

# UL-EU CERTIFICATE

**Certificate No.** UL-EU-00770-CPR  
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**Date of Issue** 2015-04-20  
**Revision** 2022-03-21

**Certificate Holder** FSi Ltd  
Westminster Industrial Estate  
Tamworth Rd  
Measham  
DE12 7DS  
United Kingdom

**Manufacturer** A/008

**Certified Product Type** Fire Stop – Sealant  
**Product Trade Name** PYROPRO HPE Sealant  
**Trademark** N/A  
**Rating/Classification** See Appendix

**Harmonised Technical Specifications** ETAG 026-2 / EN 13501-2  
**Supporting Documentation** ETA 20/1011, EC – CERTIFICATE OF CONSTANCY OF PERFORMANCE - 2531 – CPR – CX010253  
**Additional information** Additional test evidence is held on file  
**Expiry date** 2024-04-23



A handwritten signature in purple ink, appearing to read 'Chris Miles', is written over a horizontal line.

**Authorized Certification Decision Maker**  
Chris Miles

This is to certify that representative samples of the Certified Product listed above have been investigated by Underwriters Laboratories to the Standard(s) indicated on this Certificate, in accordance with the UL Global Services Agreement and the UL-EU Mark Service Terms and Conditions ("Agreement"). The Certificate Holder is entitled to use the UL-EU Mark for the Certified Product listed on the certificate and manufactured at the production site(s) listed, in accordance with the terms of the Agreement. Only those products bearing the UL-EU Mark for Europe should be considered as being covered by UL's UL-EU Mark Service. This Certificate shall remain valid through the Expiration date, unless a Standard identified on this Certificate is amended or withdrawn prior to that date or there is a non-compliance with the Agreement.



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This certificate relates to the use of PYROPRO HPE Sealant for fire stopping where services penetrate floors and walls. The detailed scope is given in pages 3 to 46 of this Certificate. This shows the thickness and acceptable dimensions, substrates and orientations required to provide fire resistance periods of up to 240 minutes (EI 240).

The product is certificated on the basis of:

- i) ETA 20/1011
- ii) EC – CERTIFICATE OF CONSTANCY OF PERFORMANCE 2531 – CPR – CX010253
- ii) Inspection and surveillance of factory production control by UL
- iii) Fire resistance test data in accordance with 1366-3: 2009
- iv) Classification in accordance with EN 13501-2
- v) Durability and Servicability as defined in ETAG 026-2

The durability class of PYROPRO HPE is Z<sub>1</sub> - intended for use at internal conditions with high humidity, excluding temperatures below 0°C



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Product-type: Sealant (reactive)		Intended use: Penetration Seal
Basic requirement for construction work	Basic Requirement	Basic requirement for construction work
<b>BWR 1 Mechanical resistance and stability</b>		
-	None	-
<b>BWR 2 Safety in case of fire</b>		
EN 13501-1	Reaction to fire	Class F
EN 13501-2	Resistance to fire	See page 5
<b>BWR 3 Hygiene, health and environment</b>		
EN 1026:2000	Air permeability (material property)	See page 4
ETAG 026-3, Annex C	Water permeability (material property)	No performance determined
Declaration of manufacturer	Release of dangerous substances	Declaration of manufacturer
<b>BWR 4 Safety in use</b>		
EOTA TR 001:2003	Mechanical resistance and stability	No performance determined
EOTA TR 001:2003	Resistance to impact/movement	No performance determined
EOTA TR 001:2003 ISO 11600	Adhesion	No performance determined
<b>BWR 5 Protection against noise</b>		
EN 10140-2/ EN ISO 717-1	Airborne sound insulation	R <sub>w</sub> (C;C <sub>tr</sub> )= 52(-1;-6)
EN 10140-3/ EN ISO 717-2	Impact sound insulation	No performance determined
<b>BWR 6 Energy economy and heat retention</b>		
EN 12664, EN 12667 or EN 12939	Thermal properties	No performance determined
EN ISO 12572 EN 12086	Water vapour permeability	No performance determined
<b>General aspects relating to fitness for use</b>		
ISO 8339: 2005, ISO 9046: 2004 & ISO 7389: 2003	Durability and serviceability	Z <sub>1</sub>
<b>BWR 7 Sustainable use of natural resources</b>		
-	-	No performance determined



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## Pyropro HPE Sealant: Air Permeability according to BS EN 1314-1

Pressure (Pa)	Results under positive chamber pressure		Results under negative chamber pressure	
	Leakage (m <sup>3</sup> /h)	Leakage (m <sup>3</sup> /m <sup>2</sup> /h)	Leakage (m <sup>3</sup> /h)	Leakage (m <sup>3</sup> /m <sup>2</sup> /h)
50	0.2	5.6	0.3	8.3
100	0.4	11.1	0.6	16.7
150	0.7	19.4	0.9	25.0
200	1.0	27.8	1.2	33.3
250	1.1	30.6	1.6	44.4
300	1.2	33.3	1.9	52.8
450	2.2	61.1	2.7	75.0
600	2.4	66.7	3.4	94.4



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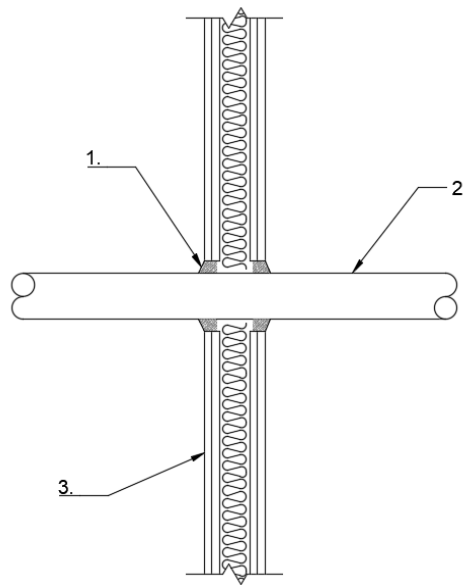
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## Penetration Seals

Flexible or Rigid Walls Minimum Thickness 100 mm

Plastic pipes

Flexible or Rigid Walls  $\geq 100$  mm



### Key

1. Pyropro HPE
2. Plastic pipe
3. Flexible wall

Penetration Service	Depth (mm)	Annular Space (mm)	Backing Material	Classification
PVC pipe 40 – 125 mm Ø, 1.9 – 9.2 mm wall thickness*	25 (with 10 mm fillet protruding wall)	20	N/A	EI 45 C/U, U/C, C/C
PVC pipe 40 mm Ø, 1.9 mm wall thickness				EI 120 - C/U, U/C, C/C
ABS pipe 40 mm Ø, 1.9 mm wall thickness				EI 120 - C/U, U/C, C/C
PP pipe 40 mm Ø, 2 mm wall thickness				EI 120 - C/U, U/C, C/C

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

All services supported with 'Unistrut' pipe supports at 260 mm from both faces of the wall.

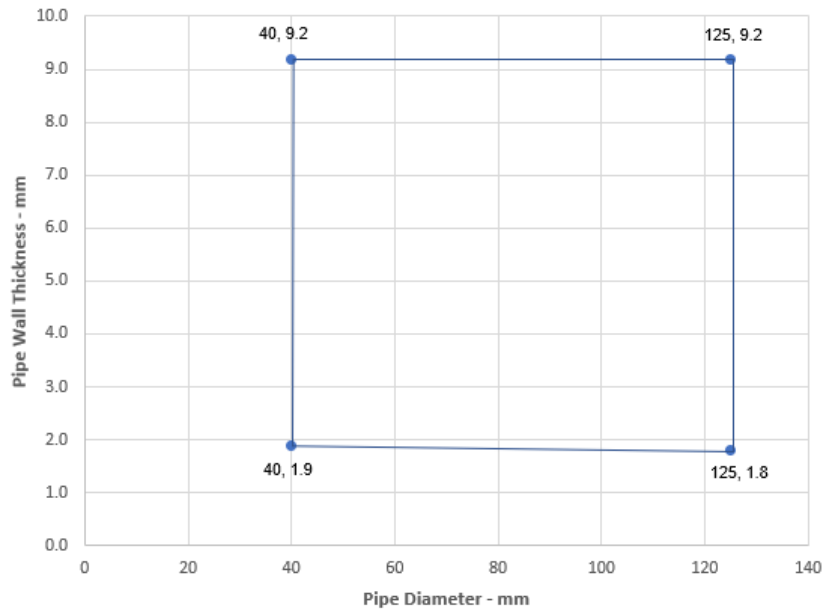
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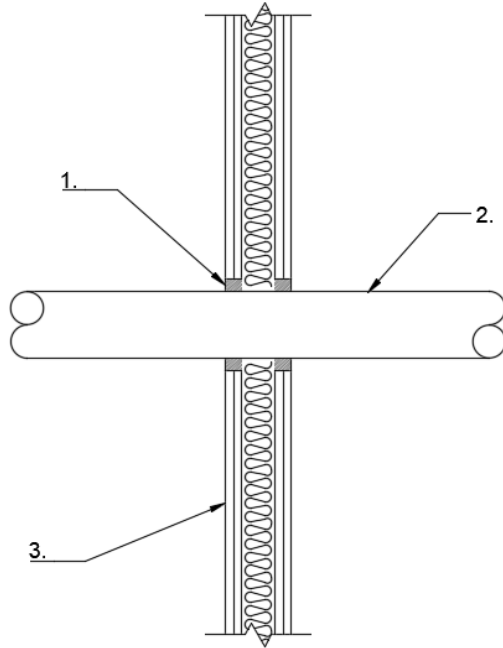
PVC-U Pipes - EI 45 C/U



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Flexible or Rigid Walls  $\geq 100$  mm



Key

1. Pyropro HPE
2. Plastic pipe
3. Flexible wall

Penetration Service	Depth (mm)	Annular Space (mm)	Backing Material	Classification
Blazemaster CPVC Sprinkler Pipe 27 – 89 mm Ø, 2.5 – 7.2 mm wall thickness	25	20	N/A	EI 120 – U/U, C/U, U/C, C/C

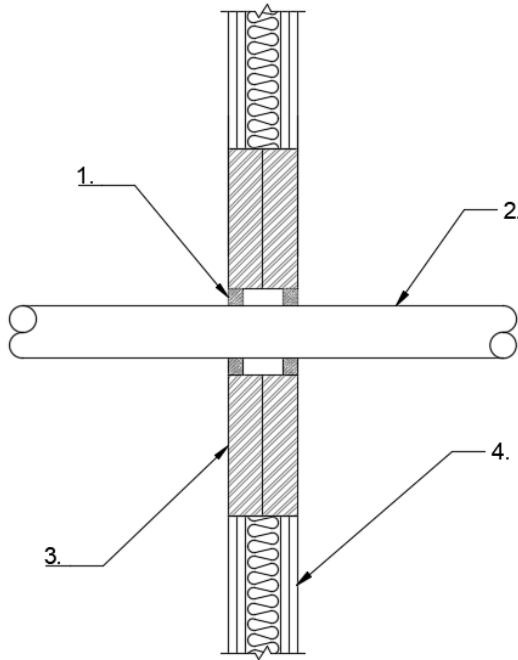
All services supported with pipe and cable supports at 425 mm from both faces of the wall.



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Flexible or Rigid Walls  $\geq 100$  mm



Key

1. Pyropro HPE
2. Plastic pipe
3. Stopseal Batt
4. Flexible Wall

Penetration Service	Pyropro HPE		Stopseal Batt Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
Lubrizol CPVC Sprinkler Pipe 20 – 80 mm Ø, 2.5 – 7.9 mm wall thickness	20	25	1200 x 730	EI 90 – C/U, U/C, C/C
			2600 x 2600	EI 60 – C/U, U/C, C/C

All services supported with pipe and cable supports at 425 mm from both faces of the wall.

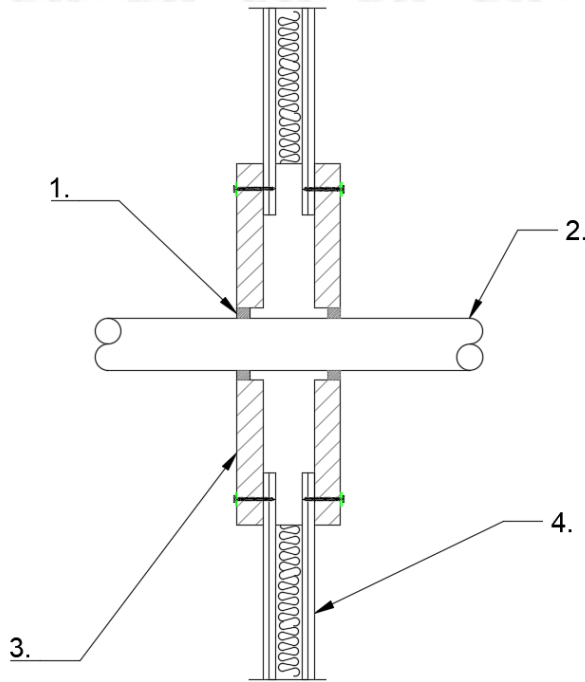




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Flexible or Rigid Walls  $\geq 100$  mm Insulated or uninsulated



Key

1. Pyropro HPE
2. Plastic pipe
3. Stopseal Batt
4. Flexible Wall

Penetration Service	Pyropro HPE		Stopseal Batt Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
Blazemaster CPVC Sprinkler Pipe 27 – 89 mm Ø, 2.5 – 7.0 mm wall thickness	20	25	1200 x 750	EI 120 – U/C, C/U, U/C, C/C

All services supported with pipe and cable supports at 425 mm from both faces of the wall.



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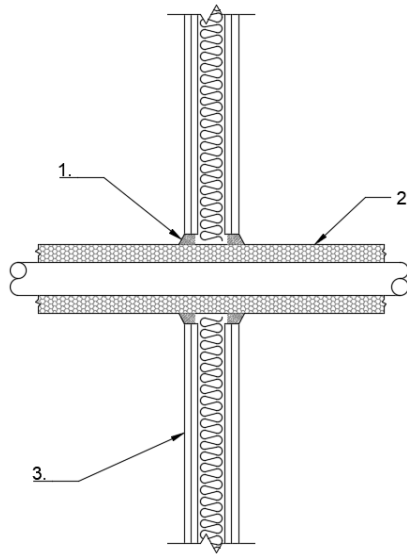
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Cables

Metallic Pipes

Insulated metallic pipes

Flexible or Rigid Walls  $\geq 100$  mm



Key

1. Pyropro HPE
2. Insulated metal pipe
3. Flexible wall

Penetration Service	Depth (mm)	Annular Space (mm)	Backing Material	Classification
Copper 159 mm Ø, 2 -14.2 mm wall thickness with $\geq 30$ mm thick $\geq 80\text{kg/m}^3$ foil faced glass wool (LS*, CS**)	25 (with 10 mm fillet protruding wall)	20	N/A	E 120, EI 30 – C/U, C/C
Copper 40 – 159 mm Ø, 2 - 14.2 mm wall thickness with 32 mm thick $96\text{kg/m}^3$ Armaflex pipe insulation (LS*, CS**)				

\* Continuous through seal and extending minimum 650 mm from both faces of the seal (LS)

\*\* Continuous through seal and full length of the pipe (CS)

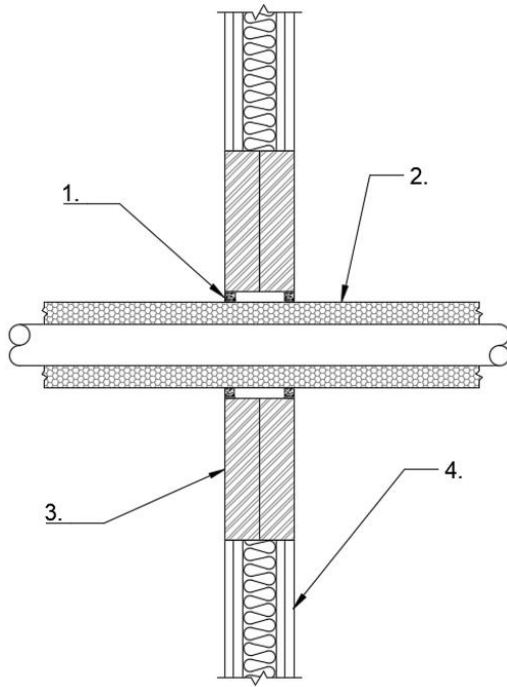
All services supported with 'Unistrut' pipe supports at 260 mm from both faces of the wall.



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Flexible or Rigid Walls  $\geq 100$  mm



Key

1. Pyropro HPE
2. Insulated metal pipe
3. Stopseal Batt
4. Flexible wall

Penetration Service	Pyropro HPE		Stopseal Batt Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
Copper/Steel pipe 40 mm $\varnothing$ 1.5 mm – 14.2 mm wall thickness, insulated with $\geq 20$ mm thick foil faced glass wool insulation $\geq 80\text{kg/m}^3$ (CS) Continued Sustained	15	15	2600 x 2600	EI 60 - C/C
Copper/Steel pipe 40mm – 159mm $\varnothing$ 1.5mm – 14.2 mm wall thickness*, insulated with $\geq 30$ mm thick foil faced glass wool insulation $\geq 80\text{kg/m}^3$ (CS) Continued Sustained	15	15	1200 x 730	EI 60 - C/C

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

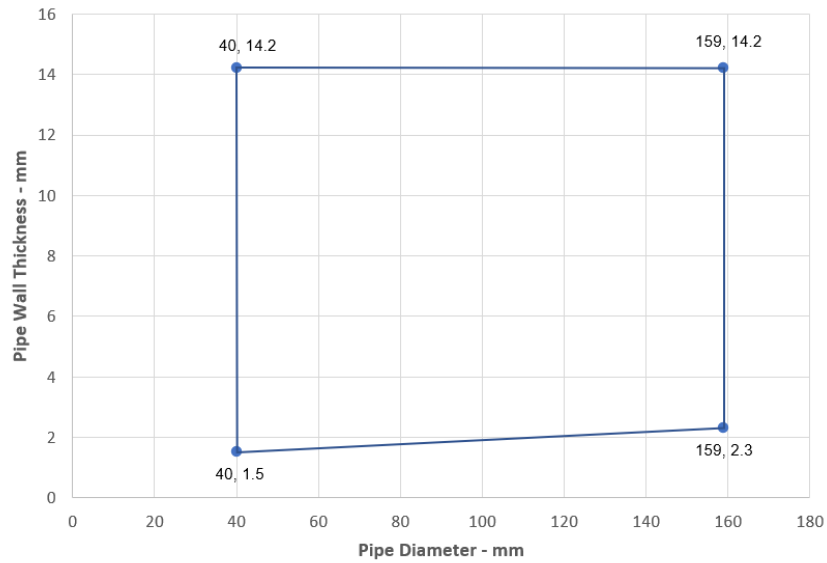
All services supported with pipe and cable supports at 250 mm from both faces of the wall.



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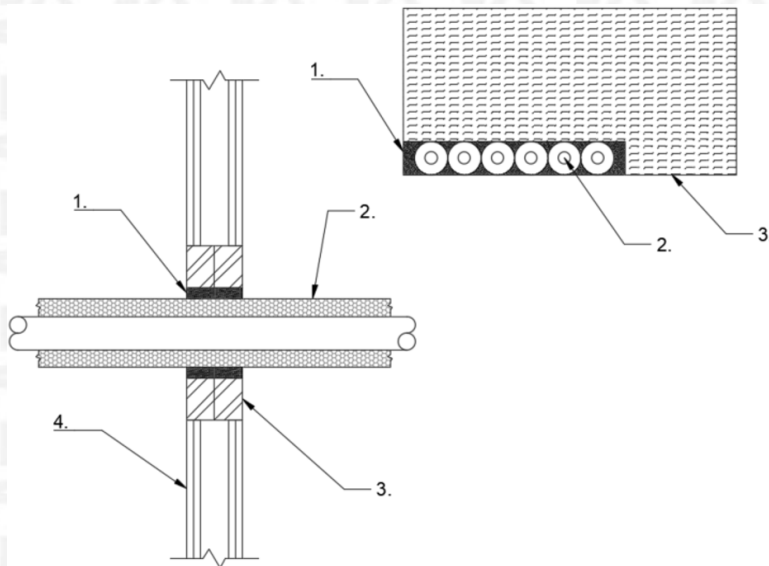
## Copper or Steel Pipes with Glass Wool Insulation EI 60 C/C



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Flexible or Rigid Walls  $\geq 100$  mm Insulated or uninsulated



Key

1. Pyropro HPE
2. Insulated metal pipe
3. Stopseal Batt
4. Flexible wall

Penetration Service	Pyropro HPE		50 mm Stopseal Batt Maximum Aperture Size (mm)	Separating Distance		Classification
	Annular Space (mm)	Min. Depth (mm)		Between Services	Aperture Edge	
6x $\phi 22$ mm, 0.9 mm - 14.2 wall thickness Copper pipes with 20 mm thick Kooltherm FM insulation (LS*, CS**)	0mm above and below service, 20 mm on each side of service	full depth	Double layer 2600 mm x 2600 mm	$\geq 0$ mm	$\geq 0$ mm	EI 30 - C/U, C/C
6x $\phi 22$ mm, 0.9-14.2 mm wall thickness Copper pipes with 19 mm thick Armaflex Class 'O' insulation (LS*, CS**)						E 90, EI 60 - C/U, C/C

\* Continuous through seal and extending minimum 450 mm from both faces of the seal (LS)

\*\* Continuous through seal and full length of the pipe (CS)

All services supported with 'Unistrut' pipe and cable supports at 400 mm from both faces of the wall.



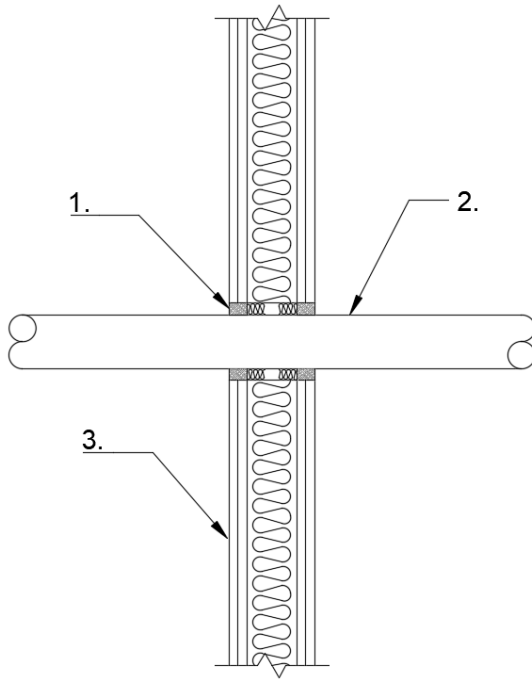
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## Flexible or Rigid Walls Minimum Thickness 120 mm

Plastic pipes

Flexible or Rigid Walls  $\geq 120$  mm



### Key

1. Pyropro HPE
2. Plastic pipe
3. Flexible Wall

Penetration Service	Depth (mm)	Annular Space (mm)	Backing Material	Classification
PVC pipe 40 – 125 mm Ø, 1.9 – 7.4 mm wall thickness*	25	16	$\geq 30$ mm deep $\geq 80$ kg/m <sup>3</sup> Stone wool	EI 120 - U/C, C/C

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

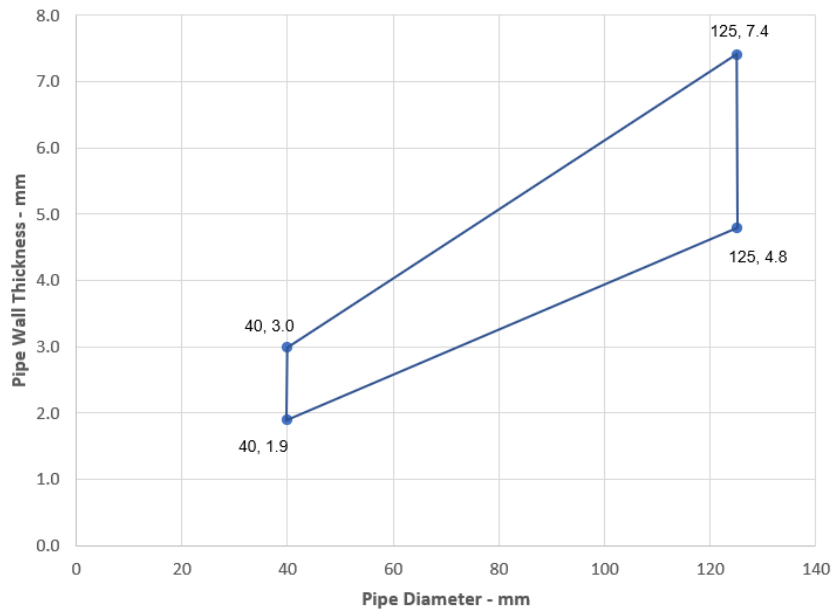
All services supported with 'Unistrut' pipe supports at 150 mm from both faces of the wall.



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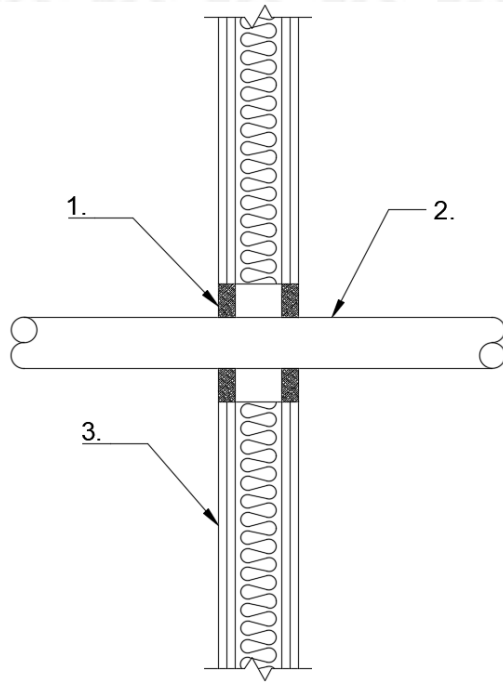
PVC-U Pipes - EI 120 U/C



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Flexible or Rigid Walls  $\geq 120$  mm



Key

1. Pyropro HPE
2. Plastic pipe
3. Flexible Wall

Penetration Service	Depth (mm)	Maximum Aperture Size (mm)	Annular Space (mm)	Backing Material	Classification
HDPE pipe 63 mm $\varnothing$ 7.2 mm wall thickness	25	300 x 100	12.5	n/a	EI 120 - U/C, C/C

All services supported with 'Unistrut' pipe supports at 150 mm from both faces of the wall.

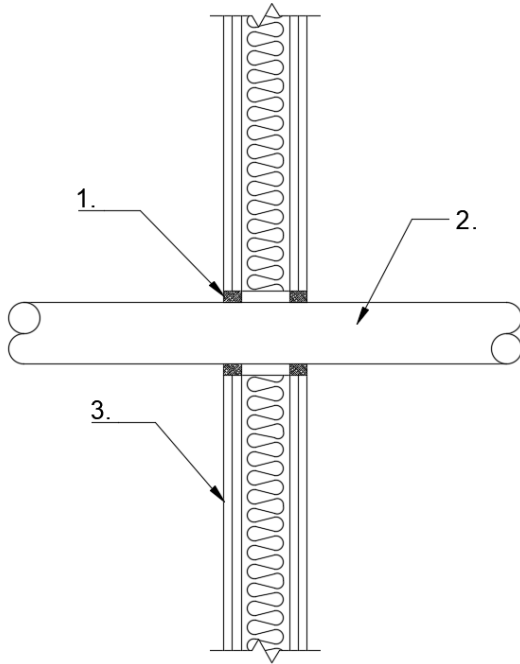




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Flexible or Rigid Walls  $\geq 120$  mm



Key

1. Pyropro HPE
2. Plastic pipe
3. Flexible Wall

Penetration Service	Depth (mm)	Annular Space (mm)	Backing Material	Classification
HDPE pipe 90 mm $\varnothing$ 9.2 mm wall thickness	25	12.5	n/a	EI 120 - U/C, C/C

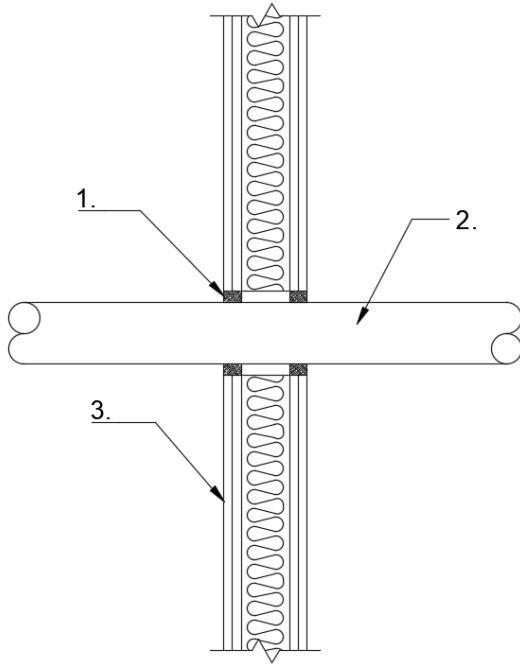
All services supported with 'Unistrut' pipe and cable supports at 150 mm from both faces of the wall.



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Flexible or Rigid Walls  $\geq 120$  mm



Key

1. Pyropro HPE
2. Plastic pipe
3. Flexible Wall

Penetration Service	Depth (mm)	Annular Space (mm)	Backing Material	Classification
ABS pipe 90 mm $\varnothing$ 6.0 mm wall thickness	25	12.5	n/a	EI 120 - U/C, C/C

All services supported with 'Unistrut' pipe and cable supports at 150 mm from both faces of the wall.

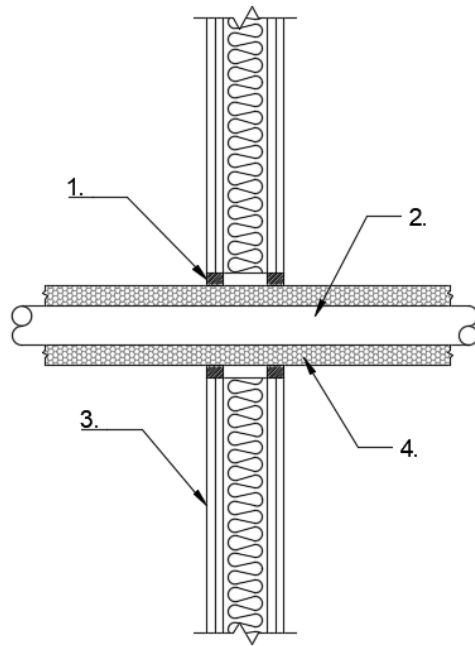


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Insulated metallic pipes

Flexible or Rigid Walls  $\geq 120$  mm



Key

1. Pyropro HPE
2. Plastic pipe
3. Flexible Wall
4. Armaflex Insulation

Penetration Service	Depth (mm)	Annular Space (mm)	Backing Material	Classification
Copper/Steel pipe 60 mm $\varnothing$ 0.8 mm – 14.2 mm wall thickness, insulated with 32 mm ‘Armaflex’ Continued Sustained (CS)	25	20	n/a	E 120, E I90 - C/U, C/C
Copper/Steel pipe 15 mm $\varnothing$ 0.8 mm – 7 mm wall thickness, insulated with 13 mm ‘Armaflex’ Continued Sustained (CS)	25	12	n/a	EI 120 - C/U, C/C

All services supported with ‘Unistrut’ pipe and cable supports at 150 mm from both faces of the wall.



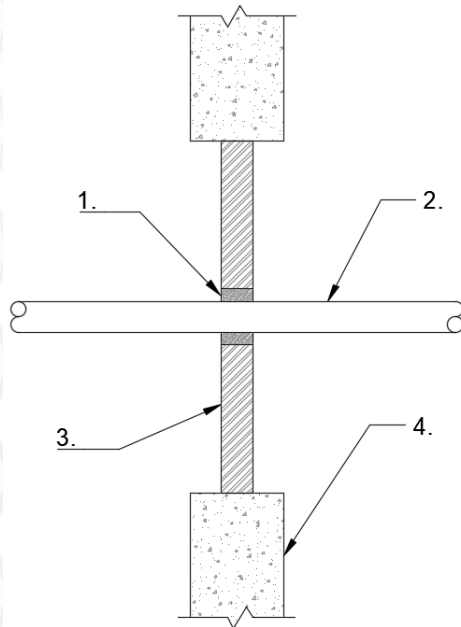
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## Rigid Walls Minimum Thickness 150 mm

Plastic pipes

Rigid Walls  $\geq 150$  mm



### Key

1. Pyropro HPE
2. Plastic pipe
3. Stopseal Batt
4. Rigid wall

Penetration Service	Pyropro HPE		Penetration Seal Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
PVC Pipe 50 mm $\varnothing$ 2.6 wall thickness	20	25 - both sides of wall	1100 x 750	EI 45 - U/C, C/C
PVC Pipe 50 mm $\varnothing$ 2.6 – 3.7 wall thickness	20	25 - both sides of wall	1100 x 750	E 45, EI 30 - U/C, C/C
PVC Pipe 50 mm – 125 mm $\varnothing$ 2.6 – 7.4 wall thickness*	20	25 - both sides of wall	1100 x 750	EI 30 - U/C, C/C

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

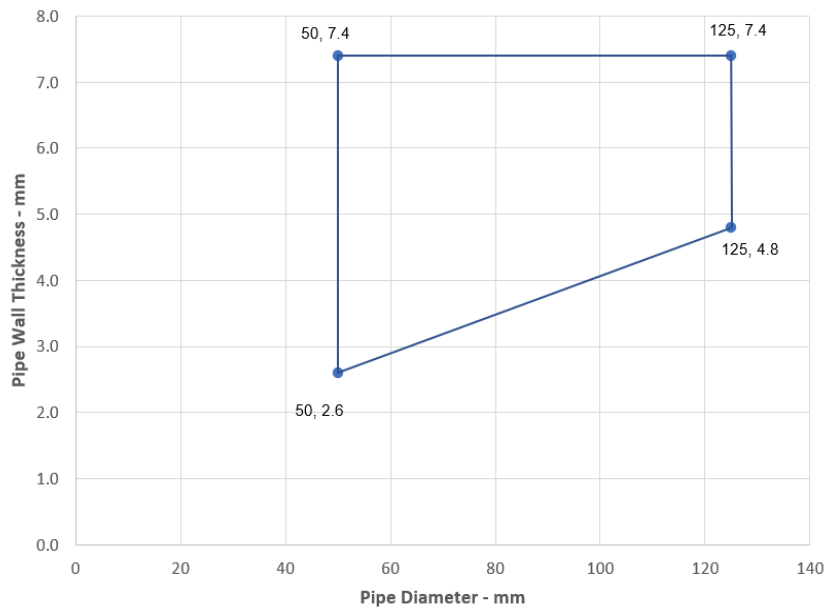
All services supported with 'Unistrut' pipe and cable supports at 400 mm from both faces of the wall.



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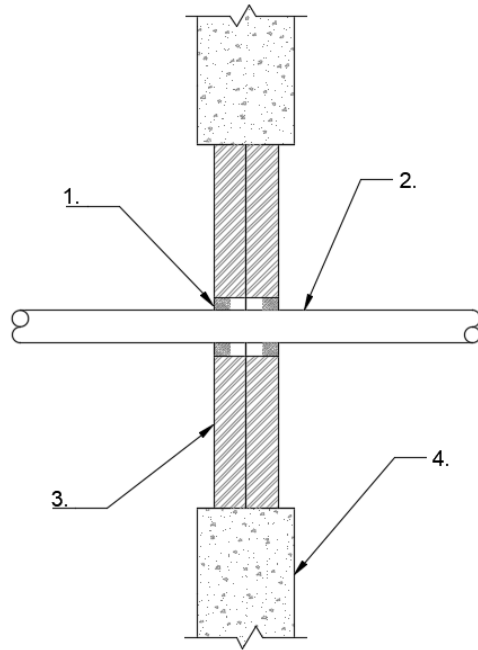
PVC-U Pipes - EI 30 U/C



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Rigid Walls  $\geq 150$  mm



Key

1. Pyropro HPE
2. Plastic pipe
3. Stopseal Batt
4. Rigid wall

Penetration Service	Pyropro HPE		Penetration Seal Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
PVC Pipe 50 mm $\varnothing$ 2.6 – 7.4 mm wall thickness*	20	25 - both sides of wall	1200 x 730	EI 120 - U/C, C/C
PVC Pipe 125 mm $\varnothing$ 7.4 mm wall thickness				
PVC Pipe 50 mm – 125 mm $\varnothing$ 2.6 – 7.4 mm wall thickness*				E 120, EI 90 - U/C, C/C
PVC Pipe 50 mm $\varnothing$ 2.6 – 7.4 mm wall thickness	20	25 - both sides of wall	2600 x 2600	EI 60 - U/C, C/C
PVC Pipe 125 mm $\varnothing$ 7.4 mm wall thickness				
PVC Pipe 50 mm – 125 mm $\varnothing$ 2.6 – 7.4 mm wall thickness*				

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

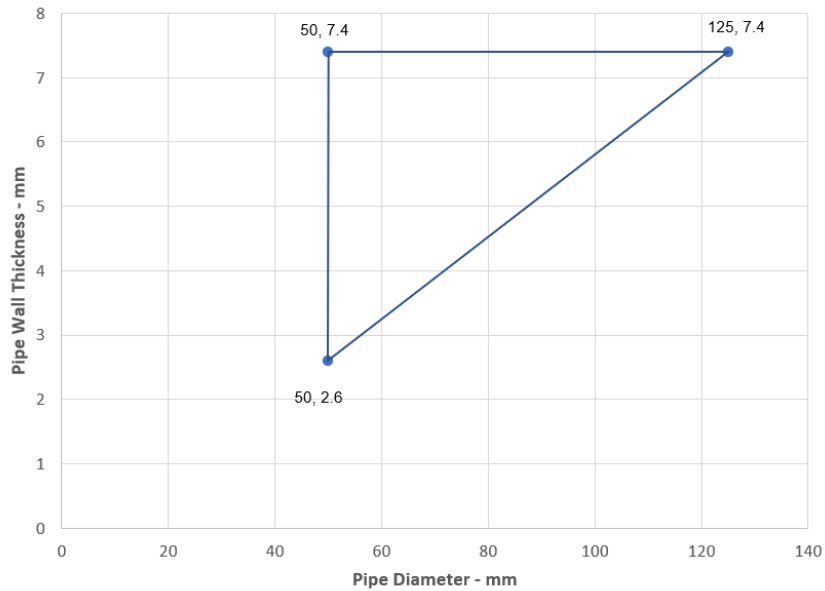
All services supported with 'Unistrut' pipe and cable supports at 400 mm from both faces of the wall.



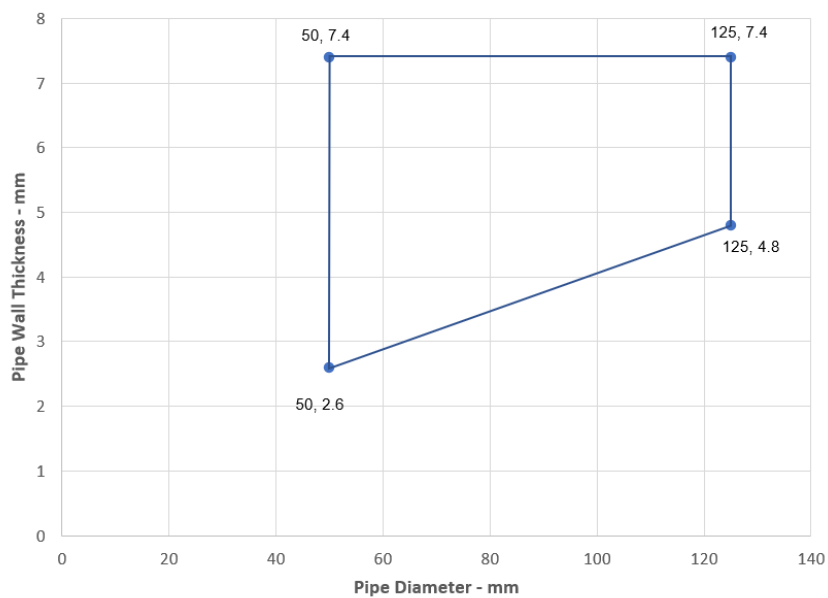
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PVC-U Pipes - EI 120 U/C

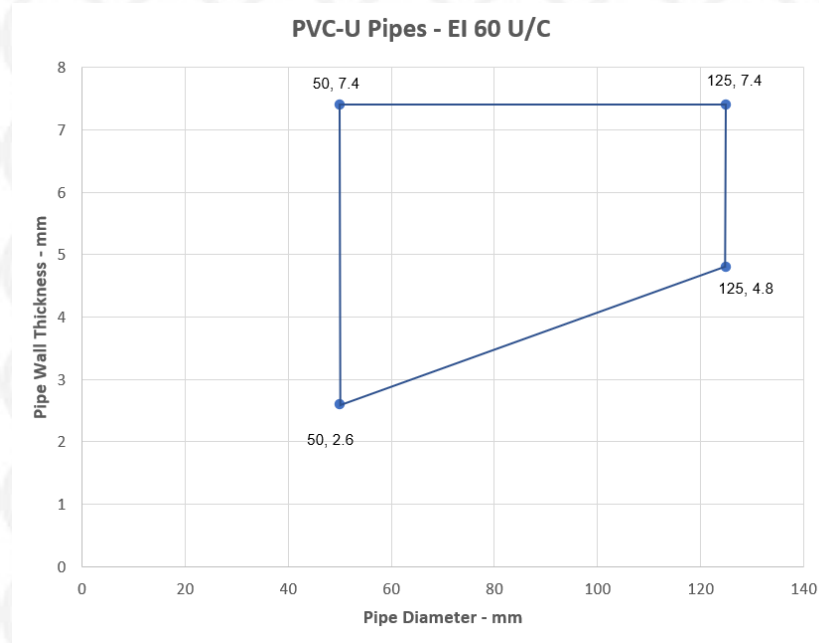


PVC-U Pipes - E 120, EI 90 U/C



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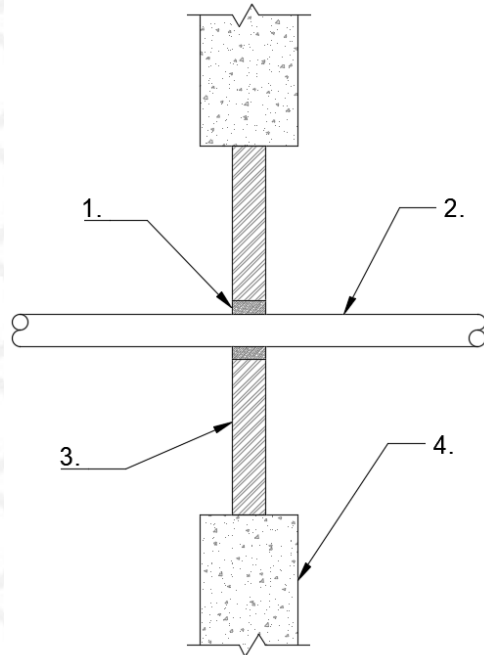


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Multi layered pipes

Rigid Walls $\geq 150$ mm			Penetration Seal Maximum Aperture Size (mm)	Classification
Penetration Service	Pyropro HPE			
	Annular Space (mm)	Min. Depth (mm)		
Uponor MLC (Multi-Layer Composite) Pipe 40 mm – 110 mm $\varnothing$ 4 mm – 10 mm wall thickness*	20	25 - both sides of wall	1100 x 750	E 45, EI30 - C/U, U/C & C/C



Key

1. Pyropro HPE
2. MLC pipe
3. Stopseal Batt
4. Rigid wall

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

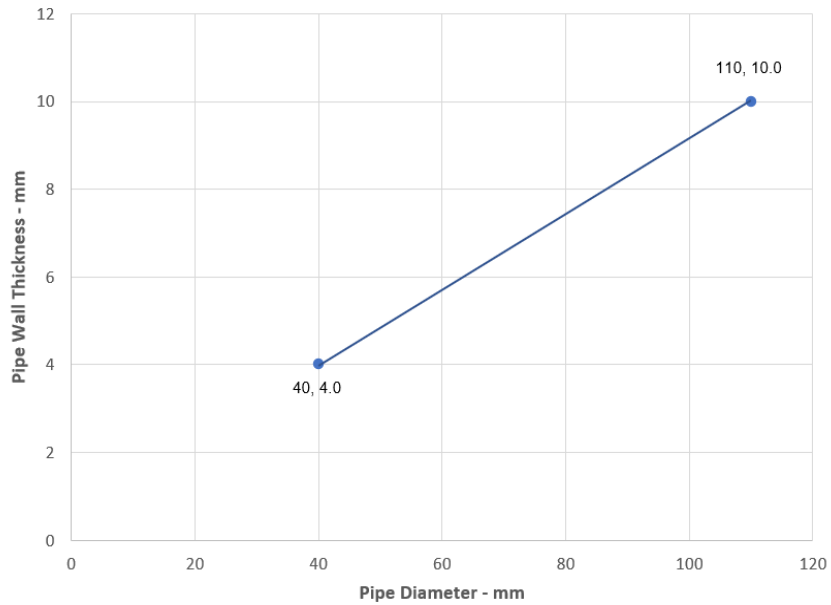
All services supported with 'Unistrut' pipe and cable supports at 400 mm from both faces of the wall.



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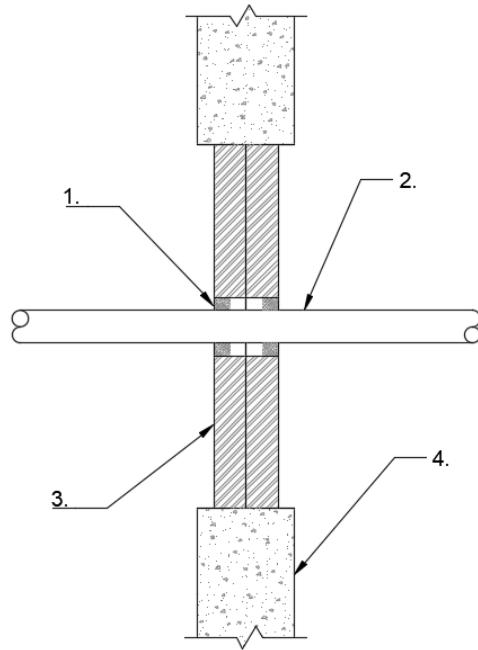
MLC Pipes - E 45, EI 30 C/U



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Rigid Walls  $\geq 150$  mm



Key

1. Pyropro HPE
2. Plastic pipe
3. Stopseal Batt
4. Rigid wall

Penetration Service	Pyropro HPE		Penetration Seal Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
Uponor MLC (Multi-Layer Composite) Pipe 40 mm – 110 mm Ø 4 mm – 10 mm wall thickness*	20	25 - both sides of wall	1200 x 730	EI 120 – U/C, C/C
			2600 x 2600	EI 60 - U/C, C/C

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

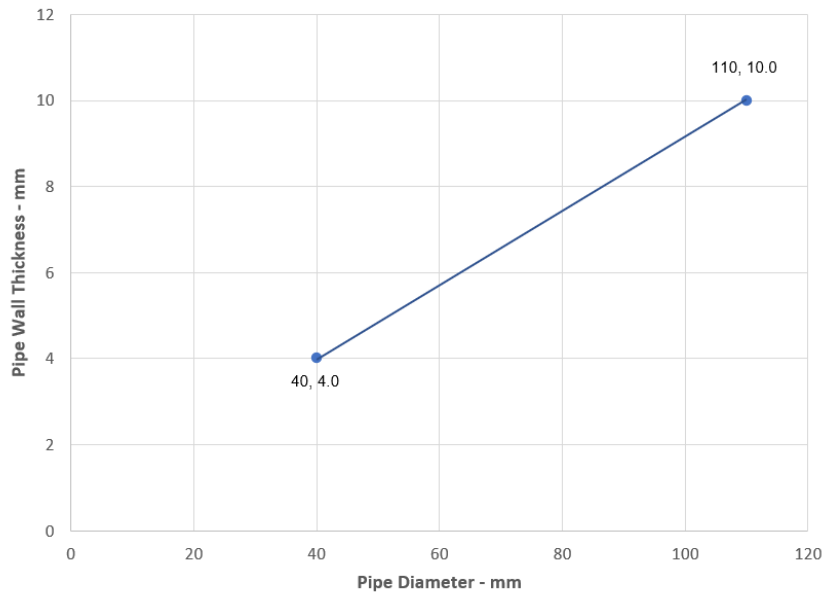
All services supported with 'Unistrut' pipe and cable supports at 400 mm from both faces of the wall.



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MLC Pipes - U/C

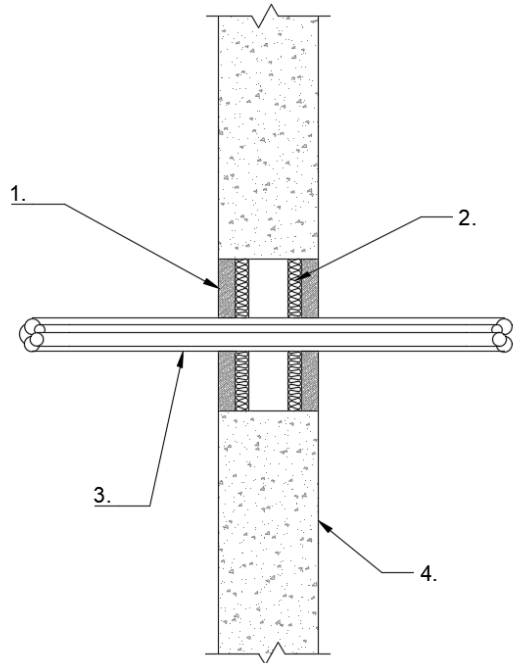


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Cables

Rigid Walls  $\geq 150$  mm



Key

1. Pyropro HPE
2. Backing material
3. Cables
4. Rigid wall

Penetration Service	Depth (mm)	Maximum Aperture Size (mm)	Backing Material	Minimum Distance to Edge of Aperture (mm)	Classification
Telecomms. Cable bunch $\leq 100$ mm $\varnothing$	25	180 x 180	Stone wool or ceramic wool (20mm 45kg/m <sup>3</sup> )	10	EI 240
PVC conduits $\leq 16$ mm $\varnothing$					E 240, EI 45
Steel/Copper conduits $\leq 16$ mm $\varnothing$					E 240, EI 90
Cables $\leq 21$ mm $\varnothing$					E 180, EI 45
Cables $\leq 50$ mm $\varnothing$					E 180, EI 45
Cables $\leq 80$ mm $\varnothing$					E 180, EI 45

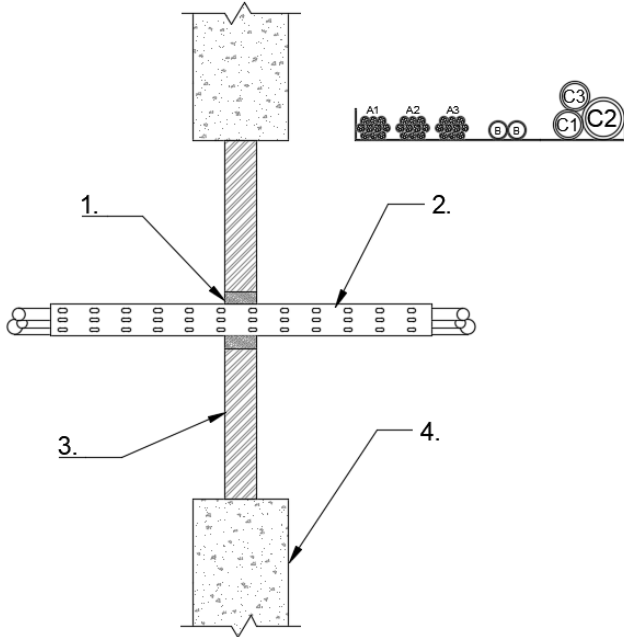
All services supported with 'Unistrut' pipe and cable supports at 400 mm from both faces of the wall.



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Rigid Walls  $\geq 150$  mm



Key

1. Pyropro HPE
2. 500mm perforated cable tray
3. Stopseal Batt
4. Rigid wall

Penetration Service	Pyropro HPE		Penetration Seal Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
*500 mm perforated cable tray	20	25 - both sides of wall	1100 x 750	EI 30
*Electrical cables up to 21 mm Ø				
Cable bunch comprising 1no. C1, 1no. C2 and 1no. C3 cables				

\*All cables coated with 2mm DFT PST Coating 300mm along the cables both sides of the seal

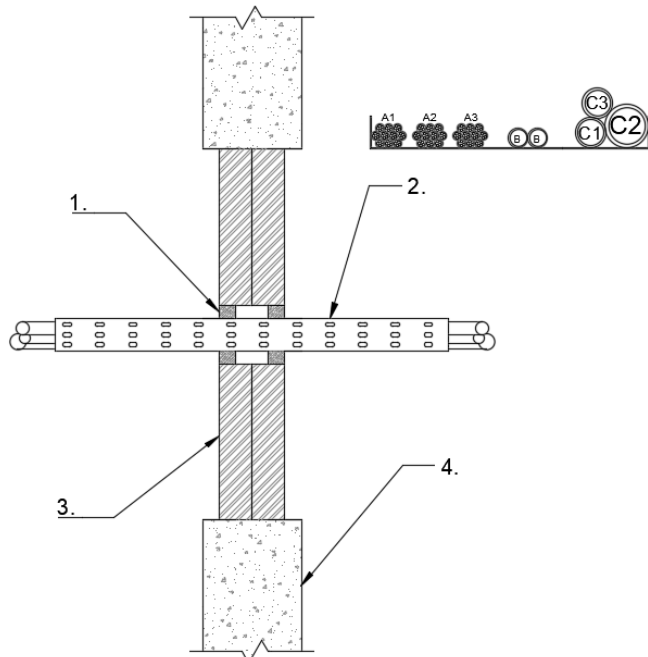
All services supported with pipe and cable supports at 400 mm from both faces of the wall.



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Rigid Walls  $\geq 150$  mm



Key

1. Pyropro HPE
2. 500mm perforated cable tray
3. Stopseal Batt
4. Rigid wall

Penetration Service	Pyropro HPE		Penetration Seal Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
*500 mm perforated cable tray	20	25 - both sides of wall	1200 x 730	EI 120
*Electrical cables up to 21 mm Ø				E 120, EI 90
*Cable bunch comprising 1no. C1, 1no. C2 and 1no. C3 cables				
*500 mm perforated cable tray			2600 x 2600	EI 60
*Electrical cables up to 21 mm Ø				
*Electrical cables up to 50 mm Ø				

\*All cables coated with 2mm DFT PST Coating 300mm along the cables both sides of the seal

All services supported with pipe and cable supports at 400 mm from both faces of the wall.

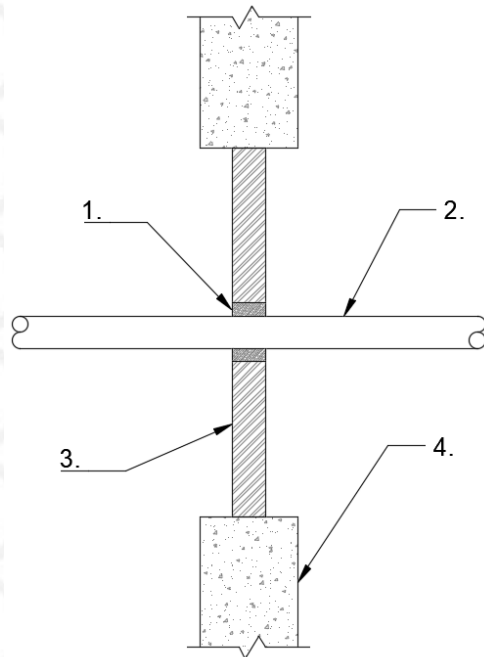


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Metallic pipes

Rigid Walls  $\geq 150$  mm



Key

1. Pyropro HPE
2. Metal pipe
3. Stopseal Batt
4. Rigid wall

Penetration Service	Pyropro HPE		Penetration Seal Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
Copper/Steel pipe 40 mm – 159mm Ø 1.2mm – 14.2 mm wall thickness*	20	25 - both sides of wall	1100 x 750	E 45, EI 20 – C/U, C/C
Copper/Steel pipe 40 mm Ø 1.2mm – 14.2 mm wall thickness				EI 45 - C/U, C/C

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

All services supported with 'Unistrut' pipe and cable supports at 400 mm from both faces of the wall.

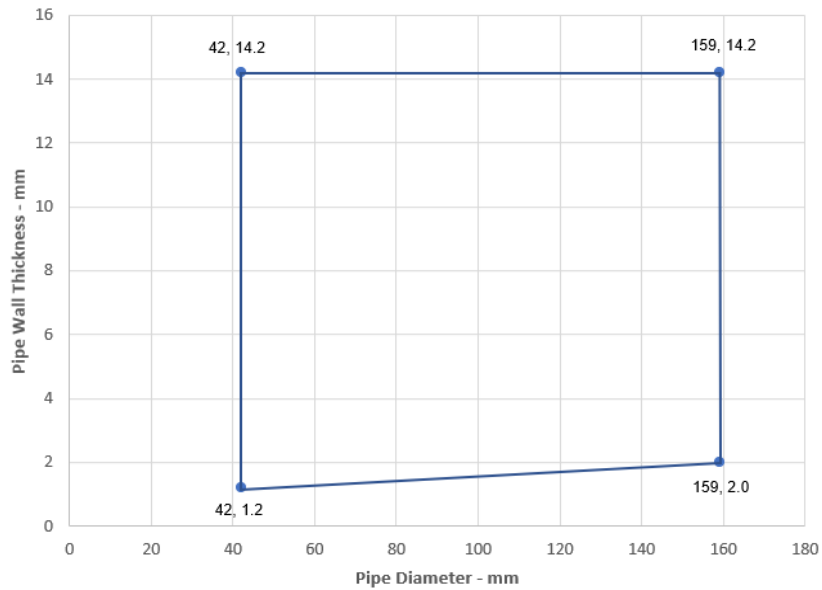




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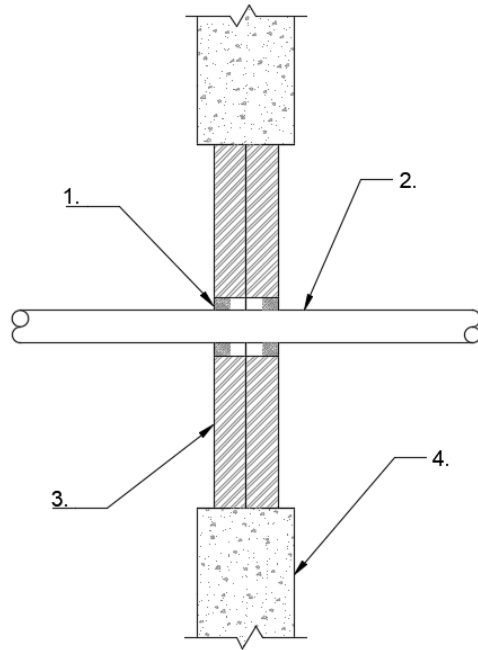
Copper Pipes - C/U



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Rigid Walls  $\geq 150$  mm



Key

1. Pyropro HPE
2. Metal pipe
3. Stopseal Batt
4. Rigid wall

Penetration Service	Pyropro HPE		Penetration Seal Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
Copper/Steel pipe 42 mm – 159mm Ø 1.2mm – 14.2 mm wall thickness*	20	25 - both sides of wall	1100 x 750	E 120, EI 30 – C/U, C/C
Copper/Steel pipe 42 mm Ø 1.2 mm – 14.2 mm wall thickness				E 120, EI 60 – C/U, C/C
Copper/Steel pipe 42 mm – 159 mm Ø 1.2 mm – 14.2 mm wall thickness			2600 x 2600	EI 60 – C/U, C/C

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

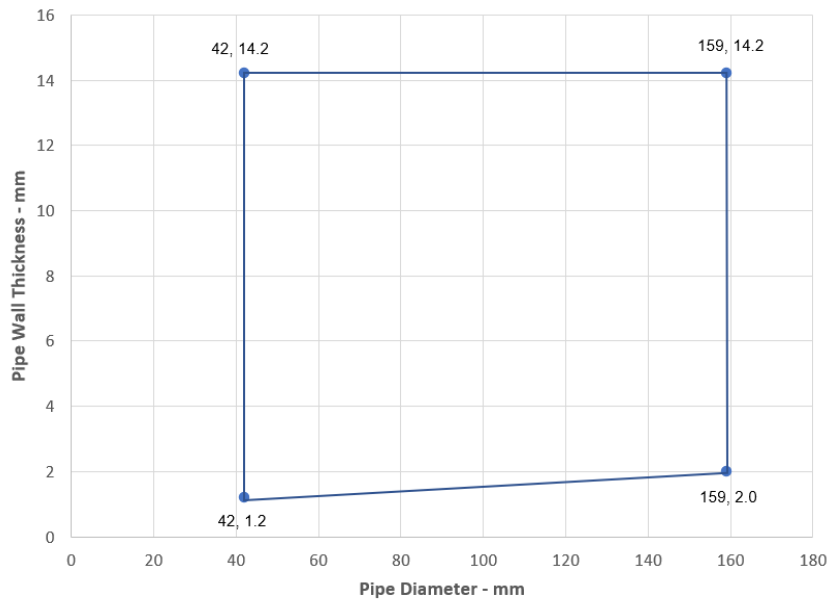
All services supported with pipe and cable supports at 400 mm from both faces of the wall.



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Copper Pipes - C/U



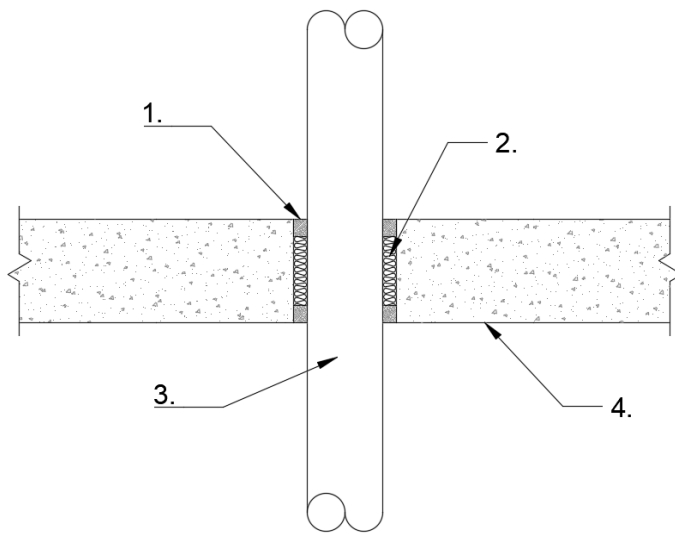
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## Rigid Floors Minimum Thickness 150 mm

Plastic pipes

Flexible Floor  $\geq 150\text{mm}$



### Key

1. Pyropro HPE
2. Backing material
3. Plastic pipe
4. Rigid floor

Penetration Service	Pyropro HPE Depth (mm)	Annular Space (mm)	Backing Material	Classification
PP Pipe 110 mm Ø 3.7 mm wall thickness	$\geq 25$ (both sides of floor)	20mm	$\geq 100\text{mm}$ $\geq 45 \text{ kg/m}^3$ stone wool	EI 30 - U/C, C/C
PP Pipe 110 mm Ø 10.7 mm wall thickness				EI 120 - U/C, C/C
PP Pipe 50 mm Ø 2.1 mm wall thickness				EI 240 - U/C, C/C
PP Pipe 50 – 110 mm Ø 2.1 – 10.7 mm wall thickness*				EI 30 - U/C, C/C
PVC Pipe 40 mm Ø 2 mm wall thickness				EI 240 - U/C, C/C
PVC Pipe 114 mm Ø 3.6 mm wall thickness				E 90, EI 45 - U/C, C/C
PVC Pipe 114 mm Ø 8.1 mm wall thickness				E 120, EI 30 - U/C, C/C
PVC Pipe 40 – 114 mm Ø 2 – 8.1 mm wall thickness*				E 90, EI 30 - U/C, C/C



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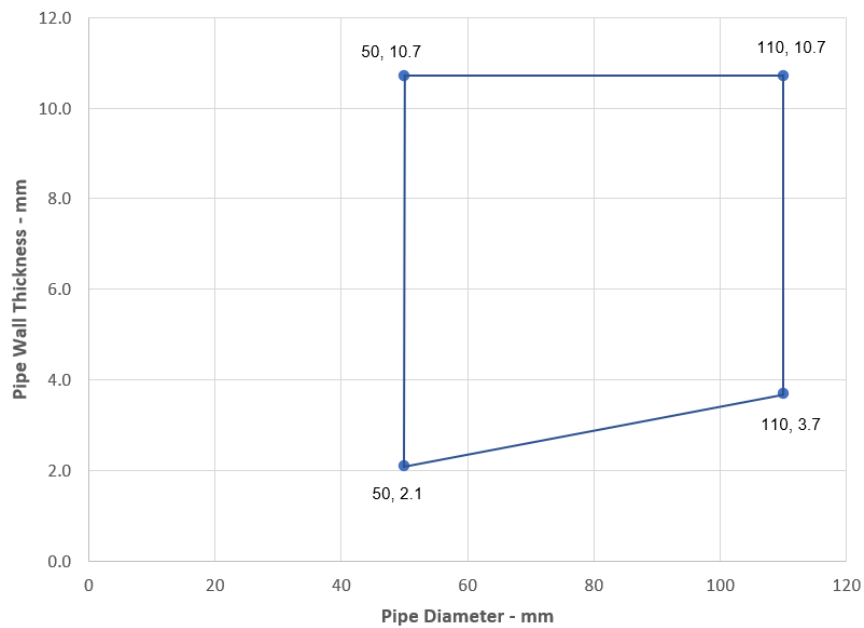
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Penetration Service	Pyropro HPE Depth (mm)	Annular Space (mm)	Backing Material	Classification
PE Pipe 40 mm Ø 4.1 mm wall thickness	≥25 (both sides of floor)	15	≥100mm ≥45 kg/m <sup>3</sup> stone wool	EI 240 - U/C, C/C
PE Pipe 125 mm Ø 7.6 mm wall thickness				EI 60 - U/C, C/C
PE Pipe 125 mm Ø 11.4 mm wall thickness				EI 90 - U/C, C/C
PE Pipe 40 – 125 mm Ø 4.1 – 11.4 mm wall thickness*				EI 60 - U/C, C/C

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

All services supported with pipe and cable supports at 250 mm from upper face of the floor.

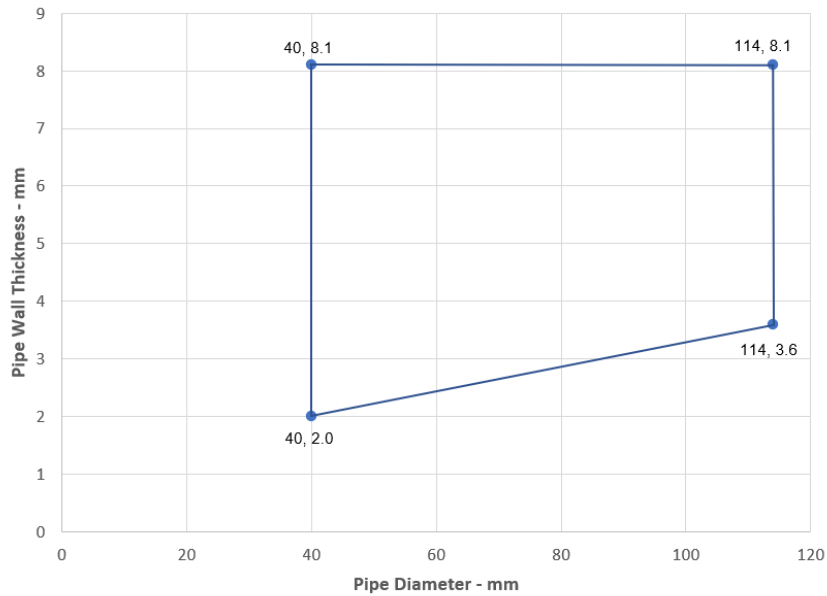
PP Pipes - EI 30 U/C



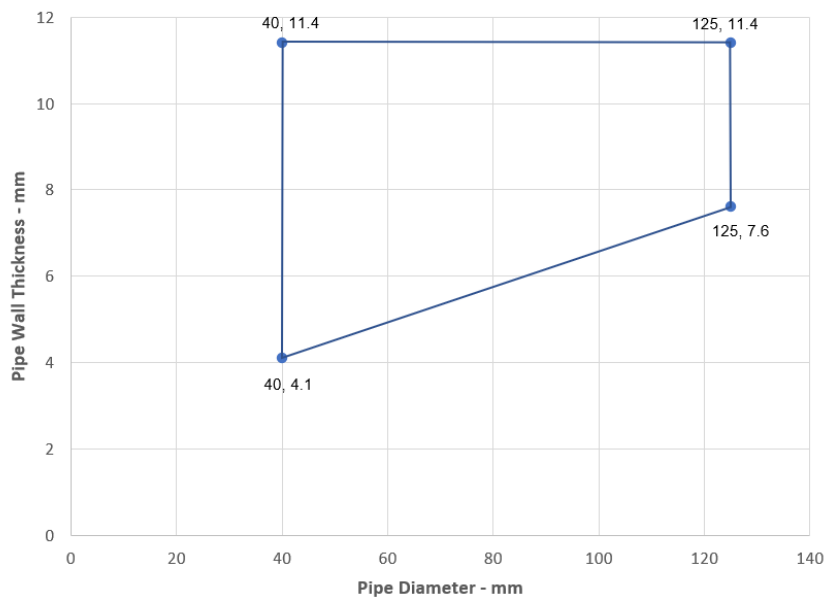
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PVC Pipes - E 90, EI 45 U/C



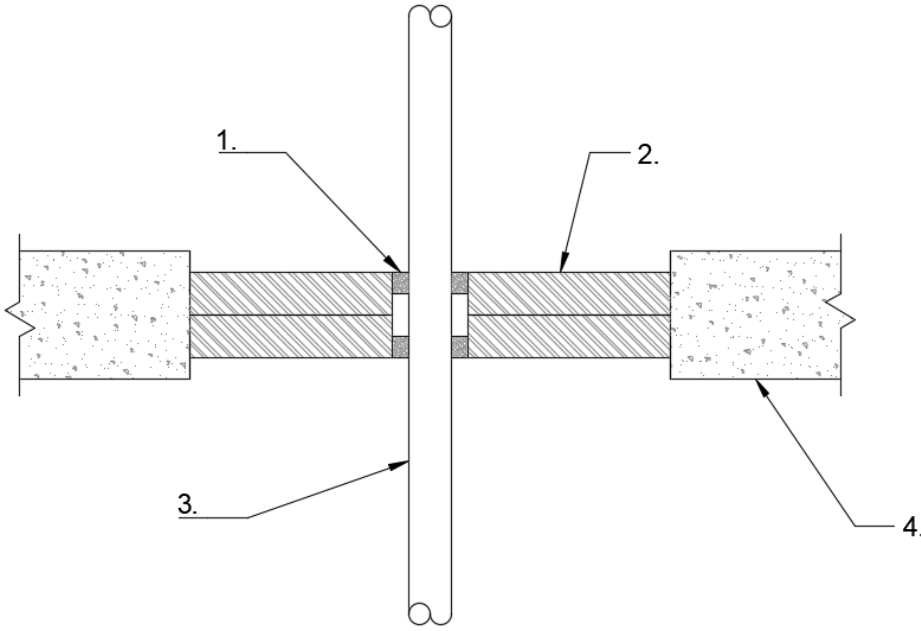
PE Pipes - EI 60 U/C



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Rigid Floor  $\geq 150$  mm



Key

1. Pyropro HPE
2. Stopseal Batt
3. Plastic pipe
4. Rigid floor

Penetration Service	Pyropro HPE		50mm Stopseal Batt Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
PVC Pipe 50 mm – 125 mm Ø 2.6 – 7.4 mm wall thickness*	20	25 - both sides of floor	Double layer 1500 x 1000	EI 60 - U/C, C/C

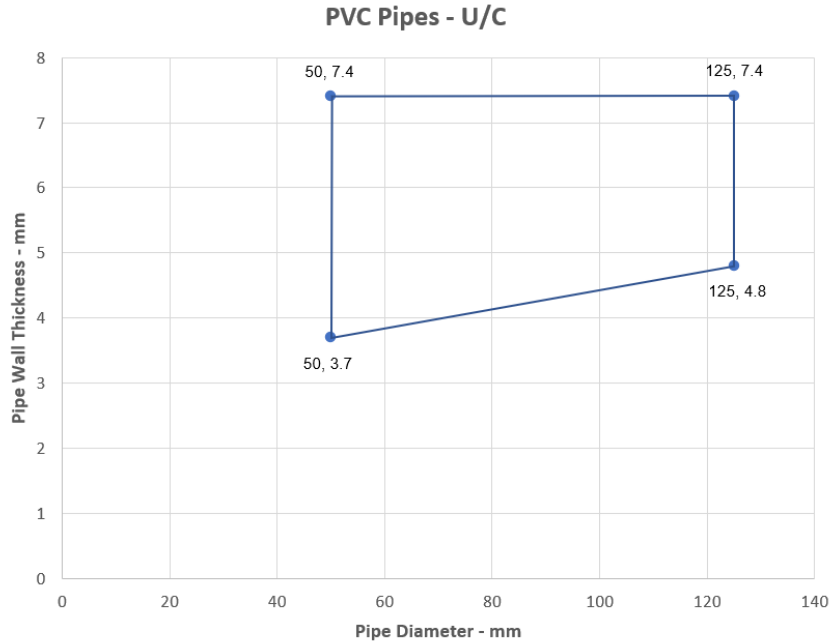
\*Typical pipe diameters shown, see below graph for intermediate sizes

All services supported with pipe and cable supports at 400 mm from upper face of the floor.



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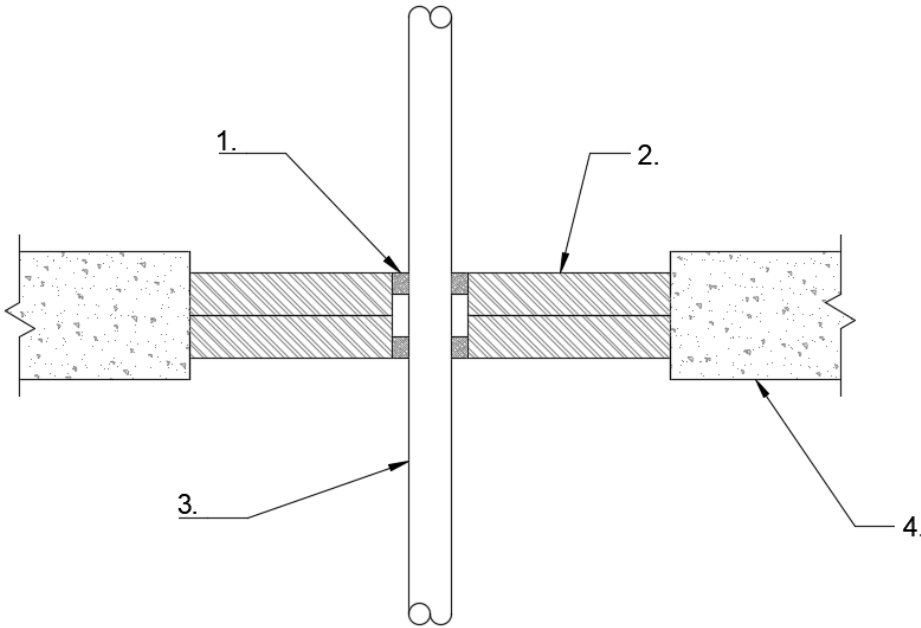


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Multi layered pipes

Rigid Floor  $\geq 150$  mm



Key

1. Pyropro HPE
2. Stopseal Batt
3. MLC pipe
4. Rigid floor

Penetration Service	Pyropro HPE		50mm Stopseal Batt Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
Uponor MLC (Multi-Layer Composite) Pipe 40 mm – 110 mm Ø 4 mm – 10 mm wall thickness	20	25 - both sides of floor	Double layer 1500 x 1000	EI 60 - U/C, C/C

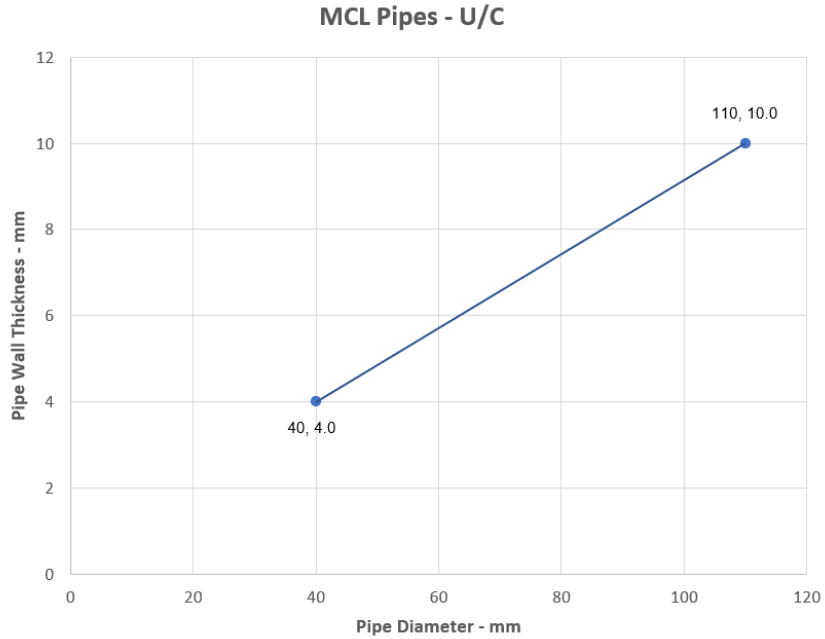
\*Typical pipe diameters shown, see below graph for intermediate sizes

All services supported with pipe and cable supports at 400 mm from upper face of the floor.



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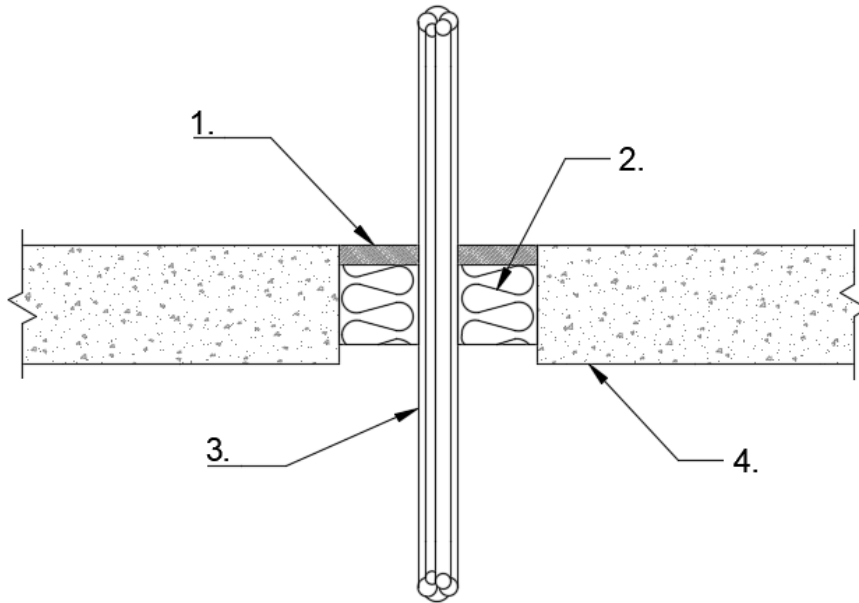


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Cables

Rigid Floor  $\geq 150$  mm



Key

1. Pyropro HPE
2. Backing material
3. Cables
4. Rigid floor

Penetration Service	Pyropro HPE Min. Depth (mm)	Aperture Size (mm)	50mm Stopseal Batt Maximum Aperture Size (mm)	Classification
Electrical Cables $\leq 21$ mm $\varnothing$	$\geq 25$ (installed upper face only)	Max 200 x 200 Min 50 x 50	$\geq 100$ mm $\geq 45$ kg/m <sup>3</sup> stone wool	E 180, EI 30
Electrical Cables $\leq 80$ mm $\varnothing$				E 120, EI 20
Non sheathed electrical cables 0-24 mm $\varnothing$				E 180, EI 20

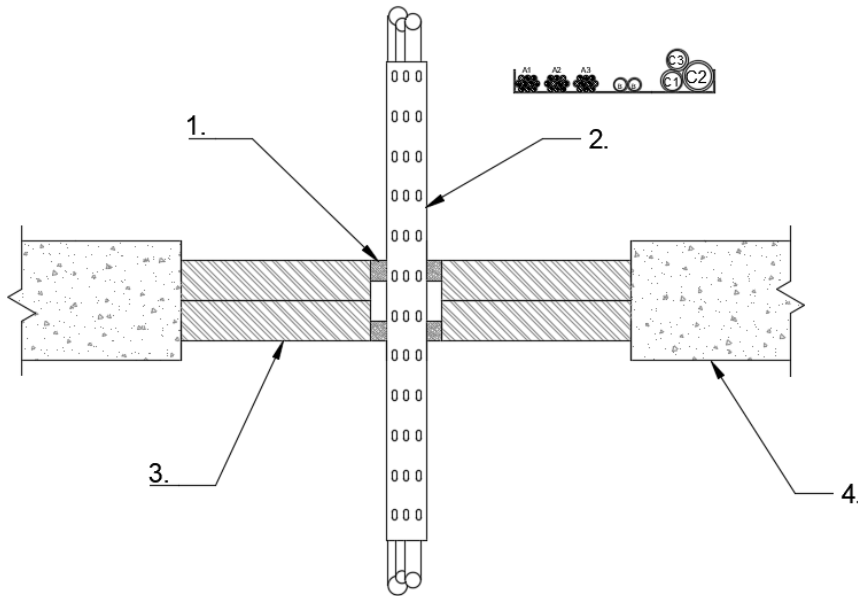
All services supported with pipe and cable supports at 400 mm from upper face of the floor.



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Rigid Floor  $\geq 150$  mm



Key

1. Pyropro HPE
2. 500mm perforated cable tray
3. Stopseal Batt
4. Rigid wall

Penetration Service	Pyropro HPE		50mm Stopseal Batt Maximum Aperture Size (mm)	Classification
	Annular Space (mm)	Min. Depth (mm)		
*500 mm perforated cable tray	20	25 - both sides of floor	Double layer 1500mm x 1000	EI 60
*Electrical cables up to 21 mm Ø				
*Cable bunch comprising 1no. C1, 1no. C2 and 1no. C3 cables				

\*All cables coated with 2 mm DFT PST Coating 300 mm along the cables both sides of the seal

All services supported with pipe and cable supports at 400 mm from upper face of the floor.

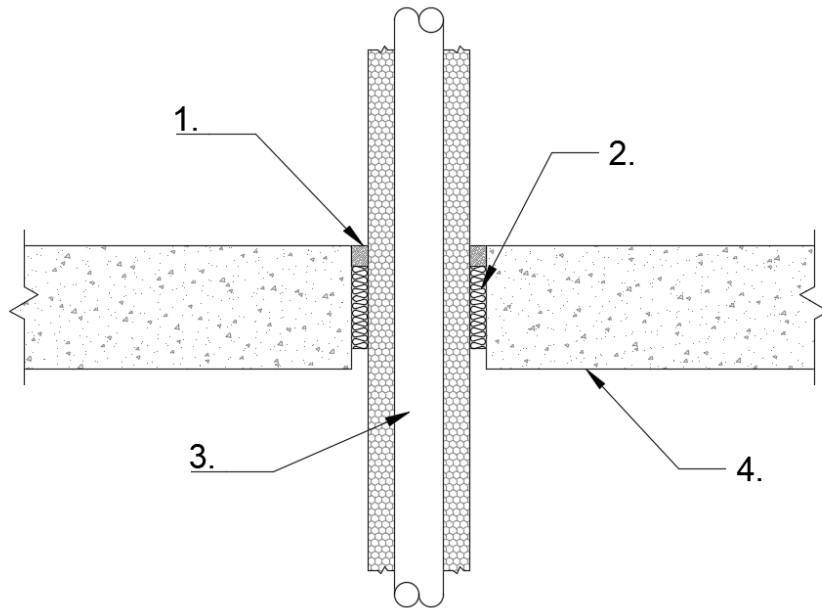


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Insulated metal pipes

Rigid Floor  $\geq 150$  mm



Key

1. Pyropro HPE
2. Backing material
3. Copper/Steel pipe
4. Rigid floor

Penetration Service	Pyropro HPE Min. Depth (mm)	Annular Space (mm)	Backing Material	Classification
Copper/Steel pipe 41-159 mm Ø 2.5 mm - 14.2 mm wall thickness, insulated with 13 mm – 32 mm ‘Armaflex’ (CS) Continued Sustained	$\geq 25$ (installed upper face only)	20mm	$\geq 100$ mm $\geq 45$ kg/m <sup>3</sup> stone wool	EI 20 - U/C, C/U & C/C
Copper/Steel pipe 41 mm Ø 1.4 mm - 14.2 mm wall thickness, insulated with 13 mm ‘Armaflex’ (CS) Continued	$\geq 25$ (both sides of floor)			E 240, EI 60 - U/C, C/U, C/C

All services supported with pipe and cable supports at 250 mm from upper face of the floor.



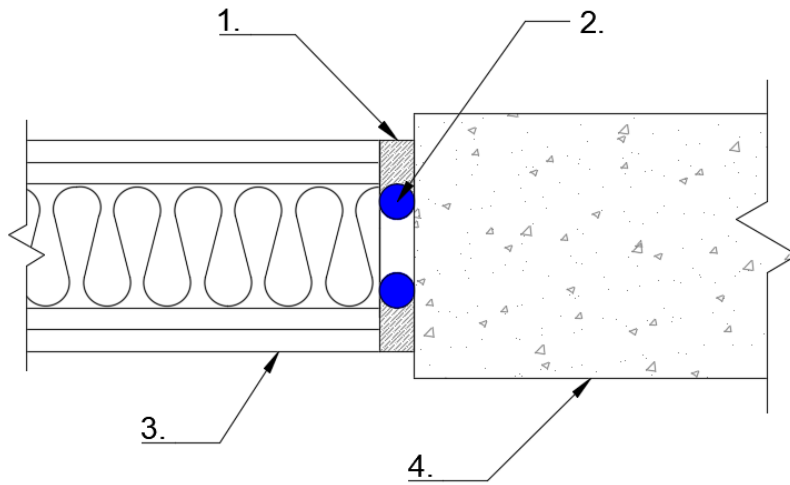
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## Linear Joints

Flexible or Rigid Walls Minimum Thickness 120mm

Flexible or Rigid Walls  $\geq 120$ mm



### Key

- 1. Pyropro HPE
- 2. Backing Material
- 3. Flexible Wall
- 4. Rigid wall

Substrate	Depth (mm)	Backing Material	Classification
Flexible wall to rigid wall	25mm (both sides)	PE backing rod	EI 120 – V – X – F – W 00 to 20



# Appendix UL-EU Certificate

<b>Certification Mark</b>	<b>UL-EU mark</b>
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<b>Date of Issue</b>	<b>2015-04-20</b>

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