



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 25/0233
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 / FSA

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 56 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.

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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I. SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESSMENT

1. Technical description of the product

- 1) FIRESAFE / FSA is a sealant used to form a penetration seal around metal pipes, plastic pipes, composite pipes and electrical cables to reinstate the fire resistance performance of wall and floor constructions, where they have been provided with apertures for the penetration of services.
- 2) The FIRESAFE / FSA is supplied in liquid form contained within 310ml cartridges and in buckets of 6 and 12.5 kg. The sealant is gunned or trowelled into the aperture in the separating element/elements and around the service or services, to a specified depth utilizing mineral fibre insulation backing material.
- 3) The products below can be used in conjunction with FIRESAFE / FSA depending upon the required application and classification (see Annex A, B and C). These products are subject to separate ETAs.
- Mulcol® Multitherm Bandage, thermal insulation
The applicant has submitted a written declaration that FIRESAFE / FSA, FIRESAFE / FSP and FIRESAFE / FSB1 do not contain substances which have to be classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No 1272/2008 and listed in the "Indicative list on dangerous substances" of the EGDS - taking into account the installation conditions of the construction product and the release scenarios resulting from there.
In addition to the specific clauses relating to dangerous substances contained in this European technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.
- 4) The use category of FIRESAFE / FSA 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 / FSA 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 / FSA may be used to provide a penetration seal in, are as follows:
 - a) Flexible wall*: The wall must have a minimum thickness of 100 mm. Apertures in flexible wall are not required to be lined.
 - b) Rigid wall*: The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 350 kg/m³.
 - c) Rigid floor: 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 13501-2 for the required fire resistance period.
- 3) The system FIRESAFE / FSA 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) Apertures in the separating element shall be maximum 375 x 375 mm. The annular space/gap around the services shall be infilled with mineral fibre insulation backing material and FIRESAFE / FSA sealant. Blank seals up to 375 x 375 mm are permitted. For full details, see Annex C.
- 5) 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 / FSA 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 acoustic insulation types are allowed (or equal, not limited by brand or type):

- ABSound Sonocool
- Jacomassa / Sonimass
- Merfisol Silver Alu
- ThermaCompact TF

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, not limited by brand or type) 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, not limited by brand or type) 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 Climatic PP-RCT and Bänninger Watertec PP-RCT

The following low-noise (silent) pipes (or equal, not limited by brand or type) are allowed:

- Coes PhoNoFire and Coestilen BluePower
- Geberit Silent PP and Geberit Silent dB 20
- Girpi Friaphon and Marley Silent
- Pipelife Master 3 and PhonEX AS
- Poloplast POLO-KAL NG and Poloplast POLO-KAL 3S
- Skolan dB
- Raupiano Plus
- Valsir Triplus, Wavin SiTech+ and Wavin AS
- DykaSono
- Uponor Decibel

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/W 2 - 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	R _w (C;C _{tr}) = 58 (-5;-13) 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 12572, 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 89/106/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 25/0233 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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Built Environment

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

Annex - Resistance to Fire Classification - FIRESAFE / FSA

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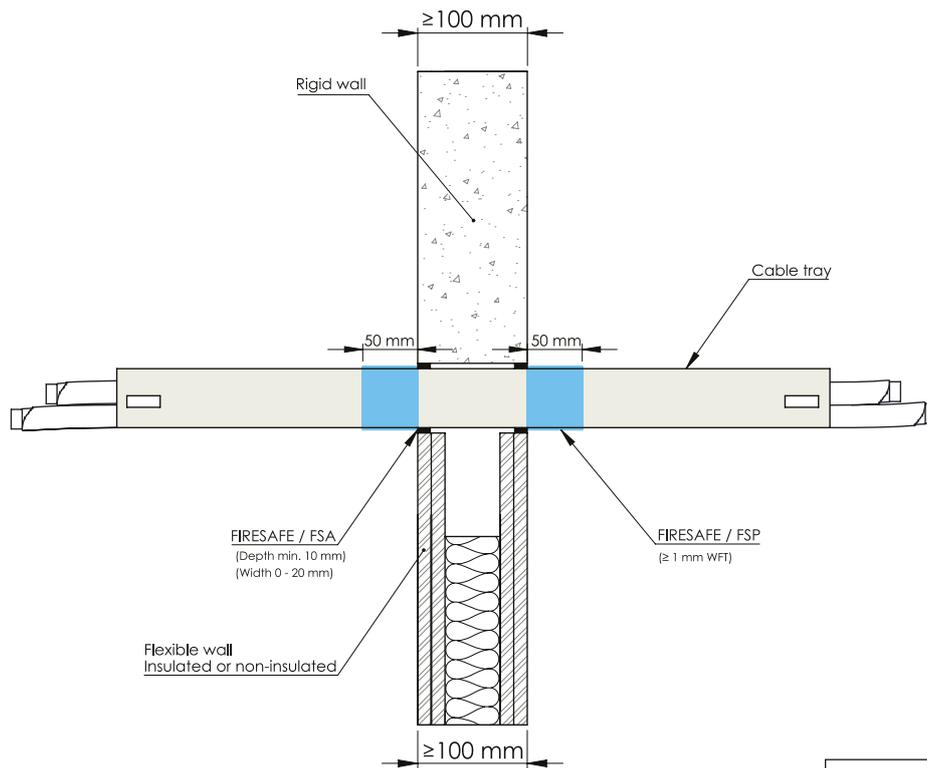
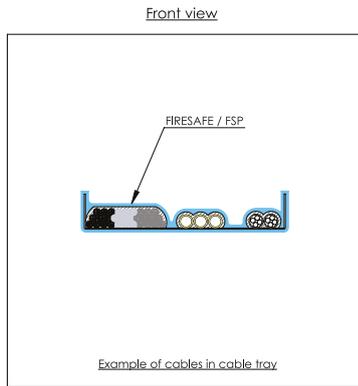
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A.1.1 Flexible or rigid wall - Cables, trays and conduits

A.1.1.1 Cables, trays and conduits - FIRESAFE / FSP - 50 mm

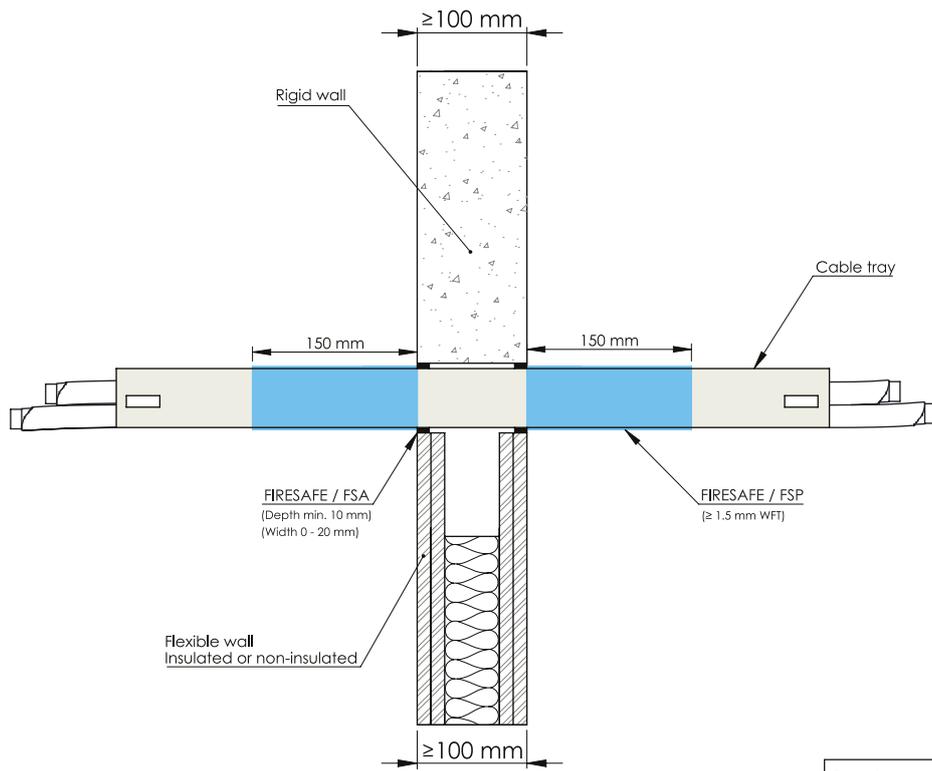
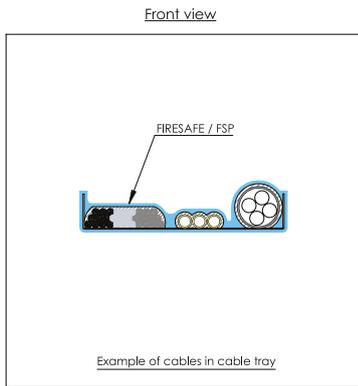


Drawing: FW.E-CT-0.10_50

Services	Coating	Classification
Metal cable ladders	Coat back 50 mm ≥ 1 mm WFT	EI 60, E 90
Metal (non-)perforated cable trays		
Steel wire mesh cable trays (baskets)		
Cables ≤ Ø 80 mm		
Cables ≤ Ø 21 mm in a tied bundle ≤ Ø 100 mm		EI 45, E 90
Non sheathed cables ≤ Ø 24 mm		EI 60 U/C, E 90 U/C
Plastic conduits ≤ Ø 16 mm		EI 45 C/U, E 60 C/U
Copper conduits ≤ Ø 16 mm		EI 60 C/U
Steel conduits ≤ Ø 16 mm		

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

A.1.1.2 Cables, trays and conduits - FIRESAFE / FSP - 150 mm

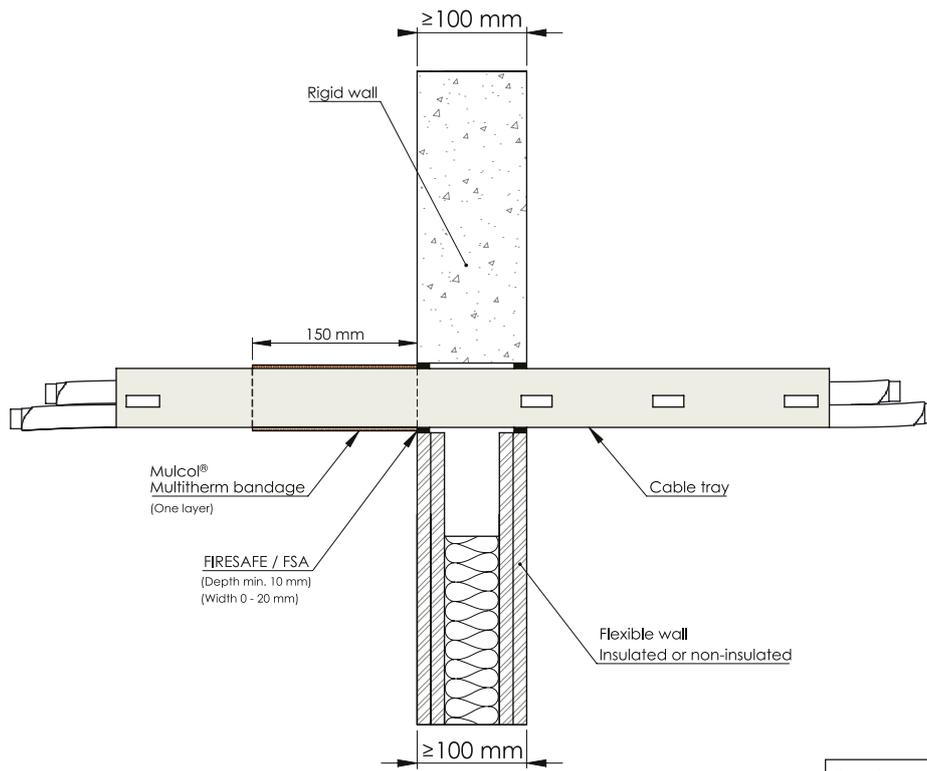
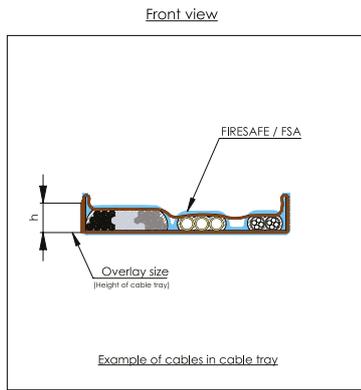


Drawing: FW.E-CT-0.10_150

Services	Coating	Classification
Metal cable ladders	Coat back 150 mm ≥ 1.5 mm WFT	EI 90, E 120
Metal (non-)perforated cable trays		EI 120
Steel wire mesh cable trays (baskets)		EI 90, E 120
Cables ≤ Ø 80 mm		EI 60, E 120
Cables ≤ Ø 21 mm in a tied bundle ≤ Ø 100 mm		EI 120 U/C
Non sheathed cables ≤ Ø 24 mm		EI 45 C/U, E 90 C/U
Plastic conduits ≤ Ø 16 mm		EI 90 C/U
Copper conduits ≤ Ø 16 mm		
Steel conduits ≤ Ø 16 mm		

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

A.1.1.3 Cables and trays - Multitherm Bandage



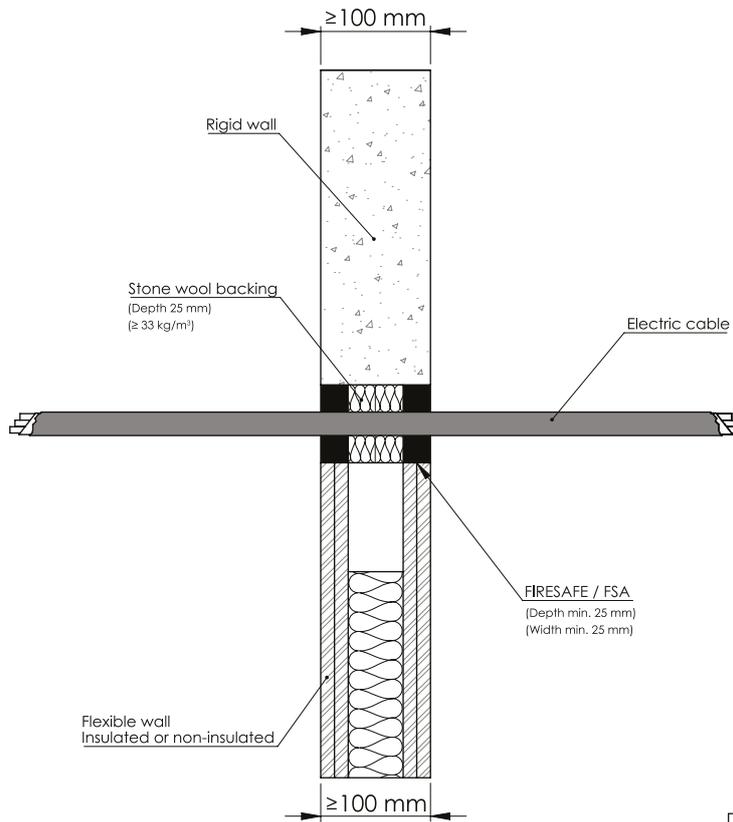
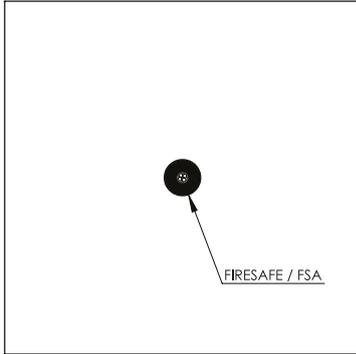
Drawing: FW.E-CT-B1.3.10

Services	Insulation (mm)	Classification
Metal (non-)perforated cable trays	LI 150 - Multitherm Bandage either side	EI 120
Steel wire mesh cable trays (baskets)		
Cables ≤ Ø 21 mm (single or bundled)		

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

A.1.1.4 Single cables

Front view



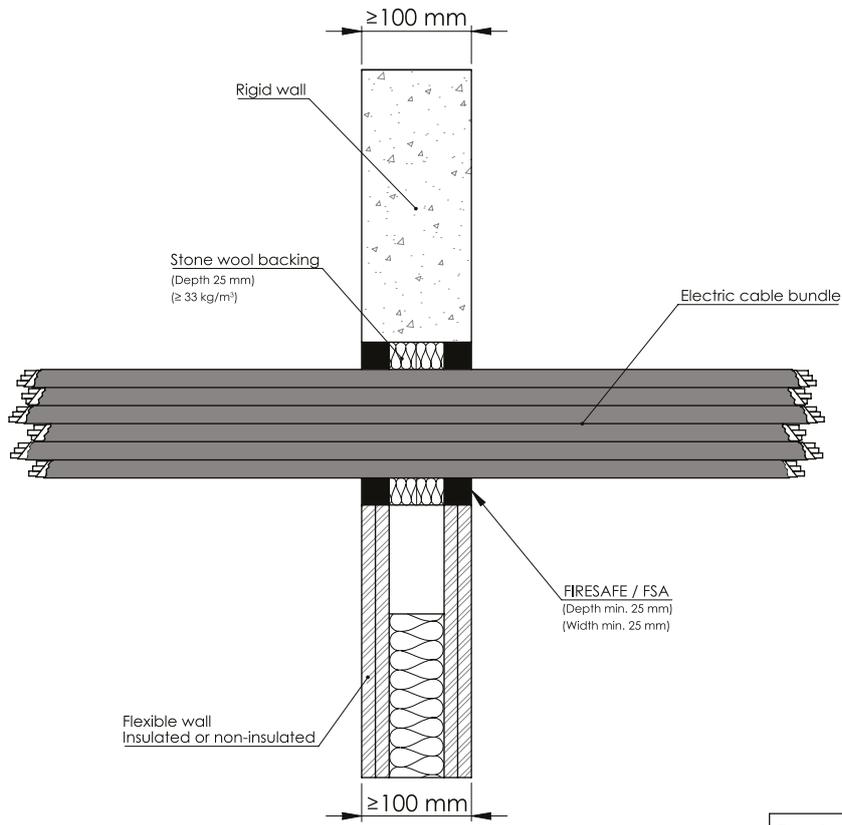
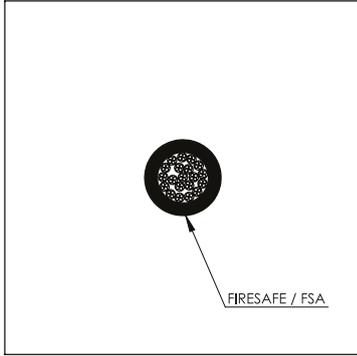
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Services	Sealing (mm)	Backing	Classification
Cables ≤ Ø 21 mm	FIRESAFE / FSA ≥ 25 x 25 (wxd)	Stone wool (≥ 33 kg/m ³)	EI 60, E 120
Cables ≤ Ø 50 mm			EI 120
Cables ≤ Ø 80 mm			EI 90, E 120

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

A.1.1.5 Multiple cables

Front view



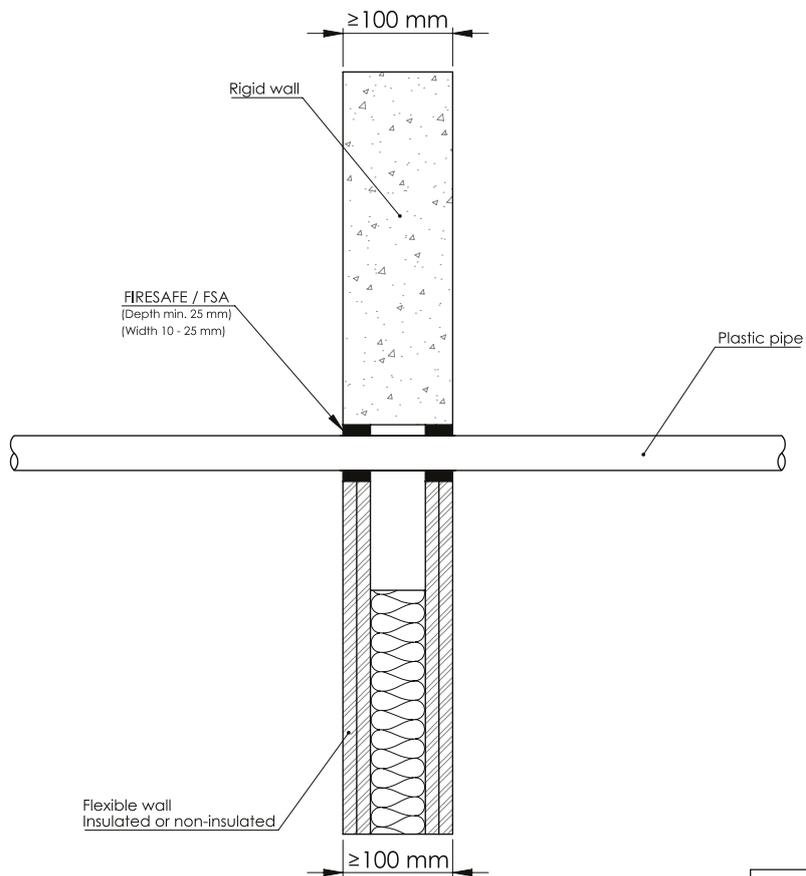
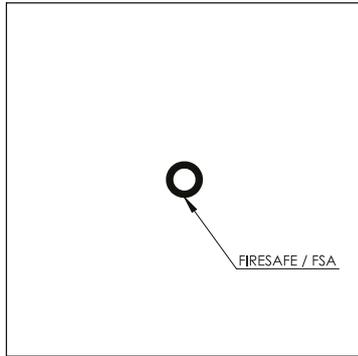
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Services	Sealing (mm)	Backing	Classification
Cables ≤ Ø 21 mm in a tied bundle ≤ Ø 100 mm	FIRESAFE / FSA ≥ 25 x 25 (wxd)	Stone wool (≥ 33 kg/m ³)	EI 60, E 120

A.1.2 Flexible or rigid wall - Combustible pipes

A.1.2.1 Plastic pipes

Front view

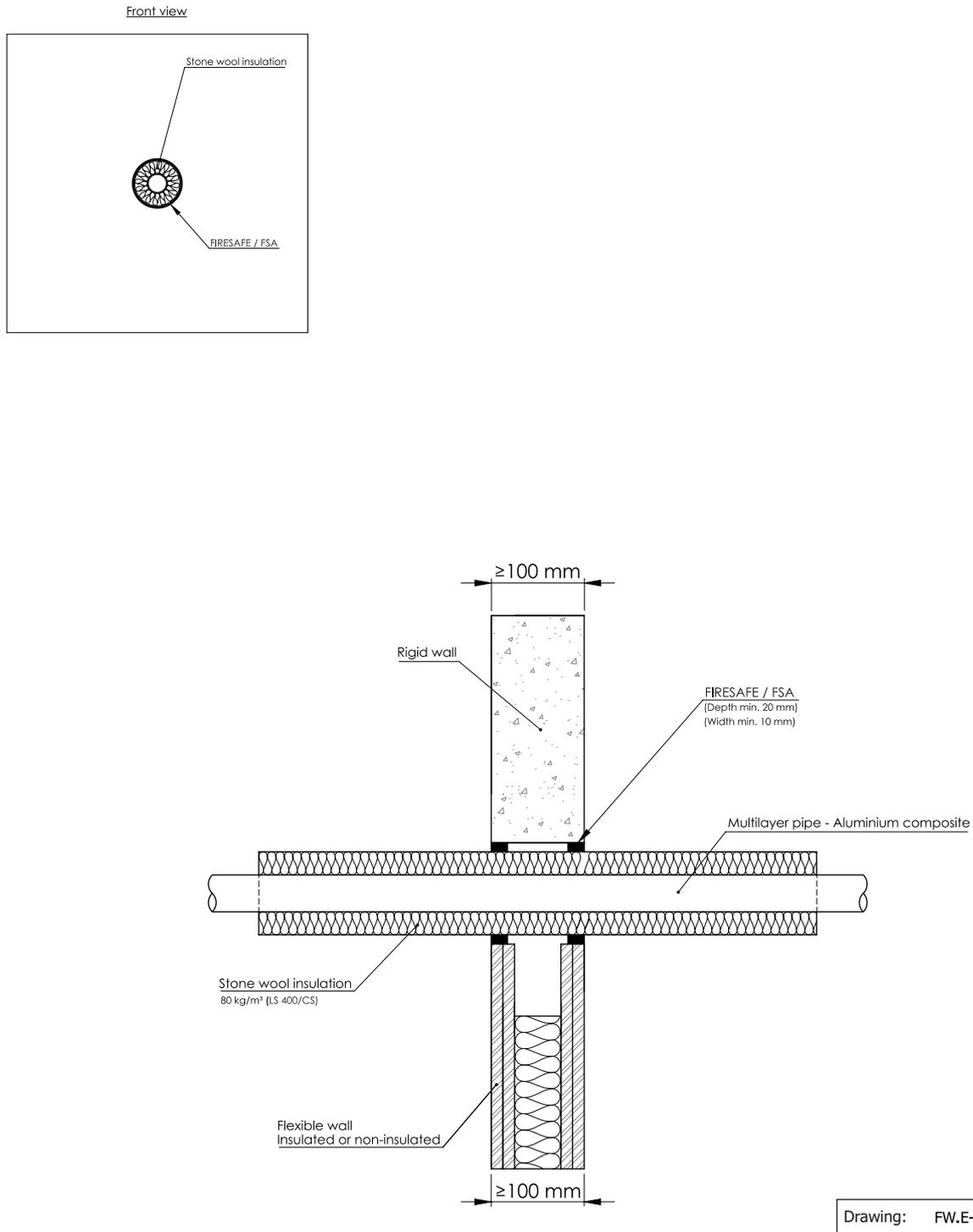


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Services	Pipe dimensions (mm)		Sealing (mm)	Classification
	Outer dimension	Wall thickness		
PE(-HD) / PE-X / ABS / SAN+PVC	≤ Ø 32	2.0 - 3.0	FIRESAFE / FSA 10 - 20 x ≥ 25 mm (wxd)	EI 120 U/C
PP		1.8		EI 90 U/C, E 120 U/C
		1.8 - 3.0		EI 120 U/C
PVC(-U/-C)		2.0		EI 90 U/C, E 120 U/C
		2.0 - 3.0		

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

A.1.3.1 Multilayer pipes (MLC) - Stone wool LS 400 / CS

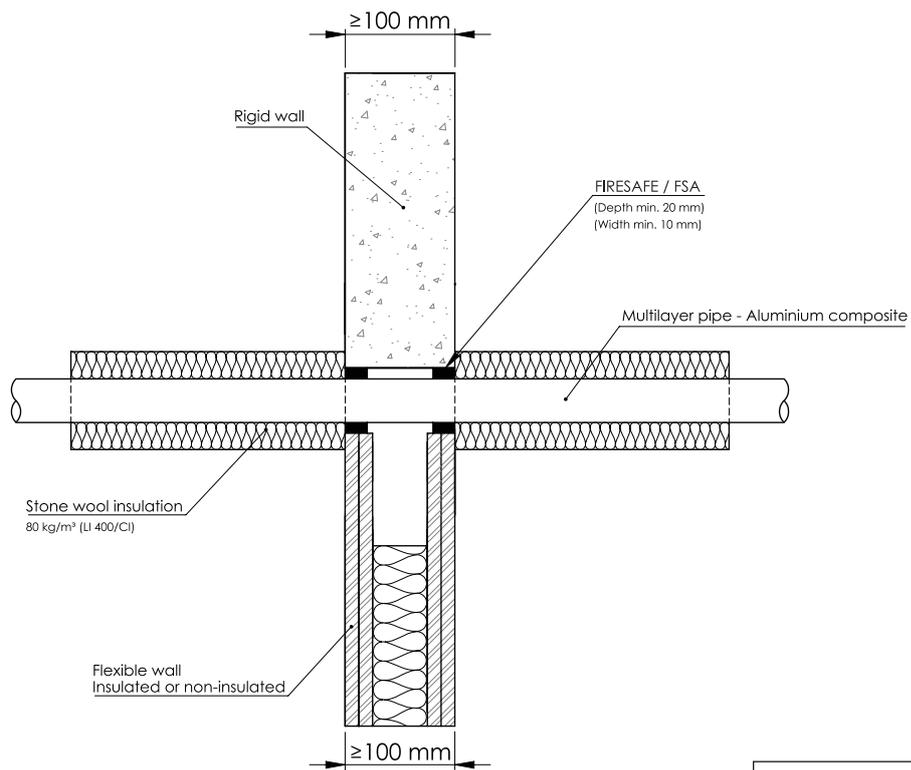
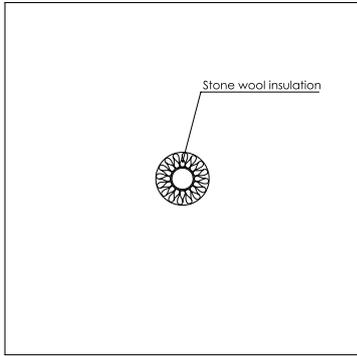


Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Multilayer pipes (MLC)	≤ Ø 32	3.0 - 6.0	Stone wool (≥ 80 kg/m ³)	≥ 25	LS 400 / CS	FIRESAFE / FSA ≥ 10 x 10 (wxd)	EI 60 U/C, E 90 U/C
	≤ Ø 75	6.0					EI 90 U/C

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

A.1.3.2 Multilayer pipes (MLC) - Stone wool LI 400 / CI

Front view



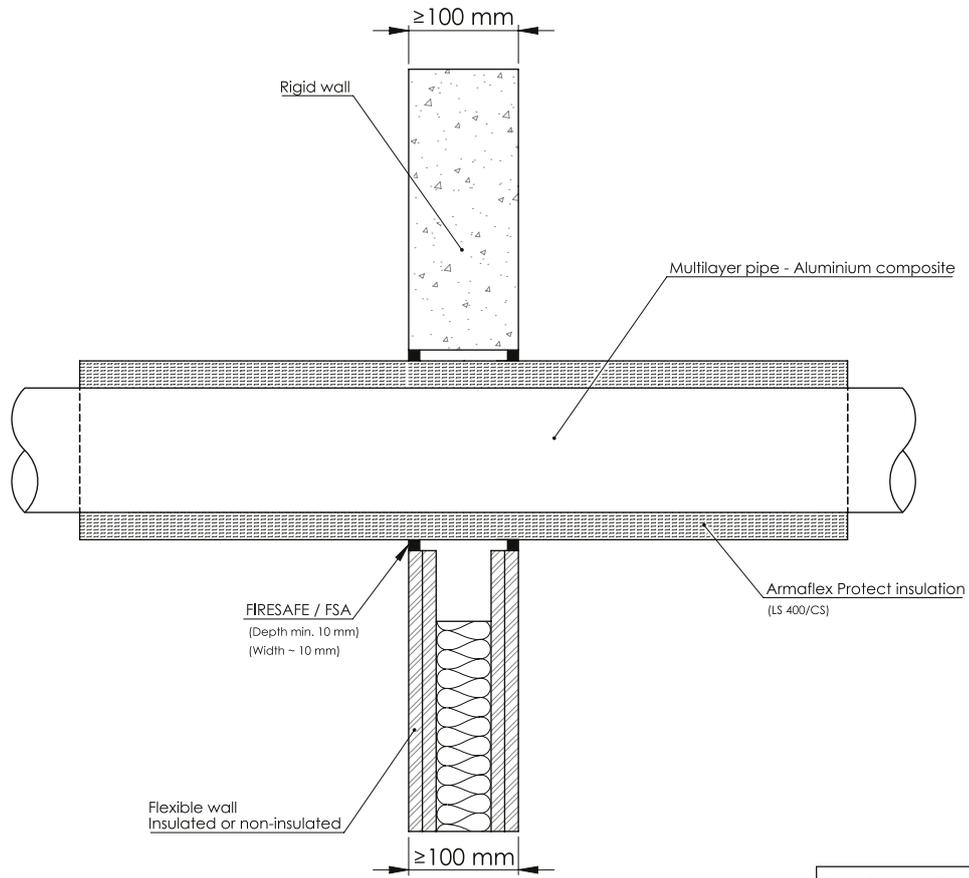
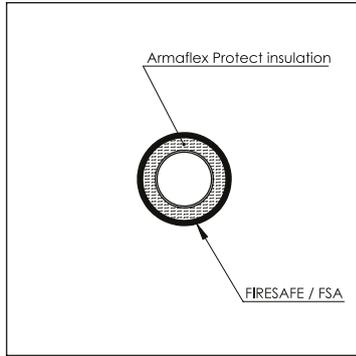
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Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Multilayer pipes (MLC)	≤ Ø 40	3.5	Stone wool (≥ 80 kg/m ³)	≥ 25	LI 400 / CI	FIRESAFE / FSA ≥ 10 x 20 (wxd)	EI 90 U/C

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

A.1.3.3 Multilayer pipes (MLC) - ArmaFlex Protect LS 400 / CS

Front view

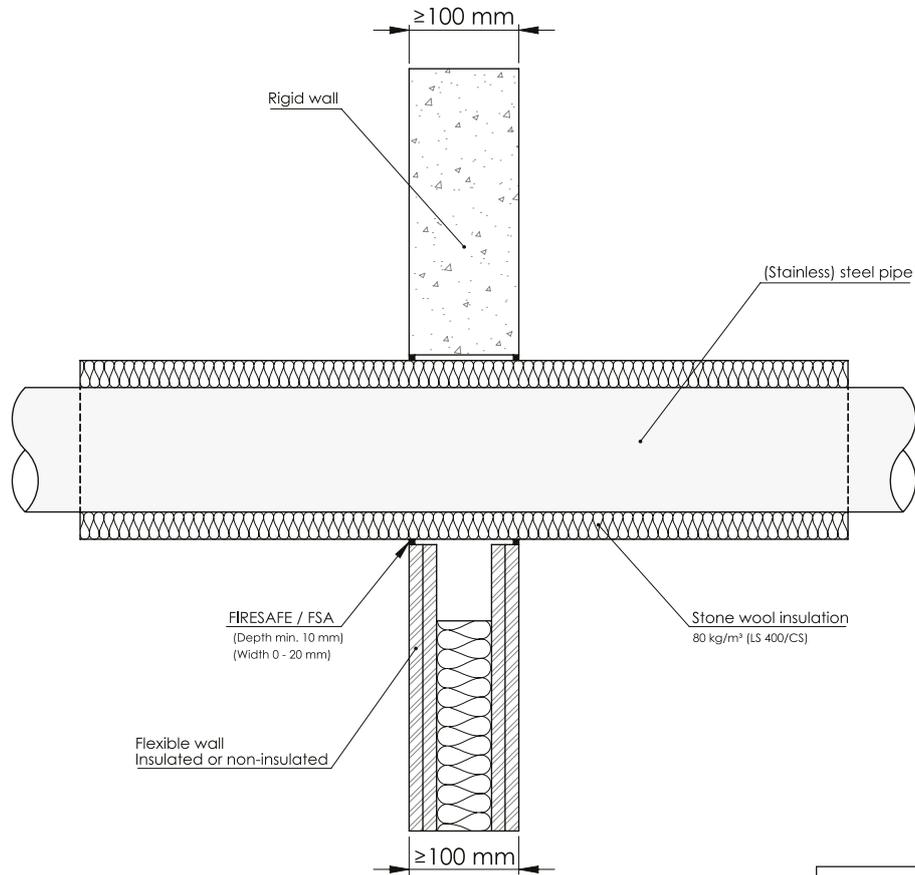
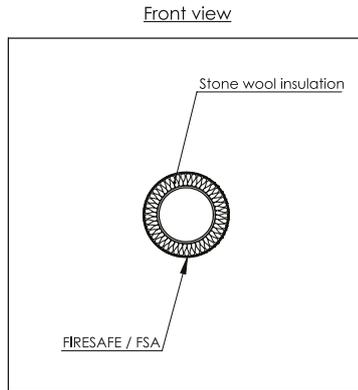


Drawing: FW.E-MLA-MSP2.2.22

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Multilayer pipes (MLC)	≤ Ø 26	3.0 - 5.0	ArmaFlex Protect	20	LS 400 / CS	FIRESAFE / FSA 10 x ≥ 10 (wxd)	EI 120 U/C
	≤ Ø 75	5.0		25			

A.1.4 Flexible or rigid wall - Metal pipes insulated

A.1.4.1 Copper and steel pipes - Stone wool LS 400 / CS



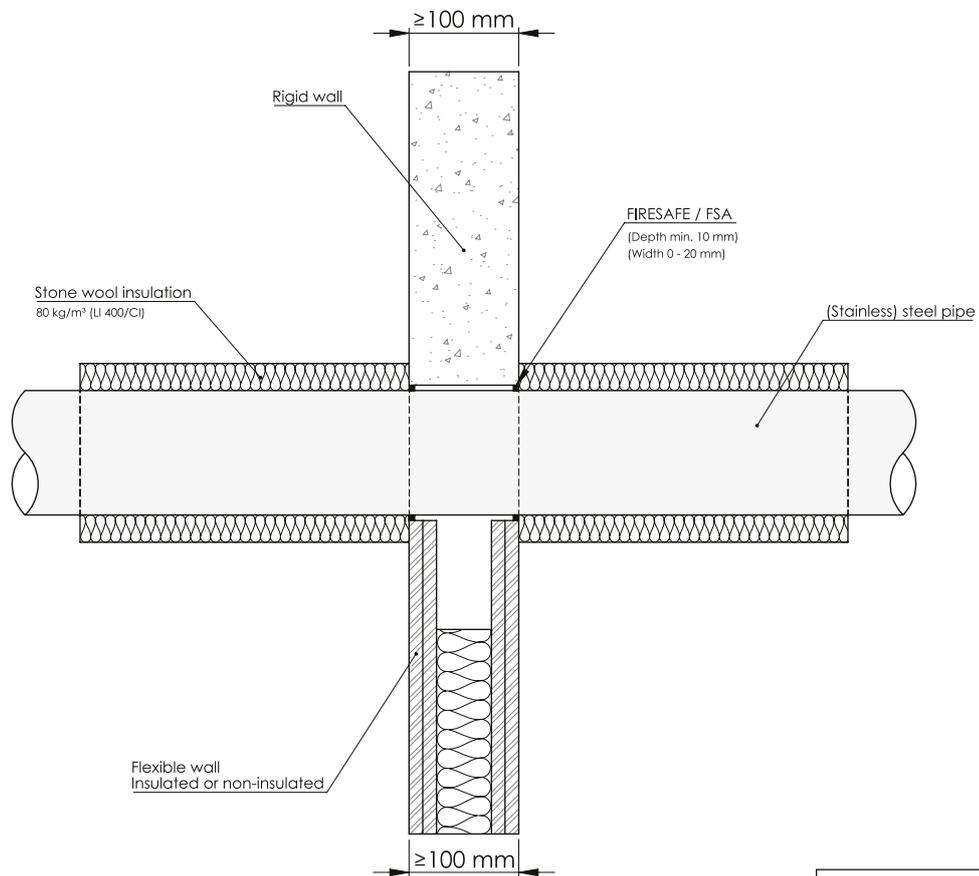
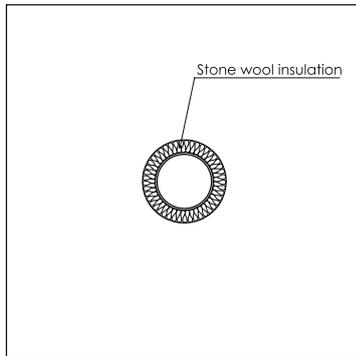
Drawing: FW.E-ST-MSP2.2.20.LS

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	Stone wool (≥ 80 kg/m ³)	25	LS 400 / CS	FIRESAFE / FSA 0-20 x ≥ 10 (wxd)	EI 120 C/U
	≤ Ø 54	≥ 1.5					
(Stainless) Steel / cast iron	≤ Ø 12	≥ 1.5					
	≤ Ø 114,3	≥ 3.6					
	≤ Ø 219,1	≥ 4.0					
	≤ Ø 324	≥ 3.7		30	CS		EI 60 C/U EI 60 C/U E 120 C/U EI 90 C/U E 120 C/U

A.1.4 Flexible or rigid wall - Metal pipes insulated

A.1.4.2 Copper and steel pipes - Stone wool LI 400 / CI

Front view



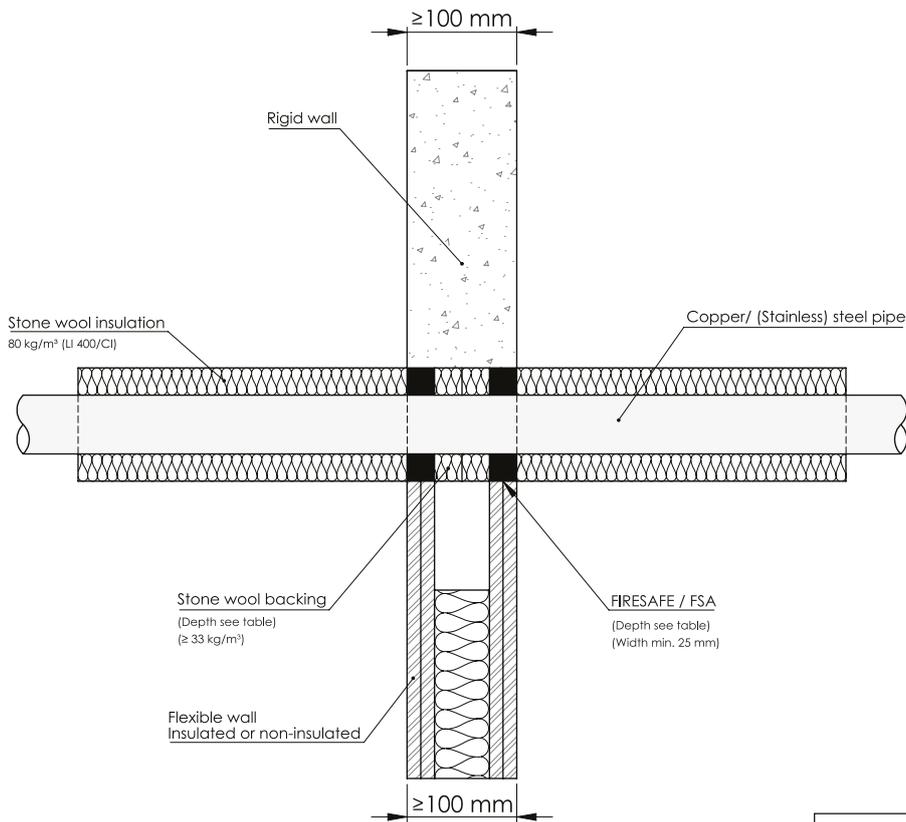
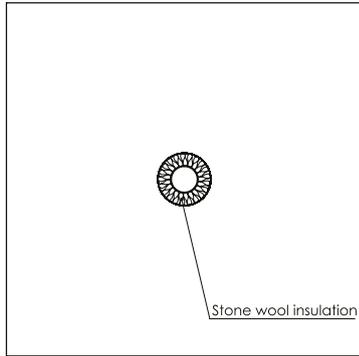
Drawing: FW.E-ST-MSP2.2.20.LI

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	Stone wool (≥ 80 kg/m ³)	≥ 25	LI 400 / CI	FIRESAFE / FSA 0-20 x ≥ 10 (wxd)	EI 120 C/U
	≤ Ø 54	≥ 1.5					
(Stainless) Steel / cast iron	≤ Ø 114.3	≥ 3.6					
	≤ Ø 324	≥ 3.7					

A.1.4 Flexible or rigid wall - Metal pipes insulated

A.1.4.2 Copper and steel pipes - Stone wool LI 400 / CI

Front view



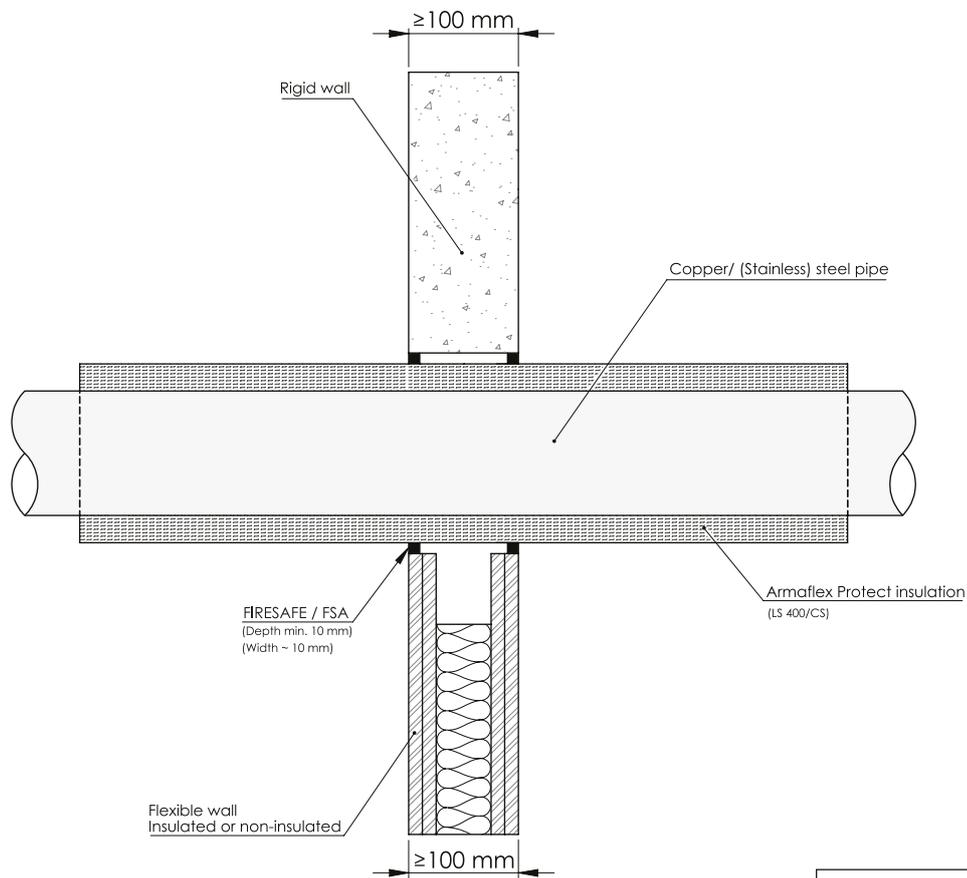
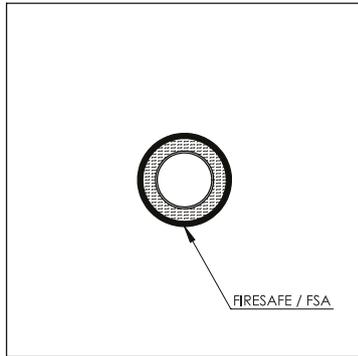
Drawing: FW.E-CU-MSP2.2.20

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	Stone wool (≥ 80 kg/m ³)	≥ 25	LI 400 / CI	FIRESAFE / FSA ≥ 25 x 25 (wxd)	25 mm stone wool (≥ 33 kg/m ³)	EI 120 C/U
						FIRESAFE / FSA ≥ 25 x 12.5 (wxd)	12.5 mm stone wool (≥ 33 kg/m ³)	EI 90 C/U E 120 C/U

A.1.4 Flexible or rigid wall - Metal pipes insulated

A.1.4.3 Copper and steel pipes - ArmaFlex Protect LS 400 / CS

Front view



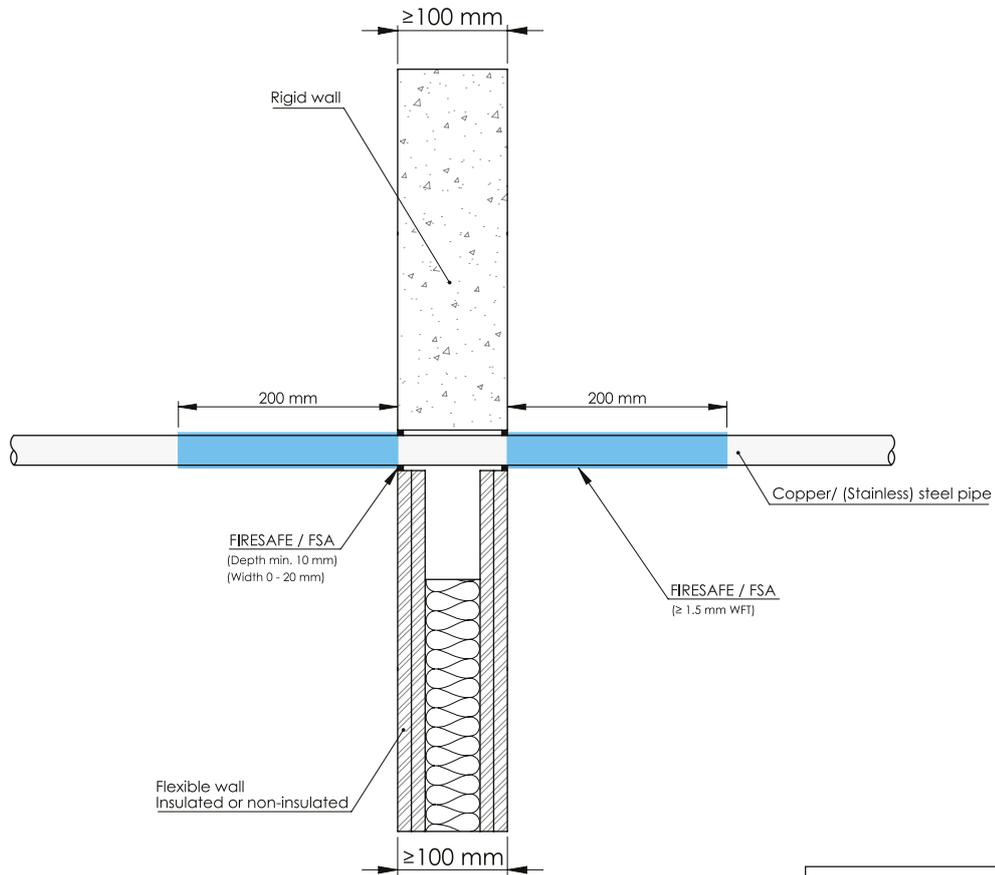
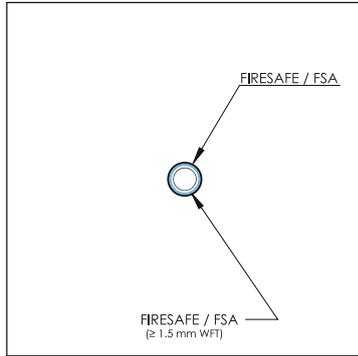
Drawing: FW.E-CU-MSP2.2.22

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	$\leq \varnothing 22$	≥ 1.0	ArmaFlex Protect	20 - 25	LS 400 / CS	FIRESAFE / FSA 10 x ≥ 10 (wxd)	EI 120 U/C
	$\leq \varnothing 54$	≥ 1.5		25			EI 90 C/U, E 120 C/U

A.1.5 Flexible or rigid wall - Metal pipes uninsulated

A.1.5.1 Copper and steel pipes - FIRESAFE / FSA coated on pipe

Front view



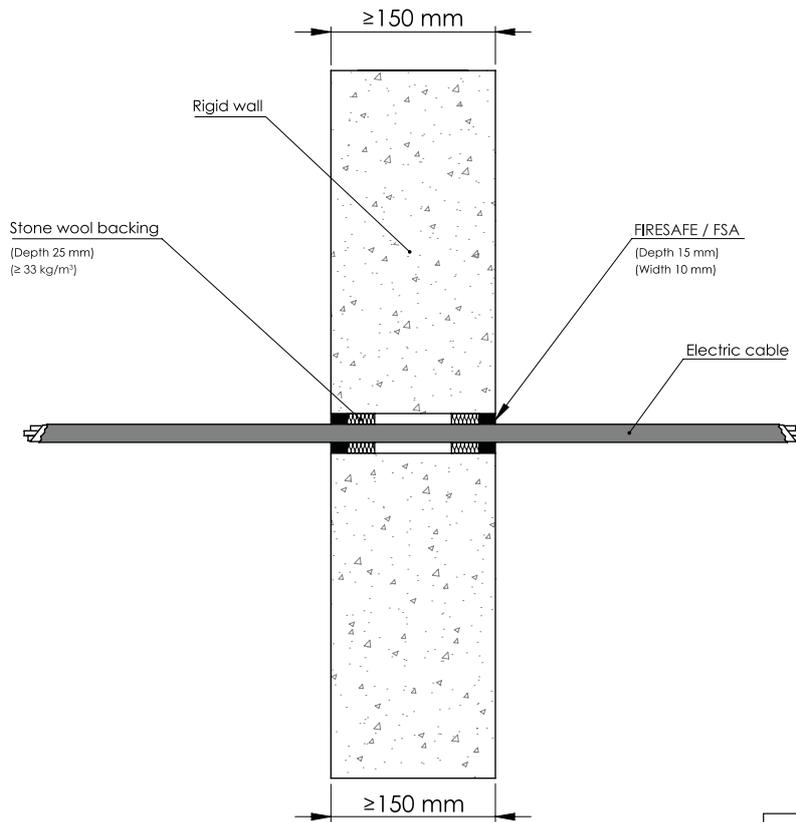
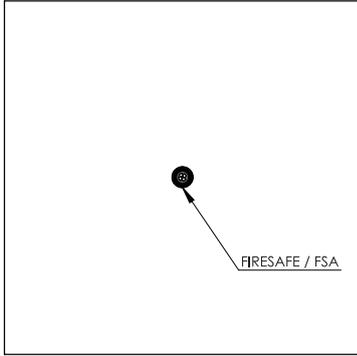
Drawing: FW.E-CU-SPC-MSP2.2.10

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	$\leq \varnothing 15$	≥ 1.0	FIRESAFE / FSA	1.5 WFT	LI 200	FIRESAFE / FSA 0-20 x ≥ 10 mm (wxd)	EI 60 C/U, E 120 C/U
	$\leq \varnothing 22$	≥ 1.0					EI 45 C/U, E 120 C/U
(Stainless) Steel / cast iron	$\leq \varnothing 16$	≥ 1.0					EI 90 C/U
	$\leq \varnothing 26.9$	≥ 2.6					EI 90 C/U, E 120 C/U
	$\leq \varnothing 42.4$	≥ 3.2					
	$\leq \varnothing 60.3$	≥ 3.6					EI 60 C/U, E 120 C/U

A.2.1 Rigid wall - Cables

A.2.1.1 Single cables

Front view



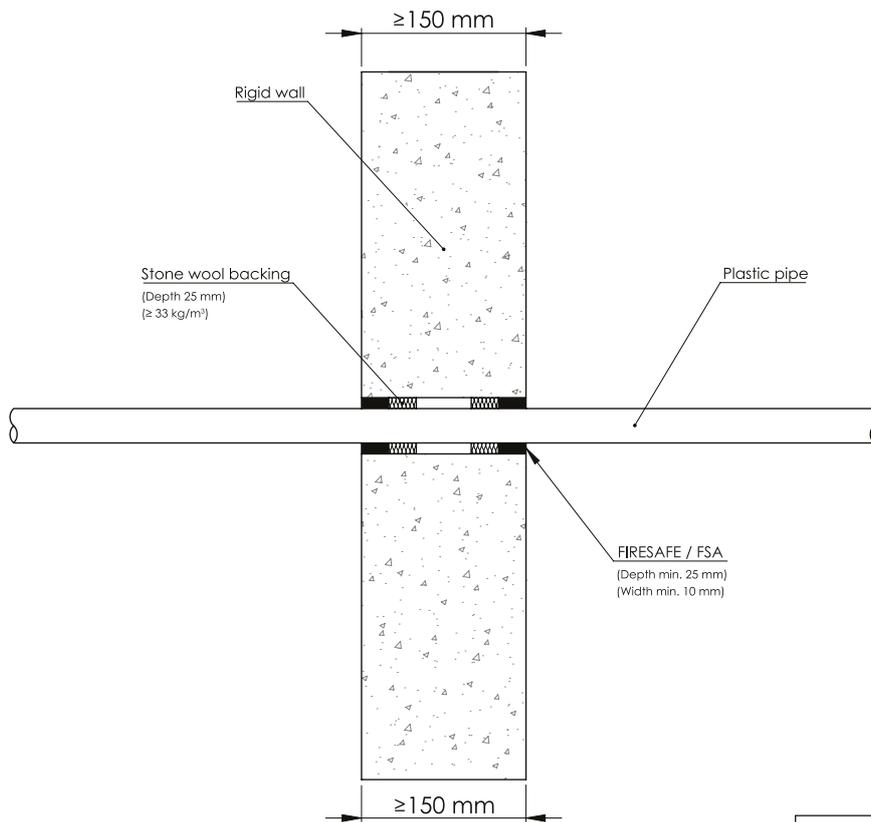
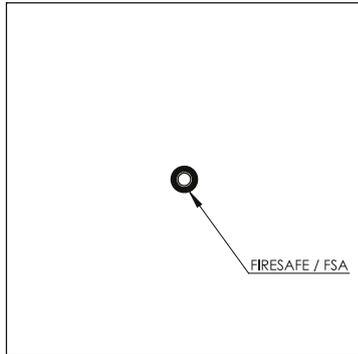
Drawing: RW150.E-EC-MSP2.2.10

Services	Sealing (mm)	Backing	Classification
Single electrical cables $\leq \varnothing 21$ mm	FIRESAFE / FSA $\geq 10 \times 15$ (wxd)	25 mm, stone wool (≥ 33 kg/m ³)	EI 60, E 180

A.2.2 Rigid wall - Combustible pipes

A.2.2.1 Plastic pipes

Front view



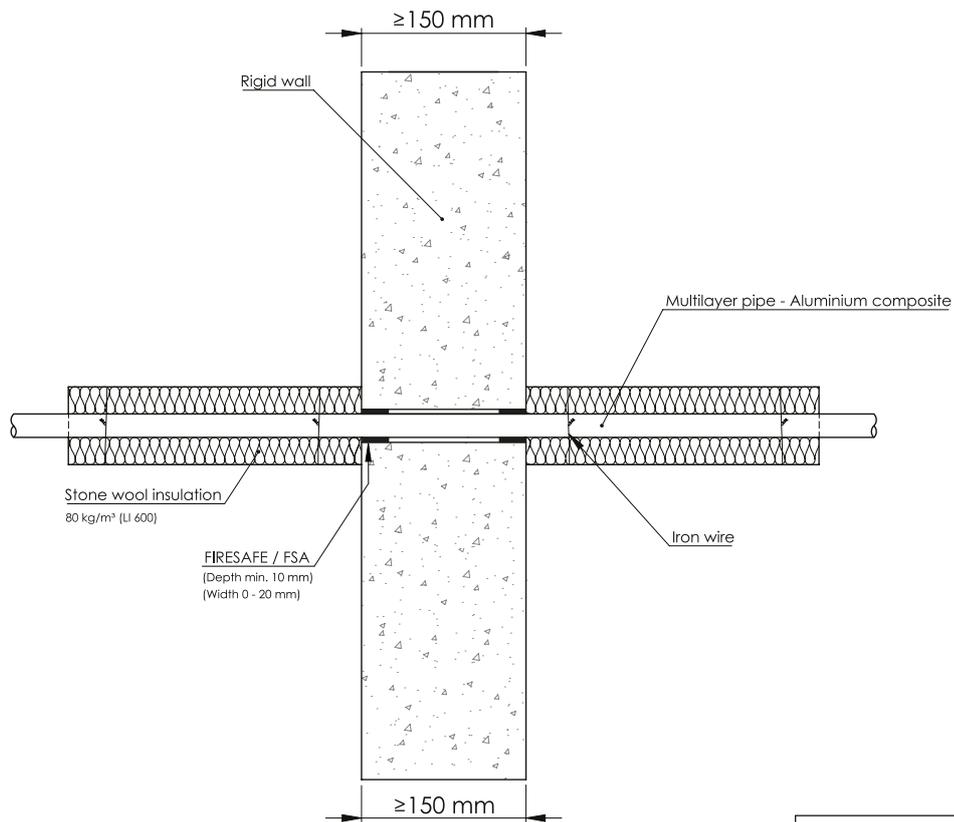
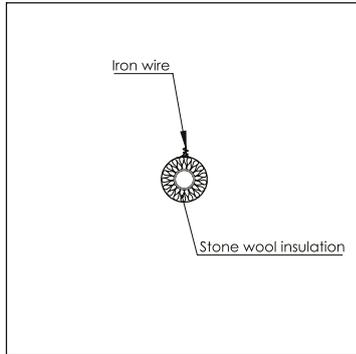
Drawing: RW150.E-PP-MSP2.2.10

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
PE(-HD) / PE-X / ABS / SAN+PVC	≤ Ø 32	2.0 - 4.4	FIRESAFE / FSA ≥ 10 x 25 (wxd)	25 mm stone wool (≥ 33 kg/m ³)	EI 240 U/C
PP		2.0 - 5.4			
PVC(-U/-C)		2.0 - 4.4			

A.2.3 Rigid wall - Multilayer pipes (MLC)

A.2.3.1 Multilayer pipes (MLC) - Stone wool LI 600 / CI

Front view

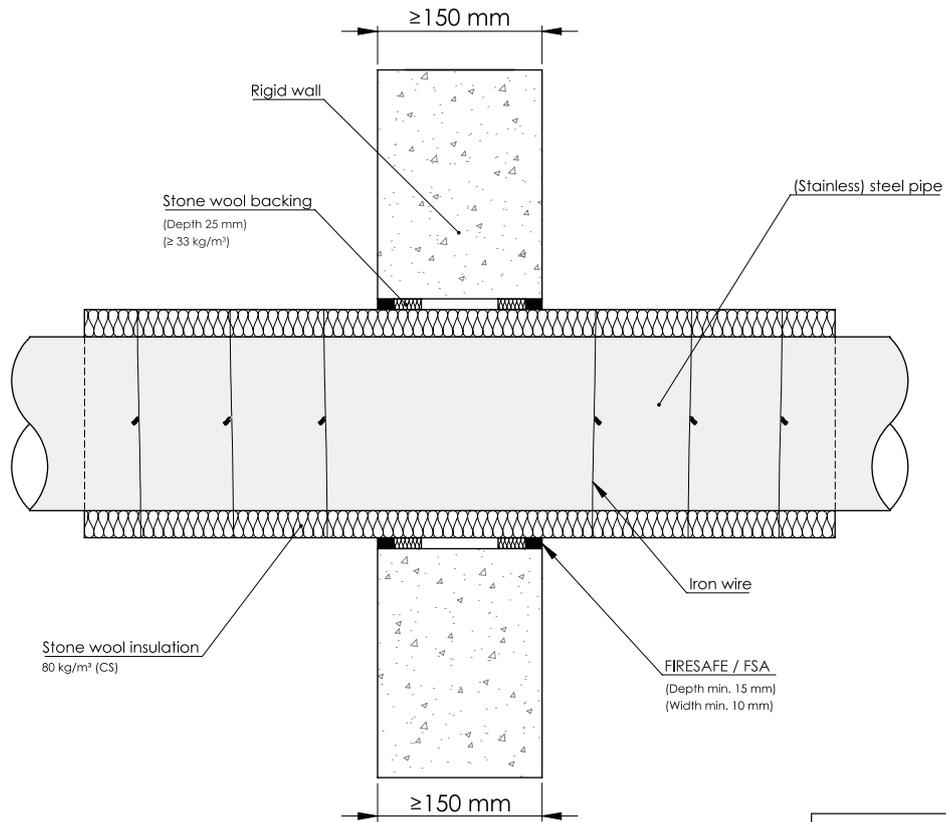
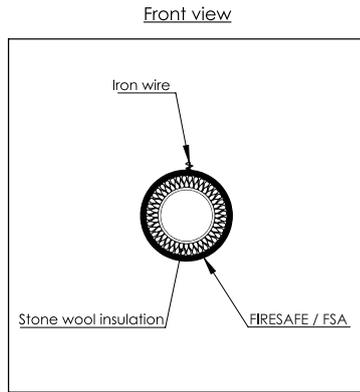


Drawing: RW150,E-MLA-1.0.20,LI

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Multilayer pipes (MLC)	$\leq \varnothing 20$	2.0	Stone wool ($\geq 80 \text{ kg/m}^3$)	≥ 25	LI 600 / CI	FIRESAFE / FSA 0 - 20 x ≥ 10 (wxd)	EI 240 C/U

A.2.4 Rigid wall - Metal pipes insulated mineral wool

A.2.4.1 Steel pipes - Stone wool CS



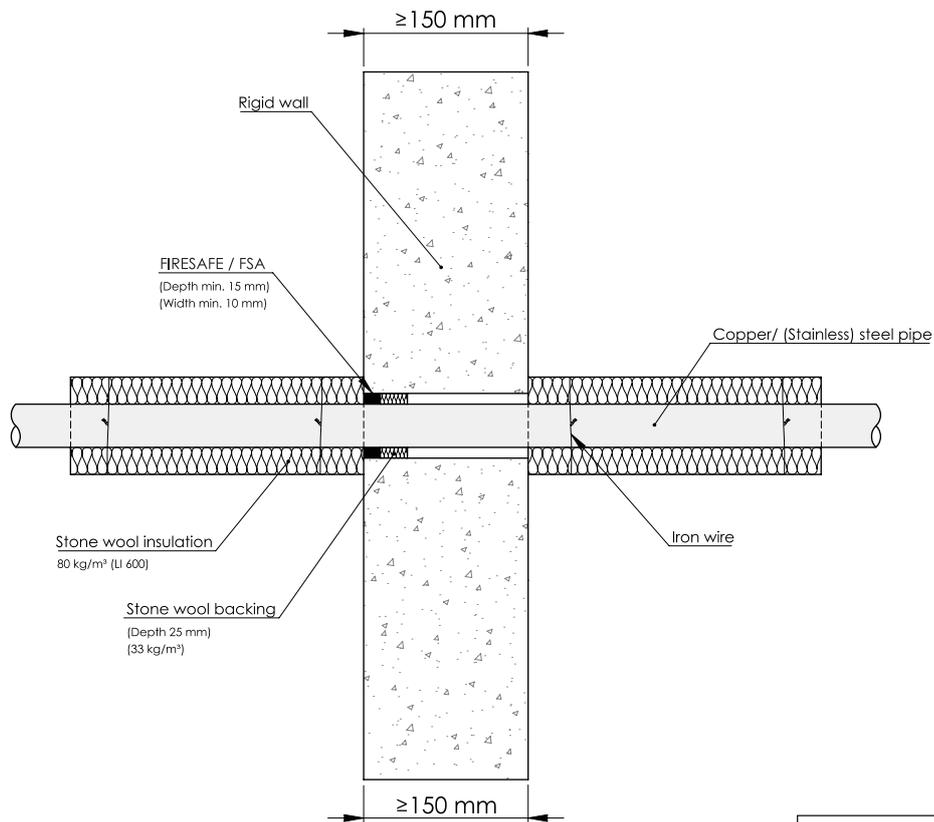
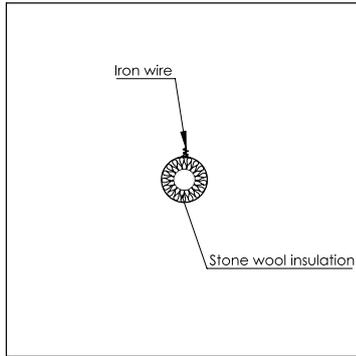
Drawing: RW150.E-ST-MSP2.2.20

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
(Stainless) Steel / cast iron	≤ Ø 40	≥ 1.0	Stone wool (≥ 80 kg/m³)	30	CS	FIRESAFE / FSA ≥ 10 x 15 (wxd)	25 mm stone wool (≥ 33 kg/m³)	EI 240 C/U
	≤ Ø 324	≥ 6.3						

A.2.4 Rigid wall - Metal pipes insulated mineral wool

A.2.4.2 Copper and steel pipes - Stone wool LI 600 / CI

Front view



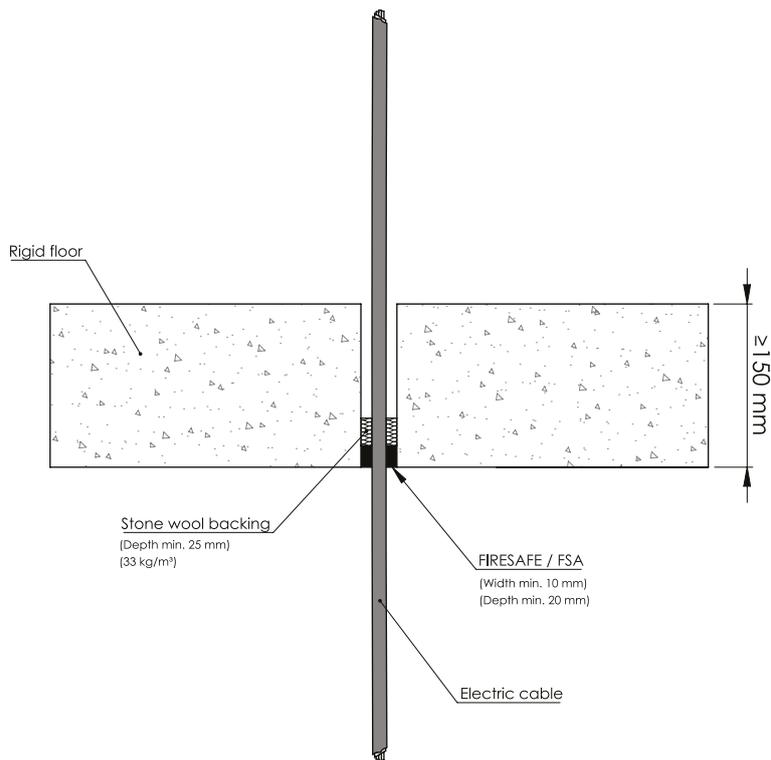
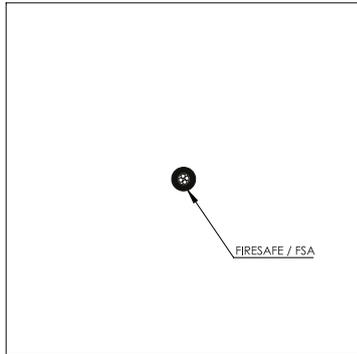
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Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	$\leq \varnothing 22$	≥ 1.0	Stone wool ($\geq 80 \text{ kg/m}^3$)	≥ 25	LI 600 / CI	FIRESAFE / FSA $\geq 10 \times 15 \text{ mm}$ (wxd) either side	25 mm stone wool ($\geq 33 \text{ kg/m}^3$)	EI 120 C/U E 240 C/U
	$\leq \varnothing 54$	≥ 1.5		≥ 30				
(Stainless) Steel / cast iron	$\leq \varnothing 219$	≥ 4.0						

B.1.1 Rigid floor - Cables

B.1.1.1 Single cables

Bottom view



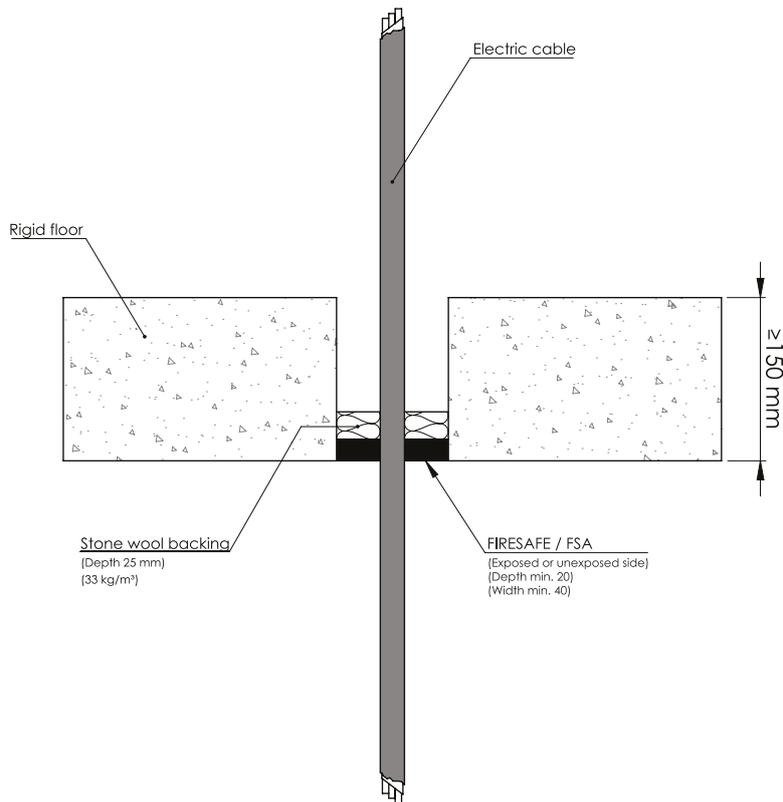
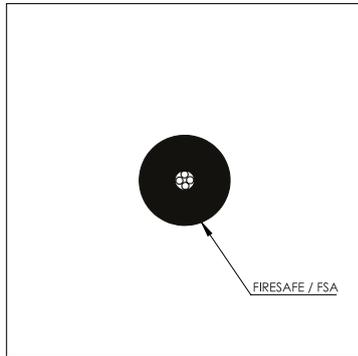
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Services	Sealing (mm)	Sealing side	Backing	Classification
Cables ≤ Ø 21 mm	FIRESAFE / FSA ≥ 10 x 20 (wxd)	Either side	25 mm, stone wool (≥ 33 kg/m ³)	EI 120

B.1.1 Rigid floor - Cables

B.1.1.2 Single cables - Bottom of floor

Bottom view

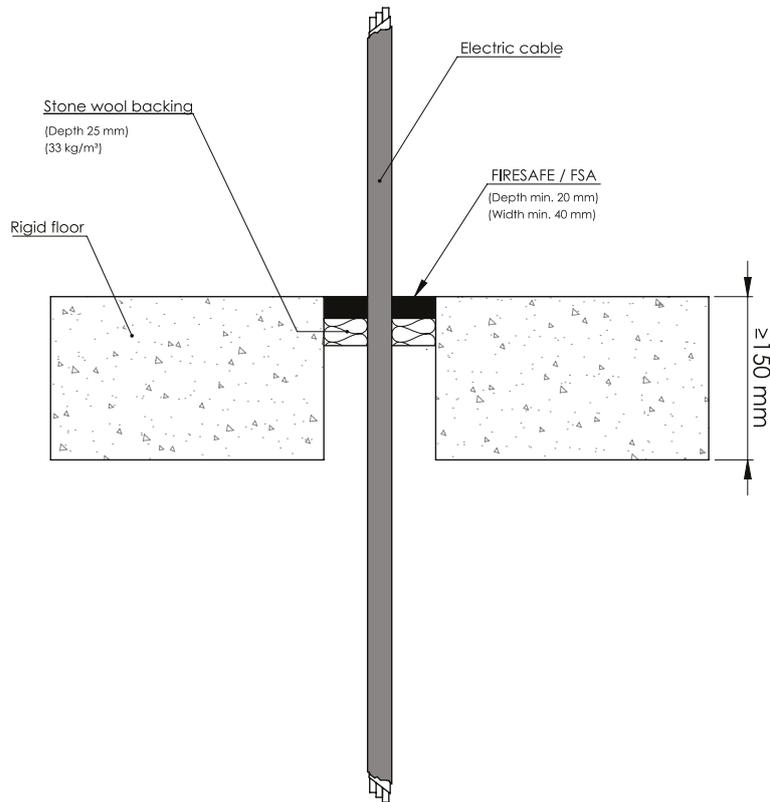
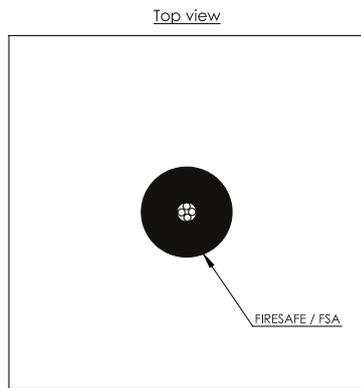


Drawing: RF.E-EC-MSP1.12.1.2.10

Services	Sealing (mm)	Sealing side	Backing	Classification
Cables ≤ Ø 21 mm	FIRESAFE / FSA ≥ 40 x 20 (wxd)	Bottom of floor	25 mm, stone wool (≥ 33 kg/m ³)	EI 180, E 240

B.1.1 Rigid floor - Cables

B.1.1.3 Single cables - Top of floor

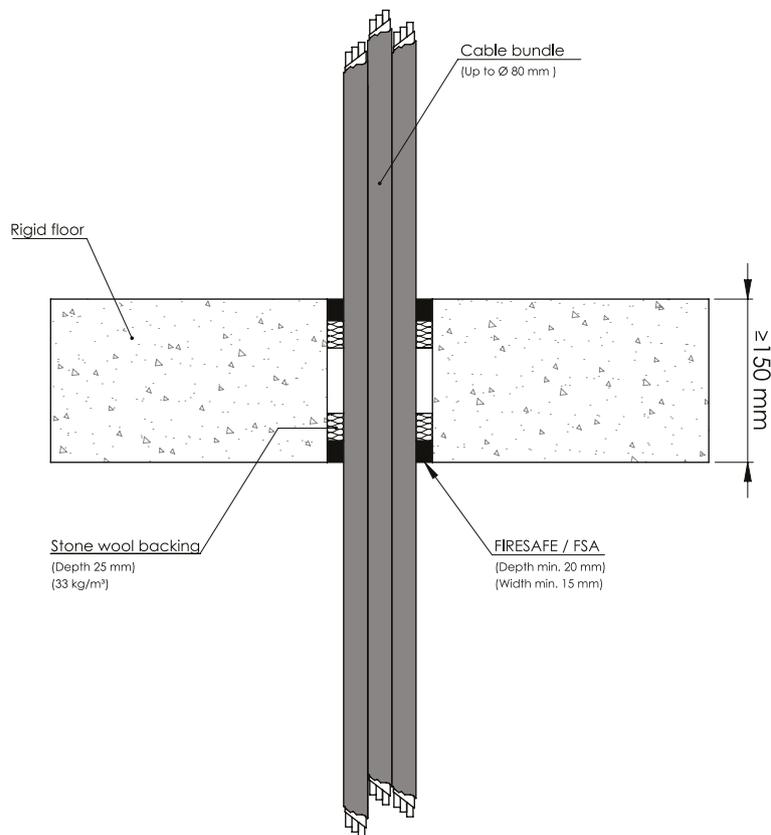
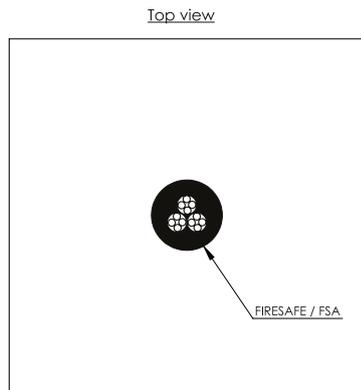


Drawing: RF,E-EC-MSP1.12.1.3.10

Services	Sealing (mm)	Sealing side	Backing	Classification
Cables ≤ Ø 21 mm	FIRESAFE / FSA ≥ 40 x 20 (wxd)	Top of floor	25 mm, stone wool (≥ 33 kg/m ³)	EI 60, E 240

B.1.1 Rigid floor - Cables

B.1.1.4 Multiple cables



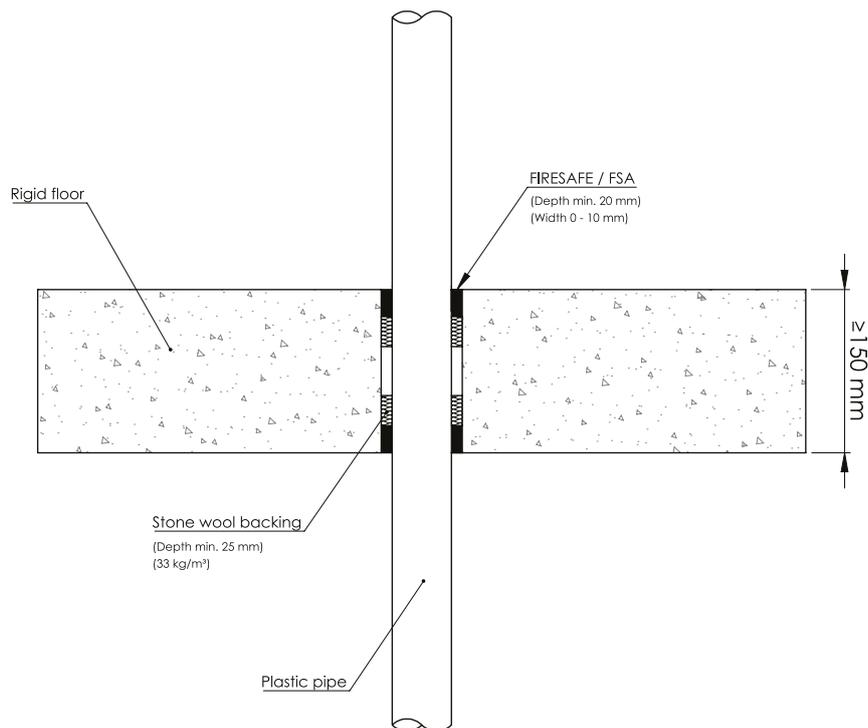
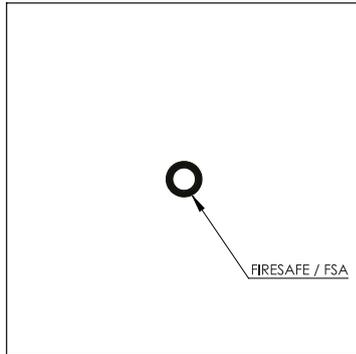
Drawing: RF.E-ECB-MSP2.18.2.1.10

Services	Sealing (mm)	Backing	Classification
Cables $\leq \varnothing$ 21 mm in a tied bundle $\leq \varnothing$ 100 mm	FIRESAFE / FSA	25 mm, stone wool	EI 120
Cables $\leq \varnothing$ 80 mm, max. 3pcs	$\geq 15 \times 20$ (wxd)	(≥ 33 kg/m ³)	EI 60, E 240

B.1.2 Rigid floor - Combustible pipes

B.1.2.1 Plastic pipes

Top view



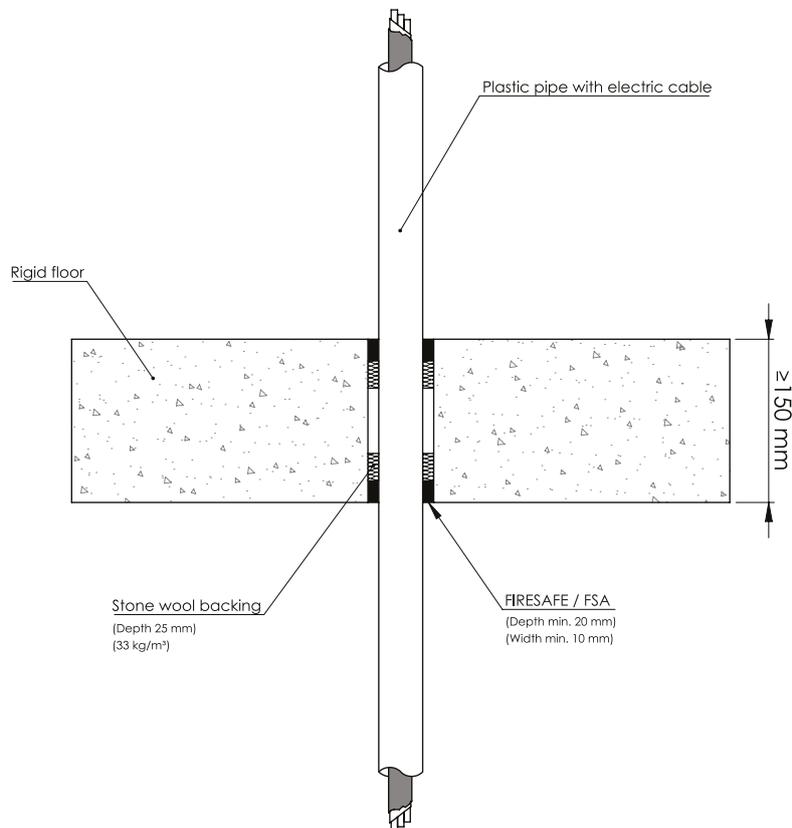
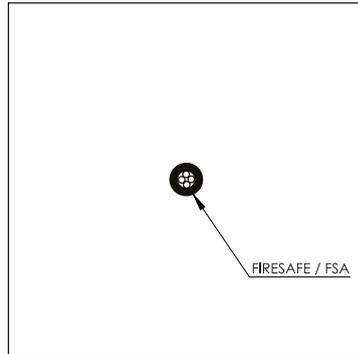
Drawing: RF.E-PP-MSP2.2.10

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
PE(-HD) / PE-X / ABS / SAN+PVC	≤ Ø 40	2.0	FIRESAFE / FSA ≥ 10 x 20 (wxd)	25 mm stone wool (≥ 33 kg/m³)	EI 90 U/C, E 240 U/C
		2.0 - 3.7			EI 120 U/C
PP		1.8			EI 240 U/C
		1.8 - 3.7			EI 120 U/C
PVC(-U/-C)	≤ Ø 50	2.0 - 3.0			EI 240 U/C
		3.0			EI 240 U/C

B.1.2 Rigid floor - Combustible pipes

B.1.2.2 Plastic pipes with cables

Bottom view



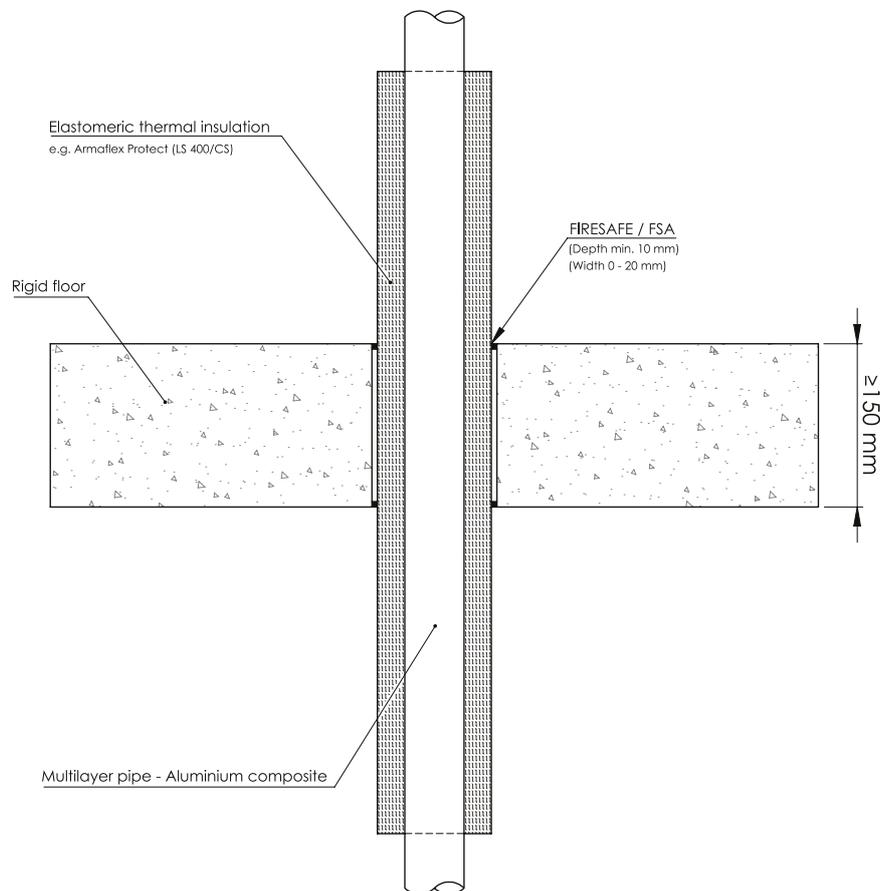
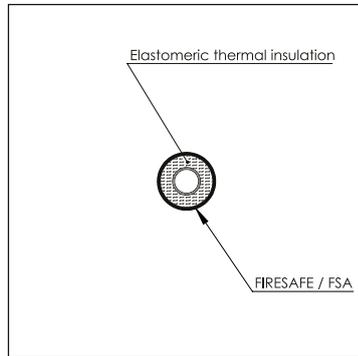
Drawing: RF.E-PPEC-MSP2.2.10

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
PE(-HD) / PE-X / ABS / SAN+PVC	Filled with cables ≤ Ø 21 mm	≤ Ø 40	FIRESAFE / FSA ≥ 10 x 20 (wxd)	25 mm stone wool (≥ 33 kg/m ³)	EI 240 U/C
PVC(-U/-C)					
PP		1.8			

B.1.3 Rigid floor - Multilayer pipes (MLC) insulated elastomer

B.1.3.1 Multilayer pipes (MLC) - ArmaFlex Protect LS 400 / CS

Bottom view



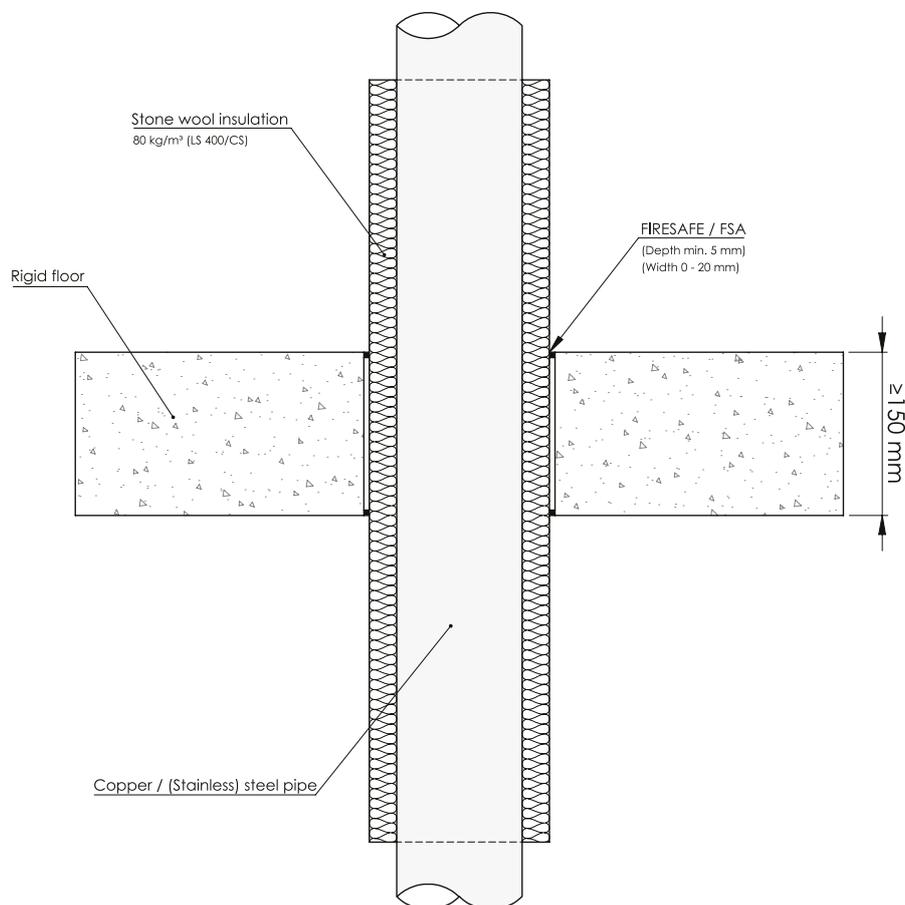
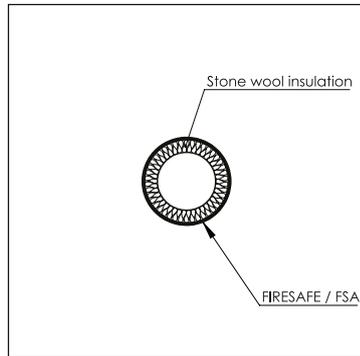
Drawing: RF.E-MLA-0.22

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Multilayer pipes (MLC)	$\leq \text{Ø } 26$	3.0 - 6.0	ArmaFlex Protect	20	LS 400 / CS	FIRESAFE / FSA 0-20 x ≥ 10 (wxd)	EI 120 U/C
	$\leq \text{Ø } 75$	6.0		25			

B.1.4 Rigid floor - Metal pipes insulated

B.1.4.1 Copper and steel pipes - Stone wool LS 400 / CS

Bottom view



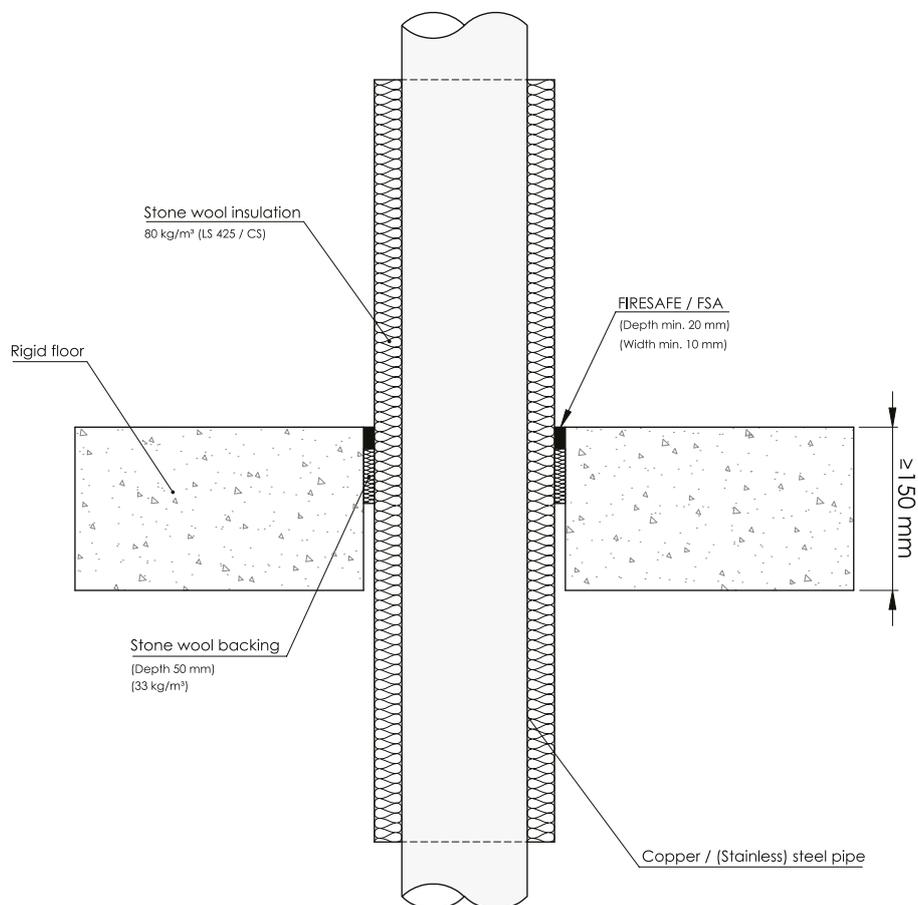
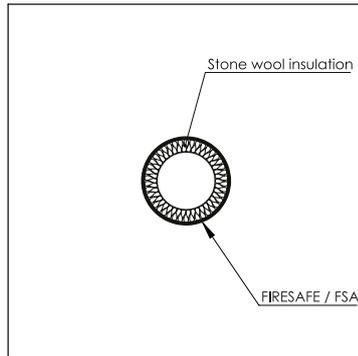
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Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	Stone wool (≥ 80 kg/m ³)	25	LS 400 / CS	FIRESAFE / FSA 0-20 x ≥ 5 (wxd)	EI 120 C/U
	≤ Ø 54	≥ 1.5					
(Stainless) Steel / cast iron	≤ Ø 114.3	≥ 3.6		30			
	≤ Ø 324	≥ 3.7					

B.1.4 Rigid floor - Metal pipes insulated

B.1.4.2 Copper and steel pipes - Stone wool LS 425 / CS

Bottom view



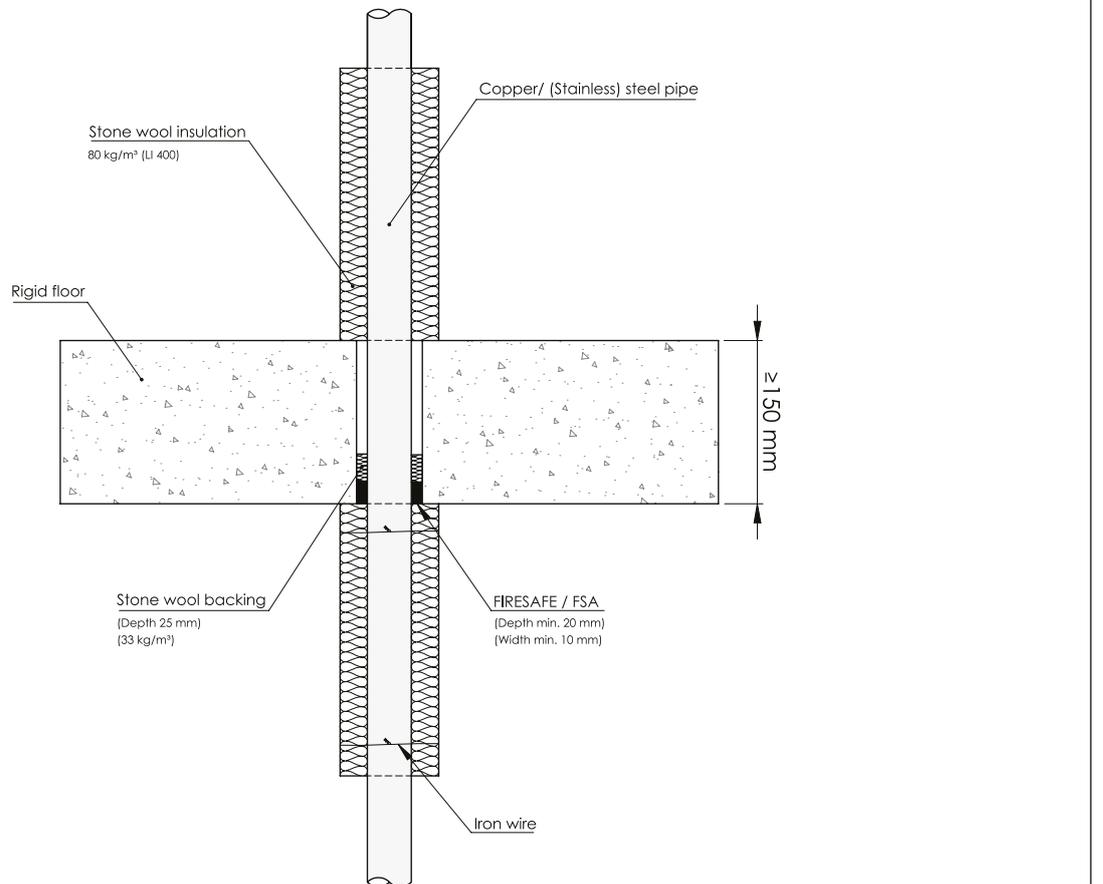
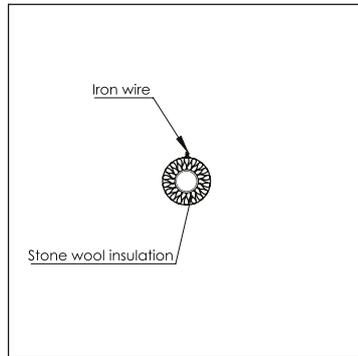
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Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	Stone wool (≥ 80 kg/m³)	≥ 25	LS 425 / CS	FIRESAFE / FSA ≥ 10 x 20 (wxd) top of floor	50 mm stone wool (≥ 33 kg/m³)	EI 180 C/U E 240 C/U
	≤ Ø 54	≥ 1.5		≥ 30				CS
(Stainless) Steel / cast iron	≤ Ø 114.3	≥ 3.6		≥ 50				
	≤ Ø 324	≥ 6.3						

B.1.4 Rigid floor - Metal pipes insulated

B.1.4.3 Copper and steel pipes - Stone wool LI 400 / CI - Bottom of floor

Bottom view



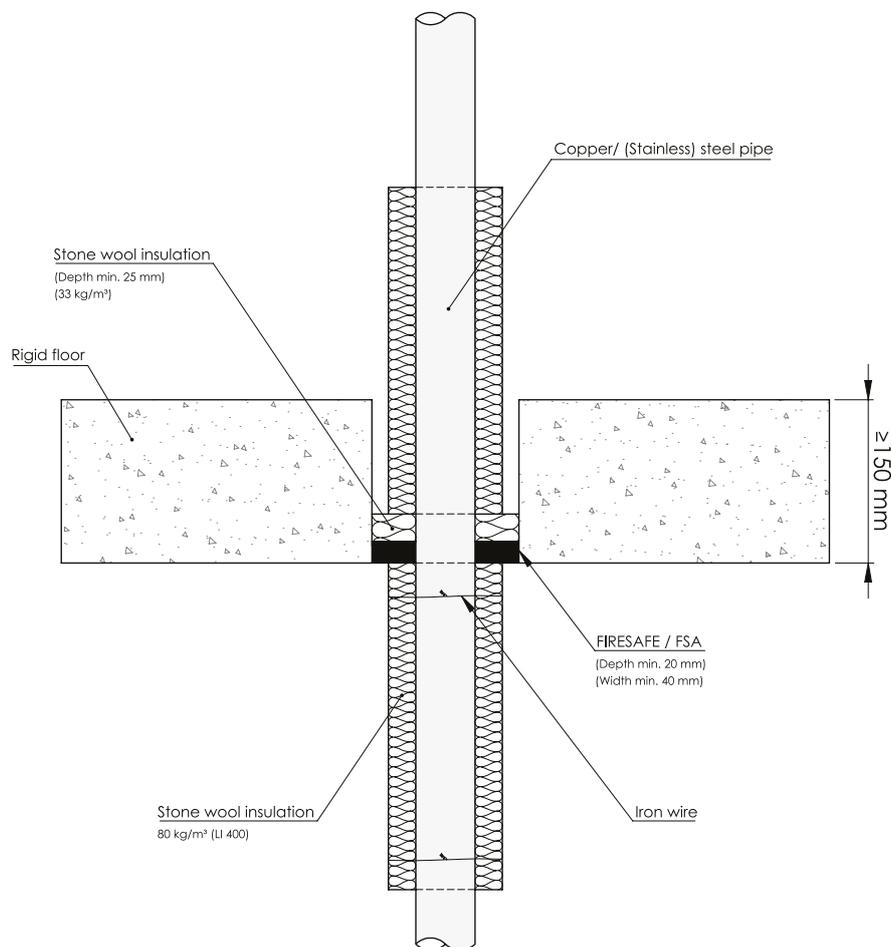
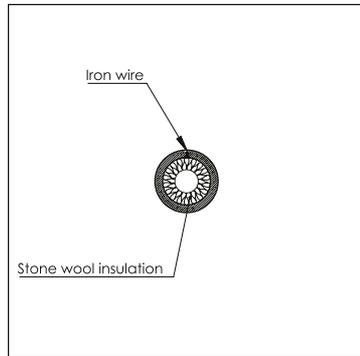
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Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	Stone wool (≥ 80 kg/m ³)	≥ 25	LI 400 / CI	FIRESAFE / FSA ≥ 10 x 20 (wxd) bottom of floor	25 mm stone wool (≥ 33 kg/m ³)	EI 180 C/U
	≤ Ø 54	≥ 1.5						E 240 C/U
(Stainless) Steel / cast iron	≤ Ø 114.3	≥ 3.6						EI 240 C/U
	≤ Ø 219	≥ 4.0						EI 120 C/U E 240 C/U

B.1.4 Rigid floor - Metal pipes insulated

B.1.4.4 Copper and steel pipes - Stone wool LI 400 / CI - w40 x d20 mm, bottom of floor

Bottom view



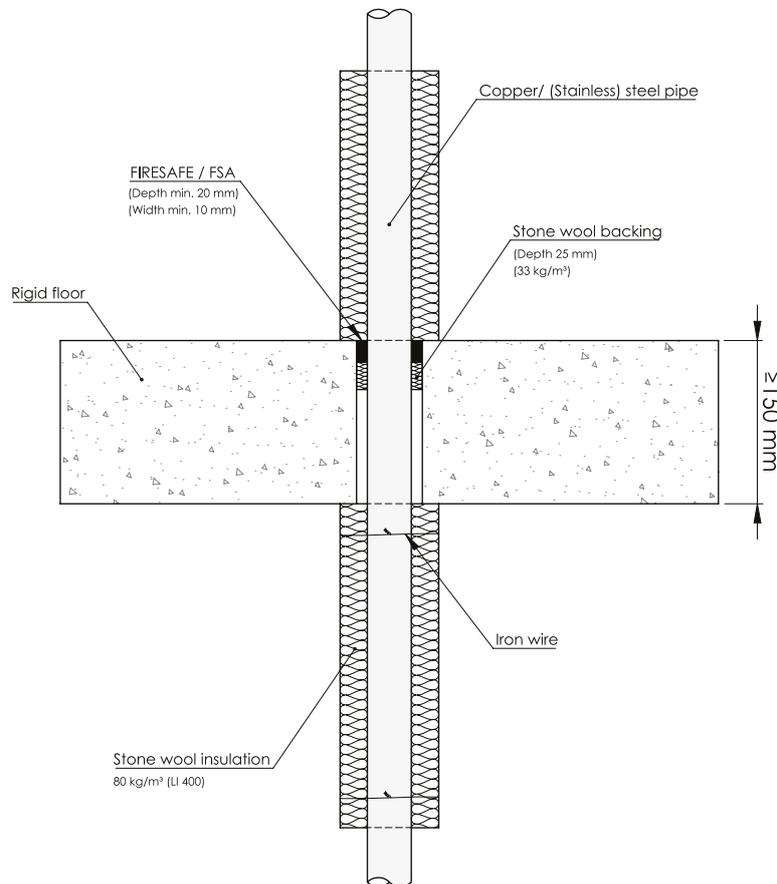
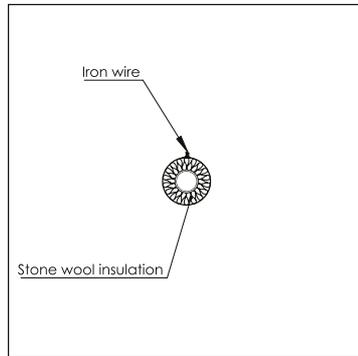
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Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 54	≥ 1.5	Stone wool (≥ 80 kg/m ³)	≥ 25	LI 400 / CI	FIRESAFE / FSA ≥ 40 x 20 (wxd) bottom of floor	25 mm stone wool (≥ 33 kg/m ³)	EI 180 C/U E 240 C/U

B.1.4 Rigid floor - Metal pipes insulated

B.1.4.5 Copper and steel pipes - Stone wool LI 400 / CI - Top of floor

Bottom view

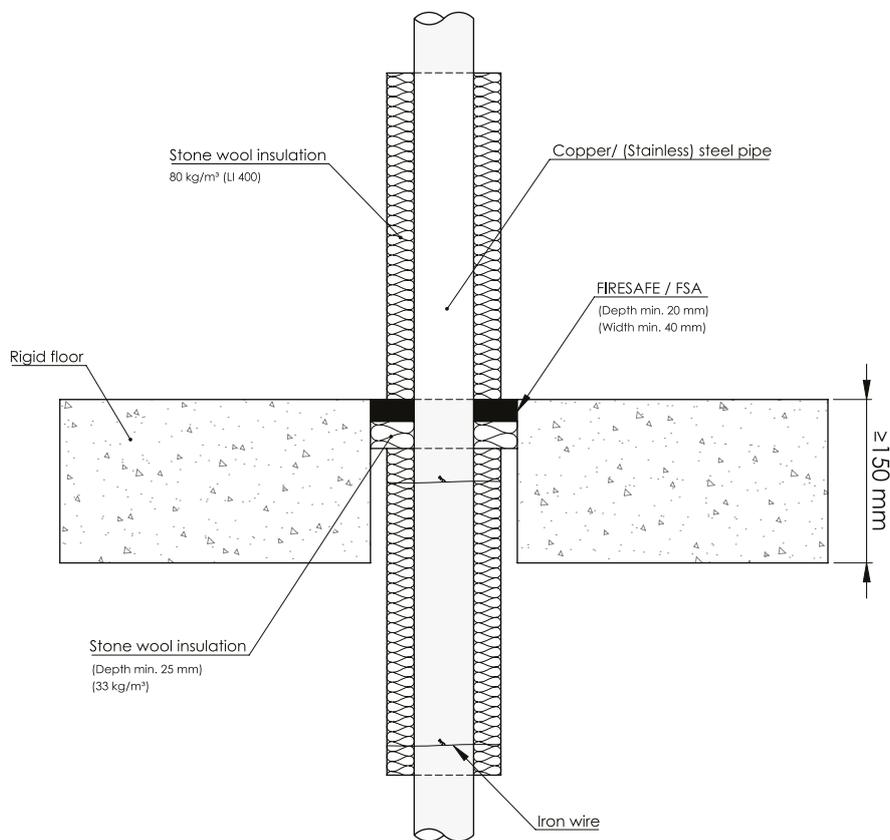
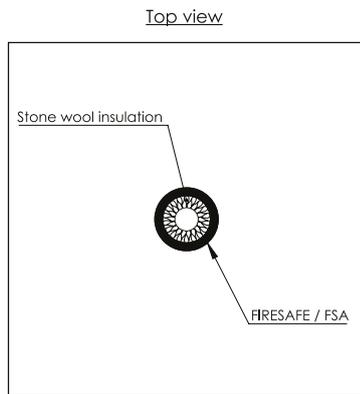


Drawing: RF.E-CU-MSP1.18.1.3.20

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	$\leq \text{Ø } 22$	≥ 1.1	Stone wool ($\geq 80 \text{ kg/m}^3$)	≥ 25	LI 400 / CI	FIRESAFE / FSA $\geq 10 \times 20$ (wxd) top of floor	25 mm stone wool ($\geq 33 \text{ kg/m}^3$)	EI 240 C/U
	$\leq \text{Ø } 54$	≥ 1.5						EI 180 C/U
(Stainless) Steel / cast iron	$\leq \text{Ø } 114.3$	≥ 3.6						EI 240 C/U
	$\leq \text{Ø } 219$	≥ 4.0						EI 120 C/U
							EI 240 C/U	

B.1.4 Rigid floor - Metal pipes insulated

B.1.4.6 Copper and steel pipes - Stone wool LI 400 / CI - w40 x d20 mm, top of floor



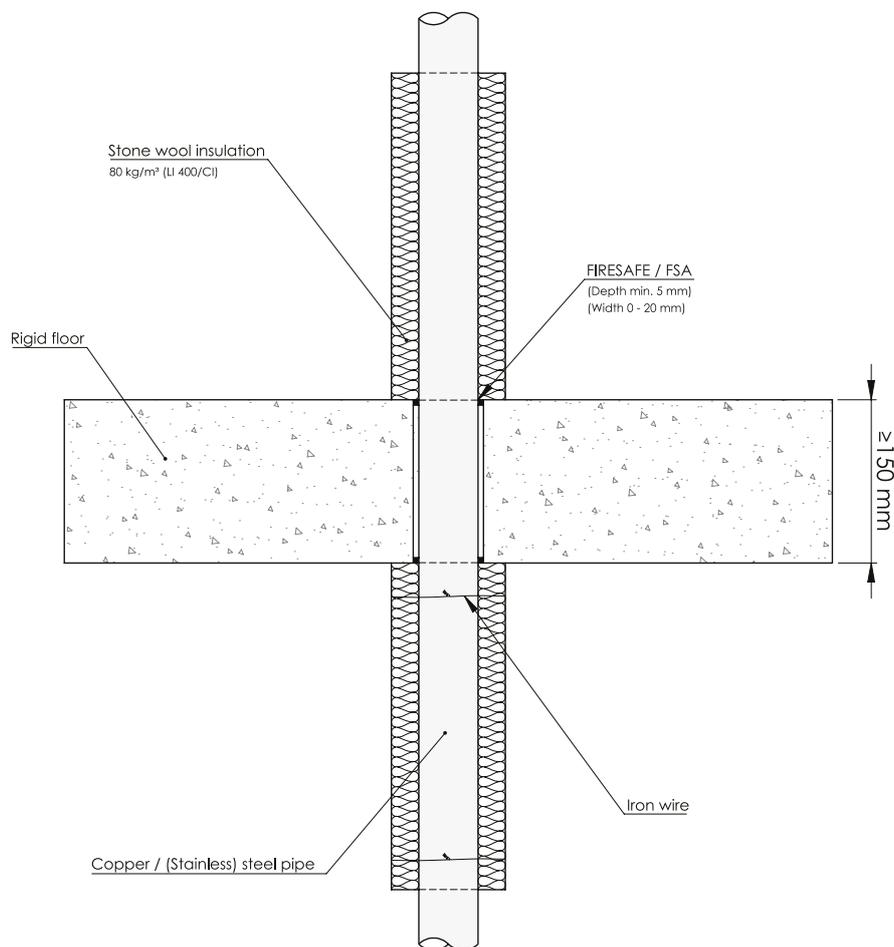
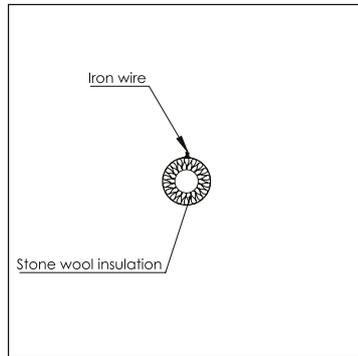
Drawing: RF-E-CU-MSP1.12.1.3.20

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	$\leq \text{Ø } 54$	≥ 1.5	Stone wool ($\geq 80 \text{ kg/m}^3$)	≥ 25	LI 400 / CI	FIRESAFE / FSA $\geq 40 \times 20$ (wxd) top of floor	25 mm stone wool ($\geq 33 \text{ kg/m}^3$)	EI 240 C/U

B.1.4 Rigid floor - Metal pipes insulated

B.1.4.7 Copper and steel pipes - Stone wool LI 400 / CI - Both sides

Bottom view

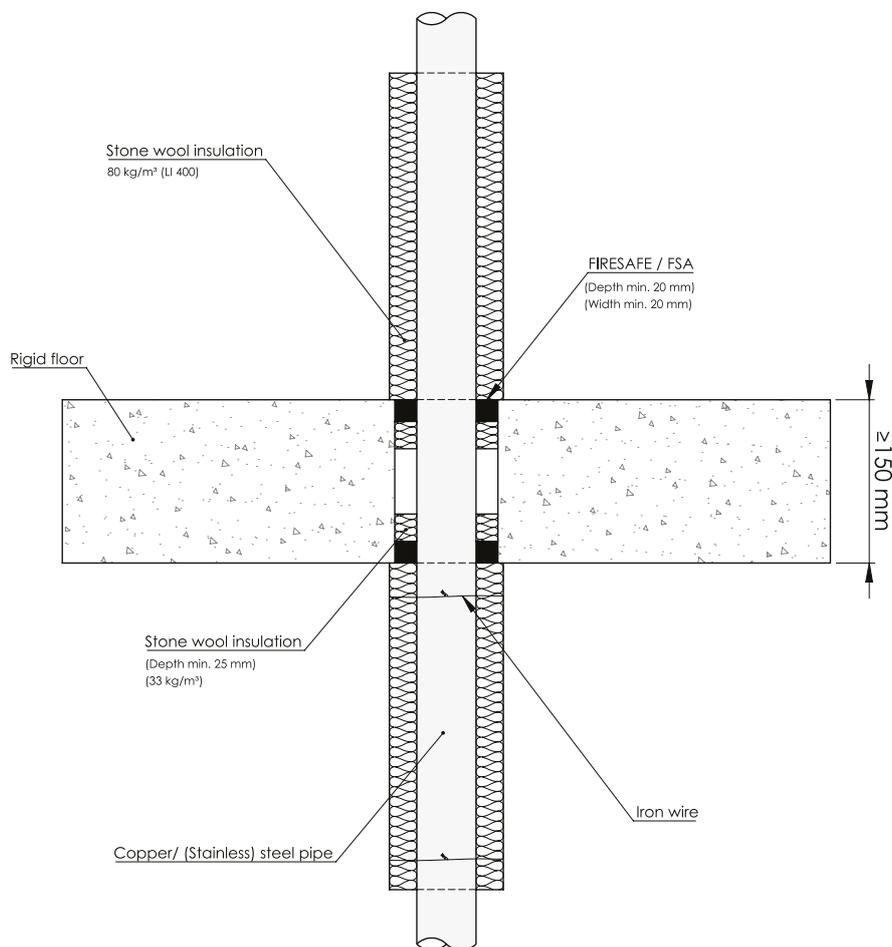
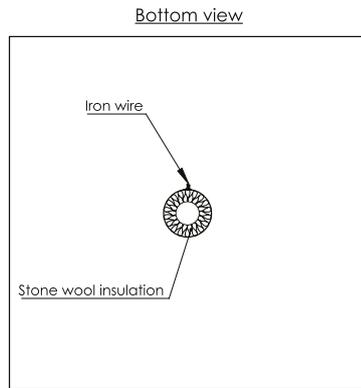


Drawing: RF.E-CU-0.20.LI

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	Stone wool (≥ 80 kg/m ³)	≥ 25	LI 400 / CI	FIRESAFE / FSA 0-20 x ≥ 5 (wxd)	EI 120 C/U
	≤ Ø 54	≥ 1.5					
(Stainless) Steel / cast iron	≤ Ø 114.3	≥ 3.6		≥ 30			
	≤ Ø 219	≥ 4.0					

B.1.4 Rigid floor - Metal pipes insulated

B.1.4.8 Copper and steel pipes - Stone wool LI 400 / CI - w20 x d20 mm, both sides



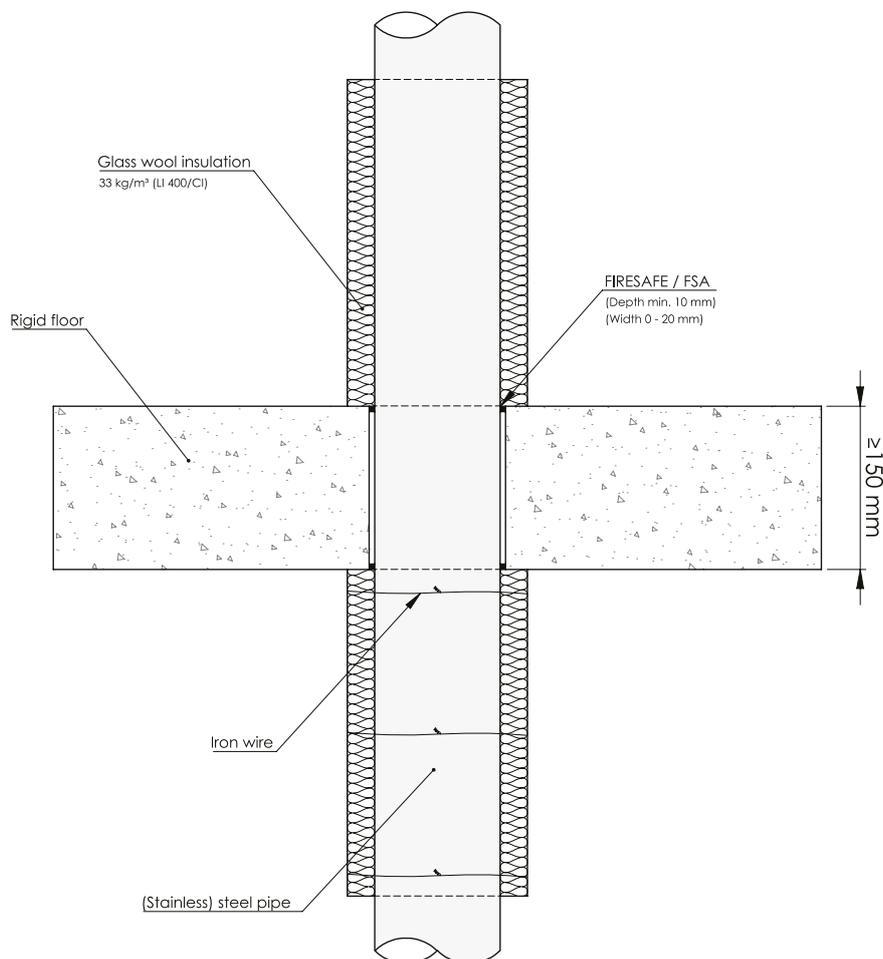
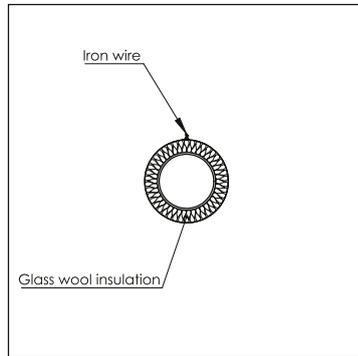
Drawing: RF,E-CU-MSP2.6.2.1.20

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	Stone wool (≥ 80 kg/m ³)	≥ 25	LI 400 / CI	FIRESAFE / FSA ≥ 20 x 20 (wxd)	25 mm stone wool (≥ 33 kg/m ³)	EI 180 C/U E 240 C/U
(Stainless) Steel / cast iron	≤ Ø 40	≥ 1.0						EI 240 C/U
	≤ Ø 114.3	≥ 3.6						EI 180 C/U E 240 C/U
	≤ Ø 219	≥ 4.0	EI 90 C/U E 240 C/U					

B.1.4 Rigid floor - Metal pipes insulated

B.1.4.9 Copper and steel pipes - Glass wool LI 400 / CI

Bottom view



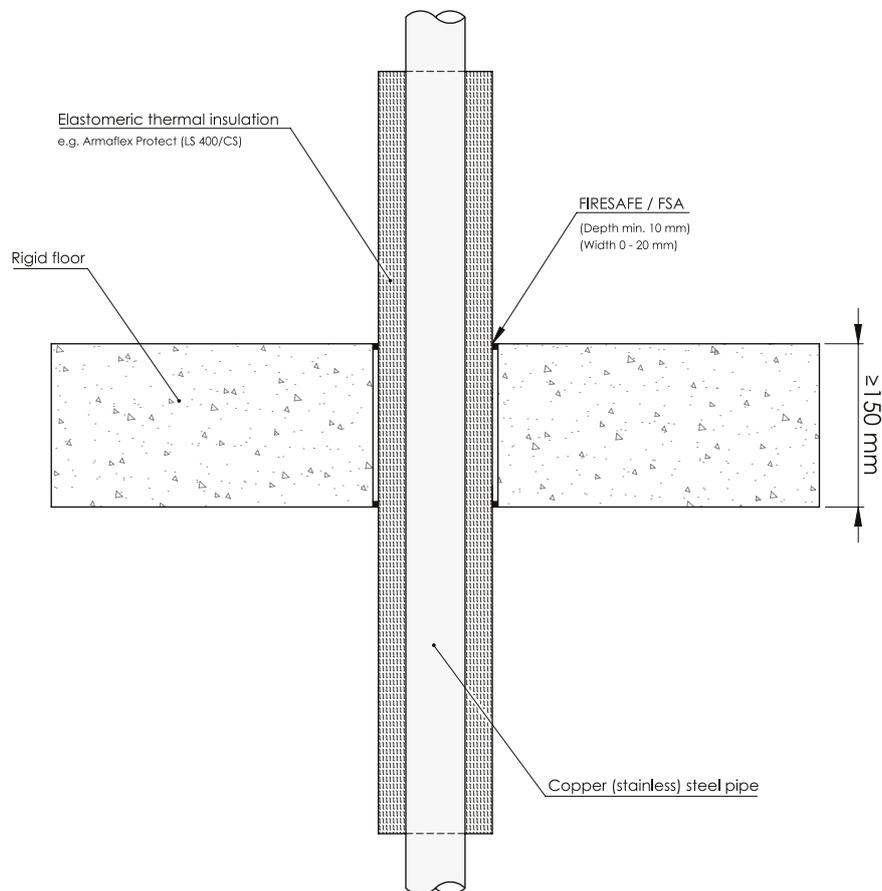
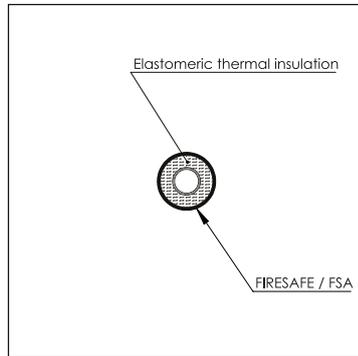
Drawing: RF.E-ST-0.20.G.LI

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
(Stainless) Steel / cast iron	≤ Ø 40	≥ 2.0	Isover	≥ 25	LI 400 / CI	FIRESAFE / FSA 0-20 x ≥ 10 (wxd)	EI 120 C/U
	≤ Ø 114.3	≥ 3.6	Climclover				EI 90 C/U, E 120 C/U
	≤ Ø 219	≥ 4.0	Glass wool (≥ 33 kg/m³)	≥ 30			EI 60 C/U, E 120 C/U

B.1.4 Rigid floor - Metal pipes insulated

B.1.4.10 Copper and steel pipes - ArmaFlex Protect LS 400 / CS

Bottom view



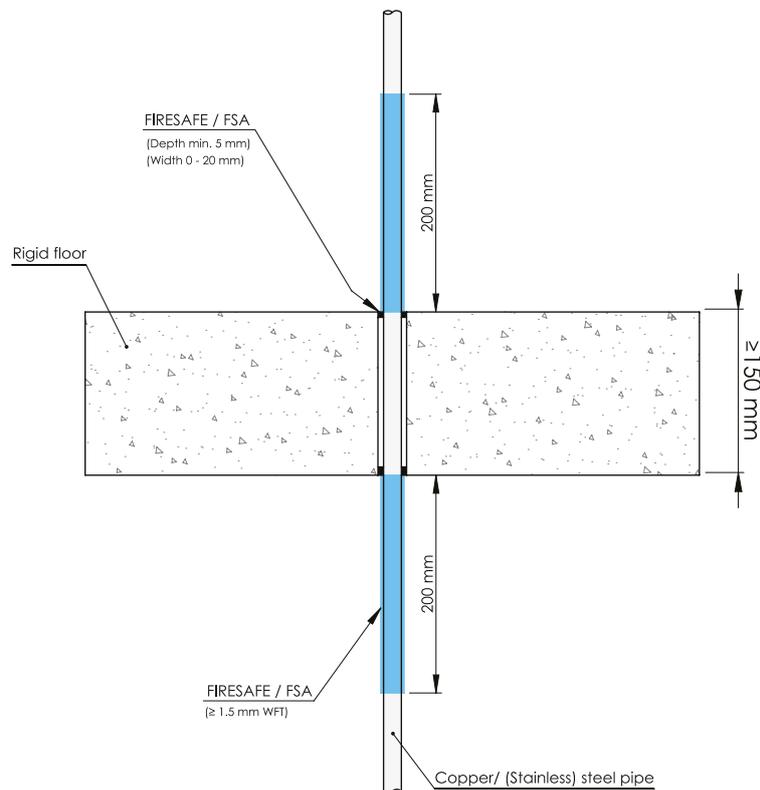
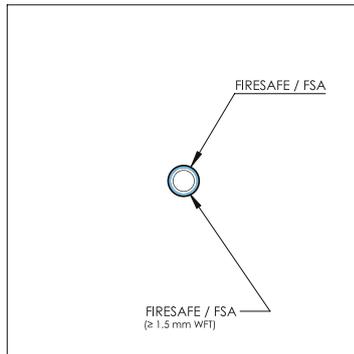
Drawing: RF.E-CU-0.22

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 Protect	20 - 25	LS 400 / CS	FIRESAFE / FSA 0-20 x ≥ 10 (wxd)	EI 120 C/U
	≤ Ø 54	≥ 1.5		25			

B.1.5 Rigid floor - Metal pipes uninsulated

B.1.5.1 Copper and steel pipes - FIRESAFE / FSA coated on pipe

Bottom view

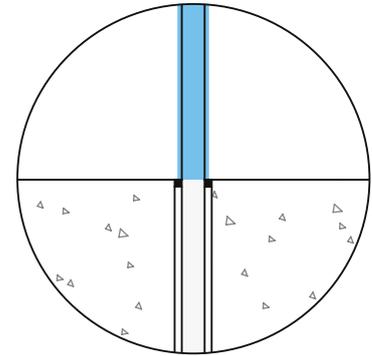
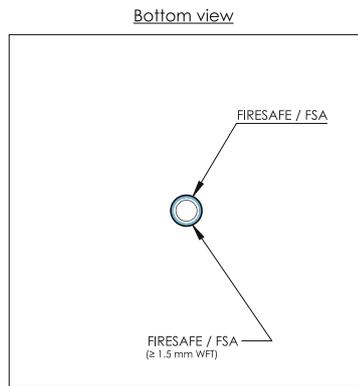


Drawing: RF.E-CU-SPC.1.1.10

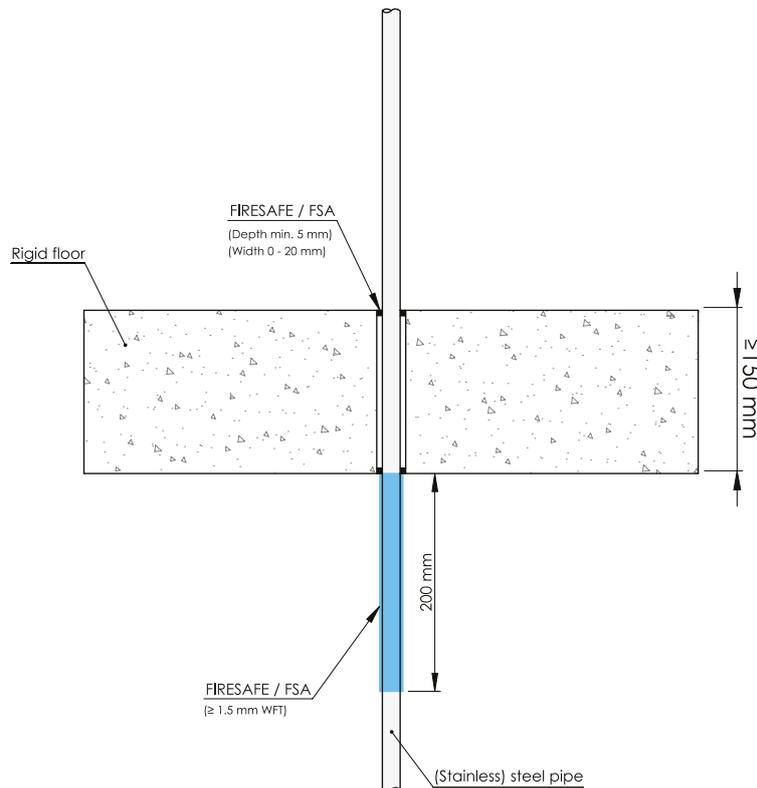
Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	$\leq \text{Ø } 15$	≥ 1.0	FIRESAFE / FSA	1.5 WFT	LI 200	FIRESAFE / FSA 0-20 x ≥ 5 (wxd)	EI 120 C/U
(Stainless) steel / cast iron	$\leq \text{Ø } 60.3$	≥ 3.6					

B.1.5 Rigid floor - Metal pipes uninsulated

B.1.5.2 Copper and steel pipes - FIRESAFE / FSA coated on pipe - Bottom of floor



Pipe coated on top of floor allowed



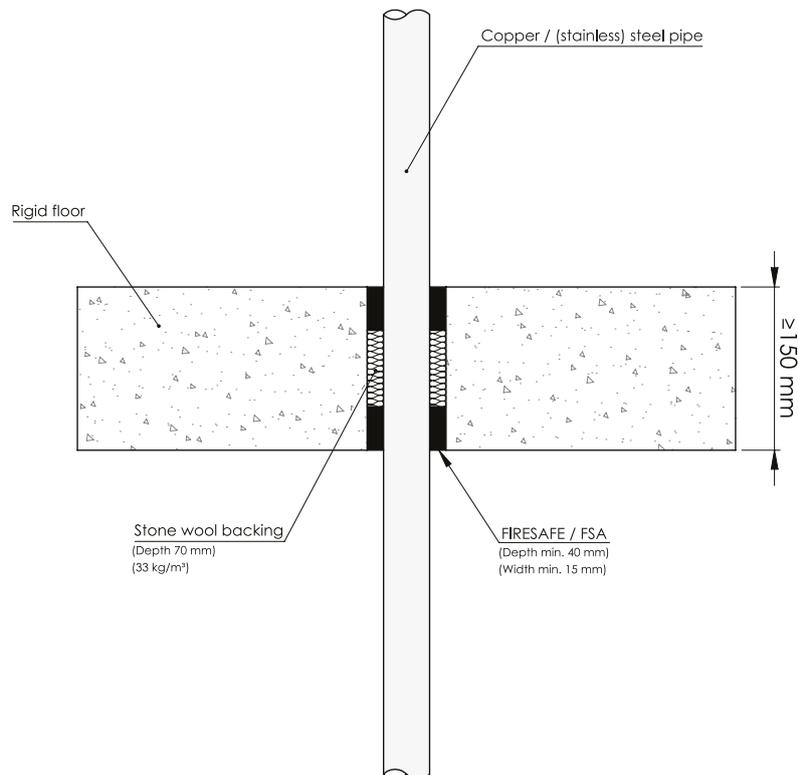
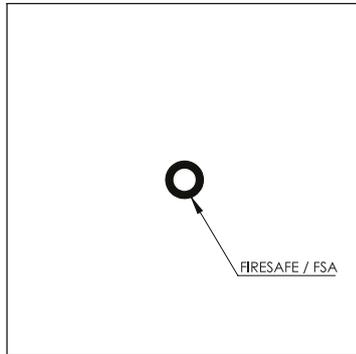
Drawing: RF.E-ST-SPC.1.2.10

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
(Stainless) steel / cast iron	≤ Ø 35	≥ 2.0	FIRESAFE / FSA	1.5 WFT	LI 200 (bottom of floor)	FIRESAFE / FSA 0-20 x ≥ 5 (wxd)	EI 120 C/U

B.1.5 Rigid floor - Metal pipes uninsulated

B.1.5.3 Copper and steel pipes - Both sides

Bottom view

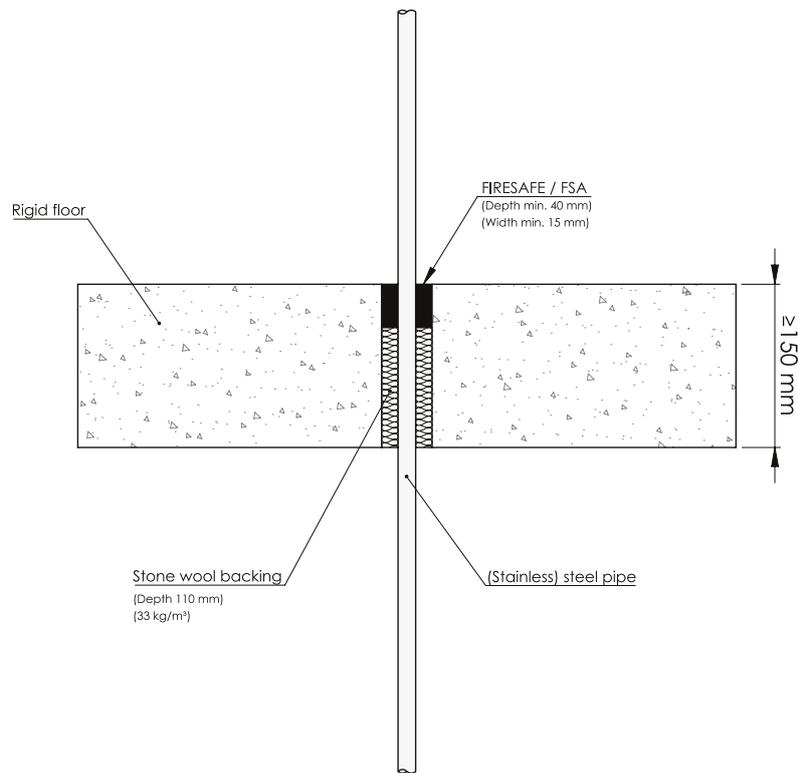
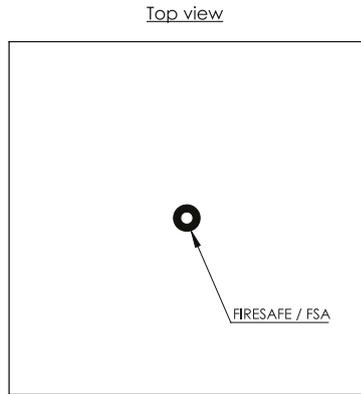


Drawing: RF.E-CU-MSP2.11.1.1.10

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
Copper / (stainless) steel / cast iron	$\leq \text{Ø } 22$	≥ 1.0	FIRESAFE / FSA $\geq 15 \times 40$ (wxd)	70 mm stone wool ($\geq 33 \text{ kg/m}^3$)	EI 30 C/U, E 240 C/U
(Stainless) Steel / cast iron	$\leq \text{Ø } 15$	≥ 1.5			EI 240 C/U
	$\leq \text{Ø } 42.4$	≥ 2.4			EI 180 C/U, E 240 C/U

B.1.5 Rigid floor - Metal pipes uninsulated

B.1.5.4 Copper and steel pipes - Top of floor

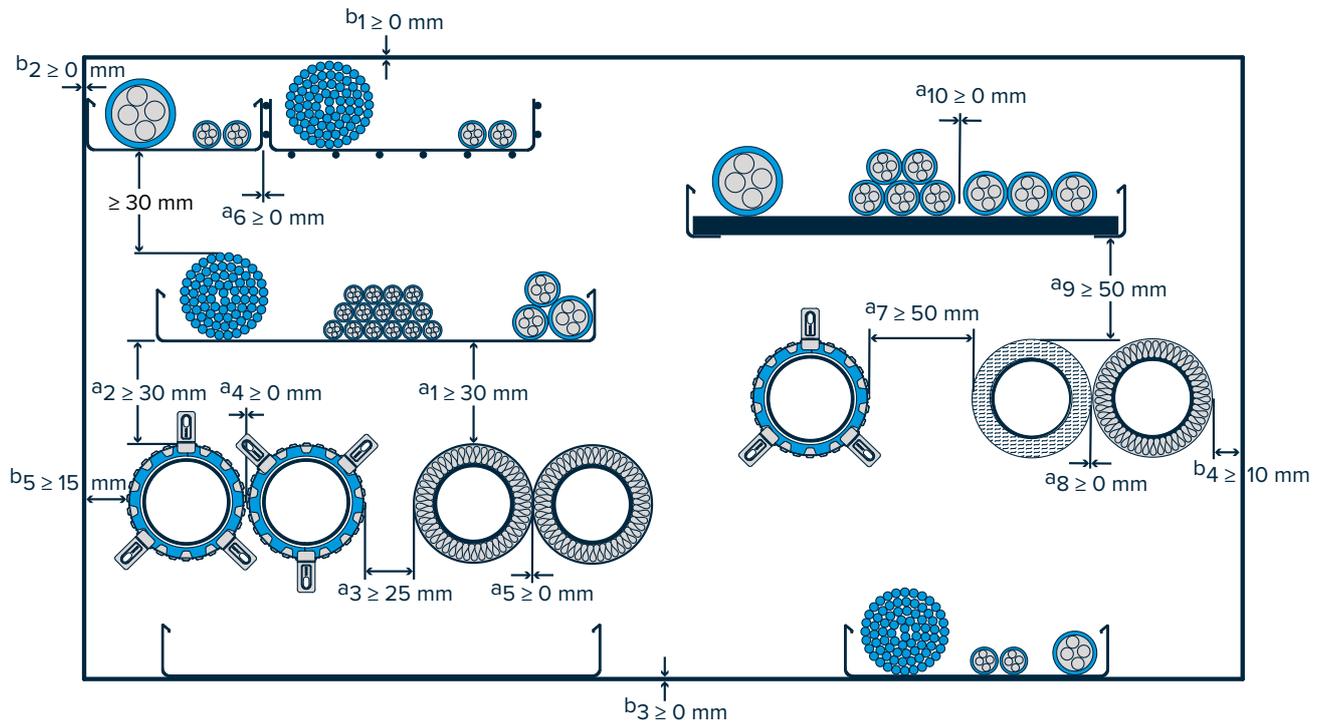


Drawing: RF-E-ST-MSP1.11.1.3.10

Services	Pipe dimensions (mm)		Sealing (mm)	Sealing side	Backing	Classification
	Outer dimension	Wall thickness				
(Stainless) Steel / cast iron	≤ Ø 15	≥ 1.5	FIRESAFE / FSA ≥ 15 x 40 (wxd)	Top of floor	≥ 110 mm stone wool (≥ 33 kg/m ³)	EI 240 C/U

C.1 Flexible and rigid wall - General

C.1.1 Mutual distances & distance to first support



Mutual distances Mixed Penetration Seal – FIRESAFE/FSA

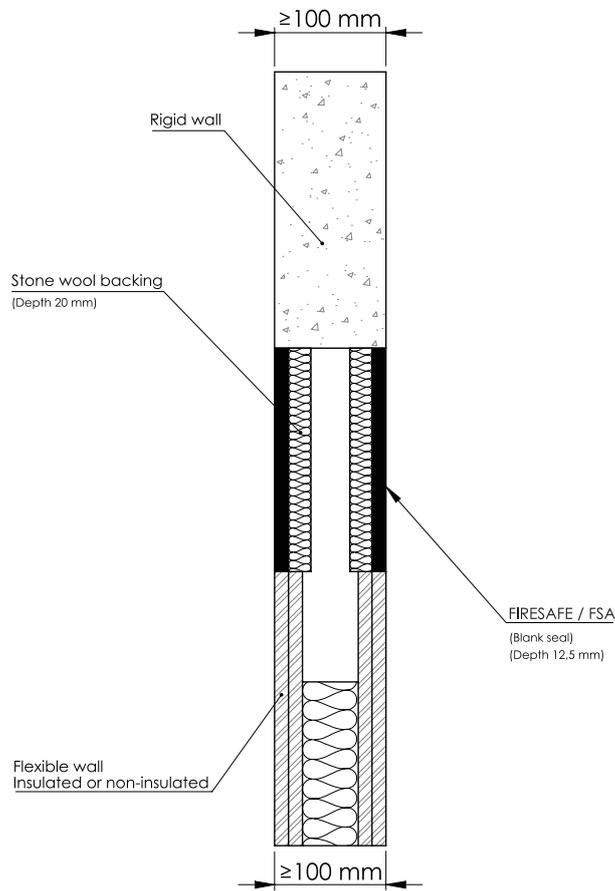
- a₁ Distance between cables/cable trays and metal pipes
- a₂ Distance between cables/cable trays and plastic pipes
- a₃ Distance between metal pipes and plastic pipes
- a₄ Distance between plastic pipes
- a₅ Distance between metal pipes with non-combustible insulation
- a₆ Distance between cable trays
- 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.1.2 Flexible and rigid wall - Maximum seal dimensions

C.1.2.1 Maximum seal dimensions - FIRESAFE / FSA

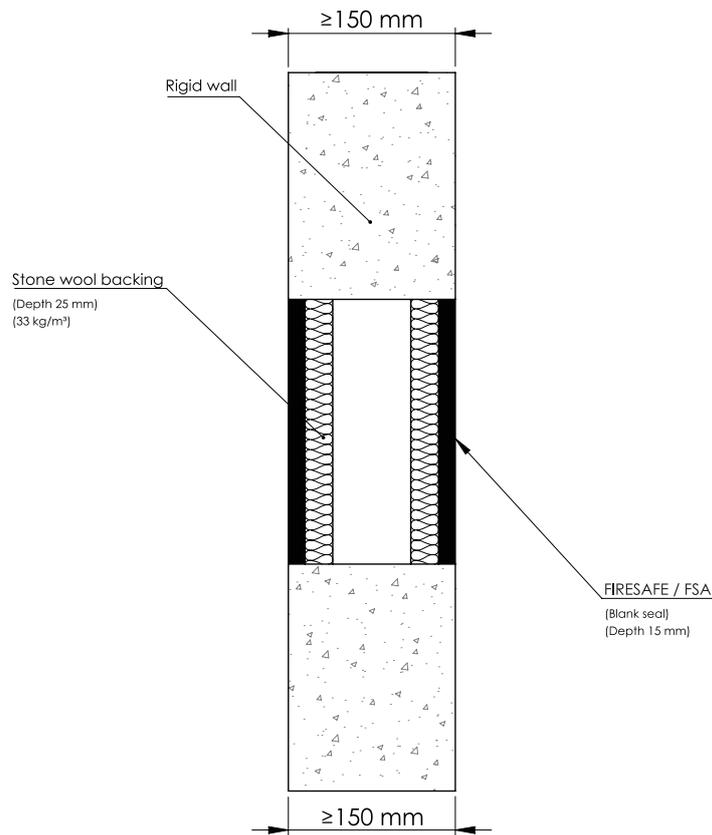


Drawing: Pbfw-BS-MSP2.2.10

Services	Classification
Maximum seal size 187.5 x 187.5 mm (width x height or height x width) With a maximum surface of 0.028 m ²	EI 120
Maximum circular seal size Ø 106 mm	

C.1.2 Rigid wall - General - Maximum seal dimensions

C.1.2.2 Maximum seal dimensions - FIRESAFE / FSA

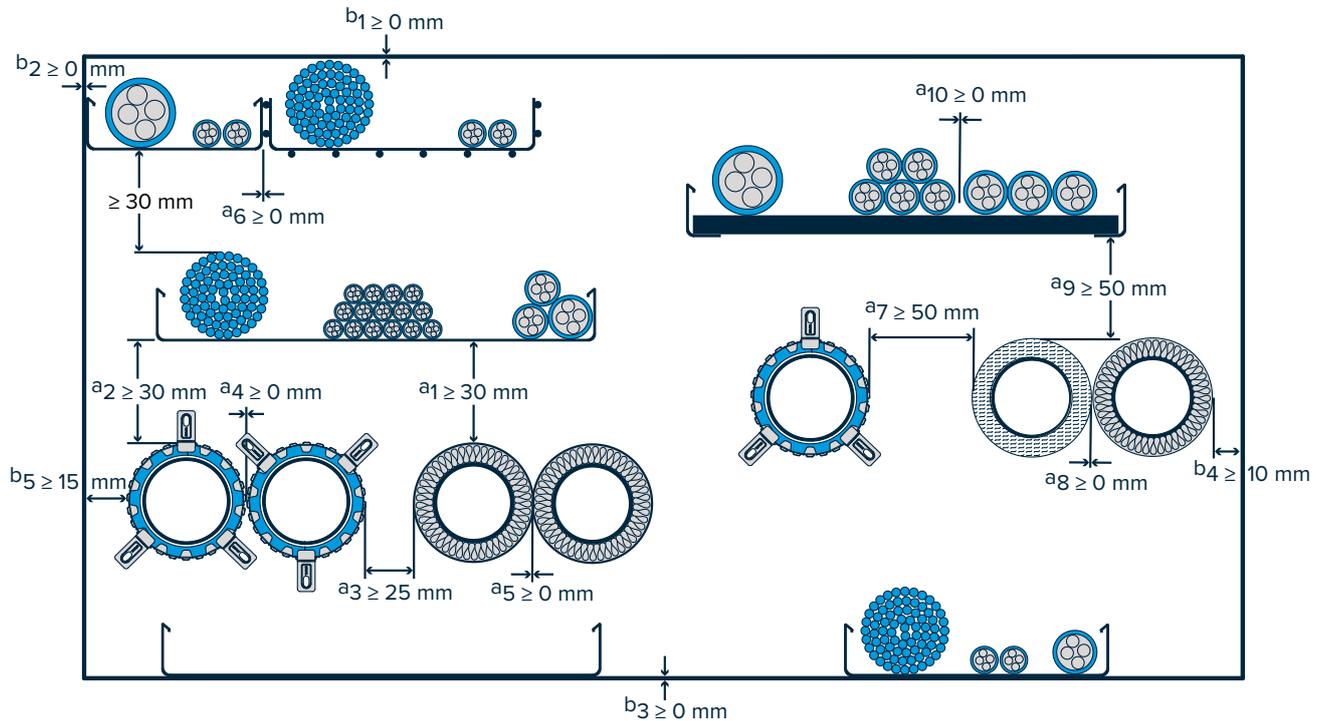


Drawing: RW150-BS-MSP2.2.10

Services	Classification
Maximum seal size 375 x 375 mm (width x height or height x width) With a maximum surface of 0.113 m ²	EI 240
Maximum circular seal size Ø 424 mm	

C.2.1 Rigid floor - General

C.2.1.1 Mutual distances & distance to first support



Mutual distances Mixed Penetration Seal – FIRESAFE / FSA

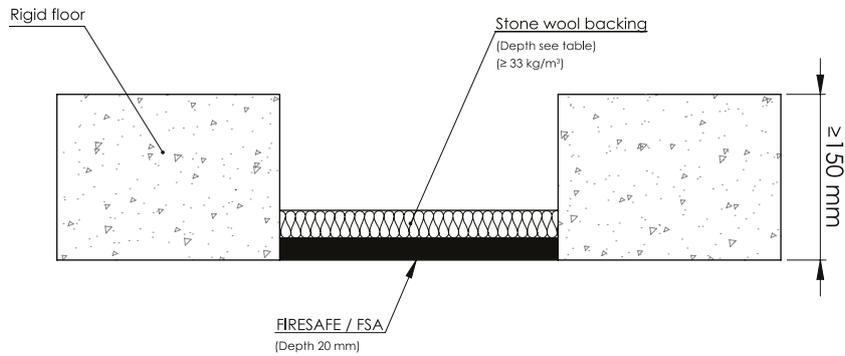
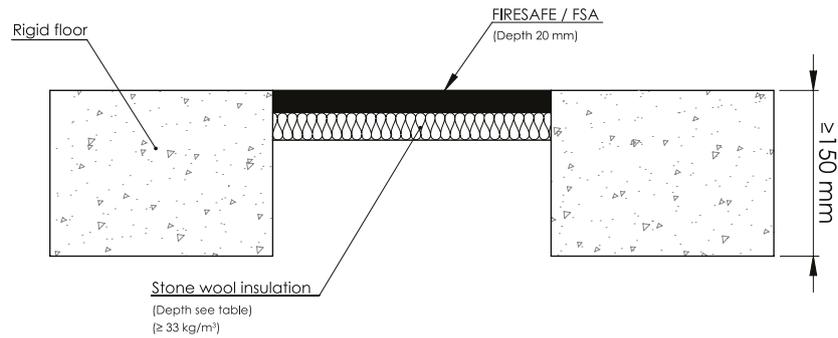
- a_1 Distance between cables/cable trays and metal pipes
- a_2 Distance between cables/cable trays and plastic pipes
- a_3 Distance between metal pipes and plastic pipes
- a_4 Distance between plastic pipes
- a_5 Distance between metal pipes with non-combustible insulation
- a_6 Distance between cable 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.2.2 Rigid floor - General - Maximum seal dimensions

C.2.2.1 Maximum seal dimensions - FIRESAFE / FSA



Drawing: RF-BS-MSP1.1.10

Services	Side of application	Backing	Classification	
Maximum seal size 150 x 150 mm	Bottom of floor	≥ 25 mm stone wool (≥ 33 kg/m ³)	EI 120, E 240	
Maximum circular seal size Ø 169 mm				
Maximum seal size 150 x 150 mm	Top of floor		≥ 50 mm stone wool (≥ 33 kg/m ³)	EI 240
Maximum circular seal size Ø 169 mm				
Maximum seal size 300 x 300 mm	Bottom of floor	≥ 50 mm stone wool (≥ 33 kg/m ³)		EI 45, E 240
Maximum circular seal size Ø 339 mm				
Maximum seal size 300 x 300 mm	Top of floor		≥ 50 mm stone wool (≥ 33 kg/m ³)	EI 120
Maximum circular seal size Ø 339 mm				

C.3 Wall configurations

C.3.1 Allowed wall configurations

The use of FIRESAFE / FSA 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 13501-2, 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.

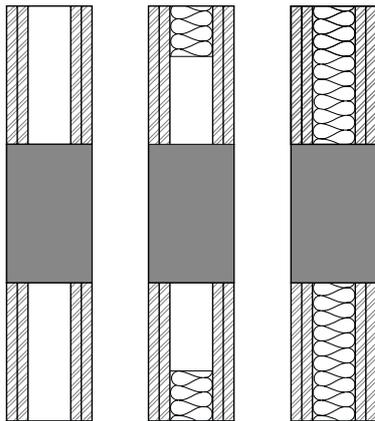
Field of direct application rules for double-sided flexible wall constructions:

- 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 13501-1;
- 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):

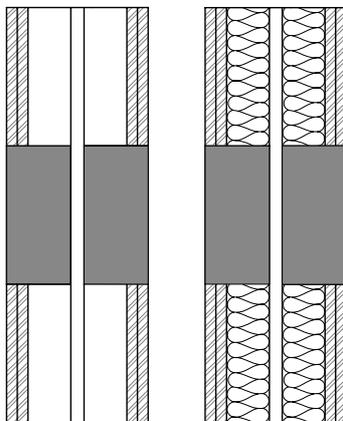
Flexible walls, not insulated, partially removed insulation or fully insulated with any type of insulation.

e.g.:



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

e.g.:



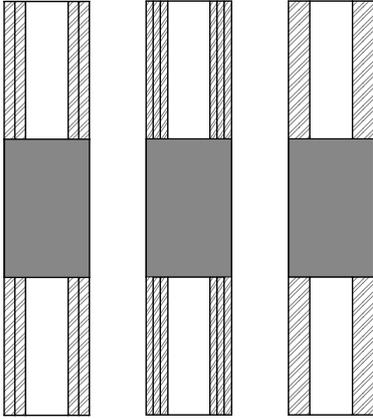
C.3 Wall configurations

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.:

