M&E Specification Remedial Works Millfield lane

15 May 2009

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Mechanical heating, cooling and refrigeration

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T40 Heat pump systems

To be read with Preliminaries/ General conditions

GENERAL
Wall mounted Daikin split heat pump a/c unit to be installed at high level on the conservatory rear brick wall backing onto the bedroom with pipework, condensate and interconnecting cables and condensate drain routed via a boxed in route through the bedroom to a floor mounted external unit, generally is indicated on drawing 5813/M/1001.

Wall mounted hard wired controller mounted adjacent unit with concealed cabling from the bedroom.

Include interconnecting power and controls cabling and pipework between outdoor and indoor units.

Refer to electrical works description for power supply requirements to outdoor outdoor unit.

Note that the unit selected is rated at 9.1kW total cooling, 6.25kW sensible cooling in uk conditions.

Heat gain calculations indicate a sensible heat gain of between 6 and 14kW, depending on glazing solar characteristics and internal and external solar shading options.

Due to the extremely high solar heat gains to the very small space formed by the conservatory, it is not considered feasible or desirable to fully offset the calculated maximum heat gain as this would result in excessive cold drafts due to the volumes of circulated that would be required.

The proposed unit is intended to mitigate the discomfort caused by overheating and direct solar gains by means of partially offsetting the heatgains and circulation of cooled air.

It should be stressed that high temperatures will still occur and the effects of direct solar radiated heat onto an occupant with no shading may still cause discomfort.

Should additional cooling capacity be felt necessary or desirable to approach the potential maximum heat gain, then a second unit of similar capacity would need to be installed on the wall the the WC. The would increase the demand on the electrical supply capacity to the building and would necessitate finding a route for pipweork and cabling to a second external unit.

110 AIR SOURCE HEAT PUMP SYSTEMSConservatory cooling unit.

- System manufacturer: Daikin.
- Heat pump type: Air to air.
- Pipelines: Submit design and cost proposals.
- Pipeline ancillaries: Submit design and cost proposals.
- Pumps: n/a.
- Thermal insulation: Submit design and cost proposals.
- Outlets: Submit design and cost proposals.
- Controls: Submit design and cost proposals.
- Completion:
  - Cleaning and chemical treatment: Submit design and cost proposals.
  - Plant and equipment identification: Submit design and cost proposals.
  - Commissioning: Submit design and cost proposals.

SYSTEM PERFORMANCE

210 DESIGN

- Design: Complete the design of the heat pump system.
- Proposals: Submit drawings, technical information, calculations and manufacturers' literature.

PRODUCTS

310A AIR TO AIR HEAT PUMPSConservatory cooling

- Standards:
  - Safety and environmental: To BS EN 378-1 and -2.
  - Test requirements: To BS EN 14511-2, -3 and -4.
  - Electrical safety: To BS EN 60335-2.40.
- Type: Split system.
- Manufacturer: Daikin.
  - Product reference: FAQ100B.
- Output: 10kW Nominal Cooling, 11.2kW Nominal Heating.
- Air quantity: 0.31 to 0.38cu.m/s.
- Electrical supply type: Sinlge Phase.
- Configuration: Wall mounted.
- Compressor: Hermetic suction gas cooled - Inverter controlled.
- Refrigerant: R410A.

EXECUTION

620 INSTALLATION GENERALLY

- Standards: To BS EN 378-3 and -4.
- Fixing of equipment, components and accessories: Fix securely on purpose-made bases or supports.
- External units: Protect from high winds. Prevent snow from blocking air flow.
- Access: Provide for inspection and servicing of heat pumps and ancillary equipment.
- Refrigerant lines: Short and straight.
- Location of outdoor unit: Away from windows and adjacent buildings.

COMPLETION

910 DOCUMENTATION

- Operation and maintenance instructions: Submit.
- Record drawings: Submit.

920 MAINTENANCE

- Servicing and maintenance: Undertake.
  - Duration: Until 12 months after Practical Completion.

V
Electrical systems

V90
Electrical systems - domestic

V90 Electrical systems - domestic

To be read with Preliminaries/ General conditions.

GENERAL

ELECTRICAL SCOPE OF WORKS

The work consists of minor electrical alterations to the existing premises at 38 Millfield lane London N66JB as follows:-

NEW SPLIT A/C UNIT

1.0 Supply and install a new 32A SP&N 230V supply to serve a new external Air Conditioning Condenser, which will be be positioned just outside the Bedroom to the flat.(Final position to be agreed on site)
2.0 The new 32A supply shall be taken from the existing consumer unit which is situated in the garage.
3.0 A new 32A RCBO shall be fitted to the existng consumer unit to cater for this new load. (Assumed spare way available)
4.0 This new supply shall be routed via the garage and store room utilising 4sqmm 3core xlpe/swa 600/1000V grade cable,which should terminate onto an IP65 32A SP&N isolator suitable labelled.
5.0 The cabling between the outdoor and indoor unit will be supplied and installed by the mechanical contractor.

6.0 If the existing consumer unit has no spare ways to accept the above new circuit, then the electrical contractor shall provide an additional cost to replace this with a larger board to cater for the existing circuits and this new load.

REMEDIAL WORKS INTERNALLY

1.0 Carry out the electrical modifications as detailed in Appendix E1: SCHEDULE OF INTERNAL WORKS
2.0 The existing installation is carried out via a concealed metallic conduit installation, any modifications will deemed to be carried out in a similar manner.
3.0 All builders work will be carried out by the main contractor along with any re-decoration.
4.0 All wiring shall be concealed within the building fabric.

FULL PERIODIC TEST

1.0 Carry out a full periodic test of all the oulets,accessories and lighting points under the directive of an electrical consultant.
2.0 On the day in question the electrical consultant will walk round the premises with the testing engineer giving directives as to the outlets,points ,switches etc that will require dis-connecting for inspection.
3.0 The electrical contractor shall submit a report on the findings following these tests/inspections to high light any deficencies with the installation.
4.0 These tests shall be carried out to meet the requirements of Part 6 of BS7671:2008 IEE Wiring Regulations Seventeenth Edition.

DEFECTS

1.0 A provisional sum is included in this work package which will be used against any defects found following the above inspections/tests.

NEW LIGHTING EQUIPMENT

1.0 A provisional sum is included in this work package which will be used for the supply only of new lighting to Bedroom 2.The electrical contractor shall be deemed to include within his tender for the labour,wiring alterations and conecting up of this new array, including the testing and commisioning of same.

110A LOW VOLTAGE SUPPLY(EXISTING)

- Nature of current: Alternating.
- Phase: Single.
- Voltage: 230 V.
- Source: Local electricity distribution company.
- Metering: Direct acting type Kwh meter.
- Accessories: N/a.

130A LV SWITCHGEAR(EXISTING)

- Distribution board: 2No existing distribution boards exist,one installed in the garage and the other in a room adjacent the Pool room.

131A LV CABLING Internal Consealed

- Cable: PVC insulated nonsheathed cable.

132 CONTAINMENT Internal Consealed

- Type: Steel conduit.
- Appearance: Concealed.
- Rewirable installation: Required.

132A CONTAINMENT External

- Type: Cable tray.
- Appearance: Exposed.
- Rewirable installation: Required.

SYSTEM PERFORMANCE

210A GENERAL DESIGN

- Standards: To BS 7671 and the requirements of the electricity distributor.

280 EARTHING AND BONDING DESIGN

- Earthing, main bonding, supplementary bonding and protective conductors: In accordance with BS 7430.

PRODUCTS

310 PRODUCTS GENERALLY

- Standard: To BS 7671.
- CE Marking: Required.

330 CABLE TRAYS External

- Standard: To BS EN 61537.
- Manufacturer: Submit proposals.
  - Product reference: Submit proposals.
- Width: 100 mm.
- Material: Steel.
- Type: Flanged.
- Duty: Heavy duty.
- Finish: Hot dip galvanized in accordance with BS EN ISO 1461.
- Accessories and fittings: Factory made of the same material type, pattern, finish and thickness as cable tray.

340 CONDUIT

- Standard: To BS EN 61386-1.
- Type: Suitable for location and use.

342 STEEL CONDUIT AND FITTINGSInternal

- Standards: To BS 4568-1 or BS EN 61386-1 and BS EN 61386-21.
- Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.
- Sizes: Contractor's choice.
- Jointing: Screwed.
- Fittings: Contractor's choice.
- Finish: Hot dip galvanized inside and out.

350 STEEL TRUNKING SYSTEMS FOR WALLS AND CEILINGSWhere required

- Standards: To BS EN 50085-1 and BS EN 50085-2-1.
- Mounting: Surface
- Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.
- Sizes: Contractor's choice.
- Compartments: 1.
  - Accessories and fittings: Factory made of the same material type, finish and thickness as cable trunking.
    - Types: None.
- Finish: High protection outside and inside.

410 CABLES

- Standard: To BS 7671.
- Approval: British Approvals Service for Cables (BASEC) certified.
- Mineral insulated copper sheathed cables: To BS EN 60702-1.
  - Mineral insulated copper sheathed cable terminations: To BS EN 60702-2.
- Cable sizes not stated: Submit proposals and calculations.

420 PROTECTIVE CONDUCTORS

- Type: Cable conductors with yellow/green sheath.

430 ELECTRICAL ACCESSORIESWhere required.

- Standard: To BS 5733.
  - Switches: To BS EN 60669-1.
- Manufacturer: Submit proposals.
  - Product reference: Submit proposals.
- Finish: Submit proposals.
- Mounting: Recessed.

EXECUTION

610 ELECTRICAL INSTALLATION GENERALLY

- Standards: To BS 7671.

720 INSTALLING CABLE TRAY

- Support: Submit proposals.
- Access: Provide space encompassing cable trays to permit access for installing and maintaining cables.
- Supports and fasteners: Avoid contact between dissimilar metals. Use corrosion resistant components in locations where moisture may occur.
- Cutting: Along an unperforated line. Minimise. Make good edges. Treat surface as the tray.

740 INSTALLING STEEL CONDUIT AND FITTINGS

- Fixing: Fix securely. Fix boxes independently of conduit.
- Conduit drainage: Provide drainage outlets at lowest points.
- Location: Position vertically and horizontally in line with equipment served, and parallel with building lines. Locate where accessible.
- Jointing:
  - Number of joints: Minimize.
  - Lengths of conduit: Maximize.
  - Cut ends: Remove burrs, and plug.
  - Movement joints in structure: Manufactured expansion coupling.
  - Threaded steel conduits: Tightly screw to ensure electrical continuity, with no thread showing.
  - Conduit connections to boxes and items of equipment, other than those with threaded entries: Earthing coupling/male brass bush and protective conductor.
  - Changes of direction: _____.
- Connections to boxes, trunking, equipment and accessories: Screwed couplings, adaptors, connectors and glands: Attach rubber bushes at open ends.
- Mounting and support: Submit proposals.

800 CABLE ROUTES

- Cables generally: Conceal wherever possible.
  - Concealed cable runs to wall switches and outlets: Align vertically with the accessory.
- Exposed cable runs: Submit proposals.
  - Orientation: Straight, vertical and/ or horizontal and parallel to walls.
- Distance from other services running parallel: 150 mm minimum.
  - Heating pipes: Position cables below.

810 INSTALLING CABLES

- General: Install cables neatly and securely. Protect against accidental damage, adverse environmental conditions, mechanical stress and deleterious substances.
- Timing: Do not start internal cabling until building enclosure provides permanently dry conditions.
- Jointing: At equipment and terminal fittings only.
- Cables passing through walls: Sleeve with conduit bushed at both ends.
- Cables surrounded or covered by insulation: Derate.

820 INSTALLING ARMOURED CABLE

- Temperature: Do not start installation if cable or ambient temperature is below 0°C, or has been below 0°C during the previous 24 hours.
- Galvanized steel guards: Fit where cables are vulnerable to mechanical damage.
- Earthing: Bond armour to equipment and main earthing system.
- Connections to apparatus: Moisture proof, sealed glands and PVC shrouds.

825 INSTALLING PVC SHEATHED CABLE

- Temperature: Do not install cables if ambient temperature is below 5°C.

840 INSTALLING ELECTRICAL ACCESSORIES/ EQUIPMENT

- Location: As work schedule.
- Arrangement: Coordinate with other wall or ceiling mounted equipment.
- Positioning: Accurately and square to vertical and horizontal axes.
- Alignment: Align adjacent accessories on the same vertical or horizontal axis.
- Mounting: Recessed.
- Mounting heights (finished floor level to underside of equipment/ accessory): TBA.

845 FINAL CONNECTIONS

- Size: Determine
- Cable: Heat resisting white flex.
- Length: Allow for equipment removal and maintenance.

890 LABELLING

- Identification and notices:
  - Standards: To BS 5499-5 and BS 5378-2.
  - Equipment: Label when a voltage exceeding 230 V is present.
- Distribution boards and consumer units: Card circuit chart within a reusable clear plastic cover. Fit to the inside of each unit. Include typed information identifying the outgoing circuit references, their device rating, cable type, size, circuit location and details. Label each outgoing way corresponding to the circuit chart.
- Sub-main cables: Label at both ends with proprietary cable marker sleeves.

895 ENGRAVING

- Metal and plastic accessories: Engrave, indicating their purpose.
- Emergency lighting test key switches: Describe their function.
- Multigang light switches: Describe the luminaire arrangement.

COMPLETION

910 FINAL FIX

- Accessory faceplates, luminaires and other equipment: Fit after completion of building painting.

915 CLEANING

- Electrical equipment: Clean immediately before handover.
- Equipment not supplied but installed under the electrical works: Clean immediately before handover.

920 INSPECTION AND TESTING GENERALLY

- Standard: To BS 7671.
- Notice before commencing tests (minimum): 24 hours.
- Labels and signs: Fix securely before system is tested.
- Inspection and completion certificates: Submit.
  - Number of copies: 3.

990 DOCUMENTATION

- Timing: Submit at practical completion.
- Contents:
  - Full technical description of each system installed.
  - Manufacturers' operating and maintenance instructions for fittings and apparatus.
  - Manufacturers' guarantees and warranties.
  - As-installed drawings showing circuits and their ratings and locations of fittings and apparatus.
  - List of normal consumable items.

995 MAINTENANCE

- Servicing and maintenance: Undertake.
  - Duration: Until 12 months after Practical Completion.