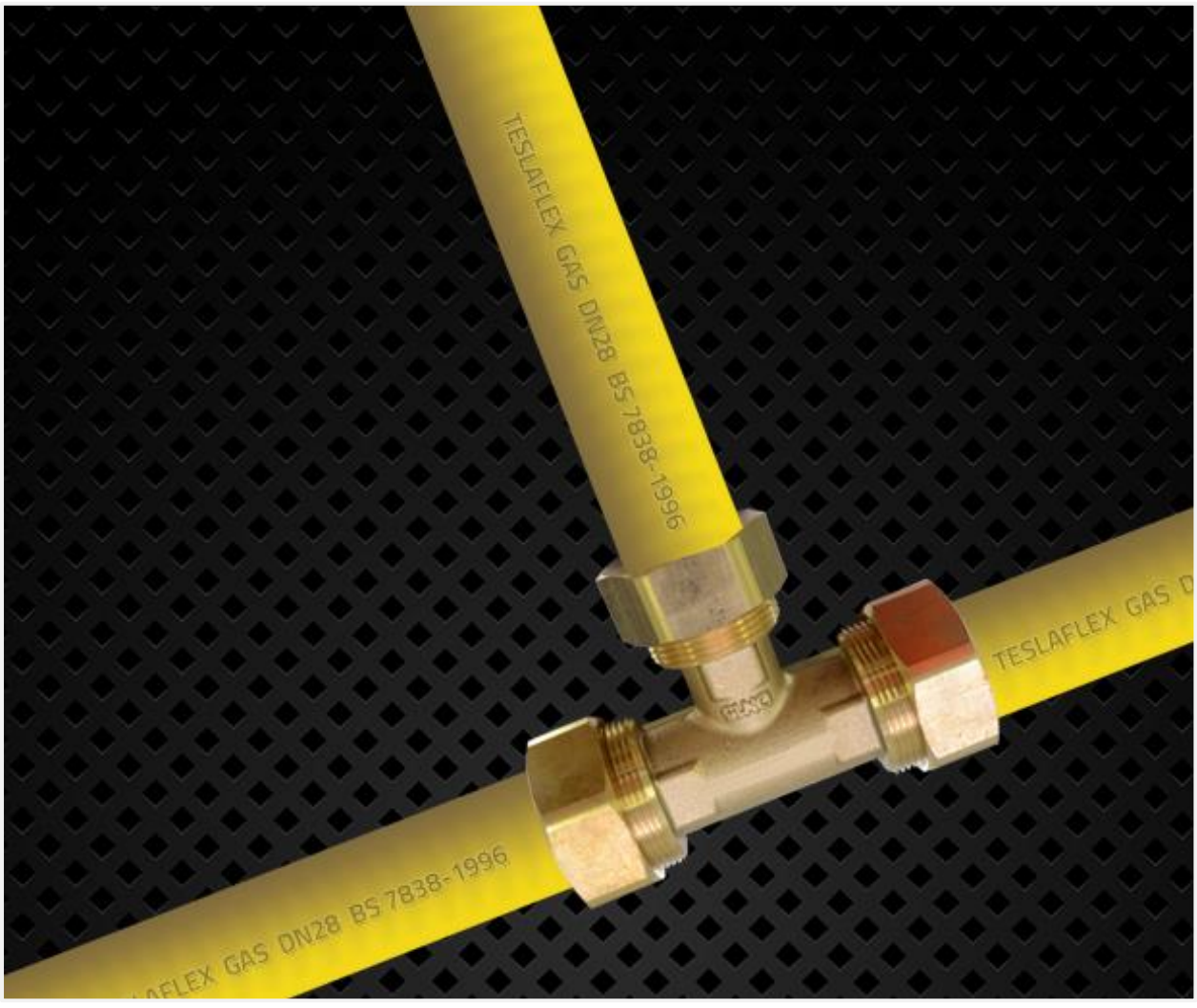
TESLAFLEX

RELIABLE I AFFORDABLE I COMPLIANT

Tesla UK
LIMITED

Design and Installation Guide



User Warnings

• All gas installation work shall be carried out by a business or self-employed operative who is a member of a class of persons approved by the Health and Safety Executive (HSE). Current registration body is Gas Safe Register.

• TeslaFlex shall be installed as per the manufacturer's installation instructions

• Only items approved for TeslaFlex CSST are to be used in the installation. TeslaFlex products are not compatible with other manufacturer's gas tubing systems. The mixing of products from other manufacturer's systems may result in failure of the system with possibly serious consequences. Improper installation or use may result in accidents such as explosions or asphyxiation etc.

• Ensure that where there is responsibility for design work, the installation is correctly sized and meets the appropriate Building Regulations, British Standards and the Gas Safety (Installation and Use) Regulations 1998.

• No naked flame shall be used within the area of TeslaFlex CSST.

• It is the Users/Installers responsibility to ensure that the necessary personal protective clothing is worn when installing TeslaFlex and care should be taken to avoid any possibility of injury when handling TeslaFlex.

• Ensure the TeslaFlex system is correctly bonded and grounded.

• Refer to the manufacturer's helpline where assistance is needed.

Within the UK the system must be installed with the relevant UK Installation Standards

• BS6891- Installation of low pressure gas pipework of up to 35mm R 1 ¼" in domestic premises.

• BS5482- Code of Practice for domestic butane and propane gas burning installations Part1: Installations at permanent dwellings, residential and commercial premises, with installation pipework sizes not exceeding DN25 for steel and DN28 for corrugated stainless steel or copper.

• IGEM/UP/2 – The Installation of Gas Engineers and Managers Communication - Installation pipework on industrial and commercial premises.

For further installation guidance see Gas Safe Technical Bulletin 120.

Contents

1. References

BS7838 = Specification for corrugated stainless steel semi-rigid pipe and associated fittings for low pressure gas pipework of up to DN50

BS EN 15266 = Stainless steel pliable corrugated tubing kits in buildings for gas with an operating pressure up to 0.5 bar

BS5482 = Code of practice for domestic butane and propane-gas burning installations Part1 : Installations at permanent dwellings, residential park homes and commercial premises, with installation tubing sizes not exceeding DN25 for steel and DN28 for corrugated stainless steel or copper

BS6891 = Specification for the installation and maintenance of low pressure gas installation pipework of up to 35mm (R11/4) on premises

BS8313 = Code of practice for accommodation of building services in ducts

BS EN 1254 = Copper and coper alloys – Plumbing fittings

IGE/UP/1A = Strength testing, tightness testing and direct purging of small, low pressure industrial and commercial Natural Gas installations

IGEM/UP/2 Edition 2 = The Institution of Gas Engineers and Mangers Communication – Installation pipework on industrial and commercial premises

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

IGEM/UP/11 = Gas installations for educational establishments

IGEM/G/5 = Gas in multi-occupancy buildings

UKLPG COP22 = Design, installation and Testing of LPG Piping Systems

Technical Bulletin 120 = Installation guidance (from Gas Safe) (formerly TB227)

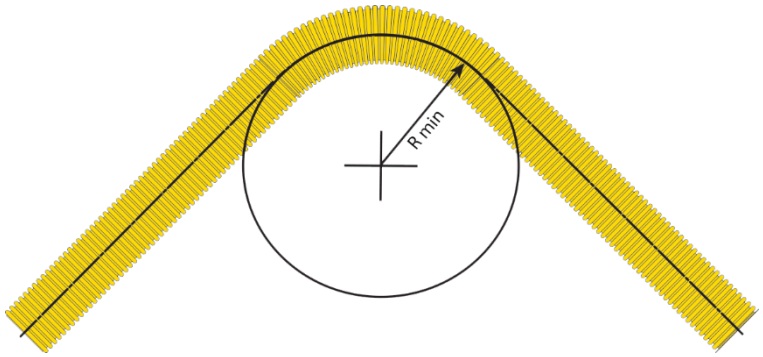
**The competent installer using the TeslaFlex system should consult any relevant standard for work they are carrying out.

2. The TeslaFlex System & Components

TESLAFLEX CORRUGATED STAINLESS STEEL PLIABLE TUBING

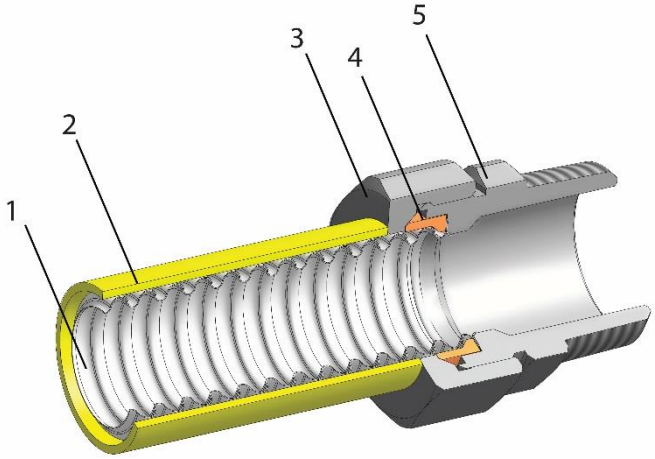
Material: 304 Stainless Steel
Cover: Flame retardant Polyethylene coating to BS 7838

DN	Internal Diameter (D1)	External Diameter (D2)	Wall Thickness (t)	Coating Thickness (Ct)	Tolerance (+/-)	Minimum Bending Radius
Size	**mm**	**mm**	**mm**	**mm**		**mm**
DN12	11.8	15.8	0.2	0.8-1	0.20	15
DN15	15.5	20.3	0.2	0.8-1	0.20	20
DN22	20.7	26.45	0.22	1-1.2	0.30	25
DN28	25.2	31.7	0.20	1-1.3	0.30	30
DN32	33.2	39.7	0.22	1-1.3	0.30	40



Available sizes					
DN	DN12	DN15	DN22	DN28	DN32
Tube Size (inches)	3/8”	1/2”	3/4”	1”	1.1/4”
BSPT Thread	3/8”	1/2”	3/4”	1”	1.1/4”

1.
2.
3.
4. Split ring
5.



Corrugated Stainless Steel Pliable Tubing (CSST)

Part Code	DN Size	Length (m)	Weight (Kg)
TIF1210BS	DN12	10	3
TIF1230BS	DN12	30	6
TIF1275BS	DN12	75	19
TIF3410BS	DN15	10	3
TIF3430BS	DN15	30	7
TIF3475BS	DN15	75	20
TIF0110BS	DN22	10	3.5
TIF0130BS	DN22	30	9
TIF0175BS	DN22	75	33
TIF11410BS	DN28	10	4
TIF11430BS	DN28	30	12
TIF11475BS	DN28	75	35
TIF1121BS	DN32	10	
TIF11230BS	DN32	30	
TIF11275BS	DN32	75	

*Note: 75m lengths are supplied on bobbins

INSTALLER KIT (CSST/TWO MALE FITTINGS/INSTRUCTIONS)

Part Code	DN Size	Length (m)	Weight (Kg)
TFX1210KIT	DN12	10m	
TFX3410KIT	DN15	10m	
TFX0110KIT	DN22	10m	
TFX11410KIT	DN28	10m	
TFX11210KIT	DN32	10m	

TESLAFLEX MALE ADAPTORS

Material:
Body, Nut, Split Ring: Brass

Male Adaptors

Part Code	Description
TFXM1212	DN12 x 3/8” Male Adaptor
TFXM1512	DN15 x 1/2" Male Adaptor
TFXM2034	DN22 x 3/4” Male Adaptor
TFXM251	DN28 x 1” Male Adaptor
TFXM32114	DN32 x 1.1/4” Male Adaptor

TESLAFLEX FEMALE ADAPTORS

Material:
Body, Nut, Split Ring: Brass

Female Adaptors

Part Code	Description
TFX1212	DN12 x 3/8” Female Adaptor
TFX1512	DN15 x 1/2" Female Adaptor
TFX2034	DN22 x 3/4” Female Adaptor
TFX251	DN28 x 1” Female Adaptor
TFX32114	DN32 x 1.1/4” Female Adaptor

TESLAFLEX COMPRESSION ADAPTORS

Material:
Body, Nut, Split Ring: Brass

Compression Adaptors

Part Code	Description
TFX1215C	DN12 x 15mm Compression Adaptor
TFX1515C	DN15 x 15mm Compression Adaptor
TFX1522C	DN15 x 22mm Compression Adaptor
TFX2022C	DN22 x 22mm Compression Adaptor
TFX2522C	DN28 x 22mm Compression Adaptor
TFX2828C	DN28 x 28mm Compression Adaptor
TFX3235C	DN32 x 35mm Compression Adaptor

TESLAFLEX COUPLERS

Material:
Body, Nut, Split Ring: Brass

Couplers

Part Code	Description
TFXC12	DN12 Coupler
TFXC15	DN15 Coupler
TFXC20	DN22 Coupler
TFXC25	DN28 Coupler

TESLAFLEX TEES

Material:
Body, Nut, Split Ring: Brass

Tees

Part Code	'A' Size	'B' Size	'C' Size
TFXT201515	DN22	DN15	DN15
TFXT201520	DN22	DN22	DN15
TFXT20	DN22	DN22	DN22
TFXT252020	DN28	DN22	DN22
TFXT252520	DN28	DN22	DN28
TFXT25	DN28	DN28	DN28

TESLAFLEX SPLIT RINGS

Material:
Body, Nut, Split Ring: Brass

Split Rings

Part Code	Description
TFXCR12	DN12 Split Ring
TFXCR15	DN15 Split Ring
TFXCR20	DN22 Split Ring
TFXCR25	DN28 Split Ring
TFXCR32	DN32 Split Ring

TESLAFLEX TAPE.

Material:
Body, Nut, Split Ring: Brass

Couplers

Part Code	Description
TIFTAPE	Self-amalgamating tape yellow 25mm x 3m

3. Assembly of fittings

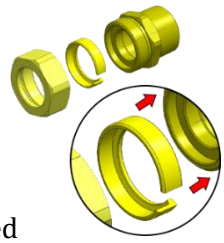
3.1 Cut pipe to length

Cut the TeslaFlex tubing using a suitable pipe cutter, ensuring the cut is centred in the valley between corrugations, and the cutter is only slightly tightened on each full revolution around the tube. The cut should be clean with no sharp metal edges.

3.2 Remove cover

Using a utility knife or suitable stripper, safely remove about 40mm of PVC cover to allow the assembly of fittings.

3.3 Place fittings



Slide the back nut over the cut end; place the split ring into the first corrugation ensuring the fitting has been assembled in accordance to figure 1.

3.4 Tighten

Tighten the nut and fitting using two suitable sized wrenches. The seal is formed when the last corrugation deforms around the copper seat inside the fitting. Make sure that sufficient torque is applied.

3.5 Tape

Once a gas tightness test has been performed, cover up the hose corrugations with the TeslaFlex tape before installing to protect the hose against possible corrosion.

3.6 Jointing compound

Jointing compound must not be used on the internal sealing components of the TeslaFlex fitting. These components are designed for metal-to-metal sealing without the aid of jointing paste. The usage of jointing compound can interfere with proper fit up and cause leakage.

When jointing paste is used it should only be applied to the external pipe threads and any excess paste should be removed on completion of the joint. Jointing compound should not be used in conjunction with PTFE tape.
PTFE tape should be wound with a 50% overlap starting from the thread runout in a direction counter to the thread form.

4. General

4.1 Where pipe work is liable to any type of damage, it shall be physically protected.

4.2 While installation is taking place, precautions shall be taken to prevent the ingress of dirt, water, etc., into the pipework.

4.3 The bore of TeslaFlex shall not be restricted by kinks, burrs, foreign matter or in any other way.

4.4 TeslaFlex shall be installed so as not to impair the structural stability, fire resistance, damp-proof course, or thermal and sound insulation of the building.

4.5 TeslaFlex shall be situated such that, in the event of a gas escape, gas is not capable of entering cavities.

4.6 TeslaFlex shall not be installed in any location where, if there is a requirement to gain access to the pipe in the future, this could affect the structural stability of the building.

4.7 For LPG installations, pipework entries to, and exits from buildings shall always be above ground.

4.8 No TeslaFlex fittings shall be buried in the structure or below ground.

4.9 TeslaFlex tubing may be directly buried externally underground providing minimal burial depths are applied.

4.10 When unwinding the coils, care should be taken not to kink, tangle or apply excessive force.

5. Pipe Sizing

5.1 When designing an installation, the sizes of all installation pipework should ensure the gas is at a suitable pressure at the inlet of any connected gas appliance to ensure that it meets the required appliance heat input. Where any sections of the pipework supply gas to multiple appliances, the heat input of all appliances fed by that section of pipework needs to be considered.

5.2 The design maximum pressure loss for all pipework must not exceed that specified in clause 5.5 or clause 5.6 in the following circumstances.

- New installations
- Pipework modification or extension to existing installations
- Before any new appliance is fitted to a new or existing installation
- Increasing any appliance heat input

5.3 For range-rated appliances, the installer must use the maximum heat input to ensure the pipework is sized correctly.

5.4 For variable-rated appliances, the installer must establish the heat input necessary to meet the requirements of the system and shall use this value to ensure the pipework is sized correctly

5.5 For natural gas at 21mbar the maximum design pressure drop between the outlet of the meter and any connected appliance should not exceed 1mbr at design installation flow conditions.

5.6 For Low pressure 3rd family gas supplies should be regulated at 37mbar (propane) or 28mbr (butane) with a maximum design pressure drop not exceeding 2mbar from the outlet of the primary meter installation, or where no meter is installed, the outlet of the Emergency Control Valve or the outlet of the final stage regulator when fitted the Emergency Control Valve and the point to be connected on any appliance.

Equivalent length of pipe (in meters) to be added to pipe run for additional 90-degree bends and tees.

TeslaFlex Size DN	90 Degree bend meters	Tee meters
12	0.3	0.5
15	0.3	0.5
22	0.3	0.5
28	0.3	0.5
32	0.5	1

See below for the natural gas discharge rates through straight horizontal TeslaFlex CSST with a 1 mbar differential pressure between the ends.

Medium: Natural Gas
Pressure drop: 1mbar
Inlet pressure: 21mbar
Specific gravity: 0.6

Discharge (m3/h) in a straight horizontal TeslaFlex CSST with a 1 mbar differential pressure between the ends for NATURAL GAS of specific gravity 0.6

Tubing Size	Tubing Length (m)																	
	1	2	3	4	5	6	7	8	9	10	12	14	15	16	18	20	22	24
DN12	2.4	1.6	1.2	1.1	1.0	0.9	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4
DN15	4.8	3.1	2.4	2.0	1.7	1.6	1.4	1.3	1.2	1.1	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.6
DN22	9.1	6.7	5.6	4.9	4.4	4.1	3.8	3.6	3.4	3.2	3.0	2.8	2.7	2.6	2.5	2.4	2.3	2.2
DN28	19.8	13.7	11.1	9.5	8.5	7.7	7.1	6.6	6.2	5.9	5.3	4.9	4.8	4.6	4.3	4.1	3.9	3.7
DN32	28.5	20.6	17.0	14.9	13.4	12.3	11.4	10.7	10.2	9.7	8.9	8.3	8.0	7.7	7.3	7.0	6.7	6.4

Tubing Size	Tubing Length (m)																	
	25	26	28	30	32	34	35	36	38	40	45	50	60	70	75	80	90	100
DN12	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.23
DN15	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3
DN22	2.2	2.1	2.1	2	1.9	1.9	1.9	1.8	1.8	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.2
DN28	3.6	3.6	3.4	3.3	3.2	3.1	3.0	3.0	2.9	2.8	2.7	2.5	2.3	2.1	2.0	2.0	1.9	1.8
DN32	6.3	6.2	6.0	5.8	5.6	5.4	5.4	5.3	5.2	5.0	4.8	4.5	4.2	3.9	3.7	3.6	3.4	3.3

See below for the natural gas discharge rates through straight horizontal TeslaFlex CSST with a 2.5 mbar differential pressure between the ends.

Medium: Propane
Pressure drop: 2.5 mbar
Inlet pressure: 37mbar
Specific gravity: 1.52

Discharge (m3/h) in a straight horizontal TeslaFlex CSST with a 2.5 mbar differential pressure between the ends for Propane of specific gravity 1.52.

Tubing Size	Tubing Length (m)																	
	1	2	3	4	5	6	7	8	9	10	12	14	15	16	18	20	22	24
DN12			1.0			0.7			0.6		0.5		0.5			0.4		
DN15	4.1	2.9	2.4	2	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	1.0	0.9	0.9	0.8
DN22	7.5	5.4	4.5	4.0	3.6	3.3	3.1	2.9	2.7	2.6	2.4	2.2	2.2	2.1	2	1.9	1.8	1.7
DN28	17.6	12.6	10.4	9.0	8.1	7.4	6.8	6.5	6.1	5.8	5.3	5.0	4.8	4.6	4.4	4.2	4.0	3.8
DN32	26.8	20.6	15.6	13.6	13.4	11.1	10.3	9.7	9.1	8.7	7.9	7.4	7.1	6.9	6.5	6.2	5.9	5.6

Tubing Size	Tubing Length (m)																	
	25	**26**	**28**	**30**	**32**	**34**	**35**	**36**	**38**	**40**	**45**	**50**	**60**	**70**	**75**	**80**	**90**	**100**
DN12	0.4			0.4						0.3		0.3	0.2	0.2		0.2	0.2	0.2
DN15	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4
DN22	1.7	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.2	1.1	1.1	1.0	1.0	0.9	0.8
DN28	3.7	3.7	3.6	3.4	3.3	3.2	3.2	3.1	3.1	3.0	2.8	2.7	2.5	2.3	2.2	2.1	2.0	1.9
DN32	5.5	5.4	5.2	5.1	4.9	4.8	4.7	4.6	4.5	4.4	4.1	3.9	3.6	3.3	3.2	3.1	3.0	2.8

See below for the natural gas discharge rates through straight horizontal TeslaFlex CSST with a 2.5 mbar differential pressure between the ends.

Medium: Butane
Pressure drop: 2.5 mbar
Inlet pressure: 28 mbar
Specific gravity: 2.07

Discharge (m3/h) in a straight horizontal Teslaflex CSST with a 2.5 mbar differential pressure between the ends for Butane of specific gravity 2.07

Tubing Size	**Tubing Length (m)**																	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**14**	**15**	**16**	**18**	**20**	**22**	**24**
DN12			0.9	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.36
DN15	3.5	2.5	2.0	1.8	1.6	1.4	1.3	1.2	1.2	1.1	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.7
DN22	6.4	4.7	3.9	3.4	3.1	2.8	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.8	1.7	1.6	1.5	1.5
DN28	15.1	10.8	8.9	7.8	7.0	6.4	5.9	5.6	5.2	5.0	4.6	4.2	4.1	4.0	3.8	3.6	3.4	3.3
DN32	23.4	16.4	13.4	11.6	10.4	9.5	8.9	8.3	7.8	7.4	6.8	6.3	6.1	5.9	5.6	5.3	5.0	4.8

Tubing Size	**Tubing Length (m)**																	
	25	**26**	**28**	**30**	**32**	**34**	**35**	**36**	**38**	**40**	**45**	**50**	**60**	**70**	**75**	**80**	**90**	**100**
DN12	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3		0.2	0.2	0.2	0.2	0.2	0.2	0.1
DN15	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
DN22	1.5	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.0	0.9	0.9	0.9	0.8	0.8
DN28	3.2	3.2	3.0	2.9	2.9	2.8	2.7	2.7	2.6	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.6
DN32	4.7	4.7	4.5	4.3	4.2	4.1	4.0	4.0	3.8	3.8	3.6	3.4	3.1	2.9	2.8	2.7	2.5	2.4

6. Safety Precautions

6.1. Prior to any work being undertaken on the pipework a risk assessment shall be carried out. This shall include:

- risks involved in working on installations that contain fuel gas; and
- stray electrical currents.

6.2 Suitable precautions shall be taken to determine the possibility of stray electrical voltage being present.

6.3 All open ends of the pipework shall be sealed with an appropriate fitting before any work is left unattended.

6.4 Where pipes are already connected to the meter either, the meter shall be temporarily disconnected and both the ends of the pipework sealed and dust caps fitted to the meter or all open ends of the pipework shall be plugged, capped or terminated with a self-sealing appliances connector conforming to BS 669:pt1, or BS 669:pt2 or BS EN15069 as appropriate, before the work is left unattended.

6.5 Installers also need to consider the risk of persons restoring the gas supply at the primary meter should they leave the general location where the work is in progress.

6.5.1 Please note: These safety precautions might reduce the risk of any gas being inadvertently ignited and constituting a danger. Where it is considered that, even when having taken these measures there could still be a risk of gas igniting, the gas operative may choose to purge the installation of any gas. Additional guidance on purging installations of any gas (decommissioning) can be found in IGEM/UP/1, IGEM/UP/1A and IGEM/UP1B.

6.6 Naked flames shall be kept away from open ends of any gas pipework.

For further information regarding “safety precautions” please consult BS 6891:2015

7. Fire Protection

6.1. For buildings containing flats and/or maisonettes, TeslaFlex shall be fire-stopped as it passes from one floor to another, unless it is installed in its own protected shaft that is ventilated top and bottom to outside air. When TeslaFlex from a protected shaft enters a flat or maisonette, it shall be fire-stopped at the point of entry. Please see images for, a typical pipework in multi-storey buildings containing flats or maisonettes.

6.2 Any material that is used as a fire stop, should the tested in accordance with BS 476 and be able to resist fire periods that are in line with that required for the structure.

6.3 Any sleeve shall not impair the structural stability, fire resistance, or thermal and sound insulation of a building. The annular space between the pipework and the sleeve shall be sealed at one end to the pipework with a flexible fire-restart compound.

6.4 The TeslaFlex cover is extruded form fire retardant Polyethylene

Figure 3 **Typical pipework in multi-story buildings containing flats or maisonettes**

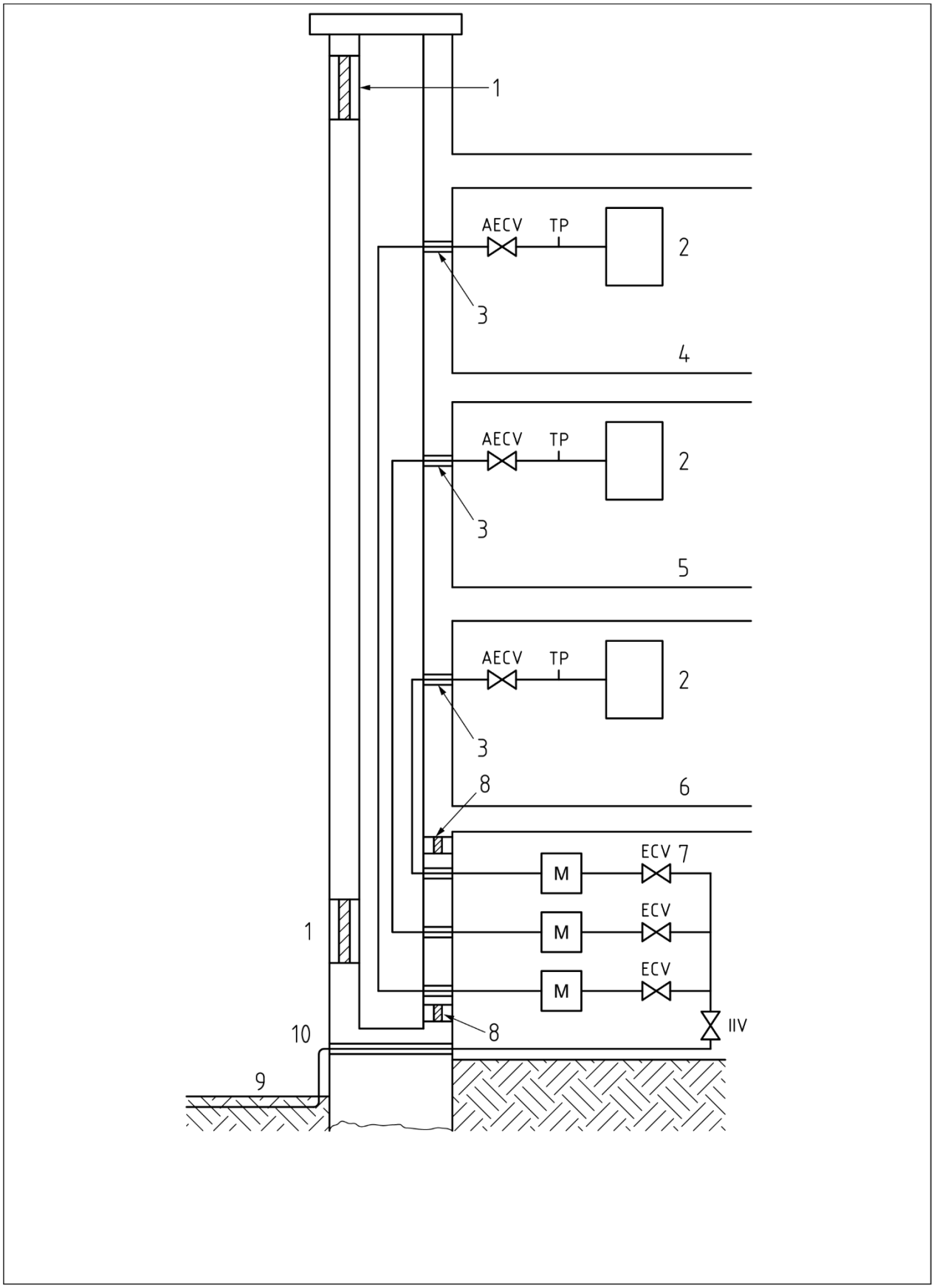
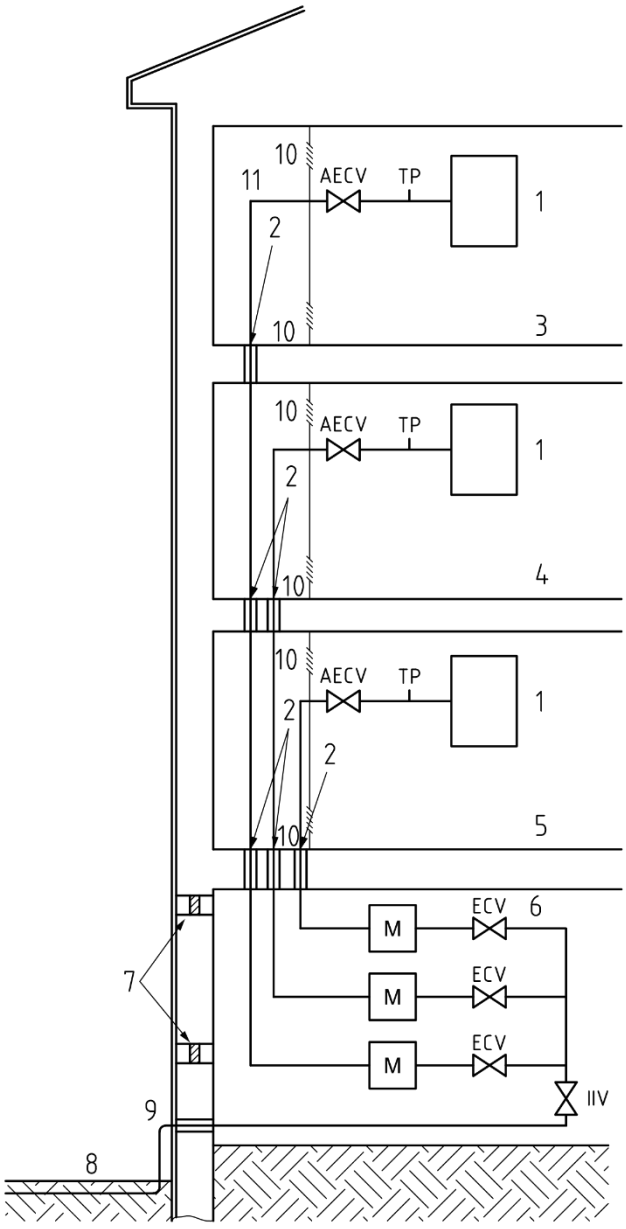


Figure 4 Typical pipework in multi-story buildings containing flats or maisonettes



b) Fire stopped pipework and ventilated enclosed area

Key	1	Appliance	6	Meter room	11	Enclosure
	2	Fire stop	7	Meter room ventilation	ECV	Emergency control valve
	3	Flat 3	8	Ground level	AECV	Additional emergency control valve
	4	Flat 2	9	Gas service	IIV	Inlet isolation valve
	5	Flat 1	10	Vent	M	Gas meter
					TP	Test point

NOTE Vents are to communicate with an area that is ventilated in accordance with the Building Regulations [5], [6], [7].

8. Main earth bonding or protective bonding conductor

8.1 All domestic gas installations shall have main protective bonding of the gas installation conforming to BS 7671 and please see image below and consult BS6891 for guidance.

8.2 The protective bonding shall be connected:

- as near as practical to the point od entry in to the premises;
- before any branch in the installation;
- in a position where it is accessible, can be visually observed, and fitted with a warning label stating “Safety electrical connection. Don not remove”;
- by a mechanically and electrically sound connection which is not subject to corrosion (i.e. not exposed to the weather).

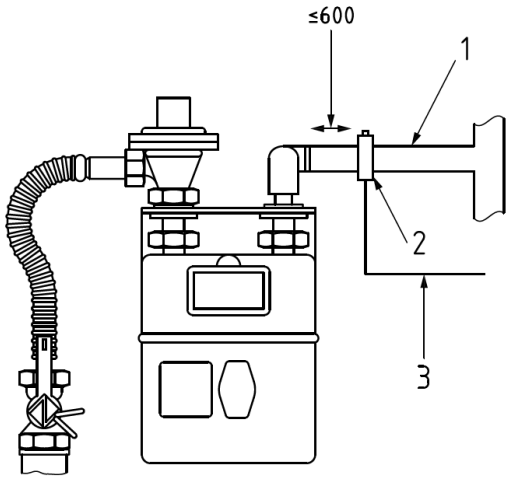
8.3 The protective bonding shall not be directly connected to any pliable corrugated (stainless-steel) tube or pliable connectors from the outlet of the primary meter installation. **For connecting protective bonding to TeslaFlex it should be connected to the fitting and never the TeslaFlex pipe itself**. The TeslaFlex tape (self-amalgamating) should leave sufficient space to apply the earthing connection to the body of the fitting, but covering any exposed pipe and the back of the nut

8.4 The main protective bonding of the gas installation pipework should be a minimum of 10mm^2 cable with green and yellow insulation, construction reference 6491X conforming to BS 6004

8.5 For meters in outside meter boxes/compartments, the bonding connection should be preferably inside the building and as near as practical to the point of entry of the installation tubing into the building. For internal meters, the bonding should be within 600 mm of the meter outlet. Alternatively, the connection may be made within the meter box/compartment, but it is essential that the bonding cable does not interfere with the integrity of the meter box/ compartment and the sealing of any sleeve.

8.6 Any alterations should be carried out by an electrically competent person and inspected and tested in accordance with BS 7671. For new gas installations the responsibility for the main protective bonding conductor lies with the installer to preferably carry out the bonding directly, where competent to do so, or the installer.

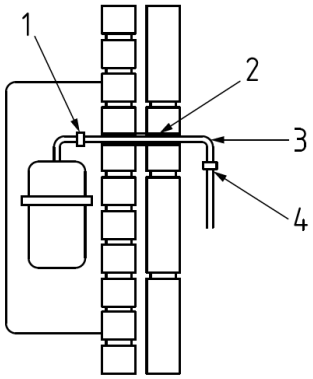
Dimensions in millimetres



a) Internal meter installation

Key

1 Pipework
2 Bonding connection
3 Green-yellow cable to consumer earth terminal



b) Meter installation in external box/ compartment

Key

1 Bonding connection (non-preferred position)
2 Pipework sleeve (sealed)
3 Pipework
4 Bonding connection (preferred position)

NOTE For medium-pressure fed meter installations the main protective bonding conductor should only exit the box as detailed in BS 6400-2 and BS 6400-3.

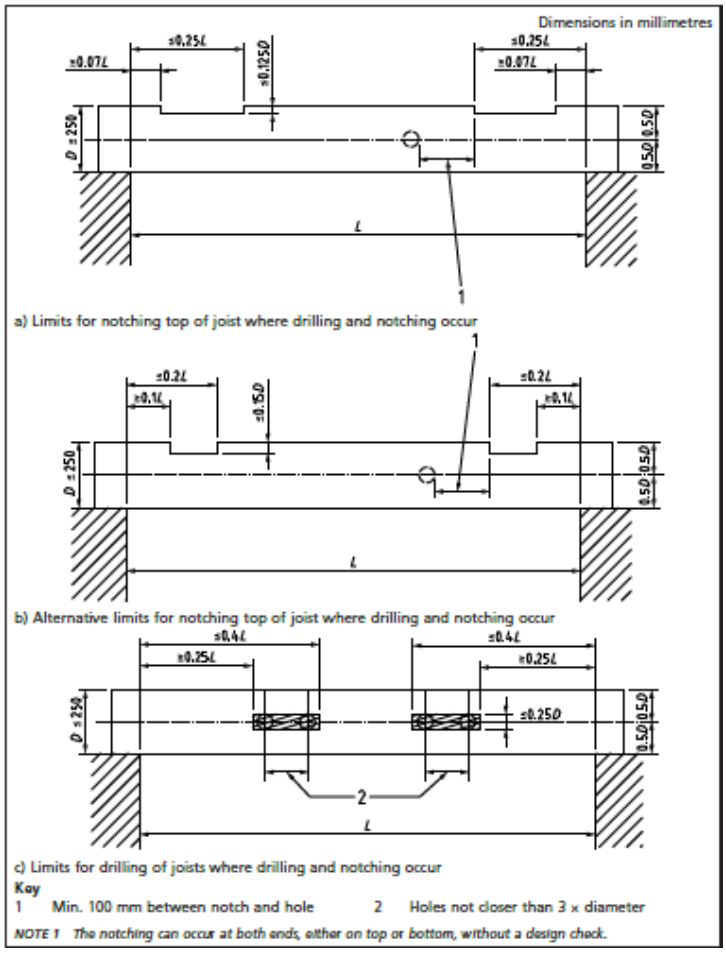
9. TeslaFlex laid in joisted floors, roof spaces and compartment floors

9.1 Where TeslaFlex is to be installed in solid floors it shall run parallel or at 90° to the walls. No diagonal TeslaFlex should be installed.

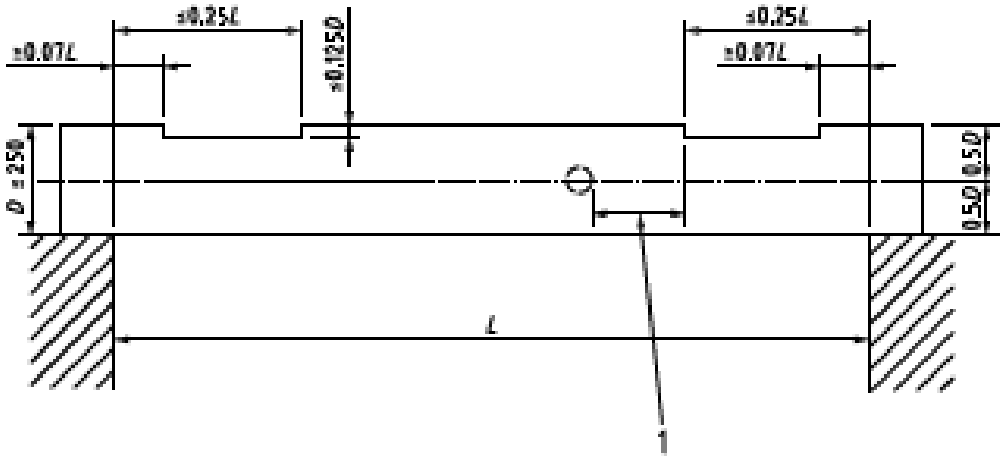
9.2 Where TeslaFlex is installed between floor joints or roof spaces, it should be correctly supported please see below chart as specified in BS 6891:2015

Recommended support spacing (m)		
DN Size - BS 7838	**Horizontal**	**Vertical**
DN12	1.2 m	1.2 m
DN 15	1.2 m	1.2 m
DN 22	1.8 m	1.8 m
DN 28	1.8 m	1.8 m
DN 32	2.5 m	2.5 m

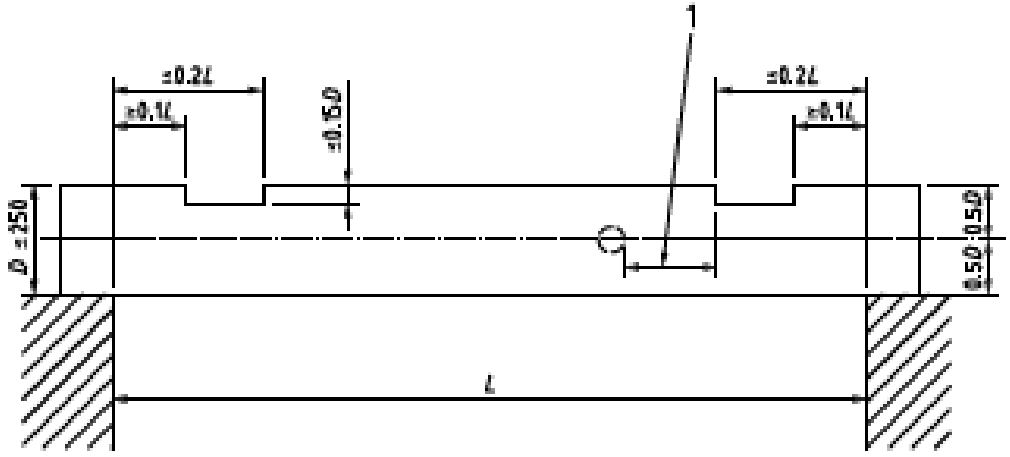
9.3 Where TeslaFlex is laid across the joints in a ceiling or roof space fitted with flooring it shall be located in purpose-made notches or possibly circular holes. Any joists less than 100mm or greater than 250mm shall not be notched. Please see below two images for notching and drilling of solid timber floor joints;



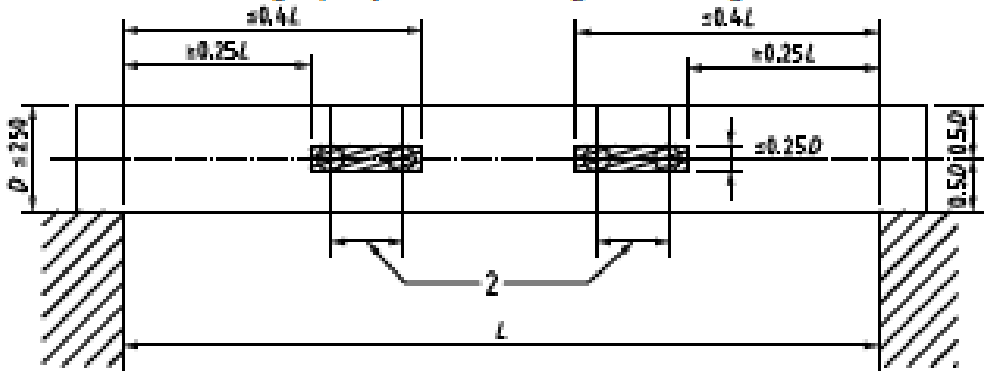
Dimensions in millimetres



a) Limits for notching top of joist where drilling and notching occur



b) Alternative limits for notching top of joist where drilling and notching occur

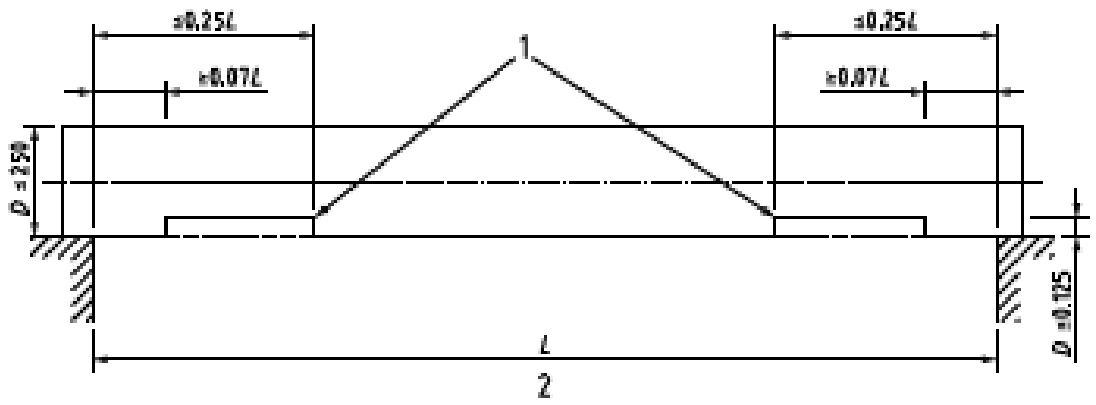


c) Limits for drilling of joists where drilling and notching occur

Key

1 Min. 100 mm between notch and hole 2 Holes not closer than 3 × diameter

NOTE 1 The notching can occur at both ends, either on top or bottom, without a design check.



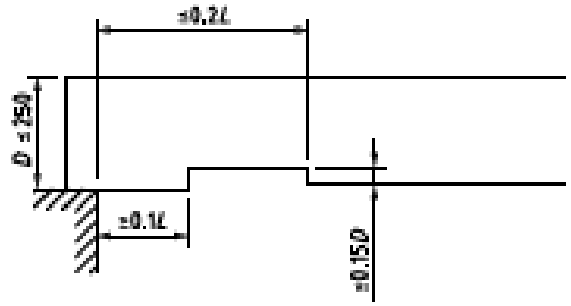
Key

1 Positions within which notching can occur on the bottom without a design check. Minimum 100 mm between the notch and any holes [see Figure 13a)].

2 Clear span simply supported joist (not a trimmer, trimming joist or beam)

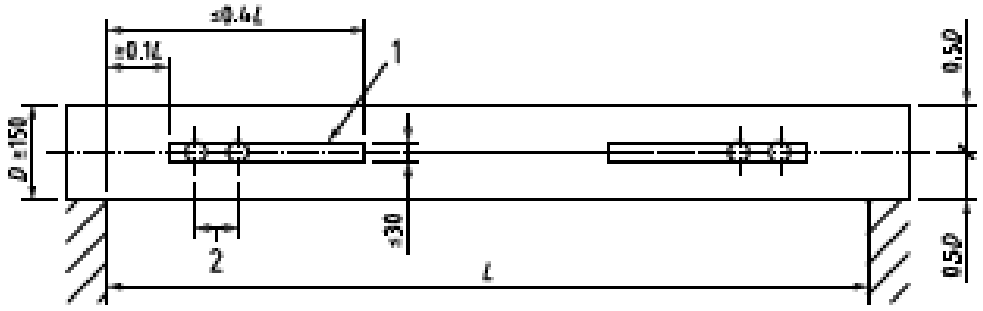
NOTE 2 The notching can occur at both ends, either on top or bottom, without a design check.

d) Limits for notching bottom of joist where drilling and notching occur



NOTE 3 The notching can occur at both ends on the bottom without a design check.

e) Alternative limits for notching: bottom of joist where drilling and notching occur



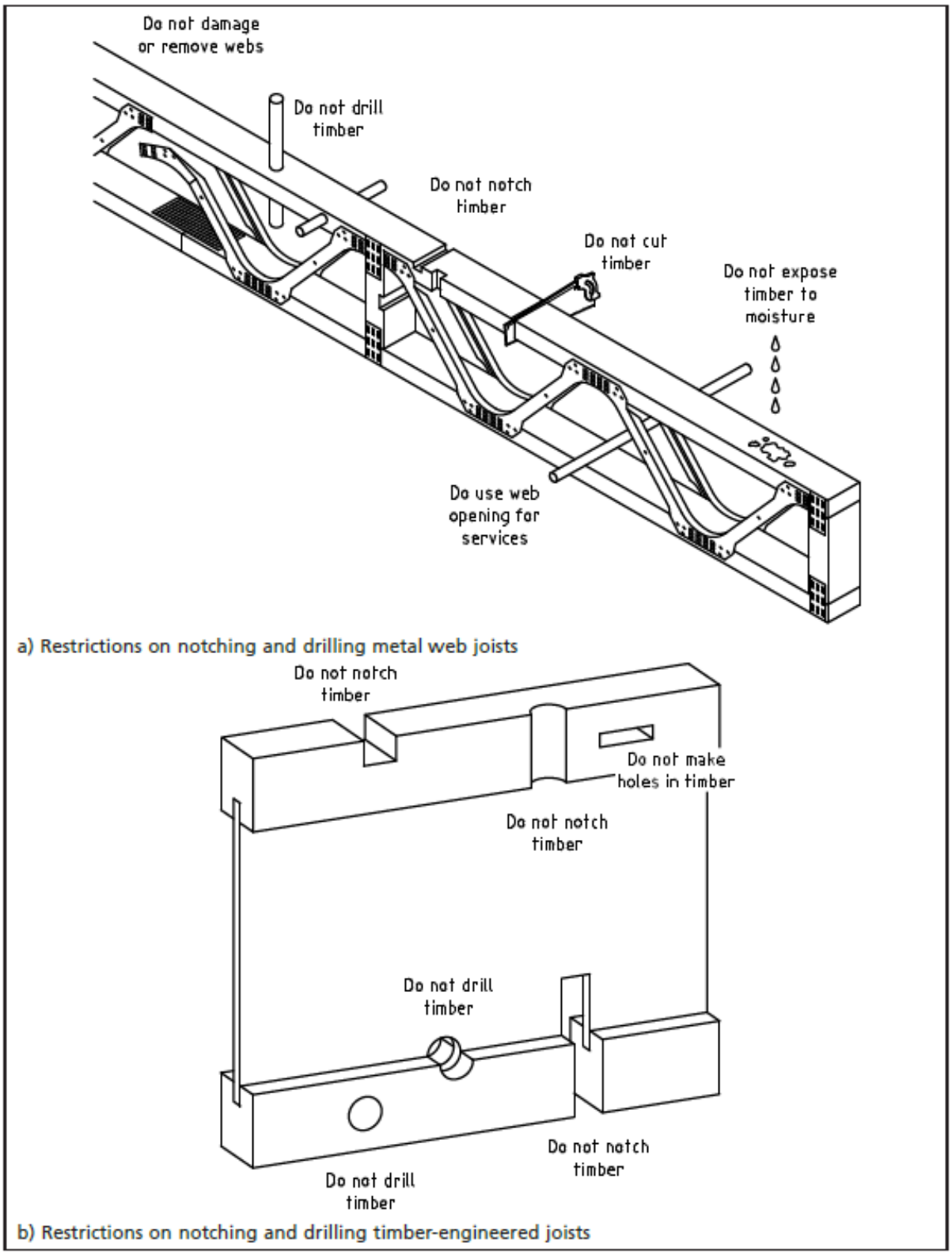
f) Alternative drilling zone where no notching occurs

Key

1 Drilling zone where no notching occurs

2 Holes not closer than 3 × diameter of largest hole and a maximum of 8 × 30 mm holes can be accommodated within each drilling zone. No notching is permitted.

9.4 The flanges of timber-engineered joists and metal web joints shall not be notched, drilled, altered or damaged, please see below;

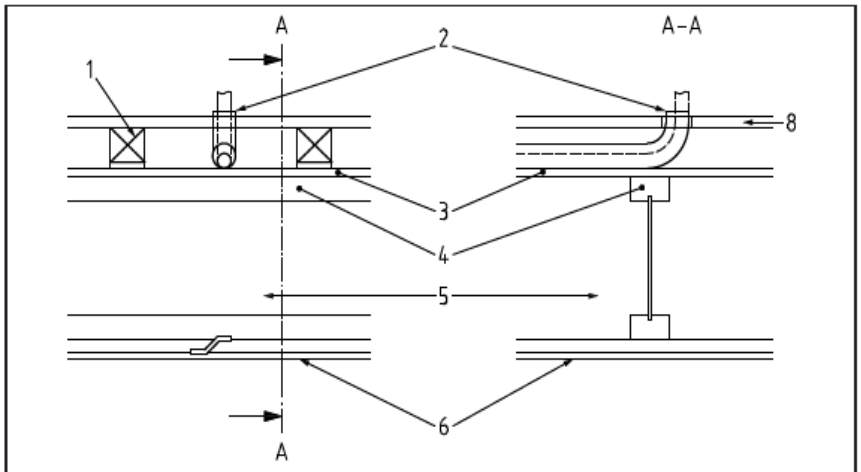


9.5 Where TeslaFlex is installed within the roof space, roof rafters, purlins, trussed rafters, bracing, etc., shall only be notched, drilled or cut away with the approval of a structural engineer.

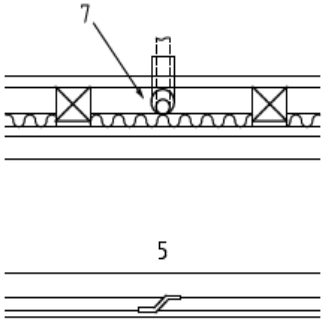
9.6 Prior to running any TeslaFlex below a suspended floor a visual inspection should be carried out to note the position of any electrical cables, junction boxes, insulation and ancillary equipment, in order that accidental damage or injury does not occur when inserting pipework.

9.7 Where TeslaFlex is installed in a void under a floor, unless there is sufficient adventitious ventilation available, ventilation available, ventilation shall be provided in accordance with BS 6891:2015 part 8.16.1, Table 6. For LPG and LPG/air mixtures this ventilation shall be the lowest point. Alternatively, the gas pipework shall be contained within a vented duct where it passes through the void. For additional guidance on LPG gas installation under the floor of a residential park home or dwelling manufactured to BS3632 is given in HSE report RR945 (27)

9.8 TeslaFlex shall not be installed within any fire compartment floor that separates one dwelling from another part of the building except as shown in images below;



a) Typical suspended timber compartment floor



b) Typical suspended timber compartment floor incorporating resilient quilt

Key

1 Floor decking on battens on resilient bearers/pads
2 Pipework within vented ducting extended above floor level and sealed to floor deck with flexible sealant
3 Structural deck
4 Timber joist
5 No pipework in this void
6 Ceiling fixed to resilient bars
7 Ducted pipework can be above or below any resilient quilt laid between floor battens with no fixings used to secure the ducting penetrating or damaging the quilt
8 Floor deck

10. TeslaFlex laid in solid floors

10.1 TeslaFlex must not be buried in the structural elements of the floor, such as concrete slabs or structural toppings. Pipework shall not be buried in power-floated floors that form part of the structure.

10.2 If TeslaFlex is to be installed in solid floors it must run parallel or at 90° to the walls.

10.3 Pipework in acoustic floors shall only be installed with the agreement of the building designer.

10.4 TeslaFlex that is to be buried in a solid floor shall be suitably protected against corrosion and degradation. The installer will have to make sure there is no damage to the protective cover or the pipe itself. If there is any or holes in the cover they should be wrapped with silicone tape with at least 50% cover to provide a layer of double thickness.

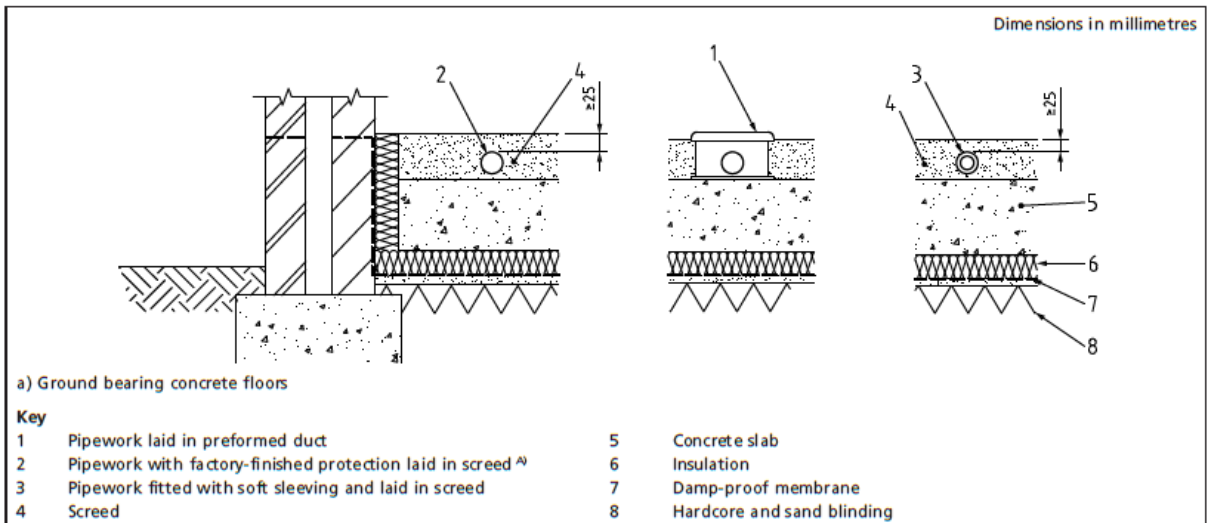
10.5 TeslaFlex passing through solid floors shall take the shortest practical route and shall be sleeved.

10.6 TeslaFlex installed in solid floors shall be protected against failure caused by movement.

10.7 Where TeslaFlex is installed in a solid floor, joints shall be kept to a minimum. Mechanical fittings and press end connections shall not be buried in solid floors, floor screeds or a concrete slab. If a fitting is requied within the floor screed or below ground boxes with removable covers are suitable so that the fitting can accessed if needed. They are known “conduit junction boxes” and will be available from your local plumbing merchant.

10.8 Where TeslaFlex is buried in the floor screed there shall be a minimum of 25mm of cover above the pipework.

For examples of TeslaFlex laid in concrete are shown in the following diagrams:

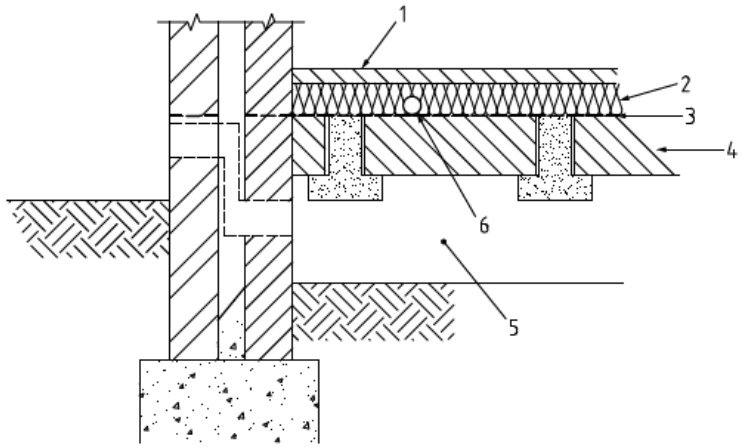


a) Ground bearing concrete floors

Key

1	Pipework laid in preformed duct	5	Concrete slab
2	Pipework with factory-finished protection laid in screed [A)]	6	Insulation
3	Pipework fitted with soft sleeving and laid in screed	7	Damp-proof membrane
4	Screed	8	Hardcore and sand blinding

Dimensions in millimetres

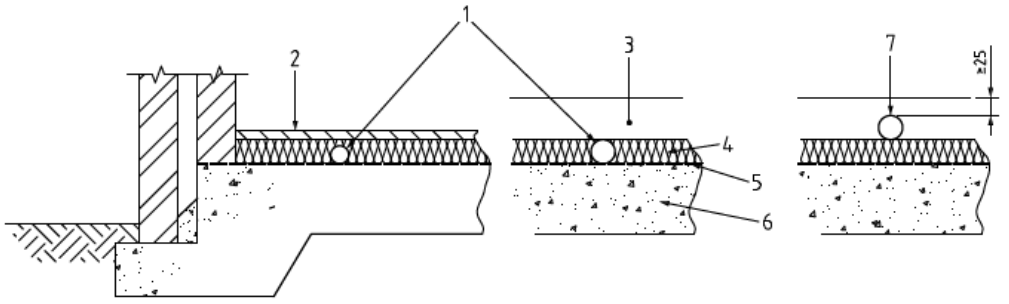


b) Suspended concrete floor

Key

1	Chipboard or floor screed over insulation	4	Precast beam and block
2	Insulation	5	Ventilated void
3	Damp-proof membrane	6	Pipework (corrosion protected as necessary)

Dimensions in millimetres



c) Concrete rafts

Key

1	Pipework laid in insulation layer (corrosion-protected as necessary)	5	Damp-proof membrane
2	Chipboard over insulation	6	Concrete raft
3	Screed over insulation	7	Pipework with factory-finished protection laid in screed [A)]
4	Insulation		

11. TeslaFlex laid in walls

11.1 TeslaFlex tubing should be placed in walls by following the below diagrams and recommendations.

For examples of Teslaflex in timber and masonry walls please refer to the following diagrams;

- TeslaFlex installed in solid walls and block plaster (Figure 11.1)
- TeslaFlex installed in brick and block with dry lining on dads (Figure 11.2)
- TeslaFlex installed in brick and block dry lined on battens (Figure 11.3)
- TeslaFlex installed in timber frame and light steel construction (Figure 11.4 – 11.7)

11.2 TeslaFlex pipe runs shall, where possible be vertical and shall be placed in ducts, sleeve or where the walls are chases with convenient access points.

11.3 TeslaFlex pipes runs shall, be fully inspected for damage before being placed within a wall. Any damage to the pipe or the plastic covering should be repaired with using silicone tape, with at least 50% overlap, to protect the pipe.

11.4 TeslaFlex passing through cavity walls shall be sleeved and shall take the shortest practicable route. No TeslaFlex pipe or fittings shall be placed within the cavities of cavity walls.

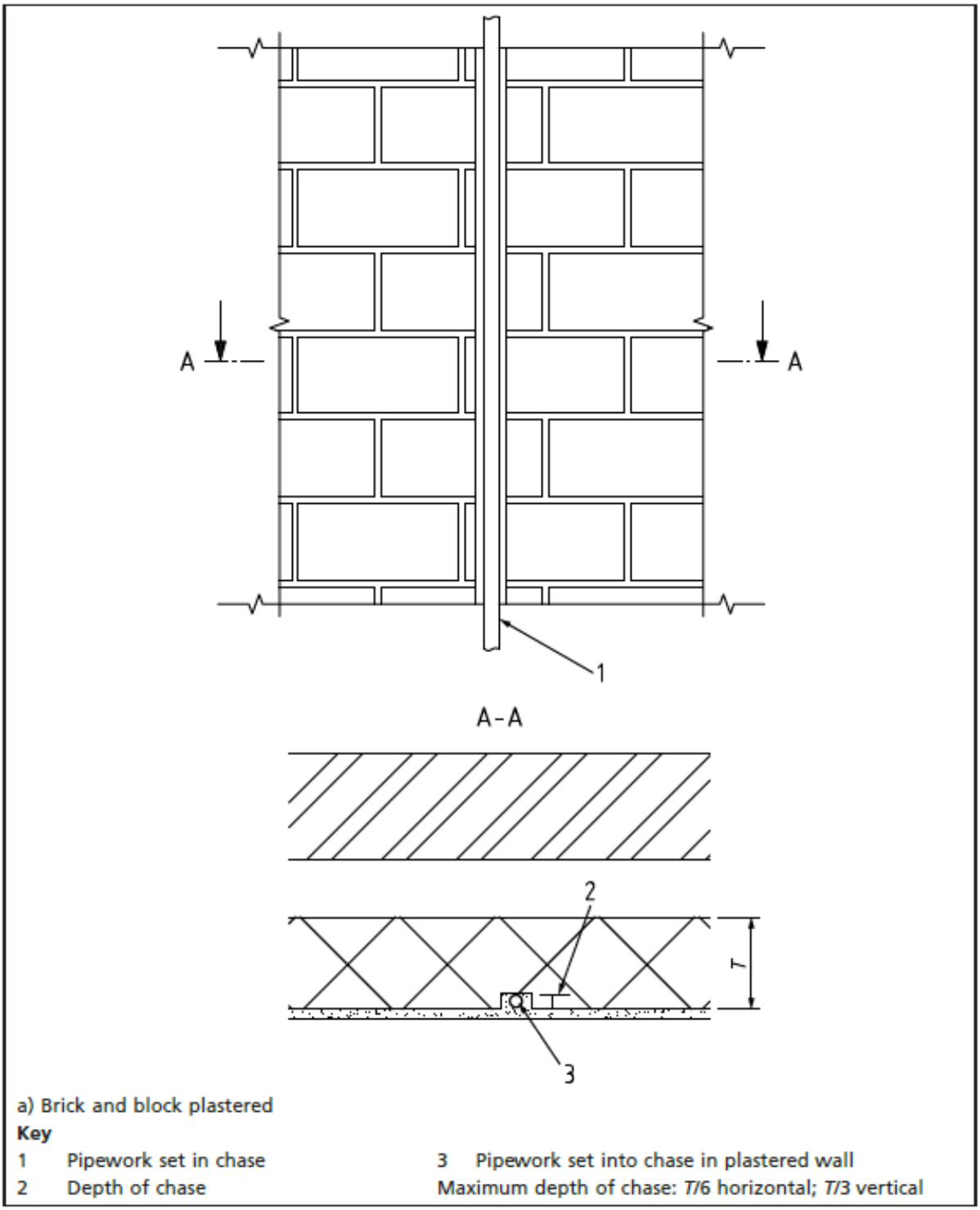
11.5 TeslaFlex pipework shall be installed such that any fixing cannot penetrate the pipework, for example plasterboard fixings, screws or short-fired nails. If this cannot be achieved, it shall be protected suitably against penetration, for example with a steel plate of minimum thickness 1 mm (Figure 11.4)

11.6 Where TeslaFlex passes through a solid wall it shall be sleeved

11.7 Timber-frame and light steel-framed walls

- The pipework installed within the walls shall be run within purpose-designed channels or duct
- The pipework should be installed in such a way, that fixings cannot penetrate the pipework
- If you are installing

Figure 11.1



a) Brick and block plastered

Key

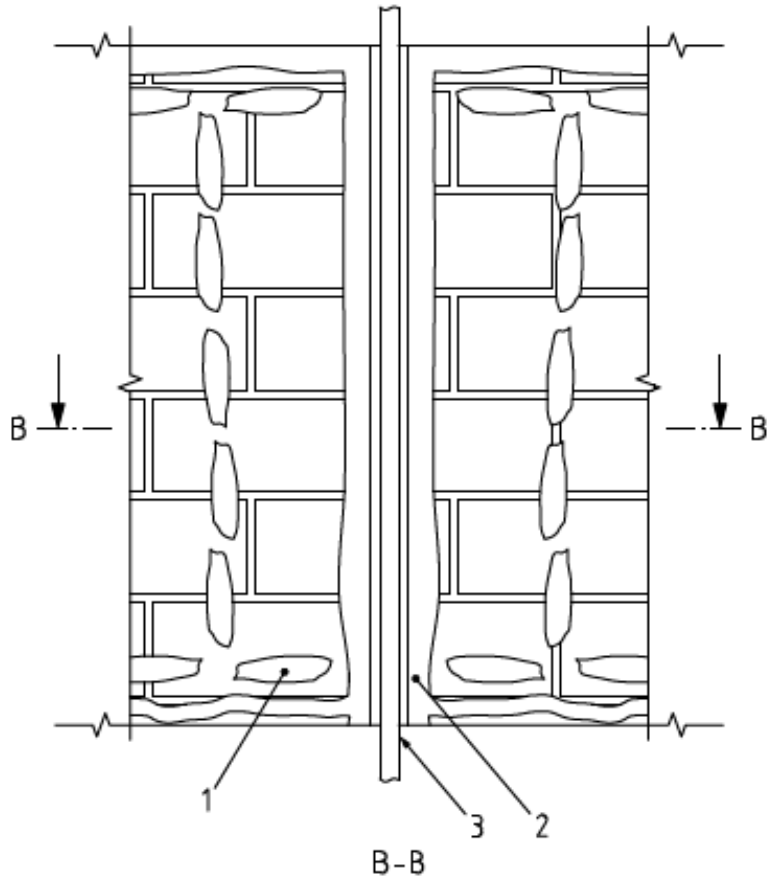
1 Pipework set in chase

2 Depth of chase

3 Pipework set into chase in plastered wall

Maximum depth of chase: *T*/6 horizontal; *T*/3 vertical

Figure 11.2

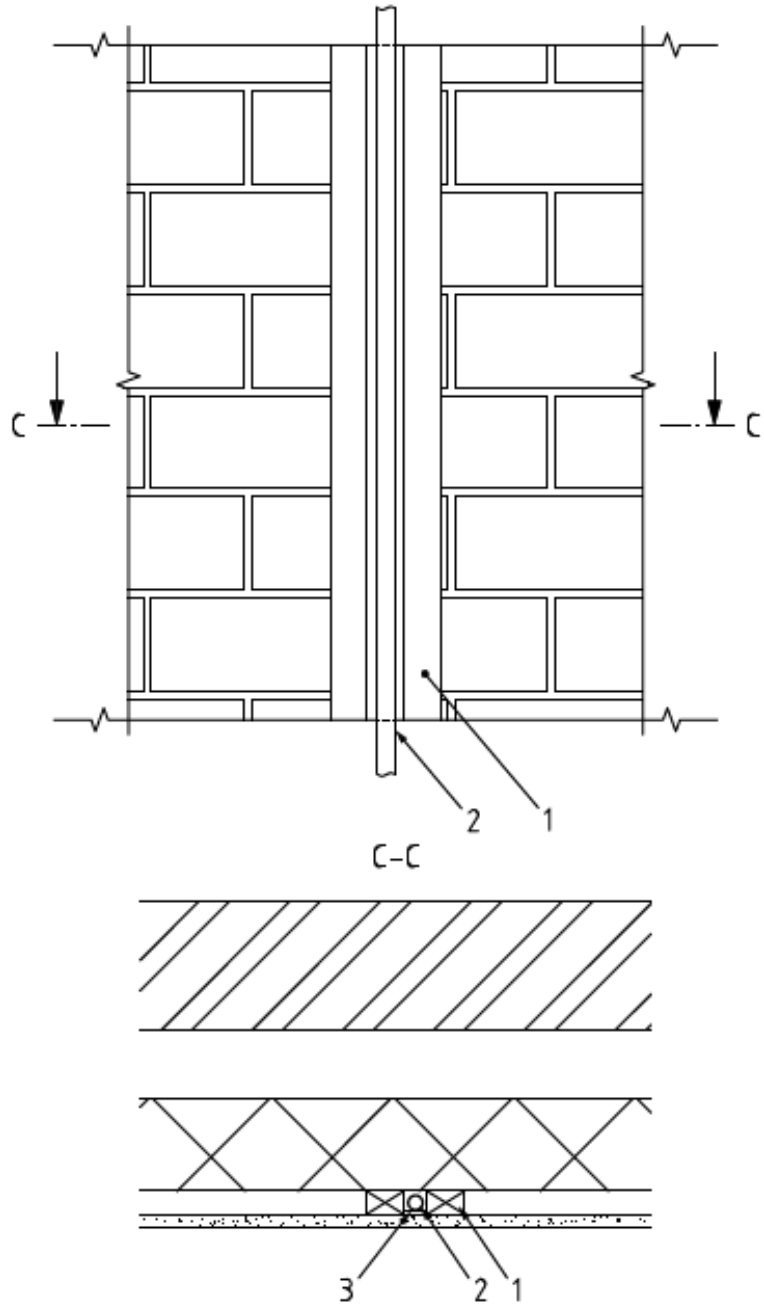


b) Brick and block with dry lining on dabs

Key

1 Individual adhesive dabs
2 Continuous adhesive dabs to surround pipework
3 Pipework

Figure 11.3



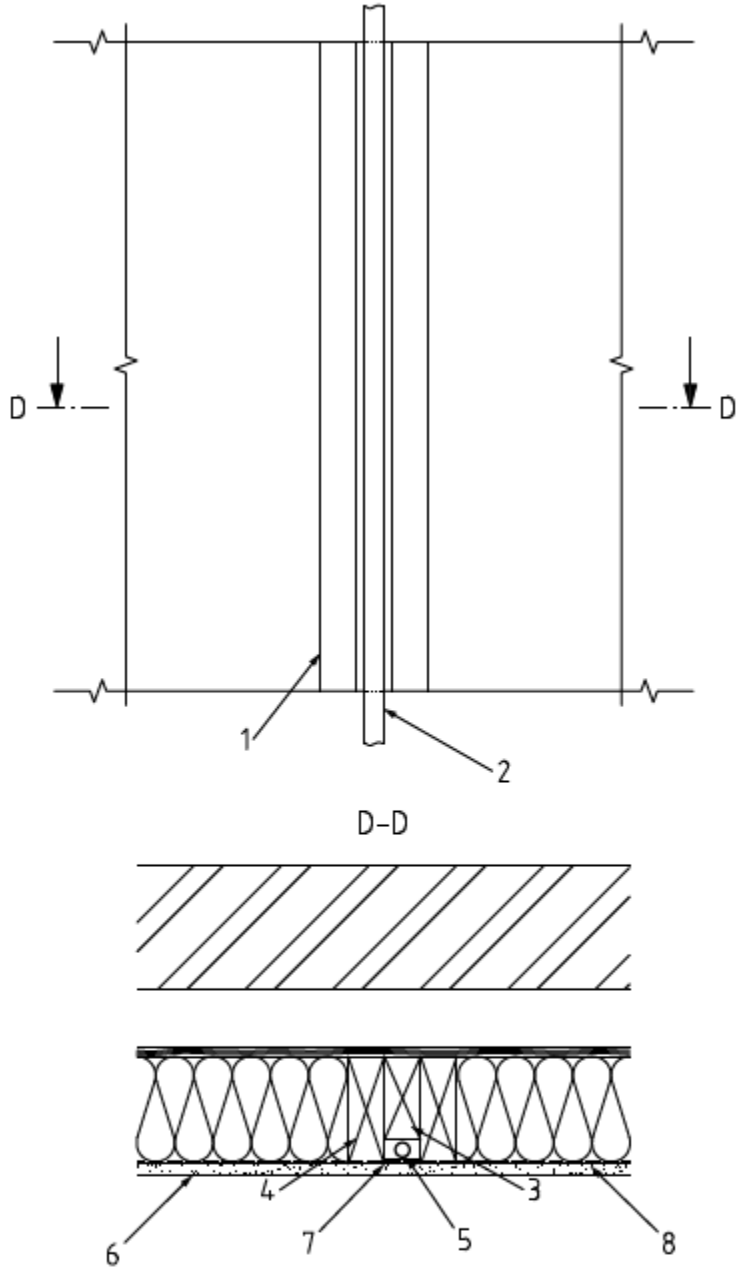
NOTE The joints between the wall and studs should be sealed with mastic in order to avoid gas tracking around the studs.

c) Brick and block dry lined on battens

Key

1 Timber battens
2 Pipework
3 Steel plate of min. 1 mm thickness

Figure 11.4



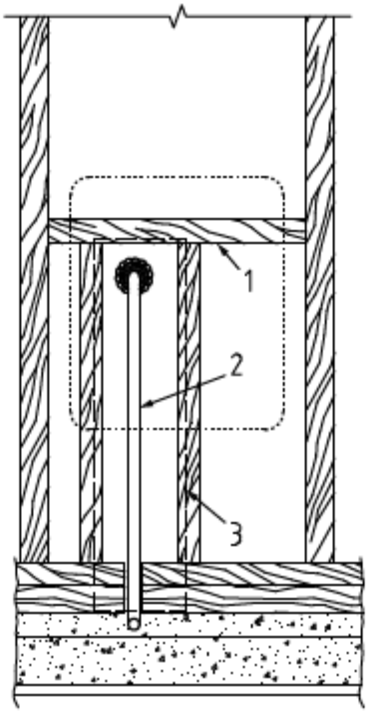
NOTE The joints between the studs should be sealed with mastic in order to avoid gas tracking around the studs.

a) Pipework passing through timber-frame wall

Key

1	Timber stud	5	Pipework
2	Pipework	6	Plasterboard
3	Timber stud blocking piece	7	Steel plate of min. 1 mm thickness
4	Timber stud	8	Vapour barrier

Figure 11.5



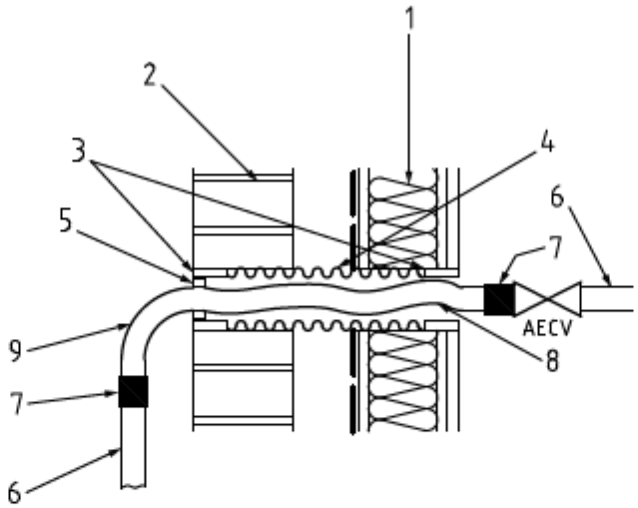
NOTE The joints between the studs should be sealed with mastic in order to avoid gas tracking around the studs.

b) Pipework installed in a timber-framed wall

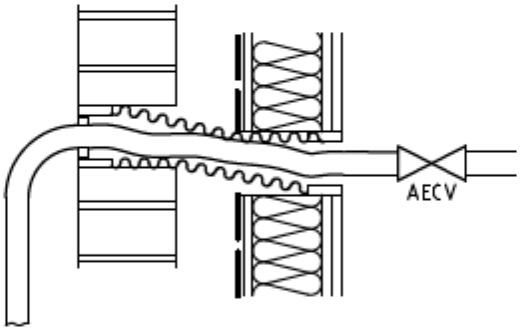
Key

1 Timber stud
2 Pipework
3 Steel plate of min. 1 mm thickness

Figure 11.6



a) As installed: before movement of timber



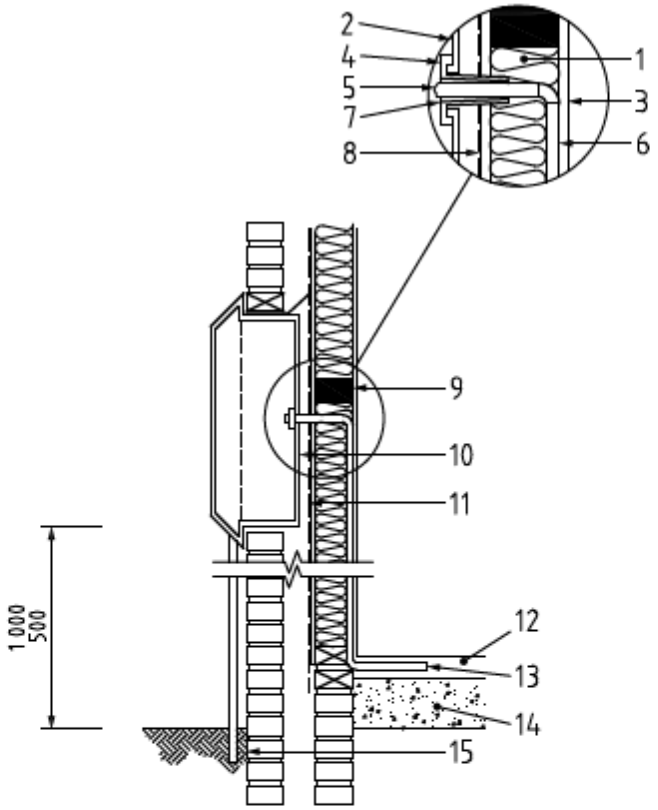
b) After relative movement of timber

Key

1 Timber frame
2 Masonry external wall or wall of internal riser duct
3 Sealant between sleeve and wall
4 Flexible pipe sleeving
5 Flexible sealant on one end of sleeve only, preferably external side to prevent water ingress
6 Rigid pipe
7 Transition fitting from rigid pipework to pliable corrugated (stainless-steel) tubing
8 Pliable corrugated (stainless-steel) tubing
9 Bend not to exceed manufacturer's recommendation

Figure 11.7

Dimensions in millimetres



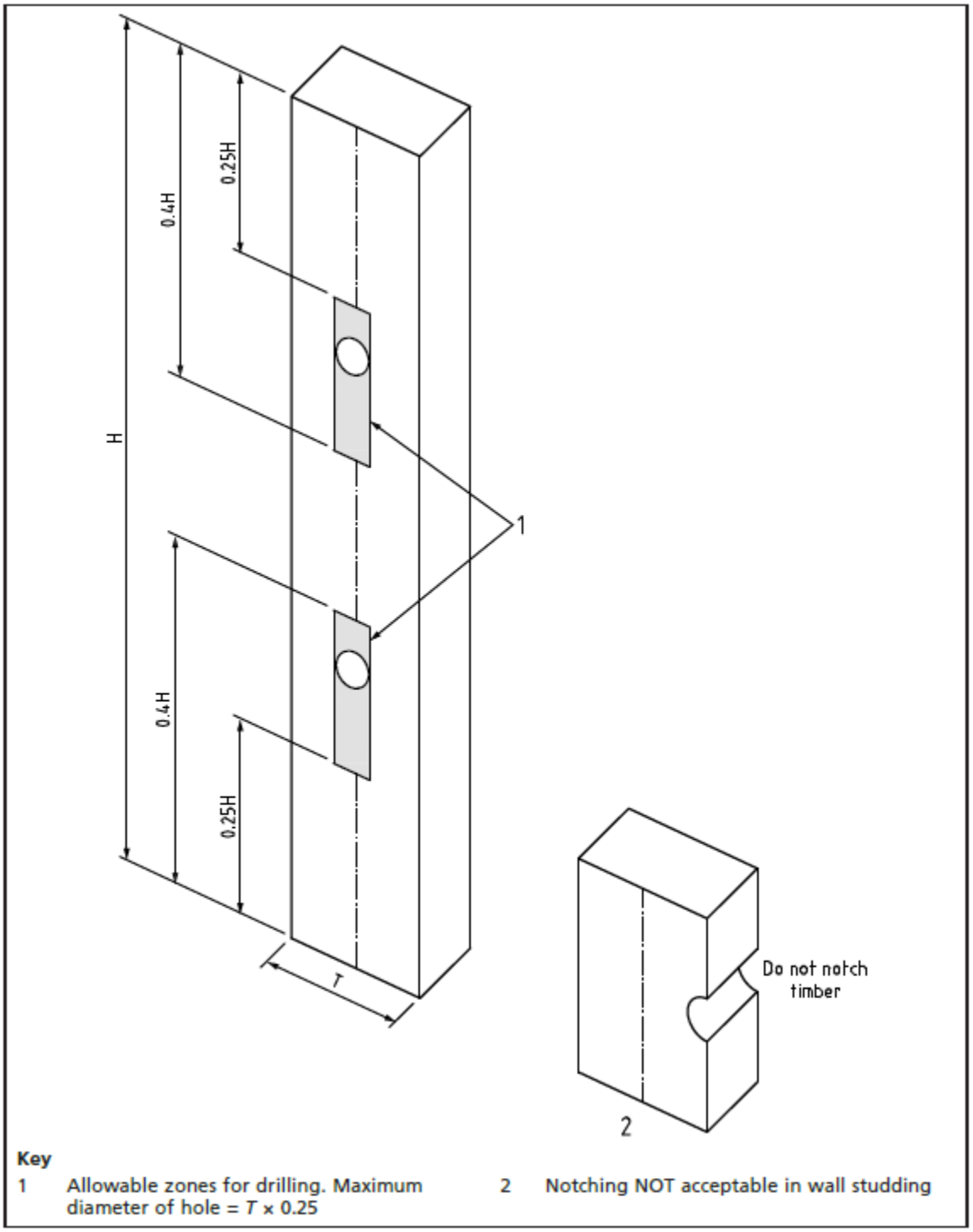
NOTE Pipework to be located in a channel formed by timber studs of the same depth as the timber frame [the principles for which are shown in Figure 18a) and b)]. Timber studs should be sealed with mastic.

c) Pipework entering a timber-framed/light steel-framed building from a meter box

Key

1 Insulation
2 Meter box wall
3 Plasterboard
4 Rear spigot
5 Pipework (protected by a steel plate of min. 1 mm thickness as necessary)
6 Vapour control layer
7 Mastic sealing
8 Timber sheathing
9 Timber stud
10 Air space between back of box and breather membrane
11 Breather membrane carried down behind meter box
12 Floor screed
13 Pipework from meter notched through sole plate
Preservative treatment to sole plate made good
14 Concrete
15 Service pipe or service pipework, as appropriate

Figure 11.8



Key

1 Allowable zones for drilling. Maximum diameter of hole = $T \times 0.25$

2 Notching NOT acceptable in wall studding

12. Sleeves

12.1 Any pipe passing through a wall has to be sleeved

12.2 Pipe sleeving is required to protect the pipe against any possible movement in the wall and corrosion from cement/mortar

12.3 Sleeves should be made of a material capable of containing or distributing gas e.g. copper, steel, MDPE, polyvinyl chloride (PVC), or other suitable plastic material.

12.4 The internal diameter of the sleeve should allow for an annular space around the pipe to ensure you can satisfactorily insert the pipe and also apply adequate sealing material

12.5 Sleeves should span the full width of the wall

12.6 Sleeves should be continuous. Do not split and placed in position after the gas pipe has been fitted.

12.7 The sleeve should be sealed at one end only between the sleeve and the pipe, with a flexible, non-setting fire resistant material

12.8 Sleeves should where possible, be vented to outside air. However, in the case of a meter box and this is not possible as the additional purpose accumulation of gas from entering the building.

12.9 Sleeves should be sealed at each end to the structure with a suitable building material. (cement, mortar, plaster, etc.)

12.10 No fittings or joints should be fitted within the sleeve

13. Exterior buried pipework

13.1 Where Tesla-Flex need to be installed in soil/ground where some vehicle traffic it shall be a minimum depth 375mm below open ground.

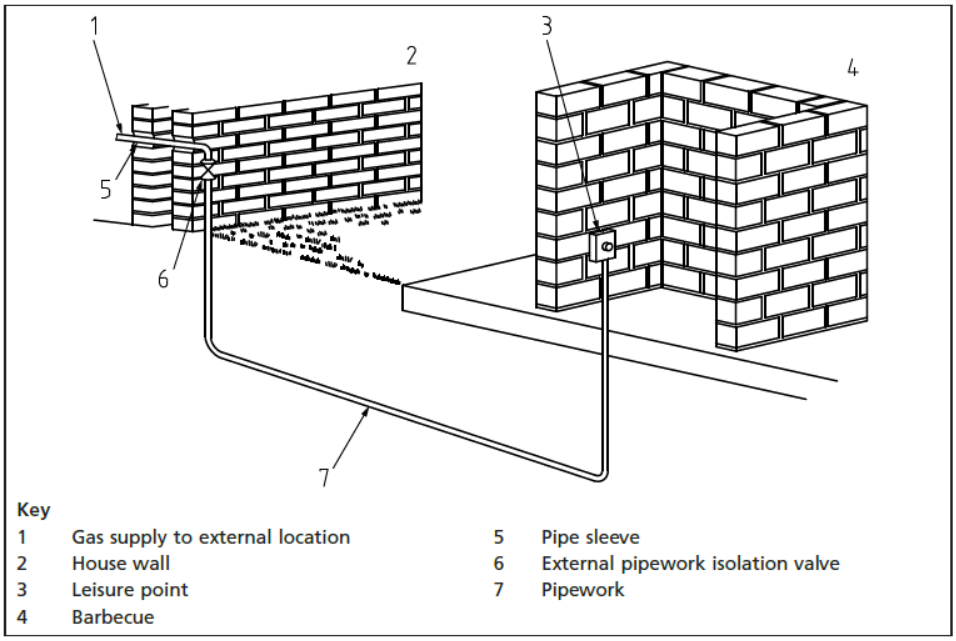
13.2 With pedestrian traffic, the Tesla-Flex pipework should be a minimum of 40mm below a concrete slab

13.3 Tesla-Flex should not pass through the foundations and shall not be any fittings.

13.4 You need to fit an external control valve where the gas supply leaves the dwelling and fit sleeves as required.

13.5 Make sure the pipe if checked for any damage and repaired before the trench is backfilled

Figure 13.1 for reference



Key

1	Gas supply to external location	5	Pipe sleeve
2	House wall	6	External pipework isolation valve
3	Leisure point	7	Pipework
4	Barbecue		