



# Classification Report

## Pipe penetration seals

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**Name of sponsor:** SAINT-GOBAIN ISOVER G+H AG

**Product name:** U Protect Pipe Section Alu2, sealing plastic pipe penetrations

**File no.:** PCA10524A      **Revision:** 0

**Date:** 05-08-2019

**Pages:** 12      **Encl.:** 33

**Ref:** ADR / JBK

# Client information

Client: SAINT-GOBAIN ISOVER G+H AG  
Address: Bürgermeister-Grünzweig-Strasse 1  
67059 Ludwigshafen  
Germany

The results relate only to the items tested. The classification report should only be reproduced in extenso - in extracts only with a written agreement with this institute.



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# Introduction

This classification report defines the classification assigned to the product in accordance with the procedures given in DS/EN 13501-2:2016.

This classification report includes the direct field of application of the test results.

# Details of classified product

## General

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Producer of product: SAINT-GOBAIN ISOVER G+H AG

The products were designated: U Protect Pipe Section Alu2

The classification is valid for the following end use application: Sealing of plastic pipe penetrations in fire compartmentation walls and floors with the configurations EI 60-U/C, EI 60-C/C EI 90-U/C, EI 90-C/C EI 120-U/C and EI 120-C/C. The insulation is sustained through the penetration and can be either local or continued in the length.

Note:

The letters C/U in the classification refers to how the ends of the pipes were closed during the fire tests. C/U means Capped inside the furnace and Uncapped Outside the furnace.

## Product description

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The product is a penetration seal system for plastic and Alu Compound (MLC) pipes services installed in vertical and horizontal direction, penetrating rigid and flexible walls and rigid floors.

### Standard solution:

Drawings and field of application of the penetration system are shown on the attached Annexes.

### Penetration service

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Pipes: Combustible pipes grouped into the following categories type PE-group, PVC-group and alu compound/ MLC-group.

Diameter range 14 mm – 110 mm

A specification of each group is given in the field of application.

### Pipe suspension system

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Hangers: System made from non-combustible material fixing the service at maximum 600 mm from both sides of the wall surface and maximum 600 mm away from the upper side of a floor surface.

### Cladding

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Insulation: U Protect Pipe Section Alu2  
Resin-bonded mineral wool with a reinforced aluminium foil  
EC Certificate of Conformity no. 0751-CPR.2-003.0-04

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Thickness range from 20 mm to 100 mm  
Nominal density range of 62 kg/m<sup>3</sup> to 90 kg/m<sup>3</sup>  
Reaction to fire classification A2<sub>L</sub>-s1,d0

The variations in the application of the insulation (e.g. thickness and length) are shown in Annexes V11A to H33B.

The minimum insulation length is measured from the center of the penetration, unless otherwise specified.

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Fixing: The insulation is wrapped around the pipes with a longitudinal butt-joint. The alu-foil overlaps the joint with minimum 30 mm and is fixed using minimum 10 -20 mm wide self-adhesive tape.

Steel wires  
with minimum thickness of 0.6 mm are used to maintain the insulation in position. The steel wires are positioned with a distance c/c of maximum 250 mm starting maximum 75 mm from the supporting construction or a lateral joint in the insulation. Can be mounted as individual wires or as a single wire running along the insulation as a corkscrew.

Or

Steel band  
Minimum dimensions w x t = 16 mm x 0.4 mm. The band and clamps are positioned with a distance c/c of maximum 250 mm starting maximum 75 mm from the supporting construction or a lateral joint in the insulation. The bands are mounted as individual bands.

*Note: The fixation solution using the 0.6 mm steel wire (0.8 mm was used in the reference tests) and the steel band is added based on the results from classification report PCA10437A.*

### **Penetration Type 1 Standard**

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Aperture: The distance from the surface of the pipe and the supporting construction can be up to 50 mm.

Sealing material: The aperture in floors and rigid walls can be filled with: mortar or concrete.  
The aperture in flexible walls can be filled with: gypsum plaster/render/filler.

### **Penetration Type 2 additional solution for small gap sizes**

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The additional solution for small gap sizes is valid for the configuration shown on Annex H33A and H33B

Aperture: The distance from the surface of the pipe section and the supporting construction shall be between 2 mm up to 15 mm

Sealing material: The aperture in flexible walls can be filled with a sealant/mastic: Protect BSK, PROMASEAL-Mastic, SIBRALIT DX or Pyro-Safe Flammoplast KS3 in a depth of  $\geq 25$ mm from both sides.  
In between the fillings can be a void or a noncombustible filling.

# Reports in support of the classification

## Test report

The product was successfully tested in accordance with EN 1366-3:2009. The evidence for this is given in the test reports listed below:

<b>Reference test reports:</b>				
Name of Laboratory	Name of sponsor	Test report file no.	Test method	Date of test
MPA Braunschweig	SAINT-GOBAIN ISOVER G+H AG	2400/243/15 Dated 28-10-2016	EN 1366-3:2009	04-11-2015
MPA Braunschweig	SAINT-GOBAIN ISOVER G+H AG	2400/274/15 Dated 31-01-2018	EN 1366-3:2009	09-12-2015
MPA Braunschweig	SAINT-GOBAIN ISOVER G+H AG	2401/051/16 Dated 25-05-2018	EN 1366-3:2009	23-03-2016
MPA Braunschweig	SAINT-GOBAIN ISOVER G+H AG	2401/250/16 dated 05-02-2018	EN 1366-3:2009	09-12-2016
DBI- Danish Institute of Fire and Security Technology	SAINT-GOBAIN ISOVER G+H AG	PGA11089A dated 22-12-2017	EN 1366-3:2009	17-10-2017

<b>Reference classification reports:</b>			
Name of Laboratory	Name of sponsor	Test report file no.	Method
DBI- Danish Institute of Fire and Security Technology	SAINT-GOBAIN ISOVER G+H AG	PCA10437A Dated 06-07-2018	DS/EN 13501-2:2016

# Classification and field of application

## Reference

This classification has been carried out in accordance with clause 7.5.8 of EN 13501-2:2016.

## Classification

The product is classified according to the following combinations of performance and classes as appropriate.

**Fire resistance classification:** **EI 60-U/C, EI 60-C/C, EI 90-U/C, EI 90-C/C, EI 120-U/C and EI 120-C/C**

For specification of the classification of each specific seal configuration, see enclosures listed below. All classifications are valid for pipe end configuration: U/C and C/C.

**Table of Annexes for U Protect Pipe Section Alu2**

Annex	Classification	Orientation	Pipe	Minimum length of insulation	Configuration	Pipe arrangement
V11A	EI 90	Vertical pipes	PE-Group	2 x 1200 mm	LS/CS	Single pipe
V11B	EI 120	Vertical pipes	PE-Group	2 x 1200 mm	LS/CS	Single pipe
V12A	EI 90	Vertical pipes	PE-Group	2 x 1200 mm	LS/CS	Cluster
V12B	EI 120	Vertical pipes	PE-Group	2 x 1200 mm	LS/CS	Cluster
V13A	EI 90	Vertical pipes	PE-Group	1200 mm	LS/CS Asymmetrical	Single pipe
V13B	EI 120	Vertical pipes	PE-Group	1200 mm	LS/CS Asymmetrical	Single pipe
V21A	EI 90	Vertical pipes	PVC-Group	2 x 1200 mm	LS/CS	Single pipe
V21B	EI 120	Vertical pipes	PVC-Group	2 x 1200 mm	LS/CS	Single pipe
V22A	EI 90	Vertical pipes	PVC-Group	2 x 1200 mm	LS/CS	Cluster
V22B	EI 120	Vertical pipes	PVC-Group	2 x 1200 mm	LS/CS	Cluster
V31A	EI 90	Vertical pipes	Alu Compound-group	2 x 1200 mm	LS/CS	Single pipe
V31B	EI 120	Vertical pipes	Alu Compound-group	2 x 1200 mm	LS/CS	Single pipe
V32A	EI 90	Vertical pipes	Alu Compound-group	2 x 1200 mm	LS/CS	Cluster
V32B	EI 120	Vertical pipes	Alu Compound-group	2 x 1200 mm	LS/CS	Cluster
V33A	EI 90	Vertical pipes	Alu Compound-group	1200 mm	LS/CS Asymmetrical	Cluster Line Configuration
V33B	EI 120	Vertical pipes	Alu Compound-group	1200 mm	LS/CS Asymmetrical	Cluster Line Configuration
H11A	EI 90	Horizontal pipes	PE-Group	2 x 1200 mm	LS/CS	Single pipe

Annex	Classification	Orientation	Pipe	Minimum length of insulation	Configuration	Pipe arrangement
H11B	EI 120	Horizontal pipes	PE-Group	2 x 1200 mm	LS/CS	Single pipe
H12A	EI 90	Horizontal pipes	PE-Group	2 x 1200 mm	LS/CS	Cluster
H12B	EI 120	Horizontal pipes	PE-Group	2 x 1200 mm	LS/CS	Cluster
H21A	EI 60	Horizontal pipes	PVC-Group	2 x 1200 mm	LS/CS	Single pipe
H21B	EI 90	Horizontal pipes	PVC-Group	2 x 1200 mm	LS/CS	Single pipe
H21C	EI 90	Horizontal pipes	PVC-Group	Continued	CS	Single pipe
H21D	EI 120	Horizontal pipes	PVC-Group	2 x 1200 mm	LS/CS	Single pipe
H22A	EI 60	Horizontal pipes	PVC-Group	2 x 1200 mm	LS/CS	Cluster
H22B	EI 90	Horizontal pipes	PVC-Group	2 x 1200 mm	LS/CS	Cluster
H22C	EI 120	Horizontal pipes	PVC-Group	2 x 1200 mm	LS/CS	Cluster
H31A	EI 90	Horizontal pipes	Alu Compound-group	2 x 1200 mm	LS/CS	Single pipe
H31B	EI 120	Horizontal pipes	Alu Compound-group	2 x 1200 mm	LS/CS	Single pipe
H32A	EI 90	Horizontal pipes	Alu Compound-group	2 x 1200 mm	LS/CS	Cluster
H32B	EI 120	Horizontal pipes	Alu Compound-group	2 x 1200 mm	LS/CS	Cluster
H33A	EI 90	Horizontal pipes	Alu Compound-group	2 x 1200 mm	LS/CS Small gap Filling	Single pipe
H33B	EI 120	Horizontal pipes	Alu Compound-group	2 x 1200 mm	LS/CS Small gap Filling	Single pipe

**Explanations:**

LS = Local, Sustained insulation

CS = Continued, Sustained insulation

## Field of application

This classification is valid for the following end use applications:

**Orientation of penetration:**

For protection of vertical and horizontal pipe penetrations.

**Supporting construction:**

For penetration through rigid floors (concrete, masonry or aerated concrete)

 minimum density 475 kg/m<sup>3</sup> (§13.2.1)

minimum thickness of 150 mm. (§13.2.1)

For penetration through rigid walls (concrete, masonry or aerated concrete)

minimum density 475 kg/m<sup>3</sup> (§13.2.1)  
minimum thickness of 100 mm. (§13.2.1)

For penetration through flexible walls (gypsum plasterboards walls)

Resistance to fire classification of minimum EI 60 for penetrations classified EI 60  
Minimum thickness of 94 mm. (§13.2.2.1 2)  
Minimum two board layers on each side (§13.2.2.1 3)  
The overall board thickness is 50 mm or greater.

Resistance to fire classification of minimum EI 90 for penetrations classified EI 90  
Minimum thickness of 94 mm. (§13.2.2.1 2)  
Minimum two board layers on each side (§13.2.2.1 3)  
The overall board thickness is 50 mm or greater.

Resistance to fire classification of minimum EI 120 for penetrations classified EI 120  
Minimum thickness of 100 mm. (§13.2.2.1 2)  
Minimum two board layers on each side (§13.2.2.1 3)  
The overall board thickness is 50 mm or greater.

For penetration through flexible walls with timber studs (§13.2.2.1, 5)

Constructed as described for wall with steel studs, but with no part of the penetration closer than 100 mm to a stud, the cavity is closed between the penetration seal and the stud, and minimum 100 mm of insulation of class A1 or A2 according to EN 13501-1 is provided within the cavity between the penetration seal and the stud.

**Position of support for the service:**

The distance between the surface of the supporting construction and the first support for the service shall not exceed 600 mm for floors and walls. (§13.4.3)

**Gap between supporting construction and insulation:**

The distance shall not exceed 50 mm

*Note: For processability/workability the preferably gap should be minimum 10 mm.*

**Sealing medium inside aperture:**

For rigid constructions the aperture can be filled with:

Mortar  
Concrete

For flexible constructions the aperture can be filled with:

Gypsum plaster/render/filler

The filling must be free of cavities.

**Pipes:**

Pipe Material

The pipe groups PE-group, PVC-group and Alu Compound/ MLC-group covers the following:

PE-group

PE/PE-HD pipes in accordance with  
EN 1519-1, EN 12666-1, EN 12201-2 and EN ISO 15494,

ABS pipes in accordance with  
EN 1455-1 and EN ISO 15493

SAN+PVC pipes in accordance with  
EN 1565-1

PVC-group

PVC-U in pipes accordance with  
EN 1329-1, EN 1453-1, EN ISO 15493 and EN ISO 1452-1

PVC-C in pipes accordance with:  
EN 1566-1, EN ISO 15493 and EN ISO 15877;

Note: rule Table 5 from EN 15882-3 has been used to include PE-HD results for PVC-group up to a maximum size of Ø160 mm.

Alu Compound-group

The current test standard for penetrations EN 1366-3:2009 gives no definition or field of application for of Alu Compound pipes. The field of application can therefore only be the types tested.

**Producer**

Uponor  
Viega  
Rehau  
Geberit  
Fränkische Rohrwerke

**Pipe type**

MLCP/Uni3Pipe3+  
Raxofix  
Universalrohr Rautitan stabil  
Mepla A  
Alpex F50 Profil

*Note 1: The revision of the penetration standard prEN1366-3:2015 holds the following definition:*

*MLC pipes:*

*Multi-layered pipes not classified to A1 or A2 in accordance with EN 13501-1, made basically of thermoplastic or thermosetting material including one or more metal layers*

*Note 2: Currently there is a product standard for MLC pipes EN 21003-2. However, this product standard is not referred to in any of the test standards.*

Pipe end configuration

The classification is valid for the U/C and C/C configuration.

U/C= (Uncapped inside the furnace, capped outside the furnace)

C/C = (capped inside the furnace, Capped outside the furnace)

Distance between the services

Single pipes penetration seal systems:

Single pipe penetration seal systems have only one pipe per aperture.

Single pipe systems should have a separation distance of  $\geq 100$  mm. The separation distance between the pipes shall be measured from the outer edges of the pipes or secondary parts of the penetration seal, as relevant. In this case the outer surface of the pipe insulation.

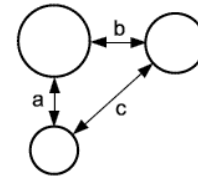
**Multiple pipe penetration seal systems:**

Multiple pipe penetration seal systems can have multiple pipes through one aperture. The pipe can be of any type material as long as this pipe type is also classified for Multiple pipe penetration seal systems configuration.

The multiple pipe systems can be classified for linear arrangement also covers cluster arrangement. The separation distances a, b and c are the distance measured from the outer edges of pipes or secondary parts of the penetration seal, as relevant. In this case the outer surface of the pipe insulation.



Linear arrangement



Cluster arrangement

The separation distance for multiple penetration seal systems should be minimum:

- a and b ≥ 0 mm
- c ≥ 22 mm

Multiple pipe penetration systems classified for linear arrangement (see Table of Annexes for U Protect Pipe Section Alu2 above) can be installed as single pipe systems and multiple pipe systems in linear configuration.

Multiple pipe systems classified for linear arrangement (see Table of Annexes for U Protect Pipe Section Alu2above) can be installed as single pipe systems and multiple pipe systems in both linear and cluster configurations.

A multiple pipe penetration system can consist of services made from different materials ex. metal and plastic pipes together, on condition that all the service types has been tested in the cluster configuration.

Note: classification of metal pipe penetration seals is given in classification report PCA10437A.

The pipes can be positioned next to pipes with a penetration seal consisting of a pipe collar of one of the following types:

Producer	Product name	Approval
Doyma	Curafam® System XS Pro;	AbZ Z-19.53-2182 ETA-11/0498
Firentis	FS-M R1	AbZ Z-19.53-2182 ETA-11/0498
Doyma	Curafam® System ECO Pro;	ABZ Z-19.17-1089
Firentis	FS-M R2	ABZ Z-19.17-1089
Rolf Kuhn	System FSC	ABZ Z-19.17-1089
Conel	Flam Manschette	ABZ Z-19.17-1986
Wavin	System BM-R90	AbZ Z-19.17-1924
Poloplast	System POLO-BSM F	AbZ Z-19.17-1923

**Insulation:**

The thickness range of the insulation is shown on Annex V11A – H33B.

The thickness can be increased above the specification given in the annexes for pipes with continued insulation.

The density of the insulation may be increased but not reduced.

The length from the center of the supporting construction to the end of the insulation may be increased from the insulation length given in Annex V11A – H33B.

The joint between 2 pipe sections can be closed using aluminum tape.

## Limitations

This document does not represent type approval or certification of the element.

### Danish Institute of Fire and Security Technology



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**Anders Drustrup**  
M.Sc. (Civ.Eng.)



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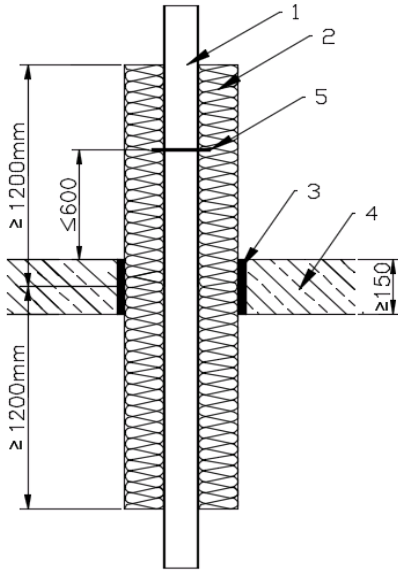
**Jeanne Kirk**  
M.Sc. (Civ.Eng.)

### SAINT-GOBAIN ISOVER G+H AG

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Bürgermeister-Grünzweig-Strasse 1  
67059 Ludwigshafen  
Germany

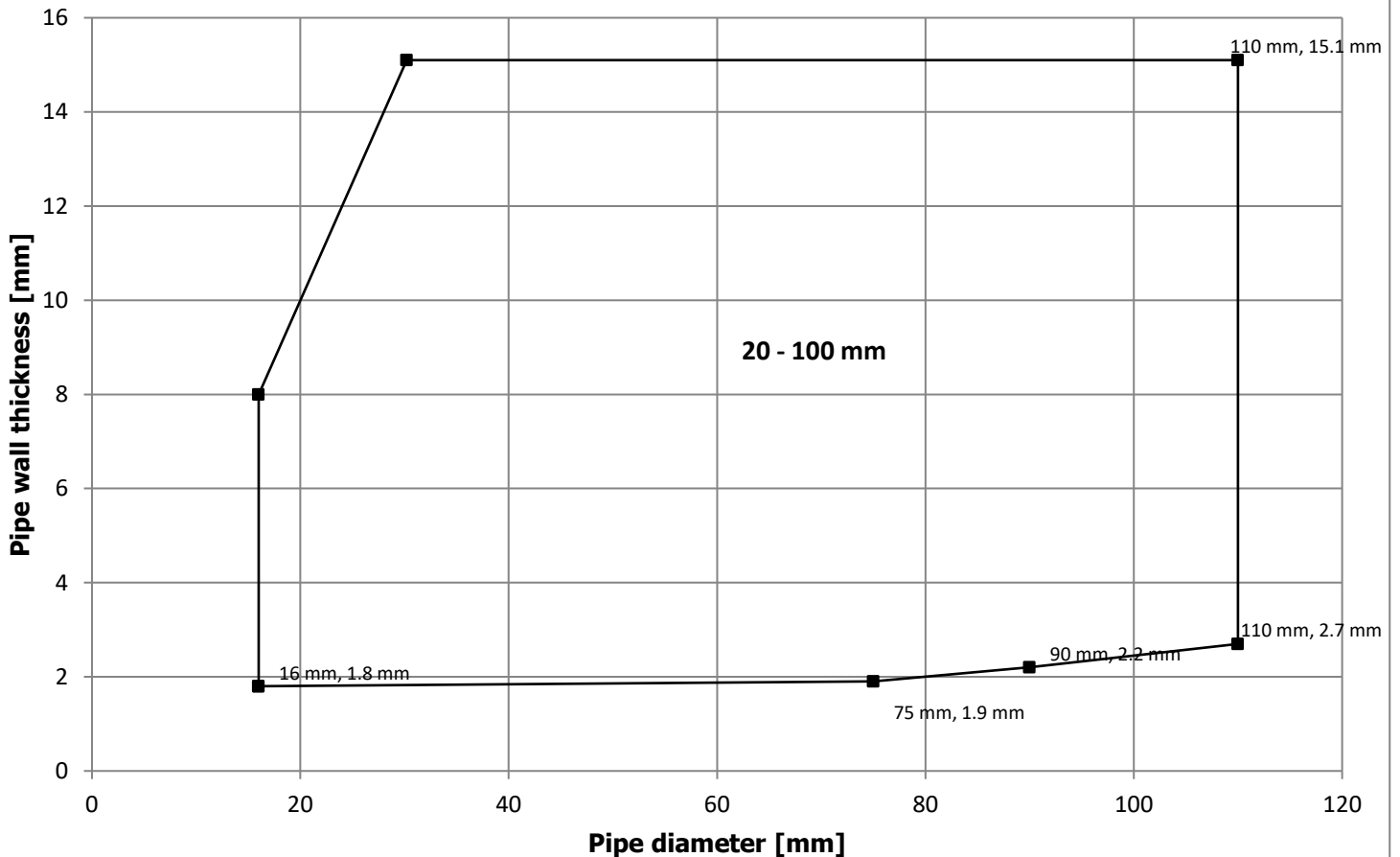
**EI 90 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PE-Group**



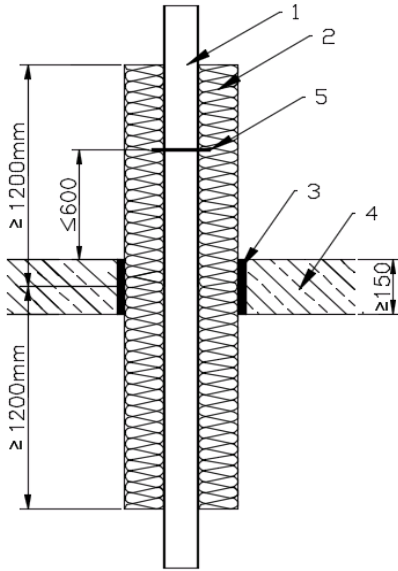
No.	Item	Description
1	Pipe	PE-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



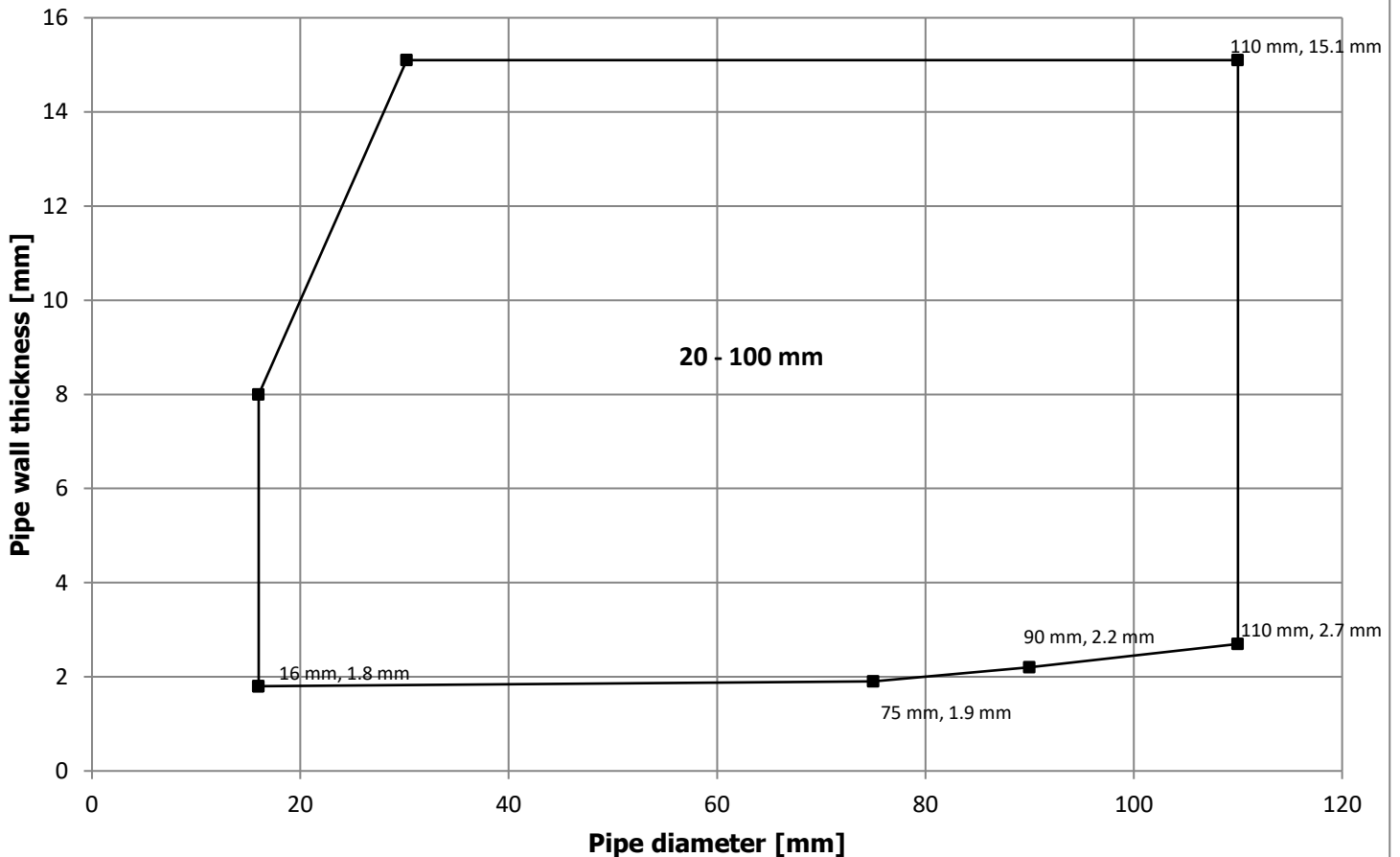
**EI 120 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PE-Group**



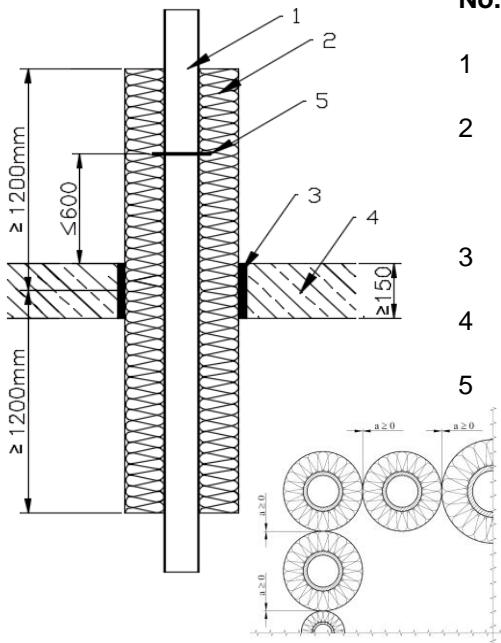
No.	Item	Description
1	Pipe	PE-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



**EI 90 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PE-Group, Cluster configuration**

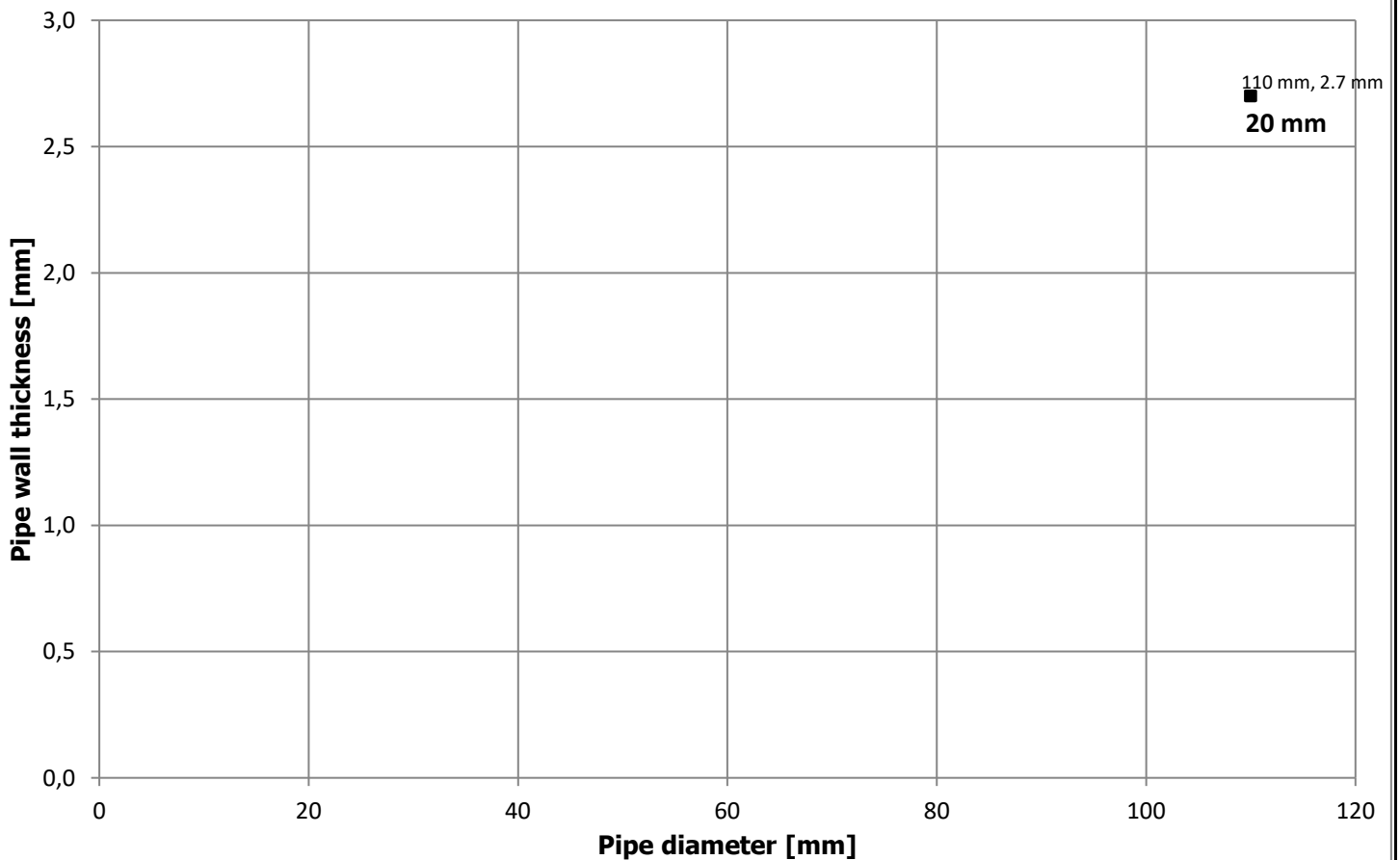


No.	Item	Description
1	Pipe	PE-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

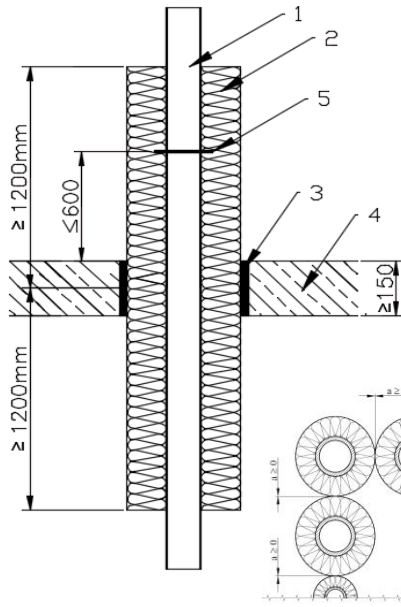
NB. Minimum distance to next penetration 0 mm

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



**EI 120 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PE-Group, Cluster configuration**

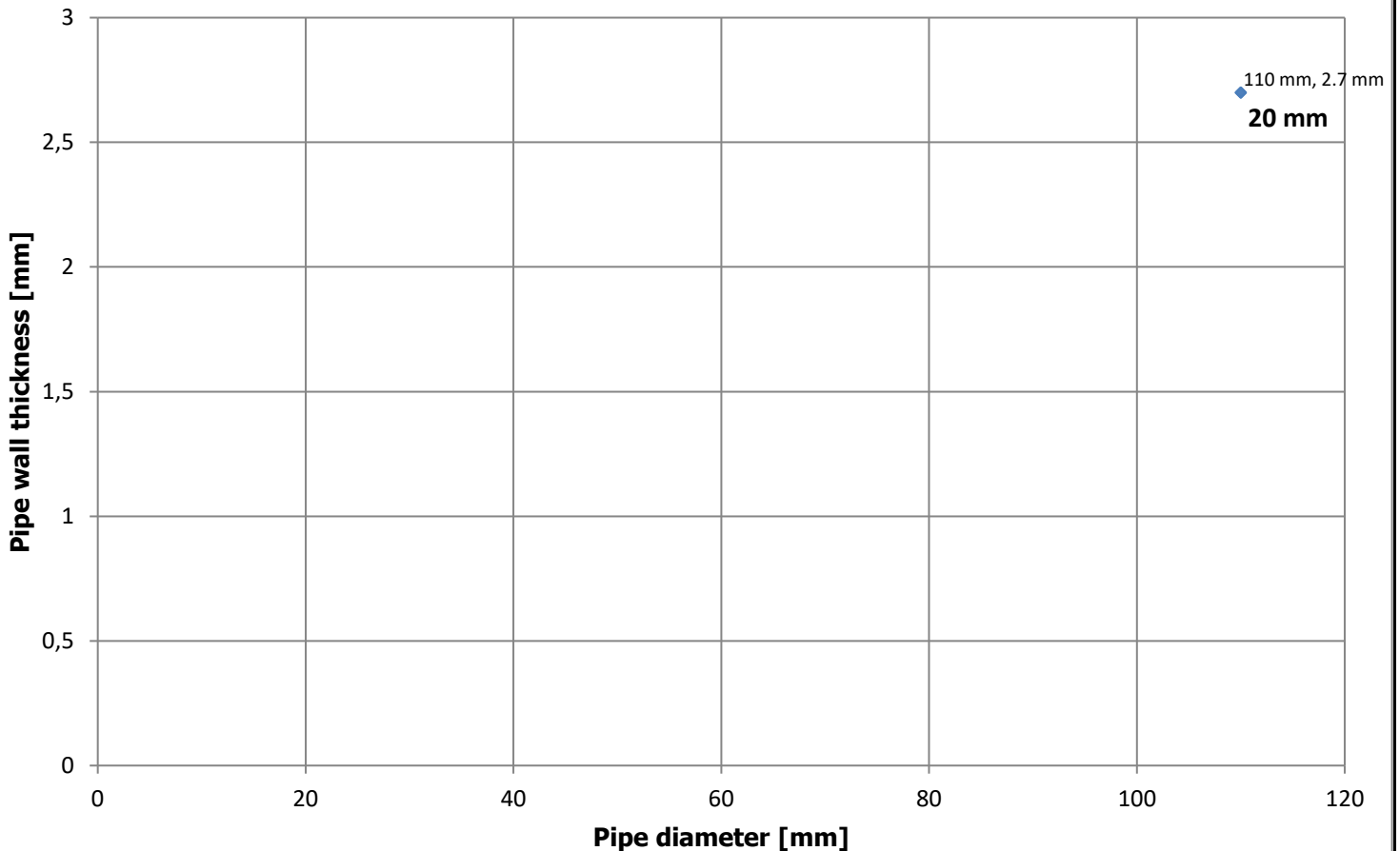


No.	Item	Description
1	Pipe	PE-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

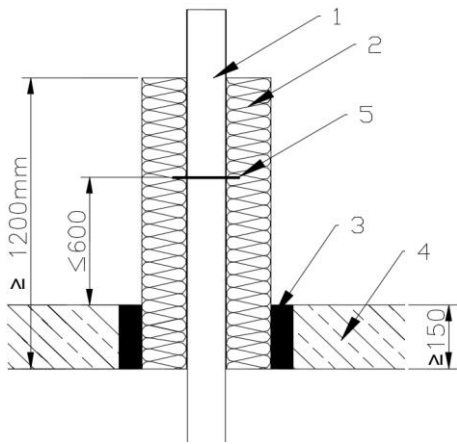
NB. Minimum distance to next penetration 0 mm

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



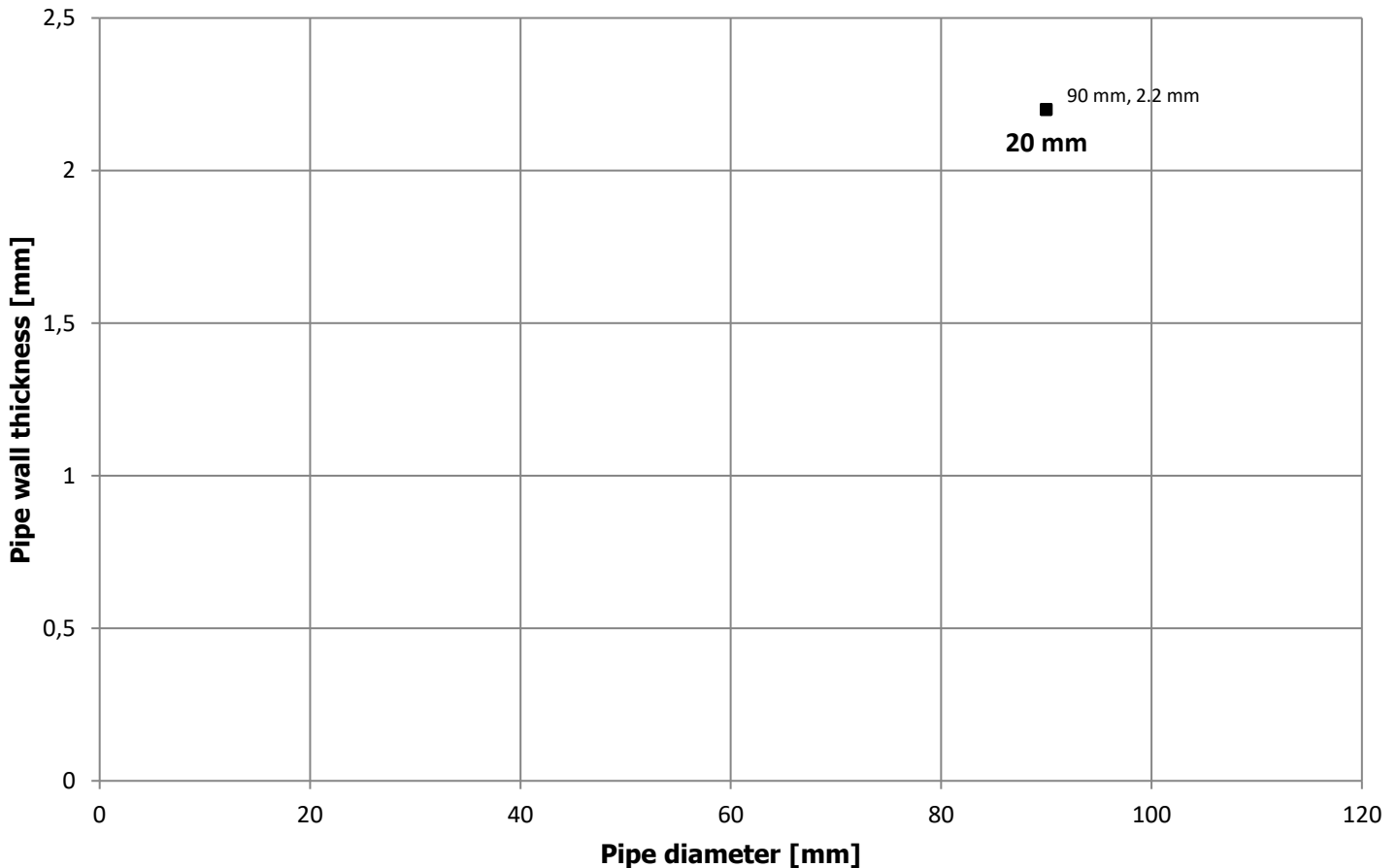
**EI 90 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation asymmetrical**  
**PE-Group**



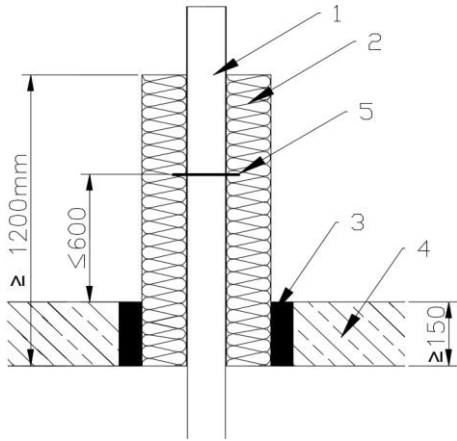
No.	Item	Description
1	Pipe	PE-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



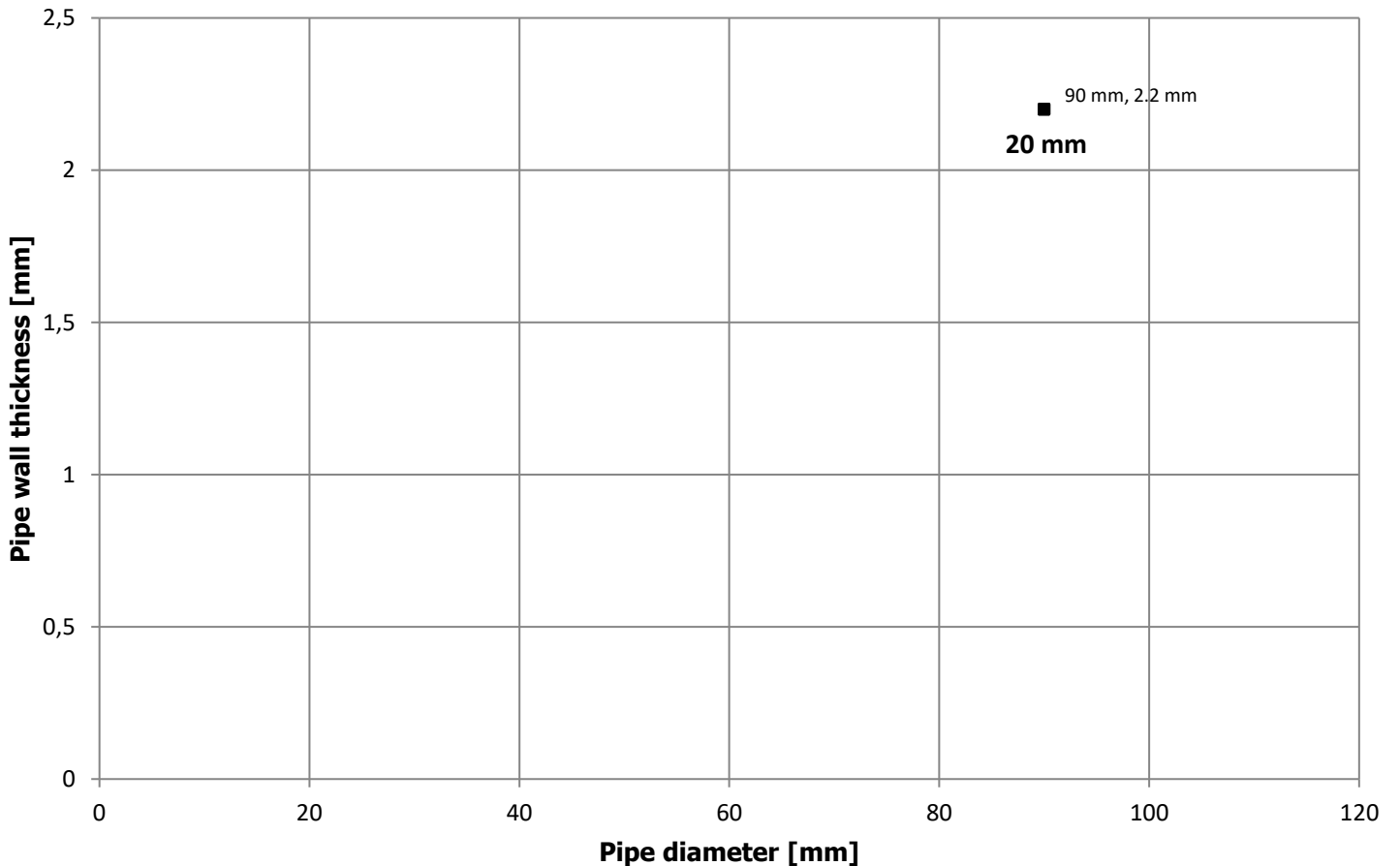
**EI 120 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation asymmetrical**  
**PE-Group**



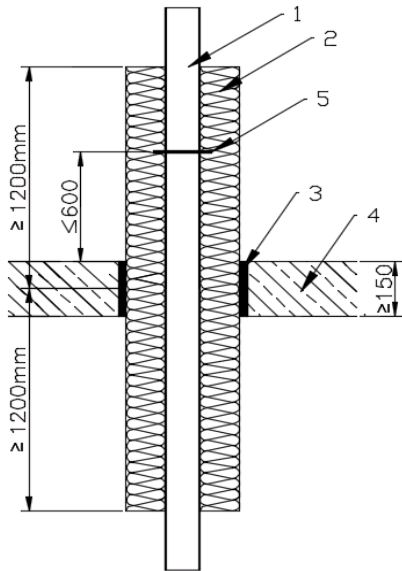
No.	Item	Description
1	Pipe	PE-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



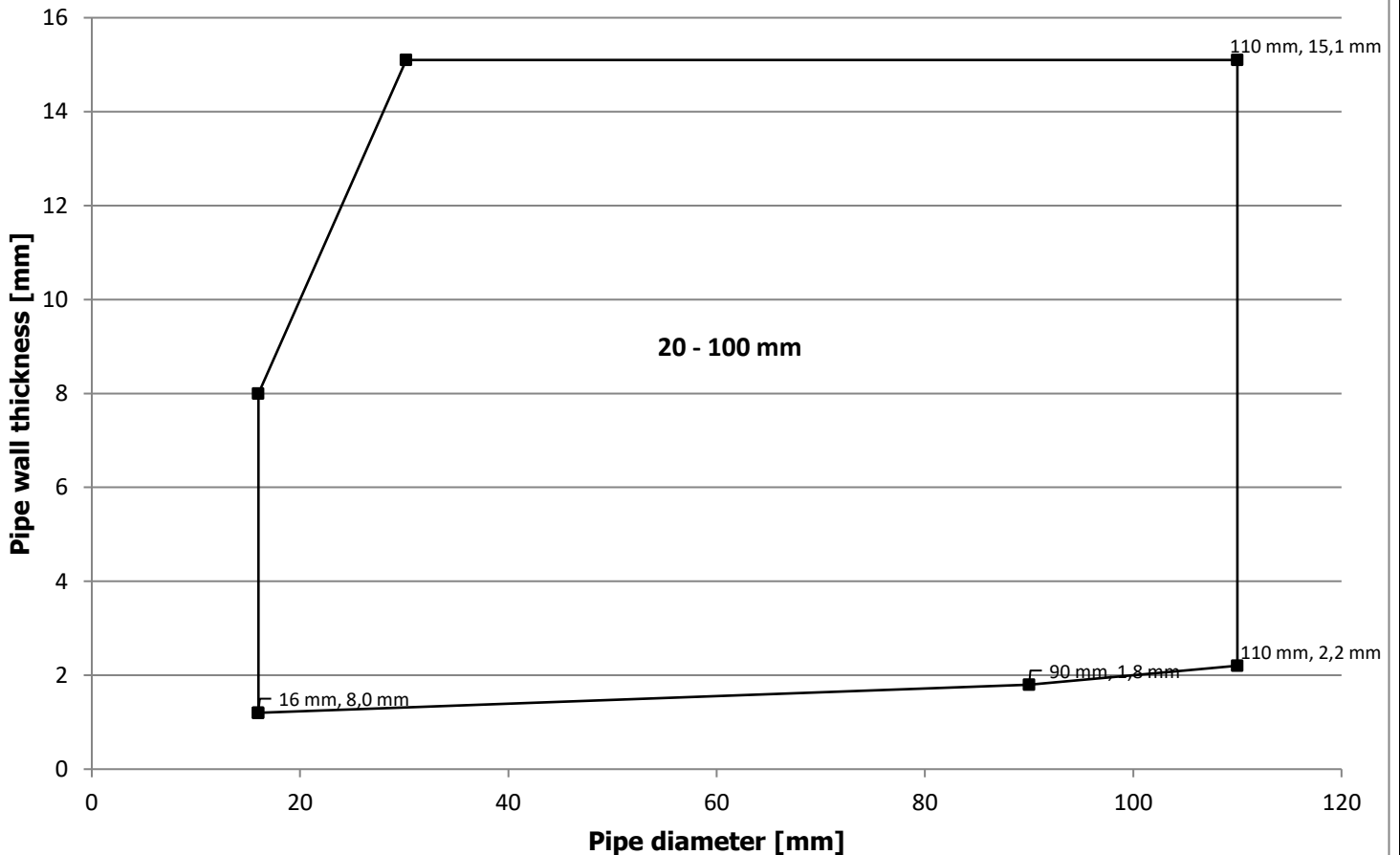
**EI 90 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PVC-Group**



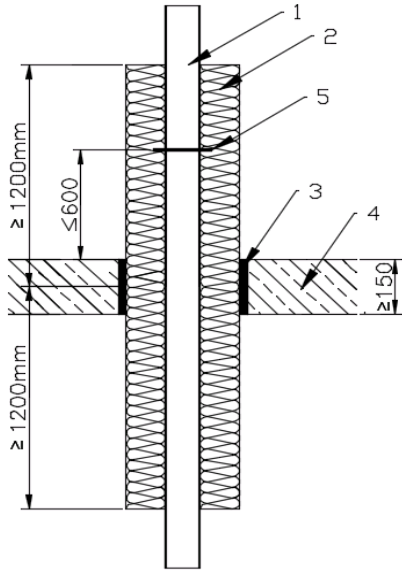
No.	Item	Description
1	Pipe	PVC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



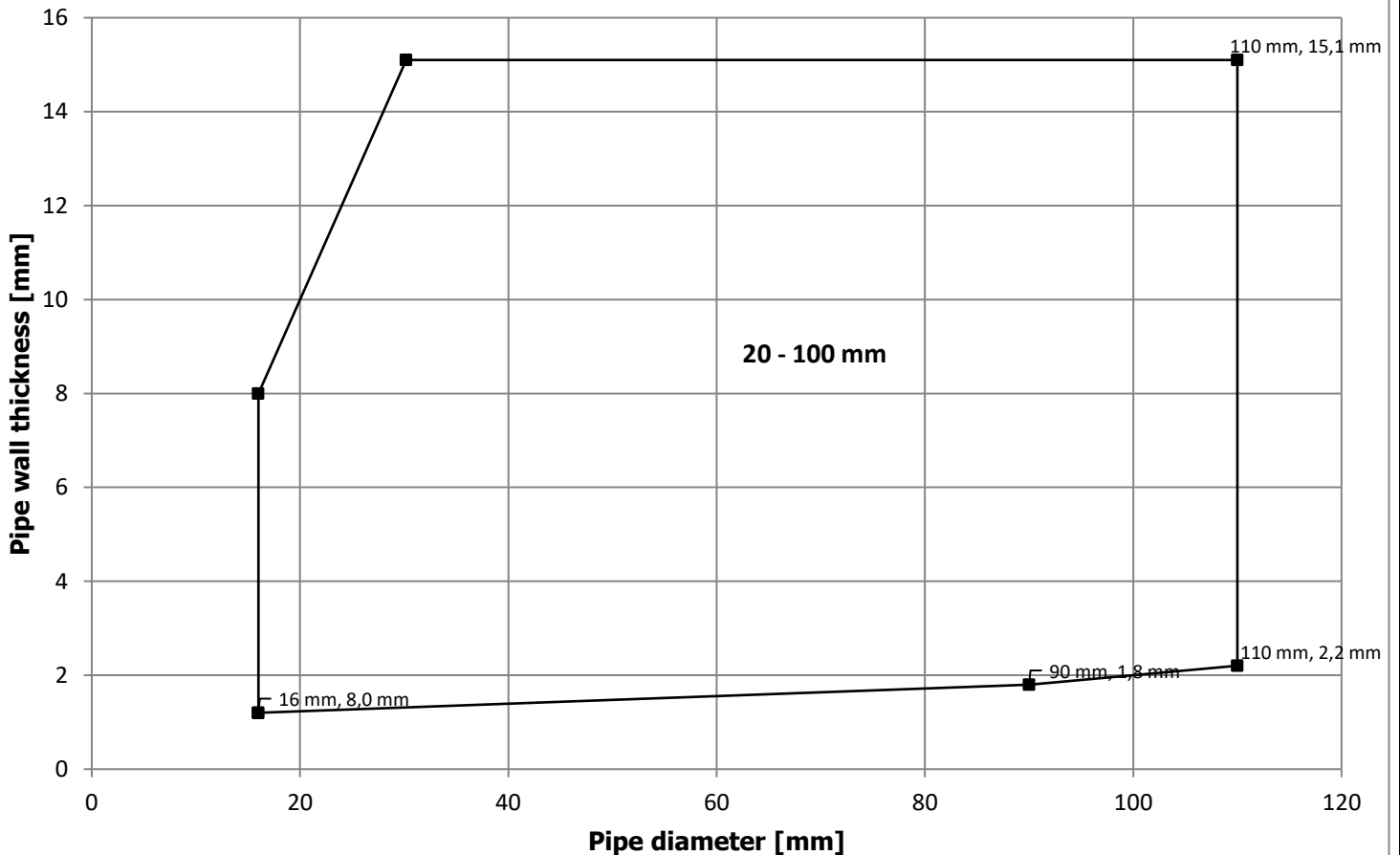
**EI 120 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PVC-Group**



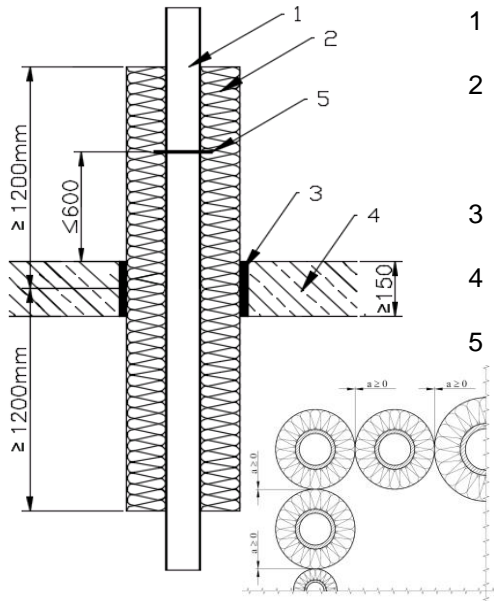
No.	Item	Description
1	Pipe	PVC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



**EI 90 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PVC-Group, Cluster configuration**

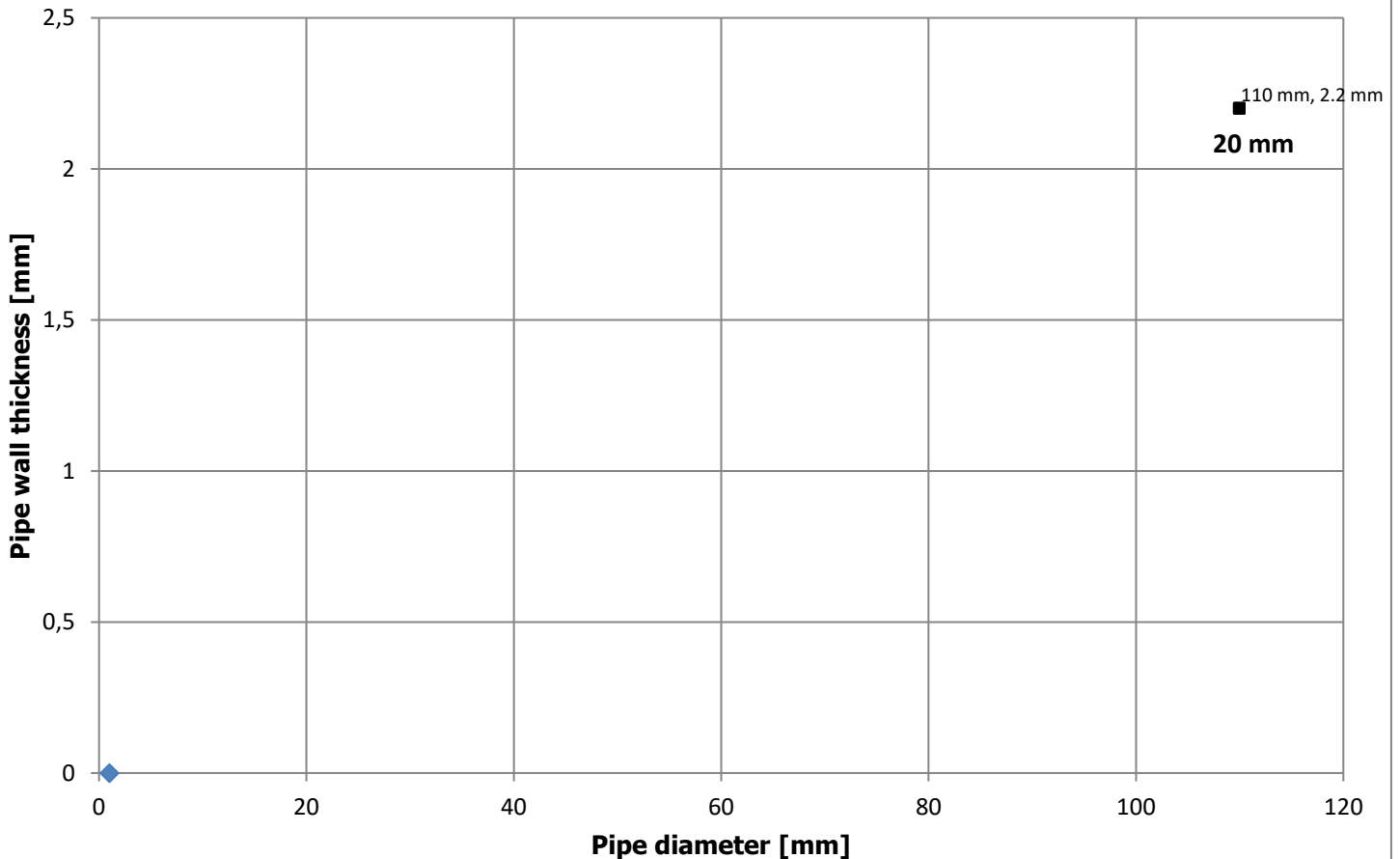


No.	Item	Description
1	Pipe	PVC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

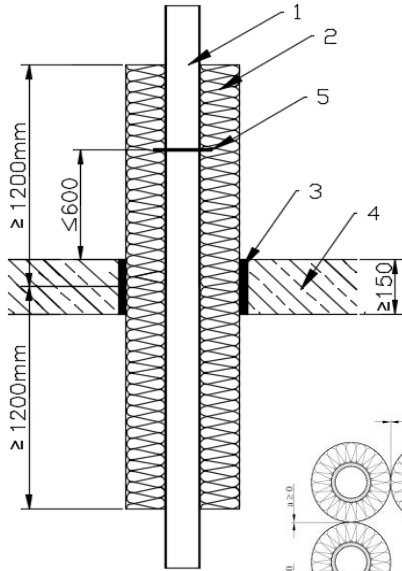
NB. Minimum distance to next penetration 0 mm

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



**EI 120 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PVC-Group, Cluster configuration**

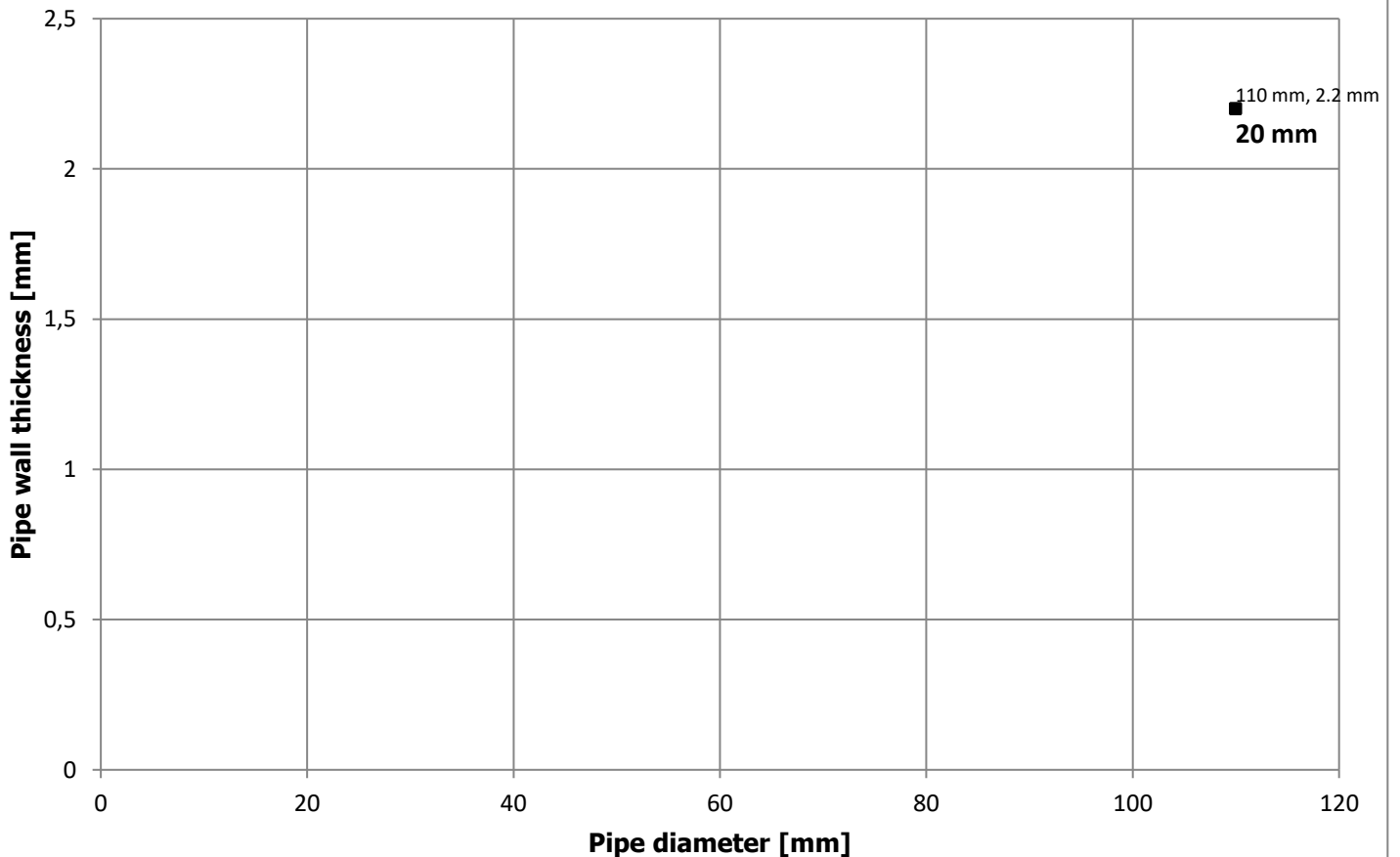


No.	Item	Description
1	Pipe	PVC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

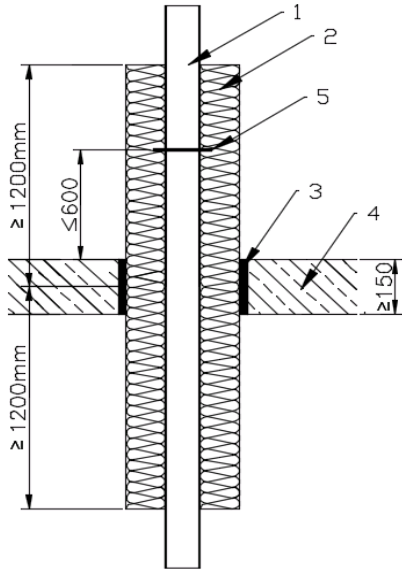
NB. Minimum distance to next penetration 0 mm

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



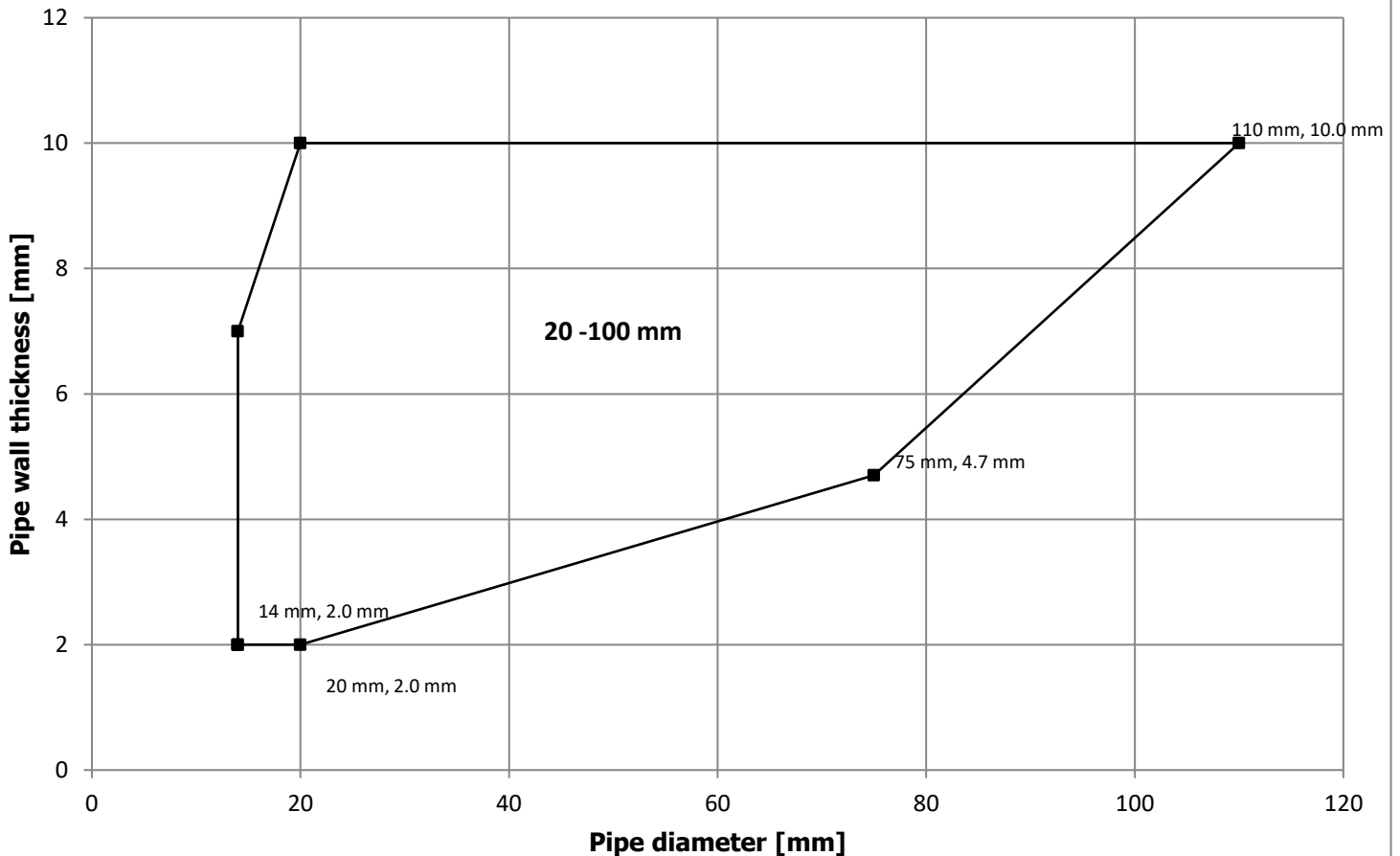
**EI 90 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**Alu Compound-Group**



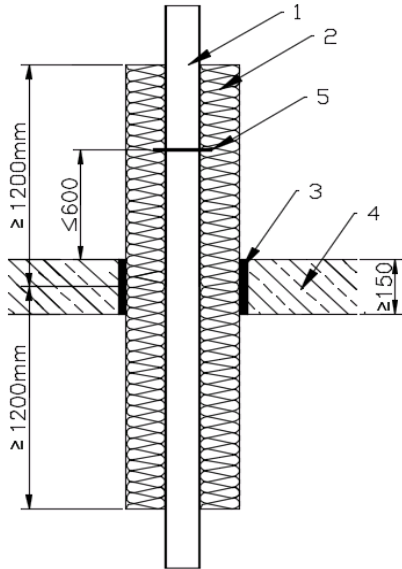
No.	Item	Description
1	Pipe	Alu Compound-Group / MLC-group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



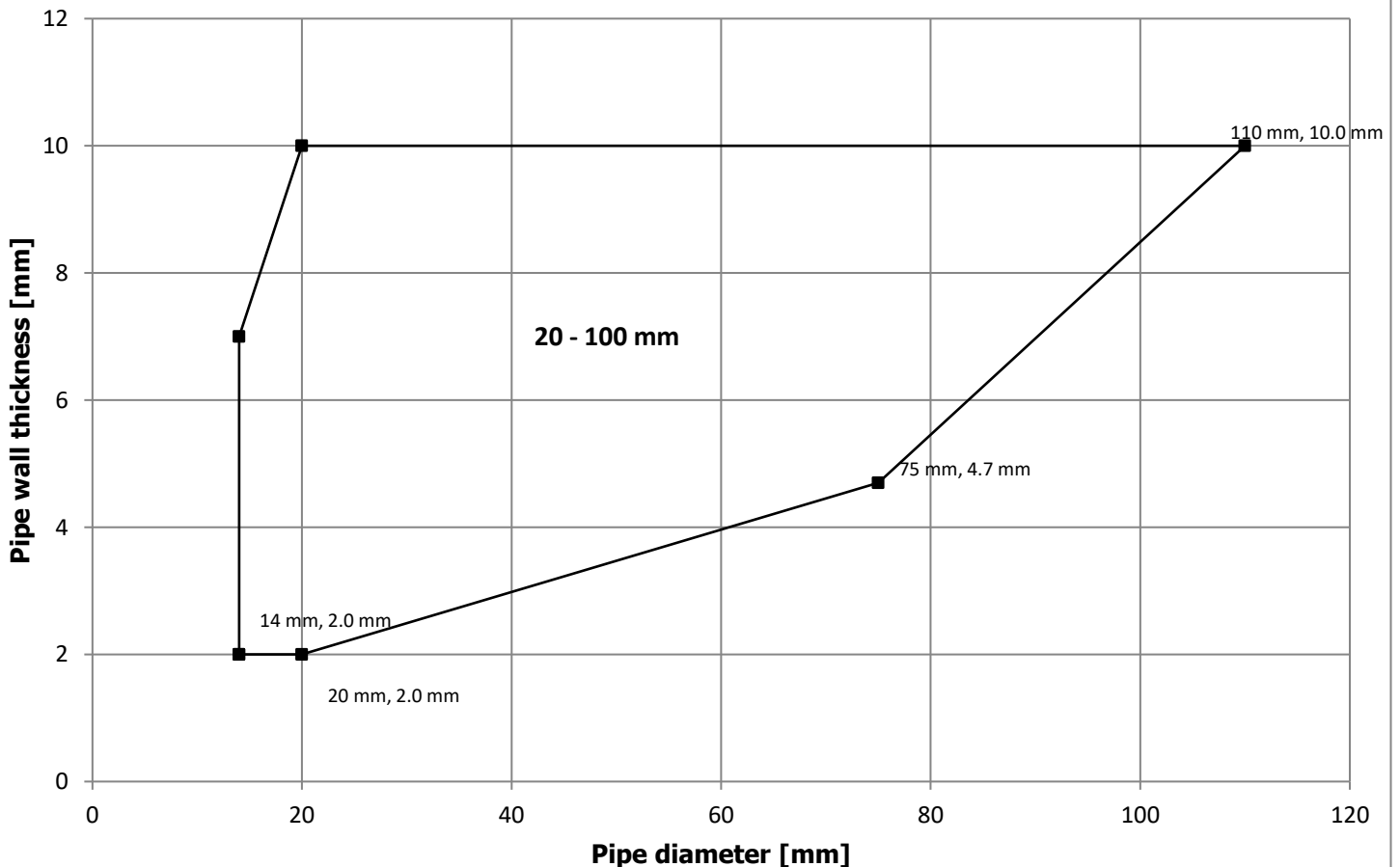
**EI 120 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**Alu compound-Group**



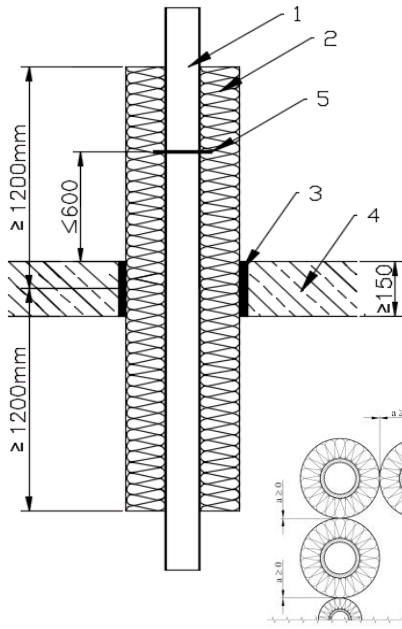
No.	Item	Description
1	Pipe	Alu Compound-Group / MLC-group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



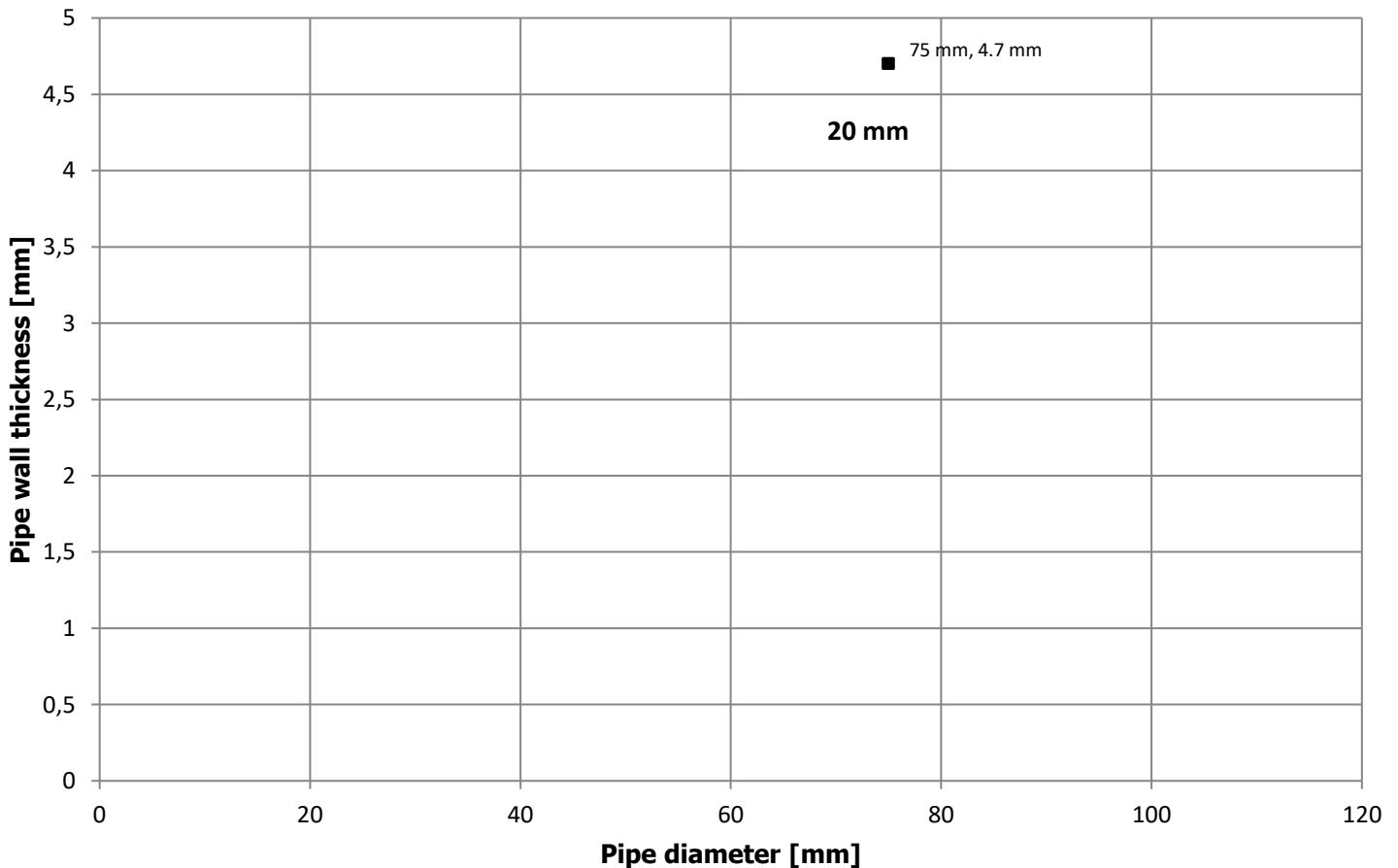
**EI 90 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**Alu compound-Group, Cluster configuration**



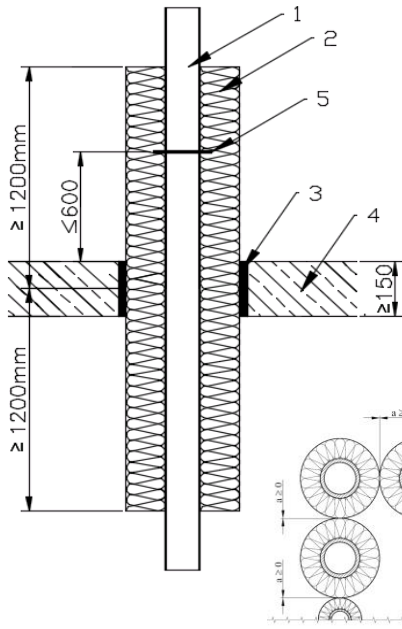
No.	Item	Description
1	Pipe	Alu Compound-Group / MLC-group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. Minimum distance to next penetration 0 mm  
 NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



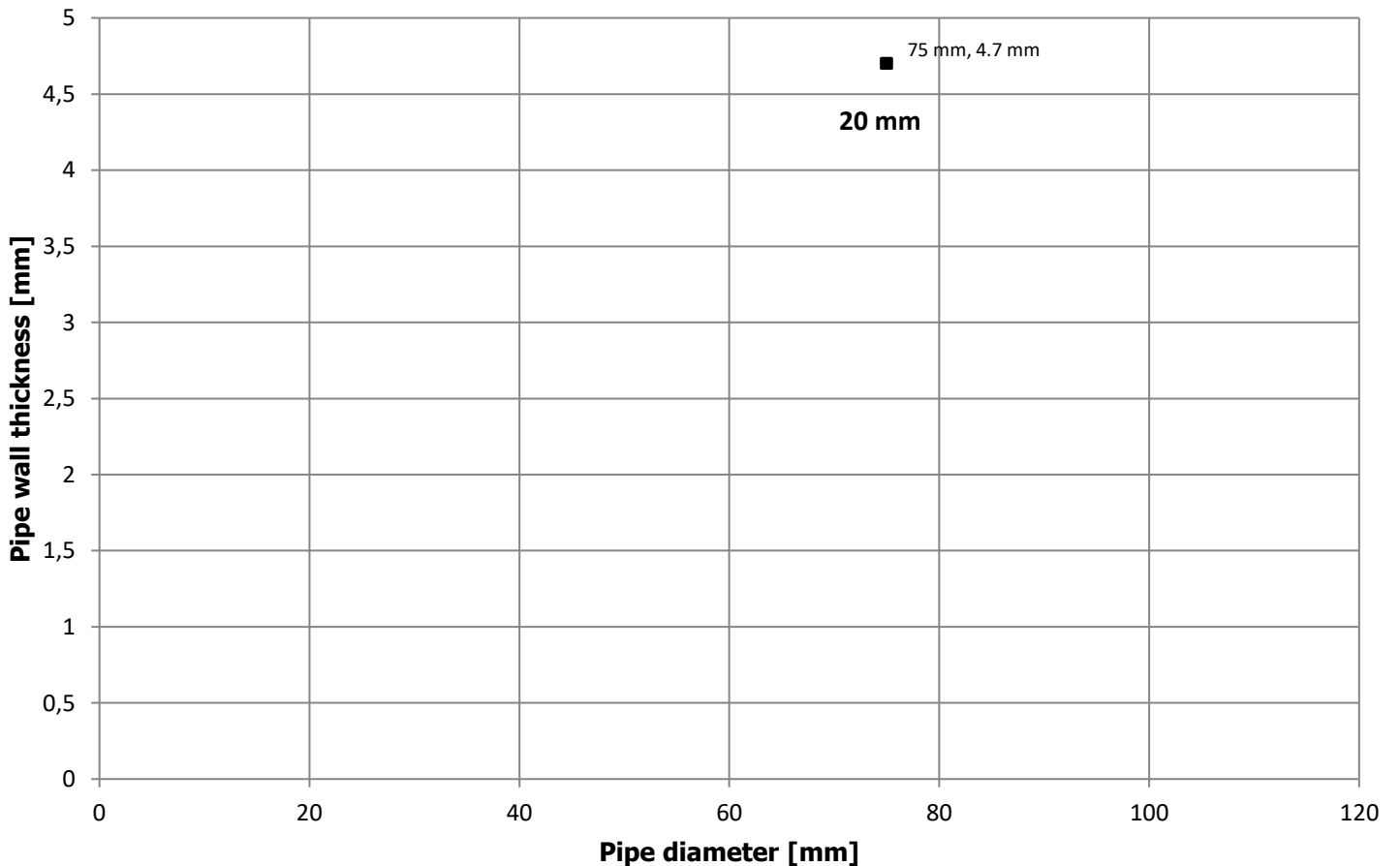
**EI 120 - Vertical pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**Alu compound-Group, Cluster configuration**



No.	Item	Description
1	Pipe	Alu Compound-Group / MLC-group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. Minimum distance to next penetration 0 mm  
 NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**

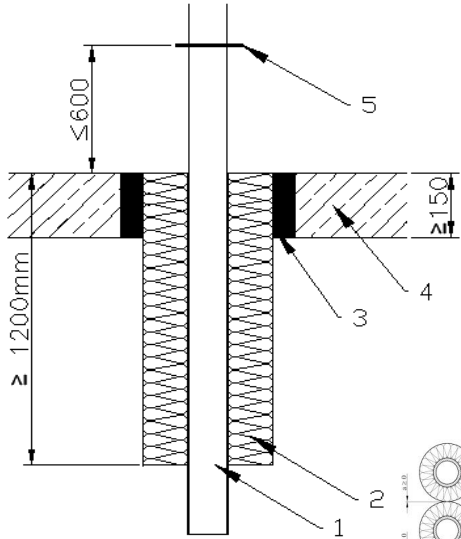


**EI 90 - Vertical pipe direction**

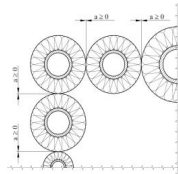
**U Protect Pipe Section Alu2**

**Local/Continued, Sustained insulation asymmetrical**

**Alu compound-Group, Cluster configuration**

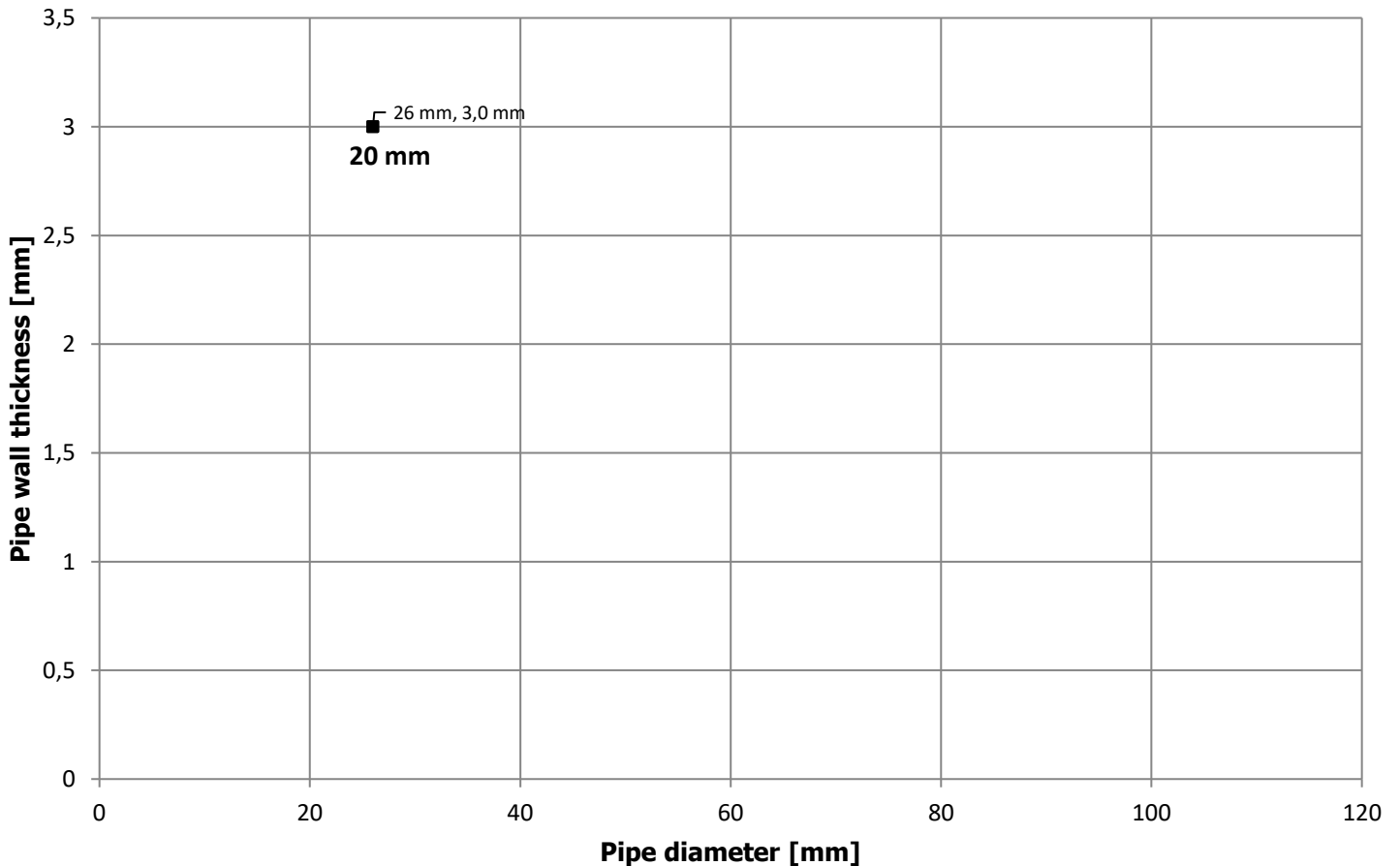


No.	Item	Description
1	Pipe	Alu Compound-Group / MLC-group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger



NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**

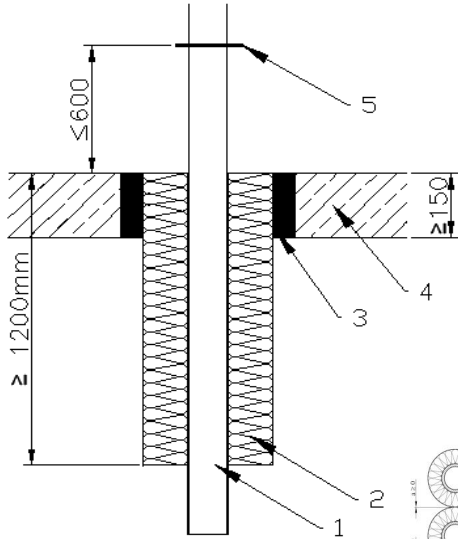


**EI 120 - Vertical pipe direction**

**U Protect Pipe Section Alu2**

**Local/Continued, Sustained insulation asymmetrical**

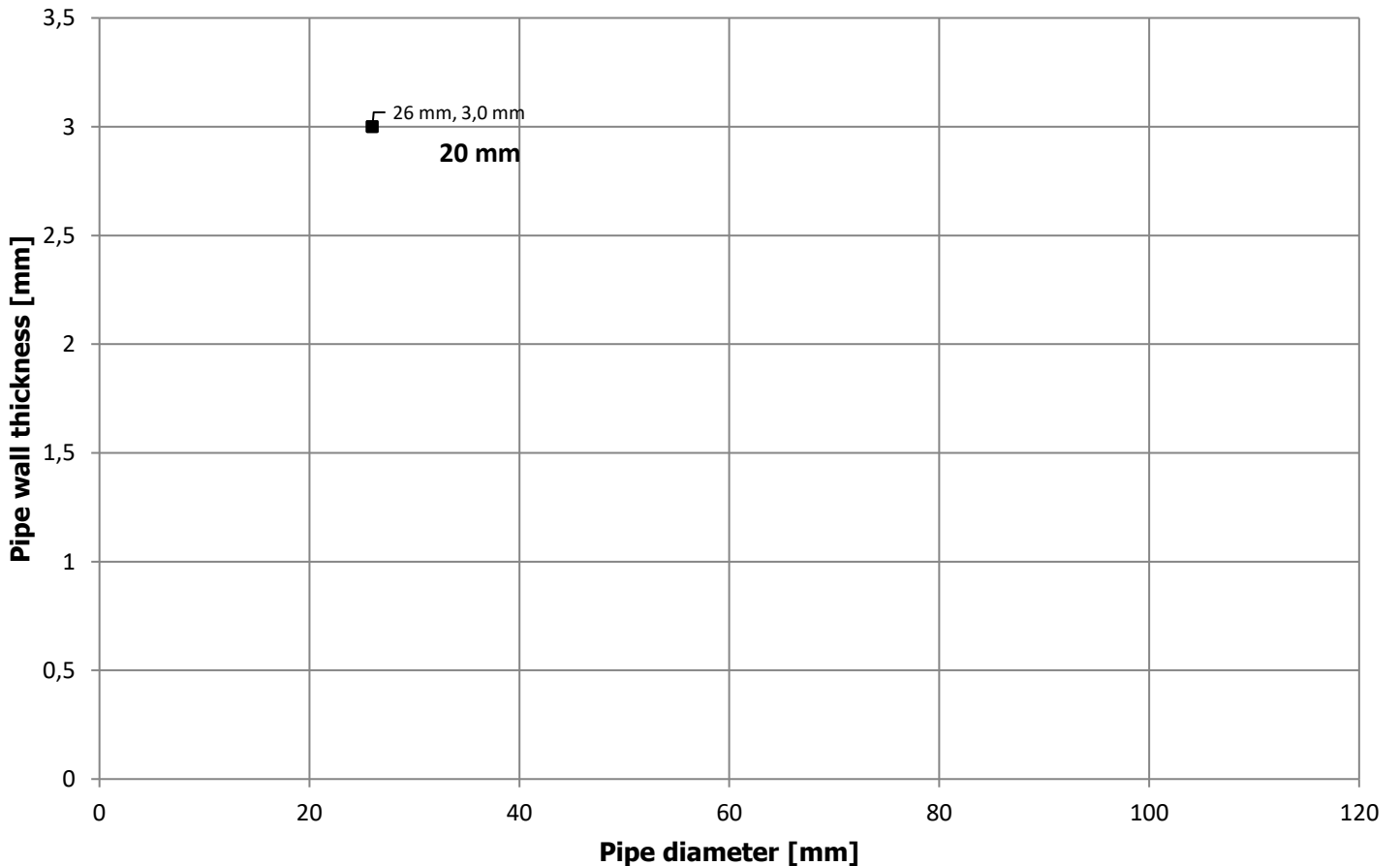
**Alu compound-Group, Cluster configuration**



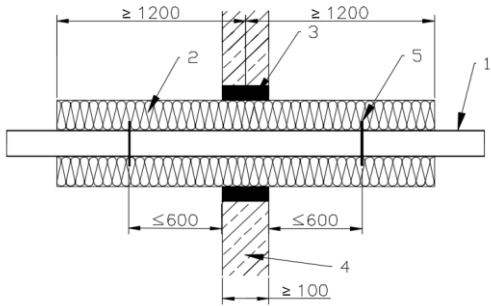
No.	Item	Description
1	Pipe	Alu Compound-Group / MLC-group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar or Concrete
4	Ceiling	Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



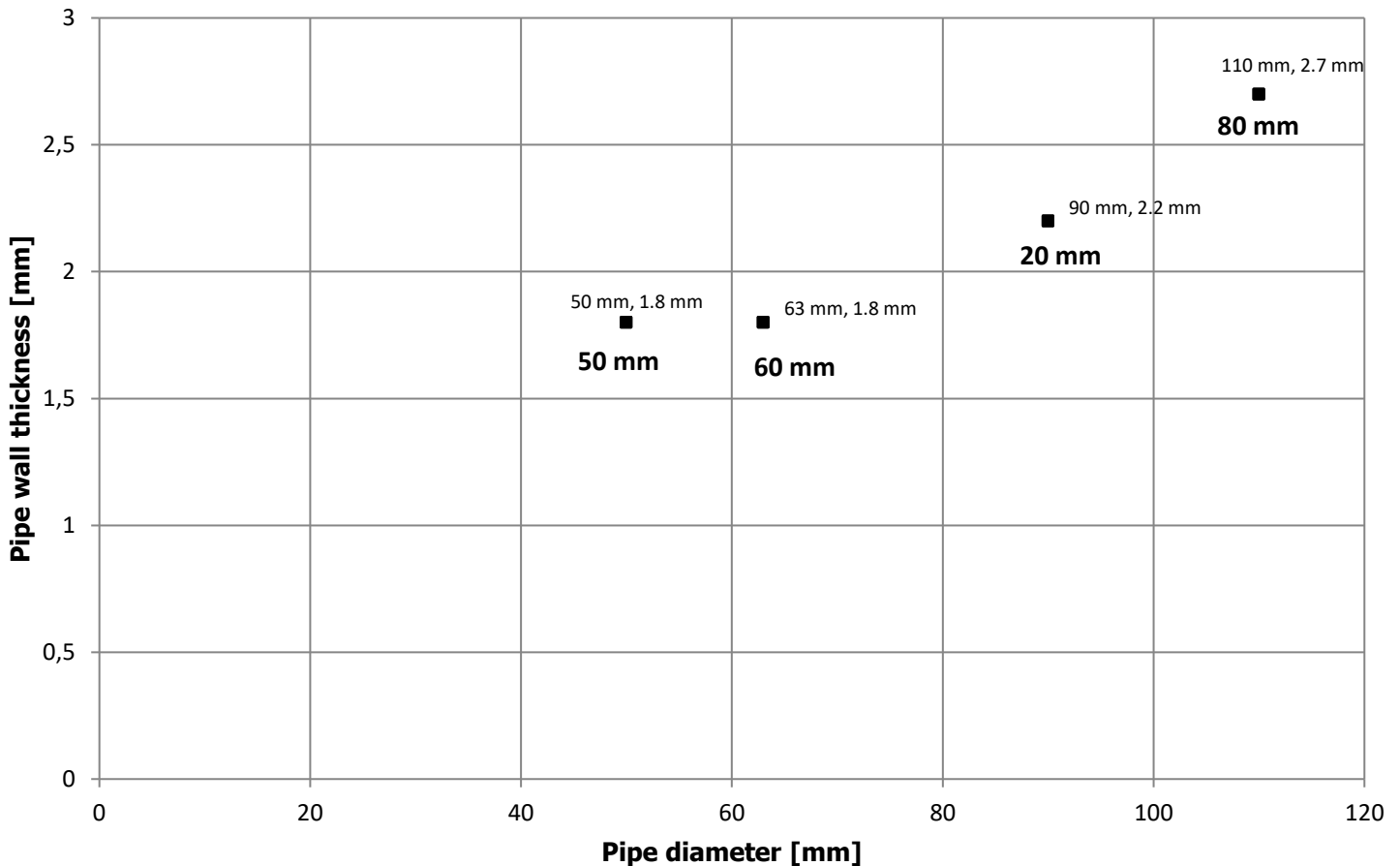
**EI 90 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PE-Group**



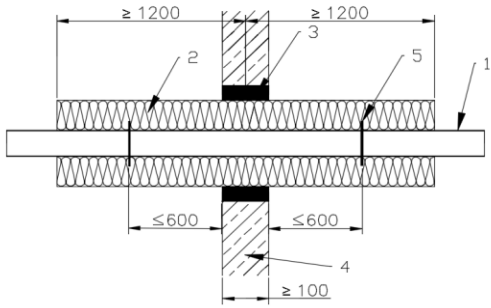
No.	Item	Description
1	Pipe	PE-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



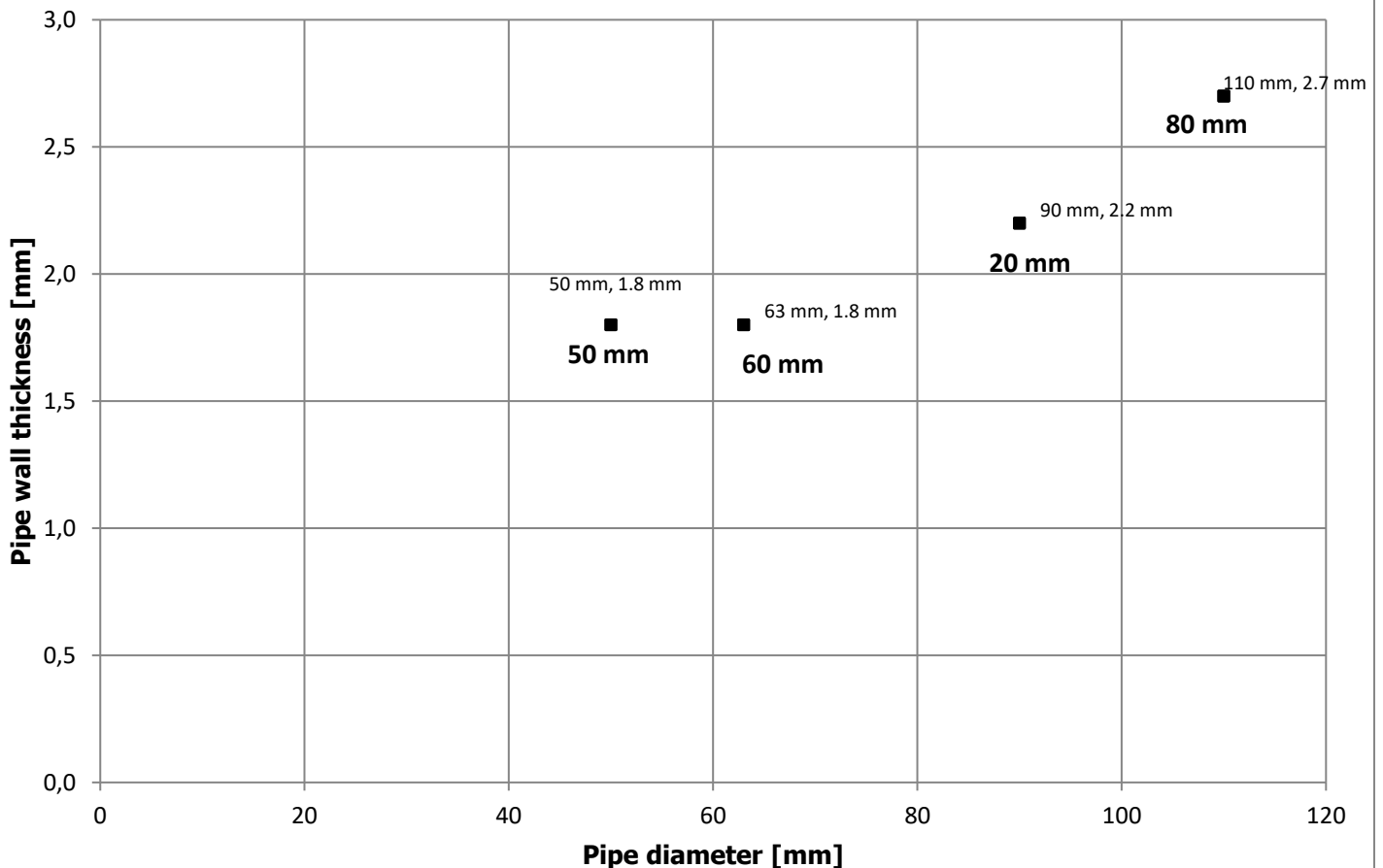
**EI 120 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PE-Group**



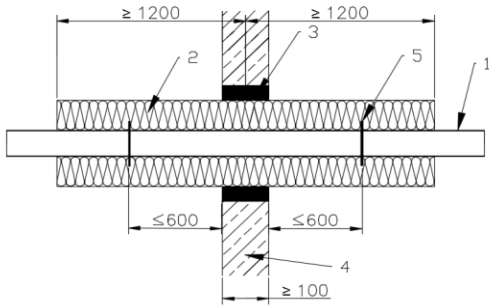
No.	Item	Description
1	Pipe	PE-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

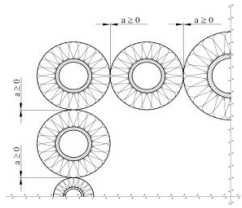
**Field of application for insulation thickness**



**EI 90 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PE-Group, Cluster configuration**



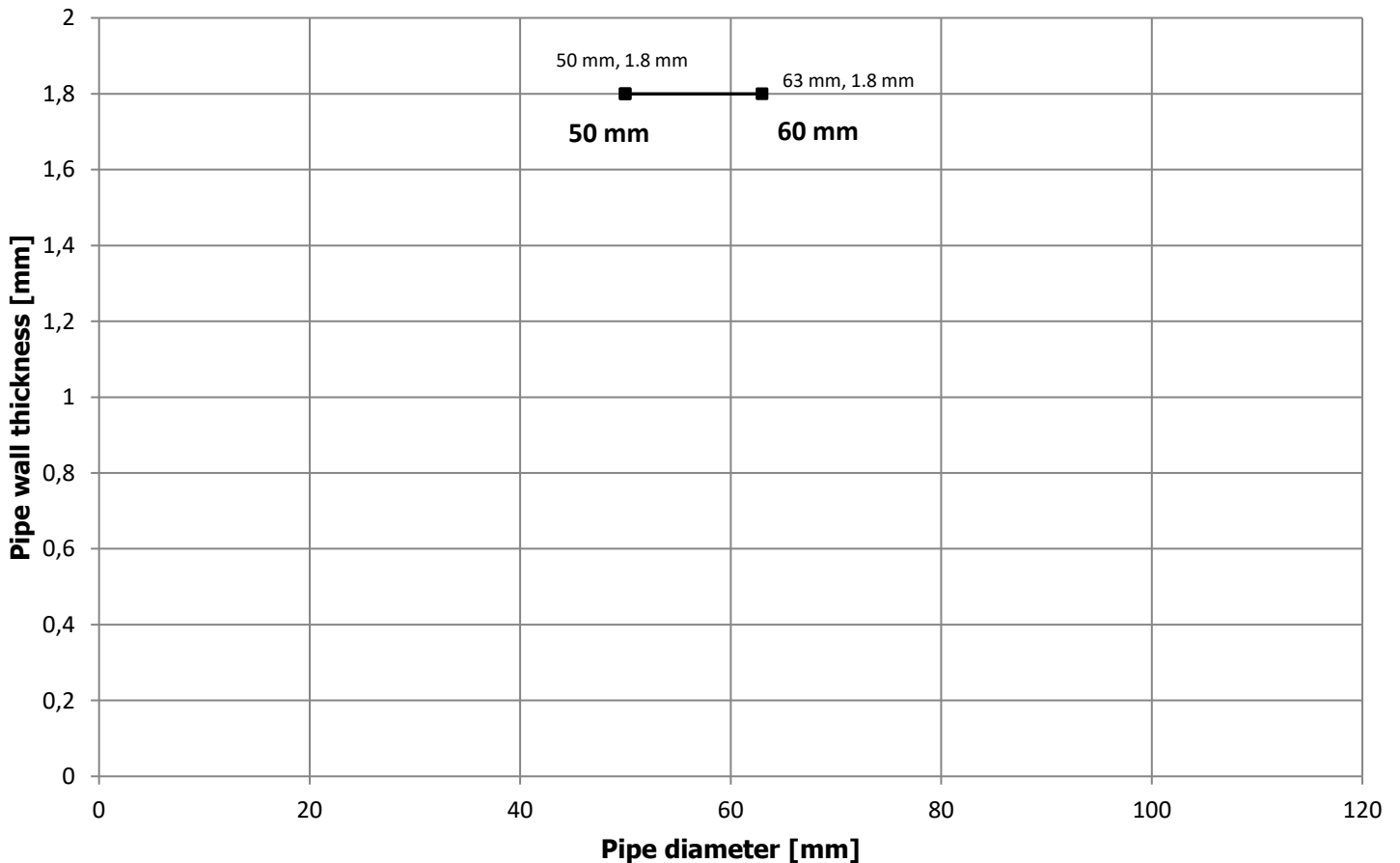
No.	Item	Description
1	Pipe	PE-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger



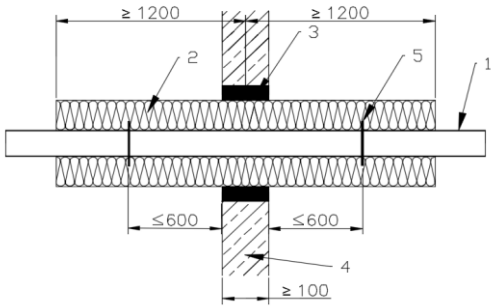
NB. Minimum distance to next penetration 0 mm

NB. For continued insulation the thickness of the insulation can be increased

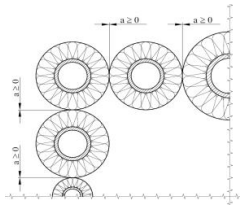
**Field of application for insulation thickness**



**EI 120 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PE-Group, Cluster configuration**



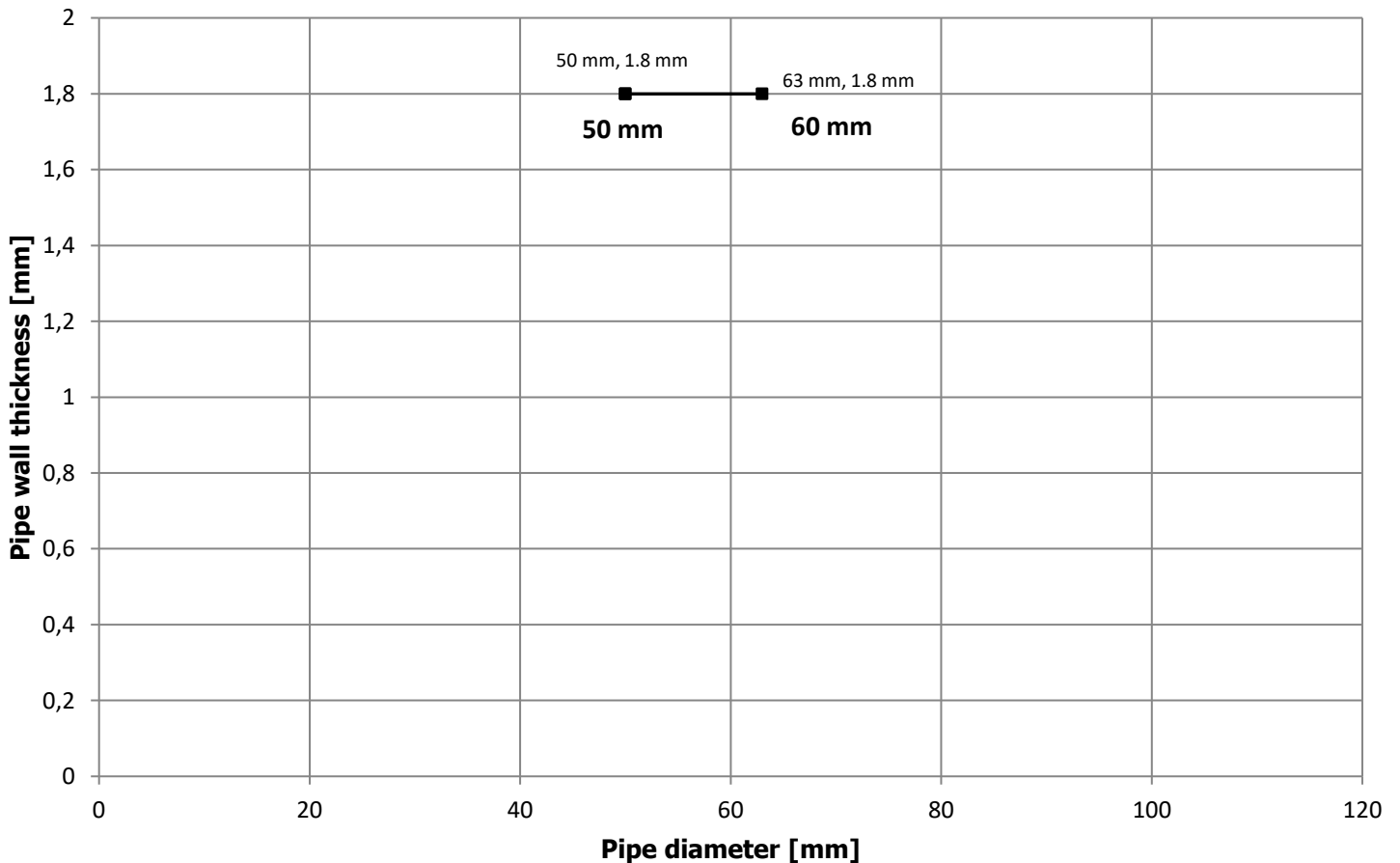
No.	Item	Description
1	Pipe	PE-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger



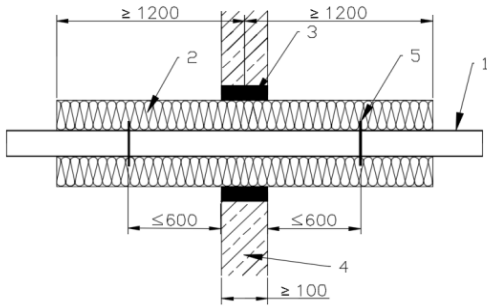
NB. Minimum distance to next penetration 0 mm

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



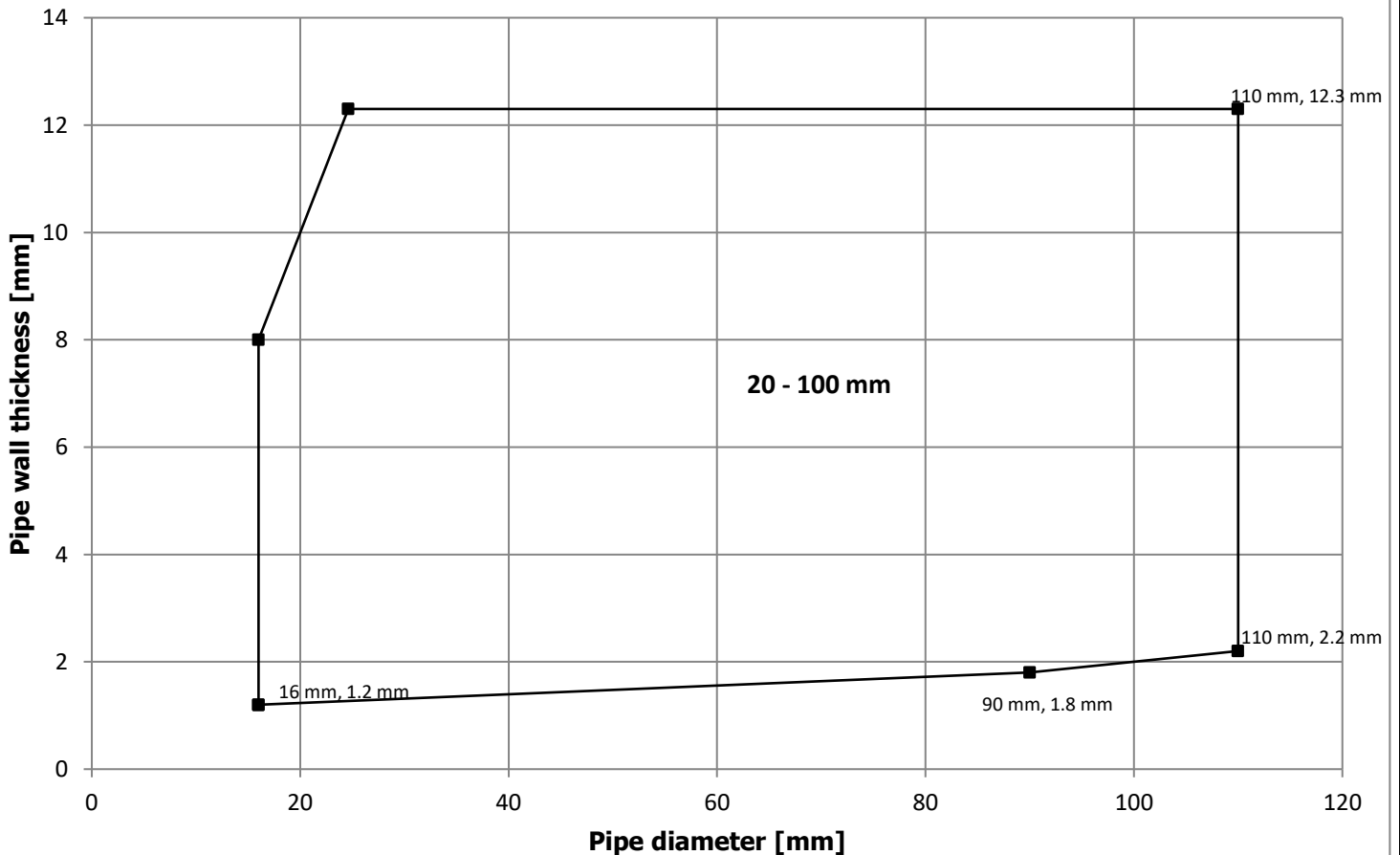
**EI 60 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PVC-Group**



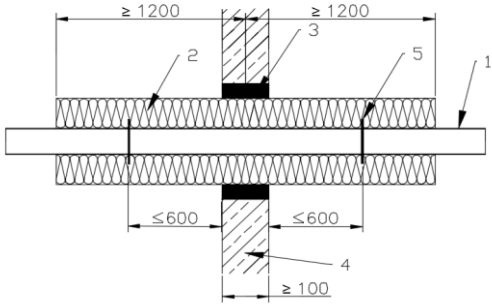
No.	Item	Description
1	Pipe	PVC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



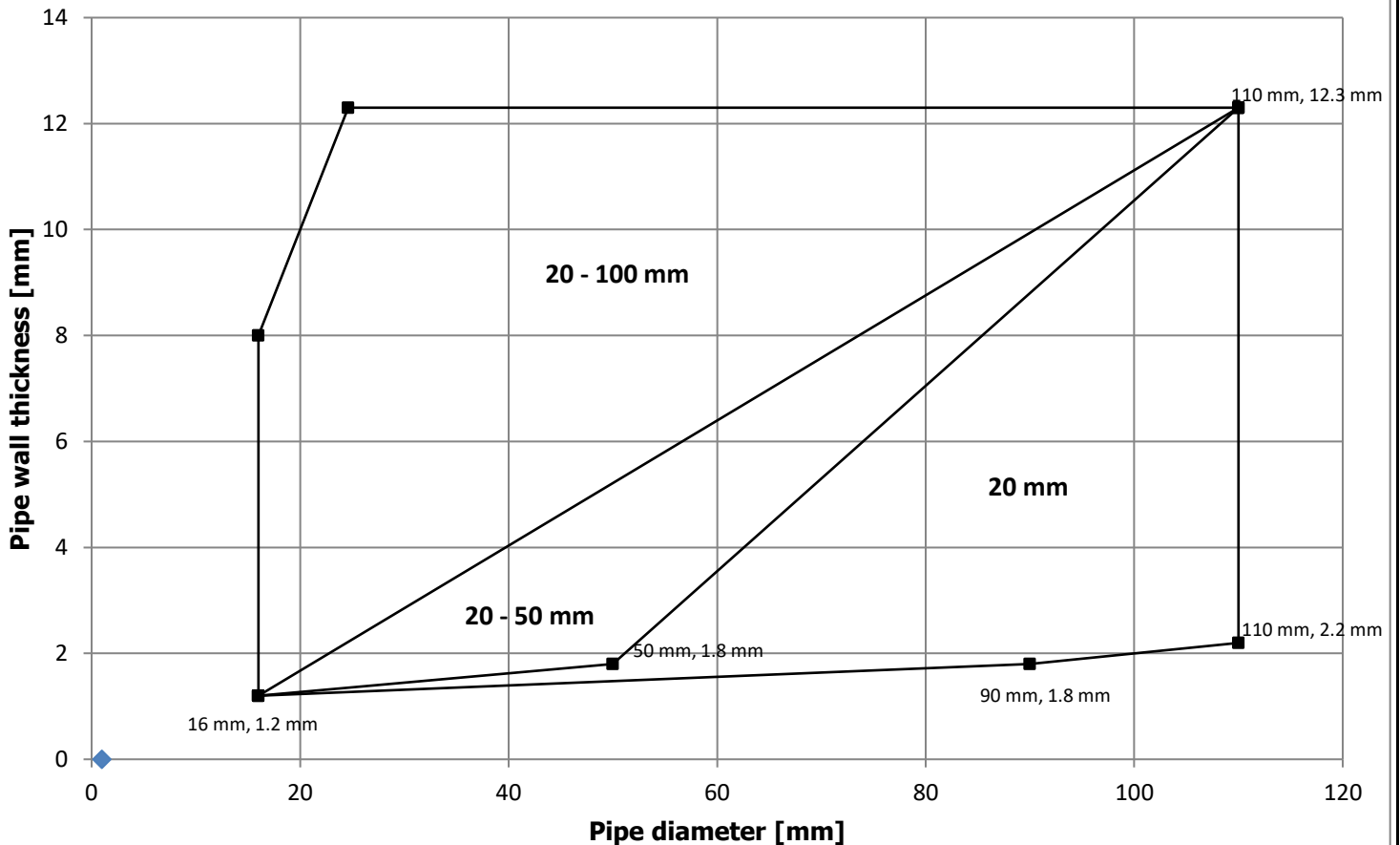
**EI 90 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PVC-Group**



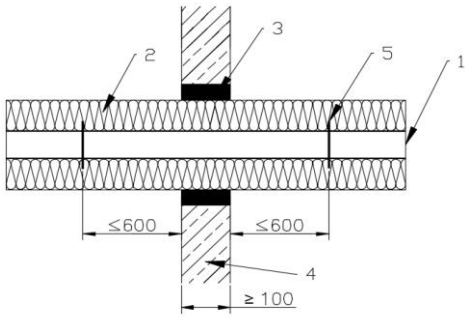
No.	Item	Description
1	Pipe	PVC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**

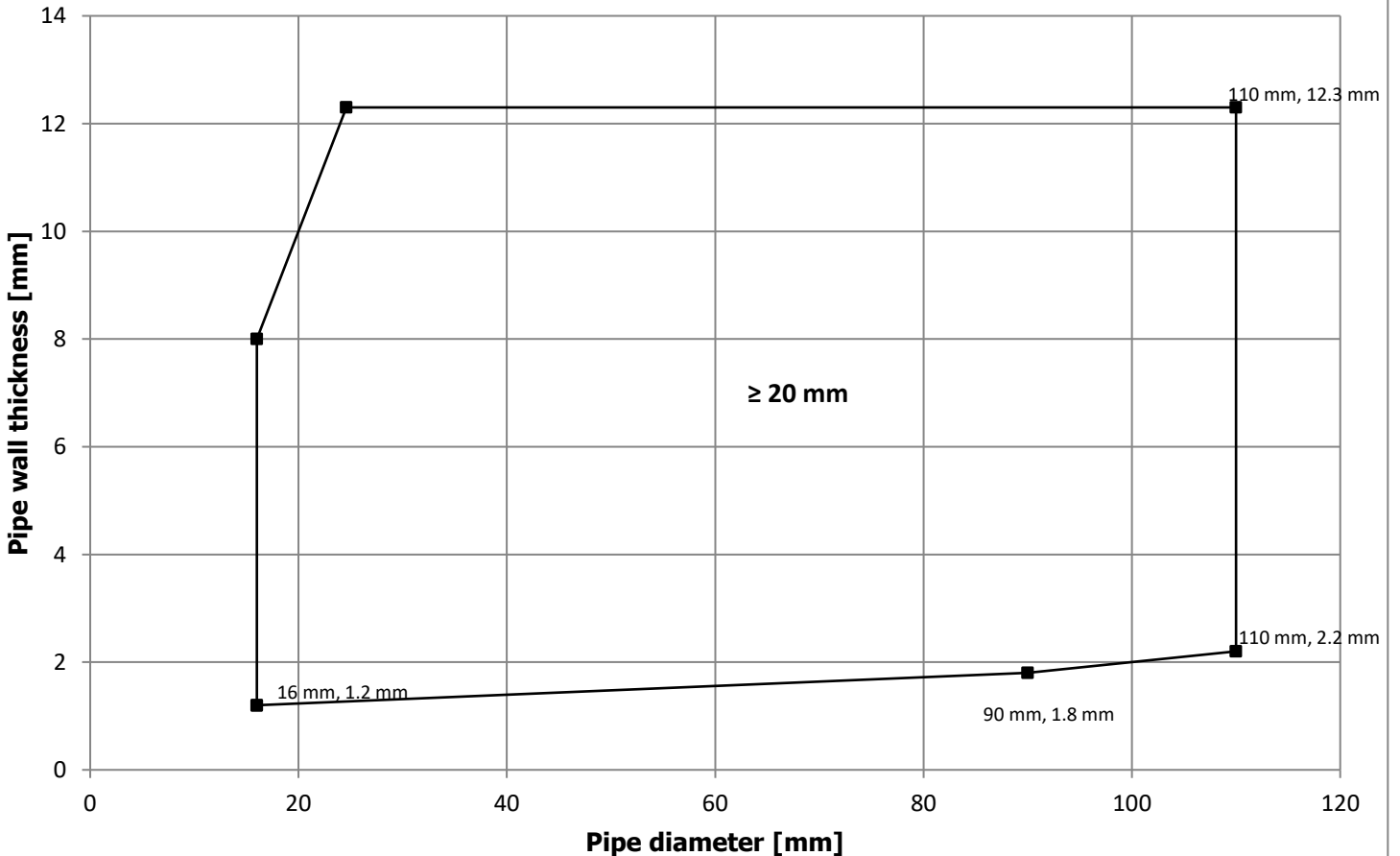


**EI 90 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Continued, Sustained insulation**  
**PVC-Group**

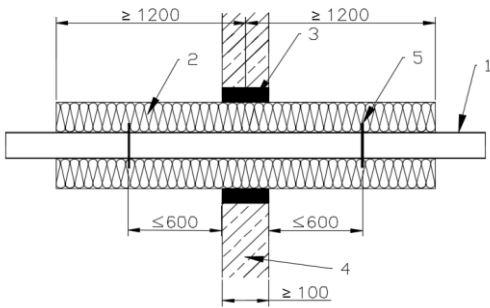


No.	Item	Description
1	Pipe	PVC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

**Field of application for insulation thickness**



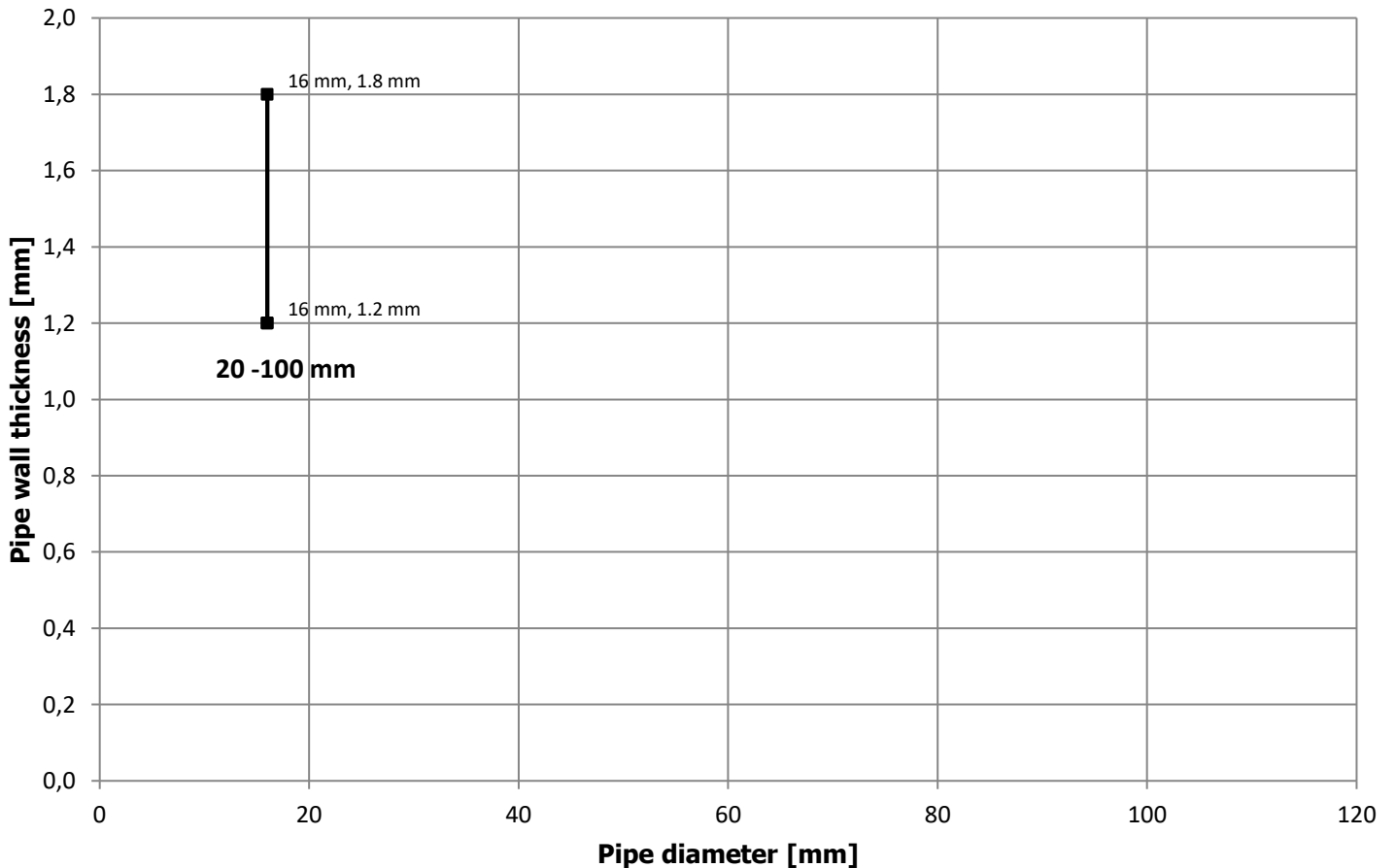
**EI 120 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PVC-Group**



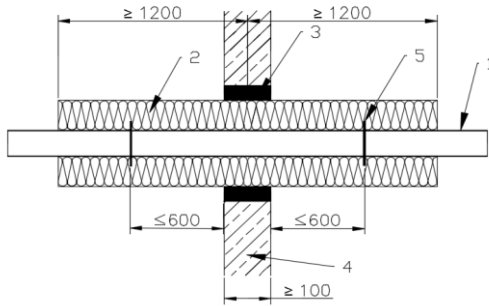
No.	Item	Description
1	Pipe	PVC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



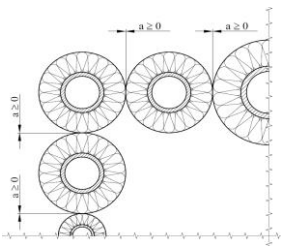
**EI 60 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PVC-Group, Cluster configuration**



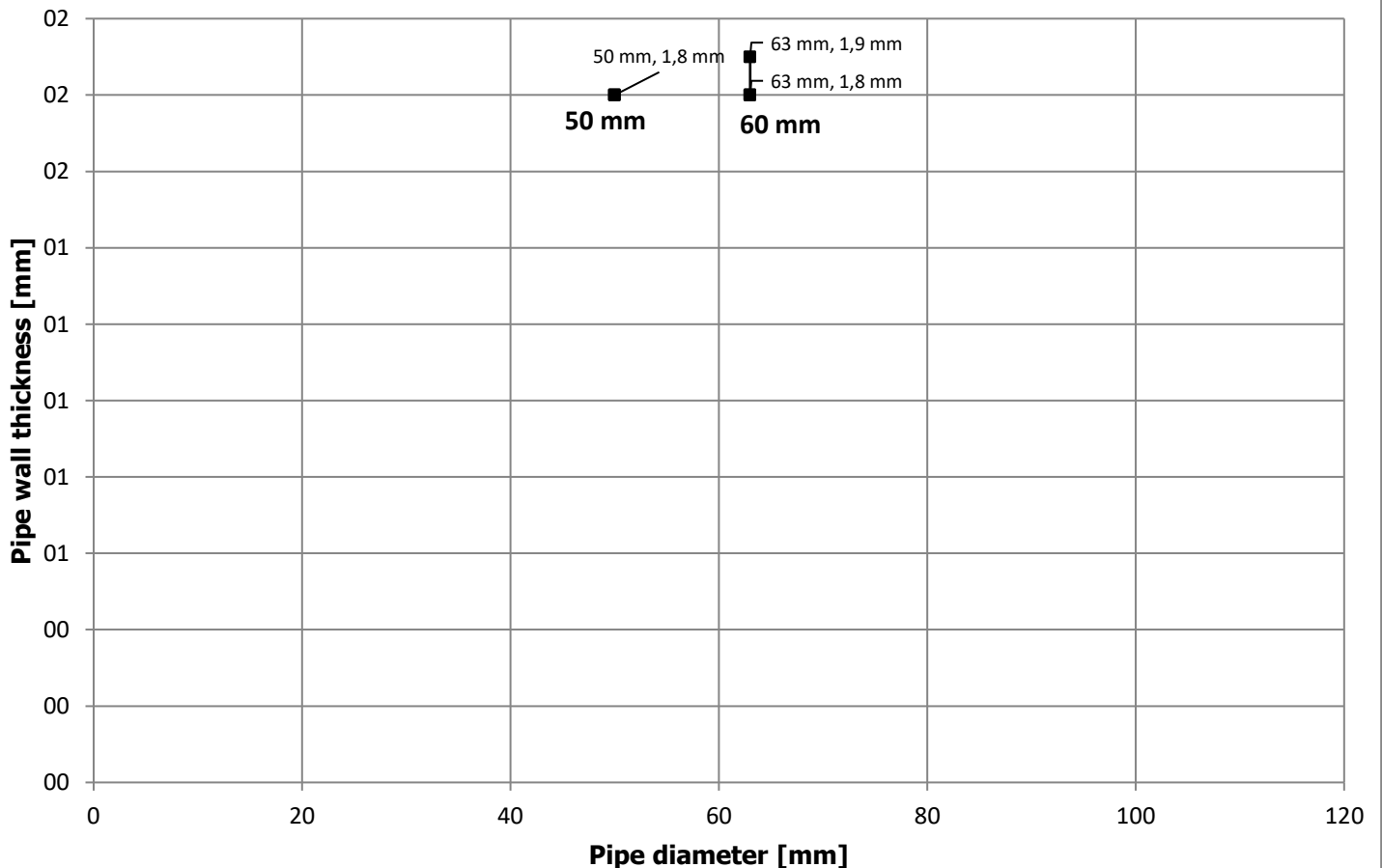
No.	Item	Description
1	Pipe	PVC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. Minimum distance to next penetration 0 mm

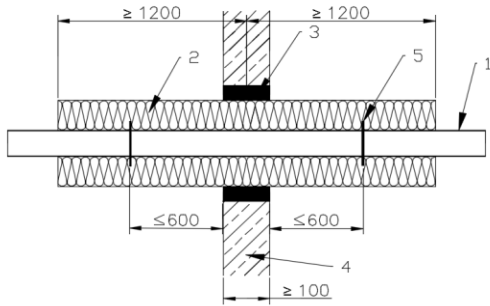
NB. For continued insulation the thickness of the insulation can be increased



**Field of application for insulation thickness**



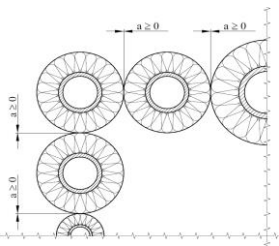
**EI 90 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**PVC-Group, Cluster configuration**



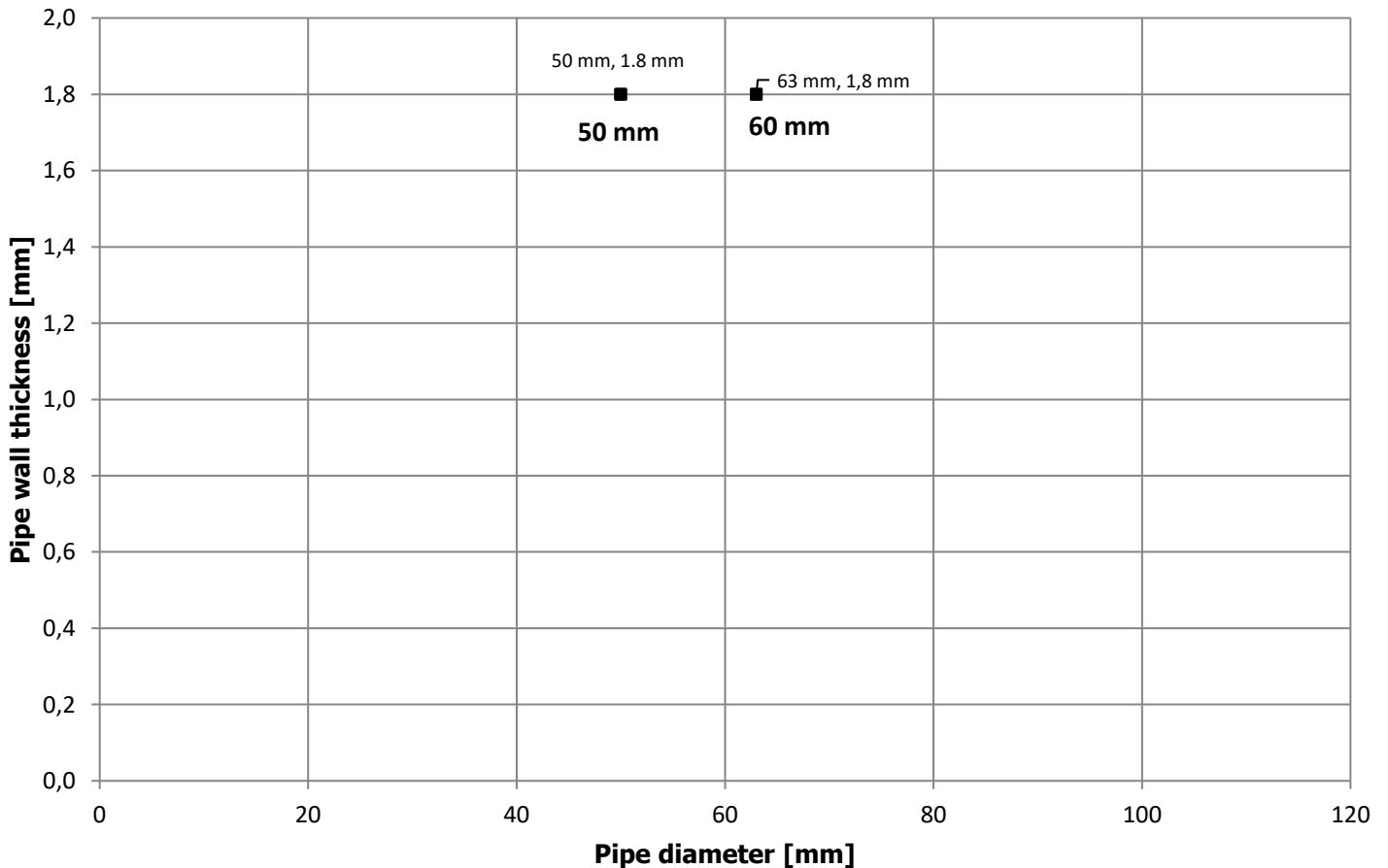
No.	Item	Description
1	Pipe	PVC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. Minimum distance to next penetration 0 mm

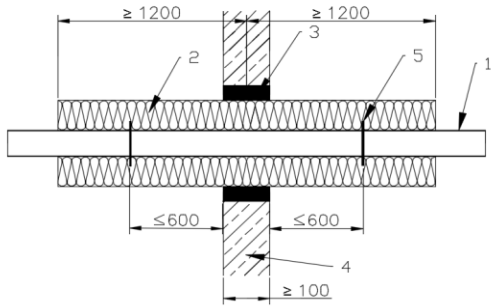
NB. For continued insulation the thickness of the insulation can be increased



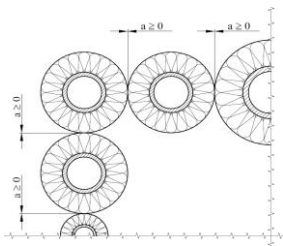
**Field of application for insulation thickness**



**EI 120 Horizontal pipe direction  
U Protect Pipe Section Alu2  
Local/Continued, Sustained insulation  
PVC-Group, Cluster configuration**



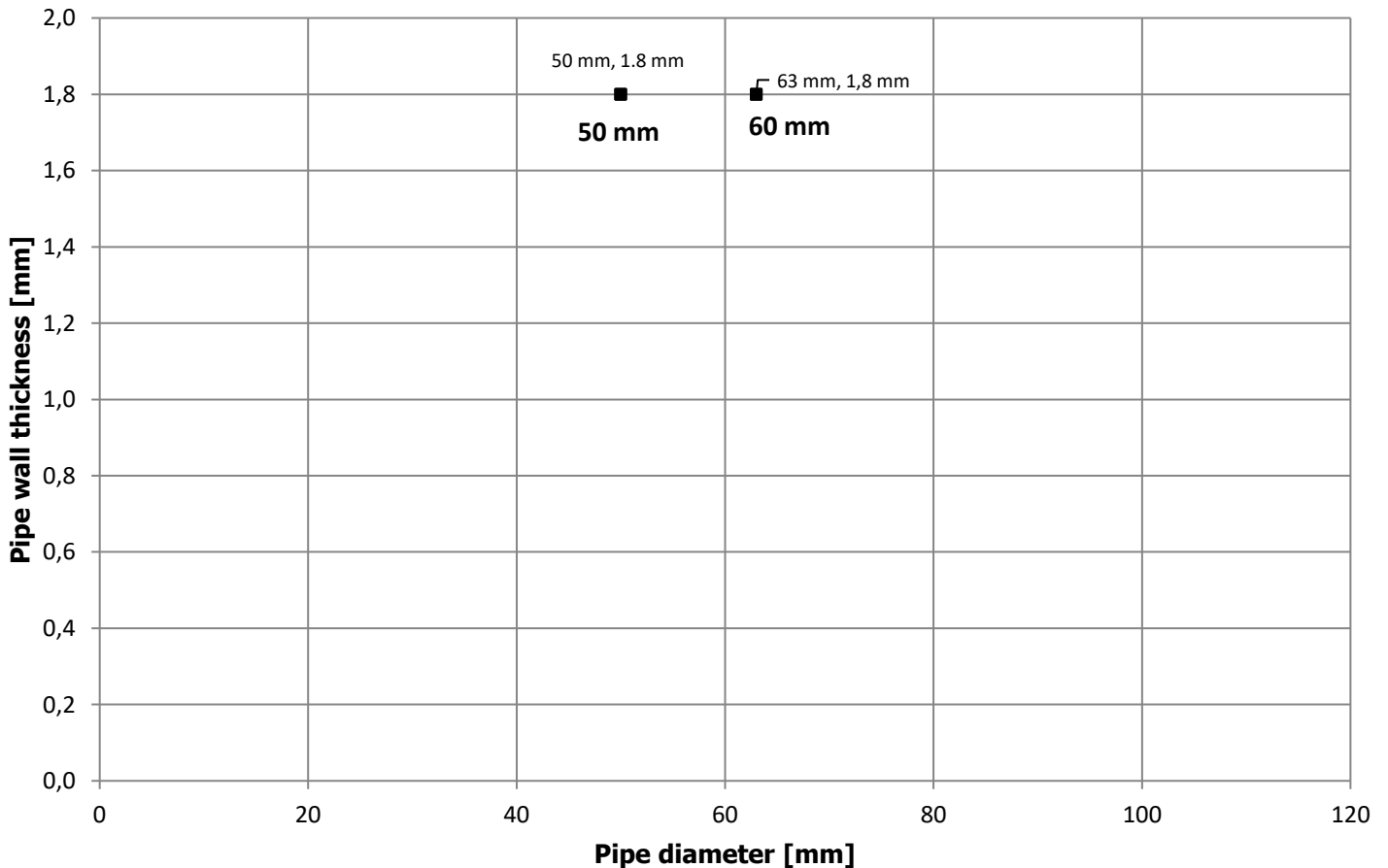
No.	Item	Description
1	Pipe	PVC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger



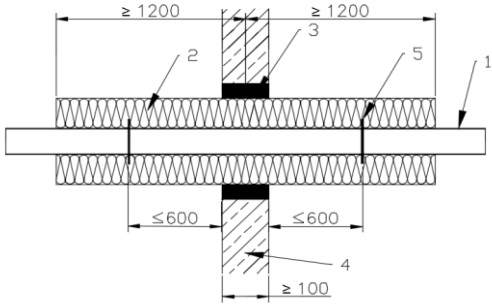
NB. Minimum distance to next penetration 0 mm

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



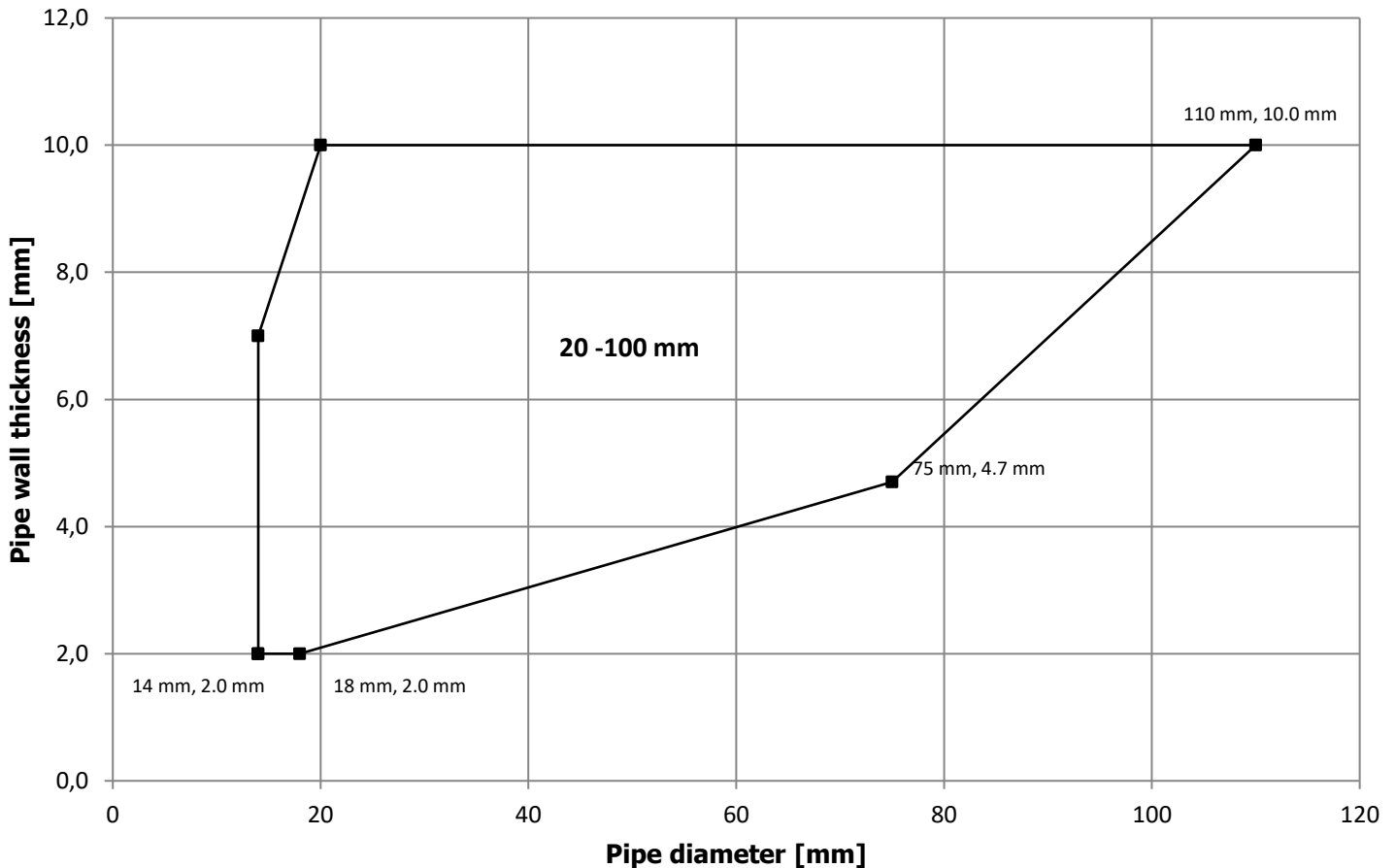
**EI 90 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**Alu Compound-Group**



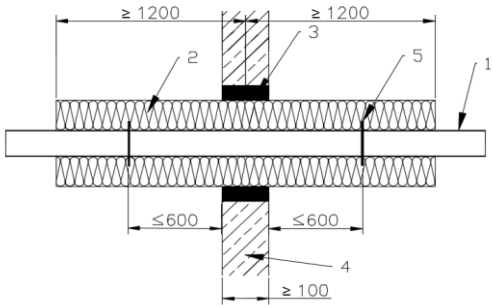
No.	Item	Description
1	Pipe	Alu Compound-Group / MLC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



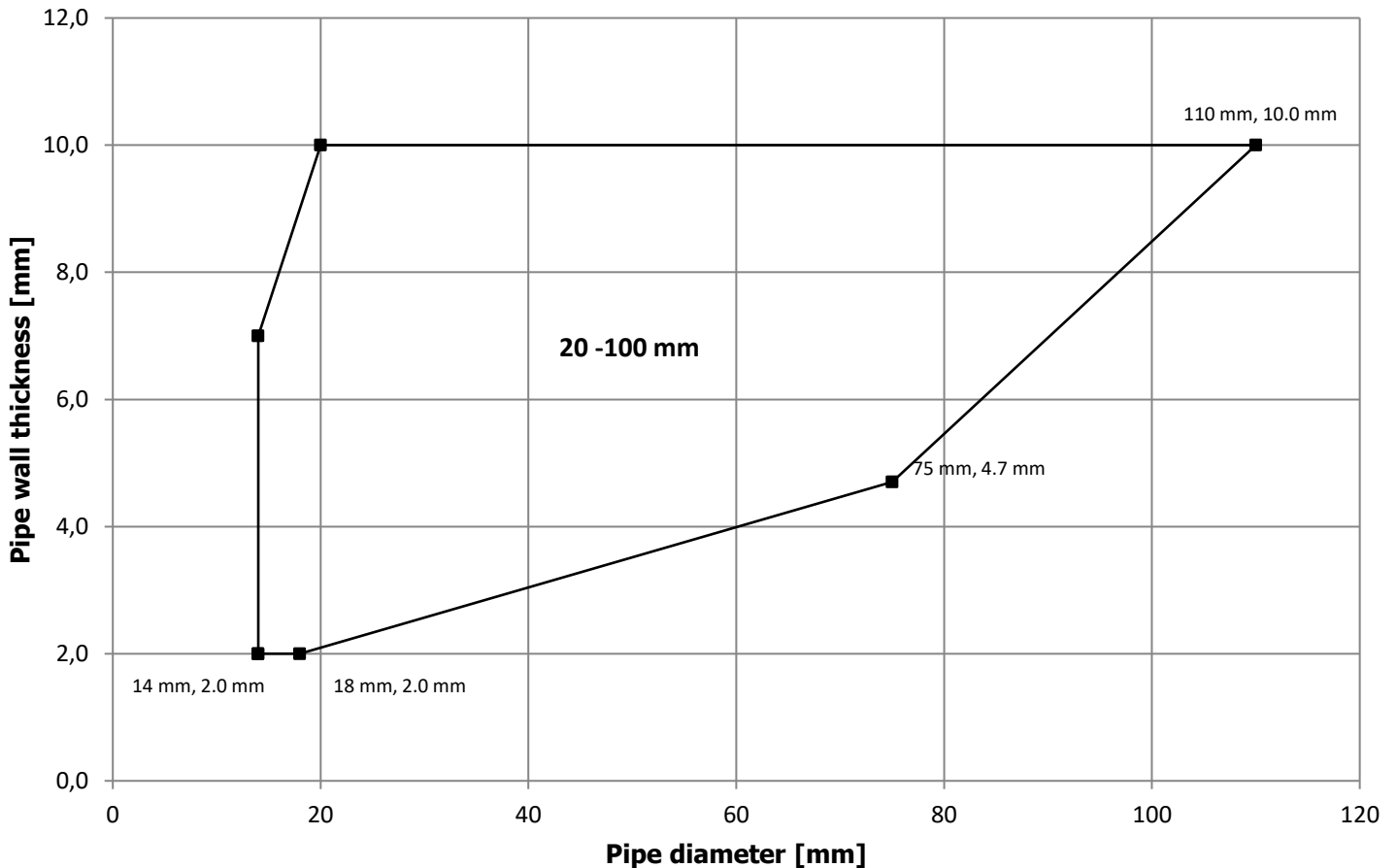
**EI 120 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**Alu Compound-Group**



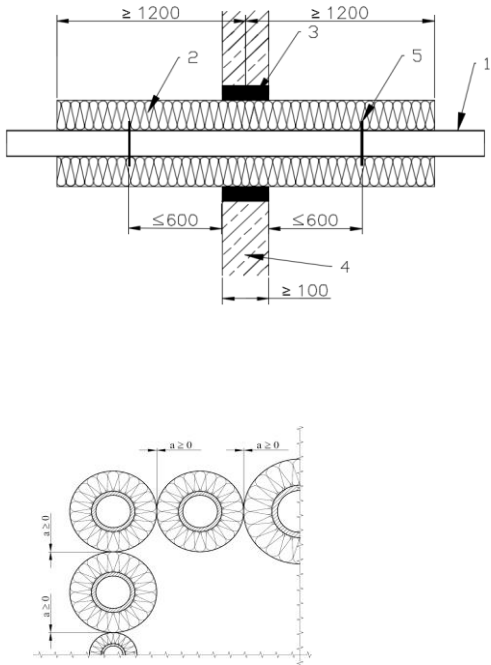
No.	Item	Description
1	Pipe	Alu Compound-Group / MLC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



**EI 90 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**Alu Compound-Group, Cluster configuration**

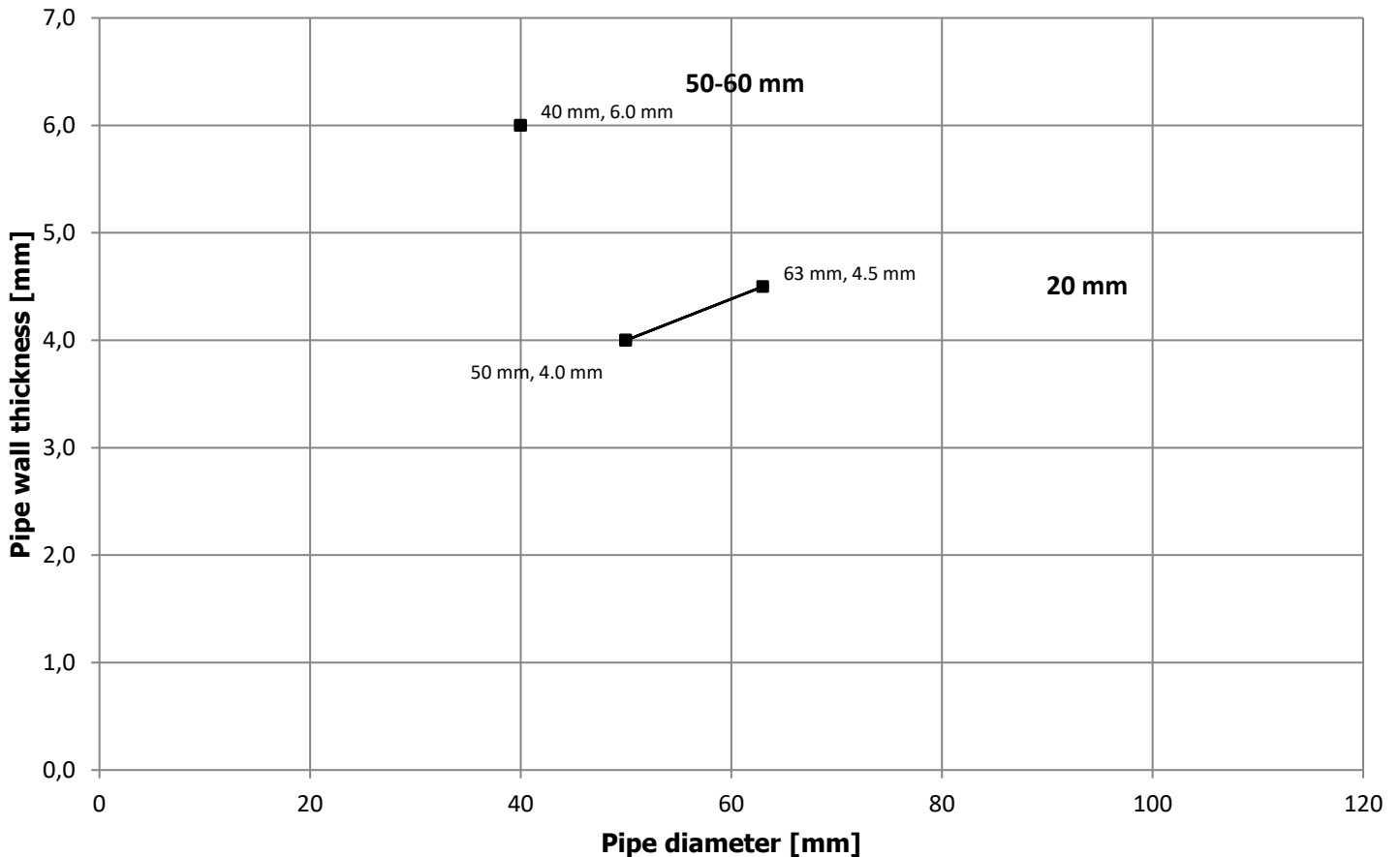


No.	Item	Description
1	Pipe	Alu Compound-Group / MLC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

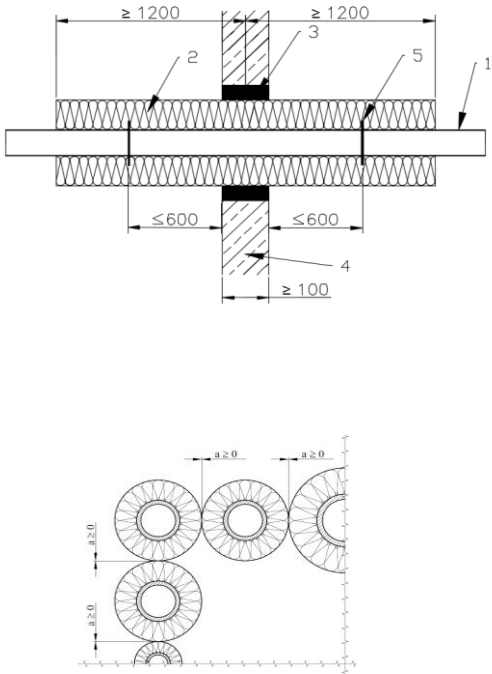
NB. Minimum distance to next penetration 0 mm

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



**EI 120 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**Alu Compound-Group, Cluster configuration**

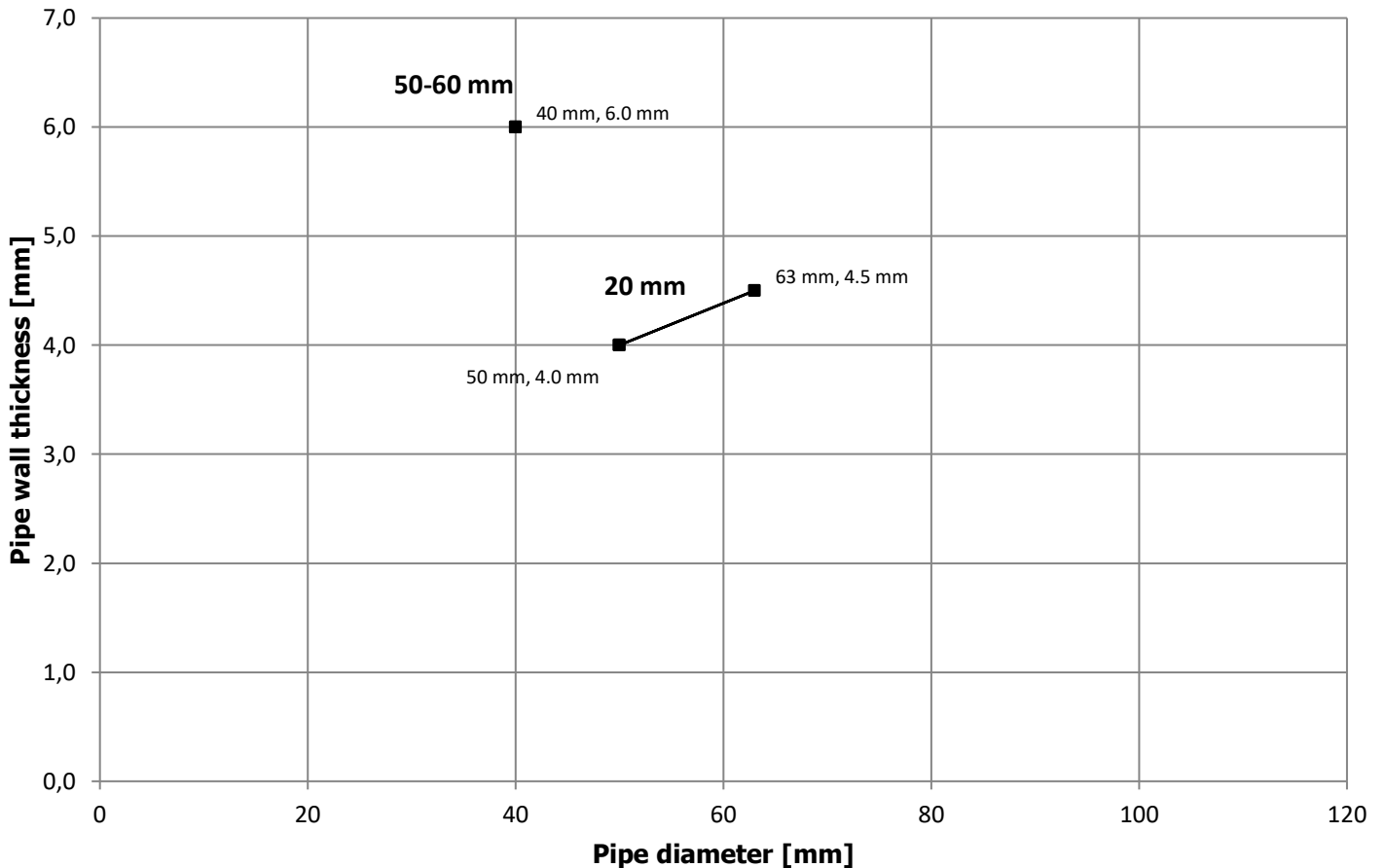


No.	Item	Description
1	Pipe	Alu Compound-Group / MLC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap	Filled with Mortar, Concrete or Gypsum
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

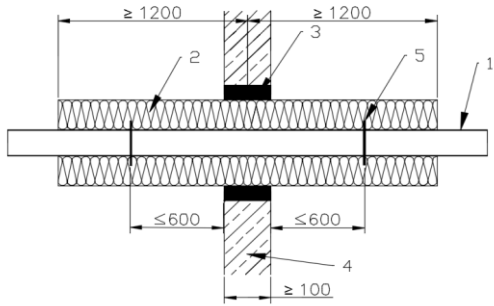
NB. Minimum distance to next penetration 0 mm

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



**EI 90 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**Alu Compound-Group**

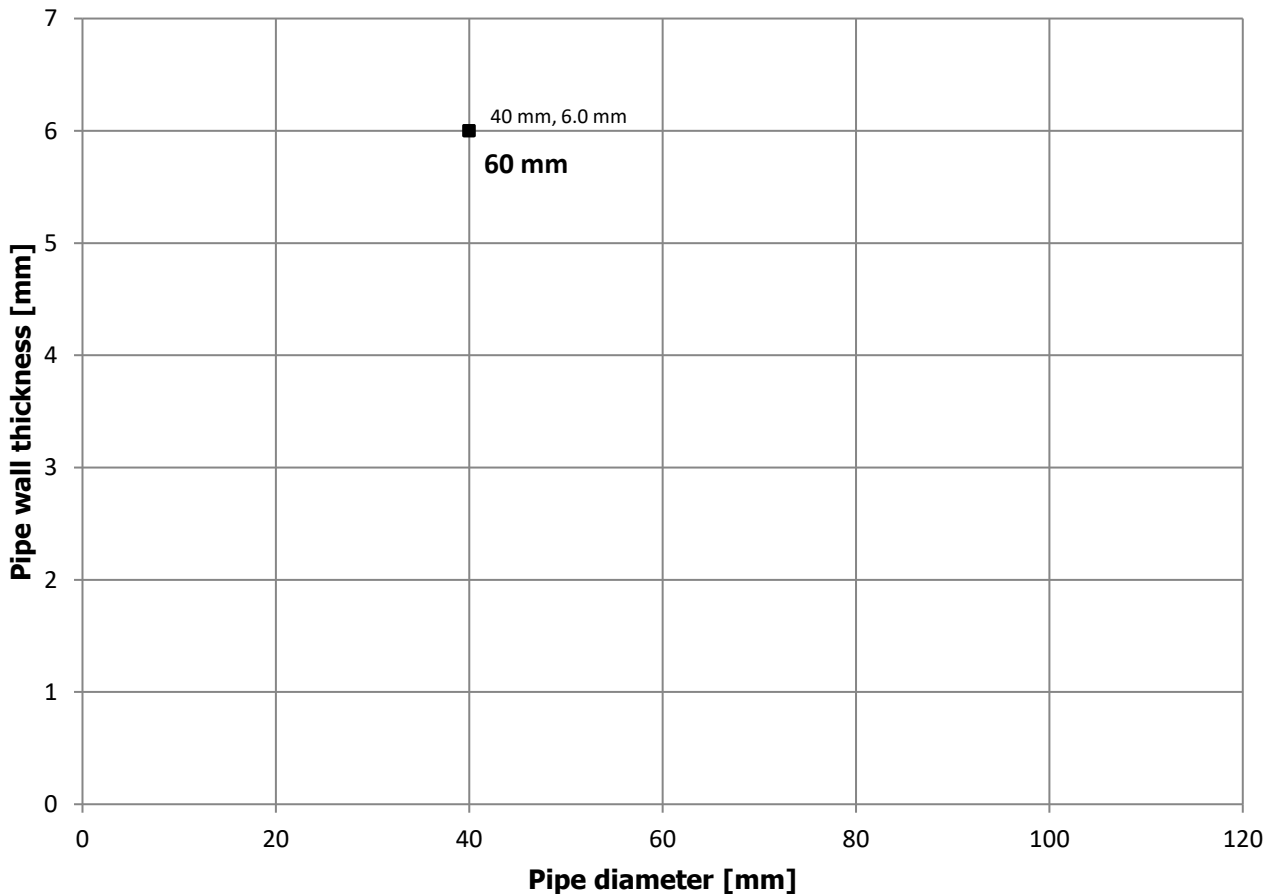


No.	Item	Description
1	Pipe	Alu Compound-Group / MLC-Group
2	Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3	Residual gap*	Protect BSK, PROMASEAL-Mastic, Pyro-Safe Flammoplast KS3 or SIBRALIT DX in a depth of $\geq 25$ mm from both sides.
4	Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5	Service support	Metal hanger

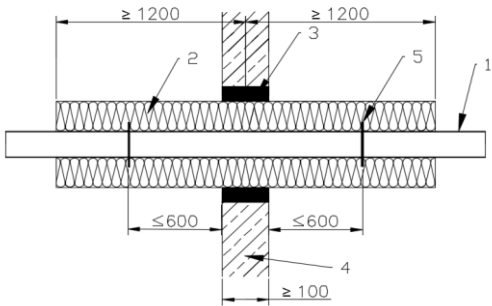
\*Gap size of 2mm – 15mm. In between the filling can be a void or a non-combustible filling

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**



**EI 120 Horizontal pipe direction**  
**U Protect Pipe Section Alu2**  
**Local/Continued, Sustained insulation**  
**Alu Compound-Group**



No. Item	Description
1 Pipe	Alu Compound-Group / MLC-Group
2 Insulation	U Protect Pipe Section Alu2 fixed with steel wire less or equal to c/c 250 mm
3 Residual gap*	Protect BSK, Pyro-Safe Flammoplast KS3 or SIBRALIT DX in a depth of >= 25mm from both sides.
4 Wall	Flexible wall or Aerated concrete, Concrete or Masonry
5 Service support	Metal hanger

\*Gap size of 2 mm – 15mm. In between the filling can be a void or an insulation filling

NB. For continued insulation the thickness of the insulation can be increased

**Field of application for insulation thickness**

