

Requirements for Pliable Corrugated Stainless-Steel Tubing (CSST) within domestic unventilated voids, ventilated risers, and intermediary floors within dwelling

(Withdrawn – January 2024)

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Scope

This guidance note covers the provision of pliable CSST in dwellings for domestic properties.

- Houses
- Apartments in multi occupancy buildings
- CSST with a secondary (dual) wrapped with outer layer acting as a gas containment cover providing ventilation

Exclusions

- The guidance does not cover buildings over 18m
- The guidance does not cover 100% Hydrogen at this point
- The guidance does not cover CSST with a separate PE or PVC outer duct or single outer layer CSST

Who should read this

Technical and construction directors and managers, architects, designers, contractors, and site managers.

Who is responsible?

People who are responsible for building work (e.g., agent, designer, builder, or installer) must ensure that the work complies with all applicable requirements of the Building Regulations. All Gas pipework must comply with the Gas Safety (Installation & Use) Regulations and be installed by an operative or business registered with a body approved by the Health and Safety Executive (HSE). Currently the Gas Safe Register.

What is dual covered CSST?

Currently proprietary pliable corrugated stainless-steel tubing on the market available in three forms and are suitable for use with natural gas and LPG

- Wrapped
- Wrapped and sold as a pipe in pipe solution
- Wrapped and covered with a secondary (dual) outer containment cover (outer cover supporting pipe with ribs and providing ventilation)
- This technical guidance is referencing the secondary (dual) wrapped with outer layer acting as a containment cover (outer cover supporting pipe with ribs and providing ventilation)
- The installation of CSST pipe with the secondary (dual) outer containment cover allows for use where standard pipes cannot be used unless run in additional ducting
- Where CSST pipes or CSST pipes with a secondary (dual) outer containment cover pass through floors or walls an additional sleeve is required to protect against building settlement (see fig 1,2 & 3)

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Building Regulation requirements

Building regulations must be complied with taking due care with areas of concern that fire precautions are not breached (shafts, lobbies corridors etc).

Gas Safety (Installation & Use) regulations (safe use of pipes including enclosed pipes)

- All Gas pipework must comply with the Gas Safety (Installation & Use) Regulations and be installed by an operative or business registered with a body approved by the Health and Safety Executive (HSE). Currently the Gas Safe Register
- No person shall install any installation pipework in any position in which it cannot be used with safety having regard to the position of other pipes, pipe supports, drains, sewers, cables conduits, and electrical apparatus and to any parts of the structure of any premises in which it is installed which might affect its safe use.
- No person shall install any part of any installation pipework in a wall or a floor or standing of solid construction unless it is so constructed and installed as to protect it against failure by the movement of the wall, the floor or the standing as the case may be.
- No person shall install any installation pipework so as to pass through a wall or a floor or standing of solid construction (whether or not it contains a cavity) from one side to the other unless: –
 - Any part of the pipe within such wall, floor or standing as the case may be takes the shortest possible route.
 - Adequate means are provided to prevent as far as reasonably practicable any escape of gas from the pipework passing through the wall, floor or standing from entering any cavity in the wall floor or standing.
- No person shall install any part of any gas installation pipework in the cavity of a cavity wall unless the pipe is to pass through the wall from one side to the other. Where any installation pipework is not itself contained in a ventilated duct, no persons shall install any installation pipework in any shaft, duct or void which is not adequately ventilated.
- No person shall install any installation pipework in a way which would impair the structure of a building or impair the fire resistance of any part of its structure.

NHBC warranty requirements (2022 Standards)

Technical Requirements

- R1 – Statutory Requirement
- R2 – Design Requirement
- R3 – Materials Requirement. – All materials, products and building systems shall be suitable for their intended purpose.

Product guidance & approvals

NHBC can only accept pliable CSST that complies with BSi Kitemark scheme PP1644 Flexible ventilated ducting for corrugated stainless-steel tubing and or the Corrugated Stainless Steel Tube Benchmark Scheme with secondary cover for use as a secondary containment, supplied under license to a testing house able to conduct testing to the standards associated in the benchmark scheme for installations involving unventilated voids and both will require

- Conformity to Corrugated Stainless Steel Tube Benchmark Standard – CSST with Secondary Cover for Use as a Secondary Containment (relevant Version)
- Conformity to PP1644 flexible ventilated ducting for corrugated stainless-steel tubing
- Independent certification of Declaration on Conformity is a requirement for accepting CSST with secondary cover for use as a secondary containment (e.g., Kitemark or DOC)
- Certification from a UKAS accredited certification body and tested in accordance with BS EN ISO 13823 & BS EN ISO 11925-2 and classified in accordance with BS EN 13501-1 and must achieve B-s1,d0 or better

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- If the ducting is intended to be fire resistant to at least the same level of fire resistance as a protected area, the fire resistance of the ducting shall be tested, evaluated and fire rated to the relevant parts of BS 476-24,
- The compatible tubing without ducting shall meet the tightness in case of fire requirements of BS EN 15266, test method BS EN 1775 Annex A Procedure A.

NHBC Standards – further guidance

- 8.1.8 Gas Service installations
- 8.1.11 Installation
- 8.1.13 Testing and commissioning
- Technical Extra 20

Requirements for pliable Corrugated Stainless-Steel Tubing (CSST)

- Risk assessment completed at design stage to identify use in any unventilated voids, areas of concern to ensure building regulations and or fire/smoke separation or safety is not impaired within the building
- Gas safety record of inspection detailing the dual layered CSST installed in an unventilated void, and the visual inspection of the outer containment cover as either intact or repaired, to include adequate tightness testing and purging
- Pipe & Fittings must comply with BS EN 15266 (see codes and reference standards at the end of the document)
- EUROCLASS Reaction to fire classification B-s1, d0 minimum
- If the ducting is intended to be fire resistant to at least the same level of fire resistance as a protected area, the fire resistance of the ducting without tubing shall be tested, evaluated and fire rated to the relevant parts of BS 476-24
- Must be possible to inspect the installation pipework prior to closing the void to confirm and repair as necessary any damage to the secondary outer pipe sleeve
- Must be adequately supported using Table 1 as reference

Table 1 maximum intervals for pipe clipping (reference standard BS 6891)

Material	Nominal Size	Interval for vertical run (m)	Interval for horizontal run (m)
CSST	DN 15	1.2	1.2
CSST	DN 20/22	1.8	1.8
CSST	DN 25/28	1.8	1.8
CSST	DN 32	2.5	2.5

- If being directly buried it must be wrapped in a factory applied cover with a minimum thickness of 0.5mm, manufactured from a non-chlorinated material of a synthetic polymer or elastomer with a total chloride content not exceeding 50ppm and colour coded (yellow for Natural Gas)
- Not repeatedly bent, therefore not directly connected to a movable appliance
- Not installed where it would be liable to mechanical damage
- Protected from sharp edges or nails penetrating the pipe
- Not installed so it will impair the structural stability, fire/smoke resistance, damp proof course, radon barrier, hazardous ground membrane or thermal or sound insulation of the building
- Not installed so that gas can enter a cavity in the event of a gas leak
- For LPG installations pipework entries to and exits from buildings shall be above ground
- Any fittings used must be compatible with the CSST used and not be buried or below ground, or used within an unventilated void

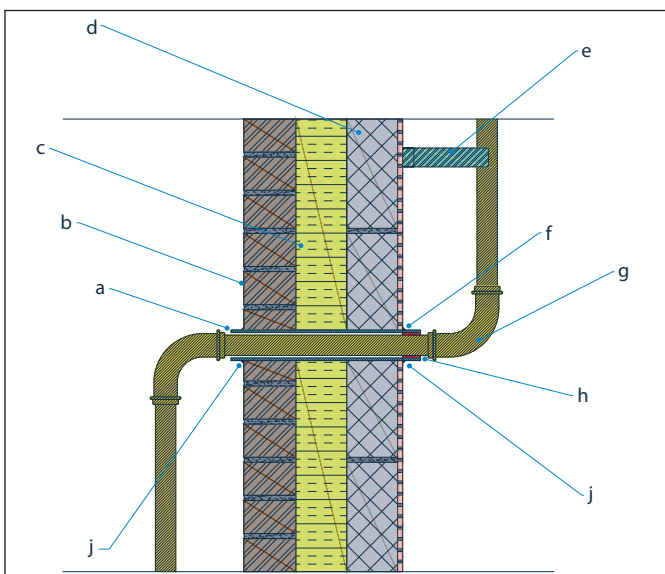
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- Not installed in a cavity
- Mixing of proprietary brands of CSST pipe is not acceptable as they utilise different connection methods
- Where torque values are detailed by the manufacturer for tightening these must be adhered to
- When connected to a gas meter within a meter box the integrity of the meter box and compartment must not be interfered with

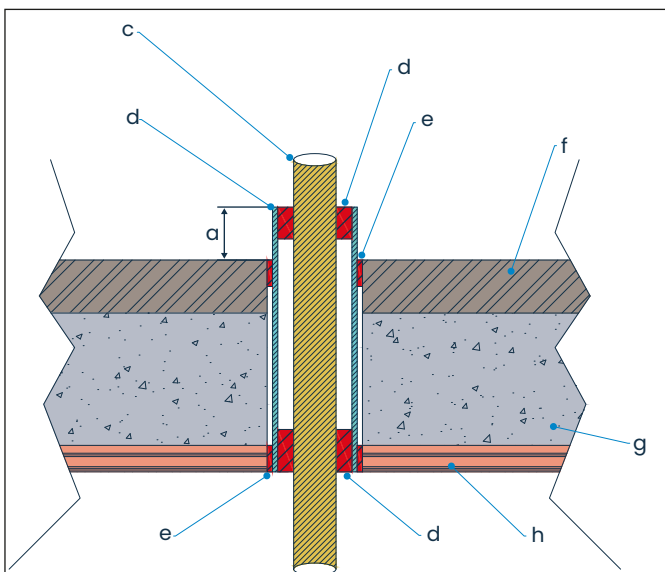
Pipes passing through walls & floors (Fig 1,2 & 3)

CSST pipes although there is a factory applied cover(s) when passing through walls or floors must be treated the same as any other gas pipework material and should be in a separate sleeve passing through the full width of the individual leaf of wall or full width of the floor.



- a. Left open to the outside
- b. Outer leaf
- c. Insulated cavity
- d. Inner leaf
- e. Pipe clip
- f. Sleeve
- g. Elbow or bend
- h. Non setting sealant between pipe and sleeve.
- i. Where it enters the building, it shall not cover joint between bend and pipe
- j. Grout

Fig 1

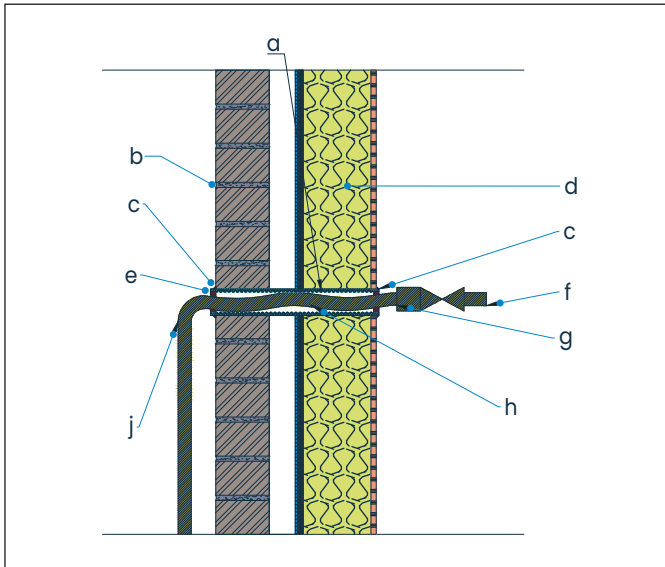


- a. 25mm
- b. Sleeve
- c. Gas pipe
- d. Non setting sealant between the gas pipe and sleeve
- e. Grout
- f. Floor finish
- g. Concrete
- h. Plaster ceiling

Fig 2

Requirements for Pliable Corrugated Stainless-Steel Tubing (CSST) within domestic unventilated voids, ventilated risers, and intermediary floors within dwelling

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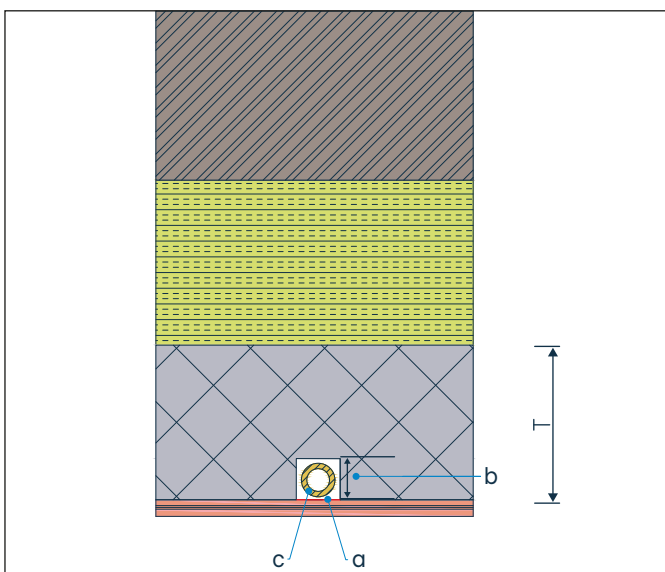
- a. Flexible pipe sleeving
- b. Masonry external wall or internal riser
- c. Sealant between sleeve and wall
- d. Insulation (within Timber frame)
- e. Flexible sealant between CSST pipe and flexible sleeve, on external side of dwelling to prevent water ingress
- f. Gas pipe
- g. Approved fitting compatible with pipe type being used
- h. CSST pipe
- i. Bend radius not to exceed manufacturer's instructions

Fig 3 – Typical method of sleeving and accommodating movement for pipework passing through a masonry/ timber-frame wall

This applies to the installation pipework for all gas types (Natural Gas, Liquefied petroleum gas or LPG/Air mix) Sleeves need to be manufactured from a corrosion resistant material which is impermeable to the gas and capable of protecting the pipe against failure caused by movement of the structure and must be continuous in length with no joints & take the shortest practicable route.

Typical method of running CSST pipe within construction types (Fig 4,5 & 6)

- CSST must be protected from the damage from nails, screws or fixings, this can be achieved by ensuring the supported pipework is at least 50mm from the decorative front face of the plasterboard, or where this is not possible a 1mm steel plate protecting the pipe



- a. Steel plate to 1mm thick if required
- b. Depth of chase
- c. Pipework set into chase in plastered wall

Maximum depth of chase

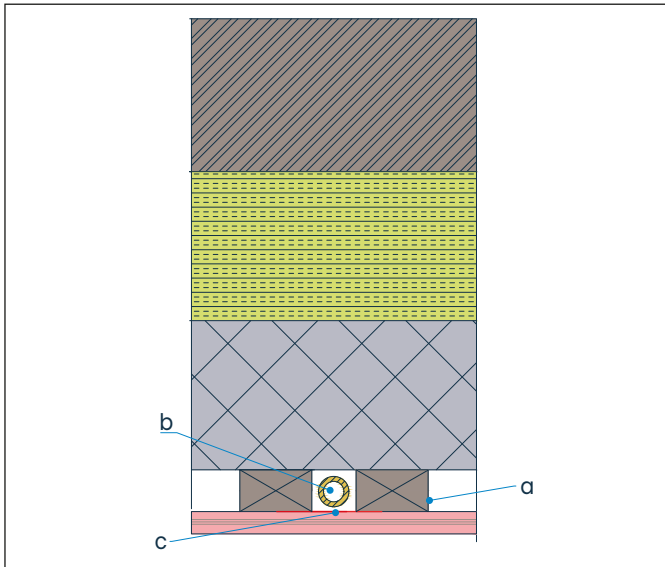
T/6 horizontal

T/3 vertical

Fig 4 – Masonry brick and block plastered

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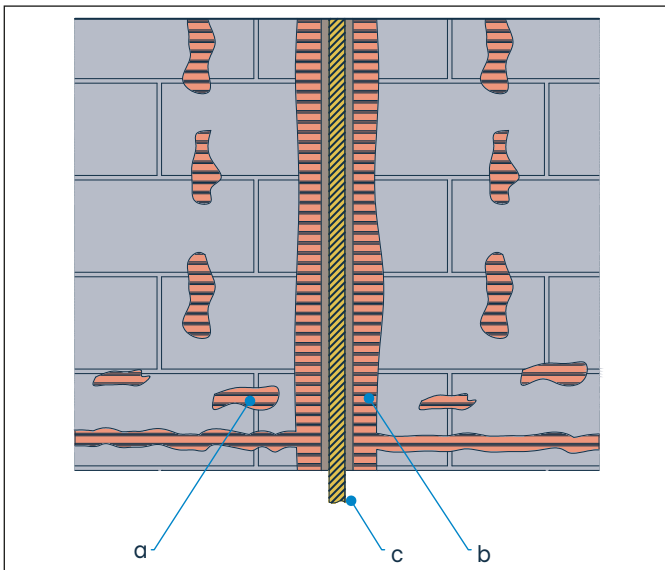


CSST pipes installed behind dry lining shall be encased by building material

- a. Continuous timber battens
- b. Gas pipework
- c. Steel plate to 1mm thick

Note the joints between the wall and the studs must be sealed with a suitable mastic to avoid gas tracking around the wooden studs.

Fig 5 – Dry lined walls on batons



CSST pipes installed behind dry lining shall be encased by building material

- a. Individual adhesive dabs
- b. Continuous adhesive dabs surround gas pipe
- c. Gas pipe

Fig 6 – Dry lined walls on dabs

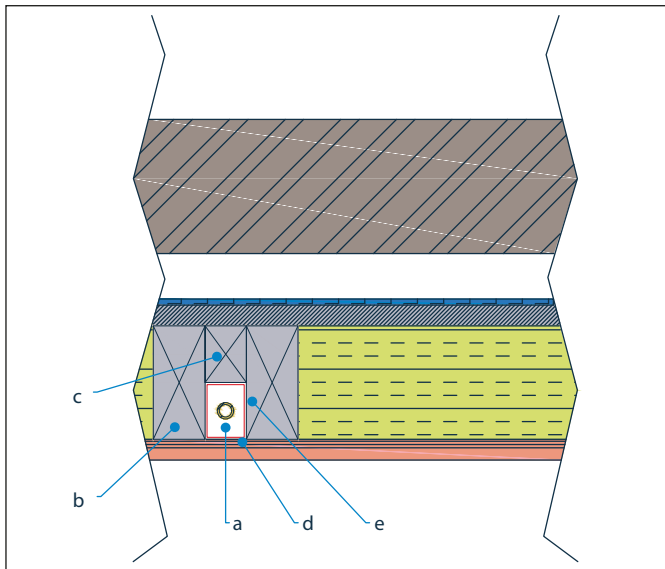
Timber-Frame & light steel framed walls (Fig 7 & 8)

- CSST pipes although there is a factory applied cover(s) when passing through timber-frame & light steel frame walls must be treated the same as any other gas pipework material and should be in a separate sleeve passing through the full width of the wall
- Any CSST pipe installed within the walls of a timber-frame or light steel frame wall must be in purpose designed channels
- CSST must be protected from the damage from nails, screws or fixings, this can be achieved by ensuring the supported pipework is at least 50mm from the decorative front face of the plasterboard, or where this is not possible a 1mm steel plate protecting the pipe

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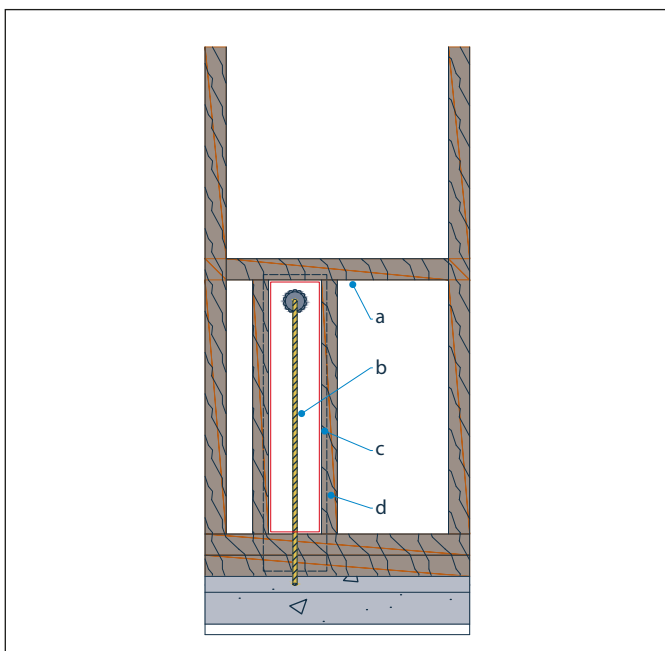
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- Where a gas supply point is to be positioned on a separating or compartment (party) wall the pipework needs to rise in front of the finished plasterboard face
- This is not a comprehensive list and the Gas Safe registered installer must comply with BS6891 and or IGEN UP7



- a. Gas pipework
- b. Timber stud
- c. Timber stud blocking piece
- d. Steel plate to 1mm thick
- e. Joints sealed with suitable mastic to avoid escaping gas tracking around wooden struts

Fig 7 – Timber-frame or light steel construction wall



- a. Timber stud
- b. Gas pipe
- c. Steel plate to 1mm thick
- d. Joints sealed with suitable mastic to avoid escaping gas tracking around wooden struts

Fig 8 – Installed in a timber-frame or light steel construction wall

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Codes & reference standards

BS EN 15266 (Product Standard) – Stainless Steel pliable corrugated tubing kits in buildings for gas with an operating pressure up to 0.5bar.

BS 476-24 – Fire tests on building materials and structures, methods for determination of the fire resistance of ventilation ducts

BS EN 1775 – Gas supply pipework for buildings

BS 7838 (Product Standard now withdrawn) replaced by **BS EN 15266**.

BS EN 13501-1 Fire classification of construction products and building elements (Part 1) classification using data from reaction to fire tests.

BS EN ISO 11925-2 Reaction to fire tests, Ignitability of products subject to direct impingement of flame. Single flame source test.

BS EN 13823 Reaction to fire tests for building products excluding flooring exposed to thermal attack by a single burning item.

BS6891 (Installation) – Specification for the installation and maintenance of low-pressure gas installation up to 35mm (R1/4) on premises.

CSA Group standard CSA/ANSI LC1 Fuel gas piping systems using corrugated stainless-steel tubing

BS 8313 Code of practice for accommodation of building services in ducts.

Bsi PP1644 – Flexible ventilated ducting for CSST

IGEM/UP/2 Installation pipework on industrial and commercial premises

IGEM/UP/7 Gas installations in timber framed and light steel framed buildings.

IGEM/G/5 Gas in multi occupancy buildings.

UKLPG COP22 Design, Installation and Testing of LPG piping Systems.



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