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Designated according to Article 29 of Regulation (EU) No 305/2011

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European Technical Assessment

ETA 24/0988 of 29/10/2024

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: UL International (Netherlands) B.V.

Trade name of the construction product	Tytan Professional B1 Fire Mortar Gypsum
Product family to which the construction product belongs	Fire Stopping and Sealing Product: • Penetration Seals
Manufacturer	Rakennuskemia OY Kerkkolankatu 17 05800 Hyvinkää Finland
Manufacturing plant(s)	A/003
This European Technical Assessment contains	99 pages including 1 Annex which forms an integral part of this assessment.
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	EAD 350454-00-1104, September 2017.

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I. SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of the product

1) Tytan Professional B1 Fire Mortar Gypsum is a gypsum based mortar material, used to reinstate the fire resistance performance of wall and floor constructions where they have been provided with apertures for the penetrations of multiple services.

2) Tytan Professional B1 Fire Mortar Gypsum is supplied as a dry material and is mixed with water to the required ratio prior to installation.

3) Tytan Professional B1 Fire Mortar Gypsum when mixed is self-supporting in a wall and floor orientation and may be used with or without a permanent mineral fibre backing material depending upon the require application and classification (see Annex A).

4) Tytan Professional B1 Fire Wrap and Tytan Professional B1 Service Coat are required to be used in conjunction with Tytan Professional B1 Fire Mortar Gypsum depending upon the required application and classification (see Annex A).

5) Applicant submitted a written declaration that Tytan Professional B1 Fire Mortar Gypsum does not contain substances which have to be classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No 1272/2008 and listed in the "Indicative list on dangerous substances" of the EGDS - taking into account the installation conditions of the construction product and the release scenarios resulting from there.

   In addition to the specific clauses relating to dangerous substances contained in this European Technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

6) The use catagory of Tytan Professional B1 Fire Mortar Gypsum in relation to BWR 3 (Hygiene, health and environment) is IA1, S/W2

2 Specification of the intended uses of the product in accordance with the applicable European Assessment Document (Hereinafter EAD): EAD 350454-00-1104: 2017

Detailed information and data is given in Annex A.

1) The intended use of Tytan Professional B1 Fire Mortar Gypsum is to reinstate the fire resistance performance of flexible wall, rigid wall and floor constructions where they are penetrated by various cables, trays and metallic, plastic and composite pipes.

2) The specific elements of construction that the system Tytan Professional B1 Fire Mortar Gypsum may be used to provide a penetration seal in, are as follows:

   a. Flexible walls: The wall must have a minimum thickness of 100 mm and comprise steel studs or timber studs* lined on both faces with minimum 2 layers of 12.5 mm thick boards. Flexible wall solutions may also be used in rigid walls, with a minimum density of 350 kg/m^3.

   b. Rigid walls: The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 650 kg/m^3.

   c. Rigid floors: The floor must have a minimum thickness of 100 mm and comprise aerated concrete or concrete with a minimum density of 650 kg/m^3.

   * no part of the penetration seal may be closer than 100 mm to a stud, the cavity must be closed between the penetration seal and the stud, and minimum 100 mm of insulation of class A1 or A2

according to EN 13501-1 must be provided within the cavity between the penetration seal and the stud.

The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period.

Tytan Fire Protection Systems which involve services penetrating both sides of a flexible wall may also be used in the situation where the services penetrates one side of the wall only and the remaining side of the wall is not penetrated at the same point (i.e. the services continues on the inside of the wall). All fire integrity and thermal insulation ratings for such single-sided penetrations remain the same as for the equivalent double-sided penetration.

Where a backing material is described in Annex A, this can be replaced with Tytan Professional B1 Fire Mortar Gypsum if the total seal depth is the same or greater.

3) The System Tytan Professional B1 Fire Mortar Gypsum may be used to provide a penetration seal with cables, cable trays, plastic pipes, composite pipes and metallic pipes with and without insulation, with mixed services in the same seal/aperture (for details see Annex A).

4) The system Tytan Professional B1 Fire Mortar Gypsum may be used to seal apertures in the separating element up to 2400 mm wide by 1200 mm high in a wall, and 2400 mm by 1200 mm in a floor. The additional sizes that are permitted in floors are:

Width (mm)	Length (mm)
1100	2900
1000	4000
900	7000
≤ 800	∞ (infinite)

The minimum permitted separation between adjacent seals/apertures is 100 mm. Services within the system Tytan Professional B1 Fire Mortar Gypsum seal do not require a minimum separation, except where specifically detailed in Annex A.

5) Services in floors shall be supported at maximum 450 mm from the top face. Services in walls shall be supported at maximum 270 mm from both faces of the wall.

6) Where minimum 100 mm depth of the system Tytan Professional B1 Fire Mortar Gypsum is described in Annex A, this can be reduced with 50 mm if a 50 mm high 45 ° angled cone made of mortar is added around services. If the reduction reduces the thickness to less than 100 mm, a stone wool backing board is required, as specified in Annex A.

7) An aperture with or without penetrating services, fire sealed with the system Tytan Professional B1 Fire Mortar Gypsum, can include a steel sleeve casted or friction fitted within rigid constructions. The sleeve must be protected against corrosion before adding the mortar seal.

8) Where single sided top face seals are described in Annex A, these can also be used in composite floors (e.g., concrete filled, steel trapezoidal decking) if the floor thickness supersedes the required mortar thickness.

9) Services through the system Tytan Professional B1 Fire Mortar Gypsum may be used in all angles between 90° and 45° in all directions, subject to metallic pipes only.

10) Where PVC pipes are mentioned in Annex A, this includes PVC-U, PVC-C and similar if the pipe is according to EN 1329-1, EN 1452-2, EN 1453-1^ and EN 1566-1. Where PP pipes are mentioned in Annex A, this includes PP-MV, PP-H, PP-R and similar if the pipe is according to EN 1451-1 or DIN 8077/8078. Where PE pipes are mentioned, this includes PE-LD, PE-MD, PE-HD, PE-X and similar according to EN 1519-1, EN 12201-2 or EN 12666-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1.

11) The provisions made in this European Technical Assessment are based on an assumed working life of the Tytan Professional B1 Fire Mortar Gypsum of 25 years, provided that the conditions laid down in the manufacturers datasheet and instructions for the packaging/transport/ storage/installation/use/repair are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

12) Type Z_2: Intended for uses in internal conditions with humidity lower than 85 % RH excluding temperatures below 0°C, without exposure to rain or UV.

3 Performance of the product and references to the methods used for its assessment

Product-type: Mortar		Intended use: Penetration Seal
Assessment method	Essential characteristic	Product Performance
BWR 2 Safety in case of fire		
EN 13501-1	Reaction to fire	Class 'A1'
EN 13501-2	Resistance to fire	Annex A
BWR 3 Hygiene, health and environment		
EN 1026	Air permeability	Annex B
EAD 350454-00-1104, Annex C	Water permeability	No performance determined
Declaration of manufacturer & EN 16516	Release of dangerous substances	Use categories: IA1, S/W2 Declaration of manufacturer
BWR 4 Safety in use		
EOTA TR 001:2003	Mechanical resistance and stability	Suitable for use in walls and floors in Zone Types I, II, III & IV*
EOTA TR 001:2003	Resistance to impact/movement	
EOTA TR 001:2003	Adhesion	
EAD 350454-00-1104, Clause 2.2.9	Durability	Z_2
BWR 5 Protection against noise		
EN 10140-1,2,4,5/ EN ISO 717-1	Airborne sound insulation	Rw 48 (-1;-3) dB
BWR 6 Energy economy and heat retention		
EN 12664, EN 12667, EN 12939, EN ISO 8990, EN ISO 6946, EN ISO 14683, EN ISO 10211, EN ISO 10456	Thermal properties	No performance determined
EN ISO 12572, EN 12086, EN ISO 10456	Water vapour permeability	No performance determined

*At dimensions up to those given in 2 4) and with soft and hard body impact

4 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE (HEREINAFTER AVCP) SYSTEM APPLIED, WITH REFERENCE TO ITS LEGAL BASE

According to the decision 1999/454/EC – Commission Decision of date 22nd June 1999 on the procedure for attesting the conformity of construction products pursuant to Article 20(2) of Council Directive 89/106/EEC as regards fire stopping, fire sealing and fire protective products, published in the Official Journal of the European Union (OJEU) L178/52 of 14/07/1999, (see https://eur-lex.europa.eu/oj/direct-access.html) of the European Commission[1], as amended, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table(s) applies (apply).

Product(s)	Intended use(s)	Level(s) or class(es)	System(s)
Fire stopping and Fire Sealing Products	For fire compartmentation and/or fire protection or fire performance	Any	1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Tasks of the manufacturer:

Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall ensure that the product is in conformity with this European Technical Assessment.

The factory production control shall be in accordance with the Control Plan of 25th June 2024 relating to the European Technical Assessment ETA 24/0988 issued on 29/10/2024 which is part of the technical documentation of this European Technical Assessment. The "Control Plan" is laid down in the context of the factory production control system operated by the manufacturer and deposited at UL International (Netherlands) B.V.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the Control Plan.

[1] Official Journal of the European Communities L178/52 of 14/7/1999

Other tasks of the manufacturer:

Additional information

The manufacturer shall provide a technical data sheet and an installation instruction with the following minimum information:

(a) Technical data sheet:

- Field of application:
- Building elements for which the penetration seal is suitable, type and properties of the building elements like minimum thickness, density, and - in case of lightweight constructions – the construction requirements.
- Limits in size, minimum thickness etc. of the penetration seal
- Construction of the penetration seal including the necessary components and additional products (e.g. backfilling material) with clear indication whether they are generic or specific.
- Services which the penetration seal is suitable, type and properties of the services like material, diameter, thickness etc. in case of pipes including insulation materials; necessary/allowed supports/fixings (e.g. pipe trays)

(b) Installation instruction:

- Steps to be followed
- Procedure in case of retrofitting
- Stipulations on maintenance, repair and replacement

6 Issued on:

29 October 2024

Report by:	Verified by:	Validated by:
C. Johnson Senior Staff Engineer Built Environment	D. Yates Staff Engineer Built Environment	Erik Teubler Head of TAB Built Environment

For and on behalf of UL International (Netherlands) B.V.

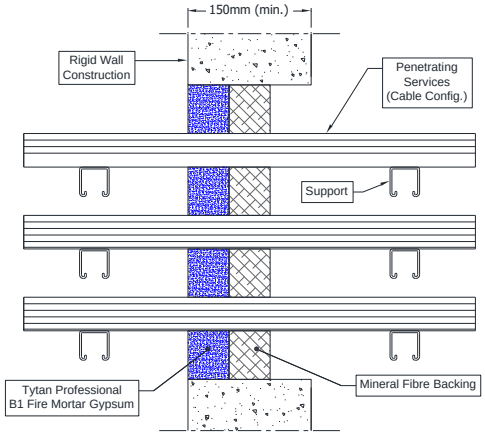
ANNEX A – Resistance to Fire Classification – Tytan Professional B1 Fire Mortar Gypsum

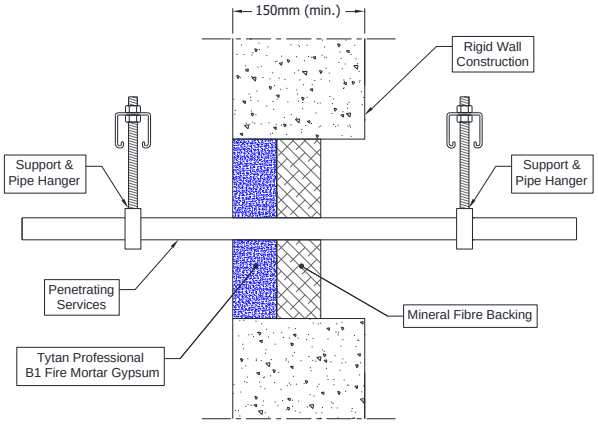
A.1 Rigid wall constructions according to 1.2.1 with wall thickness of minimum 150 mm

A.1.1 Cable penetration seal with 50 mm deep Tytan Professional B1 Fire Mortar Gypsum backed with mineral fibre board

Penetration Seal: Cables fitted at any position within the aperture (min. separation 25 mm from seal edges), with min. 50 mm Tytan Professional B1 Fire Mortar Gypsum to either side of the wall (or at any position in between), backed with min. 50 mm stone wool board min. 150 kg/m³.

Construction details:





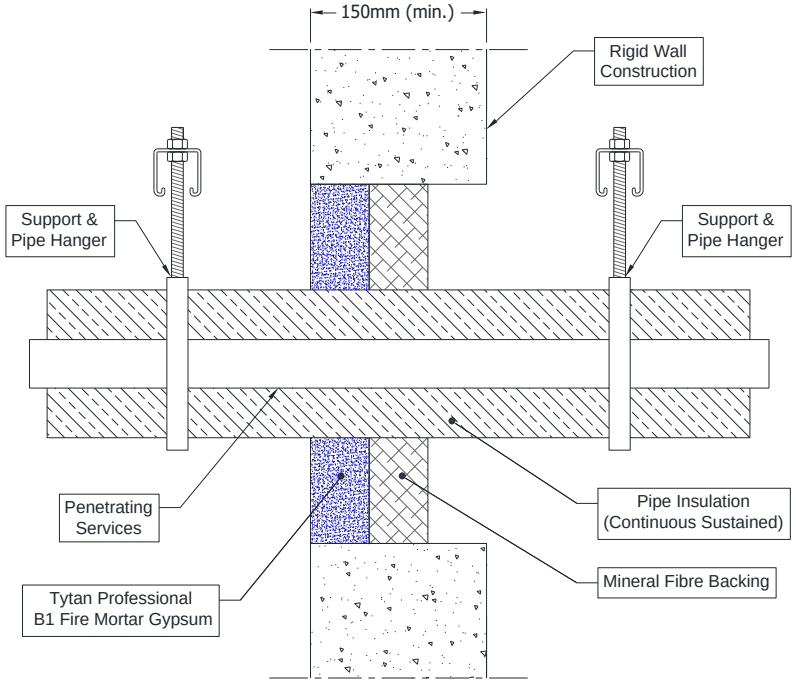
A.1.1.1 Single side penetration seal with cables

Services	Maximum aperture	Classification
None (blank)	As section 2. 4)	**E 180, EI 120**
Single electrical cables up to 21 mm Ø		**E 180, EI 60**
Single electrical cables up to 21 mm Ø	80 x 80 mm	**E 240, EI 60**
Electrical cables up to 21 mm Ø (single, bundled and on trays)	As section 2. 4)	**E 180, EI 60**
Electrical cables up to 50 mm Ø (single, bundled and on trays)		**E 180, EI 45**
Electrical cables up to 80 mm Ø (single, bundled and on trays)		**E 120, EI 45**
Telecommunication cables up to 21 mm Ø (single or bundles up to 100 mm Ø)		**E 180, EI 90**
Steel cable trays & ladders		**E 180, EI 60**
Non-sheathed wires up to 17 mm Ø		**E 180, EI 45**
Non-sheathed wires up to 24 mm Ø		**E 180, EI 30**
Copper conduits up to 16 mm Ø		**E 180 C/U, EI 30 C/U**
Steel conduits up to 16 mm Ø		**E 180 C/U, EI 60 C/U**
PVC conduits up to 16 mm Ø		**E 180 C/U, E 180 C/C, EI 60 C/U, EI 60 C/C**

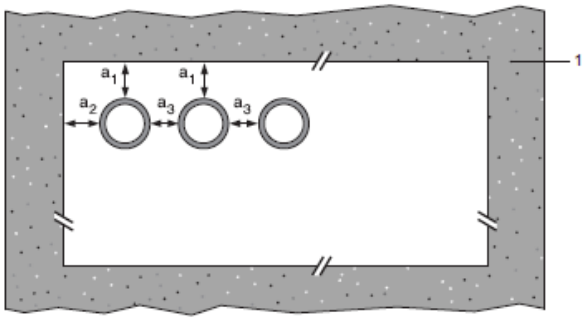
A.1.2 Pipe penetration seal with 50 mm deep Tytan Professional B1 Fire Mortar Gypsum backed with mineral fibre board

Penetration Seal: CS (Continuous Sustained) insulated metallic pipes fitted at any position within the aperture (min. separation 30 mm from seal edges, with min. 50 mm Tytan Professional B1 Fire Mortar Gypsum to either sides of the wall (or any position in between), backed with min. 50 mm stone wool min. 150 kg/m³.

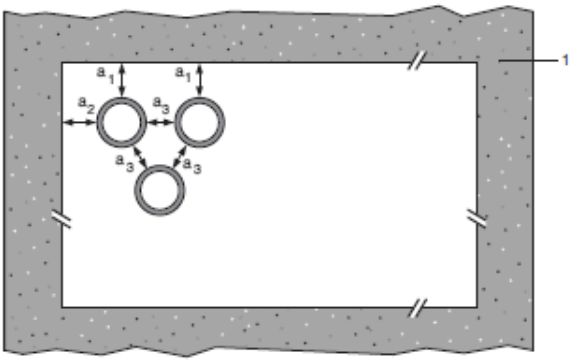
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

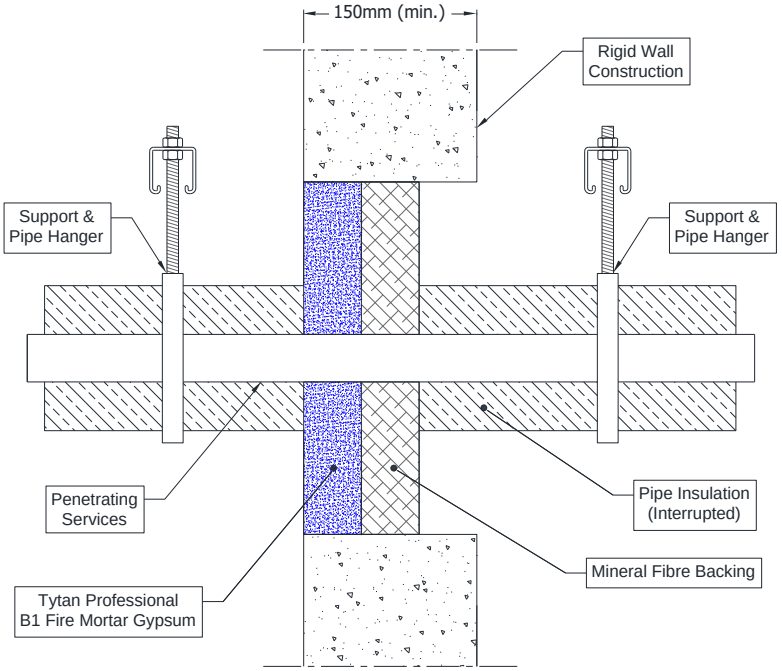
A.1.2.1 Single side penetration seal with pipes

Services	Maximum aperture	Insulation	Classification
Steel pipes 219 diameter/ 5-14.2 mm wall	As section 2. 4)	30 mm stone wool min. 80 kg/m³	**E 120 C/U, EI 90 C/U**

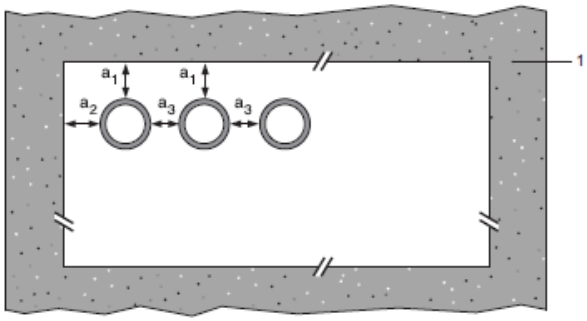
A.1.3 Pipe penetration seal with 50 mm deep Tytan Professional B1 Fire Mortar Gypsum backed with mineral fibre board

Penetration Seal: LI (Local Interrupted) or CI (Continuous Interrupted) insulated metallic and composite pipes fitted at any position within the aperture (min. separation 30 mm from seal edges, with min. 50 mm Tytan Professional B1 Fire Mortar Gypsum to either sides of the wall (or any position in between), backed with min. 50 mm stone wool min. 150 kg/m³.

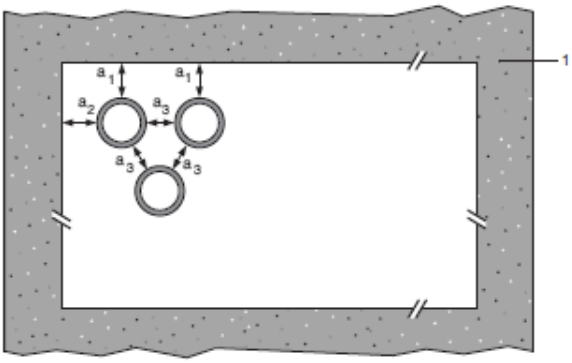
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

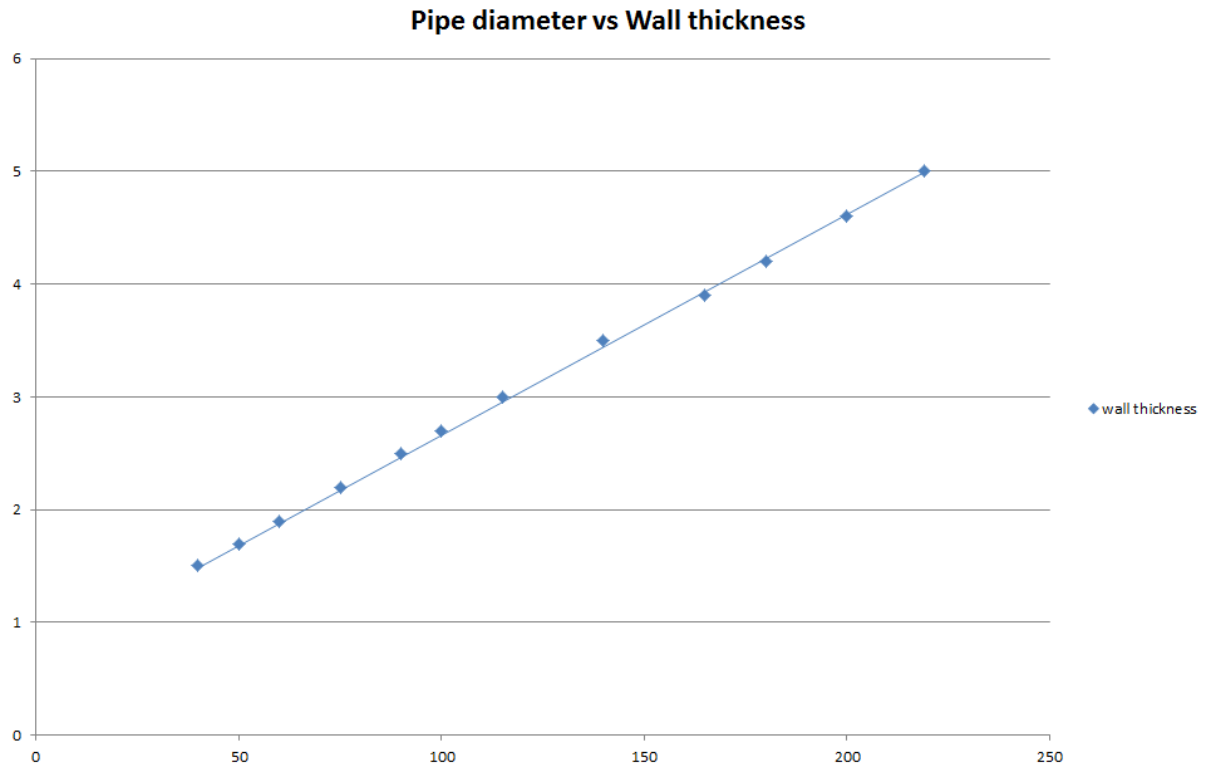
a3 Pipe / pipe separation

A.1.3.1 Single side penetration seal with pipes

Services	Maximum aperture	Insulation, minimum length, thickness and density	Classification
Copper or steel pipes up to 12 mm diameter/ 0.9-5 mm wall	70 x 70 mm	1000 mm long, 20 mm stone wool 80 kg/m^3	**EI 240 C/C**
Copper or steel pipes up to 54 mm diameter/ 1-14.2 mm wall	115 x 115 mm	1000 mm long, 20 mm stone wool 80 kg/m^3	**E 240 C/C, EI 120 C/C**
Copper or steel pipes up to 54 mm diameter/ 1-14.2 mm wall	As section 2. 4)	1000 mm long, 20 mm stone wool 80 kg/m^3	**E 180 C/C, EI 120 C/C**
75 mm Alupex composite pipes with 7.5 mm wall		600 mm long, 32 mm Elastomeric insulation minimum class B-s3,d0	**EI 60 C/C**

Services Mild or stainless steel pipes	Maximum aperture	Insulation, minimum length, thickness and density	Classification
40 mm diameter/1.5-14.2 mm wall*	100 x 100 mm	1000 mm long, 20 mm Stone wool insulation 80 kg/m^3	**EI 240 C/U**
40 mm diameter/1.5-14.2 mm wall*	As section 2. 4)		**E 180 C/U, EI 120 C/U**
40 mm diameter/1.5-14.2 mm wall*		1000 mm long, 30 mm Stone wool insulation 80 kg/m^3	**E 120 C/U, EI 90 C/U**
50 mm diameter/1.7-14.2 mm wall*			
60 mm diameter/1.9-14.2 mm wall*			
75 mm diameter/2.2-14.2 mm wall*			
90 mm diameter/2.5-14.2 mm wall*			
100 mm diameter/2.7-14.2 mm wall*			
115 mm diameter/3-14.2 mm wall*			
140 mm diameter/3.5-14.2 mm wall*			
165 mm diameter/ 3.9-14.2 mm wall*			
180 mm diameter/ 4.2-14.2 mm wall*			
200 mm diameter/ 4.6-14.2 mm wall*			
219 mm diameter/ 5.0-14.2 mm wall*			

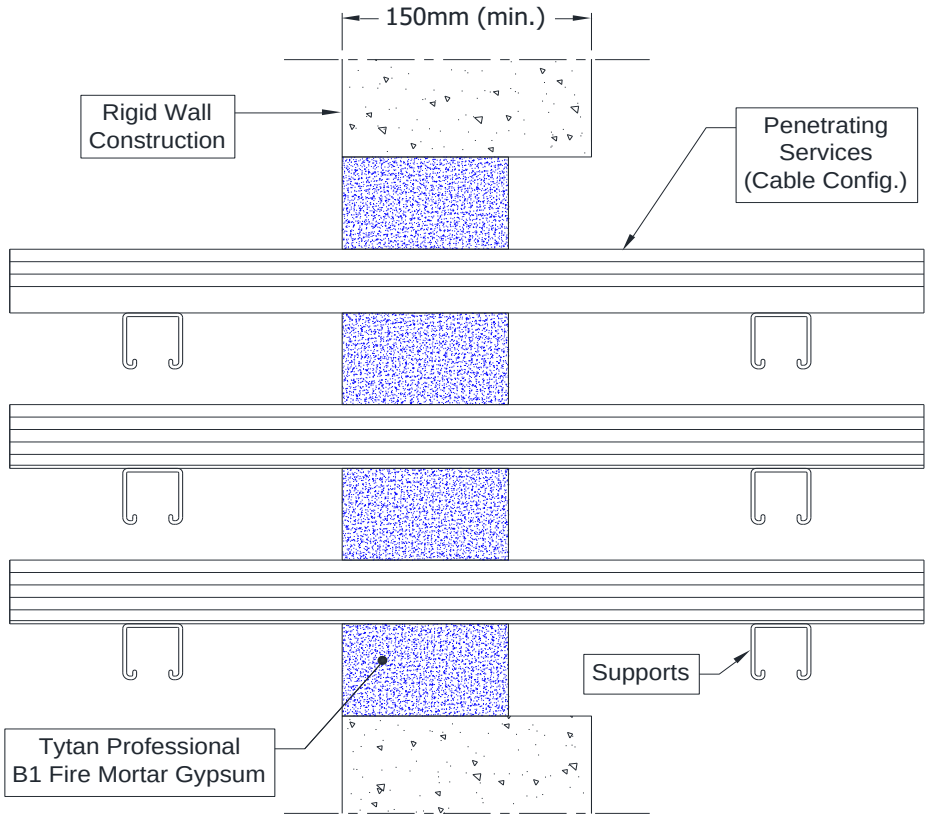
* Typical pipe diameters shown, see below graph for intermediate sizes


Pipe diameter vs Wall thickness
6
5
4
3
2
1
0
0
50
100
150
200
250
wall thickness

A.1.4 Cable penetration seal with 100 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: Cables fitted at any position within the aperture (min. separation 25 mm from seal edges), with min. 100 mm Tytan Professional B1 Fire Mortar Gypsum to either side of the wall (or at any position in between).

Construction details:



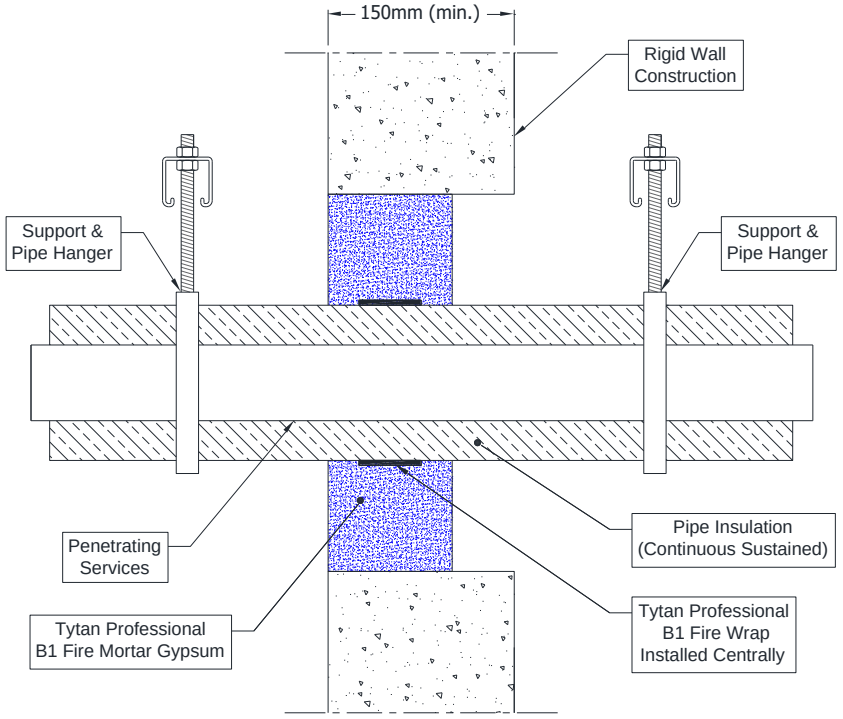
A.1.4.1 Single side penetration seal with cables

Services	Maximum aperture	Classification
None (blank)	As section 2. 4)	**EI 240**
Electrical cables up to 21 mm Ø (single, bundled and on trays)		**E 240, EI 60**
Electrical cables up to 80 mm Ø (single, bundled and on trays)		
Cables up to 21mm Ø in tied bundles up to 100mm Ø		**EI 120**
Steel cable trays & ladders		**E 120, EI 60**
Non-sheathed cables up to 24 mm Ø		
Copper conduits up to 16 mm Ø		**E 180 C/U, EI 30 C/U**
Steel conduits up to 16 mm Ø		**E 180 C/U, EI 60 C/U**
PVC conduits up to 16 mm Ø		**EI 240 C/U, EI 240 C/C**

A.1.5 Pipe penetration seal with 100 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: CS (Continuous Sustained) insulated metallic pipes fitted at any position within the aperture (min. separation 10 mm from seal edges), with min. 100 mm Tytan Professional B1 Fire Mortar Gypsum to either side of the wall. Tytan Professional B1 Fire Wraps are required to be centrally within the seal for pipes with combustible insulation. Maximum seal size as section 2. 4).

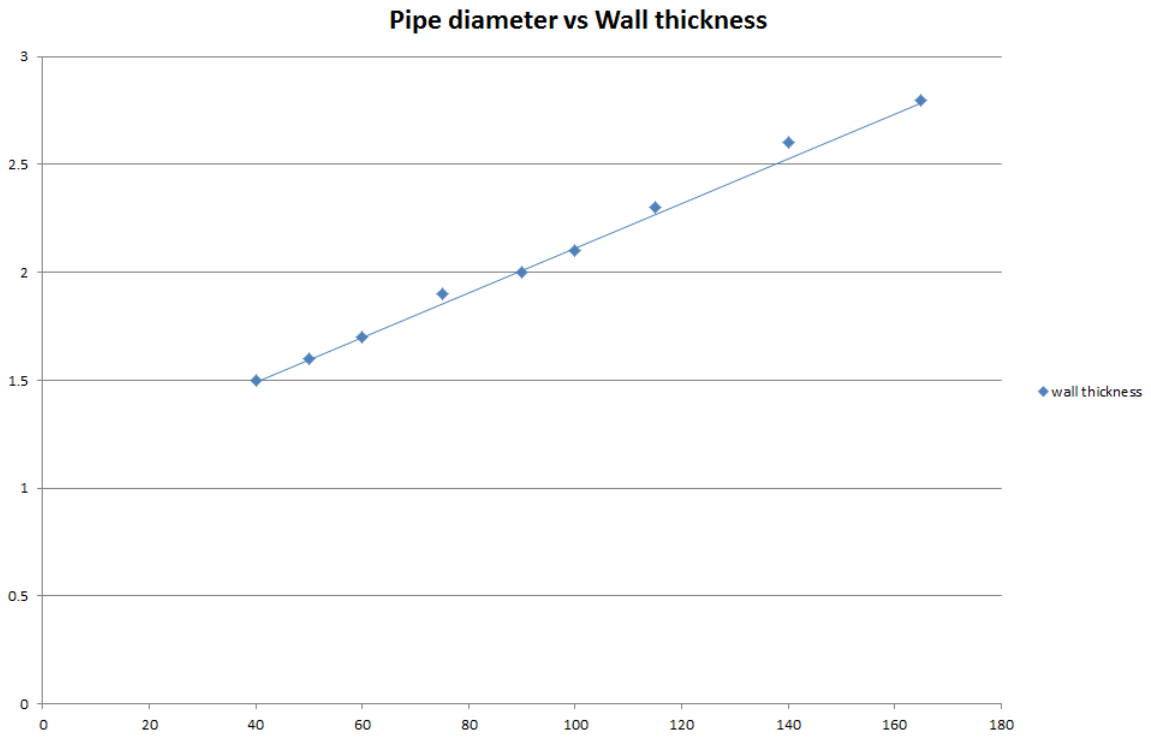
Construction details:



A.1.5.1 Single side penetration seal with pipes

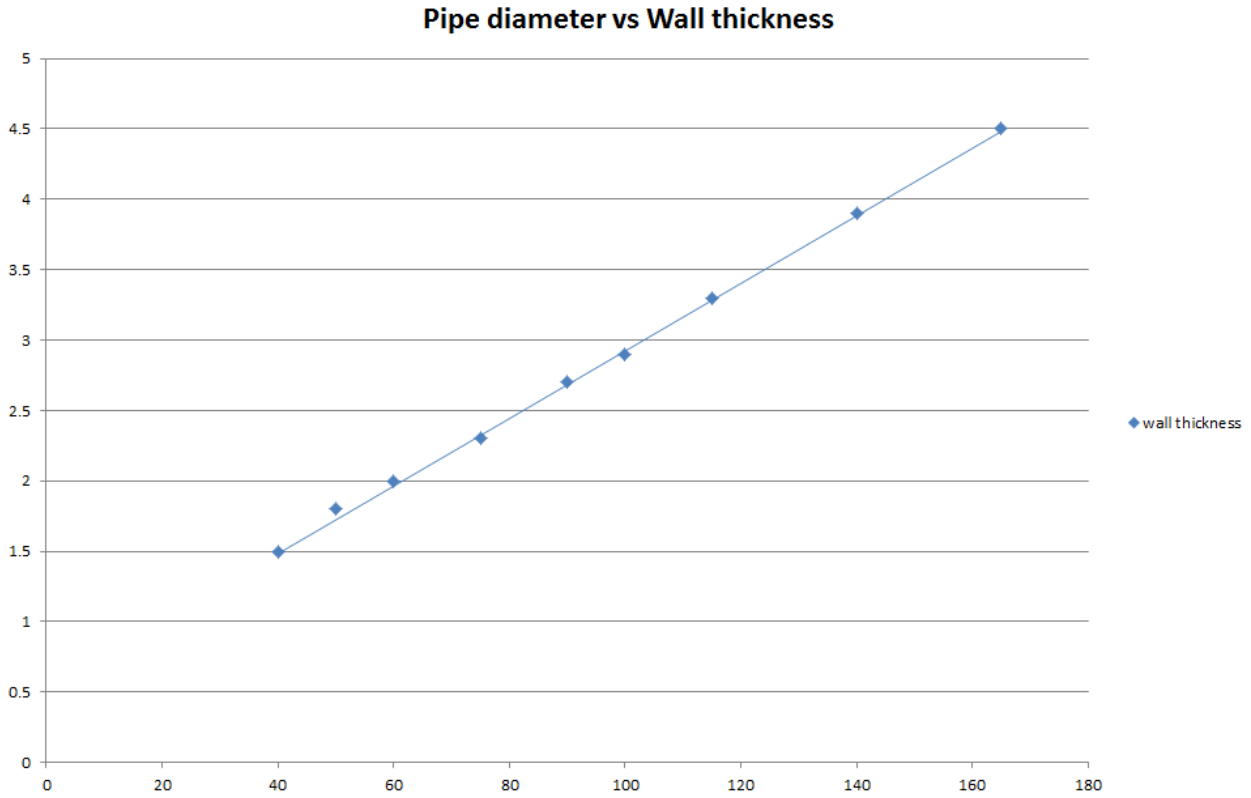
Services	Wrap	Insulation	Classification
Mild or stainless steel pipes			
40 mm diameter/1.5-14.2 mm wall	1 off 50 x 3.6mm Tytan Professional B1 Fire Wrap, fitted central	13 mm Elastomeric insulation minimum class B-s3,d0	**EI 240 C/U**
165 mm diameter/4.5-14.2 mm wall		9 mm Elastomeric insulation minimum class B-s3,d0	**E 240 C/U, EI 30 C/U**
40 mm diameter/1.5-14.2 mm wall*	1 off 50 x 1.8mm Tytan Professional B1 Fire Wrap, fitted central	13 -19 mm Elastomeric insulation minimum class B-s3,d0	**E 240 C/U, EI 60 C/U**
50 mm diameter/1.6-14.2 mm wall*			
60 mm diameter/1.7-14.2 mm wall*			
75 mm diameter/1.9-14.2 mm wall*			
90 mm diameter/2-14.2 mm wall*			
100 mm diameter/2.1-14.2 mm wall*			
115 mm diameter/2.3-14.2 mm wall*			
140 mm diameter/2.6-14.2 mm wall*			
165 mm diameter/2.8-14.2 mm wall*			

* Typical pipe diameters shown, see below graph for intermediate sizes



Services Mild or stainless steel pipes	Wrap	Insulation	Classification
40 mm diameter/1.5-14.2 mm wall*	1 off 50 x 3.6mm Tytan Professional B1 Fire Wrap, fitted central	13-25 mm Elastomeric insulation minimum class B-s3,d0	**E 180 C/U, EI 60 C/U**
50 mm diameter/1.8-14.2 mm wall*			
60 mm diameter/2-14.2 mm wall*			
75 mm diameter/2.3-14.2 mm wall*			
90 mm diameter/2.7-14.2 mm wall*			
100 mm diameter/2.9-14.2 mm wall*			
115 mm diameter/3.3-14.2 mm wall*			
140 mm diameter/3.9-14.2 mm wall*			
165 mm diameter/4.5-14.2 mm wall*			

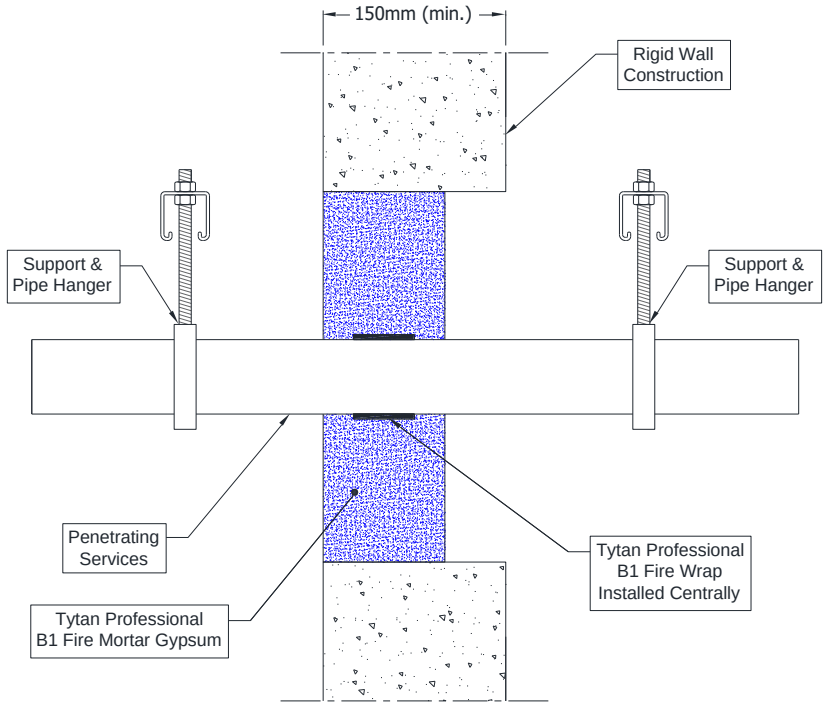
* Typical pipe diameters shown, see below graph for intermediate sizes


Pipe diameter vs Wall thickness
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0
20
40
60
80
100
120
140
160
180
wall thickness

A.1.6 Pipe penetration seal with 100 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: plastic pipes fitted at any position within the aperture (min. separation 10 mm from seal edges), with min. 100 mm Tytan Professional B1 Fire Mortar Gypsum to either side of the wall. Tytan Professional B1 Fire Wraps are required to be centrally within the seal. Maximum seal size as section 2. 4).

Construction details:



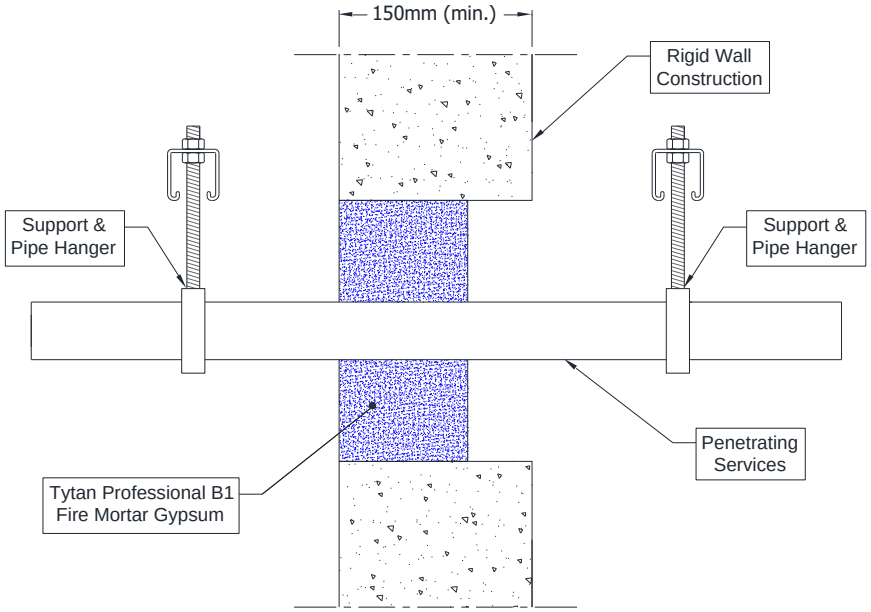
A.1.6.1 Single side penetration seal with pipes

Services	Wrap	Insulation	Classification
PVC-U pipes according to EN 1329-1, EN 1452-2 and EN 1453-1, PVC-C according to EN 1566-1			
315 mm diameter/9.2 mm wall	1 off 75 x 18 mm Tytan Professional B1 Fire Wrap, fitted central	None	**EI 120 C/C**

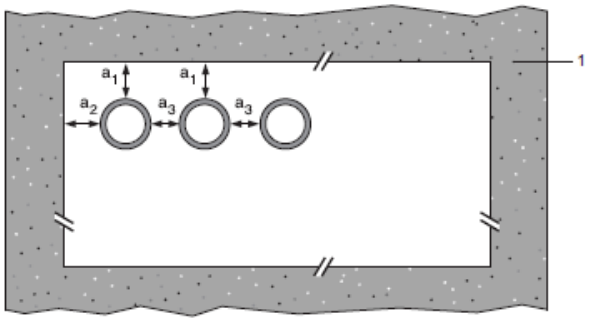
A.1.7 Pipe penetration seal with 100 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: Combustible pipes sealed with Tytan Professional B1 Fire Mortar Gypsum, to either side of the wall. Minimum separation between pipes of 30 mm (a_3) and from seal edges 30 mm (a_1 & a_2). Maximum seal size as section 2. 4).

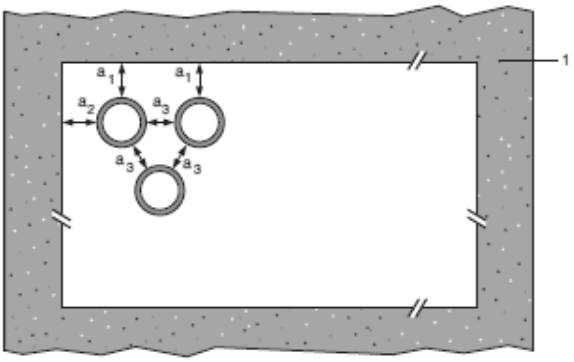
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

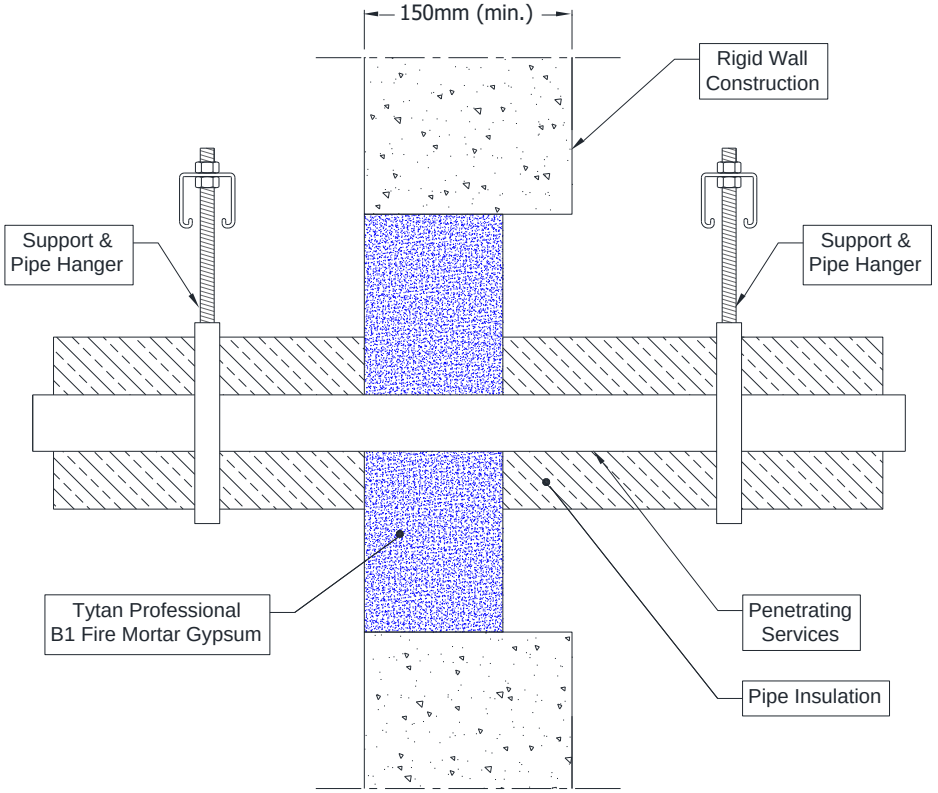
A.1.7.1 Single side penetration seal with pipes

Services	Seal Depth, minimum	Permitted configuration for seal separation	Classification
PVC-U pipes according to EN 1329-1, EN 1452-2 and EN 1453-1^, PVC-C according to EN 1566-1			
Diameter up to 32 mm, wall thickness 1.6 – 2.4 mm	100 mm	1 & 2	**EI 120 U/C, C/C**
PE pipes according to EN 1519-1, EN 12201-2 and EN 12006-1[$], ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Diameter up to 32 mm, wall thickness 1.8 – 3.0 mm	100 mm	1 & 2	**EI 120 U/C, C/C**
PP pipes according to EN 1852-1: 2009			
Diameter up to 32 mm, wall thickness 1.9 – 4.4 mm	100 mm	1 & 2	**EI 120 U/C, C/C**

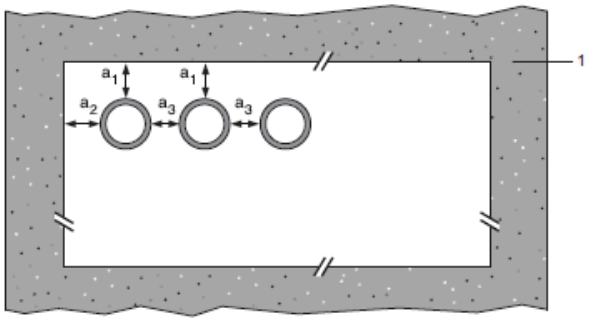
A.1.8 Pipe penetration seal with 100 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: 1000 mm (min.) LI (Local Interrupted) or CI (Continuous Interrupted) insulated metallic pipes fitted at any position within the aperture (min. separation 20 mm from seal edges, with min. 100 mm Tytan Professional B1 Fire Mortar Gypsum to either sides of the wall (or any position in between)

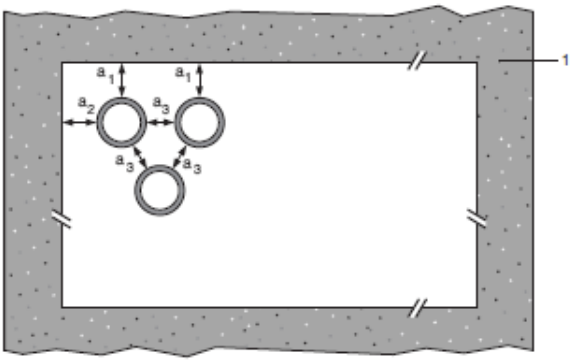
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

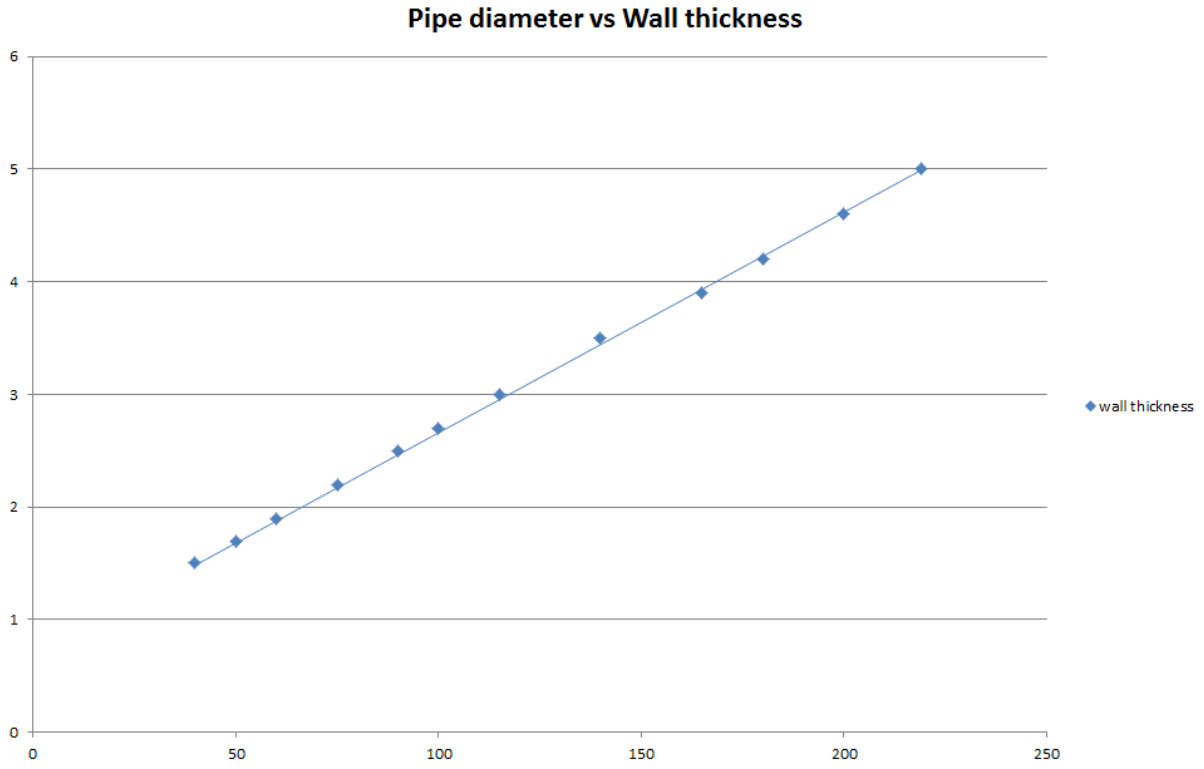
a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

A.1.8.1 Single side penetration seal with pipes

Services Mild or stainless steel pipes	Maximum aperture	Insulation, minimum thickness and density	Classification
40 mm diameter/1.5-14.2 mm wall*	As section 2. 4)	20 mm Stone wool insulation 80 kg/m^3	**EI 240 C/U**
40 mm diameter/1.5-14.2 mm wall*		30 mm Stone wool insulation 80 kg/m^3	**E 240 C/U, EI 120 C/U**
50 mm diameter/1.7-14.2 mm wall*			
60 mm diameter/1.9-14.2 mm wall*			
75 mm diameter/2.2-14.2 mm wall*			
90 mm diameter/2.5-14.2 mm wall*			
100 mm diameter/2.7-14.2 mm wall*			
115 mm diameter/3-14.2 mm wall*			
140 mm diameter/3.5-14.2 mm wall*			
165 mm diameter/ 3.9-14.2 mm wall*			
180 mm diameter/ 4.2-14.2 mm wall*			
200 mm diameter/ 4.6-14.2 mm wall*			
219 mm diameter/ 5.0-14.2 mm wall*			

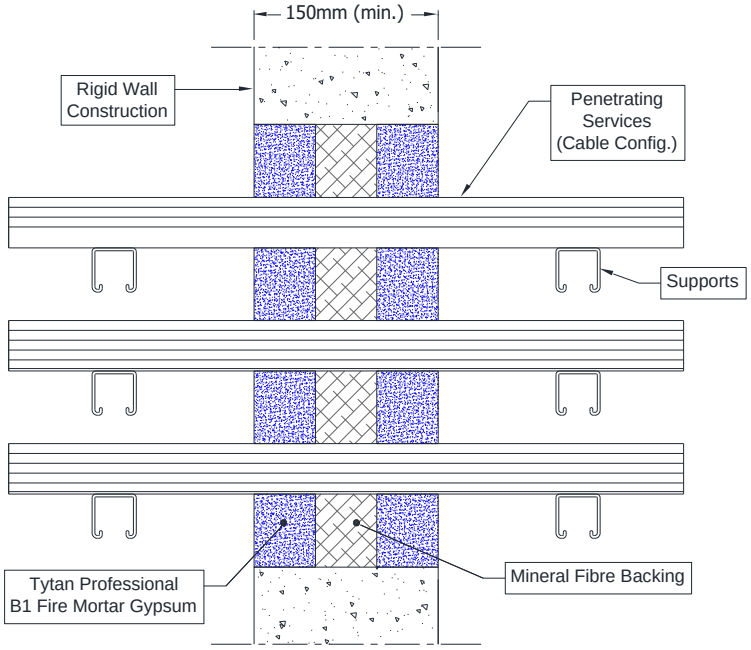
* Typical pipe diameters shown, see below graph for intermediate sizes



A.1.9 Pipe penetration seal with 50 mm deep Tytan Professional B1 Fire Mortar Gypsum to both faces

Penetration Seal: Cables fitted with Tytan Professional B1 Fire Mortar Gypsum to both sides of the wall, backed with stone wool insulation board min. 150kg/m^3. Maximum seal size as section 2. 4) and minimum separation between cables and the edge of the seal of 30 mm.

Construction details:



A.1.9.1 Single side penetration seal with pipes

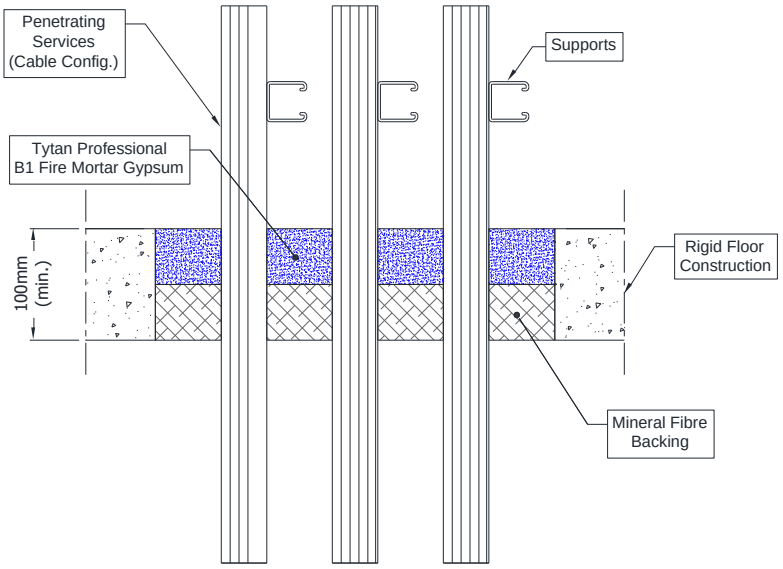
Services	Mortar depth	Backing	Insulation	Classification
Blank seals	Min. 50 mm	Min. 50 mm Stone wool min. 150 kg/m^3	None	**EI 240**
Electric cables up to 80 mm diameter, single or in a bundle.				**E 240, EI 60**
Steel cable trays and ladders up to 500 mm wide				
Telecoms cables up to 21 mm diameter, single or in a bundle up to 100 mm diameter				**EI 60**
Unsheathed wires up to 24 mm diameter				**E 240, EI 120**

A.2 Rigid floor constructions according to 1.2.1 with floor thickness of minimum 100 mm

A.2.1 Cable penetration seal with 50 mm deep Tytan Professional B1 Fire Mortar Gypsum backed with mineral fibre board

Penetration Seal: Cables fitted at any position within the aperture (min. separation 30 mm from seal edges), with min. 50 mm Tytan Professional B1 Fire Mortar Gypsum flush with the top of the floor, backed with min. 50 mm stone wool min. 150 kg/m^3

Construction details:



A.2.1.1 Single side penetration seal with cables

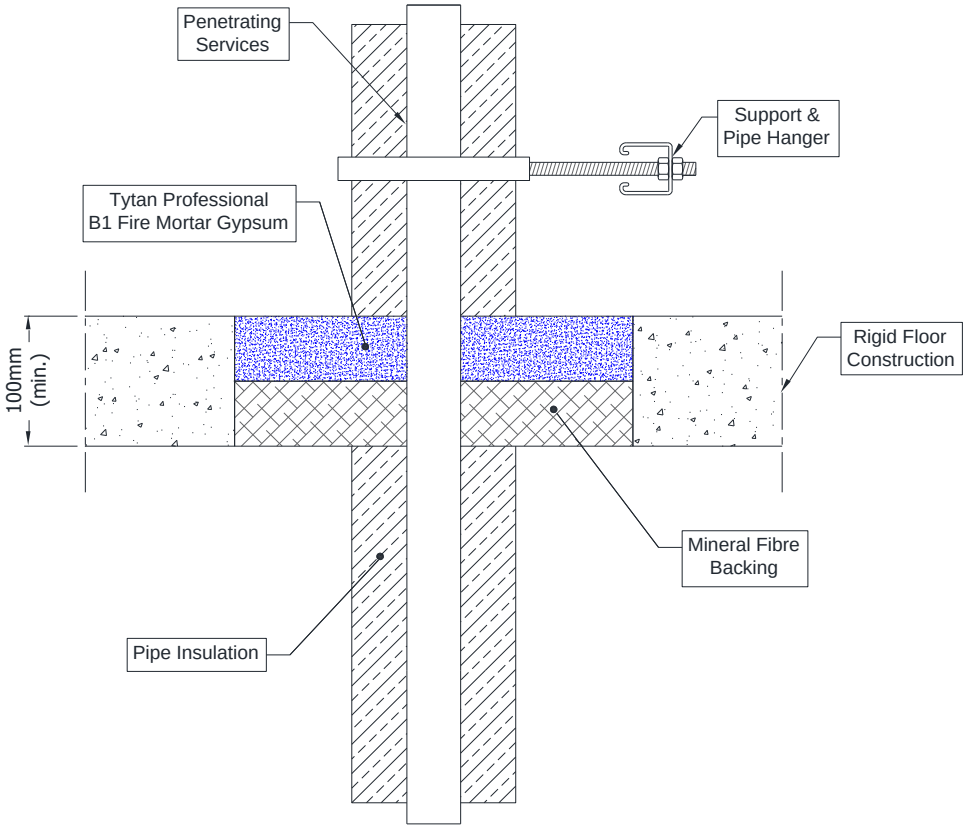
Services	Maximum aperture	Classification
None (blank)	As section 2. 4)	**EI 180**
Single* electrical cables up to 21 mm Ø		**E 180, EI 90**
Electrical cables up to 21 mm Ø (single, bundled and on trays)		**E 180, EI 60**
Electrical cables up to 80 mm Ø (single, bundled and on trays)		**E 90, EI 45**
Cables up to 21mm Ø in tied bundles up to 100mm Ø		**EI 180**
Steel cable trays & ladders		**E 90, EI 60**
Non-sheathed wires up to 17 mm Ø		**E 180, EI 60**
Non-sheathed wires up to 24 mm Ø		**E 180, EI 30**
PVC conduits up to 16 mm Ø		**EI 180 C/U, EI 180 C/C**

* To be separated by at least 30 mm

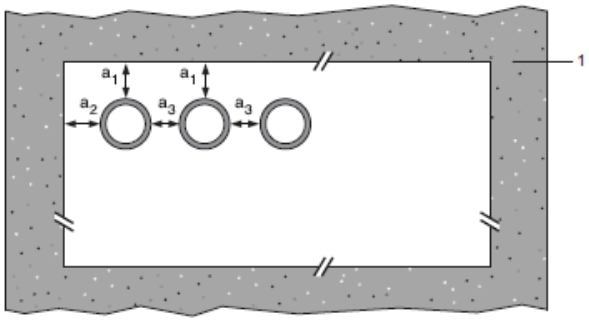
A.2.2 Pipe penetration seal with 50 mm deep Tytan Professional B1 Fire Mortar Gypsum backed with mineral fibre board

Penetration Seal: 1000 mm (min.) LI (Local Interrupted) or CI (Continuous Interrupted) insulated metallic pipes fitted at any position within the aperture (min. separation 30 mm from seal edges, with min. 50 mm Tytan Professional B1 Fire Mortar Gypsum flush with the top of floor, backed with min. 50 mm stone wool min. 150 kg/m³

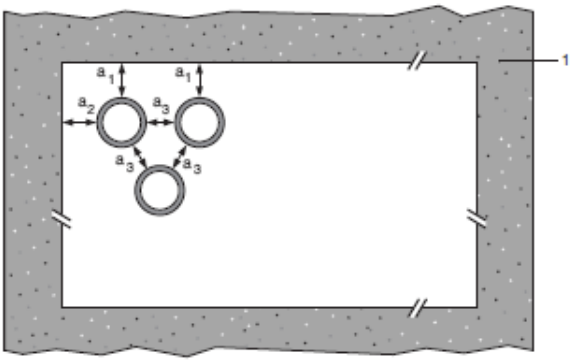
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

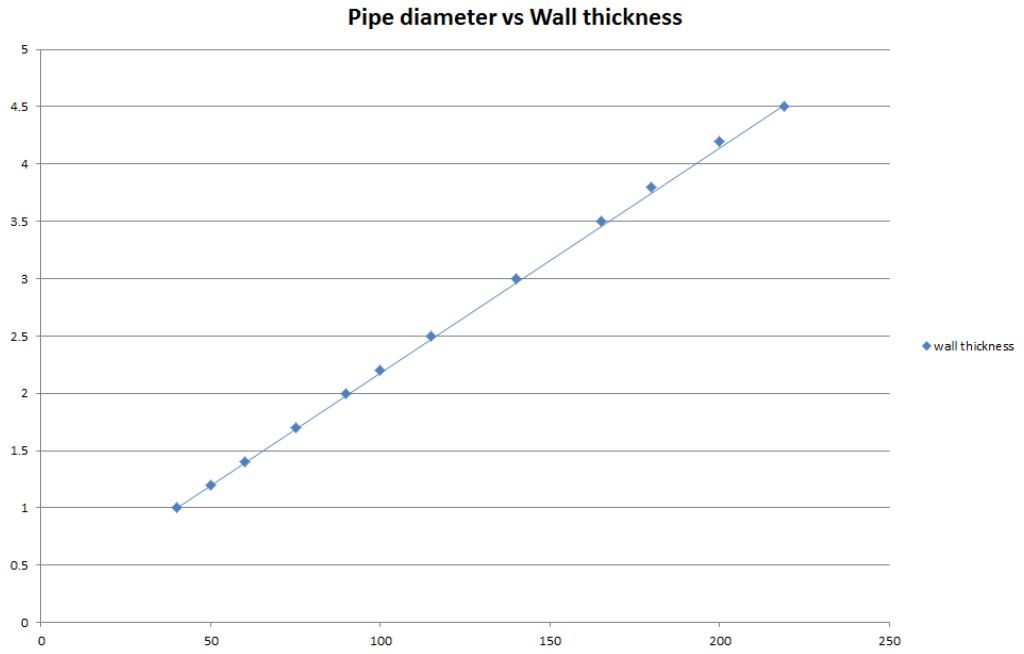
a3 Pipe / pipe separation

A.2.2.1 Single side penetration seal with pipes

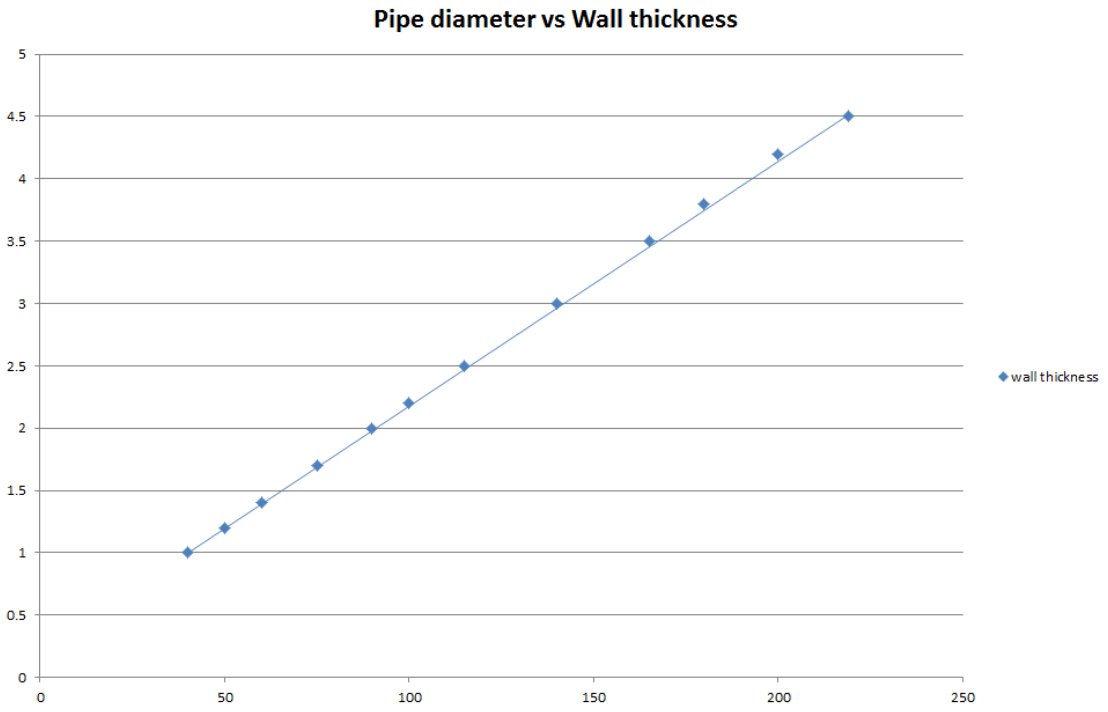
Services	Maximum aperture	Insulation, minimum thickness and density	Classification
Copper or steel pipes up to 12 mm diameter/ 1-5 mm wall	70 x 70 mm	20 mm stone wool 80 kg/m^3	**EI 240 C/C**
Copper or steel pipes up to 54 mm diameter/ 1-14.2 mm wall	115 x 115 mm		**E 240 C/C, EI 180 C/C**
Copper or steel pipes up to 54 mm diameter/ 1-14.2 mm wall	As section 2. 4)		**EI 180 C/C**

Services Mild or stainless steel pipes	Maximum aperture	Insulation, minimum thickness and density	Classification
40 mm diameter/1-14.2 mm wall*	280 x 280 mm	20 mm Stone wool insulation 80 kg/m^3	**EI 240 C/U**
40 mm diameter/1-14.2 mm wall*		30 mm Stone wool insulation 80 kg/m^3	**E 240 C/U, EI 90 C/U**
50 mm diameter/1.2-14.2 mm wall*			
60 mm diameter/1.4-14.2 mm wall*			
75 mm diameter/1.7-14.2 mm wall*			
90 mm diameter/2-14.2 mm wall*			
100 mm diameter/2.2-14.2 mm wall*			
115 mm diameter/2.5-14.2 mm wall*			
140 mm diameter/3-14.2 mm wall*			
165 mm diameter/3.5-14.2 mm wall*			
180 mm diameter/3.8-14.2 mm wall*			
200 mm diameter/4.2-14.2 mm wall*			
219 mm diameter/4.5-14.2 mm wall*			

* Typical pipe diameters shown, see below graph for intermediate sizes



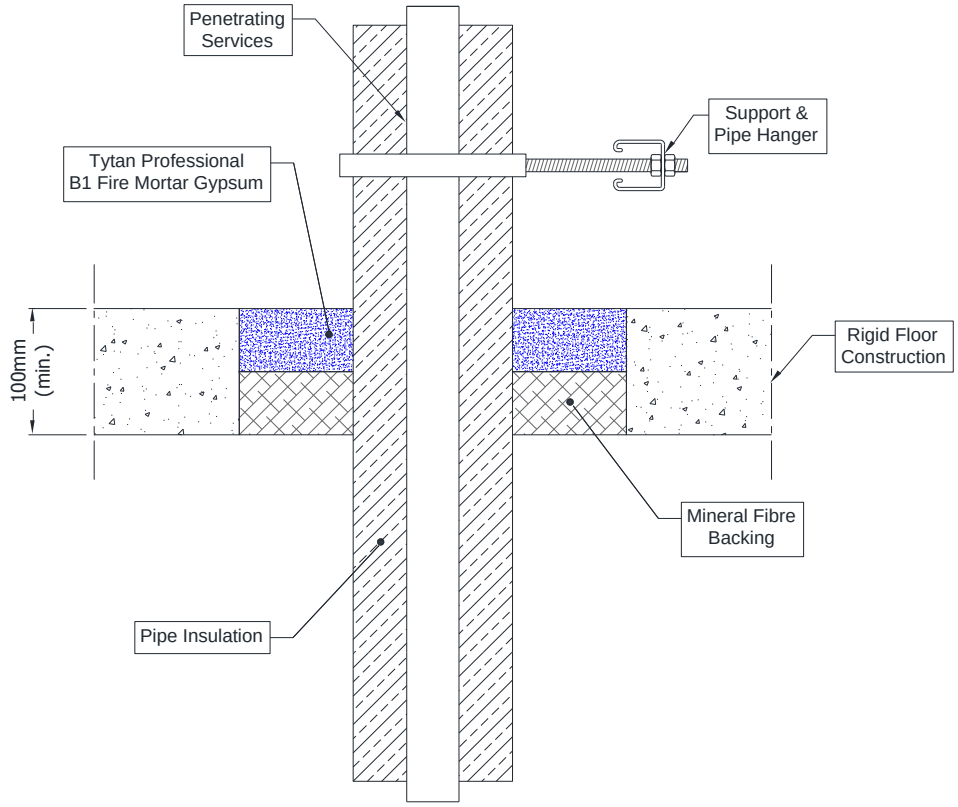
Services Mild or stainless steel pipes	Maximum aperture	Insulation, minimum thickness and density	Classification
40 mm diameter/1-14.2 mm wall*	As section 2. 4)	20 mm Stone wool insulation 80 kg/m^3	**EI 180 C/U**
40 mm diameter/1-14.2 mm wall*		30 mm Stone wool insulation 80 kg/m^3	**E 180 C/U, EI 90 C/U**
50 mm diameter/1.2-14.2 mm wall*			
60 mm diameter/1.4-14.2 mm wall*			
75 mm diameter/1.7-14.2 mm wall*			
90 mm diameter/2-14.2 mm wall*			
100 mm diameter/2.2-14.2 mm wall*			
115 mm diameter/2.5-14.2 mm wall*			
140 mm diameter/3-14.2 mm wall*			
165 mm diameter/3.5-14.2 mm wall*			
180 mm diameter/3.8-14.2 mm wall*			
200 mm diameter/4.2-14.2 mm wall*			
219 mm diameter/4.5-14.2 mm wall*			



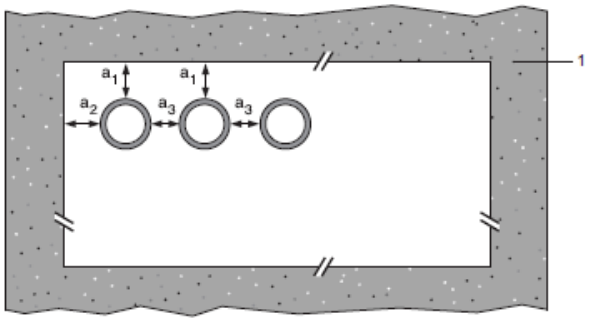
A.2.3 Pipe penetration seal with 50 mm deep Tytan Professional B1 Fire Mortar Gypsum backed with mineral fibre board

Penetration Seal: CS (Continuous Sustained) insulated metallic pipes fitted at any position within the aperture, with min. 50 mm Tytan Professional B1 Fire Mortar Gypsum, backed with min. 50 mm stone wool min. 140 kg/m^3 positioned at any height within the depth of the floor. Minimum separation between penetration seals and seal edges of 30 mm (configuration 1 & 2). Maximum aperture size as section 2. 4).

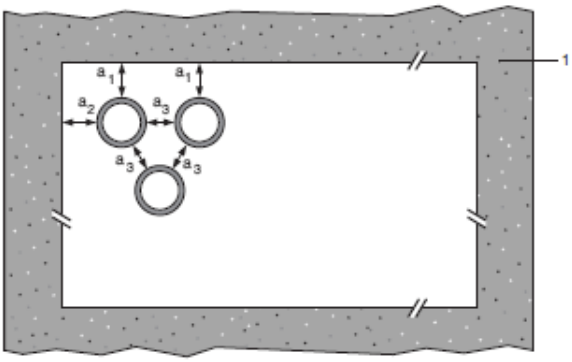
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

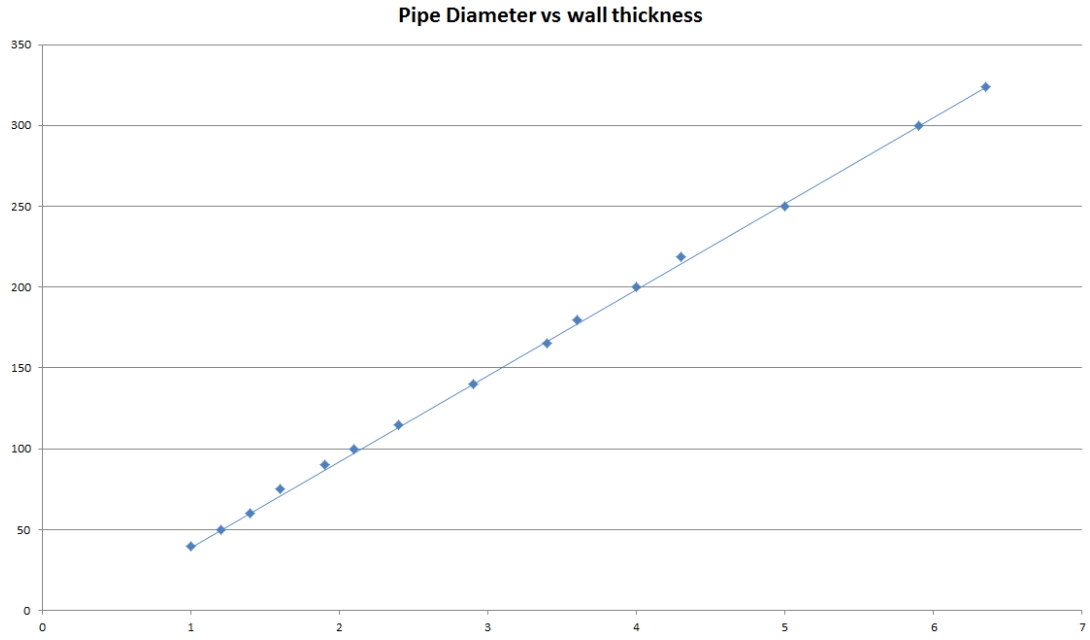
a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

A.2.3.1

Mild or stainless steel pipes	Insulation	Classification
40 mm diameter/1-14.2 mm wall	20 mm thick stone, mineral wool min. 80 kg/m^3	**EI 180 C/U (EI 240 C/U)***
40 mm diameter/1-14.2 mm wall*	30-80 mm thick stone, mineral wool min. 80 kg/m^3	
50 mm diameter/1.2-14.2 mm wall*		
60 mm diameter/1.4-14.2 mm wall*		
75 mm diameter/1.6-14.2 mm wall*		
90 mm diameter/1.9-14.2 mm wall*		
100 mm diameter/2.1-14.2 mm wall*		
115 mm diameter/2.4-14.2 mm wall*		
140 mm diameter/2.9-14.2 mm wall*		
165 mm diameter/ 3.4-14.2 mm wall*		
180 mm diameter/ 3.6-14.2 mm wall*		
200 mm diameter/ 4.0-14.2 mm wall*		
219 mm diameter/ 4.3-14.2 mm wall*		
250 mm diameter/ 5.0-14.2 mm wall*		
300 mm diameter/ 5.9-14.2 mm wall*		
324 mm diameter/ 6.35-14.2 mm wall*		
PEX pipe in pipe systems	**Insulation**	**Classification**
15 mm diameter x 2.5 mm wall inner /25mm diameter outer	None	**EI 180 C/C (EI 240 C/C)***

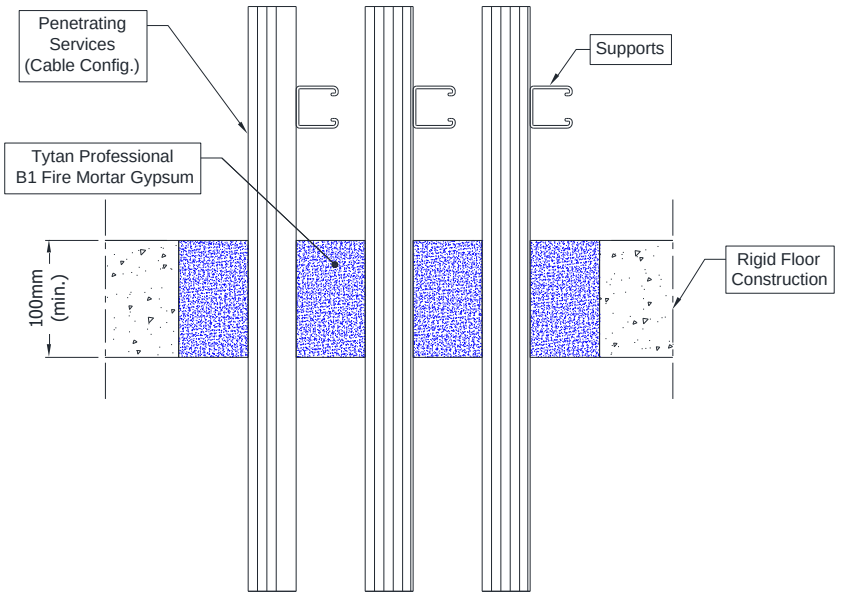
* EI 240 in apertures up to a maximum of 550 x 1100 mm



A.2.4 Cable penetration seal with 100 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: Cables fitted at any position within the aperture (min. separation 30 mm from seal edges), with min. 100 mm Tytan Professional B1 Fire Mortar Gypsum flush with the top of the floor

Construction details:



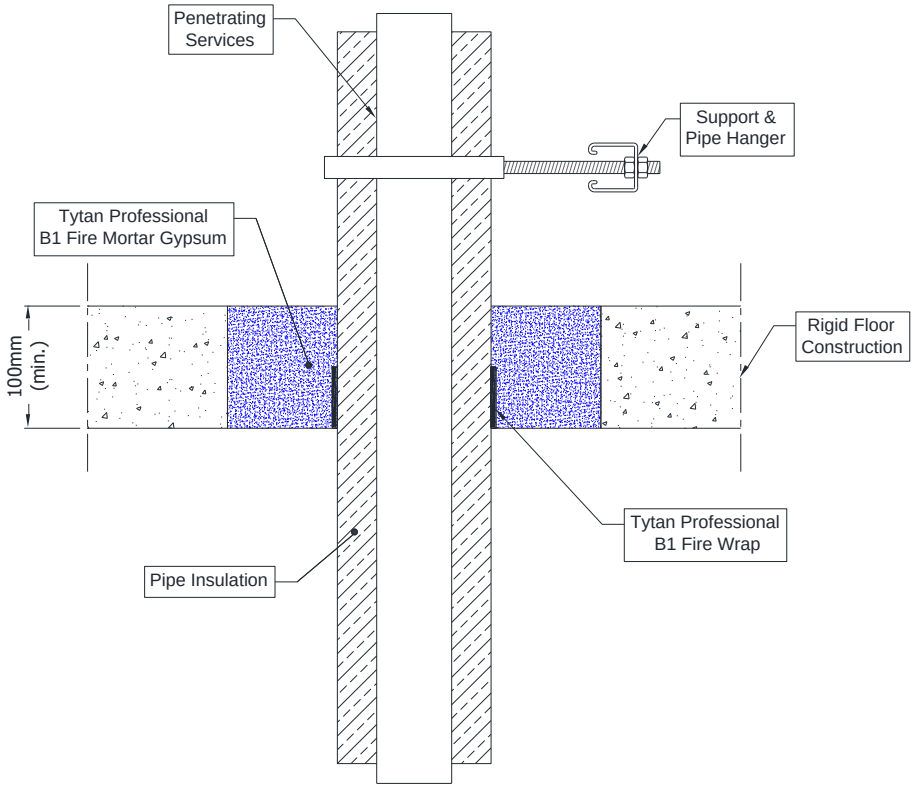
A.2.4.1 Single side penetration seal with cables

Services	Maximum aperture	Classification
None (blank)	As section 2. 4)	**EI 240**
Electrical cables up to 50 mm Ø (single, bundled and on trays)		**E 180, EI 60**
Electrical cables up to 80 mm Ø (single, bundled and on trays)		**E 120, EI 60**
Cables up to 21mm Ø in tied bundles up to 100mm Ø		**E 180, EI 120**
Steel cable trays & ladders		**E 120, EI 60**
Non-sheathed cables up to 17 mm Ø		**E 180, EI 90**
Non-sheathed cables up to 24 mm Ø		**E 180, EI 20**
PVC conduits up to 16 mm Ø		**EI 180 C/U, EI 180 C/C**

A.2.5 Pipe penetration seal with 100 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: CS (Continuous Sustained) insulated metallic pipes fitted at any position within the aperture (min. separation 25 mm from seal edges and 30 mm from other services), with min. 100 mm Tytan Professional B1 Fire Mortar Gypsum at any position within the floor. Tytan Professional B1 Fire Wraps are required to be fitted around combustible pipe insulation. Maximum seal size as section 2. 4).

Construction details:



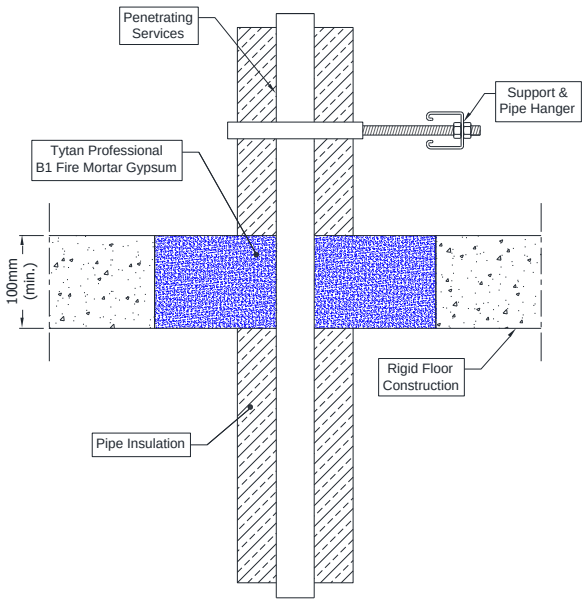
A.2.5.1 Single side penetration seal with pipes

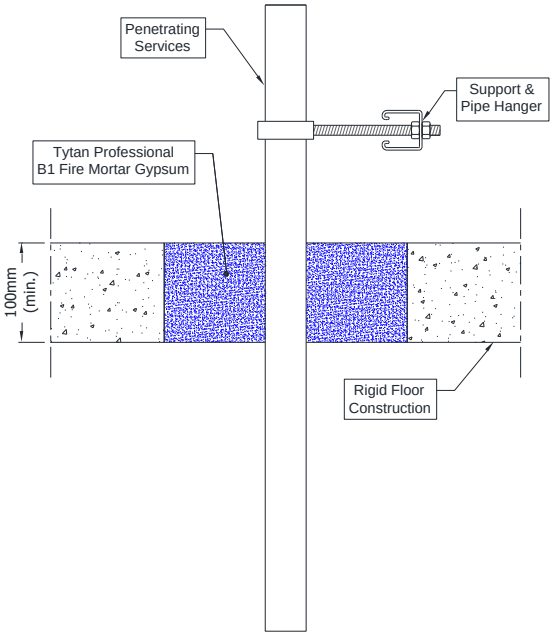
Services	Wrap	Insulation	Classification
Copper and steel pipes			
12 mm diameter/1 mm wall	50 x 3.6 mm Tytan Professional B1 Fire Wrap fitted to the soffit	9 mm Elastomeric insulation minimum class B-s3,d0 or foil faced Phenolic Foam insulation	**EI 240 C/C**
12-54 mm diameter/1-1.2 mm wall		19 mm Elastomeric insulation minimum class B-s3,d0 or foil faced Phenolic Foam insulation	**E 180 C/C, EI 120 C/C**
12-54 mm diameter/1-1.2 mm wall		9-18 & 20-25 mm Elastomeric insulation minimum class B-s3,d0 or foil faced Phenolic Foam insulation	**180 C/C, EI 60 C/C**
12-54 mm diameter/1-1.2 mm wall		25 mm foil faced Phenolic Foam insulation	**E 180 C/C, EI 120 C/C**
12-54 mm diameter/1-1.2 mm wall		40 mm PU Foam insulation	**E 120 C/C, EI 60 C/C**
Alupex pipes			
16 mm diameter/2.25 mm wall	50 x 3.6 mm Tytan Professional B1 Fire Wrap fitted to the soffit	9 mm Elastomeric insulation minimum class B-s3,d0 or foil faced Phenolic Foam insulation	**EI 240 C/C**
16 mm diameter/2.25 mm wall		9-13 mm Elastomeric insulation minimum class B-s3,d0 or foil faced Phenolic Foam insulation	**E 240 C/C, EI 180 C/C**
20 mm diameter/2.25 mm wall			
25 mm diameter/2.5 mm wall			
16 mm diameter/2.25 mm wall		9-24 mm Elastomeric insulation minimum class B-s3,d0 or foil faced Phenolic Foam insulation	**E 180 C/C, EI 90 C/C**
20 mm diameter/2.5 mm wall			
26 mm diameter/3 mm wall			
32 mm diameter/3 mm wall			
40 mm diameter/3.5 mm wall			
50 mm diameter/4 mm wall			
63 mm diameter/4.5 mm wall			
75 mm diameter/4.7 mm wall			
16 mm diameter/2.25 mm wall		25 mm Elastomeric insulation minimum class B-s3,d0 or foil faced Phenolic Foam insulation	**EI 180 C/C**
20 mm diameter/2.5 mm wall			
26 mm diameter/3 mm wall			
32 mm diameter/3 mm wall			
40 mm diameter/3.5 mm wall			
50 mm diameter/4 mm wall			
63 mm diameter/4.5 mm wall			
75 mm diameter/4.7 mm wall			

A.2.6 Pipe penetration seal with Tytan Professional B1 Fire Mortar Gypsum

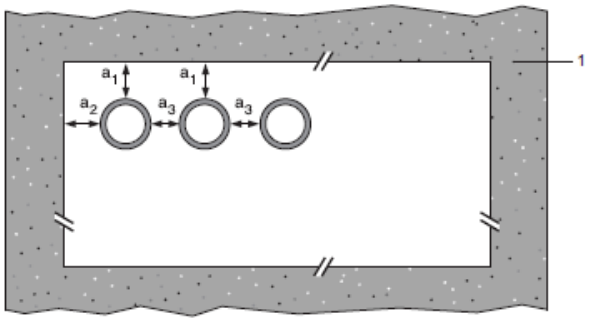
Penetration Seal: 1000 mm (min.)* LI (Local Interrupted) or CI (Continuous Interrupted) insulated and non-insulated metallic and composite pipes fitted at any position within the aperture (min. separation 30 mm from seal edges), with Tytan Professional B1 Fire Mortar Gypsum to either surface of the floor or anywhere between. Maximum seal size as section 2. 4).

Construction details:

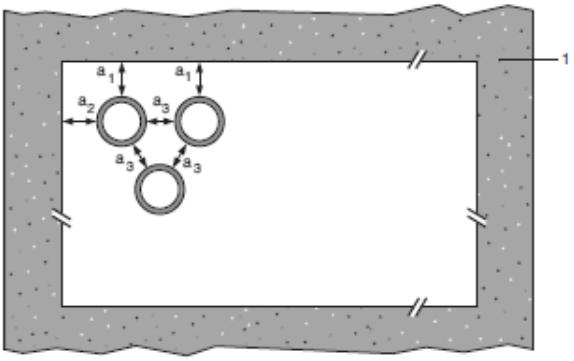




Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

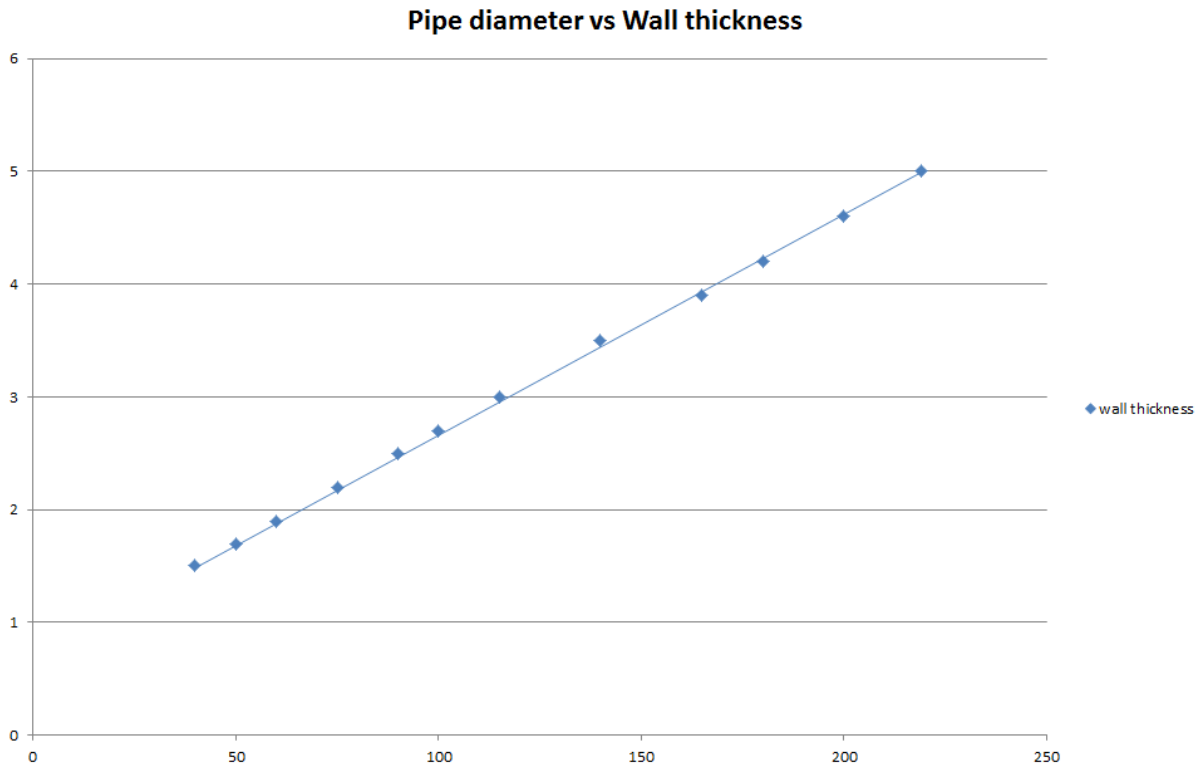
a3 Pipe / pipe separation

A.2.6.1 Single side penetration seal with pipes

Services	Minimum mortar depth and floor thickness	Insulation	Classification
Up to 16 mm diameter steel pipes 1.5-7 mm wall	100 mm	None	**E 240 C/C, EI 120 C/C**
Up to 63.5 mm diameter steel pipes 1.6-14.2 mm wall	150 mm		**E 180 C/U, EI 90 C/U**
Up to 63 mm diameter steel pipes 1.5-14.2 mm wall	100 mm	Tytan Professional B1 Service Coat, 1.5 mm DFT extending 300 mm from the top face of the fire seal	**E 240 C/U, EI 45 C/U**
Up to 90 mm diameter steel pipes 1.5-14.2 mm wall	100 mm		**E 240 C/U, EI 30 C/U**
Up to 12 mm diameter Copper and steel pipes 0.7-1.5 mm wall	120 mm	None	**E 240 C/C, EI 180 C/C**
Up to 54 mm diameter Copper and steel pipes 1.5-14.2 mm wall	100 mm		**E 120 C/C, EI 20 C/C**
75 mm Alupex composite pipes with 4.6 mm wall	100 mm		**E 240 U/C, EI 20 U/C**

Services Mild or stainless steel pipes	Minimum mortar depth and floor thickness	Insulation, minimum thickness and density	Classification
40 mm diameter/1.5-14.2 mm wall*	100 mm	20 mm Stone wool insulation 80 kg/m^3	**EI 240 C/U**
40 mm diameter/1.5-14.2 mm wall*		30 mm Stone wool insulation 80 kg/m^3	**E 240 C/U, EI 120 C/U**
50 mm diameter/1.7-14.2 mm wall*			
60 mm diameter/1.8-14.2 mm wall*			
75 mm diameter/2.1-14.2 mm wall*			
90 mm diameter/2.3-14.2 mm wall*			
100 mm diameter/2.5-14.2 mm wall*			
115 mm diameter/2.8-14.2 mm wall*			
140 mm diameter/3.2-14.2 mm wall*			
165 mm diameter/ 3.6-14.2 mm wall*			
180 mm diameter/ 3.9-14.2 mm wall*			
200 mm diameter/ 4.2-14.2 mm wall*			
219 mm diameter/ 4.5-14.2 mm wall*			

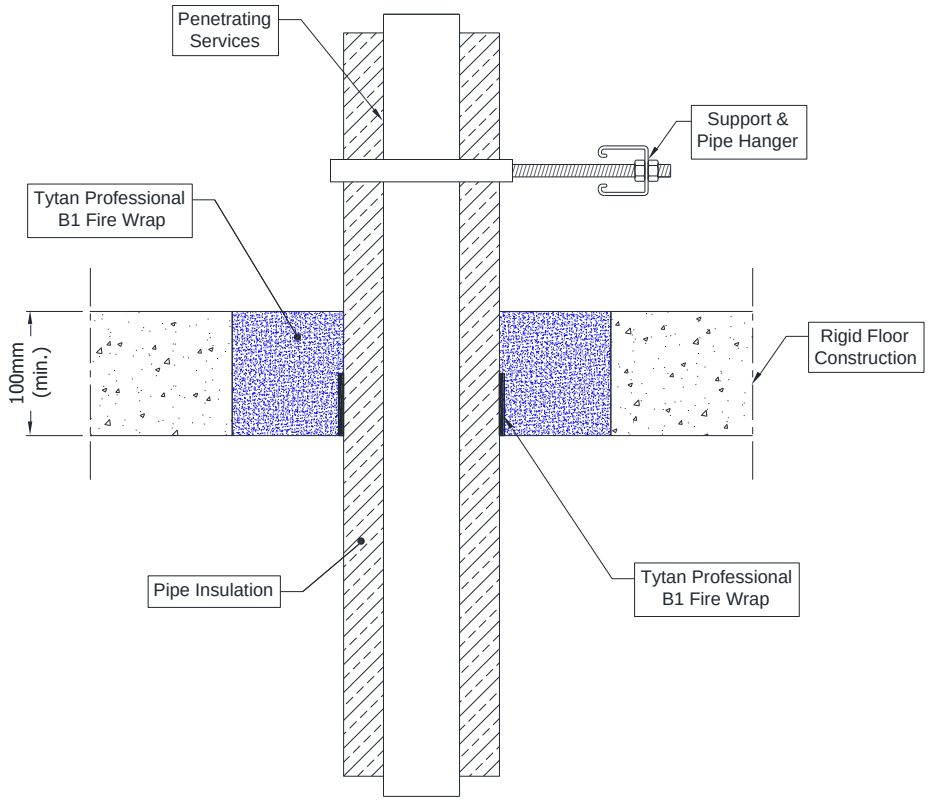
* Typical pipe diameters shown, see below graph for intermediate sizes


Pipe diameter vs Wall thickness
6
5
4
3
2
1
0
0
50
100
150
200
250
wall thickness

A.2.7 Pipe penetration seal with 100 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: CS (Continuous Sustained) insulated metallic pipes fitted at any position within the aperture (min. separation 30 mm from seal edges and 30 mm from other services), with min. 100 mm Tytan Professional B1 Fire Mortar Gypsum to the top surface of the floor. Tytan Professional B1 Fire Wraps are required to be fitted around combustible pipe insulation. Maximum seal size as section 2. 4).

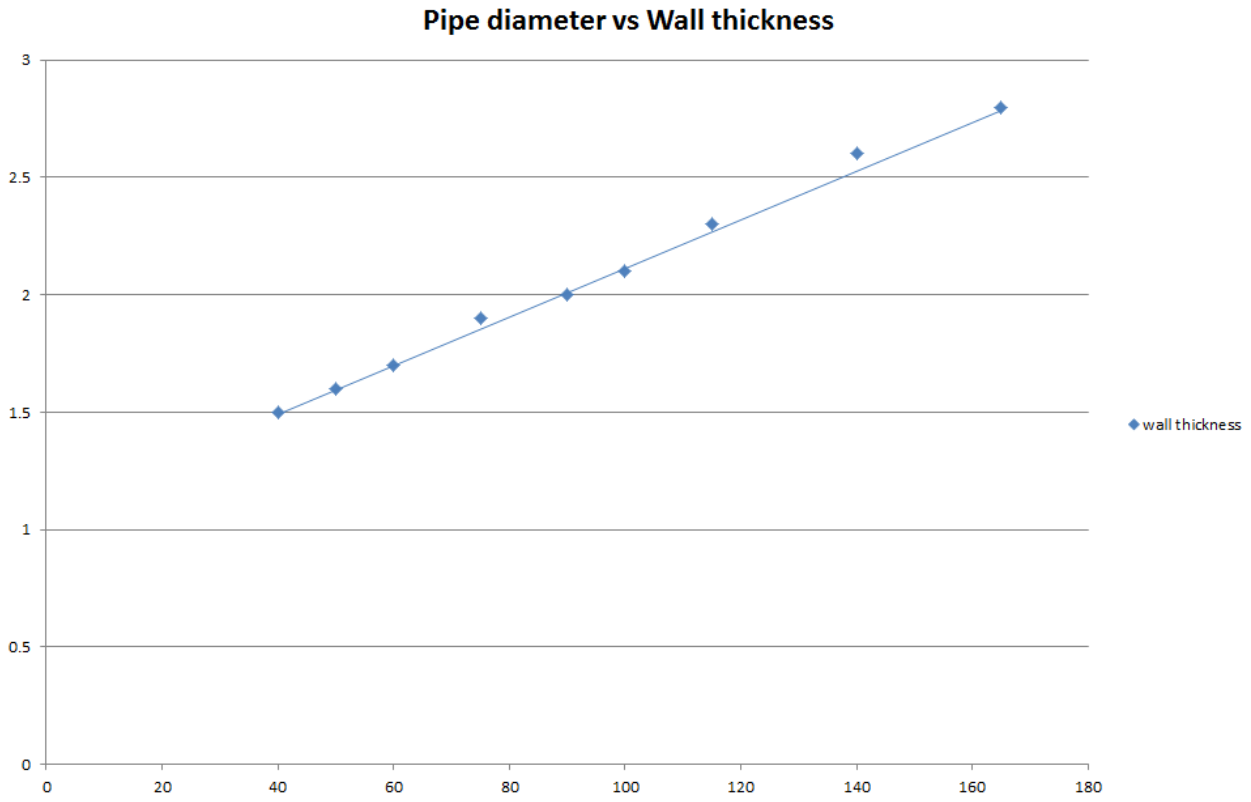
Construction details:



A.2.7.1 Single side penetration seal with pipes

Services Mild or stainless steel pipes	Wrap	Insulation	Classification
40 mm diameter/1.5-14.2 mm wall	1 off 50 x 1.8 mm Tytan Professional B1 Fire Wrap, fitted at soffit	13 mm Elastomeric insulation minimum class B-s3,d0 or foil faced Phenolic Foam insulation	**EI 180 C/U**
40 mm diameter/1.5-14.2 mm wall*		13 -19 mm Elastomeric insulation minimum class B-s3,d0 or foil faced Phenolic Foam insulation	**E 180 C/U, EI 120 C/U**
50 mm diameter/1.6-14.2 mm wall*			
60 mm diameter/1.7-14.2 mm wall*			
75 mm diameter/1.9-14.2 mm wall*			
90 mm diameter/2-14.2 mm wall*			
100 mm diameter/2.1-14.2 mm wall*			
115 mm diameter/2.3-14.2 mm wall*			
140 mm diameter/2.6-14.2 mm wall*			
165 mm diameter/2.8-14.2 mm wall*			

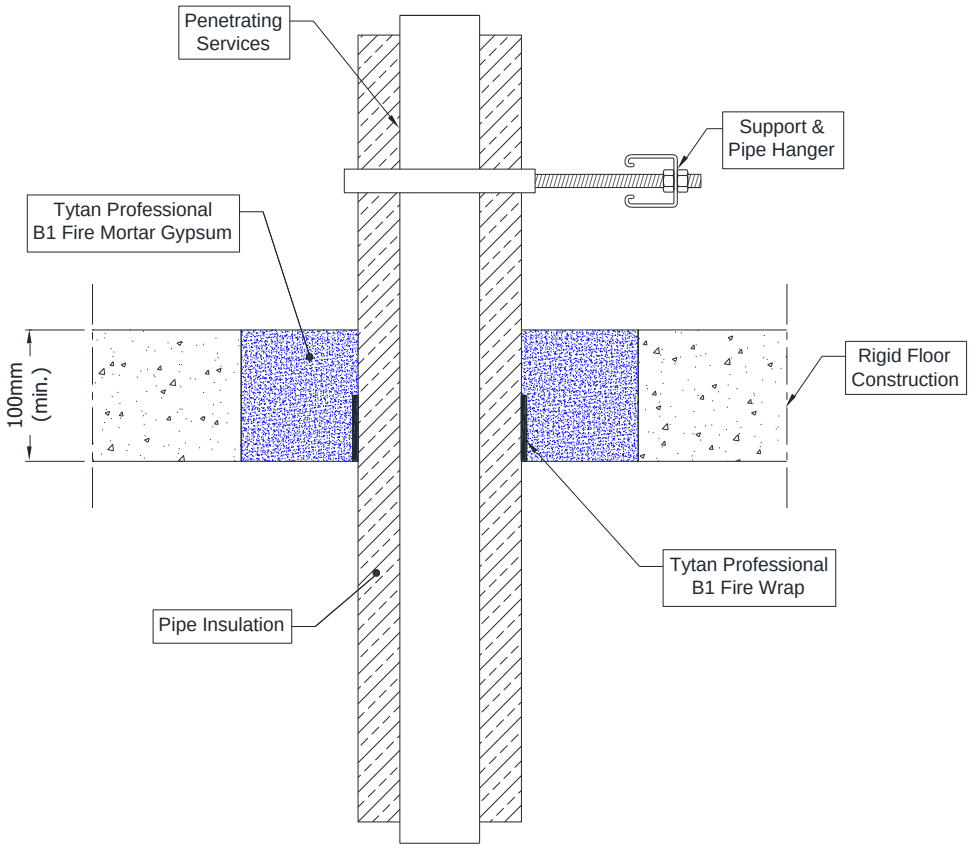
* Typical pipe diameters shown, see below graph for intermediate sizes


Pipe diameter vs Wall thickness
3
2.5
2
1.5
1
0.5
0
0
20
40
60
80
100
120
140
160
180
wall thickness

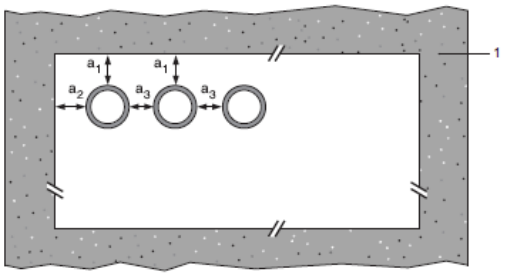
A.2.8 Pipe penetration seal with 100 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: CS (Continuous Sustained) insulated metallic pipes sealed with Tytan Professional B1 Fire Wraps, fitted at any position within the aperture, with min. 100 mm Tytan Professional B1 Fire Mortar Gypsum Seal. Minimum separation between penetration seals and seal edges of 30 mm (Configuration 1 & 2). Maximum seal size as section 2. 4).

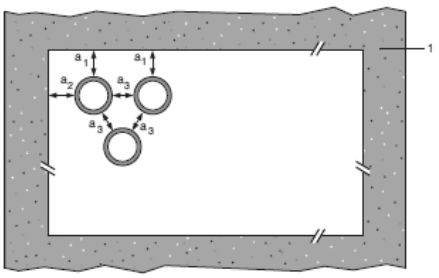
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

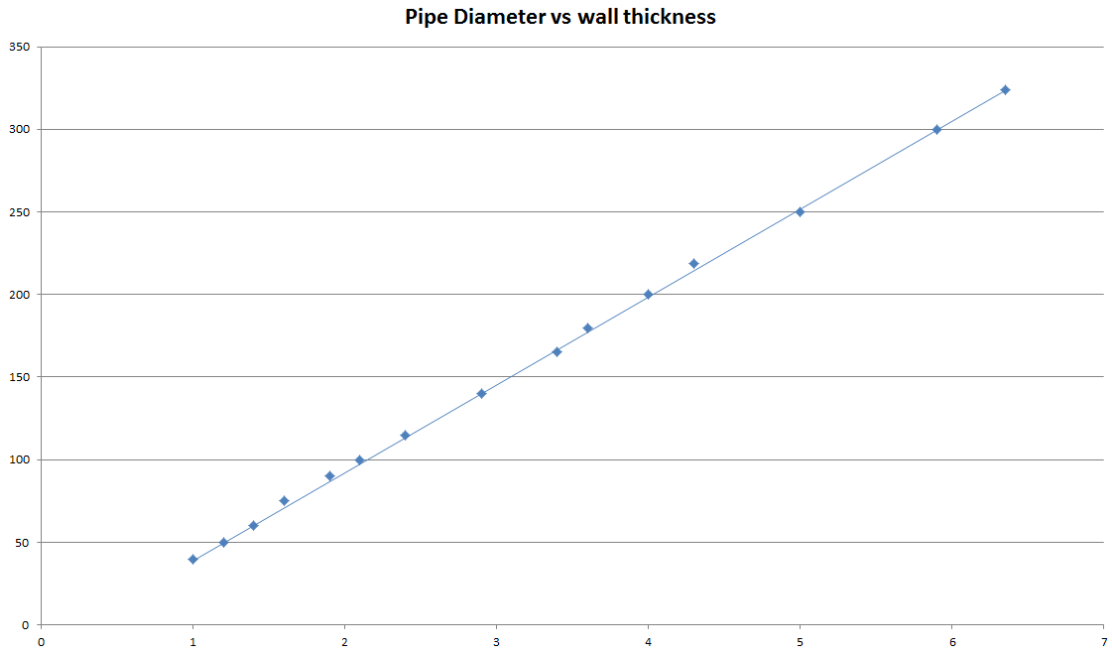
a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

A.2.8.1

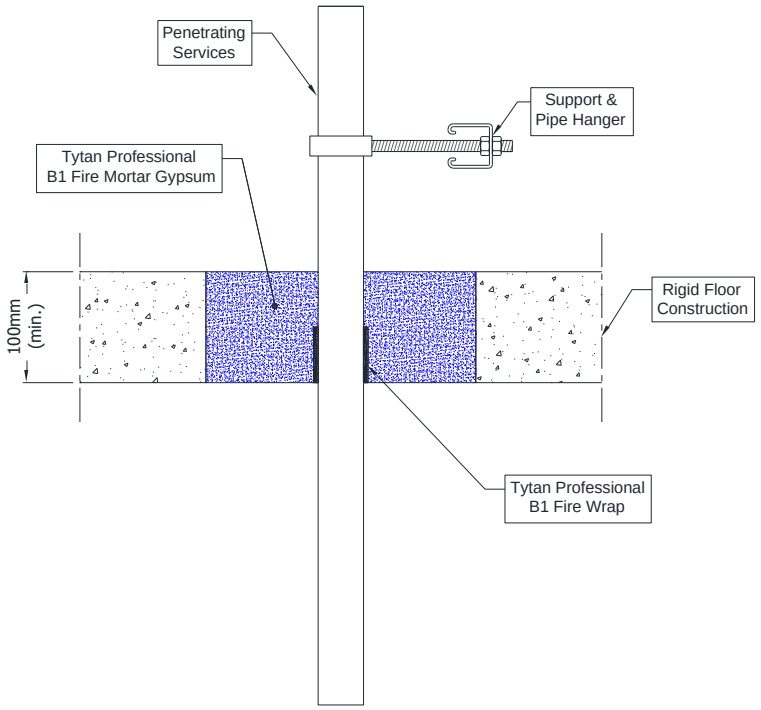
Mild or stainless steel pipes	Insulation	Tytan Professional B1 Fire Wrap	Classification
40 mm diameter/1-14.2 mm wall	25 mm thick Elastomeric insulation minimum class B-s3,d0 or foil faced Phenolic Foam insulation	50 x 3.6 mm (2 x 1.8 layer)	**EI 240 C/U**
40 mm diameter/1-14.2 mm wall*	25mm thick Elastomeric insulation minimum class B-s3,d0 or foil faced Phenolic Foam insulation		**E 240 C/U** **EI 120 C/U**
50 mm diameter/1.2-14.2 mm wall*			
60 mm diameter/1.4-14.2 mm wall*			
75 mm diameter/1.6-14.2 mm wall*			
90 mm diameter/1.9-14.2 mm wall*			
100 mm diameter/2.1-14.2 mm wall*			
115 mm diameter/2.4-14.2 mm wall*			
140 mm diameter/2.9-14.2 mm wall*			
165 mm diameter/ 3.4-14.2 mm wall*			
180 mm diameter/ 3.6-14.2 mm wall*			
200 mm diameter/ 4.0-14.2 mm wall*			
219 mm diameter/ 4.3-14.2 mm wall*			
250 mm diameter/ 5.0-14.2 mm wall*			
300 mm diameter/ 5.9-14.2 mm wall*			
324 mm diameter/ 6.35-14.2 mm wall*			
40 mm diameter/1-14.2 mm wall*	25-50mm thick Elastomeric insulation minimum class B-s3,d0 or foil faced Phenolic Foam insulation	50 x 5.4 mm (3 x 1.8 layer)	**EI 120 C/U**
50 mm diameter/1.2-14.2 mm wall*			
60 mm diameter/1.4-14.2 mm wall*			
75 mm diameter/1.6-14.2 mm wall*			
90 mm diameter/1.9-14.2 mm wall*			
100 mm diameter/2.1-14.2 mm wall*			
115 mm diameter/2.4-14.2 mm wall*			
140 mm diameter/2.9-14.2 mm wall*			
165 mm diameter/ 3.4-14.2 mm wall*			
180 mm diameter/ 3.6-14.2 mm wall*			
200 mm diameter/ 4.0-14.2 mm wall*			
219 mm diameter/ 4.3-14.2 mm wall*			
250 mm diameter/ 5.0-14.2 mm wall*			
300 mm diameter/ 5.9-14.2 mm wall*			
324 mm diameter/ 6.35-14.2 mm wall*			


Pipe Diameter vs wall thickness
350
300
250
200
150
100
50
0
0
1
2
3
4
5
6
7

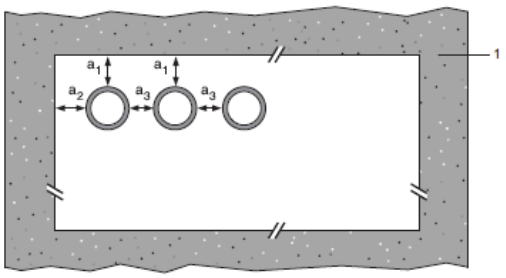
A.2.9 Pipe penetration seal with 100 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: Plastic pipes fitted at any position within the aperture, with min. 100 mm Tytan Professional B1 Fire Mortar Gypsum to the either surface of the floor or anywhere between. Tytan Professional B1 Fire Wraps are required to be fitted to the bottom of the seal, as indicated below. Minimum separation between penetration seals and seal edges of 30 mm (Configuration 1 & 2).

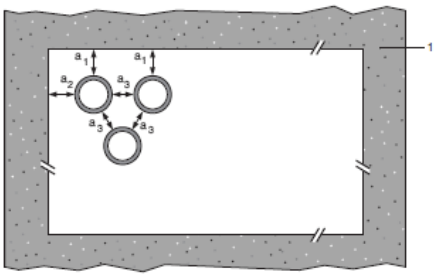
Construction details:



Configuration 1:



Configuration 2:

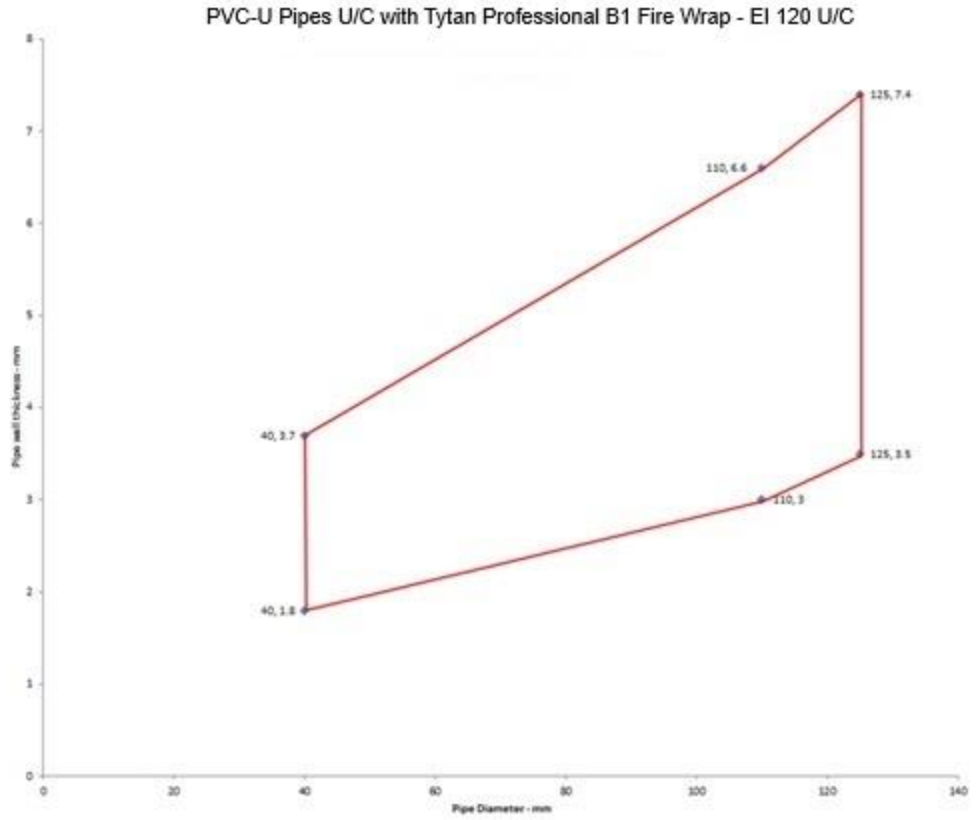


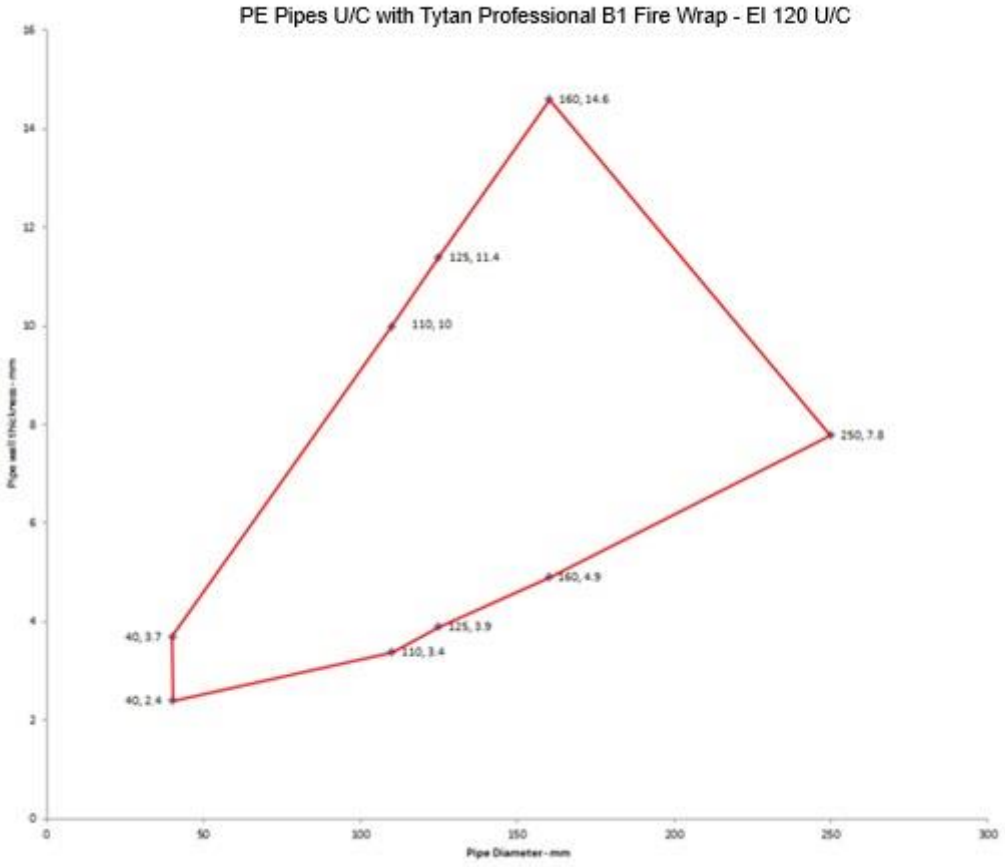
Key

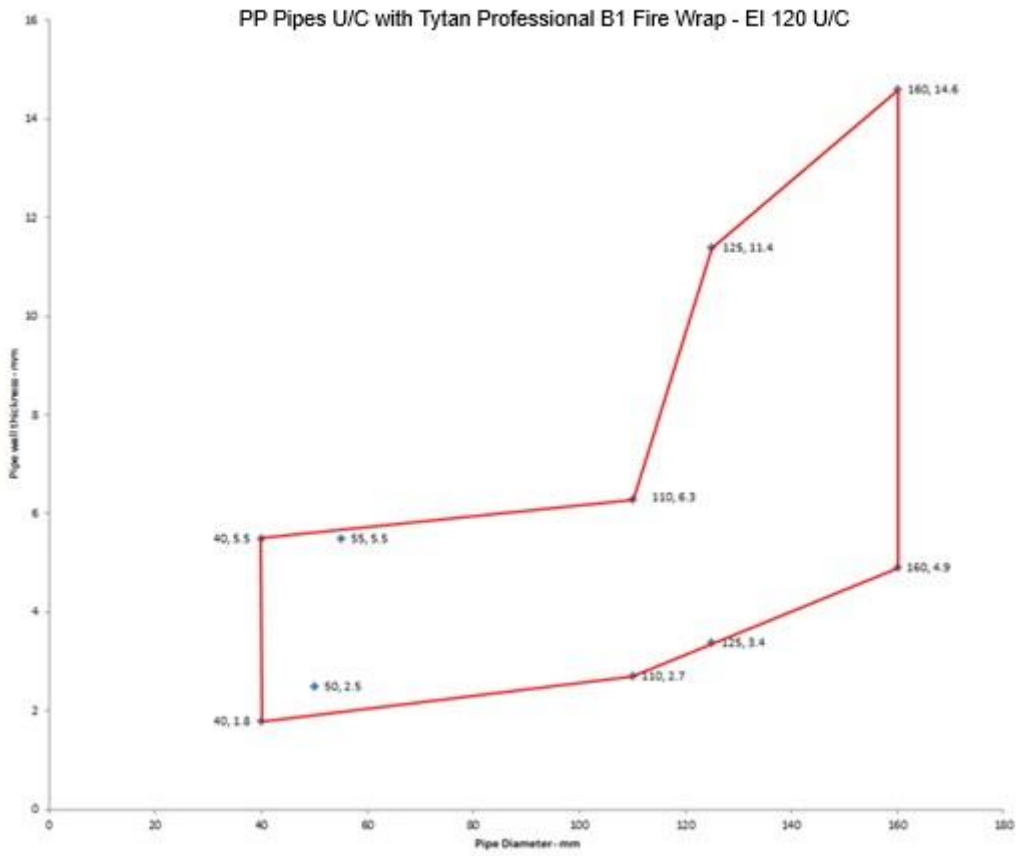
1 Supporting construction
a1 Pipe / top edge of seal separation
a2 Pipe / side edge of seal separation
a3 Pipe / pipe separation

2.9.1 Single side penetration seal with pipes

Services	Wrap	Maximum aperture	Classification
PVC-U pipes according to EN 1329-1, EN 1452-1 and EN 1453-1, PVC-C according to EN 1566-1			
Up to 40 mm diameter / 1.8-3.7 mm wall	50 x 1.8 mm	As section 2. 4)	**E 180 U/U, EI 120 U/U**
Up to 110 mm diameter / 3.0-6.6 mm wall	50 x 3.6 mm		**EI 240 U/C**
Up to 125 mm diameter / 3.5-7.4 mm wall	50 x 7.2 mm		**EI 120 U/C**
Up to 160 mm diameter / 4.5 mm wall	50 x 10.8 mm		**EI 240 C/C**
Up to 160 mm diameter / 4.5-9.5 mm wall	50 x 10.8 mm		**EI 90 C/C**
Up to 110 mm diameter bundles containing pipes up to 20 mm diameter/ 1.0-1.5 mm wall, with or without up to 14 mm Ø cables (may be combined with PP and PE conduits)	50 x 3.6 mm		**E 90 U/U, EI 60 U/U**
Up to 110 mm diameter/ 2.7-6.6 mm wall, containing up to 90mm Ø bundle of up to 14 mm Ø cables	50 x 3.6 mm		**EI 120 U/C**
PP pipes according to EN 1451-1			
Up to 40 mm diameter /1.8-4.4 mm wall	None	As section 2. 4)	**EI 120 U/C**
Up to 40 mm diameter /1.8-5.5 mm wall	50 x 1.8 mm		**EI 120 U/U**
Up to 50 mm diameter /2.5-5.5 mm wall	50 x 3.6 mm		**EI 240 C/C**
Up to 75 mm diameter /3.5-5.5 mm wall	50 x 3.6 mm		**EI 240 C/C**
Up to 110 mm diameter /2.7-6.3 mm wall	50 x 3.6 mm		**EI 240 U/C**
Up to 125 mm diameter /3.4-11.4 mm wall	50 x 7.2 mm		**EI 240 U/C**
Up to 160 mm diameter /4.9-14.6 mm wall	50 x 10.8 mm		**EI 240 U/C**
Up to 110 mm diameter bundles containing pipes up to 20 mm diameter/ 1.9 mm wall, with or without up to 14 mm Ø cables (may be combined with PVC and PE conduits)	50 x 3.6 mm		**E 90 U/U, EI 60 U/U**
Up to 110 mm diameter/ 3.4-6.3 mm wall, containing up to 90mm Ø bundle of up to 14 mm Ø cables	50 x 3.6 mm		**EI 60 U/C**
PE pipes according to EN 1519-1, EN 12201-2 and EN 12666-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Up to 40 mm diameter / 2.0-4.4 mm wall	None	As section 2. 4)	**EI 120 U/C**
Up to 40 mm diameter / 2.4-3.7 mm wall	50 x 1.8 mm		**EI 240 U/U**
Up to 110 mm diameter / 3.4-10.0 mm wall	50 x 3.6 mm		**EI 120 U/C**
Up to 125 mm diameter / 3.9-11.4 mm wall	50 x 7.2 mm		**EI 240 U/C**
Up to 160 mm diameter / 4.9-14.6 mm wall	50 x 10.8 mm		**EI 120 U/C**
Up to 250 mm diameter / 7.8 mm wall	75 x 12.6 mm		**EI 180 C/C**
Up to 110 mm diameter bundles containing pipes up to 32 mm diameter/ 2.0-2.3 mm wall, with or without up to 14 mm Ø cables (may be combined with PVC and PP conduits)	50 x 3.6 mm		**E 90 U/U, EI 60 U/U**
Up to 110 mm diameter/ 2.7-10.0 mm wall, containing up to 90mm Ø bundle of up to 14 mm Ø cables	50 x 3.6 mm		**E 120 U/C, EI 60 U/C**


PVC-U Pipes U/C with Tytan Professional B1 Fire Wrap - EI 120 U/C
125, 7.4
110, 6.6
40, 3.7
125, 3.5
110, 3
40, 1.8
Pipe wall thickness - mm
Pipe Diameter - mm

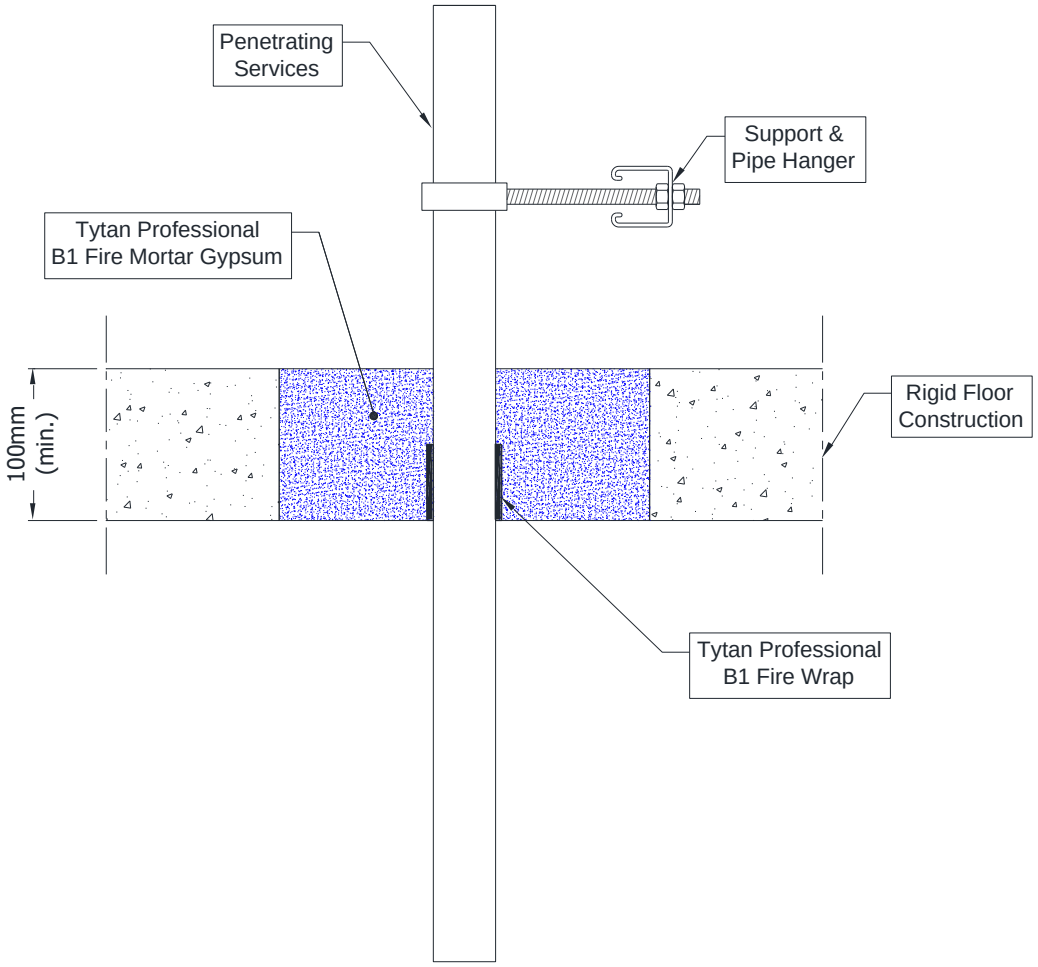

PE Pipes U/C with Tytan Professional B1 Fire Wrap - EI 120 U/C
160, 14.6
125, 11.4
110, 10
250, 7.8
160, 4.9
125, 3.9
40, 3.7
110, 3.4
40, 2.4
Pipe wall thickness - mm
Pipe Diameter - mm


PP Pipes U/C with Tytan Professional B1 Fire Wrap - EI 120 U/C
Pipe wall thickness - mm
Pipe Diameter - mm
160, 14.6
125, 11.4
110, 6.3
40, 5.5
55, 5.5
160, 4.9
125, 3.4
110, 2.7
50, 2.5
40, 1.8

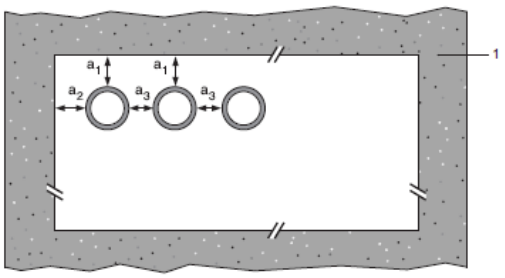
A.2.10 Pipe penetration seal with 100 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: Plastic pipes fitted at any position within the aperture (min. separation 30 mm from seal edges and from other services), with min. 100 mm Tytan Professional B1 Fire Mortar Gypsum to either surface of the floor or anywhere between. Tytan Professional B1 Fire Wraps are required to be fitted to the bottom of the seal, as indicated below. Maximum seal size as section 2. 4).

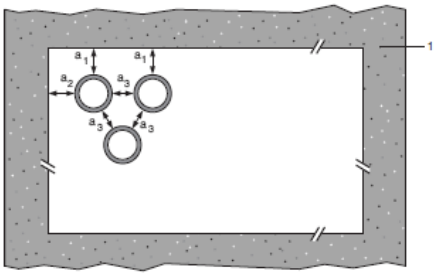
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

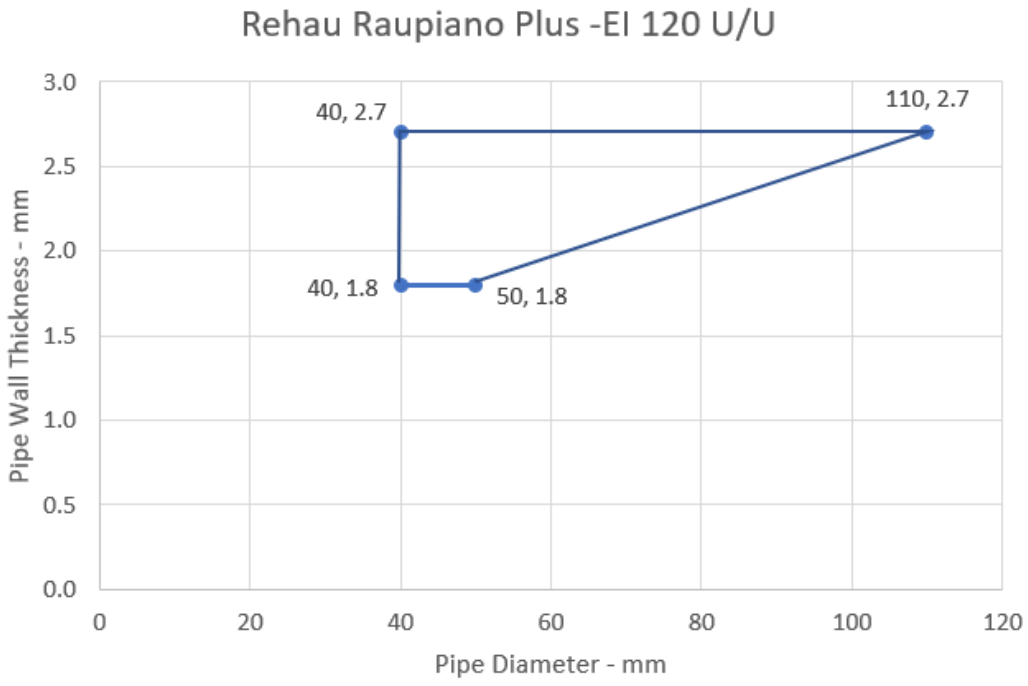
2.10.1

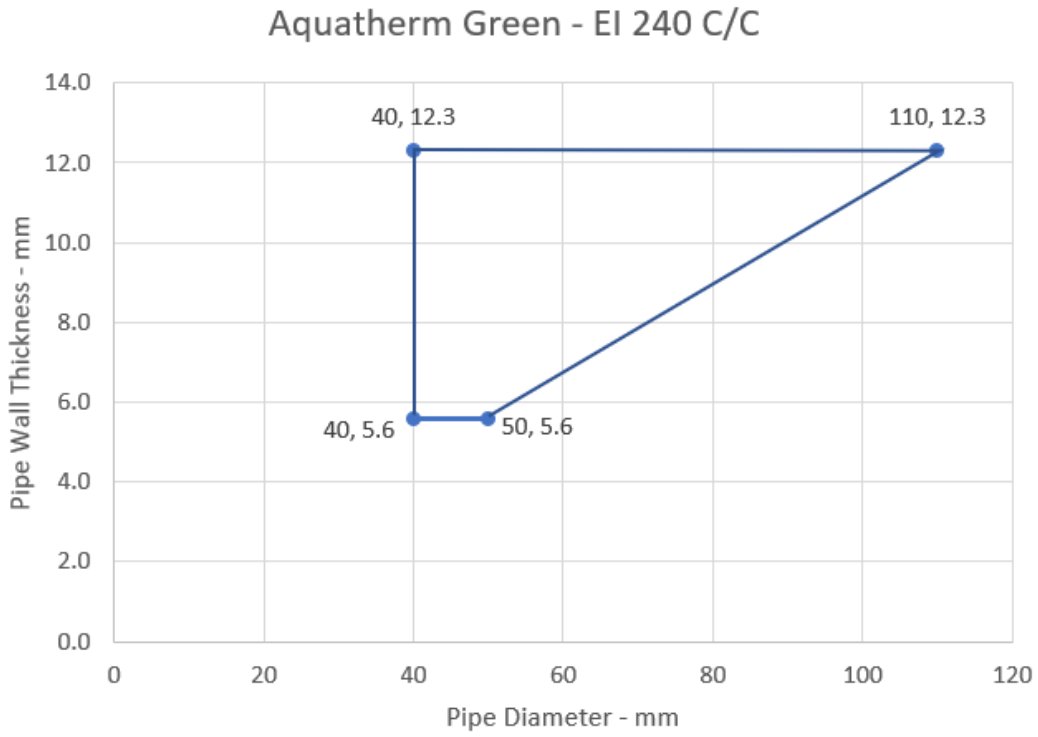
Services	Wrap	Permitted configuration for seal separation	Classification
PVC-U pipes according to EN 1329-1, EN 1452-1 and EN 1453-1, PVC-C according to EN 1566-1			
160 mm diameter / 9.5 mm wall	50 x 10.8 mm (6 x 1.8 layers)	1 & 2	**EI 90 U/C**
PEX pipe in pipe systems according to ISO 15875			
Maximum 54 mm diameter/0.4 mm wall thickness (outer pipe), 28 mm diameter/4.0 mm wall thickness (inner pipe)	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 120 C/C**
Maximum 25 mm diameter/0.6 mm wall thickness (outer pipe), 15 mm diameter/2.5 mm wall thickness (inner pipe), single, or in bundles maximum 50 mm diameter	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 240 C/C**
Rehau Raupiano Plus PP-DD according to DIN 4102			
40-50 mm diameter/1.8-2.7 mm wall thickness*	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 120 U/U**
75-110 mm diameter/2.7 mm wall thickness*	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 120 U/C**
125 mm diameter/3.1 mm wall thickness	50 x 7.2 mm (4 x 1.8 layers)	1 & 2	**E 240 U/C, EI 120 U/C**
160 mm diameter/3.9 mm wall thickness	50 x 10.8 mm (6 x 1.8 layers)	1 & 2	**EI 120 U/C**
Polo-Kal NG Poloplast PP-MV according to DIN 4102			
32-50 mm diameter/2.0 mm wall thickness	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**E 240 U/C, EI 180 U/C**
51-110 mm diameter/3.4 mm wall thickness	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 180 U/C**
125 mm diameter/3.9 mm wall thickness	50 x 7.2 mm (4 x 1.8 layers)	1 & 2	**EI 240 U/C**
160 mm diameter/4.3 mm wall thickness	50 x 10.8 mm (6 x 1.8 layers)	1 & 2	**EI 240 U/C**
Aquatherm Green SDR9 MF PP-RP according to ISO 21003			
32 mm diameter/3.6 mm wall thickness	50 x 1.8 mm (1 x 1.8 layer)	1 & 2	**EI 240 C/C**
40-50 mm diameter/5.6-12.3 mm wall thickness*	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 240 C/C**
63-110 mm diameter/12.3 mm wall thickness*	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 240 C/C**
Wavin SiTech + PP-M B according to EN 13501-1			
32-50 mm diameter/1.8-3.4 mm wall thickness*	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 120 U/U**
75-110 mm diameter/3.4 mm wall thickness*	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 120 U/C**

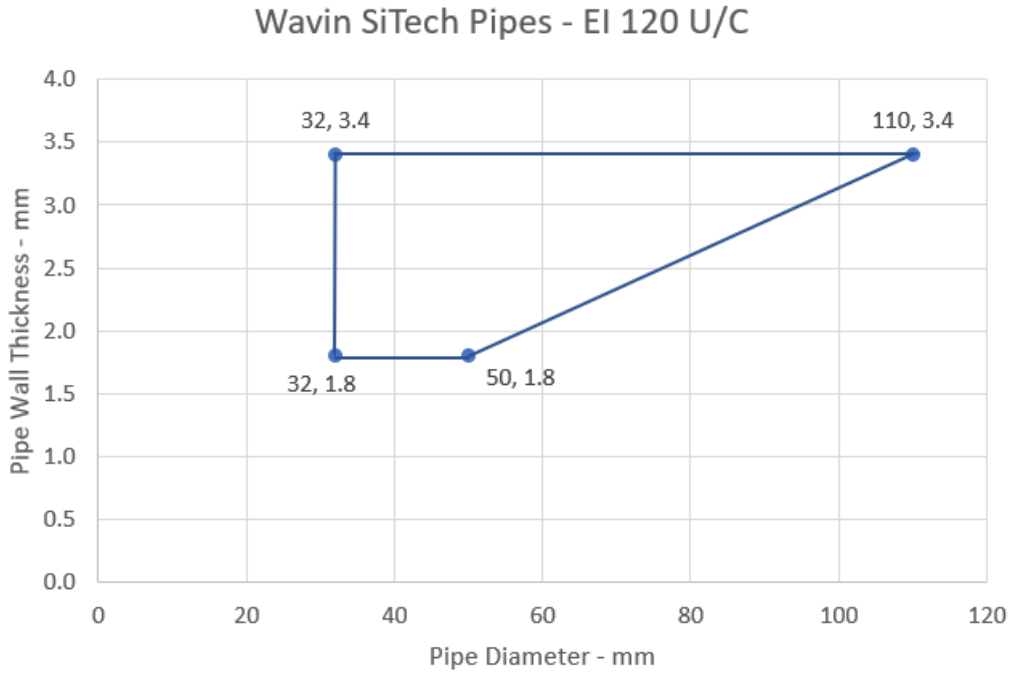
* Typical pipe diameters shown, see below graph for intermediate sizes

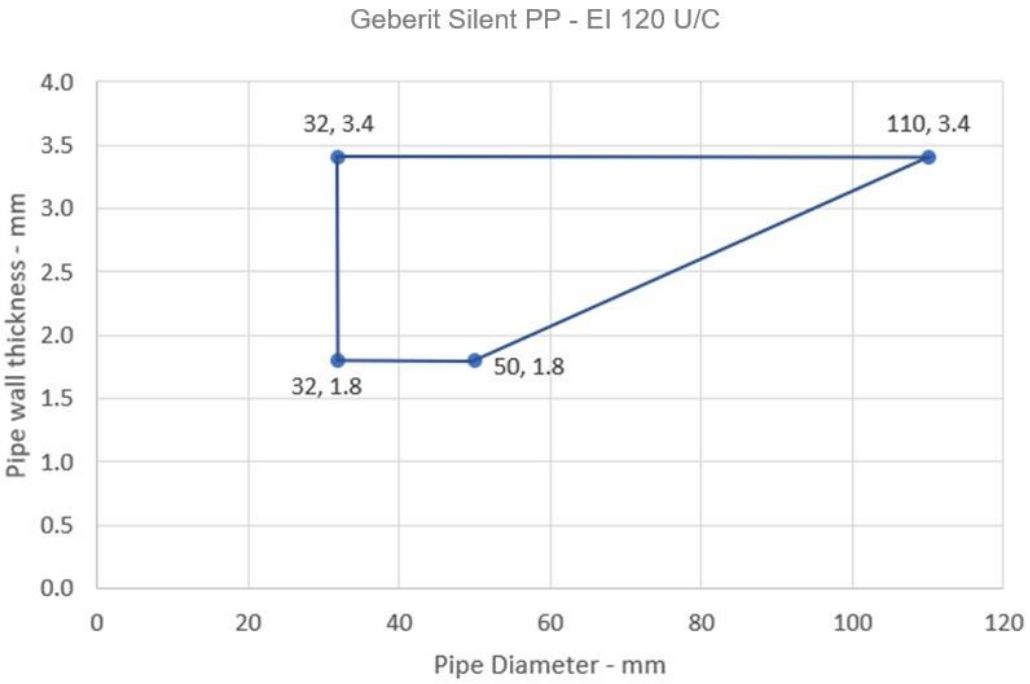
Services	Wrap	Permitted configuration for seal separation	Classification
Geberit Silent PP according to DIN 4102			
32-50 mm diameter/1.8-3.4 mm wall thickness*	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 120 U/U**
75-110 mm diameter/3.4 mm wall thickness*	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 120 U/C**
BluePower Multilayer pipes according to EN 1451-1			
32-50 mm diameter*	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 240 U/U**
75-110 mm diameter*	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 120 U/C**
125 mm diameter/3.9 mm wall thickness*	50 x 7.2 mm (4 x 1.8 layers)	1 & 2	**EI 120 U/C**
160 mm diameter/4.9 mm wall thickness*	50 x 10.8 mm (6 x 1.8 layers)	1 & 2	**EI 240 U/C**
Uponor Decibel pipes according to EN 14366			
32-50 mm diameter*	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 120 U/U**
75-110 mm diameter*	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 120 U/C**
Wavin AS+ pipes according to EN 12056 and DIN 1986-100			
32-50 mm diameter *	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 240 U/C**
75-110 mm diameter *	50 x 3.6 mm (2 x 1.8 layers)	1 & 2	**EI 240 C/C**

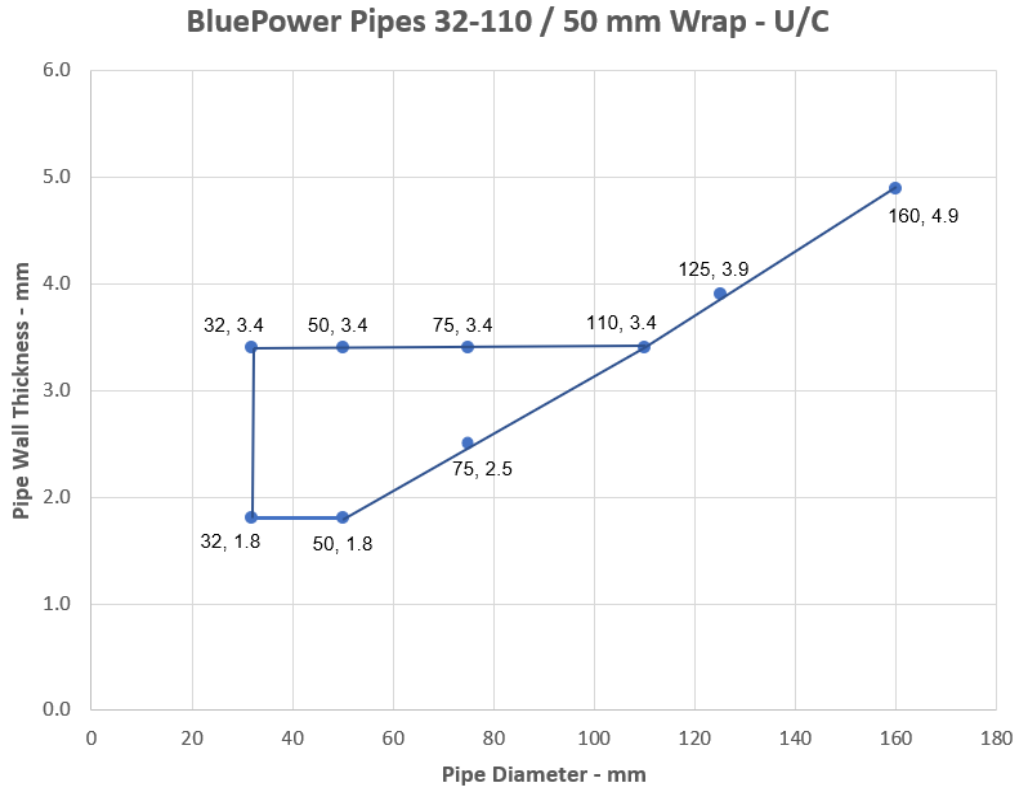
* Typical pipe diameters shown, see below graph for intermediate sizes

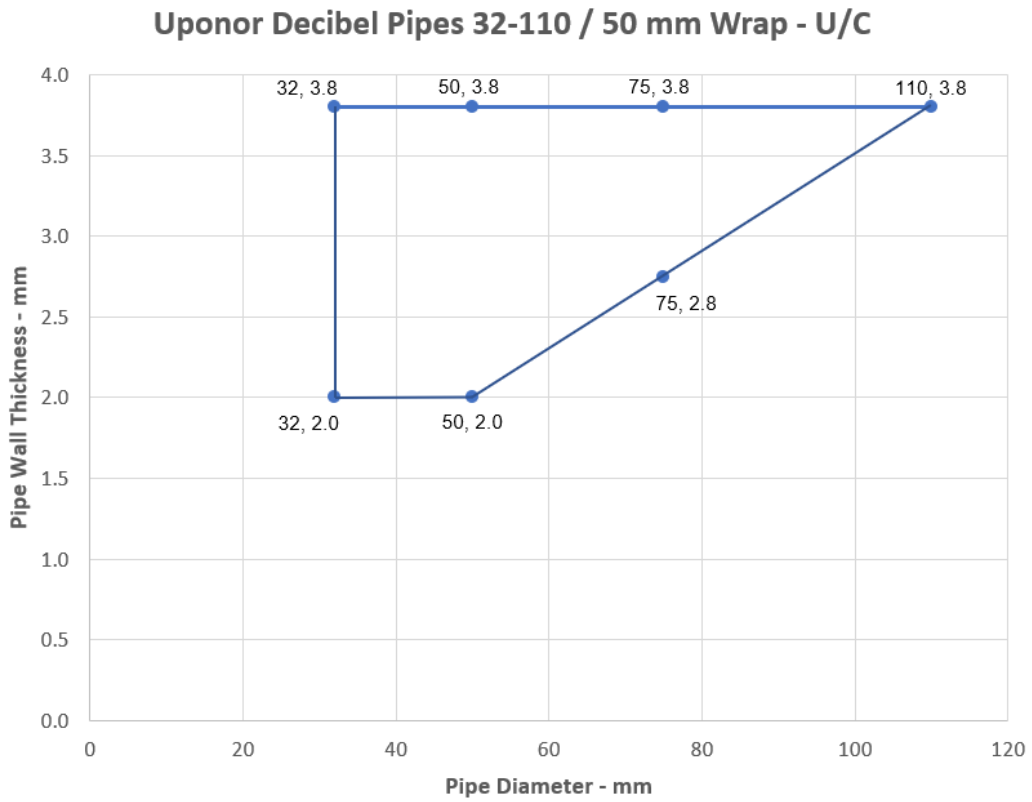


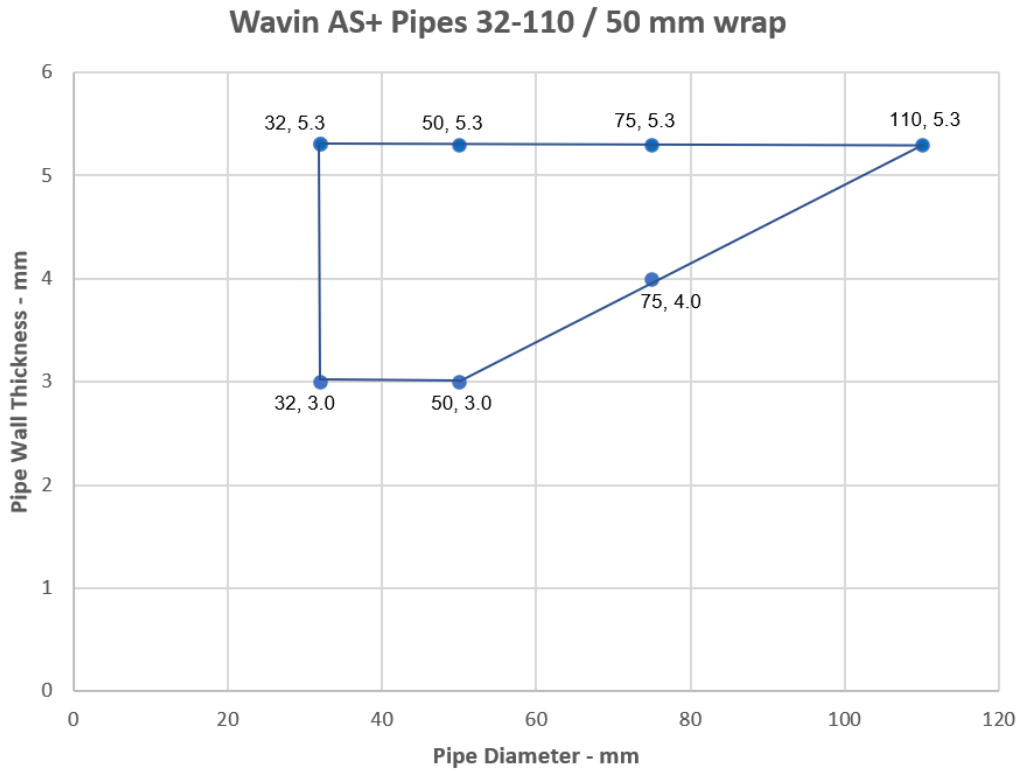

Aquatherm Green - EI 240 C/C
Pipe Wall Thickness - mm
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
20
40
60
80
100
120
Pipe Diameter - mm
40, 12.3
110, 12.3
40, 5.6
50, 5.6


Wavin SiTech Pipes - EI 120 U/C
Pipe Wall Thickness - mm
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
20
40
60
80
100
120
Pipe Diameter - mm
32, 3.4
110, 3.4
32, 1.8
50, 1.8


Geberit Silent PP - EI 120 U/C
Pipe wall thickness - mm
Pipe Diameter - mm
32, 3.4
110, 3.4
50, 1.8
32, 1.8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
0
20
40
60
80
100
120


BluePower Pipes 32-110 / 50 mm Wrap - U/C
Pipe Wall Thickness - mm
Pipe Diameter - mm
32, 3.4
50, 3.4
75, 3.4
110, 3.4
125, 3.9
160, 4.9
75, 2.5
32, 1.8
50, 1.8
0.0
1.0
2.0
3.0
4.0
5.0
6.0
0
20
40
60
80
100
120
140
160
180

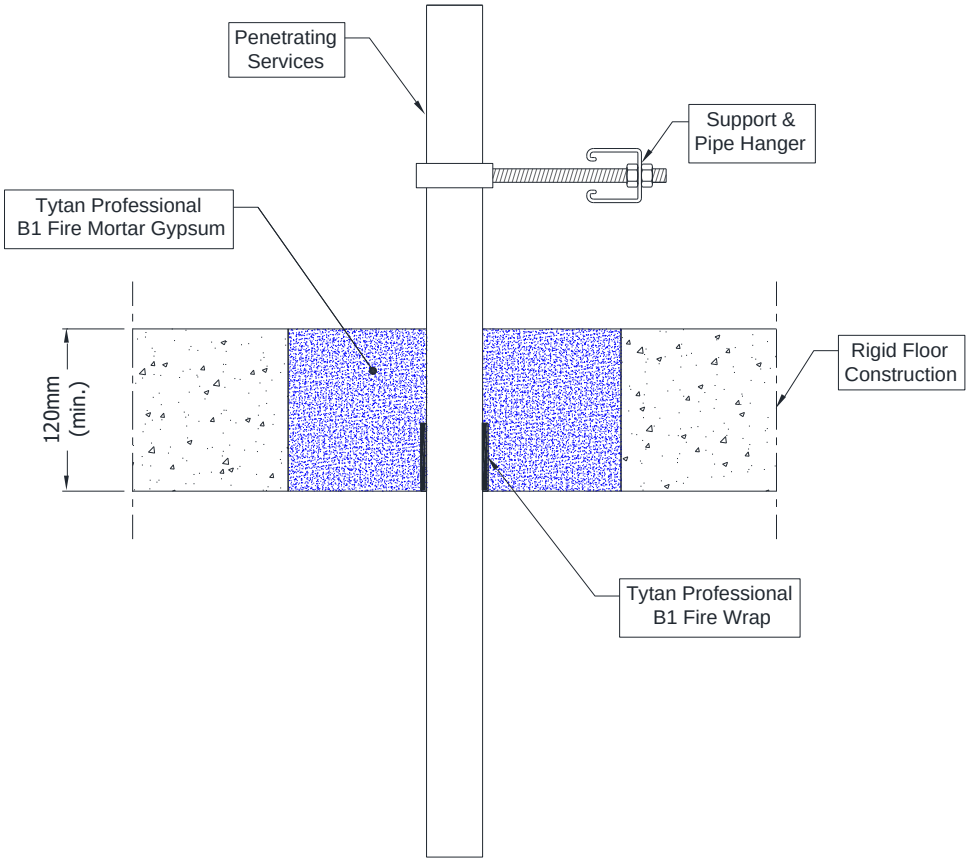

Uponor Decibel Pipes 32-110 / 50 mm Wrap - U/C
Pipe Wall Thickness - mm
Pipe Diameter - mm
32, 3.8
50, 3.8
75, 3.8
110, 3.8
75, 2.8
32, 2.0
50, 2.0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
0
20
40
60
80
100
120


Wavin AS+ Pipes 32-110 / 50 mm wrap
Pipe Wall Thickness - mm
Pipe Diameter - mm
32, 5.3
50, 5.3
75, 5.3
110, 5.3
75, 4.0
32, 3.0
50, 3.0
0
1
2
3
4
5
6
0
20
40
60
80
100
120

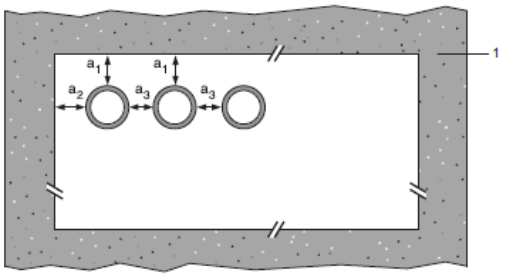
A.2.11 Pipe penetration seal with Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: Plastic pipes fitted at any position within the aperture (min. separation 30 mm from seal edges and from other services), with Tytan Professional B1 Fire Mortar Gypsum to either surface of the floor or anywhere between. Tytan Professional B1 Fire Wraps are required to be fitted to the bottom of the seal, as indicated below. Maximum seal size as section 2. 4).

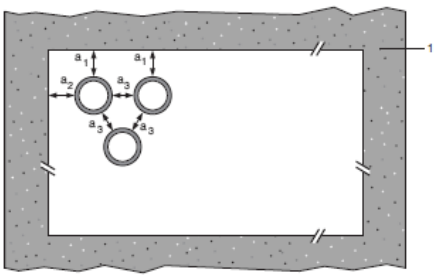
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

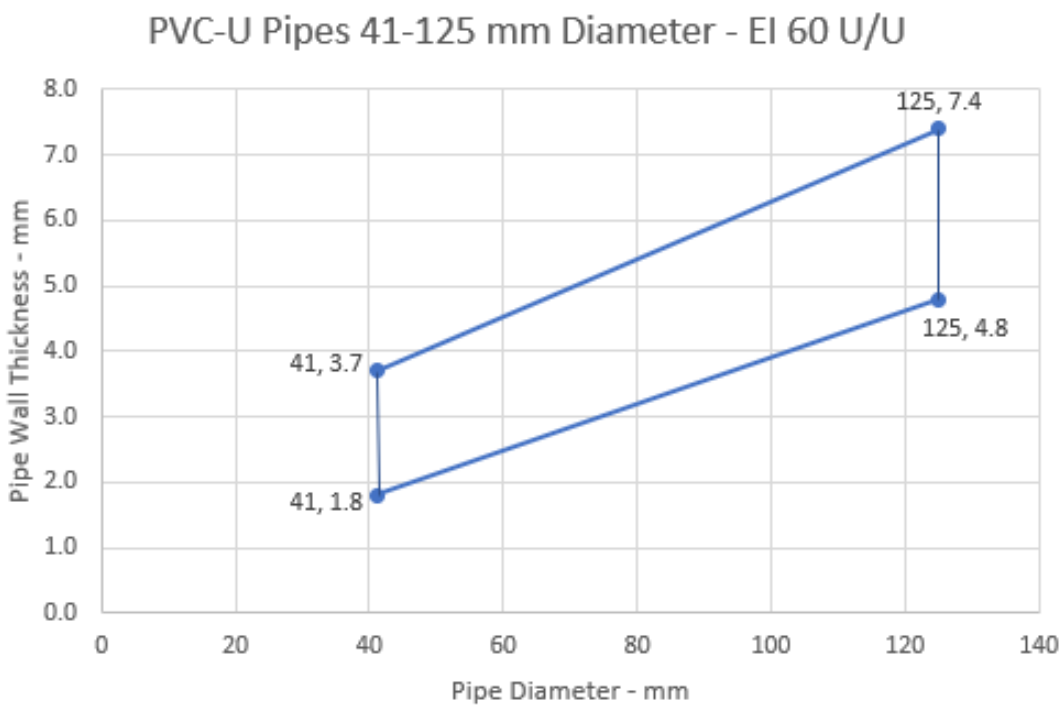
a2 Pipe / side edge of seal separation

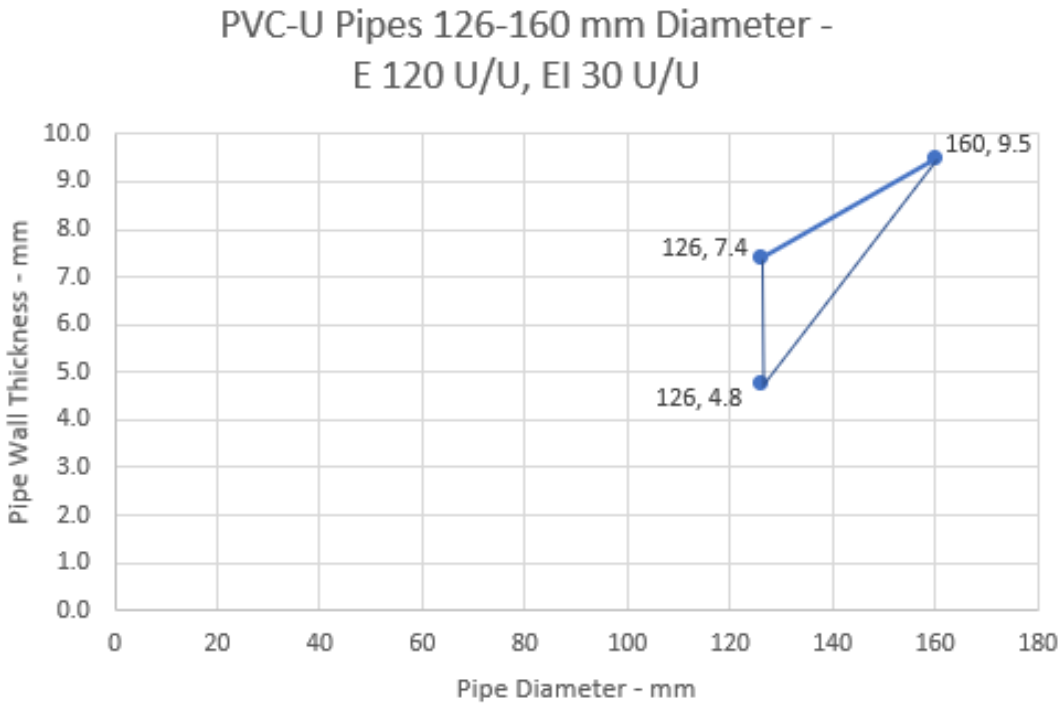
a3 Pipe / pipe separation

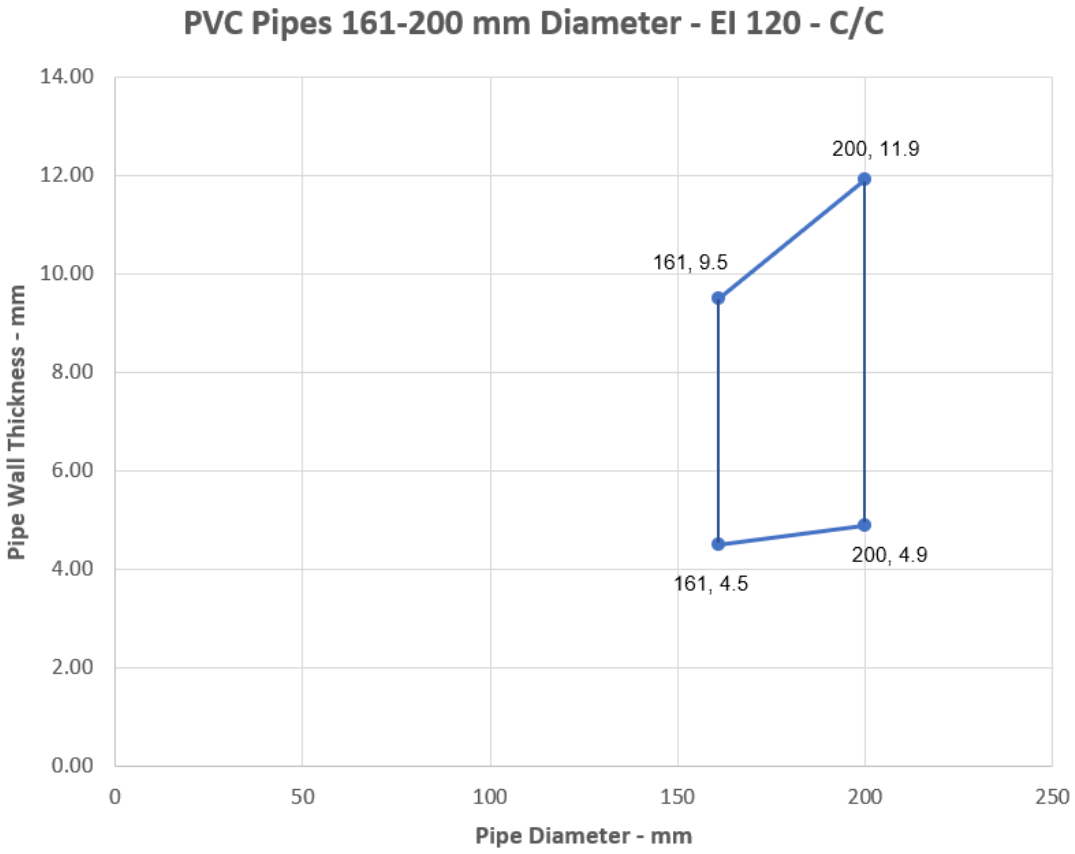
A.2.11.1

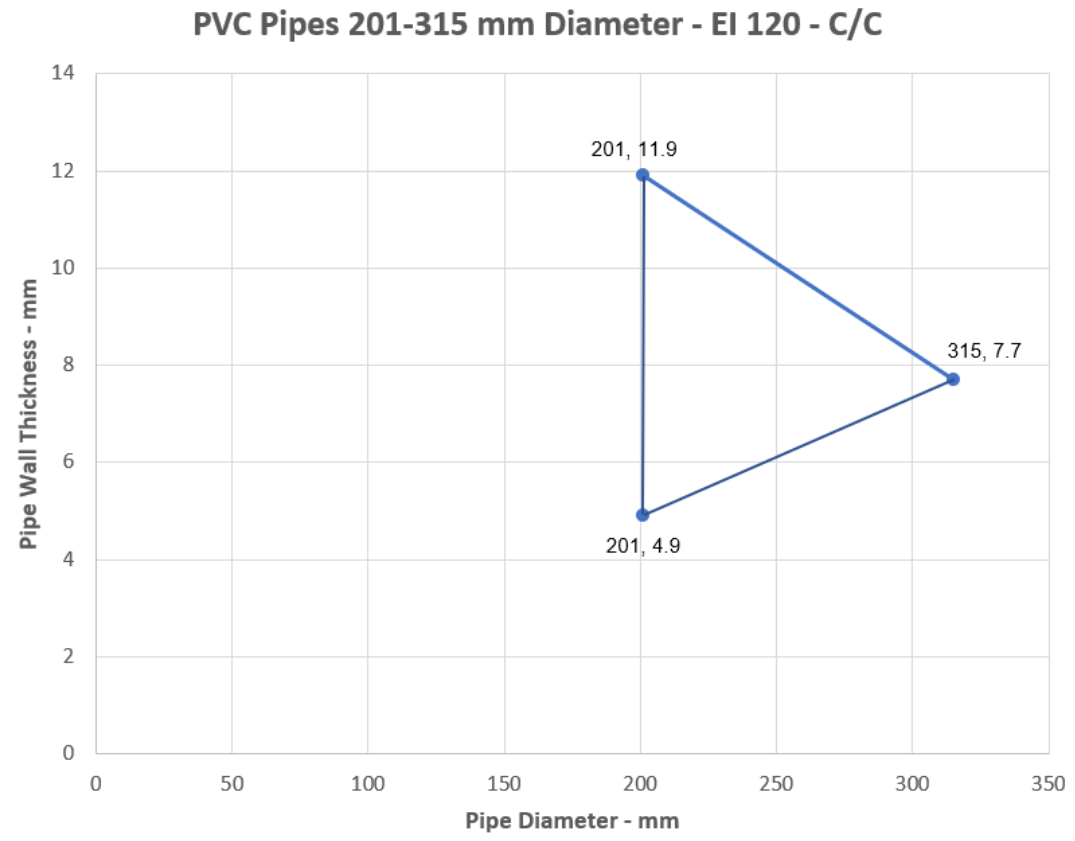
Services	Wrap	Permitted configuration for seal separation	Min. mortar depth and floor thickness	Classification
PVC-U pipes according to EN 1329-1, EN 1452-1 and EN 1453-1, PVC-C according to EN 1566-1				
Diameter 41 mm, wall thickness 1.8-3.7 mm to diameter 125 mm, wall thickness 4.8-7.4 mm*	50 x 7.2 mm (4 x 1.8 layers)	1 & 2	150 mm	**EI 60 U/U**
125 mm diameter / 7.4 mm wall	50 x 7.2 mm (4 x 1.8 layers)	1 & 2	150 mm	**EI 120 U/U**
Diameter 126 mm, wall thickness 4.8-7.4 mm to diameter 160 mm, wall thickness 9.5 mm*	75 x 10.8 mm (6 x 1.8 layers)	1	150 mm	**E 120 U/U, EI 30 U/U**
160 mm diameter / 9.5 mm wall	75 x 7.2 mm (4 x 1.8 layers)	1	150 mm	**E 120 U/U, EI 30 U/U**
160 mm diameter / 4.5-9.5 mm wall thickness	50 x 10.8 mm (6 x 1.8 layers)	1 & 2	120 mm	**EI 120 U/C, EI 120 C/C**
Diameter 161 mm, wall thickness 4.5-9.5 mm to diameter 200 mm, wall thickness 4.9-11.9 mm*	75 x 10.8 mm (6 x 1.8 layers)	1 & 2	120 mm	**EI 120 C/C**
200 mm diameter / 4.9-11.9 mm wall thickness	75 x 10.8 mm (6 x 1.8 layers)	1 & 2	120 mm	**EI 240 C/C**
Diameter 201 mm, wall thickness 4.9-11.9 mm to diameter 315 mm, wall thickness 7.7 mm*	75 x 18 mm (10 x 1.8 layers)	1	120 mm	**EI 120 C/C**
315 mm diameter / 7.7 mm wall thickness	75 x 18 mm (10 x 1.8 layers)	1	120 mm	**EI 120 C/C**
Diameter 161 mm, wall thickness 4.5-9.5 mm to diameter 315 mm, wall thickness 7.7-12.1 mm*	75 x 18 mm (10 x 1.8 layers)	1	120 mm	**EI 90 C/C**
315 mm diameter / 12.1 mm wall thickness	75 x 18 mm (10 x 1.8 layers)	1	120 mm	**EI 90 C/C**
Diameter 315 mm, wall thickness 7.7-12.1 mm to diameter 400 mm, wall thickness 15.3 mm*	75 x 28.8 mm (16 x 1.8 layers)	1	120 mm	**EI 60 C/C**
400mm diameter / 15.3 mm wall thickness	75 x 28.8 mm (16 x 1.8 layers)	1 & 2	120 mm	**EI 60 C/C**

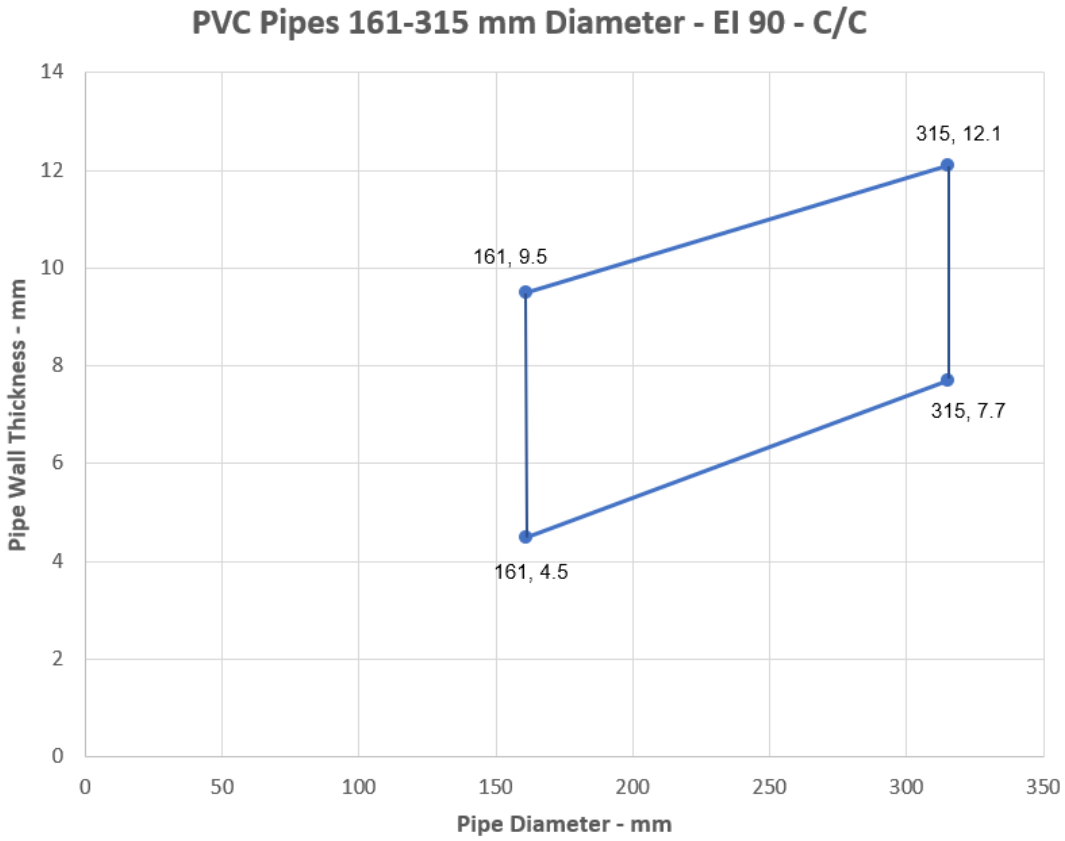
* Typical pipe diameters shown, see below graph for intermediate sizes

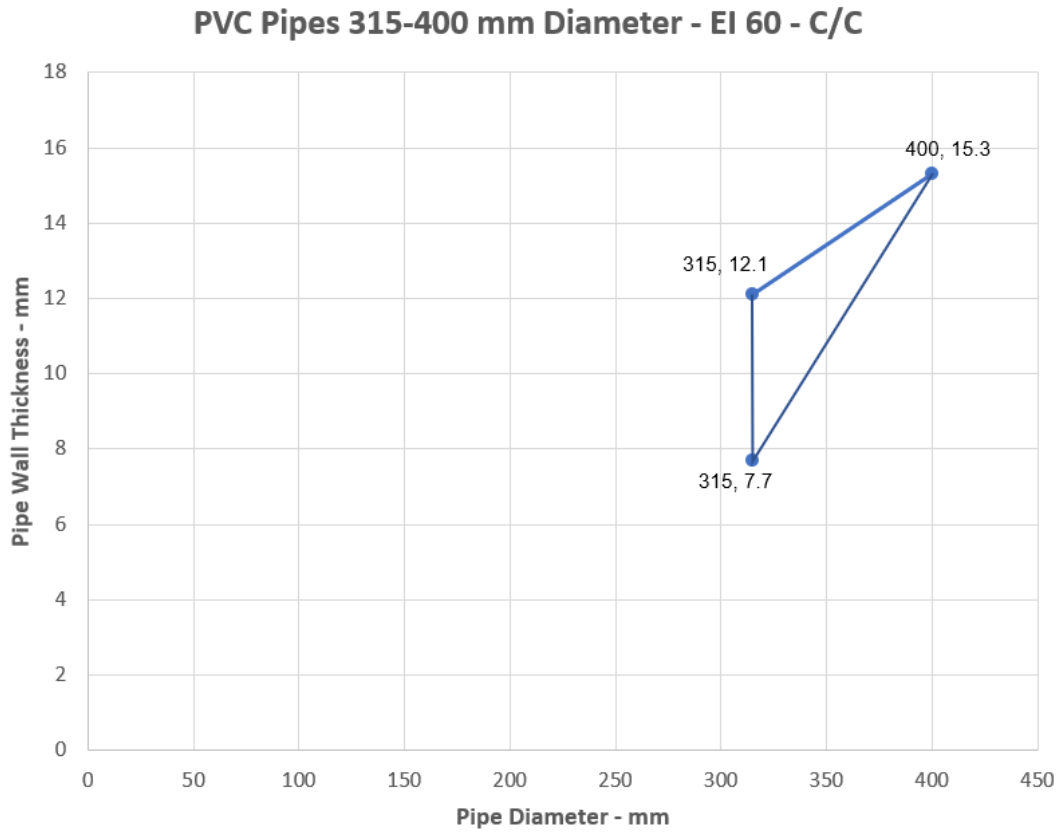

PVC-U Pipes 41-125 mm Diameter - EI 60 U/U
Pipe Wall Thickness - mm
Pipe Diameter - mm
125, 7.4
125, 4.8
41, 3.7
41, 1.8
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0
20
40
60
80
100
120
140


PVC-U Pipes 126-160 mm Diameter -
E 120 U/U, EI 30 U/U
Pipe Wall Thickness - mm
Pipe Diameter - mm
160, 9.5
126, 7.4
126, 4.8
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
20
40
60
80
100
120
140
160
180


PVC Pipes 161-200 mm Diameter - EI 120 - C/C
Pipe Wall Thickness - mm
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0
50
100
150
200
250
Pipe Diameter - mm
200, 11.9
161, 9.5
200, 4.9
161, 4.5

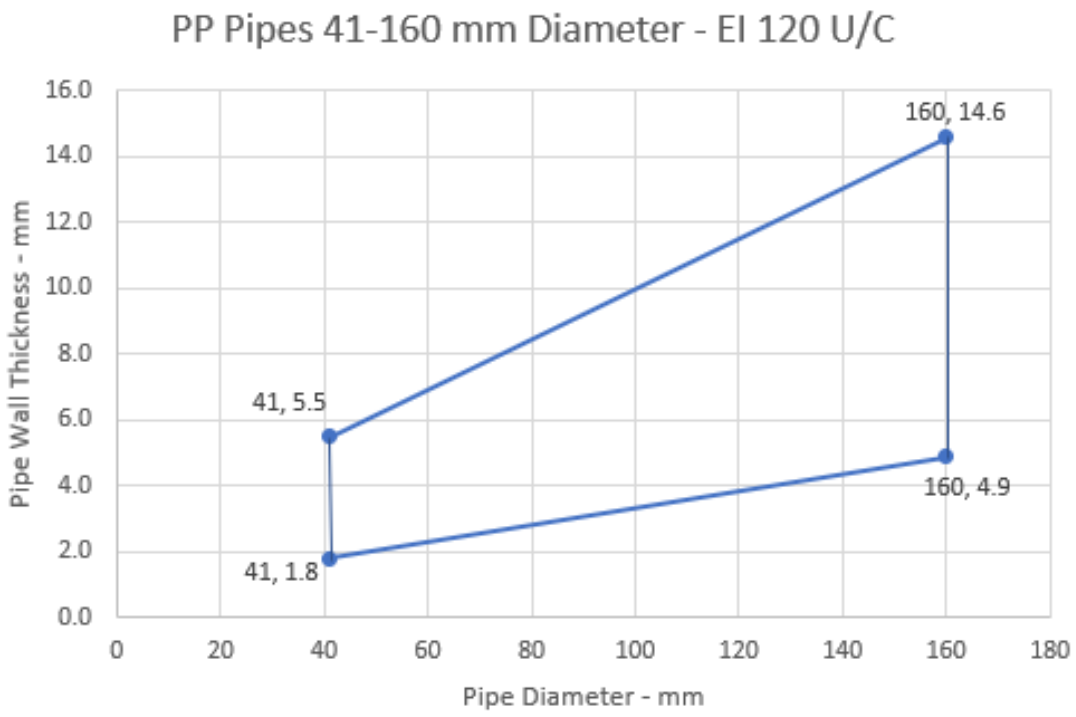

PVC Pipes 201-315 mm Diameter - EI 120 - C/C
Pipe Wall Thickness - mm
14
12
10
8
6
4
2
0
0
50
100
150
200
250
300
350
Pipe Diameter - mm
201, 11.9
315, 7.7
201, 4.9

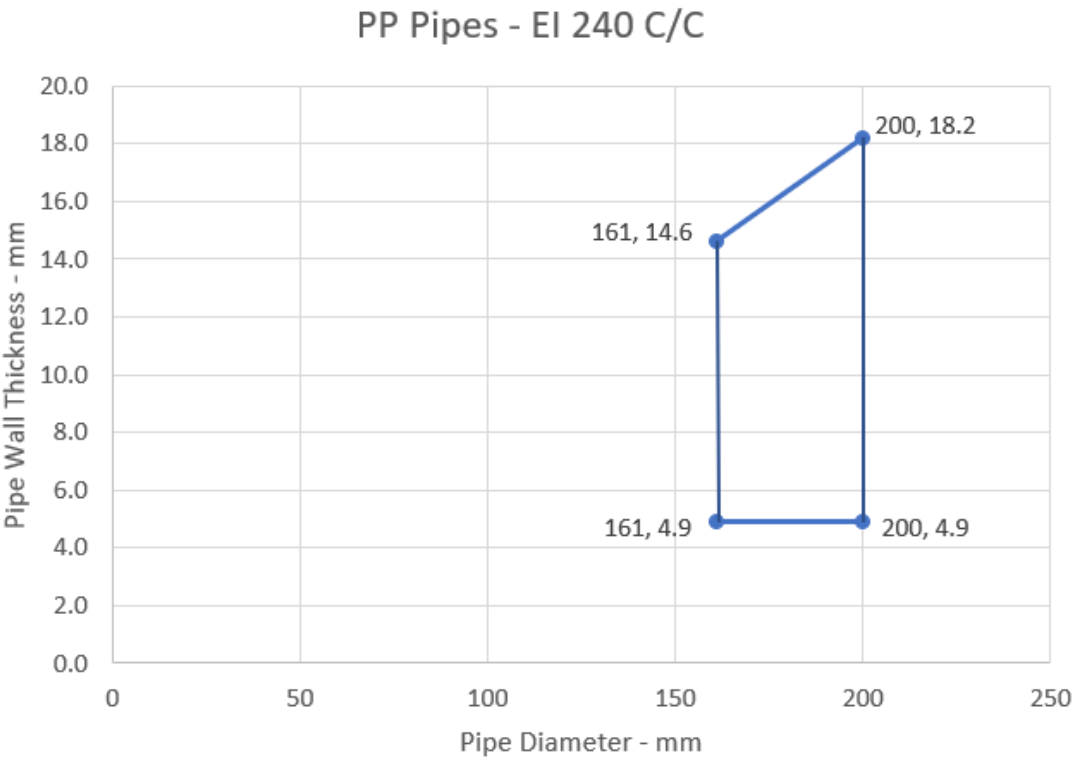

PVC Pipes 161-315 mm Diameter - EI 90 - C/C
Pipe Wall Thickness - mm
Pipe Diameter - mm
315, 12.1
161, 9.5
315, 7.7
161, 4.5
0
2
4
6
8
10
12
14
0
50
100
150
200
250
300
350

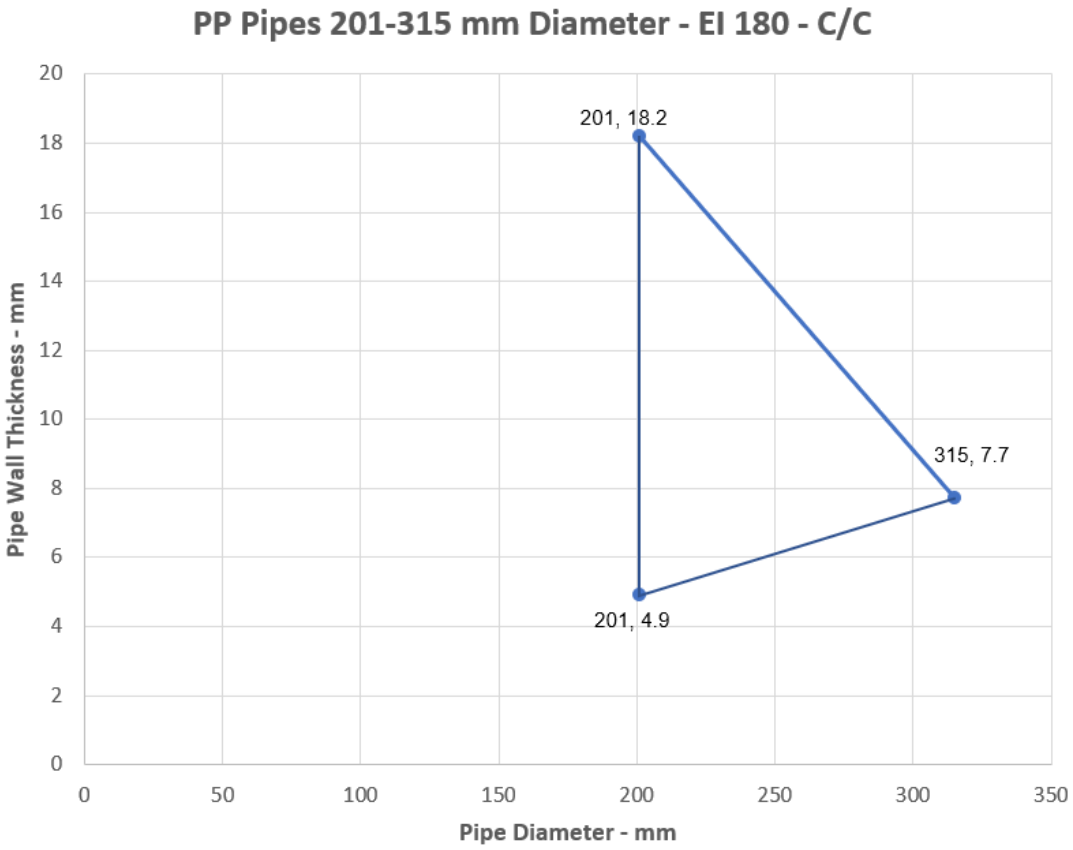

PVC Pipes 315-400 mm Diameter - EI 60 - C/C
Pipe Wall Thickness - mm
Pipe Diameter - mm
400, 15.3
315, 12.1
315, 7.7
0
2
4
6
8
10
12
14
16
18
0
50
100
150
200
250
300
350
400
450

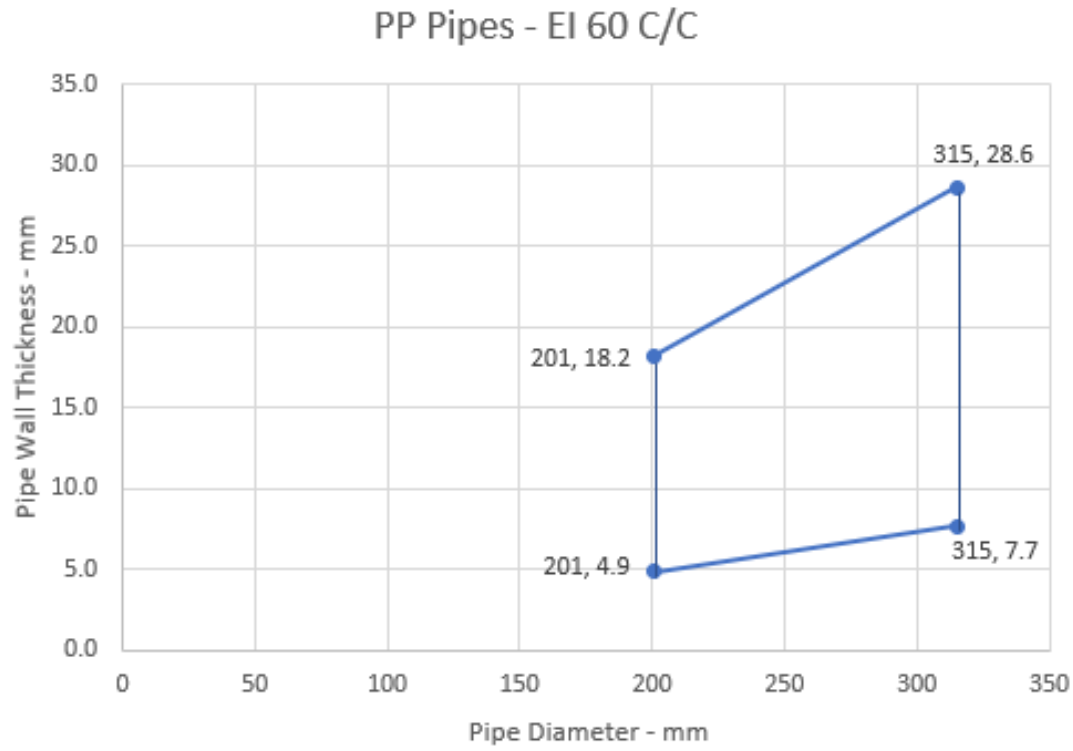
Services	Wrap	Permitted configuration for seal separation	Min. mortar depth and floor thickness	Classification
PP pipes according to EN 1451-1				
Diameter 41 mm, wall thickness 1.8-5.5 mm to diameter 160 mm, wall thickness 4.9-14.6 mm*	75 x 10.8 mm (6 x 1.8 layers)	1 & 2	150 mm	**EI 120 U/C**
160 mm diameter / 14.6 mm wall	75 x 7.2 mm (4 x 1.8 layers)	1 & 2	150 mm	**EI 240 U/U**
Diameter 161 mm, wall thickness 4.9-14.6 mm to diameter 200 mm, wall thickness 4.9-18.2 mm*	75 x 10.8 mm (6 x 1.8 layers)	1 & 2	120 mm	**EI 240 C/C**
Diameter 201 mm, wall thickness 4.9-18.2 mm to diameter 315 mm, wall thickness 7.7 mm*	75 x 18 mm (10 x 1.8 layers)	N/A	150 mm	**EI 180 C/C**
Diameter 201 mm, wall thickness 4.9-18.2 mm to diameter 315 mm, wall thickness 7.7-28.6 mm*	75 x 18 mm (10 x 1.8 layers)	N/A	150 mm	**EI 60 C/C**
315 mm diameter / 7.7 mm wall	75 x 18 mm (10 x 1.8 layers)	N/A	150 mm	**EI 180 C/C**
315 mm diameter / 7.7-28.6 mm wall	75 x 18 mm (10 x 1.8 layers)	1	150 mm	**EI 60 C/C**
Diameter 315 mm, wall thickness 7.7-28.6 mm to diameter 400 mm, wall thickness 22.7 mm*	75 x 28.8 mm (16 x 1.8 layers)	1	150 mm	**EI 60 C/C**
400mm diameter / 22.7 mm wall thickness	75 x 28.8 mm (16 x 1.8 layers)	1 & 2	150 mm	**EI 60 C/C**

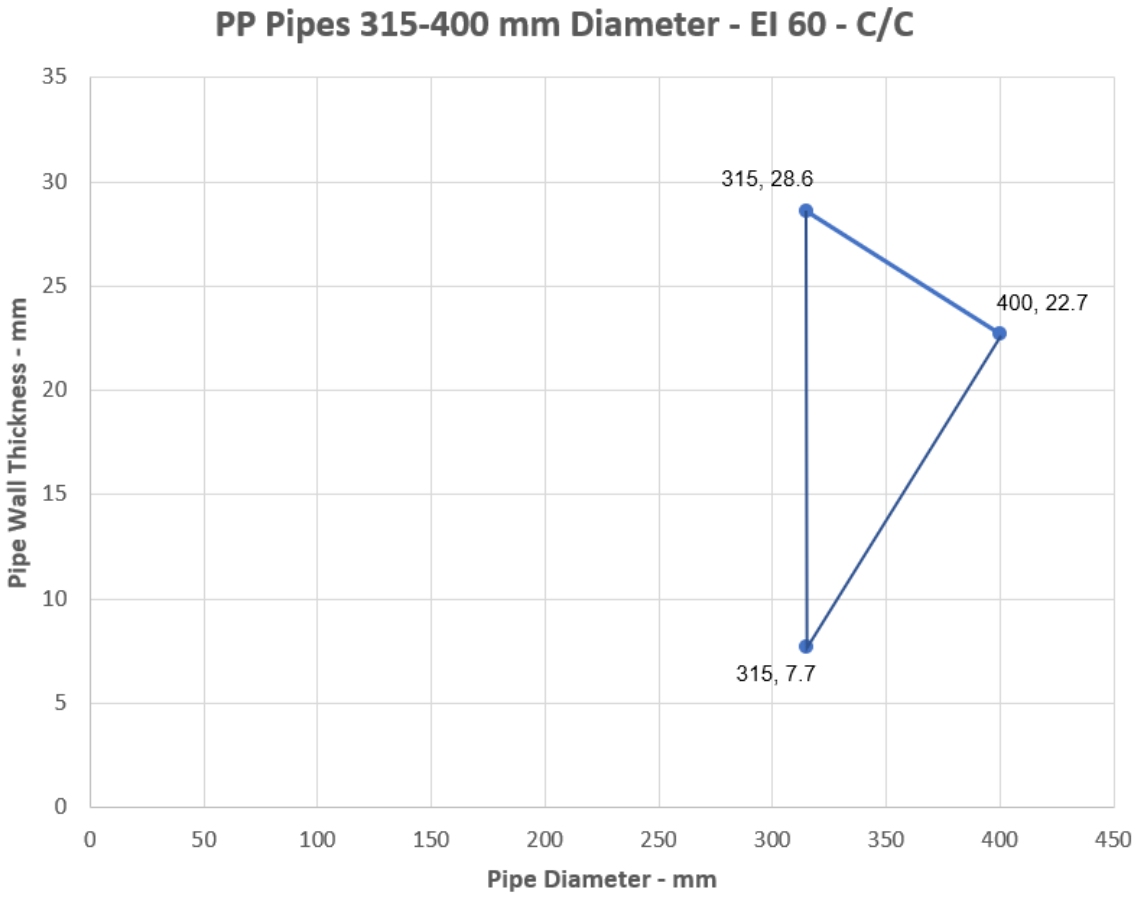
* Typical pipe diameters shown, see below graph for intermediate sizes


PP Pipes 41-160 mm Diameter - EI 120 U/C
Pipe Wall Thickness - mm
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
20
40
60
80
100
120
140
160
180
Pipe Diameter - mm
160, 14.6
41, 5.5
160, 4.9
41, 1.8


PP Pipes - EI 240 C/C
Pipe Wall Thickness - mm
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
50
100
150
200
250
Pipe Diameter - mm
200, 18.2
161, 14.6
161, 4.9
200, 4.9

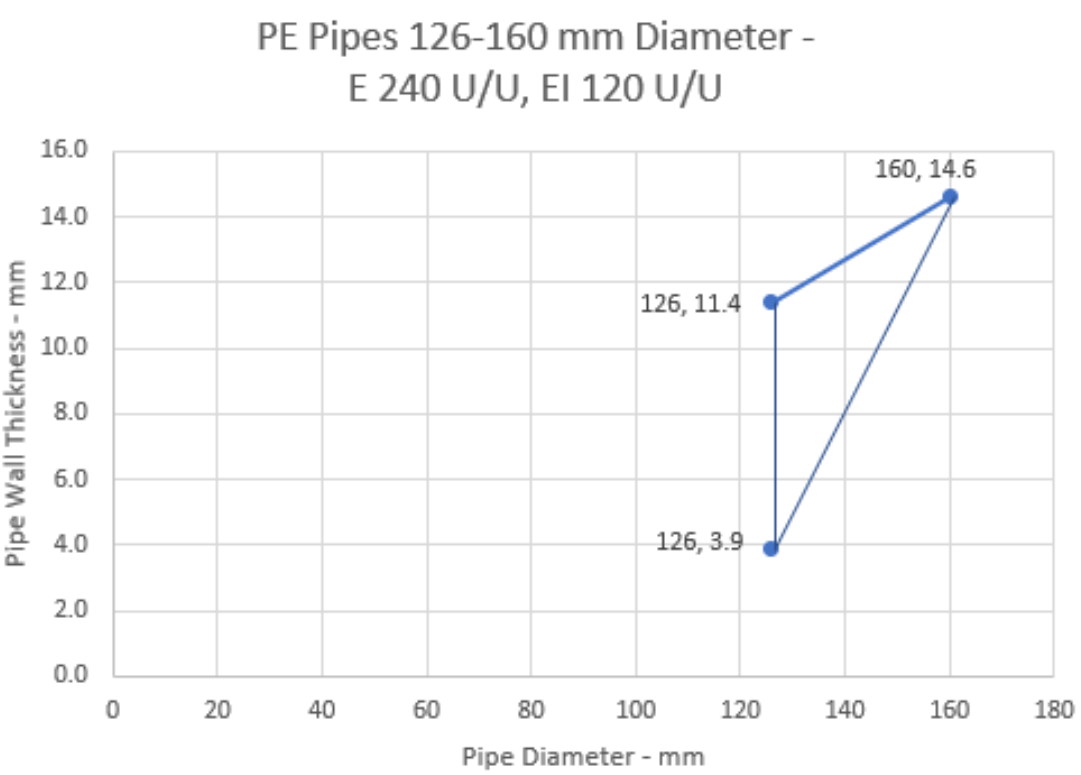

PP Pipes 201-315 mm Diameter - EI 180 - C/C
Pipe Wall Thickness - mm
Pipe Diameter - mm
201, 18.2
315, 7.7
201, 4.9
0
2
4
6
8
10
12
14
16
18
20
0
50
100
150
200
250
300
350

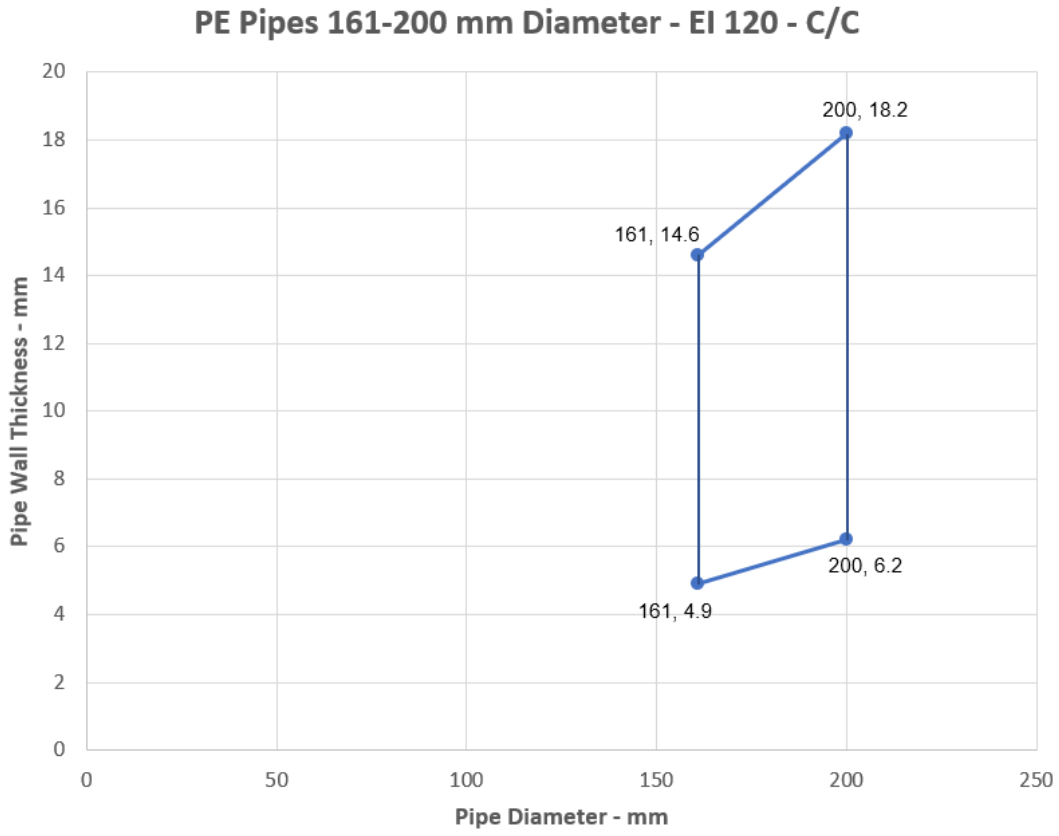

PP Pipes - EI 60 C/C
Pipe Wall Thickness - mm
Pipe Diameter - mm
315, 28.6
201, 18.2
201, 4.9
315, 7.7
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
0
50
100
150
200
250
300
350

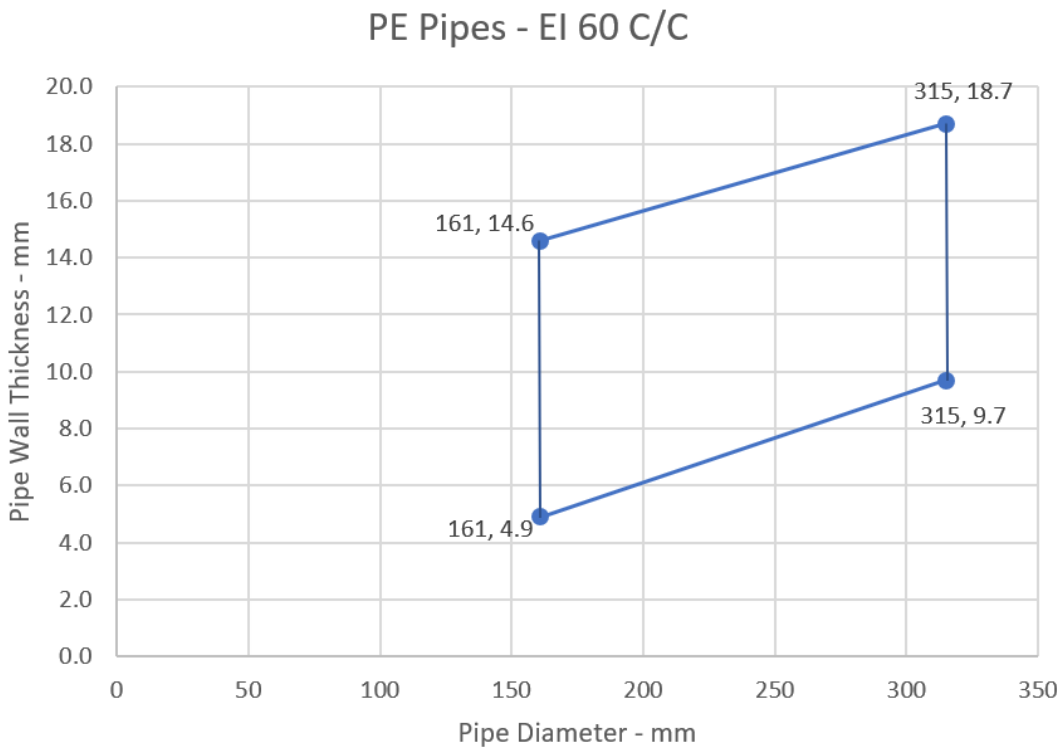

PP Pipes 315-400 mm Diameter - EI 60 - C/C
Pipe Wall Thickness - mm
Pipe Diameter - mm
315, 28.6
400, 22.7
315, 7.7
0
5
10
15
20
25
30
35
0
50
100
150
200
250
300
350
400
450

Services	Wrap	Permitted configuration for seal separation	Min. mortar depth and floor thickness	Classification
PE pipes according to EN 1519-1, EN 12201-2 and EN 12666-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1				
Diameter 126 mm, wall thickness 3.9-11.4 mm to diameter 160 mm, wall thickness 14.6*	75 x 18 mm (10 x 1.8 layers)	N/A	150 mm	**E 240 U/U, EI 120 U/U**
160 mm diameter / 14.6 mm wall	75 x 7.2 mm (4 x 1.8 layers)	1 & 2	150 mm	**E 240 U/U, EI 120 U/U**
Diameter 161 mm, wall thickness 4.9-14.6 mm to diameter 200 mm, wall thickness 6.2-18.2 mm*	75 x 10.8 mm (6 x 1.8 layers)	1 & 2	150 mm	**EI 120 C/C**
200 mm diameter / 6.2-18.2 mm wall thickness	75 x 10.8 mm (6 x 1.8 layers)	1 & 2	120 mm	**EI 240 C/C**
Diameter 161 mm, wall thickness 4.9-14.6 mm to diameter 315 mm, wall thickness 9.7-18.7 mm*	75 x 18 mm (10 x 1.8 layers)	N/A	150 mm	**EI 60 C/C**

* Typical pipe diameters shown, see below graph for intermediate sizes


PE Pipes 126-160 mm Diameter -
E 240 U/U, EI 120 U/U
Pipe Wall Thickness - mm
Pipe Diameter - mm
160, 14.6
126, 11.4
126, 3.9
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
20
40
60
80
100
120
140
160
180

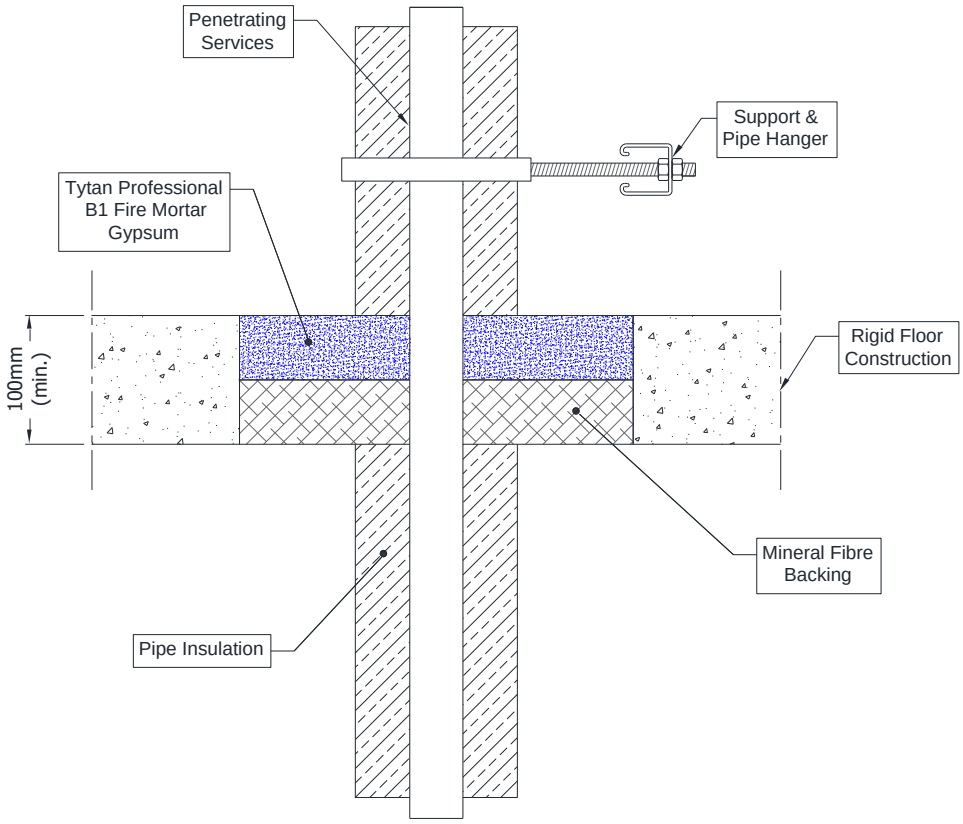

PE Pipes 161-200 mm Diameter - EI 120 - C/C
Pipe Wall Thickness - mm
Pipe Diameter - mm
200, 18.2
161, 14.6
200, 6.2
161, 4.9
20
18
16
14
12
10
8
6
4
2
0
0
50
100
150
200
250


PE Pipes - EI 60 C/C
Pipe Wall Thickness - mm
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
50
100
150
200
250
300
350
Pipe Diameter - mm
315, 18.7
161, 14.6
315, 9.7
161, 4.9

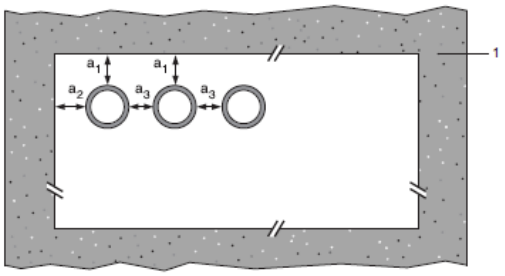
A.2.12 Pipe penetration seal with 50 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: CI (Continuous Interrupted) or LI (Local Interrupted) insulated composite pipes fitted at any position within the aperture (min. separation 10 mm from seal edges), with min. 50 mm Tytan Professional B1 Fire Mortar Gypsum to either surface of the floor or anywhere between, backed with min. 50 mm stone wool min. 150 kg/m^3.

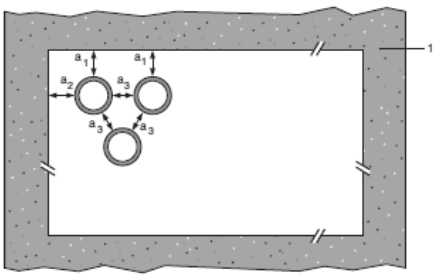
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

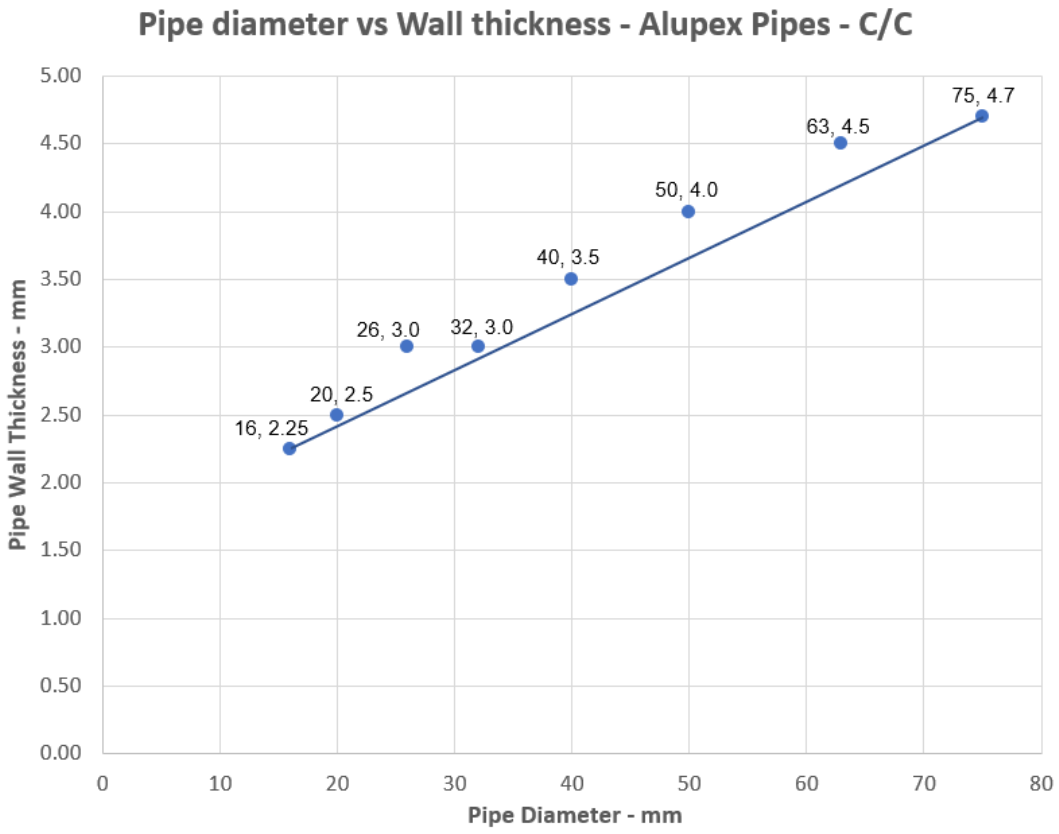
a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

A.2.12.1 Single side penetration seal with pipes

Services	Maximum Aperture	Insulation	Classification
Alupex pipes			
16 mm diameter/2.25 mm wall*	135 x 135 mm	500 mm long, minimum 20 mm Stone wool insulation minimum 80 kg/m^3	**EI 240 C/C**
16 mm diameter/2.25 mm wall*			**E 240 C/C, EI 180 C/C**
20 mm diameter/2.5 mm wall*			
26 mm diameter/3 mm wall*			
32 mm diameter/3 mm wall*			
40 mm diameter/3.5 mm wall*			
50 mm diameter/4 mm wall*			
63 mm diameter/4.5 mm wall*			
75 mm diameter/4.7 mm wall*			
16 mm diameter/2.25 mm wall*	As section 2. 4)		**EI 180 C/C**
20 mm diameter/2.5 mm wall*			
26 mm diameter/3 mm wall*			
32 mm diameter/3 mm wall*			
40 mm diameter/3.5 mm wall*			
50 mm diameter/4 mm wall*			
63 mm diameter/4.5 mm wall*			
75 mm diameter/4.7 mm wall*			

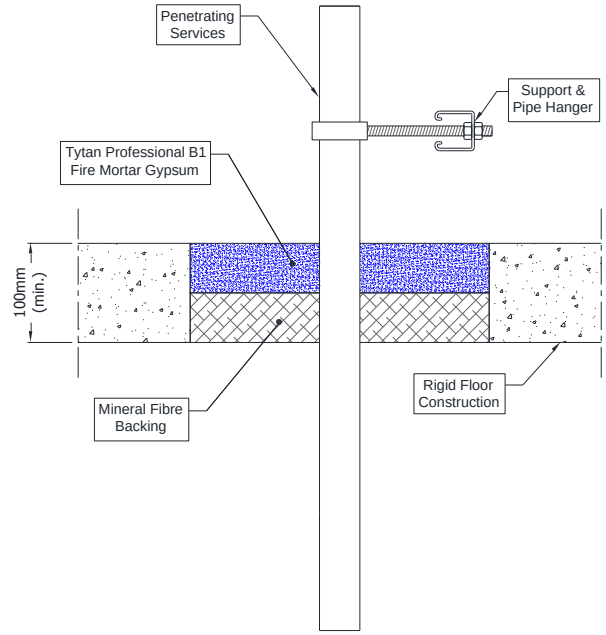
* Typical pipe diameters shown, see below graph for intermediate sizes

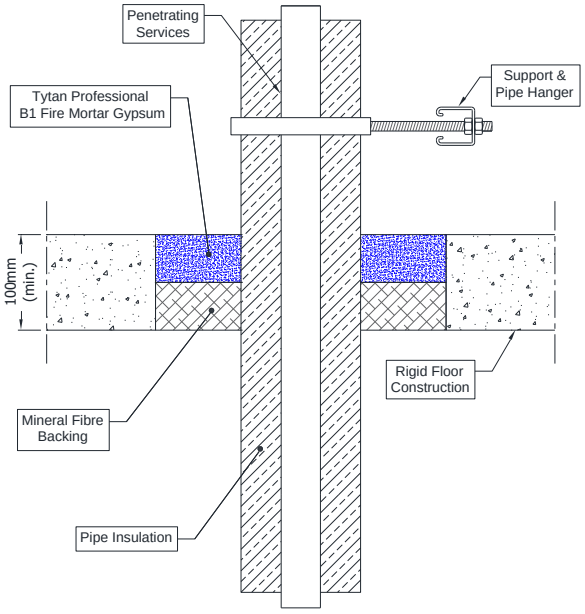


A.2.13 Pipe penetration seal with 50 mm deep Tytan Professional B1 Fire Mortar Gypsum

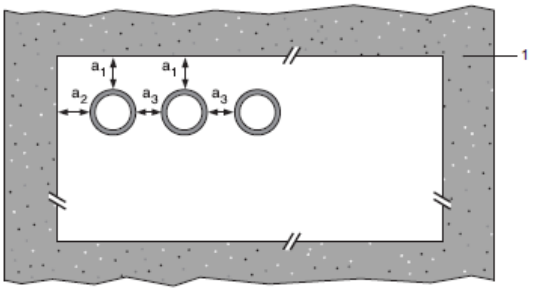
Penetration Seal: CS (Continuous Sustained) insulated metal pipes, uninsulated metal pipes and composite with Tytan Professional B1 Fire Mortar Gypsum, to either side of the floor, backed with stone wool board min. 150 kg/m³. Minimum separation from pipes to seal edges of 30 mm (a1 & a2). Maximum seal size as section 2. 4).

Construction details:

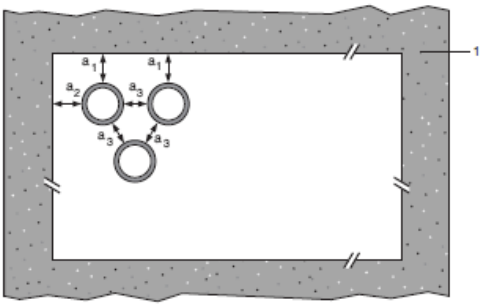




Configuration 1



Configuration 2



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

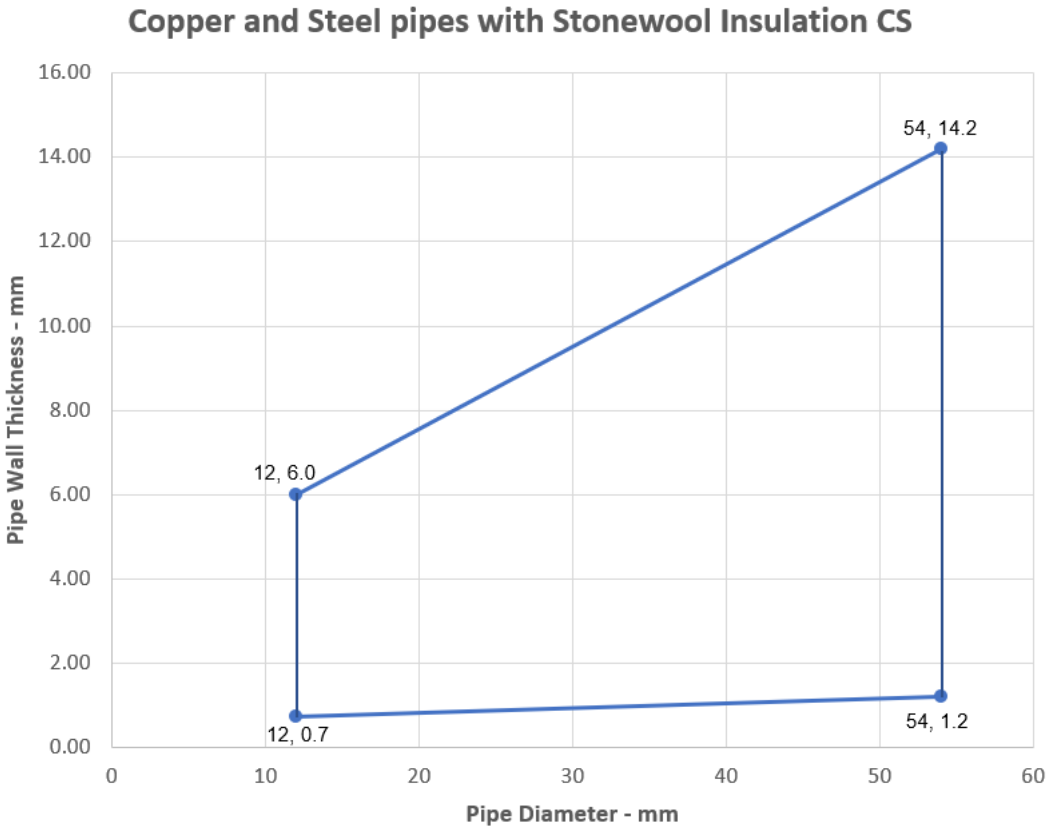
a2 Pipe / side edge of seal separation

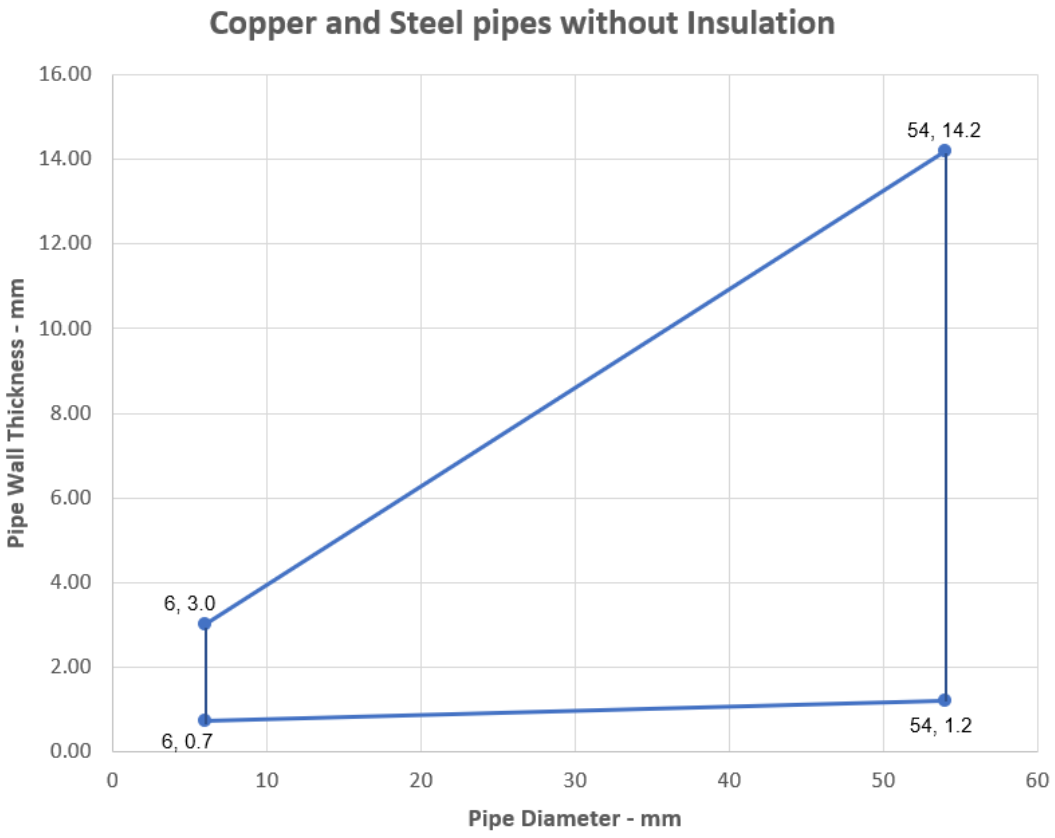
a3 Pipe / pipe separation

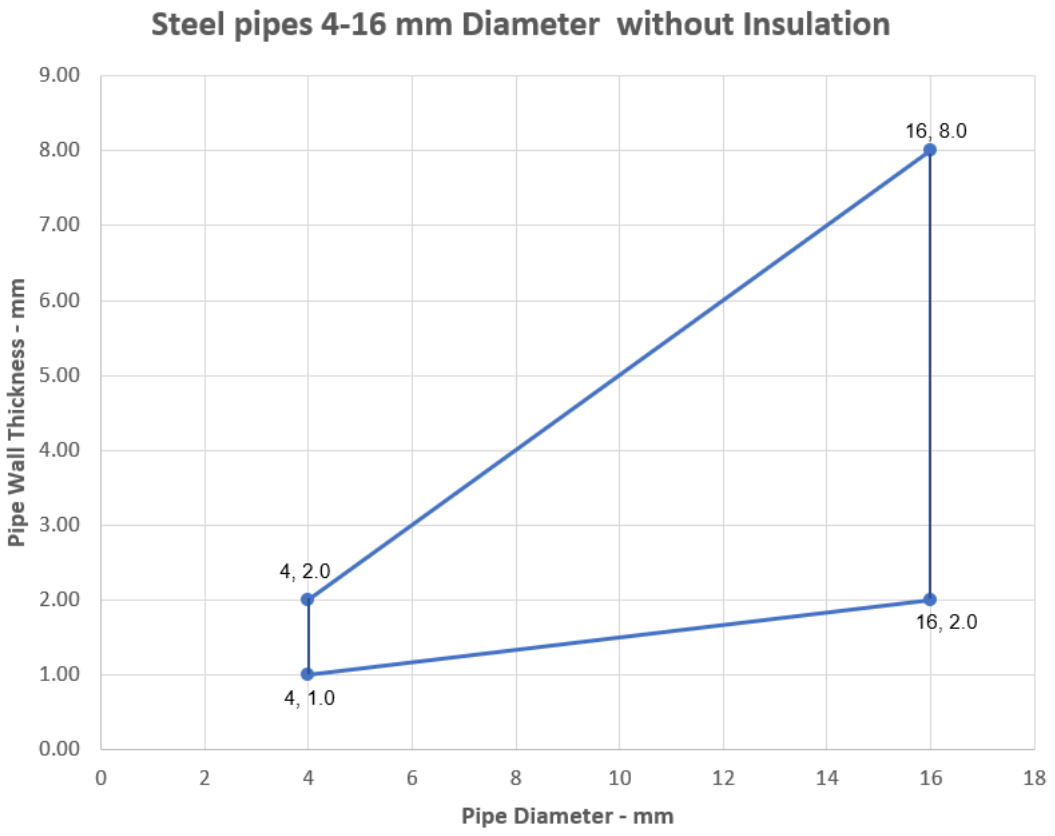
A.2.13.1 Single side penetration seal with pipes

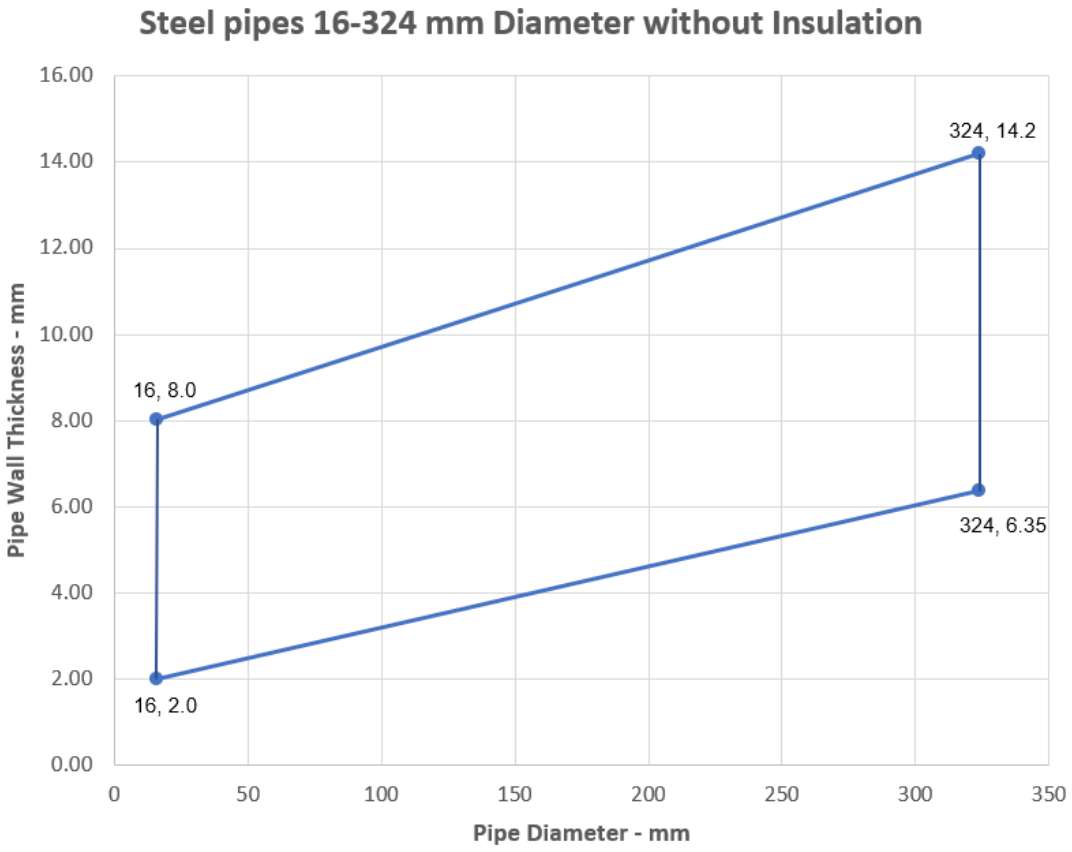
Services	Maximum Aperture	Insulation	Classification
Copper or steel pipes			
12 -54 mm diameter/0.7-14.2 mm wall*	As section 2. 4)	20-80 mm Stone wool insulation minimum 80 kg/m^3	**E 180 C/C, EI 120 C/C**
6 mm diameter/0.7-3 mm wall*		None	**E 180 C/C, EI 120 C/C**
7-15 mm diameter/0.7-7.5 mm wall*			**E 180 C/C, EI 30 C/C**
16-54mm diameter/1.2-14.2mm wall*			**E 180 C/C**
Steel pipes			
4-16 mm diameter/1.0-8.0 mm wall*		None	**EI 180 C/U**
17-324 mm diameter/6.35-14.2 mm wall*			**E 180 C/U, EI 20 C/U**
Alupex Pipes			
16-20 mm diameter/2.0 mm wall		None	**EI 180 C/C**
75mm diameter/4.6mm wall			**E 180 C/C, EI 30 C/C**
16 mm diameter/2.25 mm wall		20 mm glass- or stone wool insulation minimum 75 kg/m^3	**EI 180 C/C**
16-75 mm diameter/2.25-4.6 wall*		25-50 mm glass- or stone wool insulation minimum 75 kg/m^3	**EI 120 C/C**

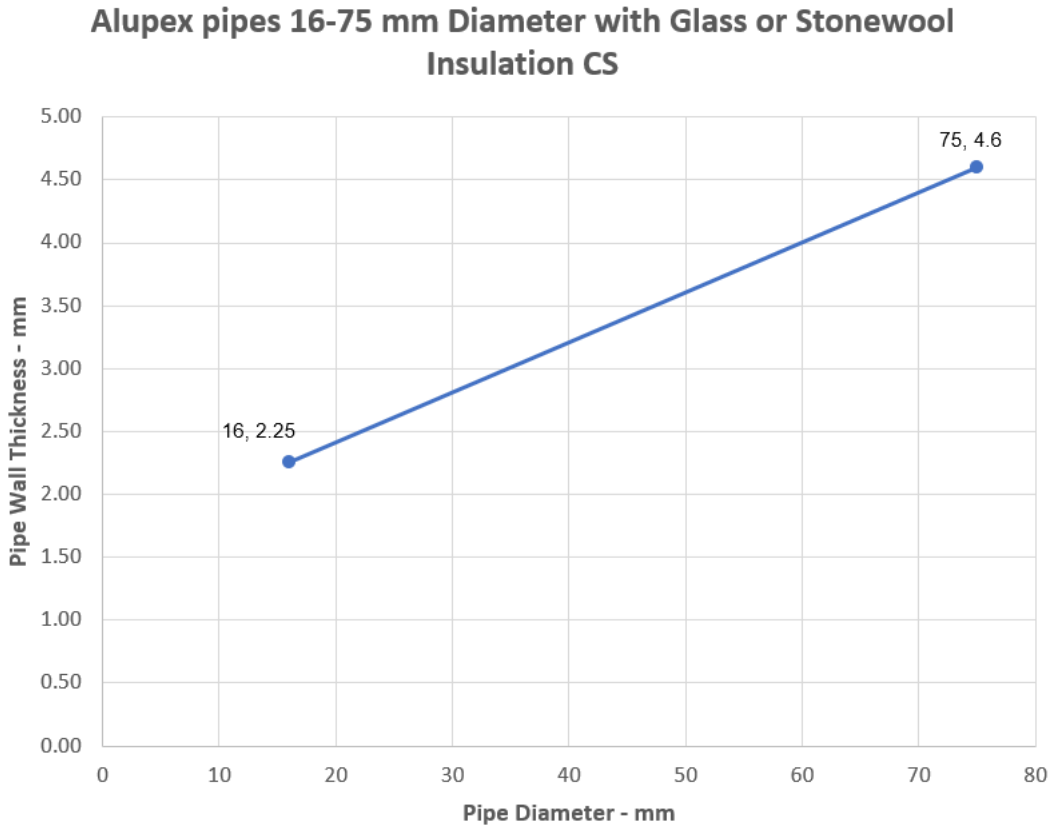
* Typical pipe diameters shown, see below graph for intermediate sizes




Copper and Steel pipes without Insulation
Pipe Wall Thickness - mm
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0
10
20
30
40
50
60
Pipe Diameter - mm
54, 14.2
6, 3.0
6, 0.7
54, 1.2


Steel pipes 4-16 mm Diameter without Insulation
Pipe Wall Thickness - mm
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0
2
4
6
8
10
12
14
16
18
Pipe Diameter - mm
16, 8.0
4, 2.0
4, 1.0
16, 2.0

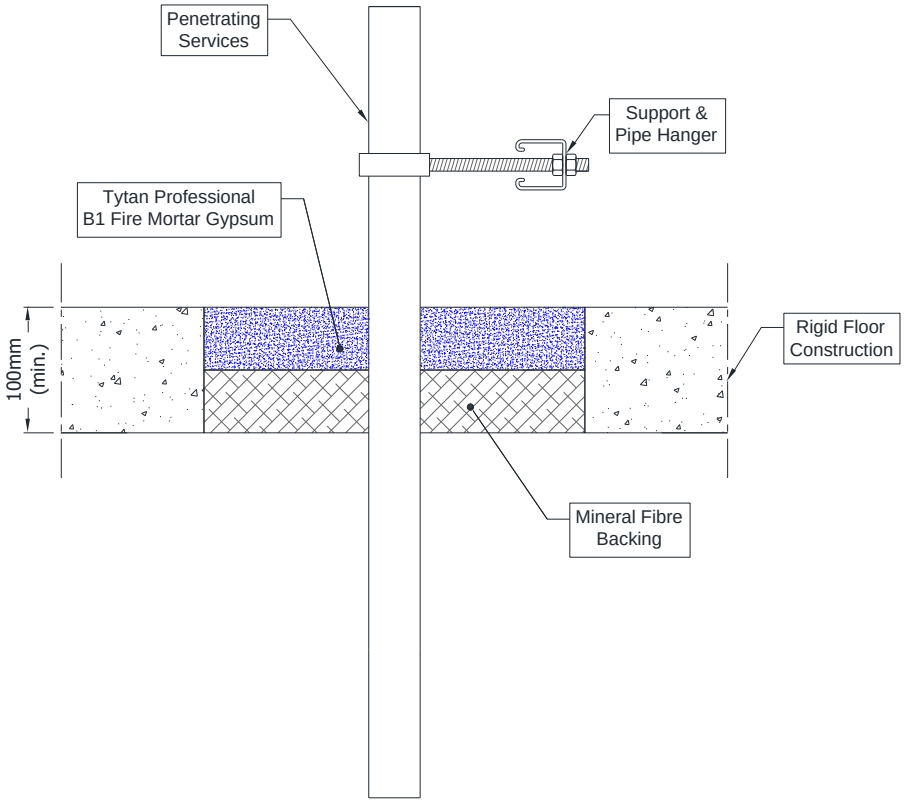

Steel pipes 16-324 mm Diameter without Insulation
Pipe Wall Thickness - mm
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0
50
100
150
200
250
300
350
Pipe Diameter - mm
324, 14.2
16, 8.0
324, 6.35
16, 2.0

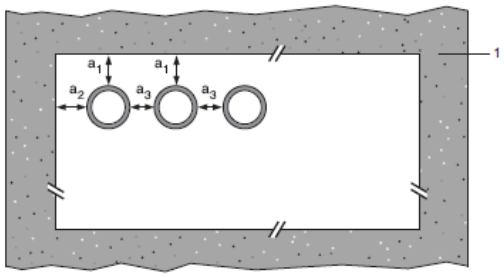
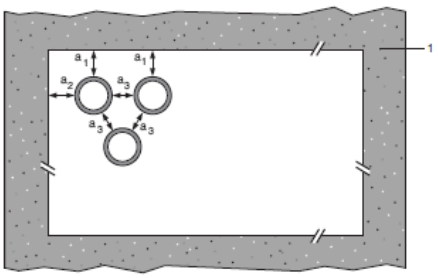

Alupex pipes 16-75 mm Diameter with Glass or Stonewool Insulation CS
Pipe Wall Thickness - mm
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0
10
20
30
40
50
60
70
80
Pipe Diameter - mm
75, 4.6
16, 2.25

A.2.14 Pipe penetration seal with 50 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: Plastic pipes fitted at any position within the aperture (min. separation 30 mm from seal edges and 30 mm from other services), with min. 50 mm Tytan Professional B1 Fire Mortar Gypsum flush with the top of floor, backed with min. 50 mm stone wool min. 150 kg/m³

Construction details:



Configuration 1:	**Configuration 2:**
	

Key

1 Supporting construction

a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

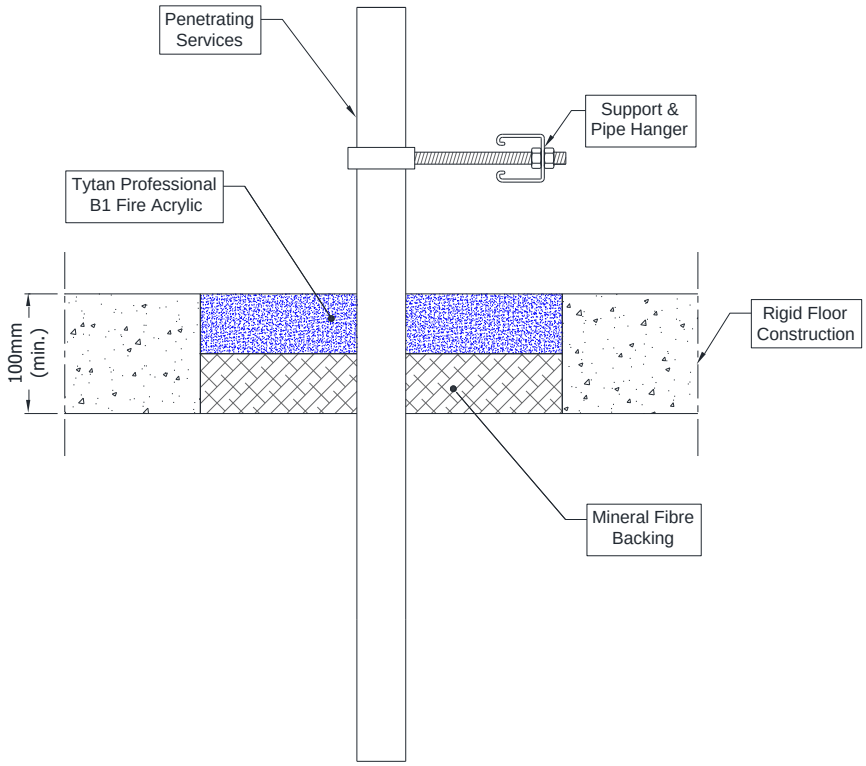
A.2.14.1 Single sided penetration seal with pipes

Services	Wrap	Maximum aperture	Classification
40 mm diameter /3 mm wall PP pipes according to EN 1451-1	None	As section 2. 4)	**EI 120 C/C**
40 mm diameter /4 mm wall PE pipes according to EN 1519-1, EN 12201-2 and EN 12006-1$, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
110 mm diameter /4.3 mm wall PE pipes according to EN 1519-1, EN 12201-2 and EN 12006-1$, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1	50 x 1.8mm		**EI 60 C/C**

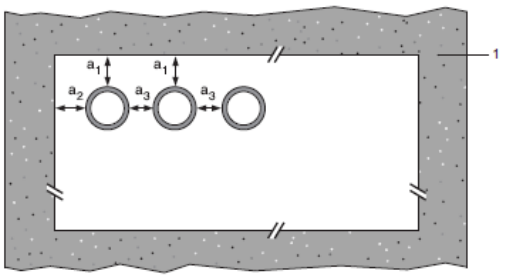
A.2.15 Pipe penetration seal with 50 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: Combustible pipes sealed with Tytan Professional B1 Fire Mortar Gypsum, to either side of the floor, backed with stone wool board min. 150 kg/m³. Minimum separation between pipes of 30 mm (a3) and from seal edges 30 mm (a1 & a2). Maximum seal size as section 2. 4).

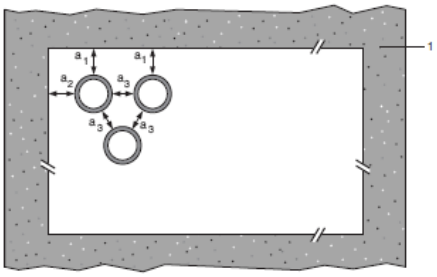
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

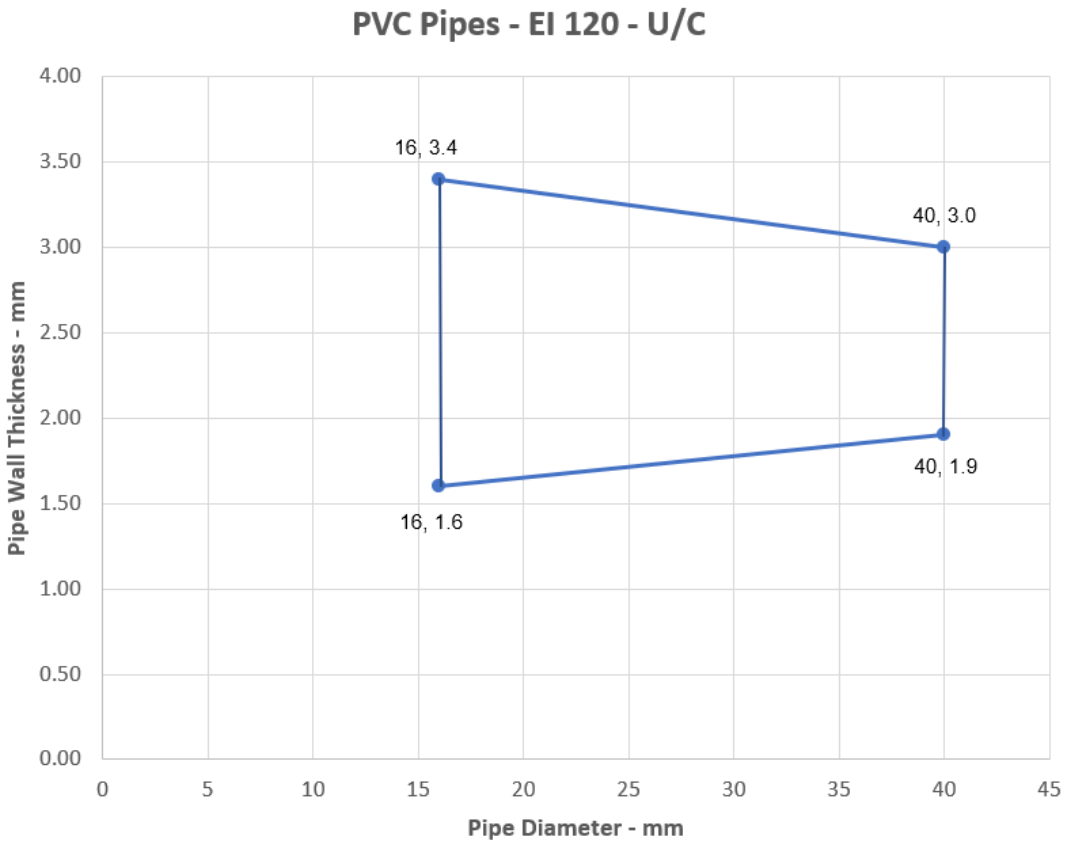
a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

A.2.15.1 Single side penetration seal with pipes

Services	Seal Depth	Permitted configuration for seal separation	Classification
PVC-U pipes according to EN 1329-1, EN 1452-2 and EN 1453-1^, PVC-C according to EN 1566-1			
Diameter 16 mm, wall thickness 1.6 – 3.4 mm, to diameter 40 mm, wall thickness 1.9-3.0 mm*	Min. 50 mm	1 & 2 between all specified pipes	**EI 120 U/C, C/C**

* See below graph for intermediate sizes

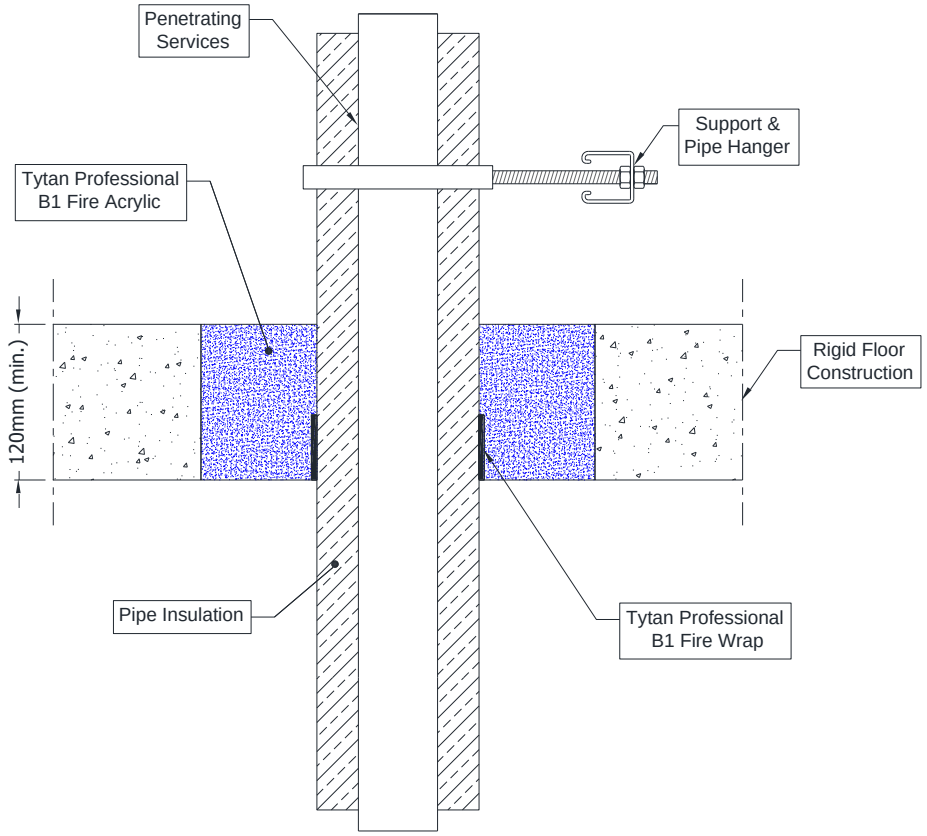

PVC Pipes - EI 120 - U/C
Pipe Wall Thickness - mm
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0
5
10
15
20
25
30
35
40
45
Pipe Diameter - mm
16, 3.4
40, 3.0
40, 1.9
16, 1.6

A.3 Rigid floor constructions according to 1.2.1 with floor thickness of minimum 120 mm

A.3.1 Pipe penetration seal with 120 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: CS (Continuous Sustained) insulated plastic pipes fitted at any position within the aperture (min. separation 30 mm from seal edges and 30 mm from other services), with min. 120 mm Tytan Professional B1 Fire Mortar Gypsum to either surface of the floor or anywhere between. Tytan Professional B1 Fire Wraps are required to be fitted around combustible pipe insulation to the bottom of the seal, as indicated below. Maximum seal size as section 2. 4).

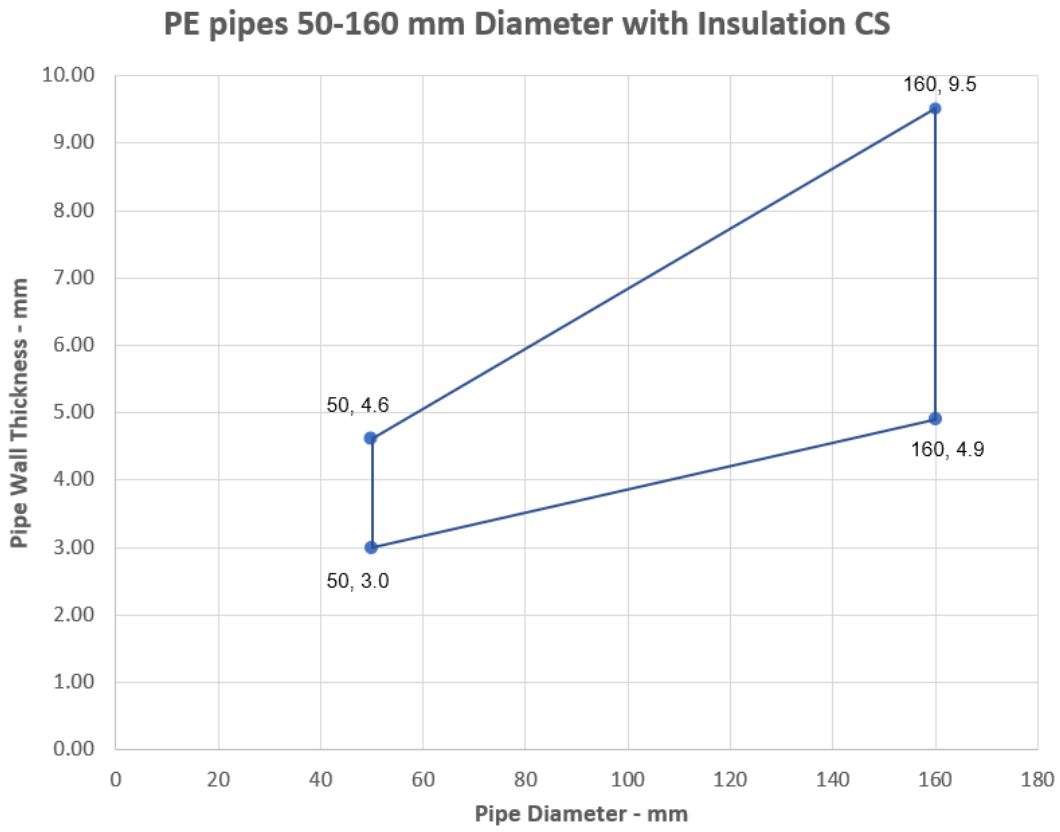
Construction details:

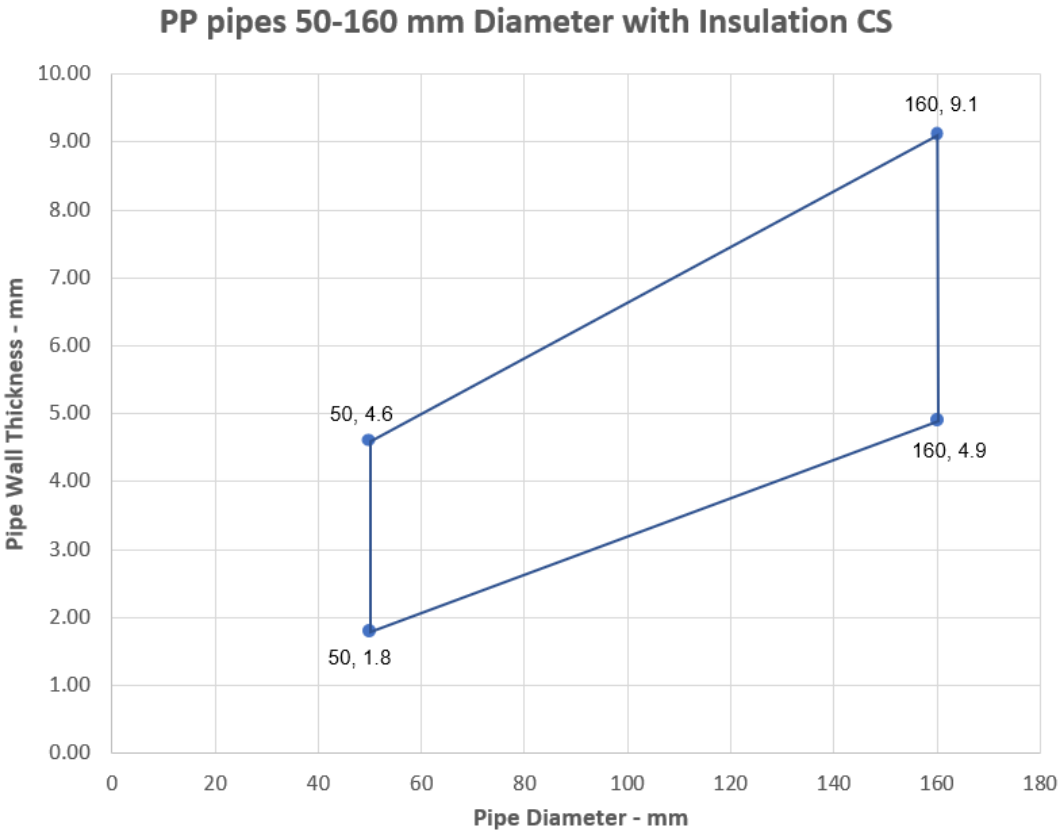


A.3.1.1 Single sided penetration seal with pipes

Services	Outer diameter including insulation	Pipe wrap	Pipe insulation	Classification
PE pipes according to EN 1519-1, EN 12201-2 and EN 12006-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1				
Maximum 160 mm diameter pipe*	Maximum 68 mm diameter	50 x 3.6 mm (2 x 1.8 layers)	9-50 mm Elastomeric insulation minimum class B-s3,d0 or foil faced phenolic foam insulation	**EI 240 C/C**
	Maximum 178 mm diameter	75 x 10.8 mm (6 x 1.8 layers)		
	Maximum 260 mm diameter	75 x 18.0 mm (10 x 1.8 layers)		**EI 120 C/C**
PP pipes according to EN 1852-1: 2009				
Maximum 160 mm diameter pipe*	Maximum 68 mm diameter	50 x 3.6 mm (2 x 1.8 layers)	9-50 mm Elastomeric insulation minimum class B-s3,d0 or foil faced phenolic foam insulation	**E 240 C/C, EI 180 C/C**
	Maximum 178 mm diameter	75 x 10.8 mm (6 x 1.8 layers)		**EI 240 C/C**
	Maximum 260 mm diameter	75 x 18.0 mm (10 x 1.8 layers)		**EI 120 C/C**

*See below graph for interpolation pipe sizes


PE pipes 50-160 mm Diameter with Insulation CS
Pipe Wall Thickness - mm
Pipe Diameter - mm
160, 9.5
160, 4.9
50, 4.6
50, 3.0
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0
20
40
60
80
100
120
140
160
180

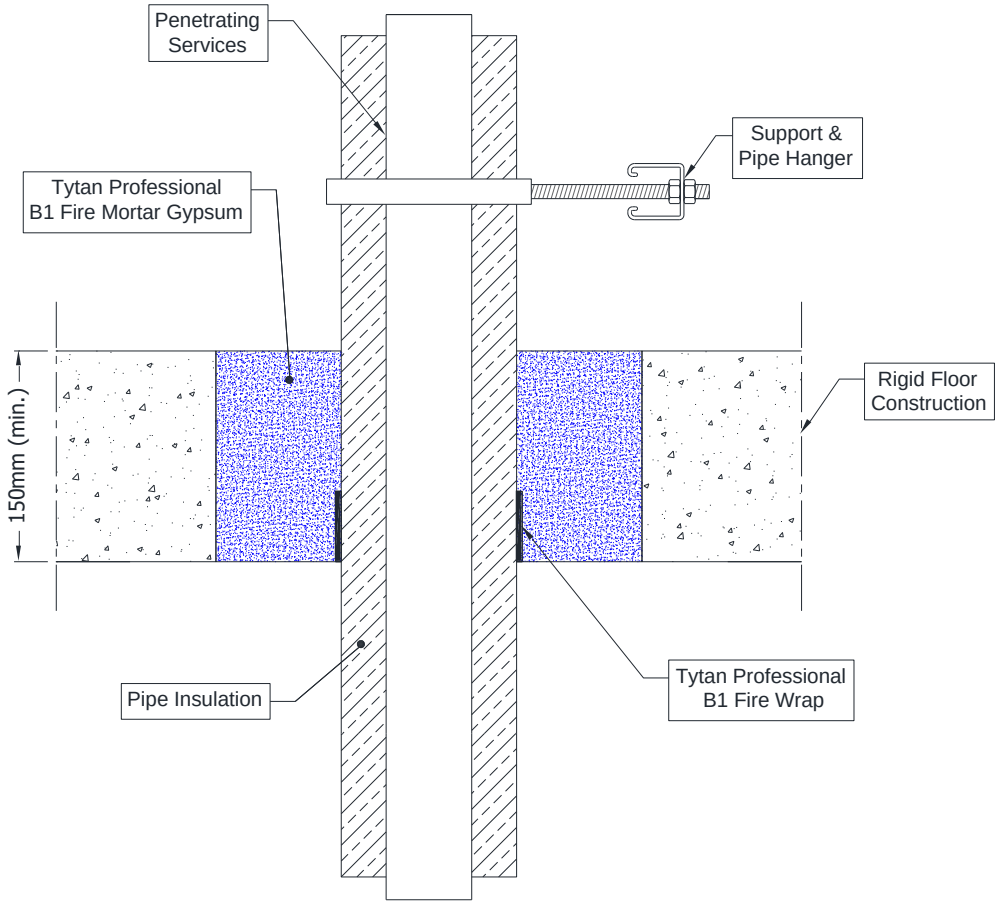

PP pipes 50-160 mm Diameter with Insulation CS
Pipe Wall Thickness - mm
Pipe Diameter - mm
160, 9.1
160, 4.9
50, 4.6
50, 1.8
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0
20
40
60
80
100
120
140
160
180

A.4 Rigid floor constructions according to 1.2.1 with floor thickness of minimum 150 mm

A.4.1 Pipe penetration seal with 150 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: CS (Continuous Sustained) insulated metallic pipes fitted at any position within the aperture (min. separation 30 mm from seal edges and 30 mm from other services), with min. 150 mm Tytan Professional B1 Fire Mortar Gypsum to either surface of the floor or anywhere between. Tytan Professional B1 Fire Wraps are required to be fitted around combustible pipe insulation. Maximum seal size as section 2. 4).

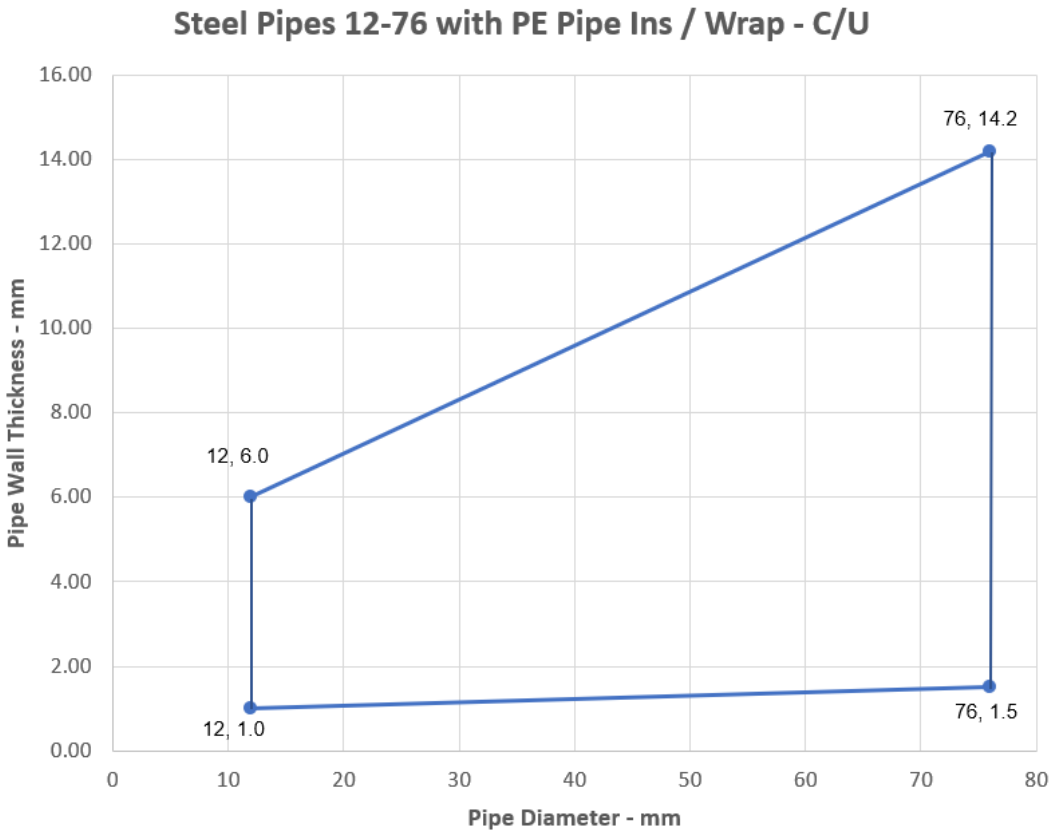
Construction details:



A.4.1.1 Single side penetration seal with pipes

Services	Wrap	Insulation	Classification
Mild or stainless steel pipes			
12 mm diameter/ 1.0 mm wall	1 off 50 x 1.8 mm Tytan Professional B1 Fire Wrap, fitted at soffit	9 mm PE foam insulation	**EI 180 C/U**
Maximum 76 mm diameter/ 1.5-14.2 mm wall*	1 off 50 x 1.8 mm Tytan Professional B1 Fire Wrap, fitted at soffit	9 mm PE foam insulation	**E 180 C/U** **EI 60 C/U**
	2 off 50 x 1.8 mm Tytan Professional B1 Fire Wrap, fitted at soffit	9-30 mm PE foam insulation	

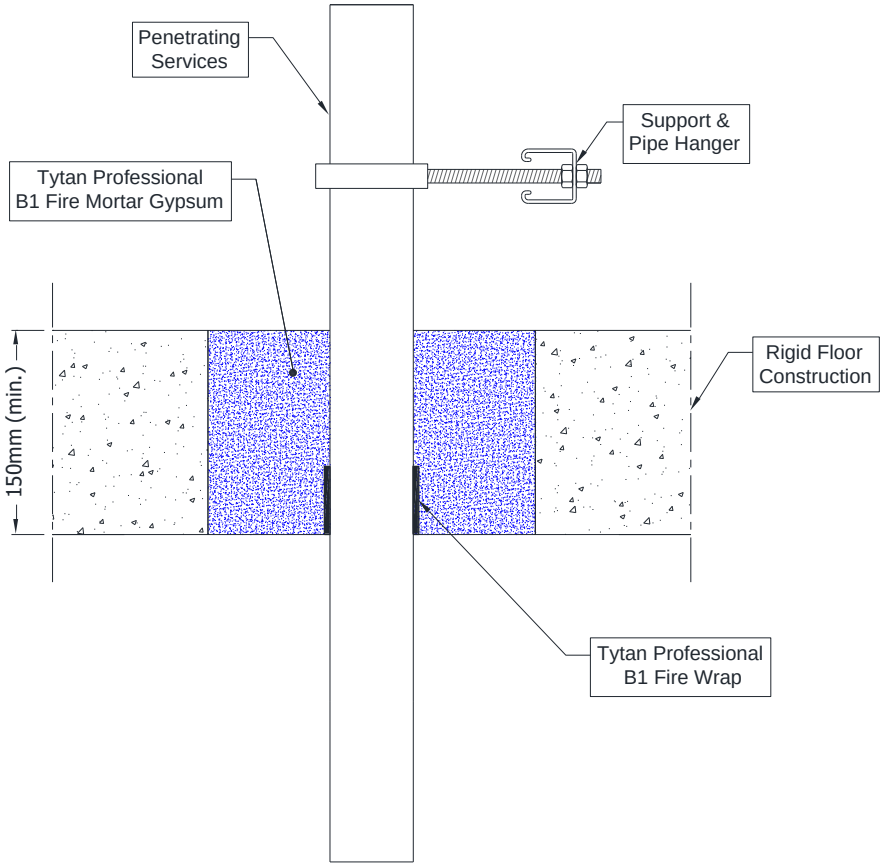
* See below graph for intermediate sizes


Steel Pipes 12-76 with PE Pipe Ins / Wrap - C/U
Pipe Wall Thickness - mm
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0
10
20
30
40
50
60
70
80
Pipe Diameter - mm
76, 14.2
12, 6.0
12, 1.0
76, 1.5

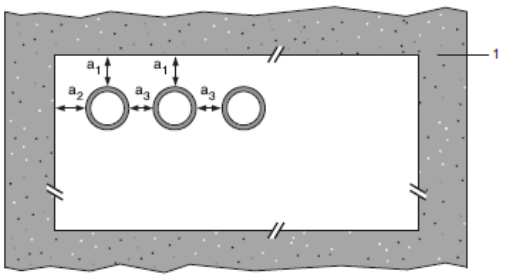
A.4.2 Pipe penetration seal with 150 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: Plastic pipes fitted at any position within the aperture (min. separation 30 mm from seal edges and from other services), with 150 mm Tytan Professional B1 Fire Mortar Gypsum to either surface of the floor or anywhere between. Tytan Professional B1 Fire Wraps are required to be fitted to the bottom of the seal, as indicated below. Maximum seal size as section 2. 4).

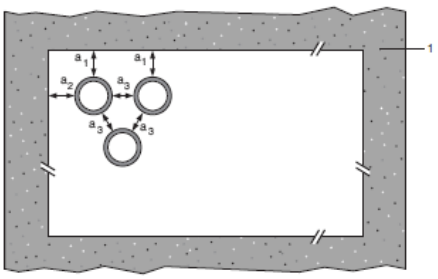
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

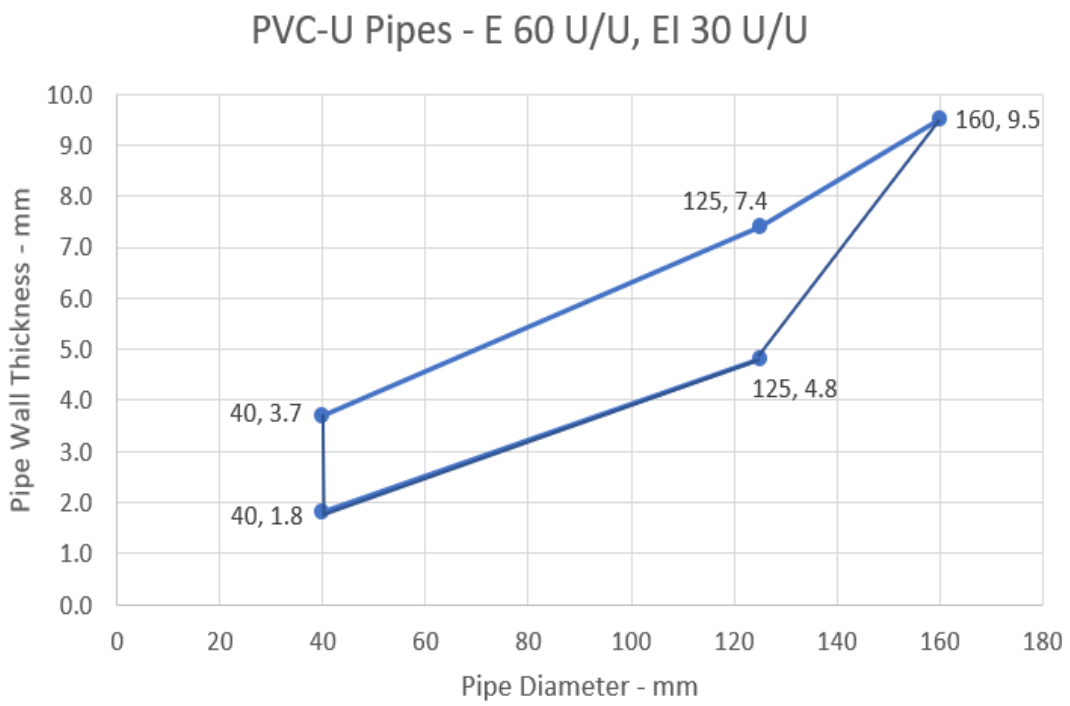
a2 Pipe / side edge of seal separation

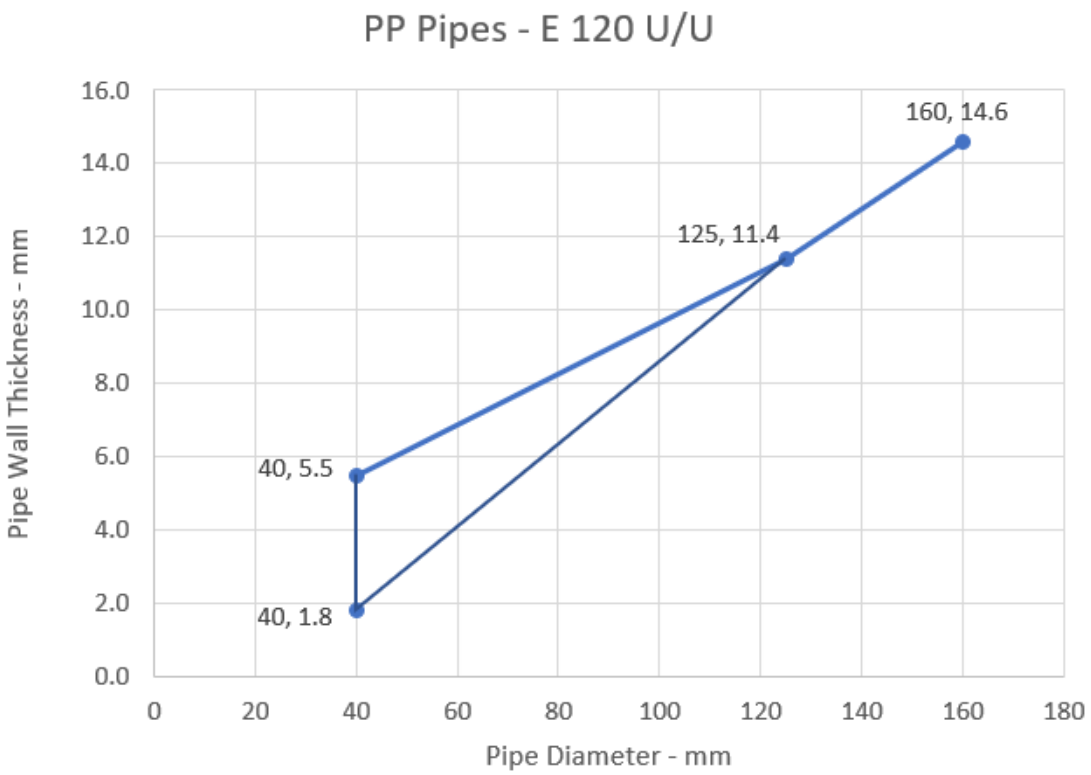
a3 Pipe / pipe separation

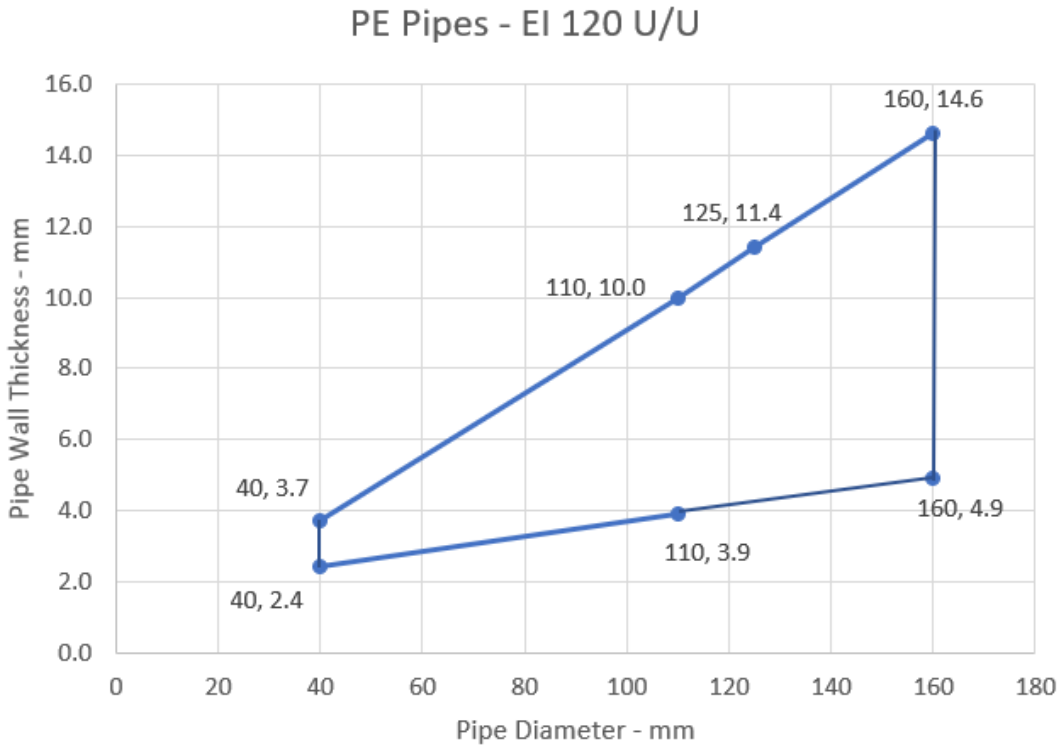
A.4.2.1

Services	Wrap	Permitted configuration for seal separation	Classification
PVC-U pipes according to EN 1329-1, EN 1452-1 and EN 1453-1, PVC-C according to EN 1566-1			
Up to 40 mm diameter/1.8-3.7 mm wall*	50 x 1.8	1 & 2	**EI 120 U/U**
Up to 125 mm diameter / 4.8-7.4 mm wall*	50 x 7.2 mm		**EI 60 U/U**
Up to 160 mm diameter/9.5 mm wall*	75 x 7.2 mm		**E 120 U/U, EI 30 U/U**
PP pipes according to EN 1451-1			
Up to 40 mm diameter/1.8-5.5 mm wall*	50 x 1.8	1 & 2	**EI 120 U/U**
Up to 125 mm diameter / 11.4 mm wall*	50 x 7.2 mm		**EI 240 U/U**
Up to 160 mm diameter/14.6 mm wall*	75 x 7.2 mm		**EI 240 U/U**
PE pipes according to EN 1519-1, EN 12201-2 and EN 12666-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Up to 40 mm diameter/2.4-3.7 mm wall*	50 x 1.8 mm	1 & 2	**EI 240 U/U**
Up to 110 mm diameter/3.4-10 mm wall*	75 x 5.4 mm		**EI 240 U/U**
Up to 125 mm diameter/11.4 mm wall*	50 x 7.2 mm		**EI 240 U/U**
Up to 160 mm diameter/4.9-14.6 mm wall*	75 x 7.2 mm		**EI 120 U/U**

* Typical pipe diameters shown, see below graph for intermediate sizes



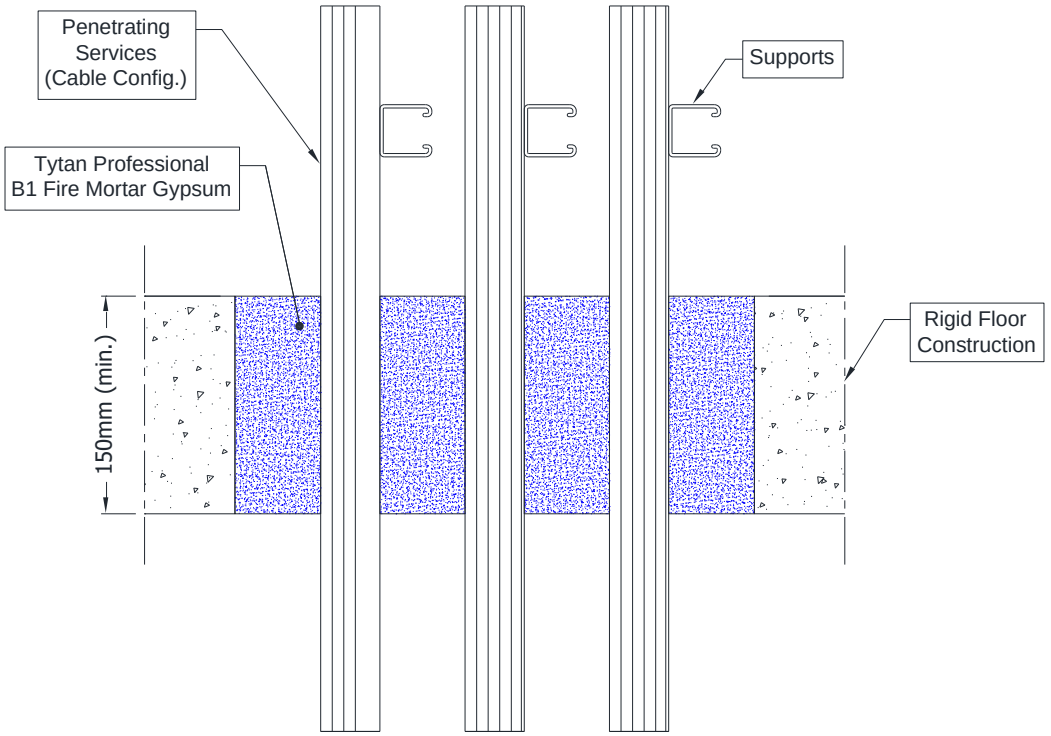

PP Pipes - E 120 U/U
Pipe Wall Thickness - mm
Pipe Diameter - mm
160, 14.6
125, 11.4
40, 5.5
40, 1.8
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
20
40
60
80
100
120
140
160
180


PE Pipes - EI 120 U/U
Pipe Wall Thickness - mm
Pipe Diameter - mm
160, 14.6
125, 11.4
110, 10.0
40, 3.7
160, 4.9
110, 3.9
40, 2.4
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
20
40
60
80
100
120
140
160
180

A.4.3 Cable penetration seal with 150 mm deep Tytan Professional B1 Fire Mortar Gypsum

Penetration Seal: Cables fitted with Tytan Professional B1 Fire Mortar Gypsum to either side of floor. Maximum seal size as section 2. 4) and minimum separation between cables and the edge of the seal of 30 mm.

Construction details:



A.4.3.1 Single side penetration seal with cables

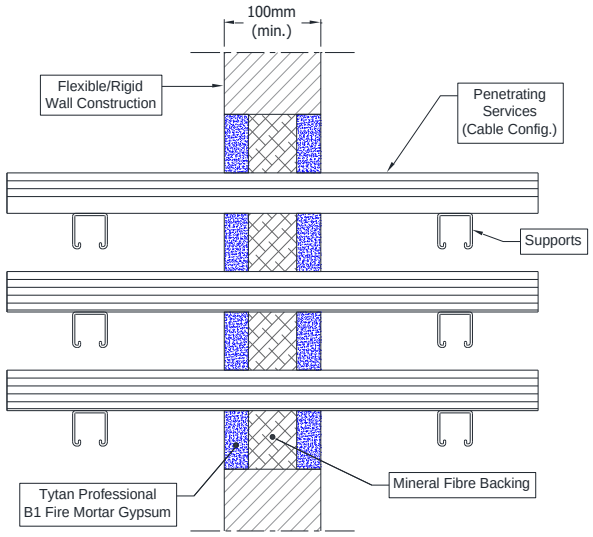
Services	Mortar depth	Backing	Insulation	Classification
Blank seals	Min. 150 mm	None	None	**EI 240**
Electric cables up to 21 mm diameter, single or in a bundle.				**E 240 EI 120**
Steel cable trays and ladders up to 500 mm wide				
Electric cables 22-50 mm diameter, single or in a bundle.				**E 240 EI 90**
Electric cables 51-80 mm diameter, single or in a bundle.				**E 90 EI 60**
Unsheathed wire up to 24 mm diameter				**EI 120**

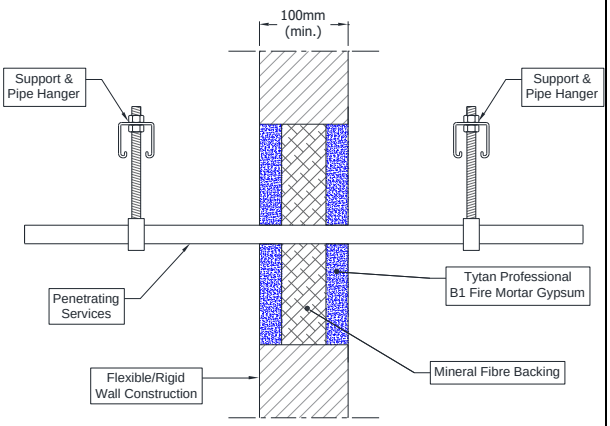
A.5 Flexible and rigid wall constructions according to 1.2.1 with wall thickness of min. 100 mm

A.5.1 Cable penetration seal with 25 mm deep Tytan Professional B1 Fire Mortar Gypsum to both faces backed with 50 mm mineral fibre board

Penetration Seal: Cables fitted at any position within the aperture (min. separation 25 mm from seal edges), with min. 25 mm Tytan Professional B1 Fire Mortar Gypsum to both sides of the wall, backed with min. 1 x 50 mm or 2 x 25 mm stone wool board min. 150 kg/m³.

Construction details:





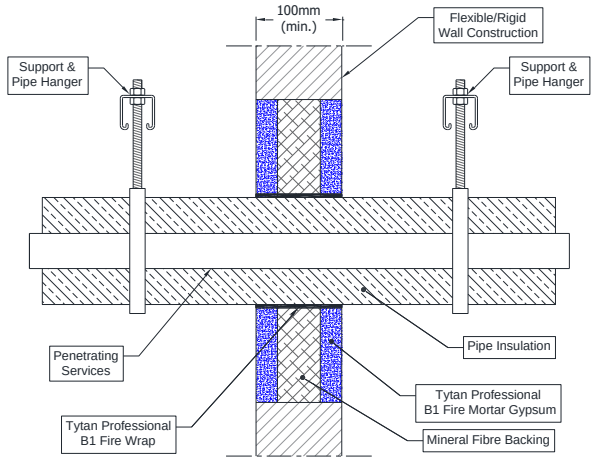
A.5.1.1 Double side penetration seal with cables

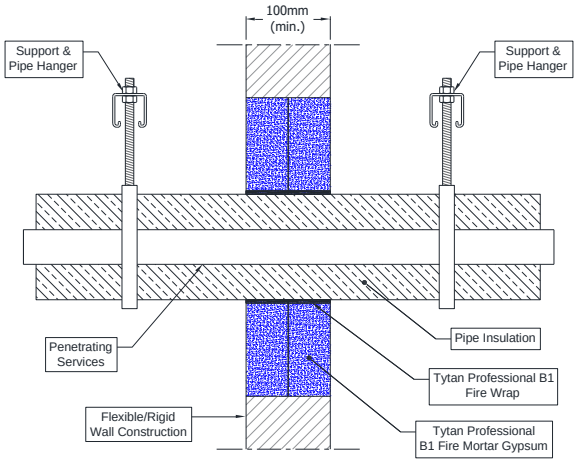
Services	Maximum aperture	Classification
None (blank)	As section 2. 4)	**EI 120**
Single electrical cables up to 21 mm Ø (min.100 separation from other services		**E 120, EI 90**
Electrical cables up to 80 mm Ø (single, bundled and on trays)		**E 120, EI 60**
Steel cable trays & ladders		
Steel conduits up to 16 mm Ø		**E 120 C/U, EI 60 C/U**
copper conduits up to 16 mm Ø		**E 120 C/U, EI 45 C/U**
Unsheathed wires up to 24 mm Ø		**E 120, EI 45**
PVC conduits up to 16 mm Ø		**EI 120 C/U, EI 120 C/C**

A.5.2 Pipe penetration seal with 25 mm deep Tytan Professional B1 Fire Mortar Gypsum to both faces backed with 50 mm mineral fibre board

Penetration Seal: CS (Continuous Sustained) insulated metallic pipes fitted at any position within the aperture (min. separation 30 mm from seal edges), with min. 25 mm Tytan Professional B1 Fire Mortar Gypsum to both sides of the wall, backed with min. 1 x 50 mm or 2 x 25 mm stone wool board min. 150 kg/m³ or min. 50 mm Tytan Professional B1 Fire Mortar Gypsum to both sides of the wall without backing*. Tytan Professional B1 Fire Wraps are required to be fitted to both faces of the seal.

Construction details:



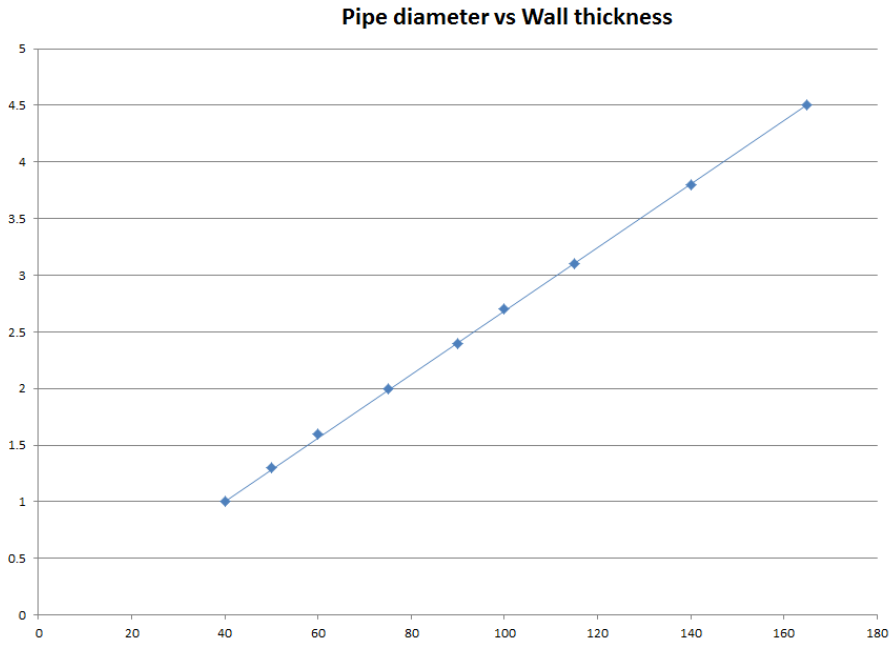


* Maximum seal size as section 2. 4)

A.5.2.1 Double side penetration seal with pipes

Services	Wrap	Insulation	Classification
Mild or stainless steel pipes			
40 mm diameter/1-14.2 mm wall	2 off 50 x 1.8 mm Tytan Professional B1 Fire Wrap, one fitted flush to each face of seal	13 mm Elastomeric insulation minimum class B-s3,d0 or PE Foam insulation	**EI 120 C/U**
40 mm diameter/1-14.2 mm wall*	2 off 50 x 3.6 mm Tytan Professional B1 Fire Wrap, one fitted flush to each face of seal		**E 120 C/U, EI 60 C/U**
50 mm diameter/1.3-14.2 mm wall*			
60 mm diameter/1.6-14.2 mm wall*			
75 mm diameter/2-14.2 mm wall*			
90 mm diameter/2.4-14.2 mm wall*			
100 mm diameter/2.7-14.2 mm wall*			
115 mm diameter/3.1-14.2 mm wall*			
140 mm diameter/3.8-14.2 mm wall*			
165 mm diameter/ 4.5-14.2 mm wall*			

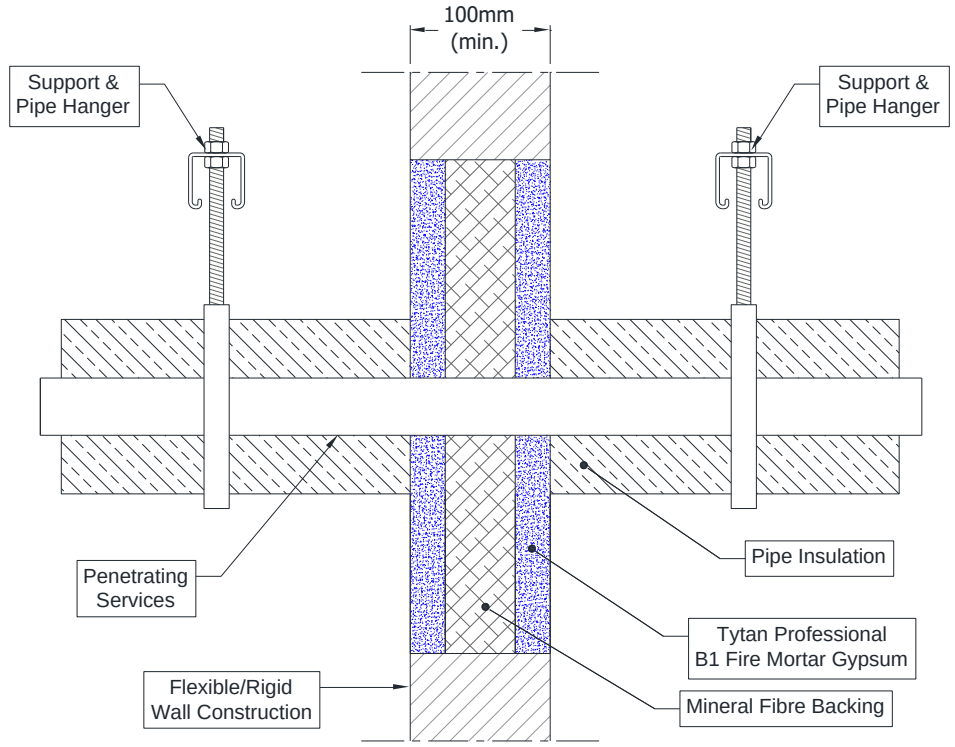
* Typical pipe diameters shown, see below graph for intermediate sizes


Pipe diameter vs Wall thickness
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0
20
40
60
80
100
120
140
160
180

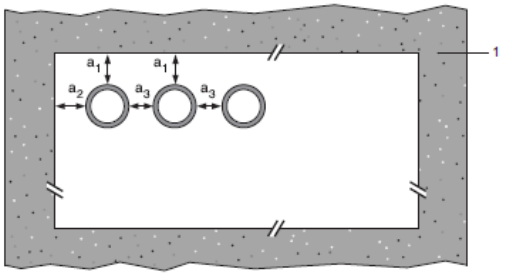
A.5.3 Pipe penetration seal with 25 mm deep Tytan Professional B1 Fire Mortar Gypsum to both faces backed with 50 mm mineral fibre board

Penetration Seal: 500 mm (min.)* LI (Local Interrupted) or CI (Continuous Interrupted) insulated metallic (and composite) pipes fitted at any position within the aperture (min. separation 30 mm from seal edges), with min. 25 mm Tytan Professional B1 Fire Mortar Gypsum to both sides of the wall backed with min. 1 x 50 mm or 2 x 25 mm stone wool board min. 150 kg/m^3. Maximum seal size as section 2. 4).

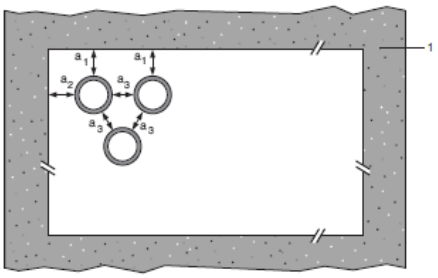
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

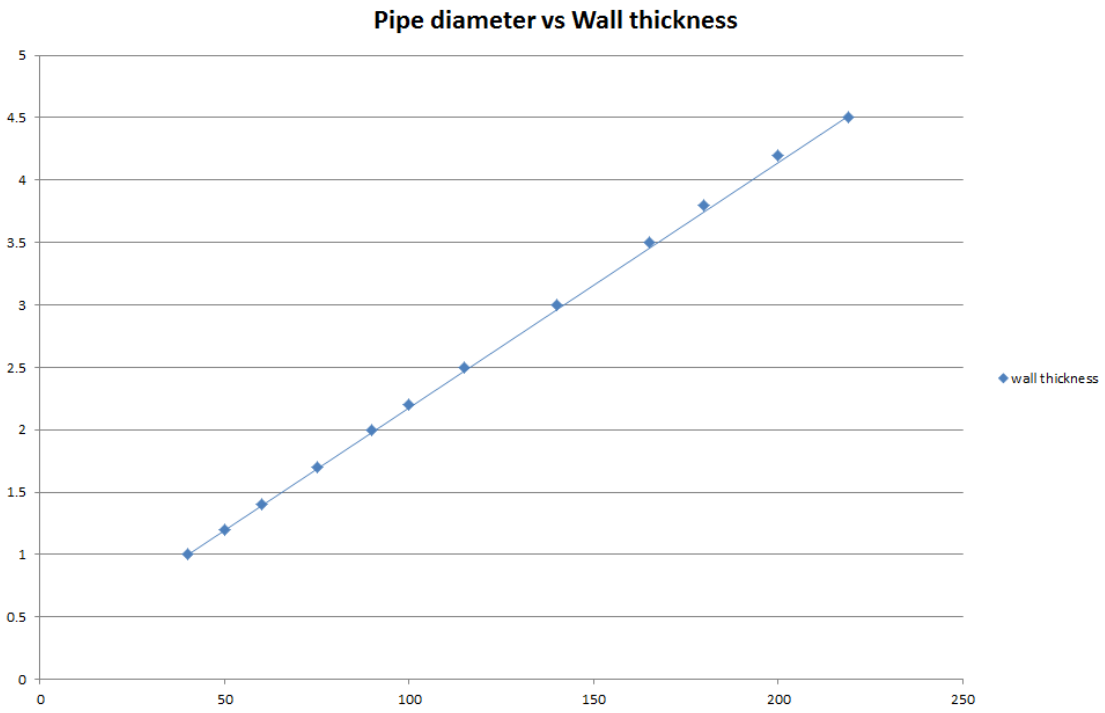
* Minimum 600 mm long insulation required for Alupex pipe.

A.5.3.1 Double side penetration seal with pipes

Services	Insulation	Classification
Copper or steel pipes up to 54 mm diameter/1-14.2 mm wall	Min. 20 mm stone wool min. 80 kg/m^3	**EI 120 C/C**
Alupex composite pipe 75 mm diameter/7.5 mm wall	600 mm length of 25 mm AES Fibre ≥ 128kg/m3	**EI 60 U/U, EI 60 U/C, EI 60 C/U. EI 60 C/C**

Services	Insulation, minimum thickness and density	Classification
Mild or stainless steel pipe		
40 mm diameter/1-14.2 mm wall	20 mm stone wool 80 kg/m^3	**EI 120 C/U**
40 mm diameter/1-14.2 mm wall*	30 mm stone wool 80 kg/m^3	**E 120 C/U, EI 90 C/U**
50 mm diameter/1.2-14.2 mm wall*		
60 mm diameter/1.4-14.2 mm wall*		
75 mm diameter/1.7-14.2 mm wall*		
90 mm diameter/2-14.2 mm wall*		
100 mm diameter/2.2-14.2 mm wall*		
115 mm diameter/2.5-14.2 mm wall*		
140 mm diameter/3-14.2 mm wall*		
165 mm diameter/3.5-14.2 mm wall*		
180 mm diameter/3.8-14.2 mm wall*		
200 mm diameter/4.2-14.2 mm wall*		
219 mm diameter/4.5-14.2 mm wall*		

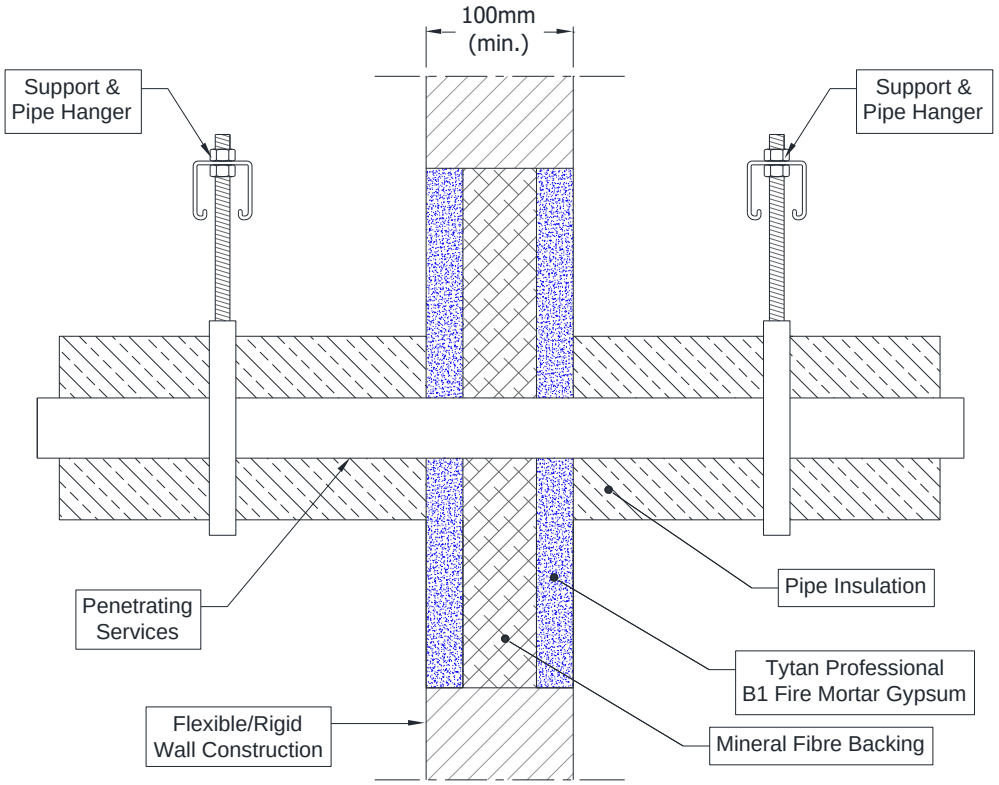
* Typical pipe diameters shown, see below graph for intermediate sizes



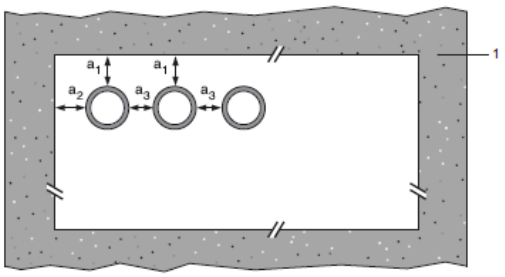
A.5.4 Pipe penetration seal with 25 mm deep Tytan Professional B1 Fire Mortar Gypsum to both faces backed with 50 mm mineral fibre board

Penetration Seal: 500 mm (min.)* LI (Local Interrupted) or CI (Continuous Interrupted) insulated metallic (and composite) pipes fitted at any position within the aperture (min. separation 30 mm from seal edges), with min. 25 mm Tytan Professional B1 Fire Mortar Gypsum to both sides of the wall backed with min. 1 x 50 mm or 2 x 25 mm stone wool board min. 150 kg/m^3. Maximum seal size as section 2. 4)

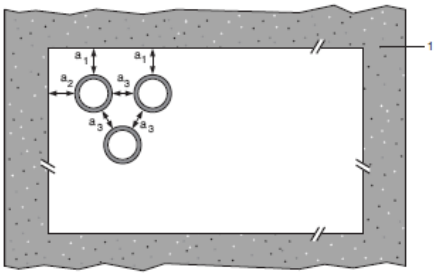
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

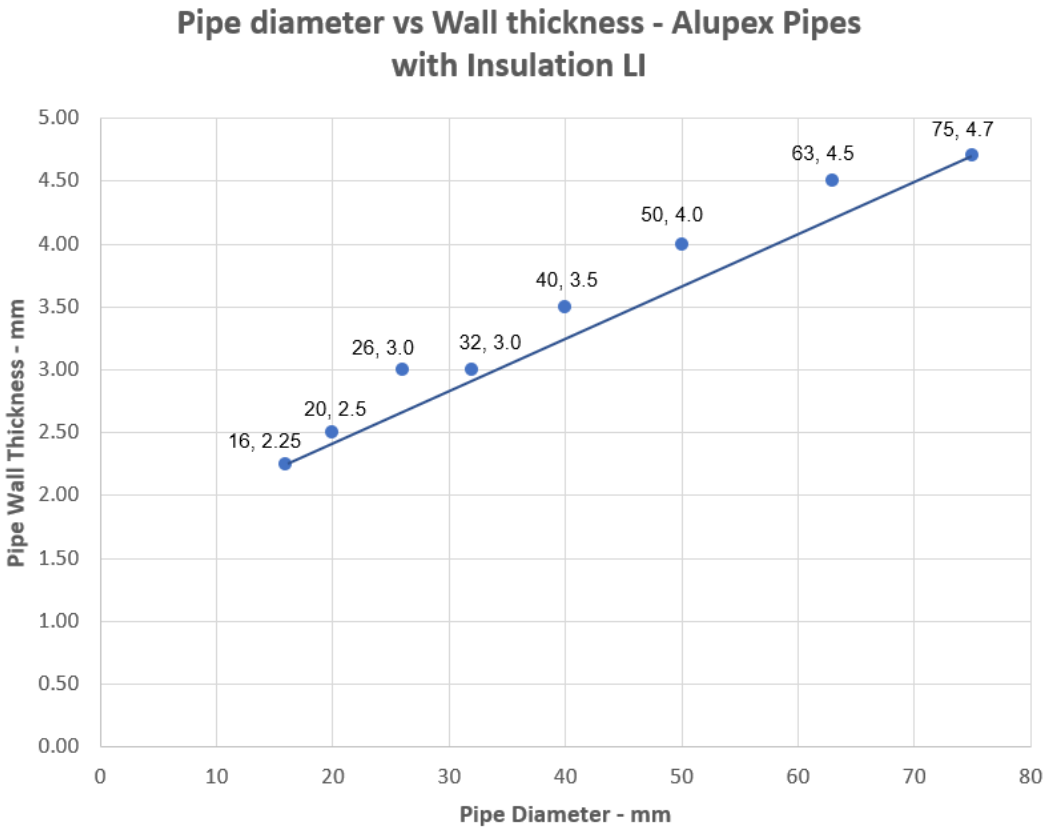
a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

A.5.4.1 Double side penetration seal with pipes

Services	Insulation	Classification
Alupex pipes		
16 mm diameter/2.25 mm wall	Minimum 20 mm stone wool, minimum 80 kg/m^3	**EI 120 C/C**
20 mm diameter/2.5 mm wall		
26 mm diameter/3 mm wall		
32 mm diameter/3 mm wall		
40 mm diameter/3.5 mm wall		
50 mm diameter/4 mm wall		
63 mm diameter/4.5 mm wall		
75 mm diameter/4.7 mm wall		

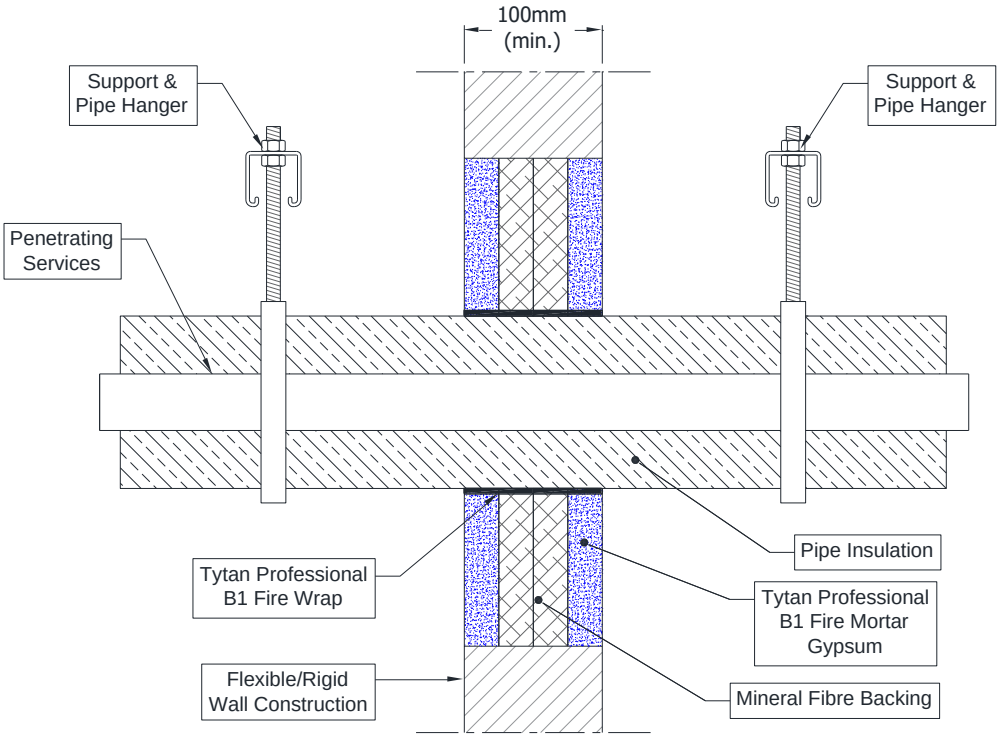
* Typical pipe diameters shown, see below graph for intermediate sizes



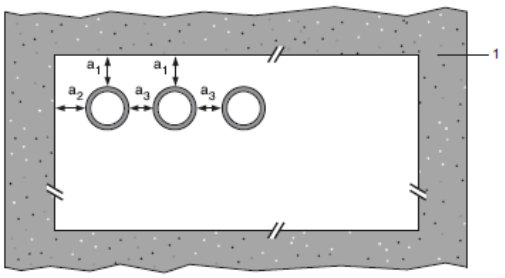
A.5.5 Pipe penetration seal with 25 mm deep Tytan Professional B1 Fire Mortar Gypsum to both faces backed with 50 mm mineral fibre board

Penetration Seal: CS (Continuous Sustained) insulated metallic and composite pipes fitted at any position within the aperture (min. separation 25 mm from seal edges), with min. 25 mm Tytan Professional B1 Fire Mortar Gypsum to both sides of the wall, backed with min. 25 mm stone wool min. 150 kg/m3*. Tytan Professional B1 Fire Wraps are required to be fitted to both faces of the seal. Maximum seal size as section 2. 4).

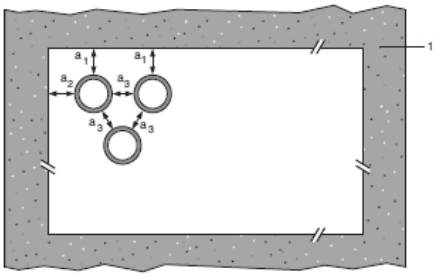
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

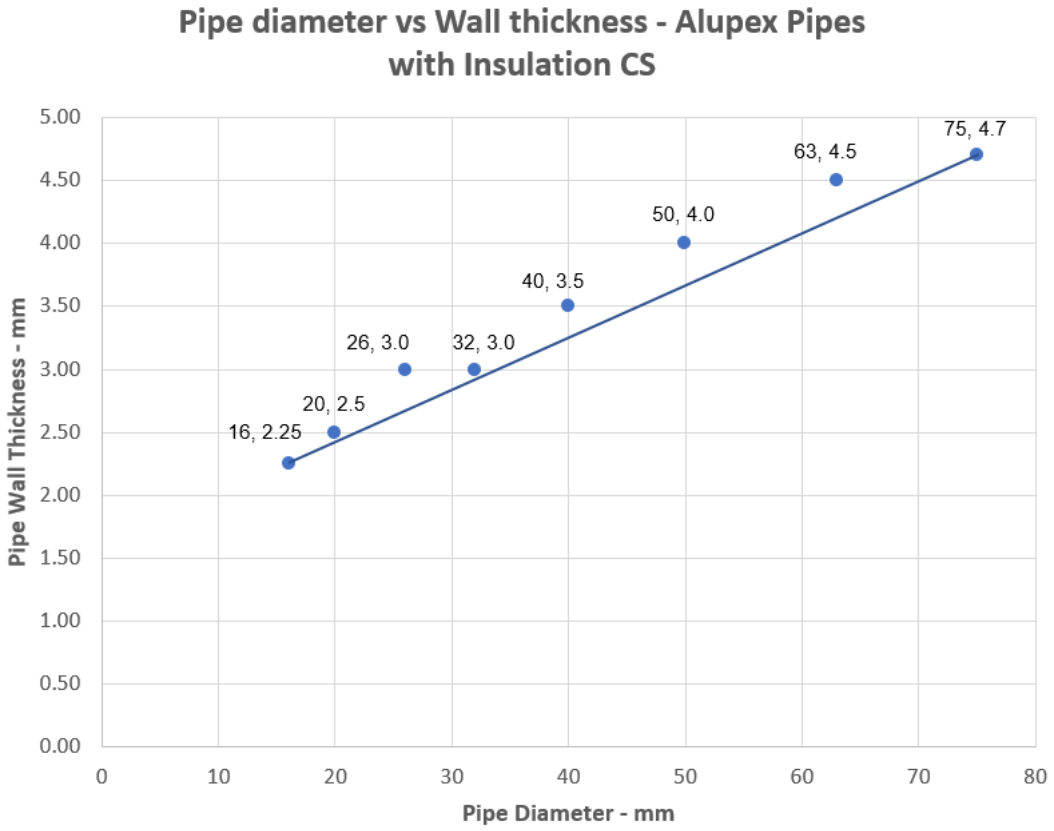
a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

A.5.5.1 Double side penetration seal with pipes

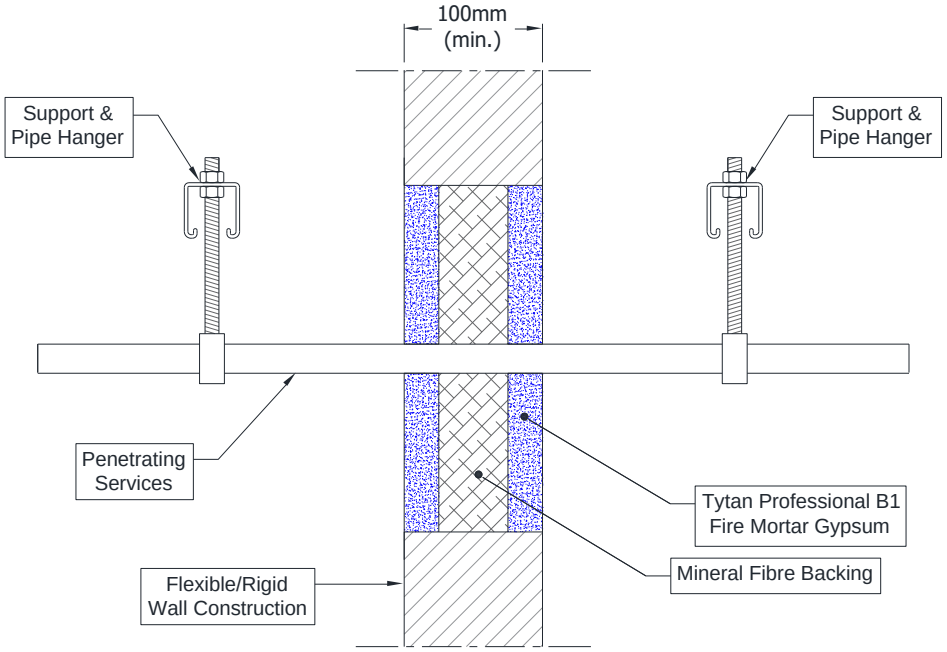
Services	Wrap	Insulation	Classification
Copper and steel pipes			
12-54 mm diameter/1-1.2 mm wall	50 x 3.6 mm Tytan Professional B1 Fire Wrap fitted to both sides of the seal	9-25 mm Elastomeric insulation minimum class B-s3,d0 or PE Foam insulation	**EI 120 C/C**
Alupex pipes			
16 mm diameter/2.25 mm wall	50 x 3.6 mm Tytan Professional B1 Fire Wrap fitted to both sides of the seal	9-25 mm Elastomeric insulation minimum class B-s3,d0 or PE Foam insulation	**EI 120 C/C**
20 mm diameter/2.5 mm wall			
26 mm diameter/3 mm wall			
32 mm diameter/3 mm wall			
40 mm diameter/3.5 mm wall			
50 mm diameter/4 mm wall			
63 mm diameter/4.5 mm wall			
75 mm diameter/4.7 mm wall			

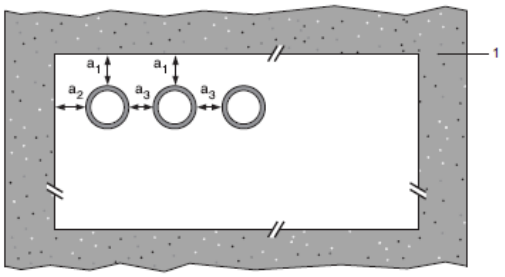
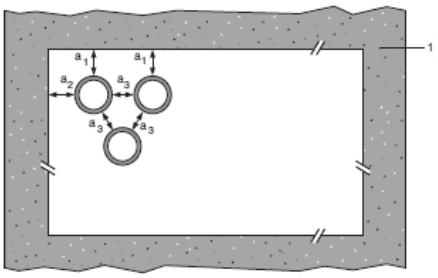


A.5.6 Pipe penetration seal with 25 mm deep Tytan Professional B1 Fire Mortar Gypsum to both faces backed with 50 mm mineral fibre board

Penetration Seal: Combustible pipes sealed with Tytan Professional B1 Fire Mortar Gypsum, to both sides of the wall, backed with stone wool board min. 140 kg/m³. Minimum separation between pipes of 30 mm (a_3) and from seal edges 30 mm (a_1 & a_2). Maximum seal size as section 2. 4).

Construction details:



Configuration 1:	**Configuration 2:**
	

Key

1 Supporting construction

a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

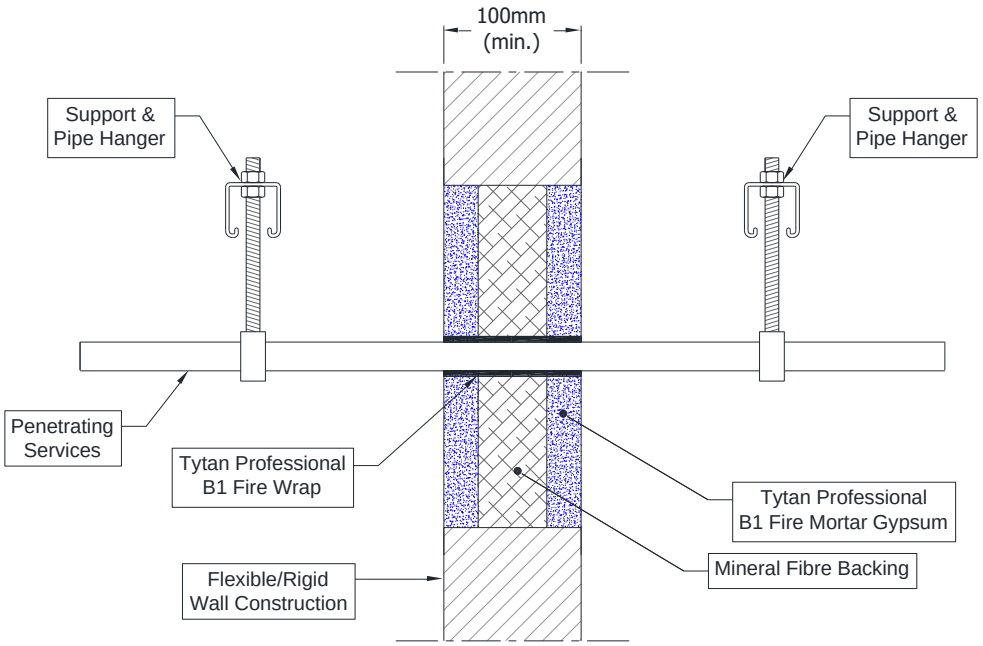
A.5.6.1 Double side penetration seal with pipes

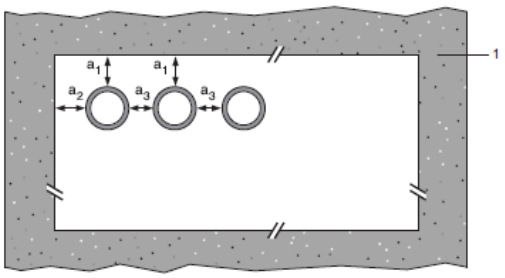
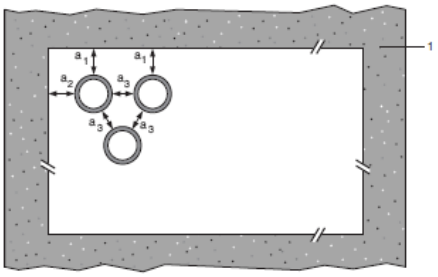
Services	Seal Depth	Permitted configuration for seal separation	Classification
PVC-U pipes according to EN 1329-1, EN 1452-2 and EN 1453-1, PVC-C according to EN 1566-1			
Diameter up to 32 mm, wall thickness 1.6 – 2.4 mm	Min. 25 mm	1 & 2 between all specified pipes	**EI 120 U/C, C/C**
PE pipes according to EN 1519-1, EN 12201-2 and EN 12006-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Diameter up to 32 mm, wall thickness 1.8 – 3.0 mm	Min. 25 mm	1 & 2 between all specified pipes	**EI 120 U/C, C/C**
PP pipes according to EN 1852-1: 2009			
Diameter up to 32 mm, wall thickness 1.9 – 4.4 mm	Min. 25 mm	1 & 2 between all specified pipes	**EI 120 U/C, C/C**

A.5.7 Pipe penetration seal with 25 mm deep Tytan Professional B1 Fire Mortar Gypsum to both faces backed with 50 mm mineral fibre board

Penetration Seal: Combustible pipes sealed with Tytan Professional B1 Fire Wrap, installed into Tytan Professional B1 Fire Mortar Gypsum seals. Minimum separation between penetration seals and seal edges of 30 mm. Minimum seal size as section 2. 4).

Construction details:



Configuration 1:	**Configuration 2:**
	

Key

1 Supporting construction

a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

a3 Pipe / pipe separation

* Partition wall must incorporate a full fill core insulation of Stonewool (35kg/m^3 density)

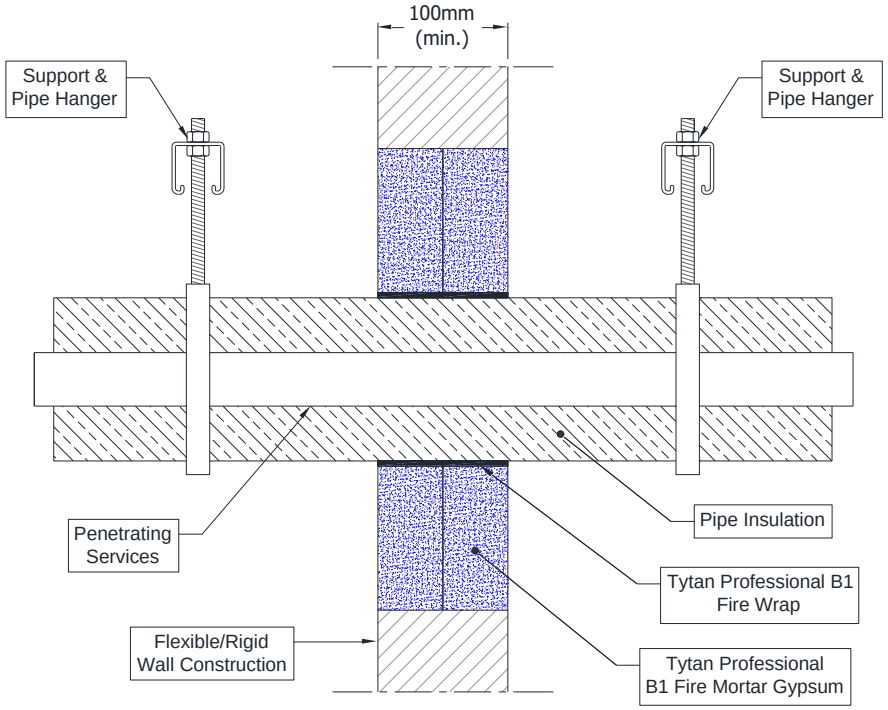
A.5.7.1 Double side penetration seal with pipes

Services	Wraps (both sides)	Permitted configuration for seal separation	Classification
PVC-U pipes according to EN 1329-1, EN 1452-2 and EN 1453-1 and PVC-C according to EN 1566-1			
Diameter up to 40 mm, wall thickness 3.0 – 4.3 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	**E 120 U/C, E 120 C/U, EI 60 U/C, EI 60 C/C**
Diameter up to 110 mm, wall thickness 2.7 - 6.6 mm	50 x 3.6 mm (2 x 1.8 layer)		**E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C**
Diameter up to 125 mm, wall thickness 3.7 – 7.4 mm	50 x 5.4 mm (3 x 1.8 layer)		**EI 120 U/C, EI 120 C/C**
Diameter up to 160 mm, wall thickness 3.2 - 9.5 mm	50 x 7.2 mm (4 x 1.8 layer)		**EI 60 U/C, EI 60 C/C**
PE pipes according to EN 1519-1, EN 12201-2 and EN 12006-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Diameter up to 40 mm, wall thickness 3.2 – 3.7 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	**EI 120 U/C, EI 120 C/C**
Diameter up to 110 mm, wall thickness 4.2 - 10 mm	50 x 3.6 mm (2 x 1.8 layer)		**EI 60 U/C, EI 60 C/C**
Diameter up to 125 mm, wall thickness 12 mm	50 x 5.4 mm (3 x 1.8 layer)		**EI 120 U/C, EI 120 C/C**
Diameter up to 160 mm, wall thickness 4.9 – 12.0 mm	50 x 7.2 mm (4 x 1.8 layer)		**E 120 U/C, E 120 C/C**
Diameter up to 160 mm, wall thickness 12.0 mm			**EI 90 U/C, EI 90 C/C**
PP pipes according to EN 1852-1: 2009			
Diameter up to 40 mm, wall thickness 4.0 – 5.5 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	**EI 120 U/C, EI 120 C/C**
Diameter up to 110 mm, wall thickness 6.6 mm	50 x 3.6 mm (2 x 1.8 layer)		**E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C**
Diameter up to 125 mm, wall thickness 17.1 mm	50 x 5.4 mm (3 x 1.8 layer)		**E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C**
Diameter up to 160 mm, wall thickness 4.0 - 21.9 mm	50 x 7.2 mm (4 x 1.8 layer)		**E 120 U/C, E 120 C/C**
Diameter up to 160 mm, wall thickness 21.9 mm			**EI 60 U/C, EI 60 C/C**

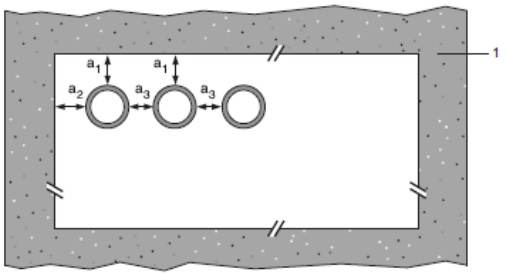
A.5.8 Pipe penetration seal with 50 mm deep Tytan Professional B1 Fire Mortar Gypsum to both faces

Penetration Seal: CS (Continuous Sustained) insulated metallic pipes fitted at any position within the aperture (min. separation 30 mm from seal edges), min. 50 mm Tytan Professional B1 Fire Mortar Gypsum to both sides of the wall without backing*. Tytan Professional B1 Fire Wraps are required to be fitted to both faces of the seal.

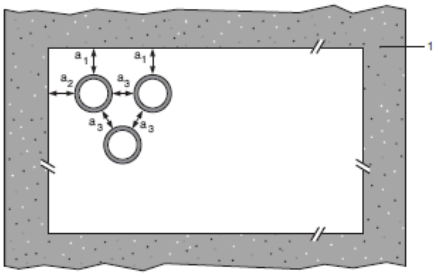
Construction details:



Configuration 1:



Configuration 2:



Key

1 Supporting construction

a1 Pipe / top edge of seal separation

a2 Pipe / side edge of seal separation

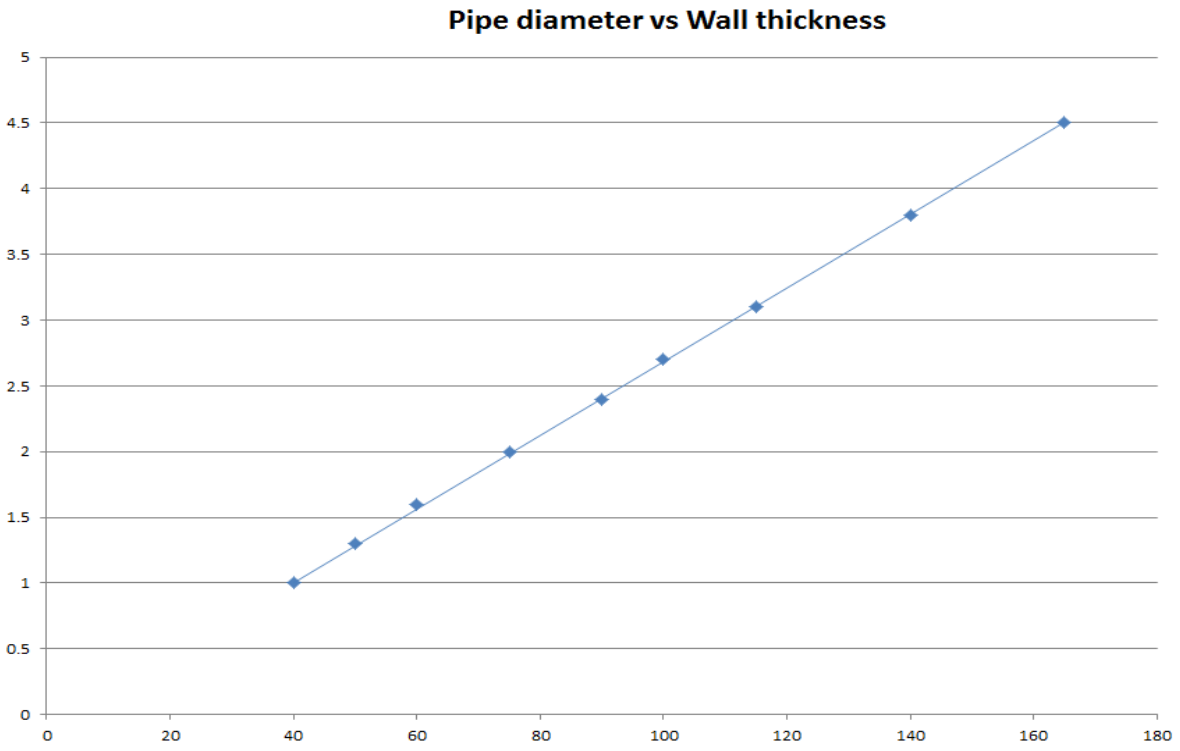
a3 Pipe / pipe separation

* Maximum seal size as section 2. 4)

A.5.8.1 Double side penetration seal with pipes

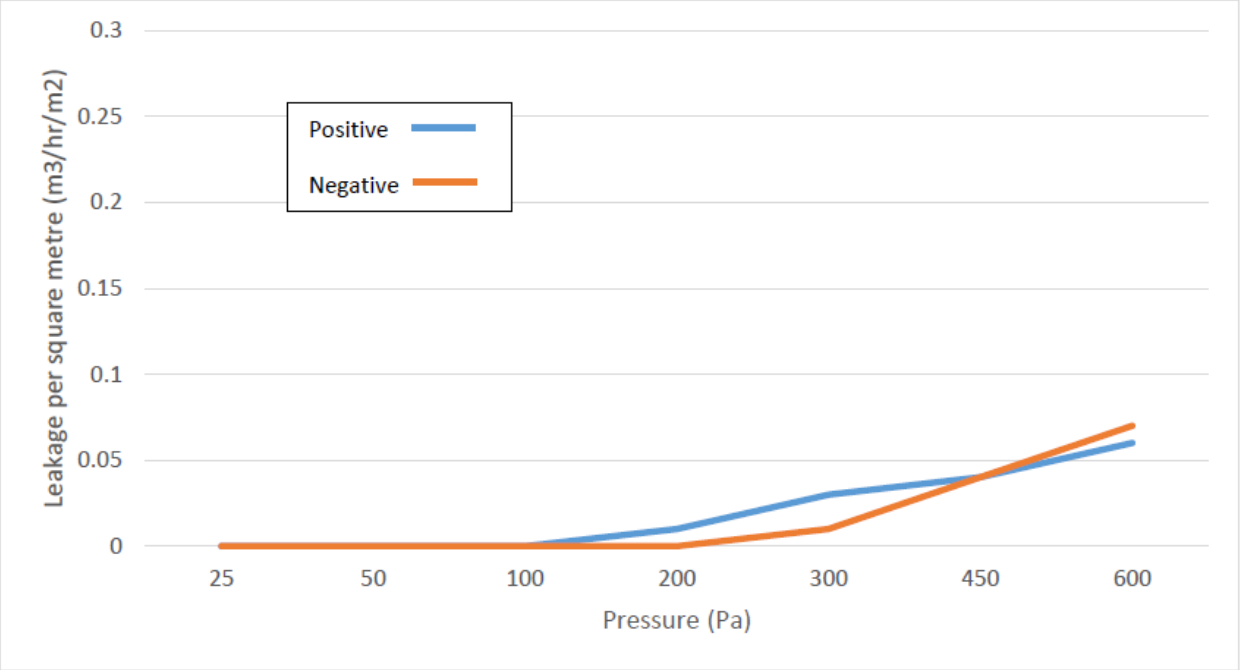
Services	Wrap	Insulation	Classification
Mild or stainless steel pipe			
40 mm diameter/1-14.2 mm wall*	2 off 50 x 3.6 mm Tytan Professional B1 Fire Wrap, one fitted flush to each face of seal	13 -32 mm Elastomeric insulation minimum class B-s3,d0 or PE Foam insulation	**E 120 C/U, EI 60 C/U**
50 mm diameter/1.3-14.2 mm wall*			
60 mm diameter/1.6-14.2 mm wall*			
75 mm diameter/2-14.2 mm wall*			
90 mm diameter/2.4-14.2 mm wall*			
100 mm diameter/2.7-14.2 mm wall*			
115 mm diameter/3.1-14.2 mm wall*			
140 mm diameter/3.8-14.2 mm wall*			
165 mm diameter/ 4.5-14.2 mm wall*			

* Typical pipe diameters shown, see below graph for intermediate sizes



ANNEX B – Air Permeability – Tytan Professional B1 Fire Mortar Gypsum

Product tested	1200 mm high x 600 mm wide x 50 mm deep Tytan Professional B1 Fire Mortar Gypsum		
Summary of testing procedure			Result
	Pressure (Pa)	Leakage (m^3/h)	Leakage ($m^3/m^2/h$)
Results under negative chamber pressure	25	0.00	0.00
	50	0.00	0.00
	100	0.00	0.00
	200	0.00	0.00
	300	0.01	0.01
	450	0.03	0.04
	600	0.05	0.07
Results under positive chamber pressure	25	0.00	0.00
	50	0.00	0.00
	100	0.00	0.00
	200	0.01	0.01
	300	0.02	0.03
	450	0.03	0.04
	600	0.04	0.06



Product tested	600 mm high x 600 mm wide x 100 mm deep Tytan Professional B1 Fire Mortar Gypsum inc. 110 mm plastic pipe with 2no layers 50 mm x 1.8 mm Tytan Professional B1 Fire Wrap cast to one face in centre of seal		
Summary of testing procedure			Result
	Pressure (Pa)	Leakage (m^3/h)	Leakage ($m^3/m^2/h$)
Results under negative chamber pressure	25	0.00	0.00
	50	0.00	0.00
	100	0.00	0.00
	200	0.00	0.00
	300	0.00	0.00
	450	0.01	0.01
	600	0.03	0.04
Results under positive chamber pressure	25	0.00	0.00
	50	0.00	0.00
	100	0.00	0.00
	200	0.00	0.00
	300	0.00	0.00
	450	0.01	0.01
	600	0.02	0.03

