

# Mechanical & Electrical Services Specification for Winfrith COB

## **SPECIFICATION FOR MECHANICAL SERVICES**

### **1.1 Scope of Design**

Develop a fully detailed design solution, compliant with current regulations, standards and good practice. It is understood that the existing incoming services to the building are adequate.

### **1.2 Ventilation**

#### **Design Parameters**

Ventilation Rates:

Office/Training Room: Heat recovery ventilation providing 4-6 air changes per hour.

Extract ventilation to be provided to tea point and new WC location to comply with Building regulation minimum requirements

Ventilation shall be provided to the area identified above to maintain comfort conditions for building occupants and to protect the fabric of the building.

#### **General**

Bulkheads, dropped ceilings and local boxings etc. will be avoided where possible.

Where ventilation ducts pass through fire compartment walls/slabs, then suitable fire protection / dampers shall be installed. Dampers built into solid construction shall be provided with HVCA installation frames.

#### **Testing and Commissioning**

Air systems shall be balanced in accordance with latest CIBSE commissioning codes and test certificates shall be provided for all ventilation systems.

All the ventilation and extract systems shall fully be tested, balanced and commissioned to meet specified design and statutory criteria.

We will demonstrate the correct operation of the ventilation systems to the user, where selected airflow spot checks will be undertaken / witnessed to ensure the systems are set up and installed correctly.

### **1.5 Domestic Water Services**

#### **Design Intent**

Mains cold water and local hot water shall be provided to all sanitary ware.

We shall ensure that adequate flow and pressure is available at all water using outlets in accordance with design criteria detailed within this specification.

The entire water installation shall conform to BS6700, latest Water Regulations and Water Company requirements.

The water services shall also be designed and installed in accordance with Health & Safety legal document ACoP L8, "Legionnaires' disease - The control of legionella bacteria in water systems" 2000 and CIBSE TM13 guidelines where applicable, to limit the risk of legionellae throughout the building.

### **System Descriptions**

The existing water service pipework to be adapted and extended to allow for the new layout.

A new electric water heater to be provided to serve the Tea Point on the first-floor level.

All connections to sanitary ware and plant etc. are to be fitted with approved shut off valves, easily accessible to isolate the water supply should a fault occur. ¼ turn lever operated ball valves should be used. Local isolation valves to be located in sensible positions so that easy future access can be gained without the need to remove or dismantle any building elements.

The use of flexible or braided type connections shall not be permitted throughout the building – all connections to sanitaryware and other plant shall be made via rigid piped connections.

All hot water outlets (except cleaners sinks) shall be provided with thermostatic blending valves to regulate outlet temperatures to 43°C, in accordance with HSE guidelines.

Protection shall either be achieved by integral TMV taps / brassware or via separate mixing valves located beneath outlets. Ensure adequate access to all blending valves is maintained, so that strainers can be cleaned / maintained.

Provision for flushing and sterilization is provided throughout the water systems, minimise 'dead legs' throughout and ensuring the systems are well insulated and cleaned internally before use to reduce legionella risks.

### **Equipment Specifications and Suppliers**

Equipment: Domestic Water Services Pipework

Supplier: BSS or equal

Type: Copper tube to BS EN 1057 R250

Fittings: Pressfit

Equipment: Pipework Ancillaries

Supplier: BSS or equal

Type Drain Cocks: screw down valve DZR

Isolation: Lever operated ball valve: Crane D171 (Provide spindle extension on insulated pipework).

Ball Service valves: Broen Ballofix, ball valve DZR

Equipment Thermostatic Blending Valves

Manufacturer Oventrop, Brawamix

Type TMV3 compliant with micro strainers and locked adjuster

### **Testing and Commissioning**

All new domestic water services systems shall be flushed, pressure tested, balanced and commissioned in accordance with the guidelines laid down in the CIBSE commissioning codes.

## **SPECIFICATION FOR ELECTRICAL SERVICES**

### **2.1 Design Development**

An outline layout of the electrical requirements is shown on drawings Q5161 702 & 702

Using this information, the Contractor is to develop the scheme into a fully detailed design solution, compliant with current regulations, standards and good practice. It is understood that the existing incoming services to the building are adequate.

### **2.2 Scope of Works**

The extent of the proposed electrical works is as detailed below;

- Strip out of existing installations where necessary – to accommodate the new WC location.
- Modification/replacement to distribution board
- Wiring and cable containment systems
- Lighting and controls including emergency lighting
- Small power including socket outlets and supplies to fixed equipment
- Electric heating to mezzanine level, drying room & WC
- Electrical supplies for mechanical services equipment
- Modifications to Fire Detection and Alarm System to meet Building Regulation requirements
- Disabled Persons Alarm to WC
- Earthing and bonding including surge protection and lightning protection systems
- Test, inspection, commissioning and demonstration of the completed works

### **2.3 Existing Services and Extent of Strip Out**

Strip out of electrical installation to existing WC location – existing fittings to be saved for re-use in new location. New circuits are to be provided to suit the new layout.

## **2.4 Electrical Distribution System**

### **System Description**

The Contractor is to satisfy himself regarding the suitability of the existing distribution and modify or replace as necessary.

### **Method of Installation**

A typed circuit connection schedule to be mounted in a wooden frame and screwed to the wall adjacent to the panel board and each distribution board. Each schedule shall identify each outgoing way and cable size, etc.

Each way on the internal label of each distribution board shall have the circuit description added in indelible ink or using a label printer.

An engraved label to be fixed on each fuse switch to indicate the distribution board reference (or item of equipment) and location of each load fed.

An electric shock poster to be fitted at each distribution position.

### **Equipment Specifications and Suppliers**

Distribution equipment to be from a single manufacturer for the project:

Equipment: Miniature Circuit Breakers

- Type: MCB's and RCBO's
- Ratings: As per contractor's design
- Cable Markers: Contractor's choice

### **Testing and Commissioning**

The complete distribution system is to be tested and commissioned in accordance with the 17th Edition of the IET Wiring Regulations 2011 and full Electrical Installation (Completion) Certificate provided.

Full Test and Completion Certificates to be provided.

## **2.5 Earthing & Bonding**

### **System Description**

We shall install a new earthing and protective bonding installation as required by the works, which shall include:

**Main Protective Bonding Conductors**

New main protective (equipotential) bonding conductors to be installed to each of the incoming main services including:

- Main heating, hot and cold water distribution pipework
- Ventilation ductwork

All extraneous conductive parts of the installation including cable tray, cable trunking, sinks, basins, waste pipes, hot and cold-water pipes, heating pipes, gas pipes, suspended ceiling grids and general items of mechanical services plant if deemed necessary to comply with the IEE Regulations.

**Circuit Protective Conductors**

Circuit protective conductors (CPC's) to be installed for every circuit.

**Testing and Commissioning**

The complete installation is to be tested and commissioned in accordance with BS7671:2008, the 17th Edition of the IEE Wiring Regulations.

Full Test and Completion Certificates to be provided.

**2.6 Wiring Systems****System Description**

Wiring systems shall generally be concealed throughout or in dado trunking. Surface wiring and / or containment will only be acceptable within the ground floor main area where surface galvanised steel cable trunking and PVC conduits to be installed.

**Concealed Wiring Installations**

Concealed wiring installations to be installed within all generally accessible areas including:

General purpose mains-voltage wiring to power and lighting systems to be carried out using twin and earth LSF/LSF insulated cables installed within ceiling voids.

Cable trays / baskets to be installed within ceiling voids for existing sub-main cabling (if required), data and ancillary services (including fire alarm, intruder alarm, access control, CCTV etc).

Conduits shall pass horizontally from the primary containment within the ceiling void and shall drop vertically, concealed in the wall finishes. Conduits for concealed mains cabling may be PVC high impact. Where wiring is concealed at a depth less than 50mm behind the wall finish it to be protected with 30mA RCBO's fitted within distribution boards (or galvanised steel conduit to be used).

For ancillary services concealed conduits to be PVC, and galvanised steel for the fire alarm.

Wiring accessories within public areas to white MK.

**Surface Wiring Installations**

Surface installations to be installed within:

- Main vehicle storage area
- Ducts and Risers

General purpose mains voltage wiring to power and lighting to be carried out using single-core LSF insulated single core cables in galvanised steel cable trunking and round plastic conduits.

Wiring accessories in these areas to be surface white plastic.

### **Fire Alarm System**

All wiring to be carried out using minimum 1.5mm<sup>2</sup> 2-core and earth red-sheathed fire-cable.

All containment and fixings associated with the fire alarm system to be metallic. Conduits to be galvanised steel throughout, including concealed and surface installations.

### **External Installations**

Wiring installations to building mounted lighting, power or alarm equipment to be routed internally through the building, with wiring passing through the outer wall directly into the rear of the equipment.

External surface installations to be water tight, with water drainage points in the bottom of boxes as may be required.

Wiring accessories installed externally to be IP56.

### **Equipment Specifications and Suppliers**

- Equipment: General Wiring
  - Manufacturer: BASEC Approved
  - Type: 624\*BH (\* indicates no of cores)
  - Description LSF insulated and sheathed flat multi-core wiring cable (twin & earth / 3-core & earth)
  - Conductor: 1.5 mm<sup>2</sup> (minimum) stranded copper
  - Grade: 600/1000v
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- Equipment: General Wiring
  - Manufacturer: BASEC Approved
  - Type: 6491B
  - Description LSF insulated single-core conduit wiring cable (singles)
  - Conductor: 1.5 mm<sup>2</sup> (minimum) stranded copper
  - Grade: 600/1000v
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- Equipment: Flexible cables – general purpose
  - Manufacturer: BASEC approved
  - Type: 318\*B (\* indicates no of cores)
  - Description: Standard HOFR flexible cords – multi-core
  - Conductor: 0.75 mm<sup>2</sup> (minimum) stranded copper

- Grade: 600/1000v
  
- Equipment: Flexible cables – high temperature applications
- Manufacturer: BASEC approved
- Type: 318\*TQ (\* indicates no of cores)
- Description: Heat resistant rubber butyl
- Conductor: 0.75 mm<sup>2</sup> (minimum) stranded copper
- Grade: 600/1000v
  
- Equipment: Flexible cables – three-phase plant, high temperature applications
- Manufacturer: BASEC approved
- Type: H07RN-F
- Description: EPR (Ethylene Propylene Rubber) insulated and PCP (Polychloroprene) sheathed
- Conductor: 2.5mm<sup>2</sup> (minimum) stranded copper
- Grade: 600/1000v Cable to BS7919
  
- Equipment: Fire alarm System Cabling
- Category: Standard
- Manufacturer: Prysmian FP200 Gold or Draka Firetuf FT30
  
- Type: Red 2-core and earth (1.5 mm<sup>2</sup> min)
- Fixings: AP saddles or FP Firefix clips
- Terminations: 251, 252 or 254 series FP LSF glands and shrouds
  
- Equipment: PVC Conduit System
- Manufacturer: MK Electric or equal and approved
- Type: Egatube high impact black PVC
- Diameter: 20mm min
  
- Equipment: Cable Trunking
- Manufacturer: Legrand or equal and approved
- Type: Class 3 hot dip zinc coated steel
- Size: 50x50 minimum
- Finishes Rounded corners with turnbuckle lid fixings
- Duty: Heavy Duty
  
- Equipment: Cable Tray
- Manufacturer: Legrand or equal and approved
- Type: Class 3 hot dip zinc coated steel
- Size: 100mm wide minimum

- Duty: Heavy-Duty return flange for sub-main cables Medium duty return flange for ancillary services
  
- Equipment: Cable Basket
- Manufacturer: Cablofil or equal and approved
- Type: Electro coated plated to EN 12 329
- Size: 100mm wide minimum
- Duty: Minimum 50mm flange
  
- Equipment: Mini Trunking
- Type: White PVC
- Compartments: YT single compartment or ZT two compartment as required
- Manufacturer: MK Ega or equal.
  
- Equipment: Wiring Accessories
- Manufacturer MK Electric or equal.

### **Testing and Commissioning**

The complete installation will be tested and commissioned in accordance with BS7671:2008, the 17th Edition of the IET Wiring Regulations.

Full Test and Completion Certificates to be provided.

## **2.5 Lighting**

### **System Description**

- The complete new lighting installation for the whole facility is to be provided follows:
- Suitably IP rated LED recessed fittings in Drying Room & WC to provide an average illumination level of 300Lux
- Suitably IP rated LED batten fittings in the Vehicle Storage Area to provide an average illumination level of 300Lux
- Suitably IP rated LED recessed fittings in the circulation spaces to provide an average illumination level of 150 Lux
- Recessed LED fittings first floor office area to provide an average illumination level of 400 Lux

### **Testing and Commissioning**

The complete installation to be tested and commissioned in accordance with BS7671:2008, the 17th Edition of the IET Wiring Regulations.

Full Test and Completion Certificates to be provided.

## Lighting Controls

### System Description

Control of lighting is generally to be by occupancy sensors, each set with a 20-minute delay timer. Manual switches are to be provided at the final exit. High bay lighting to Vehicle Storage area to be manually switched.

### Equipment Specifications and Suppliers

- Equipment: Lighting Controls
- Manufacturer: Ex-or, CP or equal and approved
  
- Equipment Lighting occupancy sensors (WC's etc)
- Manufacturer Ex-or Silver Series Light Spot with dual output relays or equal and approved
  
- Equipment: Switches
- Manufacturer MK or equivalent

### Testing and Commissioning

The electrical contractor shall commission the controls and prior to handover.

### Emergency Lighting

Provide emergency lighting to all areas required by standards including:

- escape routes, anti-panic areas, at each change of direction and at each corridor intersection
- fire alarm panels, fire alarm call points, firefighting equipment and disabled refuge positions
- mechanical services control panels and electrical distribution switchgear.
- at each exit door including door controls and panic bars
- outside each final exit door and to a place of safety
- to each flight of stairs, near a change in level
- above non-self-illuminated mandatory exit and safety signs
- inside treatment and examination rooms, first aid rooms and near each first aid post
- inside disabled WC's plus shower / WC's without borrowed light and WC's greater than 8 m<sup>2</sup>
- occupiable rooms / areas with no windows

### System Description

The emergency lighting system shall comprise of self-contained 3-hour duration emergency lighting system utilising:

- Self-contained maintained and non-maintained LED downlighters
- Self-contained maintained and non-maintained LED bulkheads
- Self-contained maintained LED exit signs
- Standard luminaires and bulkheads fitted with integral maintained battery units

Illuminated exit signs to public areas to be maintained. All exit signs to be sized in accordance with maximum viewing distances and angles.

Exit signage to be installed along all designated escape routes as required by the building's Fire Strategy document and / or by the Building Control Officer / Approved Inspector. Emergency lighting to be provided above non-illuminated exit signage where self-illuminated exit signs are not installed.

Periodic testing to be facilitated by integral non-audible self-test within each emergency luminaire.

### **Equipment Specifications and Suppliers**

- LED Panels – Kosnic W65 30W 600 x 600mm LED Panel 3000lm 6500K Daylight
- Emergency Module - Kosnic LED Panel Emergency Module - CEW03LIL/N
- Emergency bulkhead lights - Kosnic
- LED Batten Fittings (below mezzanine)– Lumin IP65 rated batten fittings
- LED High Bay fittings – Vita Energia HiPW LED
- Other fittings - Contractor's choice

### **Testing and Commissioning**

Full Test and Completion Certificates to be provided.

As part of the demonstration to the Client, the user's responsibilities regarding weekly and monthly inspections of the emergency lighting system are to be explained. These details shall also be included within the operating manual.

Undertake the first year six-monthly (bi-annual) service and maintenance visits (i.e. one six months and one twelve months after practical completion).

## **2.6 General Power and Fixed Equipment**

### **System Description**

The following to be provided in each area:

- Office/Training Room – 2No single 13A switched socket outlets for cleaning, 9No twin 13A switched socket outlets as drawn, 1No fused spur for fridge, 1No for water heater and 4No for panel heaters . Power for extract ventilation.
- Drying Room, –2No tubular heaters supplied via fused spurs. 1No fused spur for T
- WC – provide spurs for hand-drier and tubular heater.
- Vehicle Storage Area - 1No single 13A switched socket outlet for cleaning

### **13A Socket Outlets**

All socket outlets to be protected by 30mA RCBO units mounted in the distribution boards.

Socket outlets and fused connection units to be white finish

### **Equipment Specifications and Suppliers**

- Equipment: Socket outlets and fused connection units
- Manufacturer: MK Electric

### **Testing and Commissioning**

The complete installation to be tested and commissioned in accordance with BS7671:2008, the 17th Edition of the IET Wiring Regulations.

Full Test and Completion Certificates to be provided.

## **2.7 Electric Heating**

### **Design Intent**

Heating shall be provided to all areas for the comfort of all building occupants plus to provide frost protection to the fabric of the property to the following design parameters.

External Temperatures

Winter -4°C db / wb

Internal Temperatures:

Office/Training when occupied      21°C

Vehicle Storage Area:                  Ambient

The heating installations shall fully comply with latest Building Regulations Parts J and L2A 2013.

### **System Description**

Heating to be provided to Office/Training Room by Dimplex panel heaters to maintain background low level protection whilst the building is unoccupied. Control to include push button delay timers to raise temperature for periods of occupancy to the range

### **Equipment Specifications and Suppliers**

Panel Heaters: Dimplex PLX – sized to meet performance requirements

Panel Heater Control: Dimplex Push Button Delay Timer PX01001

Tubular Heater: Dimplex IPX4

Tubular Heater Cage: Dimplex to suit.

## **2.7 Fire Alarm System**

### **General**

The existing fire alarm system is to remain but be modified to suit the new arrangement to provide coverage to Category L2 as described in BS 5839 including installing additional call points and sounders as required.

### **Testing and Commissioning**

The fire alarm equipment to be fully tested in accordance with the requirements of BS 5839 and new certification issued.

The wiring installation to be tested and commissioned in accordance with the 17th Edition of the IEE Wiring Regulations 2008.

## **2.9 Disabled WC Alarm System Design Requirements**

A call system is to be installed so that calls for assistance can be made from the accessible WC.

The system is to comply with the latest regulations and standards including Part M of the Building Regulations, BS 8300: 2001, the Disability Discrimination Act, the Care Standards Act.

### **System Description**

Alarms to be initiated from a ceiling mounted pull cord adjacent to the WC . A reset unit to be wall mounted adjacent to the WC.

An over-door lamp / buzzer unit to be mounted above the door into the WC.

The system to be fed from a power supply unit with 4-hour battery backup. Input to the power supply to be from a fused connection unit adjacent.

The installation to be tested and verified after the installation works have been completed.