

designated according to Article 29 of the Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment, www.eota.eu)

European Technical Assessment

ETA 25/0236
of 30/04/2025

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

Trade name of the construction product FIRESAFE / FSG

Product family to which the construction product belongs Fire Stopping and Sealing Product:
• Penetration Seals

Manufacturer Firesafe AS
Robsrudskogen 15
1470 Lørenskog
Norway

Manufacturing plant(s) L/002

This European Technical Assessment contains 133 pages including 3 Annexes which form an integral part of this assessment.

This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of EAD 350454-00-1104, September 2017

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I. SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESSMENT

1. Technical description of the product

- 1) FIRESAFE / FSG is a sealant and pipe closure device used to form penetration seals where insulated and uninsulated metal pipes, combustible pipes, combustible cable conduits and cables penetrate walls and floors.
- 2) The FIRESAFE / FSG is supplied in liquid form contained within 310 cartridges. The sealant is gunned into the aperture in the separating element/elements and around the service or (mixed) services, to a specified depth utilizing backing material where needed.
- 3) The products below can be used in conjunction with FIRESAFE / FSG depending upon the required application and classification (see Annex A & B). These products are subject to separate ETAs.
 - FIRESAFE / FSB, firestop board
 - Mulcol® Multitherm Bandage, thermal insulation

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.
- 4) The use category of FIRESAFE / FSG in relation to BWR 3 (Hygiene, health and environment) is IA1, S/W2

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

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

- 1) The intended use of FIRESAFE / FSG is to reinstate the fire resistance performance of flexible wall, rigid wall and floor constructions where they are penetrated by various services.
- 2) The specific elements of construction that the system FIRESAFE / FSG may be used to provide a penetration seal in, are as follows:
 - a) Flexible walls*: The wall must have a minimum thickness of 100 mm. Apertures in flexible walls are not required to be lined.
 - b) Rigid walls*: The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 400 kg/m³.
 - c) Rigid floors: The floor must have a minimum thickness of 150 mm and comprise aerated concrete or concrete with a minimum density of 400 kg/m³.

* See Annex C for the field of application.
The supporting construction must be classified in accordance with EN 13301-2 for the required fire resistance period.
- 3) The system FIRESAFE / FSG may be used to provide a penetration seal with services e.g. cables, cable trays, metal pipes, composite pipes and plastic pipes, with and without insulation, with mixed services within the same seal/aperture (for details see Annex A and B).
- 4) Mutual distances between services and minimum support distances are given in Annex C.
- 6) The provisions made in this European Technical Assessment are based on an assumed working life of the FIRESAFE / FSG of 25 years, provided that the conditions laid down in the product data sheet regarding 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 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.
- 7) Type Z₂: Intended for uses in internal conditions with humidity lower than 85 % RH excluding temperatures below 0°C, without exposure to rain or UV.

8) Insulation types

The following elastomeric insulation types are given in Annex A and B (or equal, not limited by brand or type):

- Reaction to fire class $\leq$ B-s1, d0 – e.g. ArmaFlex Ultima, Kaiflex KK Plus S1
- Reaction to fire class $\leq$ B-s2, d0 – e.g. ArmaFlex AF EVO, Kaiflex KK Plus S2 / ST, K-Flex ST
- Reaction to fire class $\leq$ B-s3, d0 – e.g. ArmaFlex AF / XG / SH, K-Flex H
- Reaction to fire class $\leq$ C-s2, d0 – e.g. Kaiflex HT S2
- Reaction to fire class $\leq$ D-s3, d0 – e.g. ArmaFlex NH / SH / HT

The insulations may also have a B_L, C_L or D_L classification (linear insulation).

9) Pipes types

The following multi layered pipes (or equal) are allowed:

- Alpex DUO, Valsir Pexal, Valsir Mixal and APE Plain (PE-Xb/AL/PE-Xb)
- Uponor 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)

The following fibre composite pipes (or equal) are allowed:

- Aquatechnik Fusio PP-R 80, Aquatechnik Fusio PP-RCT
- Aquatherm Blue-MF, Aquatherm Blue-S, Aquatherm Red-MF, Aquatherm Green-MF, Aquatherm Green-MS, Aquatherm Green-S, Aquatherm Lilac-S, Aquatherm Grey-MS and Aquatherm Orange M
- Bänninger PP-R, Bänninger Climatec PP-RCT and Bänninger Watertec PP-RCT

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

Product-type: Sealant		Intended use: Penetration Seal
Assesment method	Essential characteristic	Product Performance
<u>BWR 2 Safety in case of fire</u>		
EN 13501-1	Reaction to fire	E
EN 13501-2	Resistance to fire	Annex A, B & C
<u>BWR 3 Hygiene, health and enviroment</u>		
EN 1026	Air permeability	No performance determined
EAD 350454-00-1104, Annex C	Water permeability	No performance determined
Declaration of manufacturer & EN 16516	Release of dangerous substances	IA1, S/W2 - Declaration of manufacturer
<u>BWR 4 Safety in use</u>		
EOTA TR 001:2003	Mechanical resistance and stability	No performance determined
EOTA TR 001:2003	Resistance to impact/movement	No performance determined
EOTA TR 001:2003	Adhesion	No performance determined
EAD 350454-00-1104, Clause 2.2.9	Durability	Z ₂
<u>BWR 5 Protection against noise</u>		
EN 10140-1,2,4,5 / EN ISO 7171-1	Airborne sound insulation	Rs,w (C;Ctr) = 55 (-2;-9) dB
<u>BWR 6 Energy economy and theat retention</u>		
EN 12664, EN 12667, EN 12939, EN ISO 8990, EN ISO 6946, EN ISO 14683, EN ISO 10211, EN ISO 10456	Thermal properties	No performance determined
EN ISO 13372, EN 12086, EN ISO 10456	Water vapour permeability	No performance determined

4. Assessment and Verification of Constancy of Performance (hereinafter AVCP) applied, with reference to its legal base

According to the decision 1999/454/EC – Commission Decision of date 22nd June 1999 on the procedure for attesting the conformity of construction products pursuant to Article 20(2) of Council Directive 89/133/EEC as regards to 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 Commission¹, as amended, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table(s) applies (apply).

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

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

Tasks of the manufacturer:

Factory production control

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

The factory production control shall be in accordance with the Control Plan of 14 September 2023 relating to the European Technical Assessment ETA 25/0236 issued on 30/04/2025 which is part of the technical documentation of this European Technical Assessment. The “Control Plan” is laid down in the context of the factory production control system operated by the manufacturer and deposited at UL International (Netherlands) B.V.

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

Other tasks of the manufacturer:

Additional information

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

(a) Technical data sheet:

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

(b) Installation instruction:

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

6. Issued on:

30 April 2025

Report by:

Verified by:

Validated by:



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Annex - Resistance to Fire Classification - FIRESAFE / FSG

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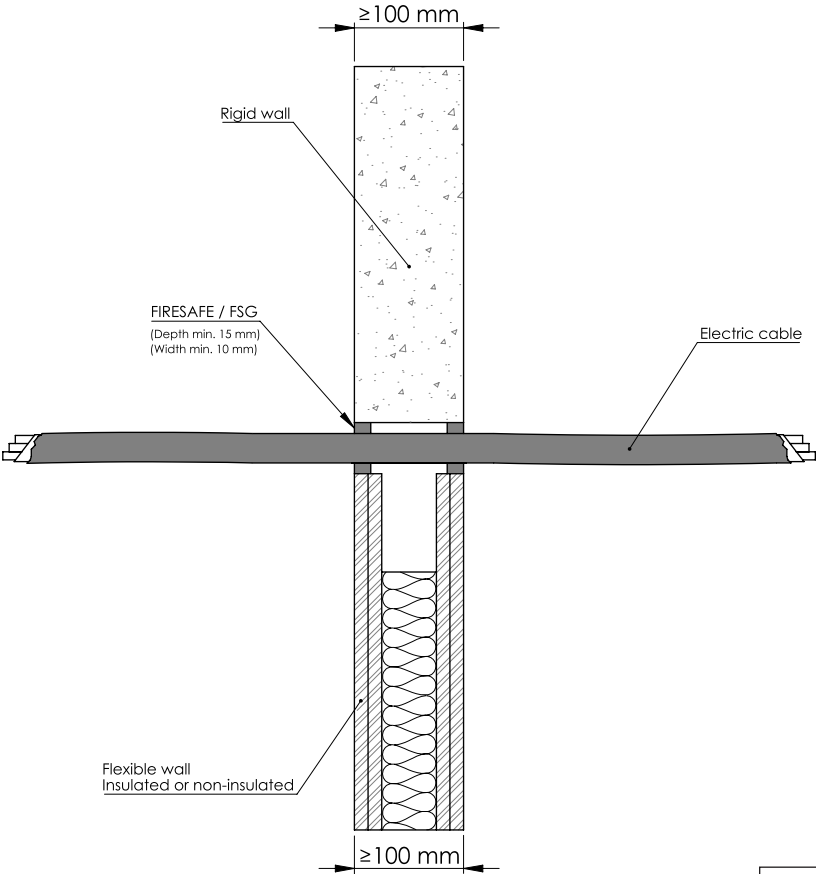
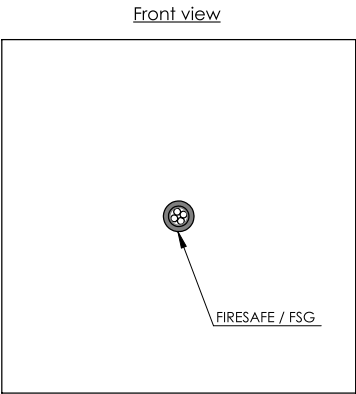
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A.1.1 Flexible or rigid wall - Cables, trays and conduits

A.1.1.1 Cables



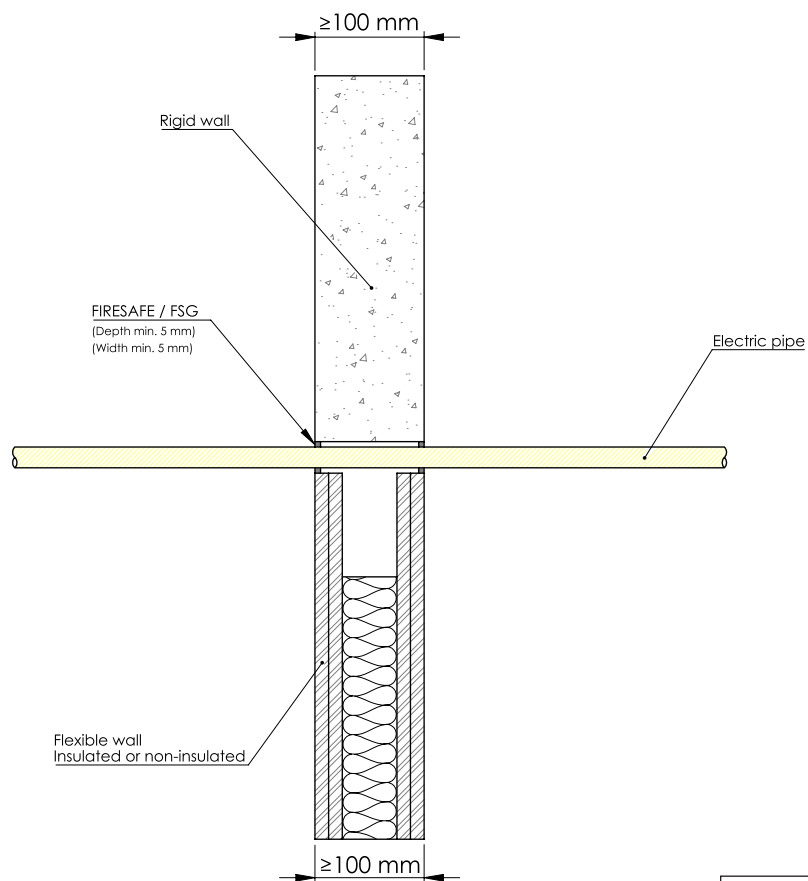
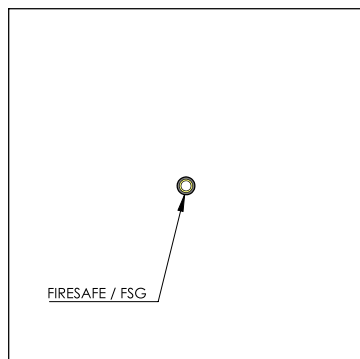
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Servicesc	Sealing (mm)	Classification
Cables ≤ Ø 25 mm, YMvK 5G 25 mm ²	FIRESAFE / FSG ≥ 10 x 15 (wxh)	EI 60, E 120

A.1.1 Flexible or rigid wall - Cables, trays and conduits

A.1.1.2 Single plastic conduits

Front view

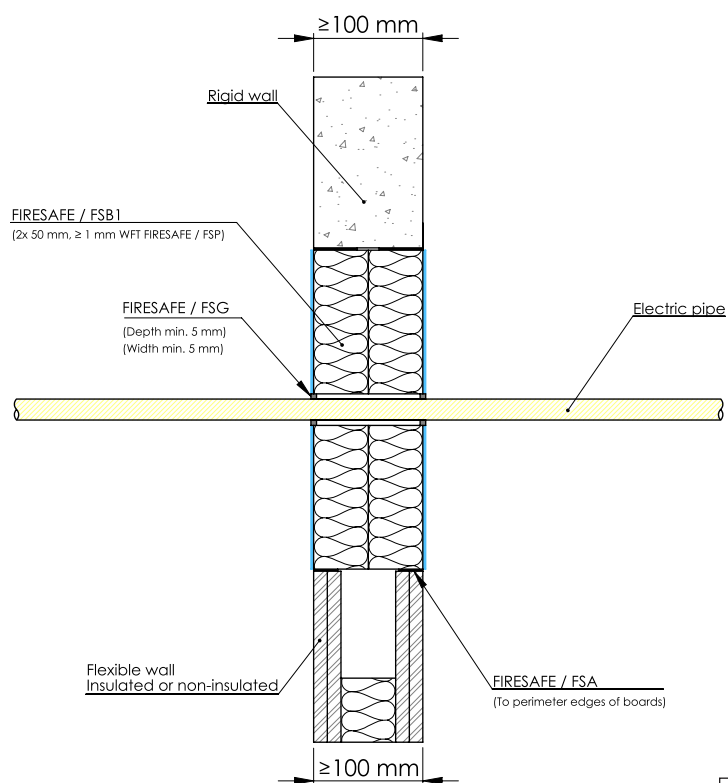
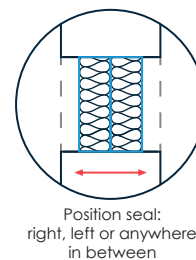
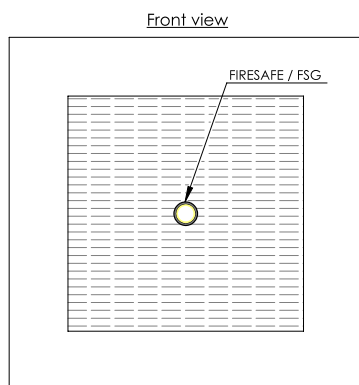


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Services	Sealing (mm)	Classification
Plastic conduits $\leq \varnothing 19$ mm, with or without cables	FIRESAFE / FSG $\geq 5 \times 5$ (wxd)	EI 60 U/U, E 90 U/U

A.1.1 Flexible or rigid wall - Cables, trays and conduits

A.1.1.3 Single plastic conduits - FIRESAFE / FSB1

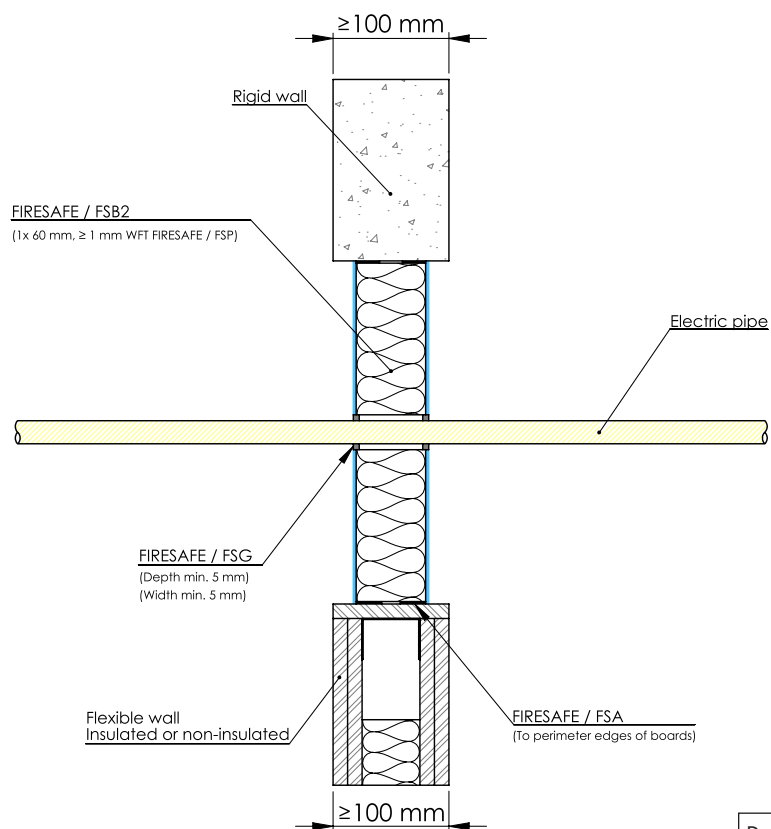
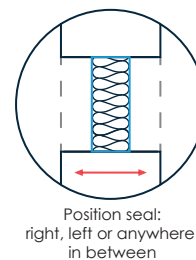
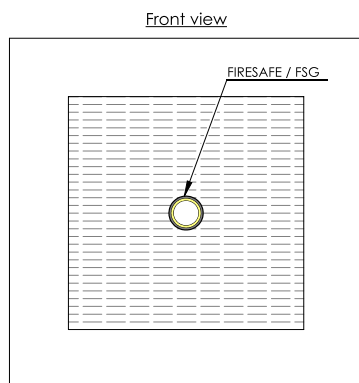


Drawing: PBfw.E-EP-MFB1-G2.0.10

Services	Sealing (mm)	Classification
Plastic conduits ≤ Ø 19 mm, with or without cables	FIRESAFE / FSG ≥ 5 x 5 (wxd)	EI 60 U/U, E 90 U/U

A.1.1 Flexible or rigid wall - Cables, trays and conduits

A.1.1.4 Single plastic conduits - FIRESAFE / FSB2

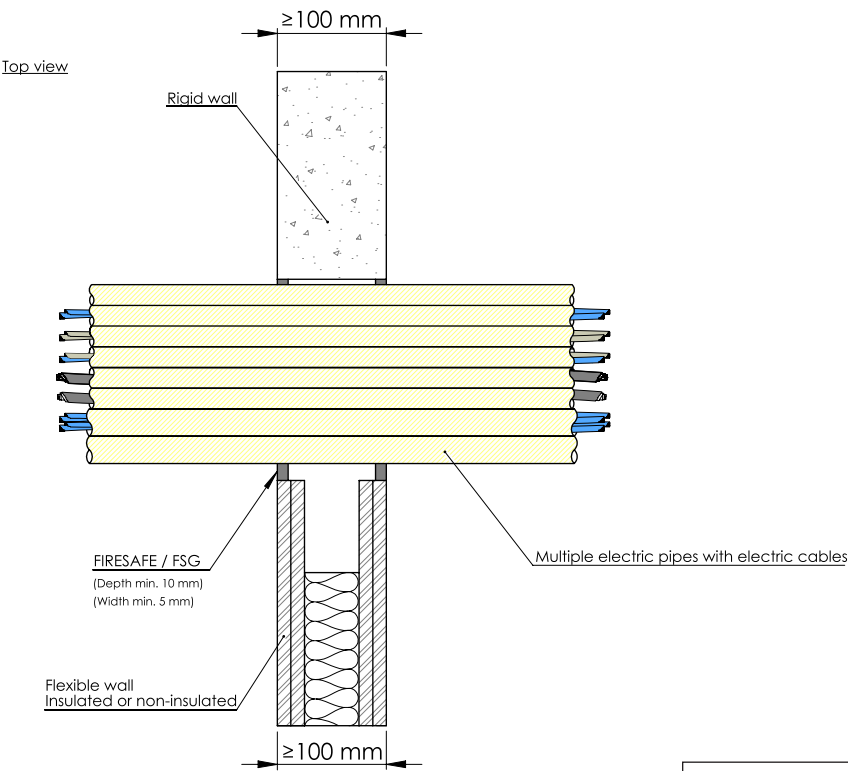
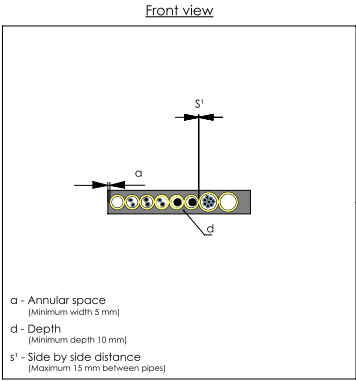


Drawing: PBfw.E-EP-MFB2-G2.0.10

Services	Sealing (mm)	Classification
Plastic conduits ≤ Ø 19 mm, with or without cables	FIRESAFE / FSG ≥ 5 x 5 (wxd)	EI 60 U/U, E 90 U/U

A.1.1 Flexible or rigid wall - Cables, trays and conduits

A.1.1.5 Multiple plastic conduits with cables

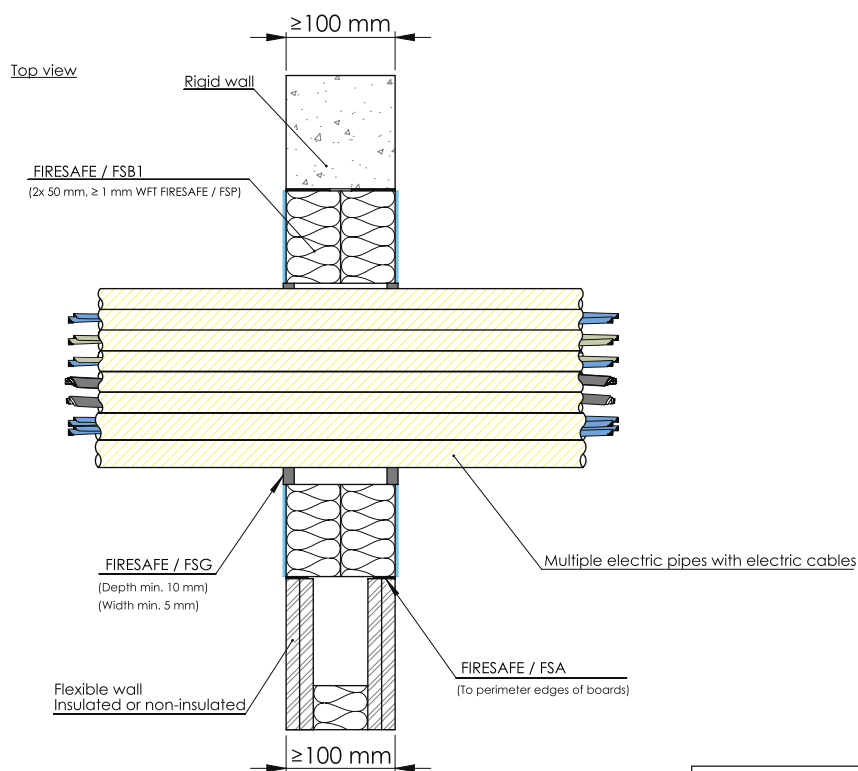
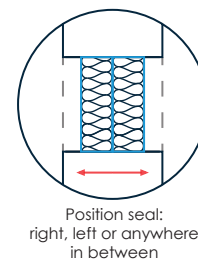
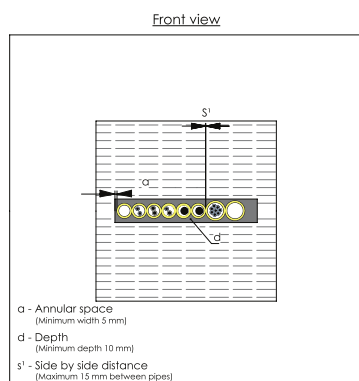


Drawing: FW.E-EP8-G2.1.10

Services	Sealing (mm)	Classification
Plastic conduits ≤ Ø 25 mm, with or without cables, max 8 pcs.	FIRESAFE / FSG ≥ 5 x 10 (wxd)	EI 90 U/U, E 120 U/U

A.1.1 Flexible or rigid wall - Cables, trays and conduits

A.1.1.6 Multiple plastic conduits with cables - FIRESAFE / FSB1

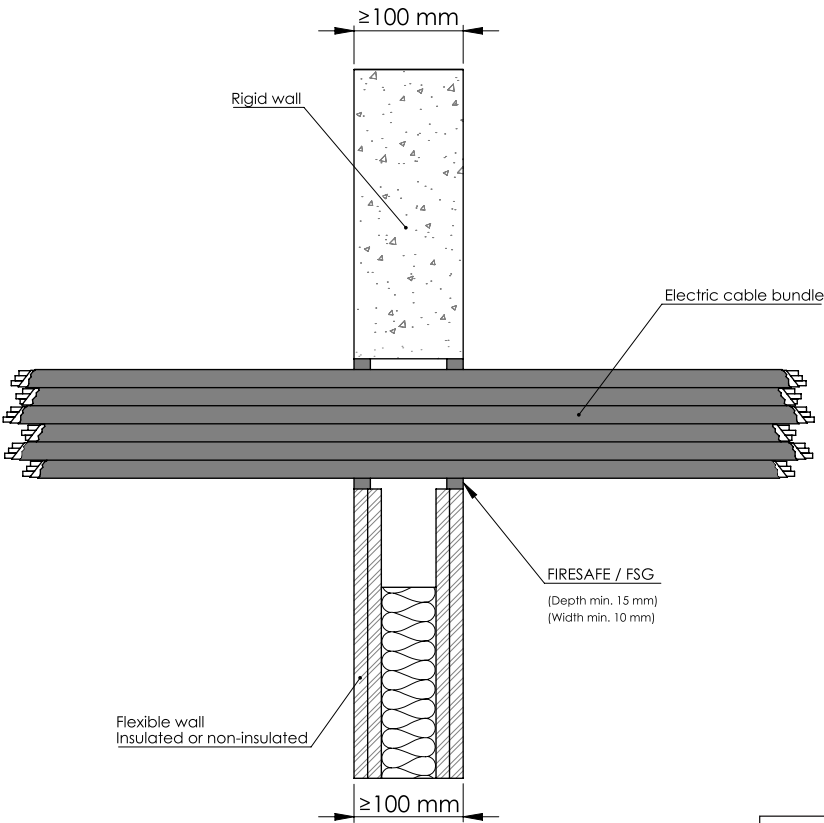
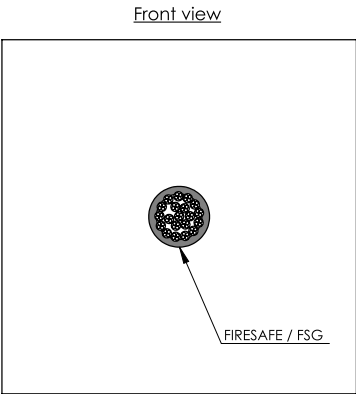


Drawing: PBfw.E-EP8-G2.1.10

Services	Sealing (mm)	Classification
Plastic conduits ≤ Ø 25 mm, with or without cables, max 8 pcs.	FIRESAFE / FSG ≥ 5 x 10 (wxd)	EI 90 U/U, E 120 U/U

A.1.1 Flexible or rigid wall - Cables, trays and conduits

A.1.1.7 Cable bundle



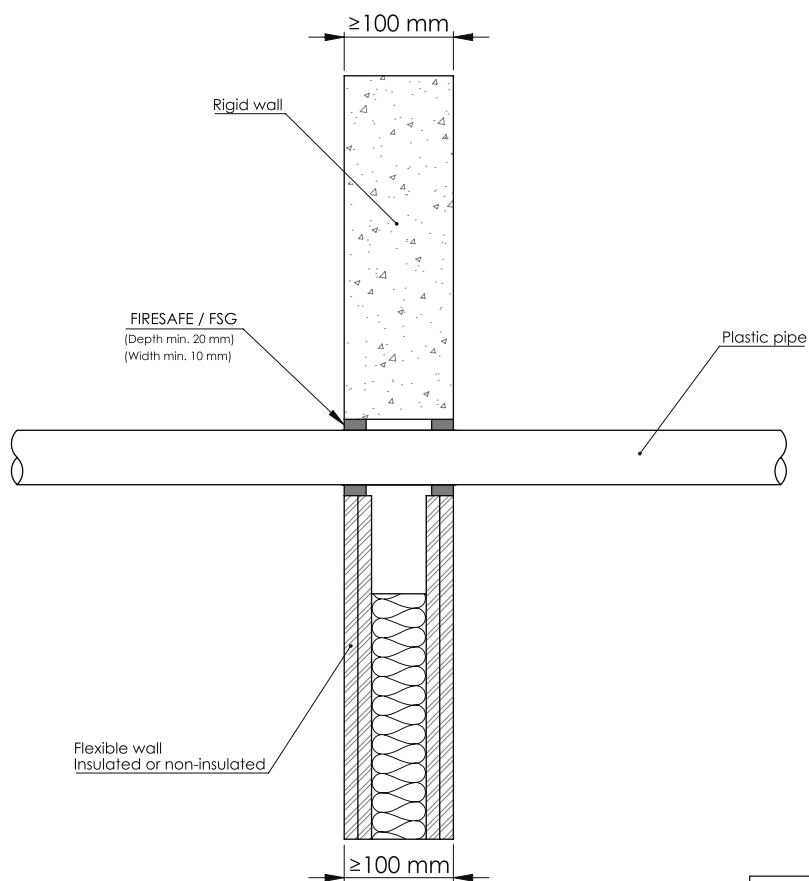
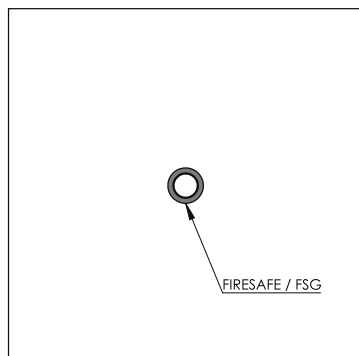
Drawing: FW.E-ECB-G2.2.10

Services	Sealing (mm)	Classification
Cables ≤ Ø 21 mm in a tied bundle ≤ Ø 100 mm	FIRESAFE / FSG ≥ 10 x 15 (wxd)	EI 60, E 120

A.1.2 Flexible or rigid wall - Combustible pipes

A.1.2.1 Plastic pipes

Front view

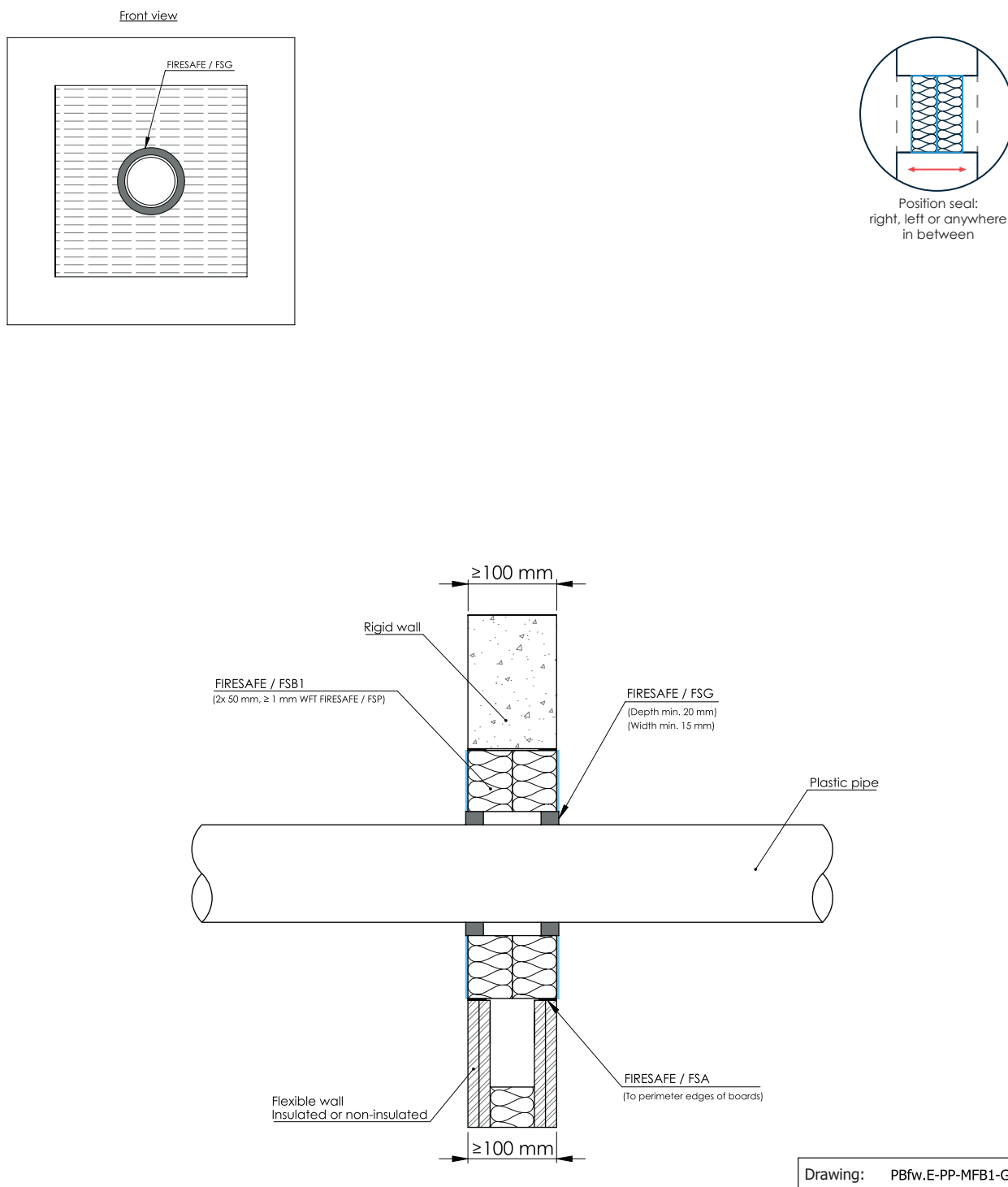


Drawing: FW.E-PP-G2.4.10

Services	Pipe dimensions (mm)		Sealing (mm)	Classification
	Outer dimension	Wall thickness		
PE(-HD) / PE-X / ABS / SAN+PVC	$\leq \text{Ø } 40$	2.4 - 10	FIRESAFE / FSG $\geq 10 \times 20 \text{ (wxd)}$	EI 120 U/C
	$\leq \text{Ø } 110$	2.7 - 10		
PP	$\leq \text{Ø } 40$	2.3 - 10		EI 120 U/U
	$\leq \text{Ø } 110$	2.7 - 10		
PVC(-U/-C)	$\leq \text{Ø } 32$	1.8 - 10		EI 120 U/C
	$\leq \text{Ø } 50$	2.0 - 10		
	$\leq \text{Ø } 40$	1.9 - 10		
	$\leq \text{Ø } 110$	2.2 - 10		
	$\leq \text{Ø } 160$	3.2 - 11.8		

A.1.2 Flexible or rigid wall - Combustible pipes

A.1.2.2 Plastic pipes - FIRESAFE / FSB1

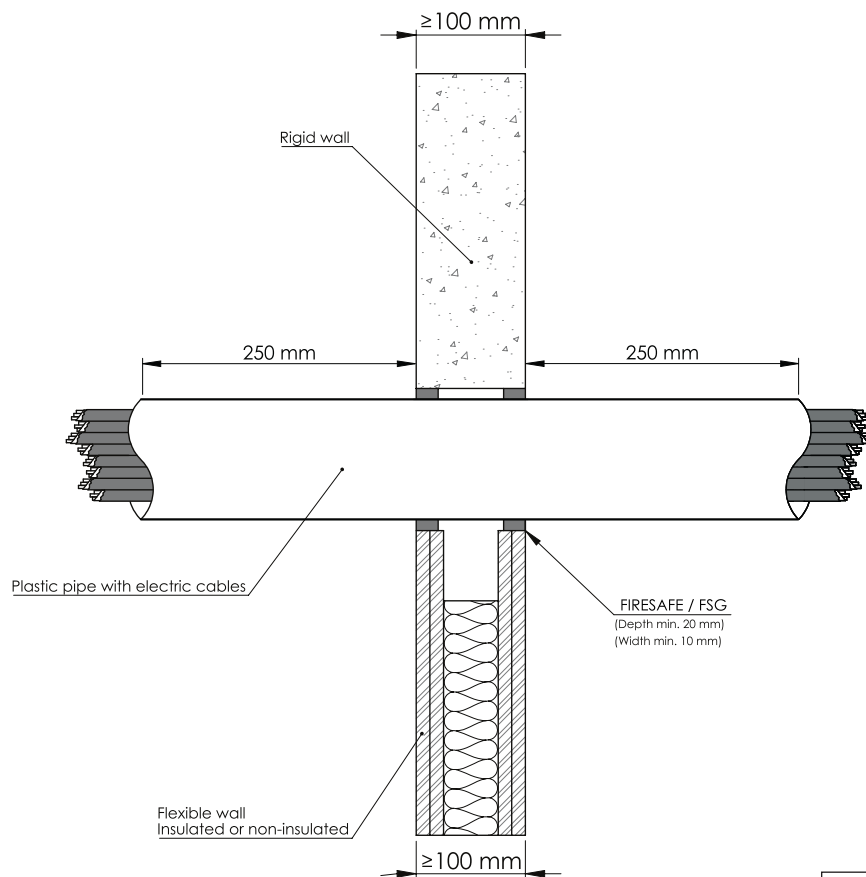
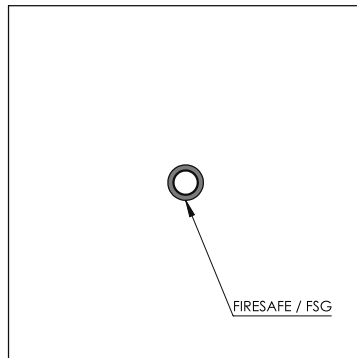


Services	Pipe dimensions (mm)		Sealing (mm)	Classification
	Outer dimension	Wall thickness		
PE(-HD) / PE-X / ABS / SAN+PVC	≤ Ø 110	2.7 - 10	FIRESAFE / FSG ≥ 15 x 20 (wxd)	EI 60 U/C
	≤ Ø 110	10		EI 120 U/C
PP	≤ Ø 110	2.7 - 10	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 90 U/C, E 120 U/C
	≤ Ø 110	10		EI 120 U/C
PVC(-U/-C)	≤ Ø 32	1.8	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 120 U/U
	≤ Ø 50	3		EI 60 U/U
	≤ Ø 110	2.7 - 10	FIRESAFE / FSG ≥ 15 x 20 (wxd)	EI 60 U/C
	≤ Ø 110	10		EI 120 U/C

A.1.2 Flexible or rigid wall - Combustile pipes

A.1.2.3 Plastic pipes with cables

Front view

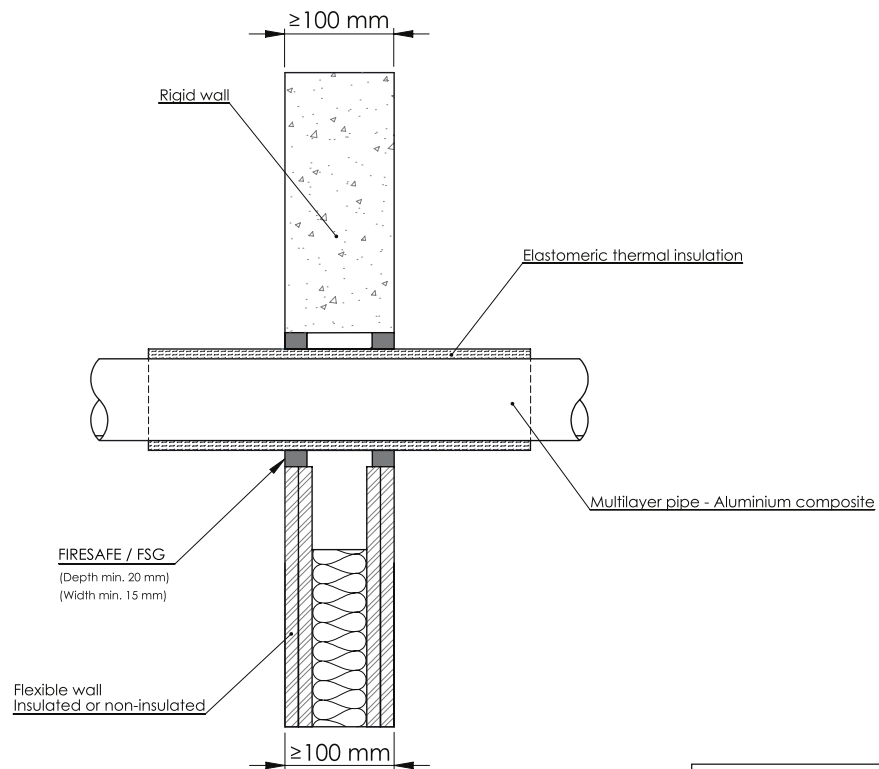
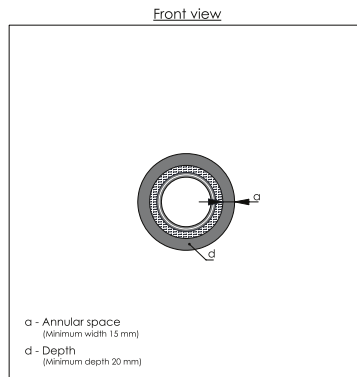


Drawing: FW.E-PPEC-G2.4.10

Services	Pipe dimensions (mm)		Sealing (mm)	Classification
	Outer dimension	Wall thickness		
PE(-HD) / PE-X / ABS / SAN+PVC	≤ Ø 110	2.7 - 10	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 120 U/C
PP				
PVC(-U/-C)				
Cables ≤ Ø 21 mm	-	-	-	EI 120
Cables ≤ Ø 80 mm	-	-	-	EI 90, E 120
Cables ≤ Ø 21 mm in a tied bundle ≤ Ø 100 mm	-	-	-	EI 120

A.1.3 Flexible or rigid wall - Multilayer pipes (MLC) insulated

A.1.3.1 Multilayer pipes (MLC) - Elastomer

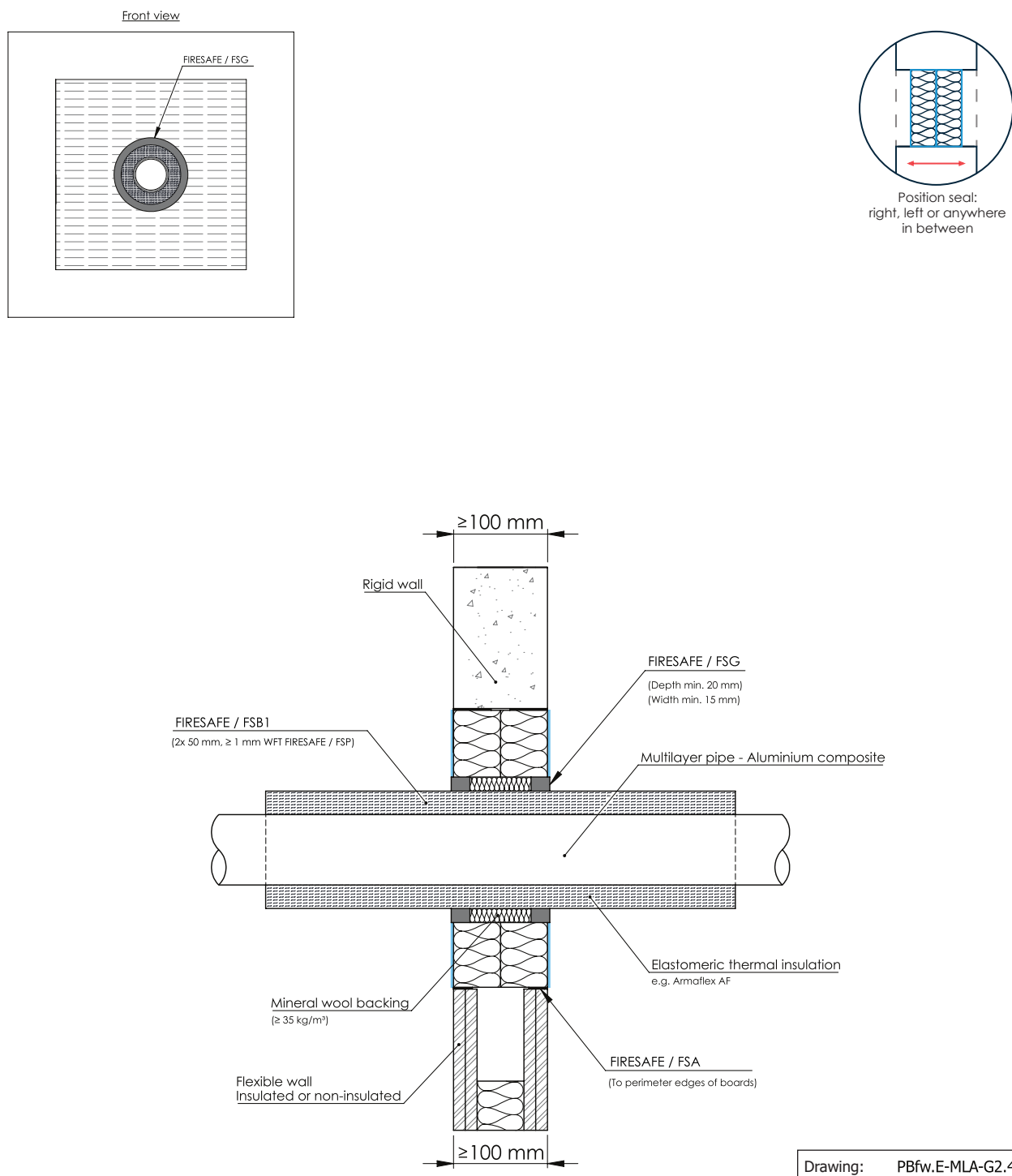


Drawing: FW.E-MLA-G2.4.22

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Multilayer pipes (MLC)	≤ Ø 75	6	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	9 - 32	LS 400 / CS	FIRESAFE / FSG ≥ 15 x 20 (wxd)	EI 90 U/C E 120 U/C

A.1.3 Flexible or rigid wall - Multilayer pipes (MLC) insulated

A.1.3.2 Multilayer pipes (MLC) - Elastomer - FIRESAFE / FSB1

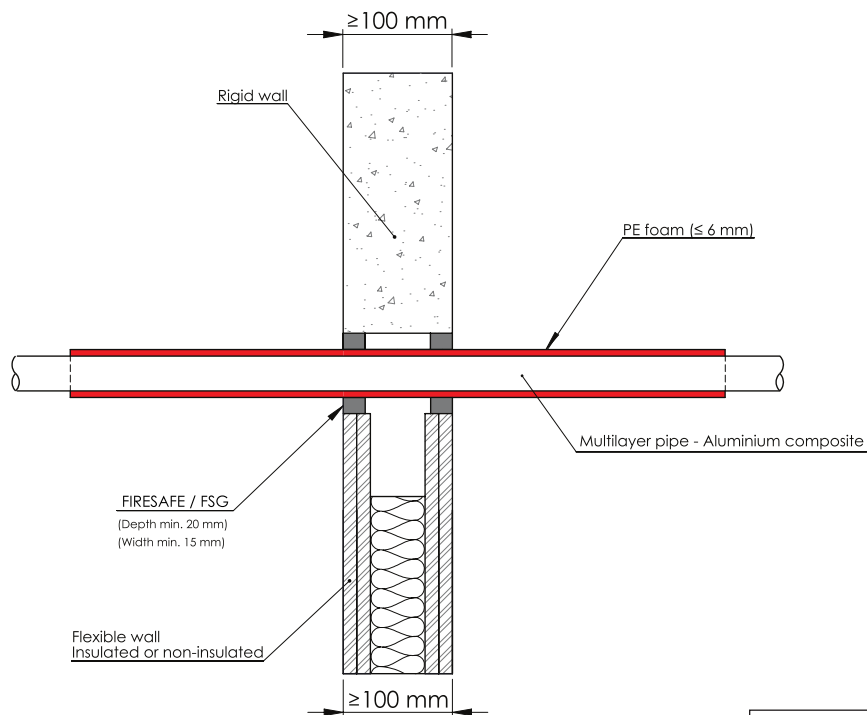
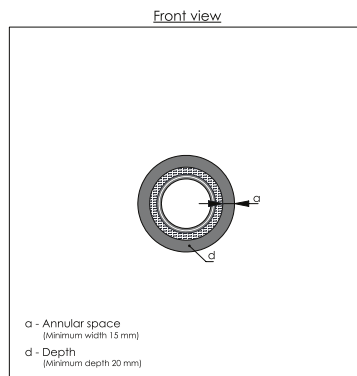


Drawing: PBfw.E-MLA-G2.4.22

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Multilayer pipe (MLC)	≤ Ø 75	6.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	9 - 32	LS 400 / CS	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Stone wool (≥ 35 kg/m³)	EI 90 U/C E 120 U/C

A.1.3 Flexible or rigid wall - Multilayer pipes (MLC) insulated

A.1.3.3 Multilayer pipes (MLC) - PE foam LS 300 / CS

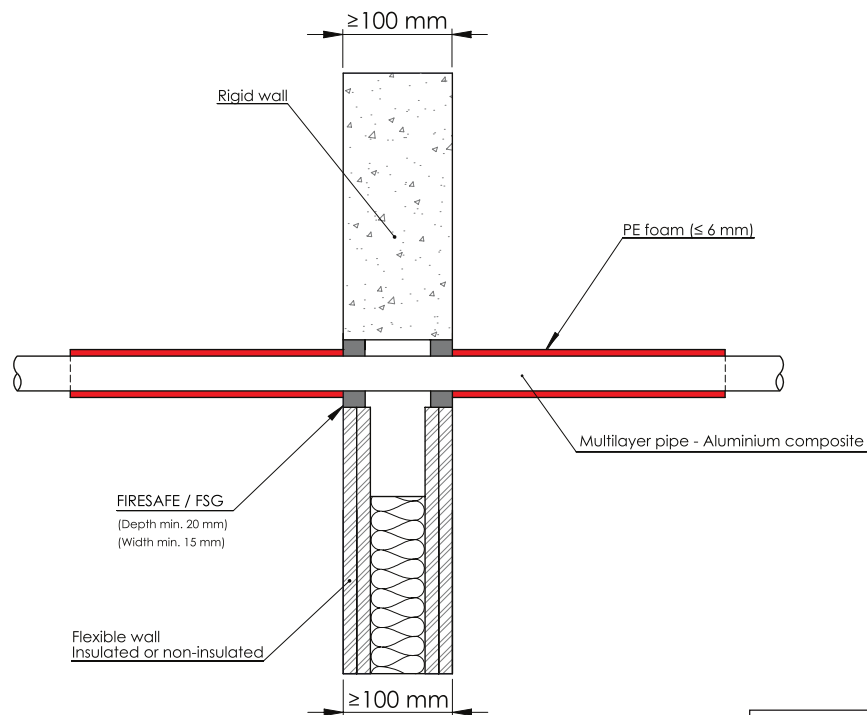
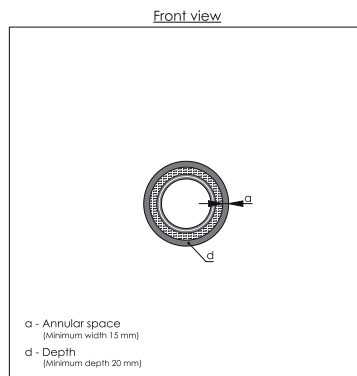


Drawing: FW.E-MLA-G2.4.23

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Multilayer pipes (MLC)	≤ Ø 32	2.0 - 3.0	PE Foam	6	LS 300 / CS	FIRESAFE / FSG ≥ 15 x 20 (wxd)	EI 120 U/C

A.1.3 Flexible or rigid wall - Multilayer pipes (MLC) insulated

A.1.3.4 Multilayer pipes (MLC) - PE foam LI 300 / CI

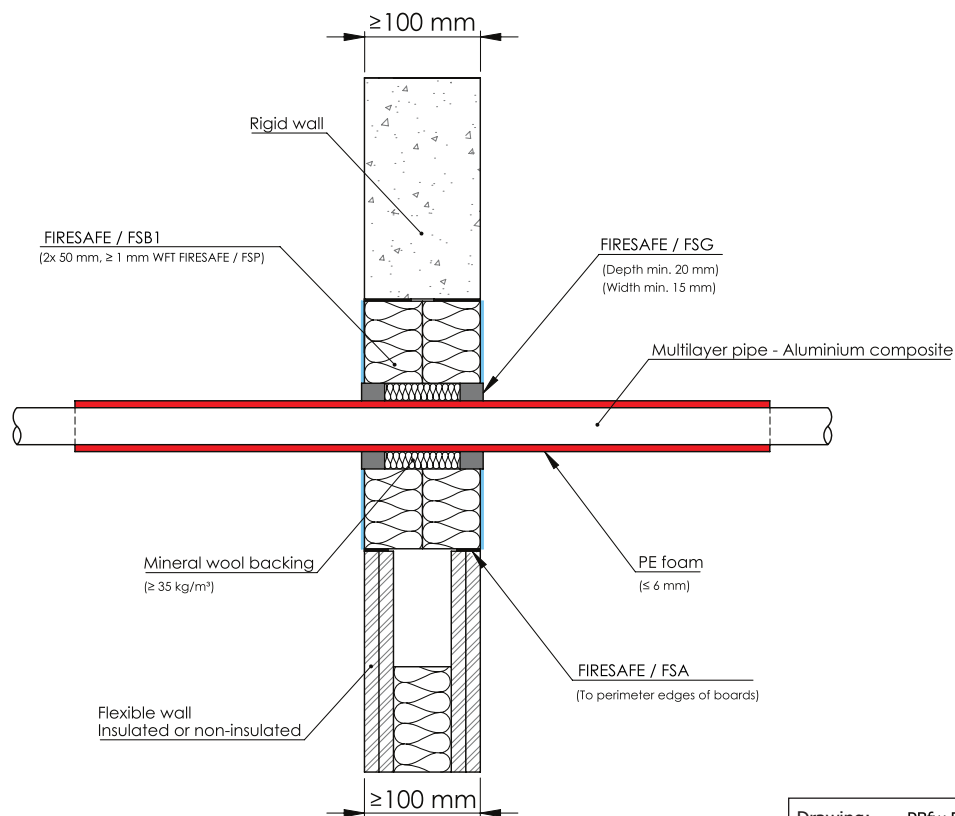
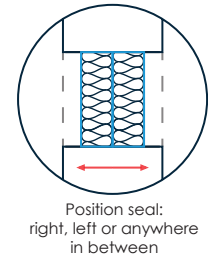
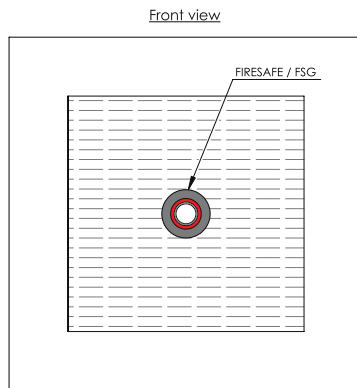


Drawing: FW.E-MLA-G2.4.23.LI

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Multilayer pipes (MLC)	≤ Ø 32	2.0 - 3.0	PE Foam	6	LI 300 / CI	FIRESAFE / FSG ≥ 15 x 20 (wxd)	EI 120 U/C

A.1.3 Flexible or rigid wall - Multilayer pipes (MLC) insulated

A.1.3.5 Multilayer pipes (MLC) - PE foam LS 300 / CS - FIRESAFE / FSB1

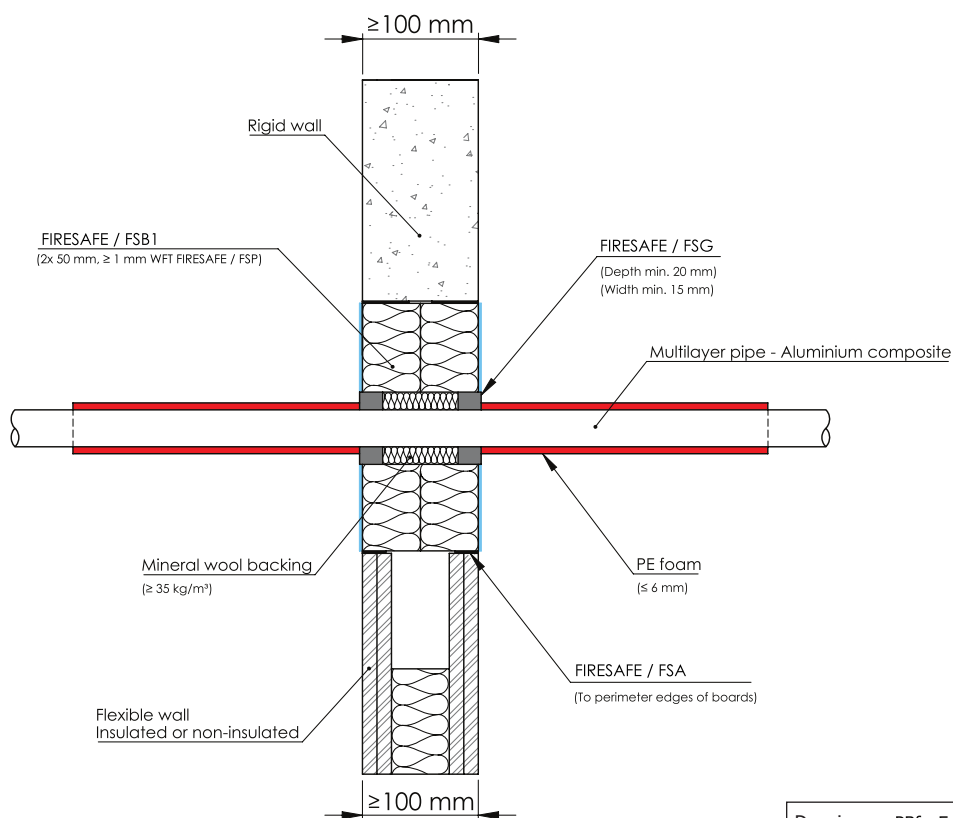
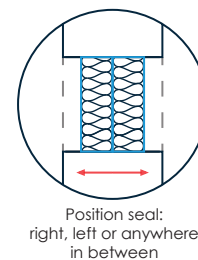
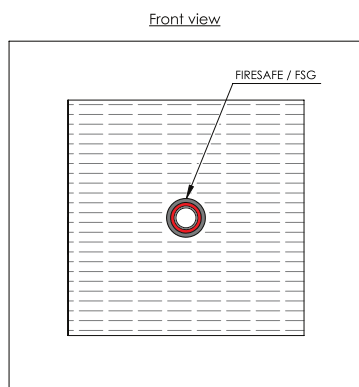


Drawing: PBfw.E-MLA_pr-G2.4.23

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Multilayer pipes (MLC)	≤ Ø 32	2.0 - 3.0	PE Foam	≤ 6	LS 300 / CS	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Stone wool (≥ 35 kg/m³)	EI 120 U/C

A.1.3 Flexible or rigid wall - Multilayer pipes (MLC) insulated

A.1.3.6 Multilayer pipes (MLC) - PE foam LI 300 / CI - FIRESAFE / FSB1

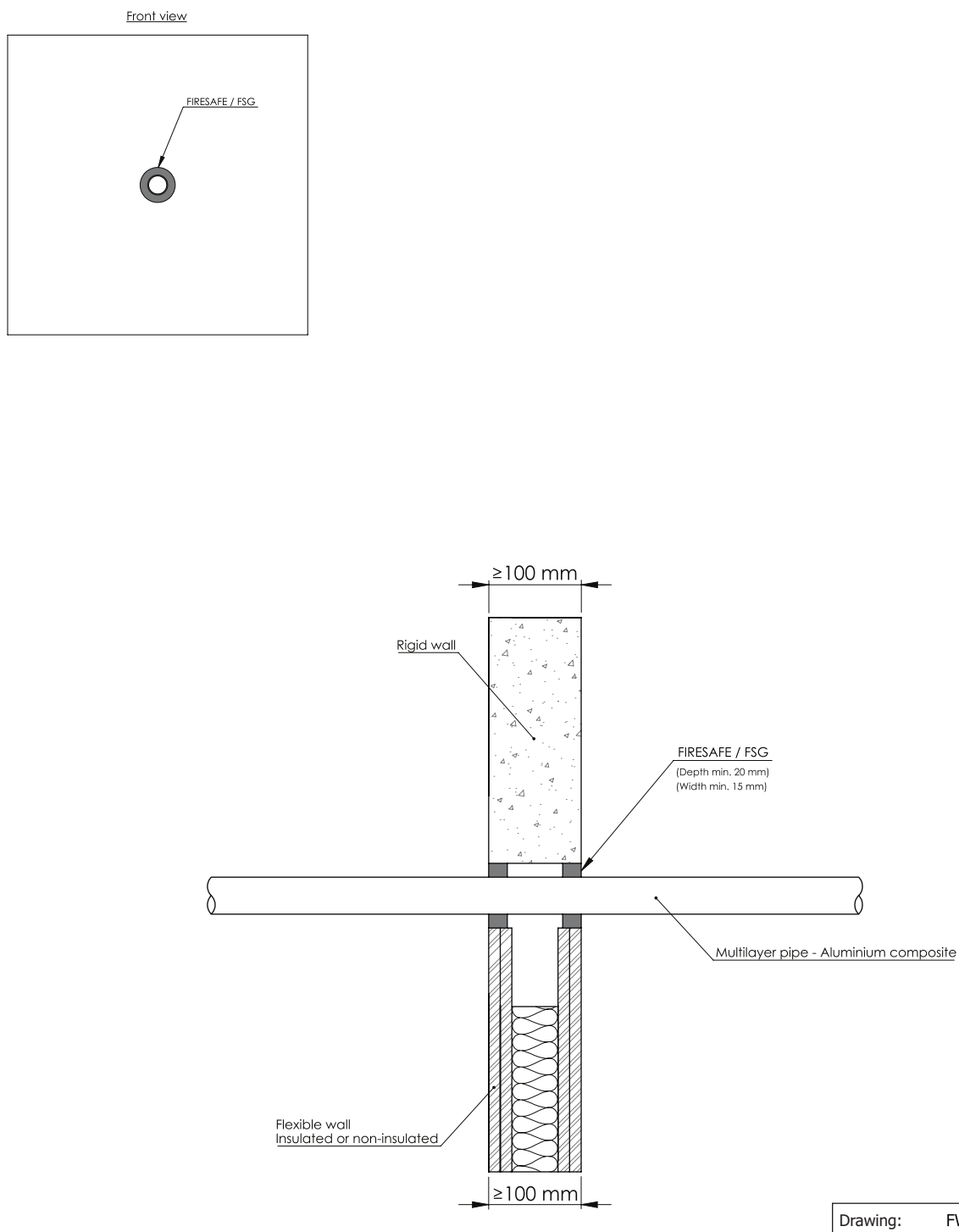


Drawing: PBfw.E-MLA_pr-G2.4.23.LI

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Multilayer pipes (MLC)	≤ Ø 32	2.0 - 3.0	PE Foam	≤ 6	LI 300 / CI	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Stone wool (≥ 35 kg/m³)	EI 120 U/C

A.1.4 Flexible or rigid wall - Multilayer pipes (MLC) uninsulated

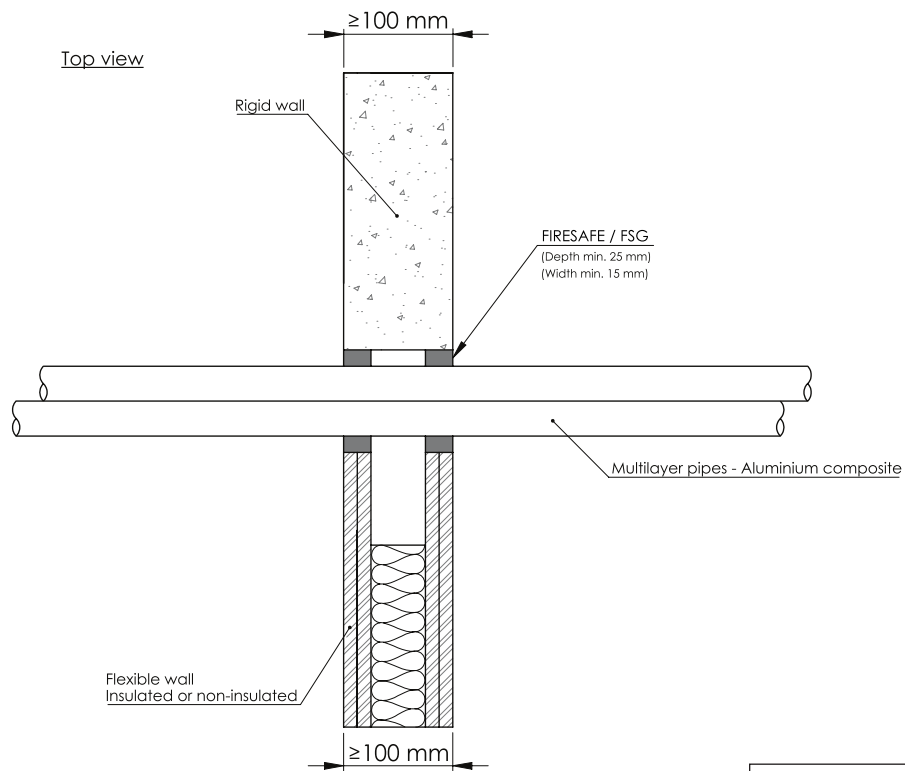
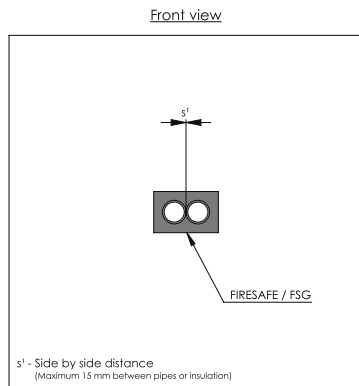
A.1.4.1 Multilayer pipes (MLC)



Services	Pipe dimensions (mm)		Sealing (mm)	Classification
	Outer dimension	Wall thickness		
Multilayer pipes (MLC)	≤ Ø 20	2.0	FIRESAFE / FSG ≥ 15 x 20 (wxd)	EI 120 U/C
	≤ Ø 32	3.0		
	≤ Ø 40	3.5 - 4.0		

A.1.4 Flexible or rigid wall - Multilayer pipes (MLC) uninsulated

A.1.4.2 Multiple Multilayer pipes (MLC)

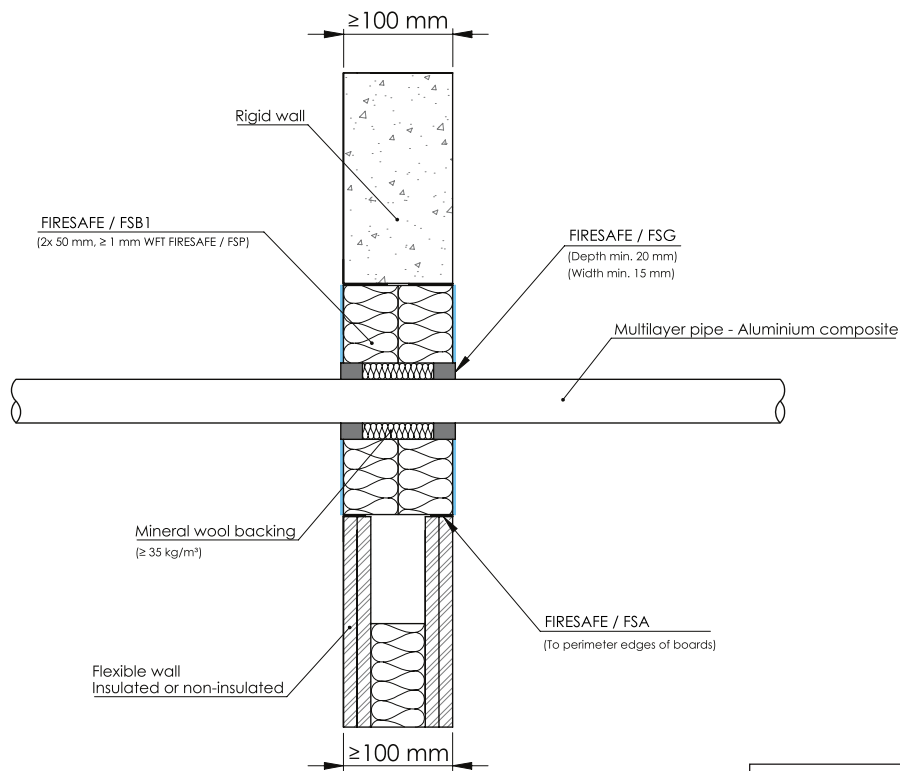
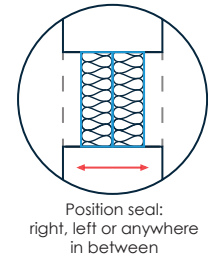
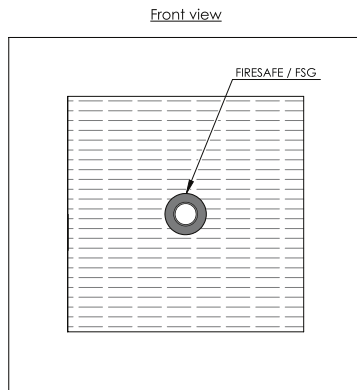


Drawing: FW.E-MLP2-G2.5.10

Services	Pipe dimensions (mm)		Sealing (mm)	Classification
	Outer dimension	Wall thickness		
Multilayer pipes (MLC) max 2 pcs.	≤ Ø 25	3.5	FIRESAFE / FSG ≥ 15 x 25 (wxd)	EI 120 U/C
	≤ Ø 32	2.0 - 3.0		

A.1.4 Flexible or rigid wall - Multilayer pipes (MLC) uninsulated

A.1.4.3 Multilayer pipes (MLC) - FIRESAFE / FSB1

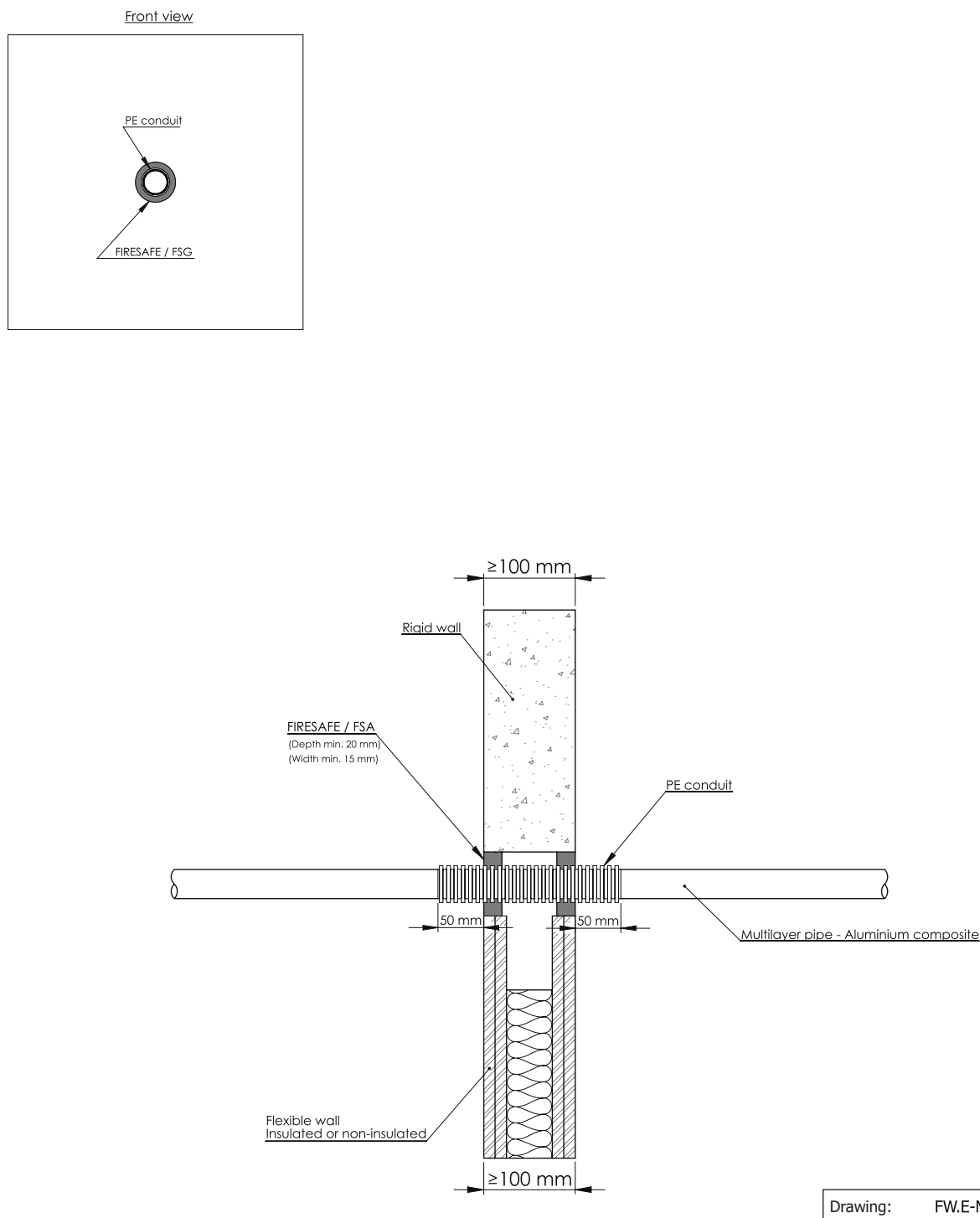


Drawing: PBfw.E-MLA-G2.4.10

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
Multilayer pipes (MLC)	≤ Ø 20	2.0	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Stone wool (≥ 35 kg/m³)	EI 120 U/C
	≤ Ø 32	3.0			
	≤ Ø 40	3.5 - 4.0			

A.1.4 Flexible or rigid wall - Multilayer pipes (MLC) uninsulated

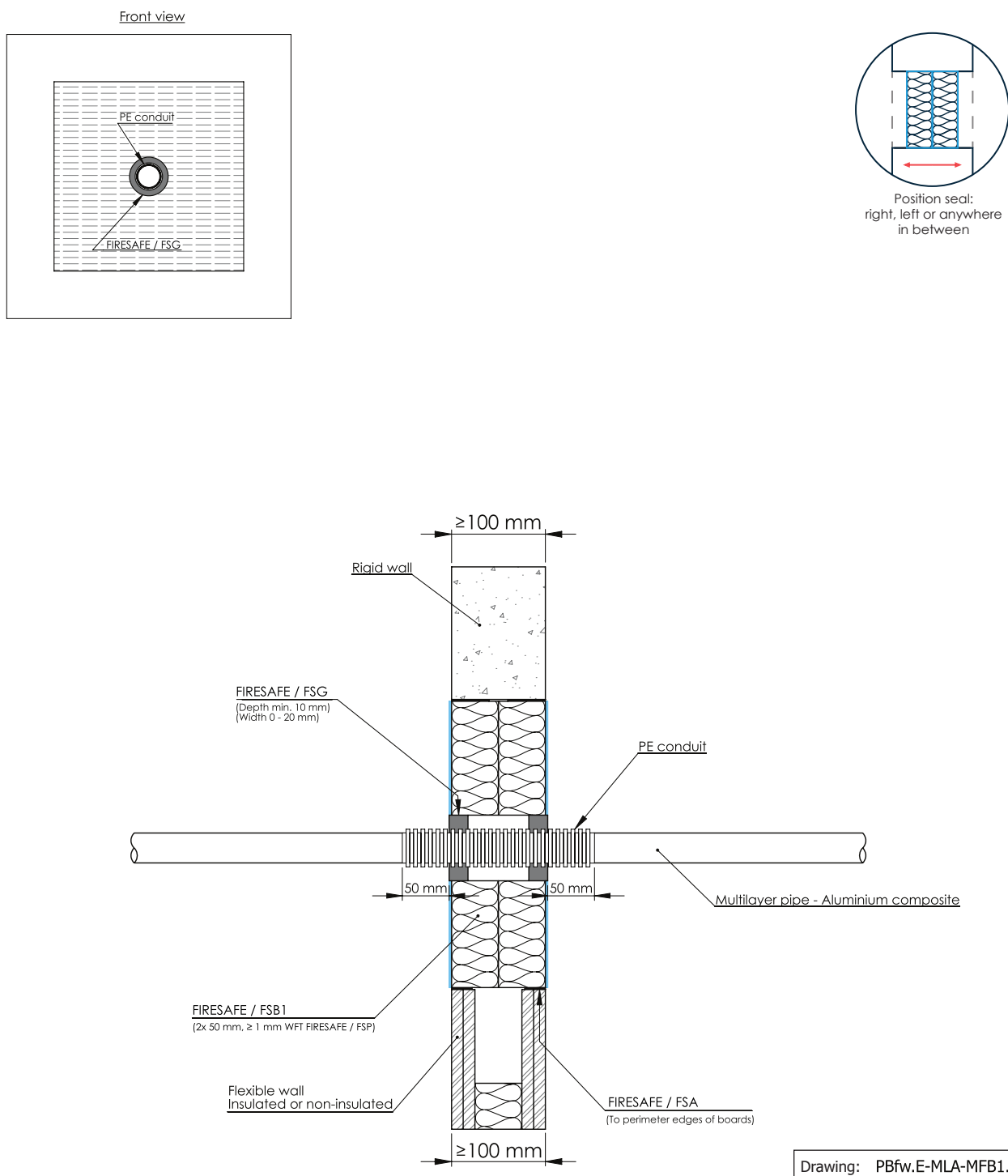
A.1.4.4 Flexible plastic conduit with Multilayer pipes (MLC)



Services	Pipe dimensions (mm)		Conduit			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Outer dimension (mm)	Configuration		
Multilayer pipes (MLC)	≤ Ø 32	3.0	PE-conduit ribbed	≤ Ø 40	LS 50 / CS	FIRESAFE / FSG ≥ 15 x 20 (wxd)	EI 60 U/C E 90 U/C

A.1.4 Flexible or rigid wall - Multilayer pipes (MLC) uninsulated

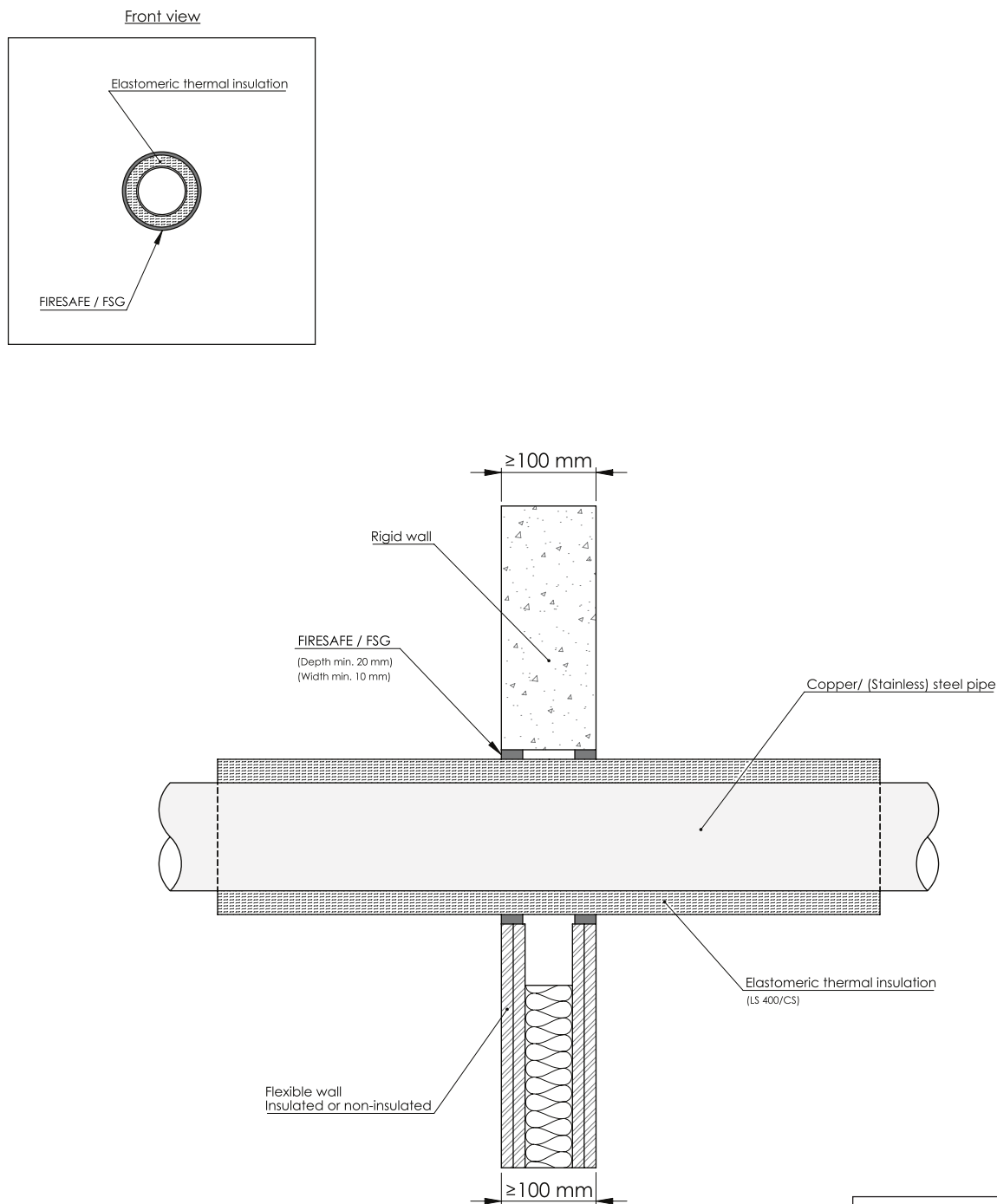
A.1.4.5 Flexible plastic conduit with Multilayer pipes (MLC) - FIRESAFE / FSB1



Services	Pipe dimensions (mm)		Conduit			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Outer dimension (mm)	Configuration		
Multilayer pipes (MLC)	≤ Ø 32	3.0	PE-conduit ribbed	≤ Ø 40	LS 50 / CS	FIRESAFE / FSG 0-20 x ≥ 10 (wxd)	EI 60 U/C

A.1.5 Flexible or rigid wall - Metal pipes insulated elastomer

A.1.5.1 Copper and steel pipes - Elastomer LS 400 / CS



Drawing: FW.E-CU-G2.4.22

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	8.5	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 90 C/U, E 120 C/U
				8.5 - 38			EI 90 C/U
				13.5 - 38			EI 30 C/U, E 90 C/U
	≤ Ø 54	≥ 1.5		13.5	CS		EI 90 C/U
				13.5 - 38			EI 60 C/U, E 90 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		38	LS 400 / CS		EI 90 C/U
				8.5			EI 90 C/U, E 120 C/U
				8.5 - 38			EI 90 C/U
	≤ Ø 114.3	≥ 3.6		15 - 43			EI 45 C/U, E 90 C/U
				43			EI 60 C/U, E 90 C/U

A.1.5 Flexible or rigid wall - Metal pipes insulated elastomer

A.1.5.1 Copper and steel pipes - Elastomer LS 400 / CS

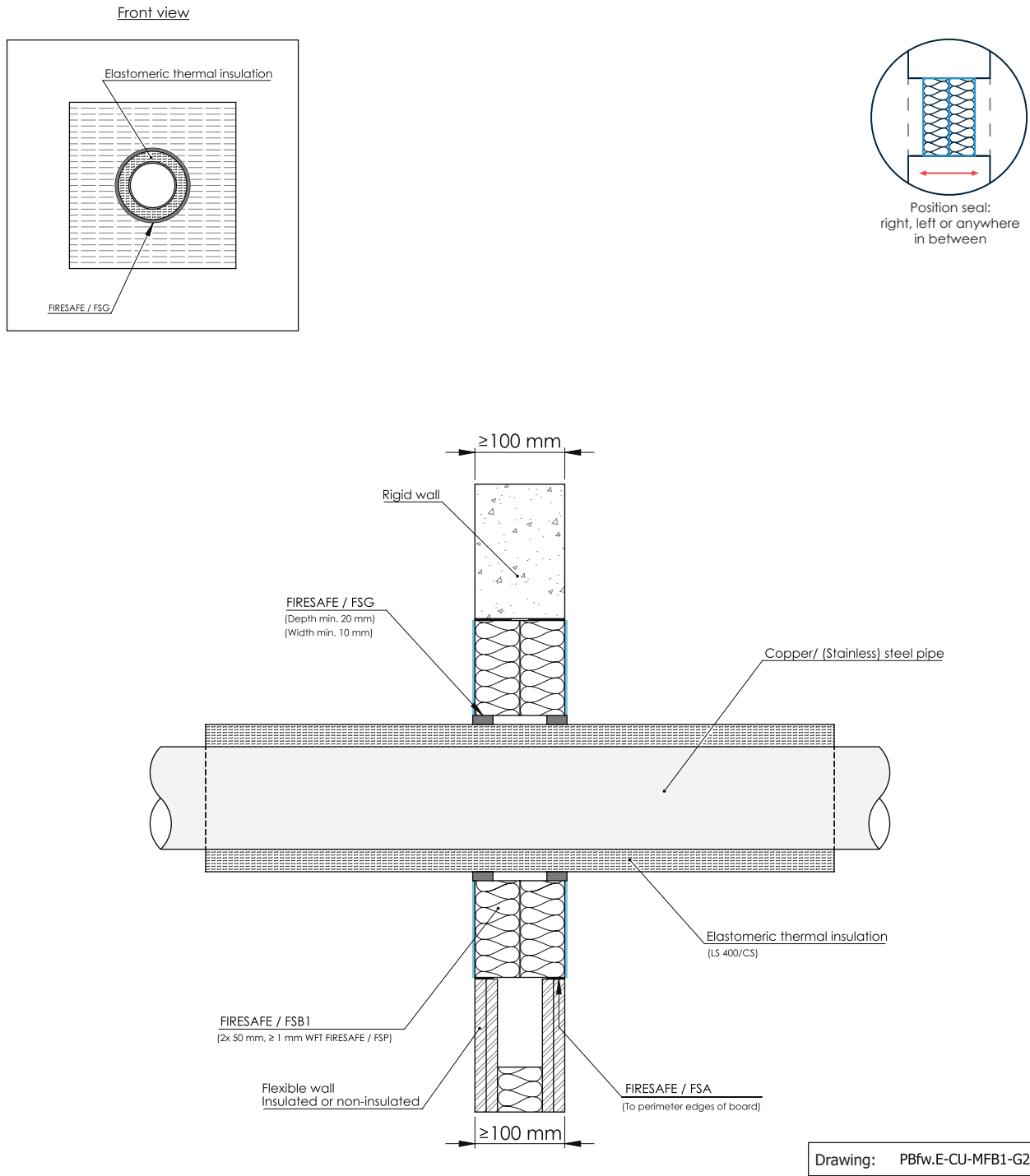
Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3	Kaiflex KK (min. class B-s2, d0 B _L -s2, d0)	8.5	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 120 C/U

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex NH (min. class D-s3, d0 D _L -s3, d0)	9	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 90 C/U
				9 - 25			EI 60 C/U
				13			EI 45 C/U, E 90 C/U
	≤ Ø 54	≥ 1.5		13	CS		EI 60 C/U, E 90 C/U
				13 - 25	LS 400 / CS		EI 45 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9			EI 90 C/U, E 120 C/U
				9 - 25			EI 60 C/U
	≤ Ø 114.3	≥ 3.6		19 - 25			EI 45 C/U
				25			EI 60 C/U, E 90 C/U

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex Ultima (min. class B-s1, d0 B _L -S1, d0)	9 - 32	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 60 C/U, E 120 C/U
				32			EI 90 C/U
				13			EI 60 C/U, E 120 C/U
	≤ Ø 54	≥ 1.5		13 - 32			EI 60 C/U, E 90 C/U
				32			EI 90 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9			EI 120 C/U
				9 - 32			EI 90 C/U, E 120 C/U
	≤ Ø 114.3	≥ 3.6		13			EI 90 C/U
				13 - 32			EI 60 C/U, E 120 C/U

A.1.5 Flexible or rigid wall - Metal pipes insulated elastomer

A.1.5.2 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB1



Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	8.5	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 90 C/U, E 120 C/U
				8.5 - 38			EI 90 C/U
	≤ Ø 54	≥ 1.5		13.5 - 38			CS
				13.5	EI 90 C/U		
				13.5 - 38	EI 60 C/U, E 90 C/U		
				38	EI 90 C/U		
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		8.5	LS 400 / CS		EI 90 C/U, E 120 C/U
				8.5 - 38			EI 90 C/U
				15 - 43			EI 45 C/U, E 90 C/U
	≤ Ø 114.3	≥ 3.6		43			EI 60 C/U, E 90 C/U

A.1.5 Flexible or rigid wall - Metal pipes insulated elastomer

A.1.5.2 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB1

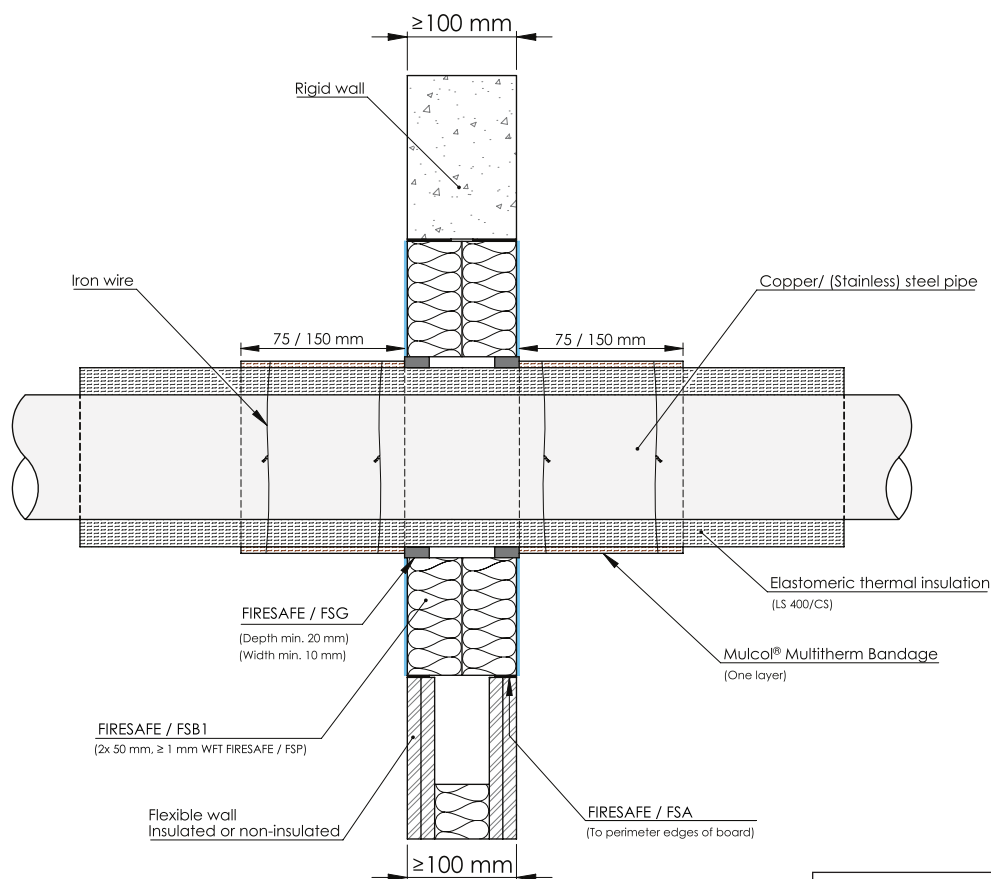
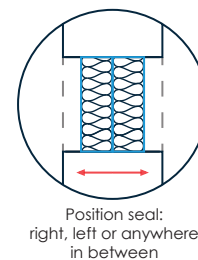
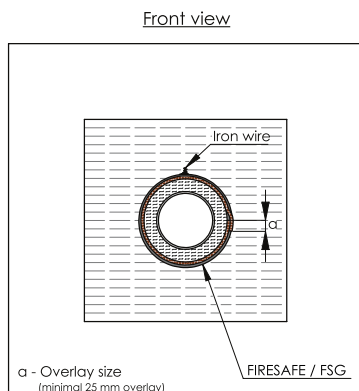
Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
(Stainless) Steel / cast iron	$\leq \varnothing 26.9$	≥ 2.3	Kaiflex KK Plus (min. class B-s2, d0 B _L -s2, d0)	8.5	LS 400 / CS	FIRESAFE / FSG $\geq 10 \times 20$ (wxd)	EI 120 C/U

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex NH (min. class D-s3, d0 D _L -s3, d0)	9	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 90 C/U
	≤ Ø 54	≥ 1.5		9 - 25			EI 60 C/U
				13			EI 45 C/U, E 90 C/U
				13	EI 60 C/U, E 90 C/U		
				13 - 25	EI 45 C/U		
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3	9	LS 400 / CS	EI 90 C/U, E 120 C/U		
	≤ Ø 114.3	≥ 3.6	9 - 25		EI 60 C/U		
			19 - 25		EI 45 C/U		
			25		EI 60 C/U, E 90 C/U		

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex Ultima (min. class B-s1, d0 B _L -s1, d0)	9 - 32	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 60 C/U, E 120 C/U
	≤ Ø 54	≥ 1.5		32			EI 90 C/U
				13			EI 60 C/U, E 120 C/U
				13 - 32			EI 60 C/U, E 90 C/U
				32			EI 90 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9			EI 120 C/U
	≤ Ø 114.3	≥ 3.6		9 - 32			EI 90 C/U, E 120 C/U
				13			EI 90 C/U
				13 - 32			EI 60 C/U, E 120 C/U

A.1.5 Flexible or rigid wall - Metal pipes insulated elastomer

A.1.5.3 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB1 - Multitherm Bandage



Drawing: PBfw.E-CU-MFB1-G2.4.92

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Multitherm Bandage	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	8.5	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	LI ≥ 75 one layer (one wire)	EI 90 C/U, E 120 C/U
	≤ Ø 54	≥ 1.5		8.5 - 38				EI 90 C/U
				13.5 - 38	CS			EI 30 C/U, E 90 C/U
				13.5 - 38				EI 60 C/U, E 90 C/U
				38	LS 400 / CS		EI 90 C/U	
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		8.5			EI 90 C/U, E 120 C/U	
	≤ Ø 114.3	≥ 3.6		8.5 - 38			EI 90 C/U	
				18.5			EI 90 C/U, E 120 C/U	
				18.5 - 43			EI 90 C/U	

A.1.5 Flexible or rigid wall - Metal pipes insulated elastomer

A.1.5.3 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB1 - Multitherm Bandage

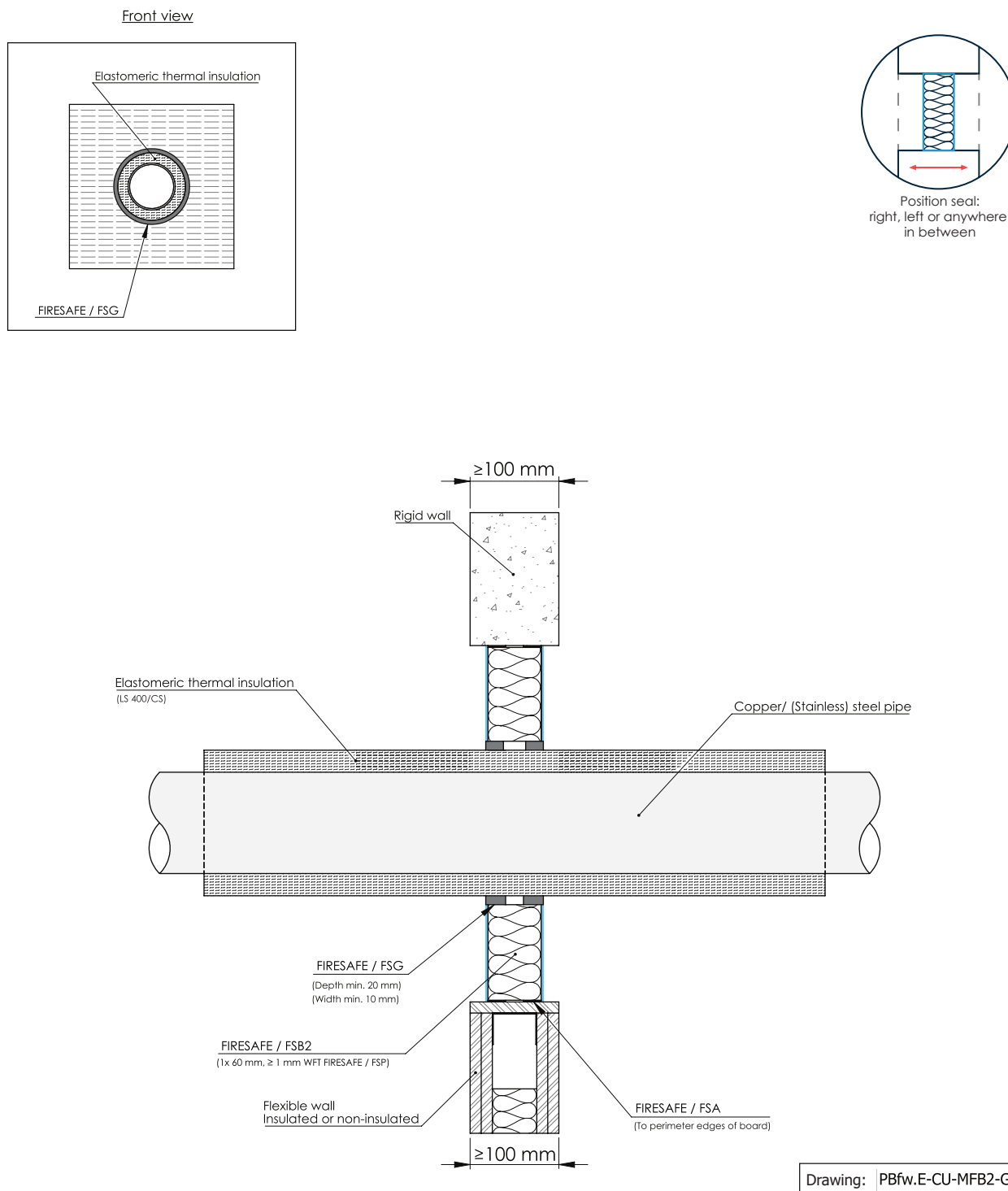
Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Multitherm Bandage	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 54	≥ 1.5	Kaiflex KK Plus (min. class B-s2, d0 B _L -s2, d0)	13.5	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	LI ≥ 75 one layer (two wires)	EI 120 C/U
				13.5 - 35.5			LI ≥ 150 one layer (two wires)	EI 90 C/U, E 120 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		8.5			LI ≥ 75 one layer (two wires)	EI 120 C/U
				8.5 - 35.5			LI ≥ 150 one layer (two wires)	EI 90 C/U, E 120 C/U
	≤ Ø 114.3	≥ 3.6		15 - 35.5				EI 90 C/U, E 120 C/U
				35.5 - 40				EI 120 C/U

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Multitherm Bandage	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex NH (min. class D-s3, d0 D _L -S3, d0)	9	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	LI ≥ 75 one layer (two wires)	EI 90 C/U
				9 - 25				EI 60 C/U
	≤ Ø 54	≥ 1.5		13	CS			EI 45 C/U, E 90 C/U
				13				EI 60 C/U, E 90 C/U
				13 - 25	EI 45 C/U			
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9	LS 400 / CS			EI 90 C/U, E 120 C/U
				9 - 25				EI 60 C/U, E 90 C/U
				19 - 25				EI 45 C/U
	≤ Ø 114.3	≥ 3.6		25				EI 60 C/U, E 90 C/U

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Multitherm Bandage	Classification		
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration					
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex Ultima (min. class B-s1, d0 B _L -s1, d0)	9 - 32	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	LI ≥ 75 one layer (two wires)	EI 90 C/U, E 120 C/U		
				32				EI 90 C/U		
	≤ Ø 54	≥ 1.5		13			LI ≥ 150 one layer (two wires)	EI 120 C/U		
				13 - 32				EI 90 C/U		
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9					LI ≥ 75 one layer (two wires)	EI 120 C/U
				9 - 32						EI 90 C/U, E 120 C/U
	≤ Ø 114.3	≥ 3.6		13 - 32						EI 90 C/U
				32						EI 90 C/U, E 120 C/U

A.1.5 Flexible or rigid wall - Metal pipes insulated elastomer

A.1.5.4 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB2



Services	Pipe dimensions (mm)		Insulation			System (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	8.5 - 33.5	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 60 C/U, E 90 C/U
				33.5			EI 60 C/U, E 120 C/U
	≤ Ø 54	≥ 1.5		13.5 - 38			EI 45 C/U, E 60 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		8.5 - 43	CS		EI 60 C/U
	≤ Ø 114.3	≥ 3.6		15 - 43			EI 45 C/U, E 60 C/U
				15 - 43	EI 60 C/U		
				43	LS 400 / CS		EI 60 C/U

A.1.5 Flexible or rigid wall - Metal pipes insulated elastomer

A.1.5.4 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB2

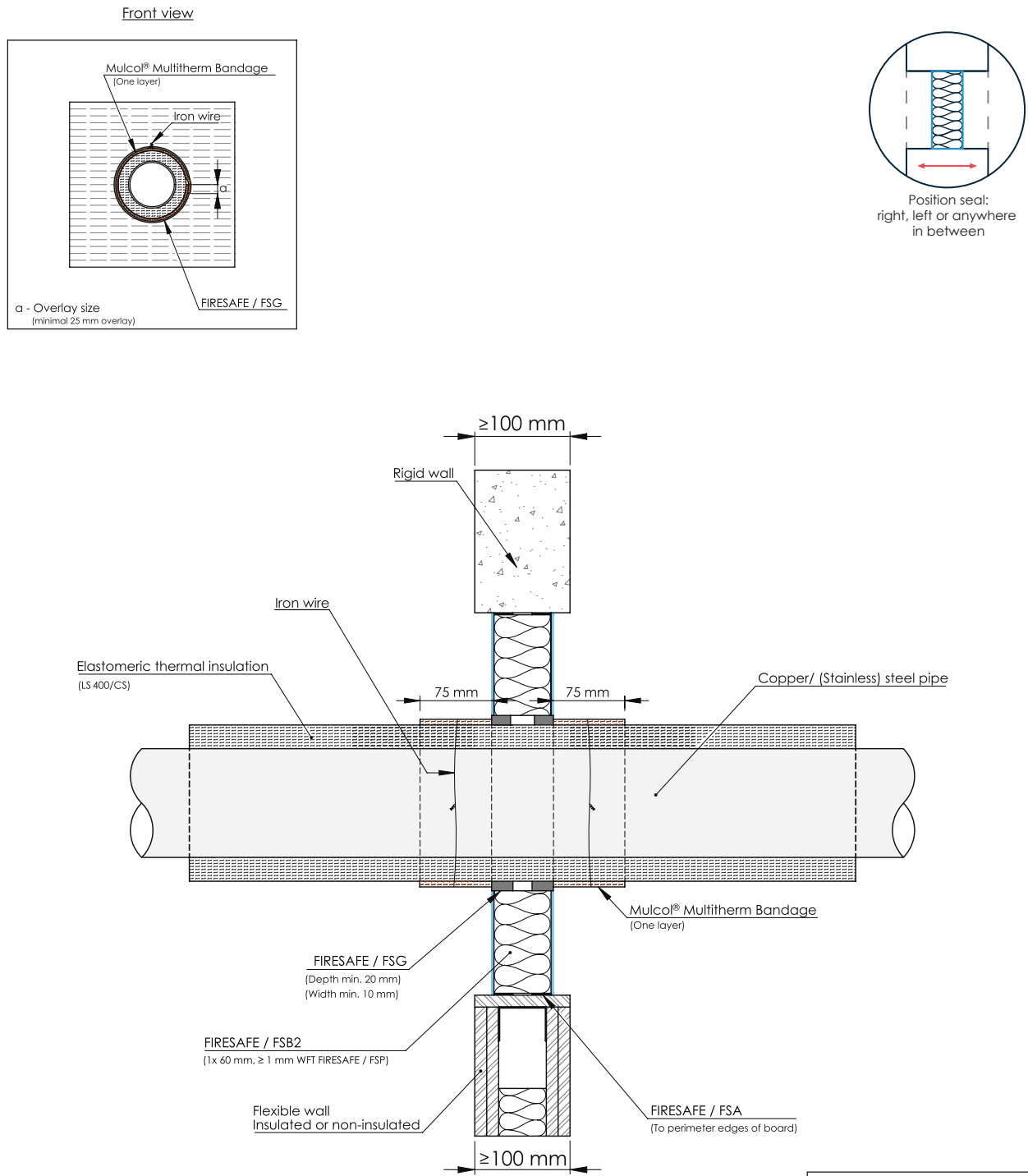
Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	Kaiflex KK Plus (min. class B-s2, d0 B _L -s2, d0)	35.5	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 45 C/U / E 90 C/U
	≤ Ø 54	≥ 1.5		35.5			EI 45 C/U / E 90 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		8.5			EI 90 C/U / E 120 C/U
	≤ Ø 114.3	≥ 3.6		8.5 - 40			EI 45 C/U / E 120 C/U
				15 - 40			EI 45 C/U / E 90 C/U

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex NH (min. class D-s3, d0 D _L -S3, d0)	9 - 25	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 30 C/U, E 60 C/U
				9 - 25	CS		EI 60 C/U
				25	LS 400 / CS		EI 60 C/U
	13	EI 45 C/U, E 120 C/U					
	≤ Ø 54	≥ 1.5		13	CS		EI 60 C/U, E 120 C/U
				13 - 25	LS 400 / CS		EI 45 C/U, E 60 C/U
(Stainless) Steel / cast iron				≤ Ø 26.9			≥ 2.3
	≤ Ø 114.3	≥ 3.6		9 - 25			EI 60 C/U
				13 - 25			EI 60 C/U

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex Ultima (min. class B-s1, d0 B _L -S1, d0)	9 - 25	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	EI 45 C/U, E 120 C/U
	≤ Ø 54	≥ 1.5		25			EI 60 C/U, E 120 C/U
				13 - 32			EI 45 C/U, E 90 C/U
				32			EI 60 C/U, E 90 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9 - 32			EI 60 C/U, E 90 C/U
	≤ Ø 114.3	≥ 3.6		32			EI 60 C/U, E 120 C/U
				13 - 32			EI 90 C/U, E 120 C/U

A.1.5 Flexible or rigid wall - Metal pipes insulated elastomer

A.1.5.5 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB2 - Multitherm Bandage



Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Multitherm Bandage	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	8.5 - 33.5	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	LI ≥ 75 one layer (one wire)	EI 60 C/U
	≤ Ø 54	≥ 1.5		17 - 43				
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		8.5 - 43				
	≤ Ø 114.3	≥ 3.6		15 - 43				

A.1.5 Flexible or rigid wall - Metal pipes insulated elastomer**A.1.5.5 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB2 - Multitherm Bandage**

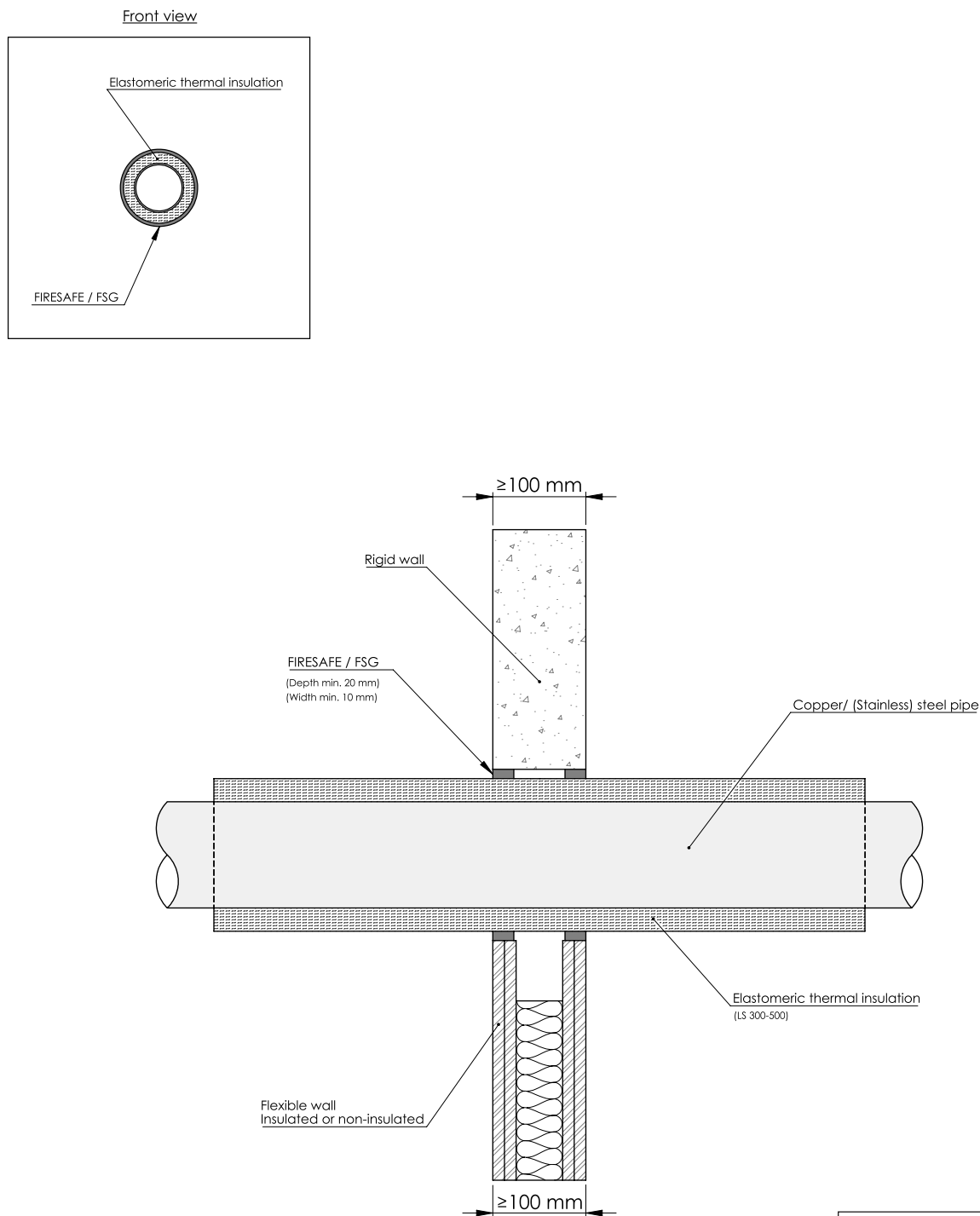
Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Multitherm Bandage	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	Kaiflex KK Plus (min. class B-s2, d0 B _L -s2, d0)	9 - 35.5	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	LI ≥ 75 one layer (one wire)	EI 60 C/U
	≤ Ø 54	≥ 1.5		21 - 35.5				
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		8.5 - 35.5				
	≤ Ø 114.3	≥ 3.6		15 - 40				

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Multitherm Bandage	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex NH (min. class D-s3, d0 D _L -S3, d0)	9 - 25	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	LI ≥ 75 one layer (one wire)	EI 60 C/U
	≤ Ø 54	≥ 1.5		13 - 25				
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9 - 25				
	≤ Ø 114.3	≥ 3.6		13 - 25				

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Multitherm Bandage	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex Ultima (min. class B-s1, d0 B _L -S1, d0)	13 - 32	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	LI ≥ 75 one layer (one wire)	EI 60 C/U
	≤ Ø 54	≥ 1.5		13 - 32				
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9 - 32				
	≤ Ø 114.3	≥ 3.6		13 - 32				

A.1.5 Flexible or rigid wall - Metal pipes insulated elastomer

A.1.5.6 Copper and steel pipes - Elastomer LS 300-500 / CS

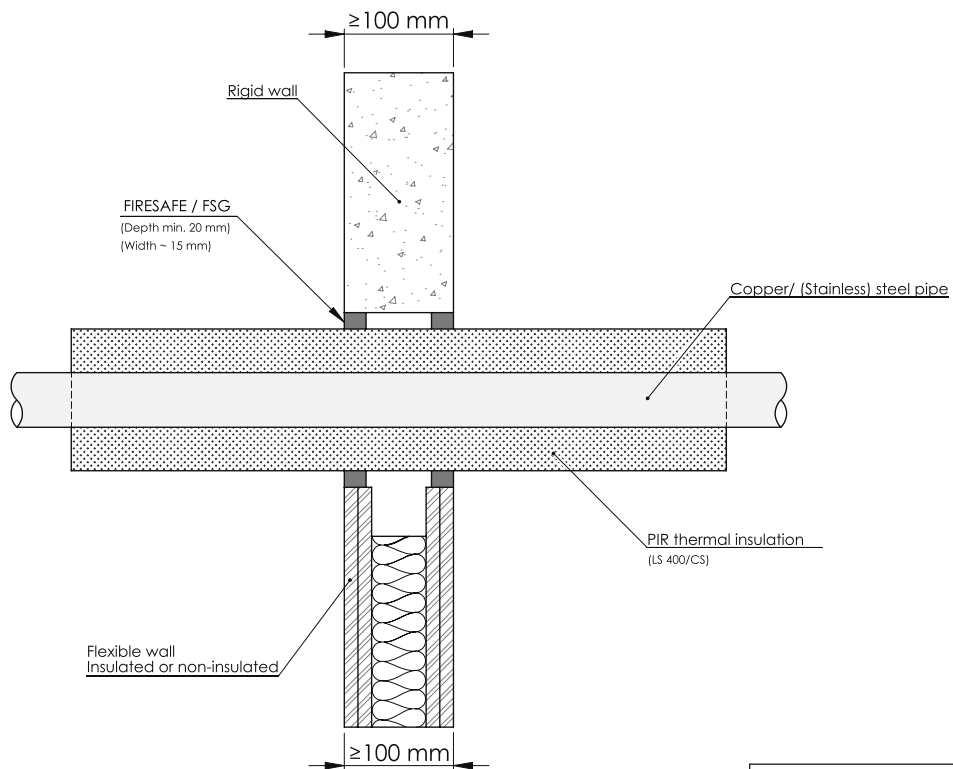
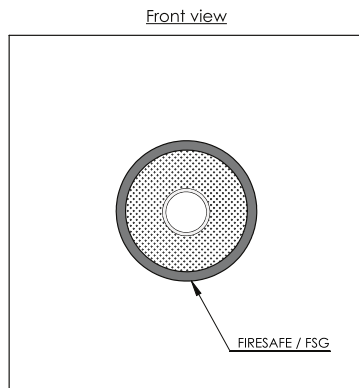


Drawing: FW.E-CU-G2.12.22

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 54	≥ 1.5	ArmaFlex AF (min. class B-s3, d0	13	LS 300 / CS	FIRESAFE / FSG ≥ 15 x 20 (wx d)	EI 60 C/U, E 120 C/U
	≤ Ø 76.1	≥ 2.0			LS 500 / CS		EI 45 C/U, E 120 C/U
(Stainless) Steel / cast iron	≤ Ø 219.1	≥ 4.0	B _L -s3, d0)	25			
	≤ Ø 168.3	≥ 4.5					

A.1.6 Flexible or rigid wall - Metal pipes insulated foam

A.1.6.1 Copper and steel pipes - PIR thermal insulation LS / CS

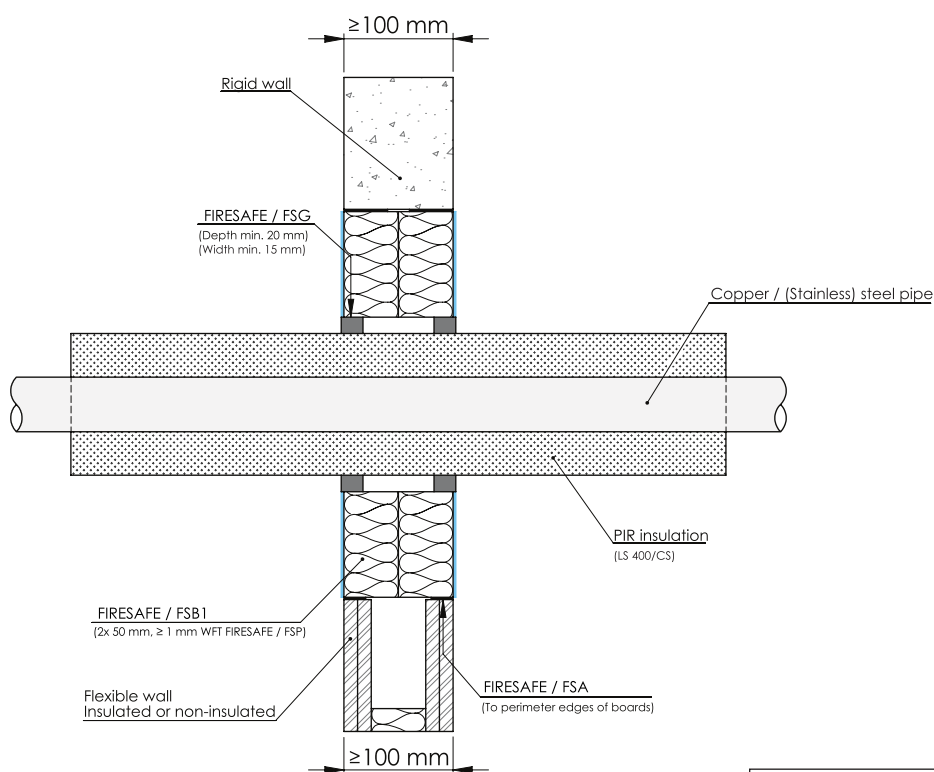
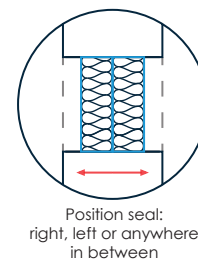
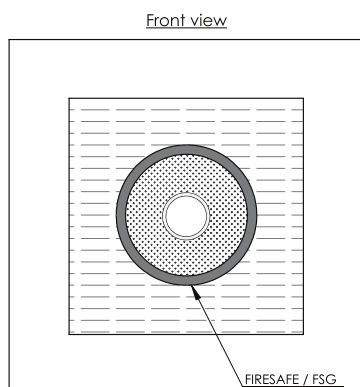


Drawing: FW.E-CU-G2.4.22

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	PIR (min. class E)	20	LS 400 / CS	FIRESAFE / FSG ≥ 15 x 20 (wxwd)	EI 60 C/U
	≤ Ø 54	≥ 1.5		25	LS 300 / CS		EI 120 C/U
	≤ Ø 76.1	≥ 2.0			LS 500 / CS		EI 45 C/U, E 120 C/U
					CS		EI 60 C/U, E 120 C/U
(Stainless) Steel / cast iron	≤ Ø 114.3	≥ 3.6		25 - 40	LS 400 / CS		EI 60 C/U
	≤ Ø 219.1	≥ 4.0		25	LS 500 / CS		EI 60 C/U, E 120 C/U

A.1.6 Flexible or rigid wall - Metal pipes insulated foam

A.1.6.2 Copper and steel pipes - PIR foam LS 400 / CS - FIRESAFE / FSB1

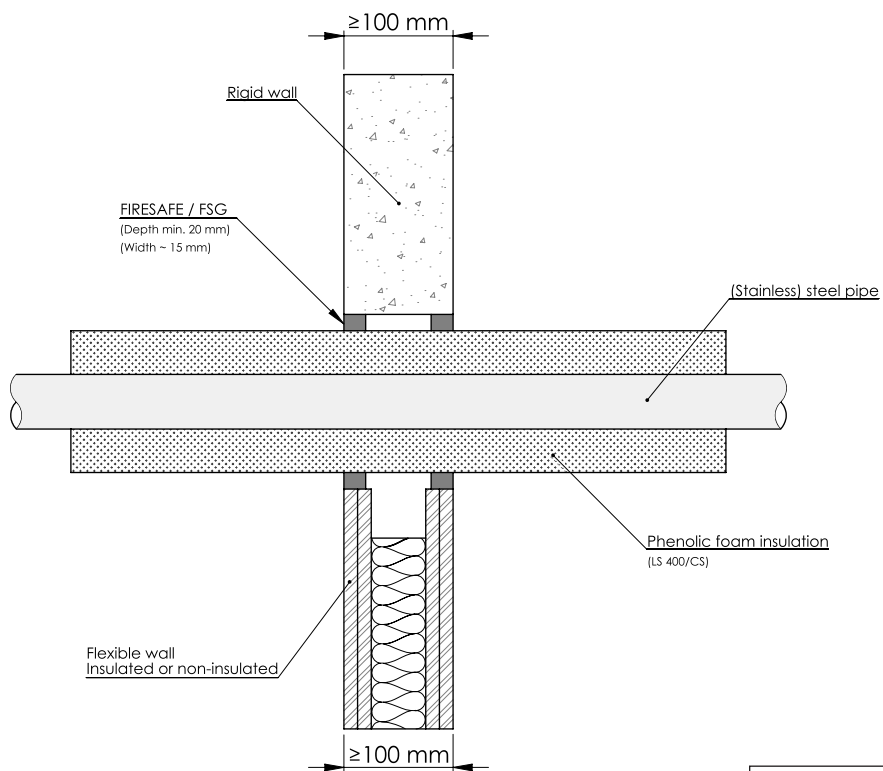
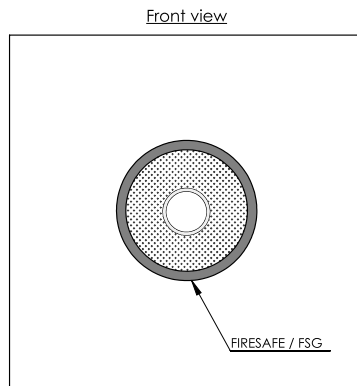


Drawing: PBfw.E-CU-MFB1-G2.4.28

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	PIR (min. class E)	20	LS 400 / CS	FIRESAFE / FSG ≥ 15 x 20 (wxd)	EI 60 C/U
	≤ Ø 54	≥ 1.5		25			
(Stainless) Steel / cast iron	≤ Ø 114.3	≥ 3.6		25 - 40			

A.1.6 Flexible or rigid wall - Metal pipes insulated foam

A.1.6.3 Steel pipes - Phenolic foam LS 400 / CS

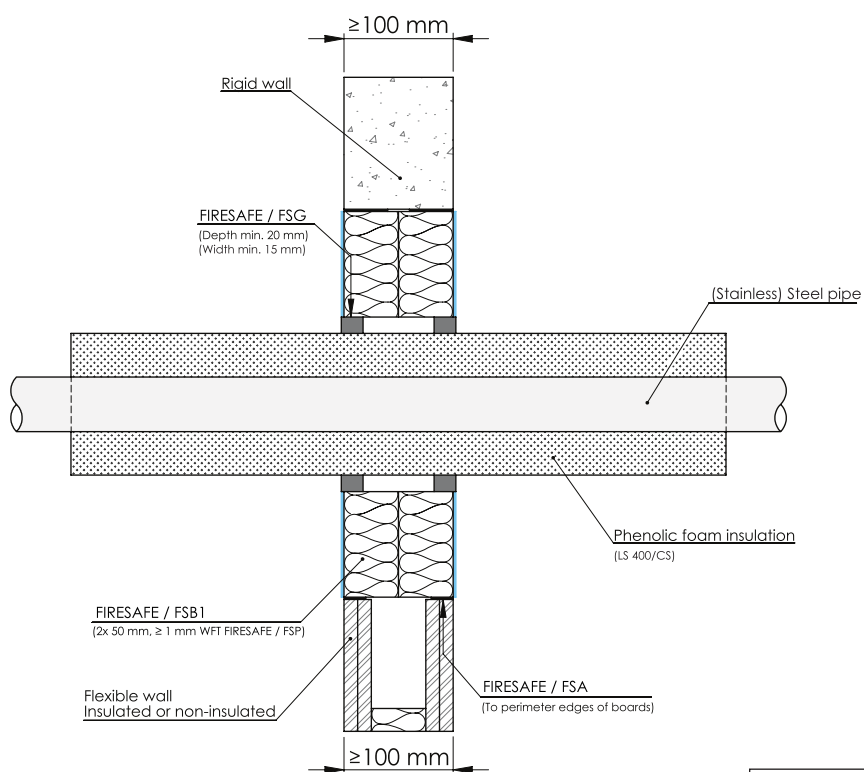
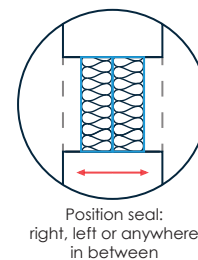
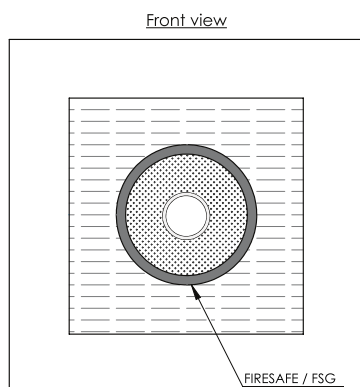


Drawing: FW.E-ST-G2.4.22

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3	Kingspan Kooltherm	15	LS 400 / CS	FIRESAFE / FSG ≥ 15 x 20 (wxd)	EI 60 C/U
	≤ Ø 114.3	≥ 3.6		20 - 45			

A.1.6 Flexible or rigid wall - Metal pipes insulated foam

A.1.6.4 Steel pipes - Phenolic foam LS 400 / CS - FIRESAFE / FSB1

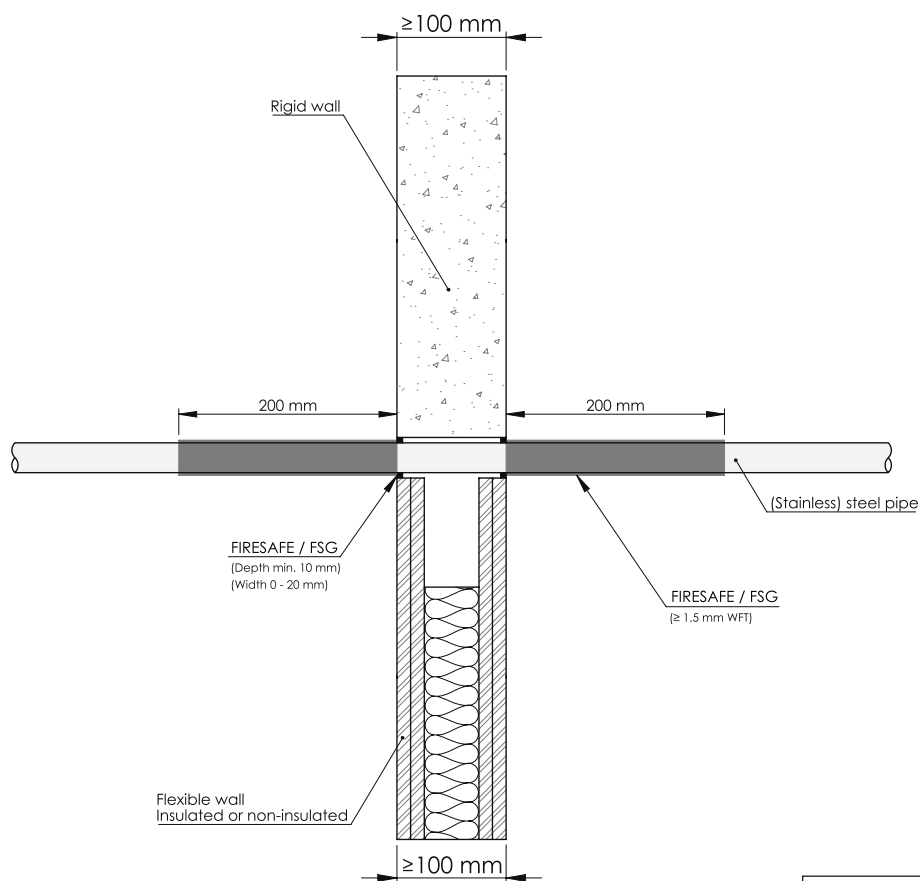
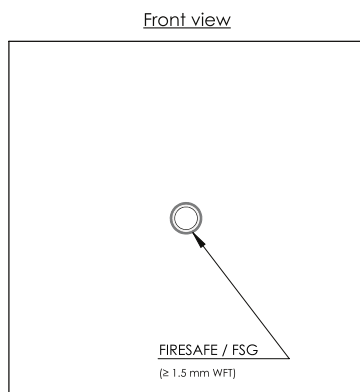


Drawing: PBfw.E-ST-MFB1-G2.4.27

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3	Kingspan	15	LS 400 / CS	FIRESAFE / FSG ≥ 15 x 20 (wxd)	EI 60 C/U
	≤ Ø 114.3	≥ 3.6	Kooltherm	20 - 45			

A.1.7 Flexible or rigid wall - Metal pipes uninsulated

A.1.7.1 Steel pipes - FIRESAFE / FSG coated on pipe



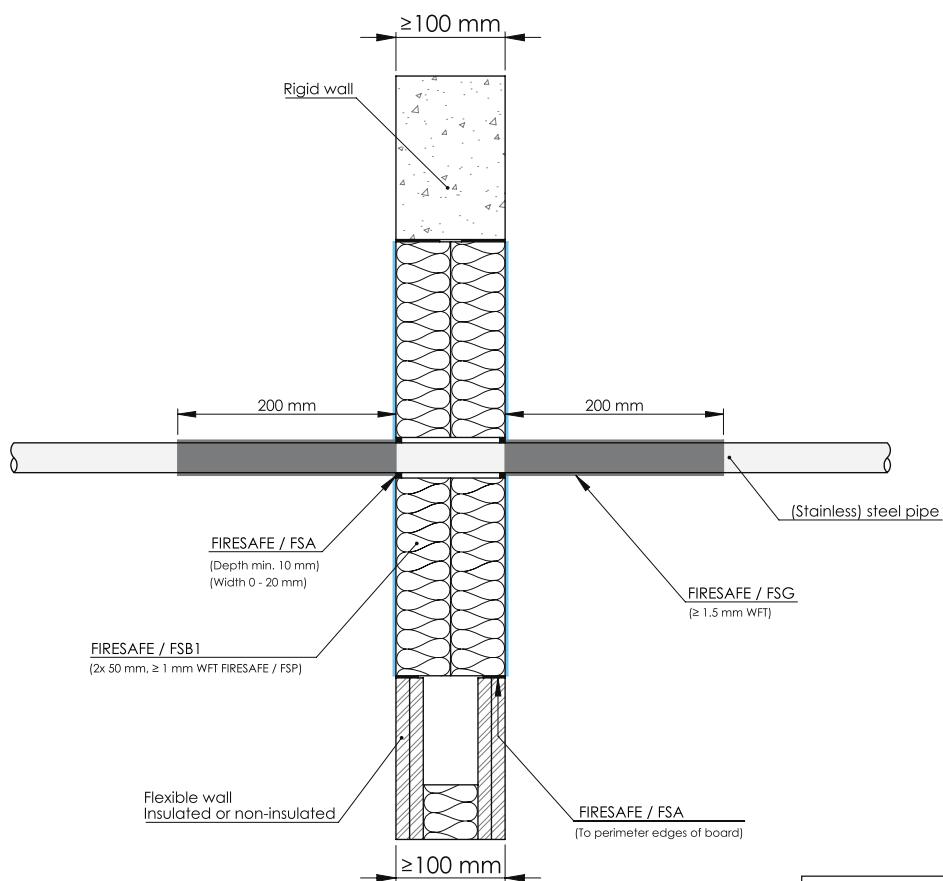
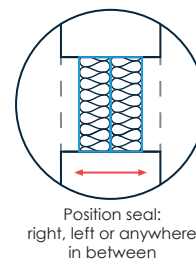
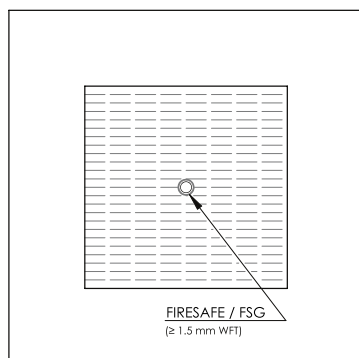
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Services	Pipe dimensions (mm)		Coating	Sealing (mm)	Classification
	Outer dimension	Wall thickness			
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.6	Coat back 200 mm ≥ 1.5 mm WFT FIRESAFE / FSG	FIRESAFE / FSG 0-20 x ≥ 10 (wxd)	EI 90 C/U, E 120 C/U
	≤ Ø 60.3	≥ 3.6			

A.1.7 Flexible or rigid wall - Metal pipes uninsulated

A.1.7.2 Steel pipes - FIRESAFE / FSB1 - FIRESAFE / FSG coated on pipe

Front view



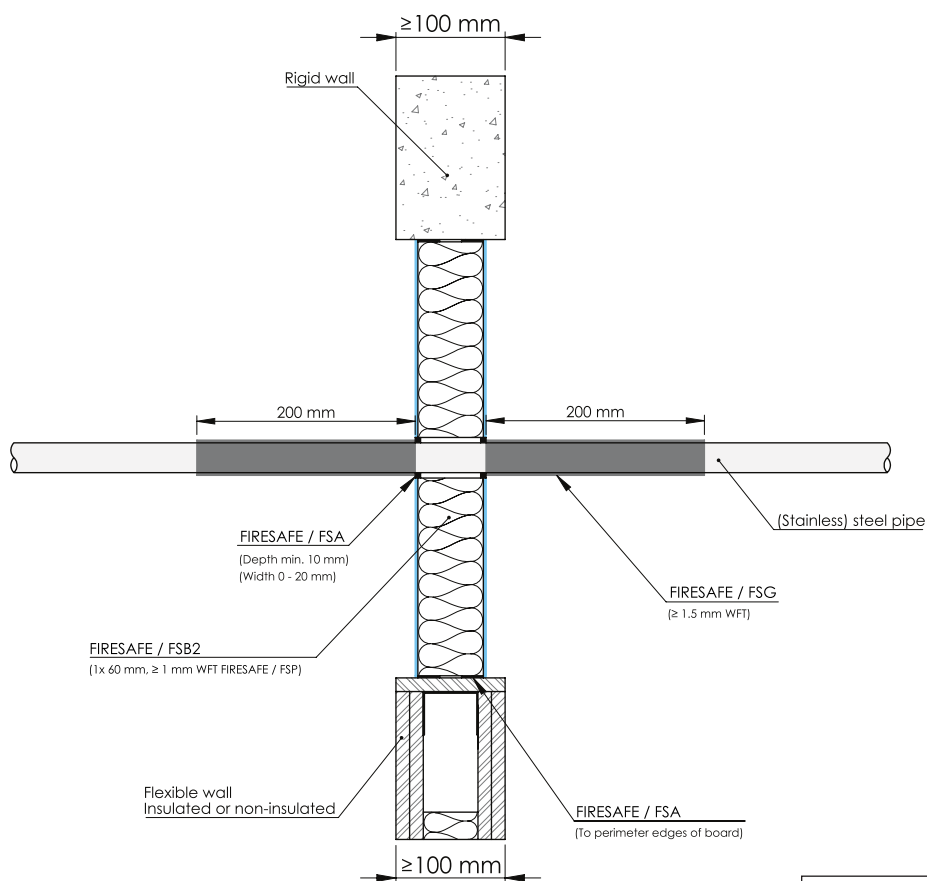
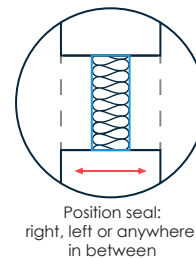
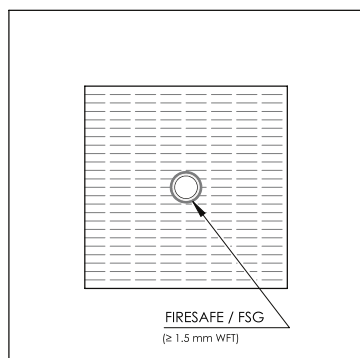
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Services	Pipe dimensions (mm)		Coating	Sealing (mm)	Classification
	Outer dimension	Wall thickness			
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.6	Coat back 200 mm ≥ 1.5 mm WFT FIRESAFE / FSG	FIRESAFE / FSG 0-20 x ≥ 10 (wxd)	EI 90 C/U, E 120 C/U
	≤ Ø 60.3	≥ 3.6			

A.1.7 Flexible or rigid wall - Metal pipes uninsulated

A.1.7.3 Steel pipes - FIRESAFE / FSB2 - FIRESAFE / FSG coated on pipe

Front view



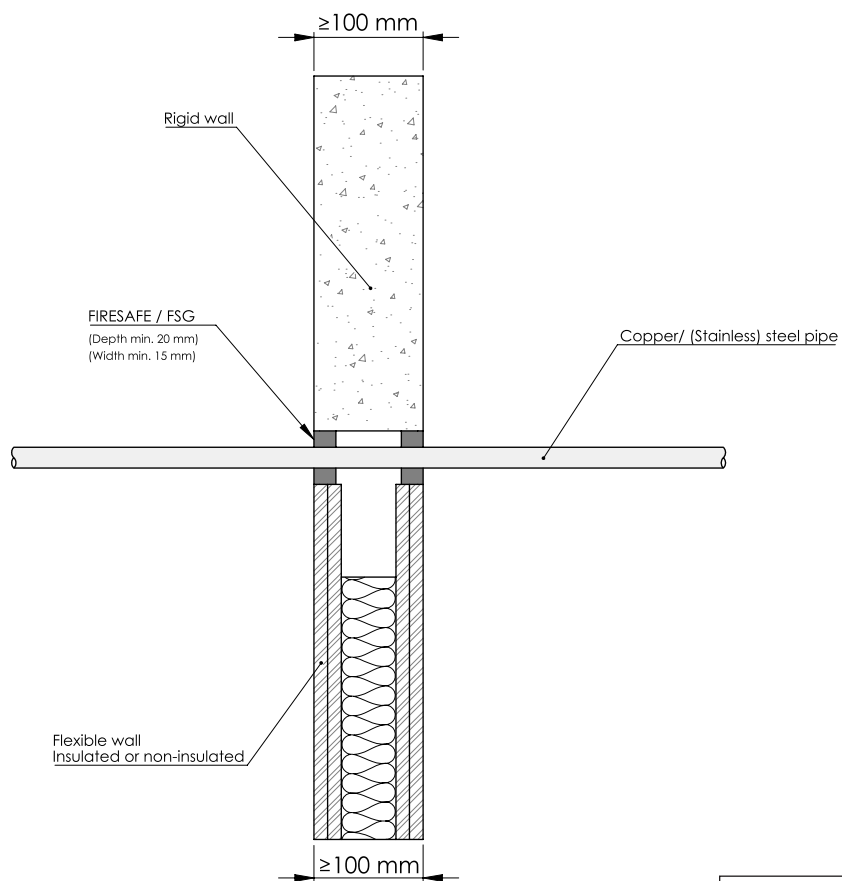
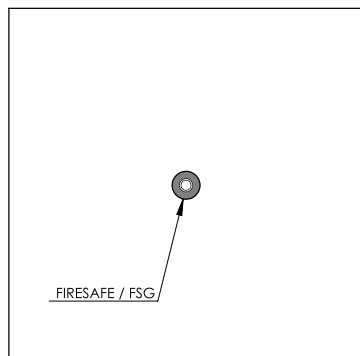
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Services	Pipe dimensions (mm)		Coating	Sealing (mm)	Classification
	Outer dimension	Wall thickness			
(Stainless) Steel / cast iron	$\leq \varnothing 26.9$	≥ 2.6	Coat back 200 mm ≥ 1.5 mm WFT FIRESAFE / FSG	FIRESAFE / FSG 0-20 x ≥ 10 (wxd)	EI 60 C/U, E 120 C/U
	$\leq \varnothing 60.3$	≥ 3.6			

A.1.7 Flexible or rigid wall - Metal pipes uninsulated

A.1.7.4 Copper and steel pipes

Front view

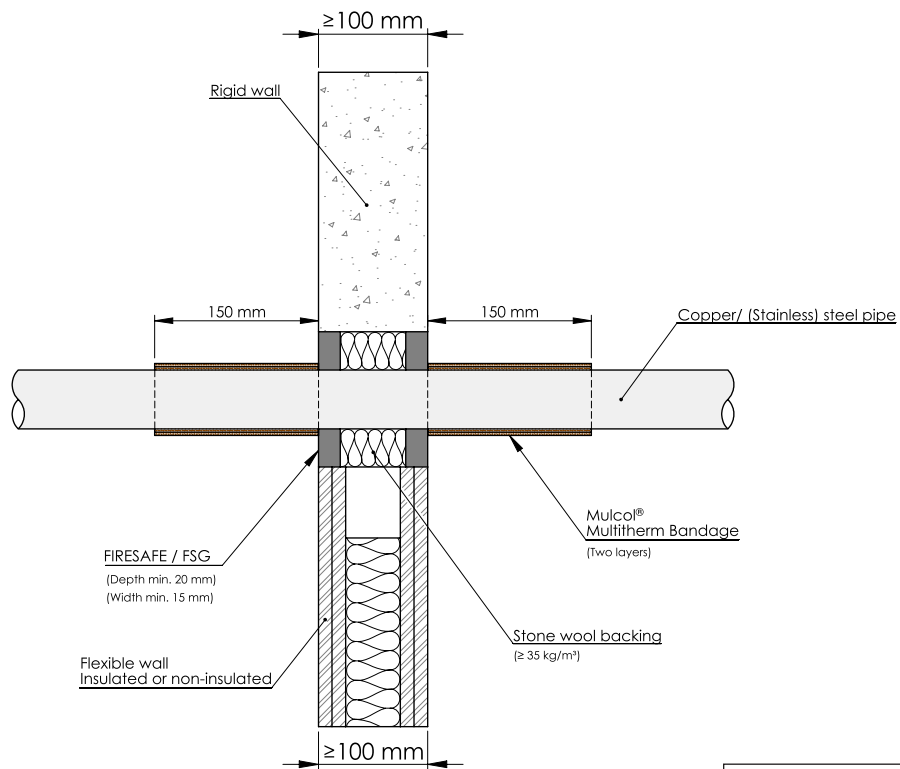
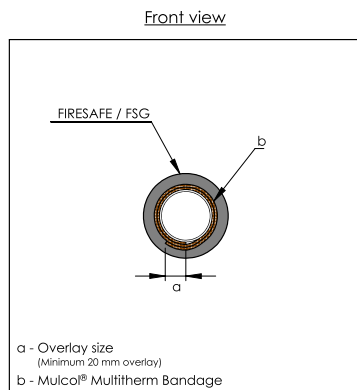


Drawing: FW.E-CU-G2.4.10

Services	Pipe dimensions (mm)		Sealing (mm)	Classification
	Outer dimension	Wall thickness		
Copper / (stainless) steel / cast iron	$\leq \varnothing 15$	≥ 1.0	FIRESAFE / FSG $\geq 15 \times 20$ mm (wxd)	EI 30 C/U, E 120 C/U

A.1.7 Flexible or rigid wall - Metal pipes uninsulated

A.1.7.5 Copper and steel pipes - Multitherm Bandage



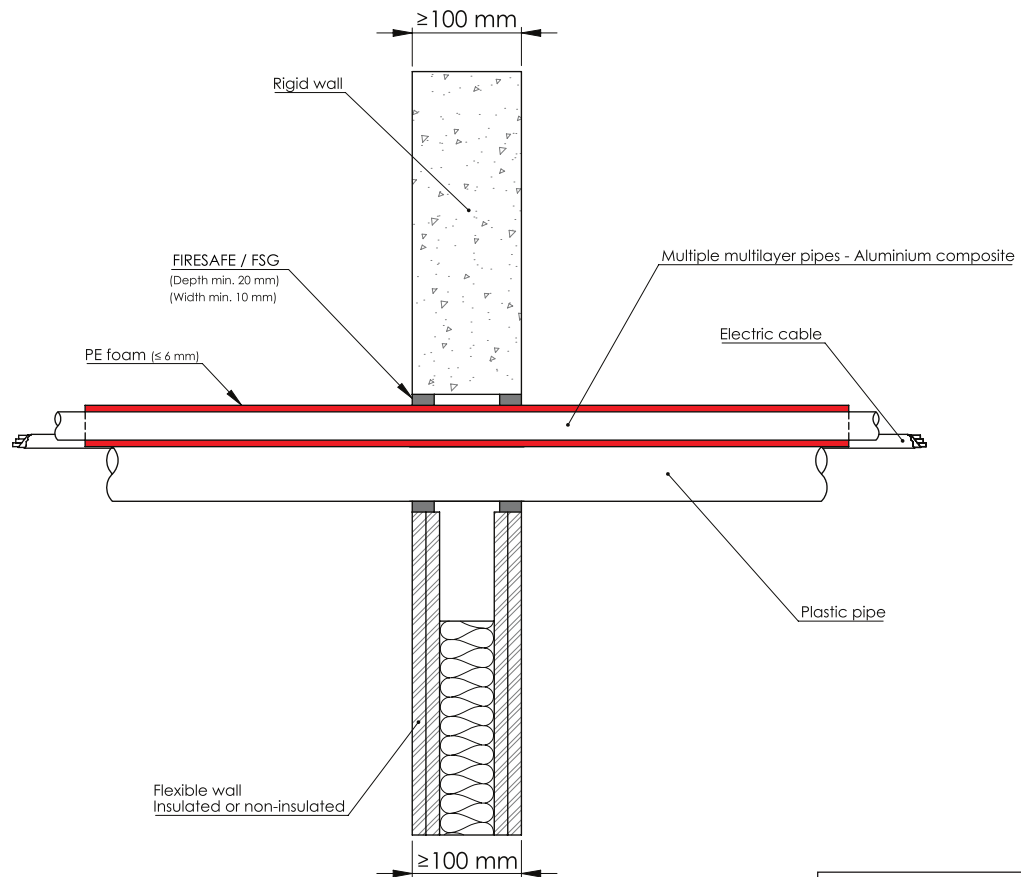
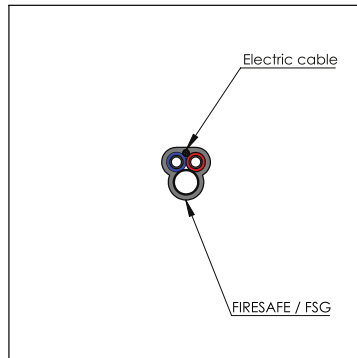
Drawing: FW.E-CU-B2.1.20

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Multitherm Bandage	Classification
	Outer dimension	Wall thickness				
Copper / (stainless) steel / cast iron	≤ Ø 54	≥ 1.5	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Stone wool (≥ 35 kg/m³)	LI 150 two layers	EI 45 C/U E 120 C/U

A.1.8 Flexible or rigid wall - Multiple services

A.1.8.1 Multiple pipes and cables

Front view

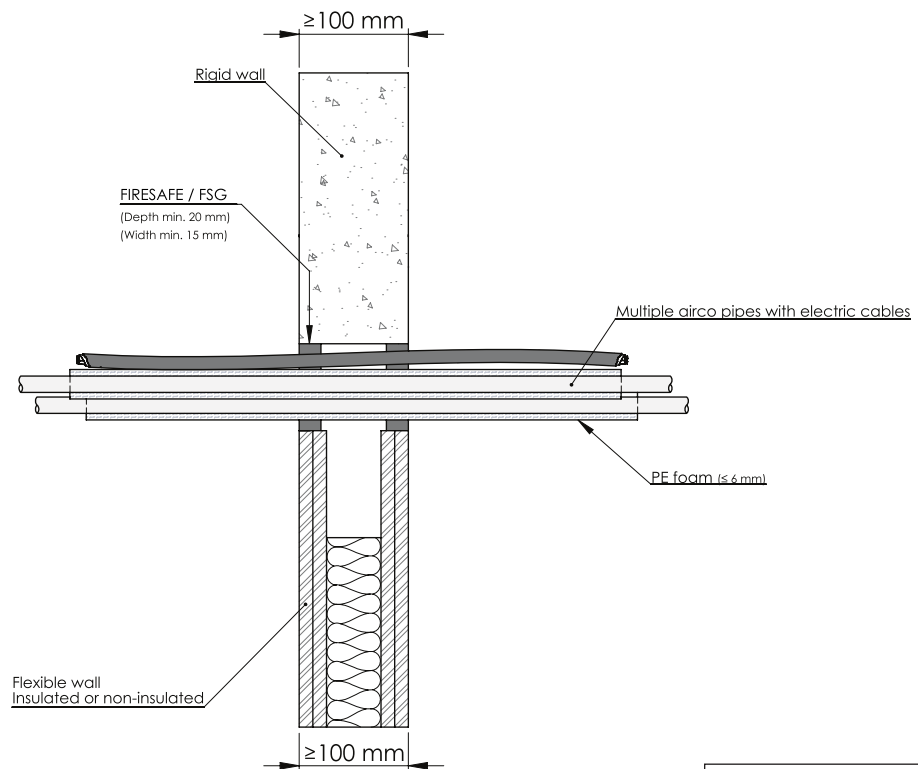
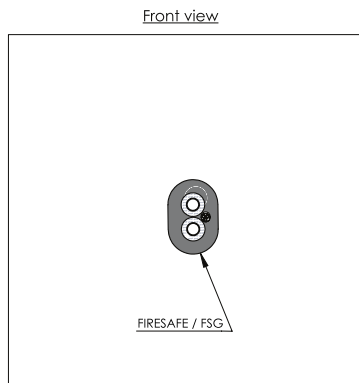


Drawing: FW.E-PP-MLA2-G2.4.23

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Multilayer pipes (MLC)	$2x \leq \varnothing 15$	2.0	PE foam	≤ 6	CS	FIRESAFE / FSG $\geq 10 \times 20$ (wxd)	EI 120 U/C
PVC(-U/-C)	$\leq \varnothing 50$	2.0	-	-	-		EI 120 U/U
Sheated cable	$\leq \text{YMKV}$ $5 \times 2.5 \text{ mm}^2$	-	-	-	-		EI 120

A.1.8 Flexible or rigid wall - Multiple services

A.1.8.2 Multiple pipes and cables

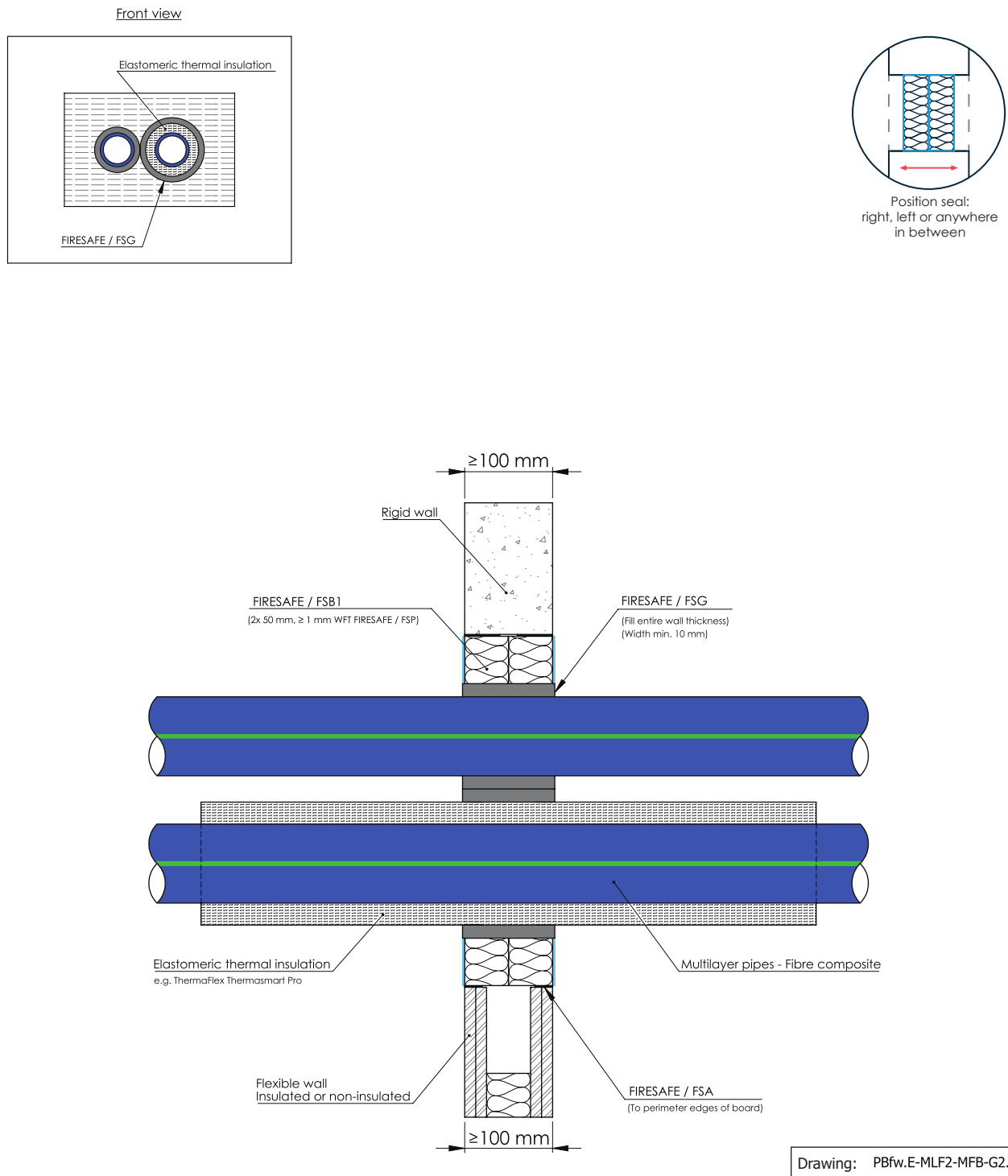


Drawing: FW.E-CU2-10.0.22

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Set of airconditioning pipes	$2x \leq \varnothing 15$	1.5	PE foam	≤ 6	LS 400 / CS LI 400 / CI	FIRESAFE / FSG $\geq 10 \times 20$ (wxd)	EI 90
Sheated cable	$\leq \text{YMKV}$ $3 \times 1.5 \text{ mm}^2$	-	-	-	-		

A.1.8 Flexible or rigid wall - Multiple services

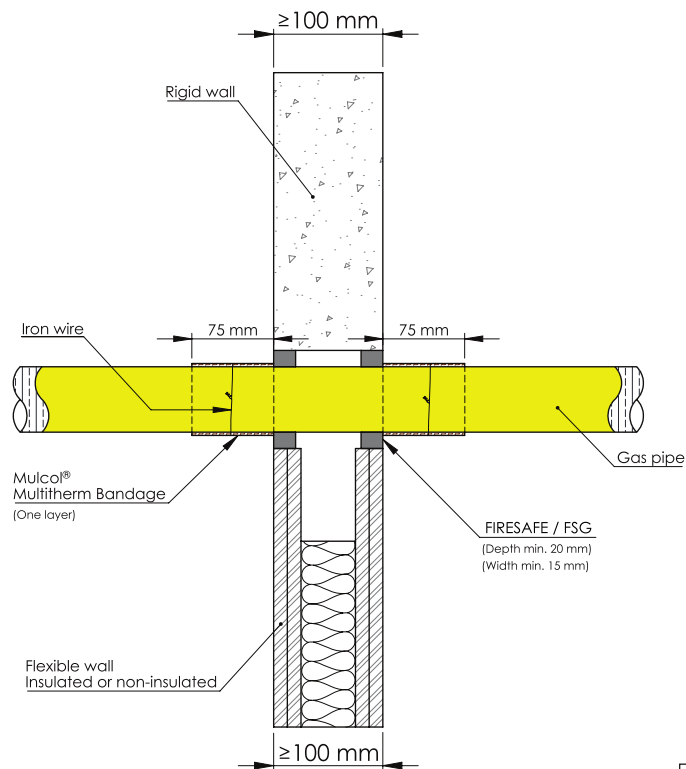
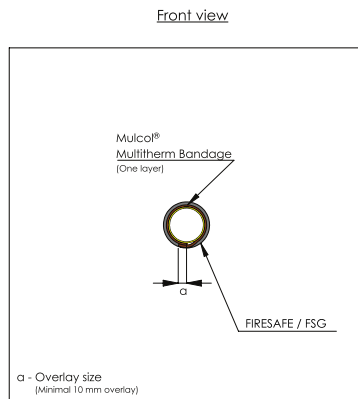
A.1.8.3 PP-R - with/without Elastomer CS



Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
PP-R Multilayer pipes	≤ Ø 90	8.2	ThermaFlex (min. class B-s1, d0 B _L -s1, d0)	≥ 25	CS	FIRESAFE / FSG ≥ 15 x 100 mm (wxd)	EI 60 U/C
	≤ Ø 90	8.2	-	-	-		EI 60 U/C, E 90 U/C

A.1.9 Flexible or rigid wall - Gas pipes

A.1.9.1 Corrugated stainless steel tube gas (CSST) pipes - Multitherm Bandage

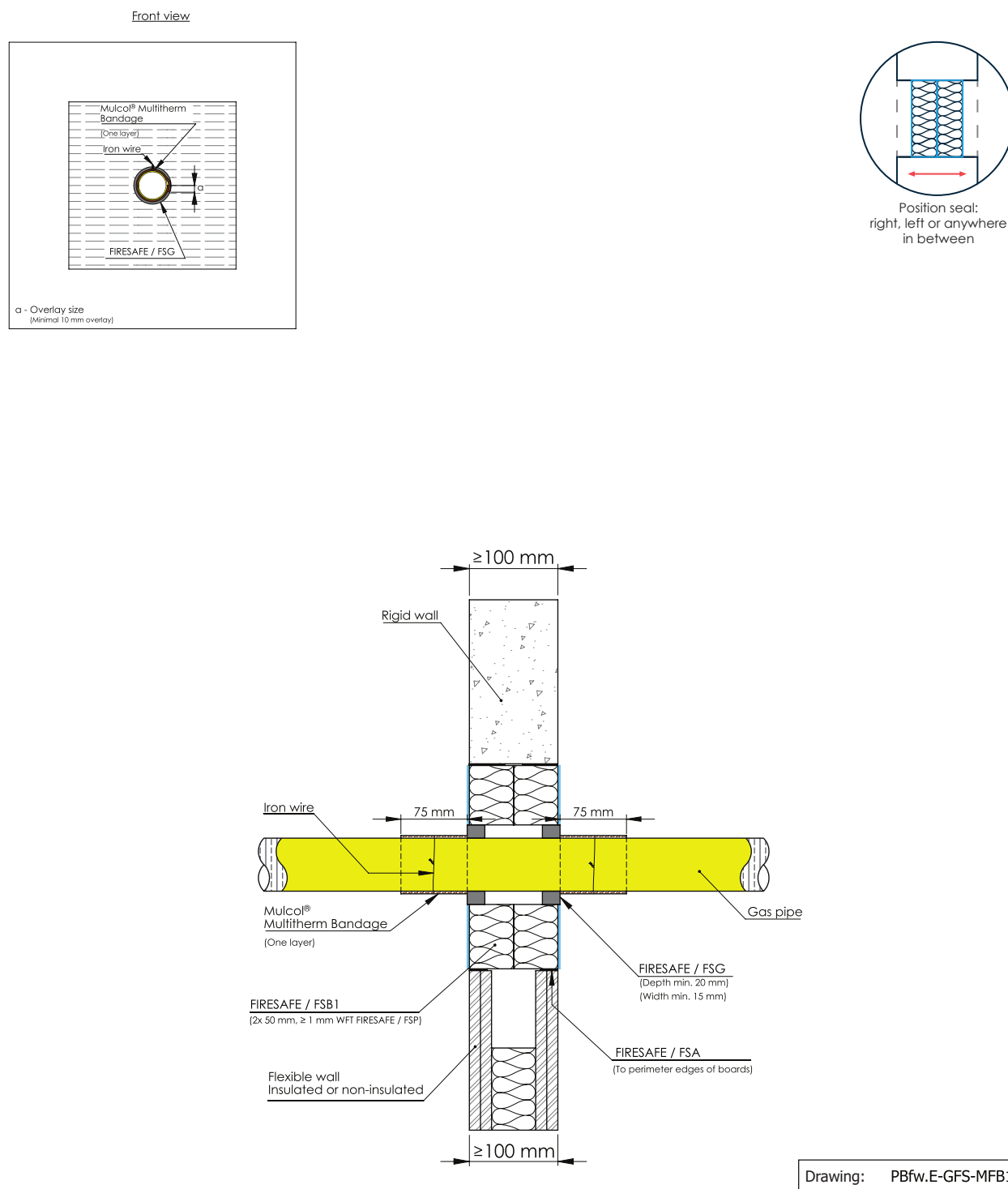


Drawing: FW.E-GFS-G2.1.90-75

Services	Service dimensions (mm)		Sealing (mm)	Multitherm Bandage	Classification
	Outer dimension	Number of pipes			
Corrugated stainless steel tube (CSST) gas pipes	≤ Ø 19.9	≤ 1	FIRESAFE / FSG ≥ 15 x 20 (wxd)	LI 75 one layer (one wire)	EI 60 U/C, E 90 U/C
		≤ 2			EI 60 U/C
	≤ Ø 40.8	≤ 1			EI 90 U/C
	≤ Ø 60.3	≤ 1			EI 120 U/C

A.1.9 Flexible or rigid wall - Gas pipes

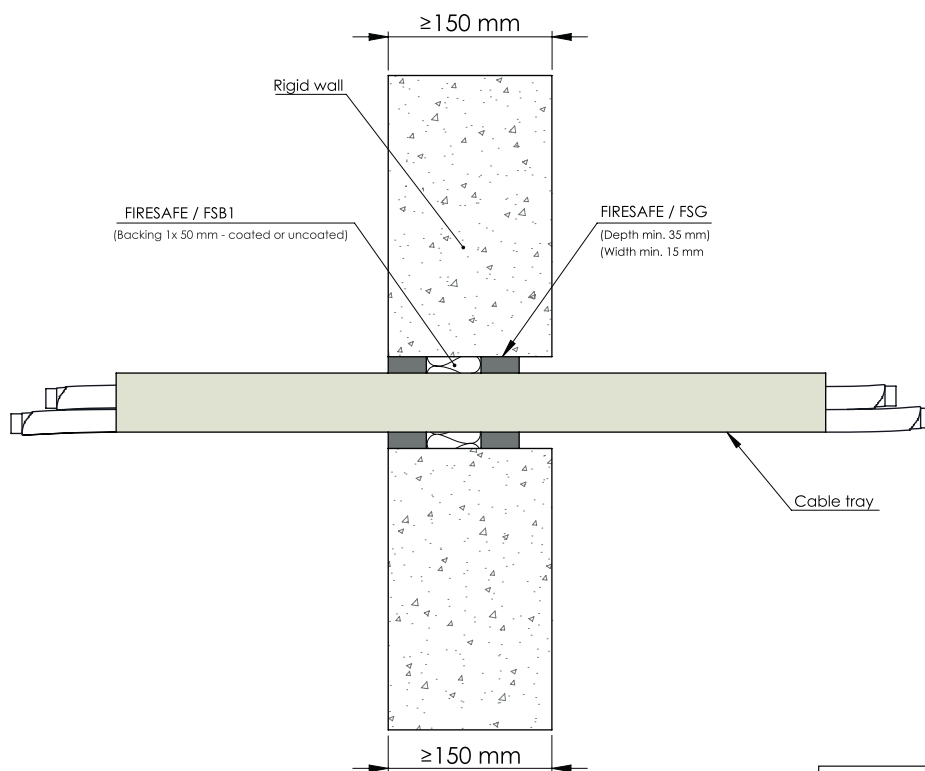
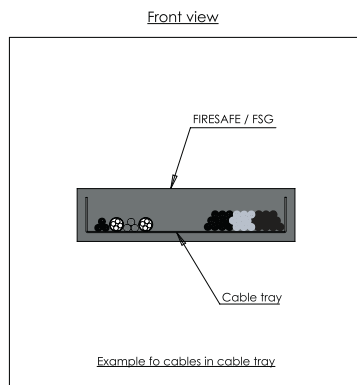
A.1.9.2 Corrugated stainless steel tube gas (CSST) pipes - FIRESAFE / FSB1 - Multitherm Bandage



Services	Service dimensions (mm)		Sealing (mm)	Multitherm Bandage	Classification
	Outer dimension	Number of pipes			
Corrugated stainless steel tube (CSST) gas pipes	≤ Ø 19.9	≤ 2	FIRESAFE / FSG ≥ 15 x 20 (wxd)	LI 75 one layer (one wire)	EI 60 U/C
	≤ Ø 40.8	≤ 1			
	≤ Ø 60.3	≤ 1			

A.2.1 Rigid walls - Cables, trays and conduits

A.2.1.1 Cables and trays



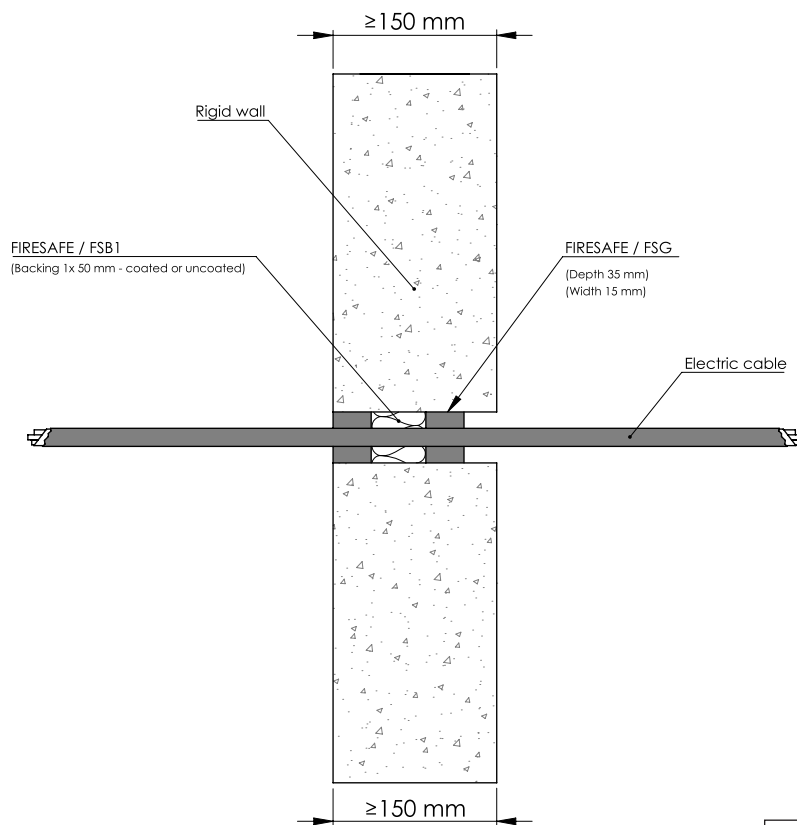
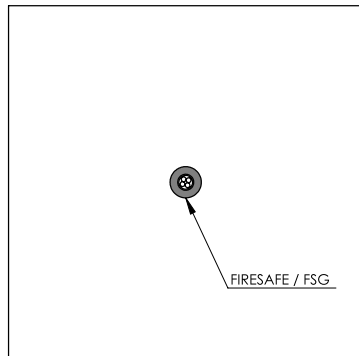
Drawing: RW150.E-CT-G2.15.10

Services	Sealing (mm)	Backing	Classification
Metal cable ladders	FIRESAFE / FSG ≥ 15 x 35 (wxd)	FIRESAFE / FSB1 coated or uncoated	EI 180, E 240
Cables ≤ Ø 21 mm			

A.2.1 Rigid walls - Cables trays and conduits

A.2.1.2 Cables

Front view



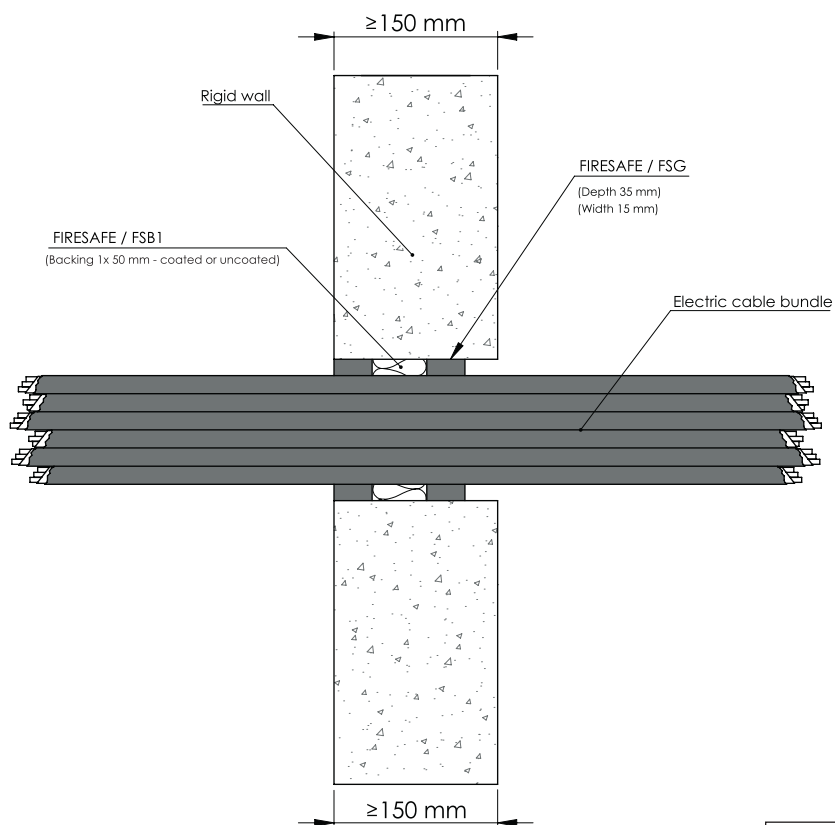
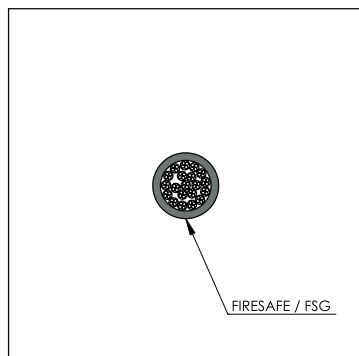
Drawing: RW150.E-EC-G2.15.10

Services	Sealing (mm)	Backing	Classification
Cables ≤ Ø 21 mm	FIRESAFE / FSG ≥ 15 x 35 (wxd)	FIRESAFE / FSB1 coated or uncoated	EI 180, E 240

A.2.1 Rigid walls - Cables trays and conduits

A.2.1.3 Cable bundle

Front view



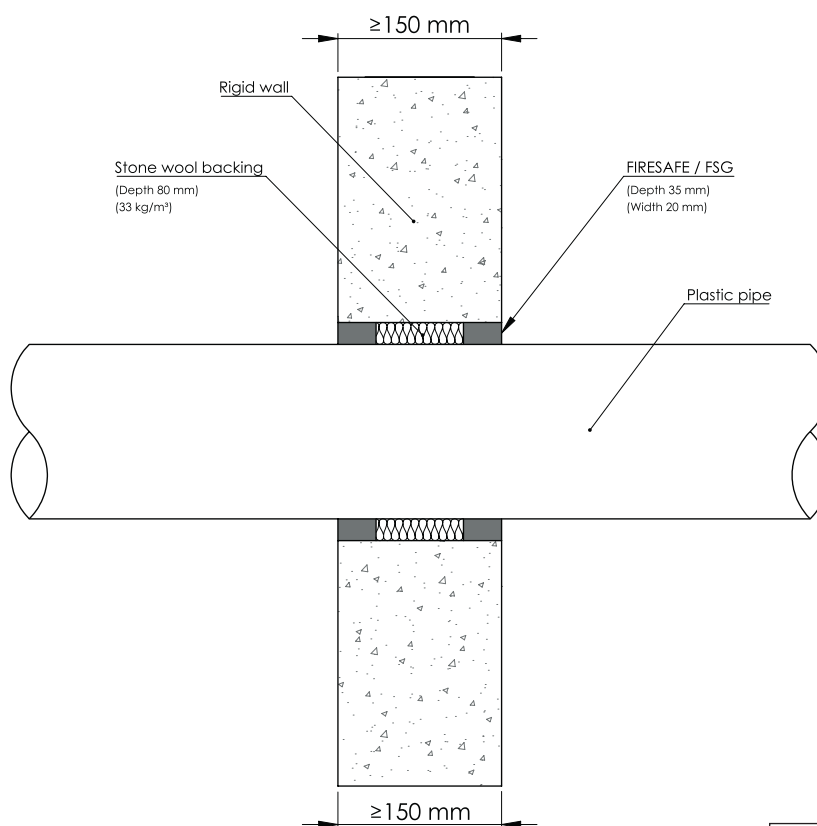
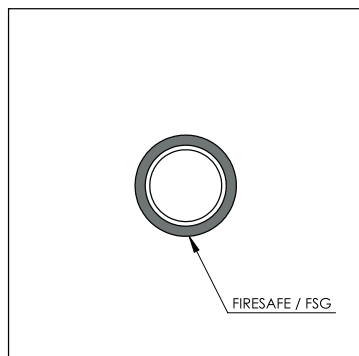
Drawing: RW150.E-ECB-G2.15.10

Services	Sealing (mm)	Backing	Classification
Cables $\leq \varnothing 21$ mm in a tied bundle $\leq \varnothing 100$ mm	FIRESAFE / FSG $\geq 15 \times 35$ (wxd)	FIRESAFE / FSB1 coated or uncoated	EI 90, E 180

A.2.2 Rigid walls - Combustible pipes

A.2.2.1 Plastic pipes

Front view

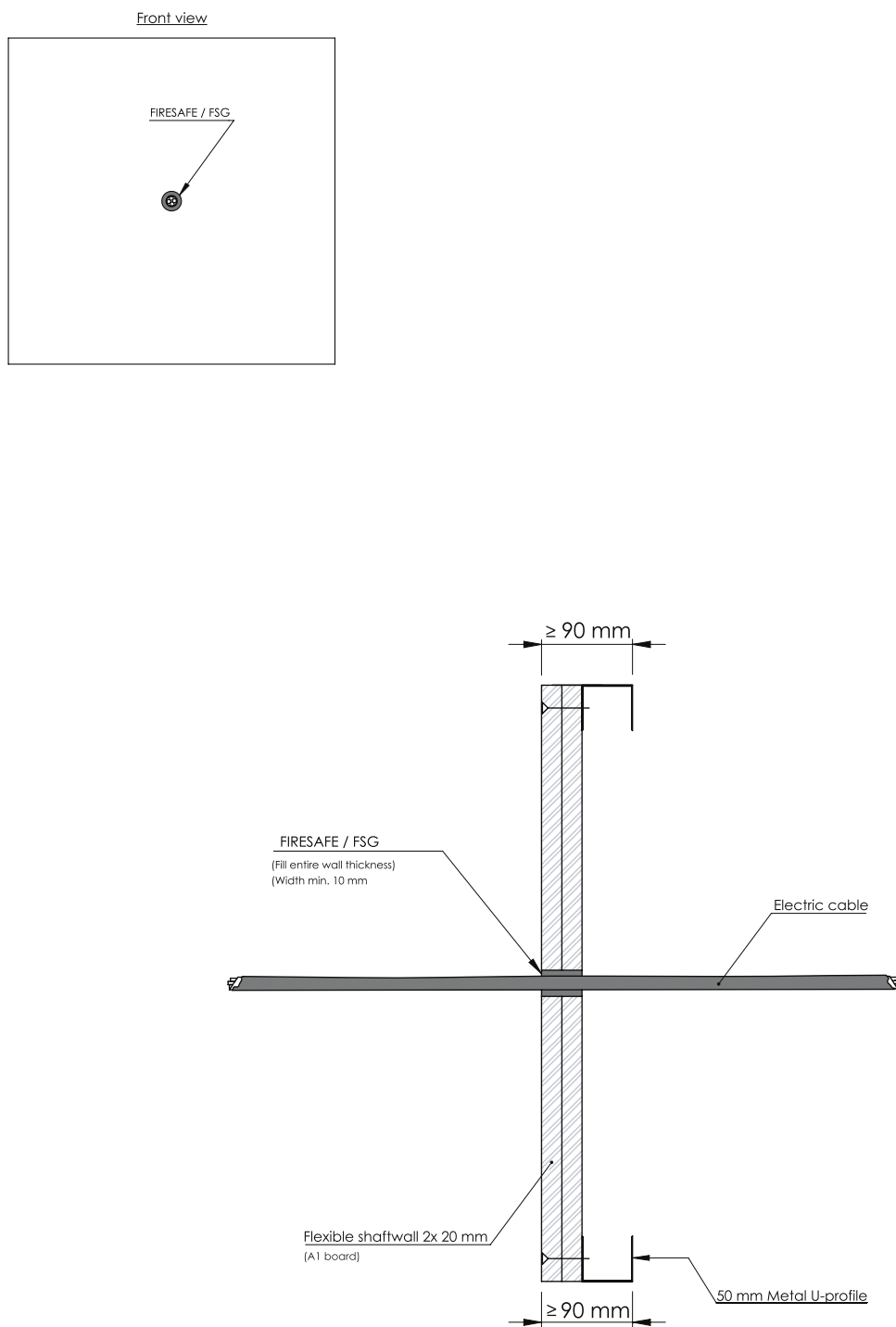


Drawing: RW150.E-PP-G2.15.10

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
PE(-HD) / PE-X / ABS / SAN+PVC	≤ Ø 110	2.7	FIRESAFE / FSG ≥ 20 x 35 (wxd)	Stone wool (≥ 33 kg/m³)	EI 240 U/C
		2.7 - 10			EI 90 U/C
	≤ Ø 160	4.0 - 9.5			EI 180 U/C
PP	≤ Ø 110	2.7			EI 240 U/C
		2.7 - 10			EI 120 U/C
	≤ Ø 160	6.2			EI 180 U/C
		6.2 - 9.1			EI 120 U/C
PVC(-U/-C)	≤ Ø 110	2.7			EI 240 U/C
		2.7 - 10			EI 90 U/C
	≤ Ø 160	6.2			EI 180 U/C
		6.2 - 9.1			EI 120 U/C

A.3.1 Shaft walls - Cables, trays and conduits

A.3.1.1 Cables

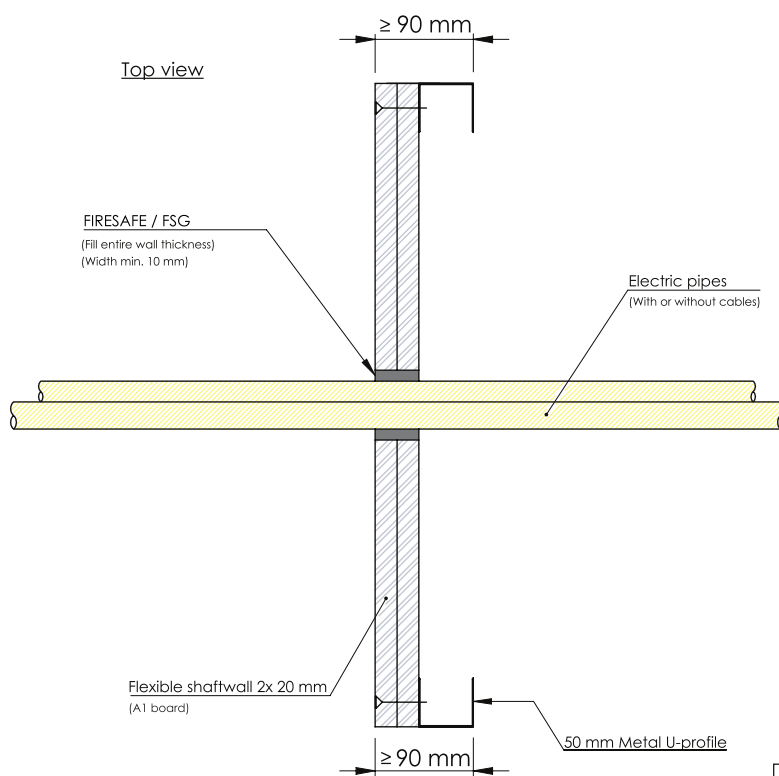
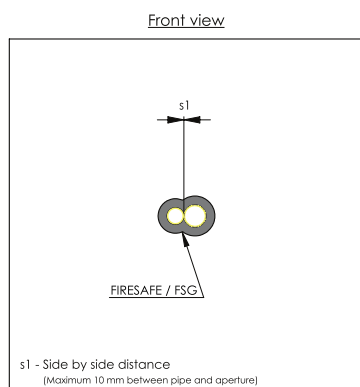


Drawing: FSW.E-EC-G1.17.10

Services	Sealing (mm)	Classification
Cables ≤ Ø 14 mm	FIRESAFE / FSG ≥ 10 x 40 (wxd)	EI 90

A.3.1 Shaft walls - Cables, trays and conduits

A.3.1.2 Multiple conduits with cables

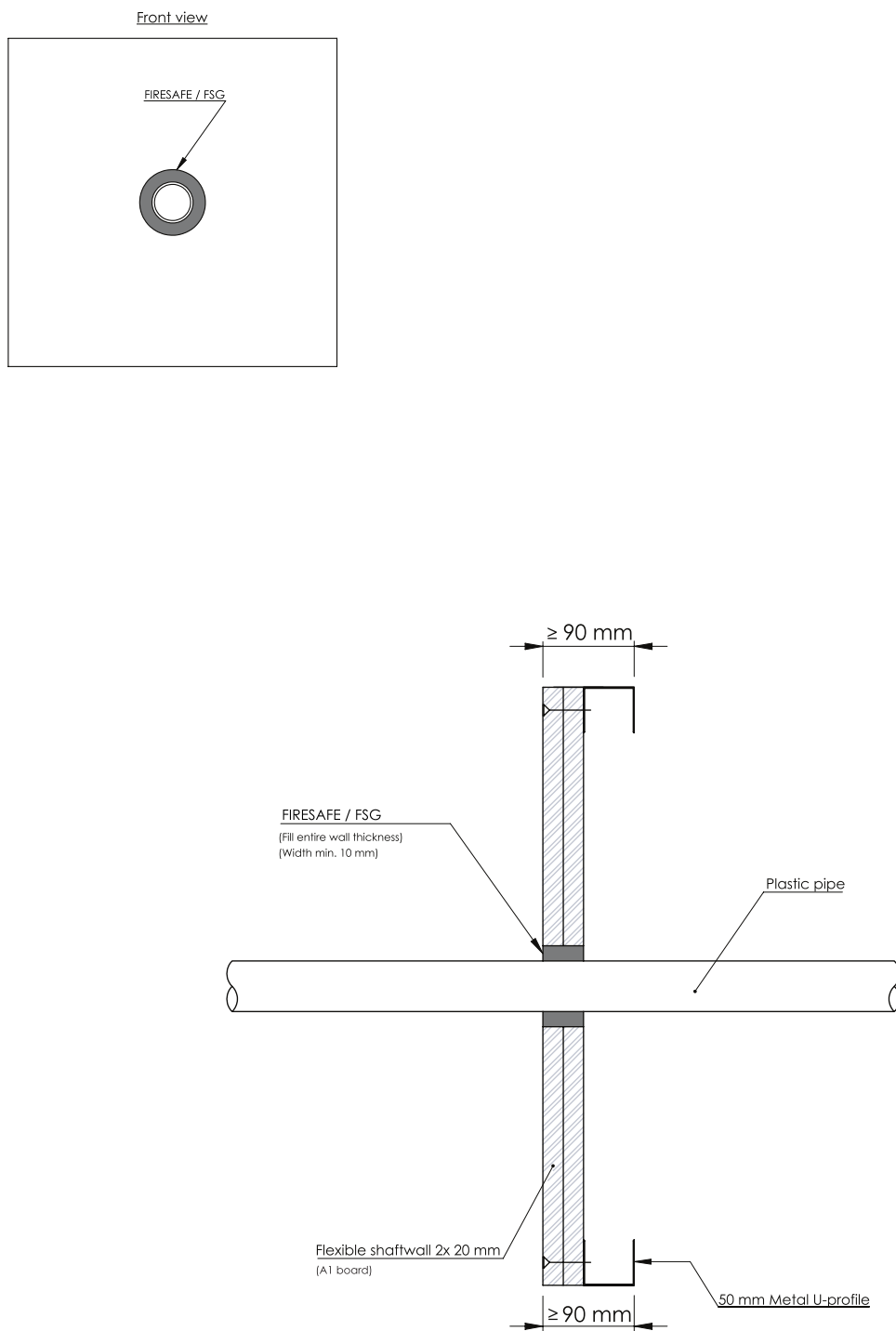


Drawing: FSW.E-EP2-G1.17.10

Services	Sealing (mm)	Classification
Plastic conduits ≤ Ø 19 mm, with or without cables	FIRESAFE / FSG ≥ 10 x 40 (wxd)	EI 90 U/C
Plastic conduits ≤ Ø 25 mm, with or without cables		EI 45 U/C

A.3.2 Shaft walls - Combustible pipes

A.3.2.1 Plastic pipes

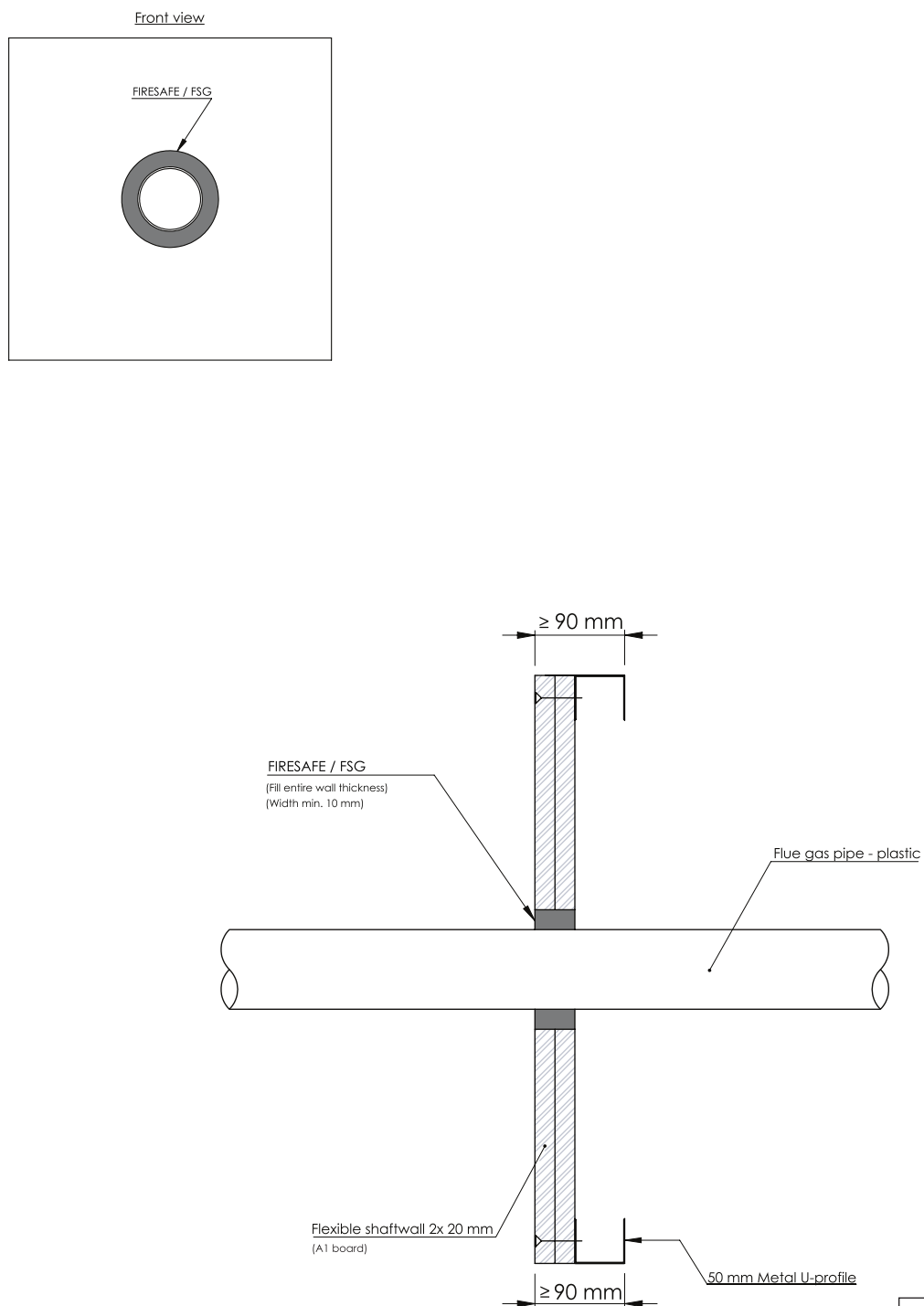


Drawing: FSW.E-PP-G1.17.10

Services	Pipe dimensions (mm)		Sealing (mm)	Classification
	Outer dimension	Wall thickness		
PE(-HD) / PE-X / ABS / SAN+PVC	$\leq \text{Ø } 50$	3.0	FIRESAFE / FSG $\geq 10 \times 40$ (wxd)	EI 45 U/U

A.3.2 Shaft walls - Combustible pipes

A.3.2.2 Plastic pipes - Flue gas pipes

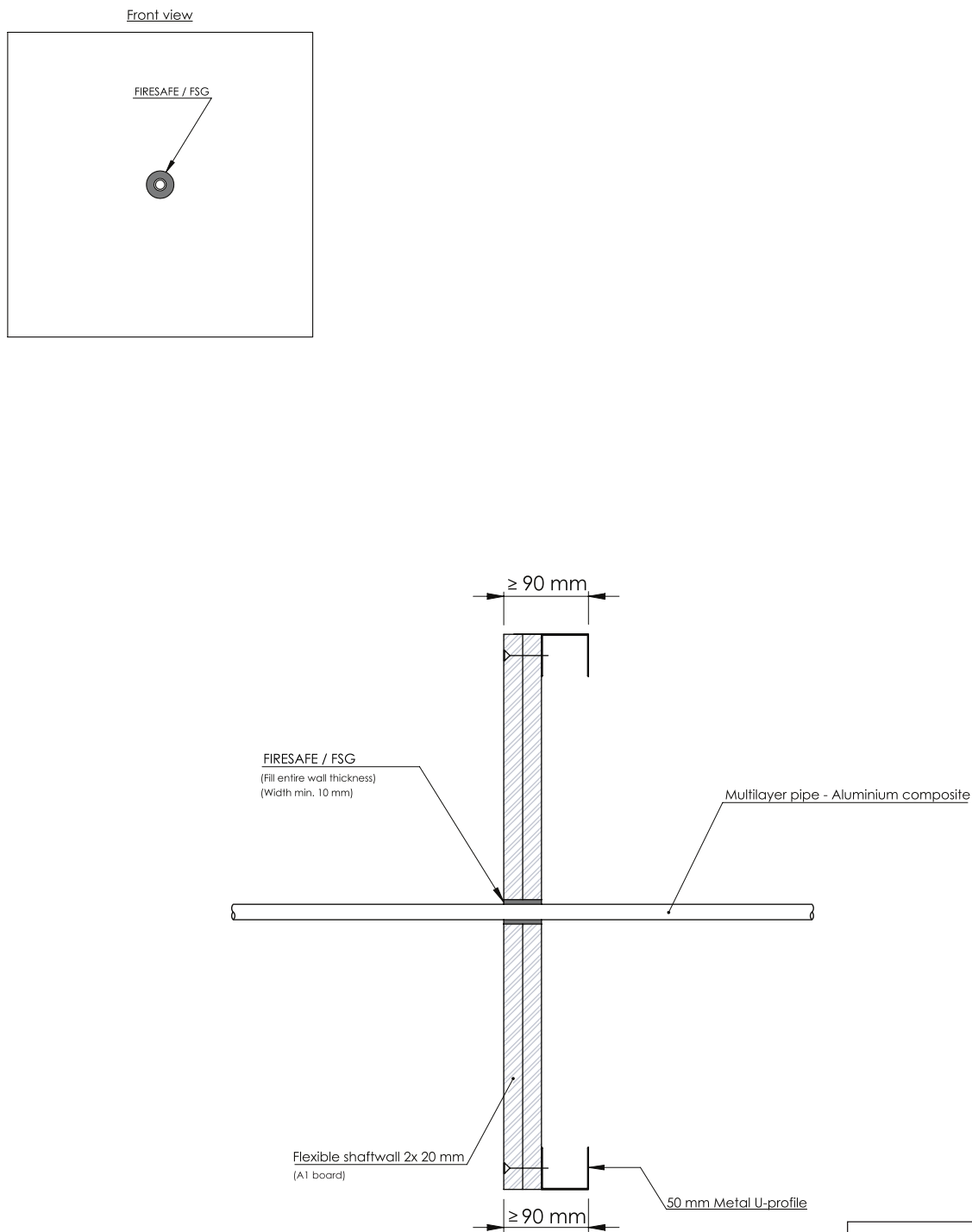


Drawing: FSW.E-RGA-G1.17.10

Services	Pipe dimensions (mm)		Sealing (mm)	Classification
	Outer dimension	Wall thickness		
Flue gas pipes	$\leq \varnothing 80$	2.2	FIRESAFE / FSG $\geq 10 \times 40$ (wxd)	EI 45 U/C

A.3.3 Shaft walls - Multilayer pipes (MLC)

A.3.3.1 Multilayer pipes (MLC)

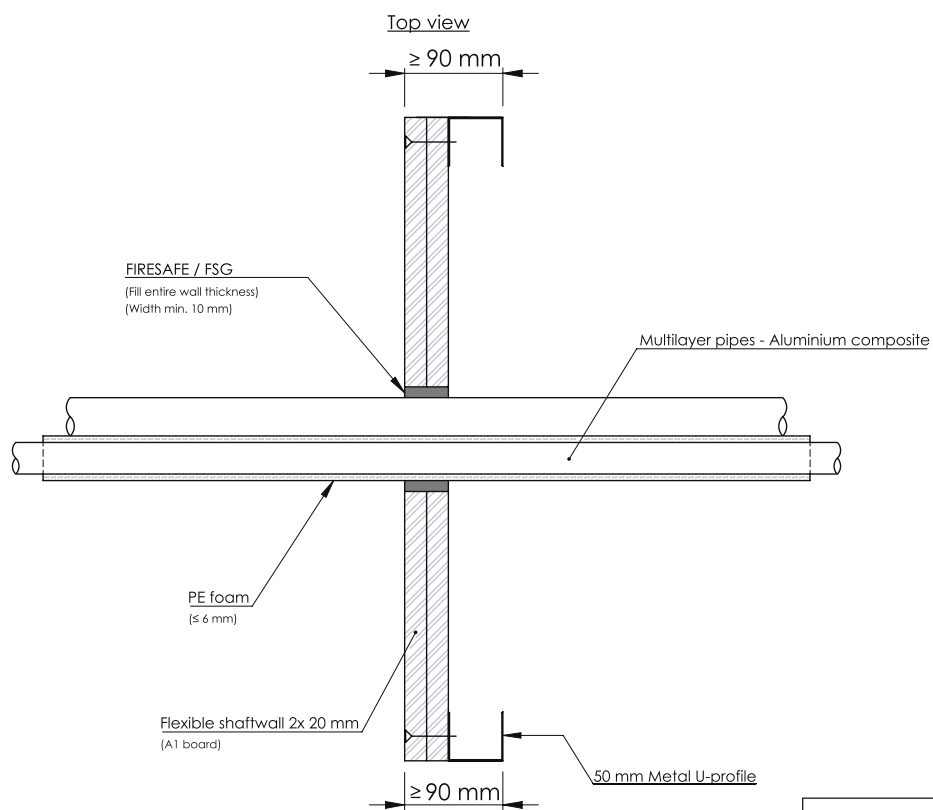
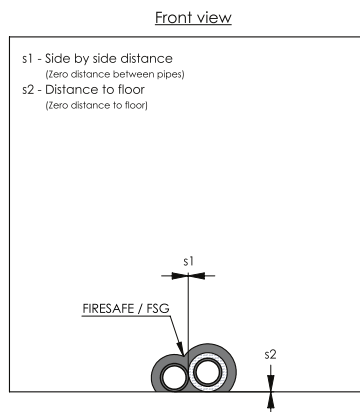


Drawing: FSW.E-MLA-G1.17.10

Services	Pipe dimensions (mm)		Sealing (mm)	Classification
	Outer dimension	Wall thickness		
Multilayer pipes (MLC)	≤ Ø 16	2.0	FIRESAFE / FSG ≥ 10 x 40 (wxd)	EI 60 U/C, E 90 U/C

A.3.3 Shaft walls - Multilayer pipes (MLC)

A.3.3.2 Multiple Multilayer pipes (MLC)

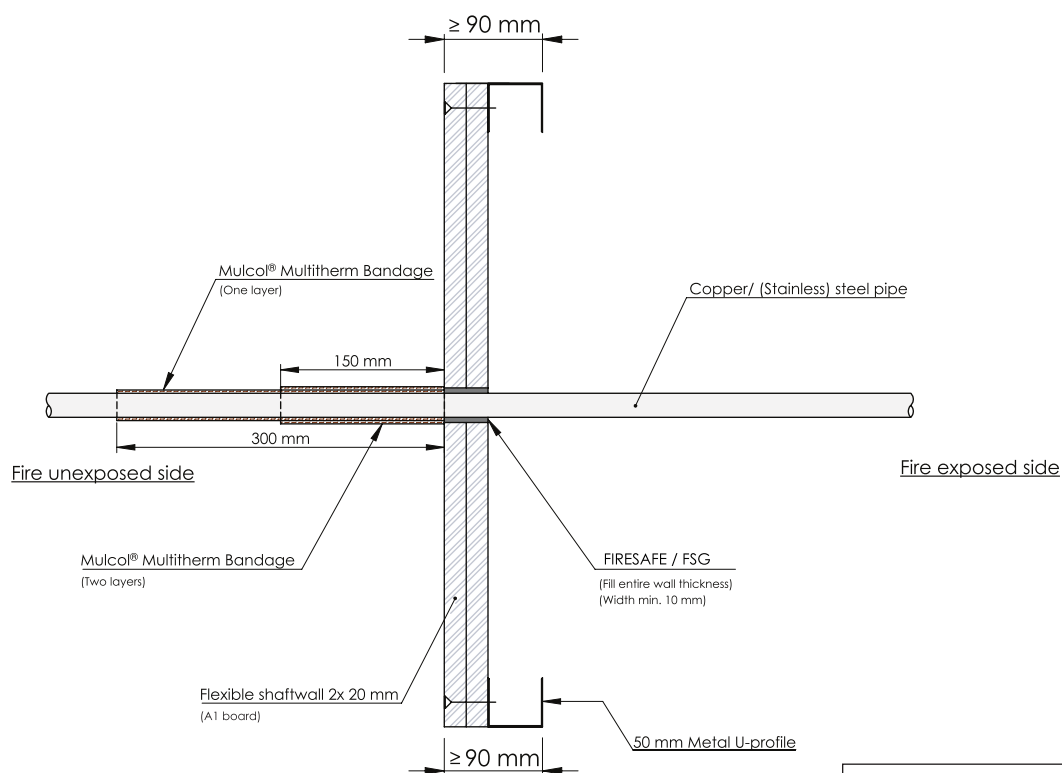
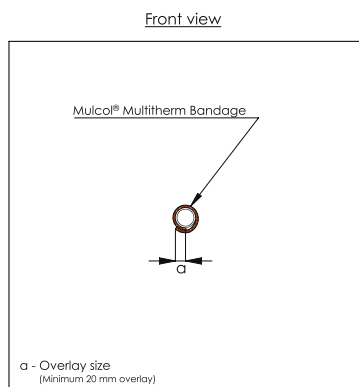


Drawing: FSW.E-MLP2-G1.17.40

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Multilayer pipes (MLC)	≤ Ø 32	3.0	PE foam	≤ 6	LS 300 / CS	FIRESAFE / FSG ≥ 10 x 40 (wxd)	EI 45 U/C, E 90 U/C
	≤ Ø 32	3.0	-	-	-		EI 90 U/C

A.3.4 Shaft walls - Metal pipes uninsulated

A.3.4.1 Copper and steel pipes - Multitherm Bandage

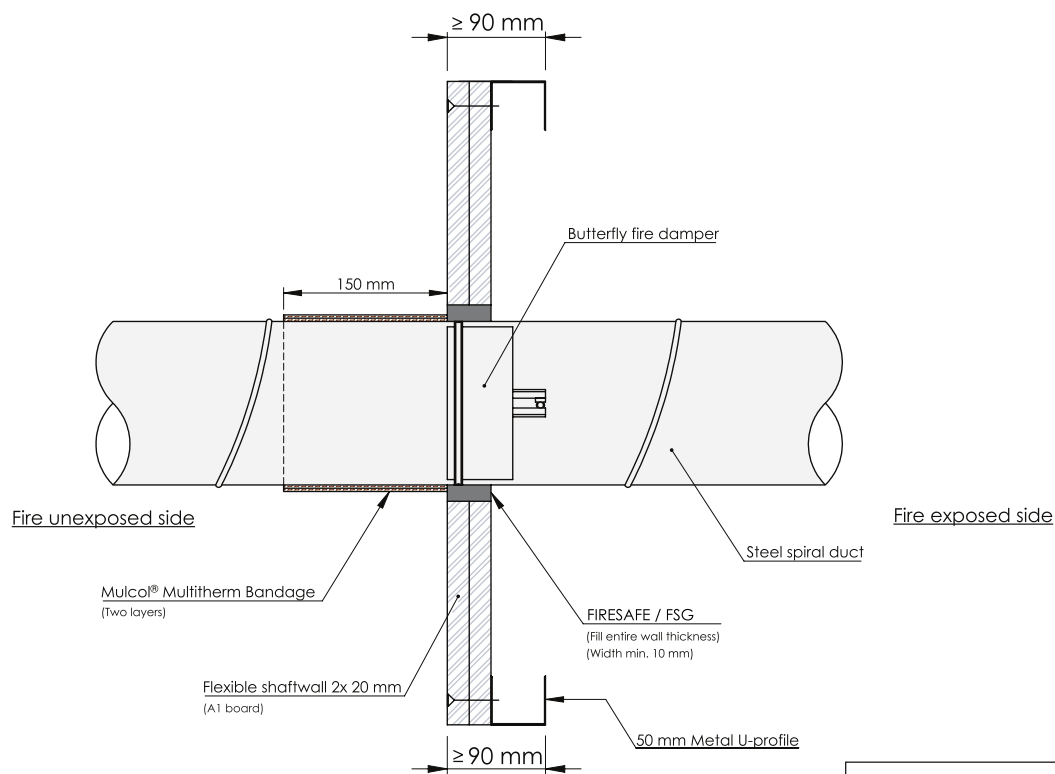
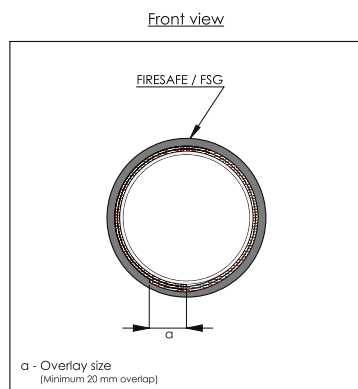


Drawing: FSW.E-CU-G1.17.92

Services	Pipe dimensions (mm)		Sealing (mm)	Multitherm Bandage	Classification
	Outer dimension	Wall thickness			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	FIRESAFE / FSG ≥ 10 x 40 mm (wxd)	LI 150 two layers + LI 300 one layer	EI 60 C/U, E 90 C/U

A.3.4 Shaft walls - Metal pipes uninsulated

A.3.4.2 Steel spiral duct - Multitherm Bandage

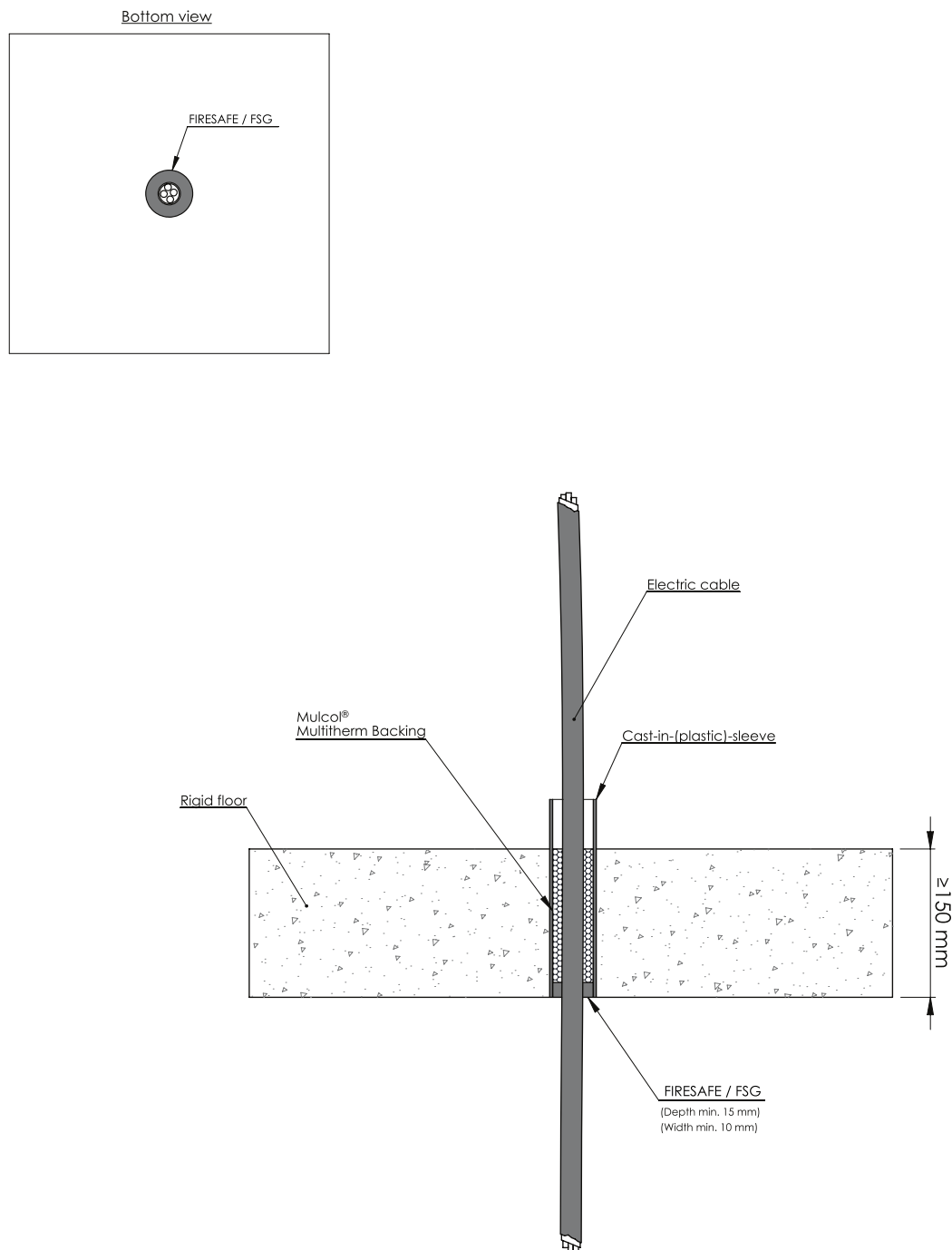


Drawing: FSW.E-ST-G1.17.92

Services	Pipe dimensions (mm)		Sealing (mm)	Multitherm Bandage	Classification
	Outer dimension	Wall thickness			
Steel spiral duct with butterfly fire damper	≤ Ø 150	0.4	FIRESAFE / FSG ≥ 10 x 40 mm (wxd)	LI 150 one layer	EI 20 U/U, E 90 U/U

B.1.1 Rigid floors - Cables, trays and conduits

B.1.1.1 Cables - Bottom of floor

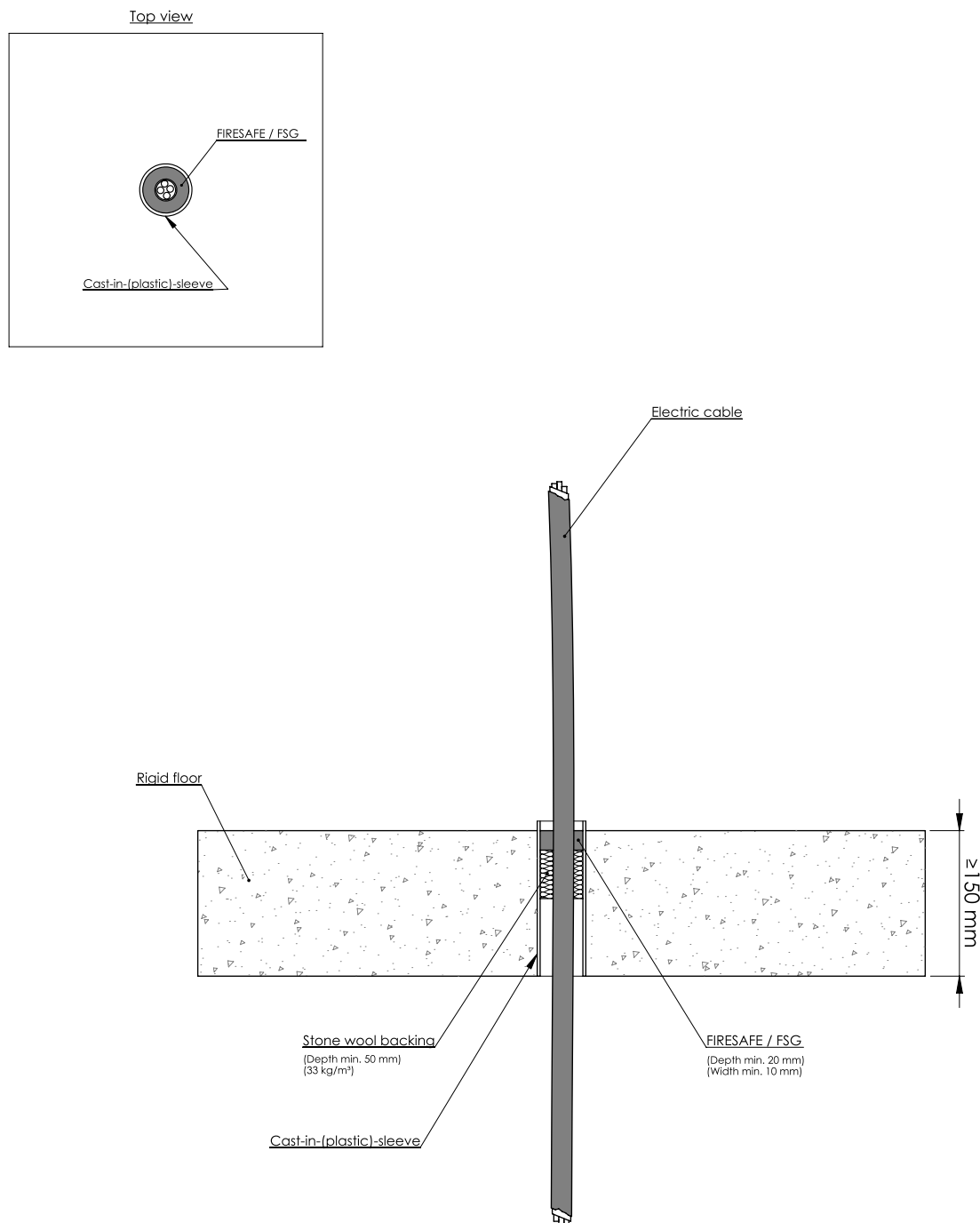


Drawing: RF.E-EC-G1.2.10

Services		Pipe dimensions (mm)	Sealing (mm)	Backing	Classification
		Outer dimension			
Cables ≤ Ø 25 mm YMvK 5G 25 mm ²	with or without plastic cast-in sleeve	≤ Ø 110	FIRESAFE / FSG ≥ 10 x 40 (wxd) bottom of floor	Multitherm backing fill entire depth	EI 60, E 120

B.1.1 Rigid floors - Cables, trays and conduits

B.1.1.2 Cables - Top of floor

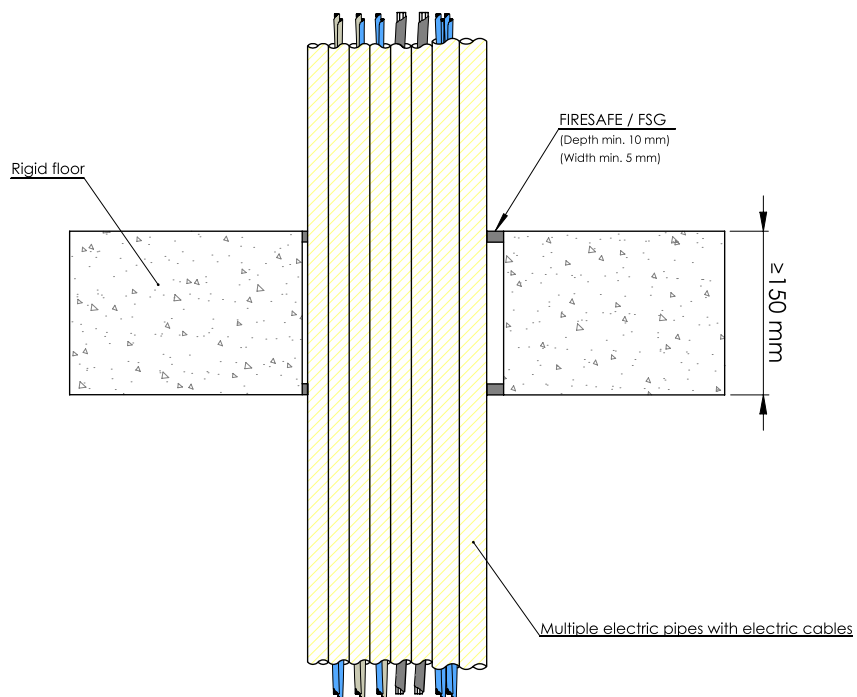
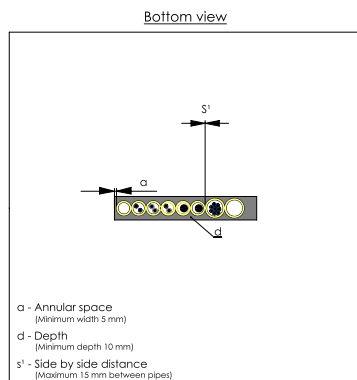


Drawing: RF-EC21-G3.12.10

Services		Pipe dimensions (mm)	Sealing (mm)	Backing	Classification
		Outer dimension			
Cables ≤ Ø 21 mm	with or without plastic cast-in sleeve	≤ Ø 50	FIRESAFE / FSG ≥ 10 x 20 (wxd) top of floor	≥ 50 mm stone wool (≥ 33 kg/m³)	EI 120

B.1.1 Rigid floors - Cables, trays and conduits

B.1.1.3 Multiple conduits with cables

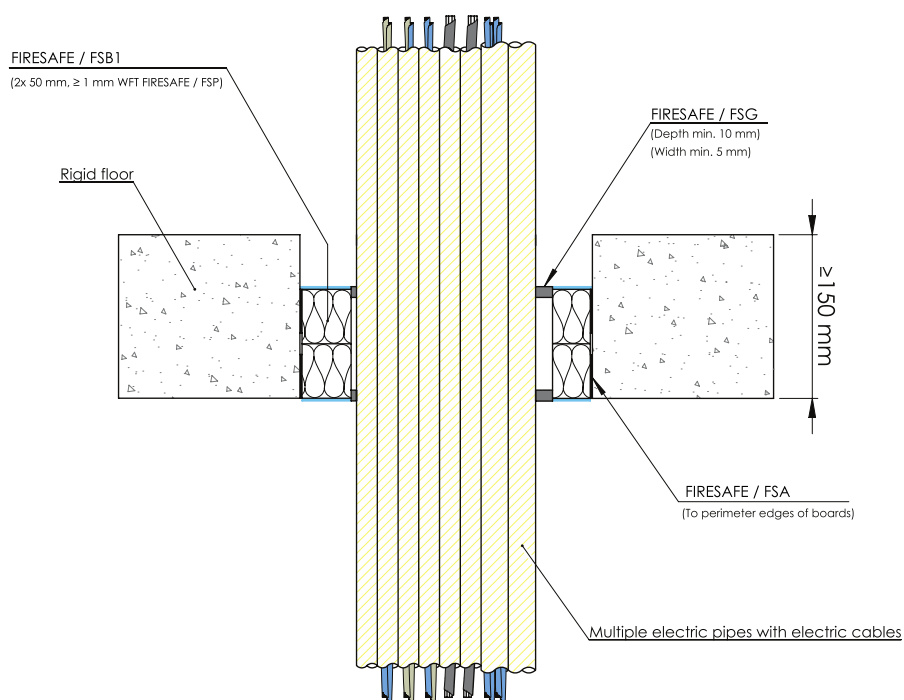
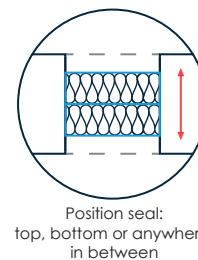
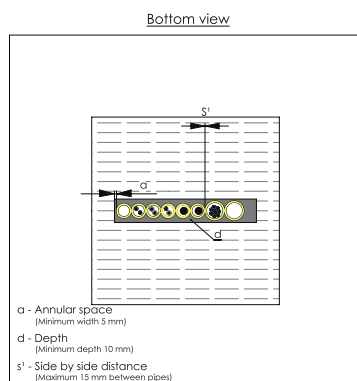


Drawing: RFE-EP8-G2.1.10

Services	Sealing (mm)	Classification
Multiple plastic conduits ≤ Ø 25 mm, with or without cables max 8 pcs.	FIRESAFE / FSG ≥ 5 x 10 mm (wxd)	EI 90 U/U, E 120 U/U

B.1.1 Rigid floors - Cables, trays and conduits

B.1.1.4 Multiple conduits with cables - FIRESAFE / FSB1

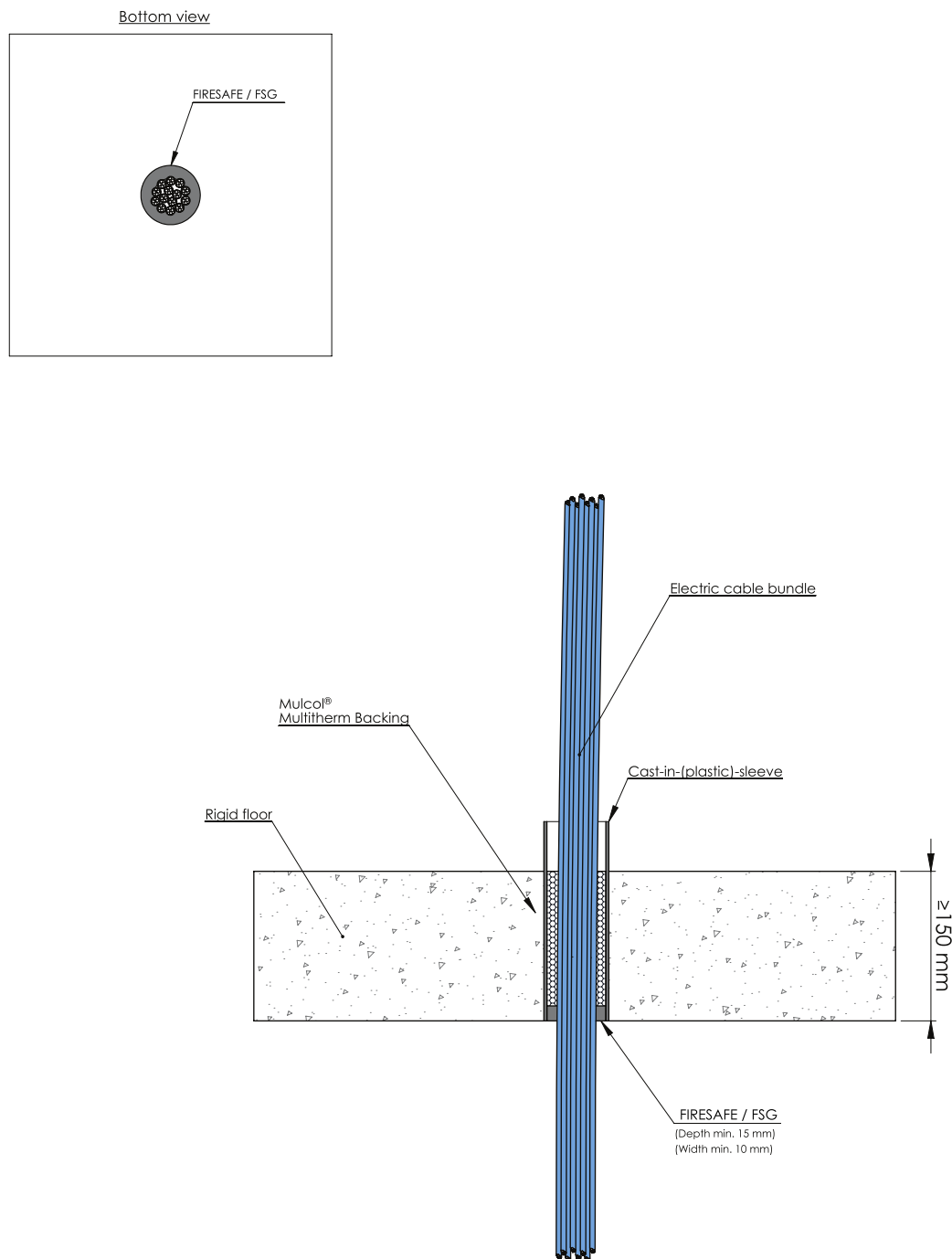


Drawing: PBrf.E-EP8-G2.1.10

Services	Sealing (mm)	Classification
Multiple plastic conduits ≤ Ø 25 mm, with or without cables max 8 pcs.	FIRESAFE / FSG ≥ 5 x 10 mm (wxd)	EI 90 U/U

B.1.1 Rigid floors - Cables, trays and conduits

B.1.1.5 Cable bundle - Bottom of floor

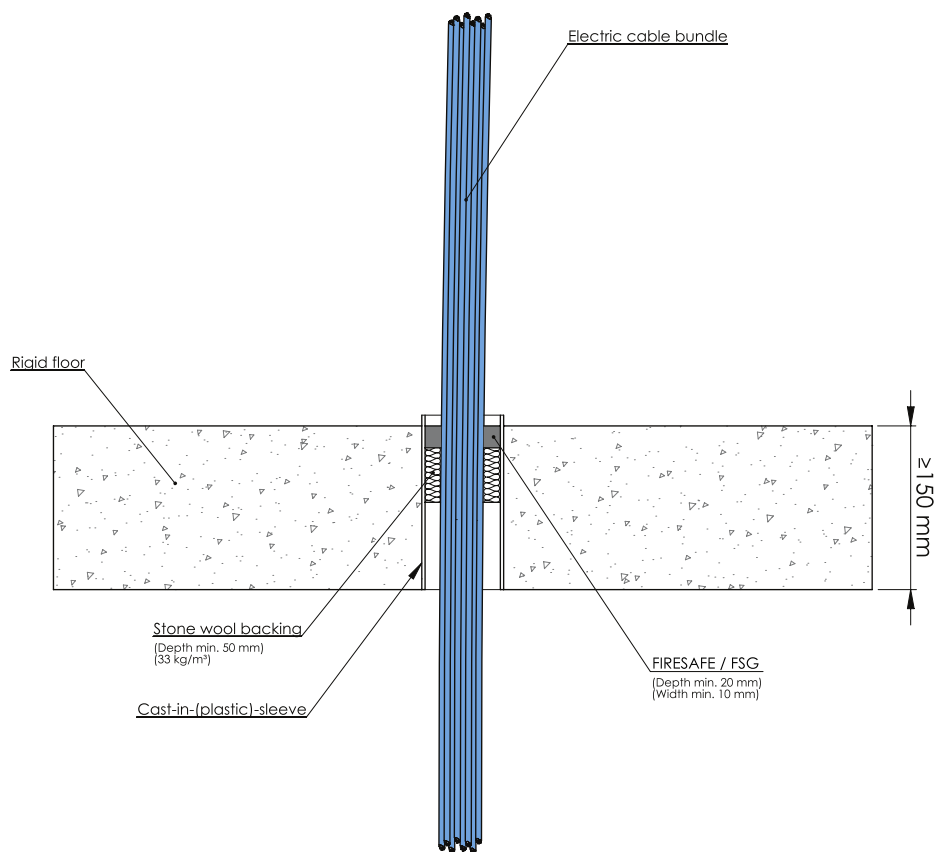
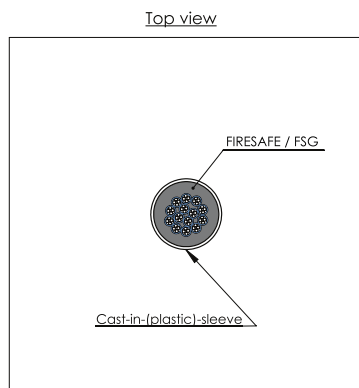


Drawing: RFE-ECB-G1.2.10

Services		Pipe dimensions (mm)	Sealing (mm)	Backing	Classification
		Outer dimension			
Telecommunication cables ≤ Ø 21 mm in a tied bundle ≤ 28 pcs	with or without plastic cast-in sleeve	≤ Ø 75	FIRESAFE / FSG ≥ 10 x 15 (wxd)	Multitherm Backing fill entire depth	EI 120

B.1.1 Rigid floors - Cables, trays and conduits

B.1.1.6 Cable bundle - Top of floor

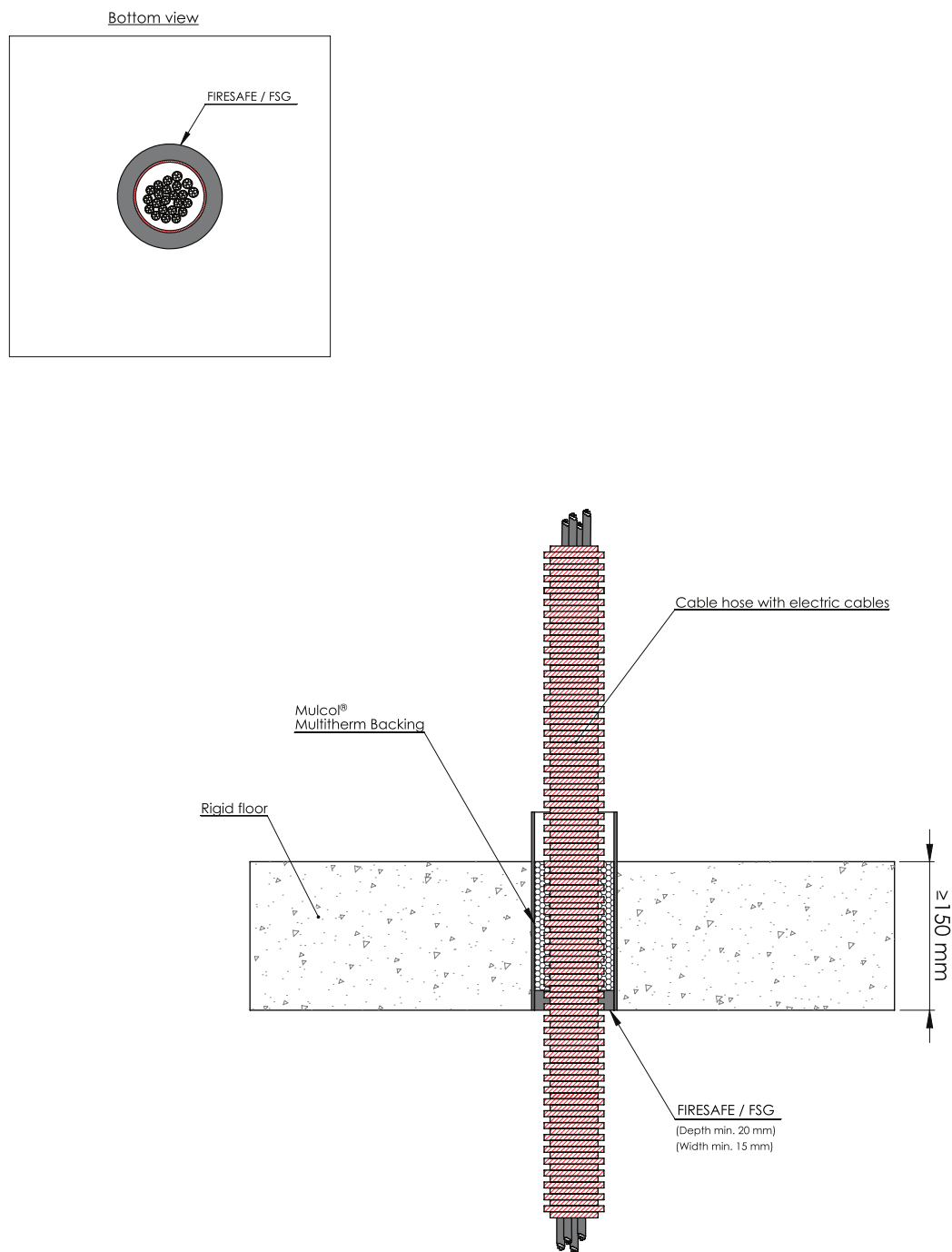


Drawing: RFE-ECB-G3.12.10

Services		Pipe dimensions (mm)	Sealing (mm)	Backing	Classification
		Outer dimension			
Telecommunication cables ≤ Ø 21 mm in a tied bundle ≤ 40 pcs	with or without plastic cast-in sleeve	≤ Ø 75	FIRESAFE / FSG ≥ 10 x 20 (wxd)	≥ 50 mm stone wool (≥ 33 kg/m³)	EI 120

B.1.1 Rigid floors - Cables, trays and conduits

B.1.1.7 Flexible conduit with cables - Bottom of floor

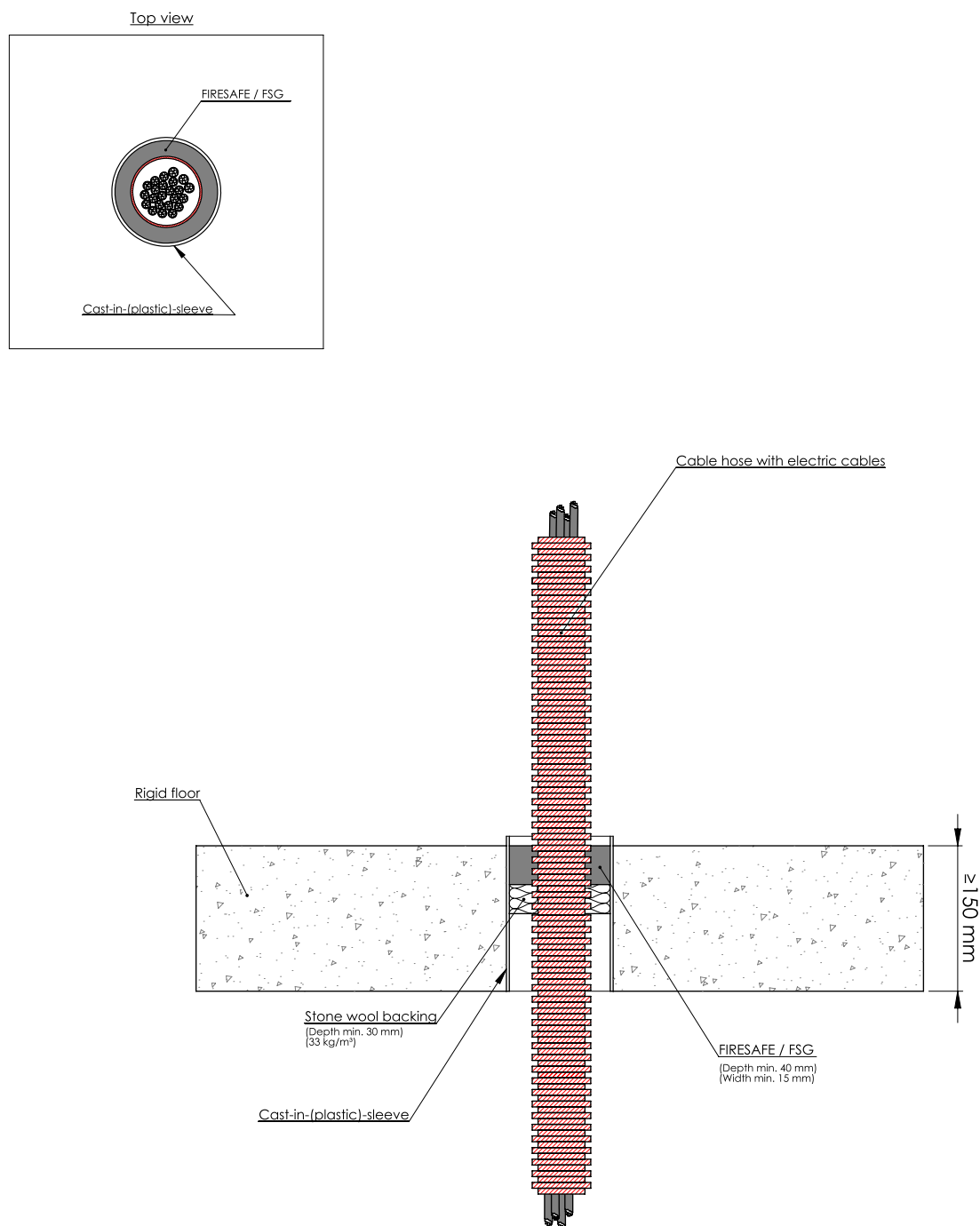


Drawing: RFE-ECH-G1.4.30

Services		Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
		Outer dimension	Wall thickness			
Ribbed PE-flexible-sleeve conduit ≤ Ø 50 mm with or without cables	with or without plastic cast-in sleeve	≤ Ø 110	3.2	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Multitherm Backing fill entire depth	EI 90 U/U

B.1.1 Rigid floors - Cables, trays and conduits

B.1.1.8 Flexible conduit with cables - Top of floor



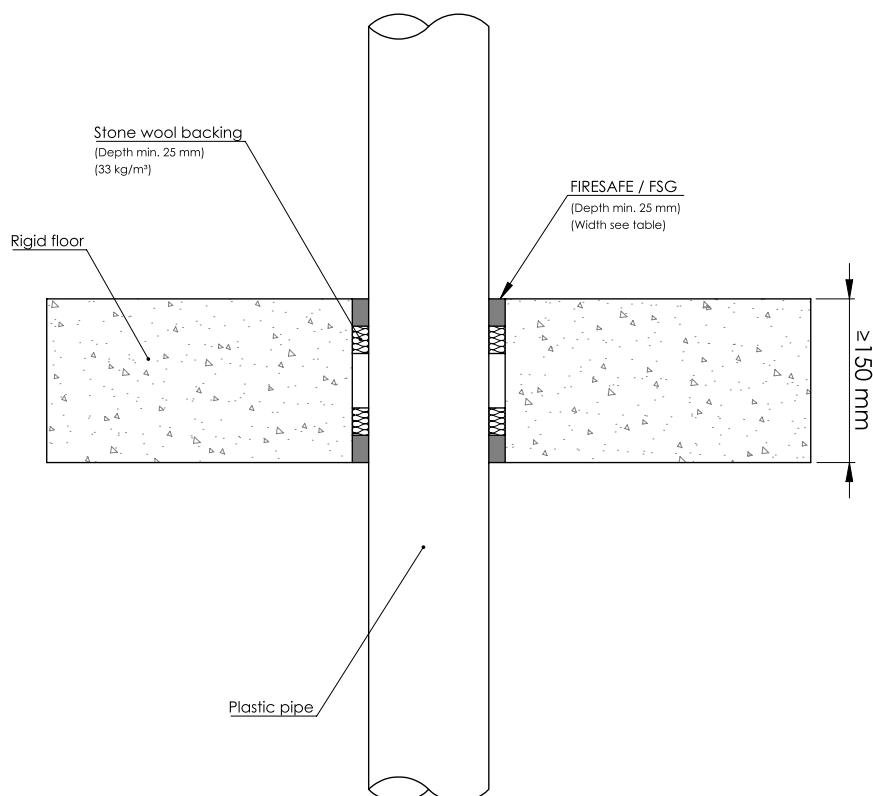
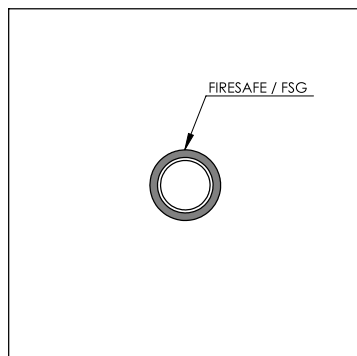
Drawing: RF-ECH63-G3.16.30

Services		Pipe dimensions (mm)	Sealing (mm)	Backing	Classification
		Outer dimension			
Ribbed PE-flexible-sleeve conduit ≤ Ø 50 mm with or without cables	with or without plastic cast-in sleeve	≤ Ø 90	FIRESAFE / FSG ≥ 15 x 40 (wxd)	≥ 30 mm stone wool (≥ 33 kg/m³)	EI 120 U/C

B.1.2 Rigid floors - Combustible pipes

B.1.2.1 Plastic pipes

Bottom view



Drawing: RF.E-PP-G2.5.10

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
PE(-HD) / PE-X / ABS / SAN+PVC	≤ Ø 40	2.4 - 5.5	FIRESAFE / FSG ≥ 10 x 25 (wxd)	≥ 25 mm stone wool (≥ 33kg/m³)	EI 240 U/U
	≤ Ø 110	2.7 - 10	FIRESAFE / FSG ≥ 15 x 25 (wxd)		EI 120 U/C
		2.7 - 10			EI 90 U/U, E 120 U/U
		10			EI 240 U/U
	≤ Ø 160	4.9 - 14.6	FIRESAFE / FSG ≥ 20 x 25 (wxd)		EI 30 U/C, E 45 U/C
		14.6			EI 90 U/C

B.1.2 Rigid floors - Combustible pipes**B.1.2.1 Plastic pipes**

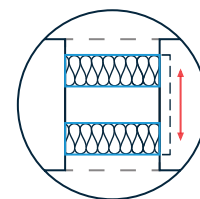
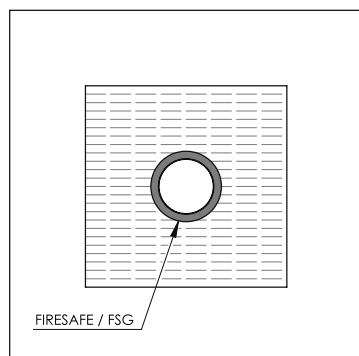
Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
PP	≤ Ø 40	2.3 - 5.5	FIRESAFE / FSG ≥ 10 x 25 (wxd)	≥ 25 mm stone wool (≥ 33kg/m³)	EI 120 U/C
		2.3 - 5.5			EI 20 U/U, E 60 U/U
		5.5			EI 240 U/U
	≤ Ø 110	2.7	FIRESAFE / FSG ≥ 15 x 25 (wxd)		EI 240 U/U
		2.7 - 10			EI 120 U/U, E 240 U/U
	≤ Ø 160	14.6	FIRESAFE / FSG ≥ 20 x 25 (wxd)		EI 60 U/C

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
PVC(-U/-C)	≤ Ø 40	2.4 - 5.5	FIRESAFE / FSG ≥ 10 x 25 (wxd)	≥ 25 mm stone wool (≥ 33kg/m³)	EI 120 U/C
		5.5			EI 240 U/U
	≤ Ø 110	2.7 - 10	FIRESAFE / FSG ≥ 15 x 25 (wxd)		EI 90 U/U, E 120 U/U
		10			EI 120 U/U, E 240 U/U
	≤ Ø 160	4 - 14.6	FIRESAFE / FSG ≥ 20 x 25 (wxd)		EI 30 U/C
		14.6			EI 60 U/C

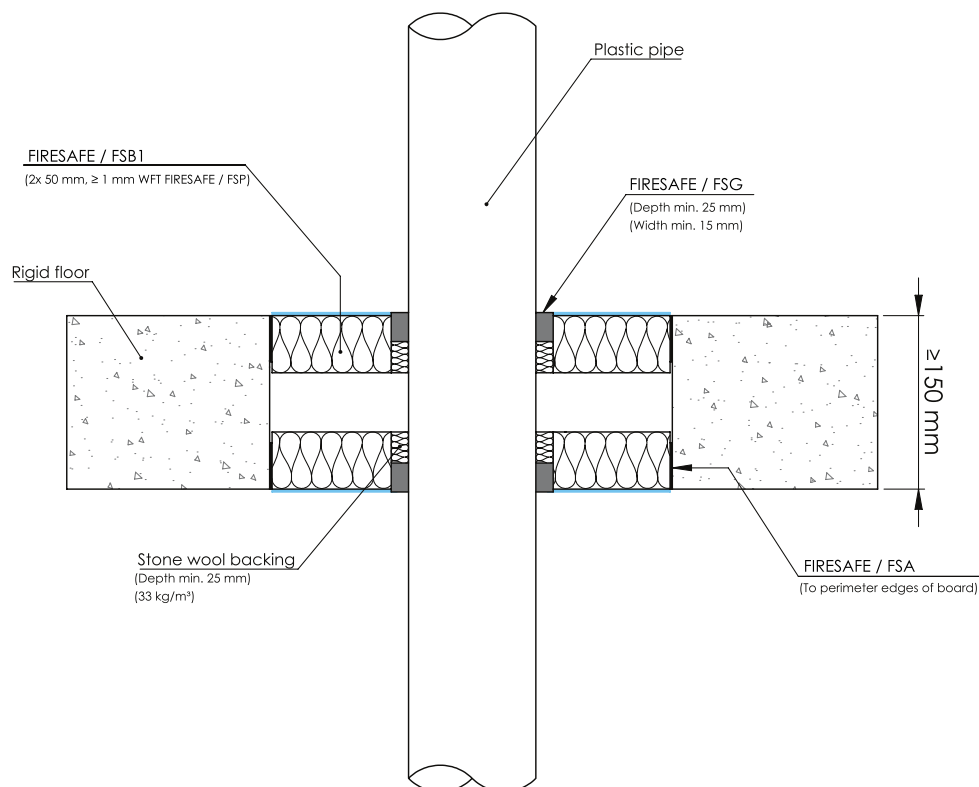
B.1.2 Rigid floors - Combustible pipes

B.1.2.2 Plastic pipes - FIRESAFE / FSB1

Bottom view



Position seal:
top, bottom or anywhere
in between



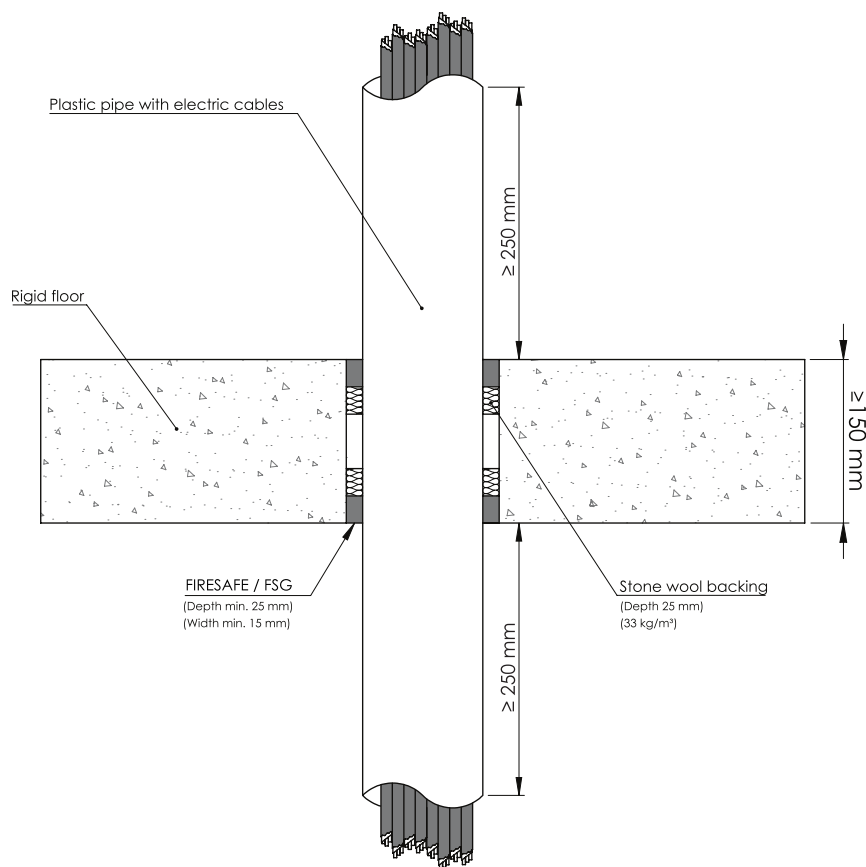
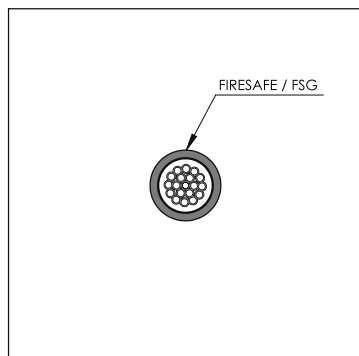
Drawing: PBrf.E-PP-MFB1-G2.5.10.C

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
PE(-HD) / PE-X / ABS / SAN+PVC	≤ Ø 40	2.4 - 10	FIRESAFE / FSG ≥ 15 x 25 (wxd)	≥ 25 mm stone wool (≥ 33 kg/m³)	EI 120 U/U
	≤ Ø 110	2.7 - 10			
PP	≤ Ø 40	2.3 - 10			
	≤ Ø 110	2.7 - 10			
PVC(-U/-C)	≤ Ø 40	2.4 - 10			
	≤ Ø 110	2.7 - 10			

B.1.2 Rigid floors - Combustible pipes

B.1.2.3 Plastic pipes with cables

Bottom view

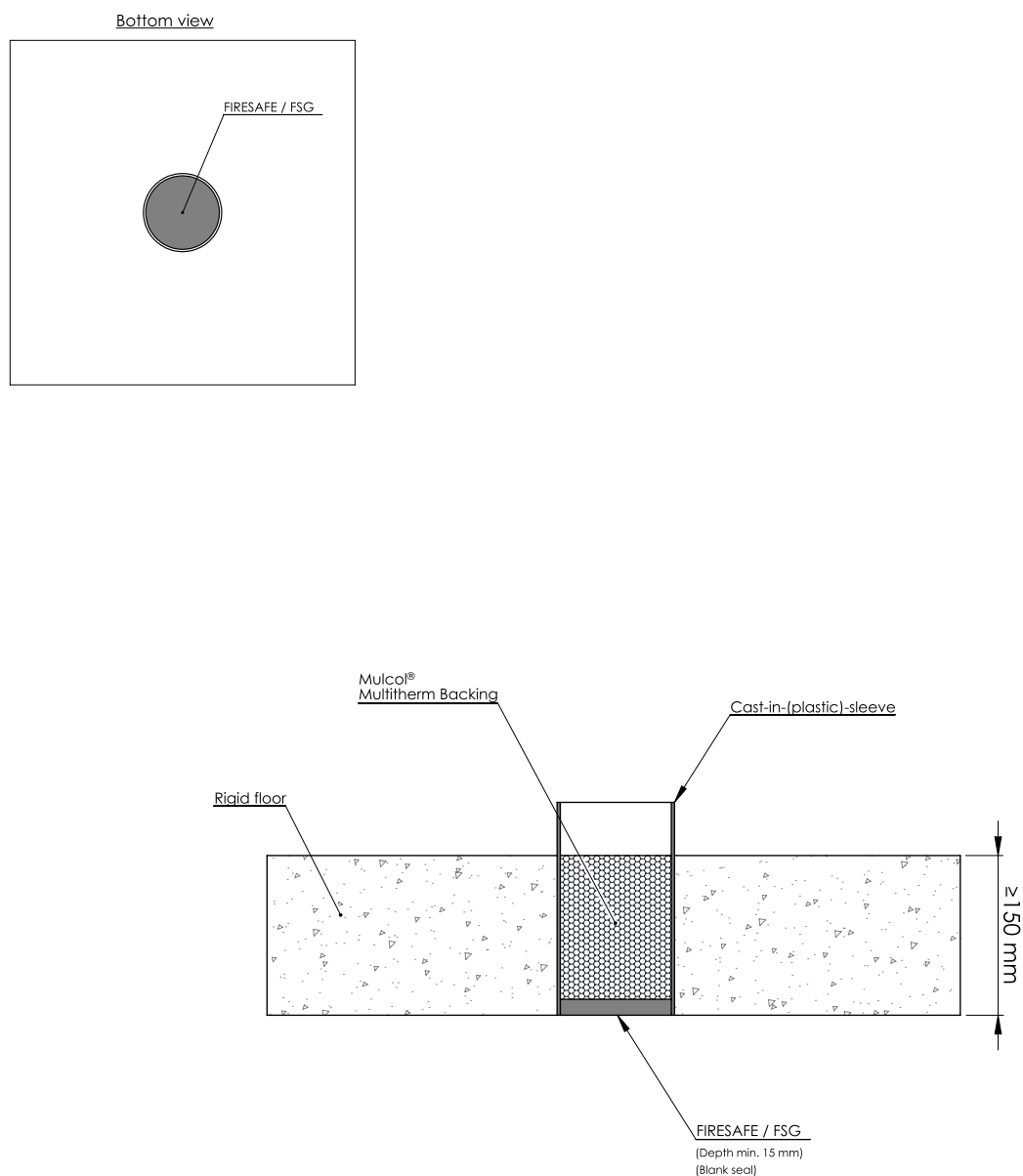


Drawing: RFE-PPEC-G2.4.10

Services	Pipe dimensions (mm)			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness				
PE(-HD) / PE-X / ABS / SAN+PVC	$\leq \varnothing 40$	2.4	Sheathed cables $\leq \varnothing 80$ mm (single or bundled) Cables $\leq \varnothing 21$ mm in a tied bundle $\leq \varnothing 100$ mm	FIRESAFE / FSG $\geq 10 \times 25$ (wxd)	≥ 25 mm stone wool ($\geq 33\text{kg/m}^3$)	EI 120 U/C
	$\leq \varnothing 110$	2.7 - 10		FIRESAFE / FSG $\geq 15 \times 25$ (wxd)		
PP	$\leq \varnothing 40$	2.3		FIRESAFE / FSG $\geq 10 \times 25$ (wxd)		
	$\leq \varnothing 110$	2.7 - 10		FIRESAFE / FSG $\geq 15 \times 25$ (wxd)		
PVC(-U/-C)	$\leq \varnothing 110$	2.7 - 10		FIRESAFE / FSG $\geq 15 \times 25$ (wxd)		

B.1.2 Rigid floors - Combustible pipes

B.1.2.4 Encased plastic pipes

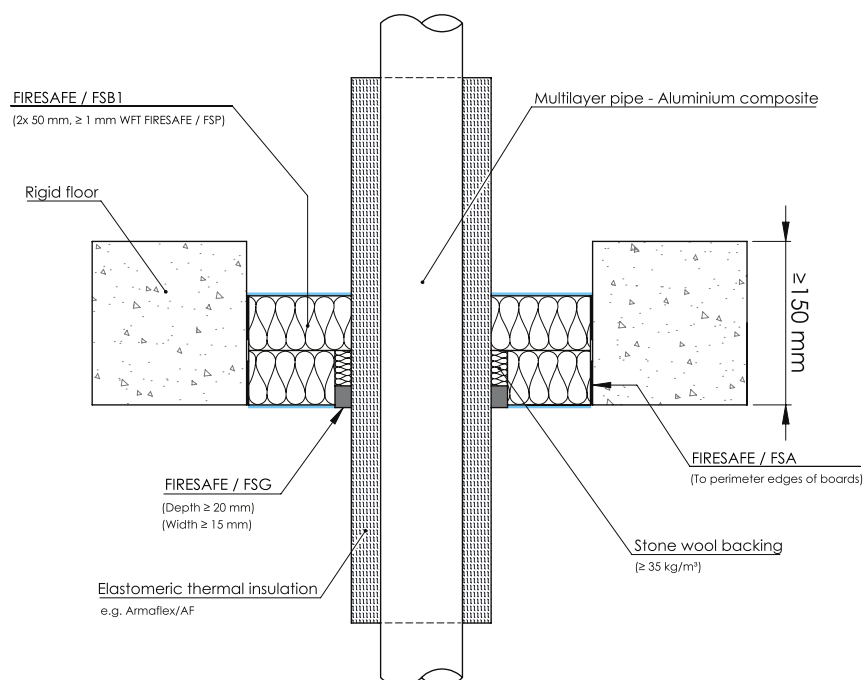
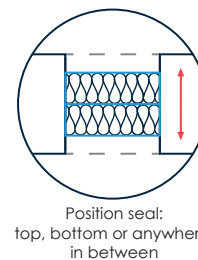
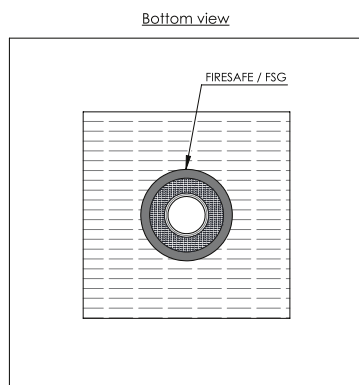


Drawing: RFmk.E-BS-G1.11.31

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
PVC(-U/-C)	≤ Ø 110	≤ 3.2	FIRESAFE / FSG ≥ 15 depth	Multitherm Backing fill entire depth	EI 120

B.1.3 Rigid floors - Multilayer pipes (MLC) insulated

B.1.3.1 Multilayer pipes (MLC) - Elastomer LS 300 / CS - FIRESAFE / FSB1



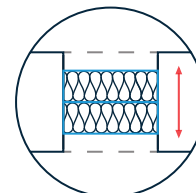
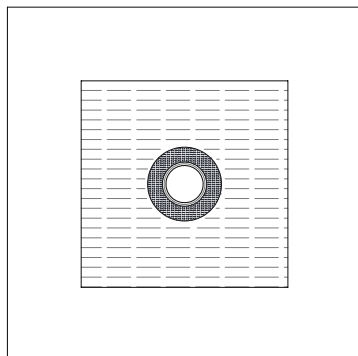
Drawing: PBrf.E-MLA-G1.4.22

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Multilayer pipe (MLC)	≤ Ø 20	2.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	9 - 32	LS 300 / CS	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Stone wool (≥ 35 kg/m ³)	EI 120 U/C
	≤ Ø 32	3.0						EI 90 U/C
	≤ Ø 40	3.5						E 120 U/C
	≤ Ø 50	4.0						EI 90 U/C
	≤ Ø 63	4.5						EI 90 U/C
	≤ Ø 75	6.0						

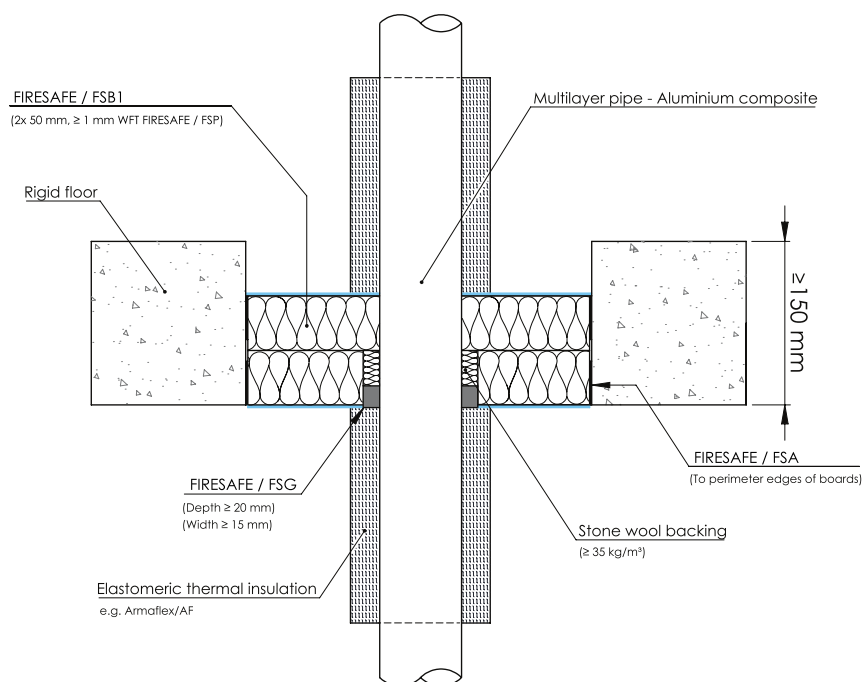
B.1.3 Rigid floors - Multilayer pipes (MLC) insulated

B.1.3.2 Multilayer pipes (MLC) - Elastomer LI 300 / CI - FIRESAFE / FSB1

Bottom view



Position seal:
top, bottom or anywhere
in between

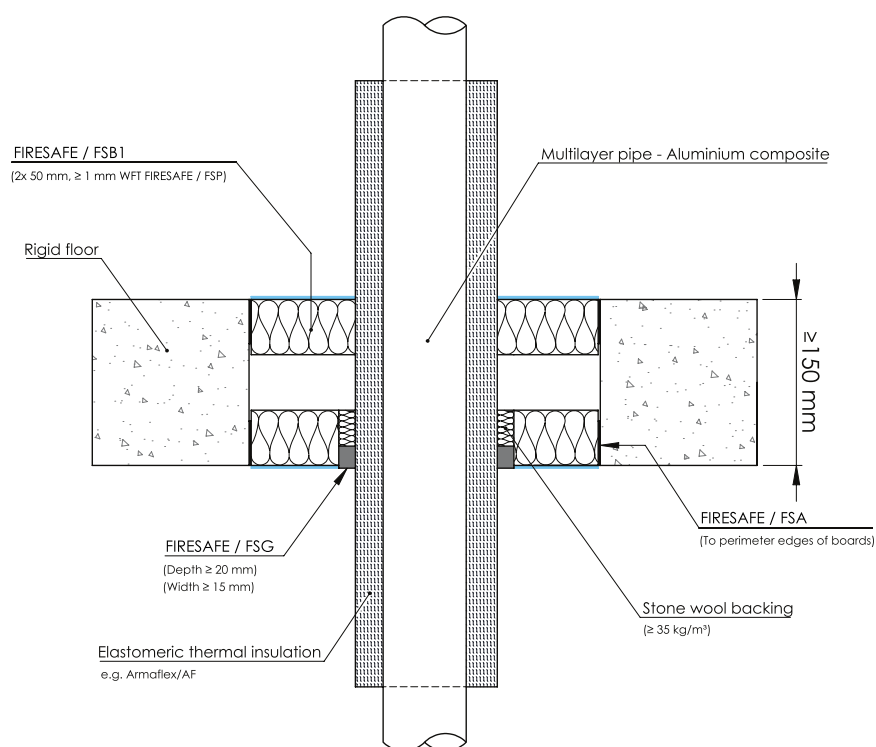
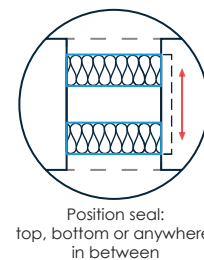
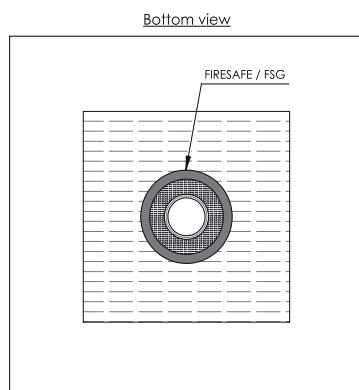


Drawing: PBrf.E-MLA-G1.4.22.LI

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Multilayer pipe (MLC)	≤ Ø 20	2.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	9 - 32	LI 300 / CI	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Stone wool (≥ 35 kg/m ³)	EI 120 U/C
	≤ Ø 32	3.0						EI 90 U/C
	≤ Ø 40	3.5						E 120 U/C
	≤ Ø 50	4.0						EI 90 U/C
	≤ Ø 63	4.5						EI 90 U/C
	≤ Ø 75	6.0						

B.1.3 Rigid floors - Multilayer pipes (MLC) insulated

B.1.3.3 Multilayer pipes (MLC) - Elastomer LS 300 / CS - FIRESAFE / FSB1 cavity

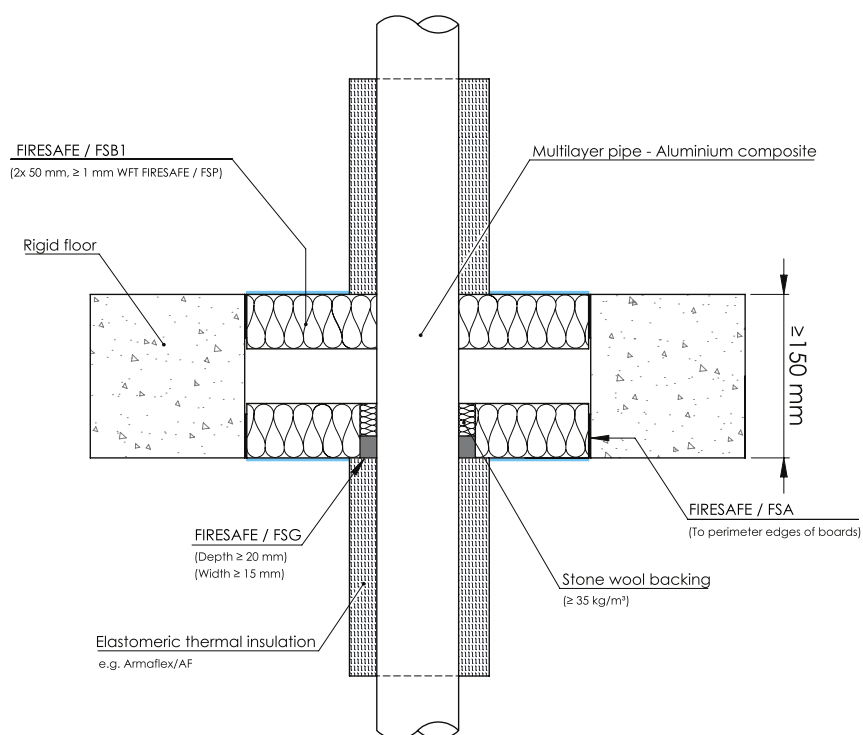
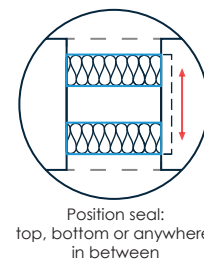
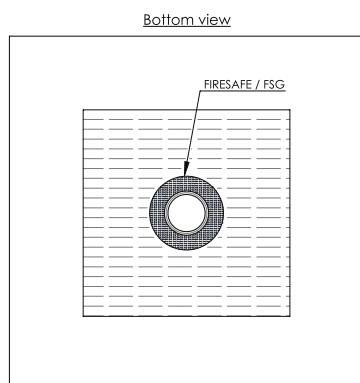


Drawing: PBrf.E-MLA-G1.4.22.C

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Multilayer pipes (MLC)	≤ Ø 20	2.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	9 - 32	LS 400 / CS LI 400 / CI	FIRESAFE / FSG ≥ 15 x 20 (wxd)	EI 120 U/C
	≤ Ø 32	3.0					EI 90 U/C
	≤ Ø 40	3.5					E 120 U/C
	≤ Ø 50	4.0					EI 90 U/C
	≤ Ø 63	4.5					
	≤ Ø 75	6.0					

B.1.3 Rigid floors - Multilayer pipes (MLC) insulated

B.1.3.4 Multilayer pipes (MLC) - Elastomer LI 300 / CI - FIRESAFE / FSB1 cavity



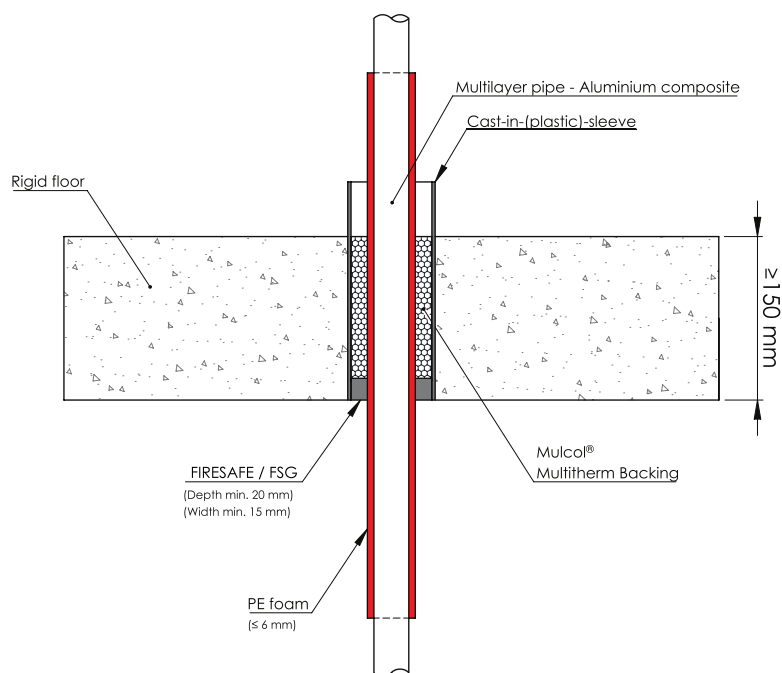
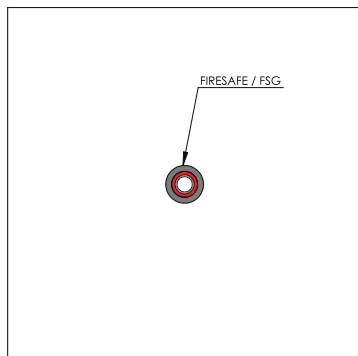
Drawing: PBrf.E-MLA-G1.4.22.C.LI

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Multilayer pipe (MLC)	≤ Ø 20	2.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	9 - 32	LI 300 / CI	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Stone wool (≥ 35 kg/m ³)	EI 120 U/C
	≤ Ø 32	3.0						EI 90 U/C
	≤ Ø 40	3.5						E 120 U/C
	≤ Ø 50	4.0						EI 90 U/C
	≤ Ø 63	4.5						EI 90 U/C
	≤ Ø 75	6.0						

B.1.3 Rigid floors - Multilayer pipes (MLC) insulated

B.1.3.5 Multilayer pipes (MLC) - PE foam LS 300 / CS

Bottom view

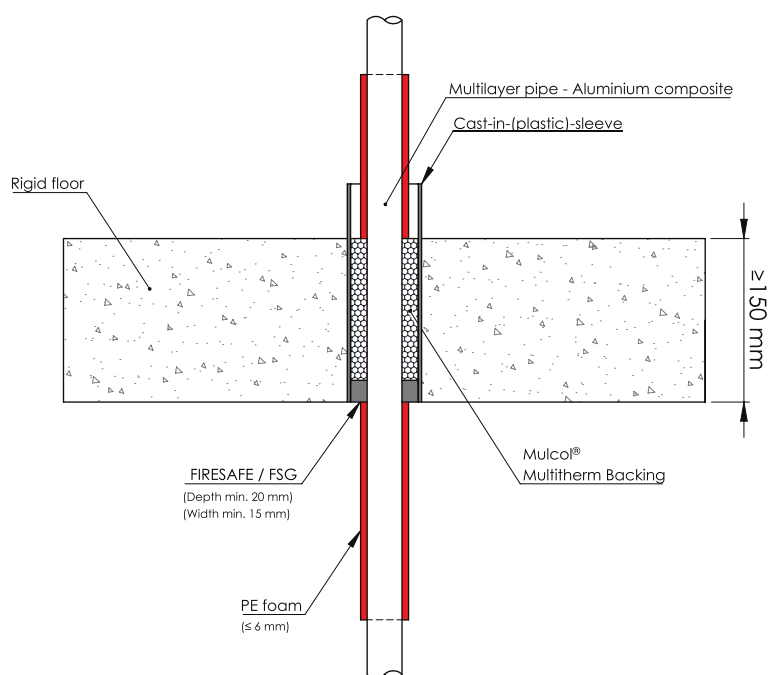
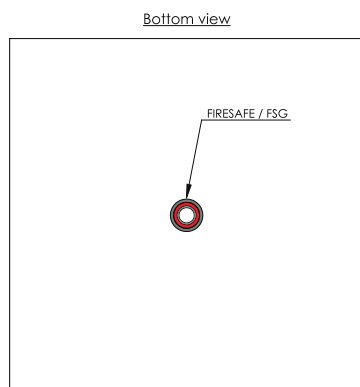


Drawing: RFE-MLA_pr-G1.4.23

Services		Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
		Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Multilayer pipes (MLC)	with or without plastic cast-in sleeve ≤ Ø 110	≤ Ø 20	2.0	PE foam	≤ 6	LS 300 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	Multitherm backing fill entire depth	EI 120 U/C
		≤ Ø 25	3.5						
		≤ Ø 32	3.0						

B.1.3 Rigid floors - Multilayer pipes (MLC) insulated

B.1.3.6 Multilayer pipes (MLC) - PE foam LI 300 / CI

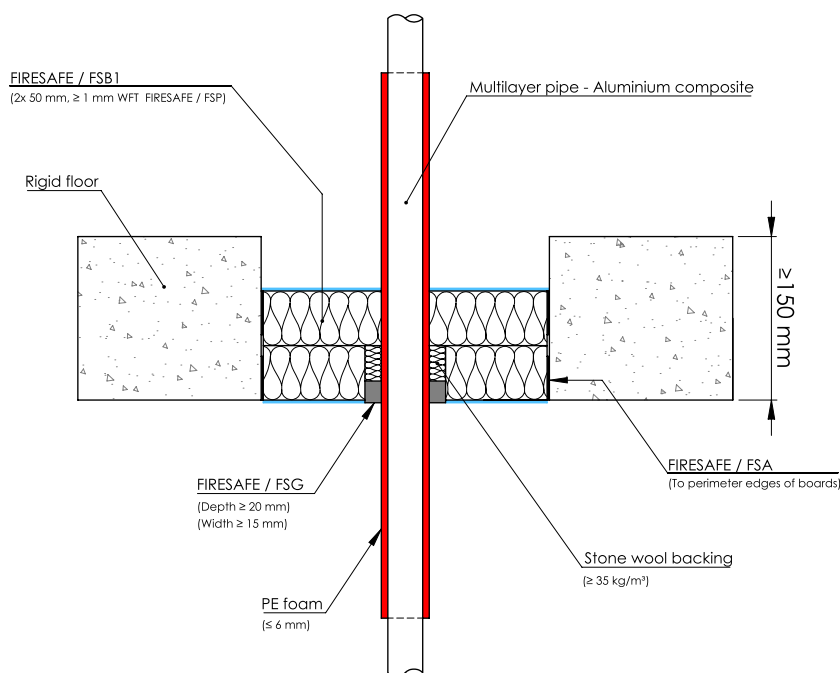
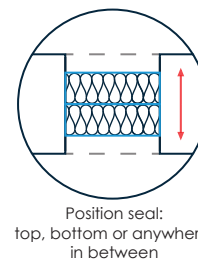
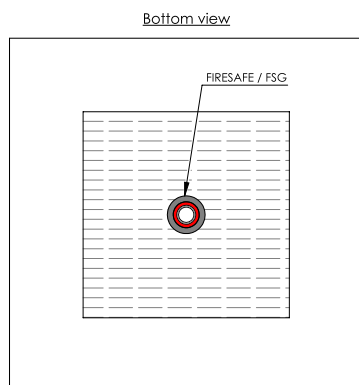


Drawing: RFE-MLA_pr-G1.4.23.LI

Services		Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
		Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Multilayer pipes (MLC)	with or without plastic cast-in sleeve ≤ Ø 110	≤ Ø 20	2.0	PE foam	≤ 6	LI 300 / CI	FIRESAFE / FSG ≥ 10 x 20 (wxd)	Multitherm backing fill entire depth	EI 120 U/C
		≤ Ø 25	3.5						
		≤ Ø 32	3.0						

B.1.3 Rigid floors - Multilayer pipes (MLC) insulated

B.1.3.7 Multilayer pipes (MLC) - PE foam LS 300 / CS - FIRESAFE / FSB1

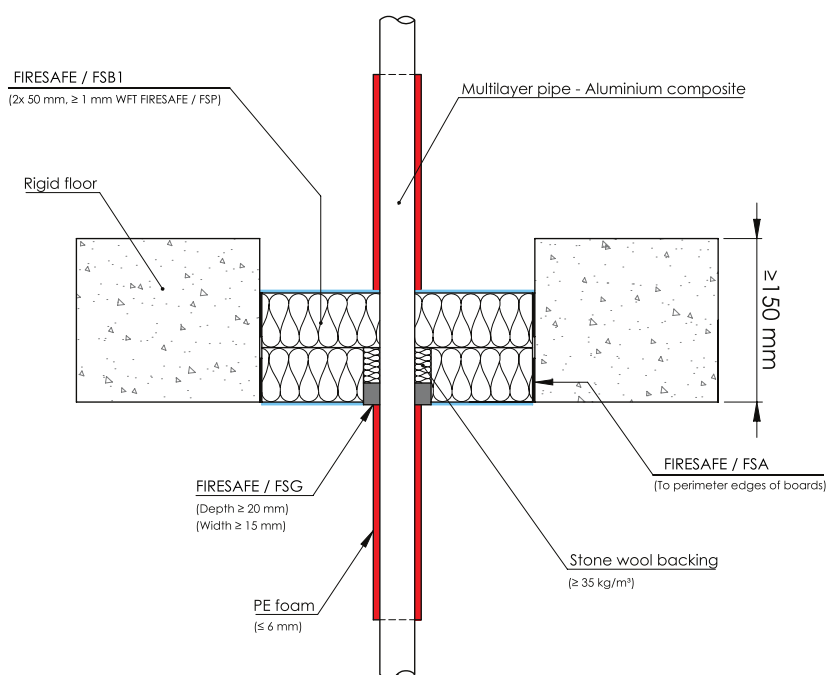
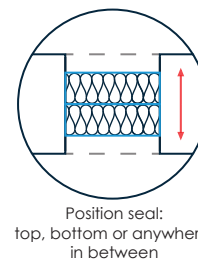
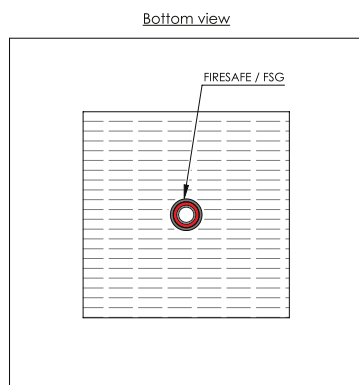


Drawing: PBrf.E-MLA_pr-G1.4.23

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Multilayer pipe (MLC)	≤ Ø 20	2.0	PE foam	≤ 6	LS 300 / CS	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Stone wool (≥ 35 kg/m³)	EI 120 U/C
	≤ Ø 25	3.5						
	≤ Ø 32	3.0						

B.1.3 Rigid floors - Multilayer pipes (MLC) insulated

B.1.3.8 Multilayer pipes (MLC) - PE foam LI 300 / CI - FIRESAFE / FSB1

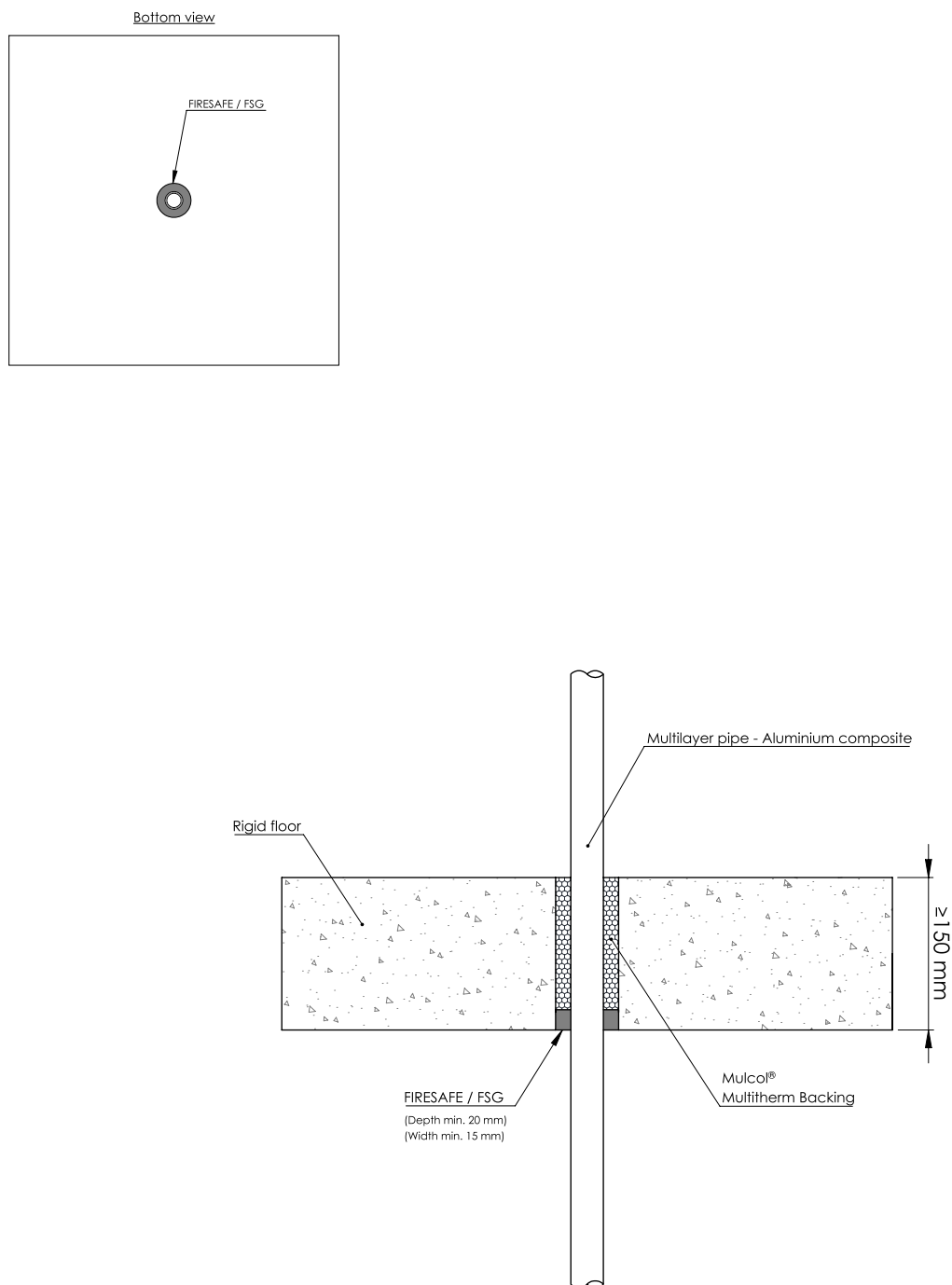


Drawing: PBrf.E-MLA_pr-G1.4.23.LI

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Multilayer pipe (MLC)	≤ Ø 20	2.0	PE foam	≤ 6	LI 300 / CI	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Stone wool (≥ 35 kg/m ³)	EI 120 U/C
	≤ Ø 25	3.5						
	≤ Ø 32	3.0						

B.1.4 Rigid floors - Multilayer pipes (MLC) uninsulated

B.1.4.1 Multilayer pipes (MLC)

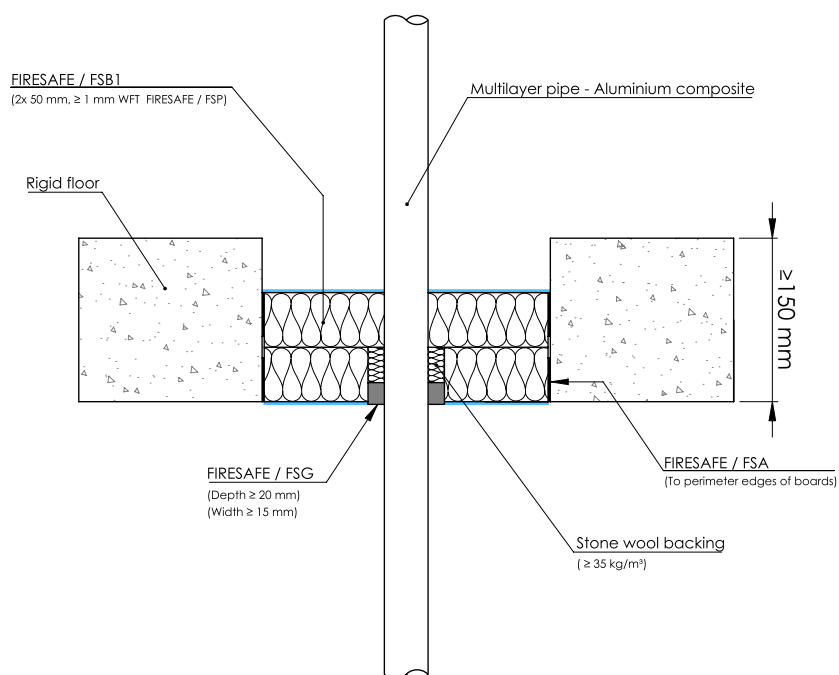
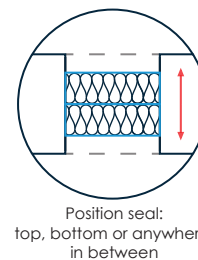
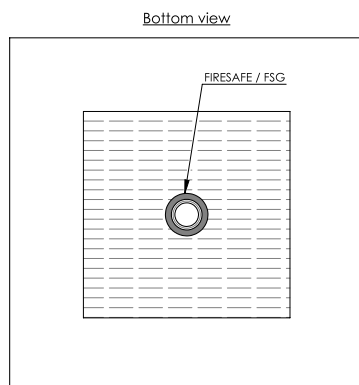


Drawing: RFE-MLA-G1.4.10

Services		Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
		Outer dimension	Wall thickness			
Multilayer pipes (MLC)	with or without plastic cast-in sleeve ≤ Ø 110 mm	≤ Ø 20	2.0	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Multitherm backing fill entire depth	EI 120 U/C
		≤ Ø 25	3.5			
		≤ Ø 32	3.0			
		≤ Ø 40	3.5			
		≤ Ø 40	4.0			

B.1.4 Rigid floors - Multilayer pipes (MLC)

B.1.4.2 Multilayer pipes (MLC) - FIRESAFE / FSB1

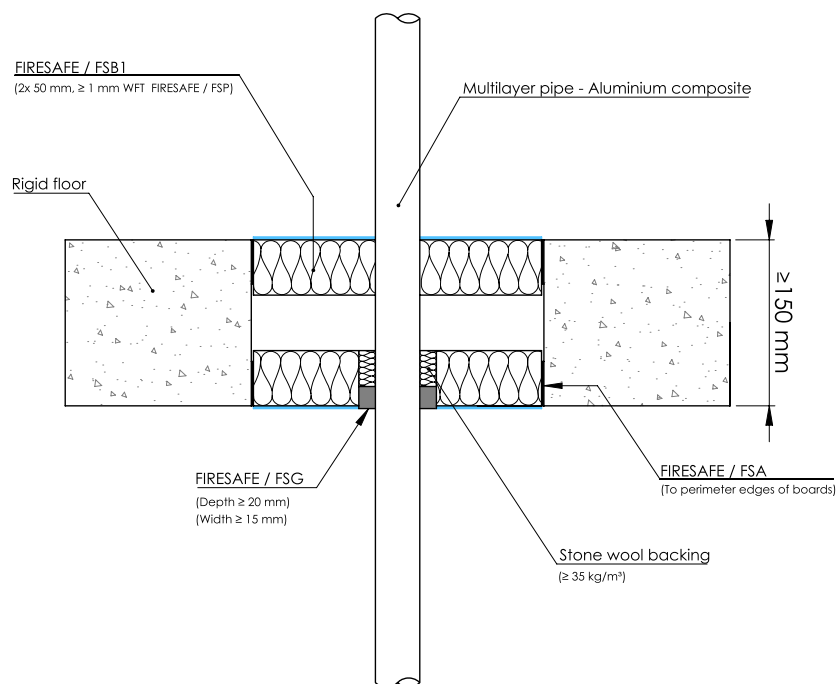
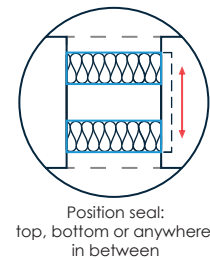
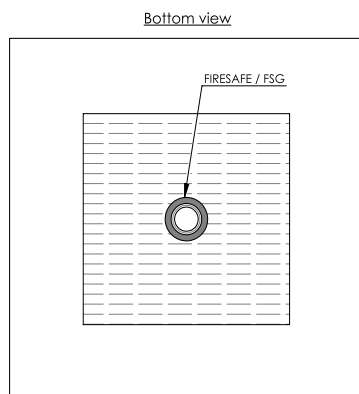


Drawing: PBrf.E-MLA-G1.4.10

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
Multilayer pipes (MLC)	≤ Ø 20	2.0	FIRESAFE / FSG ≥ 15 x 25 (wxd)	Stone wool (≥ 35 kg/m³)	EI 120 U/C
	≤ Ø 25	3.5			
	≤ Ø 32	3.0			EI 90 U/C E 120 U/C
	≤ Ø 40	3.5 - 4.0			

B.1.4 Rigid floors - Multilayer pipes (MLC)

B.1.4.3 Multilayer pipes (MLC) - FIRESAFE / FSB1 cavity

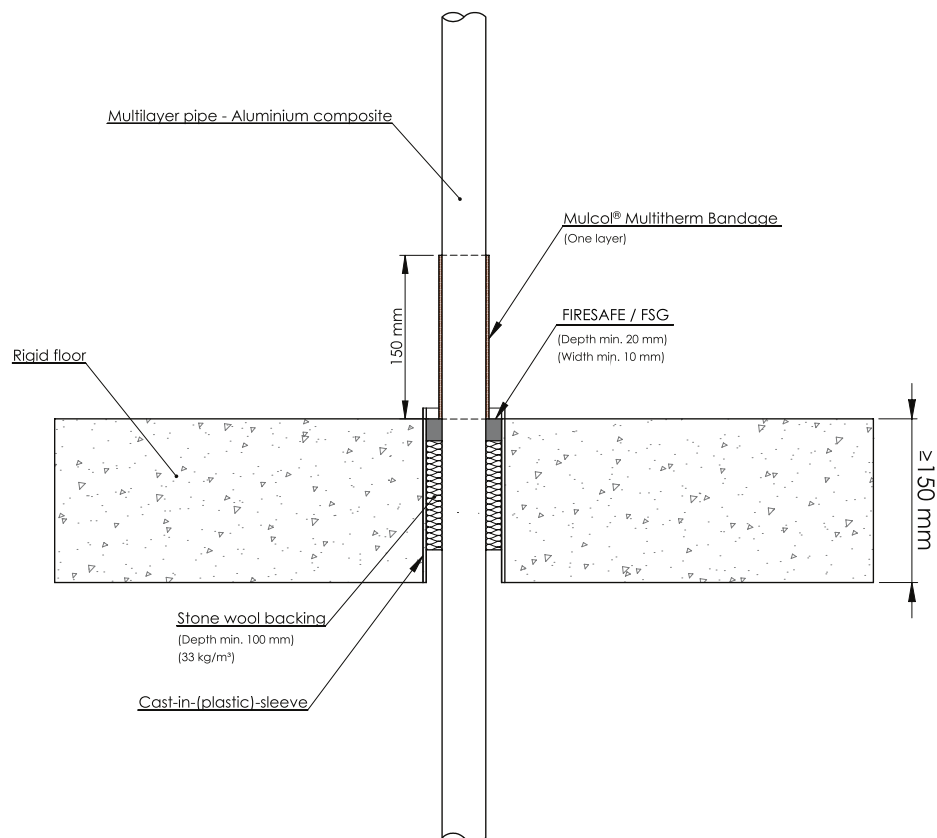
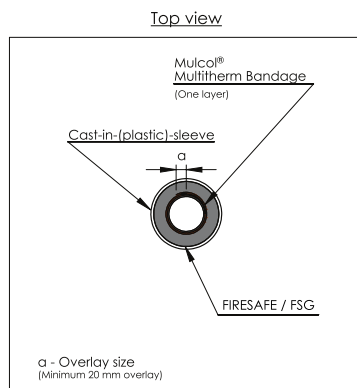


Drawing: PBrf.E-MLA-G1.4.10.C

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
Multilayer pipes (MLC)	$\leq \varnothing 20$	2.0	FIRESAFE / FSG $\geq 15 \times 25$ (wxd)	Stone wool (≥ 35 kg/m ³)	EI 120 U/C
	$\leq \varnothing 25$	3.5			
	$\leq \varnothing 32$	3.0			
	$\leq \varnothing 40$	3.5 - 4.0			EI 90 U/C E 120 U/C

B.1.4 Rigid floors - Multilayer pipes (MLC)

B.1.4.4 Multilayer pipes (MLC) - Multitherm bandage

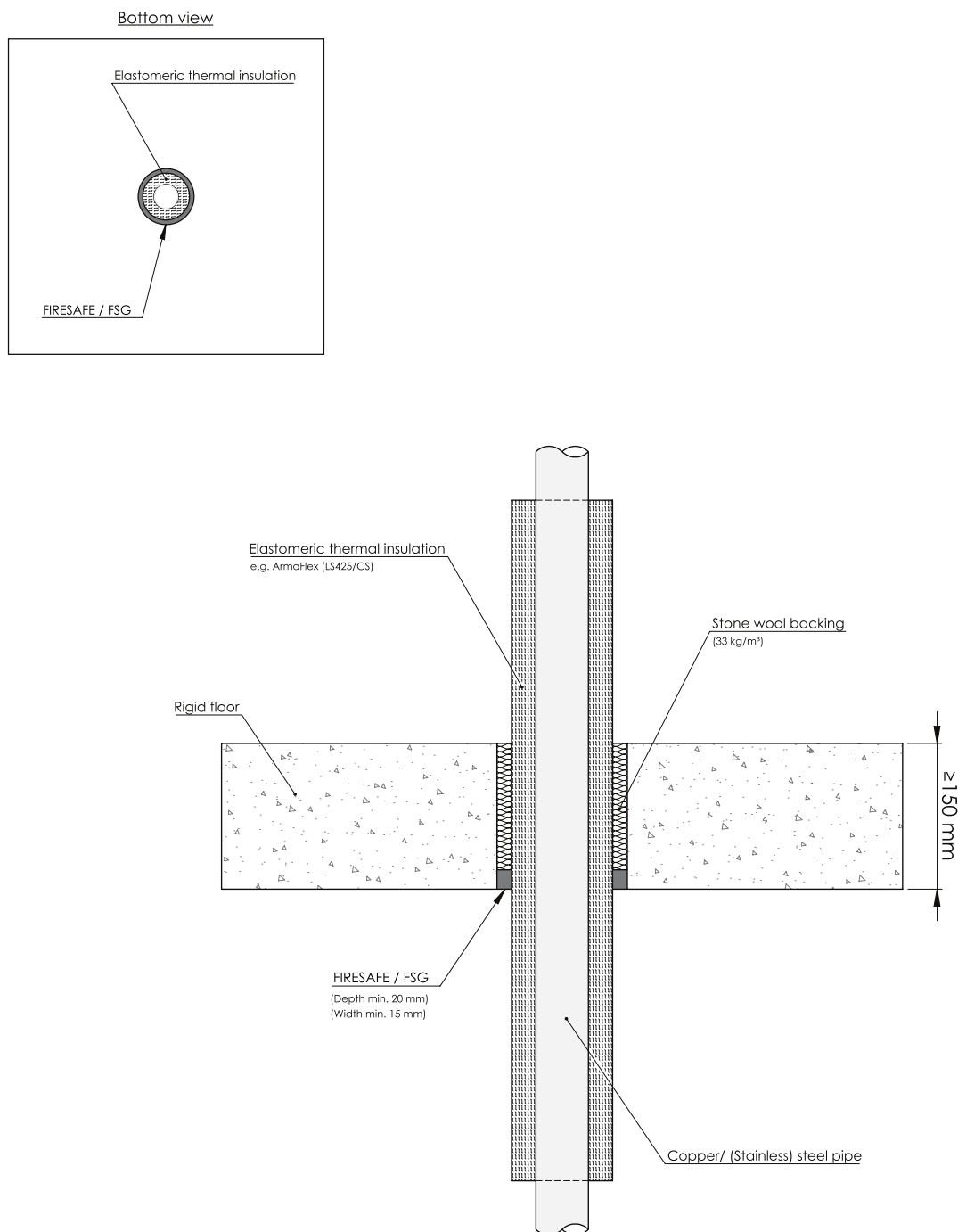


Drawing: RFE-MLA-G3.18.92

Services		Pipe dimensions (mm)	Sealing (mm)	Backing	Multitherm Bandage	Classification
		Outer dimension				
Multilayer pipes (MLC)	with or without plastic cast-in sleeve ≤ Ø 75 mm	≤ Ø 40	FIRESAFE / FSG ≥ 15 x 20 (wxd)	≥ 100 mm stone wool (≥ 33 kg/m³)	LI 150 one layer top of floor	EI 120 U/C

B.1.5 Rigid floors - Metal pipes insulated elastomer

B.1.5.1 Copper and steel pipes - Elastomer LS 450 / CS



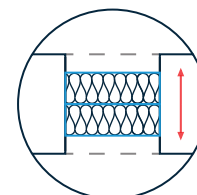
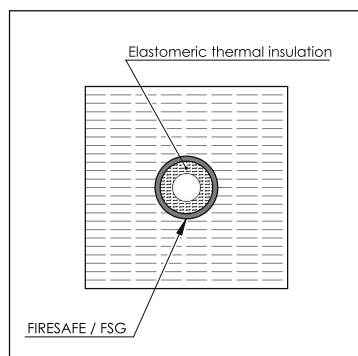
Drawing: RF.E-CU-G1.4.22_LS425

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 54	≥ 1.5	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	25	LS 450 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	Stone wool fill entire depth (≥ 33 kg/m³)	EI 60 C/U E 120 C/U
				25	CS			EI 120 C/U
(Stainless) Steel / cast iron	≤ Ø 168.3	≥ 4.5		25	LS 450 / CS			EI 60 C/U E 90 C/U

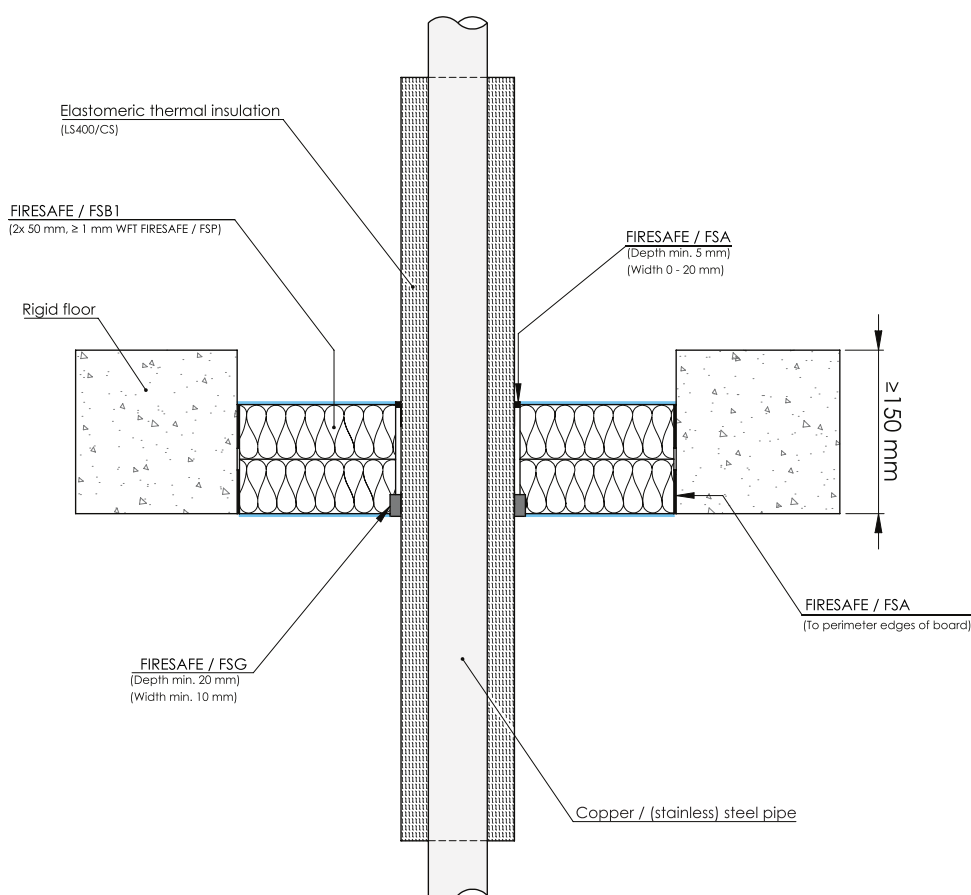
B.1.5 Rigid floors - Metal pipes insulated elastomer

B.1.5.2 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB1

Bottom view



Position seal:
top, bottom or anywhere
in between



Drawing: PBrf.E-CU-MFB1-G2.4.22

Services	Pipe dimensions (mm)		Insulation			Product (mm)	Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	8.5	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	FIRESAFE / FSA 0-20 x ≥ 5 (wxd) top of floor	EI 60 C/U, E 120 C/U
				8.5 - 33.5				EI 60 C/U, E 90 C/U
	≤ Ø 54	≥ 1.5		13.5	CS			EI 120 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		13.5 - 38	LS 400 / CS			EI 90 C/U, E 120 C/U
				8.5 - 35				EI 120 C/U
	≤ Ø 114.3	≥ 3.6		15	CS			EI 90 C/U, E 120 C/U
				15 - 43	LS 400 / CS			

B.1.5 Rigid floors - Metal pipes insulated elastomer

B.1.5.2 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB1

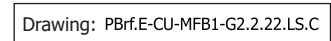
Services	Pipe dimensions (mm)		Insulation			Product (mm)	Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3	Kaiflex KK (min. class B-s2, d0 B _L -s2, d0)	8.5	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	FIRESAFE / FSA 0-20 x ≥ 5 (wxd) top of floor	EI 60 C/U E 120 C/U

Services	Pipe dimensions (mm)		Insulation			Product (mm)	Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex NH (min. class D-s3, d0 D _L -s3, d0)	9 - 25	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	FIRESAFE / FSA 0-20 x ≥ 5 (wxd) top of floor	EI 120 C/U
	≤ Ø 54	≥ 1.5		13	LS 400 / CS			EI 90 C/U
	≤ Ø 54	≥ 1.5		13 - 25	LS 400 / CS			EI 90 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9 - 25	LS 400 / CS			EI 120 C/U
	≤ Ø 114.3	≥ 3.6		19 - 25	LS 400 / CS			

Services	Pipe dimensions (mm)		Insulation			Product (mm)	Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex Ultima (min. class B-s1, d0 B _L -s1, d0)	9 - 25	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd)	FIRESAFE / FSA 0-20 x ≥ 5 (wxd) top of floor	EI 60 C/U E 120 C/U
				25 - 32				EI 90 C/U E 120 C/U
				13 - 32				EI 60 C/U E 120 C/U
	≤ Ø 54	≥ 1.5		13 - 32	CS			EI 90 C/U E 120 C/U
				32	EI 90 C/U			
				9 - 25	EI 60 C/U E 90 C/U			
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		25	LS 400 / CS			EI 90 C/U E 120 C/U
	≤ Ø 114.3	≥ 3.6		13				EI 60 C/U E 120 C/U
				13 - 32				EI 60 C/U E 120 C/U

B.1.5

B.1.5.3



Services	Pipe dimensions (mm)		Insulation			Product (mm)	Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	8.5	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 15 (wxd)	FIRESAFE / FSA 0-20 x ≥ 5 (wxd) top of floor	EI 60 C/U E 120 C/U
				8.5 - 33.5				EI 60 C/U E 90 C/U
	≤ Ø 54	≥ 1.5		13.5	CS			EI 120 C/U
				13.5 - 38	LS 400 / CS			EI 90 C/U E 120 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		8.5 - 35				CS
	≤ Ø 114.3	≥ 3.6		15	LS 400 / CS			
			15 - 43					

B.1.5 Rigid floors - Metal pipes insulated elastomer

B.1.5.3 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB1

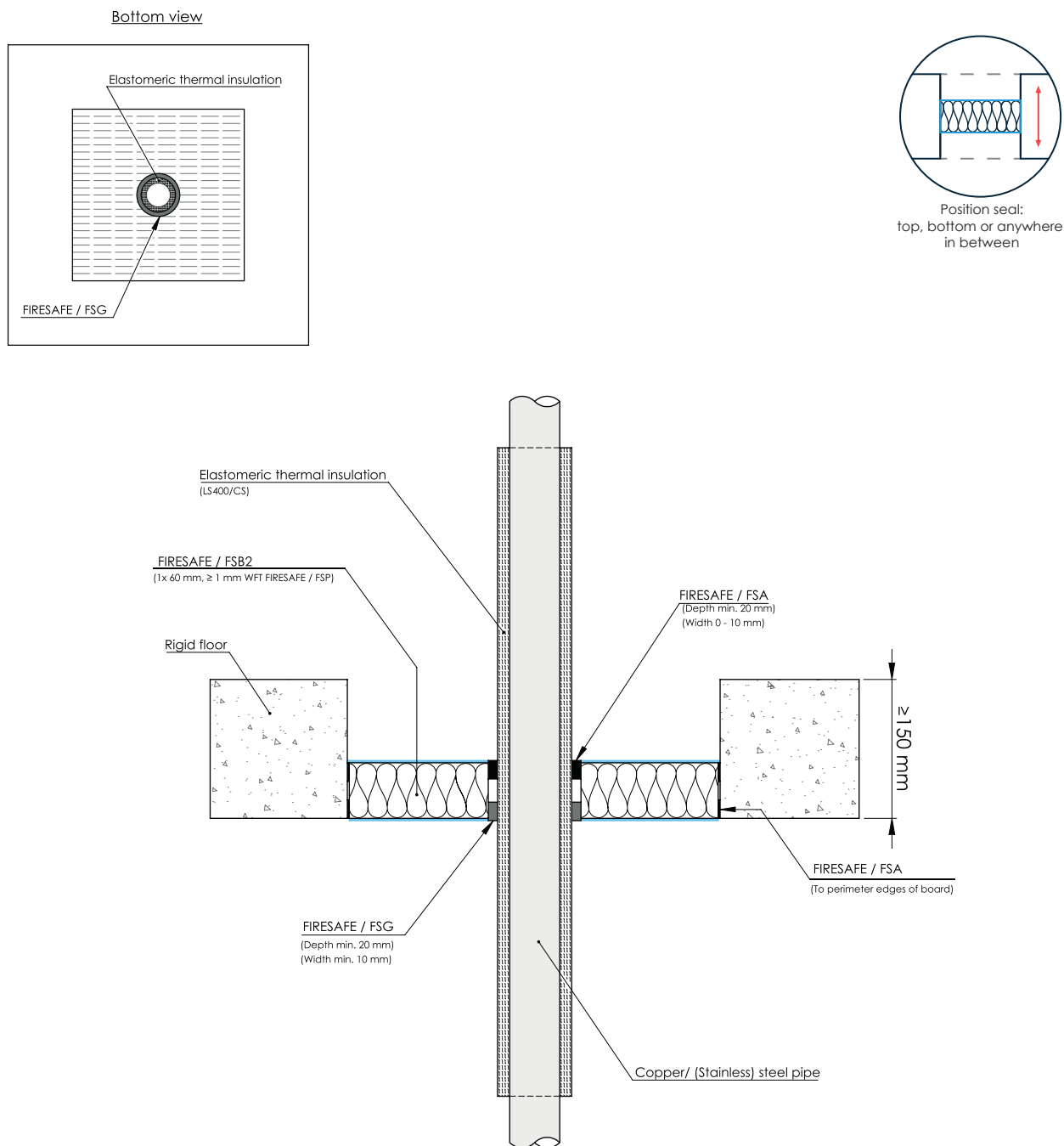
Services	Pipe dimensions (mm)		Insulation			Product (mm)	Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
(Stainless) Steel / cast iron	$\leq \varnothing 26.9$	≥ 2.3	Kaiflex KK min. class B-s2, d0 B _L -s2, d0	8.5	LS 400 / CS	FIRESAFE / FSG $\geq 10 \times 15$ (wxd)	FIRESAFE / FSA 0-20 x ≥ 5 (wxd) top of floor	EI 60 C/U E 120 C/U

Services	Pipe dimensions (mm)		Insulation			Product (mm)	Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex NH (min. class D-s3, d0 D _L -s3, d0)	9 - 25	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 15 (wxd)	FIRESAFE / FSA 0-20 x ≥ 5 (wxd) top of floor	EI 120 C/U
	≤ Ø 54	≥ 1.5		13	LS 400 / CS			EI 90 C/U
				13 - 25	LS 400 / CS			
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9 - 25	LS 400 / CS			EI 120 C/U
	≤ Ø 114.3	≥ 3.6		19 - 25	LS 400 / CS			

Services	Pipe dimensions (mm)		Insulation			Product (mm)	Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex Ultima (min. class B-s1, d0 B _L -s1, d0)	9 - 25	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 15 (wxd)	FIRESAFE / FSA 0-20 x ≥ 5 (wxd) top of floor	EI 60 C/U E 120 C/U
				25 - 32				EI 90 C/U E 120 C/U
	≤ Ø 54	≥ 1.5		13 - 32				EI 60 C/U E 120 C/U
				13 - 32	CS			EI 90 C/U E 120 C/U
				32	LS 400 / CS			EI 90 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9 - 25				EI 60 C/U E 90 C/U
				25				EI 90 C/U E 120 C/U
				13				EI 60 C/U E 120 C/U
	≤ Ø 114.3	≥ 3.6		13 - 32	EI 60 C/U E 120 C/U			

B.1.5 Rigid floors - Metal pipes insulated elastomer

B.1.5.4 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB2



Drawing: PBrf.E-CU-MFB2-G2.4.22.LS

Services	Pipe dimensions (mm)		Insulation			Product (mm)	Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex AF (min. class B-s3, d0 B _L -s3, d0)	8.5 - 35	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd) bottom of floor	FIRESAFE / FSA 0-10 x ≥ 20 (wxd) top of floor	EI 60 C/U
				33,5				EI 120 C/U
				13.5				EI 60 C/U
(Stainless) Steel / cast iron	≤ Ø 54	≥ 1.5		13.5 - 38				EI 45 C/U
				8.5 - 35				EI 120 C/U
	≤ Ø 26.9	≥ 2.3		33.5				EI 60 C/U
				13.5				EI 90 C/U
	≤ Ø 114.3	≥ 3.6		15 - 43				EI 120 C/U
								EI 60 C/U
								EI 120 C/U

B.1.5 Rigid floors - Metal pipes insulated elastomer**B.1.5.4 Copper and steel pipes - Elastomer LS 400 / CS - FIRESAFE / FSB2**

Services	Pipe dimensions (mm)		Insulation			Product (mm)	Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
(Stainless) Steel / cast iron	$\leq \varnothing 26.9$	≥ 2.3	Kaiflex KK (min. class B-s2, d0 B _L -s2, d0)	8.5	LS 400 / CS	FIRESAFE / FSG $\geq 10 \times 20$ (wxd) bottom of floor	FIRESAFE / FSA 0-20 x ≥ 10 (wxd) top of floor	EI 45 C/U

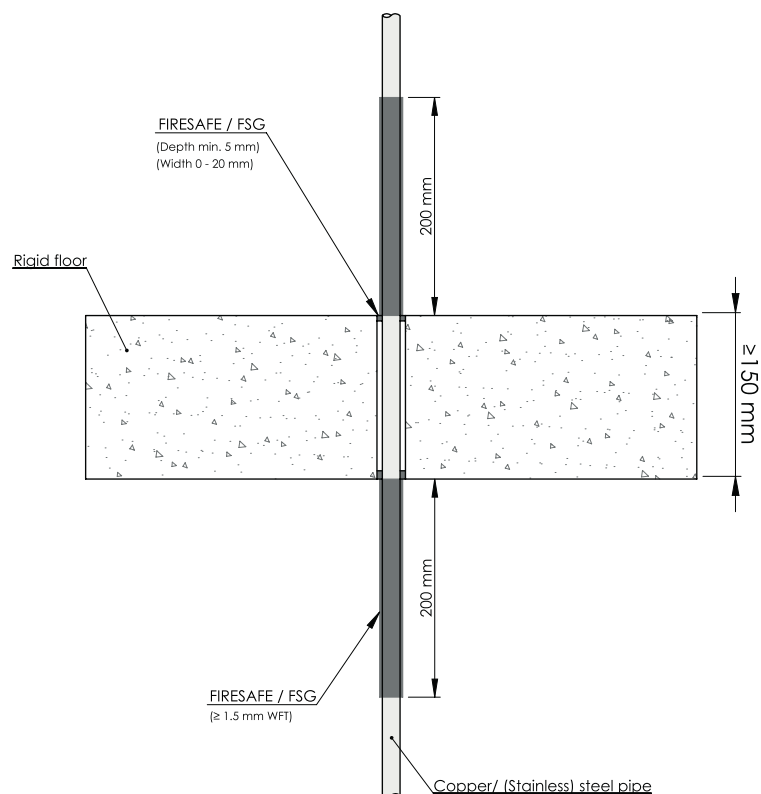
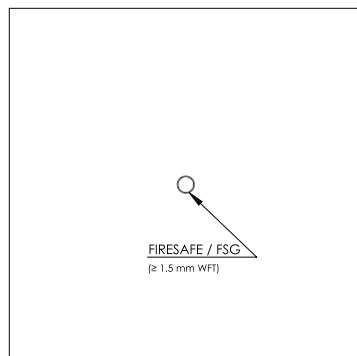
Services	Pipe dimensions (mm)		Insulation			Product (mm)	Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex NH (min. class D-s3, d0 D _L -s3, d0)	9 - 25	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd) bottom of floor	FIRESAFE / FSA 0-20 x ≥ 10 (wxd) top of floor	EI 60 C/U E 90 C/U
	≤ Ø 54	≥ 1.5		13 - 25				EI 60 C/U
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9 - 25				EI 30 C/U
	≤ Ø 26.9	≥ 2.3		25				EI 60 C/U E 120 C/U
	≤ Ø 114.3	≥ 3.6		19				EI 30 C/U E 120 C/U
				19 - 25				EI 45 C/U E 120 C/U

Services	Pipe dimensions (mm)		Insulation			Product (mm)	Sealing (mm)	Classification				
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration							
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex Ultima (min. class B-s1, d0 B _L -s1, d0)	9 - 25	LS 400 / CS	FIRESAFE / FSG ≥ 10 x 20 (wxd) bottom of floor	FIRESAFE / FSA 0-20 x ≥ 10 (wxd) top of floor	EI 30 C/U E 120 C/U				
				25 - 32				EI 60 C/U E 120 C/U				
	≤ Ø 54	≥ 1.5		13 - 32				EI 45 C/U E 120 C/U				
				32				EI 90 C/U				
(Stainless) Steel / cast iron	≤ Ø 26.9	≥ 2.3		9 - 25								EI 60 C/U E 120 C/U
				25								EI 90 C/U E 120 C/U
	≤ Ø 114.3	≥ 3.6		13								EI 120 C/U
				13 - 32								EI 60 C/U E 120 C/U

B.1.6 Rigid floors - Metal pipes uninsulated

B.1.6.1 Copper and steel pipes

Bottom view

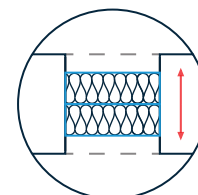
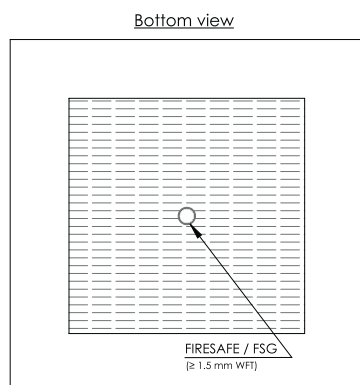


Drawing: RF-CU-GRC-G2.0.10

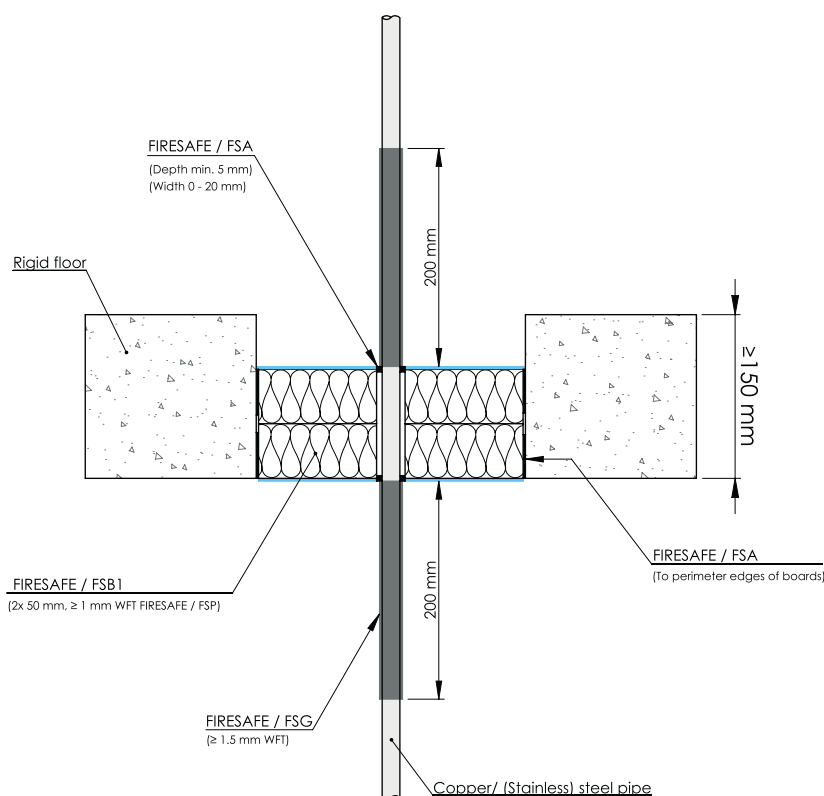
Services	Pipe dimensions (mm)		Coating	Sealing (mm)	Classification
	Outer dimension	Wall thickness			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	Coat back 200 mm ≥ 1.5 mm WFT FIRESAFE / FSG	FIRESAFE / FSG 0-20 x ≥ 5 (wxd)	EI 120 C/U
(Stainless) steel / cast iron	≤ Ø 15				
	≤ Ø 42.4	≥ 3.2			
	≤ Ø 60.3	> 3.65			

B.1.6 Rigid floors - Metal pipes uninsulated

B.1.6.2 Copper and steel pipes - FIRESAFE / FSB1



Position seal:
top, bottom or anywhere
in between

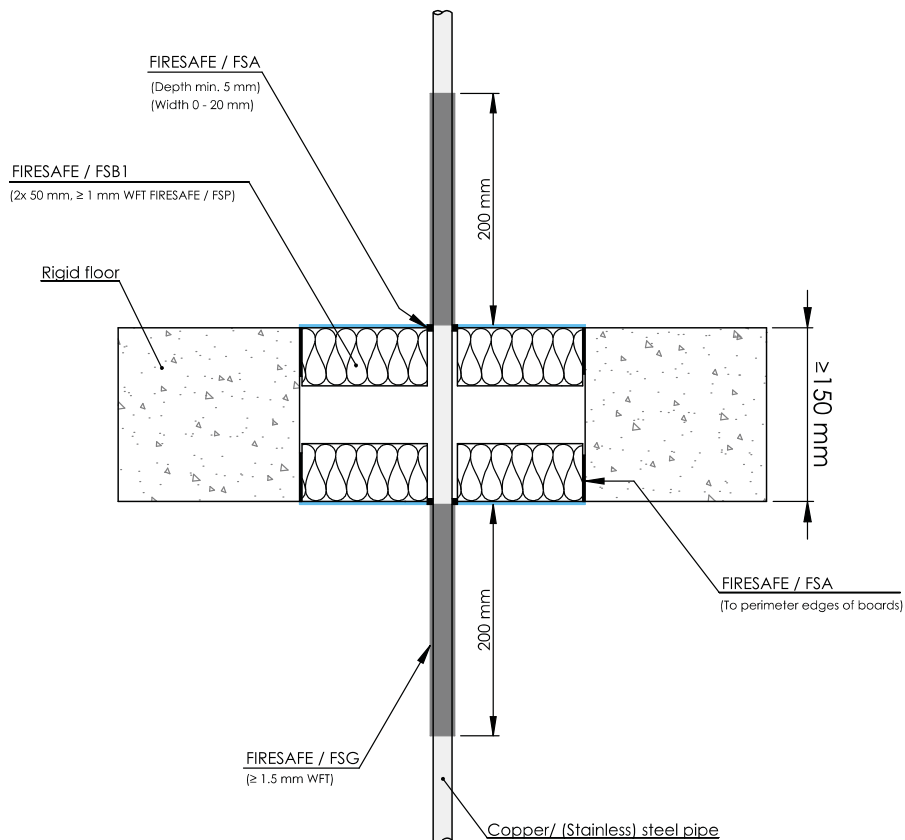
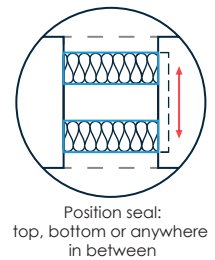


Drawing: PBrf.E-CU-MFB1-GRC.1.10

Services	Pipe dimensions (mm)		Coating	Sealing (mm)	Classification
	Outer dimension	Wall thickness			
Copper / (stainless) steel / cast iron	$\leq \varnothing 15$	≥ 1.0	Coat back 200 mm ≥ 1.5 mm WFT FIRESAFE / FSG	FIRESAFE / FSA 0-20 x ≥ 5 (wxd)	EI 60 C/U, E 90 C/U
(Stainless) steel / cast iron	$\leq \varnothing 42.4$	≥ 3.2			

B.1.6

B.1.6.3

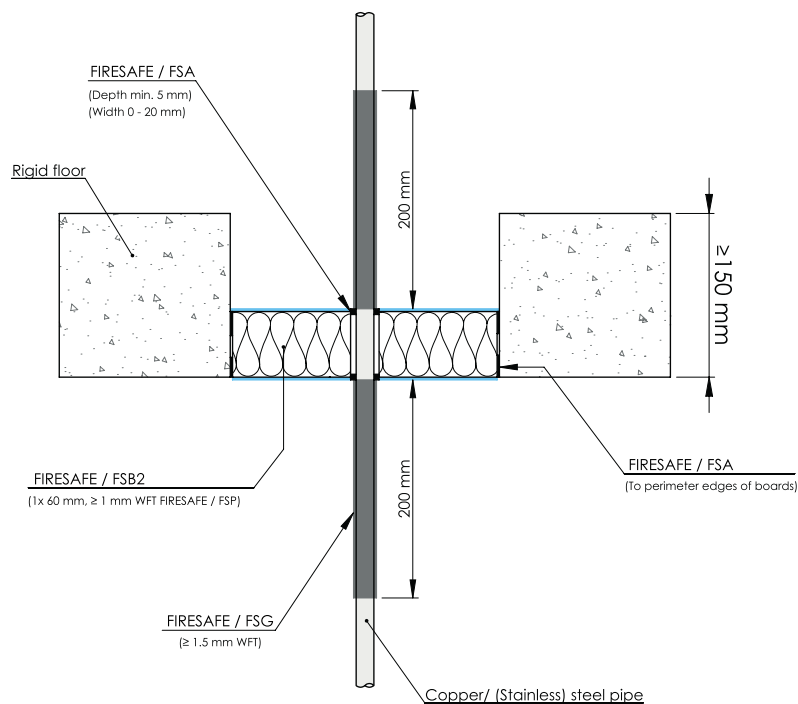
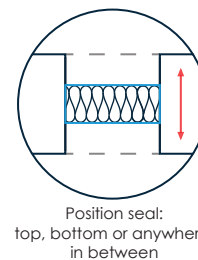
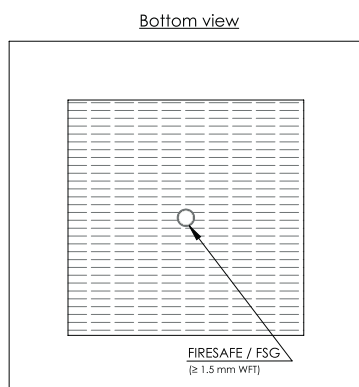


Drawing: PBrf.E-CU-MFB1-GRC.1.10.C

Services	Pipe dimensions (mm)		Coating	Sealing (mm)	Classification
	Outer dimension	Wall thickness			
Copper	≤ Ø 15	≥ 1.0	Coat back 200 mm ≥ 1.5 mm WFT FIRESAFE / FSG	FIRESAFE / FSA 0-20 x ≥ 5 (wxd)	EI 60 C/U, E 120 C/U
(Stainless) Steel / cast iron		≥ 3.2			EI 120 C/U

B.1.6 Rigid floors - Metal pipes uninsulated

B.1.6.4 Copper and steel pipes - FIRESAFE / FSB2

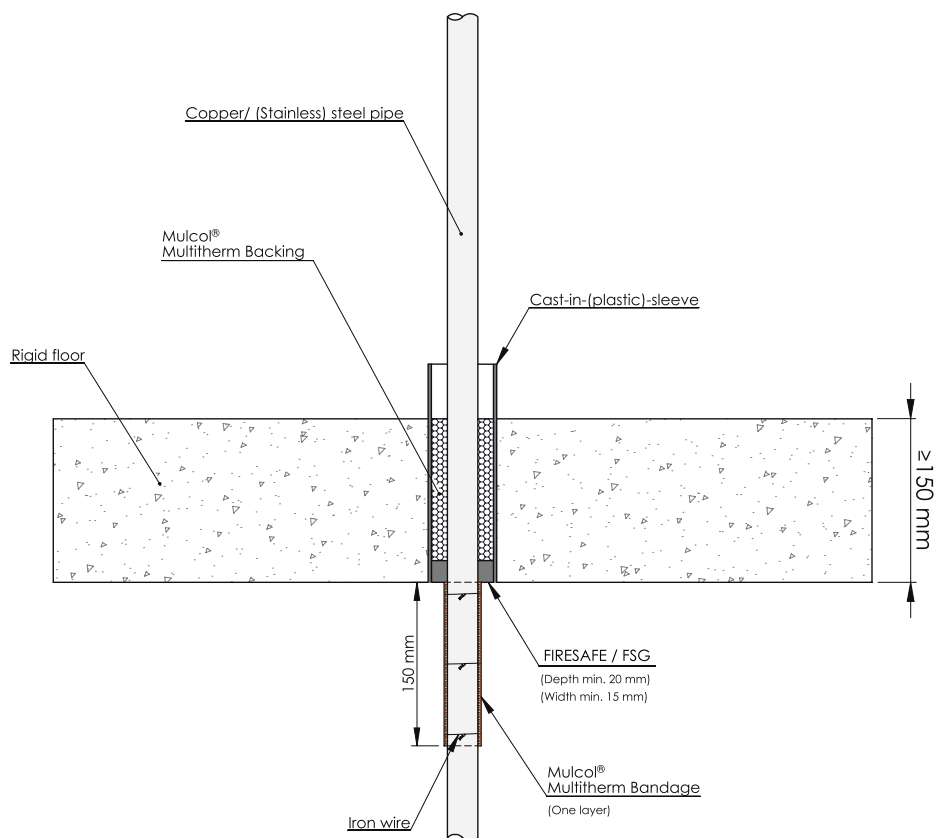
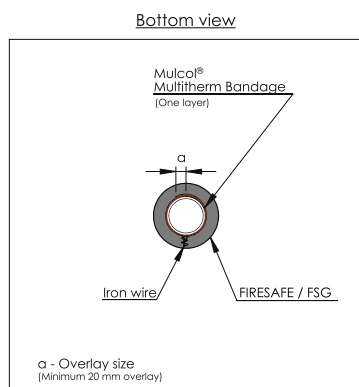


Drawing: PBrf.E-CU-MFB2-GRC.1.10

Services	Pipe dimensions (mm)		Coating	Sealing (mm)	Classification
	Outer dimension	Wall thickness			
Copper / (stainless) steel / cast iron	$\leq \varnothing 15$	≥ 1.0	Coat back 200 mm ≥ 1.5 mm WFT FIRESAFE / FSG	FIRESAFE / FSA 0-20 x ≥ 5 (wxd)	EI 60 C/U, E 90 C/U
(Stainless) steel / cast iron	$\leq \varnothing 42.4$	≥ 3.2			

B.1.6 Rigid floors - Metal pipes uninsulated

B.1.6.5 Copper and steel pipes - Multitherm bandage - Bottom of floor

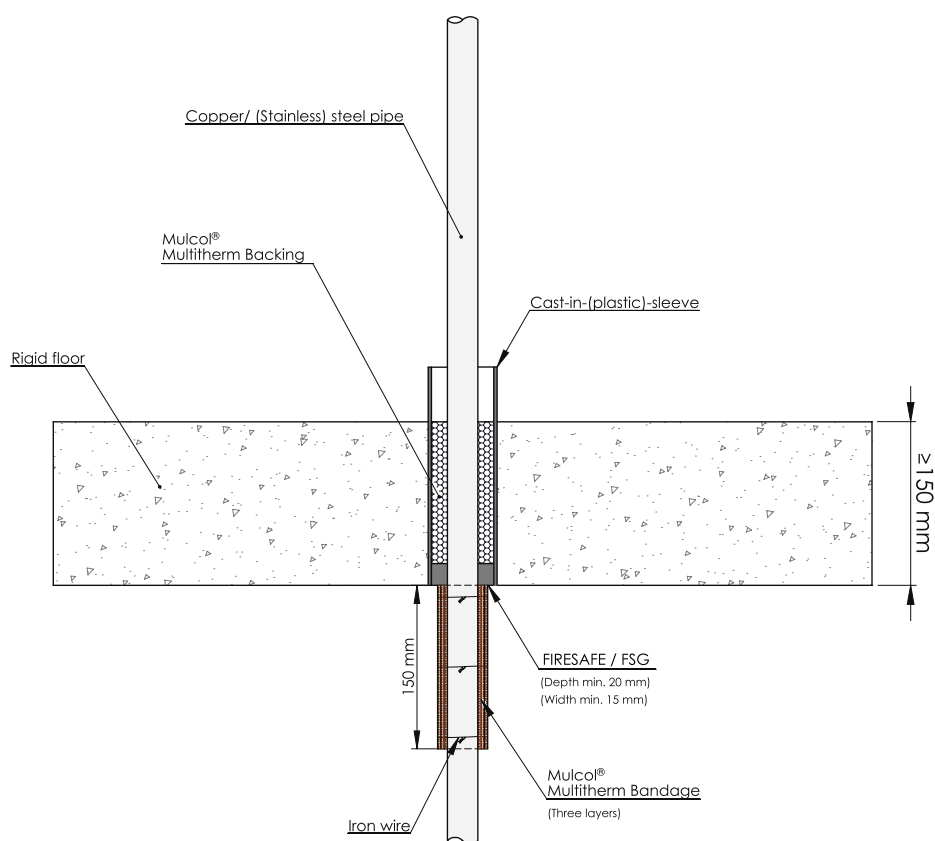
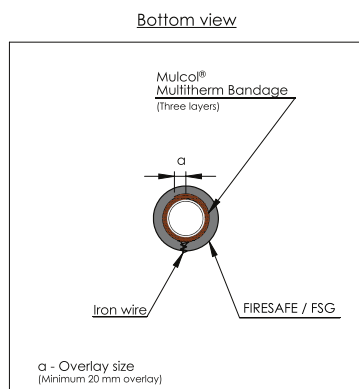


Drawing: RF.E-CU-G1.4.90

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Multitherm Bandage	Classification
	Outer dimension	Wall thickness				
Copper / (stainless) steel / cast iron	≤ Ø 35	≥ 1.5	FIRESAFE / FSG ≥ 15 x 20 (wxd) bottom of floor	Multitherm backing fill entire depth	LI 150 one layer (three wires) bottom of floor	EI 30 C/U, E 120 C/U

B.1.6 Rigid floors - Metal pipes uninsulated

B.1.6.6 Copper and steel pipes - Multitherm Bandage - Bottom of floor

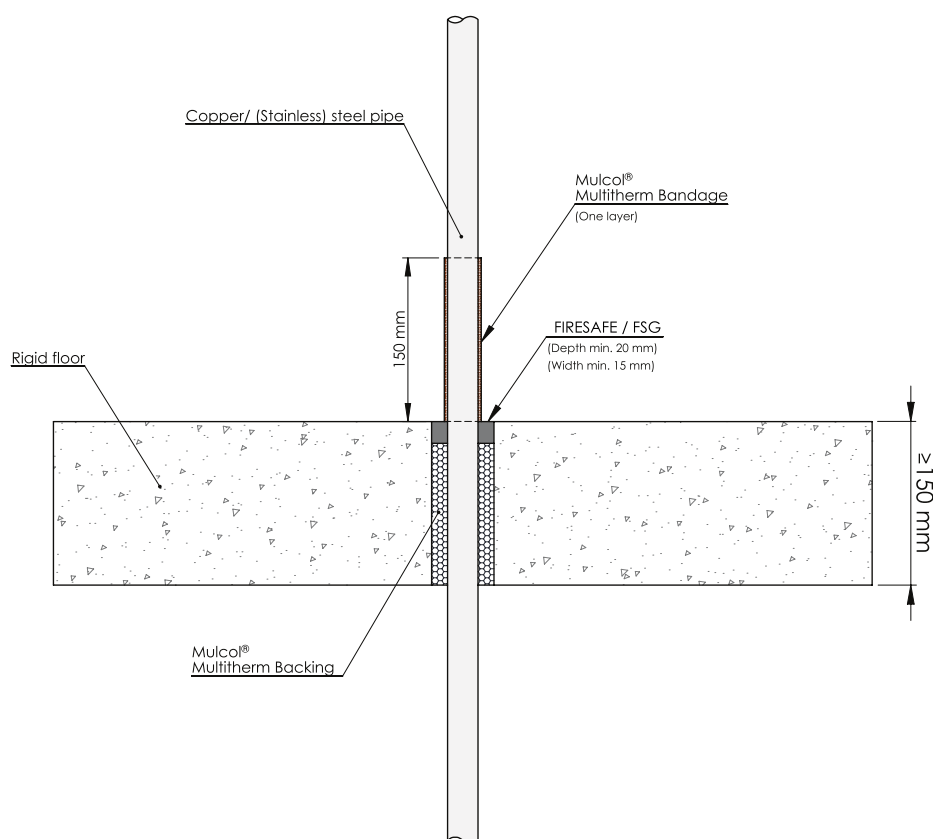
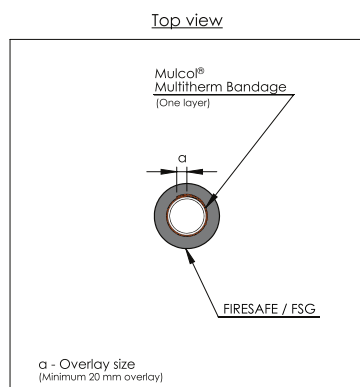


Drawing: Rf.E-CU-G1.4.92

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Multitherm Bandage	Classification
	Outer dimension	Wall thickness				
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.1	FIRESAFE / FSG ≥ 15 x 20 (wxd) bottom of floor	Multitherm backing fill entire depth	LI 150 three layers (three wires) bottom of floor	EI 60 C/U, E 120 C/U

B.1.6 Rigid floors - Metal pipes uninsulated

B.1.6.7 Copper and steel pipes - Multitherm Bandage - Top of floor

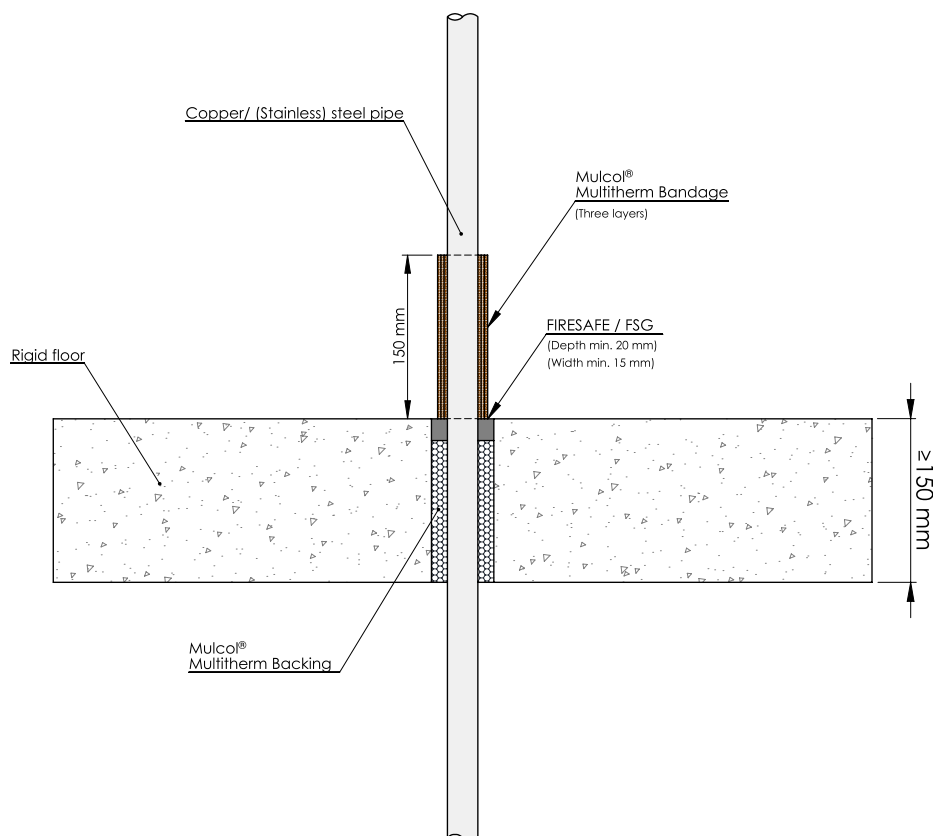
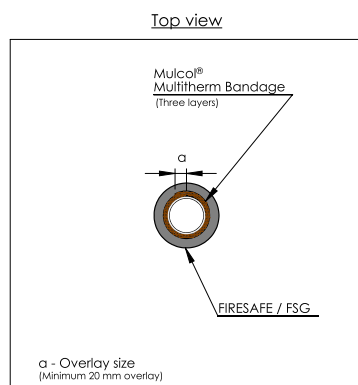


Drawing: RF.E-CU-G3.4.90

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Multitherm Bandage	Classification
	Outer dimension	Wall thickness				
Copper / (stainless) steel / cast iron	≤ Ø 35	≥ 1.5	FIRESAFE / FSG ≥ 15 x 20 (wxd) top of floor	Multitherm backing fill entire depth	LI 150 one layer top of floor	EI 30 C/U, E 120 C/U

B.1.6 Rigid floors - Metal pipes uninsulated

B.1.6.8 Copper and steel pipes - Multitherm bandage - Top of floor



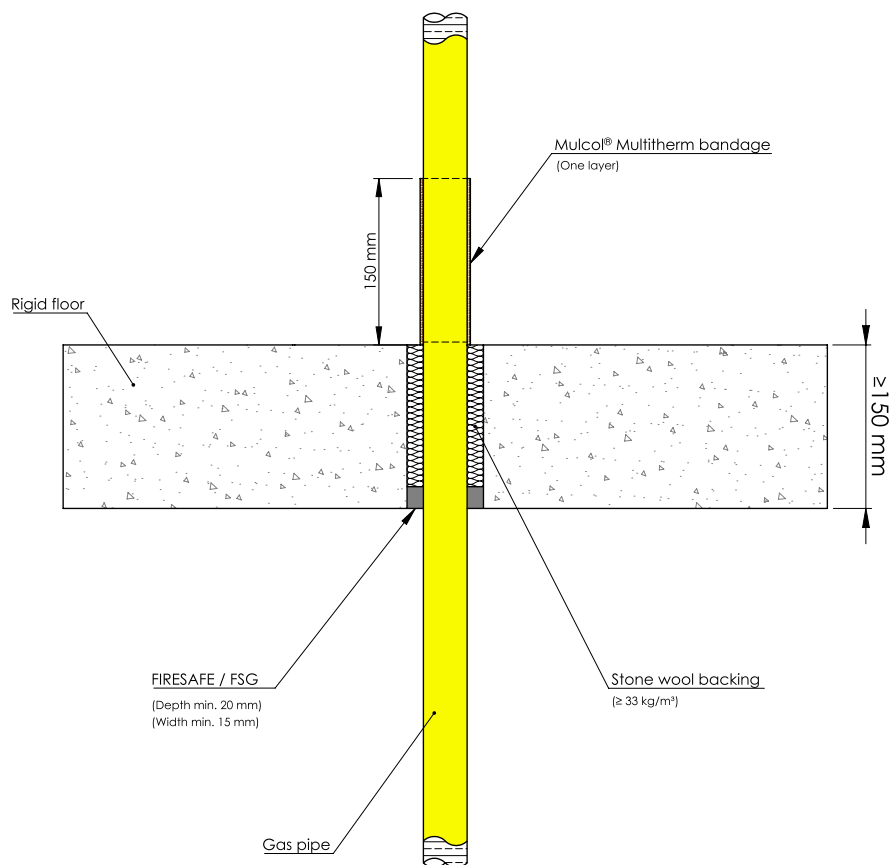
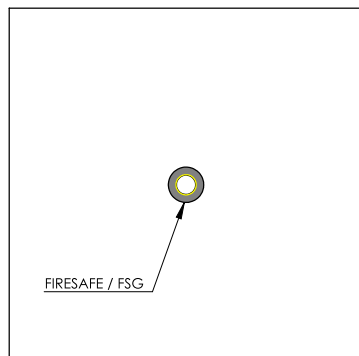
Drawing: RFE-CU-G3.4.92

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Multitherm Bandage	Classification
	Outer dimension	Wall thickness				
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.1	FIRESAFE / FSG ≥ 15 x 20 (wxd) top of floor	Multitherm backing fill entire depth	LI 150 three layers top of floor	EI 60 C/U, E 120 C/U

B.1.7 Rigid floors - Gas pipes

B.1.7.1 Corrugated stainless steel tube gas (CSST) pipes - Multitherm Bandage

Bottom view

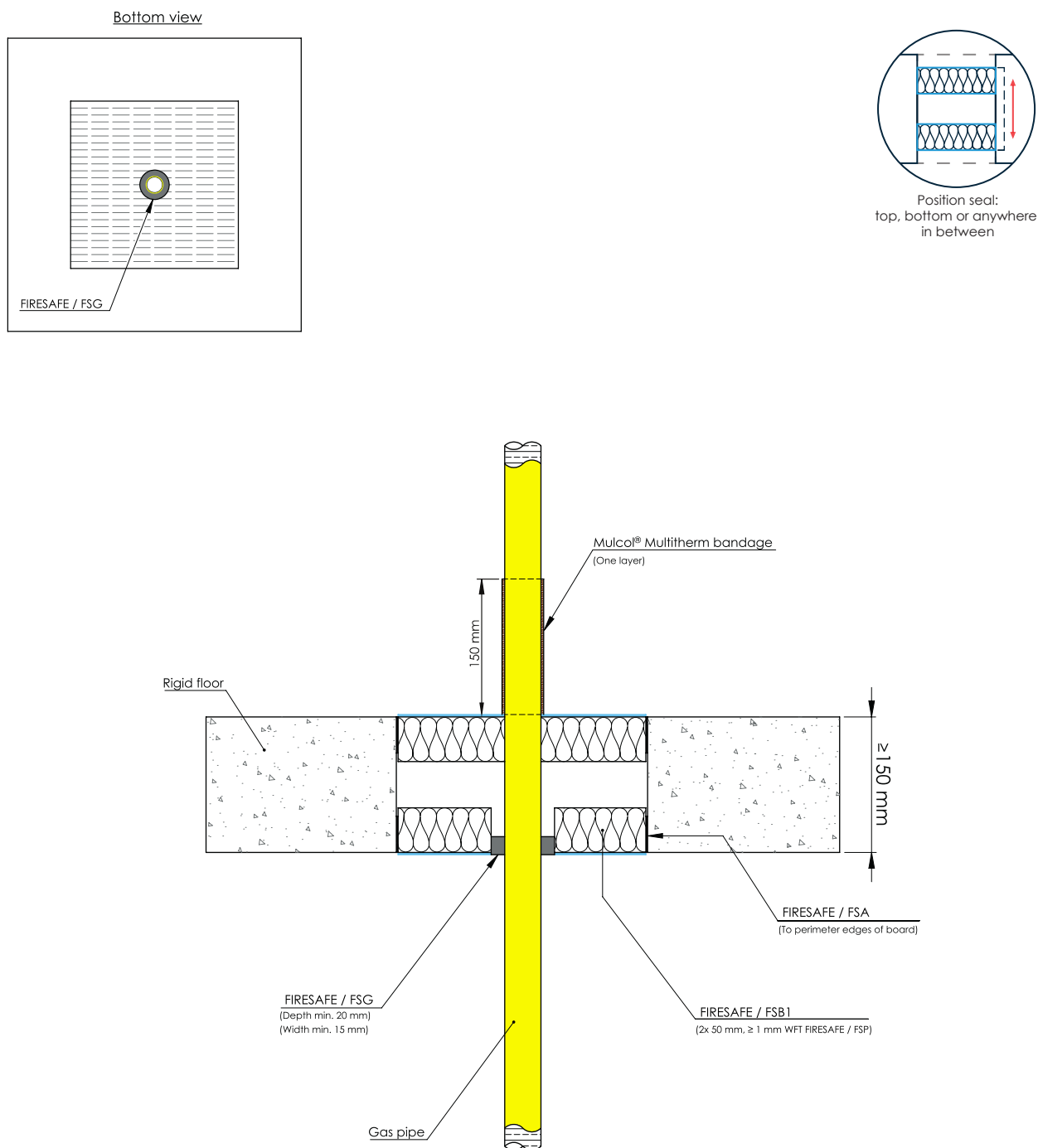


Drawing: RFE-GFS-G1.4.90

Services	Number of pipes	Product	Sealing (mm)	Backing	Classification
CFS CSST gas pipe ≤ Ø 20 mm	≤ 2	FIRESAFE / FSG (bottom of floor) & Multitherm Bandage (top of floor)	FIRESAFE / FSG ≥ 20 x 15 (wxd) top of floor	Stone wool fill entire depth (≥ 35 kg/m³)	EI 120 U/C
CFS CSST gas pipe ≤ Ø 41 mm	1				

B.1.7 Rigid floors - Gas pipes

B.1.7.2 Corrugated stainless steel tube gas (CSST) pipes - FIRESAFE / FSB1 - Multitherm Bandage



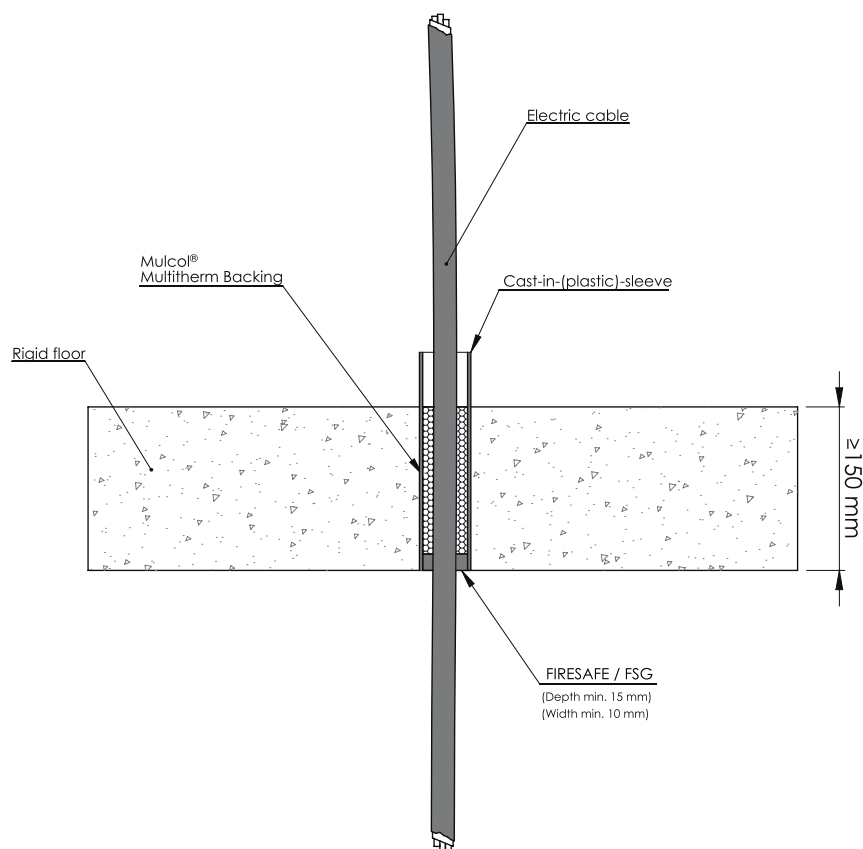
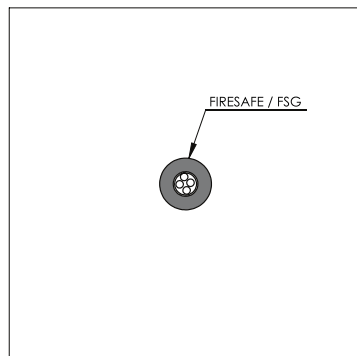
Drawing: PBrf.E-GFS-MFB1-B3.1.10.C

Services	Number of pipes	Product	Sealing (mm)	Classification
CFS CSST gas pipe DN 15	≤ 2	FIRESAFE / FSG (bottom of floor) & Multitherm Bandage (top of floor)	FIRESAFE / FSG ≥ 15 x 20 (wxd) bottom of floor	EI 120 U/C
CFS CSST gas pipe DN 32	1			

B.1.8 Rigid floors - Electrical room services

B.1.8.1 Cables - Bottom of floor

Bottom view

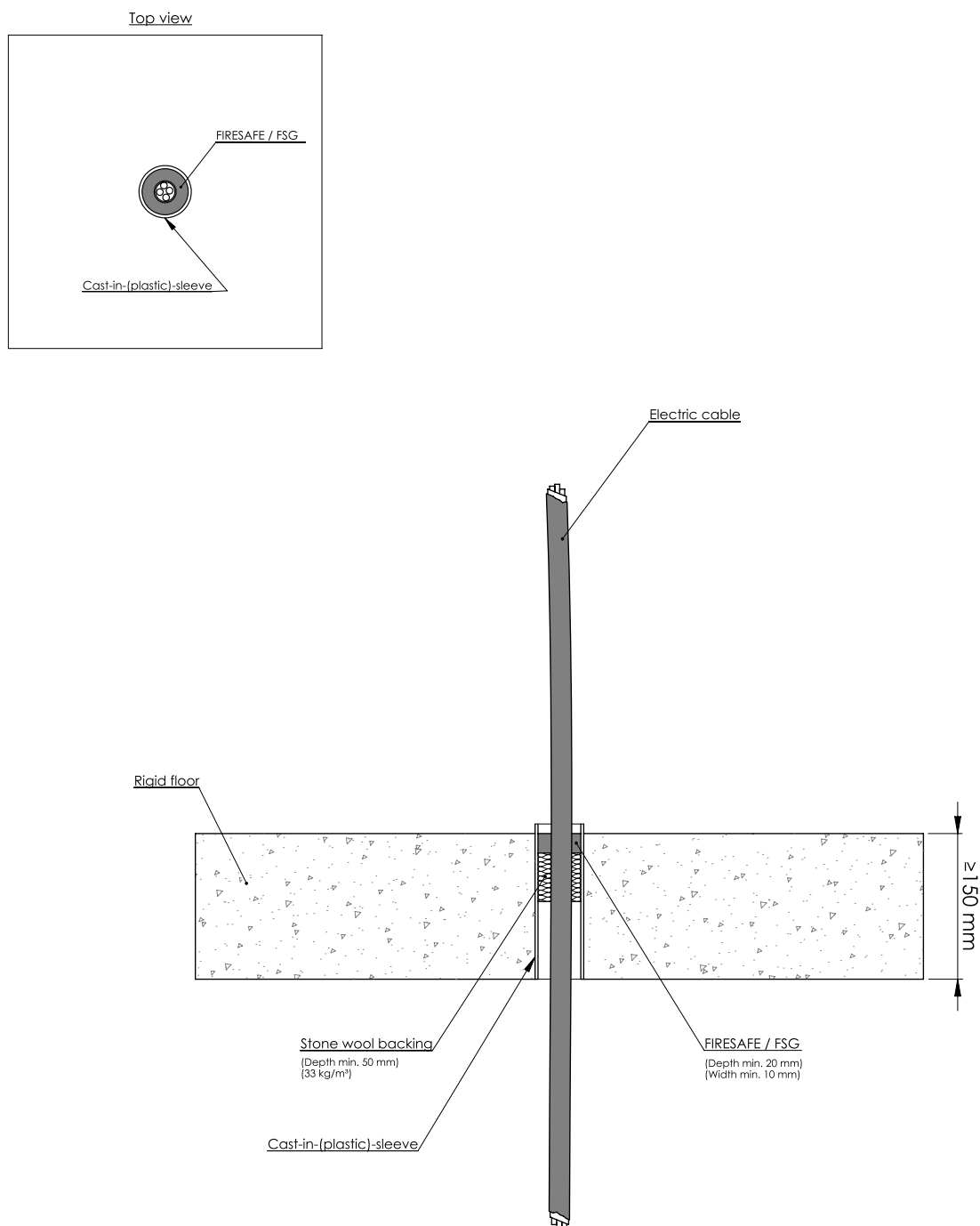


Drawing: RF.E-EC-G1.2.10

Services		Pipe dimensions (mm)	Sealing (mm)	Backing	Classification
		Outer dimension			
Cables $\leq \varnothing 25$ mm YMvK 5G 25 mm ²	with or without plastic cast-in sleeve	$\leq \varnothing 110$	FIRESAFE / FSG $\geq 10 \times 40$ (wxd) bottom of floor	Multitherm backing fill entire depth	EI 60, E 120

B.1.8 Rigid floors - Electrical room services

B.1.8.2 Cables - Top of floor

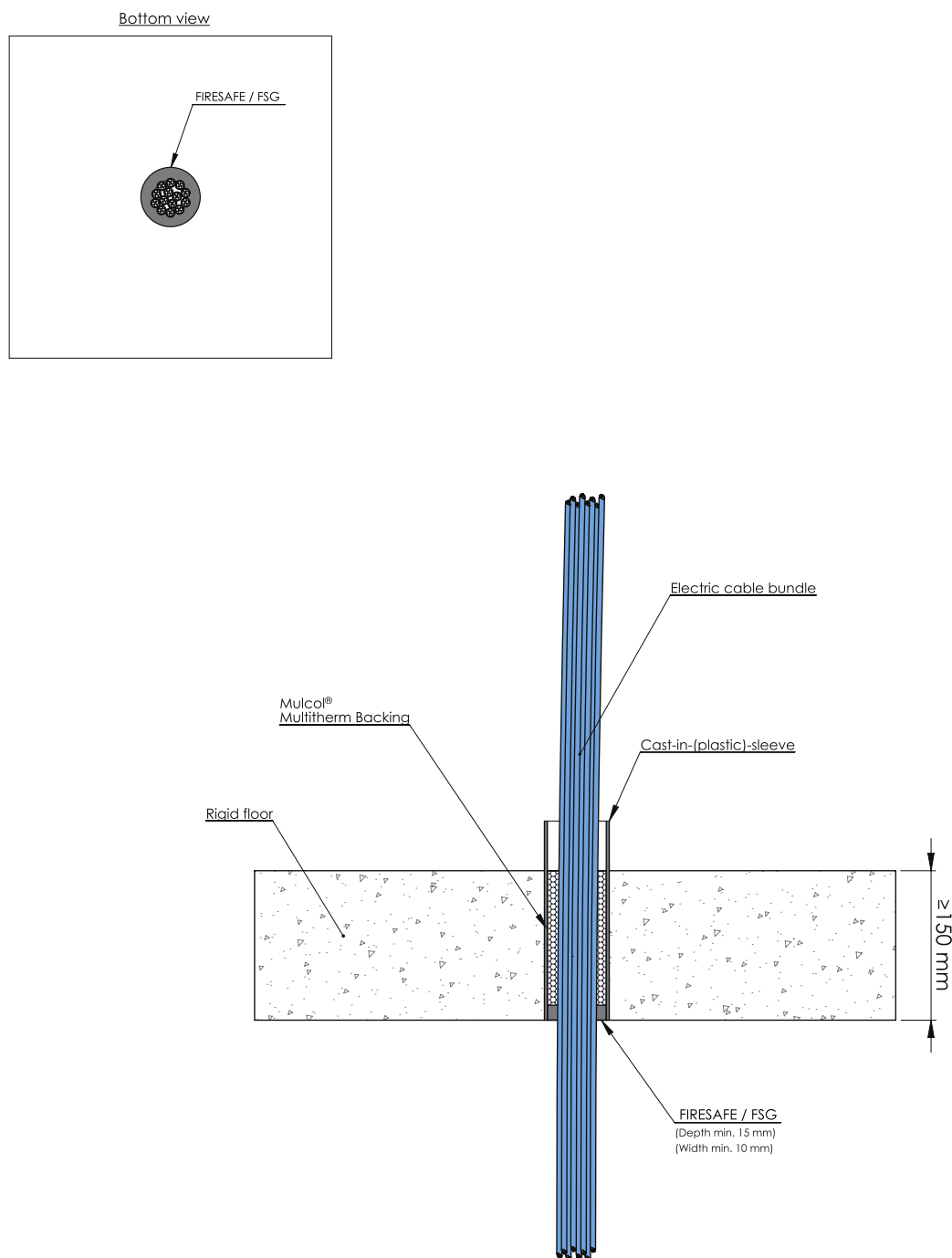


Drawing: RF-EC21-G3.12.10

Services		Pipe dimensions (mm)	Sealing (mm)	Backing	Classification
		Outer dimension			
Cables ≤ Ø 21 mm	with or without plastic cast-in sleeve	≤ Ø 50	FIRESAFE / FSG ≥ 10 x 20 (wxd) top of floor	≥ 50 mm stone wool (≥ 33 kg/m³)	EI 120

B.1.8 Rigid floors - Electrical room services

B.1.8.3 Cable bundle - Bottom of floor

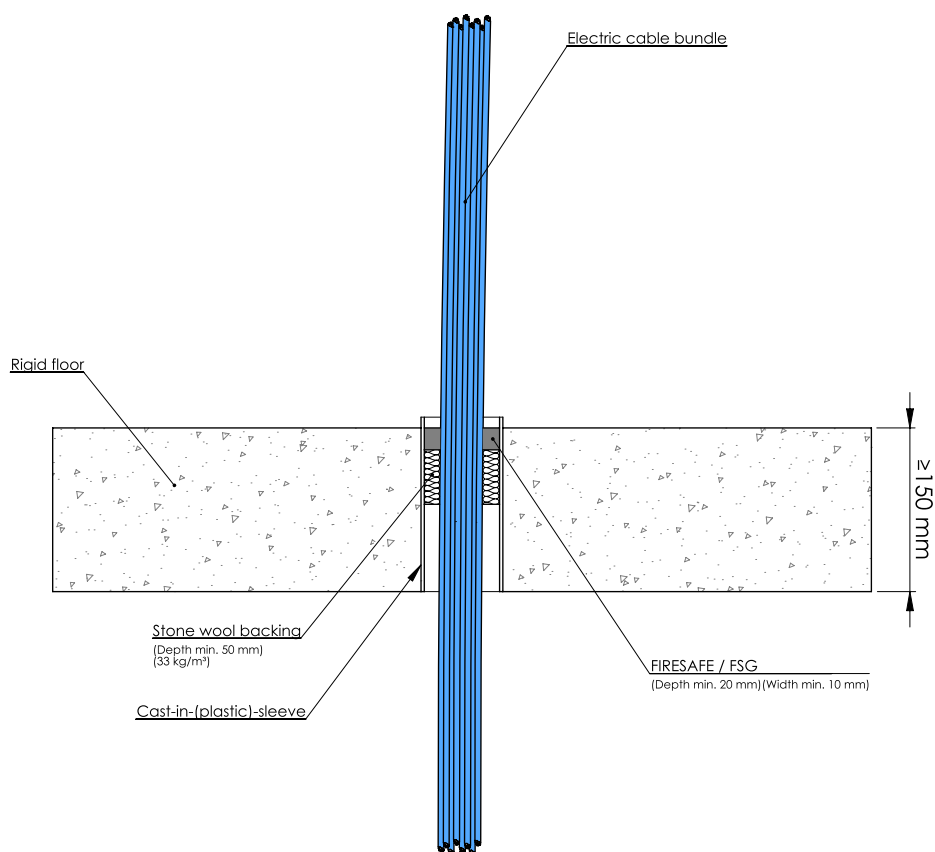
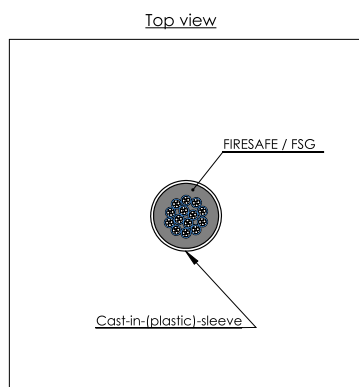


Drawing: RFE-ECB-G1.2.10

Services		Pipe dimensions (mm)	Sealing (mm)	Backing	Classification
		Outer dimension			
Telecommunication cables ≤ Ø 21 mm in a tied bundle ≤ Ø 80 mm	with or without plastic cast-in sleeve	≤ Ø 110	FIRESAFE / FSG ≥ 10 x 15 (wxd)	Multitherm Backing fill entire depth	EI 120

B.1.8 Rigid floors - Electrical room services

B.1.8.4 Cable bundle - Top of floor

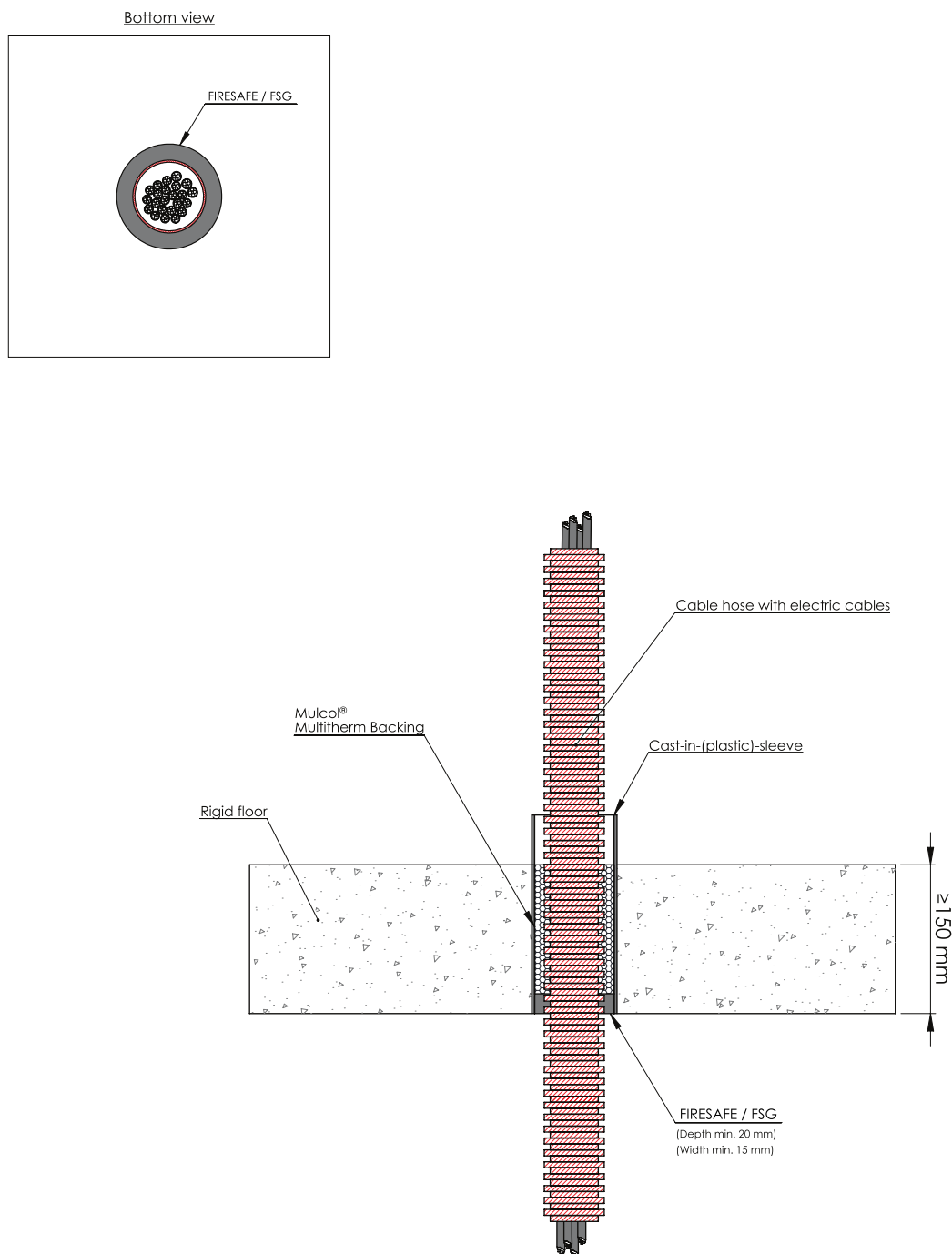


Drawing: RF-ECB-G3.12.10

Services		Pipe dimensions (mm)	Sealing (mm)	Backing	Classification
		Outer dimension			
Telecommunication cables ≤ Ø 21 mm in a tied bundle ≤ 40 pcs	with or without plastic cast-in sleeve	≤ Ø 75	FIRESAFE / FSG ≥ 10 x 20 (wxd)	≥ 50 mm stone wool (≥ 33 kg/m³)	EI 120

B.1.8 Rigid floors - Electrical room services

B.1.8.5 Flexible conduit with cables - Bottom of floor

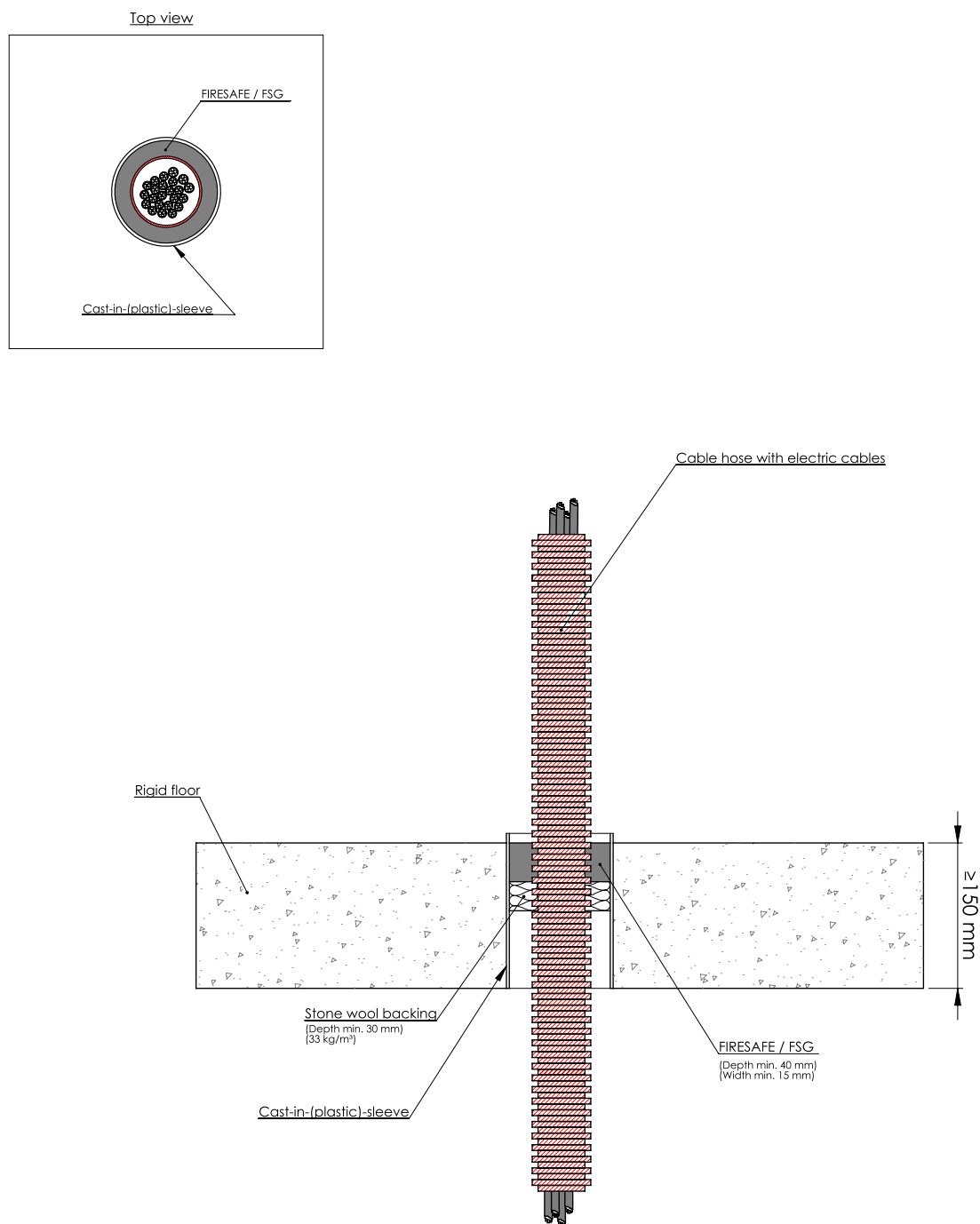


Drawing: RFE-ECH-G1.4.30

Services		Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
		Outer dimension	Wall thickness			
Ribbed PE-flexible-sleeve conduit ≤ Ø 50 mm with or without cables	with or without plastic cast-in sleeve	≤ Ø 110	3.2	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Multitherm Backing fill entire depth	EI 90 U/U

B.1.8 Rigid floors - Electrical room services

B.1.8.6 Flexible conduit with cables - Top of floor

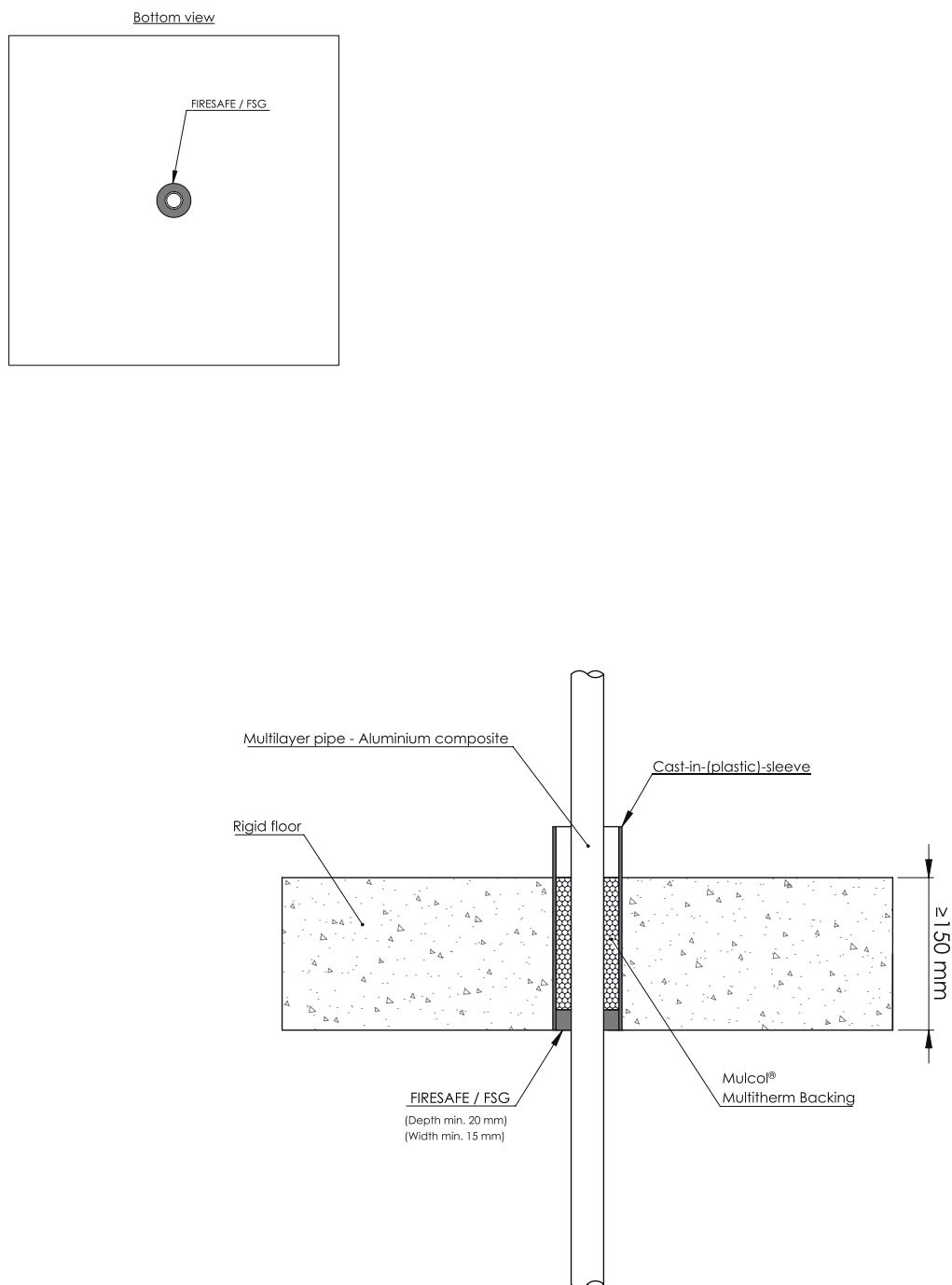


Drawing: RF-ECH63-G3.16.30

Services		Pipe dimensions (mm)	Sealing (mm)	Backing	Classification
		Outer dimension			
Ribbed PE-flexible-sleeve conduit ≤ Ø 50 mm with or without cables	with or without plastic cast-in sleeve	≤ Ø 90	FIRESAFE / FSG ≥ 15 x 40 (wxd)	≥ 30 mm stone wool (≥ 33 kg/m³)	EI 120 U/C

B.1.8 Rigid floors - Electrical room services

B.1.8.7 Multilayer pipes (MLC)

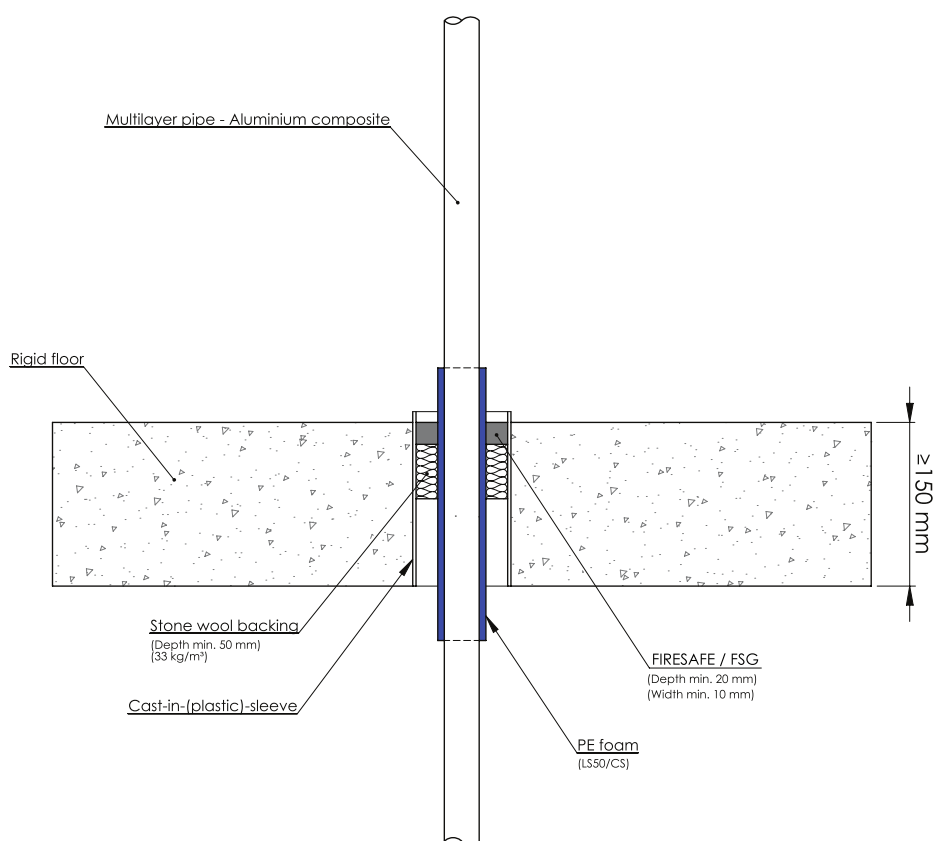
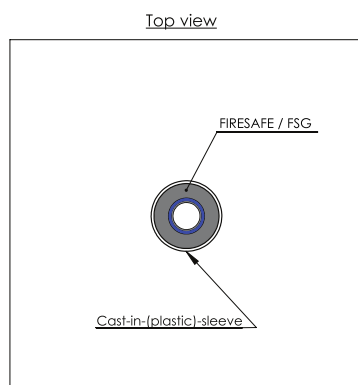


Drawing: RFE-MLA-G1.4.10

Services		Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
		Outer dimension	Wall thickness			
Multilayer pipes (MLC)	with or without plastic cast-in sleeve	≤ Ø 20	2.0	FIRESAFE / FSG ≥ 15 x 20 (wxd)	Multitherm backing fill entire floor	EI 120 U/C
		≤ Ø 32	3.0			
		≤ Ø 40	3.5 - 4.0			

B.1.8 Rigid floors - Electrical room services

B.1.8.8 Multilayer pipes (MLC) - PE foam

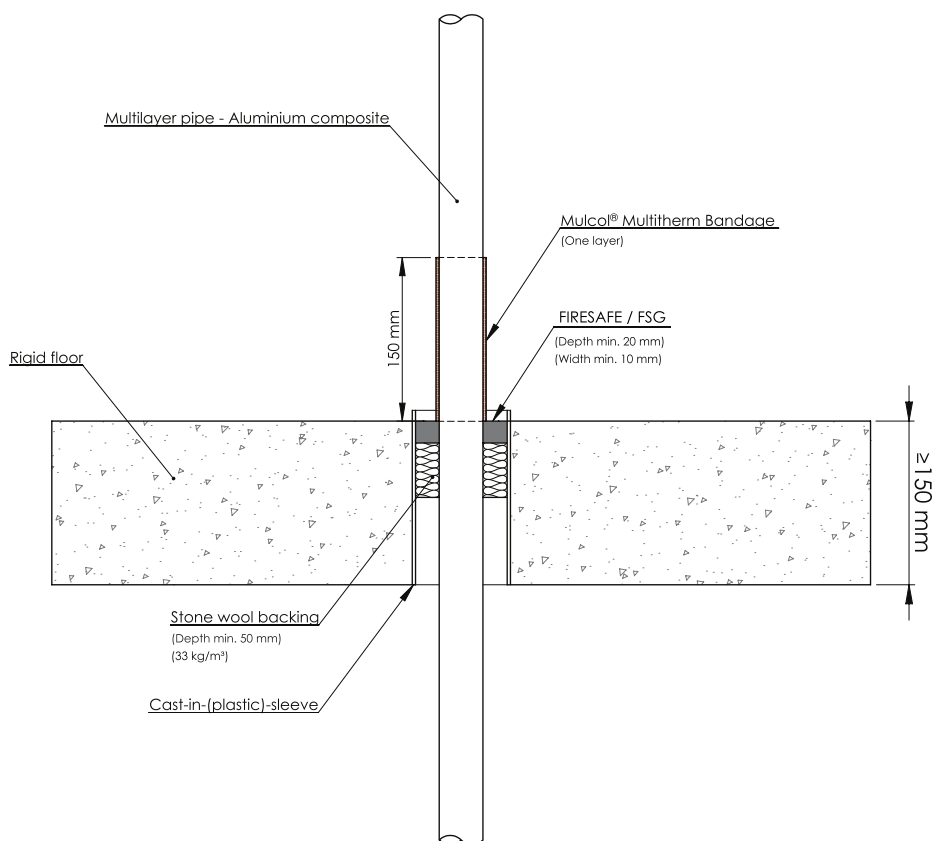
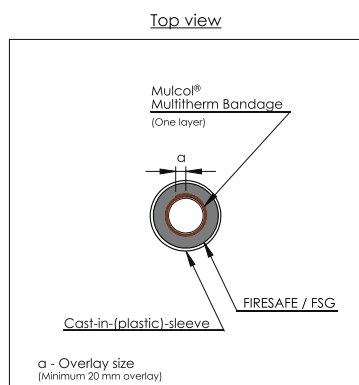


Drawing: RFE-pr_MLA-G3.4.10

Services		Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
		Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Multilayer pipes (MLC)	with or without plastic cast-in sleeve ≤ Ø 90	≤ Ø 32	3.0	PE foam	≤ 6	LS 50 / CS LI 50 / CI	FIRESAFE / FSG ≥ 10 x 20 (wxd)	≥ 50 mm stone wool (≥ 33 kg/m³)	EI 120 U/C

B.1.8 Rigid floors - Electrical room services

B.1.8.9 Multilayer pipes (MLC) - Multitherm Bandage

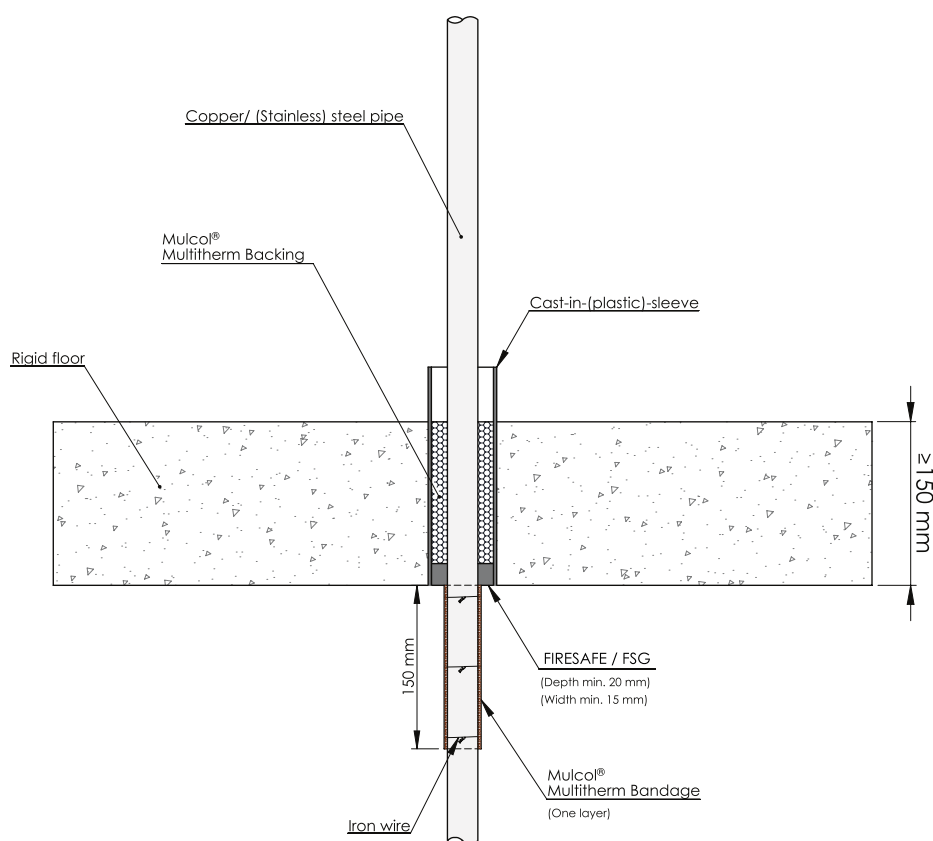
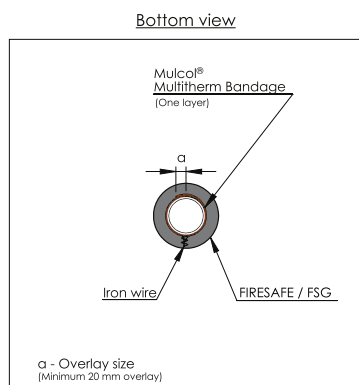


Drawing: RFE-MLA-G3.18.92

Services		Pipe dimensions (mm)		Sealing (mm)	Backing	Multitherm Bandage	Classification
		Outer dimension	Wall thickness				
Multilayer pipes (MLC)	with or without plastic cast-in sleeve ≤ Ø 75 mm	≤ Ø 40	3.5	FIRESAFE / FSG ≥ 10 x 20 (wxd)	≥ 50 mm stone wool (≥ 33 kg/m³)	LI 150 one layer top of floor	EI 120 U/C

B.1.8 Rigid floors - Metal pipes uninsulated

B.1.8.10 Copper and steel pipes - Multitherm Bandage - Bottom of floor

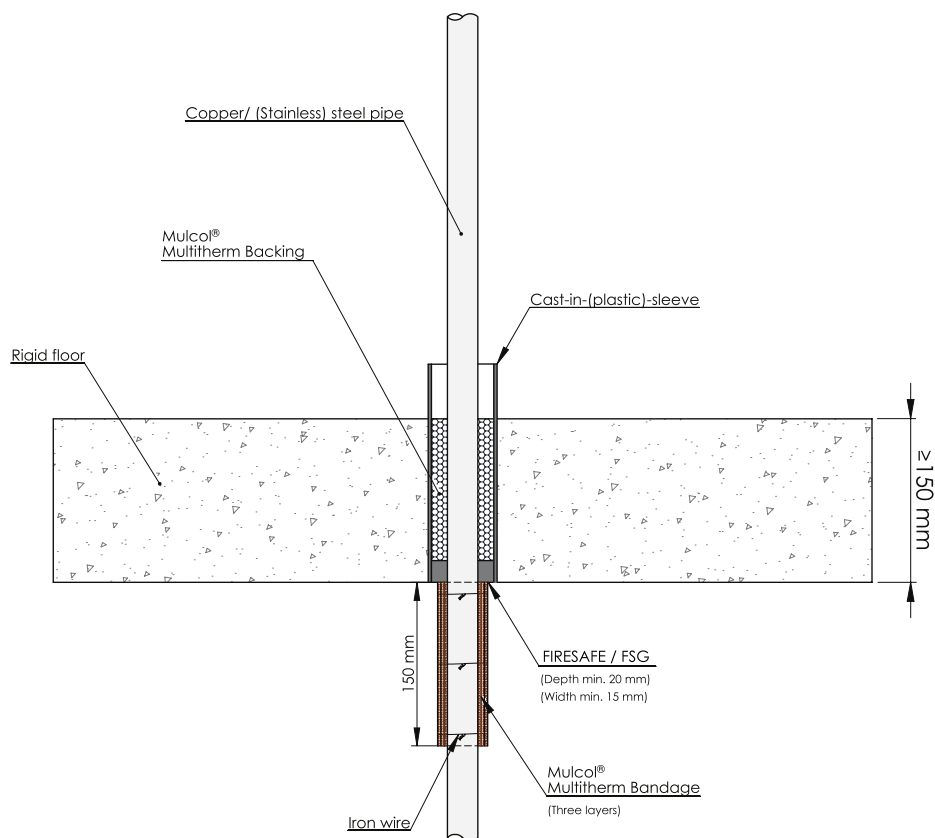
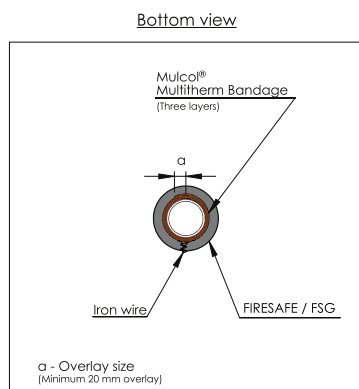


Drawing: RF.E-CU-G1.4.90

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Multitherm Bandage	Classification
	Outer dimension	Wall thickness				
Copper / (stainless) steel / cast iron	≤ Ø 35	≥ 1.5	FIRESAFE / FSG ≥ 15 x 20 (wxd) bottom of floor	Multitherm backing fill entire depth	LI 150 one layer (three wires) bottom of floor	EI 30 C/U, E 120 C/U

B.1.8 Rigid floors - Metal pipes uninsulated

B.1.8.10 Copper and steel pipes - Multitherm Bandage - Bottom of floor

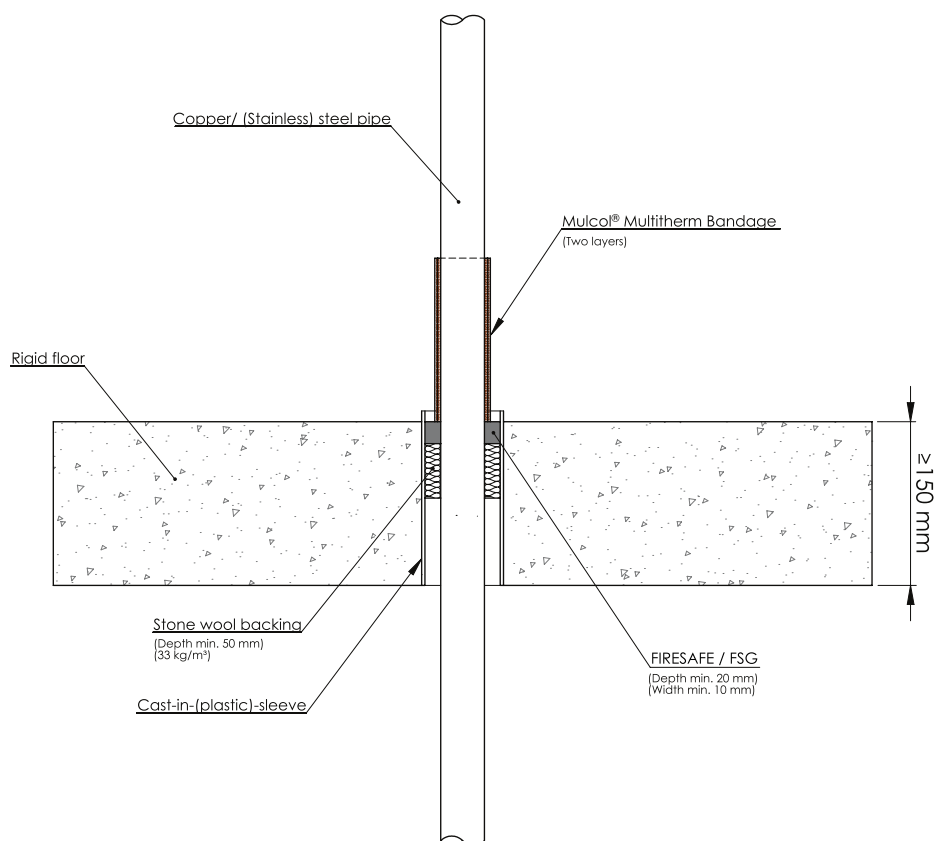
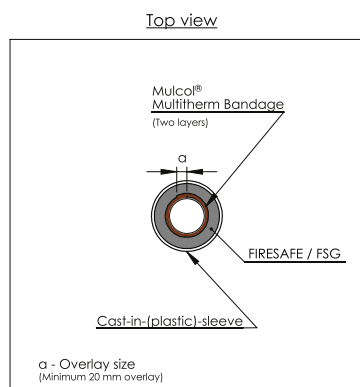


Drawing: R.F.E-CU-G1.4.92

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Multitherm Bandage	Classification
	Outer dimension	Wall thickness				
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.1	FIRESAFE / FSG ≥ 15 x 20 (wxd) bottom of floor	Multitherm backing fill entire depth	LI 150 three layers (three wires) bottom of floor	EI 60 C/U, E 120 C/U

B.1.8 Rigid floors - Metal pipes uninsulated

B.1.8.11 Copper and steel pipes - Multitherm Bandage - Top of floor

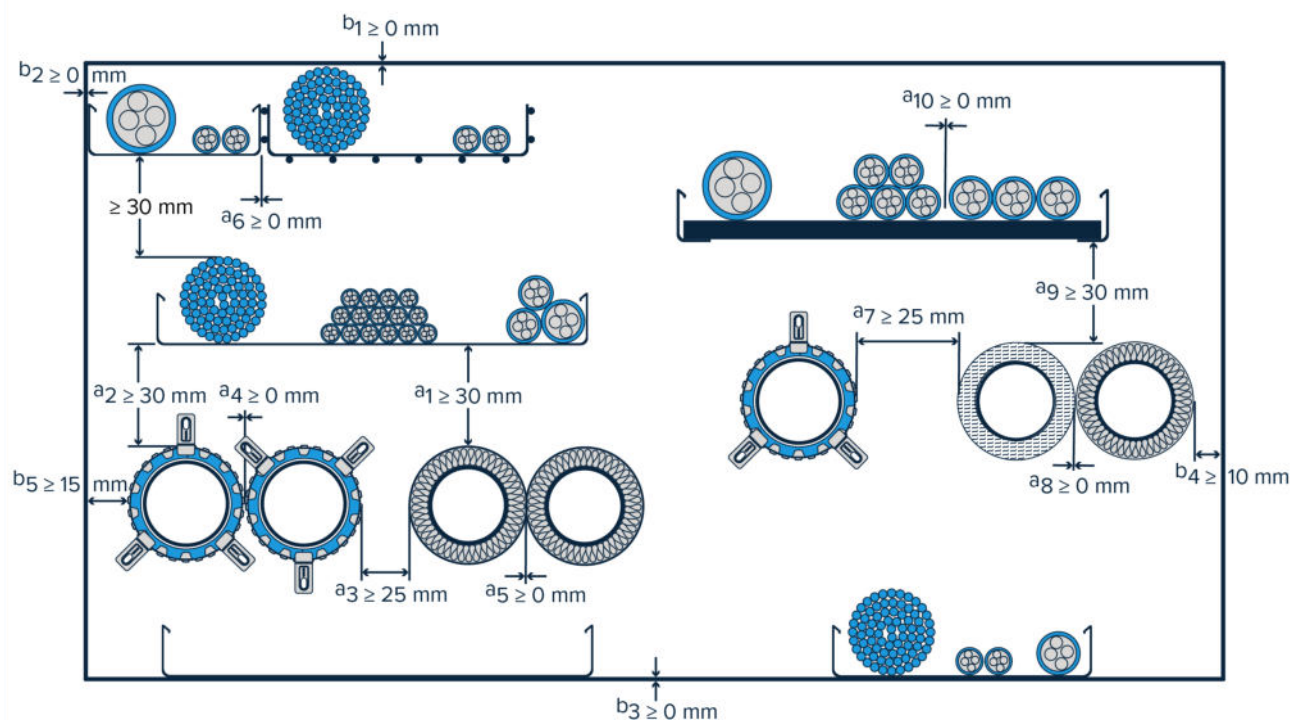


Drawing: RF.mk.E-CU-B3-G3.4.10

Services		Pipe dimensions (mm)		Sealing (mm)	Backing	Multitherm Bandage	Classification
		Outer dimension	Wall thickness				
Copper / (stainless) steel / cast iron	with or without plastic cast-in sleeve	≤ Ø 35	≥ 1.5	FIRESAFE / FSG ≥ 15 x 20 (wxd)	≥ 50 mm stone wool (≥ 33 kg/m³)	LI 150 one layer top of floor	EI 120 U/C

C.1 Flexible and rigid wall - General

C.1.1 Mutual distances & distance to first support



Mutual distances – FIRESAFE / FSG

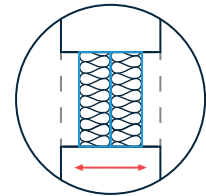
- a_1 Distance between cables/cable trays and metal pipes
- a_2 Distance between cables/cable trays and plastic pipes
- a_3 Distance between metal pipes and plastic pipes
- a_4 Distance between plastic pipes
- a_5 Distance between metal pipes with non-combustible insulation
- a_6 Distance between cable trays
- a_7 Distance between plastic pipes and pipes with combustible insulation
- a_8 Distance between pipes with non-combustible insulation and pipes with combustible insulation
- a_9 Distance between cables/cable trays and pipes with combustible insulation
- a_{10} Distance between cables stacked together or in a row
- b_1 Distance between cables/cable trays and the upper seal edge
- b_2 Distance between cables/cable trays and the side seal edge
- b_3 Distance between cables/cable tray and the lower seal edge
- b_4 Distance between metal pipes and all seal edges
- b_5 Distance between plastic pipes and all seal edges

Service support construction

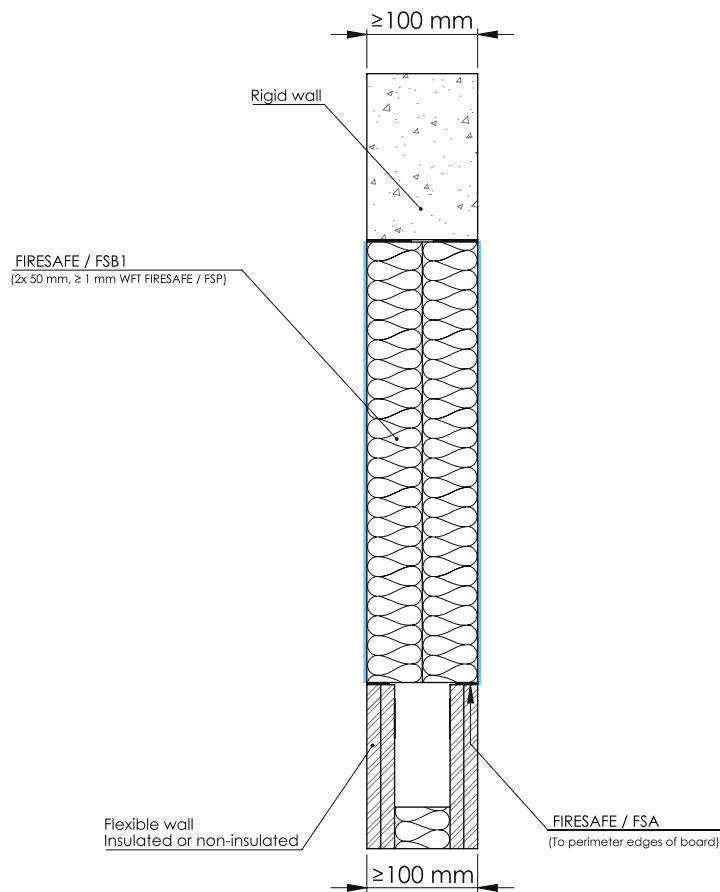
First support for all services at 450 mm, except cable trays at 250 mm.

C.1.2 Flexible and rigid wall - Maximum seal dimensions

C.1.2.1 FIRESAFE / FSB1 - 2x 50 mm no aperture framing



Position seal:
right, left or anywhere
in between

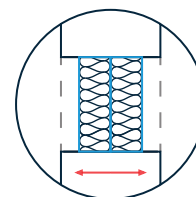


Drawing: PBfw.E-BS-MFB1.2.10

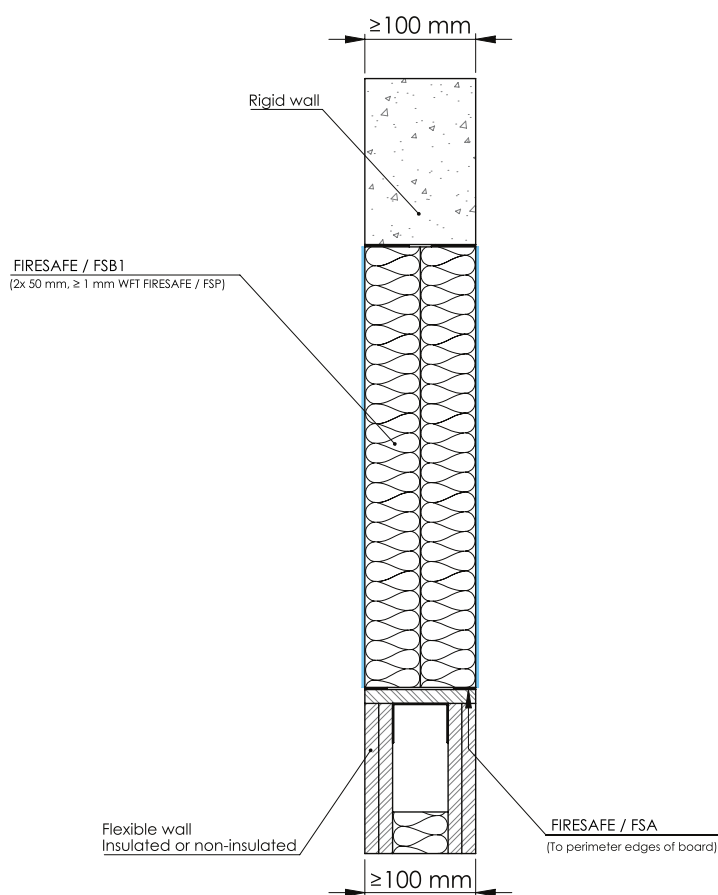
Services	Classification
Maximum seal size 1500 x 2500 mm (width x height or height x width) With a maximum surface of 3 m ²	EI 60
Maximum circular seal size Ø 1954 mm	
Maximum seal size 1200 x 1200 mm With a maximum surface of 1.44 m ²	EI 60, E 90
Maximum circular seal size Ø 1334 mm	
Maximum seal size 625 x 475 mm (w x h) With a maximum surface of 0.24 m ²	EI 120
Maximum circular seal size Ø 550 mm	

C.1.2 Flexible and rigid wall - General - Maximum seal dimensions

C.1.2.2 FIRESAFE / FSB1 - 2x 50 mm with aperture framing



Position seal:
right, left or anywhere
in between

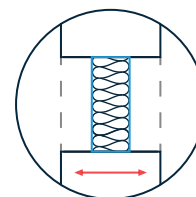


Drawing: PBfw.E-BS-A-MFB1.2.10

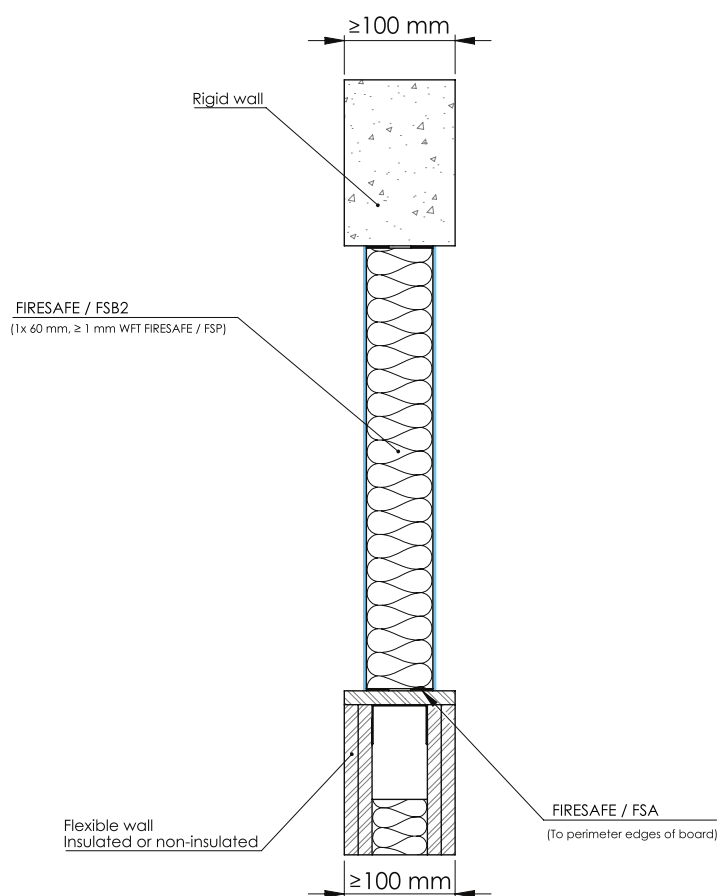
Services	Classification
Maximum seal size 1500 x 2500 mm (width x height or height x width) With a maximum surface of 3 m ²	EI 120
Maximum circular seal size Ø 1954 mm	
Maximum seal size 1200 x 2000 mm (width x height or height x width) With a maximum surface of 2.44 m ²	EI 180
Maximum circular seal size Ø 1748 mm	

C.1.2 Flexible and rigid wall - General - Maximum seal dimensions

C.1.2.3 Maximum seal dimensions - FIRESAFE / FSB2 - 1x 60 mm with aperture framing



Position seal:
right, left or anywhere
in between

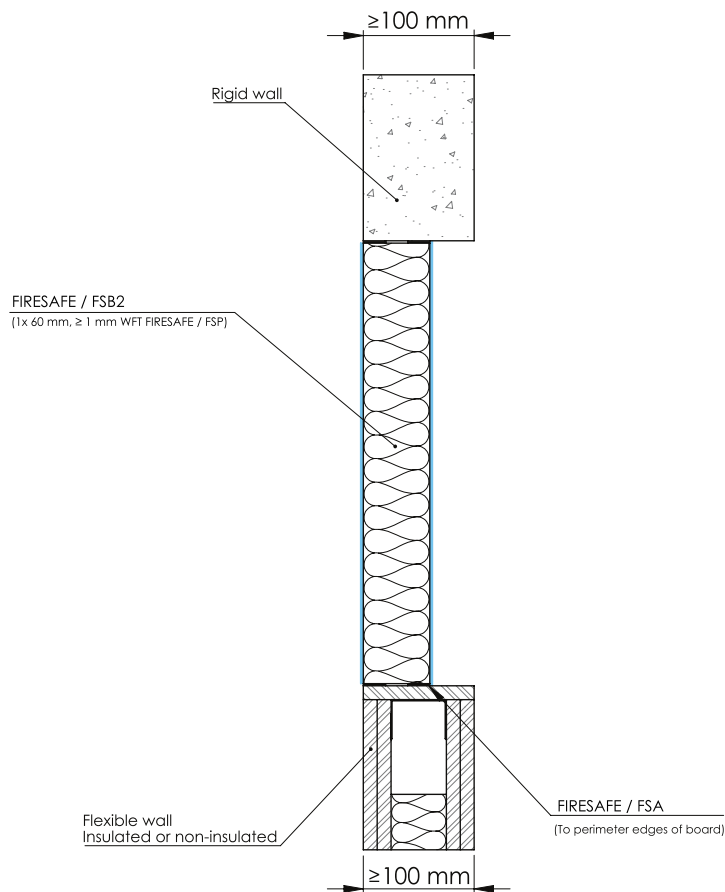


Drawing: PBfw.E-BS-MFB2.1.10

Services	Classification
Maximum seal size 1200 x 2000 mm (width x height or height x width) With a maximum surface of 2.4 m ²	EI 60
Maximum circular seal size Ø 1748 mm	
Maximum seal size 1500 x 1500 mm With a maximum surface of 1.72 m ²	
Maximum seal size 1200 x 1200 mm With a maximum surface of 1.44 m ²	EI 60, E 90
Maximum circular seal size Ø 1334 mm	
Maximum seal size 563 x 525 mm (width x height or height x width) With a maximum surface of 0.24 m ²	EI 90
Maximum circular seal size Ø 548 mm	
Maximum seal size 450 x 420 mm (width x height or height x width) With a maximum surface of 0.19 m ²	EI 120
Maximum circular seal size Ø 491 mm	

C.1.2 Flexible and rigid wall - General - Maximum seal dimensions

C.1.2.4 Maximum seal dimensions - FIRESAFE / FSB2 - 1x 60 mm with aperture framing

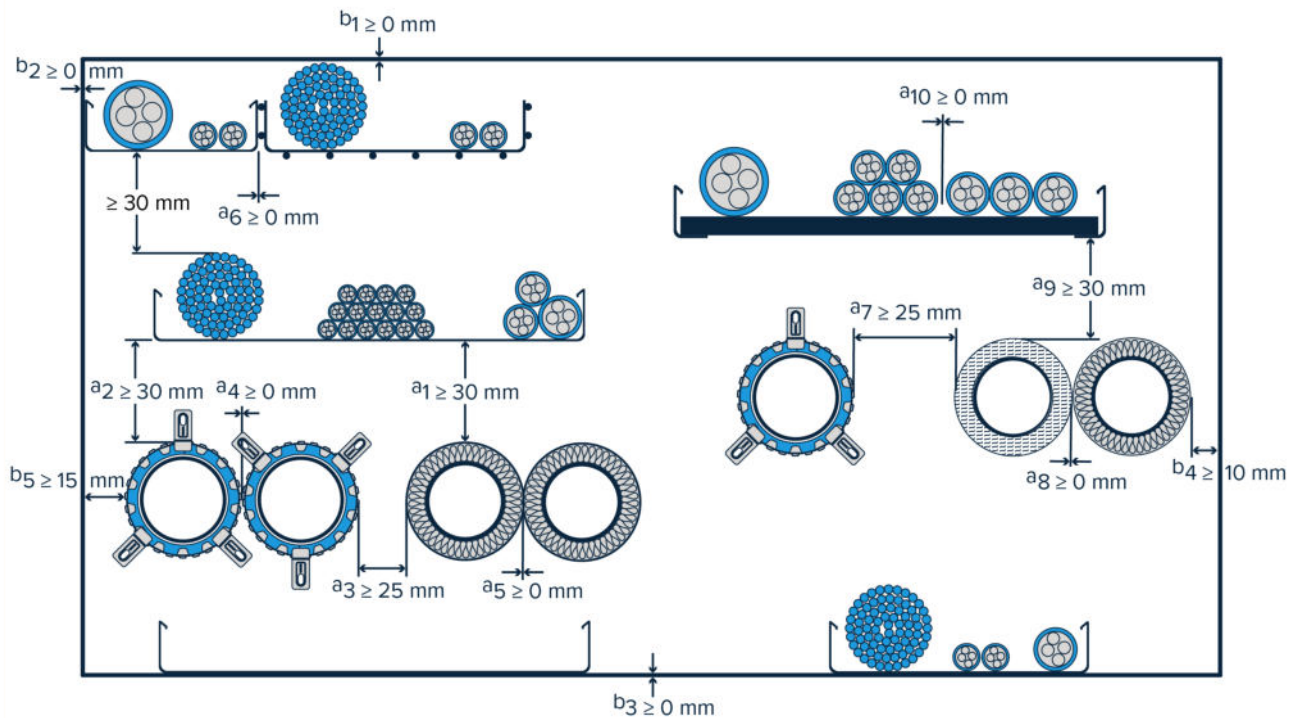


Drawing: PBfw.E-BS-fs-MFB2.1.10

Services	Classification
Maximum seal size 1200 x 2000 mm (width x height or height x width) With a maximum surface of 2.4 m ²	EI 60
Maximum circular seal size Ø 1748 mm	
Maximum seal size 425 x 265 mm (width x height or height x width) With a maximum surface of 0.11 m ²	EI 90, E 120
Maximum circular seal size Ø 379 mm	
Maximum seal size 531 x 331 mm (width x height or height x width) With a maximum surface of 0.14 m ²	EI 60, E 120
Maximum circular seal size Ø 423 mm	

C.2 Rigid floor - General

C.2.1 Mutual distances & distance to first support



Mutual distances – FIRESAFE / FSG

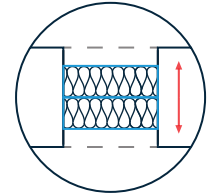
- a₁ Distance between cables/cable trays and metal pipes
- a₂ Distance between cables/cable trays and plastic pipes
- a₃ Distance between metal pipes and plastic pipes
- a₄ Distance between plastic pipes
- a₅ Distance between metal pipes with non-combustible insulation
- a₆ Distance between cable trays
- a₇ Distance between plastic pipes and pipes with combustible insulation
- a₈ Distance between pipes with non-combustible insulation and pipes with combustible insulation
- a₉ Distance between cables/cable trays and pipes with combustible insulation
- a₁₀ Distance between cables stacked together or in a row
- b₁ Distance between cables/cable trays and the upper seal edge
- b₂ Distance between cables/cable trays and the side seal edge
- b₃ Distance between cables/cable tray and the lower seal edge
- b₄ Distance between metal pipes and all seal edges
- b₅ Distance between plastic pipes and all seal edges

Service support construction

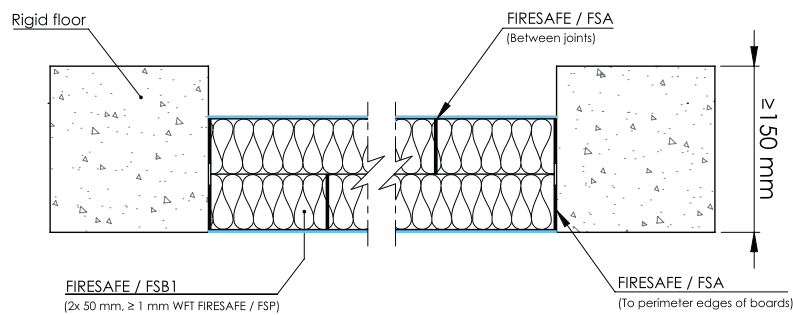
First support for all services at 450 mm, except cable trays at 250 mm.

C.2.2 Rigid floor - Maximum seal dimensions

C.2.2.1 Maximum seal dimensions - FIRESAFE / FSB1 - 2x 50 mm no cavity



Position seal:
top, bottom or anywhere
in between

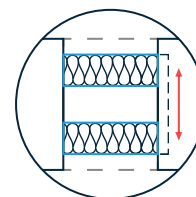


Drawing: PBrf.E-BS-MFB1.2.10

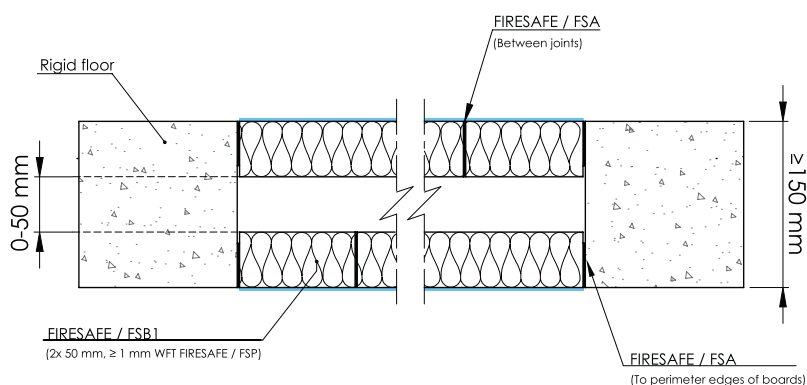
Services	Classification
Maximum seal size 1200 x 1200 mm Maximum seal size 9000 x 900 mm	EI 90, E 120
Maximum circular seal size Ø 1334 mm	
Maximum seal size 600 x 400 mm Maximum circular seal size Ø 553 mm	EI 120
Maximum seal size 450 x 450 mm	
Maximum circular seal size Ø 508 mm	EI 240

C.2.2 Rigid floor - General - Maximum seal dimensions

C.2.2.2 Maximum seal dimensions - FIRESAFE / FSB1 - 2x 50 mm cavity



Position seal:
top, bottom or anywhere
in between

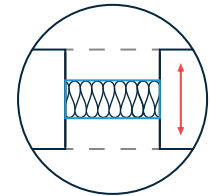


Drawing: PBrf.E-BS-MFB1.2.10.C

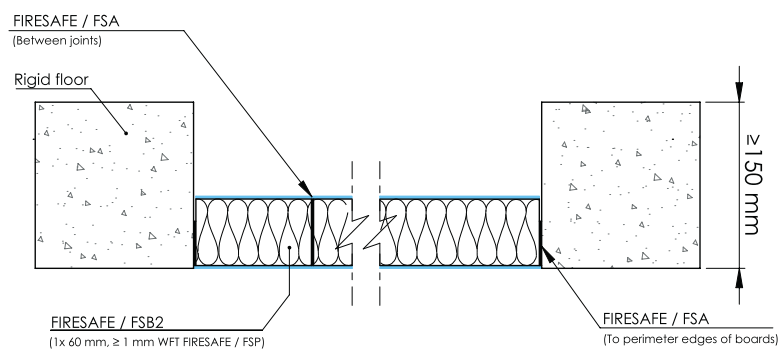
Services	Classification
Maximum seal size 1200 x 1200 mm Maximum seal size 9000 x 900 mm Maximum circular seal size Ø 1334 mm	EI 90, E 120
Maximum seal size 1200 x 600 mm Maximum seal size 9000 x 600 mm Maximum circular seal size Ø 957 mm	EI 120
Maximum seal size 450 x 450 mm Maximum circular seal size Ø 508 mm	EI 240

C.2.2 Rigid floor - General - Maximum seal dimensions

C.2.2.3 Maximum seal dimensions - FIRESAFE / FSB2 - 1x 60 mm



Position seal:
top, bottom or anywhere
in between



Drawing: PBrf.E-BS-MFB2.1.10

Services	Classification
Maximum seal size 1200 x 1200 mm	EI 90, E 120
Maximum seal size 9000 x 900 mm	
Maximum circular seal size Ø 1334 mm	

C.3 Wall configurations

C.3.1 Allowed wall configurations

The use of FIRESAFE / FSG is allowed in all double sided flexible wall constructions (with or without insulation) of the same or higher fire resistance classification in accordance with EN 13301-2, with a lining made of gypsum boards (EN 520) or Calcium Silicate boards which are CE marked for the application as lining of flexible wall, if their construction is in accordance with the rules given below.

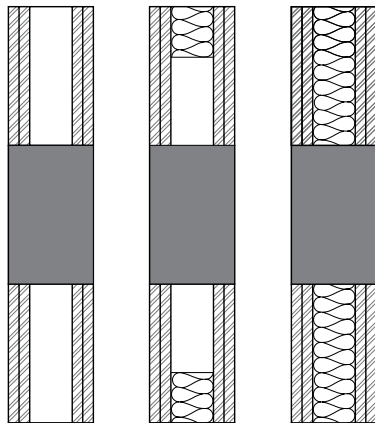
Field of direct application rules for double-sided flexible wall constructions:

- flexible wall constructions as shown in solutions given in Annex A of this document;
- flexible wall constructions with the same or higher number of board layers of the same or higher board thickness on each side of the wall, with insulation of any type or without insulation;
- flexible wall constructions with a reduced number of board layers but the same or higher board thickness on each side of the wall as tested, with insulation of any type or without insulation;
- flexible wall constructions with timber studs, no part of the penetration seal closer than 100 mm to any stud or nogging piece, the cavity closed between the penetration seal and the stud/nogging piece with minimum 100 mm of insulation of class A1 or A2 in accordance with EN 13301-1;
- rigid constructions of an overall thickness equal to or greater than that given in the solutions in Annex A and a minimum density of 350 kg/m³. In case of hollow brick wall the same rules regarding aperture framing apply as for double-sided flexible walls.

Allowed constructions (not limited by):

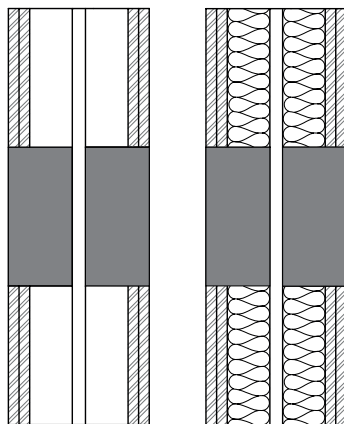
Flexible walls, not insulated, partially removed insulation or fully insulated with any type of insulation.

e.g.:



Double stud walls, separated by ≥ 0 mm, not insulated, partially insulated or fully insulated with any type of insulation.

e.g.:



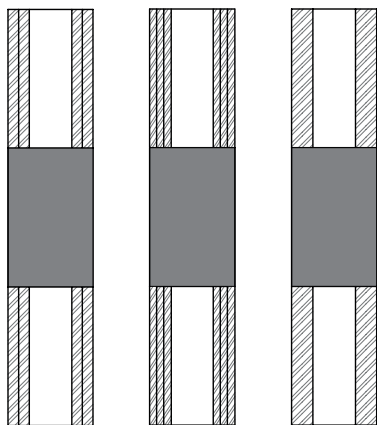
C.3 Wall configurations

C.3.1 Allowed wall configurations

Walls with a reduced number of board layers but the same or higher overall lining thickness on each side of the wall as shown in the solutions in Annex A.

Walls with a higher number of board layers, where individual boards are thinner yet the overall lining thickness is at least that of shown in the solutions in Annex A.

e.g.:



Rigid walls with a density of $\geq 350 \text{ kg/m}^3$

e.g.:

