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Code of Practice for

Centralized hot water supply —

Part 2: Buildings other than individual
dwellings

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BLCP/38- Hot water supply

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0 Introduction

0.1 A centralized hot water supply installation may include the following:

- 1) a cold water feed cistern with cold water supply connection (see CP 310);
- 2) a cold water feed pipe from feed cistern;
- 3) a feed and expansion cistern or pressurizing unit;
- 4) *a.* a boiler which may be one of the following types: solid fuel, oil fuel, gas or electric together with a hot water storage vessel; or
b. a non-storage calorifier together with a hot water storage vessel; or
c. a storage calorifier;
- 5) a supplementary heating unit;
- 6) pipework, valves, and draw-off taps;
- 7) supplementary fittings, e.g. towel rails;
- 8) circulating pumps;
- 9) thermal insulation;
- 10) automatic controls;
- 11) electrical equipment, wiring and connections.

0.2 A complete installation may involve a variety of trades, and it is in the interest of safety and good workmanship that work and services applicable to specific trades be confined to such trades.

0.3 Where the main contractor supplies the following services they should be punctually provided when called for:

- 1) hoisting facilities;
- 2) supply and erection of scaffolding and ladders;
- 3) construction of plant bases;
- 4) cutting away and making good;
- 5) carpentry and joinery;
- 6) decorating and painting;
- 7) cold water storage cistern with cold water pipes to and from the cistern, also connections to hot water draw-off points from the stopvalve (where provided) for a single fitting and from the outlet tee on the float of a range of fittings;
- 8) electrical wiring and connections;
- 9) temporary artificial lighting and cold water supply for installation purposes;
- 10) fuel, power and water for testing and for application of thermal insulation.

0.4 Centralized hot water supply installations are to comply with the byelaws of the local water undertaking.

0.5 All electrical cables and apparatus used for the installation are to be installed in accordance with the current edition of the “Regulations for the Electrical Equipment in Buildings” published by the Institution of Electrical Engineers.

0.6 All gas fired installations are to comply with the requirements of The Gas Safety Regulations, 1972.

0.7 Where applicable the requirements of the following regulations are to be observed:

- 1) The Building Regulations 1972, applicable in England and Wales except Inner London,
- 2) The Building Standards (Scotland) (Consolidation) Regulations, 1971.
- 3) The London Building Acts 1930 to 1939 and constructional by-laws in force thereunder.

Where the expression “compliance with the relevant Building Regulations” is used, it means compliance with the above regulations or any revision currently in force.

1 General

1.1 Scope

Part 2 of this Code offers guidance on the designing, planning, installation, inspection and testing of systems of hot water supply in commercial, industrial or multiple dwelling buildings supplied from a central source, including district or group schemes.

Systems for use in individual dwellings are covered in Part 1.

This Code does not deal with the installation work required for the supply of steam or high pressure hot water to calorifiers (see **3.17.2**).

Non-storage hot water supply appliances are not included in this Code. Reference should be made to CP 333 and CP 324. 202.

NOTE The titles of the British Standards referred to in this Code are listed on pages 24 and 25.

1.2 Definitions

For the purposes of this Code of Practice, the following definitions apply:

1.2.1 automatic air eliminator

a self-operating device for automatically releasing air from a water system

1.2.2 battery

the internal heating element of a calorifier comprising tubes, coils or radiator sections

1.2.3 calorifier

a heat exchanger in which water is heated by another fluid, generally at pressures in excess of atmospheric, through the medium of an internal heating element

1.2.4 combined system

a system supplying space heating and domestic hot water from a single source

1.2.5 dead leg

a length of hot water pipe leading to a draw-off point and not forming part of a circuit

1.2.6 design flow rate

the rate of water flow used in the design calculations

1.2.7 direct system

a system in which the water supplied to the draw-off points has been directly heated in the boiler

1.2.8 distributing pipe

any pipe conveying water from a storage cistern, or from a hot water apparatus supplied from a feed cistern, and under pressure from that cistern or apparatus

1.2.9 draught stabilizer

a fitting for limiting the draught in a flue to a predetermined maximum

1.2.10 fan-diluted flue system

a forced draught flue system in which the products of combustion from a gas installation are diluted, normally to a value not exceeding 1 % CO₂, with air taken preferably direct from outside

1.2.11 indirect cylinder

a hot water storage vessel in which water is stored and heated by means of an internal element through which hot water is circulated in such a manner that it does not mix with the stored water

1.2.12 indirect system

a system in which the water supplied to the draw-off points has been indirectly heated in an indirect cylinder or calorifier

1.2.13 maximum demand

the total rate of water flow when all draw-off points are in use simultaneously

1.2.14 mechanical draught

the use of a fan, usually electrically driven, to promote the movement of gases passing through the boiler and/or chimney

1.2.15 pressurizing unit

a vessel that is connected to a hot water system for accommodating increases in volumes due to expansion and/or to provide an adequate pressure

1.2.16 primary circuit

a circuit in which water circulates between a boiler or other water heater and a hot water storage vessel

1.2.17 probable demand

a rate of flow less than the maximum demand rate based on the number of draw-off points which probably may be in use simultaneously

1.2.18 secondary circuit

a circuit in which water circulates from and back to a hot water storage vessel

1.2.19 service pipe

so much of any pipe, for supplying water from a main to any premises, as is subject to water pressure from that main, or would be so subject but for the closing of some stopvalve

1.3 Exchange of information

1.3.1 At the planning stage the following matters should be agreed or determined by the installation designer, in consultation, where appropriate, with the building designer:

- 1) fuel to be used;
- 2) location and dimension of boiler house or calorifier chamber and the plant loads imposed on the structure;
- 3) location and dimension of fuel store and access;
- 4) means of ash disposal;
- 5) location and dimensions of chimney;
- 6) location of the cold water cistern, having regard to its size in relation to the maximum demand, its elevation as determining the head available, protection against frost and the weight to be supported;

- 7) location of pipe runs and the size of all main ducts and trenches;
- 8) location and sizes of holes for pipes in the building which have to be preformed, e.g. in the case of prestressed or reinforced structural members;
- 9) drainage facilities for emptying the installation;
- 10) character of water supply;
- 11) details of gas and electricity supply, including location and size of meters;
- 12) adequate provision of air for combustion and ventilation;
- 13) details of boiler house noise attenuation relative to:
 - a. the plant and equipment
 - b. the structure.

1.3.2 The installation designer should be supplied with scale drawings of the premises including plans and sectional elevations.

1.3.3 The installation designer should issue:

- 1) drawings to scale, indicating the layout of the heating unit, storage vessel, circulating pump, cold water cistern and feed pipe, pipe runs and sizes, drying coils, towel rails, draw-off points, drain points, vent pipes and meters;
- 2) a full specification of the complete system stating capacities, ratings and conditions of performance to comply with the specific requirements;
- 3) a schedule of builders' work and a set of drawings of builders' work;
- 4) electrical wiring and control diagrams.

1.3.4 The installation contractor should provide and be responsible for all drawings relating to special fabrication of pipes and, where so covered by the contract, assemblies of plant items.

1.3.5 The installation contractor should provide record drawings on which all work as installed is clearly shown and a set of operating and maintenance instructions including a list of recommended spares.

1.4 Programming

1.4.1 The installation of the hot water supply system should proceed in accordance with the general programme of operations for the construction of the entire project. The general programme should be prepared in consultation with all interested trades, as it is desirable that the installation of the hot water supply should proceed concurrently and in phase with the work of other contractors.

Before the installation contractor's work is due to commence, space for an adequate lock-up store and workshop accommodation should be provided. Racking for the storage and protection of pipes should be provided.

The installation contractor should ensure that all builder's work necessary to meet the phased progress of the work has been completed.

Priority should be given to completion of the boiler house, fuel store and plant room so as to facilitate delivery and erection of boilers, calorifiers, storage vessels, mechanical stokers and any other heavy plant. Suitable access should be provided.

On completion of the installation or sections of the installation, the system should be tested and inspected for water-tightness; thermal insulation should then be applied and a test carried out under working conditions.

2 Materials, appliances and components

2.1 British Standards

All materials, appliances and components used in the work described in this Code should comply with the requirements of the latest edition of any applicable British Standard.

Where no British Standard exists, materials and equipment should be of suitable quality and workmanship and should be open to inspection at the manufacturer's works before despatch. The detailed specification of all materials for which there is no British Standard should be available.

2.2 Boilers

2.2.1 Boilers may be classified broadly under two headings:

- 1) hot water supply boilers which are designed for the direct heating of the water actually drawn off, and
- 2) hot water supply boilers which are designed for the indirect heating of water actually drawn off.

2.2.2 The British Standards applicable to boilers are as follows:

BS 779, *Cast iron boilers for central heating and hot water supply.*

BS 855, *Welded steel boilers for central heating and hot water supply.*

Boilers fired by gas preferably should be approved by the British Gas Corporation.

2.3 Combined boiler and cylinder units

Where a combined boiler and cylinder unit is required, each of the two items comprising the unit should comply with the requirements of the appropriate British Standard.

2.4 Materials for boilers and internal treatment

The material of which the boiler is made or the protective treatment thereof should be suitable for the water supply, particularly in a direct system.

2.5 Boiler mountings

2.5.1 General. For the purpose of this Section, boiler mountings include relief valves, draining taps, thermometers, water temperature controllers, open vent pipe tappings and altitude gauges. Pending the issue of a British Standard dealing specifically with mountings for hot water boilers, this Code recommends that thermometers and relief valves should comply with the requirements for those items as set out in BS 759 or BS 779.

2.5.2 Relief valves. Boilers should be fitted with a direct acting spring loaded valve. Provision should be made for this to be mounted directly on the boiler.

2.5.3 Draining taps. Boilers should have provision for the fitting of draining taps which should comply with the requirements of BS 2879. Where provision is not made or where site conditions are such that the tap cannot be mounted directly on the boiler, it should be inserted in the lowest point of the system connected to the boiler.

2.5.4 Thermometers. Boilers should be fitted with a thermometer. Provision should be made for this to be mounted directly on the boiler preferably in a well.

2.5.5 Water temperature controls. Boilers should have provision for a water temperature controller.

2.5.6 Open vent pipes. Boilers should have a tapping for an open vent pipe.

2.5.7 Altitude gauges. Boilers should be fitted with an altitude gauge. Provision should be made for this to be mounted directly on the boiler and fitted with an isolating cock.

2.5.8 Safety controls for automatically fired and controlled boilers. Automatically fired and controlled boilers should be provided with safety controls in compliance with their respective British Standard specifications and Codes of Practice.

2.6 Flue pipes

2.6.1 The British Standards applicable to flue pipes are as follows:

BS 41, *Cast iron spigot and socket flue or smoke pipes and fittings.*

BS 567, *Asbestos cement flue pipes and fittings (light quality).*

BS 835, *Asbestos cement flue pipes and fittings, heavy quality.*

Flue pipes should be of a material and grade suitable for the fuel to be used and for the outlet temperature of the flue gases.

2.6.2 Where mild steel flue pipe is used the thickness of plate should be not less than 4.5 mm for sizes up to 300 mm diameter or the equivalent area, and not less than 6.5 mm above that size.

Joints should be of the flanged type with internal spigot.

2.6.3 Asbestos-cement flue pipes for use with gas boiler installations, where the flue diameter does not exceed 150 mm, should be in accordance with BS 567 and where the flue diameter exceeds 150 mm should be in accordance with BS 835 (see CP 337).

Asbestos-cement flue pipes are not generally suitable for use with solid fuel or for the majority of liquid fuel boilers.

2.7 Tools for cleaning and maintaining boilers

A set of tools as recommended by the manufacturer should be provided for the cleaning and maintenance of the boiler.

2.8 Calorifiers

The British Standard applicable to calorifiers is as follows:

BS 853, *Calorifiers for central heating and hot water supply.*

2.9 Calorifier mountings

2.9.1 For the purpose of this Clause, calorifier mountings include thermometers, relief valves, altitude gauges, water temperature controllers, draining taps, air release valves and open vent pipe tappings. Pending the issue of a British Standard dealing specifically with mountings for calorifiers, this Code requires that thermometers, relief valves and bursting discs should comply with the requirements for these items as set out in BS 853.

2.9.2 Calorifiers should be fitted with the following items.

- 1) A thermometer, fitted in a well, to indicate the temperature of the storage water.
- 2) A relief valve, and in addition wherever possible an open vent pipe. Where an open vent pipe cannot be fitted, protection should be provided to prevent vacuum collapse of the calorifier.
- 3) A bursting disc on a water to water calorifier where the shell is not of sufficient strength to withstand the primary pressure in the event of failure of the primary element.
- 4) A water temperature controller for steam-to-water calorifiers; also for any water-to-water calorifier where the normal working temperature of the primary water could cause a rise in temperature of the secondary water above its designed working temperature. The sensing element of the controller should be fixed clear of the internal heating element.
- 5) A draining tap on the secondary side except where it is proposed to provide a draining facility by means of a connection to a tee in the cold feed pipe immediately below the vessel.
- 6) An air release valve or open vent pipe on the primary side where air is likely to be trapped.
- 7) An altitude gauge on the secondary side.

2.10 Hot water storage vessels (other than storage calorifiers)

The British Standards applicable to hot water storage vessels are as follows:

- BS 417, *Galvanized mild steel cisterns and covers, tanks and cylinders.*
- BS 699, *Copper cylinders for domestic purposes.*
- BS 843, *Thermal-storage electric water-heaters (constructional and water requirements).*
- BS 1563, *Cast iron sectional tanks (rectangular).*
- BS 1564, *Pressed steel sectional tanks (rectangular).*
- BS 156, *Galvanized mild steel indirect cylinders, annular or saddle-back type.*
- BS 1566, *Copper indirect cylinders for domestic purposes — Part 1: Double feed indirect cylinders.*

Storage vessels should be of the grade appropriate to the working head.

2.11 Hot water storage vessel mountings

For the purpose of this Clause, mountings include thermometers and draining taps.

If a thermometer is fitted it should be of such a type and so fitted as to permit it to be readily replaced without emptying the vessel. It should be placed so as to be easily readable and at or near the mid-point of the vessel.

A draining tap should be fitted to each vessel which cannot be emptied through the boiler or calorifier, or where more than one vessel is connected to the boiler or calorifier.

2.12 Cold water feed cisterns

The British Standards applicable to cold water feed cisterns are as follows:

- BS 417, *Galvanized mild steel cisterns and covers, tanks and cylinders.*
- BS 1563, *Cast iron sectional tanks (rectangular).*
- BS 1564, *Pressed steel sectional tanks (rectangular).*
- BS 2777, *Asbestos-cement cisterns.*
- BS 4213, *Polyolefin or olefin copolymer moulded cold water storage cisterns.*

2.13 Pipes and pipe fittings

The British Standards applicable to pipes and pipe fittings are as follows:

- BS 21, *Pipe threads.*
- BS 143, *Malleable cast iron and cast copper alloy screwed pipe fittings for steam, air, water, gas and oil & BS 1256.*
- BS 864, *Capillary and compression tube fittings of copper and copper alloy — Part 2: Metric units.*
- BS 1387, *Steel tubes and tubulars suitable for screwing to BS 21 pipe threads.*
- BS 1740, *Wrought steel pipe fittings (screwed B.S.P. thread).*
- BS 2871, *Copper and copper alloys. Tubes — Part 1: Copper tubes for water, gas and sanitation.*
- BS 4127, *Light gauge stainless steel tubes.*

2.14 Electric immersion heating elements

The British Standard applicable to electric immersion heaters is as follows:

- BS 3456, *The testing and approval of household electrical appliances — Section A8. Electric immersion heaters.*