

See Drawing issue sheet.

T31 LOW TEMPERATURE HOT WATER HEATING

SYSTEM OBJECTIVES

1010 PERFORMANCE OBJECTIVES

To provide LTHW at the correct temperature and flow rate to serve all heat emitters, radiators, FCUs and the heater battery for the kitchen.

Heat emitters to be correctly controlled to produce design supply conditions and space temperatures.

1020 DESIGN PARAMETERS

LTHW systems will be designed and installed in accordance with the following standards and guidelines:

Recommendations as published by the Chartered Institute of Building Services Engineers

- A. CIBSE design guides, volumes A, B & C.
- B. CIBSE technical memorandums.
- C. CIBSE application guides.

System working temperature and pressure

Secondary LTHW flow temperature	60°C (max 80°C)
Secondary LTHW return temperature	40°C
System working pressure	2 bar

Internal Design Condition:	temperature in the class rooms 20°C temperature in the ground floor (naves) 20°C (during events)
External Winter Design Condition:	external temperature -1°C

1030 SYSTEM DESCRIPTION

The boilers described under work section T10 shall be controlled to provide LTHW at a temperature of 60°C into the header through which a constant flow of water is circulated by dedicated boiler integral pumps. The system is closed and is pressurised by a pressurisation unit located within the boiler room.

Secondary Heating Circuits

A dedicated radiator circuit comprising a variable volume duty/standby twin head pump and associated pipework and ancillaries shall serve each of the three zones: undercroft, crypt + Lady Chapel and North Transept circuits. All radiators will be provided with local TRV's to afford local temperature control of space temperature.

A dedicated FCU circuit comprising a variable volume duty/standby twin head pump and associated pipework and ancillaries including three port valve shall serve the fancoil units serving the ground floor (nave) and the sanctuary (choir).

Both circuits (ground floor with FCU 1 and sanctuary with FCU 2) are served by the same pump and three port valve will direct LTHW to each of the circuits.

A dedicated circuit comprising a constant single pump and associated pipework and ancillaries including three port mixing valve for supply air temperature control shall serve the heating battery for the kitchen make up air.

1040 CONTROL REQUIREMENTS

Refer to work section W60 for details of control requirements and plant interlocks.

Extended hours of use

All the heating (radiator and FCU) systems are capable of operating out of hours; this can be programmed via the BMS.

U10-12 GENERAL SUPPLY/EXTRACT (VENTILATION)

SYSTEM OBJECTIVES

1010 PERFORMANCE OBJECTIVES

To provide fresh air at the required flow rate to selected rooms in the undercroft level and provide adequate ventilation rates in toilets.

Class room shall be provided with natural ventilation via openable windows.

1020 DESIGN PARAMETERS

The flow rates will comply and be installed in accordance with the following standards and guidelines:
Approved Document Part L2 requirements for teaching & learning areas

Building Bulletin 101

Recommendations as published by the Chartered Institute of Building Services Engineers

A. CIBSE design guides, volumes A, B & C.

B. CIBSE technical memorandums.

C. CIBSE application guides.

Occupancy Densities: Refer to Architect's room data sheets.

1030 SYSTEM DESCRIPTION

Class rooms

There will be natural single sided ventilation in the class rooms at undercroft level.

External air will be provided via openable windows. In winter radiators located at the windows will provide heating to compensate the heat losses.

Mechanical extract ventilation will be provided to the following spaces: ladies and gents toilets, wheelchair accessible toilets on ground and crypt floors. A single extract fan will serve ladies and gents toilets, the fan shall operate on a time clock. The fan shall have an auto changeover facility. Make up air for the toilets will be via the crypt and the ground floor (nave) through the transfer grills over the toilets doors. The extract from toilets will be located at the northern side of the building. It will ensure 6 air changes per hour within each toilet core.

Kitchen

Make up air shall be supplied to the kitchen by a dedicated fan with a heating coil, the fan shall interlocked with the extract fan. The extract fan shall be located within the boiler room and shall be integrated with the kitchen canopy, with the air exhausted through the wall. The cooker gas supply shall be interlocked with the kitchen ventilation system. The ventilation system in the kitchen will provide 33 air changes per hour and negative pressure will be maintained by balancing supply and extract flows via supply grille and canopy damper.

Tuition, Principal and Head Teacher Rooms.

A dedicated supply fan will supply these rooms with minimum amount of fresh air (16 l/s per room). The fan shall operate under local manual on/off control.

An intake on the southern side of the building will be installed at the door recess at the tuition room.

Boiler room

The boiler room will not require fresh air delivery for combustion as room sealed condensing boilers will be installed. The air for combustion will come through the twin flue.

The existing opening on North building elevation will be equipped with adjustable louvre and will provide adequate ventilation to the boiler room in order to comply with BS 6644 requirement. The minimum opening area is 240 cm² for the high level and 240 cm² for the low level.

1040 CONTROL REQUIREMENTS

BMS Requirements:

Extract fans - Common fault

Supply fans - Common fault

High temperature in the boiler room alarm

Low temperature in the boiler room alarm

Refer to work section W60 for details of control requirements and plant interlocks.

1050 SYSTEM SCHEMATICS

See drawing issue list.

1060 SYSTEM DRAWINGS

See drawing issue list.

All external louvres will be of Architect's specification.

W60 CENTRAL CONTROL (BMS)

Control Strategy

The BMS shall be capable of being programmed with a schedule which defines how the plant is to operate throughout the year. When the calendar registers a day during which the plant is to operate the time clock will activate the normal (automatic) operation signal. The signal will commence when the time clock reaches the pre-defined start time for that item of plant or its related zone. The normal operation signal will be active until the time clock reaches the pre-defined stop time. The normal operation signal is removed until the next pre-defined start time is reached.

Description

The BMS signals two types of low temperature conditions to prevent any damage due to freezing fluid in pipes, coils etc. due to either low outside temperature.

A low outside air temperature condition will initiate the primary and secondary circuit heating pumps and control the valves to allow water to circulate fully throughout the respective systems. Valves should open to allow circulation through all emitters. Once the pumps have been started, if a temperature sensor located in the primary return water circuit of the heating circuit measures a temperature below a minimum value, the low primary heating return water temperature condition is initiated which shall enable the boilers.

Each ventilation system that incorporates water to air heating coils is also protected by a freeze protection thermostat to the coil in the inlet air path to sense the air temperature. This may be hard wired or operate through the BMS.

A

The low outside air temperature condition signal shall be activated when the outside air temperature is below a setpoint of 3°C. The signal shall be present until the outside air temperature rises above the outside temperature setpoint plus a differential of 2°C. While this signal is active the duty primary and secondary circuit heating and cooling pumps shall be started if they are not already operating. If primary and secondary heating circuit valves are not already operating they shall be opened fully to allow water to circulate throughout the respective systems providing the plant is not in an operating mode.

B

The low primary heating return water temperature condition signal shall be activated when the primary heating return water temperature is below a setpoint of 8°C. This shall enable the primary and secondary heating pumps (if not enabled due to low outside air temperature) and the heat generator. The signal shall remain present until either the return water temperature rises above a