Chapter

8.6

Installation and commissioning

This chapter provides guidance for installation, insulation to services, commissioning, and handover requirements for information to be provided to the homeowner.

This chapter should be used as extended information for Chapters 8.1 to 8.5.

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Definitions

Dwellings	Self-contained units to accommodate a single household.
Primary circulation	An assembly of water fittings in which water circulates between a heat source and a primary heat exchanger inside a hot water storage vessel, including any space heating system.
Secondary circulation	An assembly of water fittings in which water circulates in supply pipes or distributing pipes of hot water storage systems.

8.6.1 Compliance

Installation and commissioning shall comply with the Technical Requirements.

8.6.2 Installation

Internal services shall not adversely affect the stability of the home and be installed to ensure satisfactory operation. Issues to be taken into account include:

1) **incoming services**
2) **concealed services**
3) **stability**
4) **locating plastic pipes**
5) **jointing of pipes**
6) **fire-stopping**
7) **notching and drilling of joints.**

8.6.2.1 Incoming services

Incoming services should:

- comply with Chapter 5.1 Substructure and ground-bearing floors where they pass through the substructure
- be protected by a sleeve, or ducted, when passing through structural elements and not solidly embedded
- not be located in the cavity of an external wall, except for electricity meter tails
- not be buried in screeds unless permitted by relevant codes of practice.

8.6.2.2 Concealed services

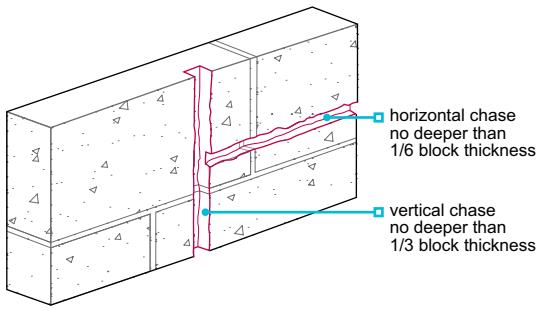
Services concealed in walls or floors should be located so that significant cracking of the surface does not occur.

Where chases in walls are necessary, their depth should not exceed:

- 1/6 thickness of the single leaf for horizontal chases
- 1/3 thickness for vertical chases.

Hollow blocks should not be chased unless specifically permitted by the manufacturer.

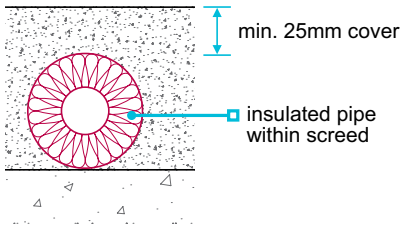
Figure 1: Vertical and horizontal chases



Where pipes are permitted in floor screeds (see Figure 2), they should:

- be protected by wrapping or ducting as required
- have adequate allowance for thermal expansion, particularly at changes of direction
- be installed to the manufacturers recommendations where underfloor heating is installed.

Figure 2: Pipes in screed



Screed cover should be a minimum of 25mm over pipes and insulating material, and:

- where pipes cross, it may be necessary to form a duct to achieve adequate cover
- for in-situ suspended concrete floors, the location and depth of pipes should be approved by the designer.

8.6.2.3 Stability

Pipes should:

- be adequately secured with suitable clips or brackets
- be installed neatly with clips spaced to prevent sagging, but not restrict thermal movement
- have adequate falls (where appropriate)
- be installed with adequate room for thermal expansion and contraction to avoid damage and noise.

8.6.2.4 Locating plastic pipes

Metallic tape should be placed behind plastic pipework, where it is concealed behind wall surfaces and would otherwise not be located by a metal detector or similar equipment.

8.6.2.5 Jointing of pipes

Joints in pipes should be made:

- strictly in accordance with the manufacturer's instructions
- using lead-free solder and flux recommended by the pipe manufacturer, with traces removed immediately after jointing.

8.6.2.6 Fire-stopping

Fire-stopping should be provided around any services which penetrate fire-resisting floors, walls or partitions in accordance with relevant Building Regulations. Where a proprietary system, such as an intumescent seal, is used, it should be installed in accordance with the manufacturer's instructions.

8.6.2.7 Notching and drilling of joists

Notching, drilling and chasing to accommodate service pipes and cables should either:

- comply with Table 1, or
- be designed by an engineer.

Solid timber and studs

Table 1: Limits for notching and drilling solid timber members

	Location	Maximum size
Notching joists up to 250mm in depth	Top edge 0.1-0.2 x span	0.15 x depth of joist
Drilling joists up to 250mm in depth	Centre line 0.25-0.4 x span	0.25 x depth of joist
Drilling studs	Centre line 0.25-0.4 x height	0.25 x depth of stud

Figure 3: Notches and holes in solid timber joists

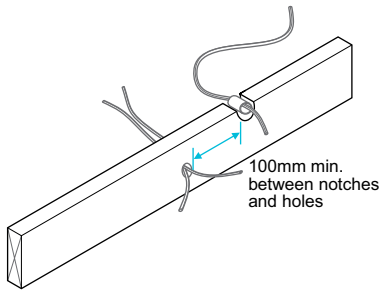
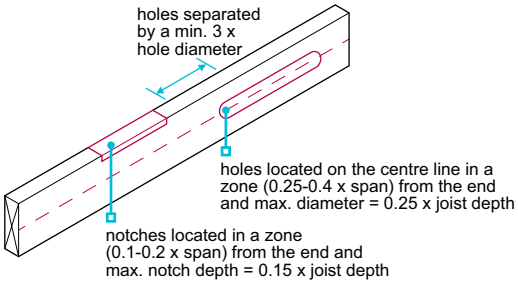


Figure 4: Notches and holes in joist's safe zones



Where the structural strength is impaired by notching or drilling, the element should be replaced or correctly repaired.

Holes should be spaced at a minimum of three times the hole diameter.

Notches and holes in the same joist should be separated by a minimum horizontal distance of 100mm.

Instructions should be obtained from the designer when notching and drilling, where:

- the joist is deeper than 250mm, or
- the dimensions are not in accordance with Table 1, or
- it is close to heavy loads, such as those from partitions, cisterns, cylinders and stair trimming.

I-joists
Preformed holes are provided, and additional holes and notches should not be cut without the approval of the manufacturer.

Metal web joists
Services should run in the gaps between the metal webs. Conduits may need to be inserted before the joists are fixed in position.

Lightweight steel
Lightweight steel should be used in accordance with Chapter 6.10 Light steel framed walls and floors.

8.6.3 Insulation to services

Also see: Clause 7.2.15

Insulation to internal services shall be in accordance with relevant Building Regulations and installed to minimise the effects of freezing, overheating or energy wastage. Issues to be taken into account include:

1) space heating and hot water
2) intermediate floors.

8.6.3.1 Space heating and hot water

Pipework serving space heating and hot water systems should:

- be insulated in accordance with relevant Building Regulations where located within the heated building envelope
- be insulated in all areas outside of the heated building envelope and meet the requirements of Clause 8.6.4.

8.6.3.2 Intermediate floors

Where pipework is installed within intermediate floors they should:

- be insulated in accordance with the relevant Building Regulations (to prevent excessive hole diameters, the insulation should only be applied between each joist)
- pipes should be wrapped where they pass through the joist so they can move freely and without noise.

8.6.4 Insulation performance

Insulation performance shall comply with relevant Building Regulations. Issues to be taken into account include:

1) thermal conductivity and pipe insulation size.

8.6.4.1 Thermal conductivity and pipe insulation size

Minimum thickness of pipework insulation for hot water services and space heating applications using high performance insulation see Table 2:

- all insulation should be designed so that the permissible heat losses in BS 5422 for hot water services at 60°C are not exceeded for the different pipe sizes
- this table relates to both plastic and metal pipes.

Table 2: Pipe insulation thickness for high emissivity (ε) outer surface = 0.90

Outside diameter of pipe on which insulation thickness is based mm	Thermal conductivity at 40°C W/mK (insulation thickness in mm)					Maximum permissible heat loss W/m
	0.025	0.03	0.035	0.04	0.045	
8	5	7	9	12	16	7.06
10	6	8	11	15	20	7.23
12	7	10	14	18	23	7.35
15	9	12	15	20	26	7.89
22	11	14	18	23	29	9.12
28	12	16	20	25	31	10.07
35	13	17	22	27	33	11.08

For low emissivity, see BS 5422. Thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range –40°C to +700°C.

8.6.5 Testing and commissioning

Services and LZC technologies shall be tested and commissioned to ensure satisfactory operation and, where appropriate, in accordance with the commissioning schedule.

Before completion and handover of the building, services should be tested and commissioned in accordance with relevant regulations and codes of practice.

The installer should check that the system is in accordance with the certification requirements, the manufacturer's recommendations and the design. Issues to be taken into account include:

- the safety of the system
- the correct installation of the system
- the correct operation of the system.

The commissioning engineer should ensure leaks or other defects are made good prior to the application of finish and handover of the home.

Upon completion, the installer should provide a certificate to confirm that the LZC technology has been installed, tested and commissioned in accordance with the above.

8.6.6 Handover requirements

Detailed information and instructions shall be provided to the homeowner.

The pack of information provided to the homeowner should include:

- user instructions for all systems installed
- contact details for all manufacturers of products used
- contact details for all installers of the products used
- key components installed
- a completed manufacturer's certificate from an acceptable independent assessment organisation, Benchmark, MCS, electrical safety or suitable alternative
- details of the fuel type and source
- maintenance and servicing requirements
- warranties and/or guarantees for appliances including LZC technology
- customer information on how to use the technologies efficiently and effectively to minimise running costs.

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