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European Technical Assessment

ETA 23/0060
of 13/10/2023

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	Mulcol® Multimastic SP
Product family to which the construction product belongs	Fire Stopping and Sealing Product: • Penetration Seals
Manufacturer	Mulcol International BV PO Box 93 4330 AB Middelburg The Netherlands
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

I. SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESMENT

1. Technical description of the product

1) Multimastic SP 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 Multimastic SP is supplied in liquid form cotained 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 Mulcol® Multimastic SP 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 Mulcol® Multimastic SP, Mulcol® Multimastic C and Mulcol® Multimastic FB 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 Mulcol® Multimastic SP in relation to BWR 3 (Hygiene, health and environment) is IA1, S/W3.

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

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

1) The intended use of Mulcol® Multimastic SP 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 Mulcol® Multimastic SP 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/m^3.

   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/m^3.

   * 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 Mulcol® Multimastic SP 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 Mulcol® Multimastic SP sealant. Blank seals up to 375 x 375 mm are permitted. For full details, see Annex C. The minimum permitted separation between adjacent seals/apertures is 100 mm. Where seals are installed without services (blank), precautions need to be taken to prevent a person stepping onto a horizontal seal or falling onto a vertical seal.

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 Mulcol® Multimastic SP 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 Z_2: 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 ≤ B-s1, d0 – e.g. ArmaFlex Ultima, Kaiflex KK Plus S1
- Reaction to fire class ≤ B-s2, d0 – e.g. ArmaFlex AF EVO, Kaiflex KK Plus S2 / ST, K-Flex ST
- Reaction to fire class ≤ B-s3, d0 – e.g. ArmaFlex AF / XG / SH, K-Flex H
- Reaction to fire class ≤ C-s2, d0 – e.g. Kaiflex HT S2
- Reaction to fire class ≤ 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 Climatec 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
BWR 2 Safety in case of fire		
EN 13501-1	Reaction to fire	E
EN 13501-1	Resistance to fire	Annex A, B & C
BWR 3 Hygiene, health and enviroment		
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 1 - Declaration of manufacturer
BWR 4 Safety in use		
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
BWR 5 Protection against noise		
EN 10140-1,2,4,5 / EN ISO 7171-1	Airborne sound insulation	R_w (C;C_{tr}) = 58 (-5;-13) dB
BWR 6 Energy economy and theat retention		
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 manufacturer may only use initial / raw / constituent materials stated in the technical documentation of this European Technical Assessment.

The factory production control shall be in accordance with the Control Plan of 7th February 2023 relating to the European Technical Assessment ETA 23/0060 issued on 13/10/2023 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:

13 October 2023

Report by:	Verified by:	Validated by:
		
C. Johnson	D. Yates	Erik Teubler
Senior Staff Engineer	Staff Engineer	Head of TAB
Built Environment	Built Environment	Built Environment

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

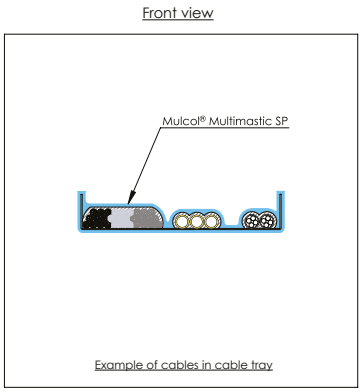
Annex - Resistance to Fire Classification - Mulcol® Multimastic SP

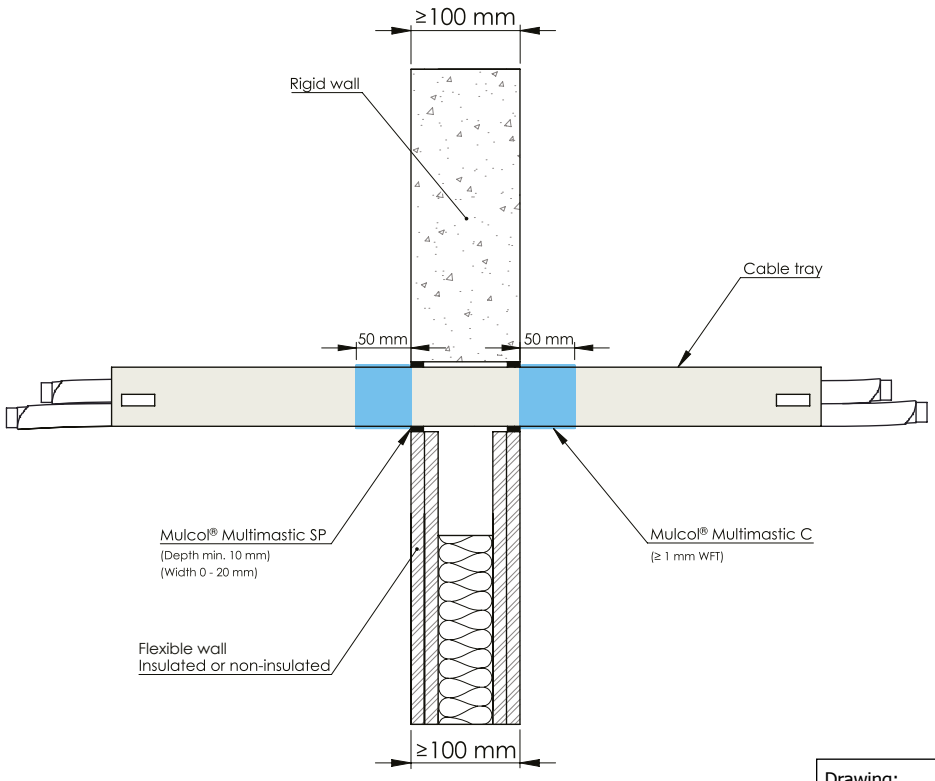
Annex A.1 - Flexible and rigid walls

Annex A.2 - Rigid walls

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

A.1.1.1 Cables, trays and conduits - Multimastic C - 50 mm



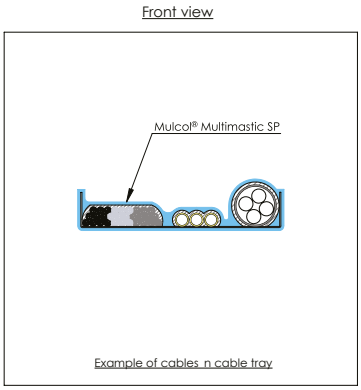


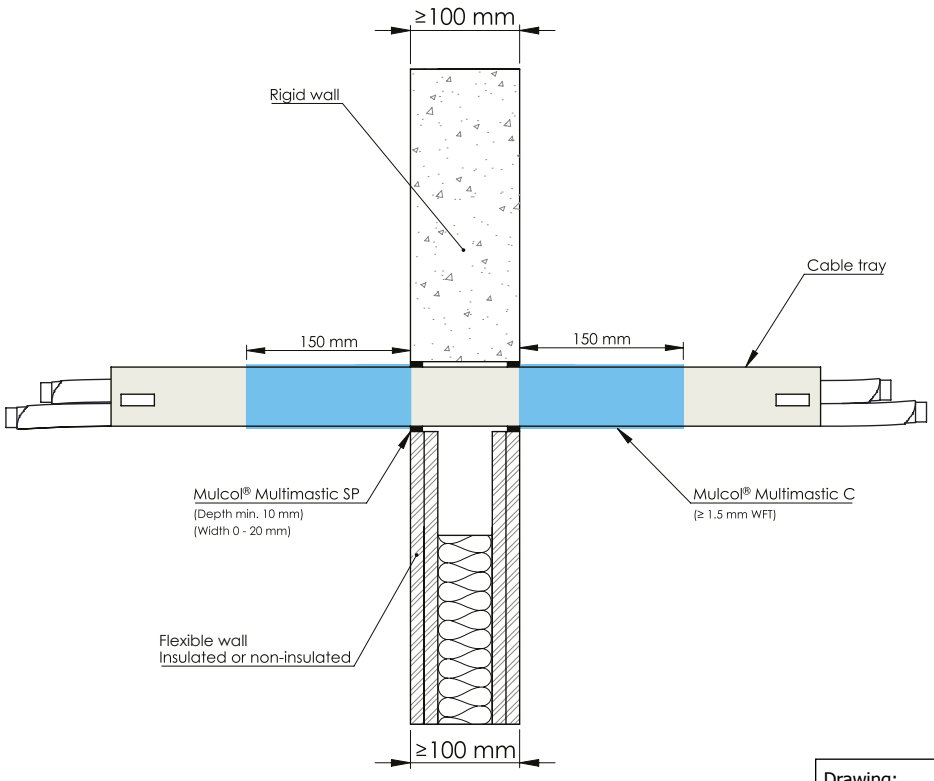
Drawing: FW.E-CT-0.10_50

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		
Non sheathed cables ≤ Ø 24 mm		**EI 45, E 90**
Plastic conduits ≤ Ø 16 mm		**EI 60 U/C, E 90 U/C**
Copper conduits ≤ Ø 16 mm		**EI 45 C/U, E 60 C/U**
Steel conduits ≤ Ø 16 mm		**EI 60 C/U**

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

A.1.1.2 Cables, trays and conduits - Multimastic C - 150 mm



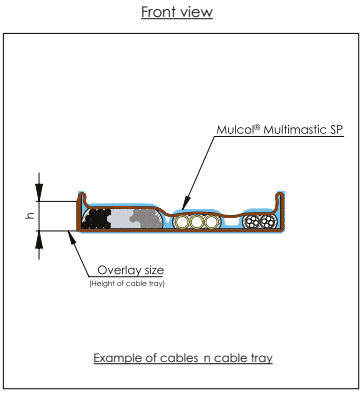


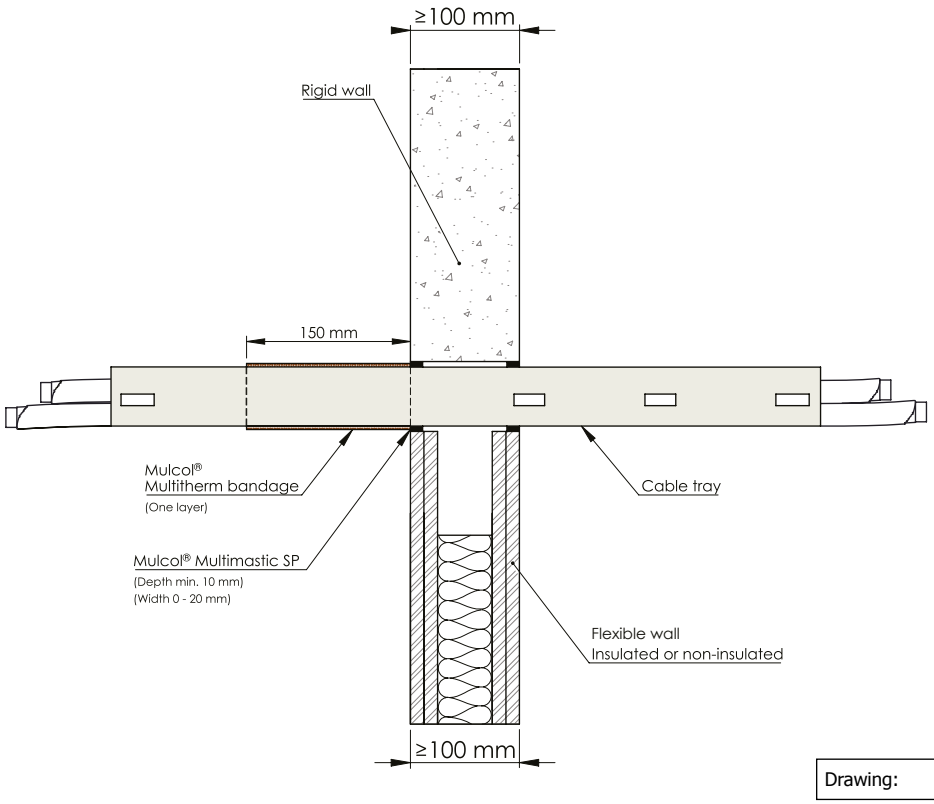
Drawing: FW.E-CT-0.10_150

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)		
Cables ≤ Ø 80 mm		**EI 90, E 120**
Cables ≤ Ø 21 mm in a tied bundle ≤ Ø 100 mm		**EI 60, E 120**
Non sheathed cables ≤ Ø 24 mm		
Plastic conduits ≤ Ø 16 mm		**EI 120 U/C**
Copper conduits ≤ Ø 16 mm		**EI 45 C/U, E 90 C/U**
Steel conduits ≤ Ø 16 mm		**EI 90 C/U**

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

A.1.1.3 Cables and trays - Multitherm Bandage





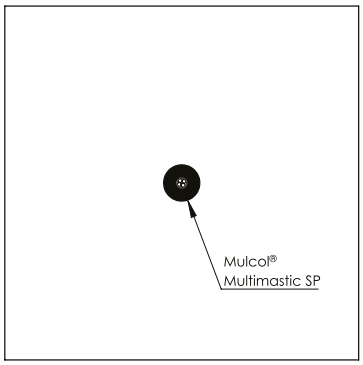
Drawing: FW.E-CT-B1.3.10

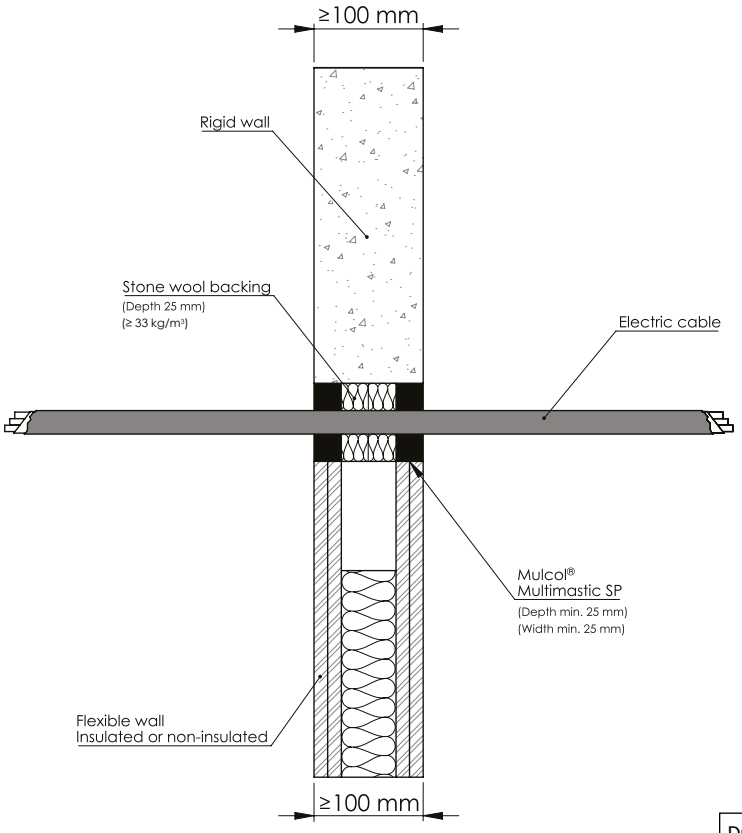
Services	Insulation (mm)	Classification
Metal (non-)perforated cable trays	LI 150 - Multitherm Bandage either side	**EI 120**
Steel wire mesh cable trays (baskets)		
Cables ≤ Ø 21 mm (single or bundled)		

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

A.1.1.4 Single cables

Front view



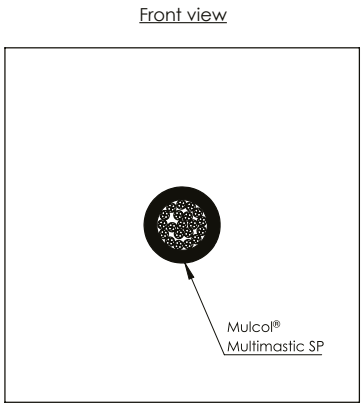


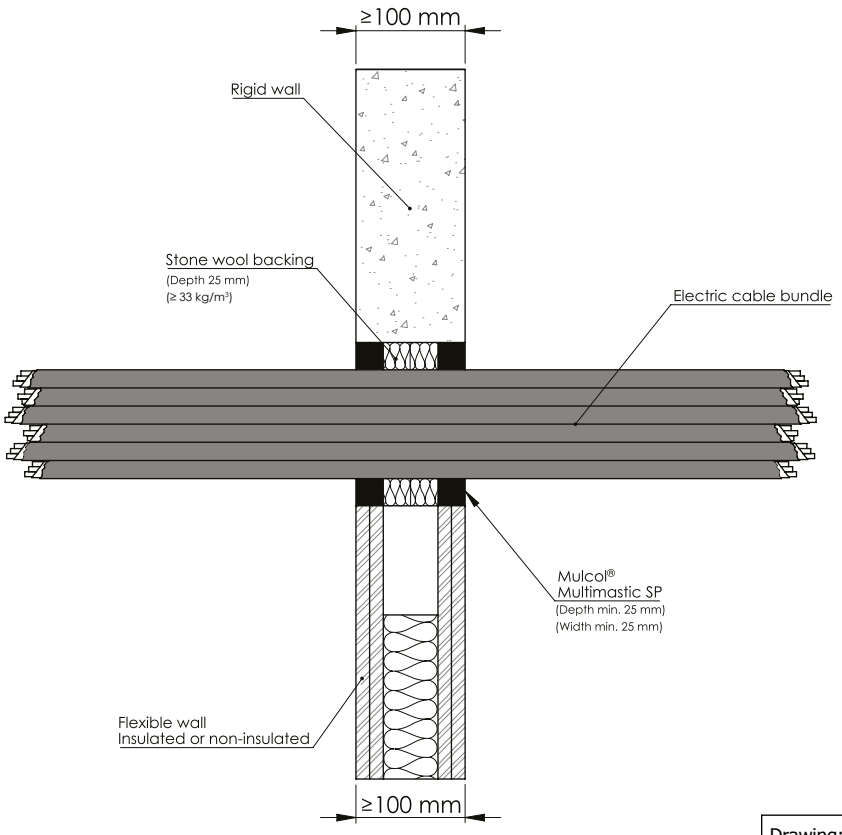
Drawing: FW.E-EC21-MSP2.2.10

Services	Sealing (mm)	Backing	Classification
Cables ≤ Ø 21 mm	Multimastic SP ≥ 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





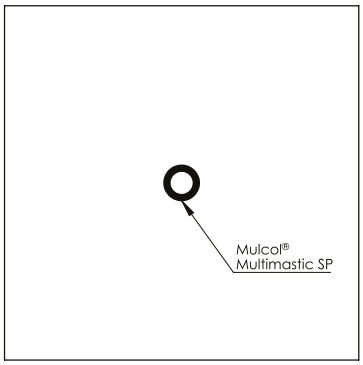
Drawing: FW.E-ECB-MSP2.2.10

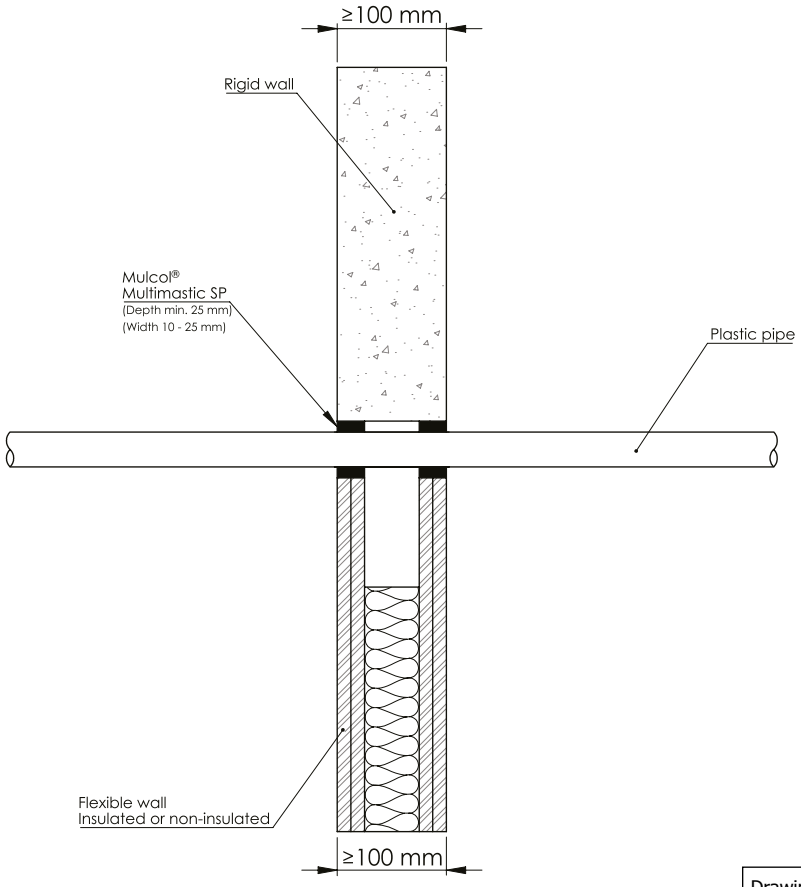
Services	Sealing (mm)	Backing	Classification
Cables ≤ Ø 21 mm in a tied bundle ≤ Ø 100 mm	Multimastic SP ≥ 25 x 25 (wxd)	Stone wool (≥ 33 kg/m^3)	**EI 60, E 120**

A.1.2 Flexible or rigid wall - Combustible pipes

A.1.2.1 Plastic pipes

Front view



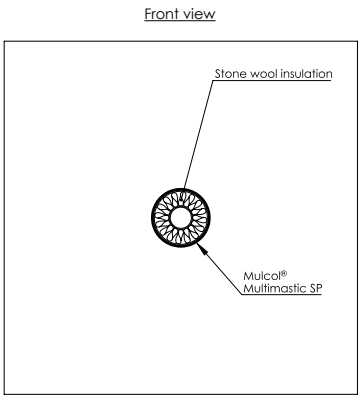


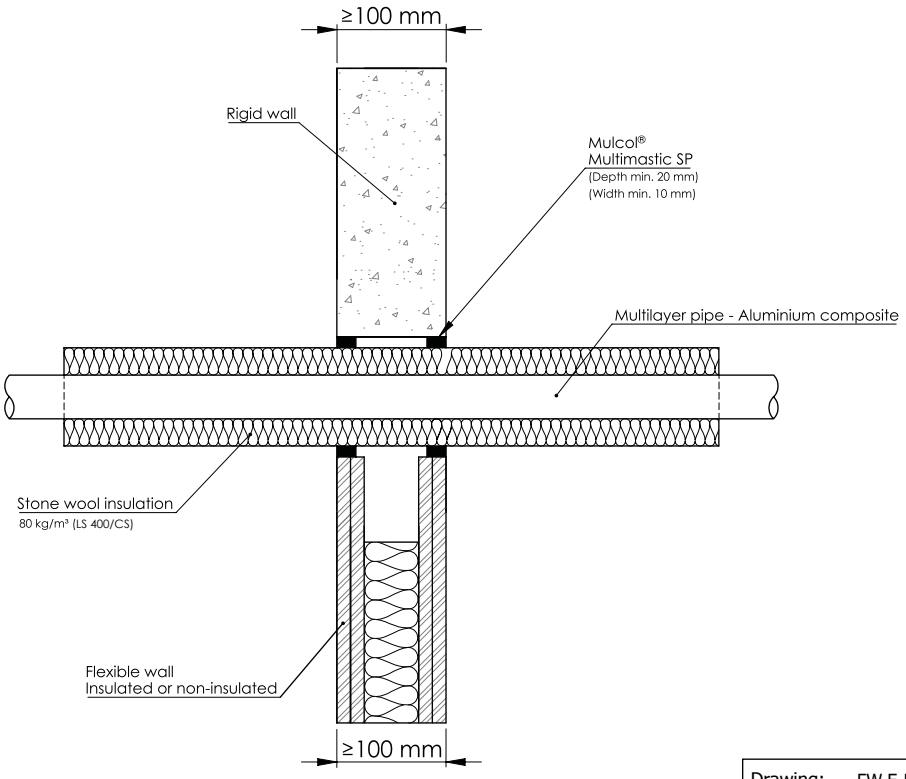
Drawing: FW.E-PP-10.0.10

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

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

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



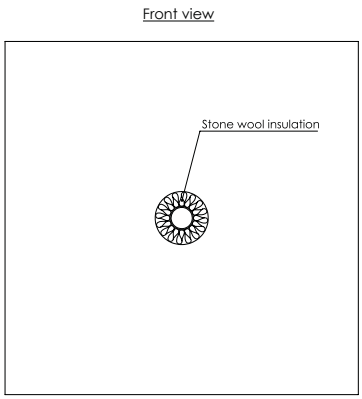


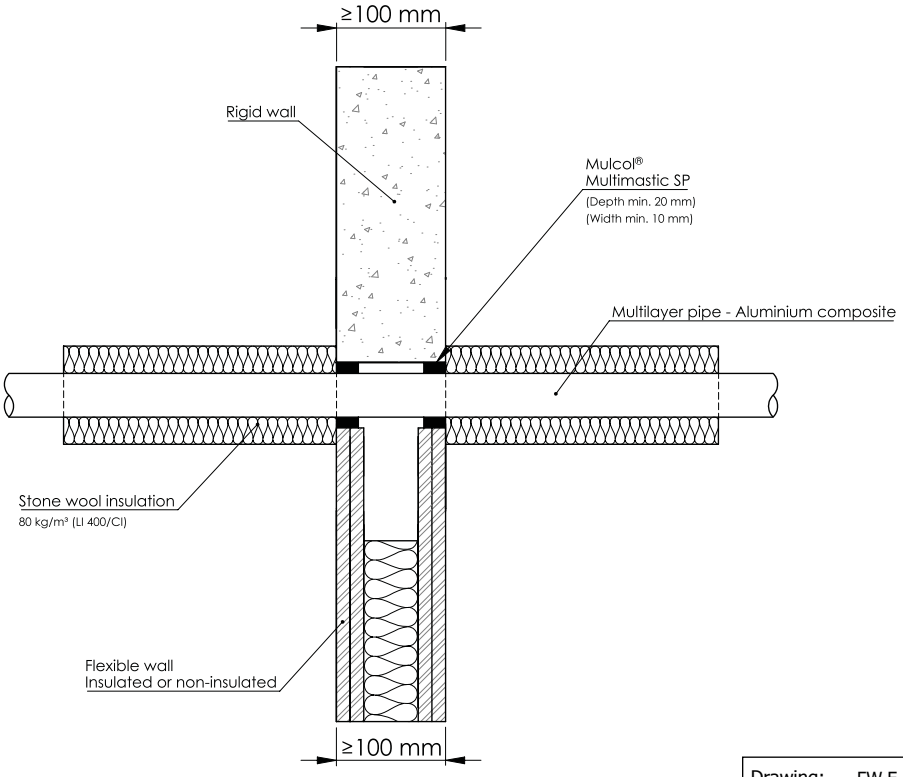
Drawing: FW.E-MLA-MSP2.2.20.LS

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	Multimastic SP ≥ 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



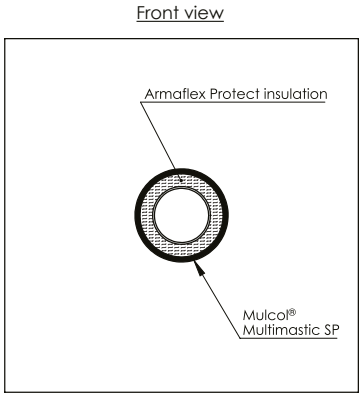


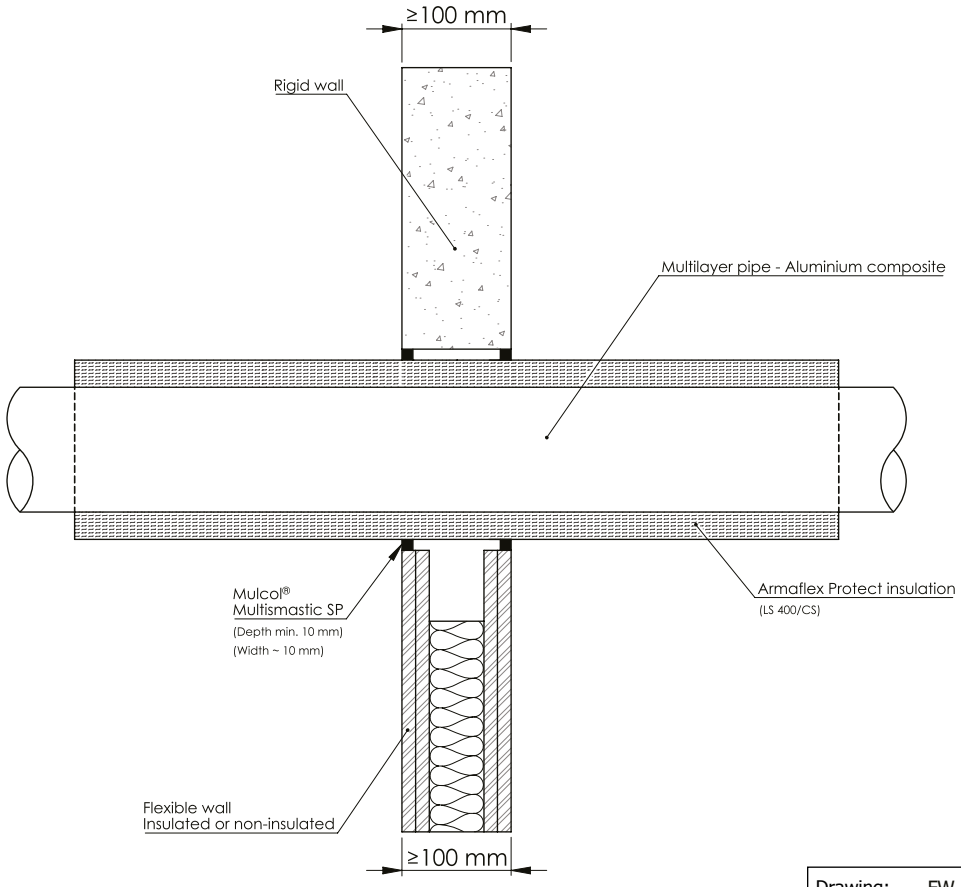
Drawing: FW.E-MLA-MSP2.2.20.LI

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/m³)	≥ 25	LI 400 / CI	Multimastic SP ≥ 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



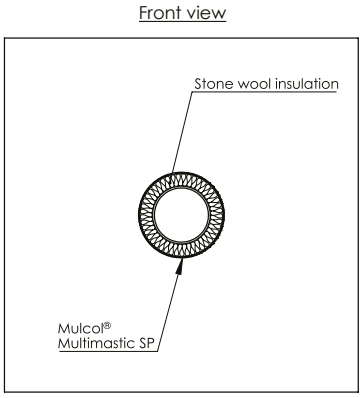


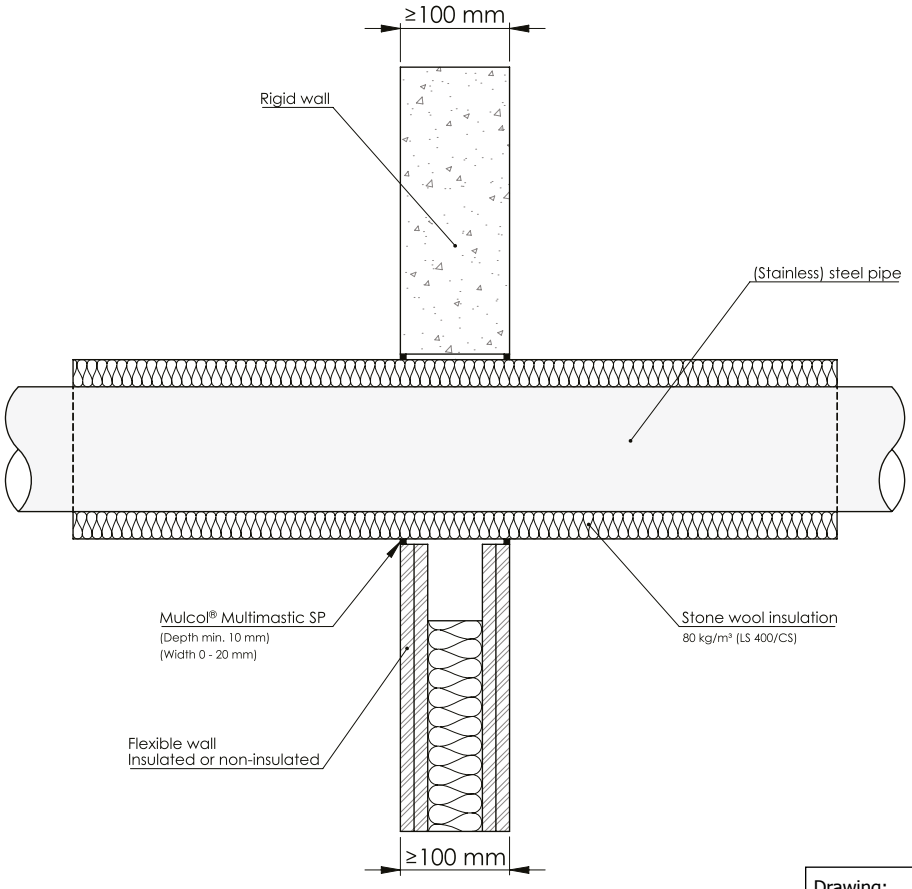
Drawing: FW.E-MLA-MSP2.2.22

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	Multimastic SP 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



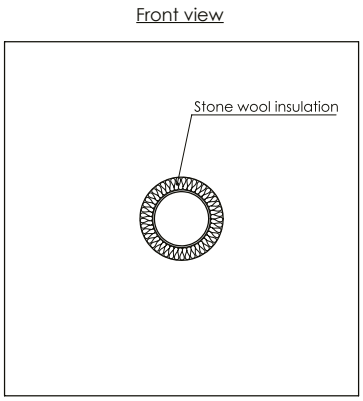


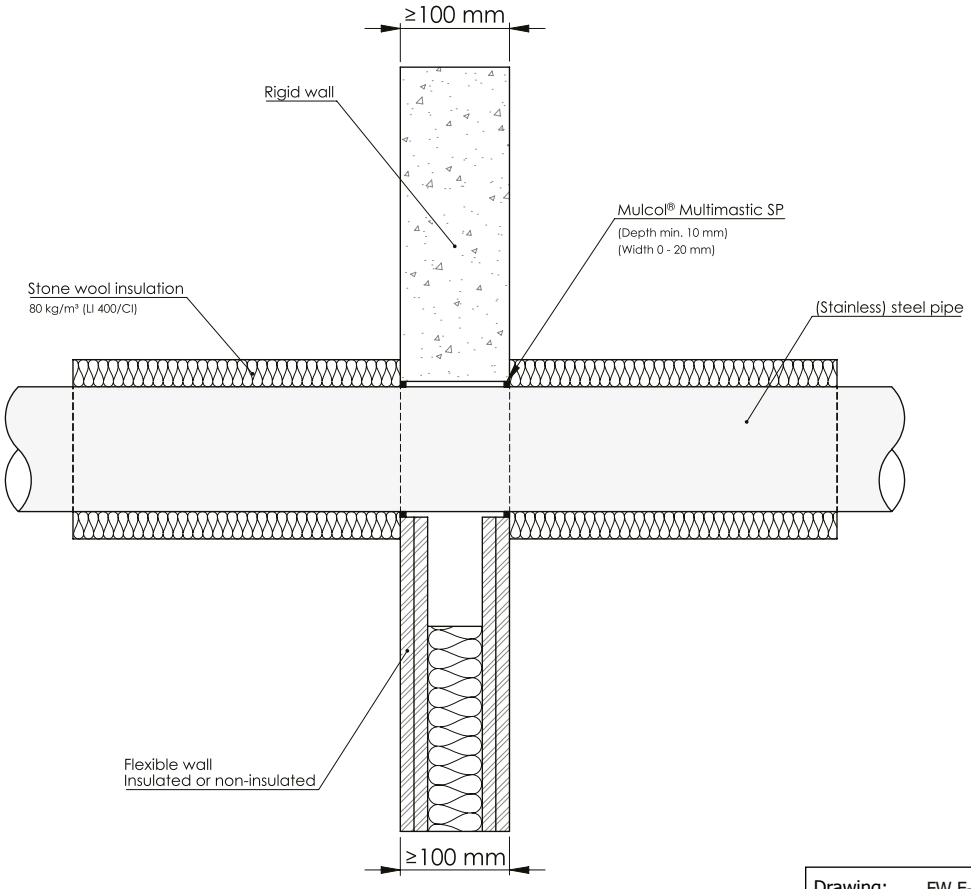
Drawing: FW.E-ST-MSP2.2.20.LS

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/m³)	25	LS 400 / CS	Multimastic SP 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					**EI 60 C/U**
	≤ Ø 324	≥ 3.7		30			**EI 60 C/U** **E 120 C/U**
					CS		**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





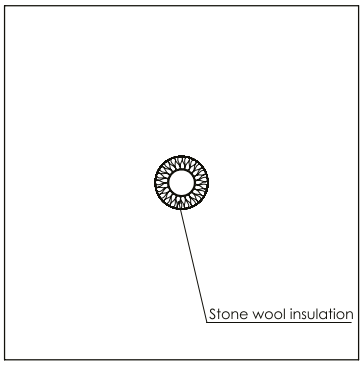
Drawing: FW.E-ST-MSP2.2.20.LI

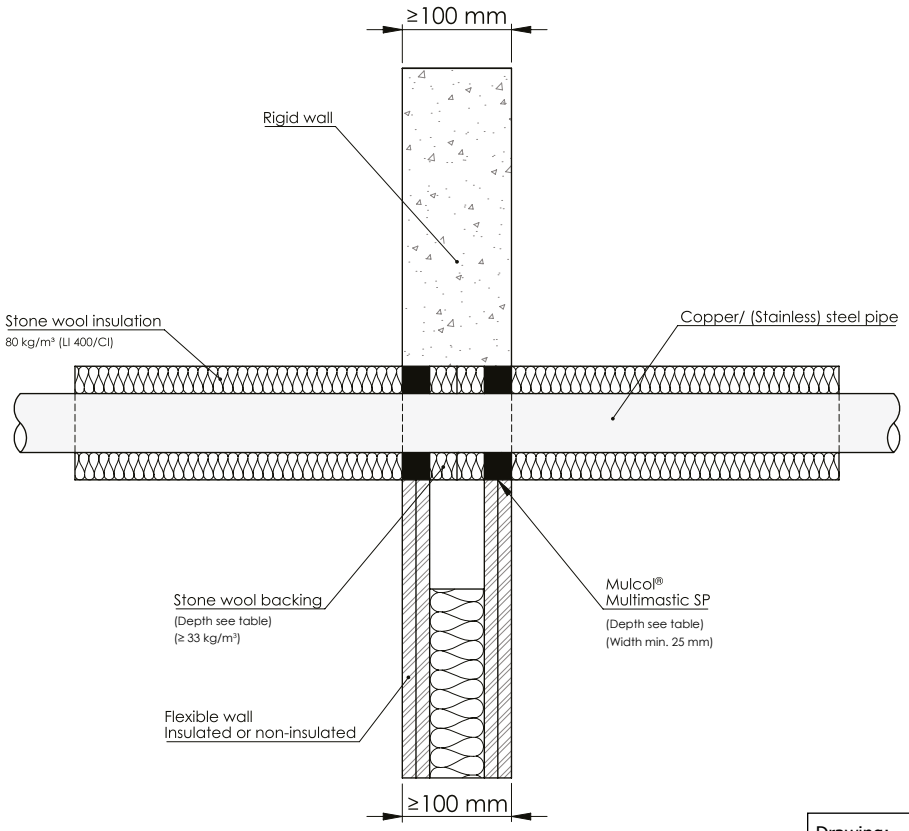
Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	Stone wool (≥ 80 kg/m³)	≥ 25	LI 400 / CI	Multimastic SP 0-20 x ≥ 10 (wxd)	**EI 120 C/U**
	≤ Ø 54	≥ 1.5					
(Stainless) 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



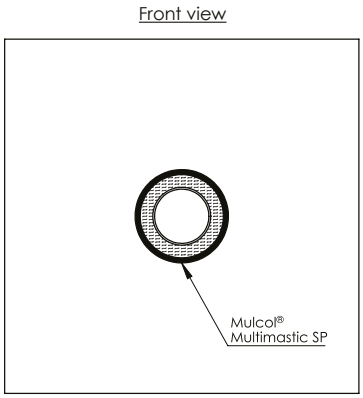


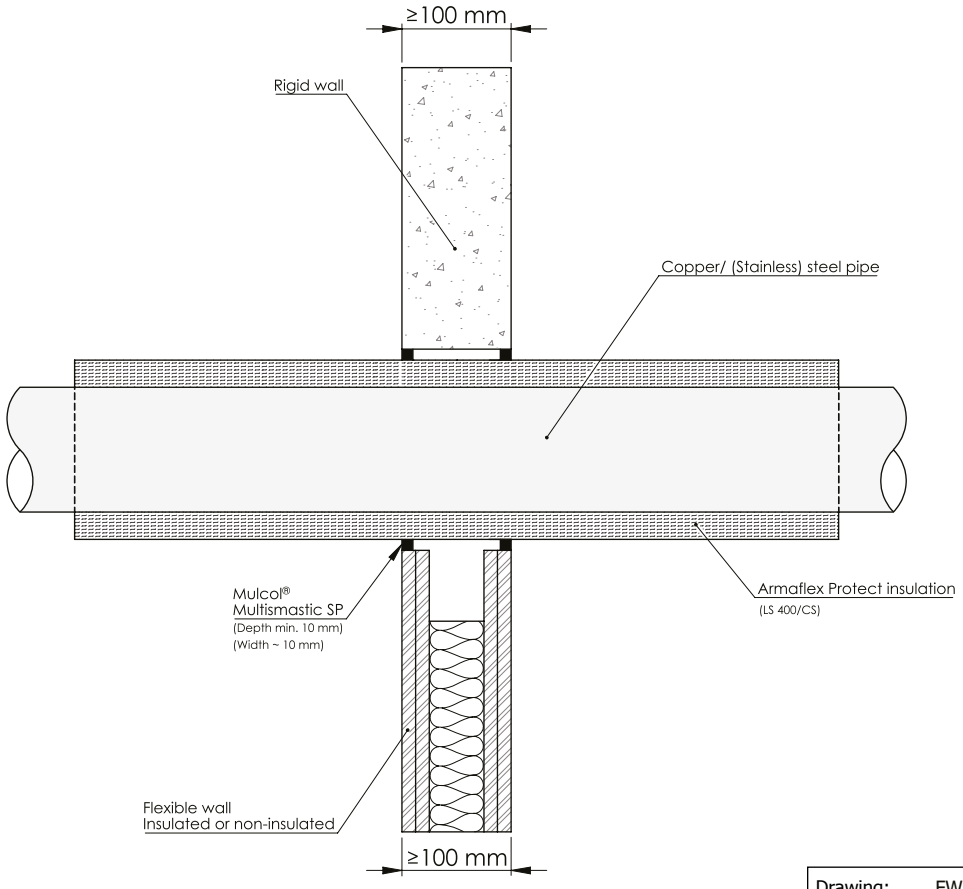
Drawing: FW.E-CU-MSP2.2.20

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	Multimastic SP ≥ 25 x 25 (wxd)	25 mm stone wool (≥ 33 kg/m^3)	**EI 120 C/U**
						Multimastic SP ≥ 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





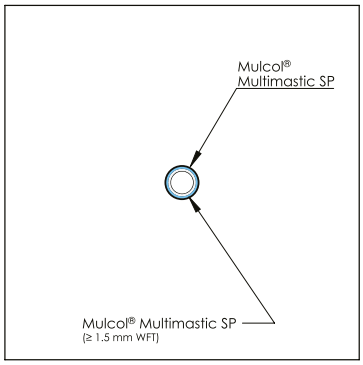
Drawing: FW.E-CU-MSP2.2.22

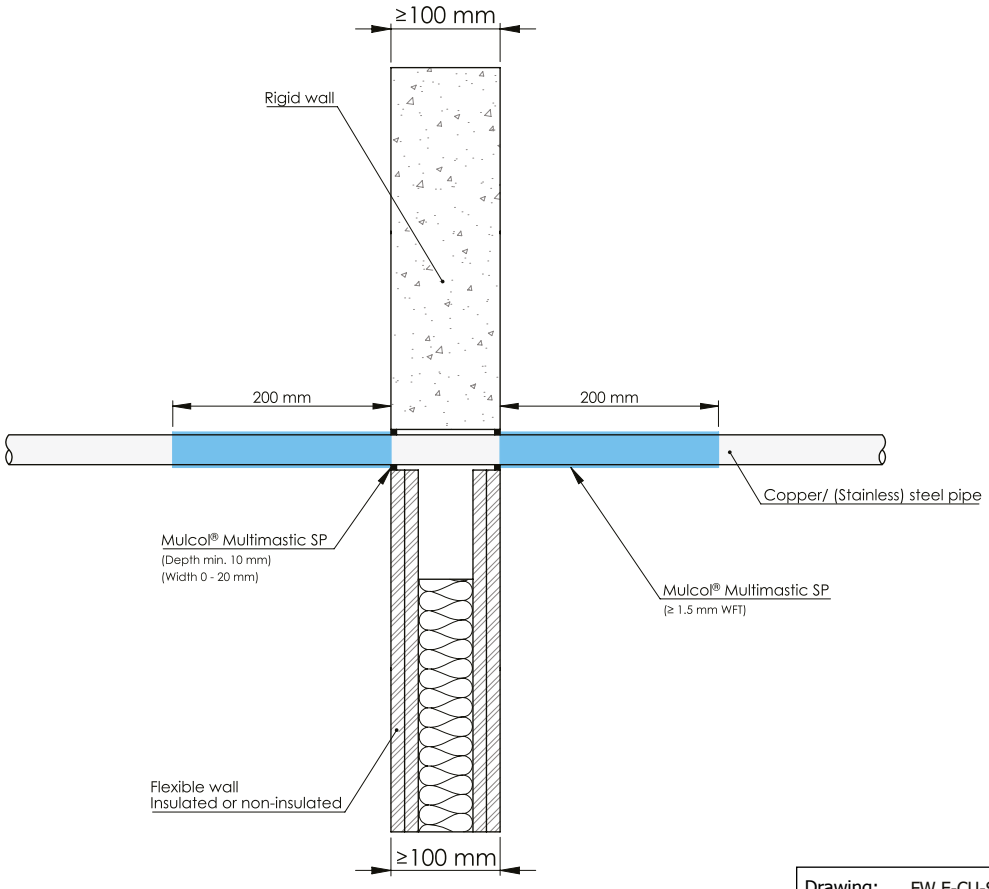
Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	ArmaFlex Protect	20 - 25	LS 400 / CS	Multimastic SP 10 x ≥ 10 (wxd)	**EI 120 U/C**
	≤ Ø 54	≥ 1.5		25			**EI 90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

A.1.5 Flexible or rigid wall - Metal pipes uninsulated

A.1.5.1 Copper and steel pipes - Multimastic SP coated on pipe

Front view





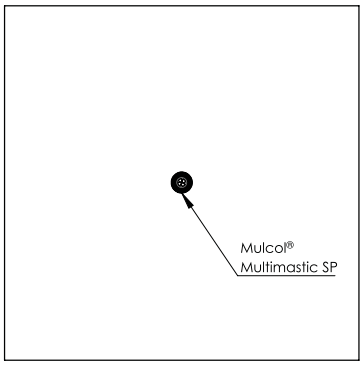
Drawing: FW.E-CU-SPC-MSP2.2.10

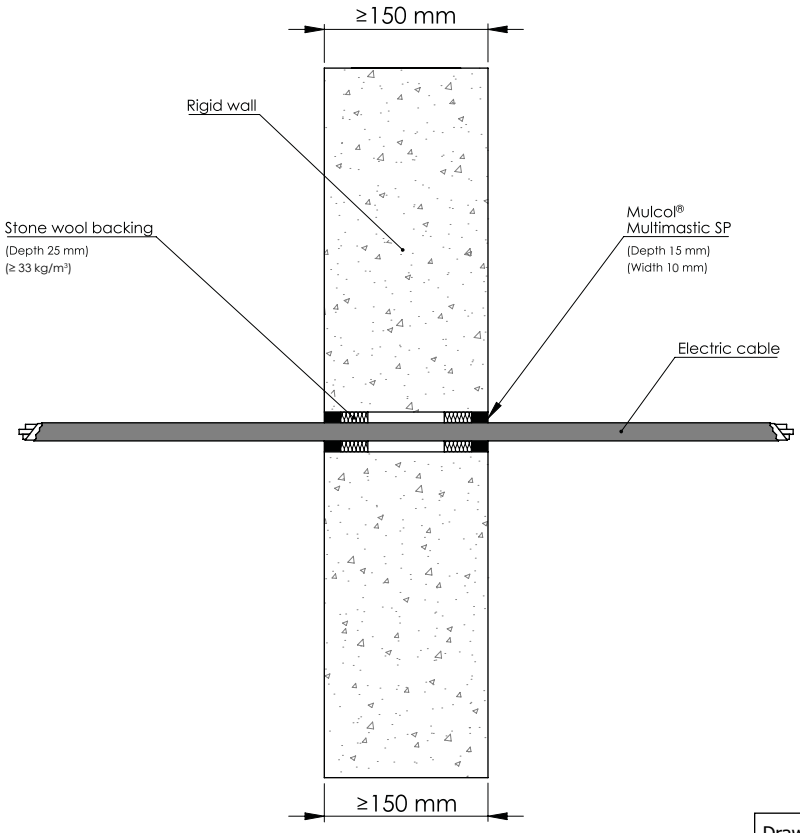
Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 15	≥ 1.0	Multimastic SP	1.5 WFT	LI 200	Multimastic SP 0-20 x ≥ 10 mm (wxd)	**EI 60 C/U, E 120 C/U**
	≤ Ø 22	≥ 1.0				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

A.2.1 Rigid wall - Cables

A.2.1.1 Single cables

Front view



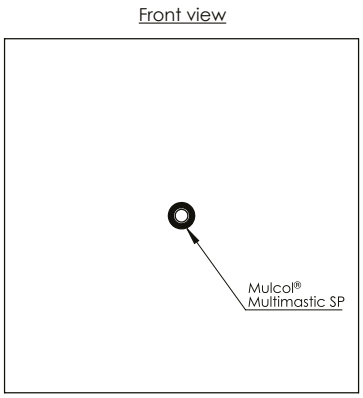


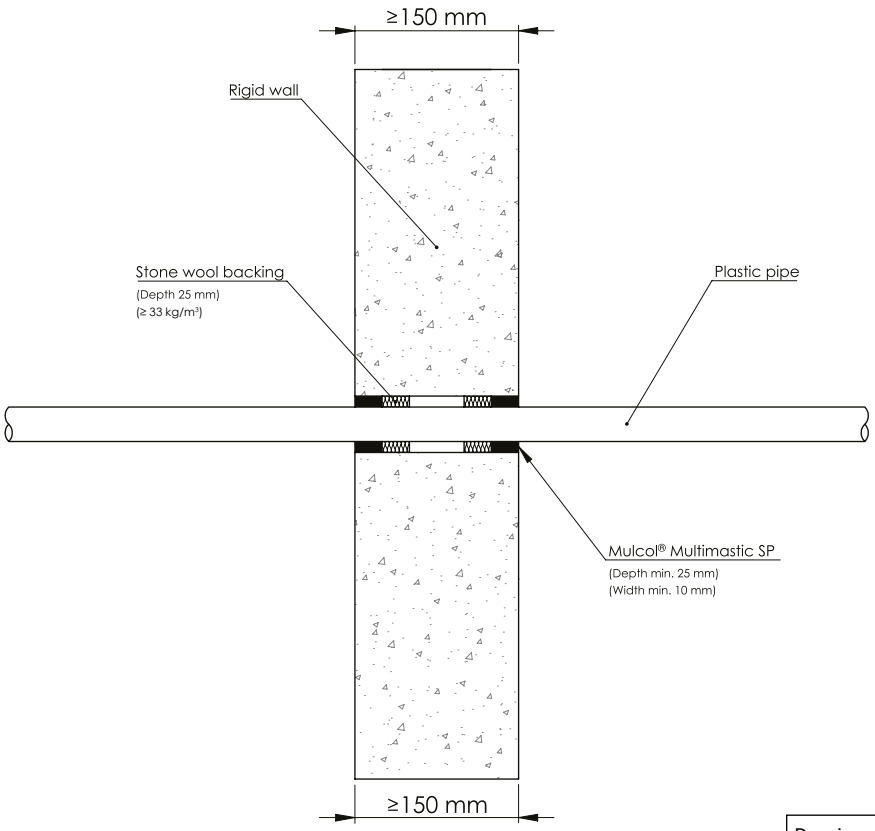
Drawing: RW150.E-EC-MSP2.2.10

Services	Sealing (mm)	Backing	Classification
Single electrical cables ≤ Ø 21 mm	Multimastic SP ≥ 10 x 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



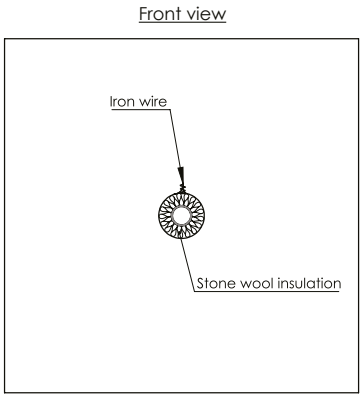


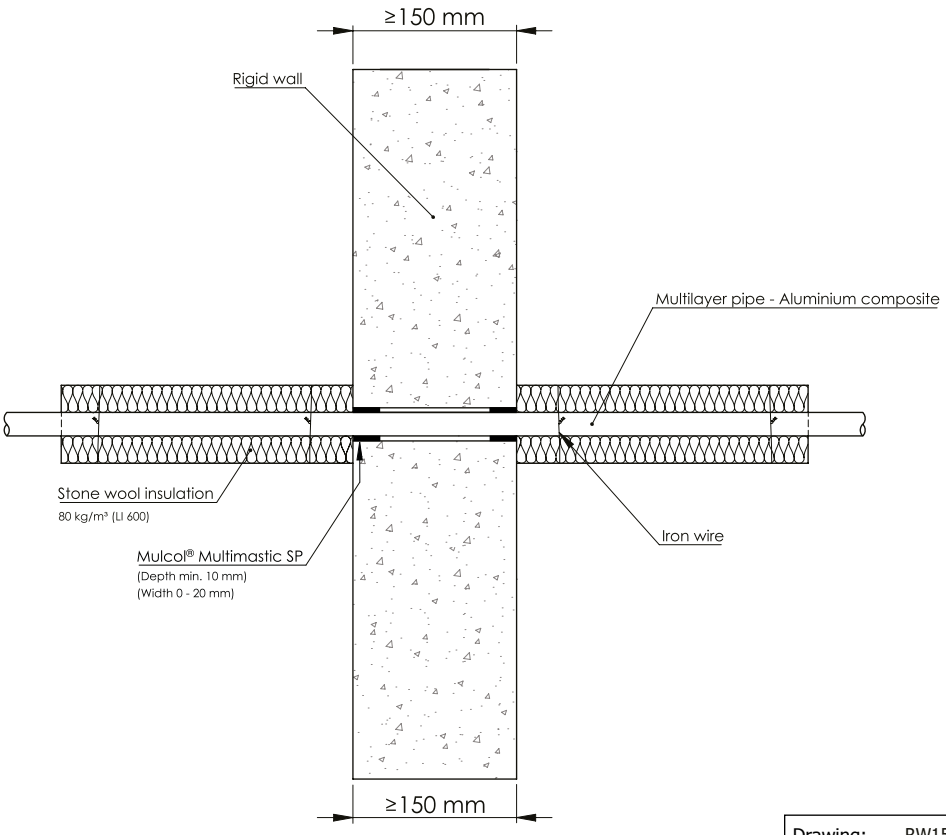
Drawing: RW150.E-PP-MSP2.2.10

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	Multimastic SP ≥ 10 x 25 (wxd)	25 mm stone wool (≥ 33 kg/m³)	**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



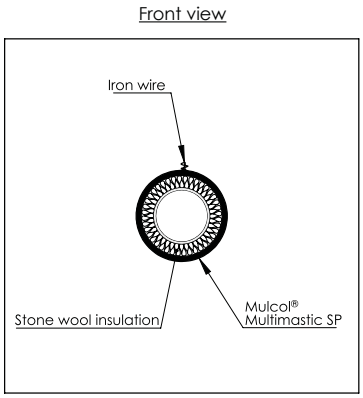


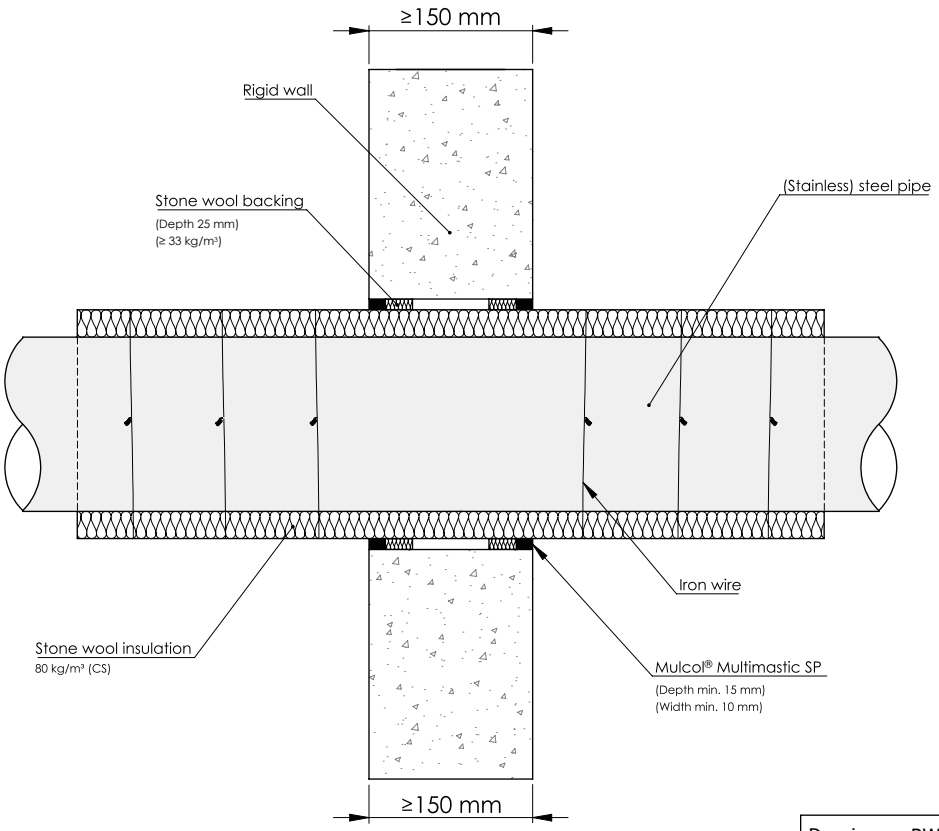
Drawing: RW150.E-MLA-1.0.20.LI

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Multilayer pipes (MLC)	≤ Ø 20	2.0	Stone wool (≥ 80 kg/m^3)	≥ 25	LI 600 / CI	Multima tic SP 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



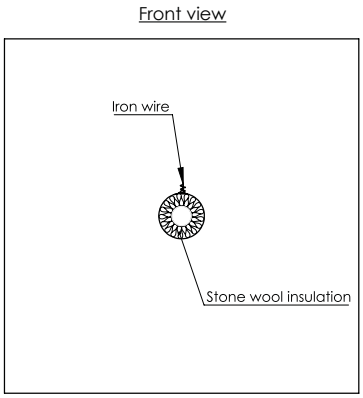


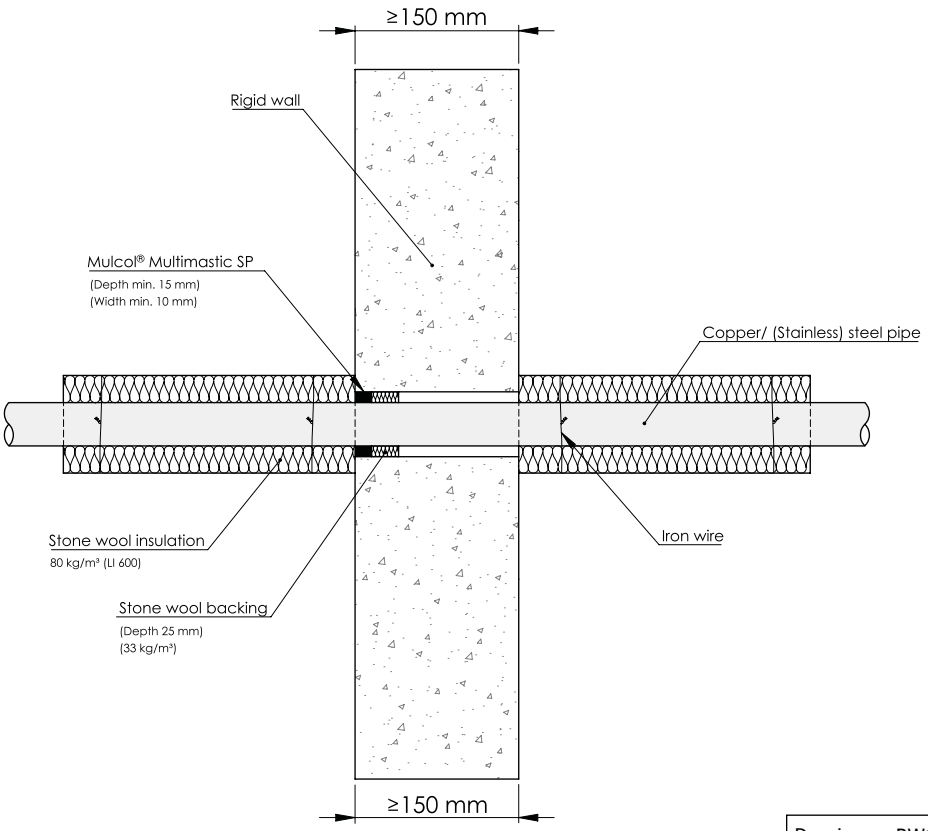
Drawing: RW150.E-ST-MSP2.2.20

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/m^3)	30	CS	Multimastic SP ≥ 10 x 15 (wxd)	25 mm stone wool (≥ 33 kg/m^3)	**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



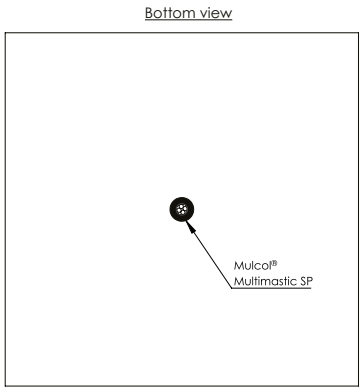


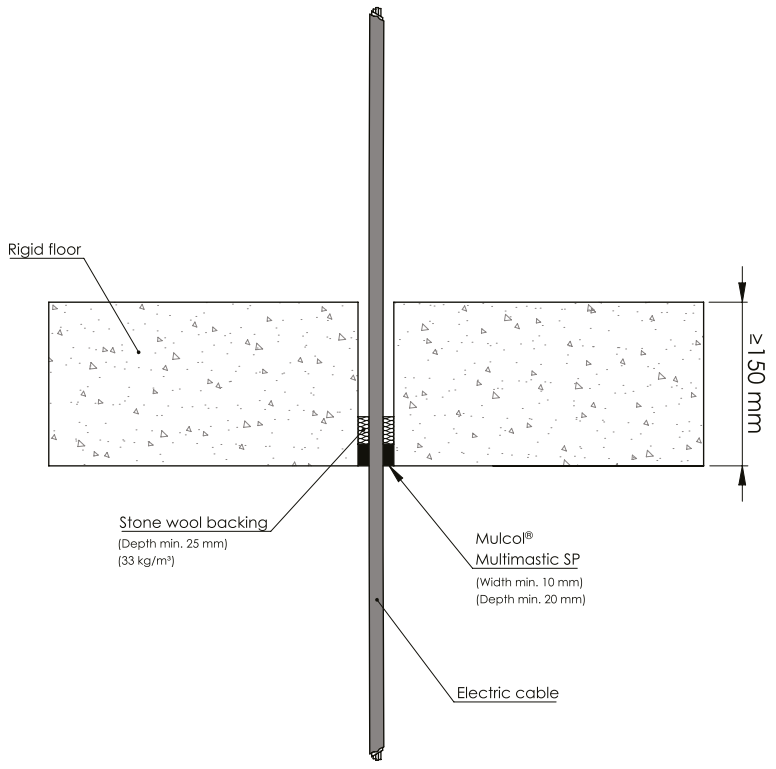
Drawing: RW150.E-CU-MSP1.1.20

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	Stone wool (≥ 80 kg/m³)	≥ 25	LI 600 / CI	Multimastic SP ≥ 10 x 15 mm (wxd) either side	25 mm stone wool (≥ 33 kg/m³)	**EI 120 C/U E 240 C/U**
	≤ Ø 54	≥ 1.5						
(Stainless) Steel / cast iron	≤ Ø 219	≥ 4.0		≥ 30				

B.1.1 Rigid floor - Cables

B.1.1.1 Single cables



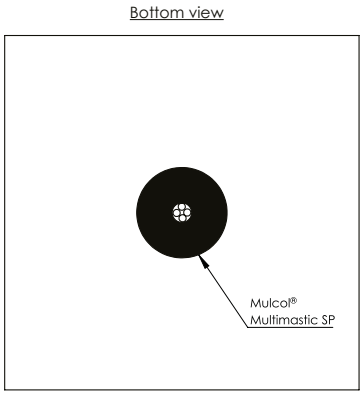


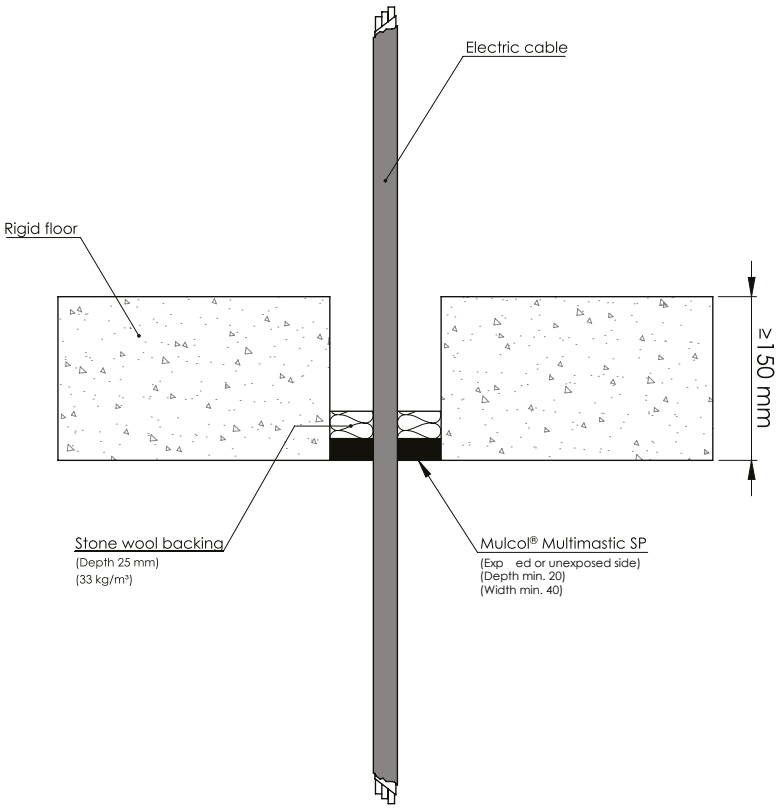
Drawing: RF.E-EC-MSP1.18.1.2.10

Services	Sealing (mm)	Sealing side	Backing	Classification
Cables ≤ Ø 21 mm	Multimastic SP ≥ 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



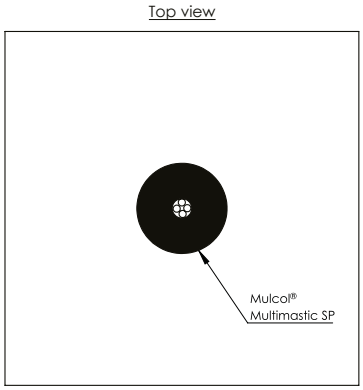


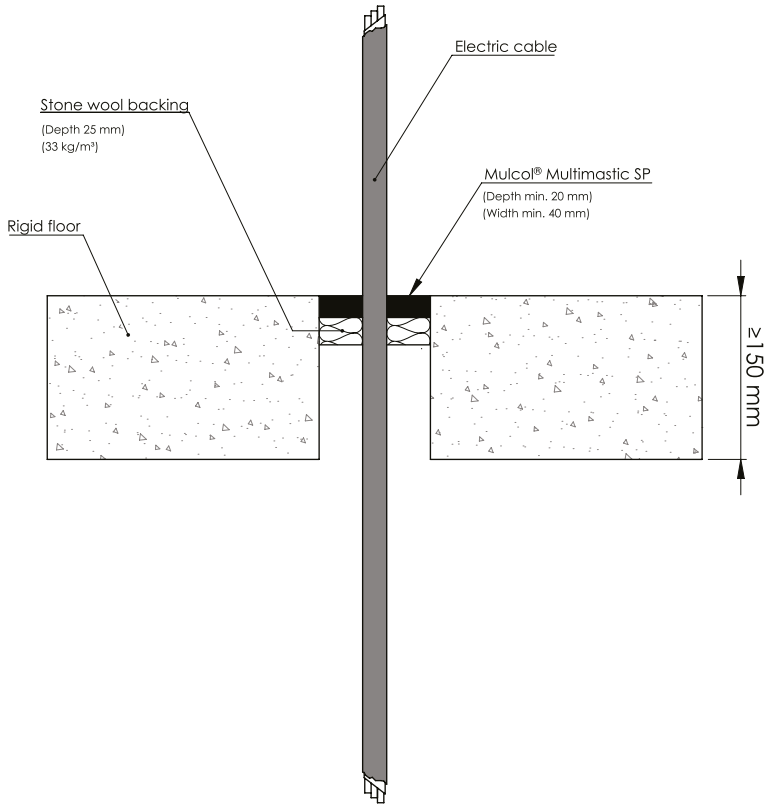
Drawing: RF.E-EC-MSP1.12.1.2.10

Services	Sealing (mm)	Sealing side	Backing	Classification
Cables ≤ Ø 21 mm	Multimastic SP ≥ 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



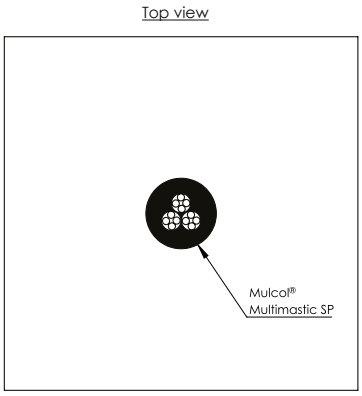


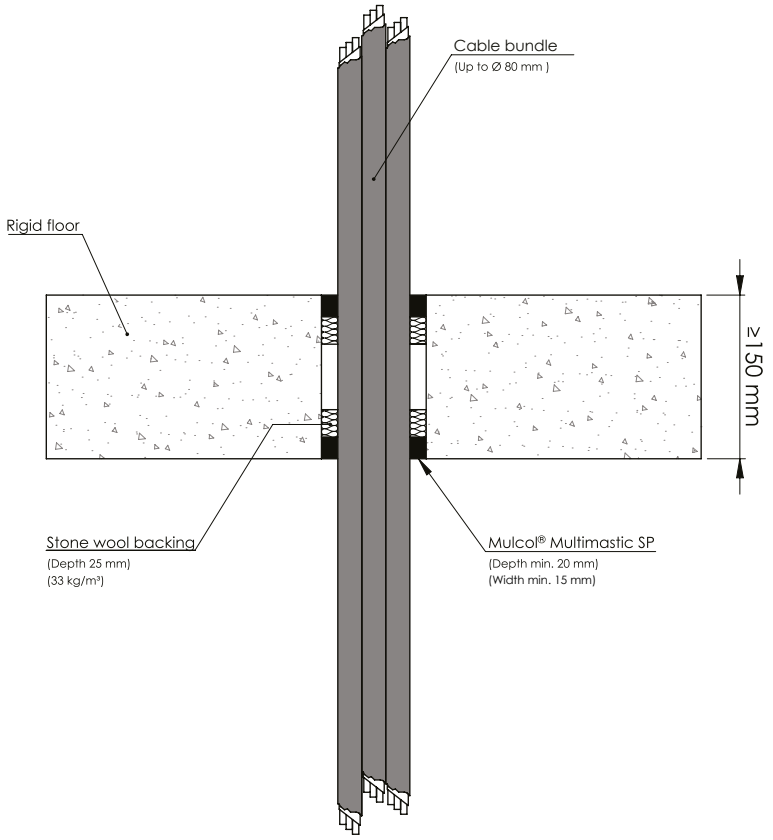
Drawing: RF.E-EC-MSP1.12.1.3.10

Services	Sealing (mm)	Sealing side	Backing	Classification
Cables ≤ Ø 21 mm	Multimastic SP ≥ 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



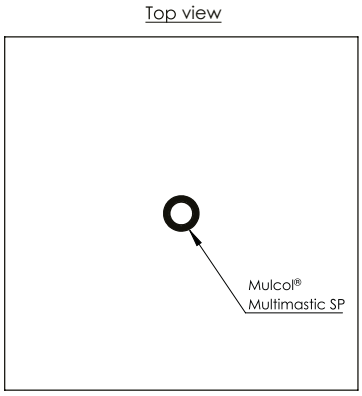


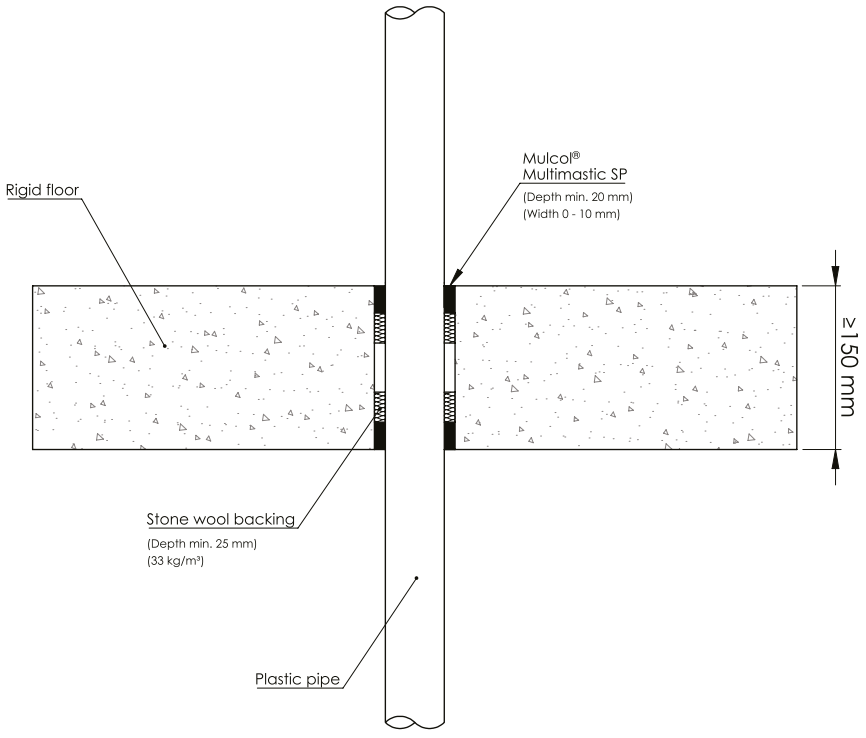
Drawing: RF.E-ECB-MSP2.18.2.1.10

Services	Sealing (mm)	Backing	Classification
Cables ≤ Ø 21 mm in a tied bundle ≤ Ø 100 mm	Multimastic SP ≥ 15 x 20 (wxd)	25 mm, stone wool (≥ 33 kg/m3)	**EI 120**
Cables ≤ Ø 80 mm, max. 3pcs			**EI 60, E 240**

B.1.2 Rigid floor - Combustible pipes

B.1.2.1 Plastic pipes



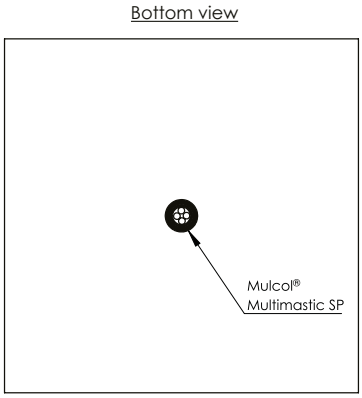


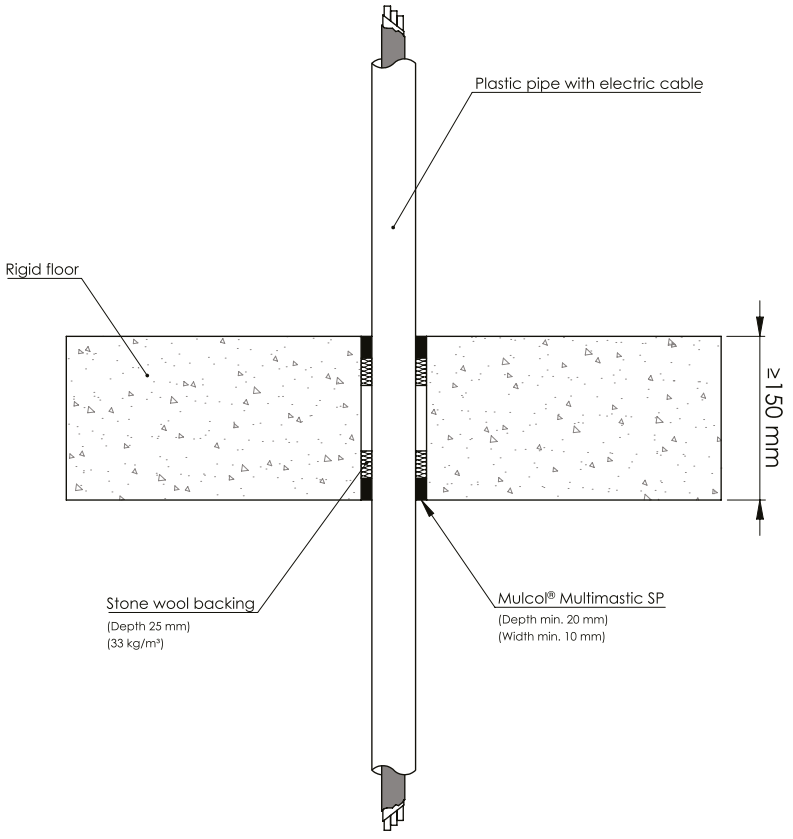
Drawing: RF.E-PP-MSP2.2.10

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
PE(-HD) / PE-X / ABS / SAN+PVC	≤ Ø 40	2.0	Multimastic SP ≥ 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)		1.8 - 3.7			
	≤ Ø 50	2.0 - 3.0			
		3.0			**EI 240 U/C**

B.1.2 Rigid floor - Combustible pipes

B.1.2.2 Plastic pipes with cables



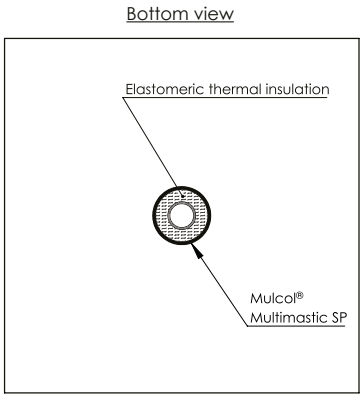


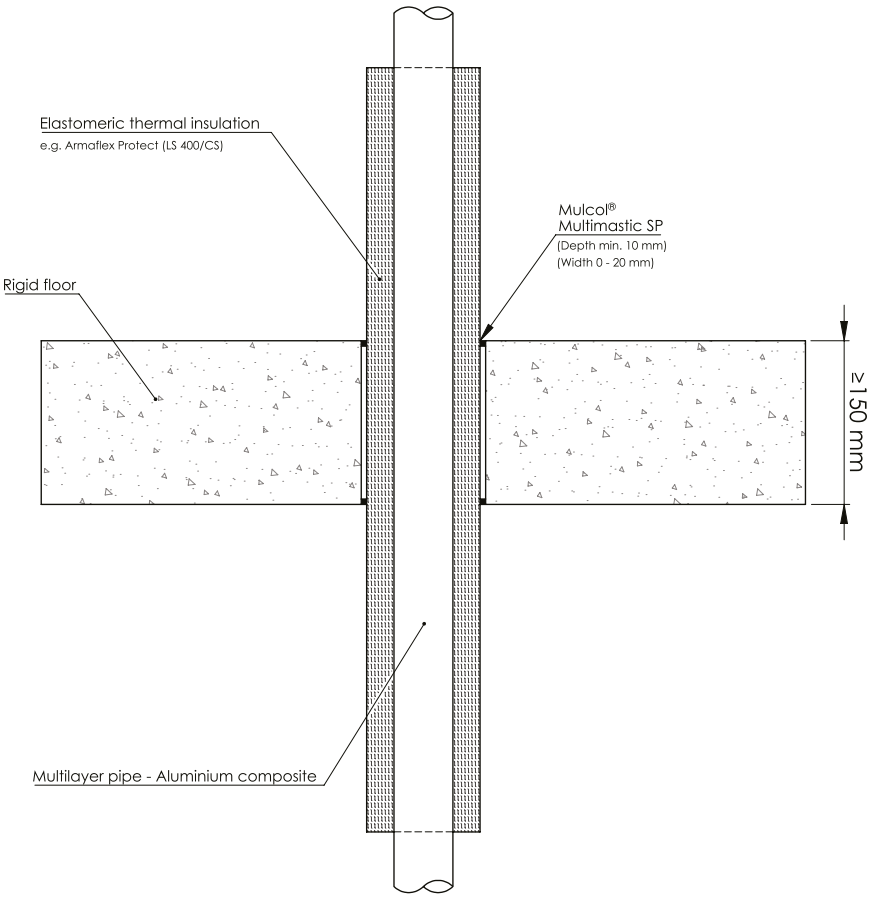
Drawing: RF.E-PPEC-MSP2.2.10

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	2.0	Multimastic SP ≥ 10 x 20 (wxd)	25 mm stone wool (≥ 33 kg/m³)	**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



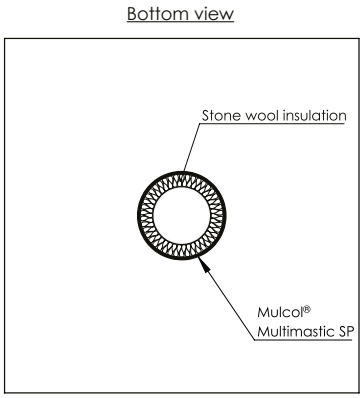


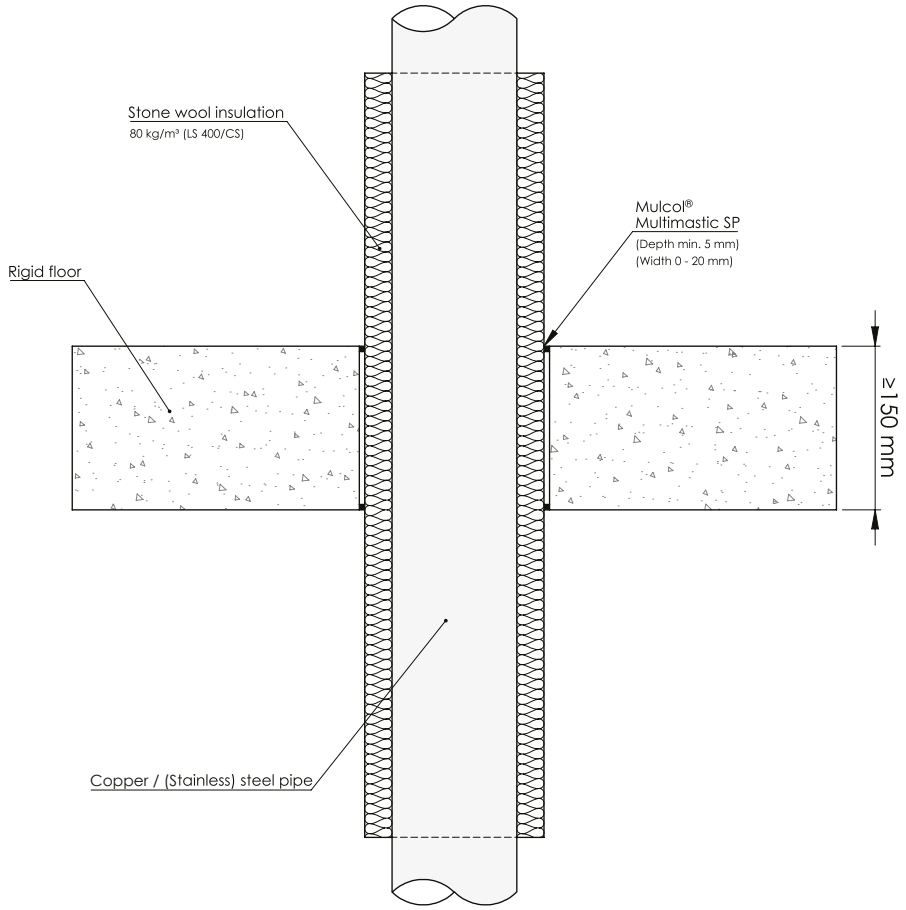
Drawing: RF.E-MLA-0.22

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configura-tion		
Multilayer pipes (MLC)	≤ Ø 26	3.0 - 6.0	ArmaFlex Protect	20	LS 400 / CS	Multimastic SP 0-20 x ≥ 10 (wxd)	**EI 120 U/C**
	≤ 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



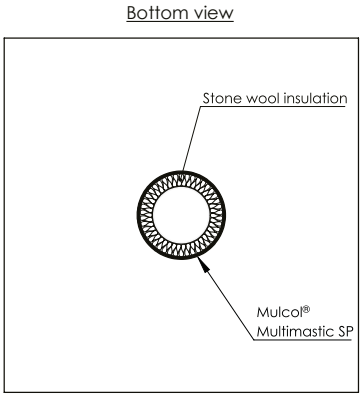


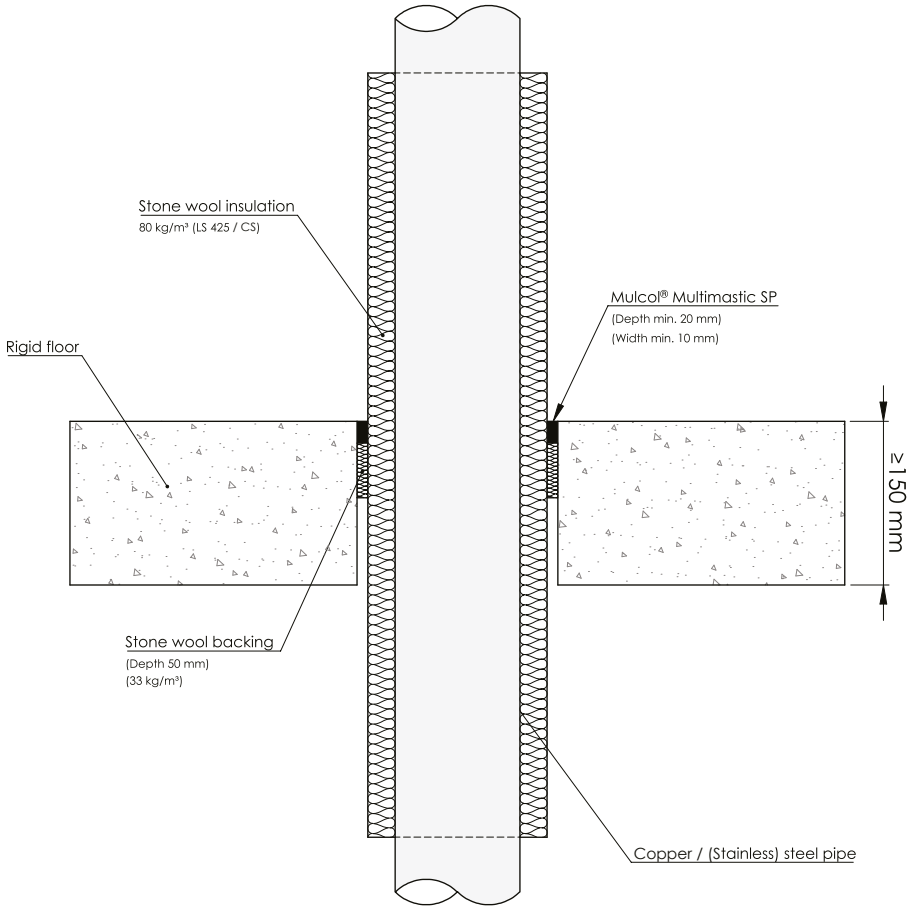
Drawing: RF.E-ST-0.20.LS

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/m³)	25	LS 400 / CS	Multimastic SP 0-20 x ≥ 5 (wxd)	**EI 120 C/U**
	≤ Ø 54	≥ 1.5					
(Stainless) Steel / cast iron	≤ Ø 114.3	≥ 3.6					
	≤ Ø 324	≥ 3.7		30			

B.1.4 Rigid floor - Metal pipes insulated

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



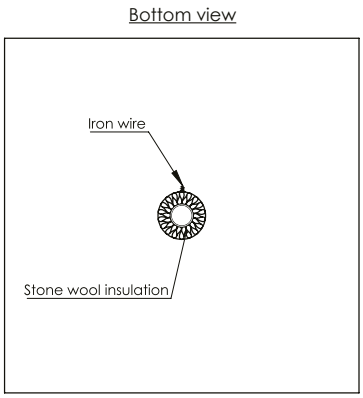


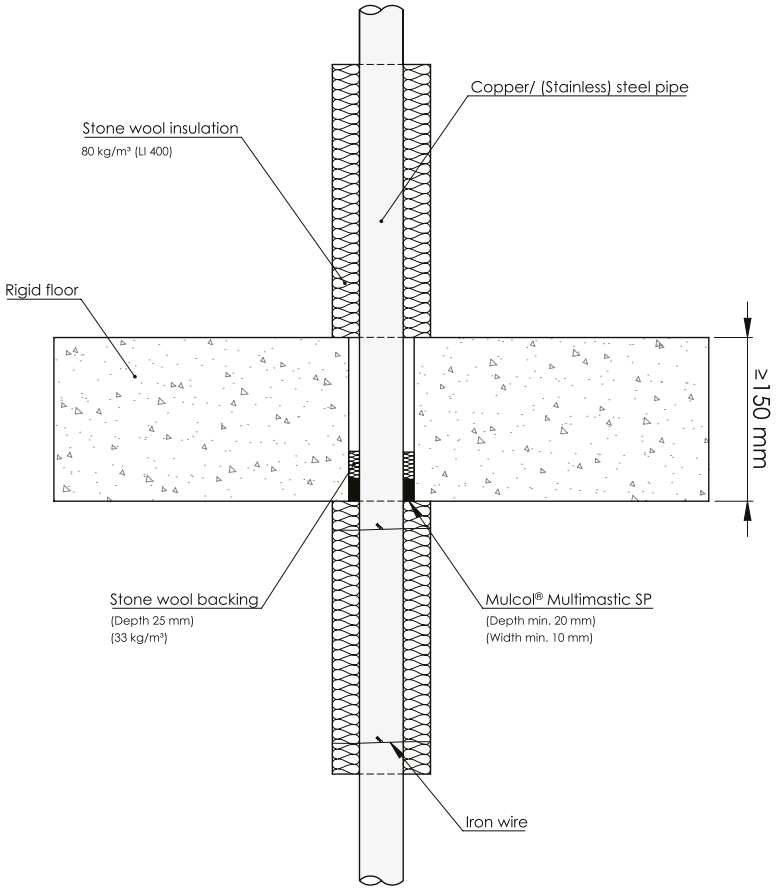
Drawing: RF E-ST-MSP1.18.1.3.20.LS425

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	Multimastic SP ≥ 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						**EI 120 C/U E 240 C/U**
(Stainless) Steel / cast iron	≤ Ø 114.3	≥ 3.6		≥ 30				
	≤ Ø 324	≥ 6.3		≥ 50				
					CS			**EI 240 C/U**

B.1.4 Rigid floor - Metal pipes insulated

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



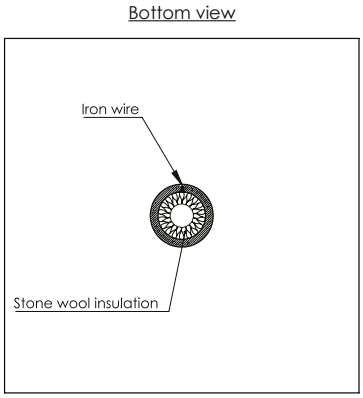


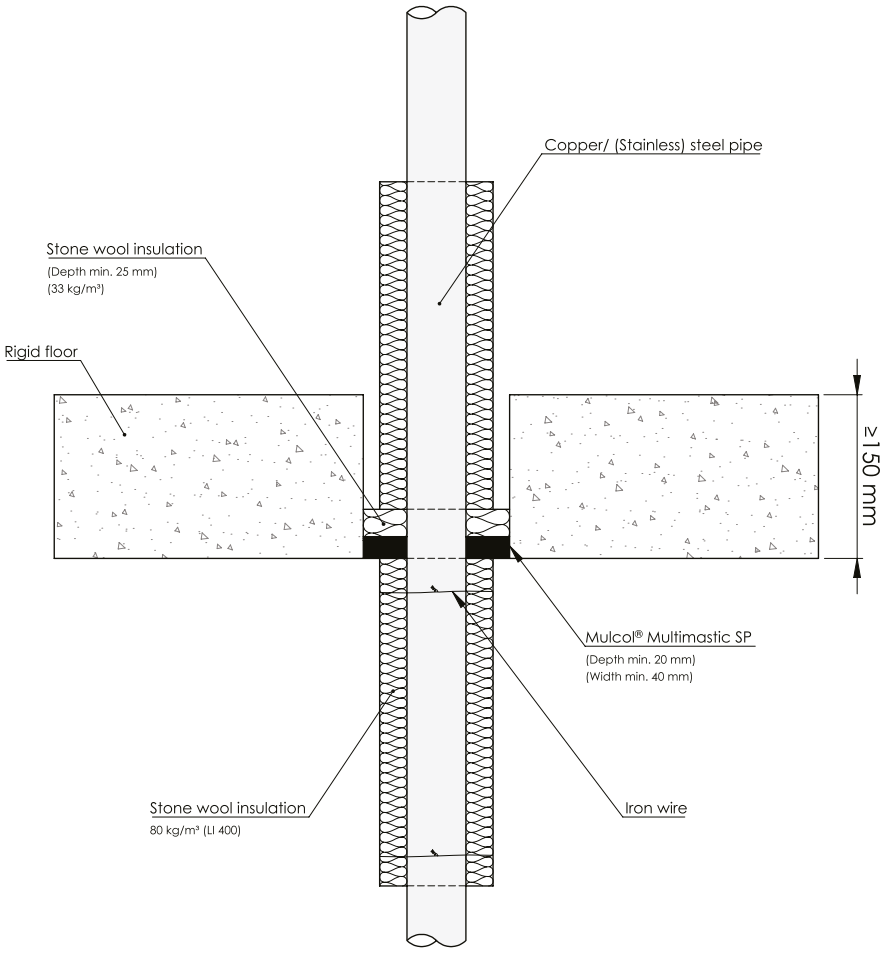
Drawing: RF.E-CU-MSP1.18.1.2.20

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



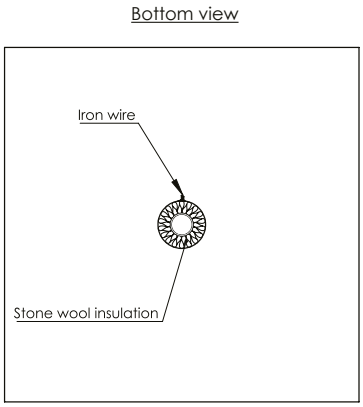


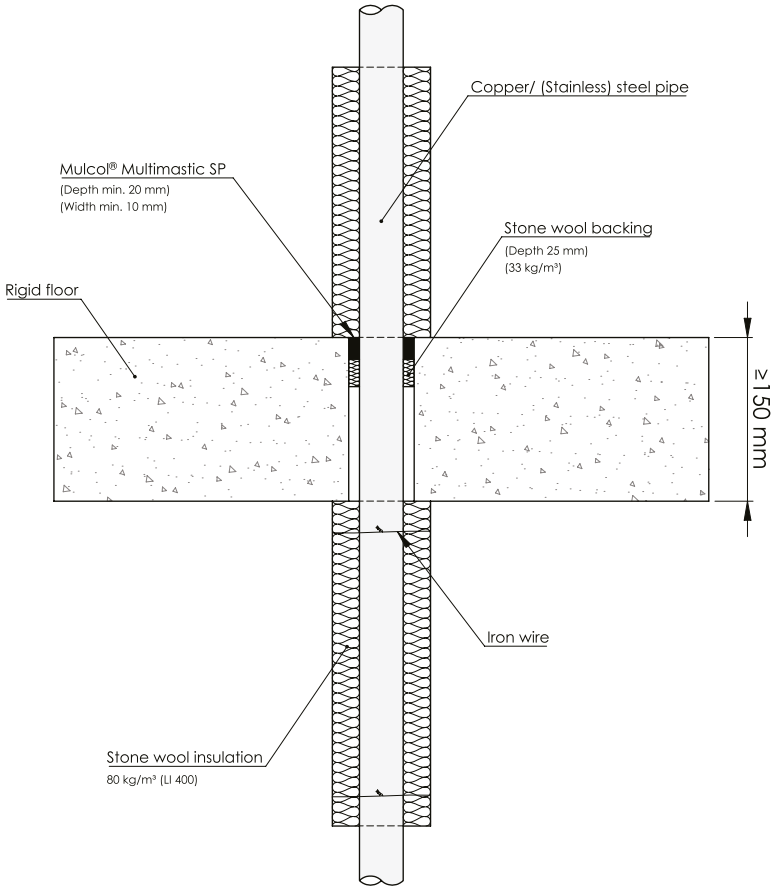
Drawing: RF.E-CU-MSP1.12.1.2.20

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	Multimastic SP ≥ 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



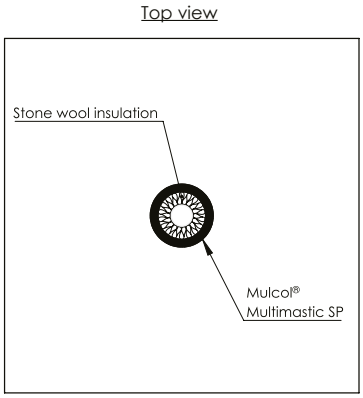


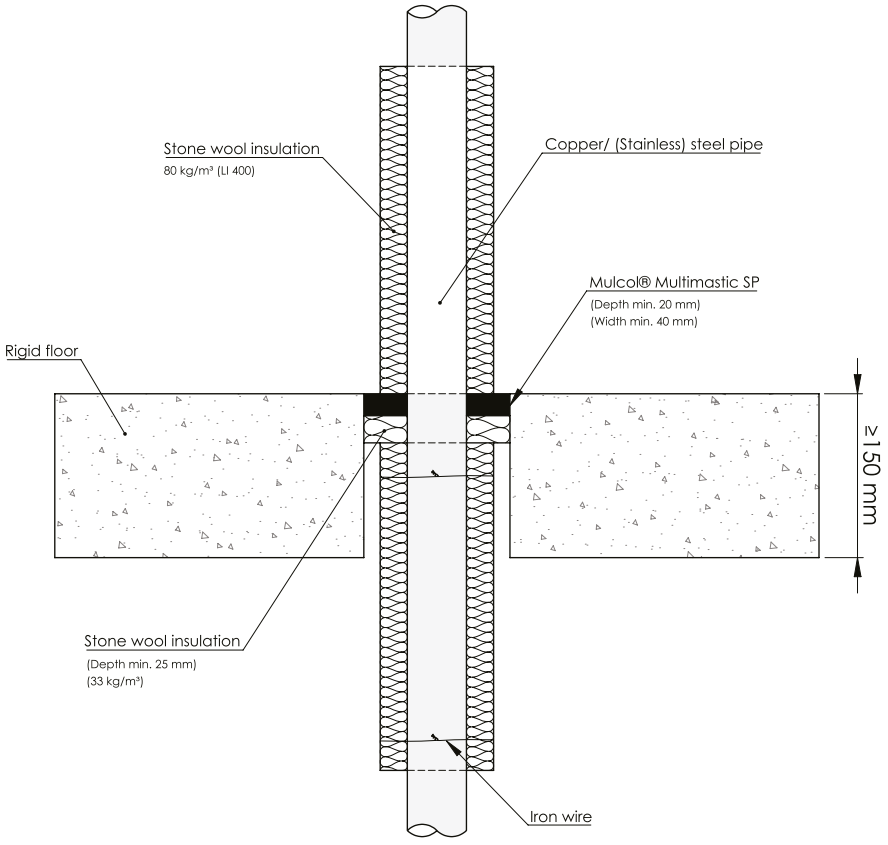
Drawing: RF.E-CU-MSP1.18.1.3.20

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.1	Stone wool (≥ 80 kg/m³)	≥ 25	LI 400 / CI	Multimastic SP ≥ 10 x 20 (wxd) top of floor	25 mm stone wool (≥ 33 kg/m³)	**EI 240 C/U**
	≤ Ø 54	≥ 1.5						
(Stainless) Steel / cast iron	≤ Ø 114.3	≥ 3.6						**EI 180 C/U** **E 240 C/U**
	≤ Ø 219	≥ 4.0						**EI 120 C/U** **E 240 C/U**

B.1.4 Rigid floor - Metal pipes insulated

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



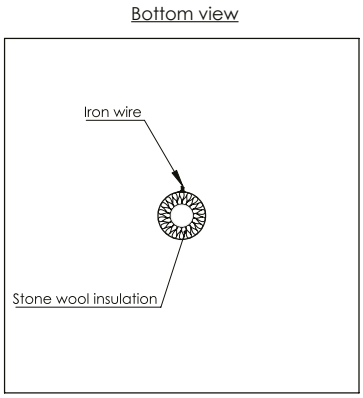


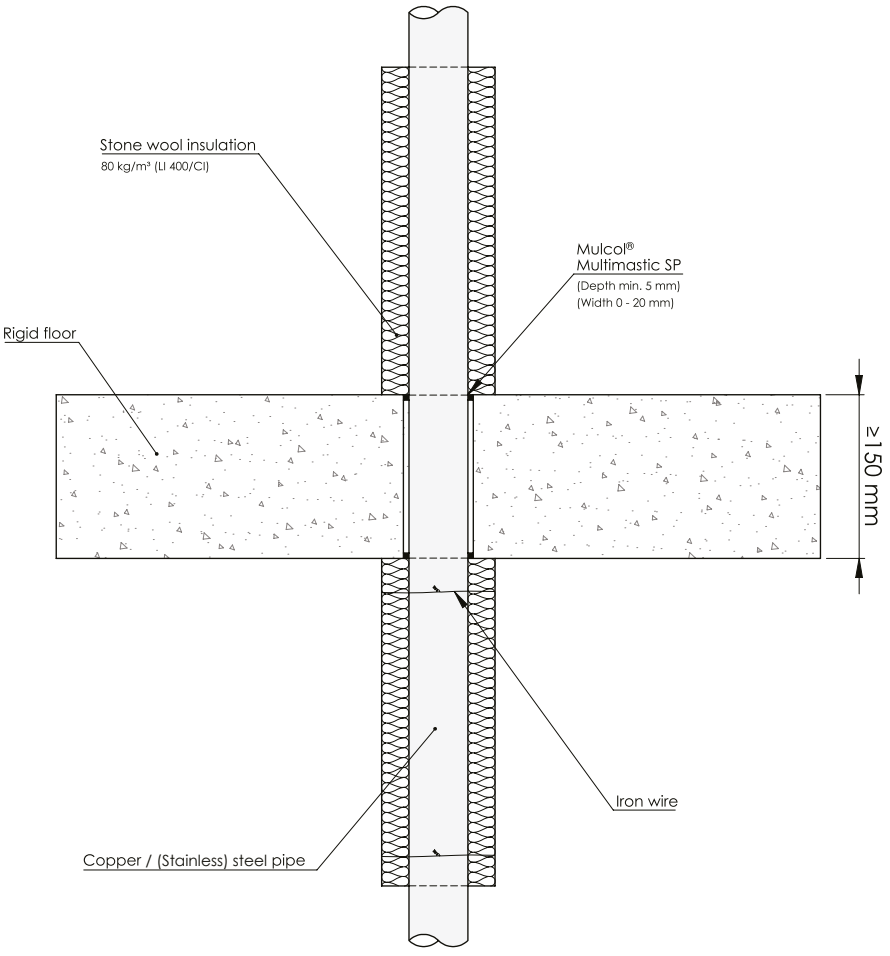
Drawing: RF.E-CU-MSP1.12.1.3.20

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration			
Copper / (stainless) steel / cast iron	≤ Ø 54	≥ 1.5	Stone wool (≥ 80 kg/m^3)	≥ 25	LI 400 / CI	Multimastic SP ≥ 40 x 20 (wxd) top of floor	25 mm stone wool (≥ 33 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



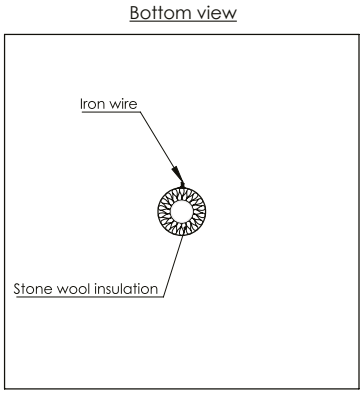


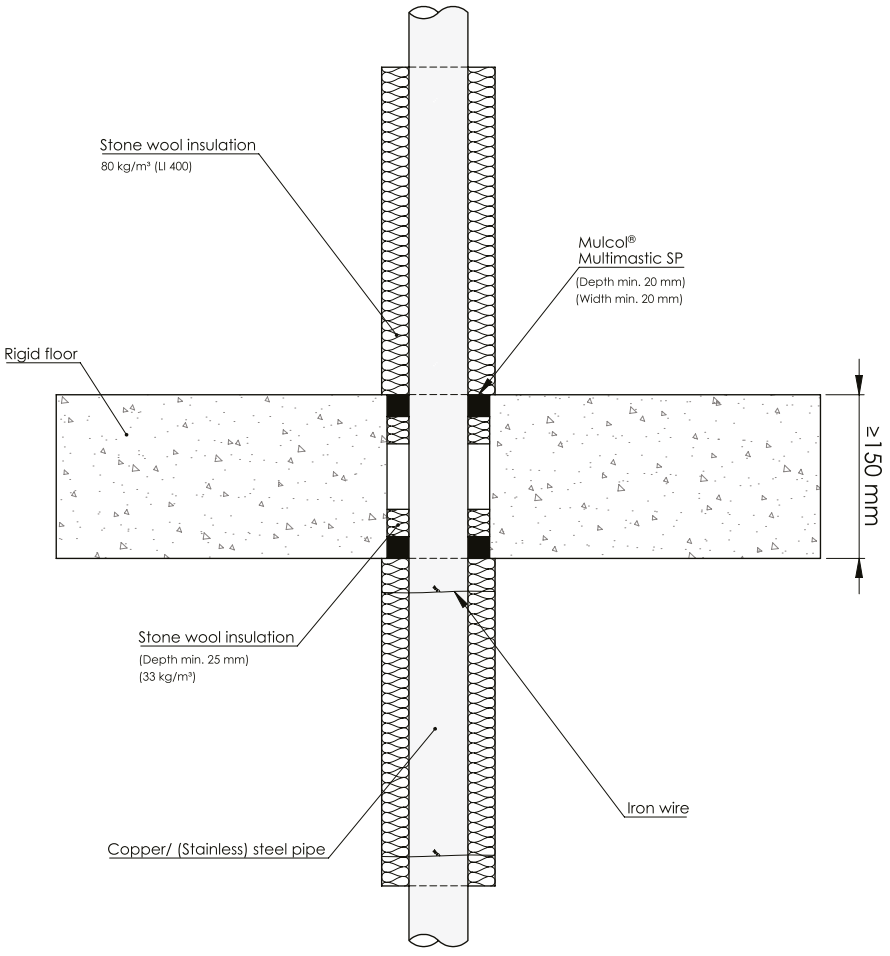
Drawing: RF.E-CU-0.20.LI

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/m³)	≥ 25	LI 400 / CI	Multimastic SP 0-20 x ≥ 5 (wxd)	**EI 120 C/U**
	≤ Ø 54	≥ 1.5					
(Stainless) Steel / cast iron	≤ Ø 114.3	≥ 3.6					
	≤ Ø 219	≥ 4.0		≥ 30			

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



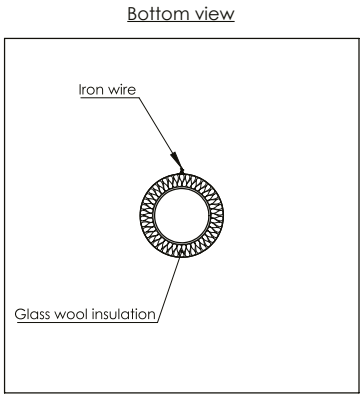


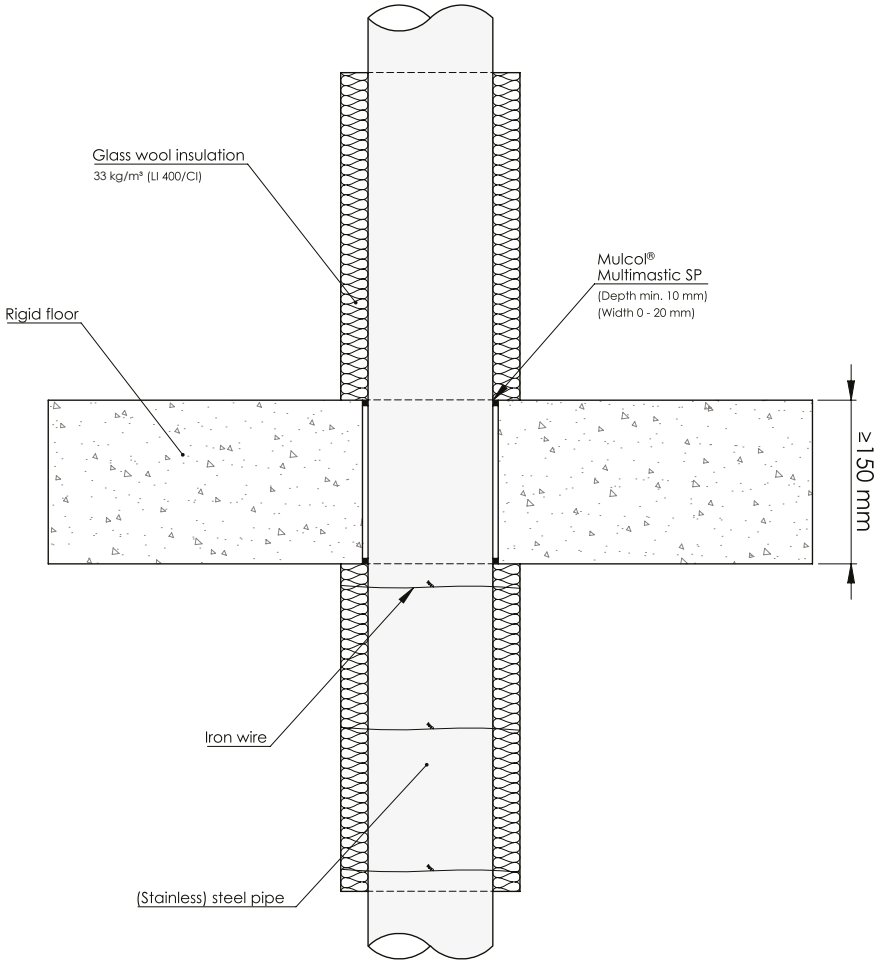
Drawing: RF.E-CU-MSP2.6.2.1.20

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/m³)	≥ 25	LI 400 / CI	Multimastic SP ≥ 20 x 20 (wxd)	25 mm stone wool (≥ 33 kg/m³)	**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



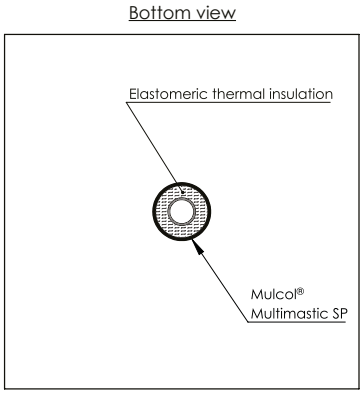


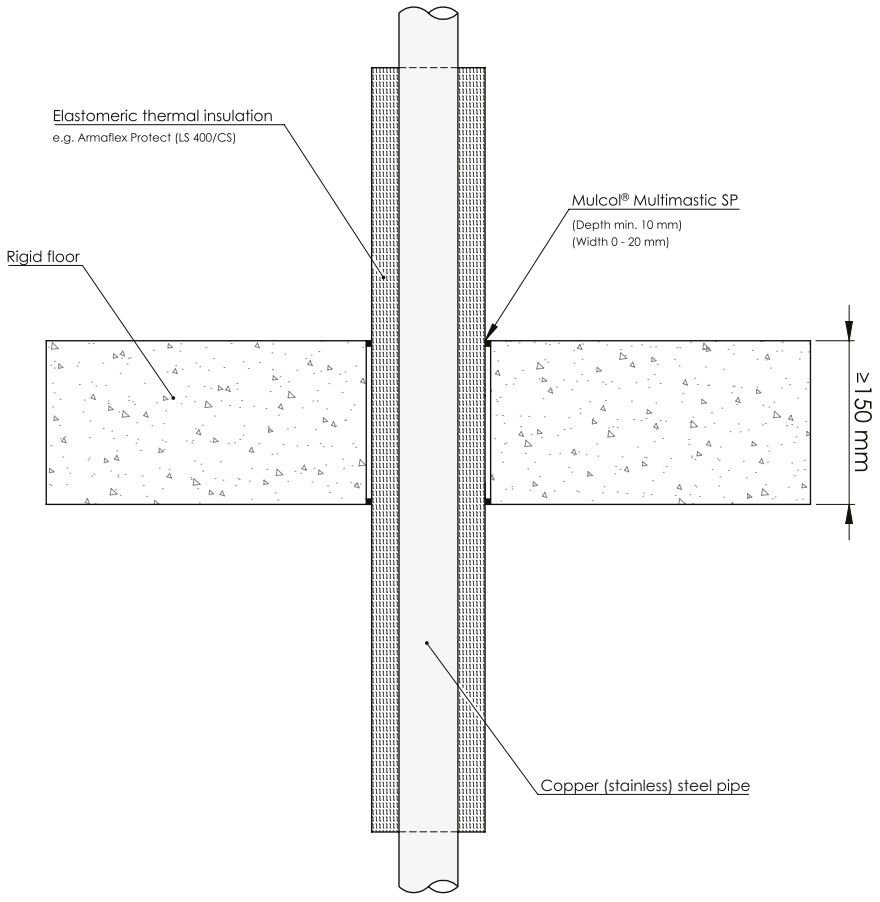
Drawing: RF.E-ST-0.20.G.LI

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 Climclover Glass wool (≥ 33 kg/m³)	≥ 25	LI 400 / CI	Multimastic SP 0-20 x ≥ 10 (wxd)	**EI 120 C/U**
	≤ Ø 114.3	≥ 3.6					**EI 90 C/U, E 120 C/U**
	≤ Ø 219	≥ 4.0		≥ 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



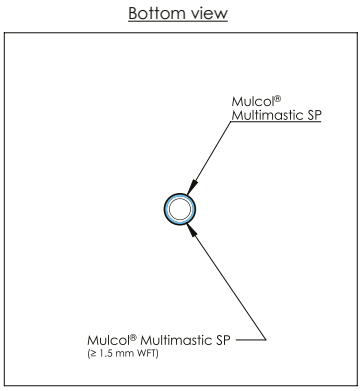


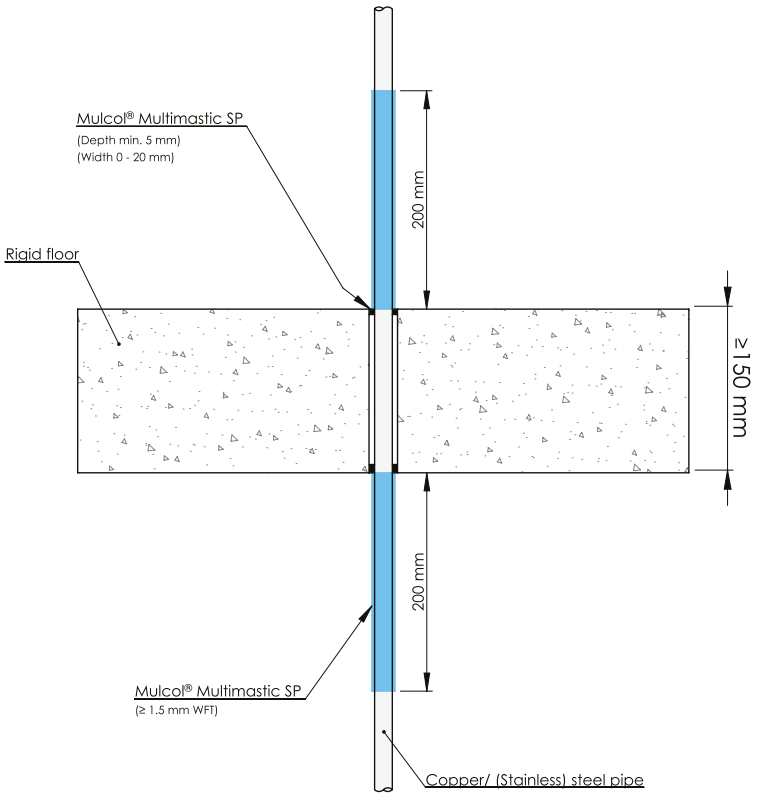
Drawing: RF.E-CU-0.22

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	Multimastic SP 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 - Multimastic SP coated on pipe



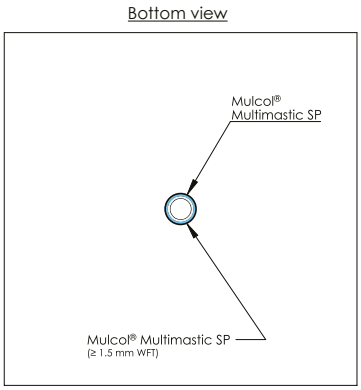


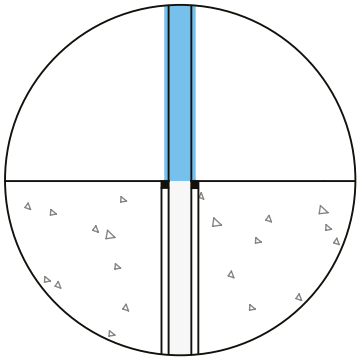
Drawing: RF.E-CU-SPC.1.1.10

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
Copper / (stainless) steel / cast iron	≤ Ø 15	≥ 1.0	Multimastic SP	1.5 WFT	LI 200	Multimastic SP 0-20 x ≥ 5 (wxd)	**EI 120 C/U**
(Stainless) steel / cast iron	≤ Ø 60.3	≥ 3.6					

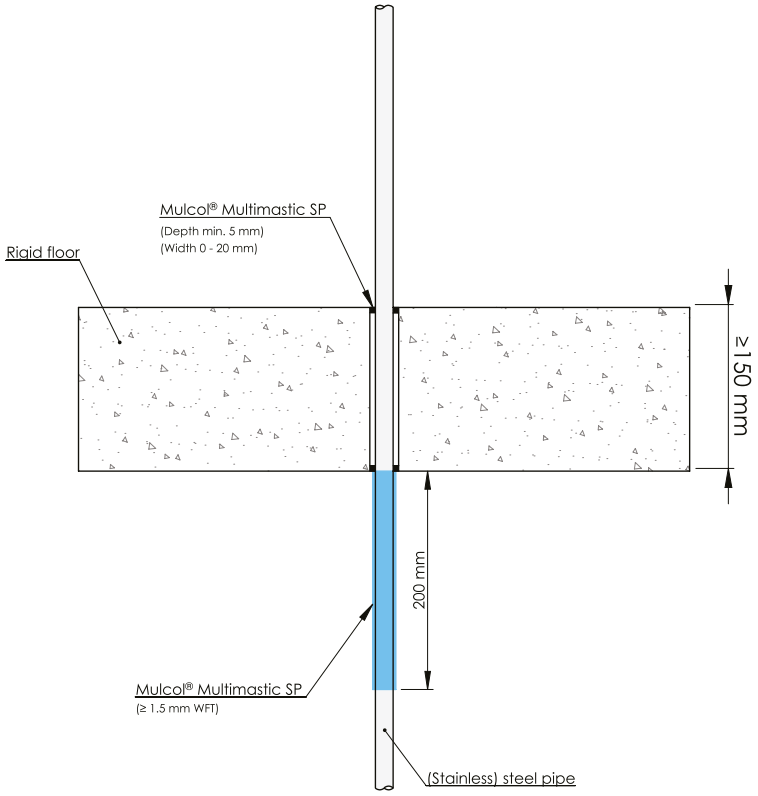
B.1.5 Rigid floor - Metal pipes uninsulated

B.1.5.2 Copper and steel pipes - Multimastic SP coated on pipe - Bottom of floor





Pipe coated on top of floor allowed

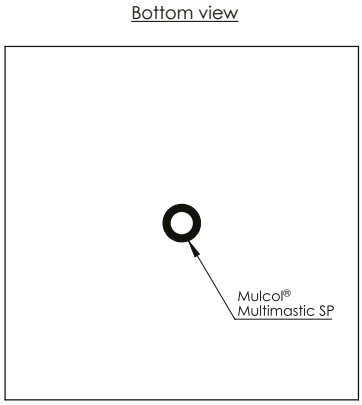


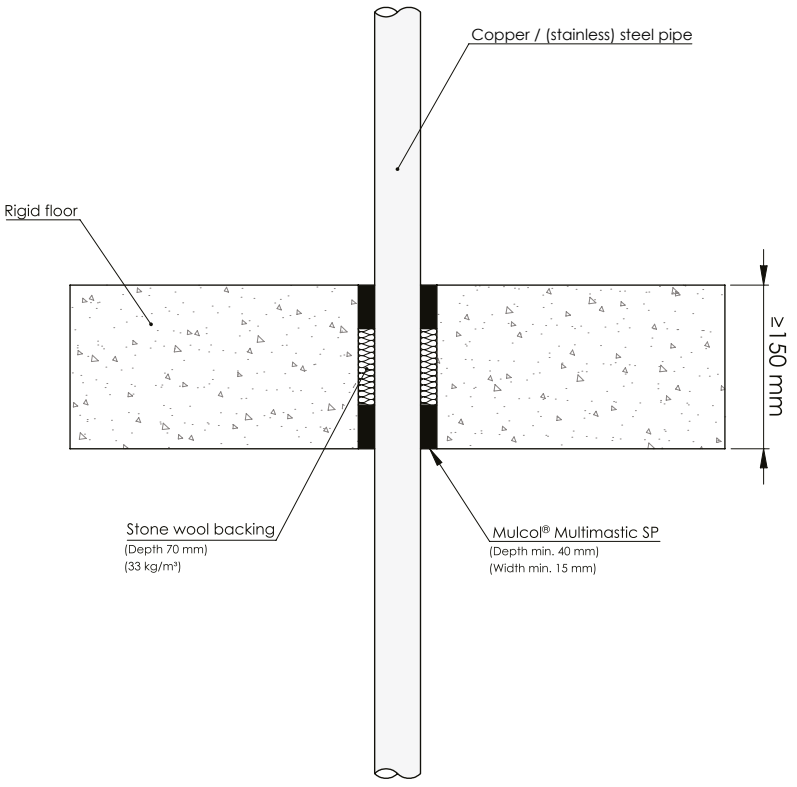
Drawing: RF.E-ST-SPC.1.2.10

Services	Pipe dimensions (mm)		Insulation			Sealing (mm)	Classification
	Outer dimension	Wall thickness	Type	Thickness (mm)	Configuration		
(Stainless) steel / cast iron	≤ Ø 35	≥ 2.0	Multimastic SP	1.5 WFT	LI 200 (bottom of floor)	Multimastic SP 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



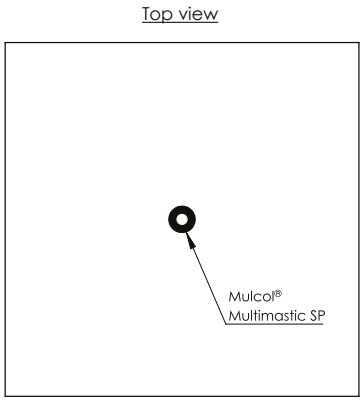


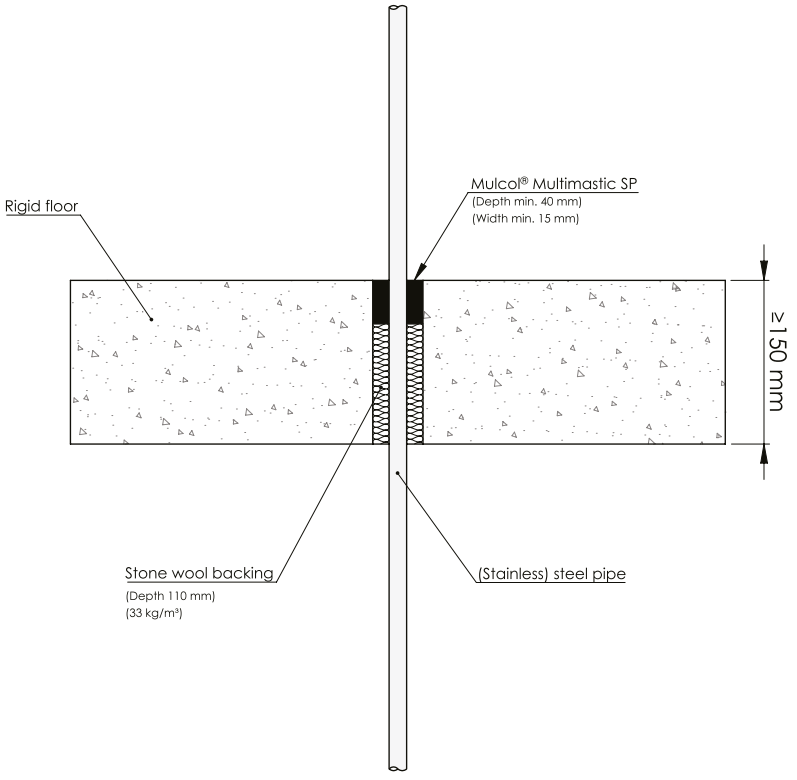
Drawing: RF.E-CU-MSP2.11.1.1.10

Services	Pipe dimensions (mm)		Sealing (mm)	Backing	Classification
	Outer dimension	Wall thickness			
Copper / (stainless) steel / cast iron	≤ Ø 22	≥ 1.0	Multimastic SP ≥ 15 x 40 (wxd)	70 mm stone wool (≥ 33 kg/m³)	**EI 30 C/U, E 240 C/U**
(Stainless) Steel / cast iron	≤ Ø 15	≥ 1.5			**EI 240 C/U**
	≤ 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



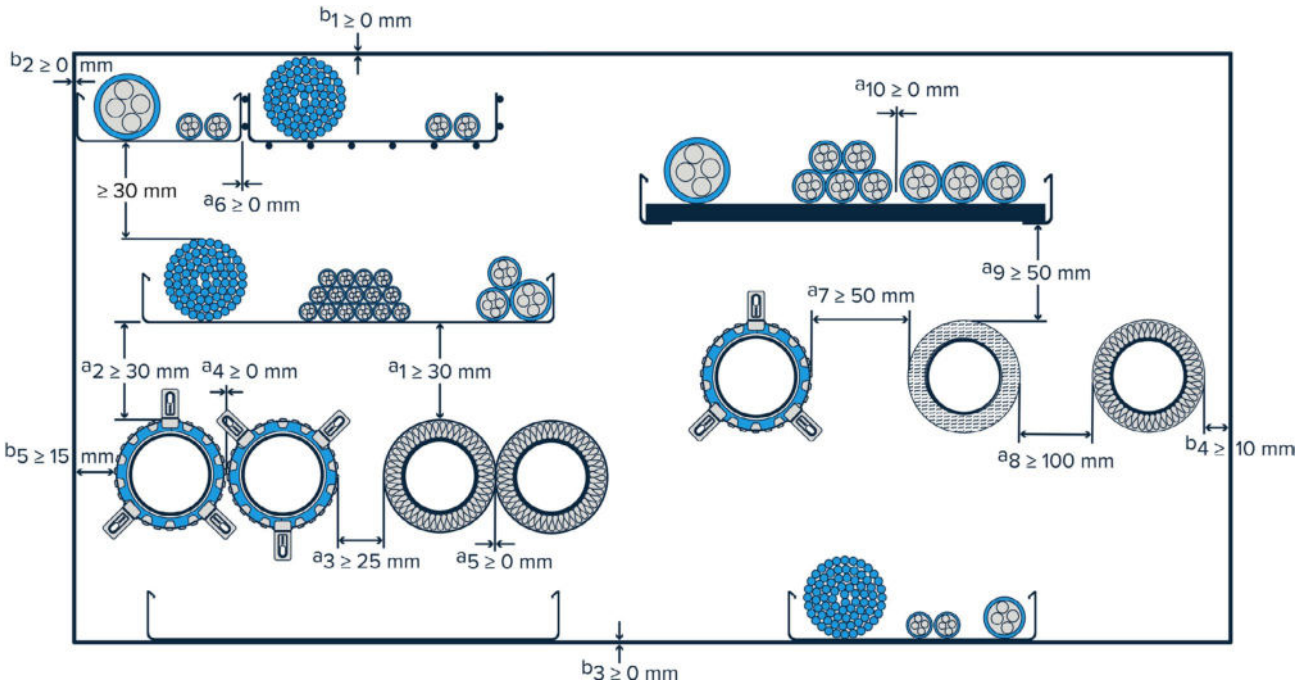


Drawing: RF.E-ST-MSP1.11.1.3.10

Services	Pipe dimensions (mm)		Sealing (mm)	Sealing side	Backing	Classification
	Outer dimension	Wall thickness				
(Stainless) Steel / cast iron	≤ Ø 15	≥ 1.5	Multimastic SP ≥ 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



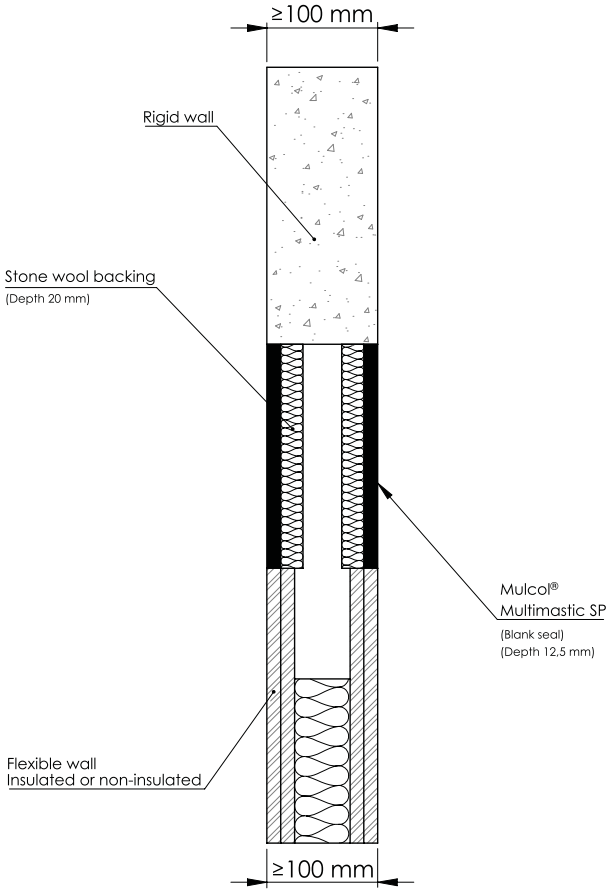
Mutual distances Mixed Penetration Seal – Mulcol® Multimastic SP

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 Maximum seal dimensions - Mulcol® Multimastic SP

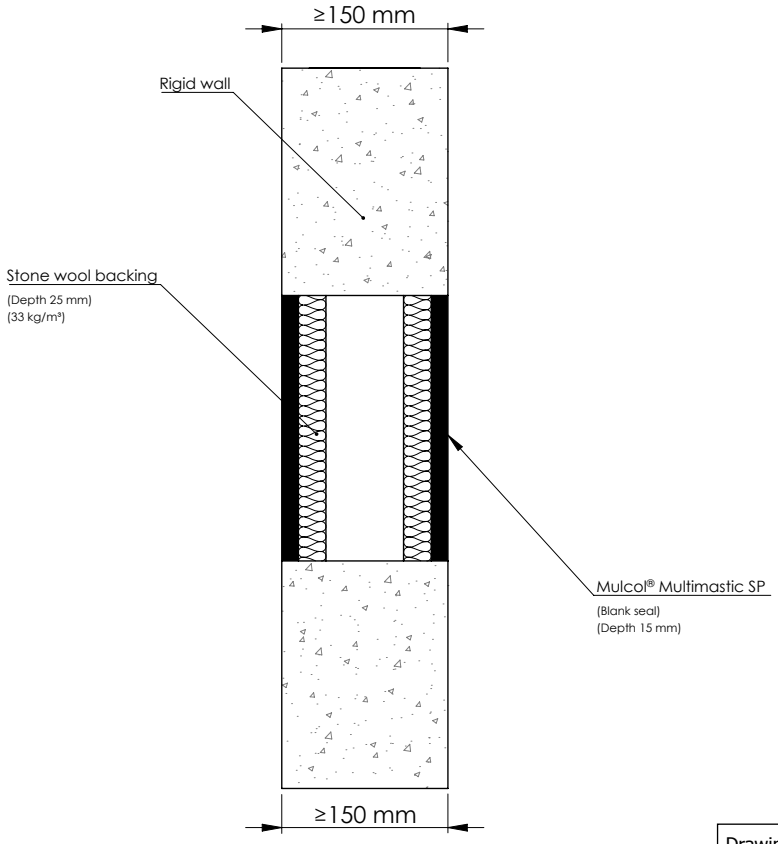


Drawing: PBfw-BS-MSP2.2.10

Services	Classification
Maximum seal size 187.5 x 187.5 mm (width x heigth 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 - Mulcol® Multimastic SP

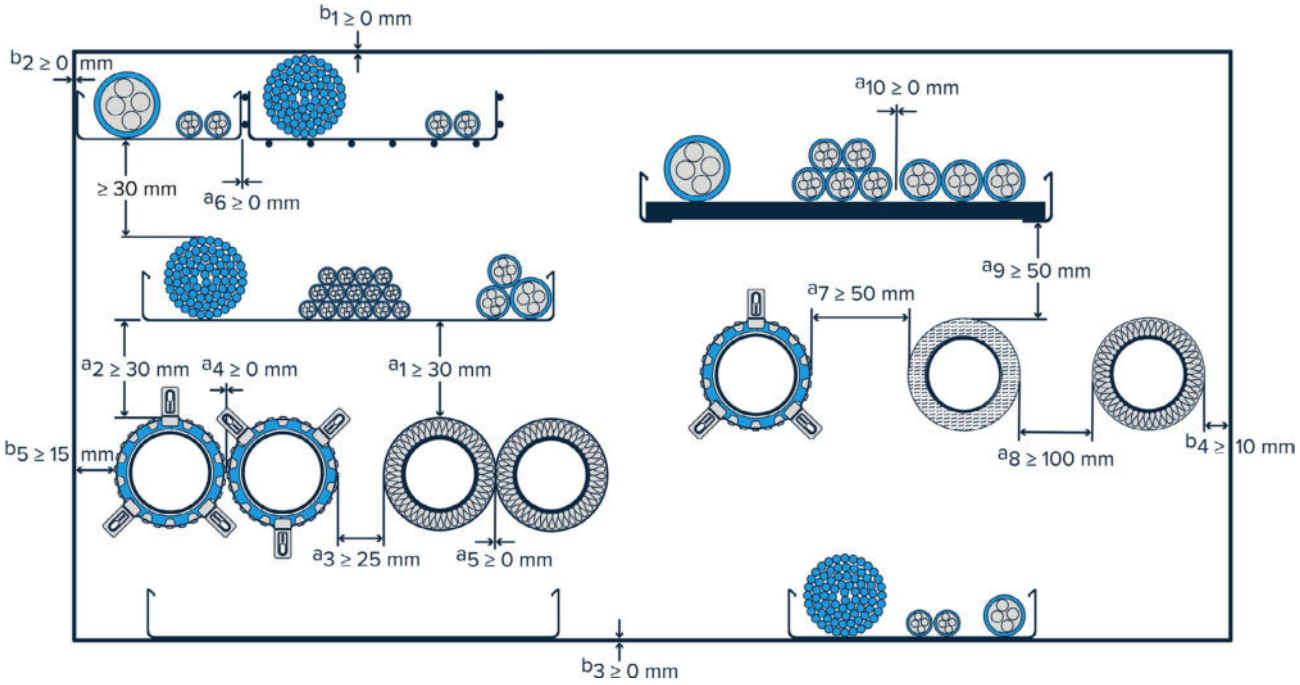


Drawing: RW150-BS-MSP2.2.10

Services	Classification
Maximum seal size 375 x 375 mm (width x heigth 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



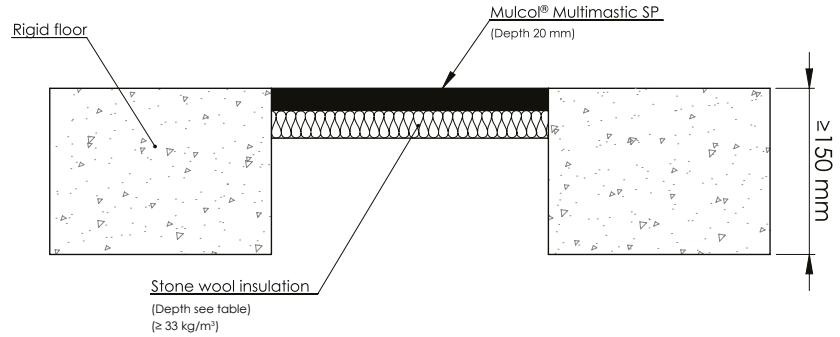
Mutual distances Mixed Penetration Seal – Mulcol® Multimastic SP

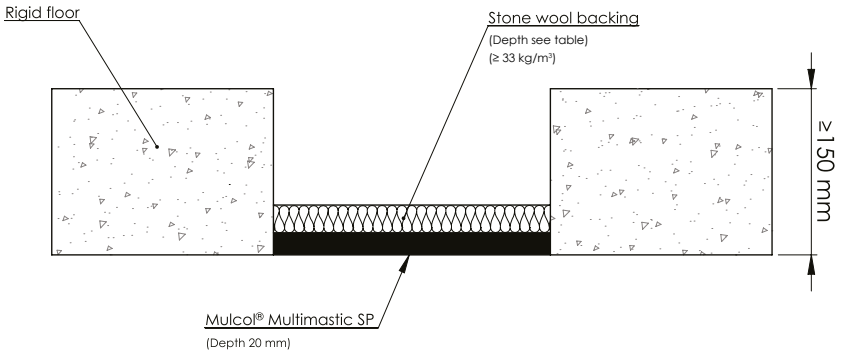
a_1	Distance between cables/cable trays and metal pipes
a_2	Distance between cables/cable trays and plastic pipes
a_3	Distance between metal pipes and plastic pipes
a_4	Distance between plastic pipes
a_5	Distance between metal pipes with non-combustible insulation
a_6	Distance between cable trays
a_7	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 - Mulcol® Multimastic SP





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/m³)	**EI 120, E 240**
Maximum circular seal size Ø 169 mm			
Maximum seal size 150 x 150 mm	Top of floor		**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/m³)	**EI 45, E 240**
Maximum circular seal size Ø 339 mm			
Maximum seal size 300 x 300 mm	Top of floor		**EI 120**
Maximum circular seal size Ø 339 mm			

C.3 Wall configurations

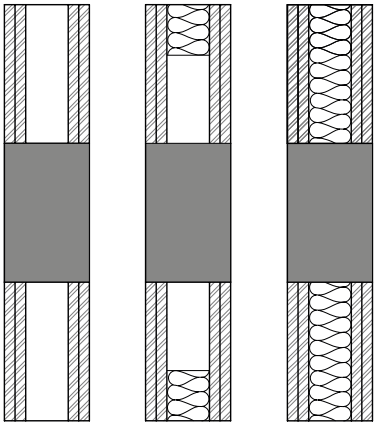
C.3.1 Allowed wall configurations

The use of Mulcol® Multimastic SP 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.

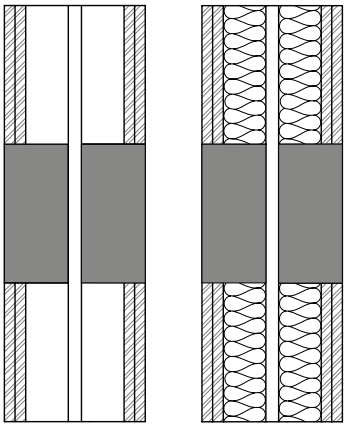
Field of direct application rules for double-sided flexible wall constructions:

- 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 givin in the solutions in Annex A and a minimum density of 350 kg/m^3. 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.:



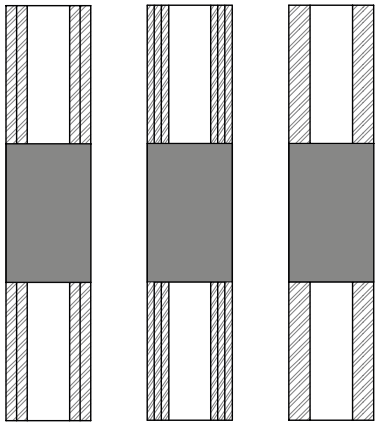
C.3 Wall configurations

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 ≥ 350 kg/m^3

e.g.: