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Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

MEMBER OF EOTA

European Technical Assessment ETA-21/0446 of 2021/01/01

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S	
Trade name of the construction product:	MULCOL® MULTISEALANT GR
Product family to which the above construction product belongs:	Fire Stopping and Sealing Product: • Penetration Seals
Manufacturer:	Mulcol International BV Arnesteinweg 18 4338 PD Middelburg The Netherlands
Manufacturing plant:	A/003
This European Technical Assessment contains:	108 pages including 1 annex which form an integral part of the document
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	EAD 350454-00-1104
This version replaces:	-

Contents

I. SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESSMENT

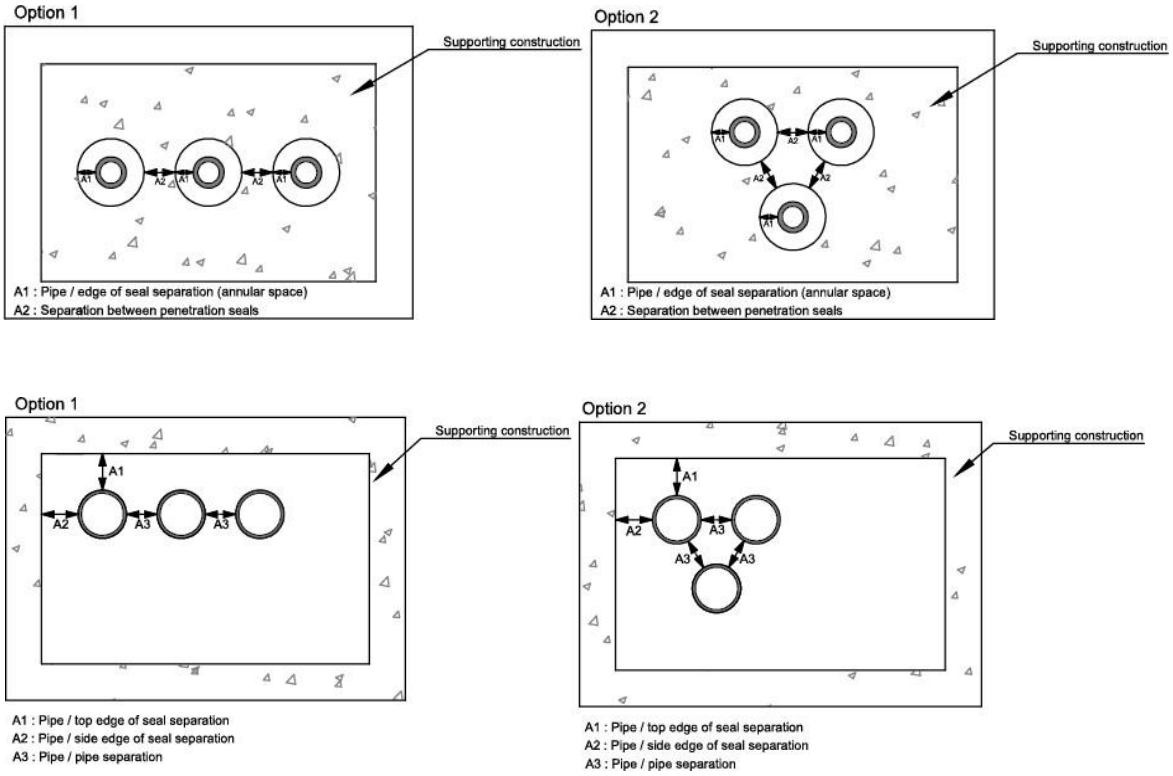
1 Technical description of the product

1) Mulcol® Multisealant GR is a sealant and pipe closure device used to form penetration seals where insulated and uninsulated metallic pipes, combustible pipes, combustible cable conduits and cables penetrate walls and floors.

2) The Mulcol® Multisealant GR is supplied in liquid form contained within 310 ml cartridges. The sealant is gunned into the aperture in the separating element and around the service or (mixed) services, to a specified depth utilising mineral fibre insulation backing material.

3) Services penetrating the Mulcol® Multisealant GR are required to be supported at maximum 450 mm from both faces of walls and from the top face of floors.

4) The permitted annular spaces for the services/seals and specific dimensions are indicated in Annex A and B.



6) Pipe materials refered to in Annex A and B are as follows:

Material	Standards
PVC-U	DIN 8061 / DIN 8062 / DIN 19531-10 / EN 1329-1 / EN 1452-1 / EN 1453-1 / EN ISO 15493
PVC-C	EN 1566-1 / EN ISO 15493
PP	DIN 8077 / DIN 8078 / DIN 16962 / EN 1451-1 / EN 15874-2 / EN ISO 15494 / EN 15874 / EN 15874-2 / EN 15874-2:2013
PE	DIN 8074 / DIN 8075 / EN 1519-1 / EN 12201-2 / EN 12666-1 / EN ISO 15494
PE-HD	DIN 19535-10 / EN 1519-1 / EN 12666-1
ABS	EN 1455-1 / EN ISO 15493
SAN+PVC	EN 1565-1
Steel	EN 1507
Copper	EN 10255 / EN 12449
PP-R	DIN 8077 / DIN 8078
Aluminium Composite	EN ISO 15494

7) The applicant has submitted a written declaration that the product and/or constituents of the product contains no substances which have been 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.

8) The use category of Mulcol® Multisealant GR in relation to BWR 3 (Hygiene, health and environment) is IA1, S/W3

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

Detailed information and data is given in Annex A and B.

The intended use of Mulcol® Multisealant GR is to reinstate the fire resistance performance of flexible wall and rigid wall and floor constructions, where they are penetrated by services.

1) The specific elements of construction that the system Mulcol® Multisealant GR may be used to provide a penetration seal in, are as follows:

Flexible walls: The wall must have a minimum thickness of 100 mm and comprise steel studs lined on both faces with minimum 2 layers of 12.5 mm thick boards.

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, class G4/600 or heavier.

Rigid floors: The floor must have a minimum thickness of 150 mm and comprise aerated concrete or concrete with a minimum density of 600±200 kg/m3, class G4/600 or heavier.

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

2) General conditions – Flexible wall
The pipe and cable penetrations can be applied in any type of insulated or non insulated flexible all construction (partition) provided that the following conditions are met. The total thickness of the flexible wall (for example walls with wooden or steel framing) shall be at least 100 mm. The wall shall consist out of two board layers to both faces with a thickness of 12.5 mm each. A minimum distance of 100 mm to a stud shall be held. When wooden studs are used, at least 100 mm of insulation class A1 or A2 according to EN 13501-2 shall be present between the penetration seal and the stud(s). It must be demonstrated that the flexible wall construction has a fire resistance classification that is the same or better than the fire resistance of the particular pipe or cable penetration seal. The flexible wall must be classified in accordance with EN 13501-2.

3) General conditions – Rigid floor
The pipe penetrations be applied in any type of floor of aerated concrete (600±200 kg/m3, class G4/600 or heavier) or concrete with a minimum thickness of 150 mm. An exception is made for some penetration seals mentioned in Annex B where a minimum thickness of 200 mm applies.

4) General conditions - distance to floor, corner or wall
A distance of at least 10 mm from the edge of the aperture of the penetration seal to a different wall, corner, floor or transfer to another type of wall (adjacent constructions) shall be taken into account.

5) General conditions – Mixed Penetration Seals – Mulcol® Multisealant GR may be used to provide multiple penetration seals with the same or different penetration seals or services, incorporated in coated firestop board Mulcol® Multimastic C system subject to the conditions specified in Annex A and B. The performance of the seal is restricted to the contained service or seal/Mulcol® Multisealant GR penetration seal with the lowest classification, as given in Annex A and B.

6) Mulcol® Multisealant GR may be used to provide a penetration seal with specific supporting constructions and substrates (for details see Annex A and B).

7) The provisions made in this European Technical Assessment are based on an assumed working life of the Mulcol® Multisealant GR of 30 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 or by the technical assessment body, 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.

8) Type Z_2: intended for use at internal conditions with humidity classes other than Z_1, excluding temperatures below 0°C.

9) General Conditions – Installation in coated firestop board Mulcol® Multimastic C System (2x50 mm)
The aperture size in the wall may be up to 1200 mm high in a rigid wall with an unlimited length. In a flexible wall, uninterrupted separating studs are required at 2400 mm centres or less. An aperture frame is not mandatory but is allowed.
The aperture size in the floor may be up to 1200 mm wide and 2400 mm long.
The coated firestop boards of The Mulcol® Multimastic C System have a total thickness of 100 mm (2 x 50 mm) coated with an ablative firestop Mulcol® Multimastic C coating. The coating is applied with a thickness of 1 mm on the outwards pointing faces of each panel (no coating between the boards). The coating is also applied circumferential over the opening of the stone wool with the adjacent construction (overlap minimal 25 mm). The joints between the different board elements and the aperture edge shall be glued together with Mulcol® Multimastic SP. A cavity of 50 mm between the stone wool panels may be present. For further information regarding the placing instructions and the field of application of the Mulcol® Multimastic FB1 (2 x 50 mm) penetration seal system reference is made to the European Technical Assessment ETA 16/0985. The use of the Mulcol® Multimastic C (2 x 50 mm) penetration seal system is recommended. When stone wool penetration seal systems of other manufacturers are used, the installation instructions of that typical manufacturer apply and at least a fire resistance and the field of application of the desired performance class in accordance with EN 13501-2 must be verified.

10) Insulation types

The following elastomeric insulation types (equal or better) are allowed:

− AF/Armaflex, with a reaction to fire class BL-s3, d0 or B-s3, d0
− SH/Armaflex;
− Kaiflex ST and Kaiflex KKplus s2;
− K-Flex EC, K-Flex EC AD, K-Flex EC, K-Flex ST, K-Flex ST/SK, K-Flex ST Frigo, K-Flex SRC and K-Flex SRC Eco.

The following thermal insulation types (equal or better) are allowed:

− Insul-Phen, Insul-Pirplus and Insul-Pir 33
− Kingspan Tarecpir M1, Kingspan Tarecpir CR, Kingspan Tarecpir B2, Kingspan Tarecpir HT, Kingspan Tarecpir HD and Kingspan Kooltherm FM.

11) Pipe types

- Alpex DUO, Valsir Pexal, Valsir Mixal and APE Plain (PE-Xb/AL/PE-Xb);
- Uponor Unipipe and Geberit Mepla (PE-RT/AL/PE-RT);
- Uponor and Henco (PE-Xc/AL/PE-Xc);
- Uponor and REHAU (PE-Xa) and REHAU (PE-Xc);
- SP Superpipe and POLYGON PEX (PE-X/AL/PE-X);
- Valsir Pexal and Valsir Mixal (PE/AL/PE-Xb);
- Wavin Tigris, Protecta-Line System and Alpex F50 Profi (PE-X/AL/PE).

12) General conditions pipe insulations

All foil faced pipe insulations with a self-adhesive edge do not require the installation of iron wires.
Pipe insulation without a self-adhesive edge must be provided with iron wires ≥ 0.6 mm.
Ratio per metre: 5 windings, with a minimum of 2

13) General conditions - encased pipe

The Mulcol® Multisealant GR can be used to fill encased plastic pipe sleeves. Detailed information and data is given in Annex A and B.

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

Product-type: Sealant/Pipe closure	Intended use: Penetration Seal
Essential Characteristics	Performance
BWR 1 Mechanical resistance and stability	
None	Not relevant
BWR 2 Safety in case of fire	
Reaction to fire	Class F (not tested)
Resistance to fire	Annex A & B
BWR 3 Hygiene, health and environment	
Air permeability (material property)	No performance determined
Water permeability (material property)	No performance determined
Release of dangerous substances	Use categories: IA1, S/W3 Declaration of manufacturer
BWR 4 Safety in use	
Mechanical resistance and stability	No performance determined
Resistance to impact/movement	No performance determined
Adhesion	No performance determined
BWR 5 Protection against noise	
Airborne sound insulation*	53 (0;-1) dB
BWR 6 Energy economy and heat retention	
Thermal properties	No performance determined
Water vapour permeability	No performance determined
General aspects relating to fitness for use	
Durability and serviceability	Z_2

* At 25 mm depth

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 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 http://eur-lex.europa.eu/JOIndex.do) 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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark A/S prior to CE marking

Issued in Copenhagen on 2021-01-01 by

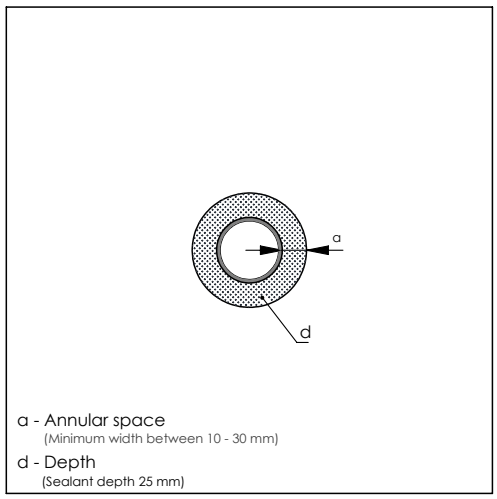
Thomas Bruun

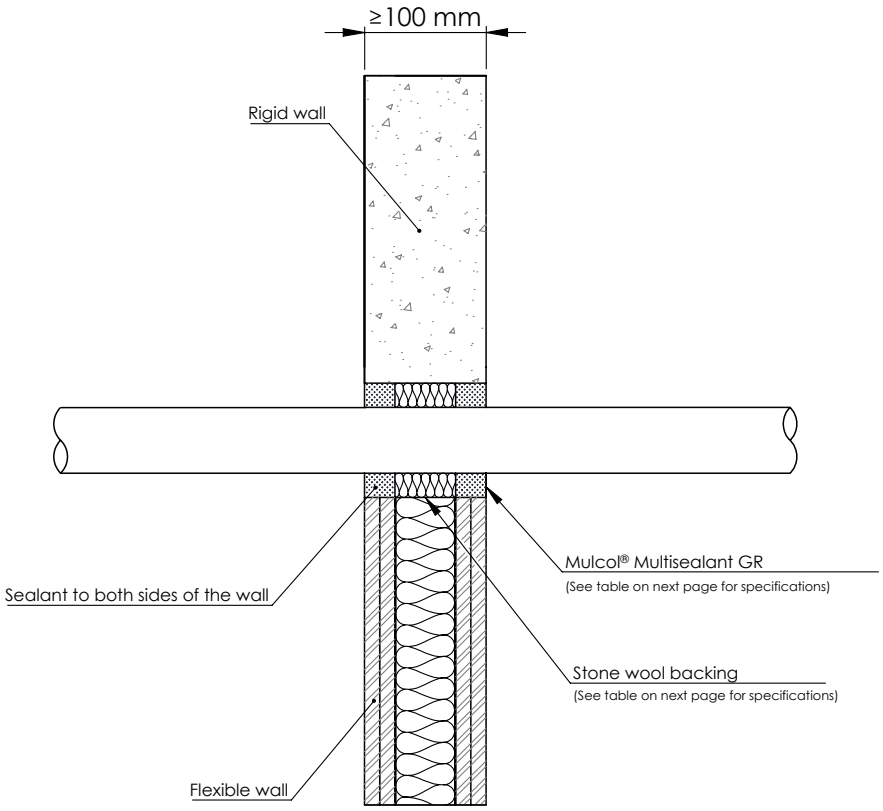
Managing Director, ETA-Danmark

ANNEX A – Resistance to Fire Classification – Mulcol® Multisealant GR - Flexible or rigid wall constructions according to Section 2 1) with wall thickness of minimum 100 mm.

A.1 Plastic pipes

A.1.1 Plastic pipes in regular configurations





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	Unit of measure : mm	Department : Research & Development	A4
	Date : 17-6-2016	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

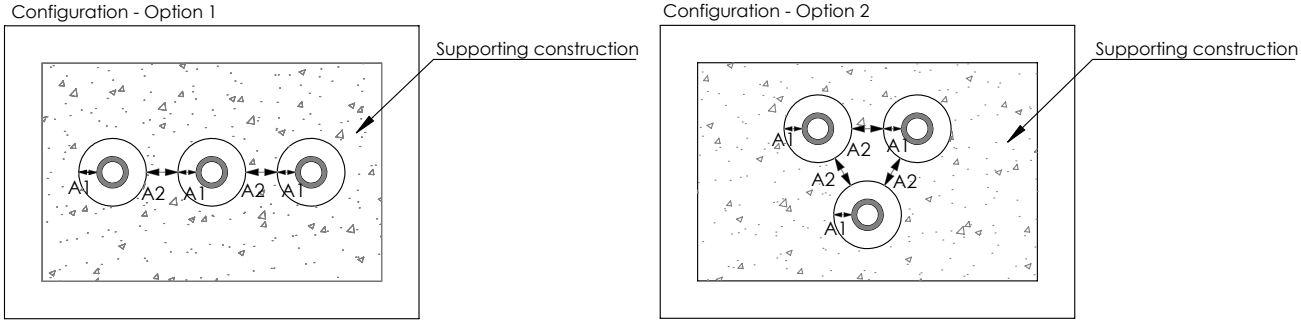
Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Backing	Configuration	Seal width mm	Classification*
PE / ABS / SAN+PVC	40	2.4-3.7	25 mm Stone wool insulation, 35 kg/m³	1 & 2 between PE pipes & between ∅ 40 mm PVC-U pipes	10-30	**EI 120 U/C**
	40 up to 100	2.4-3.7 / 4.3-10		1 & 2 between PE pipes & between ∅ 40-110 mm PVC-U pipes		**EI 60 U/C**
	110	4.3-10		1 between PE pipes		**E 120 U/C** **EI 90 U/C**
PP	40	1.8-5.5		1 & 2	10	**EI 90 U/C**
	110	6.6		1 & 2 between ∅ 40-110 mm PVC-U pipes	30	**EI 120 U/C**
PVC-U / PVC-C	40	1.9-3.7		1 & 2 between PVC-U pipes	10 - 30	**EI 120 U/C**
	40 up to 110	1.9-3.7 / 2.7-6.6		1 & 2 between PVC-U pipes & between ∅ 40 mm PE pipes		**EI 120 U/C**
				1 & 2 between PVC-U pipes & between ∅ 40-110 mm PE pipes		**EI 60 U/C**
				1 & 2 between PVC-U pipes & between ∅ 110 mm PP pipes		**EI 120 U/C**

* U/C pipe end configuration applies to C/C also

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 10-30 mm;
- distance A2 = 30 mm;

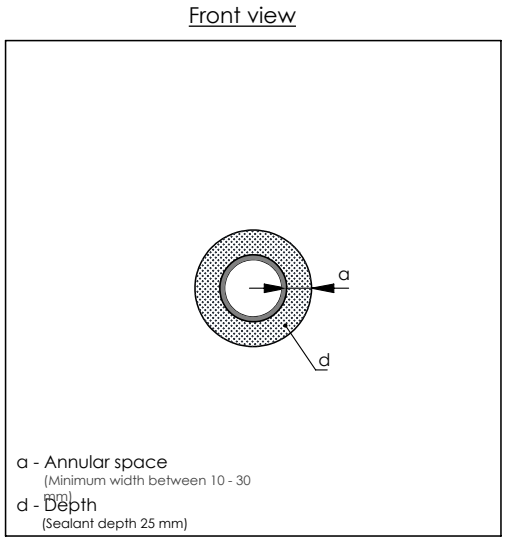
Figure E.1 out of the standard EN 1366-3:2009

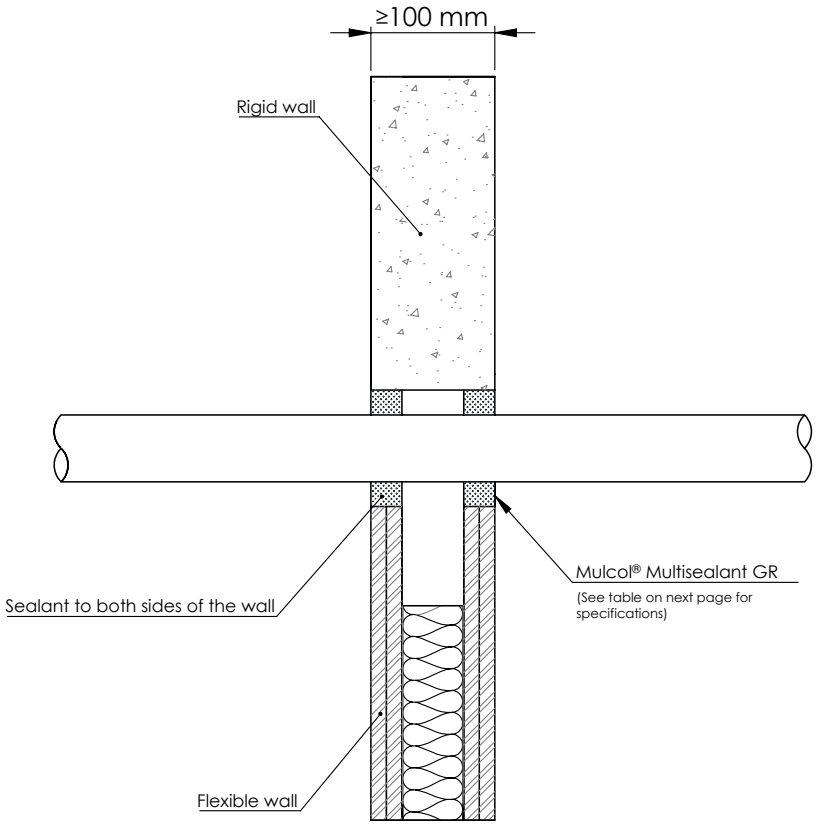


A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A.1.1.1 Plastic pipes in regular configurations without backing





NEW 2D-DRAWING

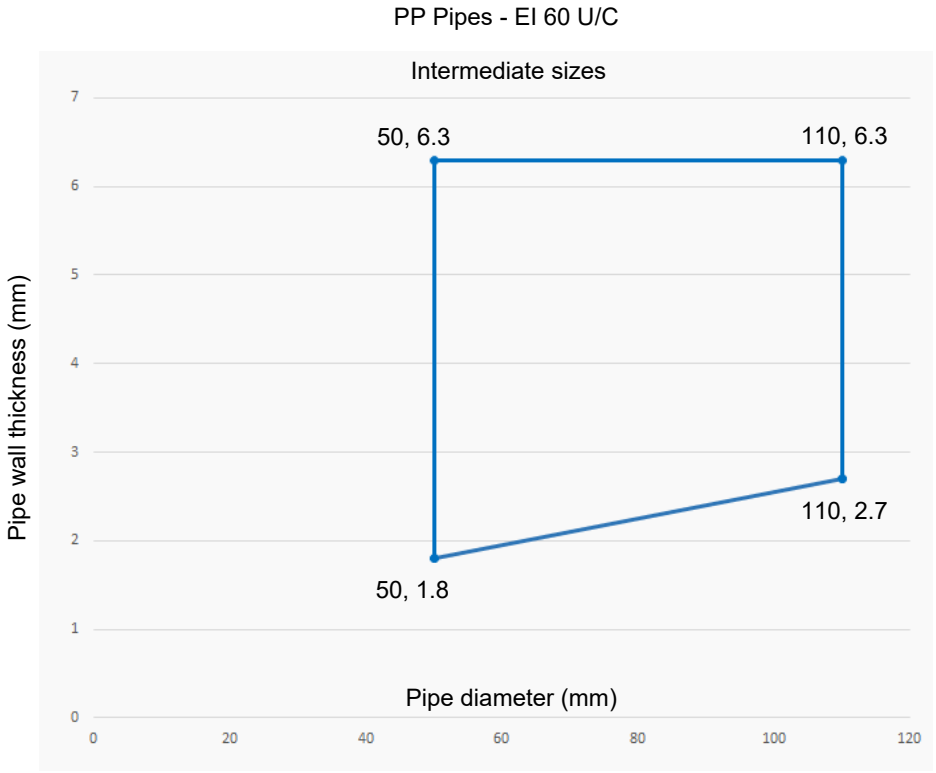
American projection	Scale : 1:5	Company : Mulcol International B.V.	FW-PP-G2.11.10
	Unit of measure : mm	Department : Research & Development	
	Date : 12-7-2018	Draftsman : K.J.	A4

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Configuration	Seal width mm	Classification**
PP	50*	1.8-6.3	1 & 2	10 - 30	**EI 60 U/C**
	110*	2.7-6.3			
PVC-U / PVC-C	160	3.2-9.5			**EI 30 U/C**
		9.5			**EI 90 U/C**

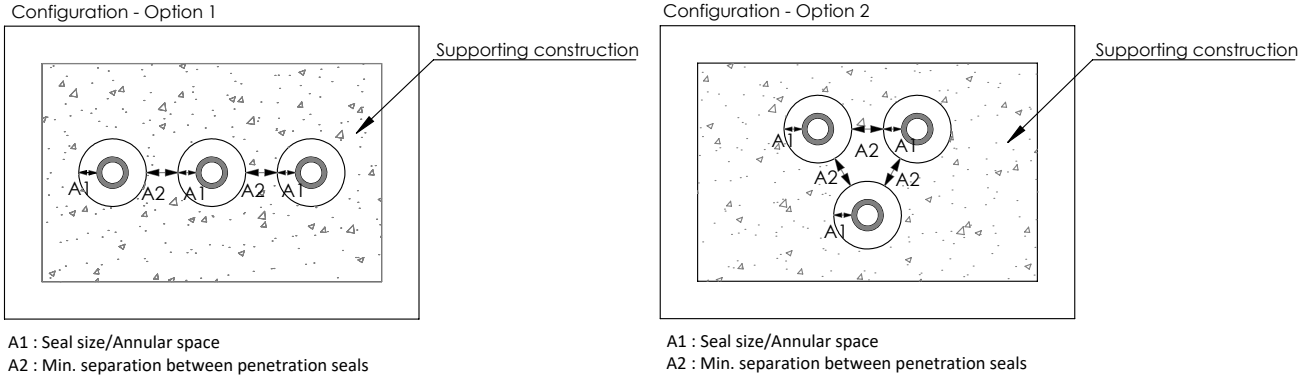
* See graph below for intermediate pipe sizes
** U/C pipe end configuration applies to C/C also



In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

– distance A1 = 10-30 mm;
– distance A2 = 30 mm;

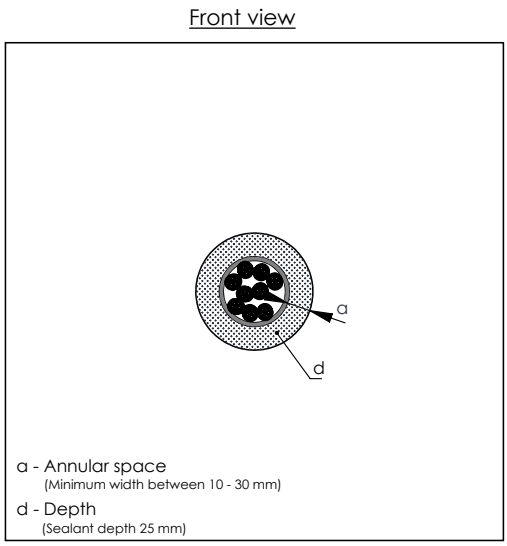
Figure E.1 out of the standard EN 1366-3:2009

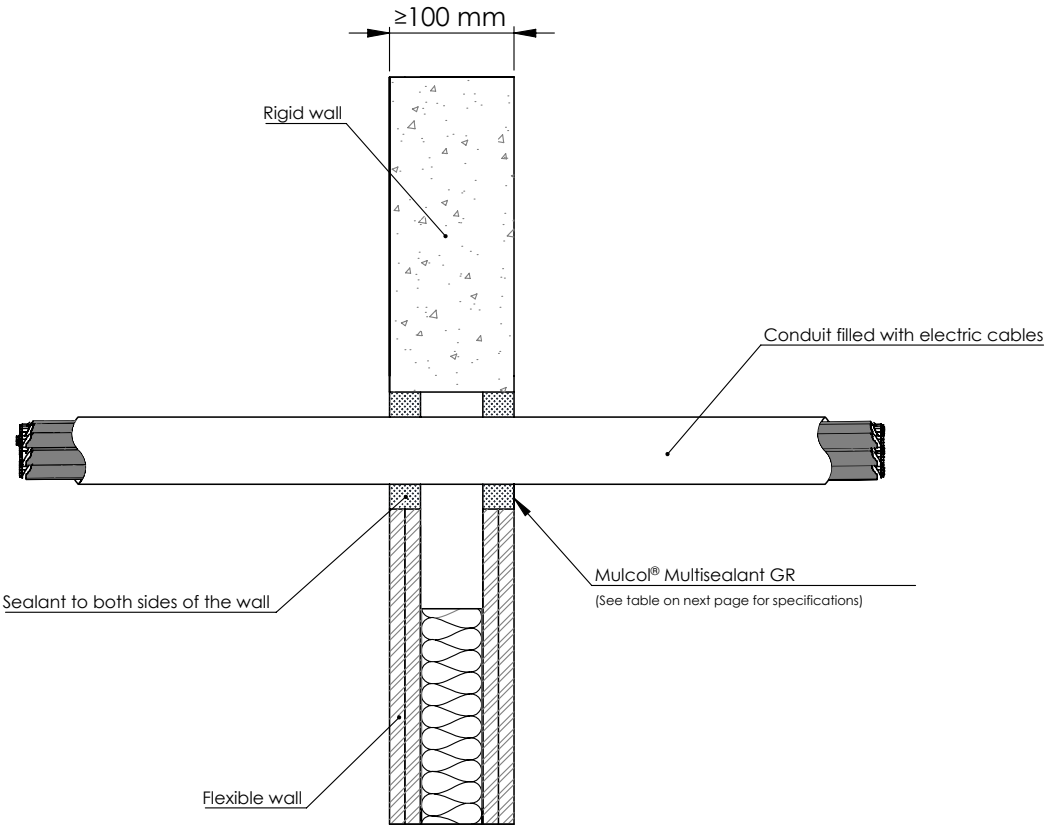


A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A.1.2 Plastic pipes containing (electrical) cables





NEW 2D-DRAWING

American projection	Scale : 1:5	Company : Mulcol International B.V.	FW-PP-G2.11.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 12-7-2018	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

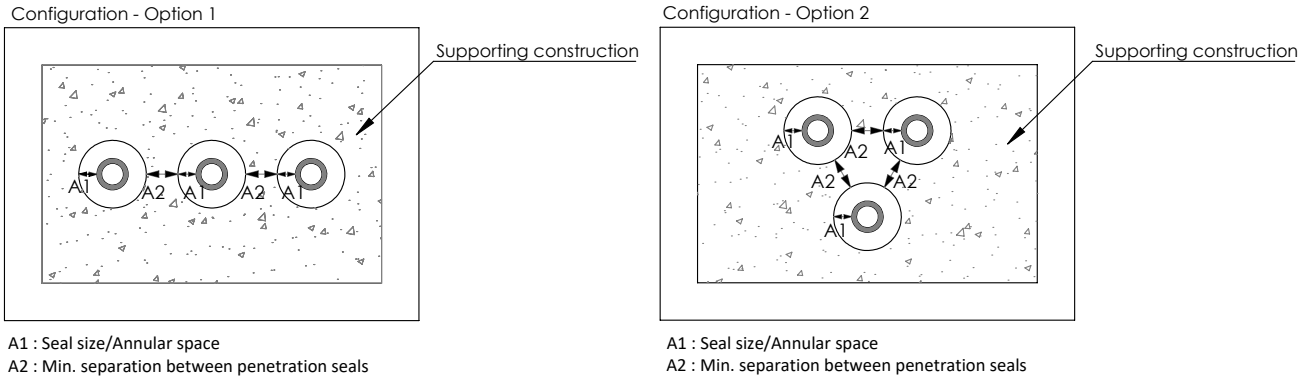
Pipe material conduit	Maximum pipe diameter mm	Pipe wall thickness mm	Partially or fully filled cable conduits	Configuration	Classification*
PE / ABS / SAN+PVC	110	2.4-10	cables up to ∅ 20 mm	1 & 2	**EI 60 U/C**
PP		2.7-6.6			**EI 90 U/C**
PVC-U / PVC-C		1.9-6.6			

* U/C pipe end configuration applies to C/C also

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 10-30 mm;
- distance A2 = 30 mm;

Figure E.1 out of the standard EN 1366-3:2009

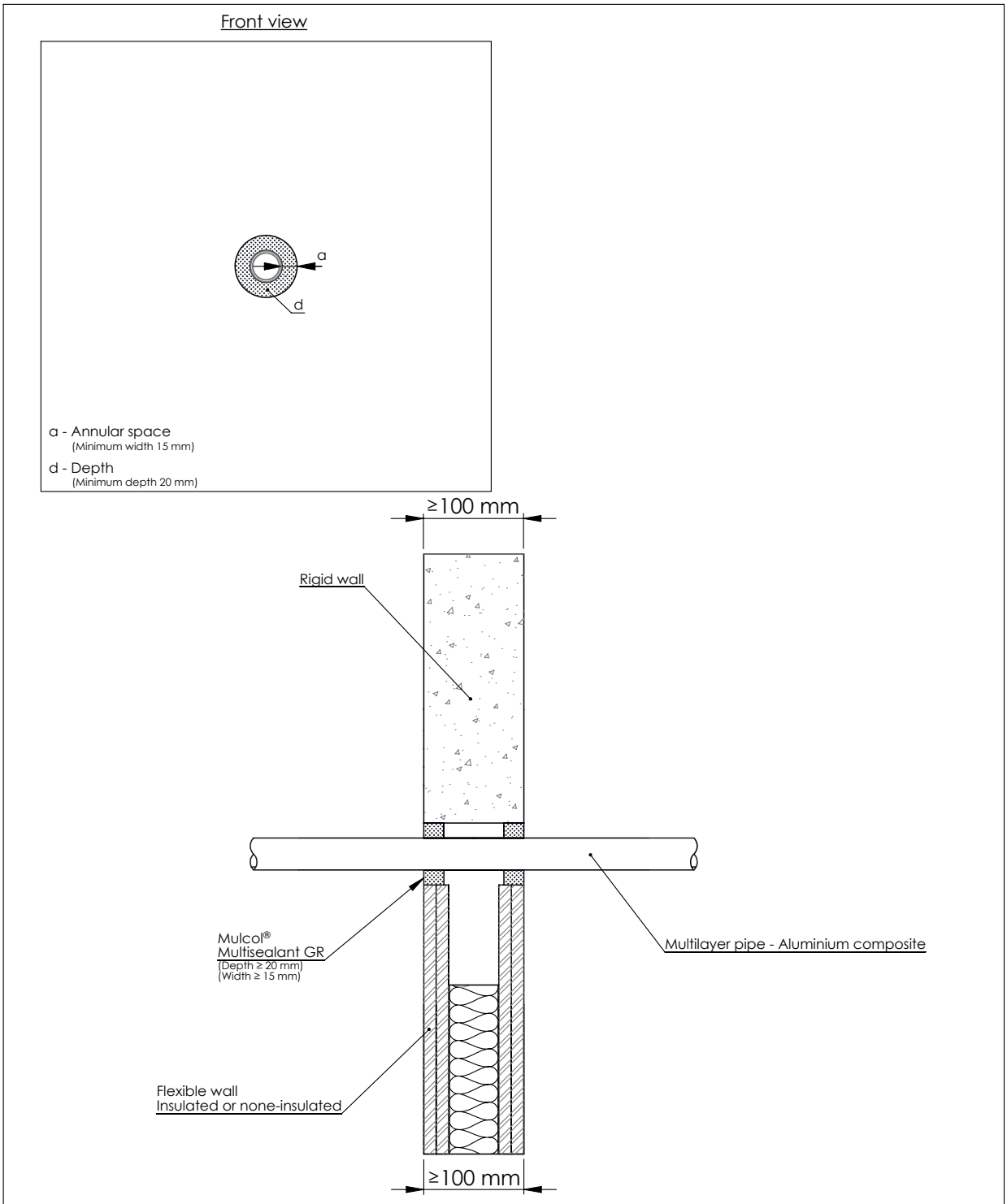


A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A.2 Aluminium composite pipes

A.2.1 Aluminium composite pipes without insulation



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	Unit of measure : mm	Department : Research & Development	A4
	Date : 19-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Distance to support each face mm	Classification*
Henco PE-Xc/AL/PE-Xc	≤ 16 / ≤ 20	2.0	≤ 350	**E 120 U/C EI 120 U/C**
Uponor PE-Xa Aqua pipe	≤ 25	3.5		
Henco PE-Xc/AL/PE-Xc	≤ 26 / ≤ 32	3.0		
	≤ 40	3.5		
Uponor PE-RT/AL/PE-RT		4.0		

* U/C pipe end configuration applies to C/C also

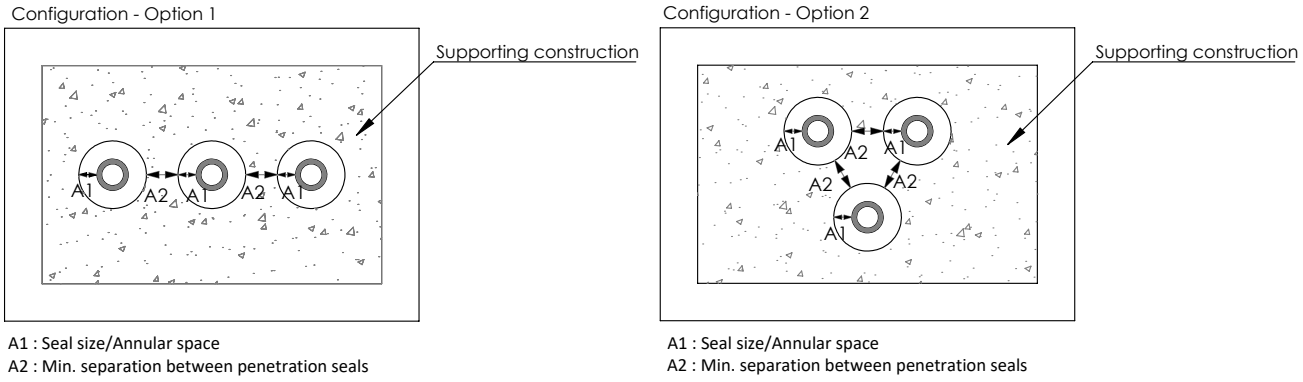
For an annular space (distance ''a'' in drawing) from 15 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

Figure E.1 out of the standard EN 1366-3:2009

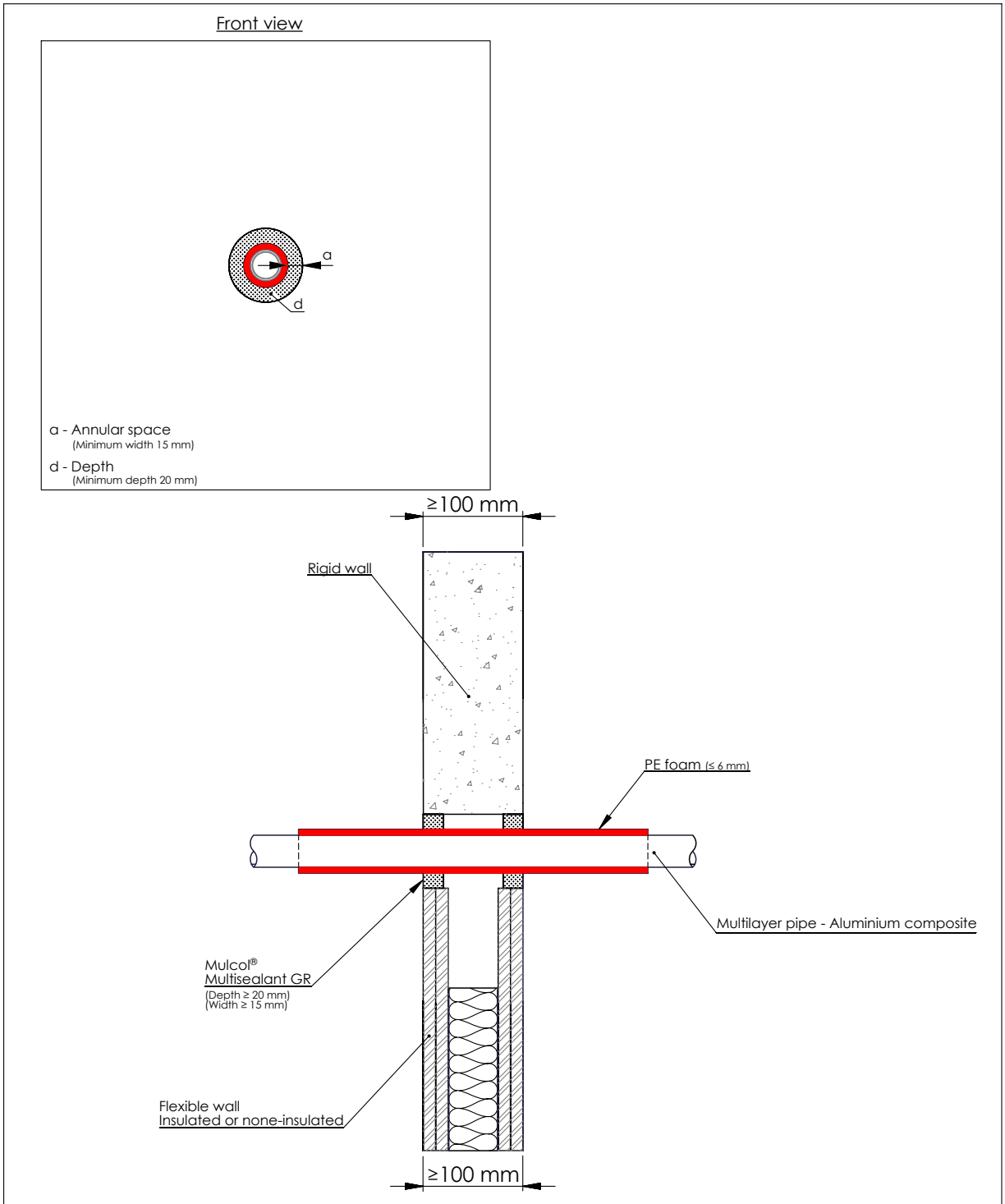


A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A.2.2 Aluminium composite pipes with insulation

A.2.2.1 Aluminium composite pipes with PE-foam insulation



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	Unit of measure : mm	Department : Research & Development	A4
	Date : 19-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation LS/CS/LI/CI thickness / length mm	Distance to support each face mm	Classification*
Henco PE-Xc/AL/PE-Xc	≤ 16 / ≤ 20	2.0	6 / 300 (min.)	≤ 350	**E 120 U/C EI 120 U/C**
Uponor PE-Xa Aqua pipe	≤ 25	3.5			
Henco PE-Xc/AL/PE-Xc	≤ 26 / ≤ 32	3.0			

* U/C pipe end configuration applies to C/C also

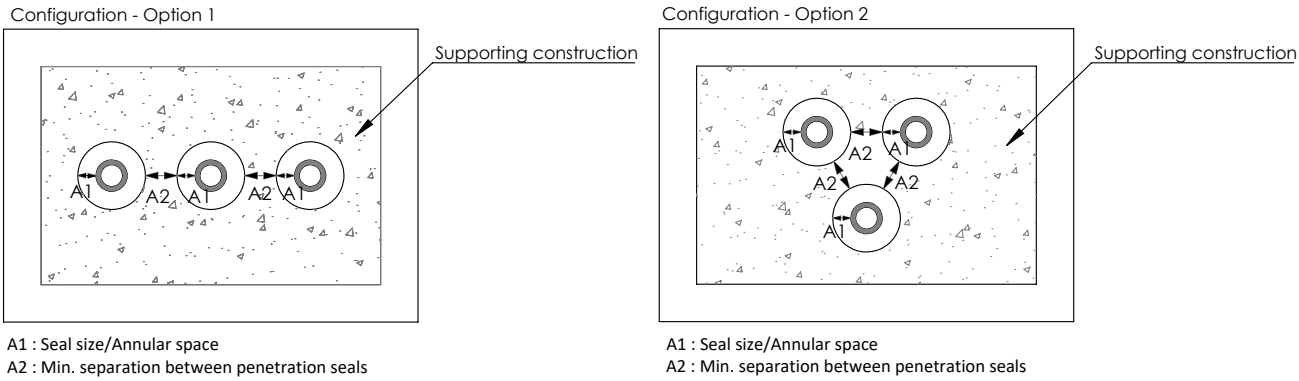
For an annular space (distance ''a'' in drawing) from 15 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

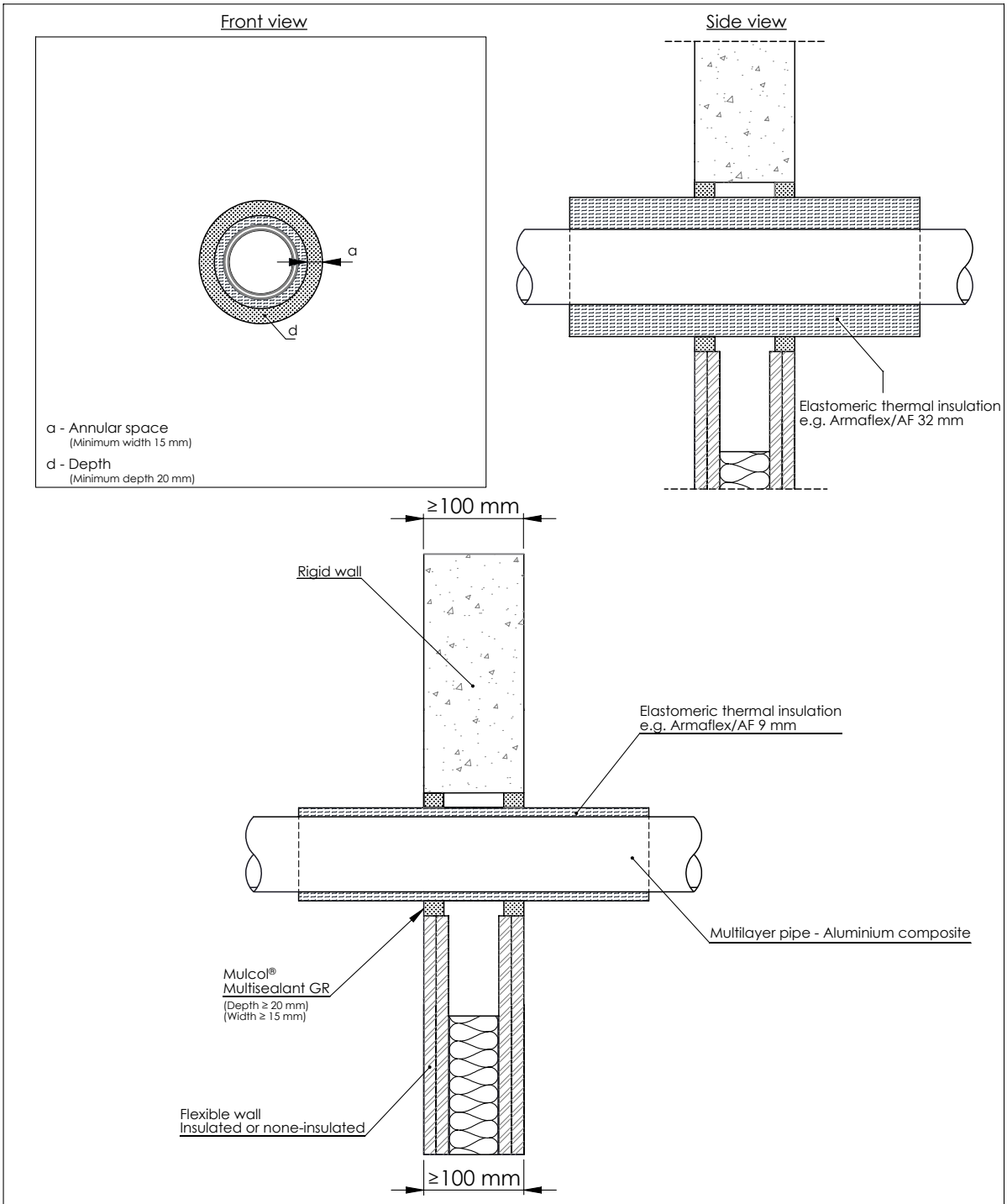
Figure E.1 out of the standard EN 1366-3:2009



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A.2.2.2 Aluminium composite pipes with Elastomeric thermal insulation



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	Date : 19-4-2017	Draftsman : K.J.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation LS/CS/LI/CI thickness / length mm	Distance to support each face mm	Classification*
Henco PE-Xc/AL/PE-Xc	≤ 16 / ≤ 20	2.0	9-32 / 300 (min.)	≤ 350	**E 120 U/C EI 120 U/C**
Uponor PE-Xa Aqua pipe	≤ 25	3.5			
Henco PE-Xc/AL/PE-Xc	≤ 26 / ≤ 32	3.0			
	≤ 40	3.5			
Uponor PE-RT/AL/PE-RT		4.0			
Henco PE-Xc/AL/PE-Xc	≤ 50				**E 120 U/C EI 90 U/C**
			32 / 300 (min.)		**E 120 U/C EI 120 U/C**
	≤ 63	4.5	9-32 / 300 (min.)		**E 120 U/C EI 90 U/C**
			32 / 300 (min.)		**E 120 U/C EI 120 U/C**
	≤ 75	6.0	9-32 / 300 (min.)		**E 120 U/C EI 60 U/C**
			32 / 300 (min.)		**E 120 U/C EI 120 U/C**

* U/C pipe end configuration applies to C/C also

For an annular space (distance ''a'' in drawing) from 15 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

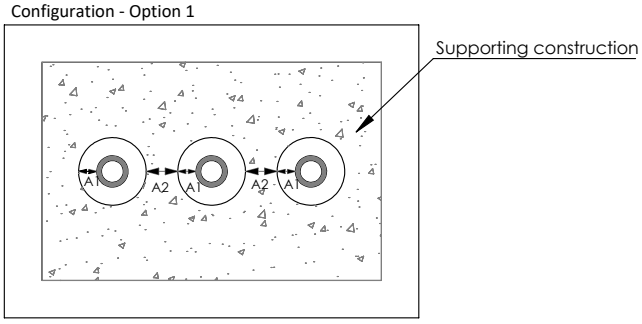
- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure on the next page):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

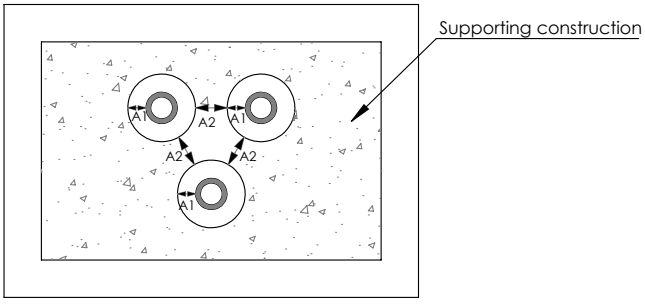
Figure E.1 out of the standard EN 1366-3:2009

Configuration - Option 1



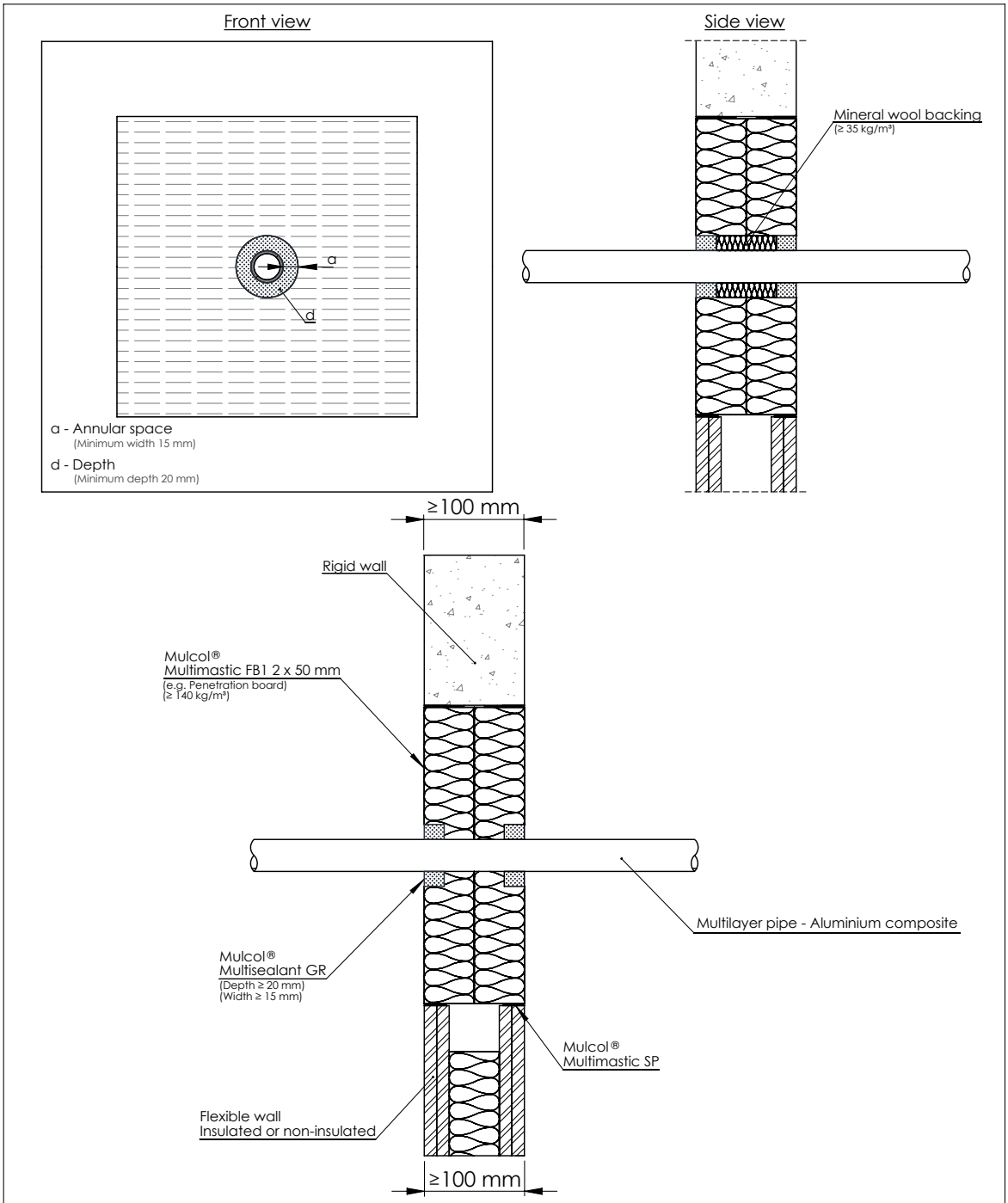
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

Configuration - Option 2



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A.2.3 Aluminium composite pipes without insulation through Mulcol® Multimastic FB1



American projection	Scale : 1:5	Company : Mulcol International B.V.	PBfw-MLA-G2.4.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 19-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Distance to support each face mm	Classification*
Henco PE-Xc/AL/PE-Xc	≤ 16 / ≤ 20	2.0	≤ 350	**E 120 U/C EI 120 U/C**
Uponor PE-Xa Aqua pipe	≤ 25	3.5		
Henco PE-Xc/AL/PE-Xc	≤ 26 / ≤ 32	3.0		
	≤ 40	3.5		
Uponor PE-RT/AL/PE-RT		4.0		

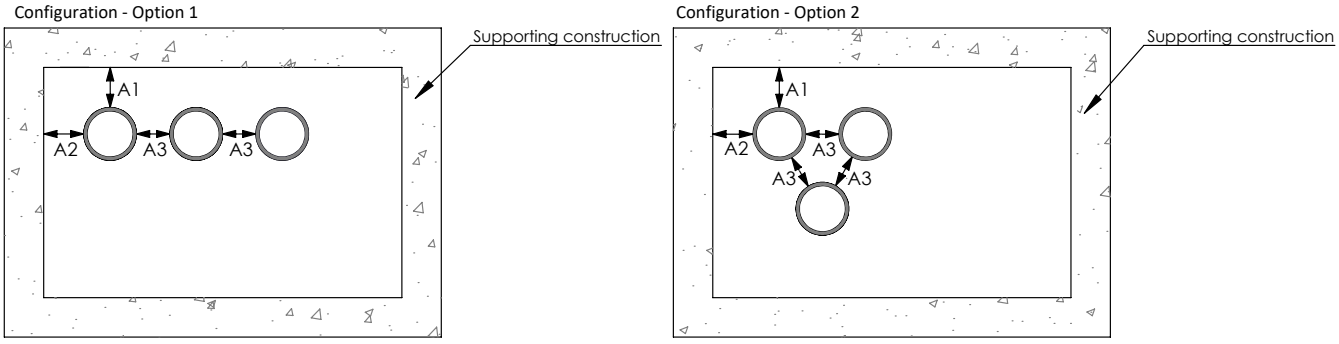
* U/C pipe end configuration applies to C/C also

The Mulcol® Multimastic C system to be used consists of two layers of 50 mm on top of each other (total thickness 100 mm). The pipes passed through the system in round holes approximately the same size as the pipe (tight fit). The aperture size in the wall may be up to 1200 mm high and unlimited length. No aperture frame is needed, but it is allowed.

In the Mulcol® Multimastic C system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 to A3 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 50 mm;
- distance A2 = 50 mm;
- distance A3 = 100 mm;

Figure E.1 out of the standard EN 1366-3:2009

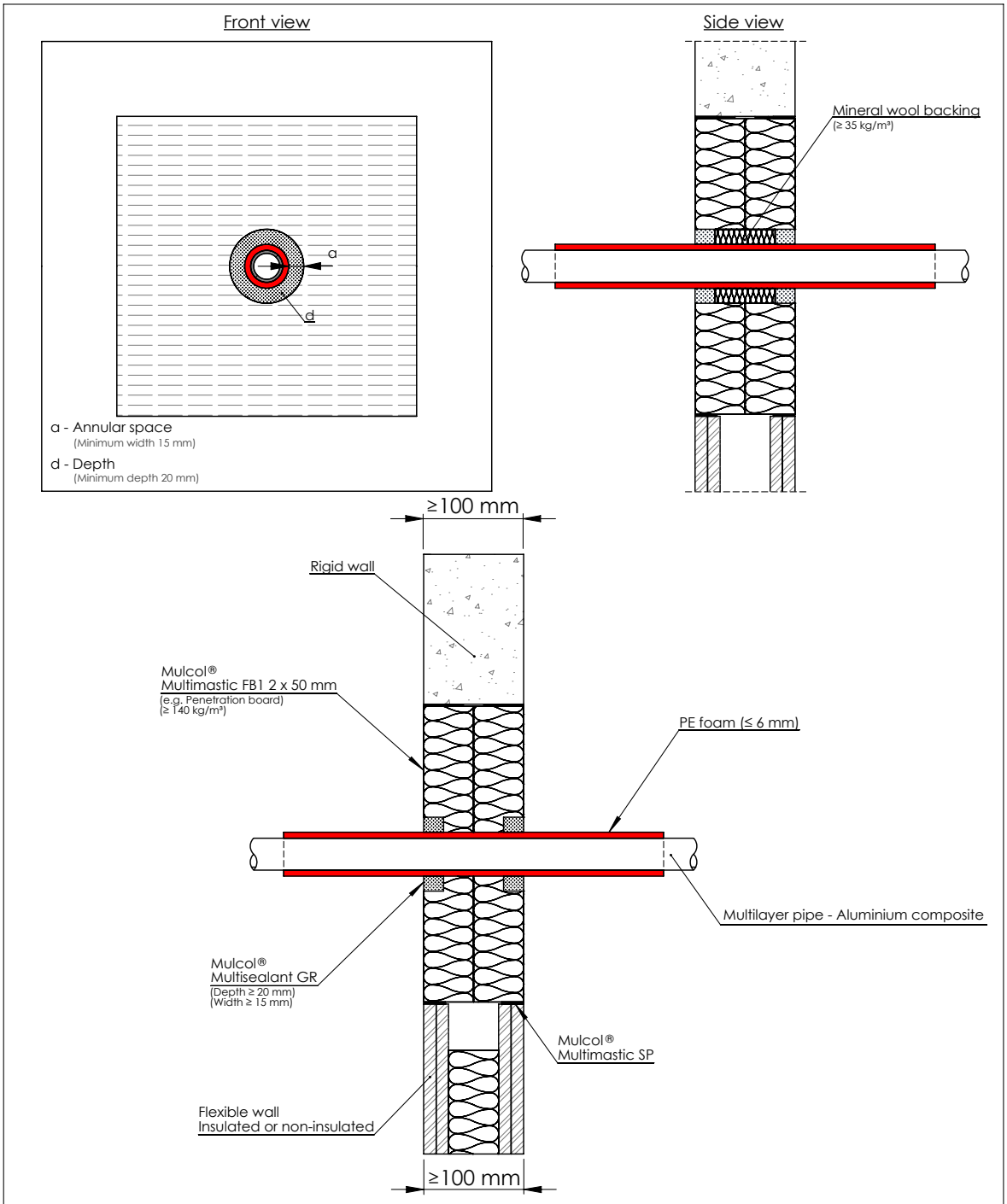


A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A.2.4 Aluminium composite pipes with insulation through Mulcol® Multimastic FB1

A.2.4.1 Aluminium composite pipes with PE-foam insulation through Mulcol® Multimastic FB1



American projection	Scale : 1:5	Company : Mulcol International B.V.	PBfw-MLA_pr-G2.4.23
	Unit of measure : mm	Department : Research & Development	A4
	Date : 19-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation LS/CS/LI/CI thickness/ length mm	Distance to support each face mm	Classification*
Henco PE-Xc/AL/PE-Xc	≤ 16 / ≤ 20	2.0	6 / 300 (min.)	≤ 350	**E 120 U/C EI 120 U/C**
Uponor PE-Xa Aqua pipe	≤ 25	3.5			
Henco PE-Xc/AL/PE-Xc	≤ 26 / ≤ 32	3.0			

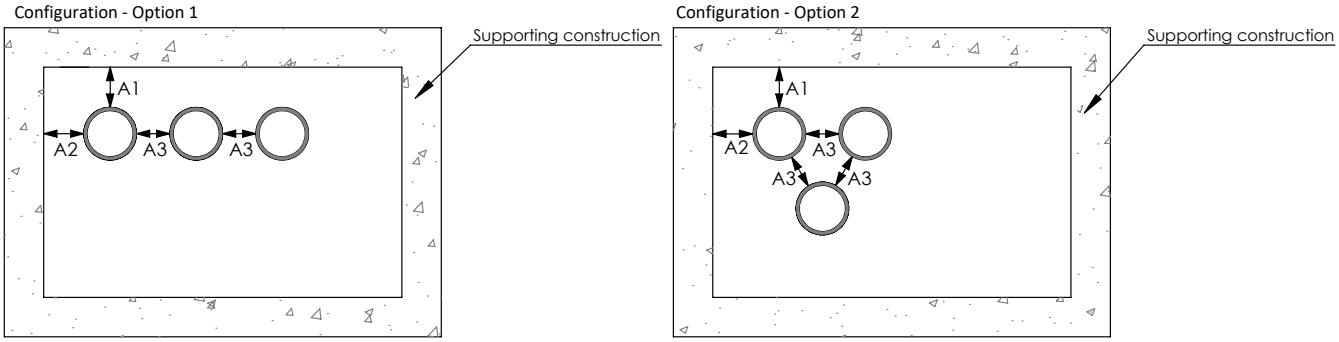
* U/C pipe end configuration applies to C/C also

The Mulcol® Multimastic C system to be used consists of two layers of 50 mm on top of each other (total thickness 100 mm). The pipes passed through the system in round holes approximately the same size as the pipe (tight fit). The aperture size in the wall may be up to 1200 mm high and unlimited length. No aperture frame is needed, but it is allowed.

In the Mulcol® Multimastic C system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 to A3 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 50 mm;
- distance A2 = 50 mm;
- distance A3 = 100 mm;

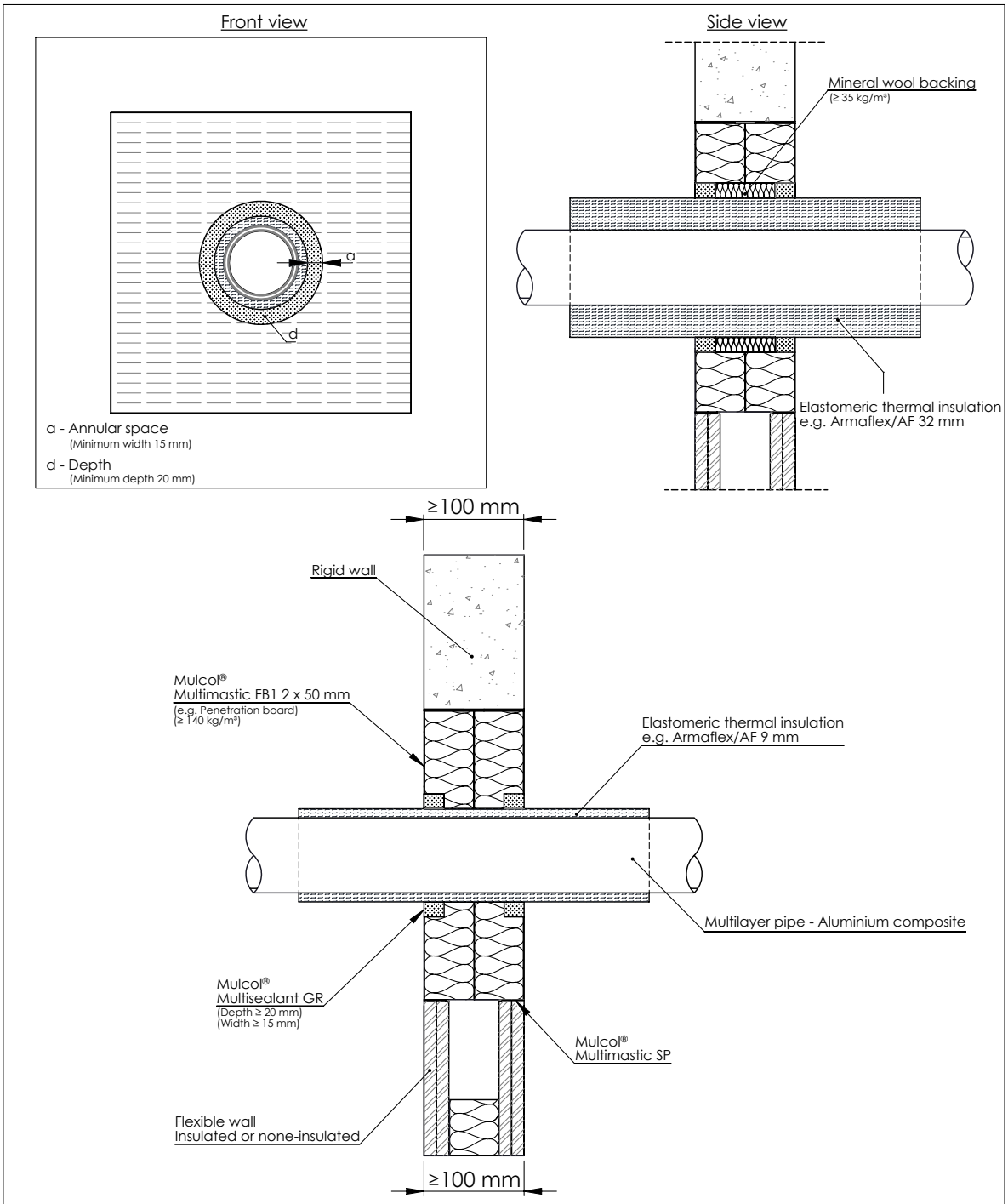
Figure E.1 out of the standard EN 1366-3:2009



A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A.2.4.2 Aluminium composite pipes with Elastomeric thermal insulation through Mulcol® Multimastic FB1



American projection	Scale : 1:5	Company : Mulcol International B.V.	PBfw-MLA-G2.4.22
	Unit of measure : mm	Department : Research & Development	A4
	Date : 19-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation LS/CS/LI/CI thickness/ length mm	Distance to support each face mm	Classification*
Henco PE-Xc/AL/PE-Xc	≤ 16 / ≤ 20	2.0	9-32 / 300 (min.)	≤ 350	**E 120 U/C EI 120 U/C**
Uponor PE-Xa Aqua pipe	≤ 25	3.5			
Henco PE-Xc/AL/PE-Xc	≤ 26 / ≤ 32	3.0			
	≤ 40	3.5			
Uponor PE-RT/AL/PE-RT		4.0			
Henco PE-Xc/AL/PE-Xc	≤ 50				**E 120 U/C EI 90 U/C**
	≤ 63	4.5			**E 90 U/C EI 90 U/C**
	≤ 75	6.0			

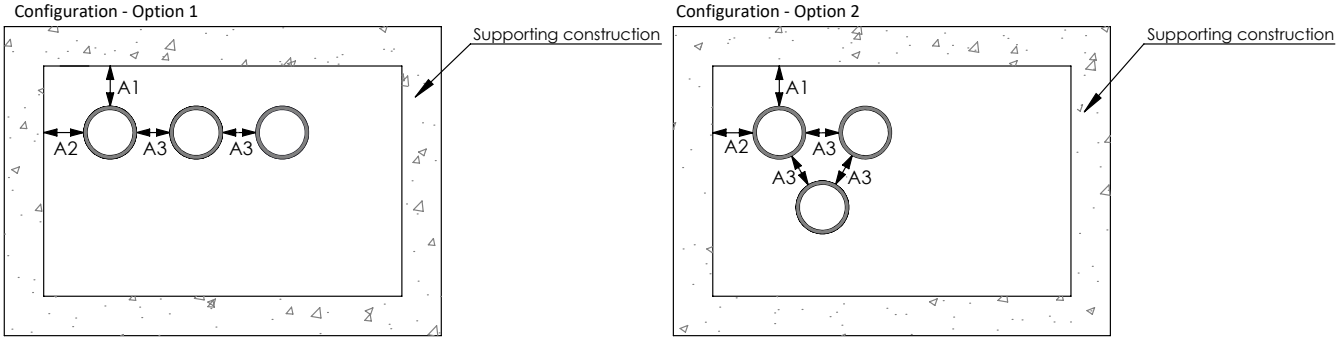
* U/C pipe end configuration applies to C/C also

The Mulcol® Multimastic C system to be used consists of two layers of 50 mm on top of each other (total thickness 100 mm). The pipes passed through the system in round holes approximately the same size as the pipe (tight fit). The aperture size in the wall may be up to 1200 mm high and unlimited length. No aperture frame is needed, but it is allowed.

In the Mulcol® Multimastic C system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 to A3 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 50 mm;
- distance A2 = 50 mm;
- distance A3 = 100 mm;

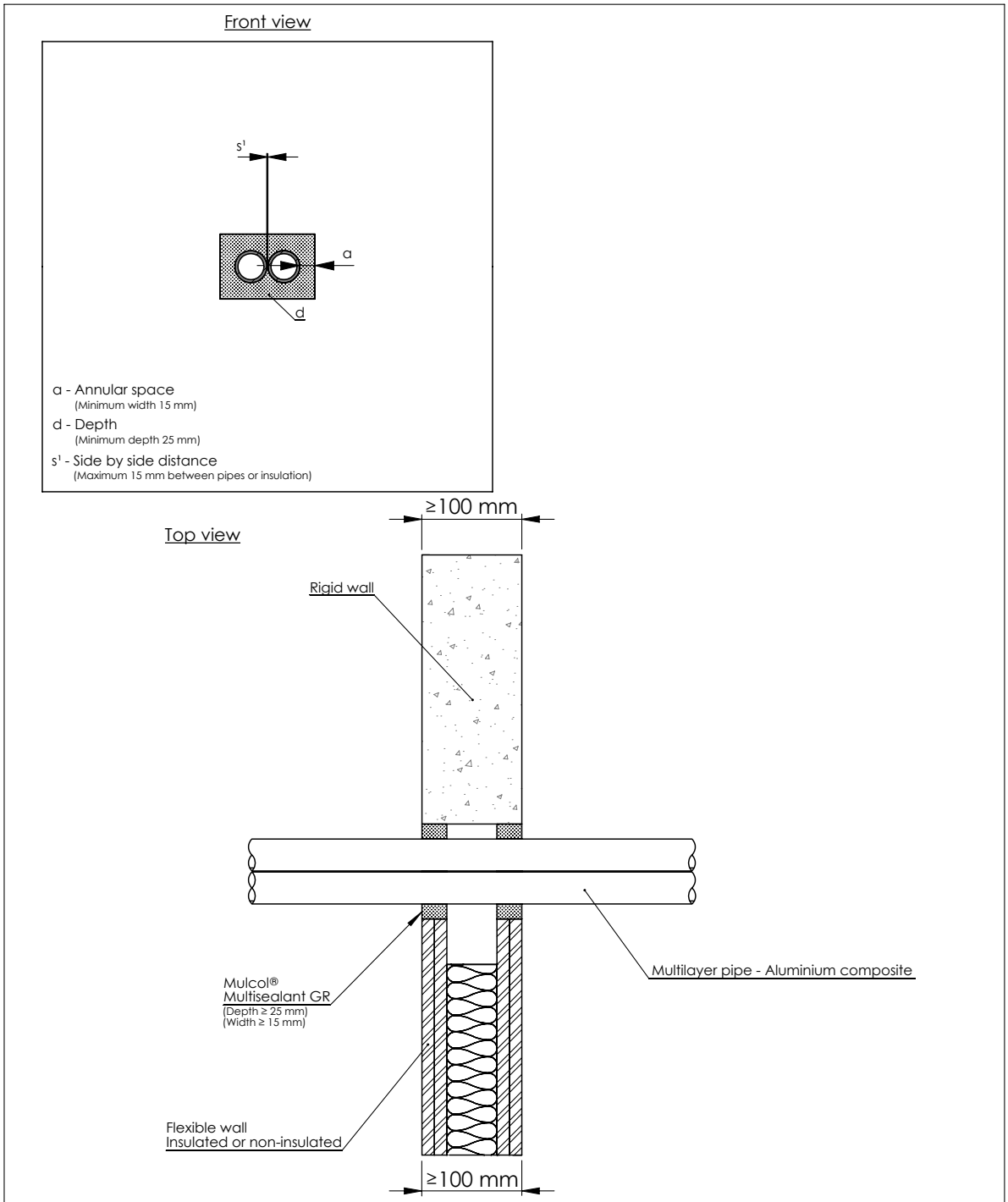
Figure E.1 out of the standard EN 1366-3:2009



A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A.2.5 Multiple penetration consisting of two aluminium composite pipes without insulation



American projection	Scale : 1:5	Company : Mulcol International B.V.	FW-MLP2-G2.5.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 19-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Distance to support each face mm	Classification*
Henco PE-Xc/AL/PE-Xc	≤ 16 / ≤ 20	2.0	≤ 350	**E 120 U/C EI 120 U/C**
Uponor PE-Xa Aqua pipe	≤ 25	3.5		
Henco PE-Xc/AL/PE-Xc	≤ 26	3.0		
	≤ 32			

* U/C pipe end configuration applies to C/C also

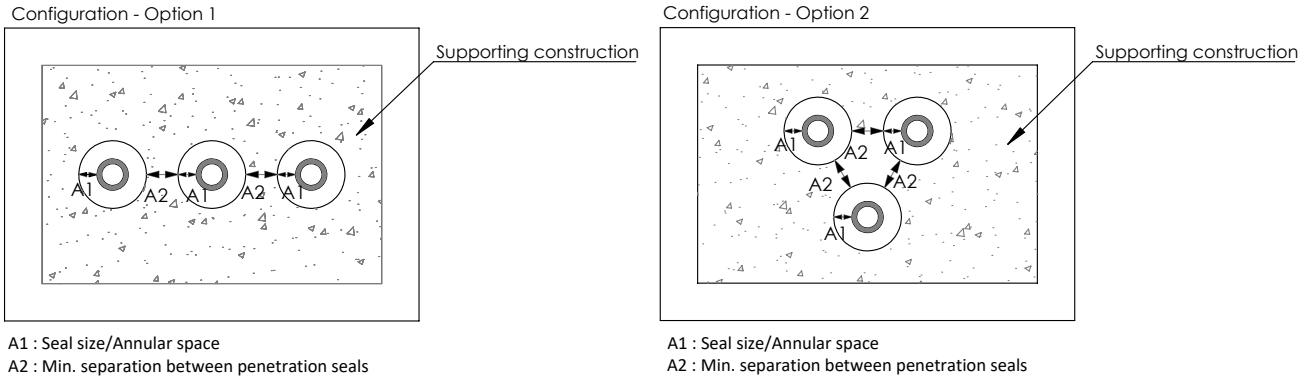
For an annular space (distance ''a'' in drawing) from 15 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

Figure E.1 out of the standard EN 1366-3:2009

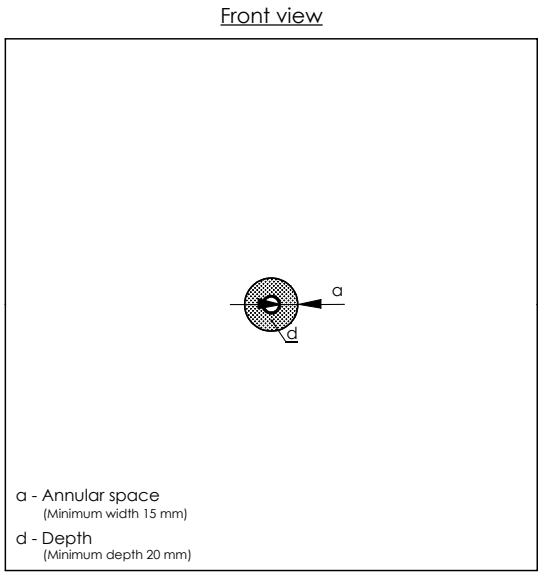


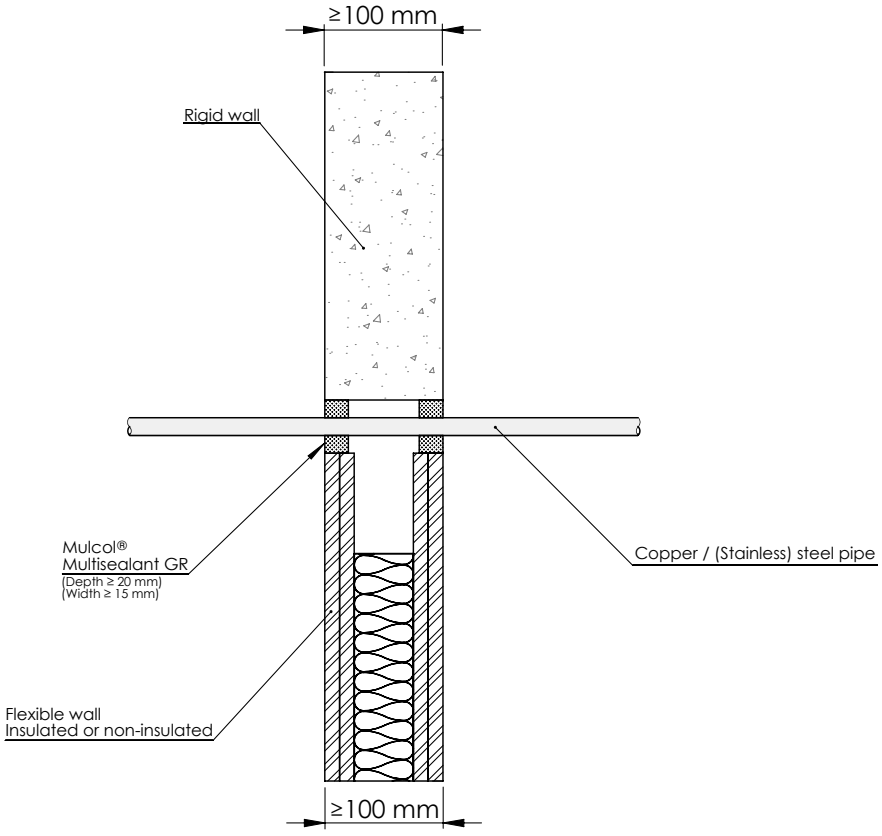
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A.3 Metal pipes

A.3.1 Metal pipes wihtout insulation





American projection		Company : Mulcol International B.V.	FW-CU-G2.4.10
	Unit of measure : mm	Department : Research & Development	
	Date : 19-4-2017	Draftsman : B.D.	A4

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Distance to support each face mm	Classification*
Copper / (Stainless) Steel / Cast Iron	≤ 15	1.0-2.0	≤ 350	**E 120 C/U EI 30 C/U**

* C/U pipe end configuration applies to C/C also

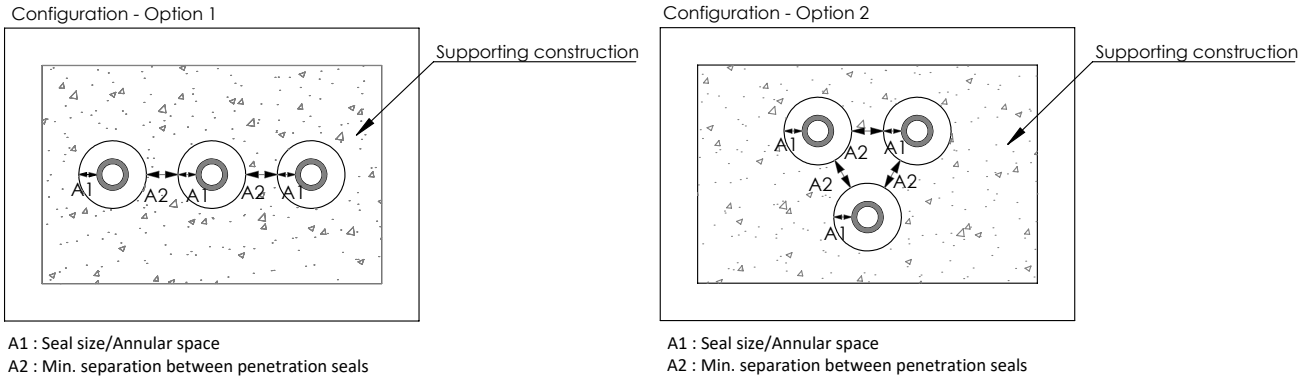
For an annular space (distance ''a'' in drawing) from 15 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

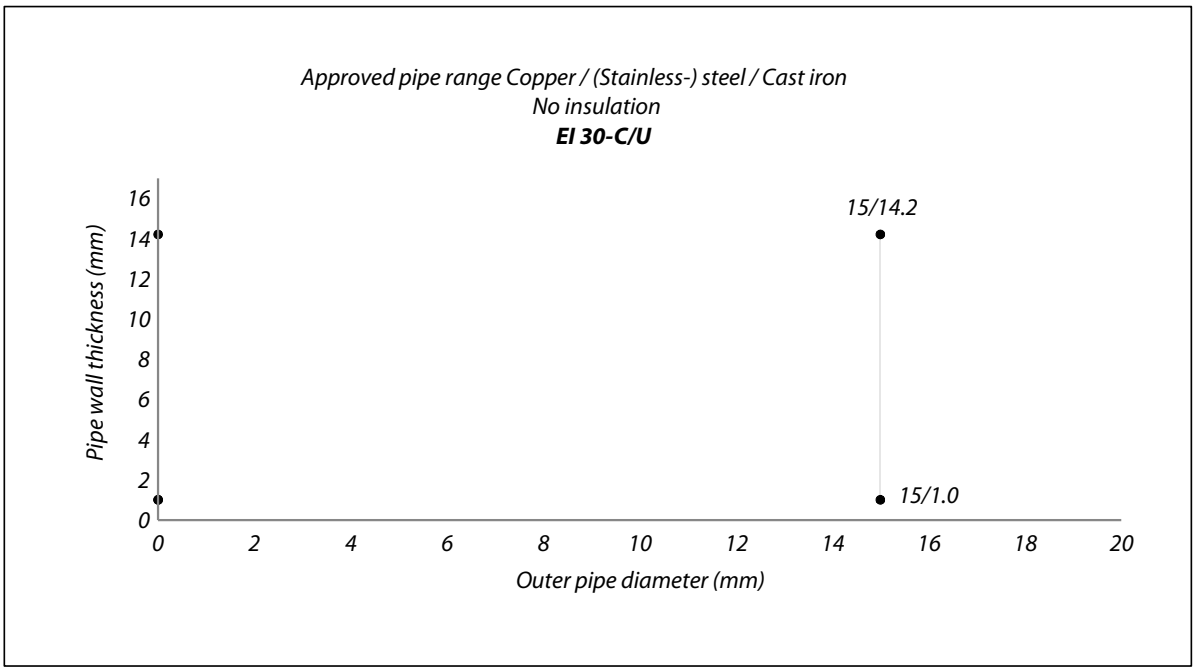
- distance A1 = 15 mm;
- distance A2 = 100 mm;

Figure E.1 out of the standard EN 1366-3:2009



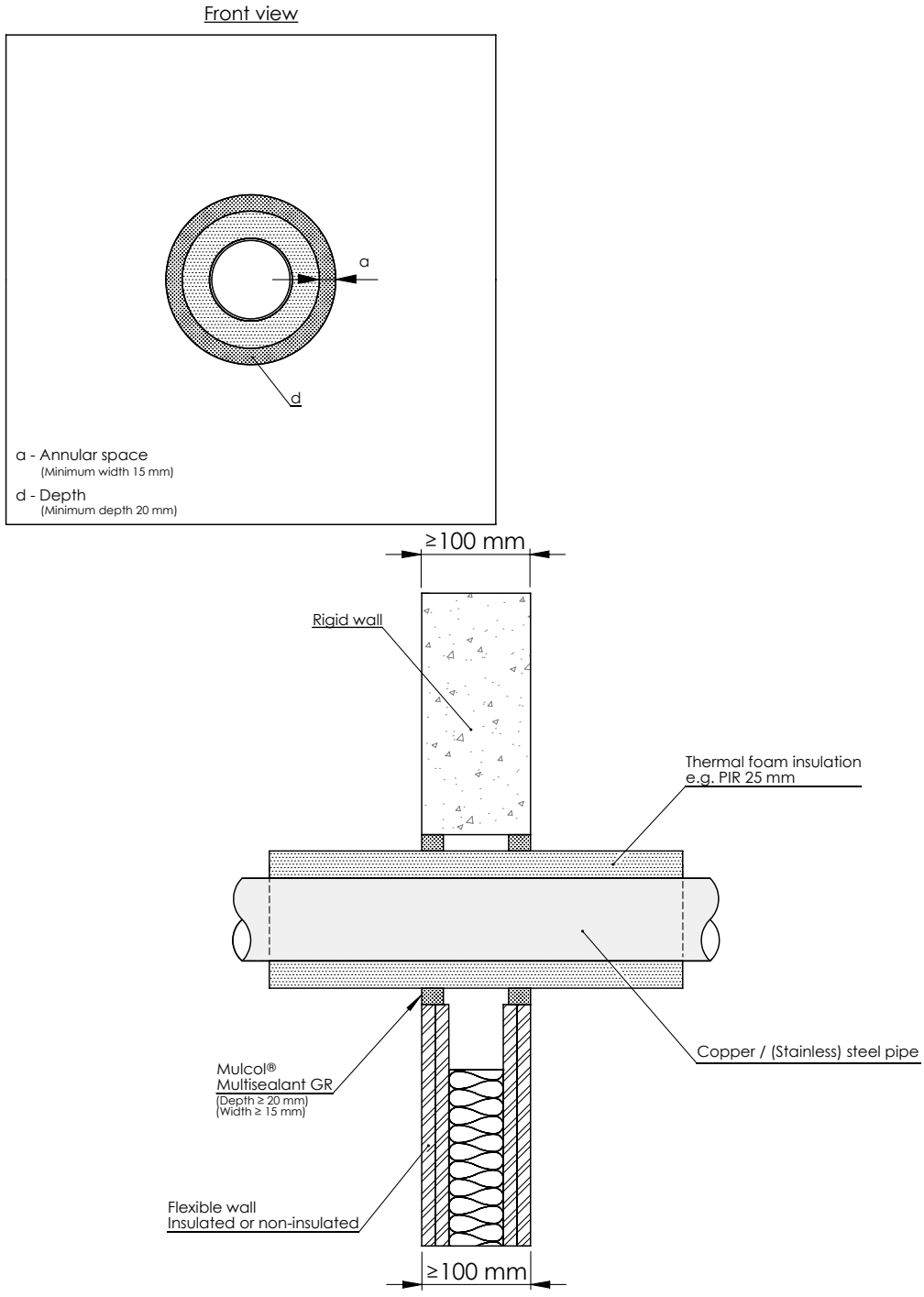
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals


Approved pipe range Copper / (Stainless-) steel / Cast iron
No insulation
EI 30-C/U
Pipe wall thickness (mm)
16
14
12
10
8
6
4
2
0
15/14.2
15/1.0
0
2
4
6
8
10
12
14
16
18
20
Outer pipe diameter (mm)

A.3.2 Metal pipes with insulation

A.3.2.1 Metal pipes with Thermal foam insulation



American projection	Scale : 1:5	Company : Mulcol International B.V.	FW-CU-G2.4.25
	Unit of measure : mm	Department : Research & Development	A4
	Date : 19-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation LS/CS thickness / length mm	Distance to support each face mm	Classification*
Copper / (Stainless) Steel / Cast Iron	≤ 54	1.5-14.2	25 / (LS) 300 (min.)	≤ 350	**E 120 C/U EI 120 C/U**
			25 / (LS) 500 (min.)		**E 120 C/U EI 120 C/U**
	≤ 76.1	2.0-14.2			**E 120 C/U EI 45 C/U**
	≤ 54	1.5-14.2	25 / (CS)		**E 120 C/U EI 120 C/U**
	≤ 76.1	2.0-14.2			**E 120 C/U EI 60 C/U**

* U/C pipe end configuration applies to C/C also

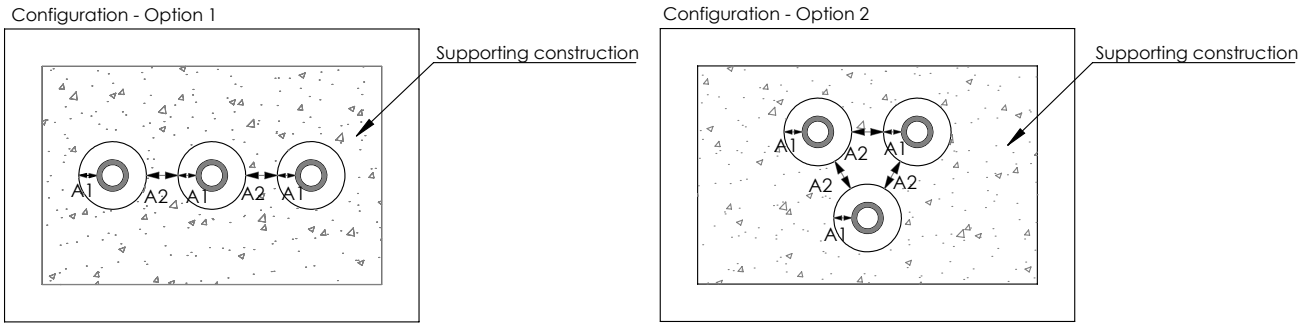
For an annular space (distance ''a'' in drawing) from 15 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

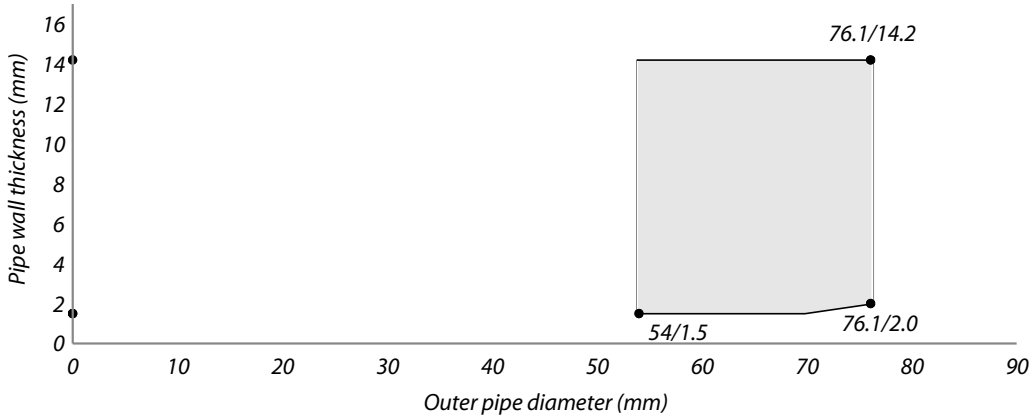
Figure E.1 out of the standard EN 1366-3:2009



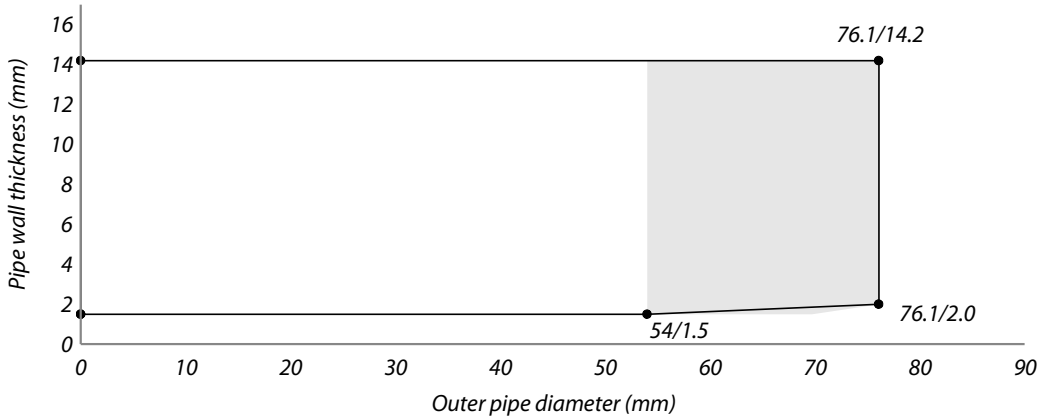
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

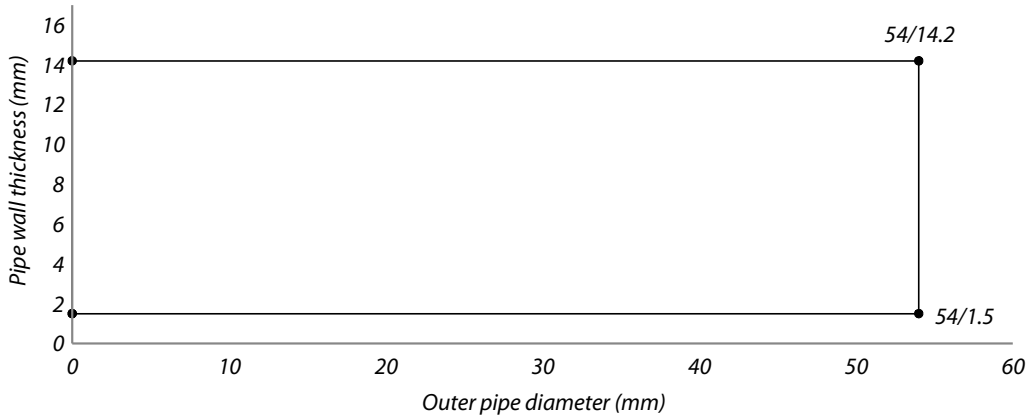
Approved pipe range Copper / (Stainless-) steel / Cast iron
Insulation Tarecpir B2 25 mm (LS 500)
EI 30-C/U and EI 45-C/U



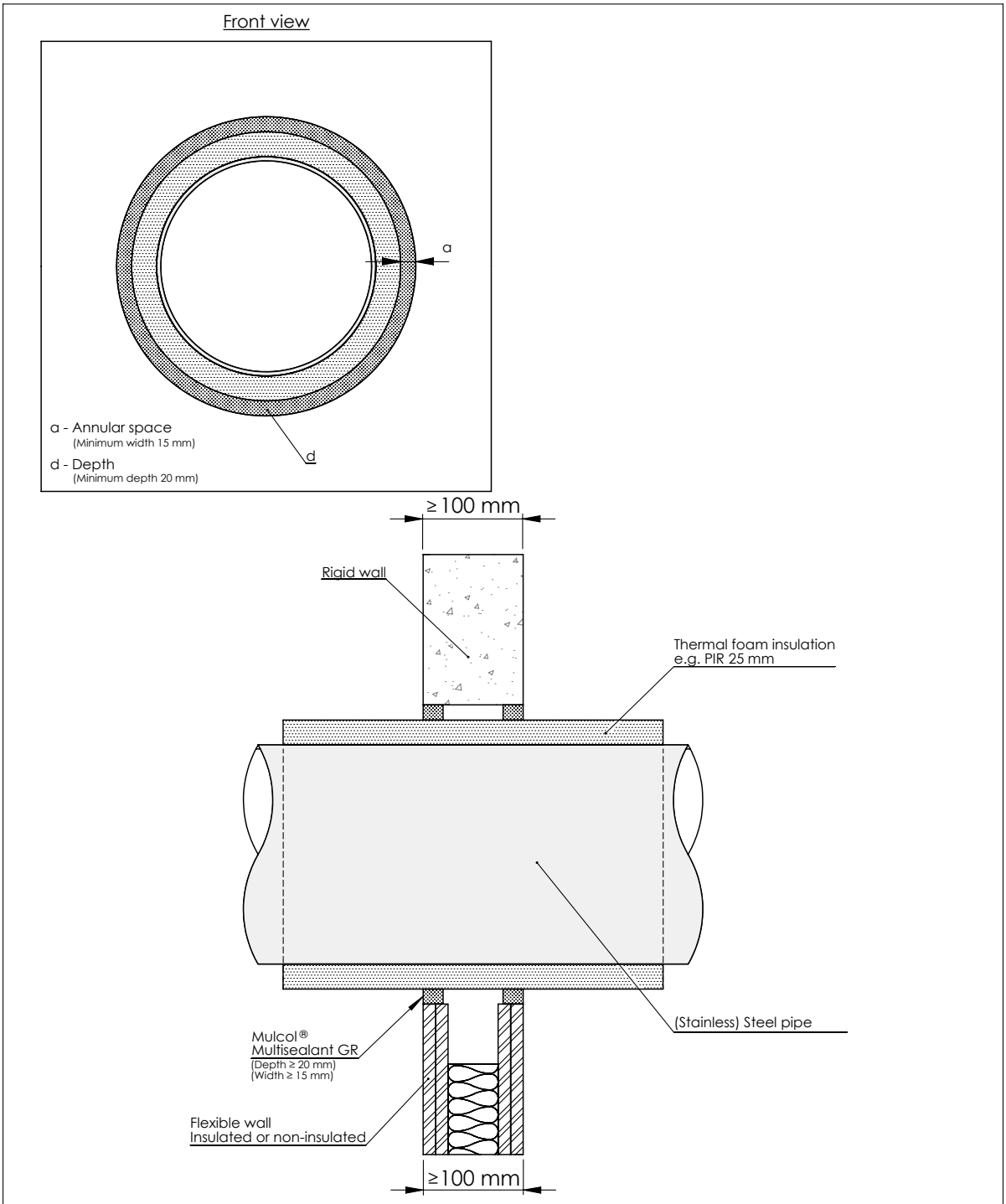
Approved pipe range Copper / (Stainless-) steel / Cast iron
Insulation Tarecpir B2 25 mm (CS)
EI 30-C/U, EI 45-C/U and EI 60-C/U



Approved pipe range Copper / (Stainless-) steel / Cast iron
Insulation TarecPIR B2 and Tarecpur 25 mm (LS 300, LS 500 and CS)
EI 30-C/U, EI 45-C/U, EI 60-C/U, EI 90-C/U and EI 120-C/U



A.3.2.2 Metal pipes up to Ø 219.1 mm with Thermal foam insulation



American projection	Scale : 1:5	Company : Mulcol International B.V.	FW-ST-G2.4.25
	Unit of measure : mm	Department : Research & Development	
	Date : 19-4-2017	Draftsman : B.D.	A4

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation LS/CS thickness / length mm	Distance to support each face mm	Classification*
(Stainless) Steel / Cast Iron	≤ 54	1.5-14.2	25 / (LS) 500 (min.) and (CS)	≤ 350	**E 120 C/U EI 120 C/U**
	≤ 219.1	4.0-14.2			**E 120 C/U EI 60 C/U**

* C/U pipe end configuration applies to C/C also

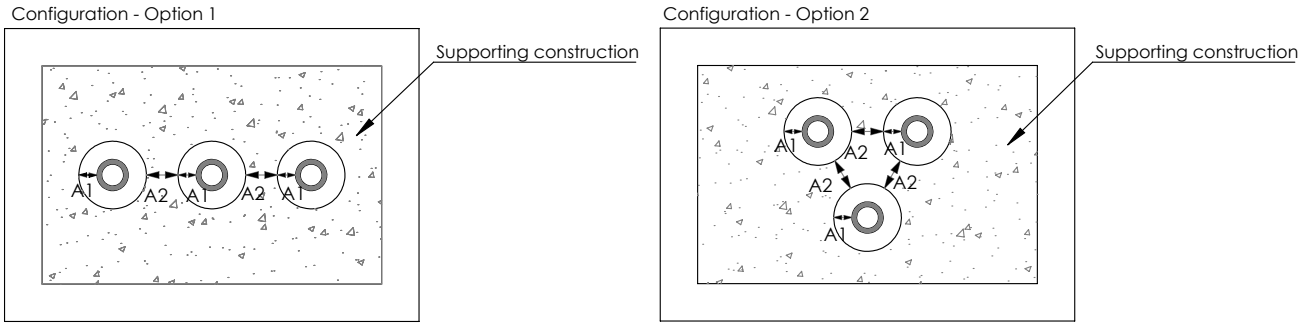
For an annular space (distance ''a'' in drawing) from 15 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

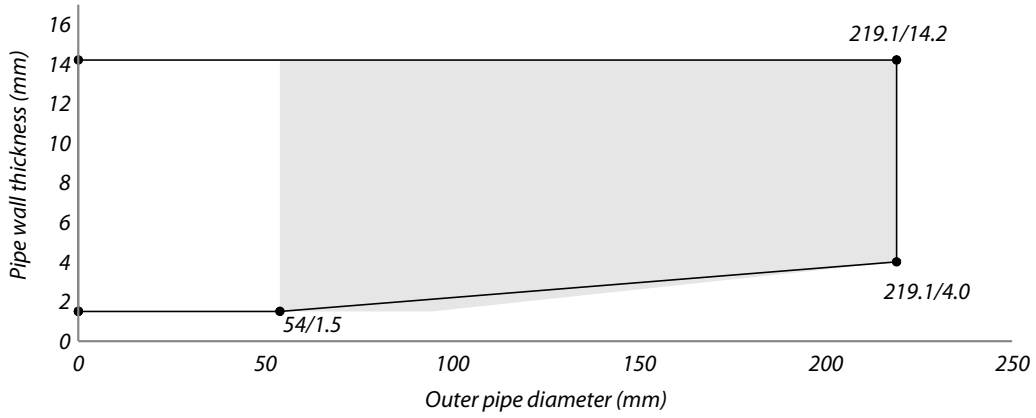
Figure E.1 out of the standard EN 1366-3:2009



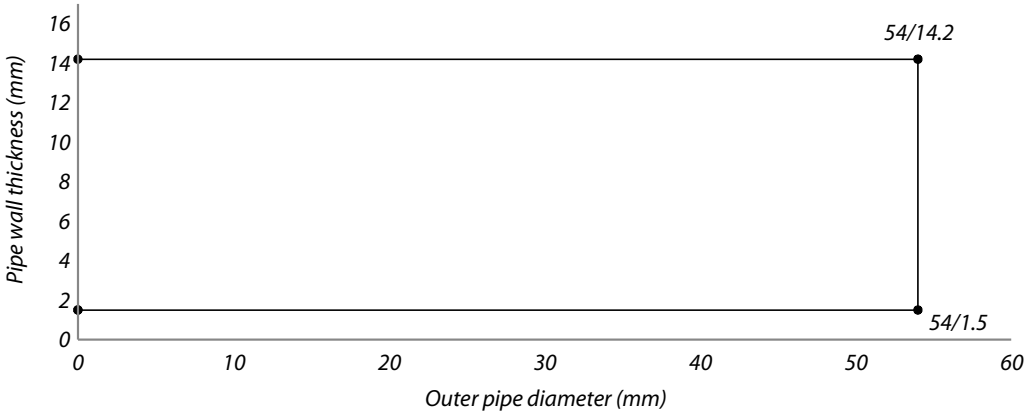
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

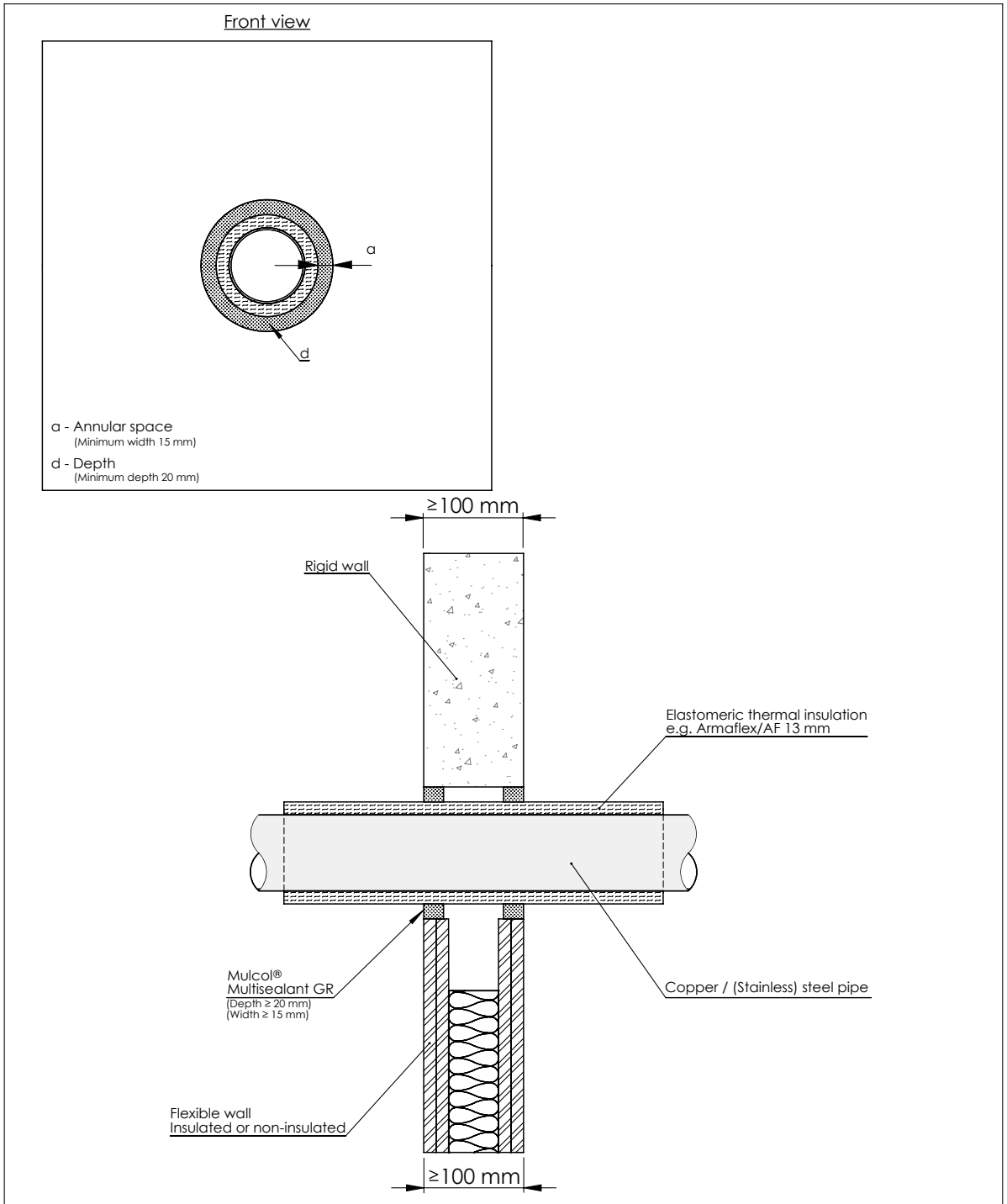
Approved pipe range (Stainless-) steel / Cast iron
Insulation Tarecpir B2 25 mm (LS 500 and CS)
EI 30-C/U, EI 45-C/U and EI 60-C/U



Approved pipe range (Stainless-) steel / Cast iron
Insulation Tarecpir B2 25 mm (LS 500 and CS)
EI 30-C/U, EI 45-C/U, EI 60-C/U, EI 90-C/U and EI 120-C/U



A.3.2.3 Metal pipes with Elastomeric thermal insulation



American projection	Scale : 1:5	Company : Mulcol International B.V.	FW-CU-G2.4.22
	Unit of measure : mm	Department : Research & Development	A4
	Date : 19-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation LS/CS thickness / length mm	Distance to support each face mm	Classification*
Copper / (Stainless) Steel / Cast Iron	≤ 54	1.5-14.2	13 / (LS) 300 (min.)	≤ 350	**E 120 C/U EI 60 C/U**
	≤ 76.1	2.0-14.2	13 / (LS) 500 (min.)		

* U/C pipe end configuration applies to C/C also

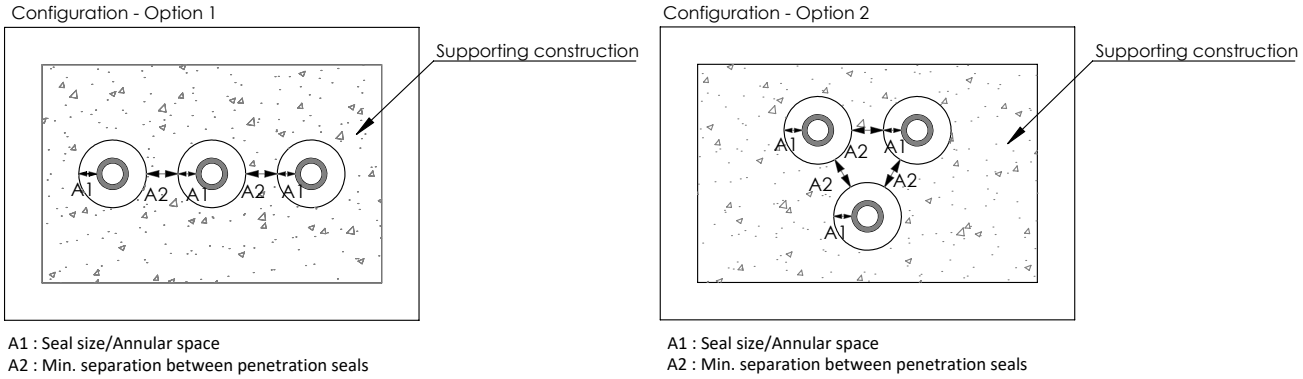
For an annular space (distance ''a'' in drawing) from 15 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

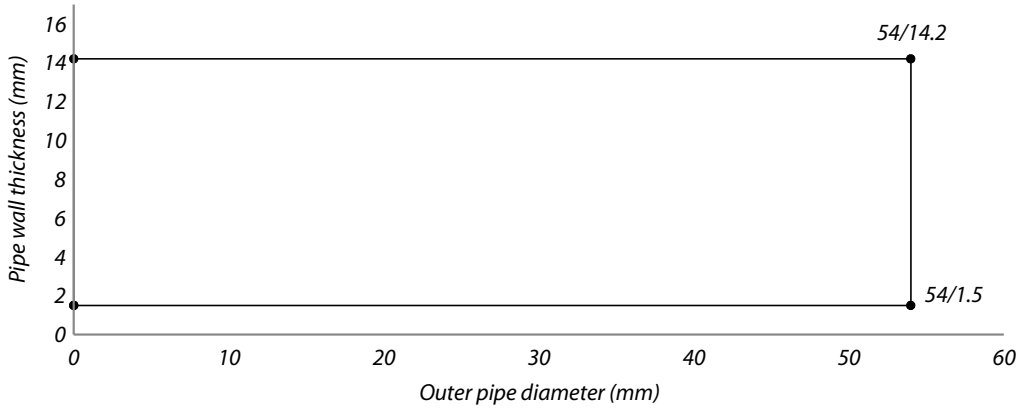
Figure E.1 out of the standard EN 1366-3:2009



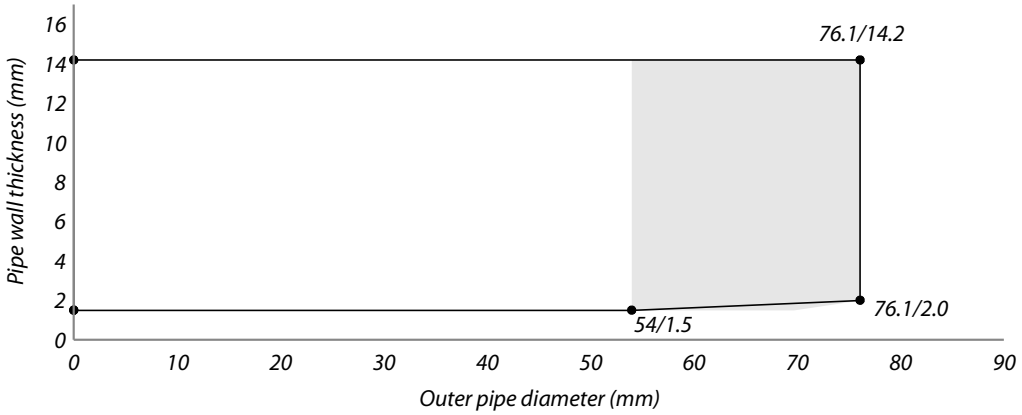
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

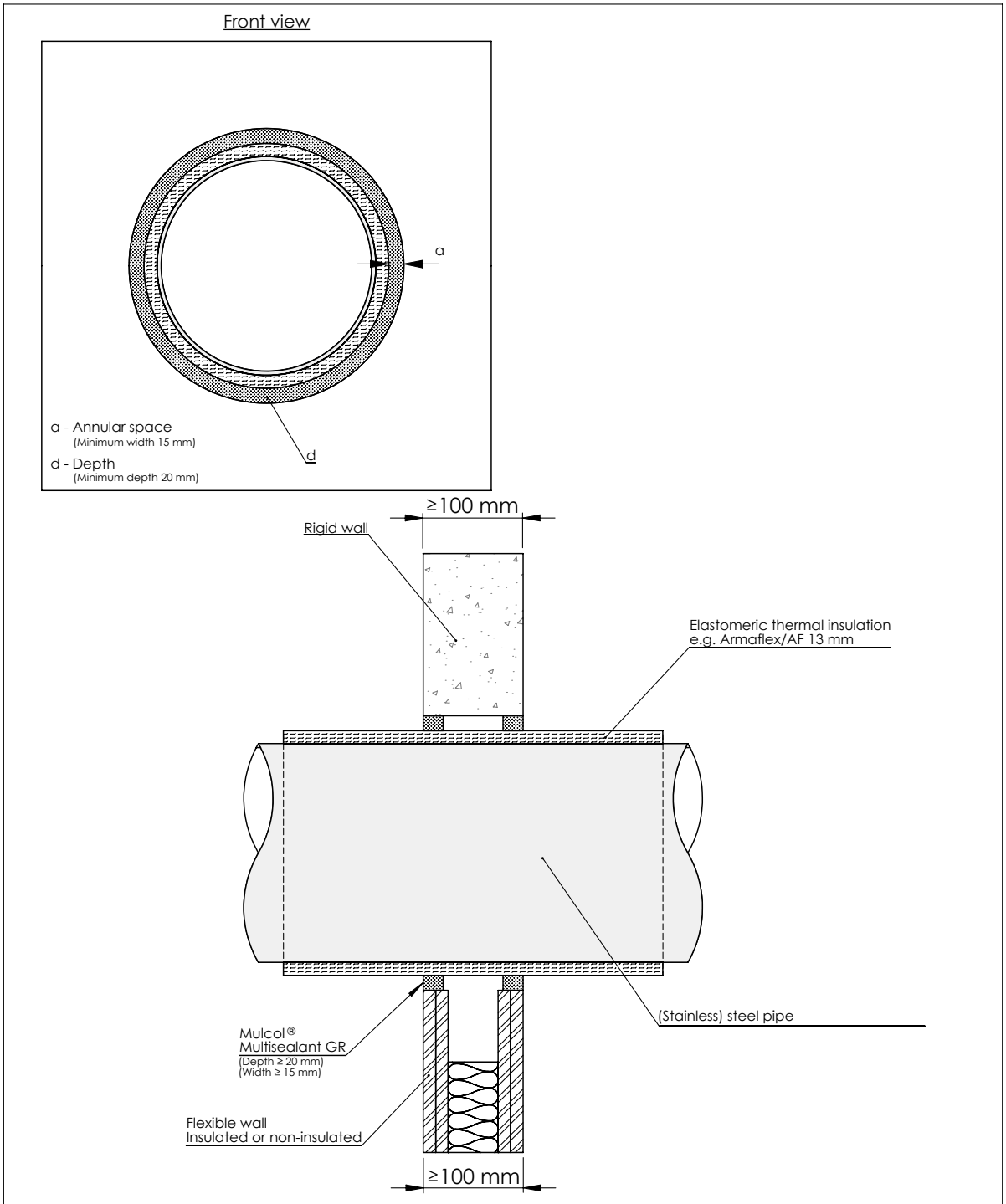
Approved pipe range Copper / (Stainless-) steel / Cast iron
Insulation AF/Armaflex 13 mm (LS 300)
EI 30-C/U, EI 45-C/U and EI 60-C/U



Approved pipe range Copper / (Stainless-) steel / Cast iron
Insulation AF/Armaflex 13 mm (LS 500)
EI 30-C/U, EI 45-C/U and EI 60-C/U



A.3.2.4 Metal pipes up to Ø 219.1 mm with Thermal foam insulation



American projection	Scale : 1:5	Company : Mulcol International B.V.	FW-ST-G2.4.22
	Unit of measure : mm	Department : Research & Development	A4
	Date : 19-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation LS / thickness / length mm	Distance to support each face mm	Classification*
(Stainless) Steel / Cast Iron	≤ 54	1.5-14.2	13 / (LS) 500 (min.)	≤ 350	**E 120 C/U EI 60 C/U**
	≤ 76.1	2.0-14.2			
	≤ 219.1	4.0-14.2			**E 120 C/U EI 45 C/U**
	≤ 54	1.5-14.2	25 / (LS) 500 (min.)		**E 120 C/U EI 60 C/U**
	≤ 76.1	2.0-14.2			
	≤ 168.3	4.5-14.2			

* U/C pipe end configuration applies to C/C also

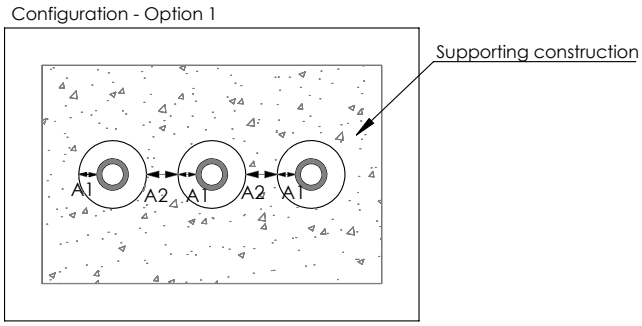
For an annular space (distance ''a'' in drawing) from 15 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

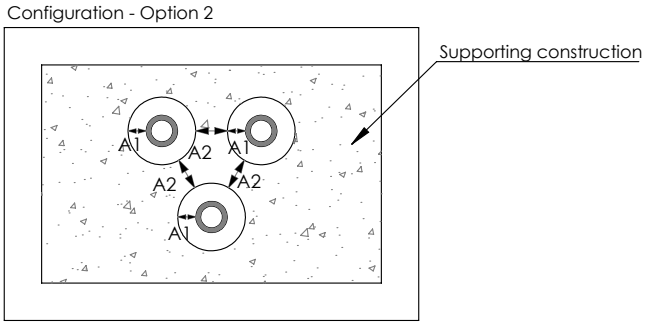
In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

Figure E.1 out of the standard EN 1366-3:2009

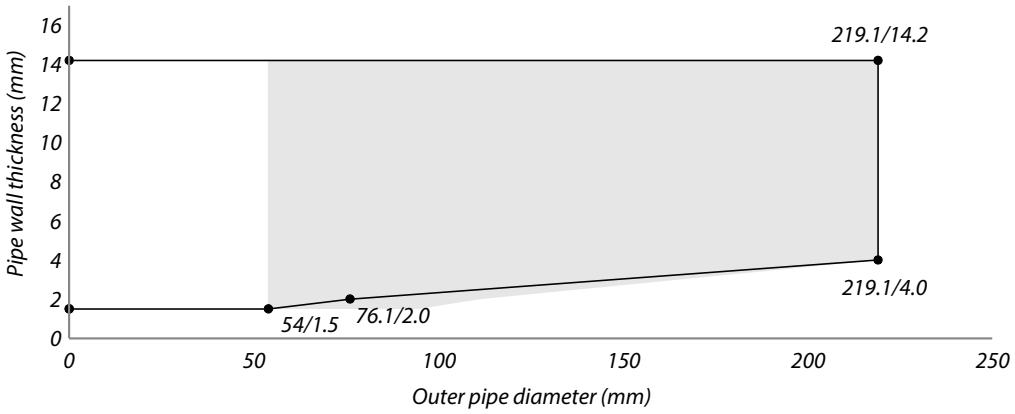


A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

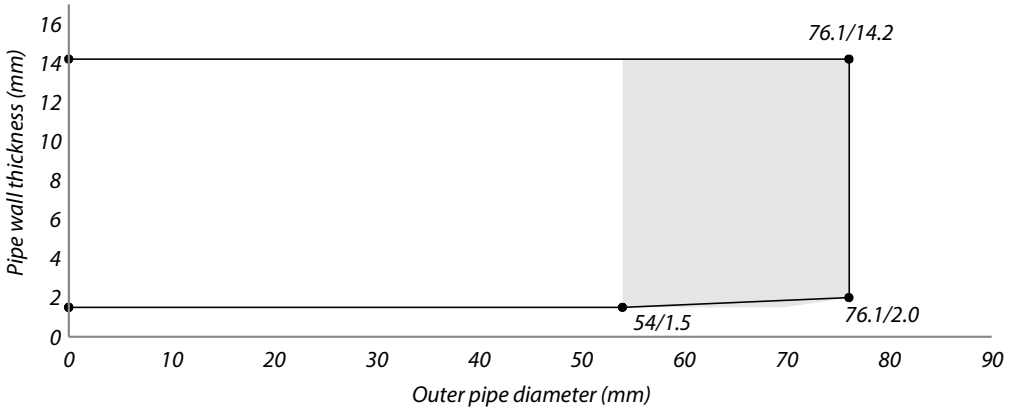


A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

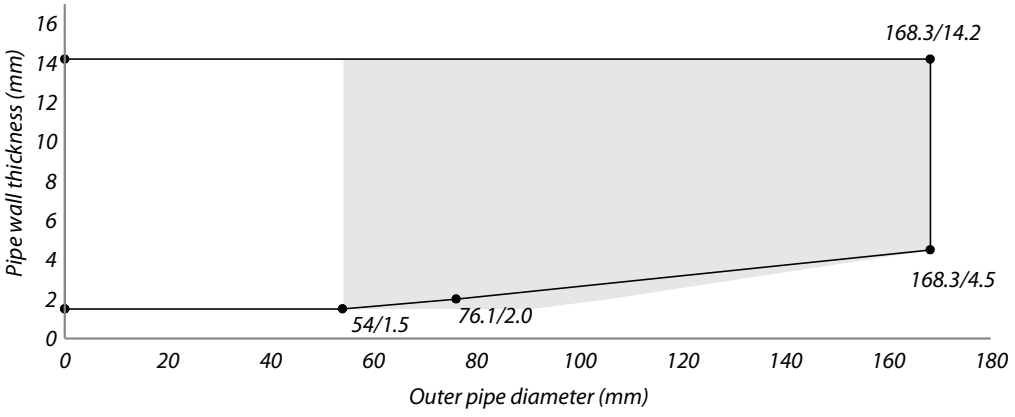
Approved pipe range (Stainless-) steel / Cast iron
Insulation AF/Armaflex 13 mm (LS 500)
EI 30-C/U and EI 45-C/U



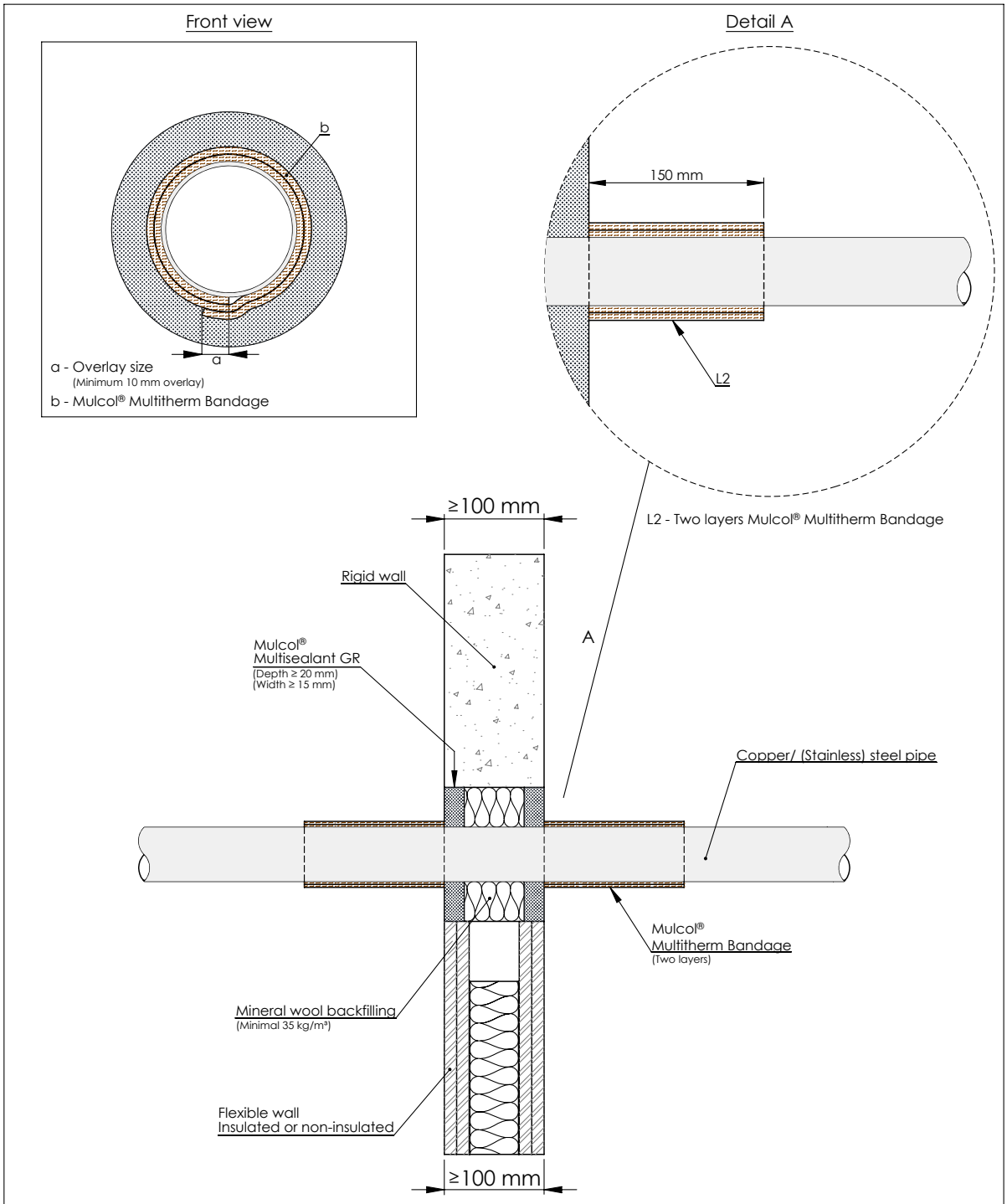
Approved pipe range (Stainless-) steel / Cast iron
Insulation AF/Armaflex 13 mm (LS 500)
EI 30-C/U, EI 45-C/U and EI 60-C/U



Approved pipe range (Stainless-) steel / Cast iron
Insulation AF/Armaflex 25 mm (LS 500)
EI 30-C/U, EI 45-C/U and EI 60-C/U



A.3.3 Metal pipes with two Mulcol® Multitherm Bandage to both faces of the wall (LI 150)



American projection	Scale : 1:5	Company : Mulcol International B.V.	FW-ST-B2.1.20
	Unit of measure : mm	Department : Research & Development	A4
	Date : 11-4-2017	Draftsman : K.J.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multitherm Bandage
Installation in flexible wall and rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Layers each face (LI 150)	Distance to support each face mm	Classification*
Copper / (Stainless) Steel / Cast Iron	≤ 54	1.5-14.2	Two (see fig. 2 according to I.2.13)	≤ 350	**E 120 C/U EI 45 C/U**

* U/C pipe end configuration applies to C/C also

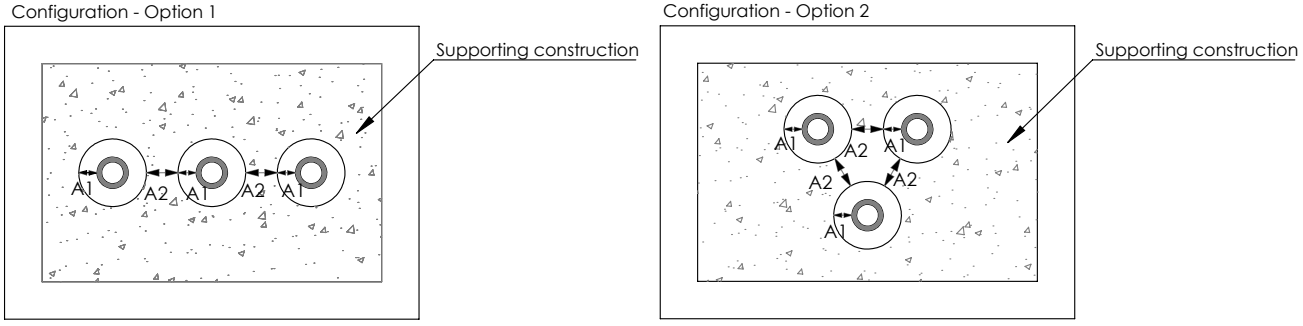
For an annular space (distance ''a'' in drawing) from 15 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

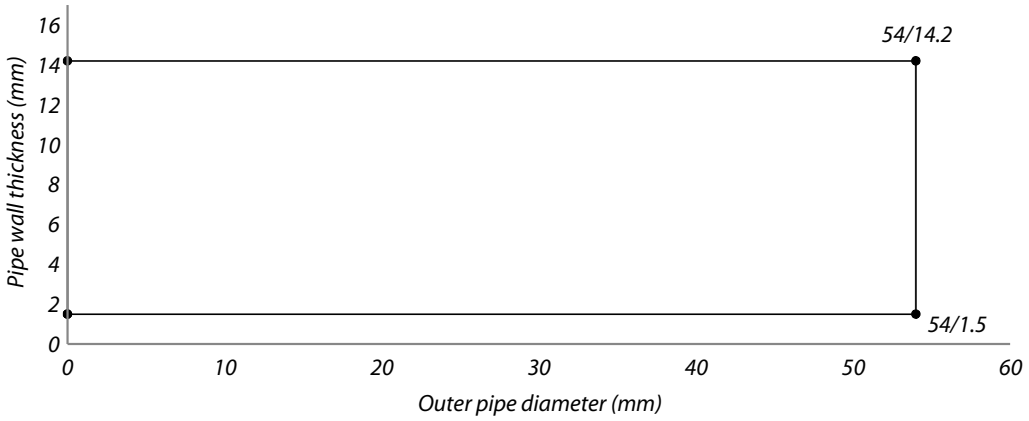
Figure E.1 out of the standard EN 1366-3:2009



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

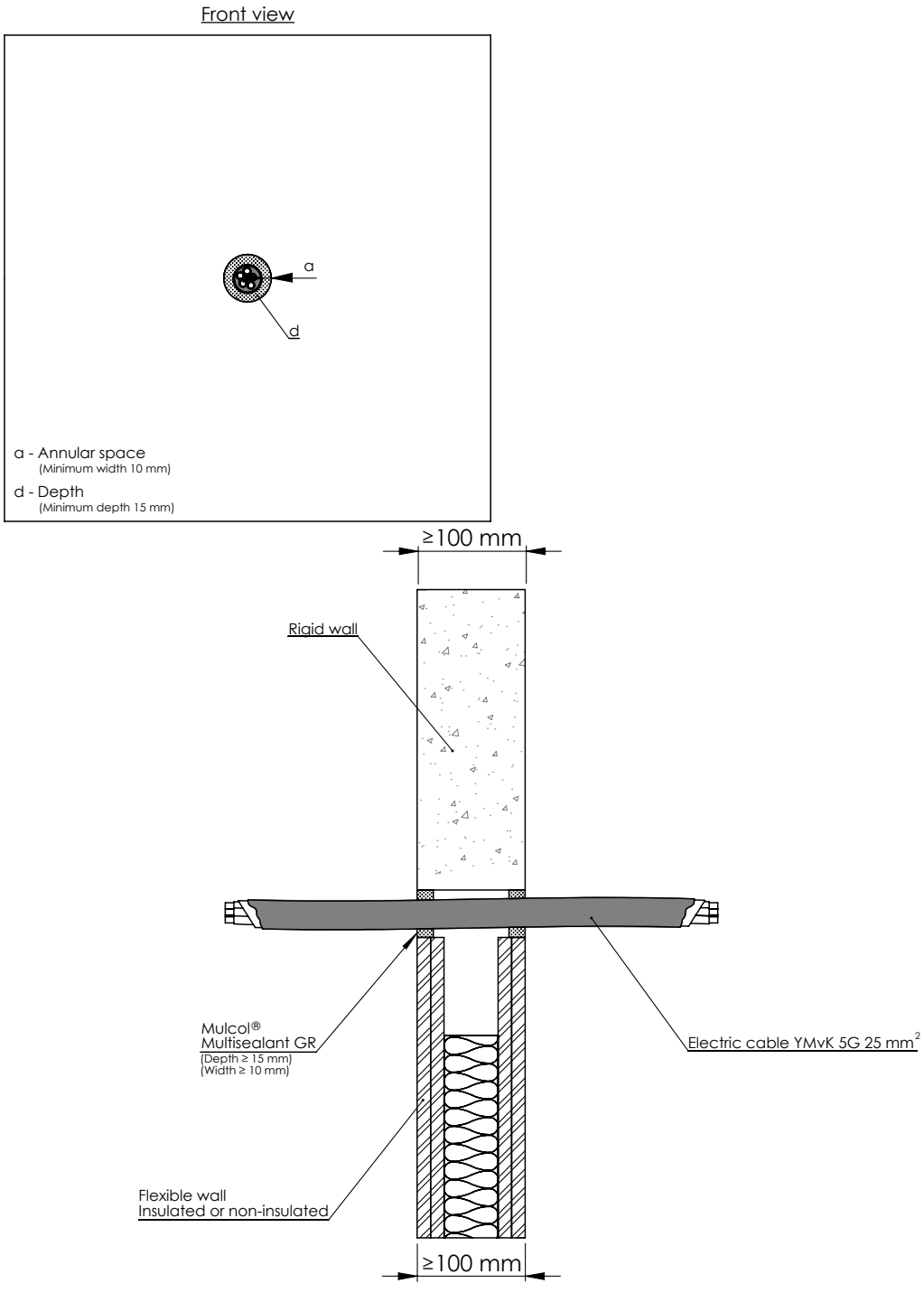
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

Approved pipe range Copper / (Stainless-) steel / Cast iron
Insulation Multitherm Bandage 2 layers (LI 150)
EI 30-C/U and EI 45-C/U



A.4 Electrical cables

A.4.1 Electrical cables in regular configurations



American projection		Company : Mulcol International B.V.	FW-EC-G2.2.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 19-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Cable		Number of cables allowed	Distance to support each face mm	Classification
Generic type	Type			
Sheathed cable Ø25 mm	5G 25 mm² 0.6/1kV	1	≤ 350	**E 120 EI 60**

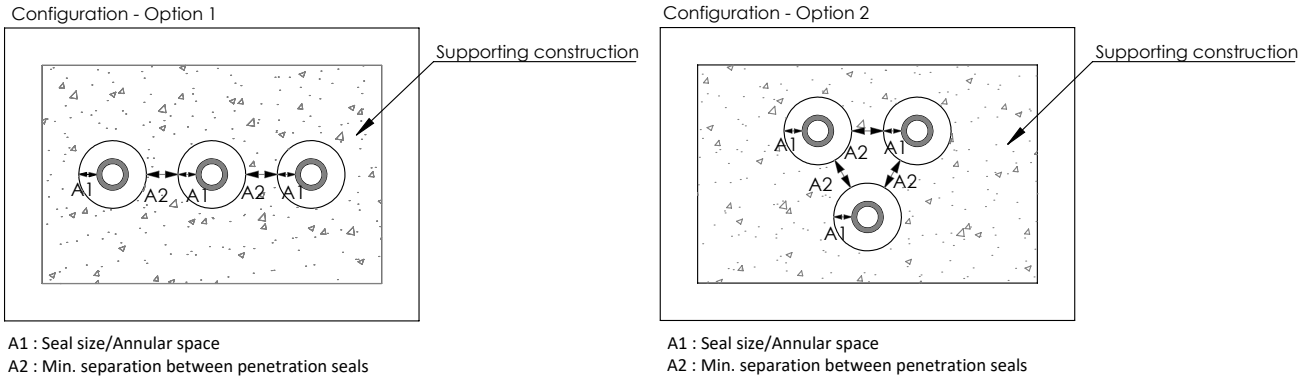
For an annular space (distance ''a'' in drawing) from 10 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the cables shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 10 mm;
- distance A2 = 100 mm;

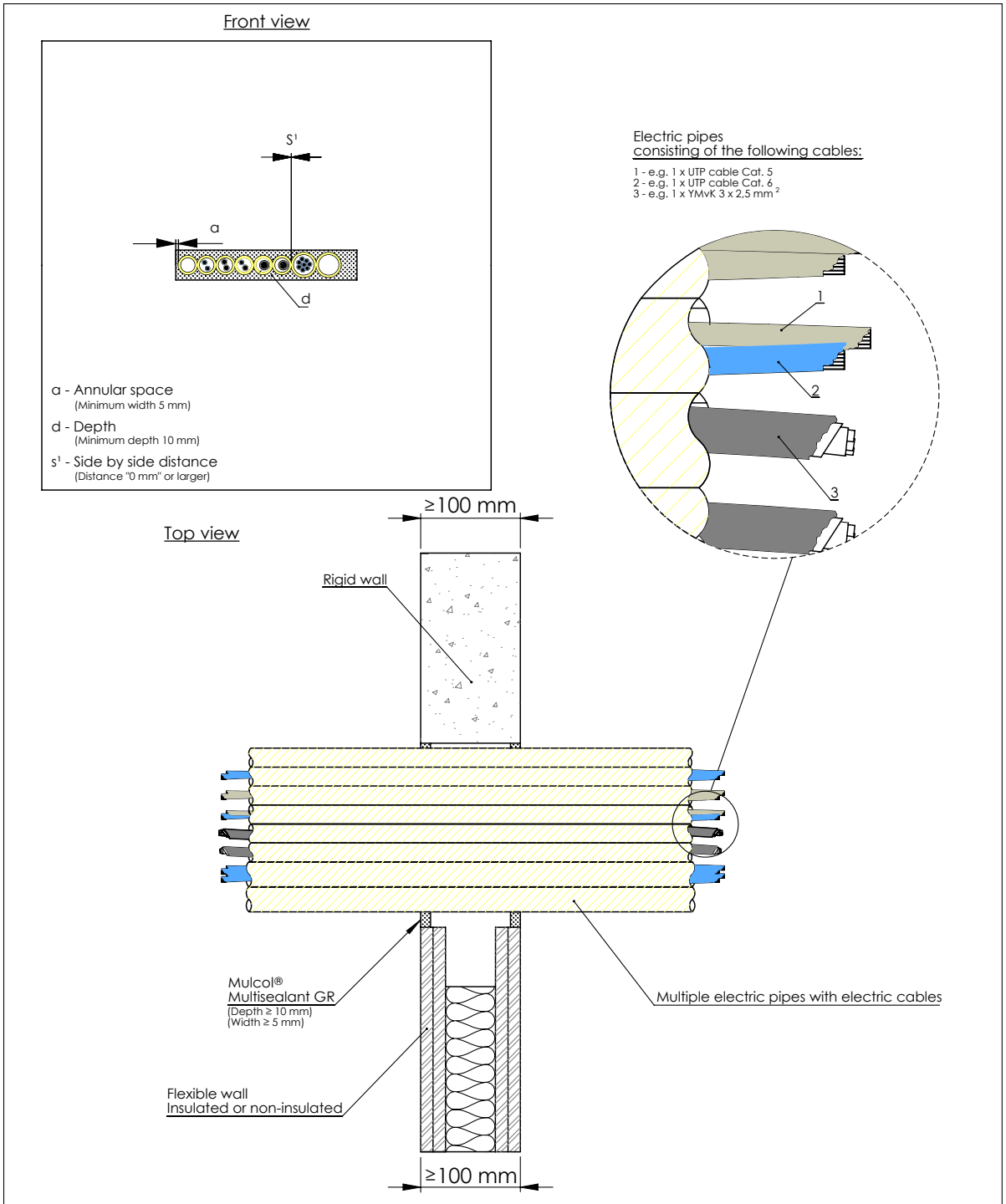
Figure E.1 out of the standard EN 1366-3:2009



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A.4.2 Multiple penetration consisting of eight PVC-ET pipes containing electrical cables



American projection	Scale : 1:5	Company : Mulcol International B.V.	FW-EP8-G2.1.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 31-5-2018	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

For this system, a fire resistance according to the following combinations of performance parameters and classes applies (up to a maximum of 8 pipes)

Pipe/ conduit material	Outer pipe diameter mm	Distance between pipes S[1] mm	Distance to support each face mm	Classification*
PVC-ET	3/4", 5/8" or Ø 25 mm	≤ 15	≤ 600	**E 120 U/U EI 90 U/U**

* U/U pipe end configuration applies to C/U, U/C and C/C also

Permitted telecommunication cables		One sheathed cable allowed for each pipe			Empty pipe
UTP Cat. 5	UTP Cat. 6	YMVK 3 x 2.5 mm²	YMVK 5 x 1.5 mm²	YMVK 5 x 2.5 mm²	
Yes	Yes	Yes	Yes	Yes	Yes

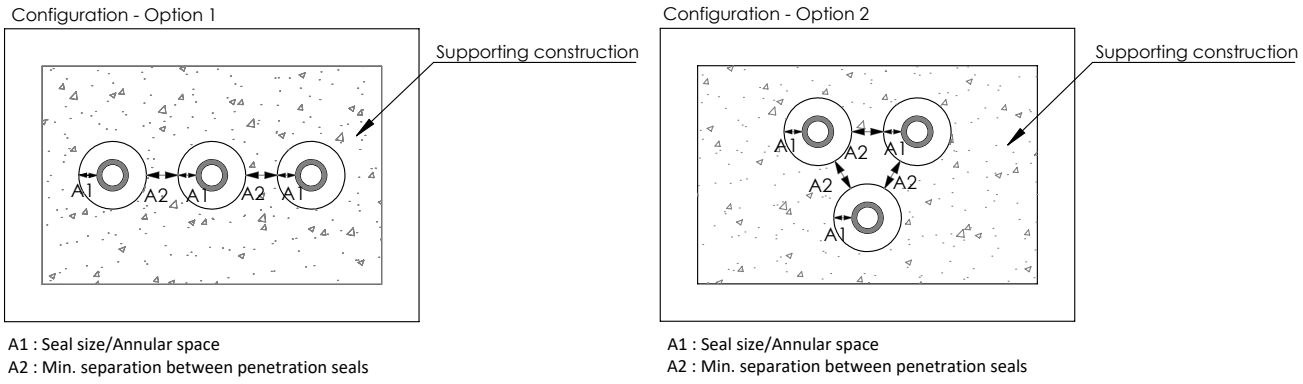
For an annular space (distance ''a'' in drawing) from 5 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 5 mm;
- distance A2 = 100 mm;

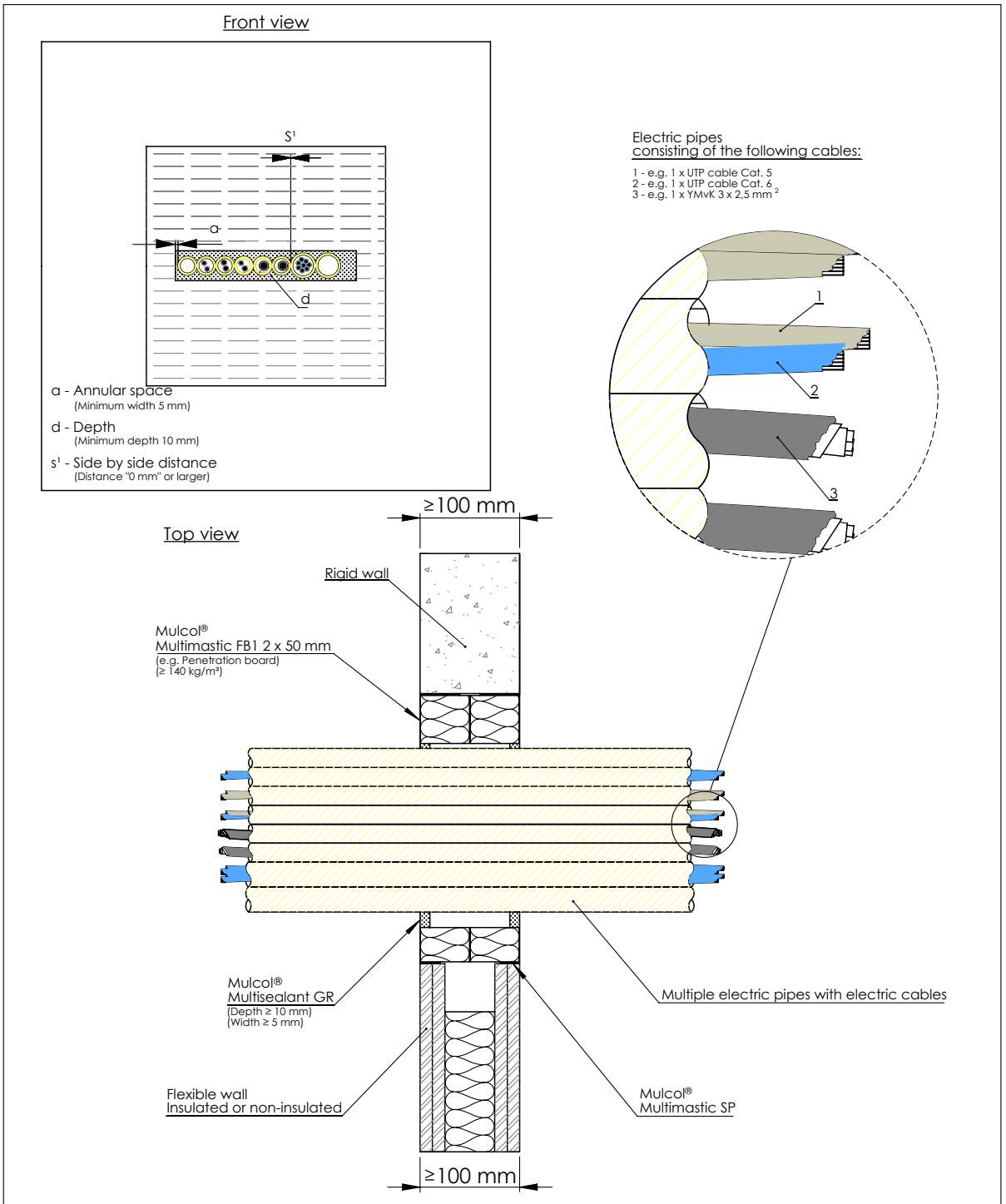
Figure E.1 out of the standard EN 1366-3:2009



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A.4.2.1 Multiple penetration consisting of eight PVC-ET pipes containing electrical cables trough Mulcol® Multimastic FB1



American projection	Scale : 1:5	Company : Mulcol International B.V.	PBfw-EP8-G2.1.10
	Unit of measure : mm	Department : Research & Development	
	Date : 1-6-2018	Draftsman : B.D.	A4

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

For this system, a fire resistance according to the following combinations of performance parameters and classes applies (up to a maximum of 8 pipes)

Pipe/ conduit material	Outer pipe diameter mm	Distance between pipes S[1] mm	Distance to support each face mm	Classification*
PVC-ET	3/4", 5/8" or Ø 25 mm	≤ 15	≤ 600	**E 90 U/U EI 90 U/U**

* U/U pipe end configuration applies to C/U, U/C and C/C also

Permitted telecommunication cables		One sheathed cable allowed for each pipe			Empty pipe
UTP Cat. 5	**UTP Cat. 6**	**YMVK 3 x 2.5 mm²**	**YMVK 5 x 1.5 mm²**	**YMVK 5 x 2.5 mm²**	
Yes	Yes	Yes	Yes	Yes	Yes

For an annular space (distance ''a'' in drawing) from 5 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

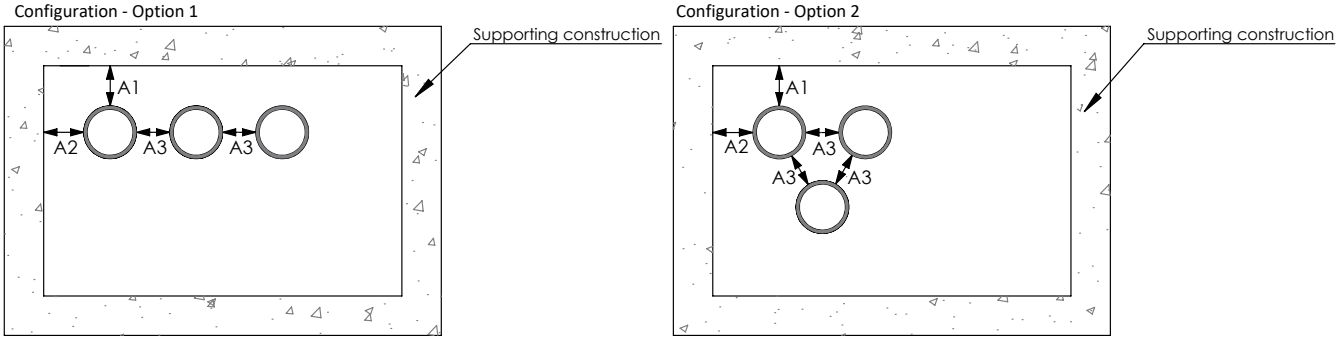
- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

The Mulcol® Multimastic C system to be used consists of two layers of 50 mm on top of each other (total thickness 100 mm). The aperture size in the wall may be up to 1200 mm high and unlimited length. No aperture frame is needed, but it is allowed.

In the Mulcol® Multimastic C system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 to A3 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 50 mm;
- distance A2 = 50 mm;
- distance A3 = 100 mm;

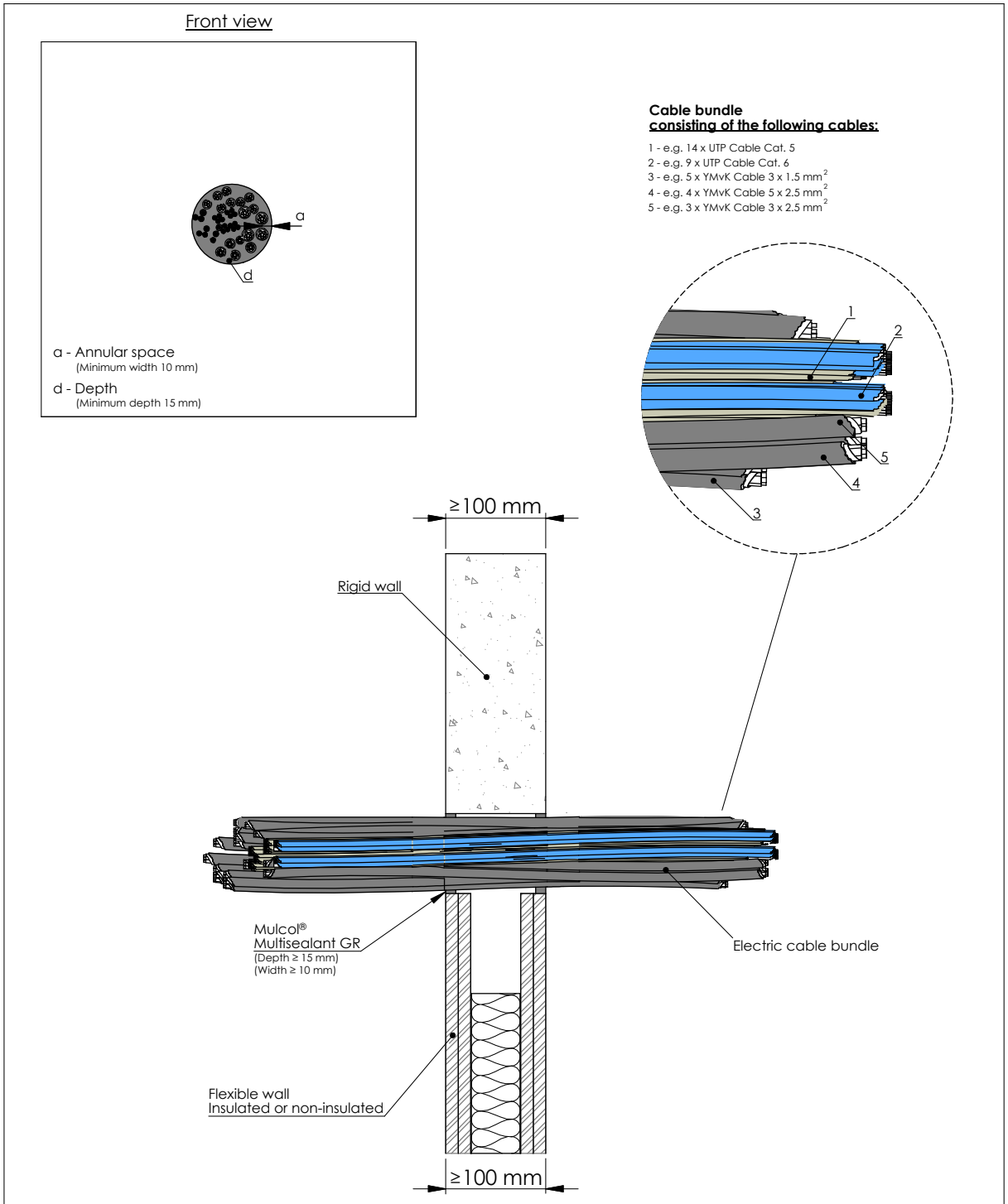
Figure E.1 out of the standard EN 1366-3:2009



A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A.4.3 Electrical cable bundle



American projection	Scale	: 1:5	Company : Mulcol International B.V.	FW-EC-G2.2.10
	Unit of measure	: mm	Department : Research & Development	A4
	Date	: 17-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in flexible wall and rigid wall

Generic type	Maximum aperture diameter mm	Maximum cables allowed	Distance to support each face mm	Classification
Cable bundle	100	41	≤ 350	**E 120** **EI 60**

Permitted telecommunication cables		Sheathed cable allowed		
UTP Cat. 5	**UTP Cat. 6**	**YMVK 3 x 2.5 mm²**	**YMVK 5 x 1.5 mm²**	**YMVK 5 x 2.5 mm²**
Yes	Yes	Yes	Yes	Yes

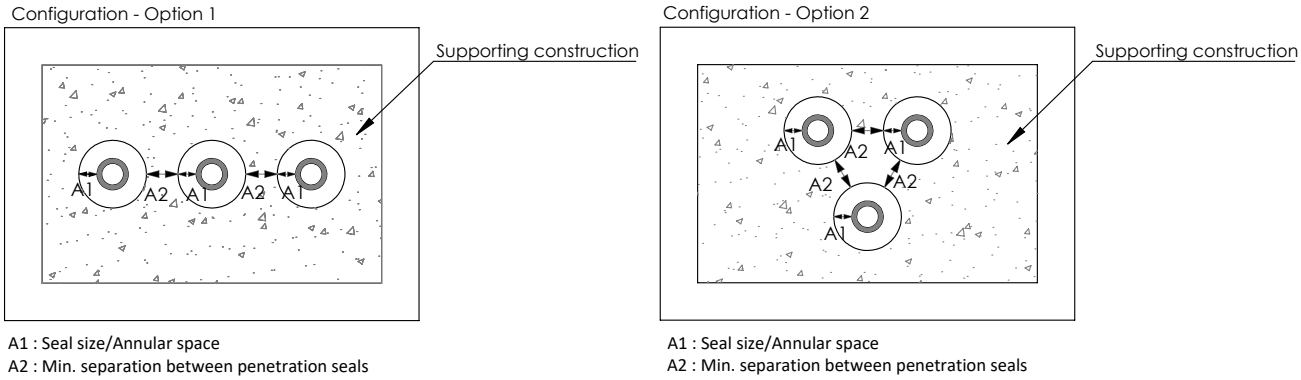
For an annular space (distance ''a'' in drawing) from 10 to 20 mm no backing material is necessary but it is allowed. For an annular spaces from 21 to 75 mm backing material is mandatory. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a flexible or rigid wall system the following minimum distances between the apertures edges and between cable bundles shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 10 mm;
- distance A2 = 100 mm;

Figure E.1 out of the standard EN 1366-3:2009



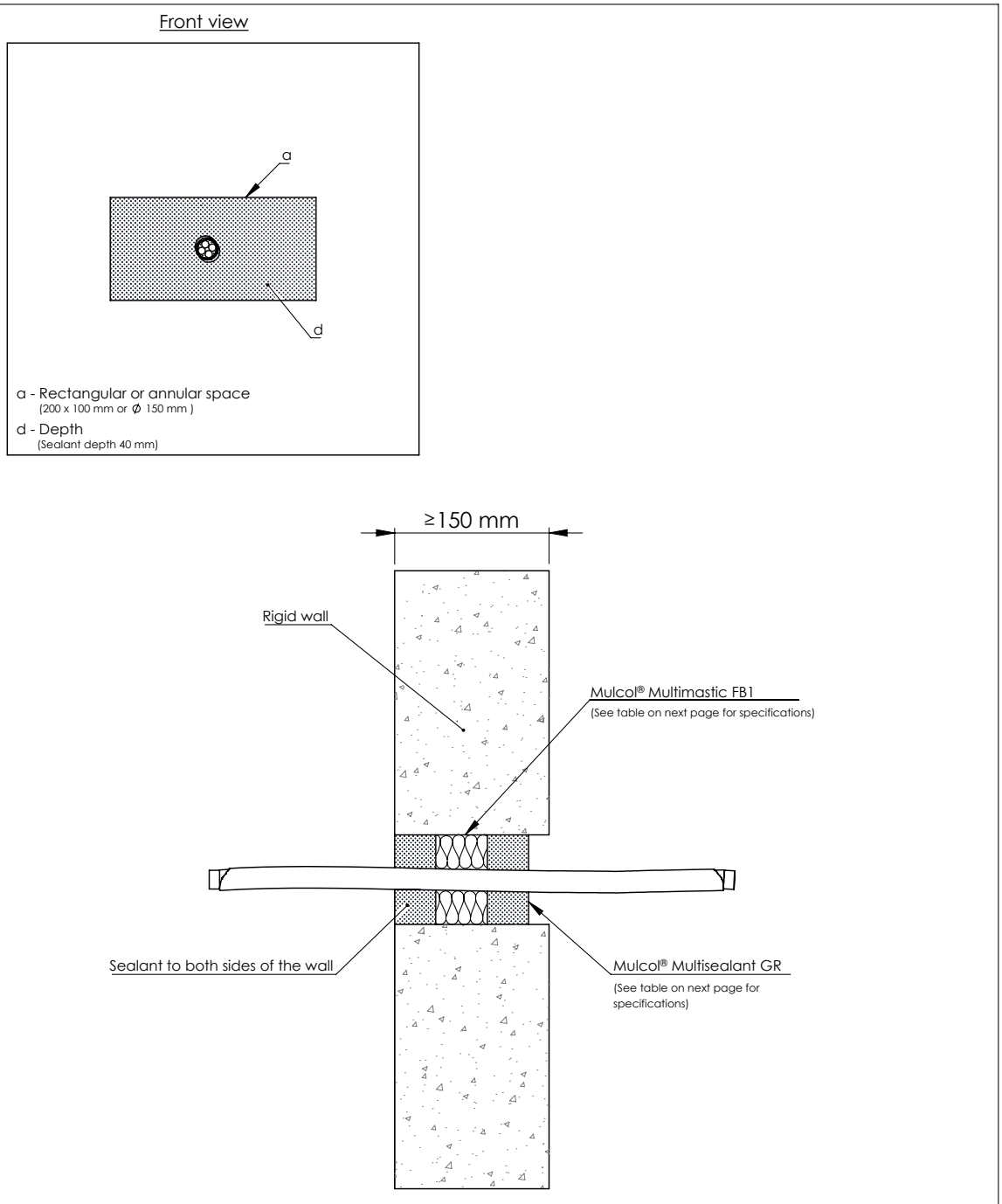
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

ANNEX A-A – Resistance to Fire Classification – Mulcol® Multisealant GR - Rigid wall constructions according to Section 2 1) with wall thickness of minimum 150 mm

A-A.1 (Electrical) cables

A-A.1.1 (Electrical) cables in regular configurations



American projection	Scale : 1:5	Company : Mulcol International B.V.	FW-EC-G2.14.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 17-6-2016	Draftsman : B.D.	

MULCOL FIRE PROTECTION

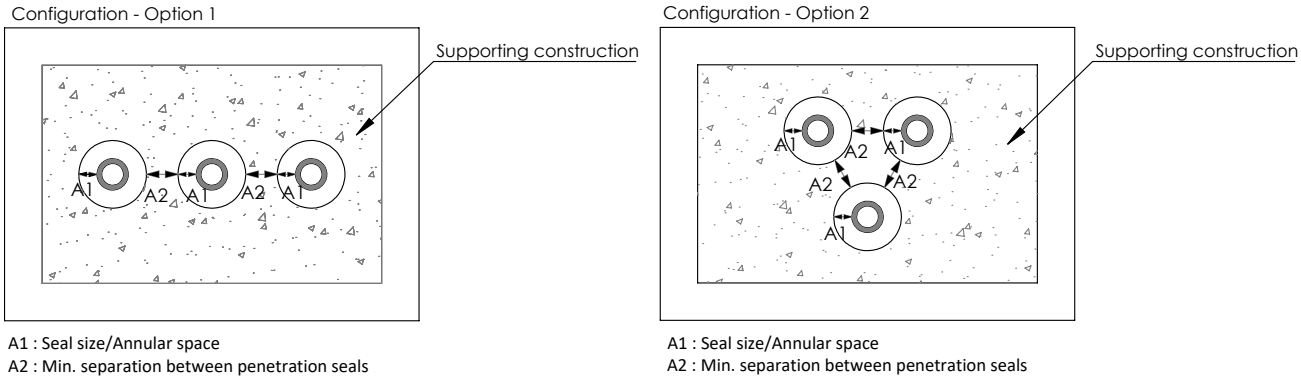
Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid wall

Service type	Service dimensions or diameter mm	Seal width mm	Backing	Classification
Perforated steel cable tray	150 x 25	200 x 100	50 mm Mulcol® Multimastic FB1	**E 240 EI 180**
Single copper core armoured cable	Ø 20			
Twin/ earth cable	Ø 110			
Cable bundle	Ø 100 (4 pcs. of Ø 20 mm, single copper core armoured cable and 12 pcs. twin/ earth cables)	Ø 150		**E 240 EI 60**

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = Ø 150 or 200 x 100 mm;
- distance A2 = 30 mm;

Figure E.1 out of the standard EN 1366-3:2009

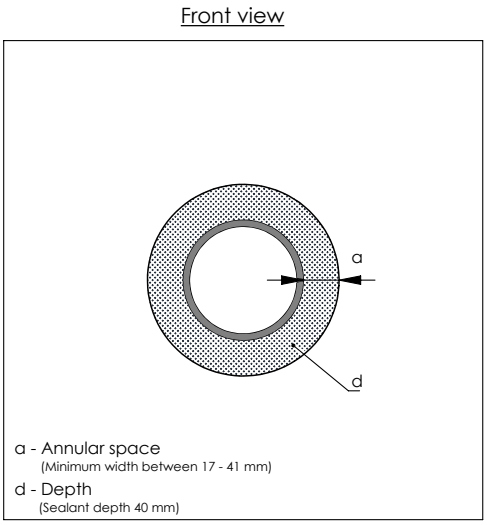


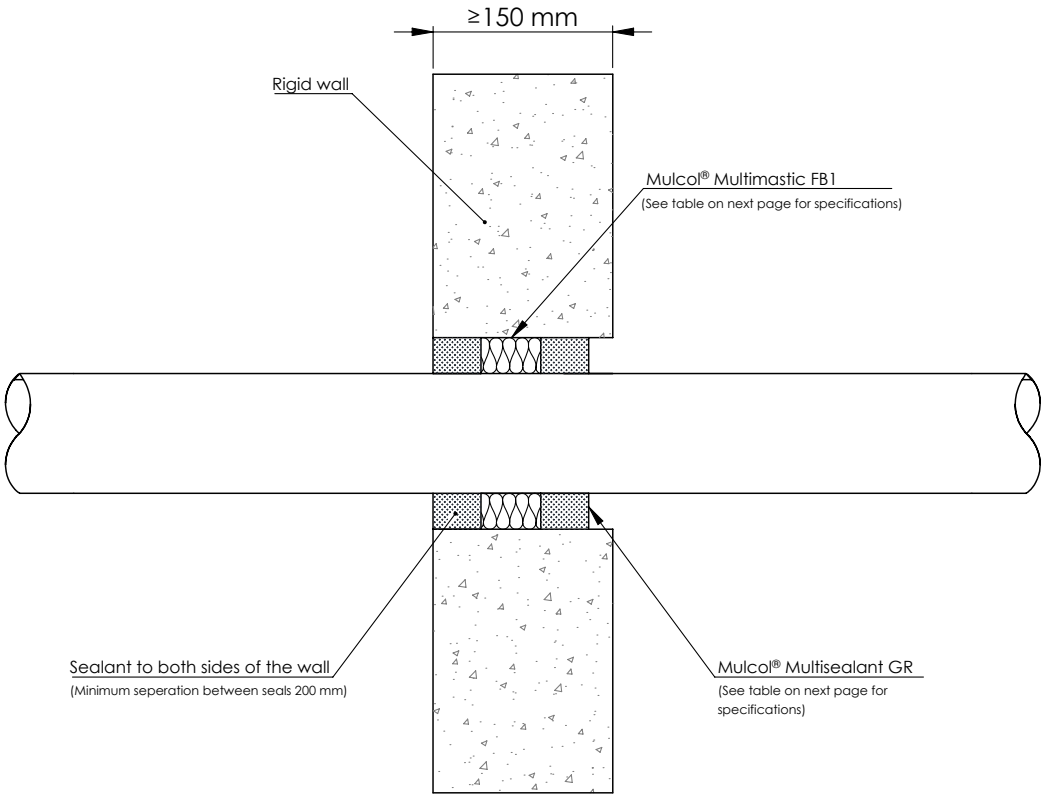
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A-A.2 Plastic pipes

A-A.2.1 Plastic pipes in regular configurations, backed with 50 mm Mulcol® Multimastic FB1





American projection	Scale : 1:5	Company : Mulcol International B.V.	RW-PP-G2.14.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 17-6-2016	Draftsman : B.D.	

MULCOL FIRE PROTECTION

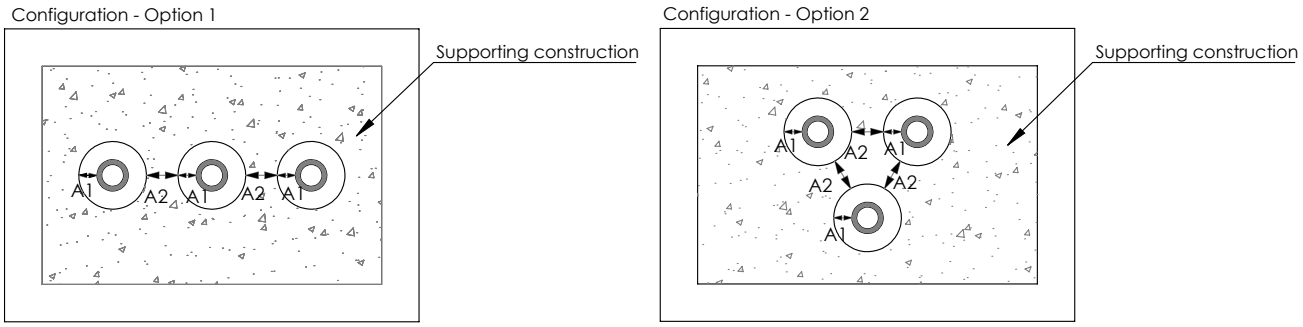
Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Seal width mm	Backing	Classification*
PE / ABS / SAN+PVC	32	3.2	25	50 mm Mulcol® Multimastic FB1	**EI 240 U/C**
ABS	36	2.3			
	110	3.5			
PVC-U / PVC-C	48	3.2	17		
	68	2	41		
	110	3.5	22		

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 17-41 mm;
- distance A2 = 30 mm;

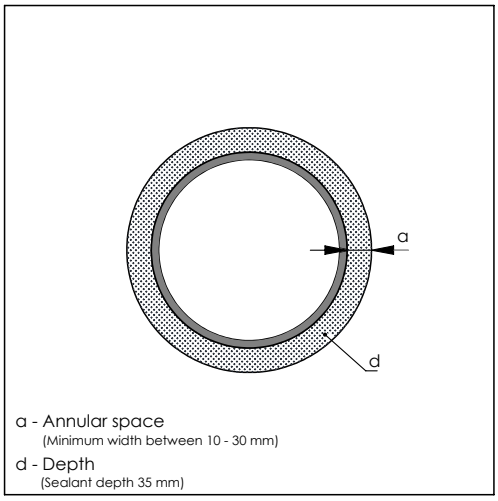
Figure E.1 out of the standard EN 1366-3:2009

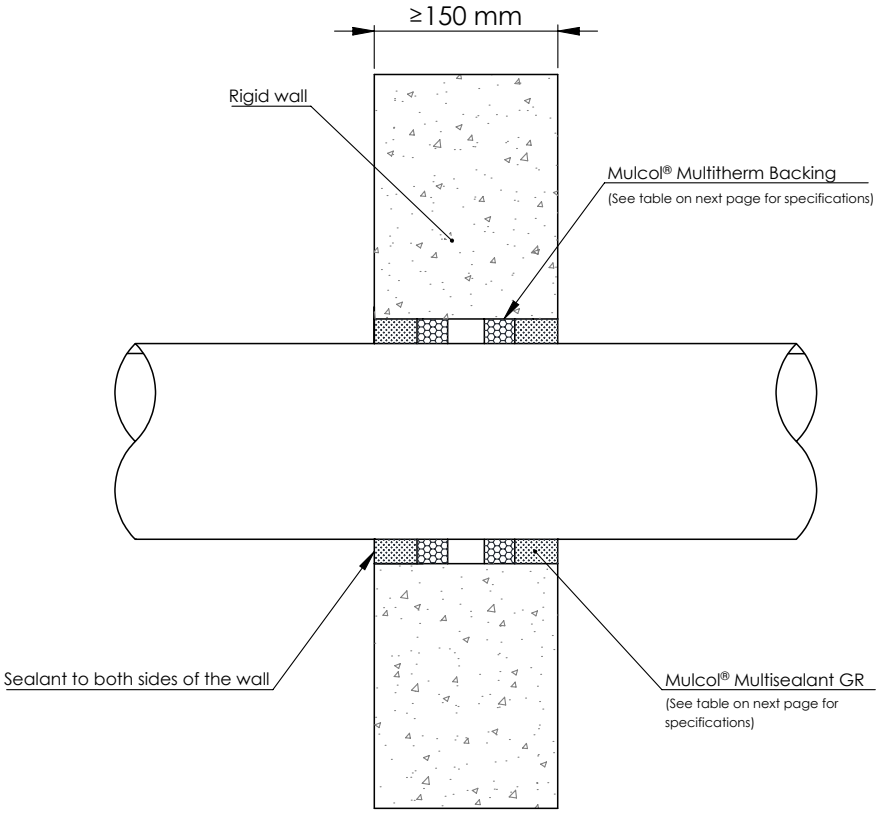


A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A-A.2.1.1 Plastic pipes in regular configurations, backed with 25 mm Mulcol® Multitherm Backing





NEW 2D-DRAWING

American projection	Scale : 1:5	Company : Mulcol International B.V.	RW-PP-G2.14.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 12-7-2018	Draftsman : B.D.	

MULCOL FIRE PROTECTION

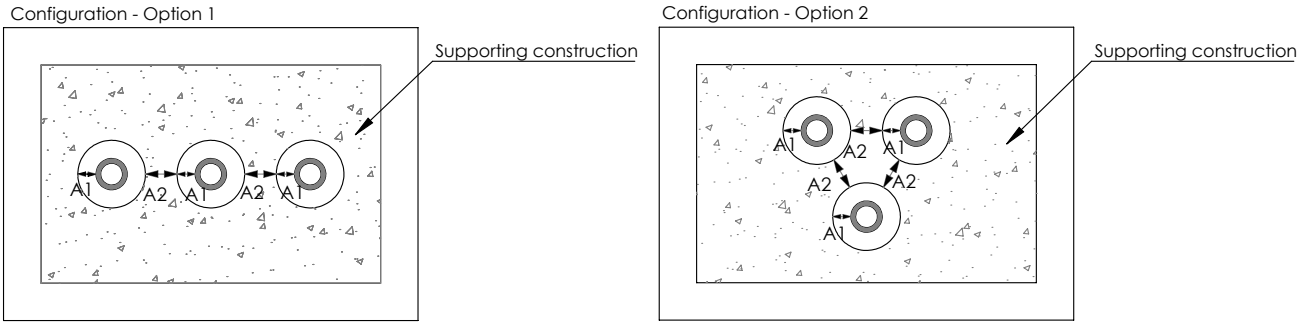
Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid wall

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Seal width mm	Backing	Classification*
PE / ABS / SAN+PVC	160	4.0-9.5	10-30	25 mm Mulcol® Multitherm Backing	**EI 30 U/C**
PP		6.2-9.1	10		
PVC-U / PVC-C		4.0-9.5	10-30		**EI 90 U/C**
		9.5			**E 240 U/C** **EI 180 U/C**

In a flexible or rigid wall system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

− distance A1 = 10-30 mm;
− distance A2 = 30 mm;

Figure E.1 out of the standard EN 1366-3:2009



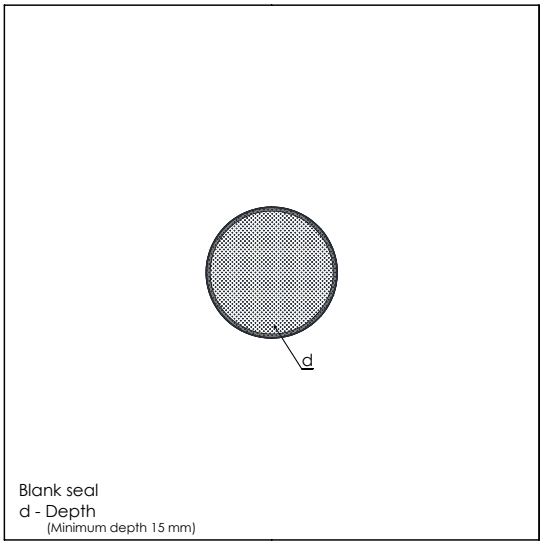
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

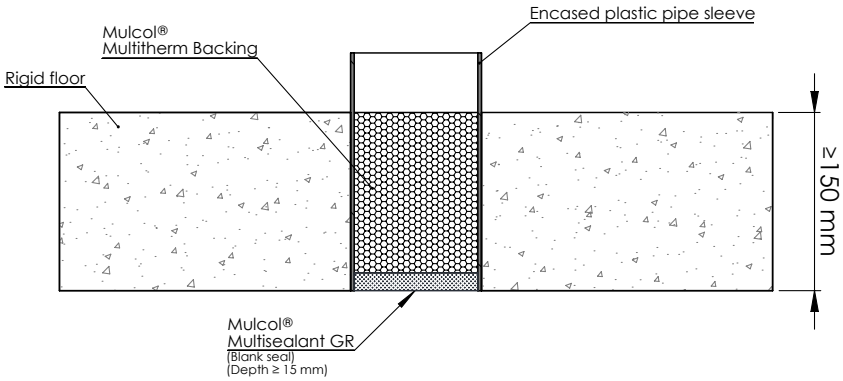
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

ANNEX B – Resistance to Fire Classification – Mulcol® Multisealant GR - Rigid floor constructions according to Section 2 1) with floor thickness of minimum 150 mm.

B.1 Plastic pipes

B.1.1 Plastic (encased) pipes in regular configurations





American projection	Scale : 1:5	Company : Mulcol International B.V.	RFmk-PP-G1.11.31
	Unit of measure : mm	Department : Research & Development	
	Date : 18-4-2017	Draftsman : B.D.	A4

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

For this system with an encased PVC-U / PVC-C pipe, a fire resistance according to the following combinations of performance parameters and classes applies in one direction (from below).

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Backing material	Classification*
PVC-U / PVC-C (Encased)	110	≤ 3.2	Multitherm Backing	**E 120 EI 120**

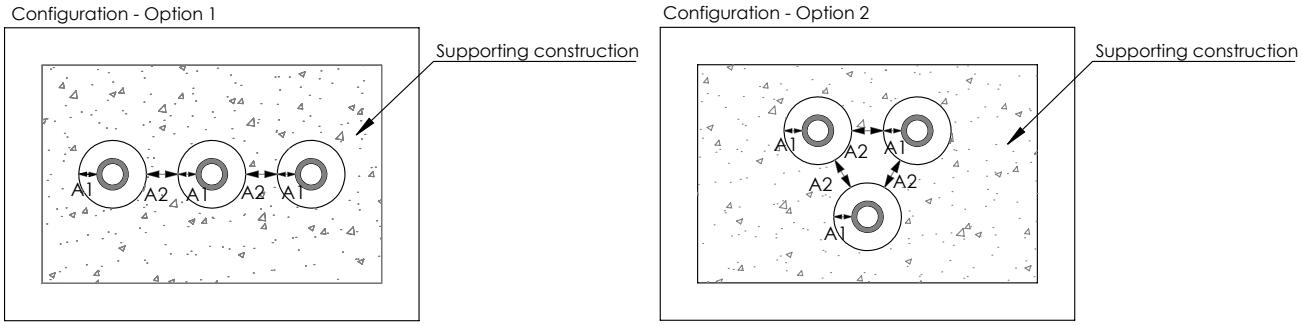
For this system without an encased pipe, a fire resistance according to the following combinations of performance parameters and classes applies in one direction (from below).

Service	Maximum aperture diameter mm	Backing material	Classification*
Blank seal	110	Multitherm Backing	**E 120 EI 120**

In a rigid floor system the following minimum distances between the apertures edges and between the (encased) pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

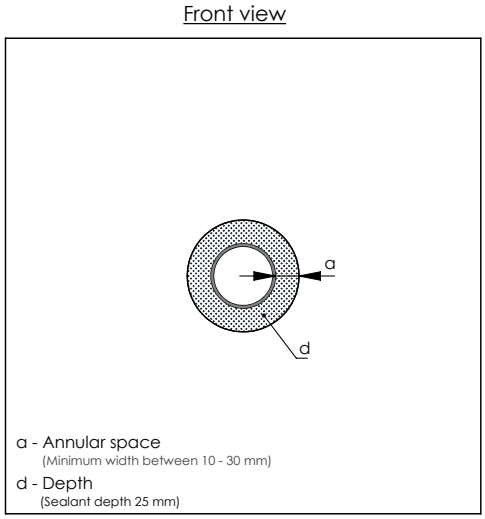
Figure E.1 out of the standard EN 1366-3:2009

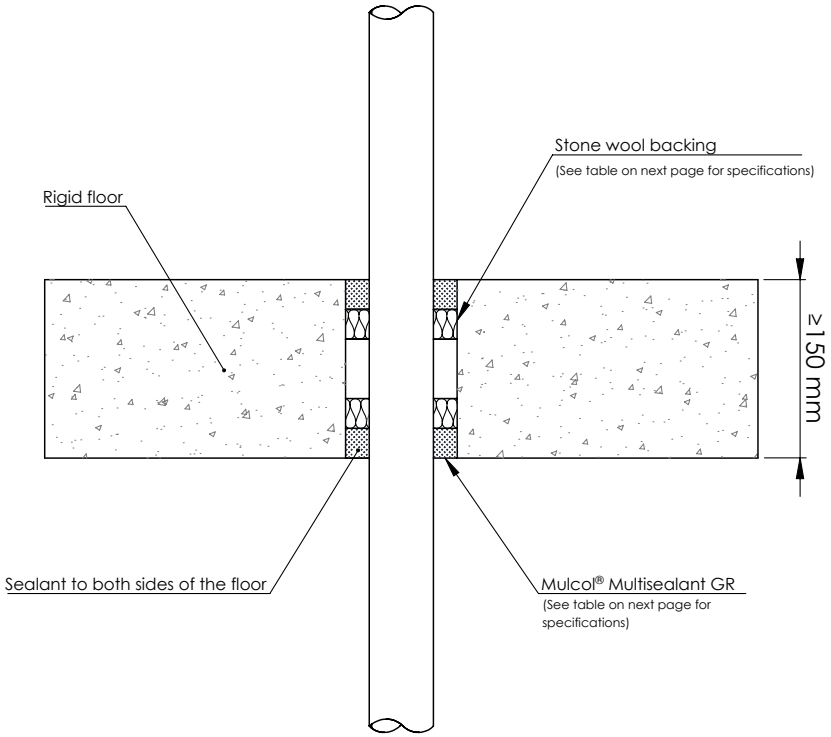


A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

B.1.1.1 Plastic pipes in regular configurations, backed with Stone wool





American projection	Scale : 1:5	Company : Mulcol International B.V.	RF-PP-G2.11.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 17-6-2016	Draftsman : R.M.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

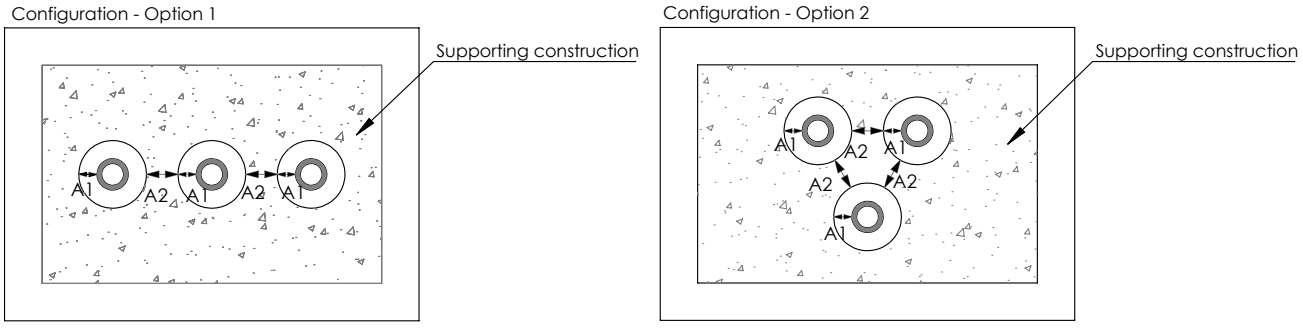
Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Backing	Configuration	Classification*
PE / ABS / SAN+PVC	40	2.4-3.7	25 mm Stone wool insulation, 35 kg/m³	2 between PE pipes	**EI 60 U/U, EI 240 U/C**
	40 up to 110	2.4-3.7 / 4.3-10		1 & 2 between PE pipes & between ∅ 40-110 mm PVC-U pipes	**EI 60 U/C**
	110	4.3-10		2 between PE pipes	**EI 90 U/C**
		10			**EI 60 U/U**
PVC-U / PVC-C	40	1.8-3.7	25 mm Stone wool insulation, 35 kg/m³	1 & 2 between PVC-U pipes	**EI 240 U/C**
	40 up to 110	1.8-3.7 / 2.7-6.6		1 & 2 between PVC-U pipes & between ∅ 40-110 mm PE pipes	**EI 90 U/C**

* U/C pipe end configuration applies to C/C also

In a rigid floor system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

− distance A1 = 10-30 mm;
− distance A2 = 30 mm;

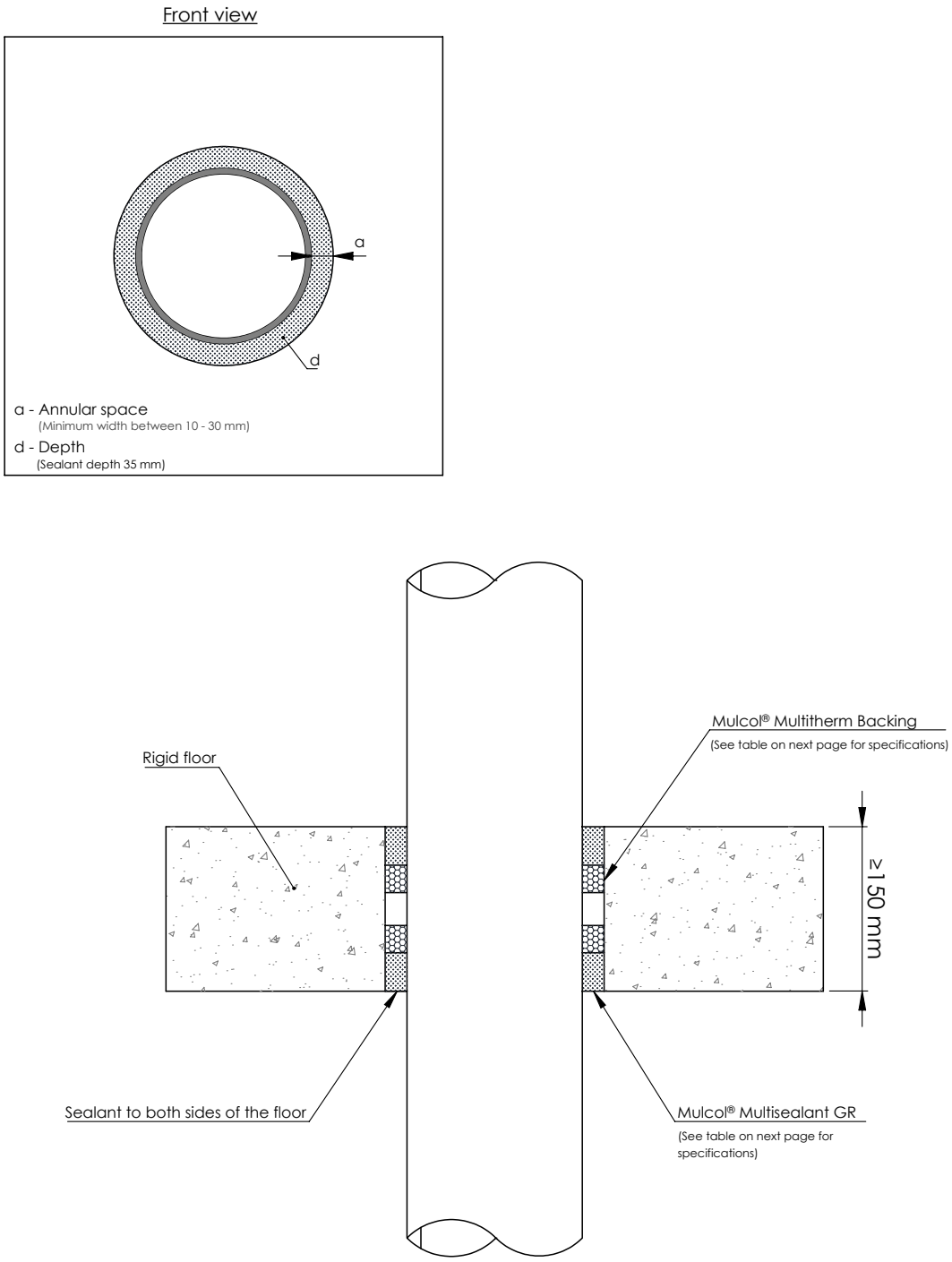
Figure E.1 out of the standard EN 1366-3:2009



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

B.1.1.2 Plastic pipes in regular configurations, backed with Mulcol® Multitherm Backing



NEW 2D-DRAWING

American projection	Scale : 1:5	Company : Mulcol International B.V.	RF-PP-G2.11.10
	Unit of measure : mm	Department : Research & Development	
	Date : 12-7-2018	Draftsman : K.J.	A4

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

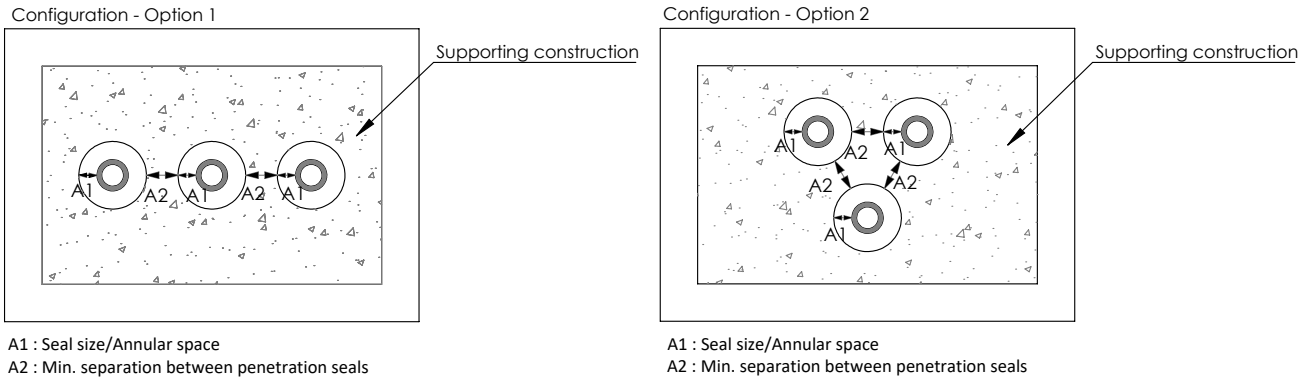
Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Backing	Classification*
PE / ABS / SAN+PVC	160	4.9-14.6	25 mm Mulcol® Multitherm Backing	**EI 30 U/C**
PE / ABS / SAN+PVC		14.6		**EI 60 U/C**
PVC-U / PVC-C		4.0-9.5		

* U/C pipe end configuration applies to C/C also

In a rigid floor system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

− distance A1 = 10-30 mm;
− distance A2 = 30 mm;

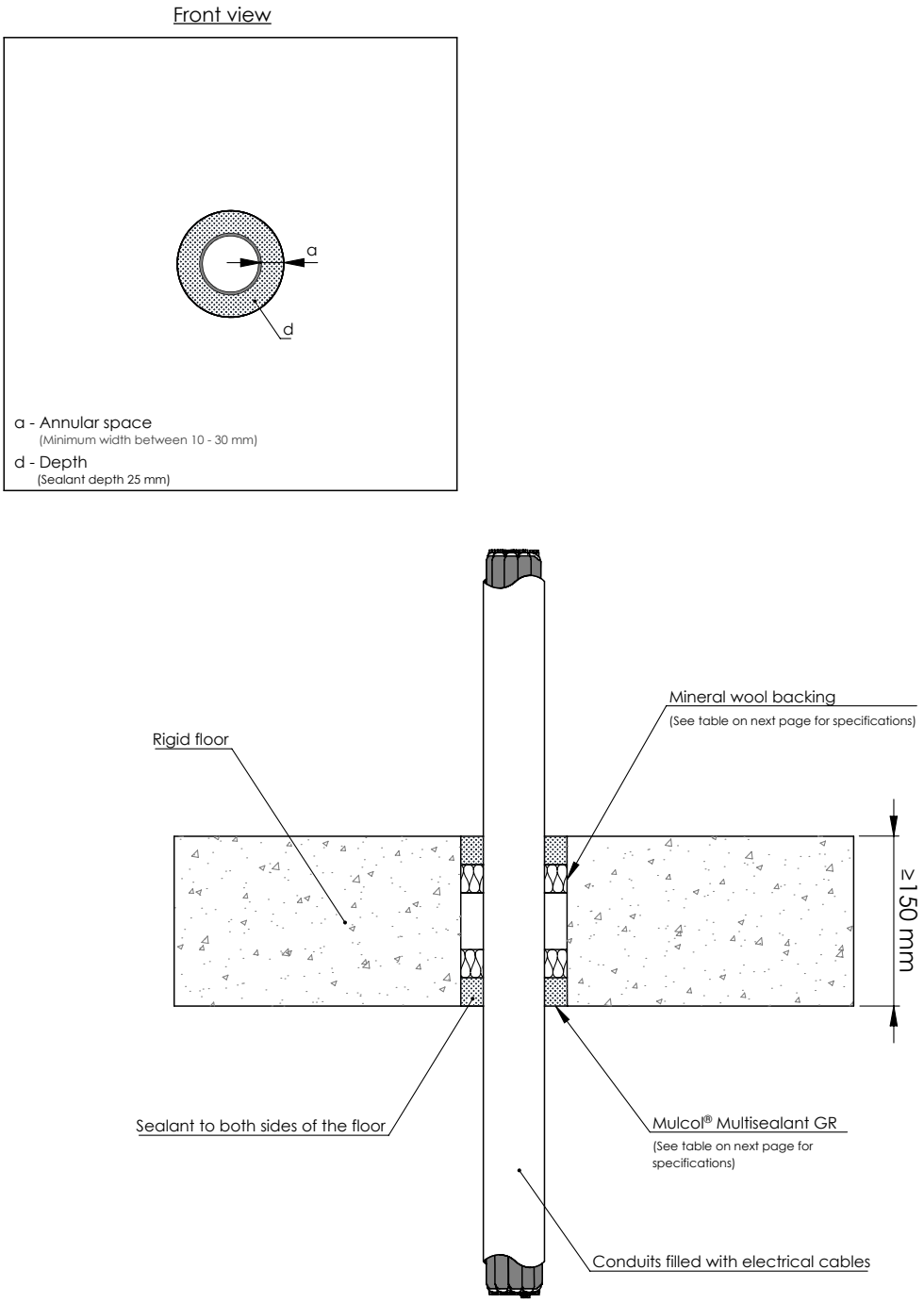
Figure E.1 out of the standard EN 1366-3:2009



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

B.1.2 Plastic pipes containing (electrical) cables



American projection	Scale : 1:5	Company : Mulcol International B.V.	RF-PP-G2.11.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 12-7-2018	Draftsman : K.J.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

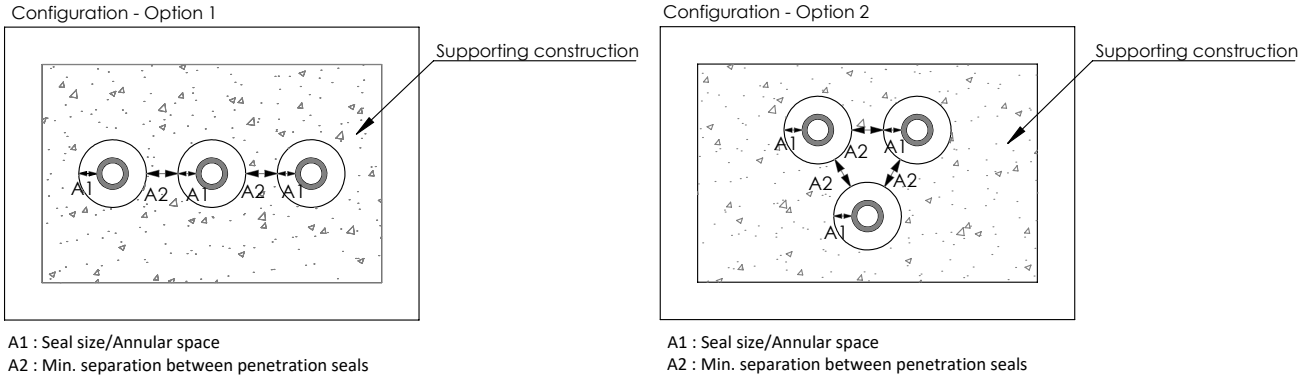
Pipe material conduit	Maximum pipe diameter mm	Pipe wall thickness mm	Partially or fully filled cable conduits	Backing	Configuration	Classification*
PE / ABS / SAN+PVC	110	2.4-10	cables up to ∅ 20 mm	25 mm Stone wool insulation, 33 kg/m³	1 & 2	**EI 60 U/C**
PVC-U / PVC-C / PP		1.8-6.6 (for PVC pipes)				**EI 90 U/C**
		2.7 (for PP pipes)				
		1.8-6.3 (for PVC pipes)				**EI 30 U/C**

* U/C pipe end configuration applies to C/C also

In a rigid floor system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 10-30 mm;
- distance A2 = 30 mm;

Figure E.1 out of the standard EN 1366-3:2009

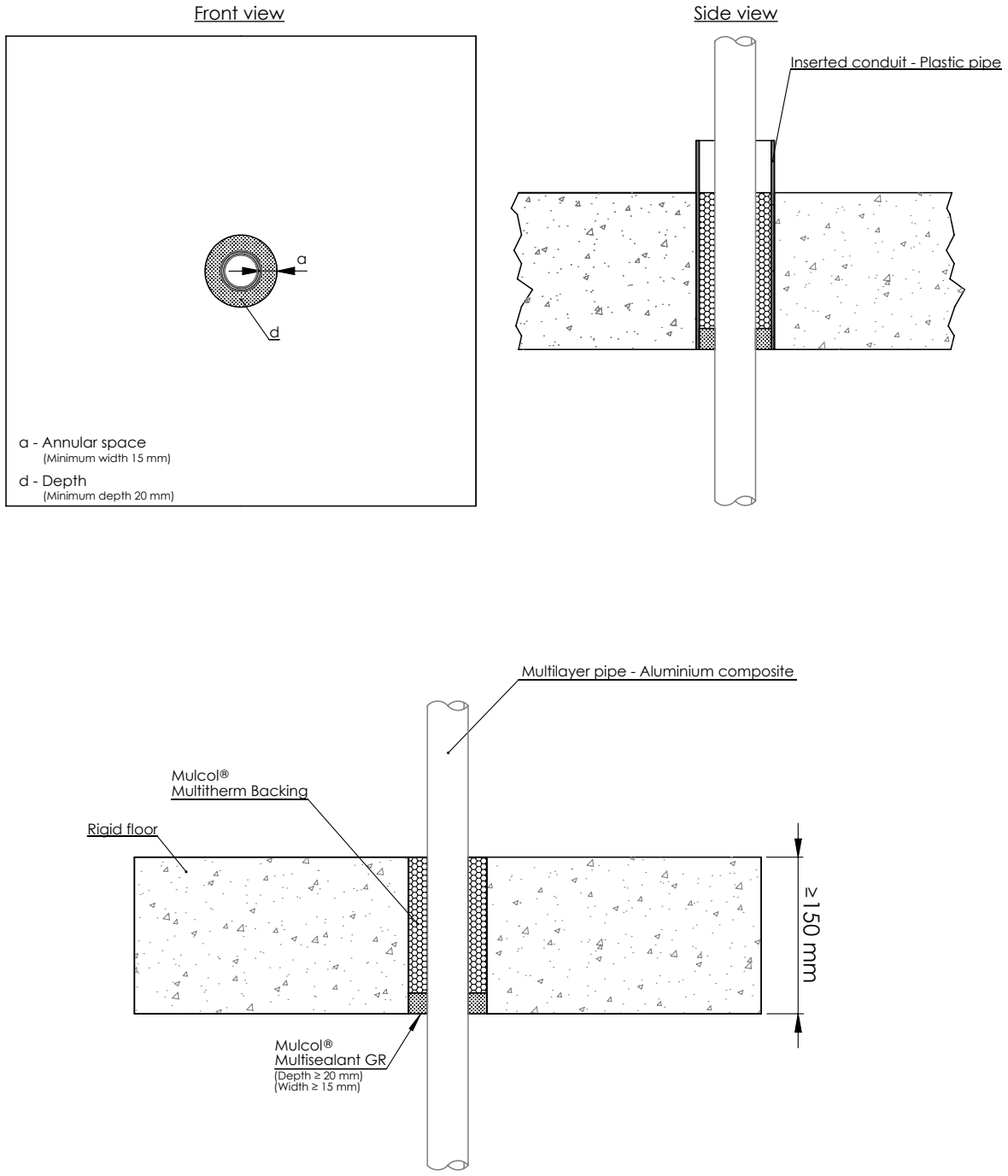


A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

B.2 Aluminium composite pipes

B.2.1 Aluminium composite pipes without insulation



American projection	Scale : 1:5	Company : Mulcol International B.V.	RFmk-MLA-G1.4.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 18-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Distance to support above floor mm	Classification*
Henco PE-Xc/AL/PE-Xc	≤ 16 / ≤ 20	2.0	≤ 350	**E 120 U/C EI 120 U/C**
Uponor PE-Xa Aqua pipe	≤ 25	3.5		
Henco PE-Xc/AL/PE-Xc	≤ 26 / ≤ 32	3.0		
	≤ 40	3.5		
Uponor PE-RT/AL/PE-RT		4.0		

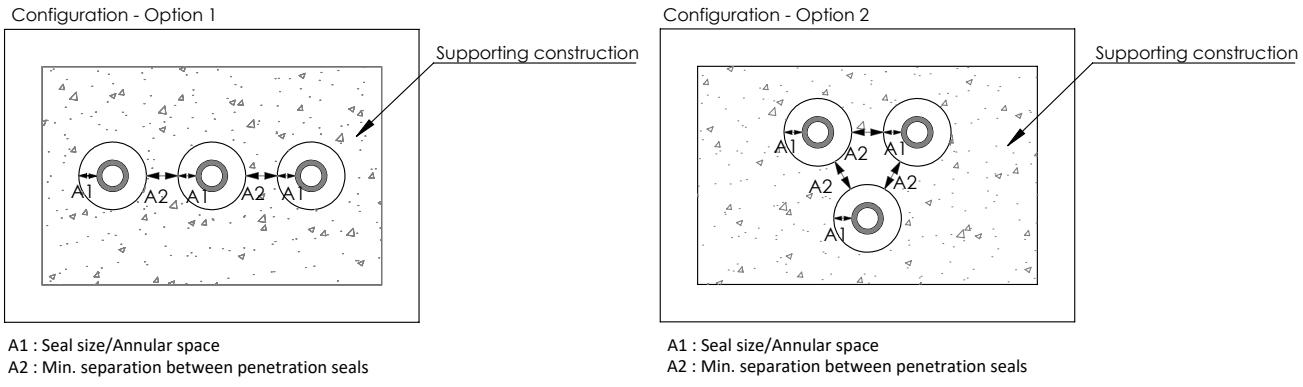
* U/C pipe end configuration applies to C/C also

The fire resistance applies with or without an encased PVC-U / PVC-C pipe. The diameter of the PVC-U / PVC-C pipe shall be maximum Ø110 mm and the wall thickness shall be maximum 3.2 mm.

In a rigid floor system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

Figure E.1 out of the standard EN 1366-3:2009

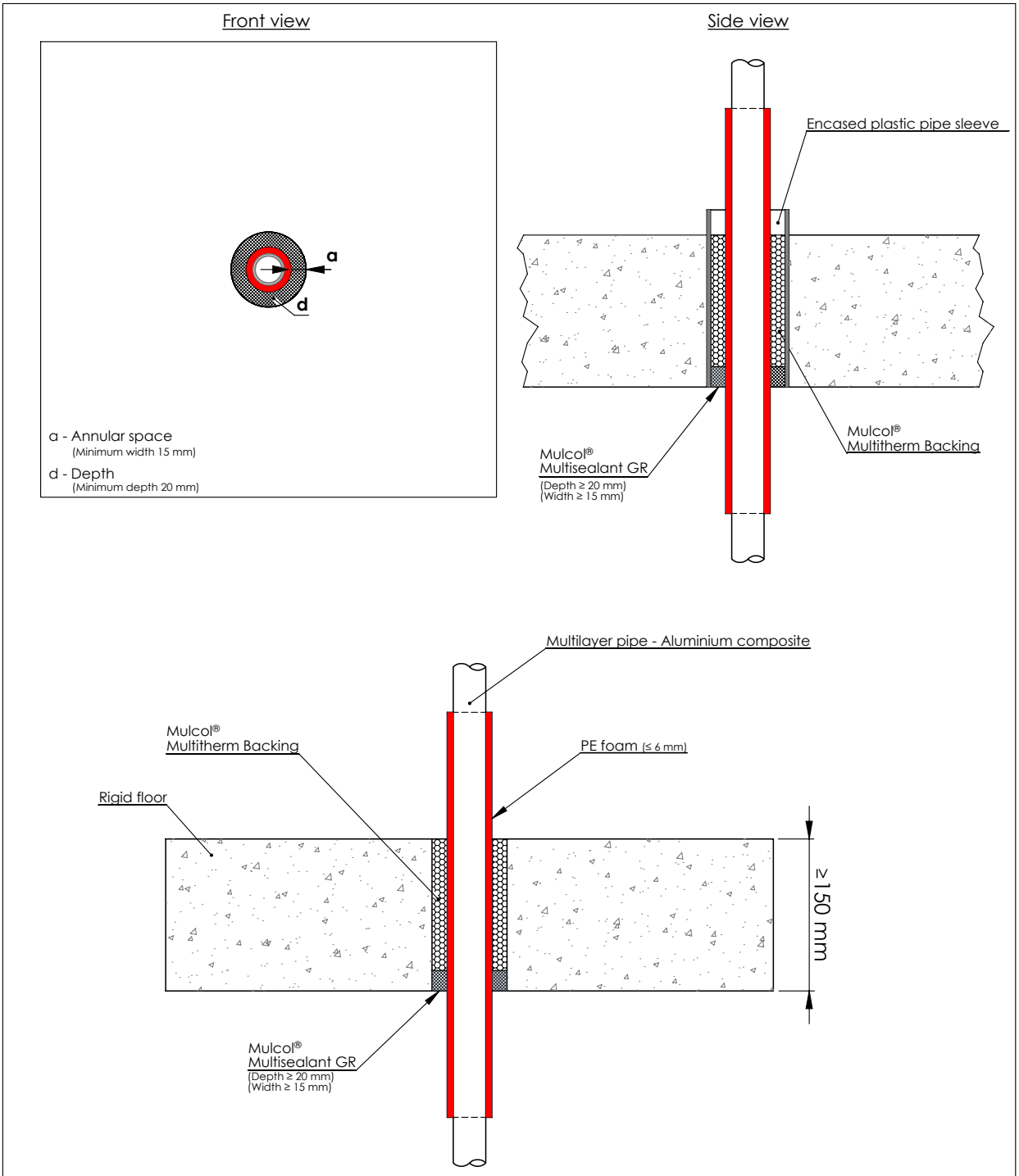


A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

B.2.2 Aluminium composite pipes with insulation

B.2.2.1 Aluminium composite pipes with PE-foam insulation



American projection	Scale : 1:5	Company : Mulcol International B.V.	RF-MLA_pr-G1.4.22
	Unit of measure : mm	Department : Research & Development	A4
	Date : 12-4-2018	Draftsman : K.J.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation LS/CS/LI/CI thickness/ length mm	Distance to support above floor mm	Classification*
Henco PE-Xc/AL/PE-Xc	≤ 16 / ≤ 20	2.0	6 / 300 (min.)	≤ 350	**E 120 U/C EI 120 U/C**
Uponor PE-Xa Aqua pipe	≤ 25	3.5			
Henco PE-Xc/AL/PE-Xc	≤ 26 / ≤ 32	3.0			

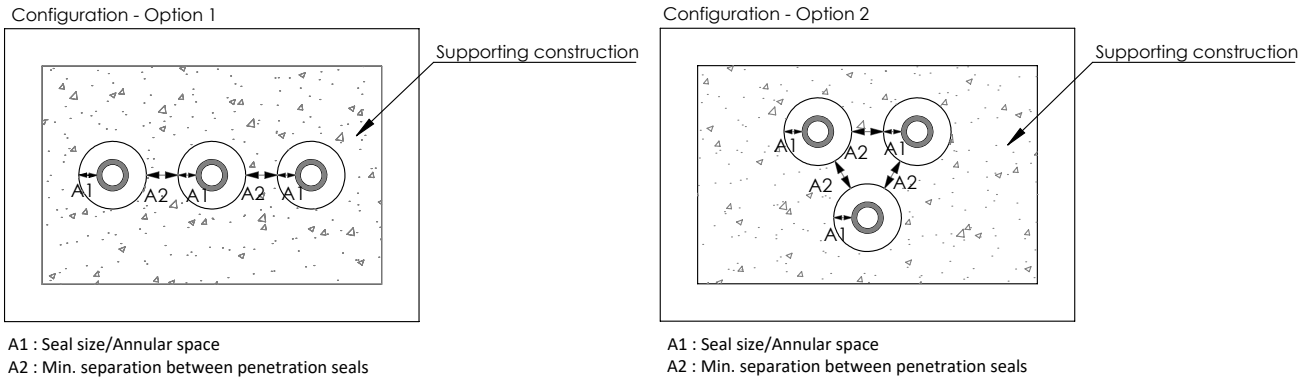
* U/C pipe end configuration applies to C/C also

The fire resistance applies with or without an encased PVC-U / PVC-C pipe. The diameter of the PVC-U / PVC-C pipe shall be maximum Ø110 mm and the wall thickness shall be maximum 3.2 mm.

In a rigid floor system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

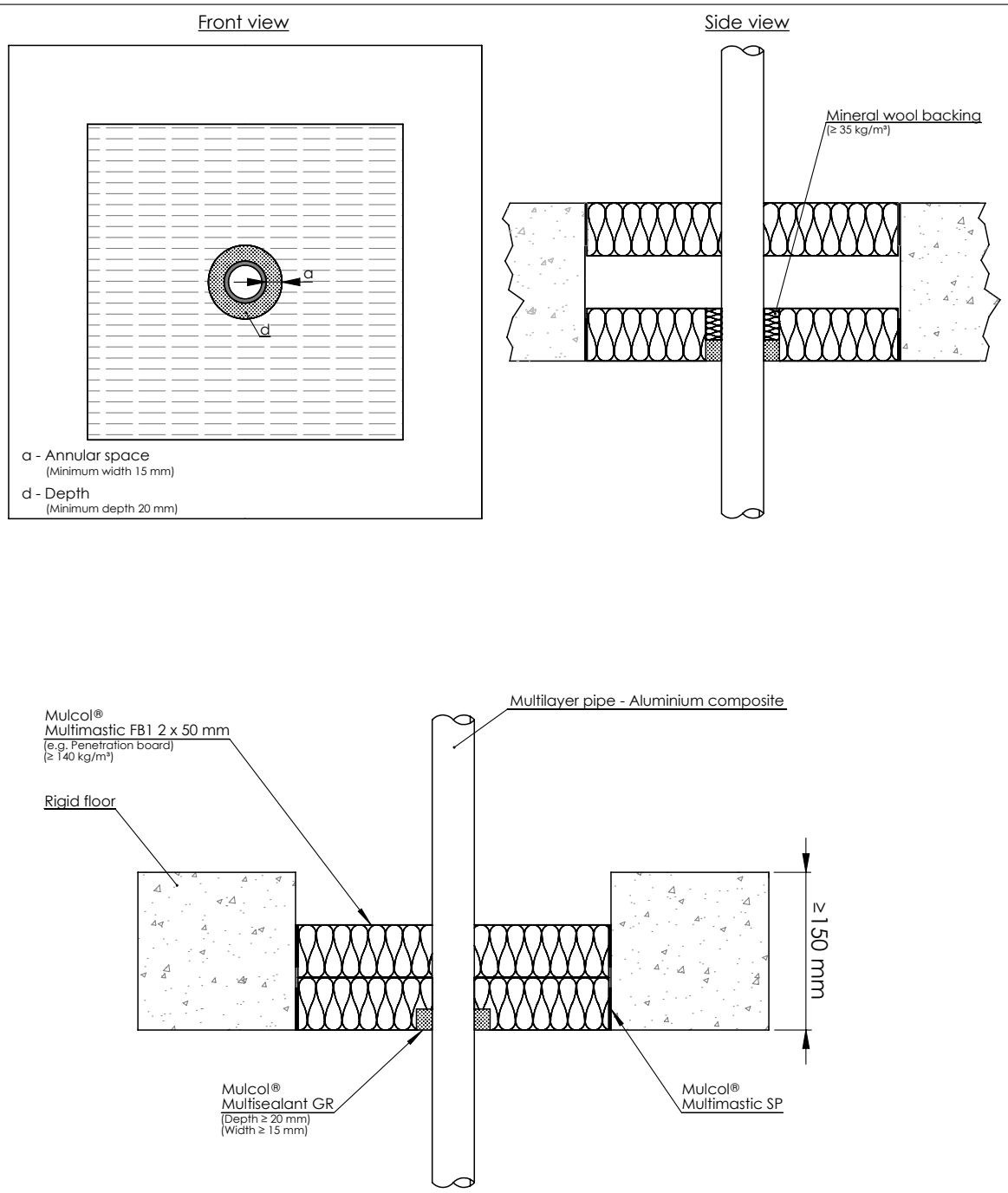
Figure E.1 out of the standard EN 1366-3:2009



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

B.2.3 Aluminium composite pipes without insulation through Mulcol® Multimastic FB1



American projection	Scale : 1:5	Company : Mulcol International B.V.	PBrf-MLA-G1.4.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 19-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Distance to support above floor mm	Classification*
Henco PE-Xc/AL/PE-Xc	≤ 16 / ≤ 20	2.0	≤ 350	**E 120 U/C EI 120 U/C**
Uponor PE-Xa Aqua pipe	≤ 25	3.5		
Henco PE-Xc/AL/PE-Xc	≤ 26 / ≤ 32	3.0		
	≤ 40	3.5		**E 120 U/C EI 90 U/C**
Uponor PE-RT/AL/PE-RT		4.0		

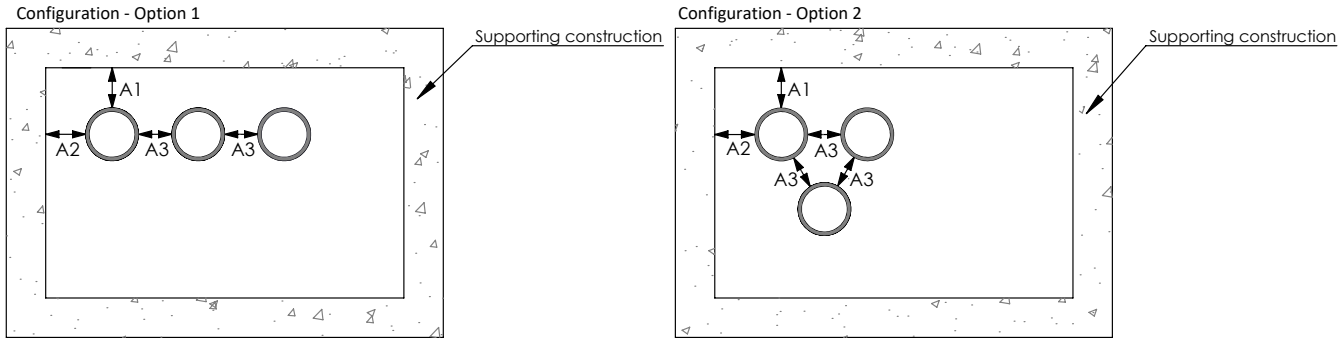
*U/C pipe end configuration applies to C/C also

The Mulcol® Multimastic C system to be used consists of two layers of 50 mm on top of each other (total thickness 100 mm). The aperture size in the floor may be up to 2400 mm long and 1200 mm wide. The pipes passed through the system in round holes approximately the same size as the pipe (tight fit). A cavity of maximum 50 mm between the stone wool panels may be present.

In the Mulcol® Multimastic C system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 to A3 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 50 mm;
- distance A2 = 50 mm;
- distance A3 = 100 mm;

Figure E.1 out of the standard EN 1366-3:2009

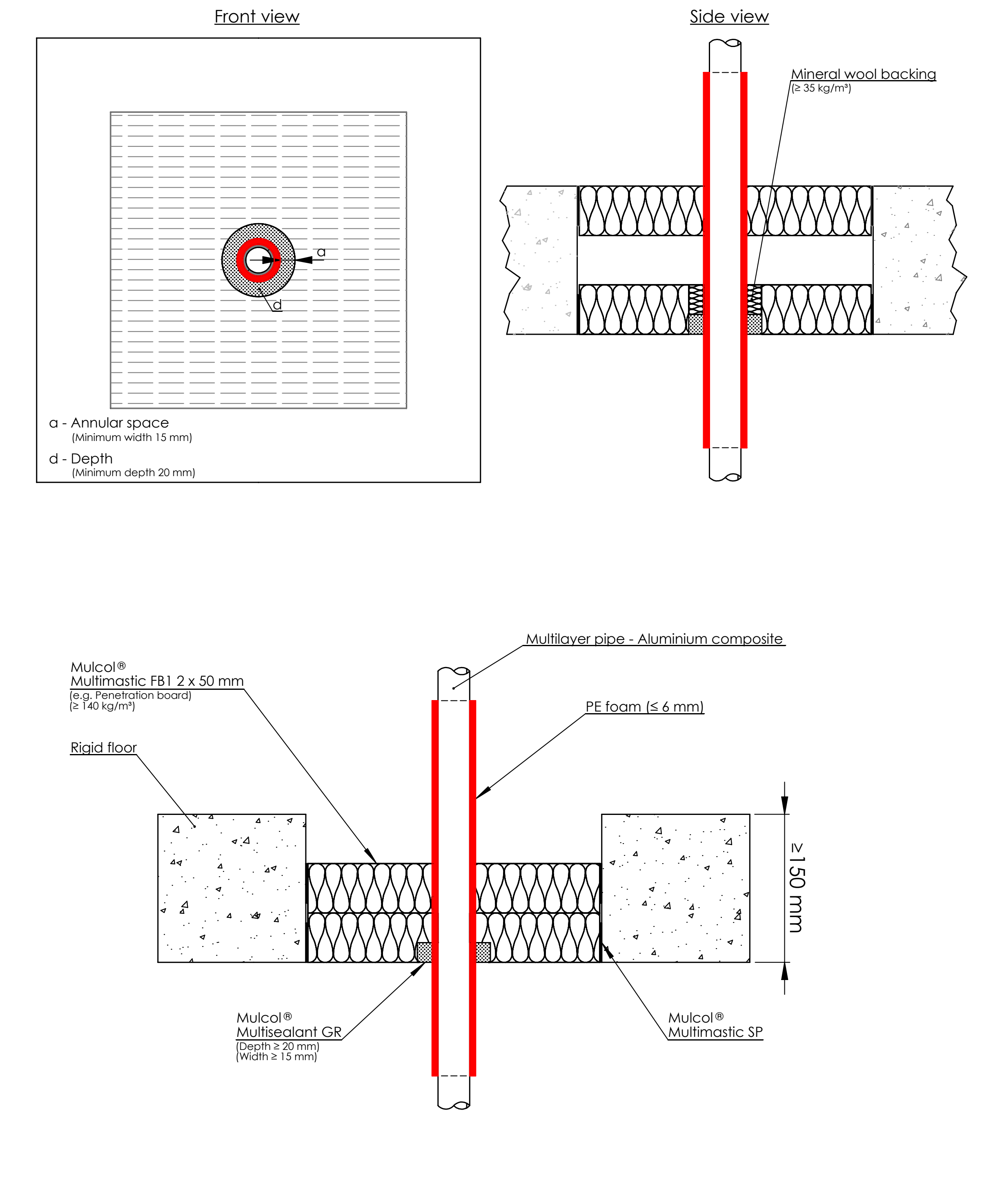


A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

B.2.4 Aluminium composite pipes øĂůK ĂẏădzflͲůĂ2ẏ ůŴ2dzƎK a dzfŎ2ff a dzfůĂYlͲăůĂŎ C.M

B.2.4.1 Aluminium composite pipes øĂůK PE-foam ĂẏădzflͲůĂ2ẏ ůŴ2dzƎK a dzfŎ2ff a dzfůĂYlͲăůĂŎ C.M



American projection	Scale : 1:5	Company : Mulcol International B.V.	PBrf-MLA_pr-G1.4.23
	Unit of measure : mm	Department : Research & Development	
	Date : 19-4-2017	Draftsman : B.D.	A4

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Distance to support above floor mm	Classification*
Henco PE-Xc/AL/PE-Xc	≤ 16 / ≤ 20	2.0	≤ 350	**E 120 U/C EI 120 U/C**
Uponor PE-Xa Aqua pipe	≤ 25	3.5		
Henco PE-Xc/AL/PE-Xc	≤ 26 / ≤ 32	3.0		
	≤ 40	3.5		
Uponor PE-RT/AL/PE-RT		4.0		

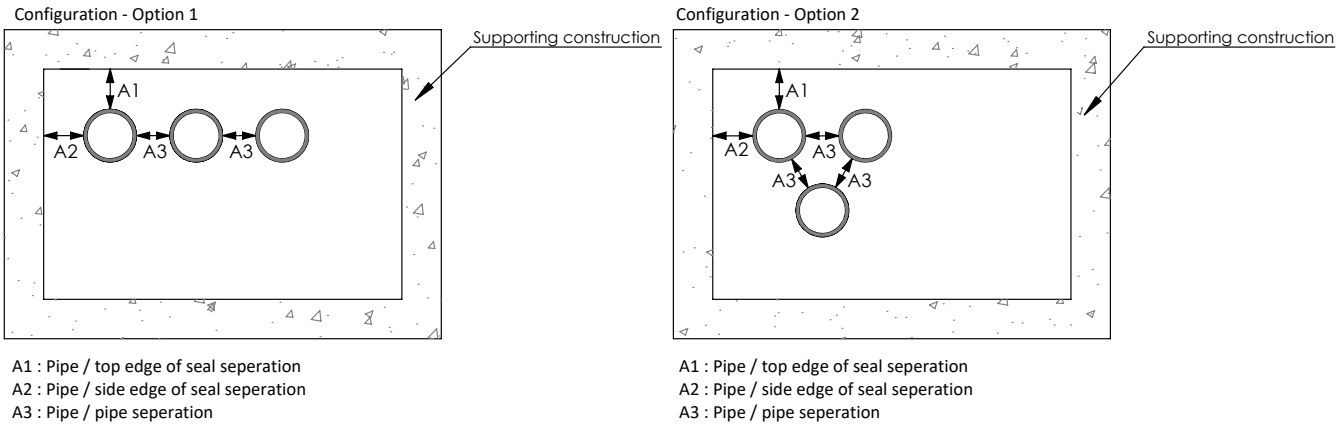
*U/C pipe end configuration applies to C/C also

The Mulcol® Multimastic C system to be used consists of two layers of 50 mm on top of each other (total thickness 100 mm). The aperture size in the floor may be up to 2400 mm long and 1200 mm wide. The pipes passed through the system in round holes approximately the same size as the pipe (tight fit). A cavity of maximum 50 mm between the stone wool panels may be present.

In the Mulcol® Multimastic C system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 to A3 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 50 mm;
- distance A2 = 50 mm;
- distance A3 = 100 mm;

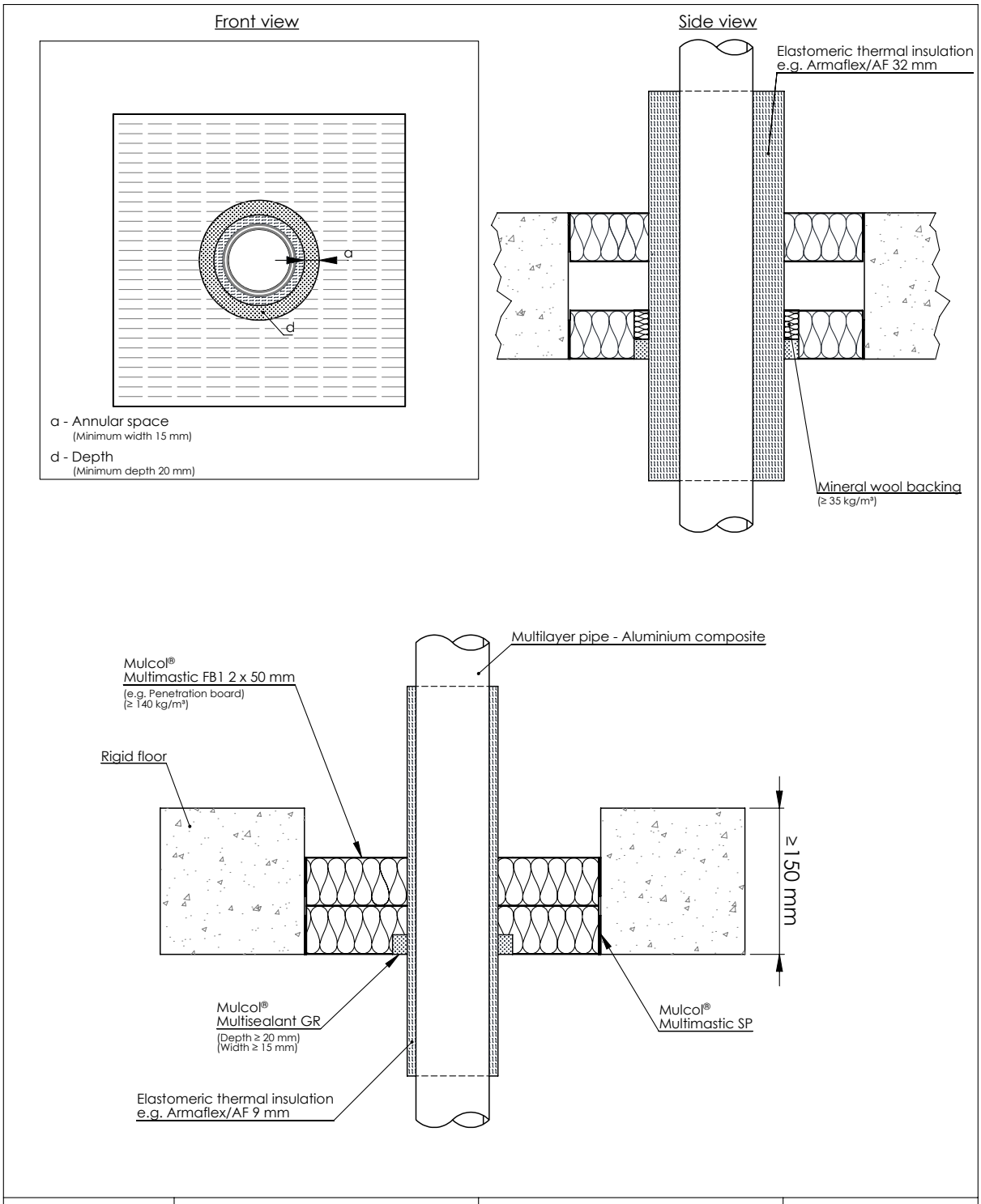
Figure E.1 out of the standard EN 1366-3:2009



A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

B.2.4.2 Aluminium composite pipes with Elastomeric thermal insulation trough Mulcol® Multimastic FB1



American projection	Scale : 1:5	Company : Mulcol International B.V.	PBrf-MLA-G1.4.22
	Unit of measure : mm	Department : Research & Development	A4
	Date : 19-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation LS/CS/LI/CI thickness/ length mm	Distance to support above floor mm	Classification*
Henco PE-Xc/AL/PE-Xc	≤ 16 / ≤ 20	2.0	9-32 / 300 (min.)	≤ 350	**E 120 U/C EI 120 U/C**
Uponor PE-Xa Aqua pipe	≤ 25	3.5			
Henco PE-Xc/AL/PE-Xc	≤ 26 / ≤ 32	3.0			
	≤ 40	3.5			
Uponor PE-RT/AL/PE-RT		4.0			
Henco PE-Xc/AL/PE-Xc	≤ 50				**E 120 U/C EI 90 U/C**
	≤ 63	4.5			**E 90 U/C EI 90 U/C**
	≤ 75	6.0			

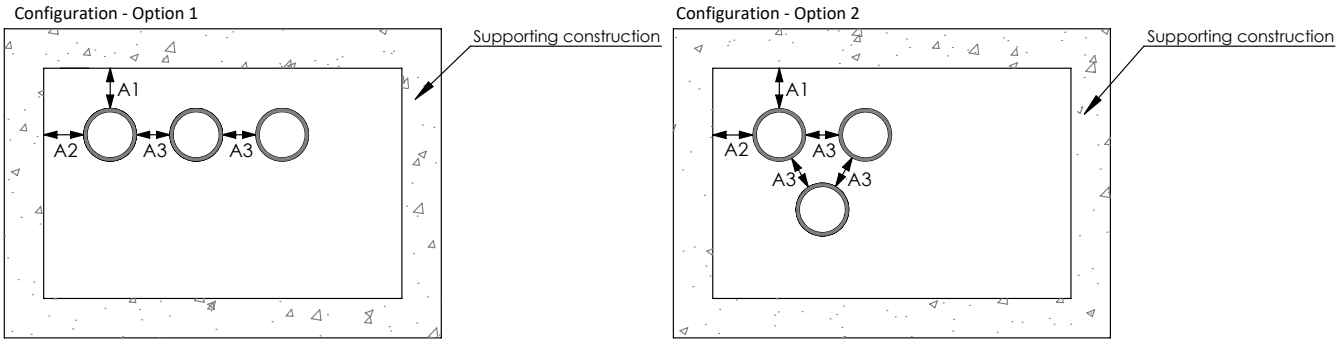
*U/C pipe end configuration applies to C/C also

The Mulcol® Multimastic C system to be used consists of two layers of 50 mm on top of each other (total thickness 100 mm). The aperture size in the floor may be up to 2400 mm long and 1200 mm wide. The pipes passed through the system in round holes approximately the same size as the pipe (tight fit). A cavity of maximum 50 mm between the stone wool panels may be present.

In the Mulcol® Multimastic C system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 to A3 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 50 mm;
- distance A2 = 50 mm;
- distance A3 = 100 mm;

Figure E.1 out of the standard EN 1366-3:2009

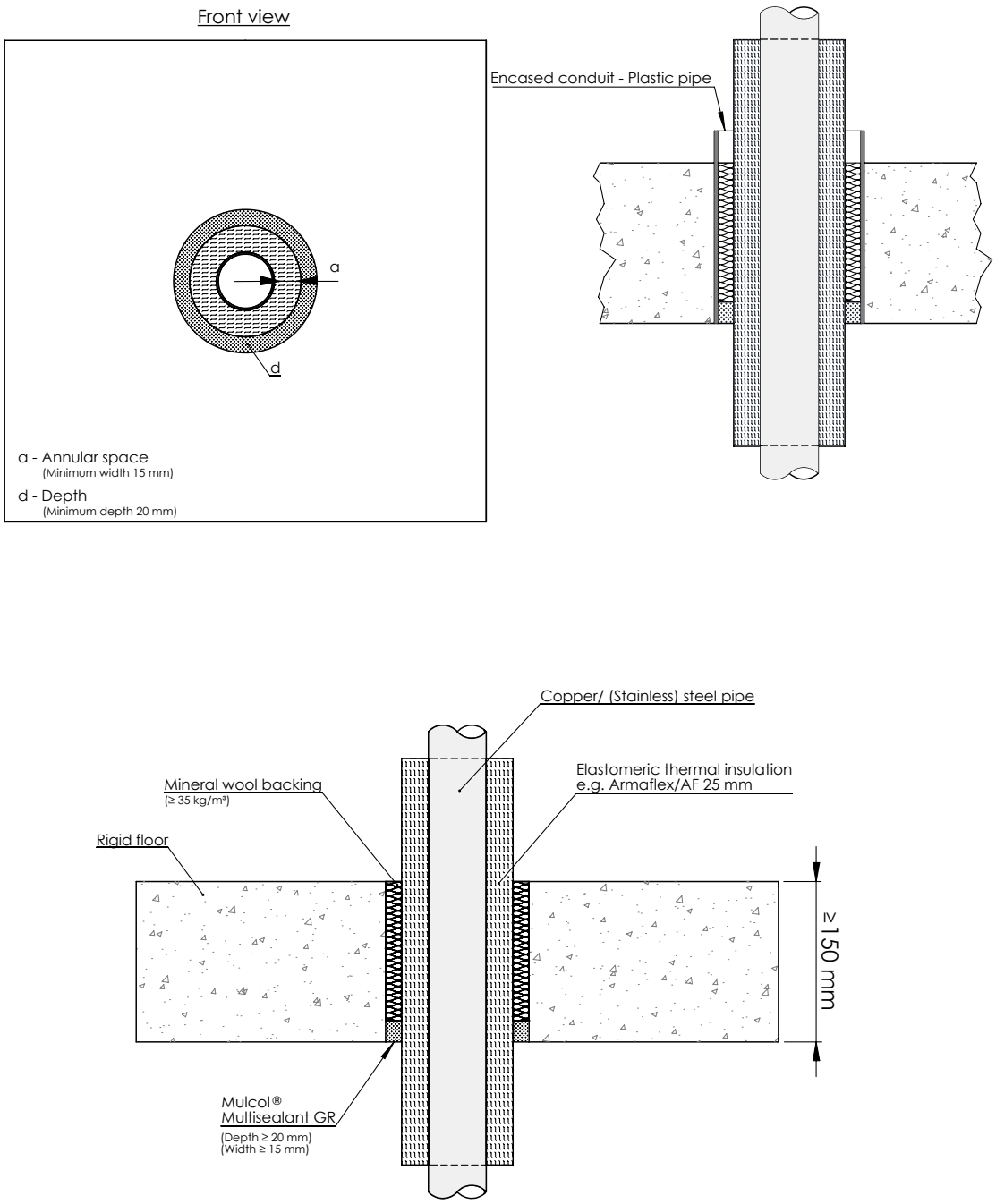


A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

B.3 Metal pipes

B.3.1 Metal pipes with Elastomeric thermal insulation



American projection	Scale : 1:5	Company : Mulcol International B.V.	RF-CU-G1.4.22
	Unit of measure : mm	Department : Research & Development	A4
	Date : 18-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation LS/CS thickness / length mm	Distance to support above floor mm	Classification*
Copper / (Stainless) Steel / Cast Iron	≤ 54	1.5	25 / (LS) 450 (min.)	≤ 350	**E 120 C/U EI 60 C/U**
			25 / (CS)		**E 120 C/U EI 120 C/U**

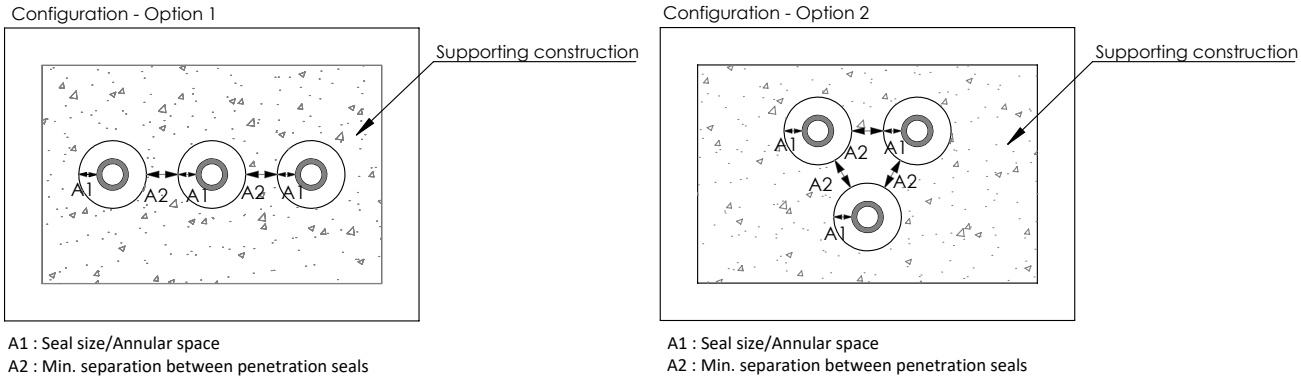
* C/U pipe end configuration applies to C/C also

The fire resistance applies with or without an encased PVC-U / PVC-C pipe. The diameter of the PVC-U / PVC-C pipe shall be maximum Ø110 mm and the wall thickness shall be maximum 3.2 mm.

In a rigid floor system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

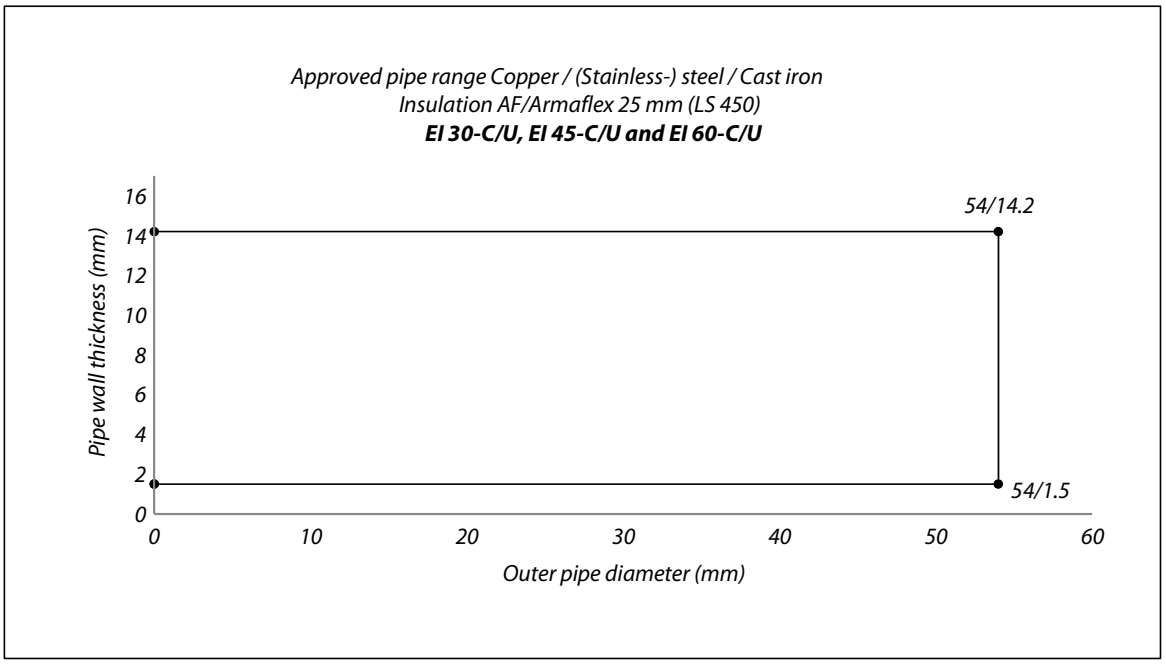
- distance A1 = 15 mm;
- distance A2 = 100 mm;

Figure E.1 out of the standard EN 1366-3:2009

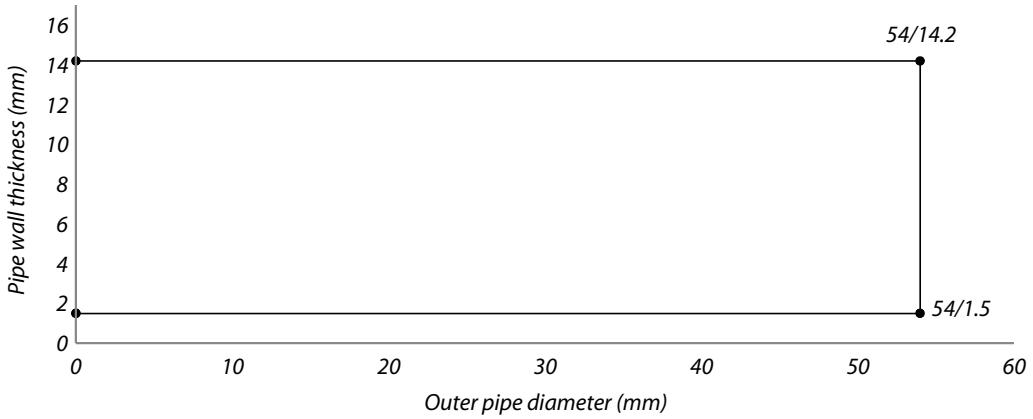


A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

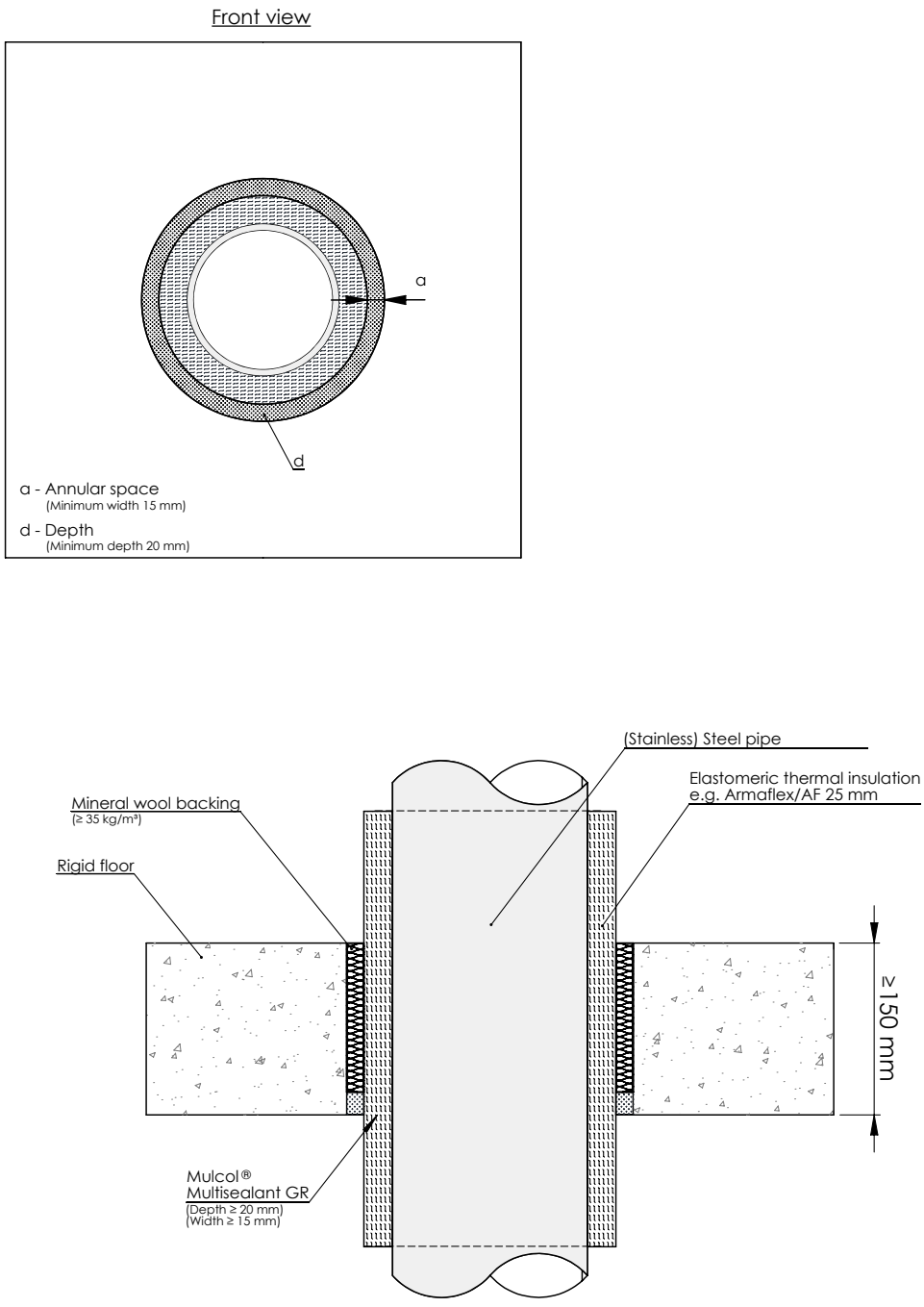
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals



Approved pipe range Copper / (Stainless-) steel / Cast iron
Insulation AF/Armaflex 25 mm (CS)
EI 30-C/U, EI 45-C/U, EI 60-C/U, EI 90-C/U and EI 120-C/U



B.3.1.1 Metal pipes up to Ø 168.3 mm with Elastomeric thermal insulation



American projection	Scale : 1:5	Company : Mulcol International B.V.	RF-ST-G1.4.22
	Unit of measure : mm	Department : Research & Development	A4
	Date : 18-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

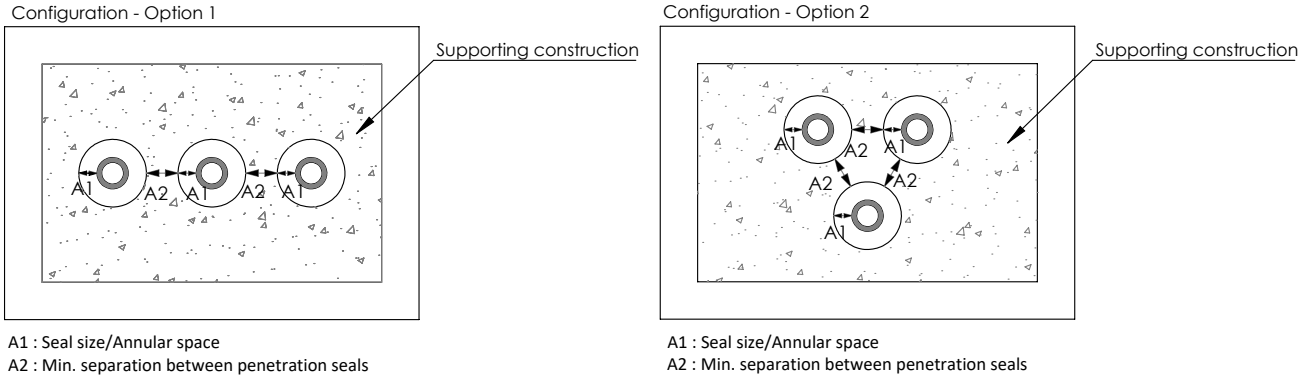
Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation LS/CS thickness / length mm	Distance to support above floor mm	Classification*
Copper / (Stainless) Steel / Cast Iron	≤ 54	1.5-14.2	25 / (LS) 450 (min.)	≤ 350	**E 120 C/U EI 60 C/U**
			25 / (CS)		**E 120 C/U EI 120 C/U**
	≤ 168.3	4.5-14.2	25 / (LS) 450 (min.)		**E 90 C/U EI 60 C/U**

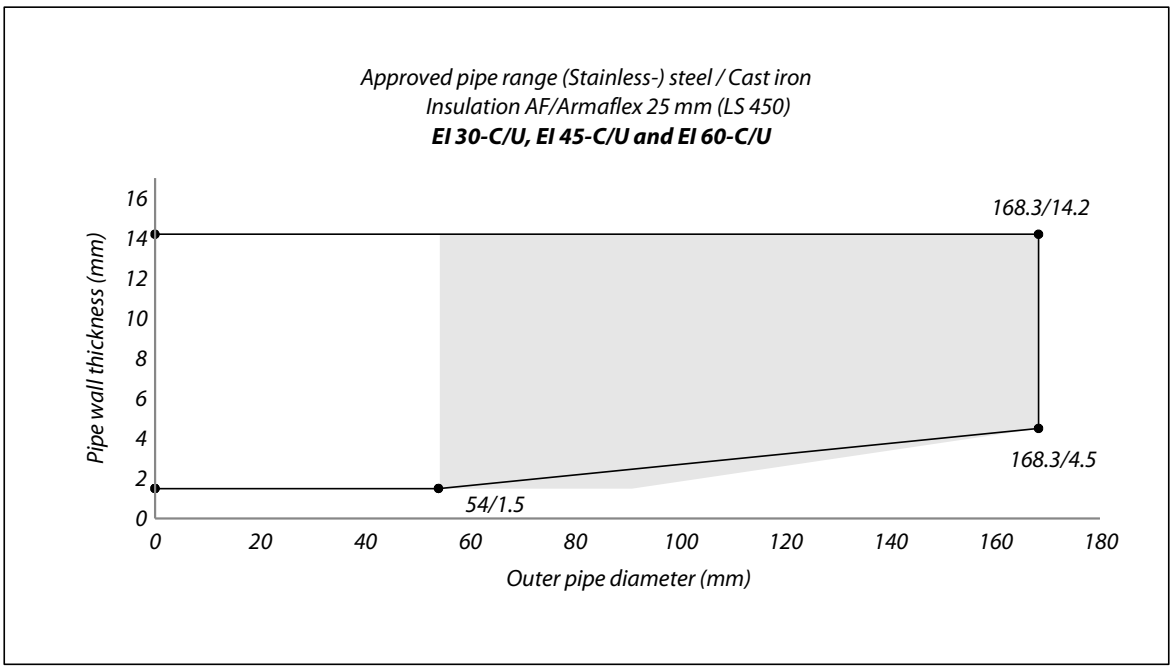
* C/U pipe end configuration applies to C/C also

In a rigid floor system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

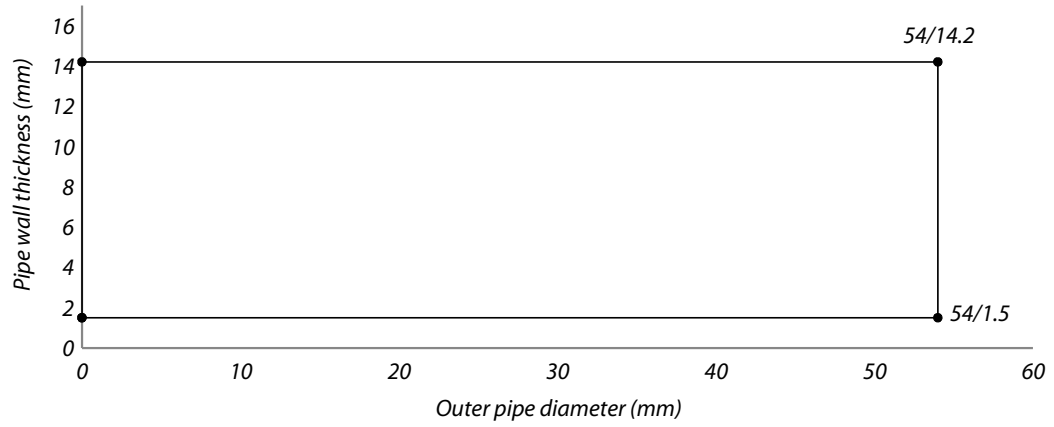
− distance A1 = 15 mm;
− distance A2 = 100 mm;

Figure E.1 out of the standard EN 1366-3:2009

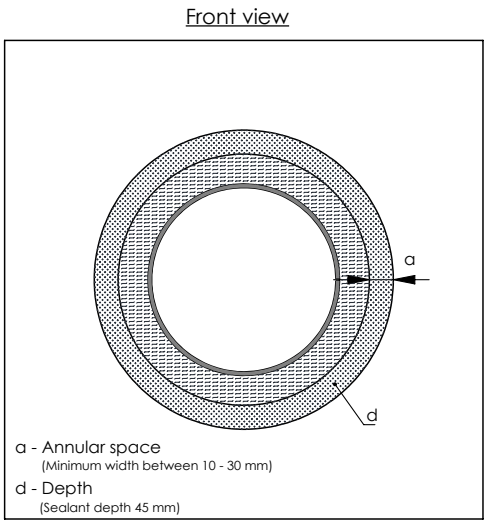


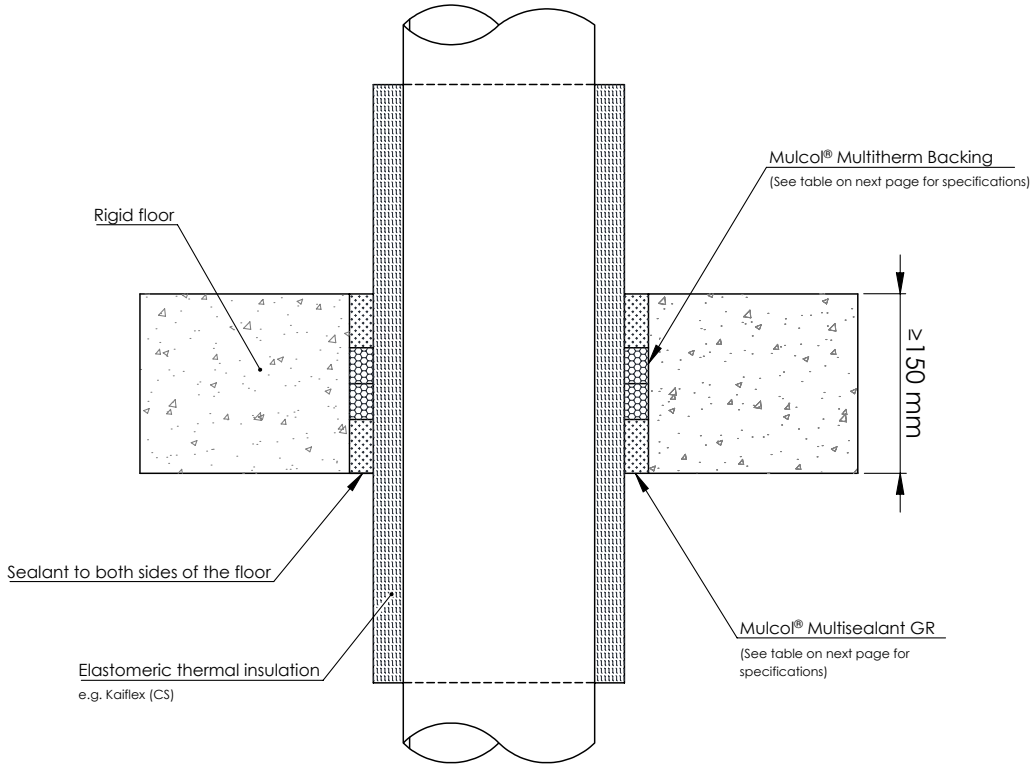


Approved pipe range (Stainless-) steel / Cast iron
Insulation AF/Armaflex 25 mm (CS)
EI 30-C/U, EI 45-C/U, EI 60-C/U, EI 90-C/U and EI 120-C/U



B.3.1.2 Metal pipes up to Ø 324 mm with Elastomeric thermal insulation





American projection	Scale : 1:5	Company : Mulcol International B.V.	RF-ST-G2.11.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 12-7-2018	Draftsman : K.J.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

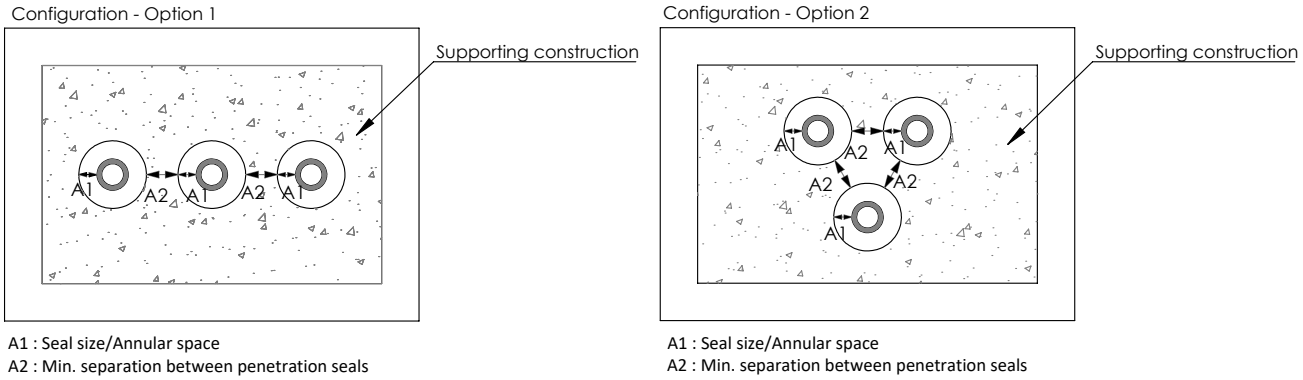
Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Insulation CS	Backing	Configuration	Classification
(Stainless) steel	≤ 324	1.0-14.2	25-50 mm Elastomeric insulation min. class B-s3, d0	30 mm Mulcol® Multitherm Backing	1 & 2	**EI 60 C/U**
		6.35-14.2	50 mm Elastomeric insulation min. class B-s3, d0			**EI 120 C/U**

* C/U pipe end configuration applies to C/C also

In a rigid floor system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

− distance A1 = 10-30 mm;
− distance A2 = 30 mm;

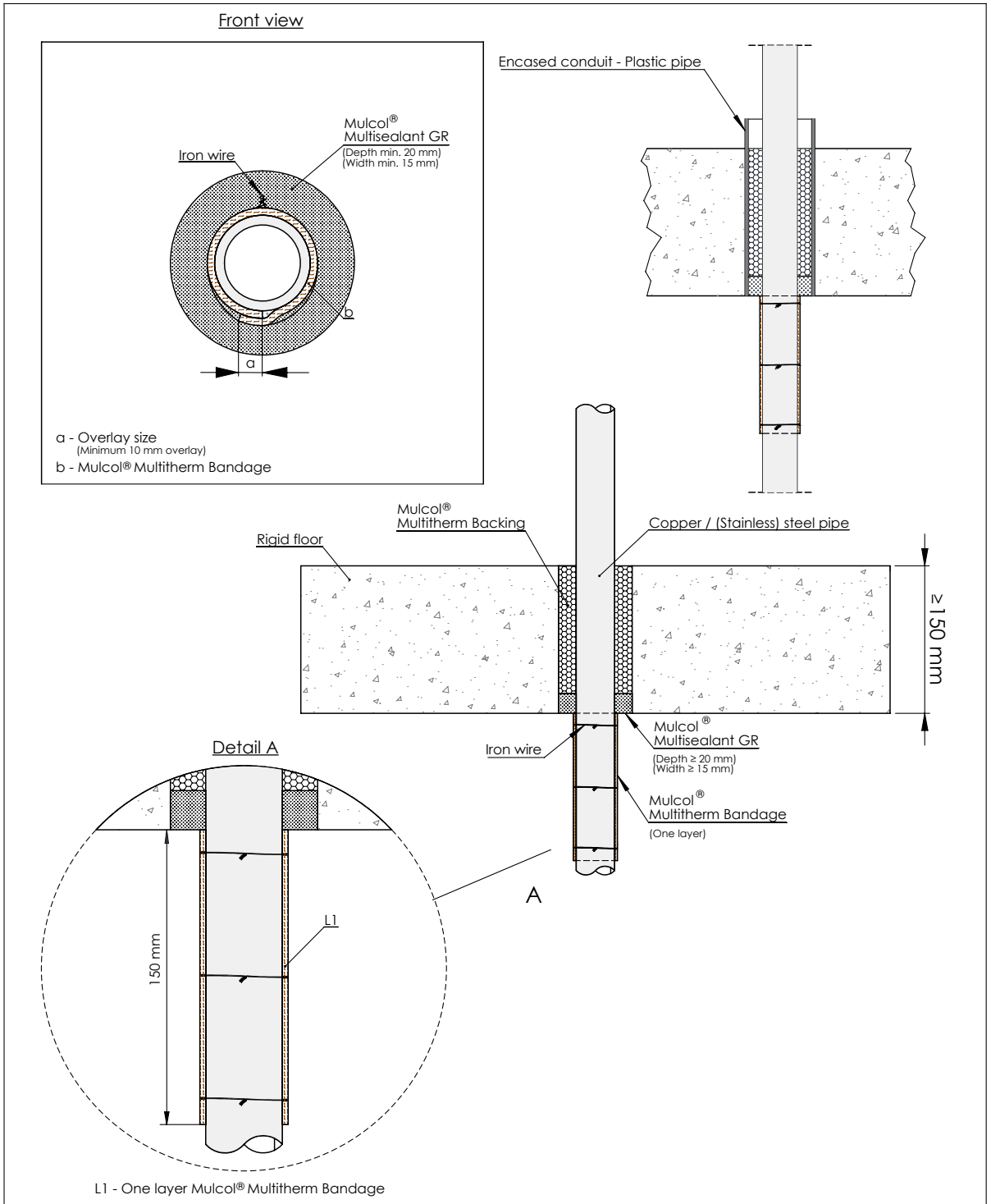
Figure E.1 out of the standard EN 1366-3:2009



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

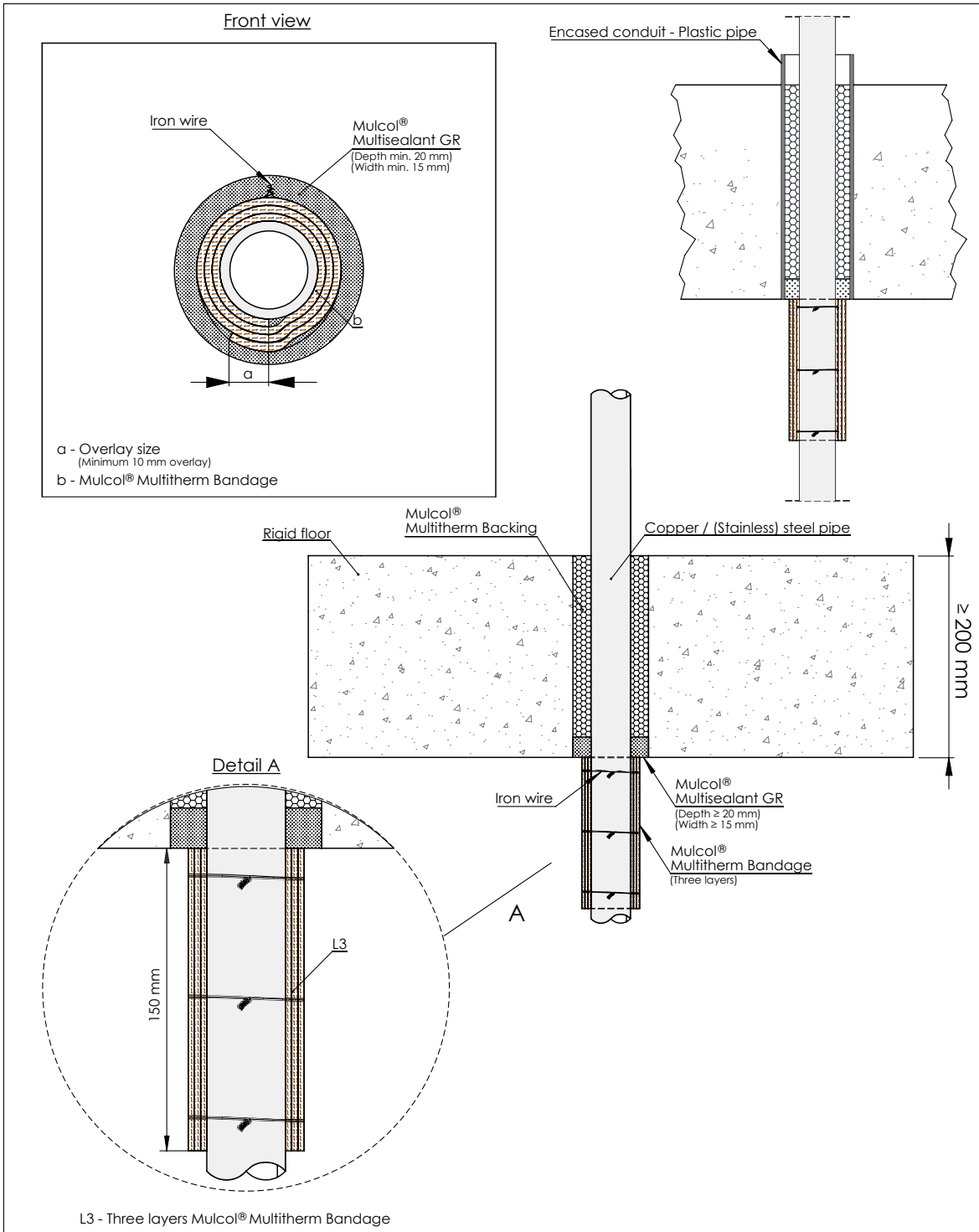
B.3.2 Metal pipes with one or three Mulcol® Multitherm Bandage below the floor



American projection	Scale : 1:5	Company : Mulcol International B.V.	RF-ST-G1.4.90
	Unit of measure : mm	Department : Research & Development	A4
	Date : 15-6-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor



American projection	Scale : 1:5	Company : Mulcol International B.V.	RF-ST-G1.4.92
	Unit of measure : mm	Department : Research & Development	A4
	Date : 15-6-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

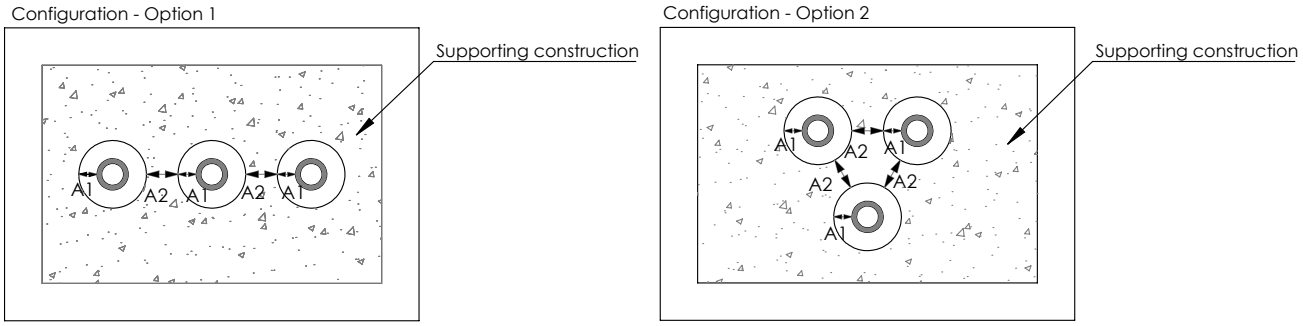
Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Minimum floor thickness mm	Layer(s) below the floor	Distance to support above floor mm	Classification*
Copper / (Stainless) Steel / Cast Iron	≤ 35	1.5-14.2	150	One (see fig. 2 according to I.2.13)	≤ 350	**E 120 C/U EI 30 C/U**
	≤ 22	1.1-14.2	200	Three (see fig. 2 according to I.2.13)		**E 120 C/U EI 60 C/U**

The fire resistance applies with or without an encased PVC-U / PVC-C pipe. The diameter of the PVC-U / PVC-C pipe shall be maximum Ø110 mm and the wall thickness shall be maximum 3.2 mm.

In a rigid floor system the following minimum distances between the apertures edges and between the cables shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

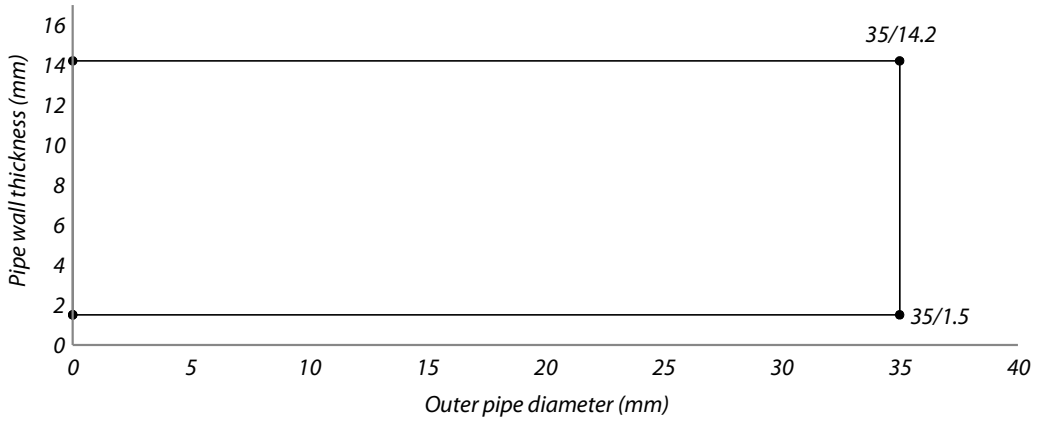
Figure E.1 out of the standard EN 1366-3:2009



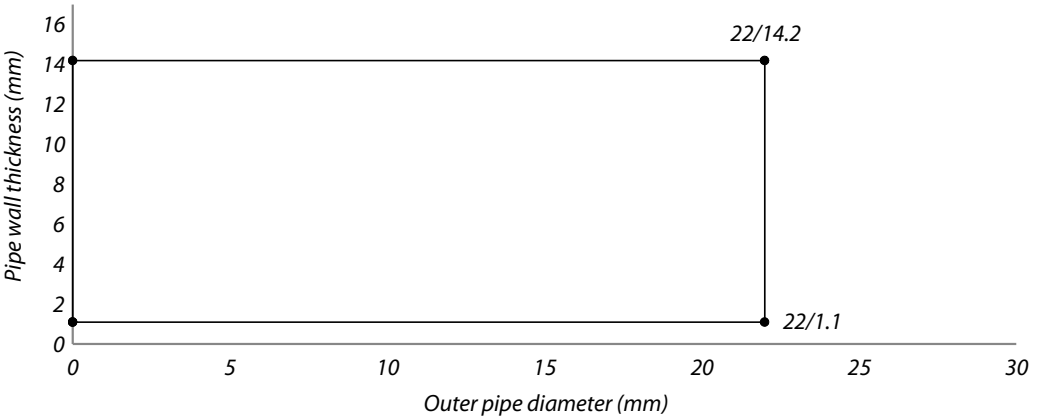
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

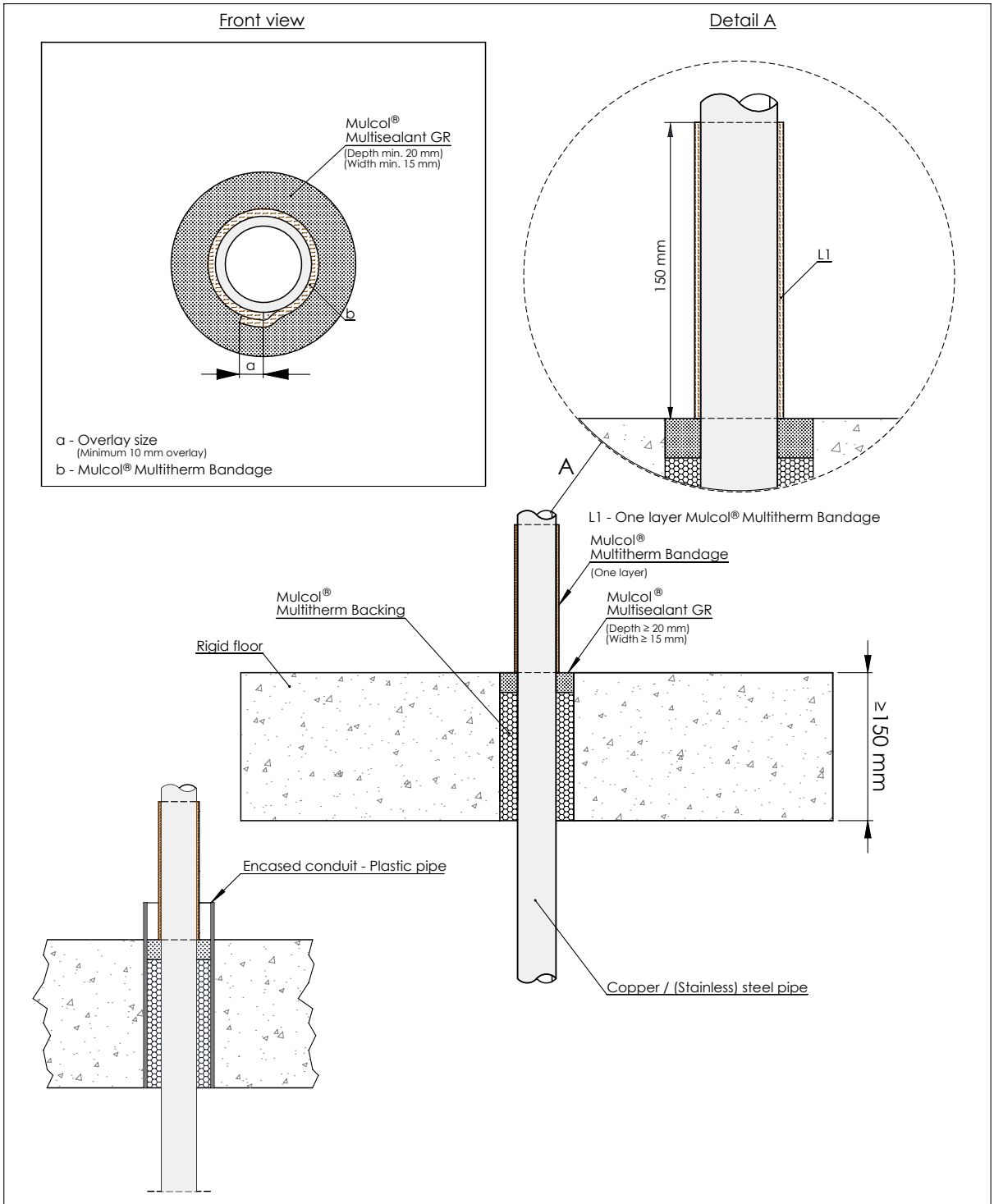
Approved pipe range Copper / (Stainless-) steel / Cast iron
Insulation Multitherm Bandage 1 layer below the floor (LI 150)
EI 30-C/U



Approved pipe range Copper / (Stainless-) steel / Cast iron
Insulation Multitherm Bandage 3 layers below the floor (LI 150)
EI 30-C/U, EI 45-C/U and EI 60-C/U



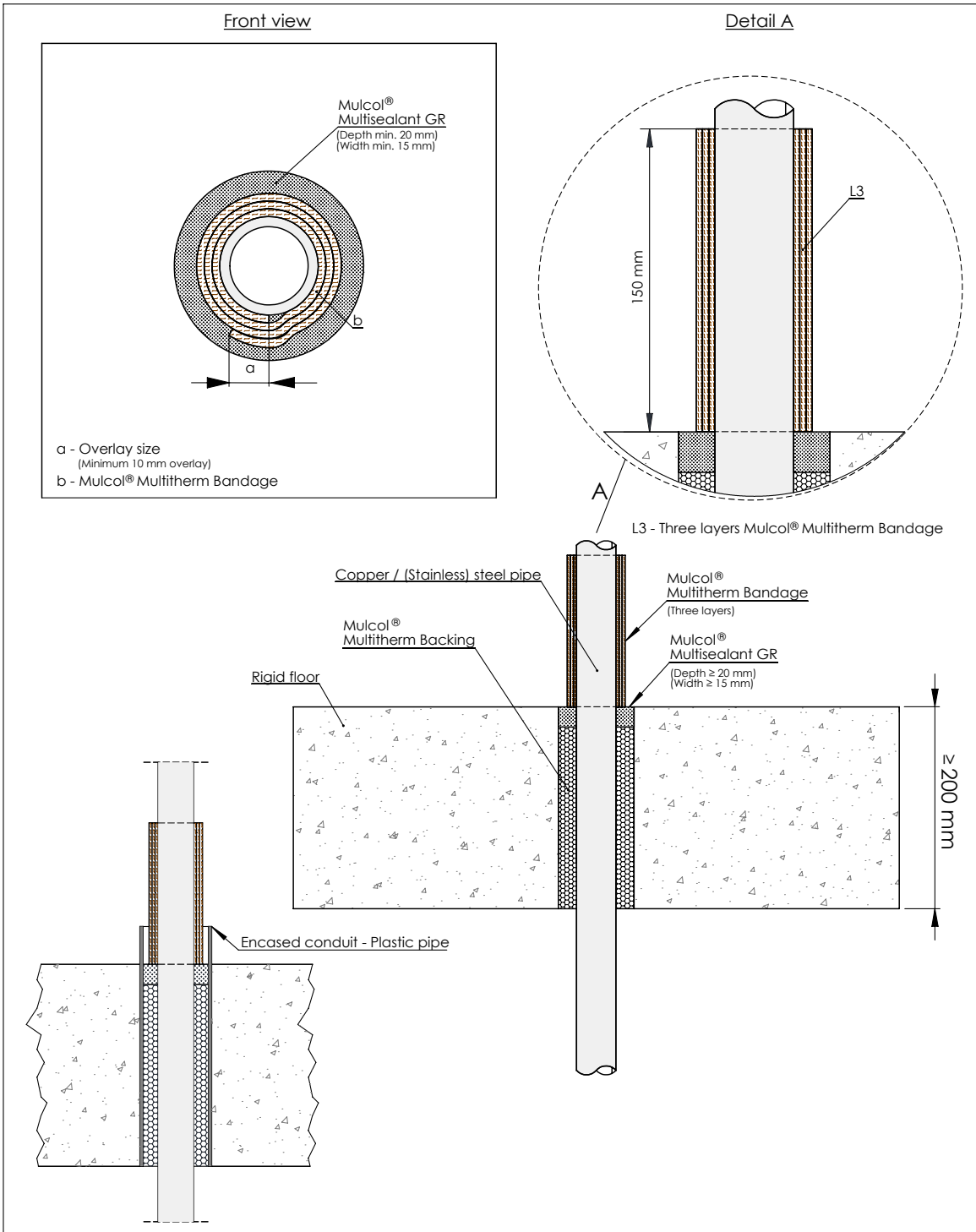
B.3.3 Metal pipes with one or three Mulcol® Multitherm Bandage above the floor



American projection	Scale : 1:5	Company : Mulcol International B.V.	RF-ST-G3.4.90
	Unit of measure : mm	Department : Research & Development	A4
	Date : 15-6-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor



American projection	Scale : 1:5	Company : Mulcol International B.V.	RF-ST-G3.4.92
	Unit of measure : mm	Department : Research & Development	A4
	Date : 15-6-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

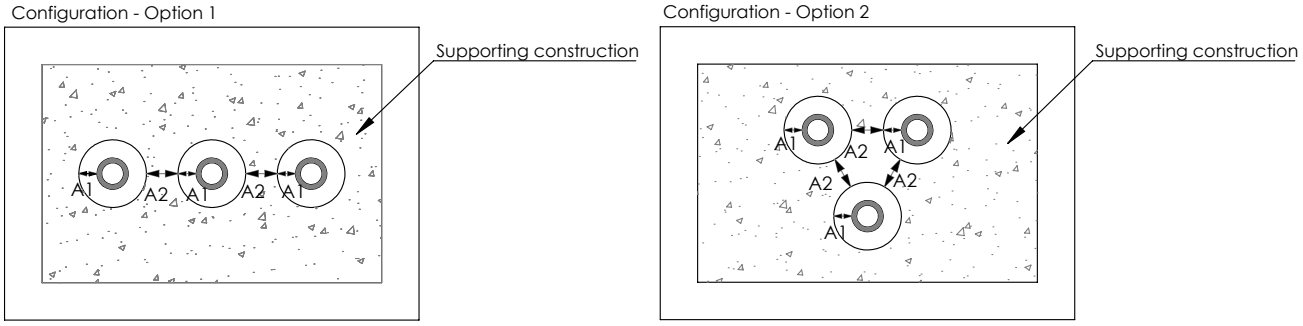
Pipe material	Maximum pipe diameter mm	Pipe wall thickness mm	Minimum floor thickness mm	Layer(s) above the floor	Distance to support above floor mm	Classification*
Copper / (Stainless) Steel / Cast Iron	≤ 35	1.5-14.2	150	One (see fig. 2 according to I.2.13)	≤ 350	**E 120 C/U EI 30 C/U**
	≤ 22	1.1-14.2	200	Three (see fig. 2 according to I.2.13)		**E 120 C/U EI 60 C/U**

The fire resistance applies with or without an encased PVC-U / PVC-C pipe. The diameter of the PVC-U / PVC-C pipe shall be maximum Ø110 mm and the wall thickness shall be maximum 3.2 mm.

In a rigid floor system the following minimum distances between the apertures edges and between the cables shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 15 mm;
- distance A2 = 100 mm;

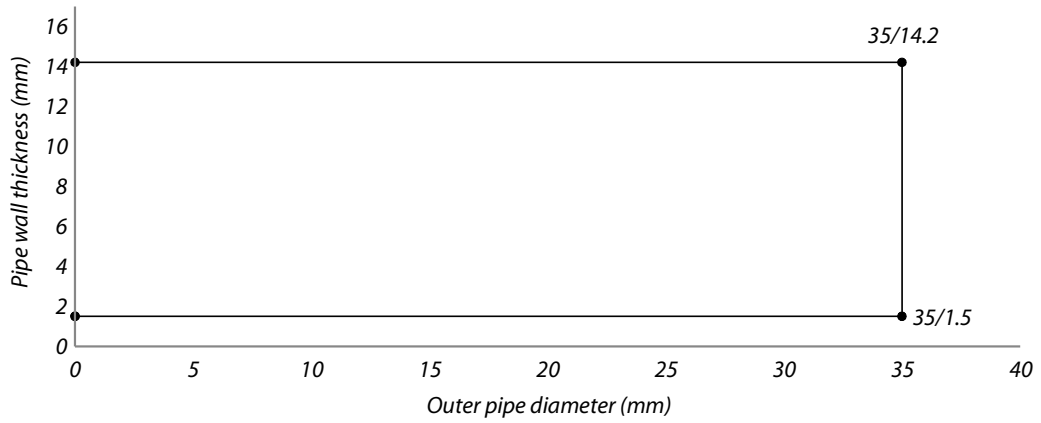
Figure E.1 out of the standard EN 1366-3:2009



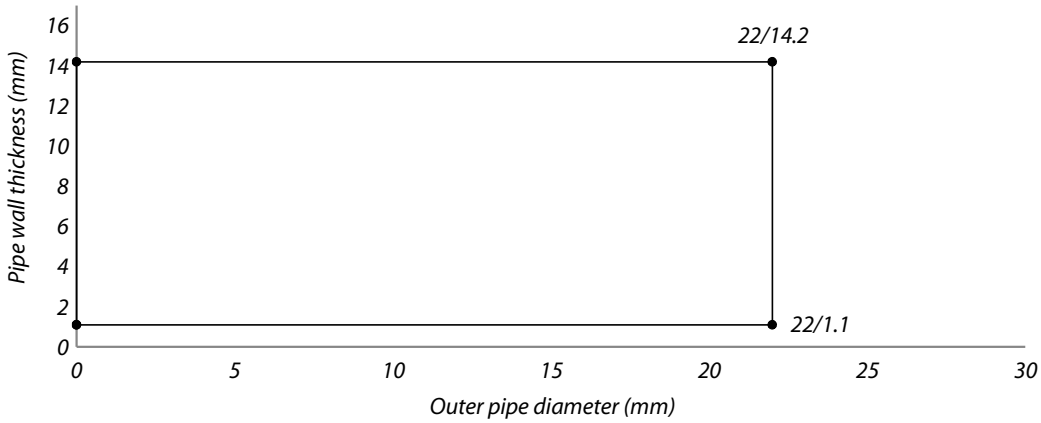
A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

Approved pipe range Copper / (Stainless-) steel / Cast iron
Insulation Multitherm Bandage 1 layer above the floor (LI 150)
EI 30-C/U

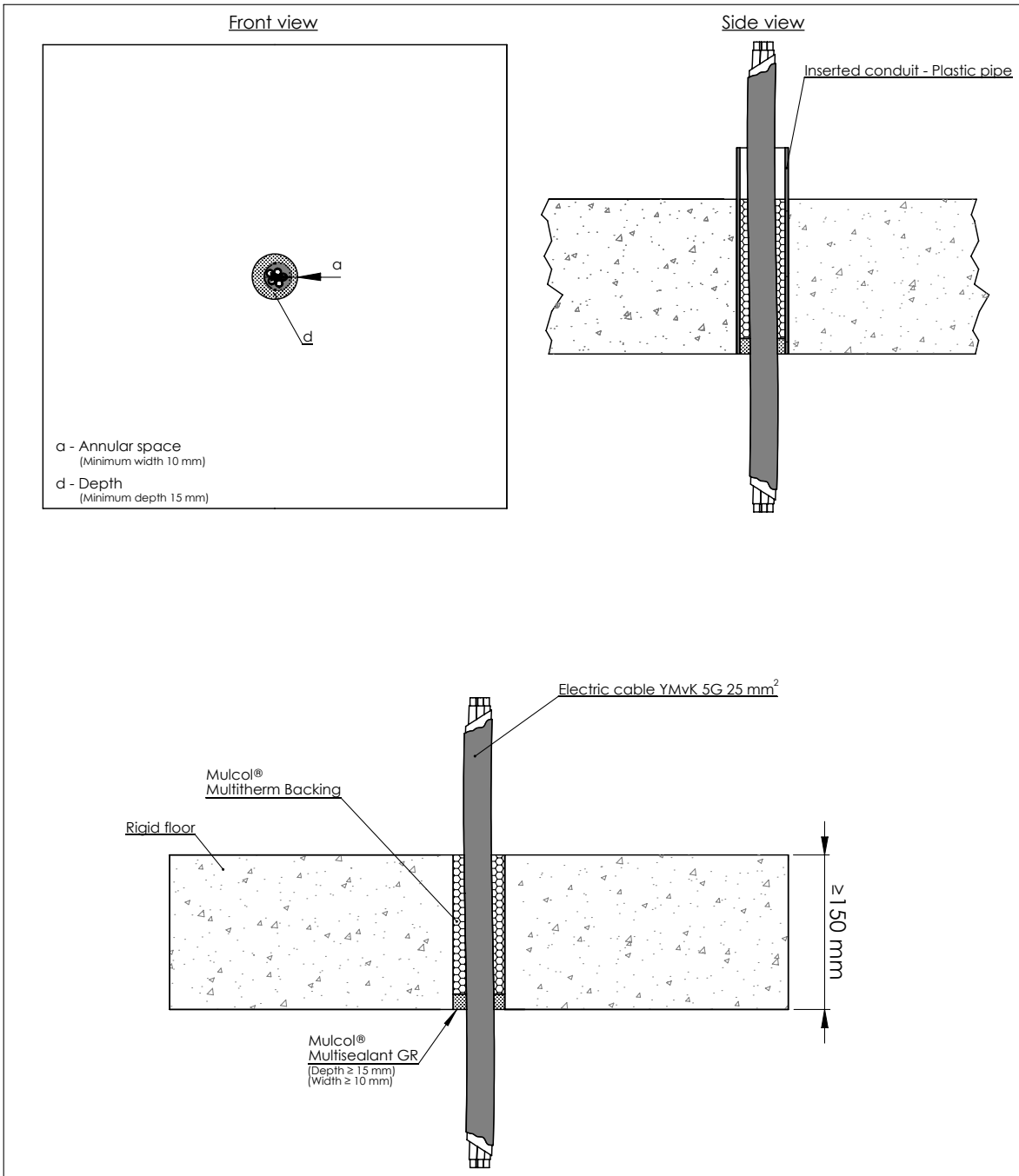


Approved pipe range Copper / (Stainless-) steel / Cast iron
Insulation Multitherm Bandage 3 layers above the floor (LI 150)
EI 30-C/U, EI 45-C/U and EI 60-C/U



A.4 Electrical cables

A.4.1 Electrical cables in regular configurations



American projection	Scale : 1:5	Company : Mulcol International B.V.	RFmk-EC-G1.2.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 18-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

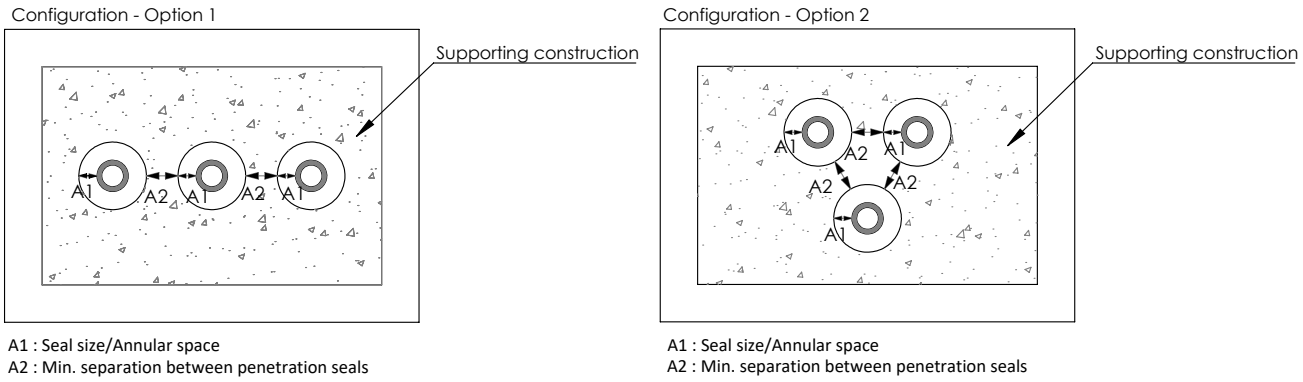
Cable		Number of cables allowed	Distance to support above floor mm	Classification
Generic type	**Type**			
Sheathed cable Ø25 mm	5G 25 mm² 0.6/1kV	1	≤ 350	**E 120 EI 60**

The fire resistance applies with or without an encased PVC-U / PVC-C pipe. The diameter of the PVC-U / PVC-C pipe shall be maximum Ø110 mm and the wall thickness shall be maximum 3.2 mm.

In a rigid floor system the following minimum distances between the apertures edges and between the cables shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 10 mm;
- distance A2 = 100 mm;

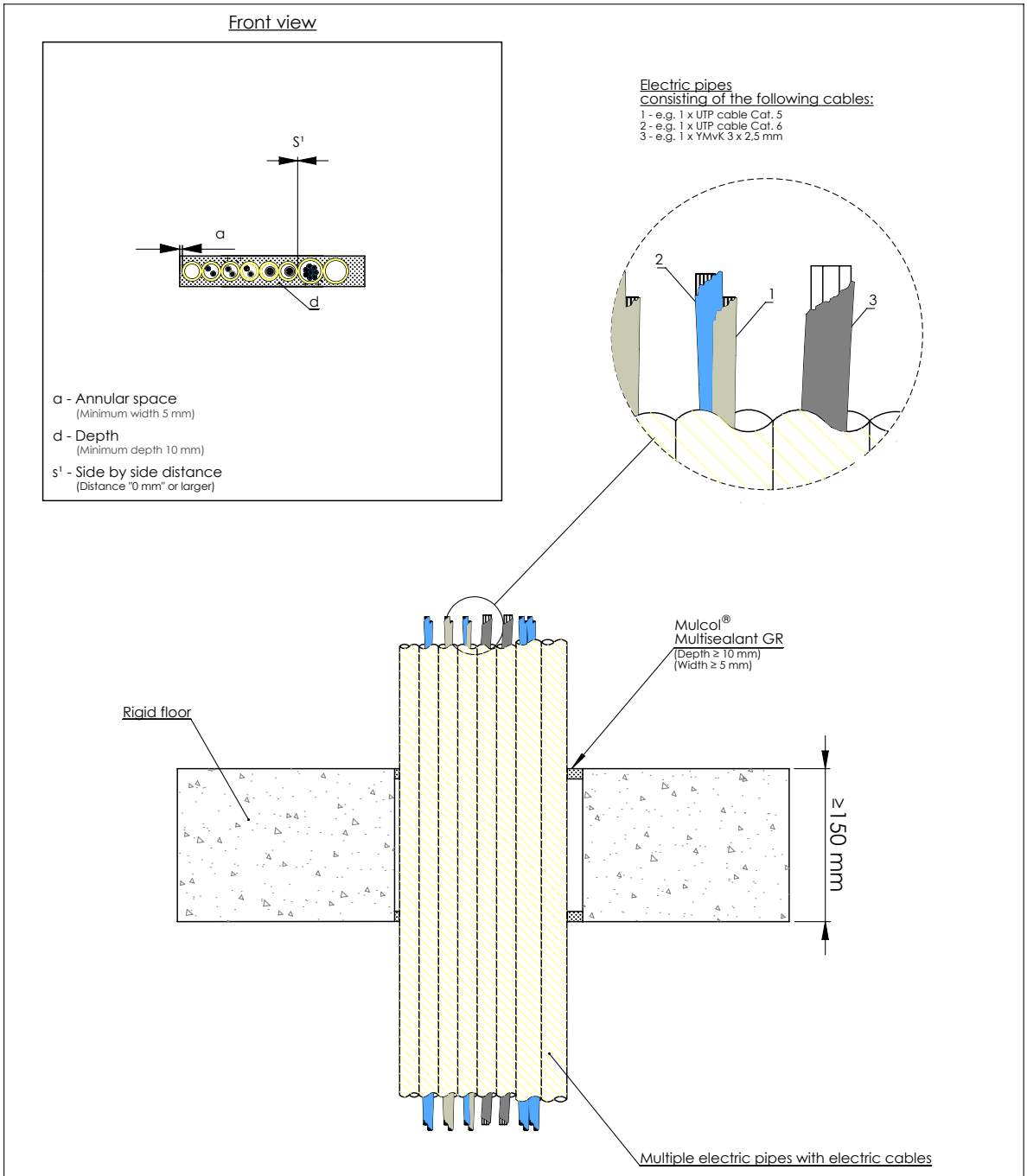
Figure E.1 out of the standard EN 1366-3:2009



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A.4.2 8x PVC-ET pipes containing electrical cables



American projection	Scale : 1:5	Company : Mulcol International B.V.	RF-EP8-G2.1.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 1-6-2018	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

For this system, a fire resistance applies in one direction (from below) for the following combinations of performance parameters and classes (up to a maximum of 8 pipes).

Pipe/ conduit material	Outer pipe diameter mm	Distance between pipes S² mm	Distance to support above floor mm	Classification*
PVC-ET	3/4", 5/8" or Ø 25 mm	≤ 15	≤ 600	**E 120 U/U EI 90 U/U**

* U/U pipe end configuration applies to C/U, U/C and C/C also

Permitted telecommunication cables		One sheathed cable allowed for each pipe			Empty pipe
UTP Cat. 5	**UTP Cat. 6**	**YMVK 3 x 2.5 mm²**	**YMVK 5 x 1.5 mm²**	**YMVK 5 x 2.5 mm²**	
Yes	Yes	Yes	Yes	Yes	Yes

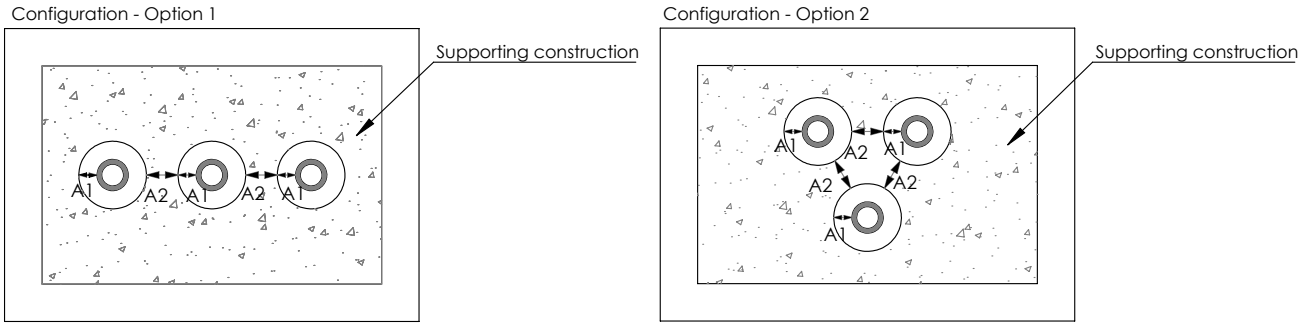
For an annular space (distance ''a'' in drawing) from 5 to 50 mm no backing material is necessary but it is allowed. The backing material may consist out of the following materials:

- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

In a rigid floor system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 5 mm;
- distance A2 = 100 mm;

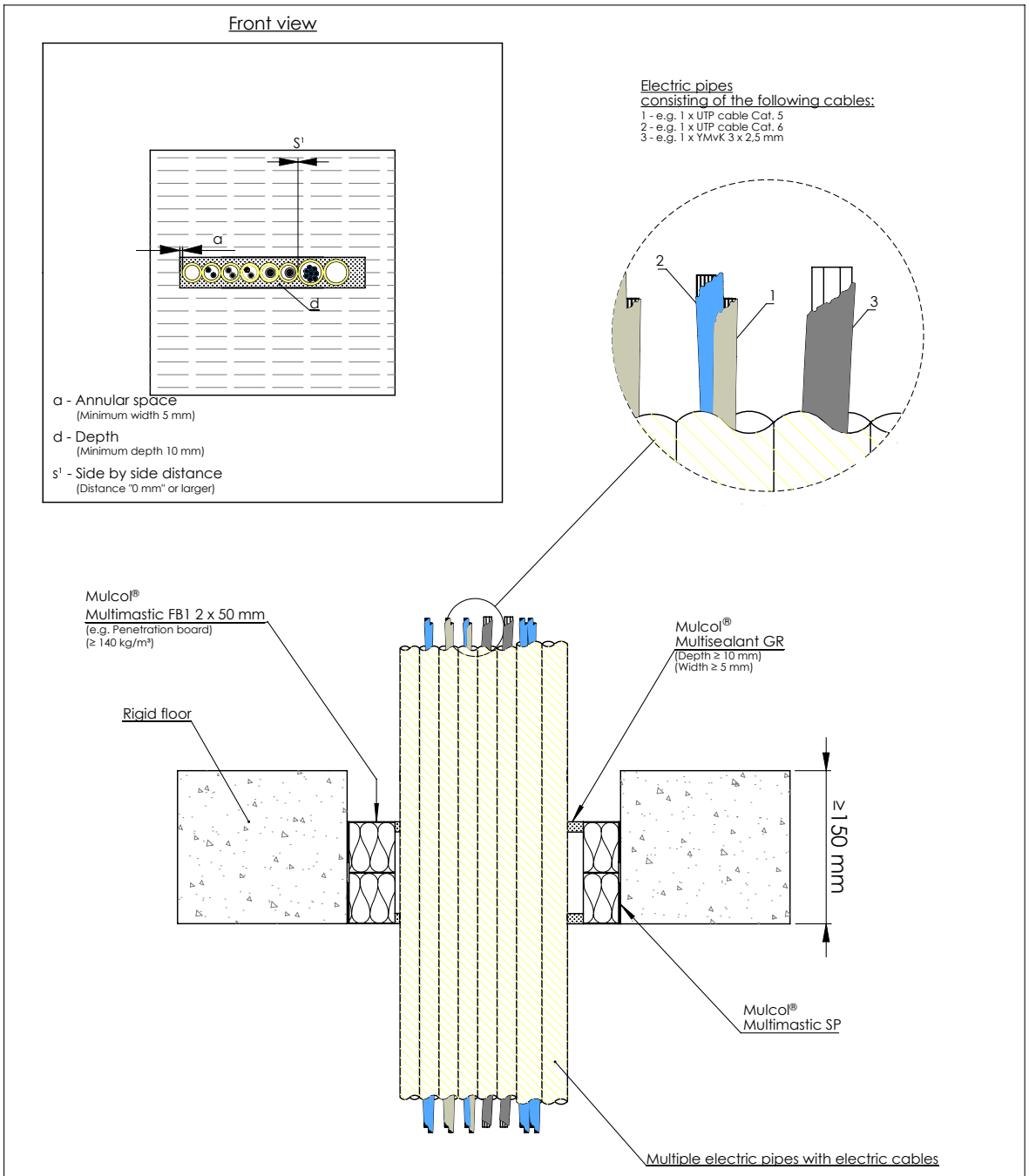
Figure E.1 out of the standard EN 1366-3:2009



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A.4.2.1 8x PVC-ET pipes containing electrical cables trough Mulcol® Multimastic FB1



American projection	Scale : 1:5	Company : Mulcol International B.V.	PBrf-EP8-G2.1.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 1-6-2018	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

For this system, a fire resistance applies in one direction (from below) for the following combinations of performance parameters and classes (up to a maximum of 8 pipes).

Pipe/ conduit material	Outer pipe diameter mm	Distance between pipes S[1] mm	Distance to support above floor mm	Classification*
PVC-ET	3/4", 5/8" or Ø 25 mm	≤ 15	≤ 600	**E 90 U/U EI 90 U/U**

* U/U pipe end configuration applies to C/U, U/C and C/C also

Permitted telecommunication cables		One sheathed cable allowed for each pipe			Empty pipe
UTP Cat. 5	UTP Cat. 6	YMVK 3 x 2.5 mm²	YMVK 5 x 1.5 mm²	YMVK 5 x 2.5 mm²	
Yes	Yes	Yes	Yes	Yes	Yes

For an annular space (distance ''a'' in drawing) from 5 to 50 mm no backing material is necessary but it is allowed. The backing material may consist out of the following materials:

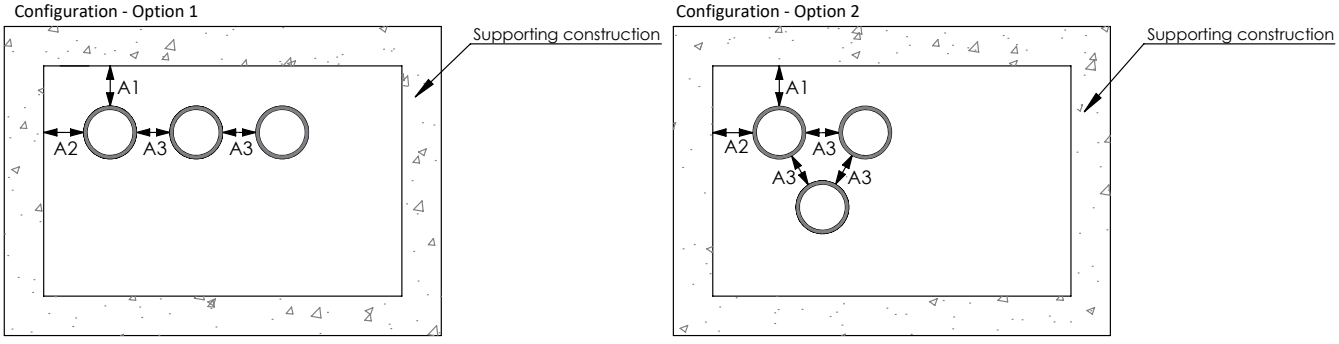
- Stone wool of at least 35 kg/m³;
- Mulcol® Multimastic FB1 coated boards
- Mulcol® Multitherm Backing.

The Mulcol® Multimastic C system to be used consists of two layers of 50 mm on top of each other (total thickness 100 mm). The pipes passed through the system in round holes approximately the same size as the pipe (tight fit). The aperture size in the wall may be up to 2400 mm wide and 1200 mm high. No aperture frame is needed, but it is allowed.

In the Mulcol® Multimastic C system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 to A3 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 50 mm;
- distance A2 = 50 mm;
- distance A3 = 100 mm;

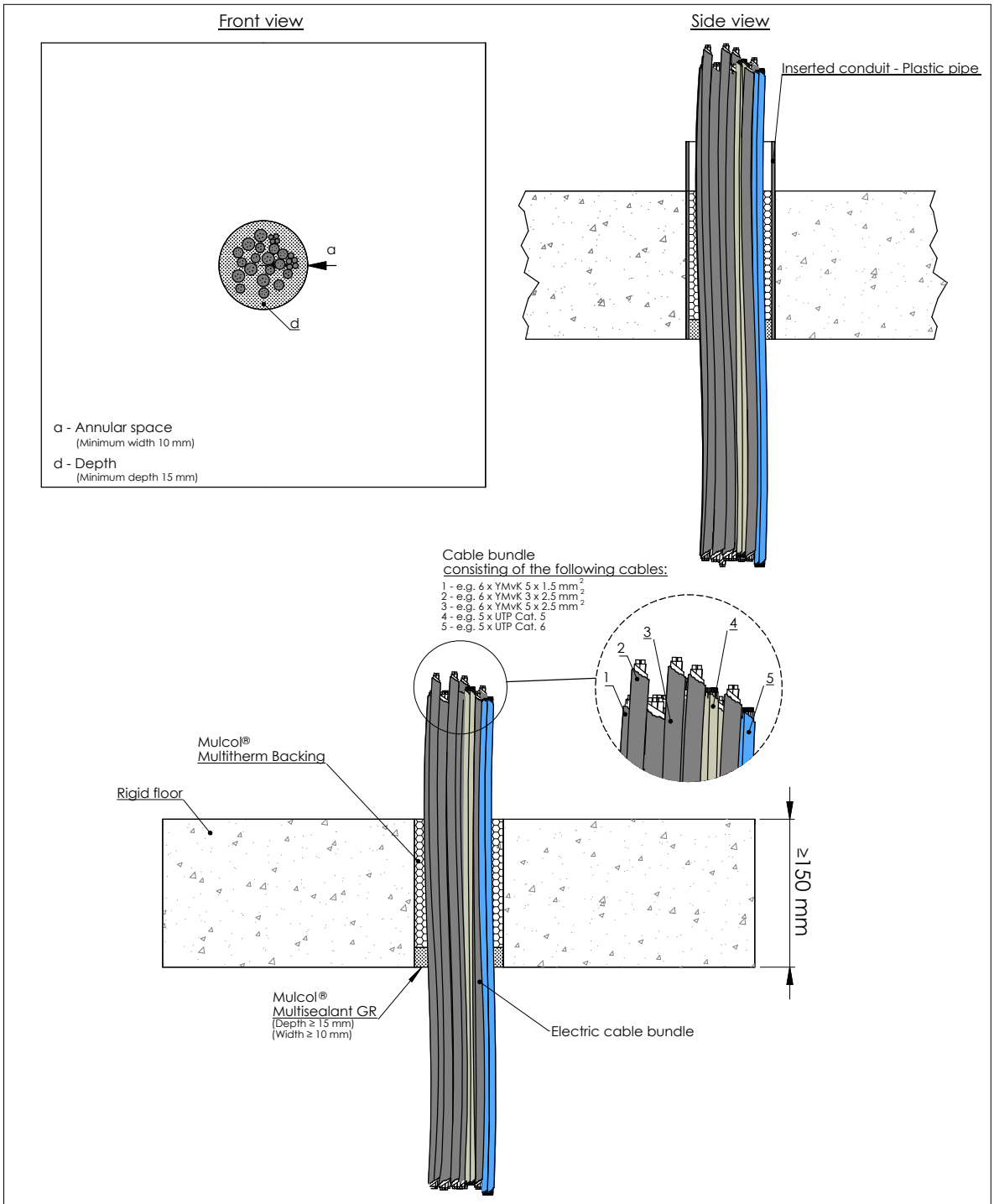
Figure E.1 out of the standard EN 1366-3:2009



A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A1 : Pipe / top edge of seal seperation
A2 : Pipe / side edge of seal seperation
A3 : Pipe / pipe seperation

A.4.3 Electrical cable bundle



American projection	Scale : 1:5	Company : Mulcol International B.V.	RFmk-EC-G1.2.10
	Unit of measure : mm	Department : Research & Development	A4
	Date : 17-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

Generic type	Maximum aperture diameter mm	Number of cables allowed	Distance to support above floor mm	Classification*
Cable bundle	80	≤ 28	≤ 350	**E 120** **EI 120**

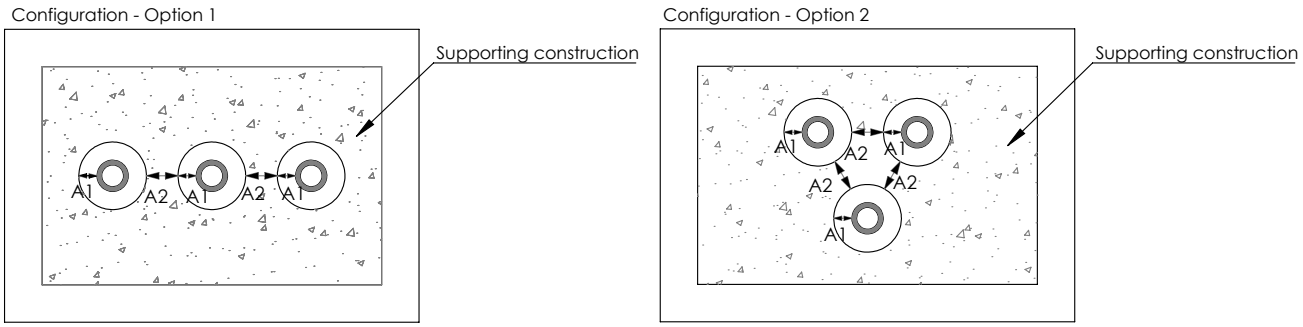
Permitted telecommunication cables		Sheathed cable allowed		
UTP Cat. 5	**UTP Cat. 6**	**YMVK 3 x 2.5 mm²**	**YMVK 5 x 1.5 mm²**	**YMVK 5 x 2.5 mm²**
Yes	Yes	Yes	Yes	Yes

The fire resistance applies with or without an encased PVC-U / PVC-C pipe. The diameter of the PVC-U / PVC-C pipe shall be maximum Ø110 mm and the wall thickness shall be maximum 3.2 mm.

In a rigid floor system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

- distance A1 = 10 mm;
- distance A2 = 100 mm;

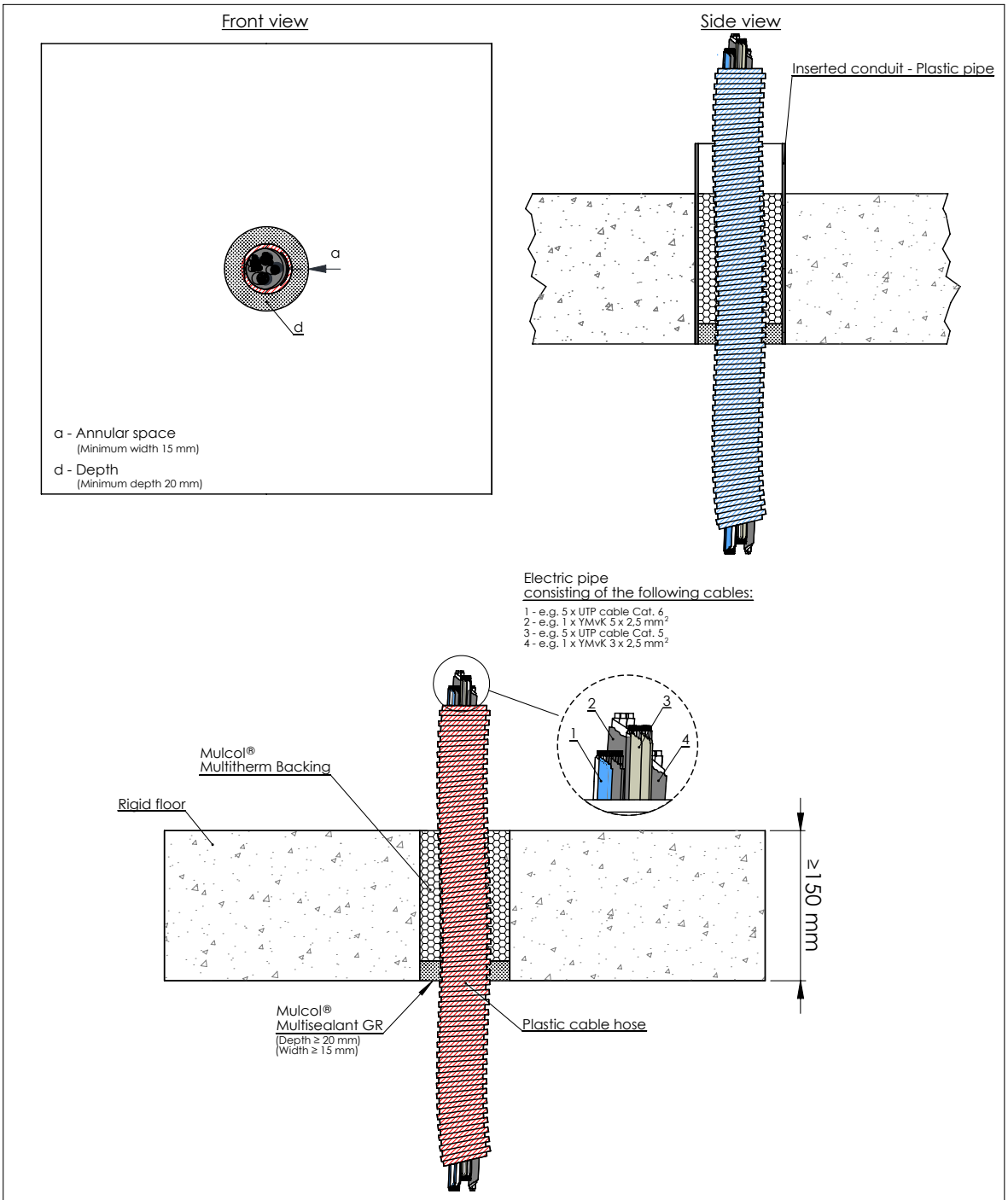
Figure E.1 out of the standard EN 1366-3:2009



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

A.4.4 Plastic conduit containing electrical cables



American projection	Scale : 1:5	Company : Mulcol International B.V.	RFmk-EC-G1.4.30
	Unit of measure : mm	Department : Research & Development	A4
	Date : 18-4-2017	Draftsman : B.D.	

MULCOL FIRE PROTECTION

Fire test pipe penetration seal
Mulcol® Multisealant GR
Installation in rigid floor

Pipe/ conduit material	Maximum aperture diameter mm	Maximum PE conduit diameter mm	Number of cables allowed	Distance to support above floor mm	Classification*
PE	80	50	≤ 12	≤ 350	**E 90 U/U EI 90 U/U**

* U/U pipe end configuration applies to C/U, U/C and C/C also

Permitted telecommunication cables		Sheathed cable allowed		
UTP Cat. 5	**UTP Cat. 6**	**YMVK 3 x 2.5 mm²**	**YMVK 5 x 1.5 mm²**	**YMVK 5 x 2.5 mm²**
Yes	Yes	Yes	Yes	Yes

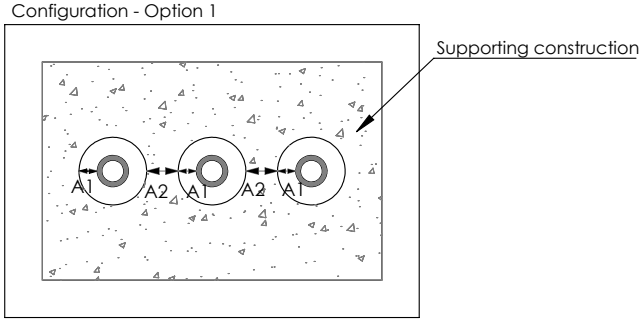
The fire resistance applies with or without an encased PVC-U / PVC-C pipe. The diameter of the PVC-U / PVC-C pipe shall be maximum Ø110 mm and the wall thickness shall be maximum 3.2 mm.

In a rigid floor system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 and A2 according to Figure E.1 of EN 1366-3:2009, See figure below):

− distance A1 = 15 mm;
− distance A2 = 100 mm;

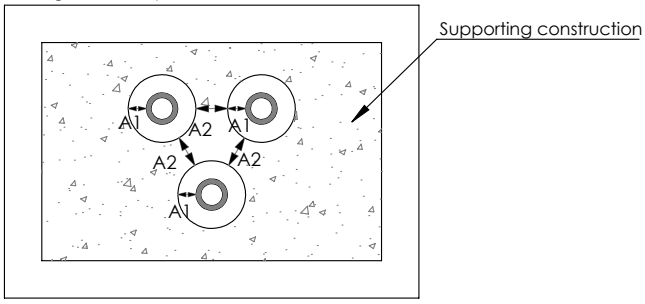
Figure E.1 out of the standard EN 1366-3:2009

Configuration - Option 1



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals

Configuration - Option 2



A1 : Seal size/Annular space
A2 : Min. separation between penetration seals