



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

## European Technical Assessment

## ETA 25/0232 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 / FSC

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

**Manufacturer** Firesafe A/S  
Robsrudskogen 15  
1470 Lørenskog  
Norway

**Manufacturing plant(s)** L/002  
E/002

**This European Technical Assessment contains** 281 pages including 3 Annexes which form an integral part of this assessment.

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

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## I. SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESSMENT

### 1. Technical description of the product

- 1) FIRESAFE / FSC is a pipe closure device used to reinstate the fire resistance performance of wall and floor constructions where they have been provided with apertures for the penetration of single or multiple services.
- 2) FIRESAFE / FSC is supplied with a 30 by 12 mm intumescent liner within a stainless steel spine, to be closed around the service and fixed to the supporting element.
- 3) The products below can be used in conjunction with FIRESAFE / FSC depending upon the required application and classification (see Annex A/B). These products are subject to separate ETAs.
  - FIRESAFE / FSB, Firestop board
  - Mulcol® Multimortar, Firestop mortar
  - FIRESAFE / FSA, Firestop mastic
- 4) The annular gap around the service may be filled with FIRESAFE / FSA or Multimortar. The annular gap between the pipe/insulation and the FIRESAFE / FSC may be:  $\leq 15$  mm when the outer diameter is  $\leq 125$  mm,  $\leq 5$  mm when the outer diameter is  $\geq 125$  mm.
- 5) The applicant has submitted a written declaration that FIRESAFE / FSC does 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.

### 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 / FSC is to reinstate the fire resistance performance of flexible, rigid, sand wick and CLT walls and rigid and CLT floor constructions where they are penetrated by various services.
- 2) The specific elements of construction that the system FIRESAFE / FSC may be used to provide a penetration seal in, are as follows:
  - a) Flexible walls\*: The wall must have a minimum thickness of 100 mm.
  - b) Rigid walls\*: The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 400 kg/m<sup>3</sup>.
  - c) CLT walls: The wall must have a minimum thickness of 100 mm, with a minimum density of 376 kg/m<sup>3</sup>
  - d) Sandwich panel walls: The wall must have a minimum thickness of 100 mm, consisting of a stone wool core with a minimum density of 115 kg/m<sup>3</sup>
  - e) Rigid floors: The floor must have a minimum thickness of 150 mm and comprise aerated concrete or concrete with a minimum density of 400 kg/m<sup>3</sup>.
  - f) CLT floors: The wall must have a minimum thickness of 140 mm, with a minimum density of 350 kg/m<sup>3</sup>

\* 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 / FSC may be used to provide a penetration seal with services e.g. cables, 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) The minimum permitted separation between adjacent seals/apertures is 100 mm when penetration seals are  $\leq 300 \times 300$  mm, a separation of 200 mm is needed for larger seals.
- 5) The provisions made in this European Technical Assessment are based on an assumed working life of 30 years, provided that the conditions laid down in the product datasheet for the packaging/ transport/ storage/ installation/ use/repair are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer, 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.
- 6) Type Z<sub>i</sub>; product intended for use at conditions exposed to free weathering.
- 7) Mutual distances between services and minimum support distances are given in Annex C.

8) Insulation types

The following acoustic insulation types are allowed (or equal):

- 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<sub>L</sub>, C<sub>L</sub> or D<sub>L</sub> classification (linear insulation).

9) Pipes types

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

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

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

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

The following low-noise (Silent) pipes (or equal) 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,
- DykaSono
- Uponor Decibel
- Geberit Silent Pro
- Wavin SiTech+
- Wavin SiTech B1
- Wavin AS

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

|   |                                     |   |
|---|-------------------------------------|---|
| Product-type: Fire collar   |                                     | Intended use: Penetration Seal              |
| Assesment method  | Essential characteristic            | Product Performance                         |
| <b><u>BWR 2 Safety in case of fire</u></b>  |                                     |   |
| EN 13501-1  | Reaction to fire                    | E   |
| EN 13501-2  | Resistance to fire                  | Annex A, B & C                              |
| <b><u>BWR 3 Hygiene, health and enviroment</u></b>  |                                     |   |
| EN 1026   | Air permeability                    | No performance determined                   |
| EAD 350454-00-1104,<br>Annex C  | Water permeability                  | No performance determined                   |
| Declaration of manufacturer &<br>EN 16516   | Release of dangerous substances     | IA1, S/W 2 - Declaration of<br>manufacturer |
| <b><u>BWR 4 Safety in use</u></b>   |                                     |   |
| 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,<br>Clause 2.2.9   | Durability                          | Z <sub>1</sub>                              |
| <b><u>BWR 5 Protection against noise</u></b>  |                                     |   |
| EN 10140-1,2,4,5 / EN ISO 7171-1  | Airborne sound insulation           | No performance determined                   |
| <b><u>BWR 6 Energy economy and theat retention</u></b>  |                                     |   |
| EN 12664, EN 12667, EN 12939,<br>EN ISO 8990, EN ISO 6946,<br>EN ISO 14683, EN ISO 10211,<br>EN ISO 10456 | Thermal properties                  | No performance determined                   |
| EN ISO 12572, EN 12086,<br>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 Commission<sup>1</sup>, 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).

| <b>Product(s)</b>                       | <b>Intended use(s)</b>   | <b>Level(s) or class(es)</b> | <b>System(s)</b> |
|---|--|------------------------------|------------------|
| 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 25/0232 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:

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

## Annex - Resistance to Fire Classification - FIRESAFE / FSC

### Annex A.1 - Flexible and rigid walls

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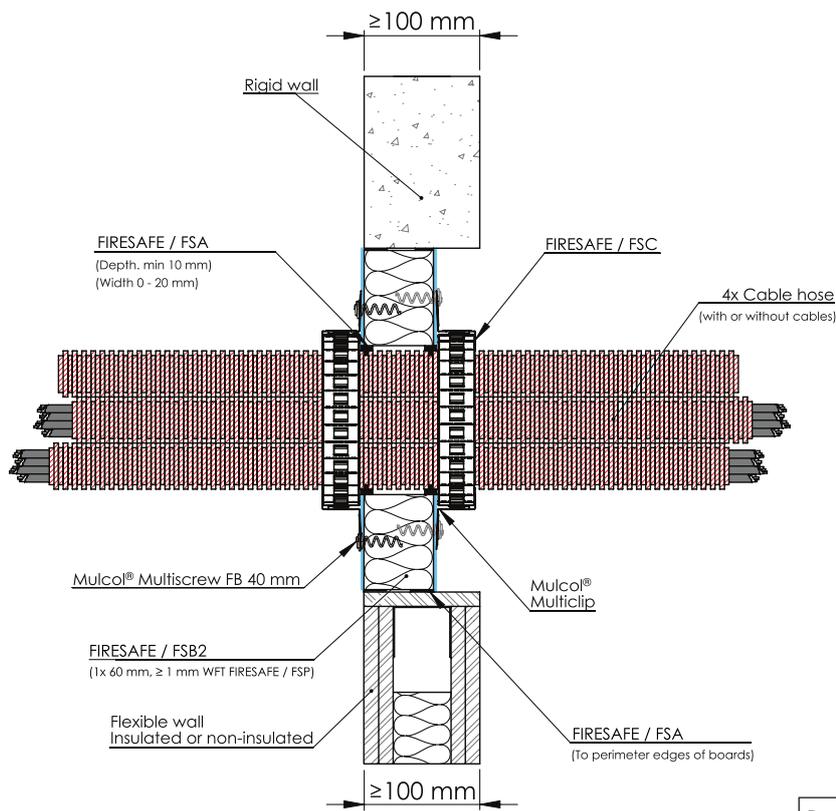
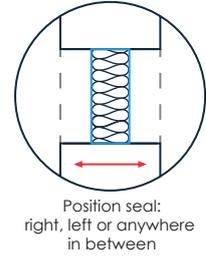
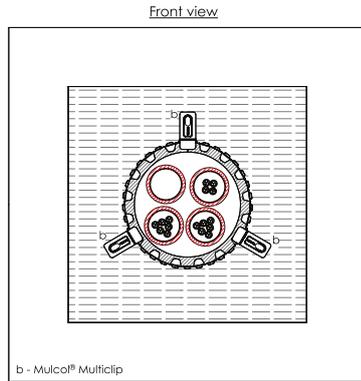
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**A.1.1 FIRESAFE / FSB2 - 1x60 mm - Cables, trays and conduits**

**A.1.1.1 Multiple flexible conduits with cables**



Drawing: PBfw.E-ECH4-MC30-MFB2.1.30

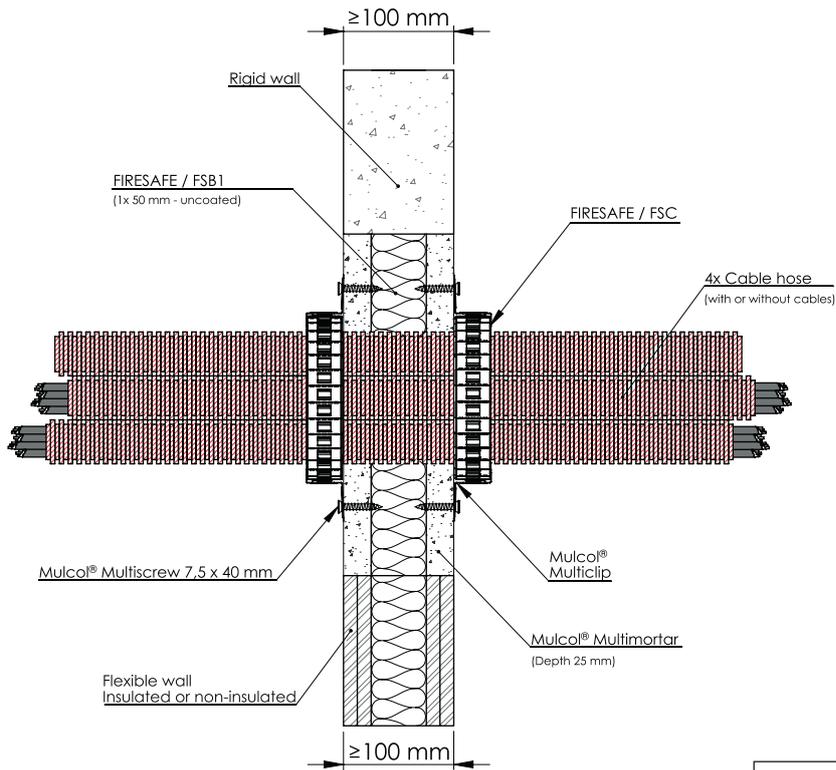
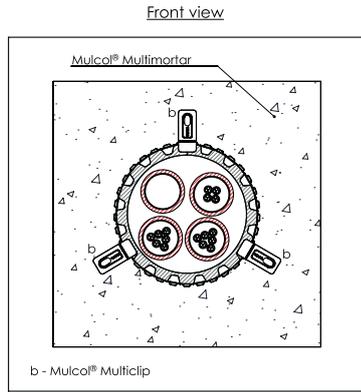
| Services  | Number of sleeves | Product        | Sealing (mm)                        | Classification       |
|---|-------------------|----------------|-------------------------------------|----------------------|
| Ribbed PE-sleeve conduit<br>≤ Ø 63 mm, with or without cables | ≤ 4               | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 90 U/C, E 120 U/C |

**A.1.2**

**Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm -  
Cables, trays and conduits**

**A.1.2.1**

**Multiple flexible conduits with cables**

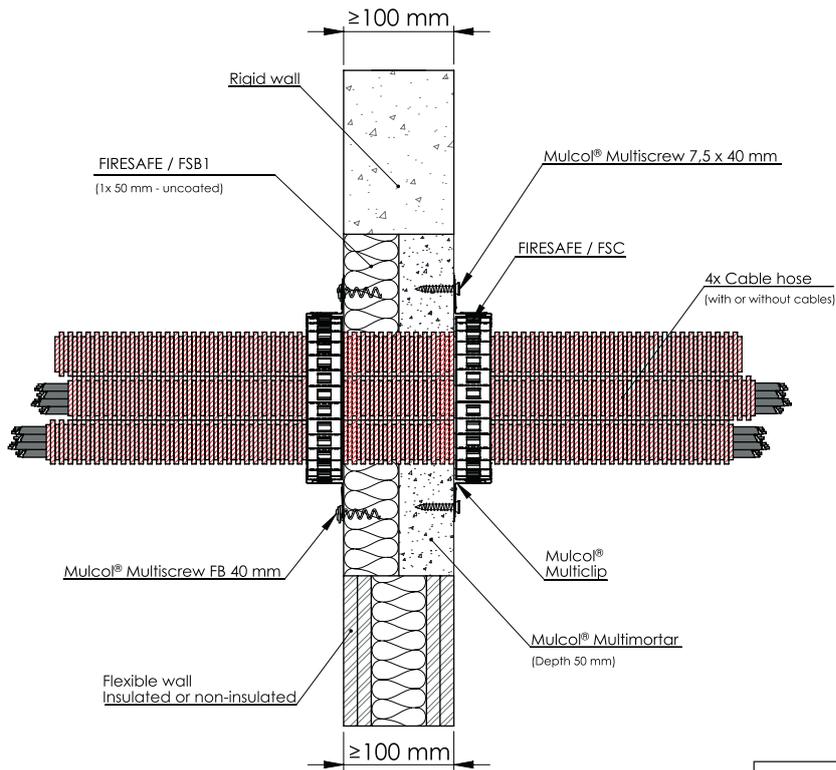
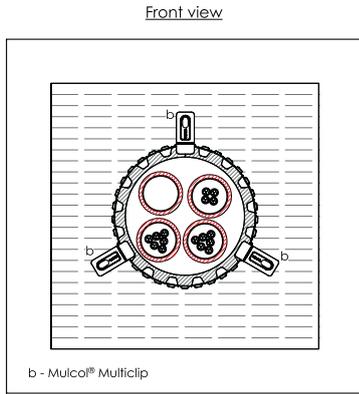


Drawing: FW.E-MC30-ECH4-MM3.4.30

| Services  | Number of sleeves | Product        | Allowed cables   | Classification       |
|---|-------------------|----------------|--|----------------------|
| Ribbed PE-sleeve conduit $\leq \varnothing 63$ mm, with or without cables | $\leq 4$          | FIRESAFE / FSC | Sheathed cables $\leq \varnothing 21$ mm (single or bundled)<br>Cables $\leq \varnothing 21$ mm in a tied bundle $\leq \varnothing 100$ mm | EI 90 U/C, E 120 U/C |

**A.1.3 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Cables, trays and conduits**

**A.1.3.1 Multiple flexible conduits with cables**

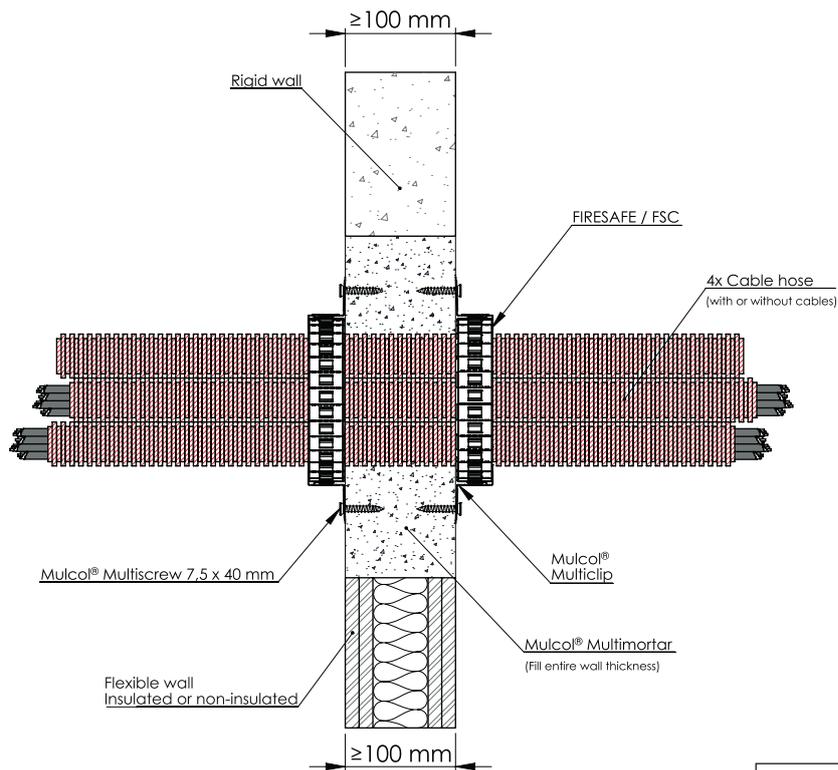
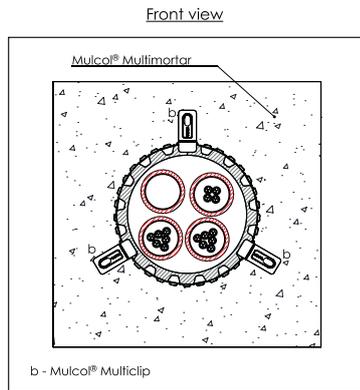


Drawing: FW.E-MC30-ECH4-MM2.5.30

| Services   | Number of sleeves | Product        | Allowed cables   | Classification              |
|--|-------------------|----------------|--|-----------------------------|
| Ribbed PE-sleeve conduit<br>$\leq \text{Ø } 63$ mm, with or without cables | $\leq 4$          | FIRESAFE / FSC | Sheathed cables $\leq \text{Ø } 21$ mm<br>(single or bundled)<br>Cables $\leq \text{Ø } 21$ mm in a<br>tied bundle $\leq \text{Ø } 100$ mm | <b>EI 90 U/C, E 120 U/C</b> |

## A.1.4 Multimortar - $\geq 100$ mm - Cables, trays and conduit

### A.1.4.1 Multiple flexible conduits with cables



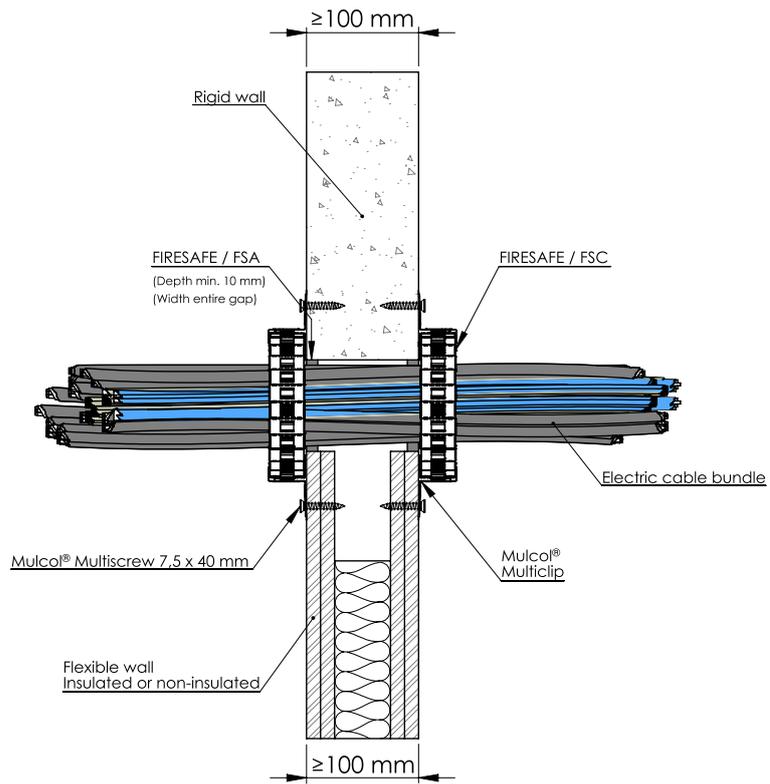
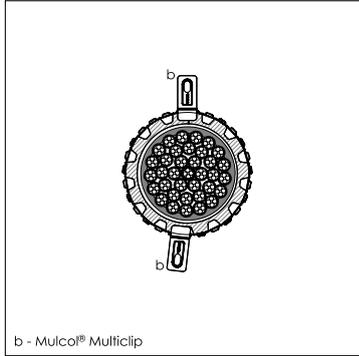
Drawing: FW.E-MC30-ECH4-MM1.2.30

| Services   | Number of sleeves | Product        | Allowed cables   | Classification       |
|--|-------------------|----------------|--|----------------------|
| Ribbed PE-sleeve conduit $\leq \varnothing 63$ mm with or without cables | $\leq 4$          | FIRESAFE / FSC | Sheathed cables $\leq \varnothing 21$ mm (single or bundled)<br>Cables $\leq \varnothing 21$ mm in a tied bundle | EI 90 U/C, E 120 U/C |
| Ribbed PE-sleeve conduit $\leq \varnothing 50$ mm with or without cables | $\leq 5$          | FIRESAFE / FSC | Sheathed cables $\leq \varnothing 21$ mm (single or bundled)<br>Cables $\leq \varnothing 21$ mm in a tied bundle | EI 120 U/U           |

**A.1.5 Directly through wall -  $\geq 100$  mm - Cables, trays and conduits**

**A.1.5.1 Electrical cables**

Front view

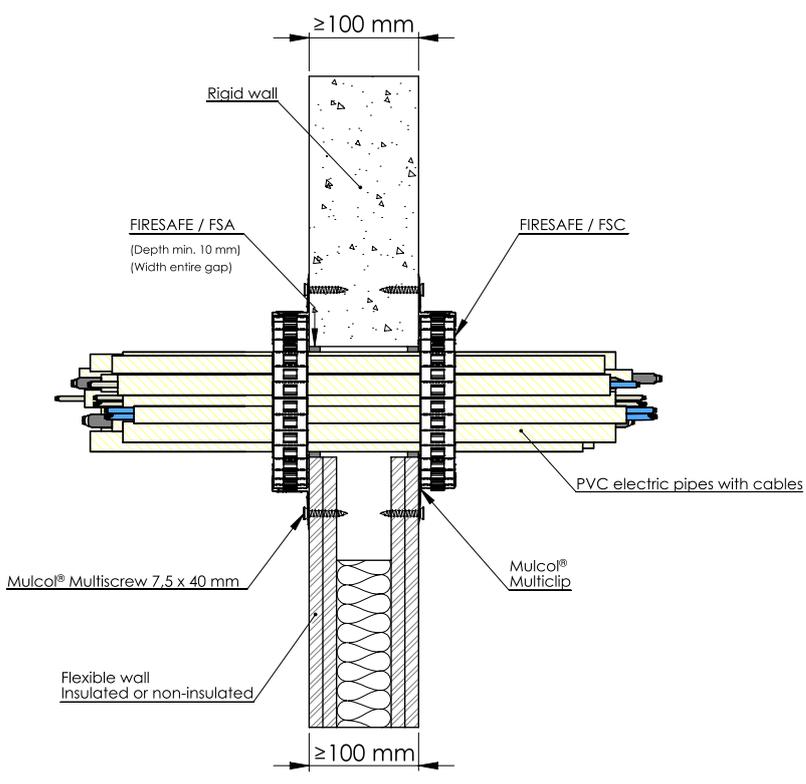
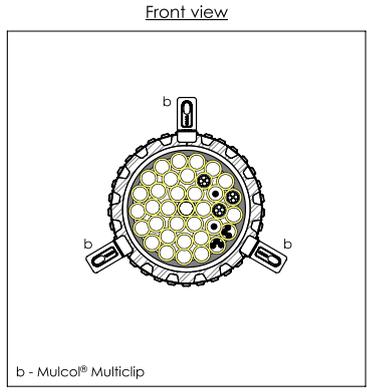


Drawing: FW.E-MC30-ECB-10.0.10

| Services   | Product        | Aperture (mm)          | Sealing (mm)                             | Classification |
|--|----------------|------------------------|--|----------------|
| Multiple electrical / telecommunication cables<br>max. 63 pcs. | FIRESAFE / FSC | $\leq \varnothing 100$ | FIRESAFE / FSA<br>0-20 x $\geq 10$ (wxd) | <b>EI 120</b>  |

**A.1.5 Directly through wall -  $\geq 100$  mm - Cables, trays and conduits**

**A.1.5.2 Multiple PVC conduits**



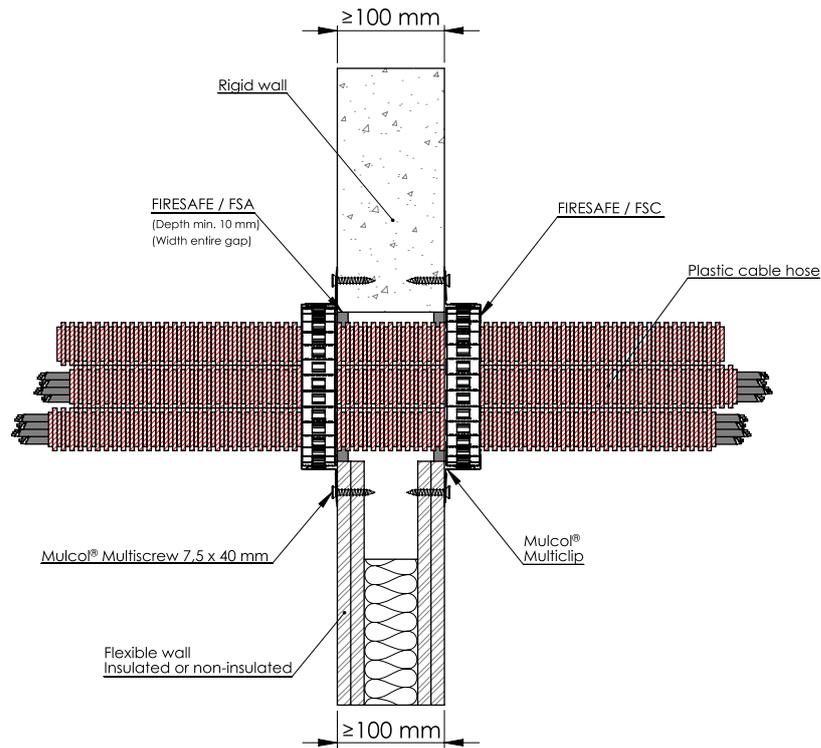
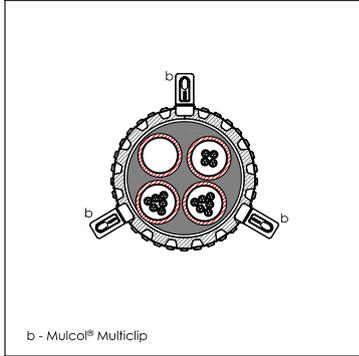
Drawing: FW.E-MC30-EPB-10.0.40

| Services   | Product        | Aperture (mm)          | Sealing (mm)                             | Classification |
|--|----------------|------------------------|--|----------------|
| Multiple PVC conduits max. 18 pcs., max. $\leq \varnothing 25$ mm with or without cables | FIRESAFE / FSC | $\leq \varnothing 100$ | FIRESAFE / FSA<br>0-20 x $\geq 10$ (wxd) | EI 90 U/U      |

**A.1.5 Directly through wall -  $\geq 100$  mm - Cables, trays and conduits**

**A.1.5.3 Multiple flexibles conduits with cables**

Front view

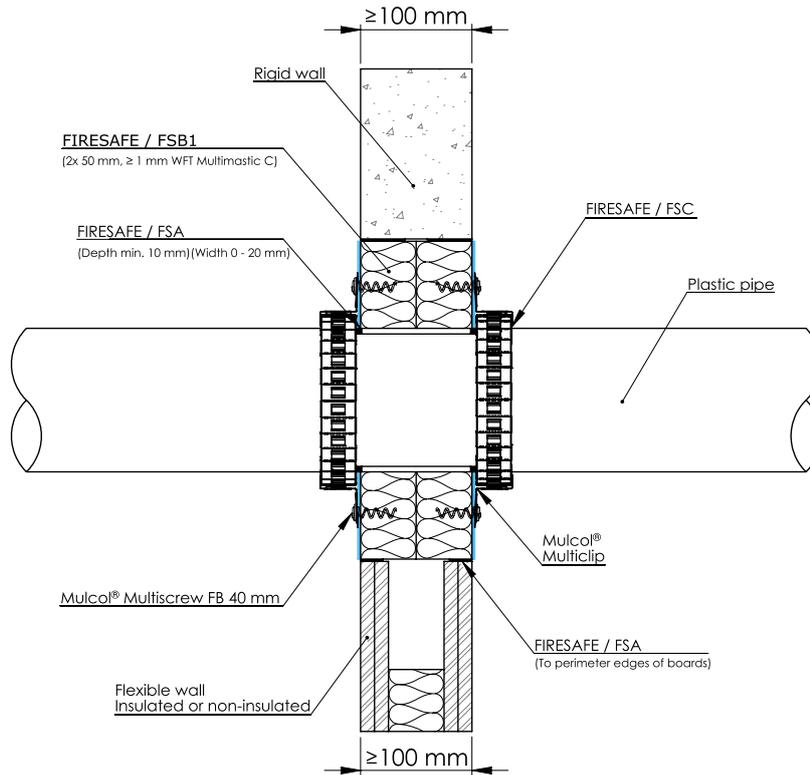
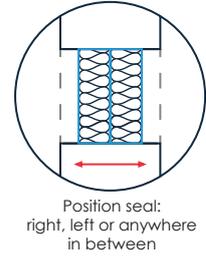
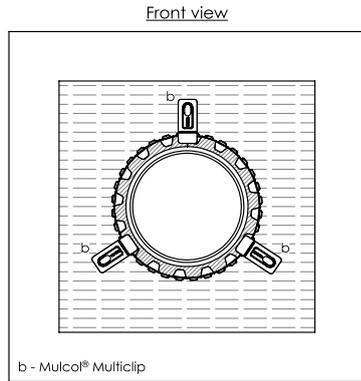


Drawing: FW.E-MC30-ECH-10.0.30

| Services   | Number of sleeves | Product        | Allowed cables   | Classification    |
|--|-------------------|----------------|--|-------------------|
| Ribbed PE-sleeve conduit $\leq \varnothing 50$ mm with or without cables | $\leq 5$          | FIRESAFE / FSC | Sheathed cables $\leq \varnothing 21$ mm (single or bundled)<br>Cables $\leq \varnothing 21$ mm in a tied bundle | <b>EI 120 U/U</b> |

# A.1.6 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes

## A.1.6.1 Plastic pipes



Drawing: PBFw.E-MC30-PP-MFB1.2.10

| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification |
|--------------------------------|----------------------|----------------|----------------|--|----------------|
|                                | Outer dimension      | Wall thickness |                |  |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 40               | 2.3 - 9.3      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 60 U/U      |
| PP                             |                      |                |                |  |                |
| PVC(-U/-C)                     |                      |                |                |  |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 2.7 - 6.6      |                |  | EI 120 U/U     |
|                                |                      | 6.6 - 9.3      |                |  | EI 60 U/U      |
| PP                             |                      | 2.7            |                |  | EI 120 U/U     |
|                                |                      | 2.7 - 9.3      | EI 60 U/U      |  |                |
| PVC(-U/-C)                     |                      | 2.7            | EI 120 U/U     |  |                |
|                                |                      | 2.7 - 9.3      | EI 60 U/U      |  |                |

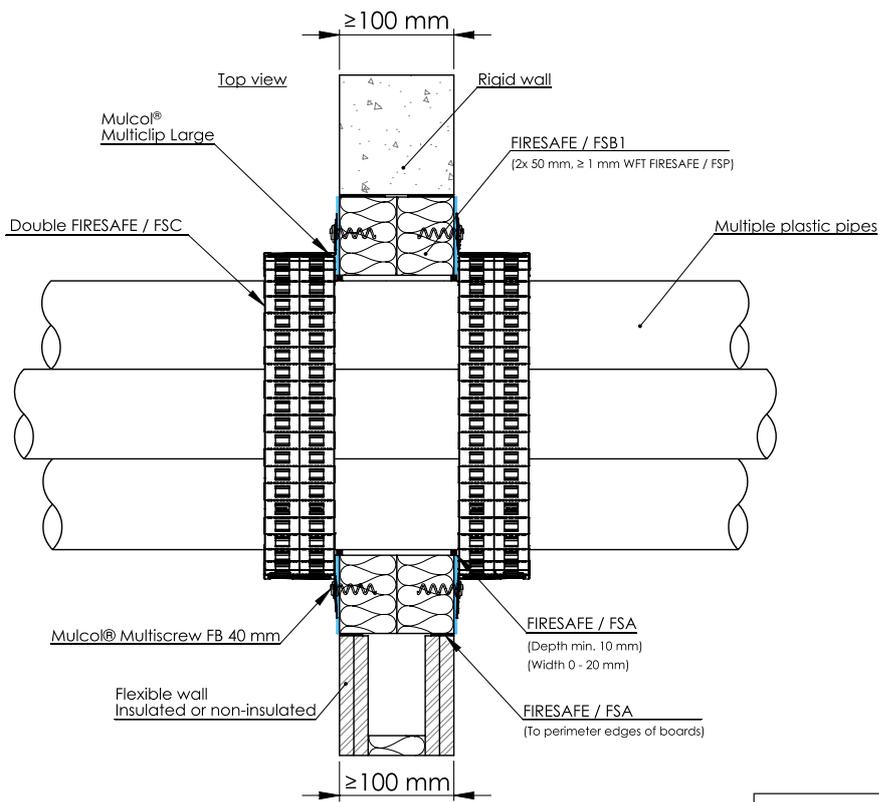
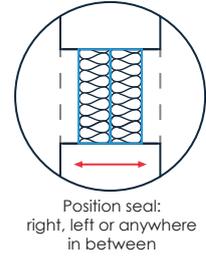
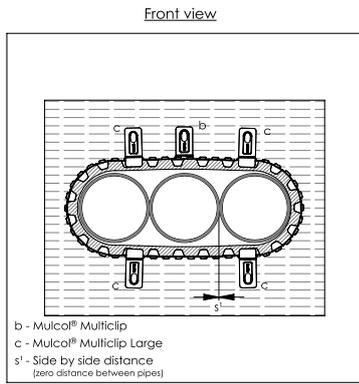
**A.1.6 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes**

**A.1.6.1 Plastic pipes**

| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification   |  |                  |
|--------------------------------|----------------------|----------------|----------------|--|------------------|--|------------------|
|                                | Outer dimension      | Wall thickness |                |  |                  |  |                  |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 125              | 3.1 - 9.3      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | <b>EI 60 U/U</b> |  |                  |
| PP                             |                      |                |                |  |                  |  |                  |
| PVC(-U/-C)                     |                      |                |                |  |                  |  |                  |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 160              | 4.0 - 9.5      |                |  | FIRESAFE / FSC   | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | <b>EI 60 U/C</b> |
| PP                             |                      | 4.0 - 9.1      |                |  |                  |  |                  |
| PVC(-U/-C)                     |                      |                |                |  |                  |  |                  |

**A.1.6 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes**

**A.1.6.2 Multiple plastic pipes**



Drawing: PBfw.E-MLP3-20.0.10

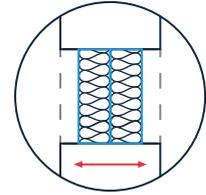
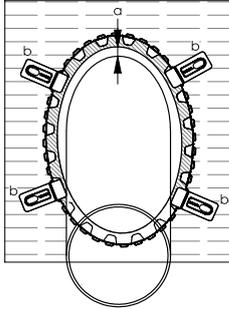
| Services                       | Pipe dimensions (mm) |                | Product               | Sealing (mm)                           | Classification       |
|--------------------------------|----------------------|----------------|-----------------------|--|----------------------|
|                                | Outer dimension      | Wall thickness |                       |  |                      |
| PE(-HD) / PE-X / ABS / SAN+PVC | 3x ≤ Ø 110           | 2.7            | FIRESAFE / FSC Double | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 90 U/C, E 120 U/C |

## A.1.6 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes

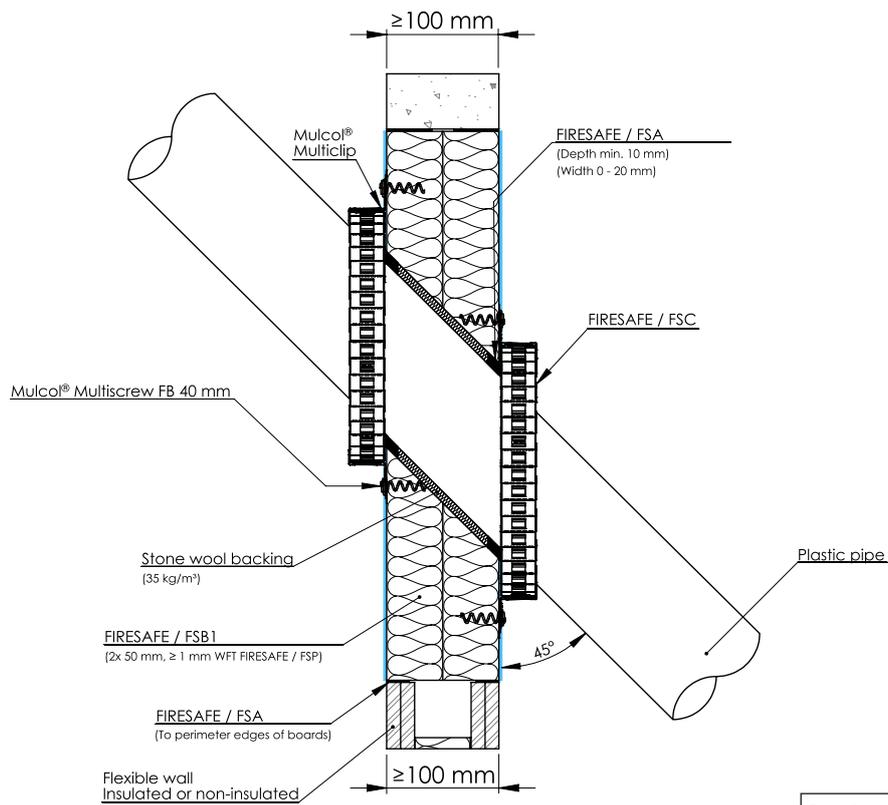
### A.1.6.3 Plastic pipes perpendicular to 45°

Front view

- a - Annular space  
(Maximum 15 mm between pipe and FIRESAFE / FSC)
- b - Mulcol® Multiclip



Position seal:  
right, left or anywhere  
in between



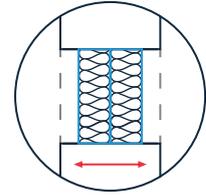
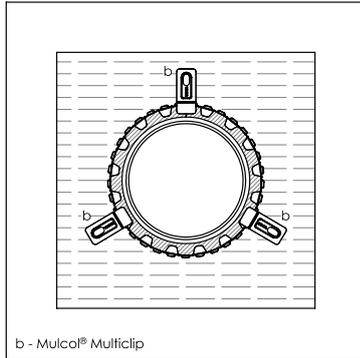
Drawing: PBfw.E-PP-MFB1-10.1.10

| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification      |
|--------------------------------|----------------------|----------------|----------------|--|---------------------|
|                                | Outer dimension      | Wall thickness |                |  |                     |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 2.7            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 60 U/U, E 90 U/U |
| PP                             |                      |                |                |  |                     |
| PVC(-U/-C)                     |                      |                |                |  |                     |

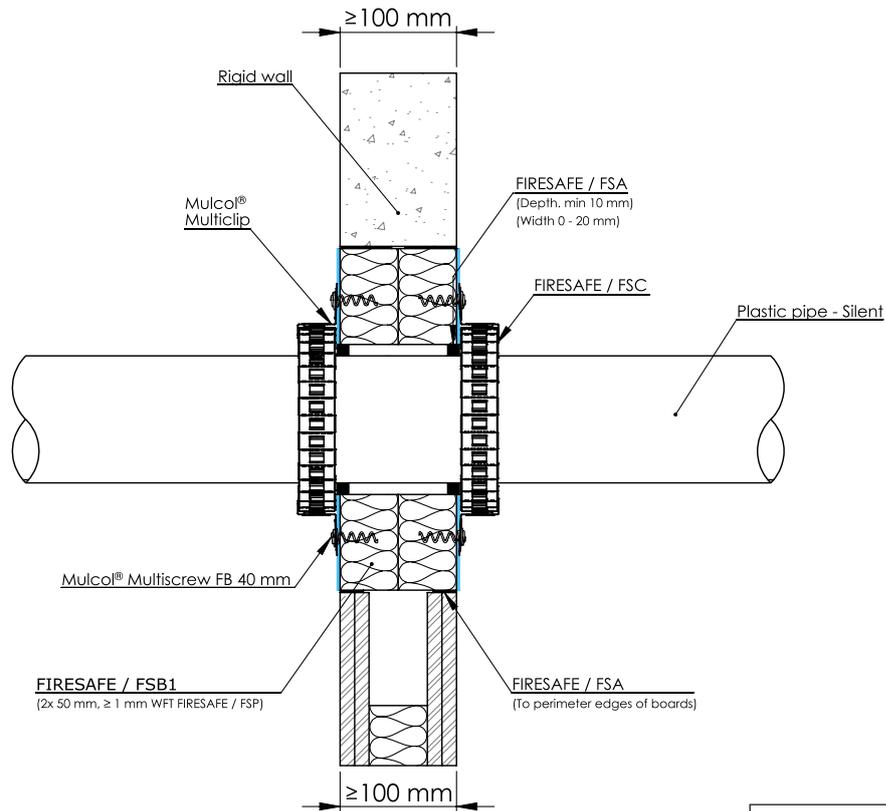
**A.1.6 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes**

**A.1.6.4 Plastic pipes (Silent)**

Front view



Position seal:  
right, left or anywhere  
in between

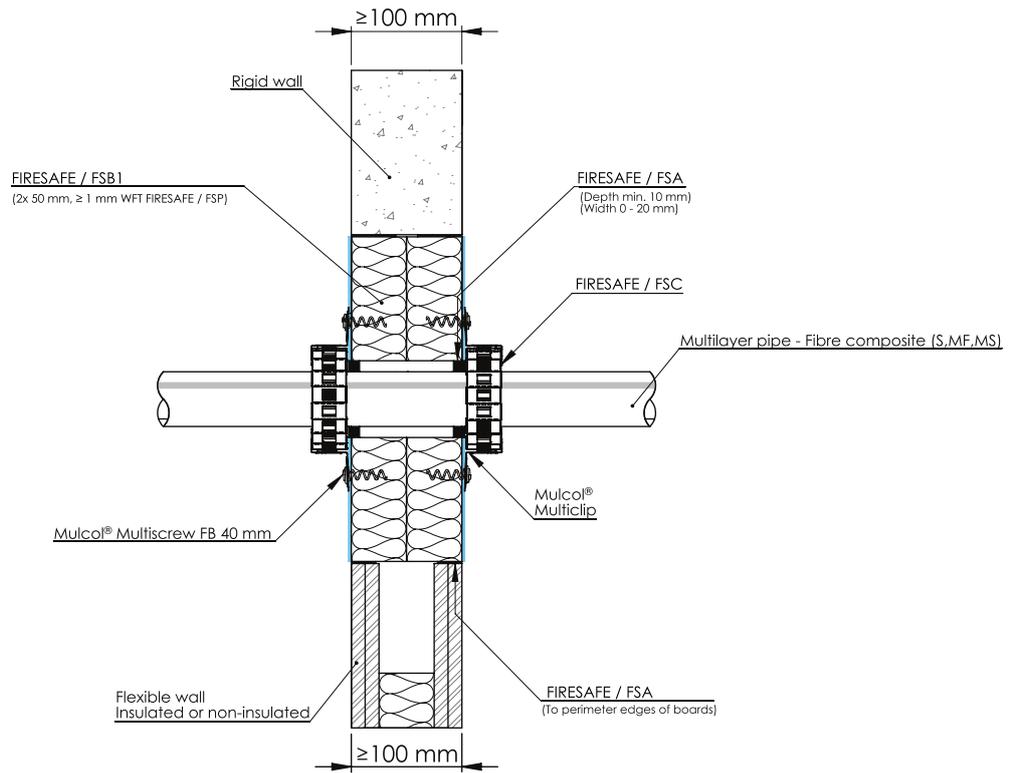
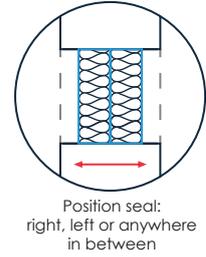
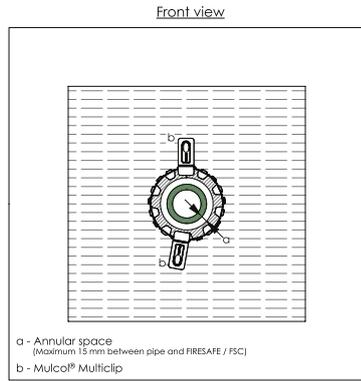


Drawing: PBfw.E-MC30-PPS-MFB1.2.10

| Services            | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|---------------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                     | Outer dimension      | Wall thickness |                |                                     |                |
| Geberit Silent dB20 | ≤ Ø 110              | 6.0            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 60 U/U      |

**A.1.6 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes**

**A.1.6.5 PP-R Multilayer pipes**

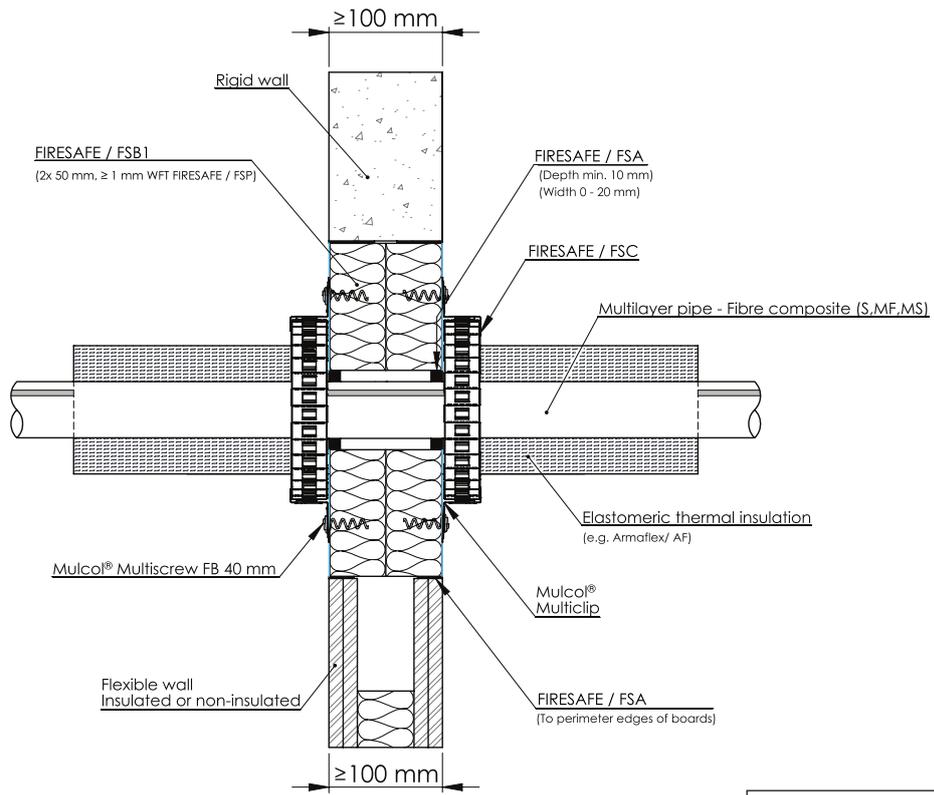
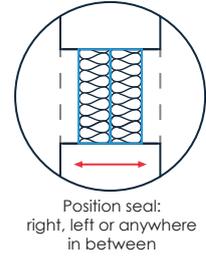
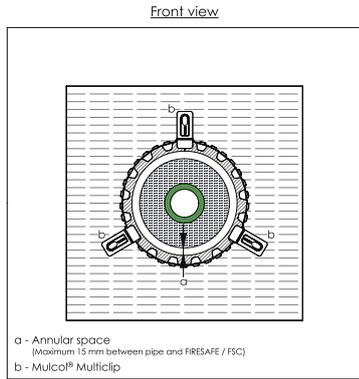


Drawing: PBfw.E-MLF-MC30-10.0.10

| Services        | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|-----------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                 | Outer dimension      | Wall thickness |                |                                     |                |
| Aquatherm Green | ≤ Ø 50               | 6.9            | FIRESAFE / FSC | FIRESAFE / FSA<br>≥ 0-20 x 10 (wxd) | EI 120 U/C     |

**A.1.6 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes**

**A.1.6.6 PP-R Multilayer pipes - Elastomer LI 300 / CI**



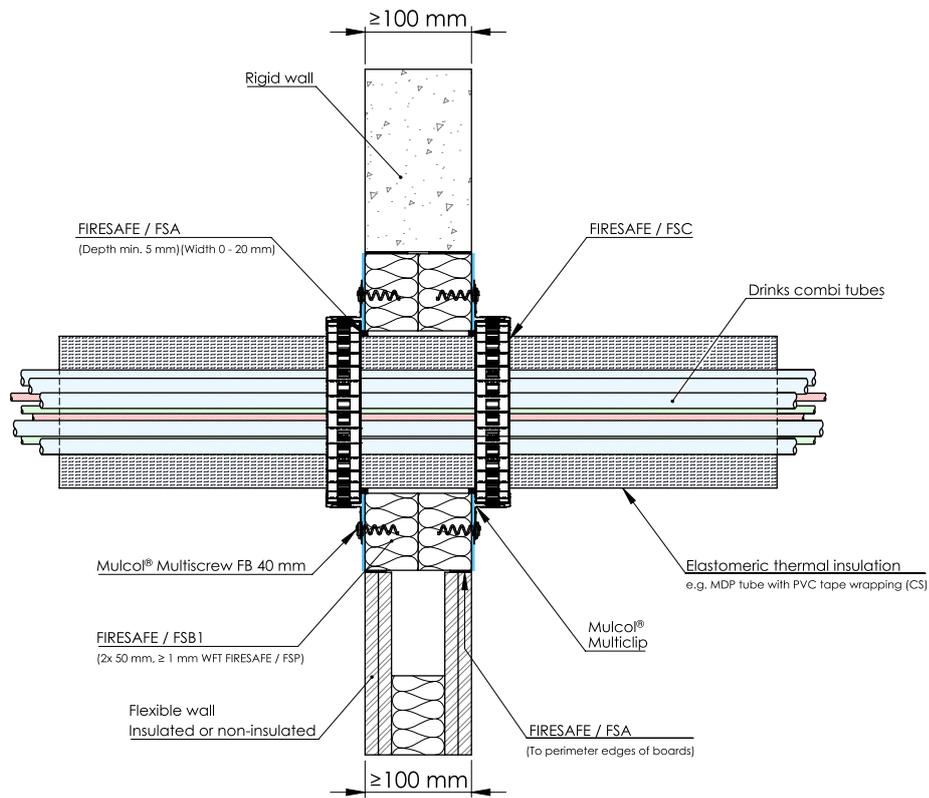
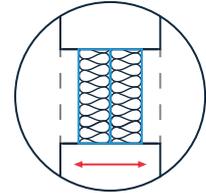
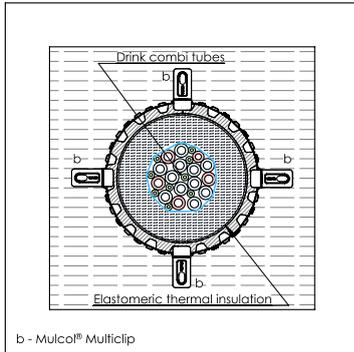
Drawing: PBfw.E-MLF-MC30-10.0.22

| Services        | Pipe dimensions (mm) |                | Insulation   |                |               | Product        | Classification |
|-----------------|----------------------|----------------|--|----------------|---------------|----------------|----------------|
|                 | Outer dimension      | Wall thickness | Type   | Thickness (mm) | Configuration |                |                |
| Aquatherm Green | ≤ Ø 50               | 6.9            | ArmaFlex AF (min. class B-s3, d0 B <sub>L</sub> -s3, d0) | 9 - 32         | LI 300 / CI   | FIRESAFE / FSC | EI 120 U/C     |

**A.1.6 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes**

**A.1.6.7 Drinks tubing system**

Front view



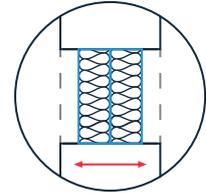
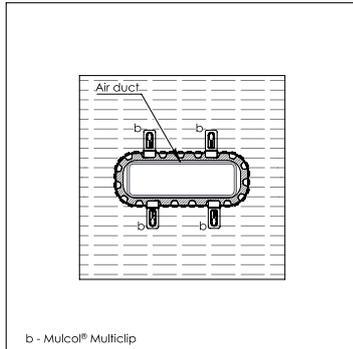
Drawing: PBfw.E-DCT52-MC30-10.0.22

| Services             | Dimensions (mm) |           | Insulation       |                |               | Product        | Sealing (mm)                        | Classification |
|----------------------|-----------------|-----------|------------------|----------------|---------------|----------------|-------------------------------------|----------------|
|                      | Outer dimension | Hoses no. | Type             | Thickness (mm) | Configuration |                |                                     |                |
| Drinks tubing system | ≤ Ø 47          | ≤ 3       | Elastomeric foam | 8 - 35         | CS            | FIRESAFE / FSC | FIRESAFE / FSA<br>≥ 0-20 x 5 (wx d) | EI 60 U/C      |
|                      | ≤ Ø 145         | ≤ 52      |                  |                |               |                |                                     |                |

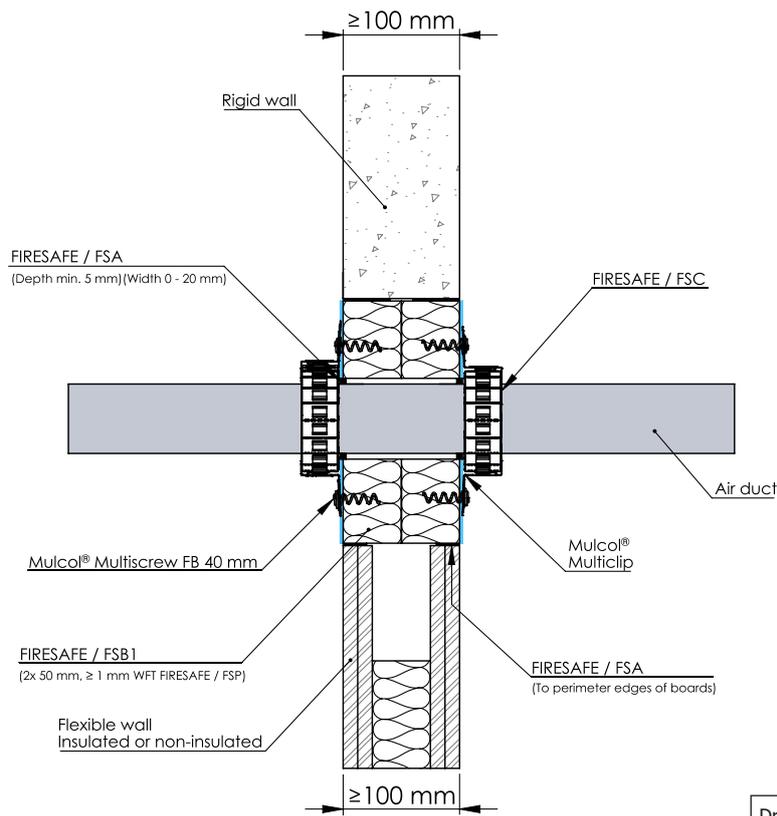
**A.1.6 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes**

**A.1.6.8 Rectangular plastic duct**

Front view



Position seal:  
right, left or anywhere  
in between

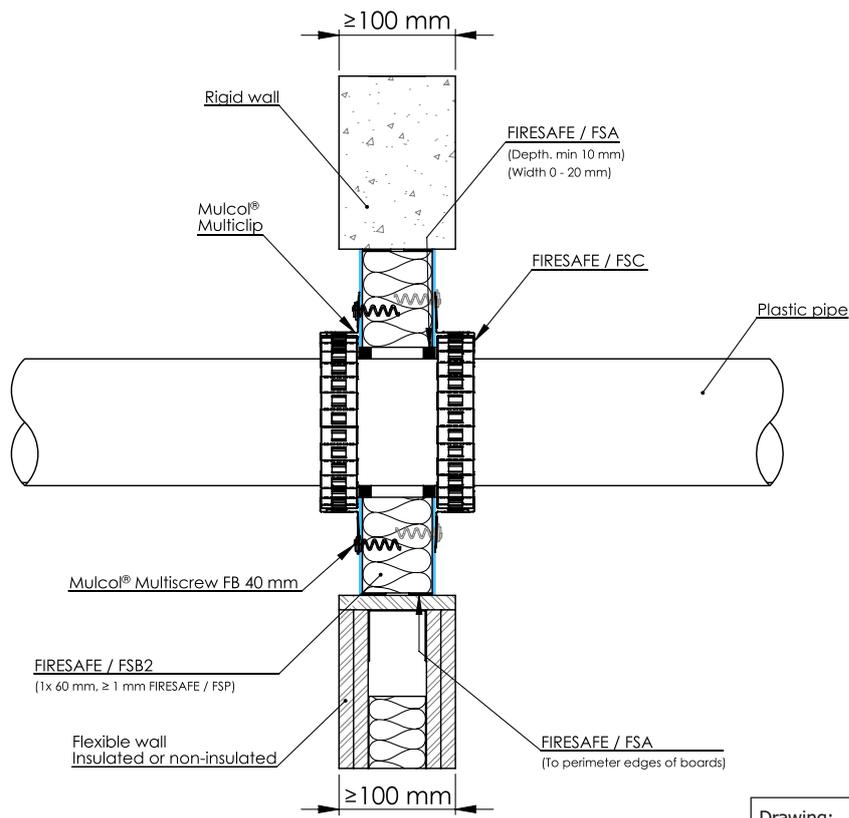
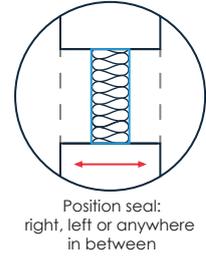
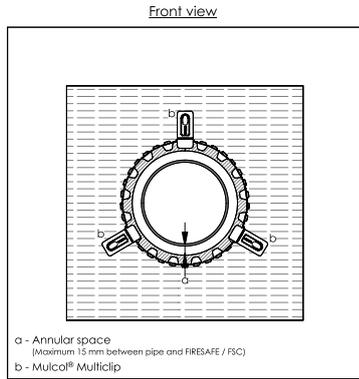


Drawing: PBfw.E-AD-MFB1.2.10

| Services                 | Duct dimensions (mm) |                | Product        | Sealing (mm)                       | Classification |
|--------------------------|----------------------|----------------|----------------|------------------------------------|----------------|
|                          | Outer dimension      | Wall thickness |                |                                    |                |
| Rectangular plastic duct | ≤ 220 x 90           | 1.0            | FIRESAFE / FSC | FIRESAFE / FSA<br>≥ 0-20 x 5 (wxd) | EI 45 U/C      |
|                          |                      | 2.0            |                |                                    | EI 120 U/C     |

**A.1.7 FIRESAFE / FSB2 - 1x60 mm - Combustible pipes**

**A.1.7.1 Plastic pipes**

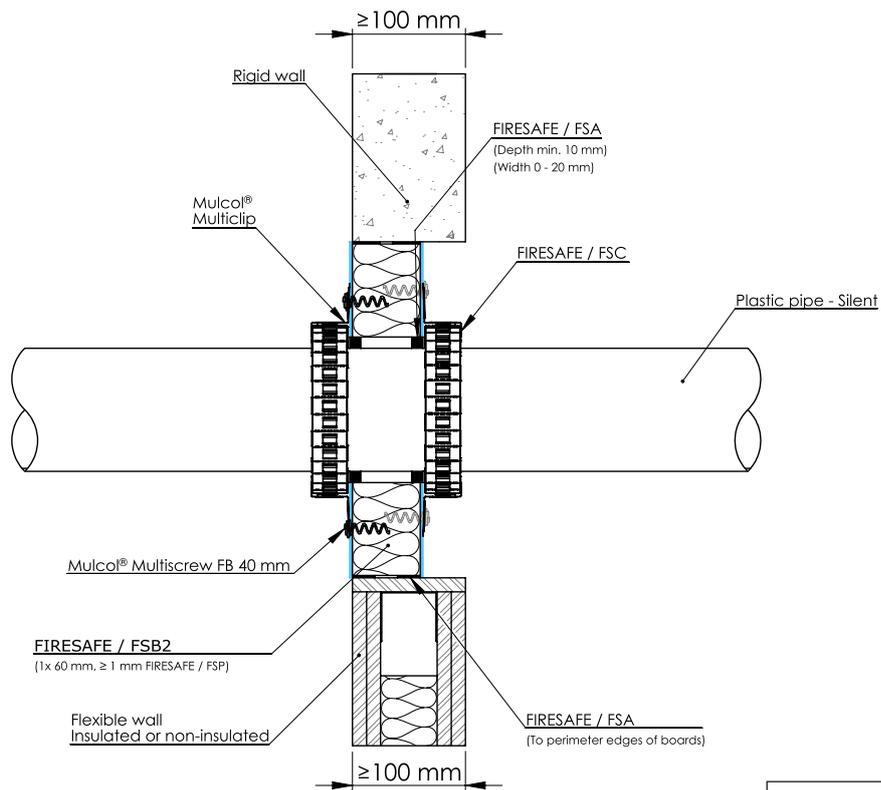
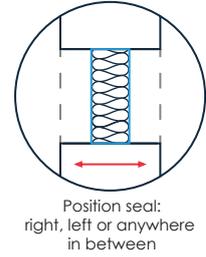
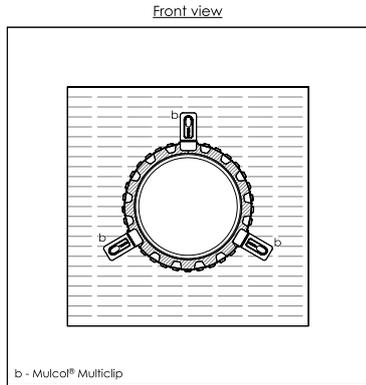


Drawing: PBfw.E-PP-MFB2.1.10

| Services                                     | Pipe dimensions (mm) |                | Product           | Sealing (mm)                        | Classification        |
|--|----------------------|----------------|-------------------|-------------------------------------|-----------------------|
|  | Outer dimension      | Wall thickness |                   |                                     |                       |
| PE(-HD) / PE-X / ABS / SAN+PVC<br>PVC(-U/-C) | ≤ Ø 110              | 2.7            | FIRESAFE /<br>FSC | FIRESAFE / FSA<br>≥ 0-20 x 10 (wxd) | EI 120 U/U            |
| PE(-HD) / PE-X / ABS / SAN+PVC               | ≤ Ø 125              | 3.9            |                   |                                     | EI 45 U/U<br>E 60 U/U |
| PP   |                      |                |                   |                                     | EI 60 U/U             |
| PVC(-U/-C)                                   |                      |                |                   |                                     | EI 60 U/U             |

**A.1.7 FIRESAFE / FSB2 - 1x60 mm - Combustible pipes**

**A.1.7.2 Plastic pipes (Silent)**

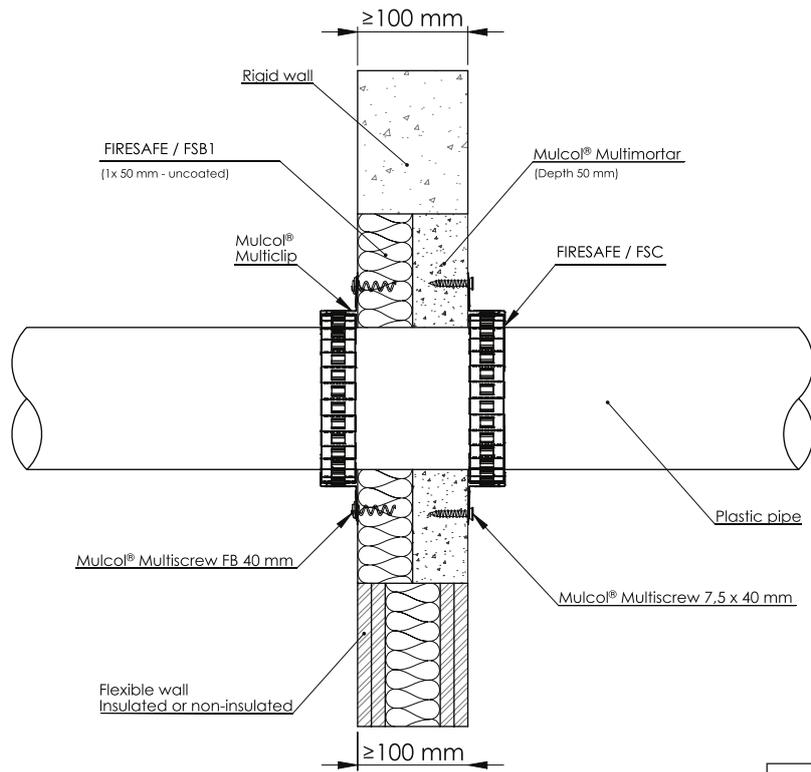
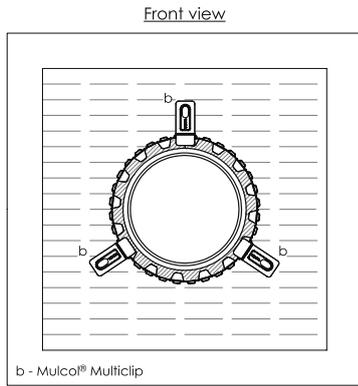


Drawing: PBfw.E-MC30-PPS-MFB2.1.10

| Services            | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|---------------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                     | Outer dimension      | Wall thickness |                |                                     |                |
| Geberit Silent dB20 | ≤ Ø 110              | 6.0            | FIRESAFE / FSC | FIRESAFE / FSA<br>≥ 0-20 x 10 (wxd) | EI 60 U/U      |

**A.1.8 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Combustible pipes**

**A.1.8.1 Plastic pipes**

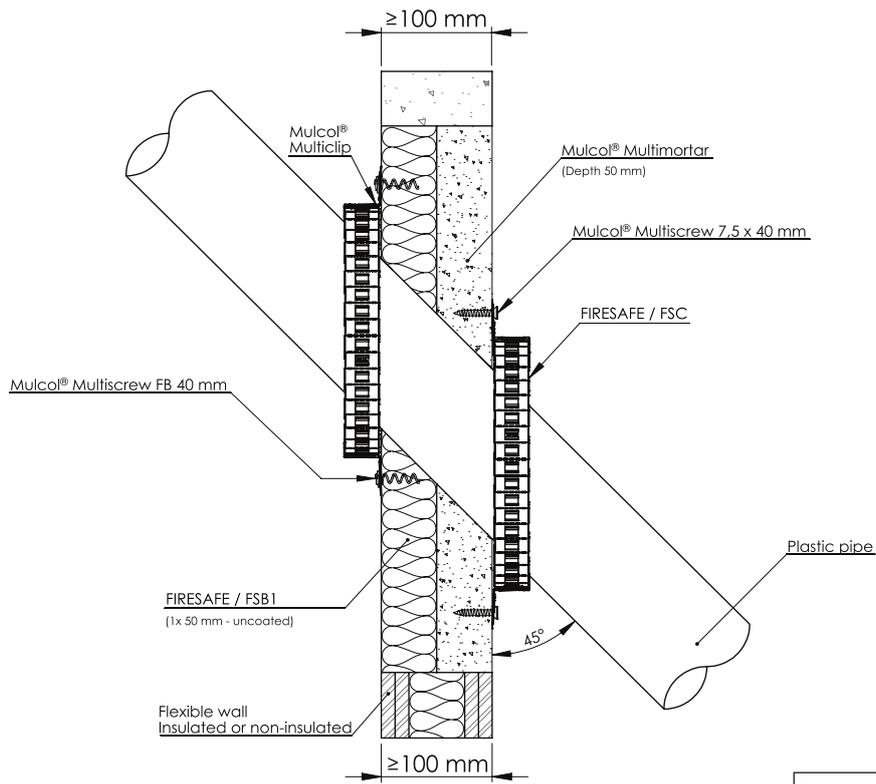
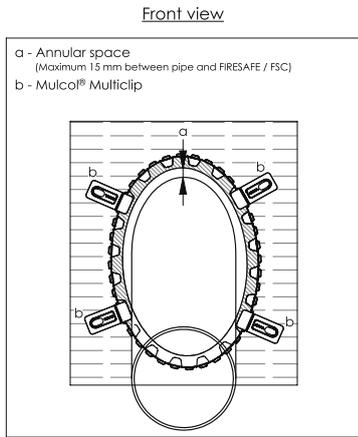


Drawing: FW.E-MC30-PP-MM2.5.10

| Services                       | Pipe dimensions (mm) |                | Product        | Classification |
|--------------------------------|----------------------|----------------|----------------|----------------|
|                                | Outer dimension      | Wall thickness |                |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 2.7 - 6.6      | FIRESAFE / FSC | EI 120 U/U     |
| PP                             |                      | 2.7            |                |                |
| PVC(-U/-C)                     |                      |                |                |                |

**A.1.8 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Combustible pipes**

**A.1.8.2 Plastic pipes perpendicular to 45°**

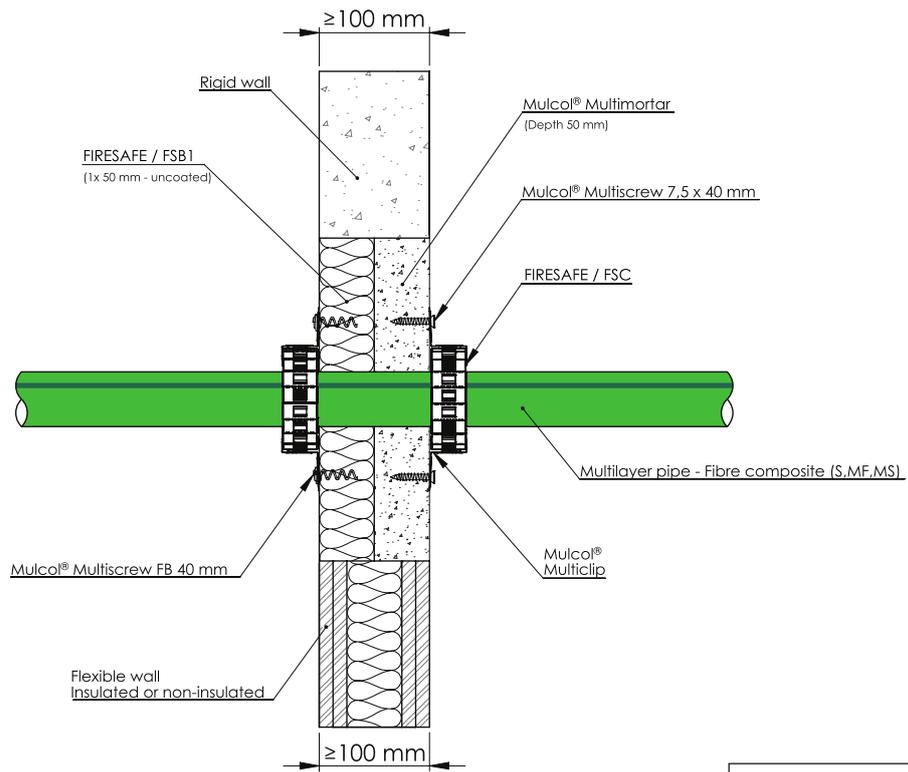
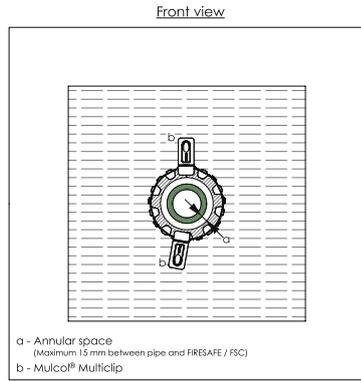


Drawing: FW.E-MC30o-PP-MM2.5.10

| Services                       | Pipe dimensions (mm) |                | Product        | Classification      |
|--------------------------------|----------------------|----------------|----------------|---------------------|
|                                | Outer dimension      | Wall thickness |                |                     |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 2.7            | FIRESAFE / FSC | EI 60 U/U, E 90 U/U |
| PP                             |                      |                |                |                     |
| PVC(-U/-C)                     |                      |                |                |                     |

**A.1.8 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Combustible pipes**

**A.1.8.3 PP-R Multilayer pipes**

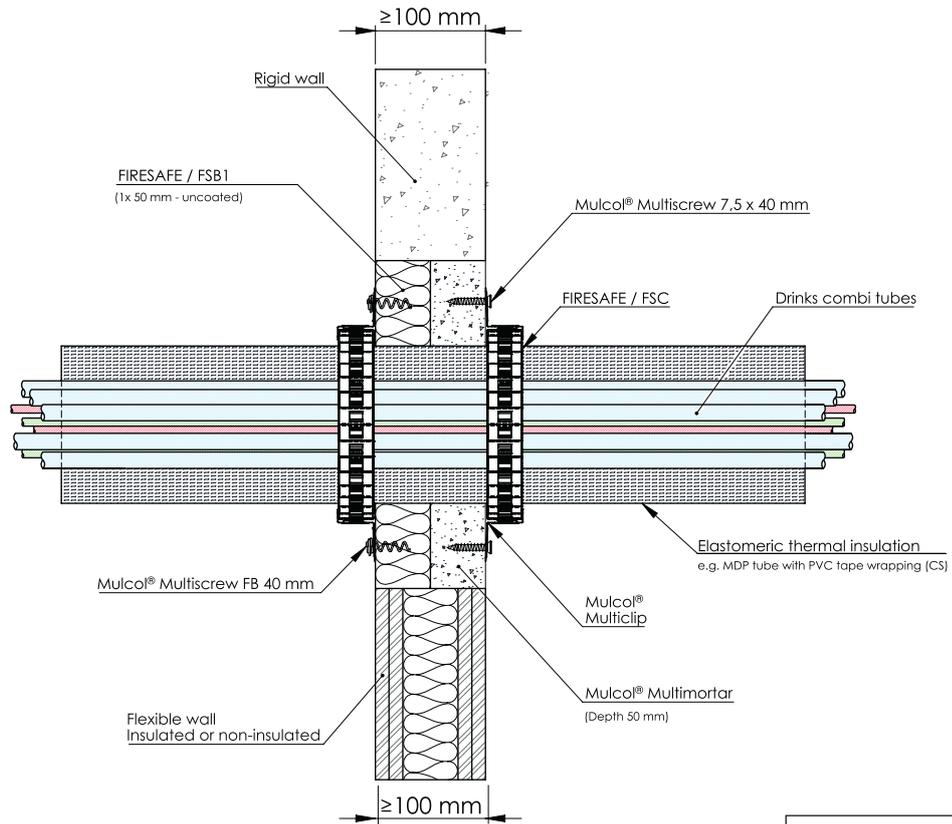
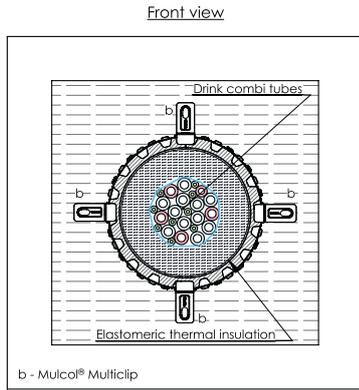


Drawing: FW.E-MC30-MLF-MM2.5.10

| Services        | Pipe dimensions (mm) |                | Product        | Classification |
|-----------------|----------------------|----------------|----------------|----------------|
|                 | Outer dimension      | Wall thickness |                |                |
| Aquatherm Green | $\leq \text{Ø } 50$  | 6.9            | FIRESAFE / FSC | EI 120 U/C     |

**A.1.8 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Combustible pipes**

**A.1.8.4 Drinks tubing system**

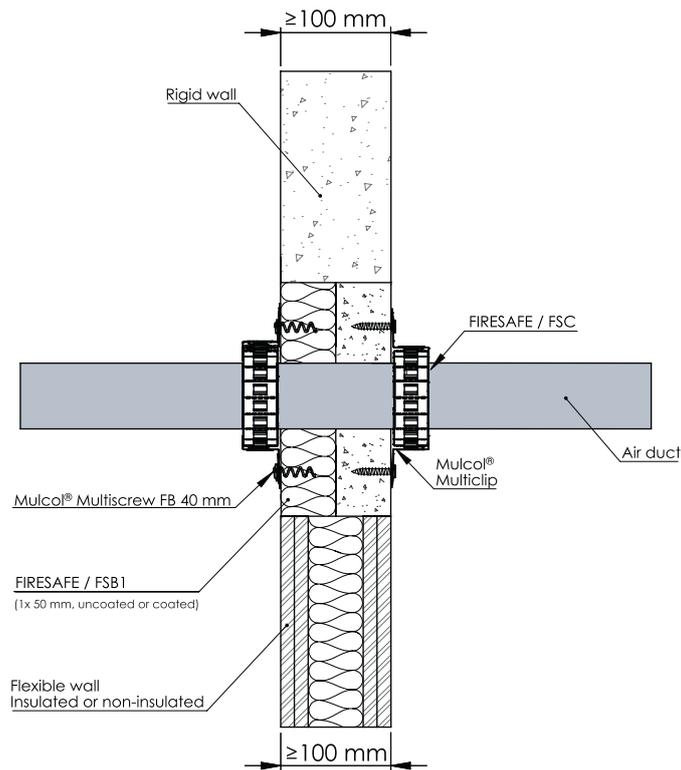
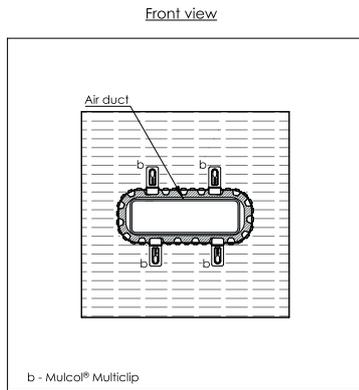


Drawing: FW-E-MC30-DCT52-MM2.5.10

| Services             | Dimensions (mm)      |           | Insulation       |                |               | Product        | Classification   |
|----------------------|----------------------|-----------|------------------|----------------|---------------|----------------|------------------|
|                      | Outer dimension      | Hoses no. | Type             | Thickness (mm) | Configuration |                |                  |
| Drinks tubing system | $\leq \text{Ø } 145$ | $\leq 52$ | Elastomeric foam | 8 - 35         | CS            | FIRESAFE / FSC | <b>EI 60 U/C</b> |

**A.1.8 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Combustible pipes**

**A.1.8.5 Rectangular plastic duct**



Drawing: FW.E-MC30-AD-MM2.5.10

| Services                 | Pipe dimensions (mm) |                | Product        | Classification |
|--------------------------|----------------------|----------------|----------------|----------------|
|                          | Outer dimension      | Wall thickness |                |                |
| Rectangular plastic duct | $\leq 220 \times 90$ | 1.0            | FIRESAFE / FSC | EI 45 U/C      |
|                          |                      | 2.0            |                | EI 120 U/C     |

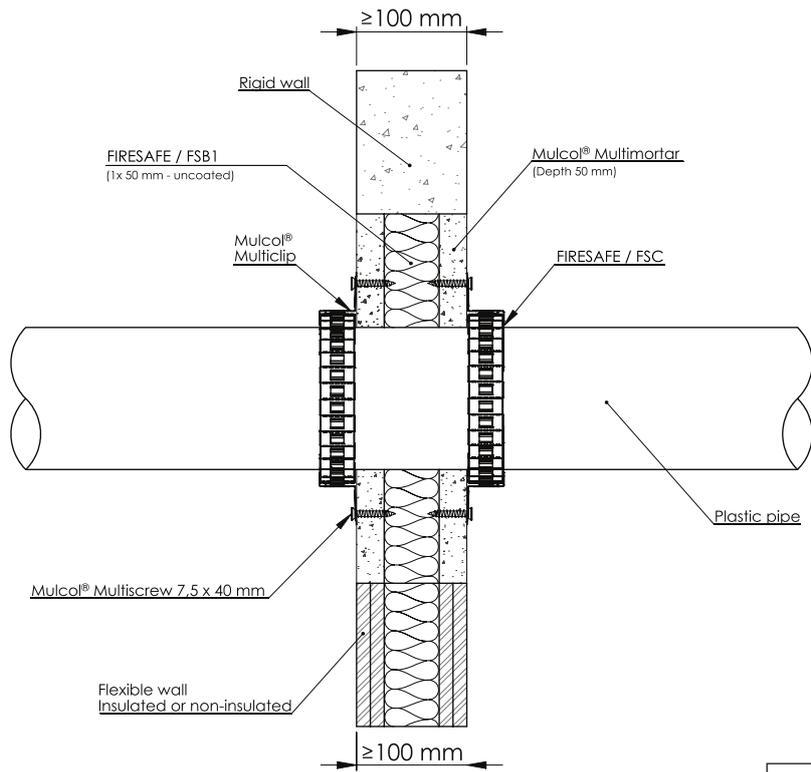
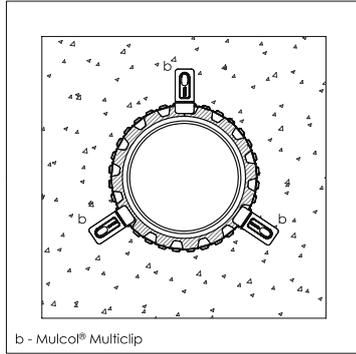
**A.1.9**

**Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm - Combustible pipes**

**A.1.9.1**

**Plastic pipes**

Front view



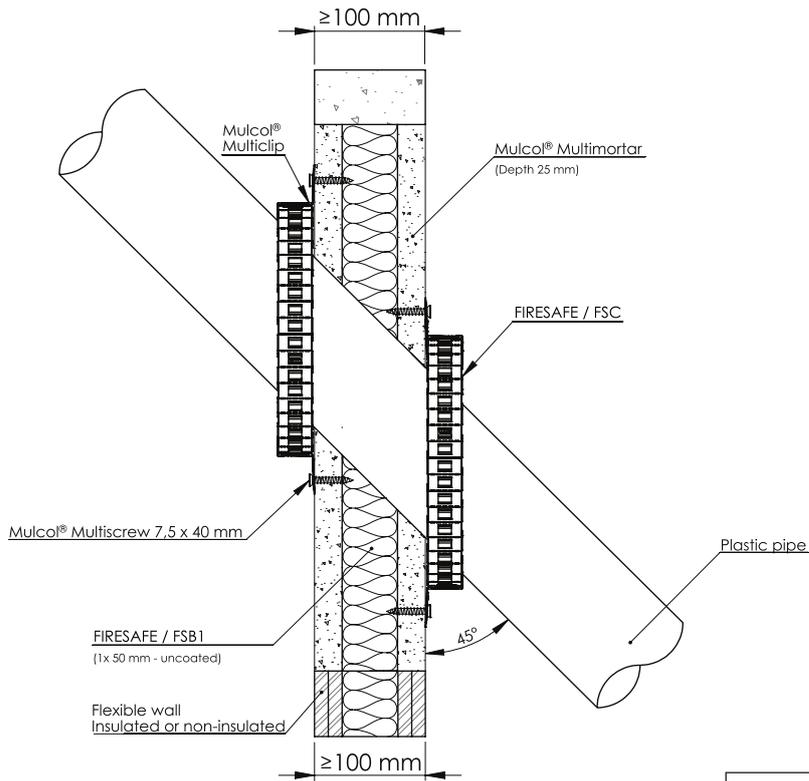
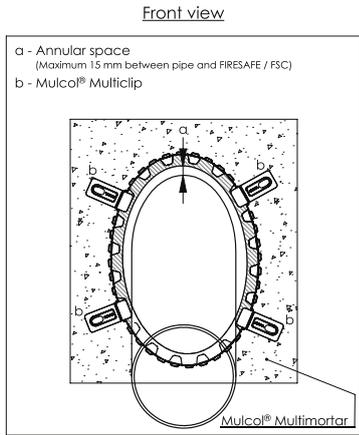
Drawing: FW.E-MC30-PP-MM3.4.10

| Services                       | Pipe dimensions (mm) |                | Product        | Classification |
|--------------------------------|----------------------|----------------|----------------|----------------|
|                                | Outer dimension      | Wall thickness |                |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 2.7 - 6.6      | FIRESAFE / FSC | EI 120 U/U     |
| PP                             |                      | 2.7            |                |                |
| PVC(-U/-C)                     |                      |                |                |                |

**A.1.9 Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm -**

**Combustible pipes**

**A.1.9.2 Plastic pipes perpendicular to 45°**



Drawing: FW.E-PP-MM3.4.10

| Services                       | Pipe dimensions (mm) |                | Product        | Classification      |
|--------------------------------|----------------------|----------------|----------------|---------------------|
|                                | Outer dimension      | Wall thickness |                |                     |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 2.7            | FIRESAFE / FSC | EI 60 U/U, E 90 U/U |
| PP                             |                      |                |                |                     |
| PVC(-U/-C)                     |                      |                |                |                     |

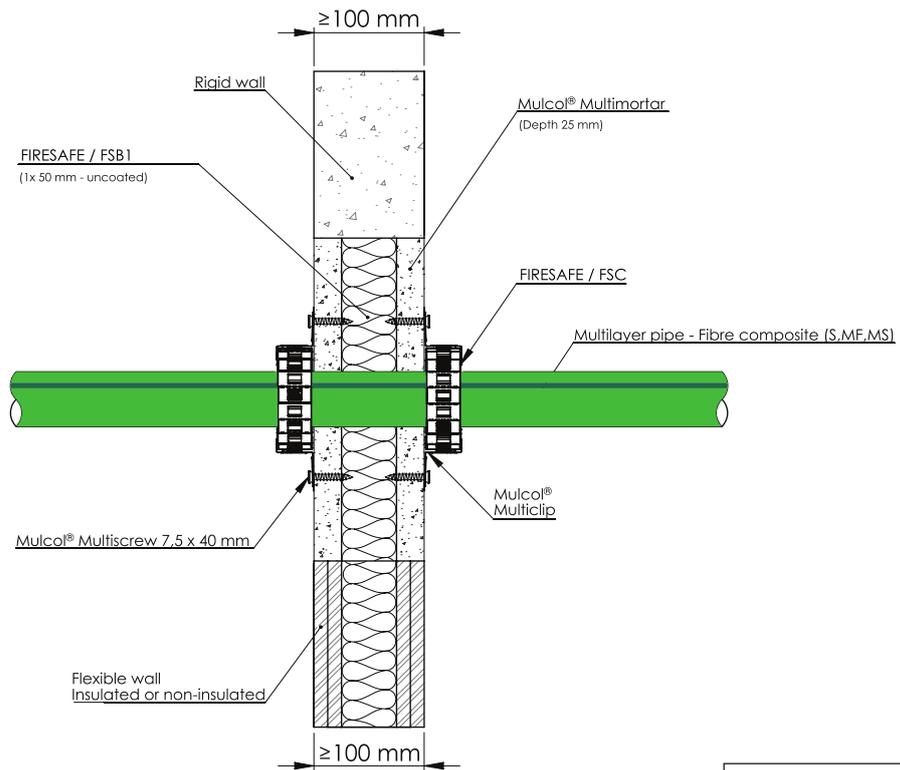
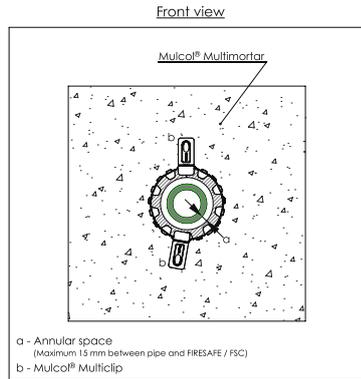
**A.1.9**

**Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm -**

**Combustible pipes**

**A.1.9.3**

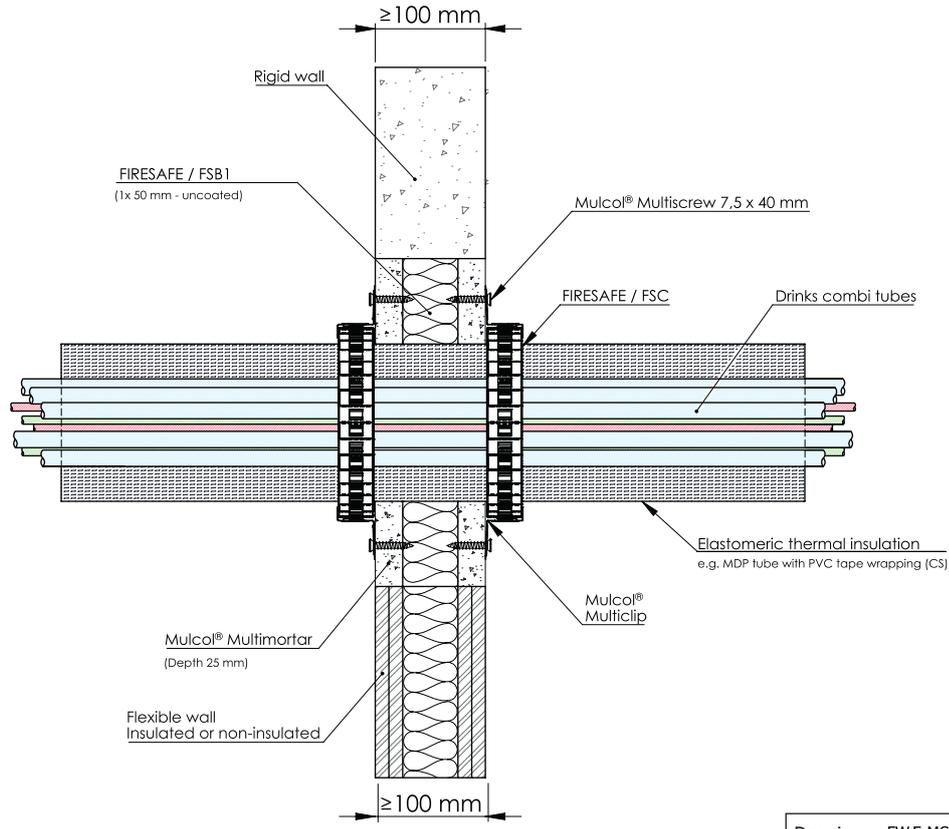
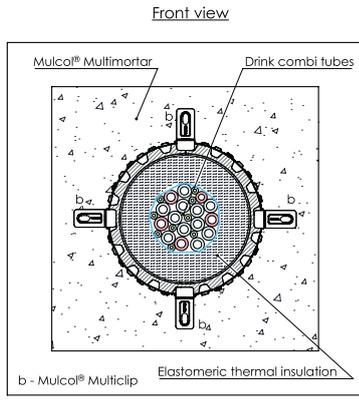
**PP-R Multilayer pipes**



Drawing: FW.E-MLF-MM3.4.10

| Services        | Pipe dimensions (mm) |                | Product        | Classification |
|-----------------|----------------------|----------------|----------------|----------------|
|                 | Outer dimension      | Wall thickness |                |                |
| Aquatherm Green | $\leq \text{Ø } 50$  | 6.9            | FIRESAFE / FSC | EI 120 U/C     |

**A.1.9 Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm - Combustible pipes**  
**A.1.9.4 Drinks tubing system**



Drawing: FW-E-MC30-DCT52-MM3.4.10

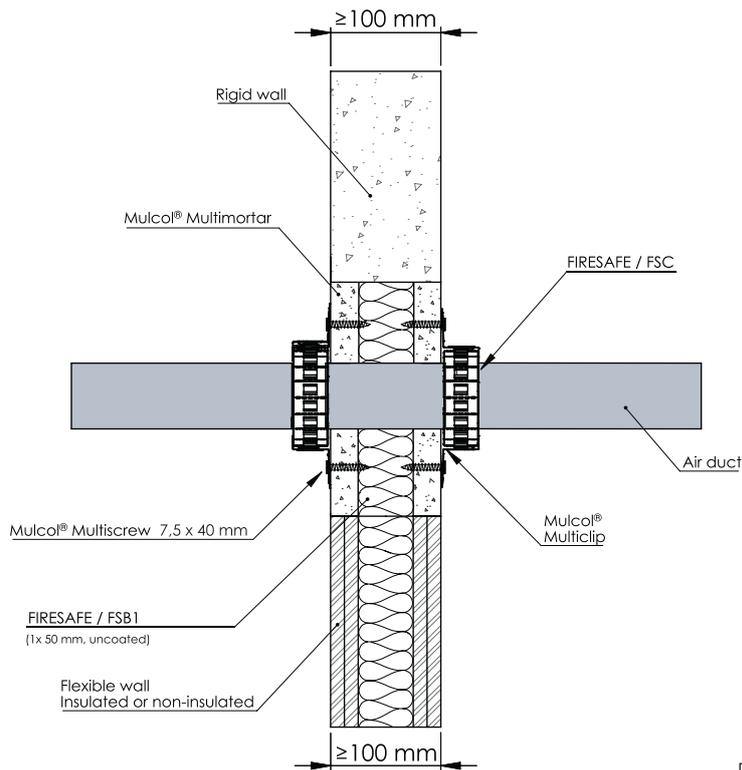
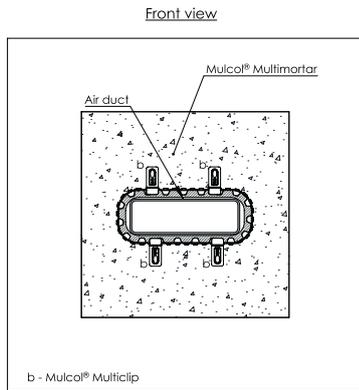
| Services             | Dimensions (mm)      |           | Insulation       |                |               | Product        | Classification   |
|----------------------|----------------------|-----------|------------------|----------------|---------------|----------------|------------------|
|                      | Outer dimension      | Hoses no. | Type             | Thickness (mm) | Configuration |                |                  |
| Drinks tubing system | $\leq \text{Ø } 145$ | $\leq 52$ | Elastomeric foam | 8 - 35         | CS            | FIRESAFE / FSC | <b>EI 60 U/C</b> |

**A.1.9**

**Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm - Combustible pipes**

**A.1.9.5**

**Rectangular plastic duct**

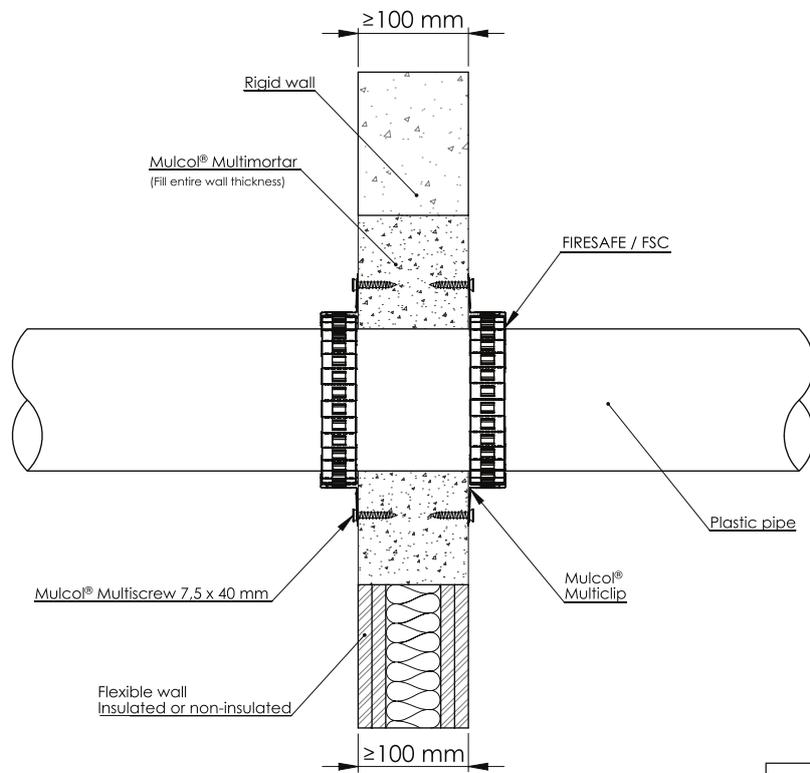
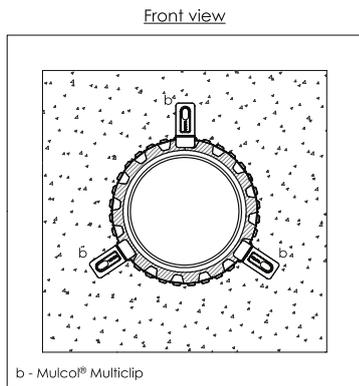


Drawing: FW.E-MC30-AD-MM3.4.10

| Services                 | Pipe dimensions (mm) |                | Product        | Classification |
|--------------------------|----------------------|----------------|----------------|----------------|
|                          | Outer dimension      | Wall thickness |                |                |
| Rectangular plastic duct | $\leq 220 \times 90$ | 1.0            | FIRESAFE / FSC | EI 45 U/C      |
|                          |                      | 2.0            |                | EI 120 U/C     |

**A.1.10 Multimortar -  $\geq 100$  mm - Combustible pipes**

**A.1.10.1 Plastic pipes**



Drawing: FW.E-MC30-PP-MM1.2.10

| Services                     | Pipe dimensions (mm) |                | Product        | Classification       |
|------------------------------|----------------------|----------------|----------------|----------------------|
|                              | Outer dimension      | Wall thickness |                |                      |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 40$  | 2.4 - 6.6      | FIRESAFE / FSC | EI 120 U/U           |
|                              | $\leq \text{Ø } 50$  | 3.0 - 6.6      |                |                      |
|                              | $\leq \text{Ø } 110$ | 2.7 - 6.6      |                | EI 90 U/U, E 120 U/U |
|                              |                      | 6.6 - 7.4      |                | EI 60 U/U            |
|                              |                      | 7.4 - 10.0     |                | EI 120 U/U           |
|                              | $\leq \text{Ø } 125$ | 3.1 - 4.9      |                | EI 90 U/U, E 120 U/U |
|                              |                      | 4.9 - 7.4      |                | EI 45 U/U            |
|                              |                      | 7.4 - 11.4     |                | EI 90 U/C            |
|                              |                      | 7.4 - 14.6     |                | EI 90 U/U            |
|                              | $\leq \text{Ø } 160$ | 4.0            |                | EI 30 U/U            |
| 4.0 - 14.6                   |                      | EI 90 U/C      |                |                      |

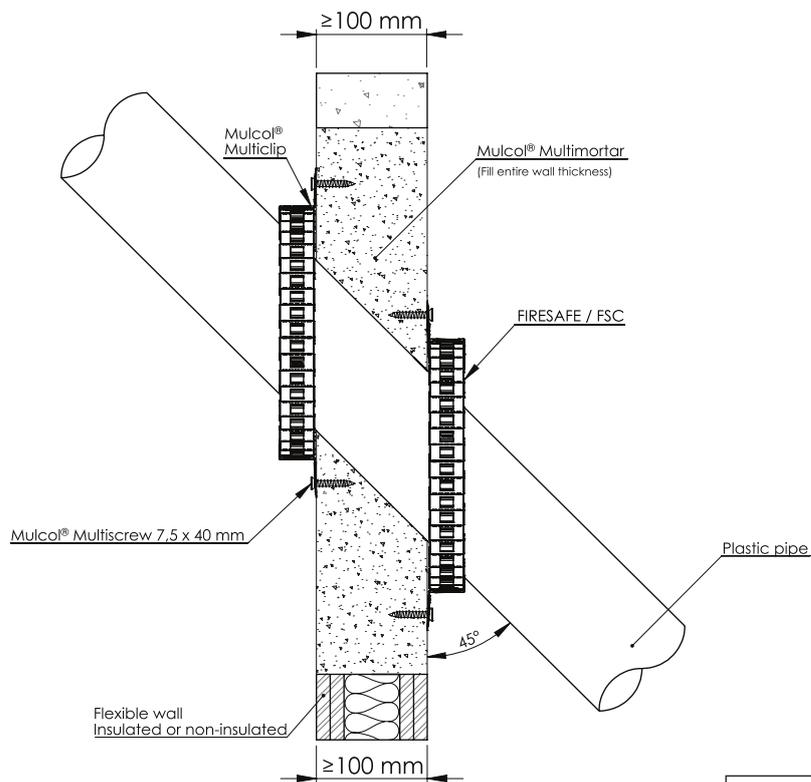
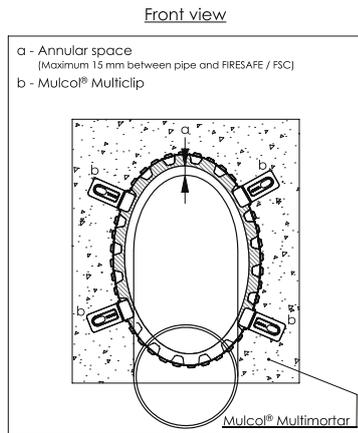
**A.1.10 Multimortar - ≥ 100 mm - Combustible pipes**

**A.1.10.1 Plastic pipes**

| Services                     | Pipe dimensions (mm) |                      | Product                  | Classification           |                |
|------------------------------|----------------------|----------------------|--------------------------|--------------------------|----------------|
|                              | Outer dimension      | Wall thickness       |                          |                          |                |
| PE-HD / PE-X / ABS / SAN+PVC | ≤ Ø 160              | 4.0 - 9.5            | FIRESAFE / FSC<br>double | EI 120 U/U               |                |
|                              |                      | 9.5 - 14.6           |                          | EI 60 U/U                |                |
|                              |                      |                      |                          | EI 120 U/C               |                |
| Services                     | Pipe dimensions (mm) |                      | Product                  | Classification           |                |
|                              | Outer dimension      | Wall thickness       |                          |                          |                |
| PP                           | ≤ Ø 40               | 1.8 - 6.3            | FIRESAFE / FSC           | EI 120 U/U               |                |
|                              | ≤ Ø 110              | 2.7 - 6.3            |                          | EI 90 U/U                |                |
|                              |                      | 6.3 - 7.1            |                          | EI 120 U/U               |                |
|                              | ≤ Ø 125              | 3.1                  |                          | EI 90 U/U, E 120 U/U     |                |
|                              |                      | 3.1 - 7.1            |                          | EI 120 U/C               |                |
|                              |                      | 3.1 - 9.1            |                          | EI 120 U/U               |                |
|                              | ≤ Ø 160              | 4.0                  |                          | EI 45 U/U, E 60 U/U      |                |
|                              |                      | 4.0 - 6.2            |                          | EI 30 U/U                |                |
|                              |                      | 6.2 - 14.6           |                          | EI 120 U/C               |                |
|                              |                      | 9.1                  |                          | EI 120 U/U               |                |
|                              |                      | 4.0                  |                          | FIRESAFE / FSC<br>double | EI 90 U/U      |
|                              |                      | 4.0 - 9.1            |                          |                          | EI 60 U/U      |
|                              |                      | 9.1 - 14.6           |                          |                          | EI 120 U/C     |
|                              | Services             | Pipe dimensions (mm) |                          | Product                  | Classification |
| Outer dimension              |                      | Wall thickness       |                          |                          |                |
| PVC(-U/-C)                   | ≤ Ø 40               | 1.9 - 9.3            | FIRESAFE / FSC           | EI 120 U/U               |                |
|                              | ≤ Ø 110              | 2.2 - 9.3            |                          | EI 120 U/U               |                |
|                              |                      | 9.3 - 12.3           |                          | EI 90 U/U, E 120 U/U     |                |
|                              |                      | 12.3 - 14.6          |                          | EI 30 U/U                |                |
|                              | ≤ Ø 125              | 2.5 - 9.3            |                          | EI 120 U/U               |                |
|                              |                      | 9.3 - 11.8           |                          | EI 90 U/U, E 120 U/U     |                |
|                              |                      | 11.8 - 14.6          |                          | EI 30 U/U                |                |
|                              | ≤ Ø 160              | 1.8 - 11.8           |                          | EI 90 U/U, E 120 U/U     |                |
|                              |                      | 11.8 - 14.6          |                          | EI 30 U/U                |                |
|                              |                      | 1.8 - 11.8           |                          | FIRESAFE / FSC<br>double | EI 120 U/U     |
|                              |                      | 11.8 - 14.6          |                          |                          | EI 60 U/U      |
|                              | ≤ Ø 315              | 7.7                  |                          |                          | EI 120 U/C     |
|                              |                      |                      |                          |                          | EI 90 U/C      |

## A.1.10 Multimortar - $\geq 100$ mm - Combustible pipes

### A.1.10.2 Plastic pipes perpendicular to 45°

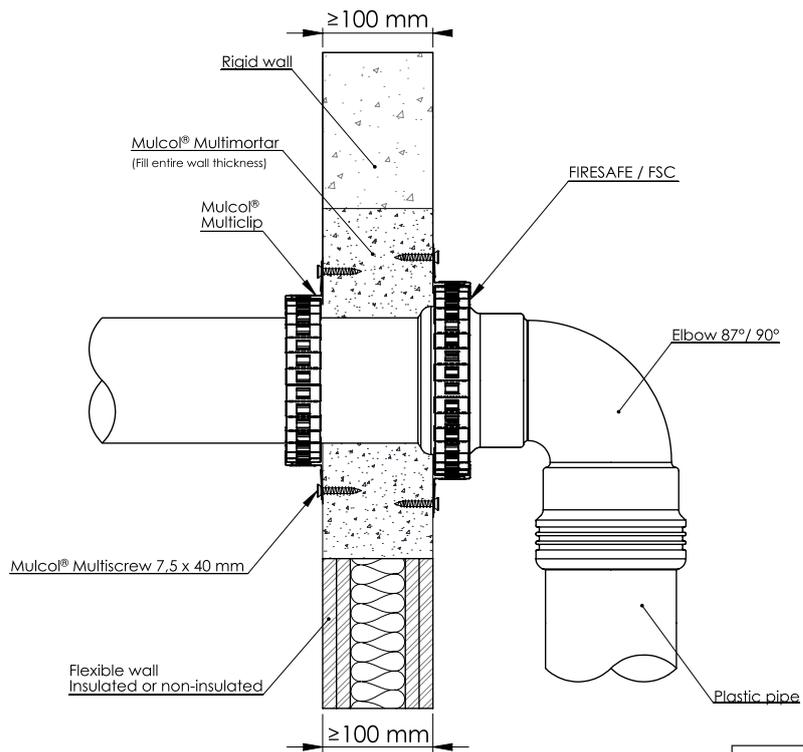
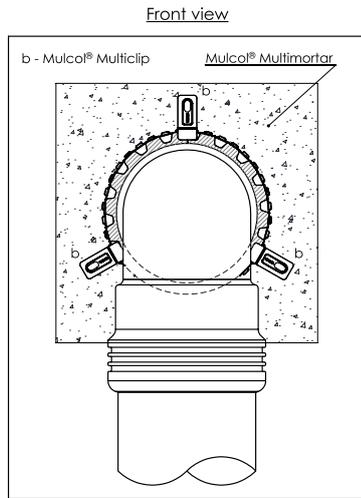


Drawing: FW.E-MC30o-PP-MM1.2.10

| Services                     | Pipe dimensions (mm) |                | Product                  | Classification      |
|------------------------------|----------------------|----------------|--------------------------|---------------------|
|                              | Outer dimension      | Wall thickness |                          |                     |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 2.7            | FIRESAFE / FSC           | EI 60 U/U, E 90 U/U |
| PP                           |                      |                |                          |                     |
| PVC(-U/-C)                   | $\leq \text{Ø } 125$ | 2.5            |                          | EI 30 U/C, E 45 U/C |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 3.4 - 10.0     | FIRESAFE / FSC<br>double | EI 120 U/C          |
| PP                           |                      | 3.4            |                          |                     |
|                              |                      | 3.4 - 10.0     |                          |                     |
| PVC(-U/-C)                   |                      | 3.4            |                          |                     |
|                              |                      |                |                          | EI 60 U/C           |
|                              |                      |                |                          | EI 120 U/C          |

**A.1.10 Multimortar -  $\geq 100$  mm - Combustible pipes**

**A.1.10.3 Plastic pipes with elbow**

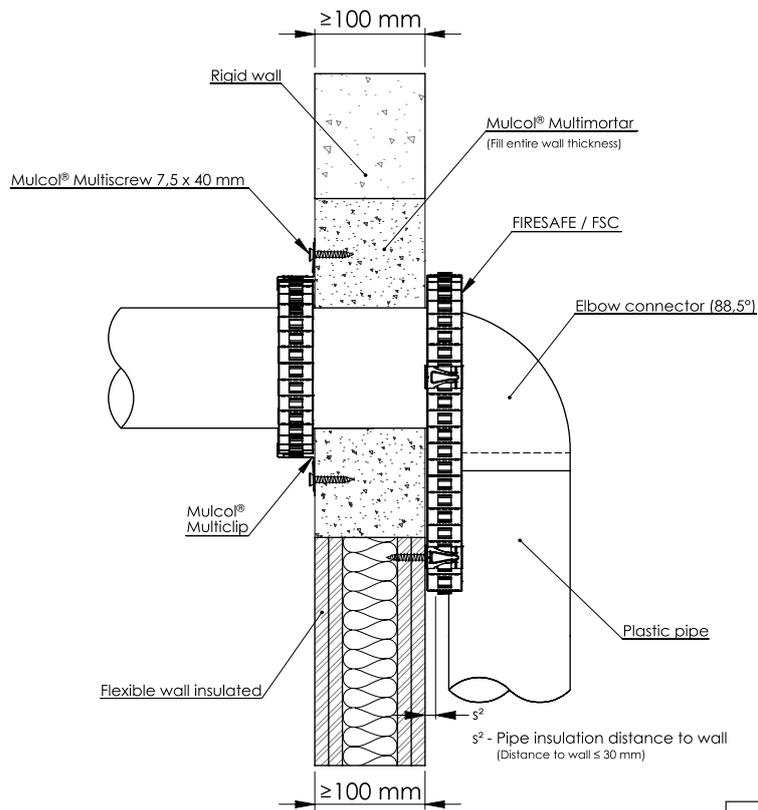
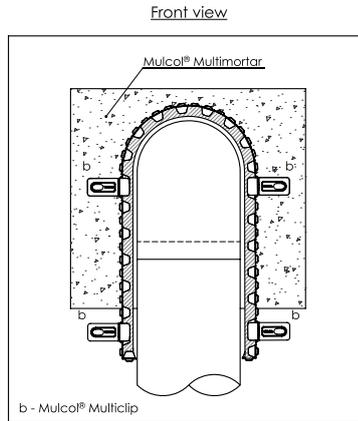


Drawing: FW.E-MC30-PP-MM1.2.70

| Services   | Pipe dimensions (mm) |                | Product        | Classification |
|------------|----------------------|----------------|----------------|----------------|
|            | Outer dimension      | Wall thickness |                |                |
| PP         | $\leq \text{Ø } 125$ | 3.1            | FIRESAFE / FSC | EI 90 U/C      |
| PVC(-U/-C) |                      | 2.5            |                | EI 90 U/U      |

**A.1.10 Multimortar -  $\geq 100$  mm - Combustible pipes**

**A.1.10.4 Plastic pipes with elbow and U-shape FIRESAFE / FSC**

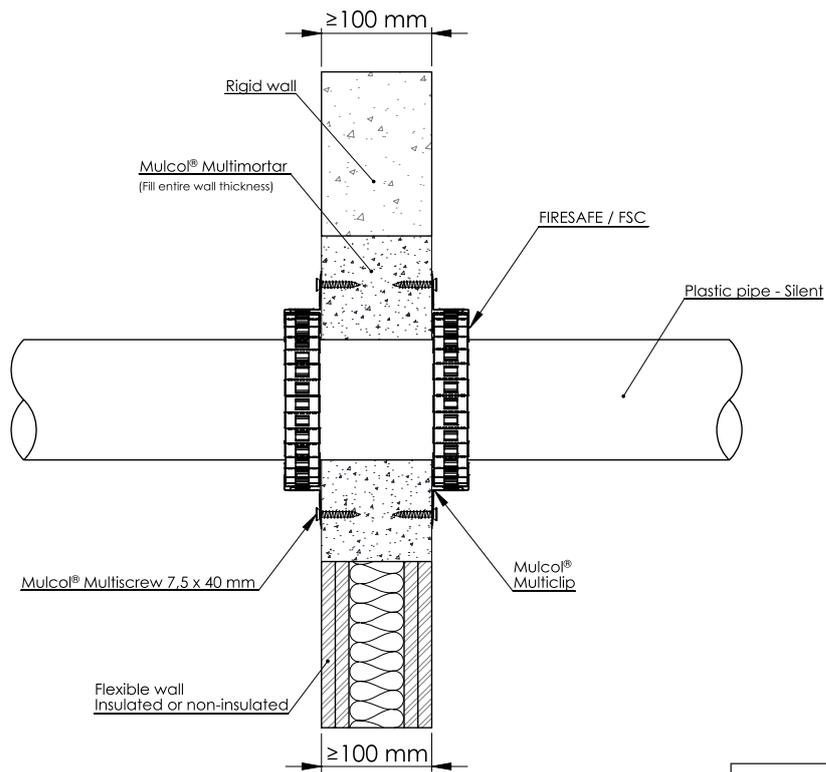
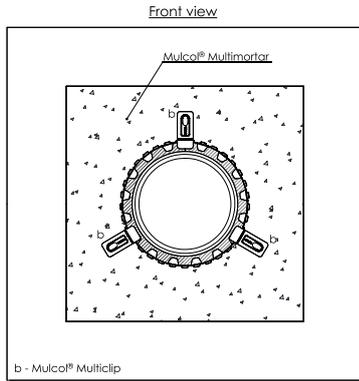


Drawing: FW.E-MC30u-PP-MM1.2.70

| Services                     | Pipe dimensions (mm) |                | Product        | Classification |
|------------------------------|----------------------|----------------|----------------|----------------|
|                              | Outer dimension      | Wall thickness |                |                |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 3.4            | FIRESAFE / FSC | EI 120 U/C     |
| PP                           |                      |                |                |                |
| PVC(-U/-C)                   |                      |                |                |                |

**A.1.10 Multimortar -  $\geq 100$  mm - Combustible pipes**

**A.1.10.5 Plastic pipes (Silent)**

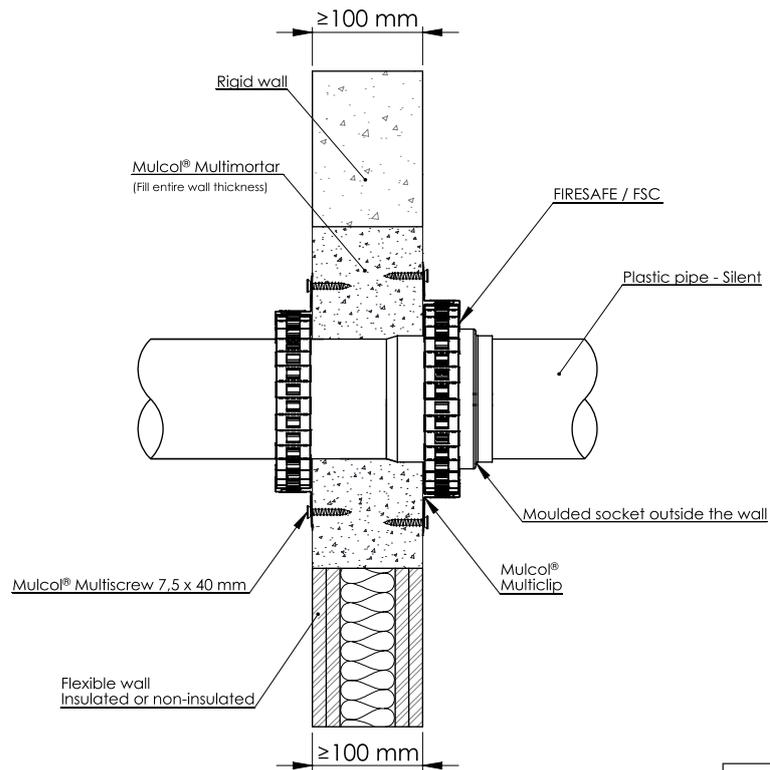
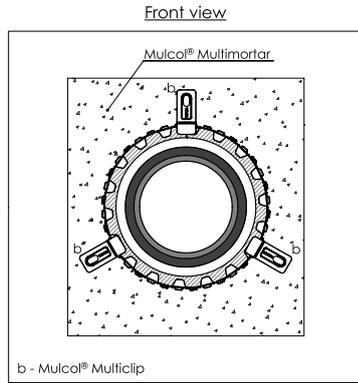


Drawing: FW.E-MC30-PPS-MM1.2.10

| Services             | Pipe dimensions (mm) |                | Product               | Classification       |
|----------------------|----------------------|----------------|-----------------------|----------------------|
|                      | Outer dimension      | Wall thickness |                       |                      |
| Wavin SiTech+        | $\leq \text{Ø } 32$  | 2.0            | FIRESAFE / FSC        | EI 120 U/U           |
| Geberit Silent dB 20 | $\leq \text{Ø } 110$ | 3.6            |                       | EI 90 U/U, E 120 U/U |
|                      |                      | 6.0            |                       | EI 120 U/U           |
| Wavin SiTech+        | $\leq \text{Ø } 160$ | 5.0            | double FIRESAFE / FSC | EI 90 U/U, E 120 U/U |

**A.1.10 Multimortar -  $\geq 100$  mm - Combustible pipes**

**A.1.10.6 Plastic pipes (Silent) with moulded socket**

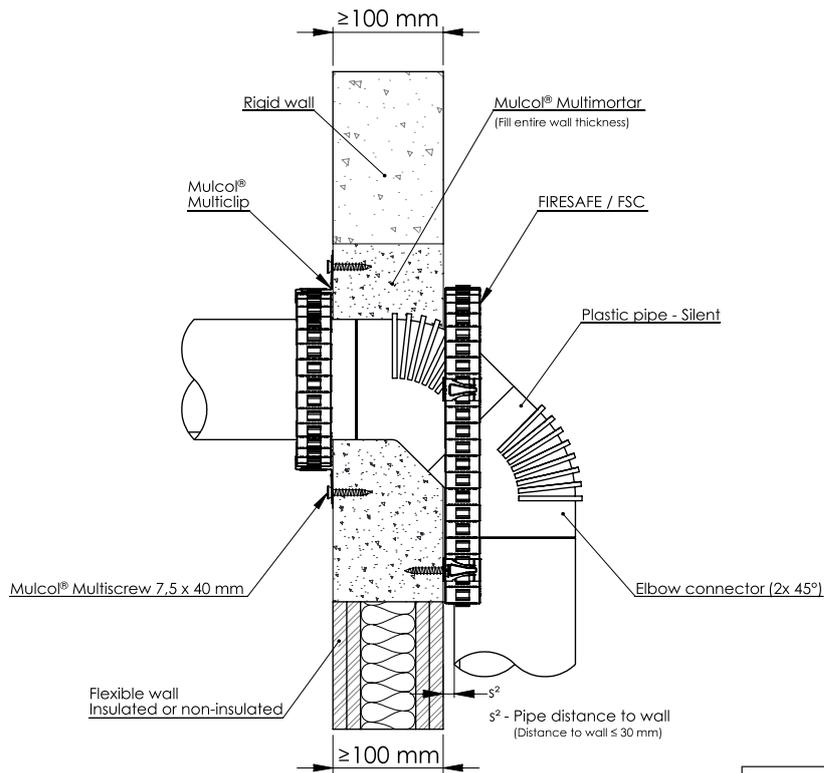
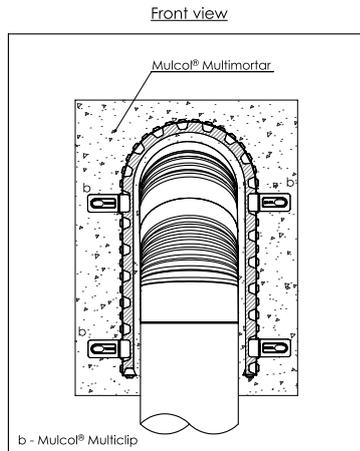


Drawing: FW.E-MC30-PPS-MM1.2.60

| Services      | Pipe dimensions (mm) |                | Product        | Classification |
|---------------|----------------------|----------------|----------------|----------------|
|               | Outer dimension      | Wall thickness |                |                |
| Raupiano Plus | $\leq \text{Ø } 110$ | 2.7            | FIRESAFE / FSC | EI 120 U/C     |

**A.1.10 Multimortar -  $\geq 100$  mm - Combustible pipes**

**A.1.10.7 Plastic pipes (Silent) with elbow and U-shape FIRESAFE / FSC**

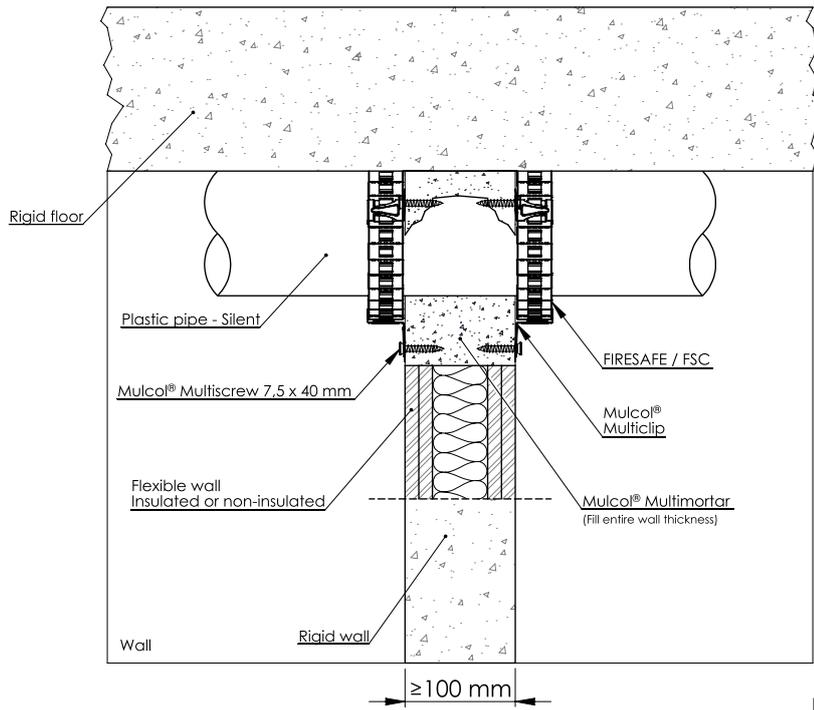
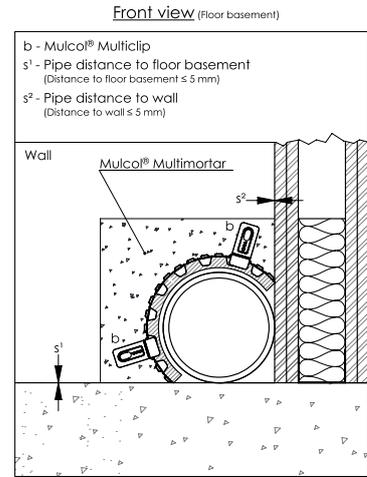
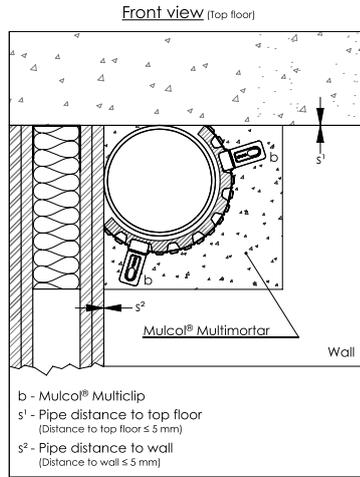


Drawing: FW.E-MC30u-PPS-MM1.2.80

| Services             | Pipe dimensions (mm) |                | Product        | Classification       |
|----------------------|----------------------|----------------|----------------|----------------------|
|                      | Outer dimension      | Wall thickness |                |                      |
| Wavin SiTech+        | $\leq \text{Ø } 110$ | 3.6            | FIRESAFE / FSC | EI 60 U/U            |
| Geberit Silent dB 20 |                      | 6.0            |                | EI 90 U/U, E 120 U/U |

**A.1.10 Multimortar -  $\geq 100$  mm - Combustible pipes**

**A.1.10.8 Plastic pipes (Silent) in corner**

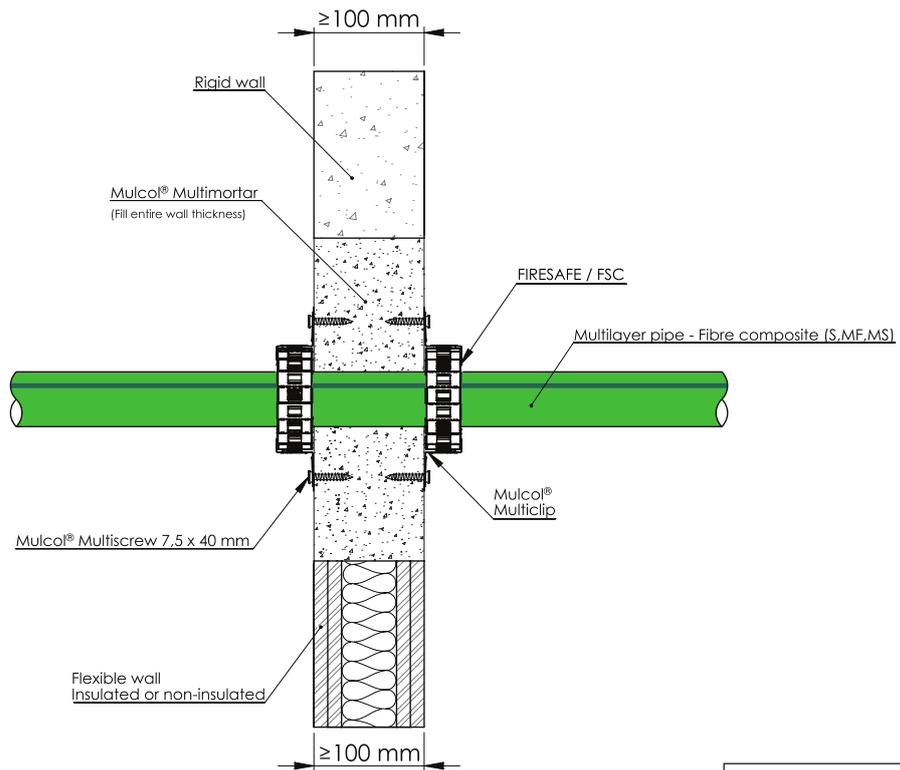
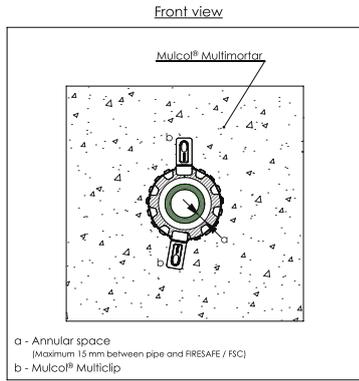


Drawing: FW.E-MC30c-PPS-MM1.2.10

| Services             | Pipe dimensions (mm) |                | Position | Product        | Classification |
|----------------------|----------------------|----------------|----------|----------------|----------------|
|                      | Outer dimension      | Wall thickness |          |                |                |
| Geberit Silent dB 20 | $\leq \text{Ø } 110$ | 6.0            | Floor    | FIRESAFE / FSC | EI 120 U/U     |
|                      |                      |                | Ceiling  |                | EI 60 U/U      |

**A.1.10 Multimortar -  $\geq 100$  mm - Combustible pipes**

**A.1.10.9 PP-R multilayer pipes**

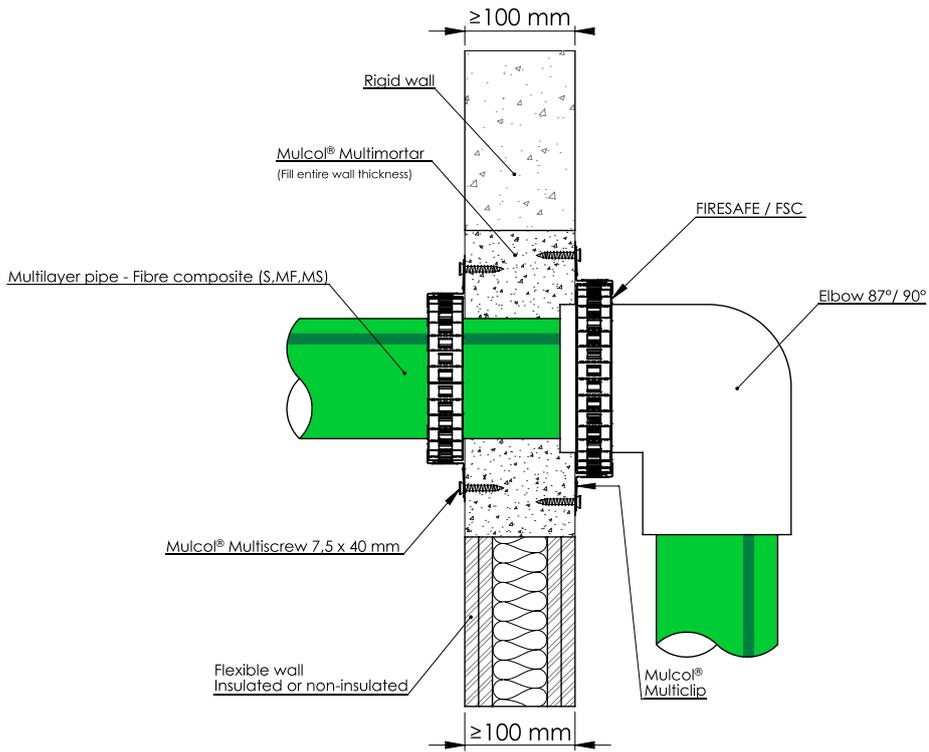
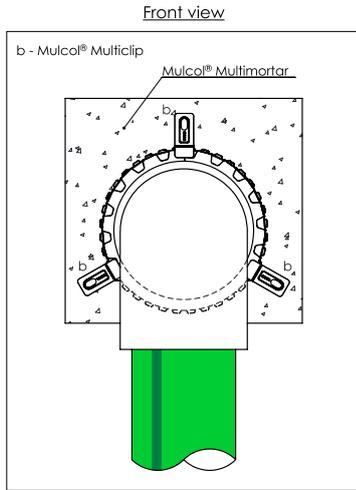


Drawing: FW.E-MLF-MM1.2.10

| Services        | Pipe dimensions (mm) |                | Product        | Classification      |
|-----------------|----------------------|----------------|----------------|---------------------|
|                 | Outer dimension      | Wall thickness |                |                     |
| Aquatherm Green | $\leq \text{Ø } 50$  | 6.9            | FIRESAFE / FSC | EI 60 U/U, E 90 U/U |
| Aquatherm Blue  | $\leq \text{Ø } 20$  | 2.8            |                | EI 90 U/C           |
|                 | $\leq \text{Ø } 110$ | 10.0           |                | EI 60 U/C           |
|                 | $\leq \text{Ø } 160$ | 14.6           |                | EI 90 U/C           |
| Aquatherm Red   | $\leq \text{Ø } 110$ | 15.1           |                | EI 90 U/C           |

**A.1.10 Multimortar -  $\geq 100$  mm - Combustible pipes**

**A.1.10.10 PP-R multilayer pipes with elbow**

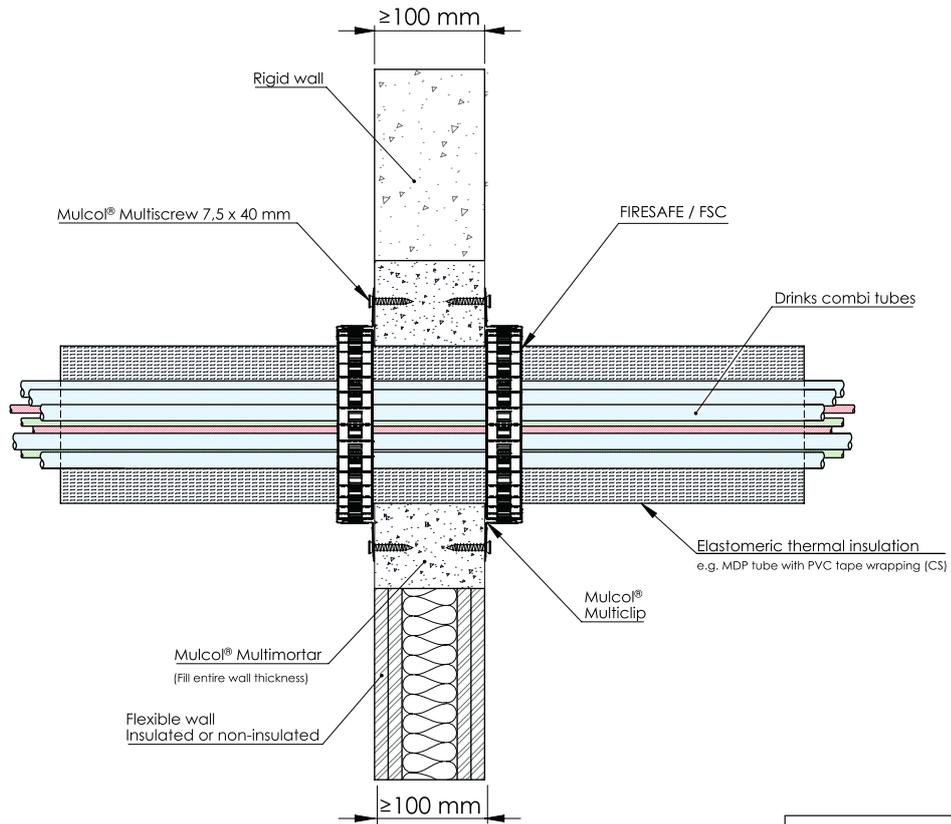
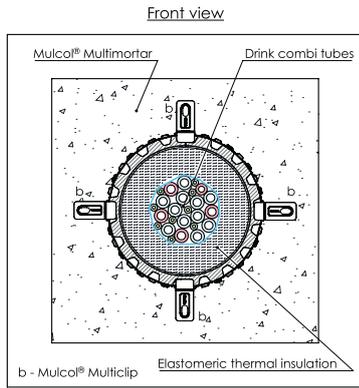


Drawing: FW.E-MC30-MLF-MM1.2.70

| Services       | Pipe dimensions (mm) |                | Product        | Classification       |
|----------------|----------------------|----------------|----------------|----------------------|
|                | Outer dimension      | Wall thickness |                |                      |
| Aquatherm Blue | $\leq \text{Ø } 110$ | 10.0           | FIRESAFE / FSC | EI 90 U/C, E 120 U/C |

**A.1.10 Multimortar -  $\geq 100$  mm - Combustible pipes**

**A.1.10.11 Drinks tubing system**

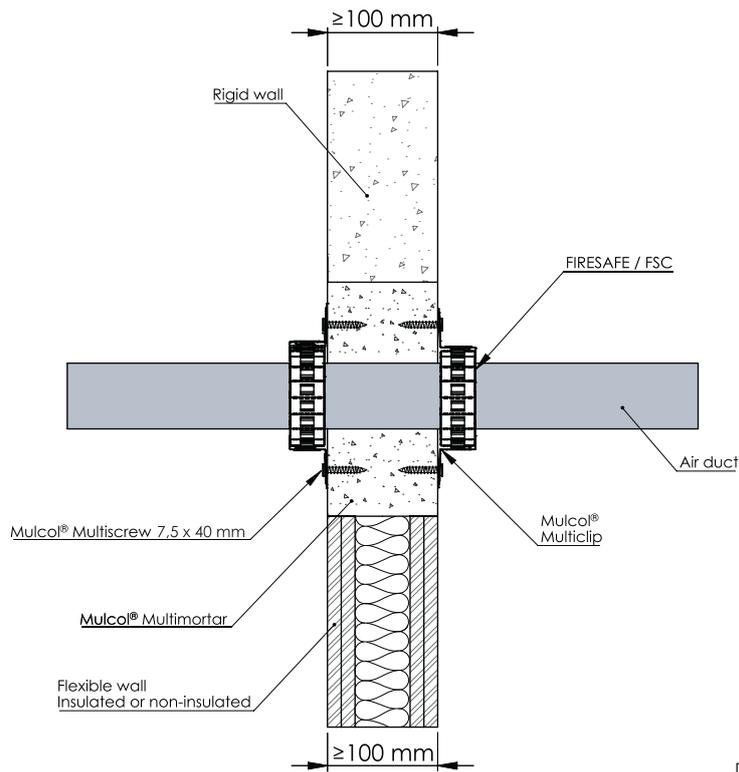
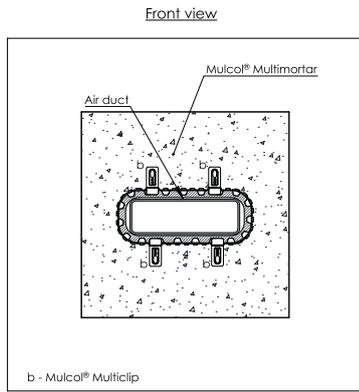


Drawing: FW.E-MC30-DCT52-MM1.2.10

| Services             | Dimensions (mm)      |           | Insulation       |                |               | Product        | Classification |
|----------------------|----------------------|-----------|------------------|----------------|---------------|----------------|----------------|
|                      | Outer dimension      | Hoses no. | Type             | Thickness (mm) | Configuration |                |                |
| Drinks tubing system | $\leq \text{Ø } 47$  | $\leq 3$  | Elastomeric foam | 8 - 35         | CS            | FIRESAFE / FSC | EI 90 U/C      |
|                      | $\leq \text{Ø } 145$ | $\leq 52$ |                  |                |               |                | EI 60 U/C      |

**A.1.10 Multimortar -  $\geq 100$  mm - Combustible pipes**

**A.1.10.12 Rectangular plastic duct**

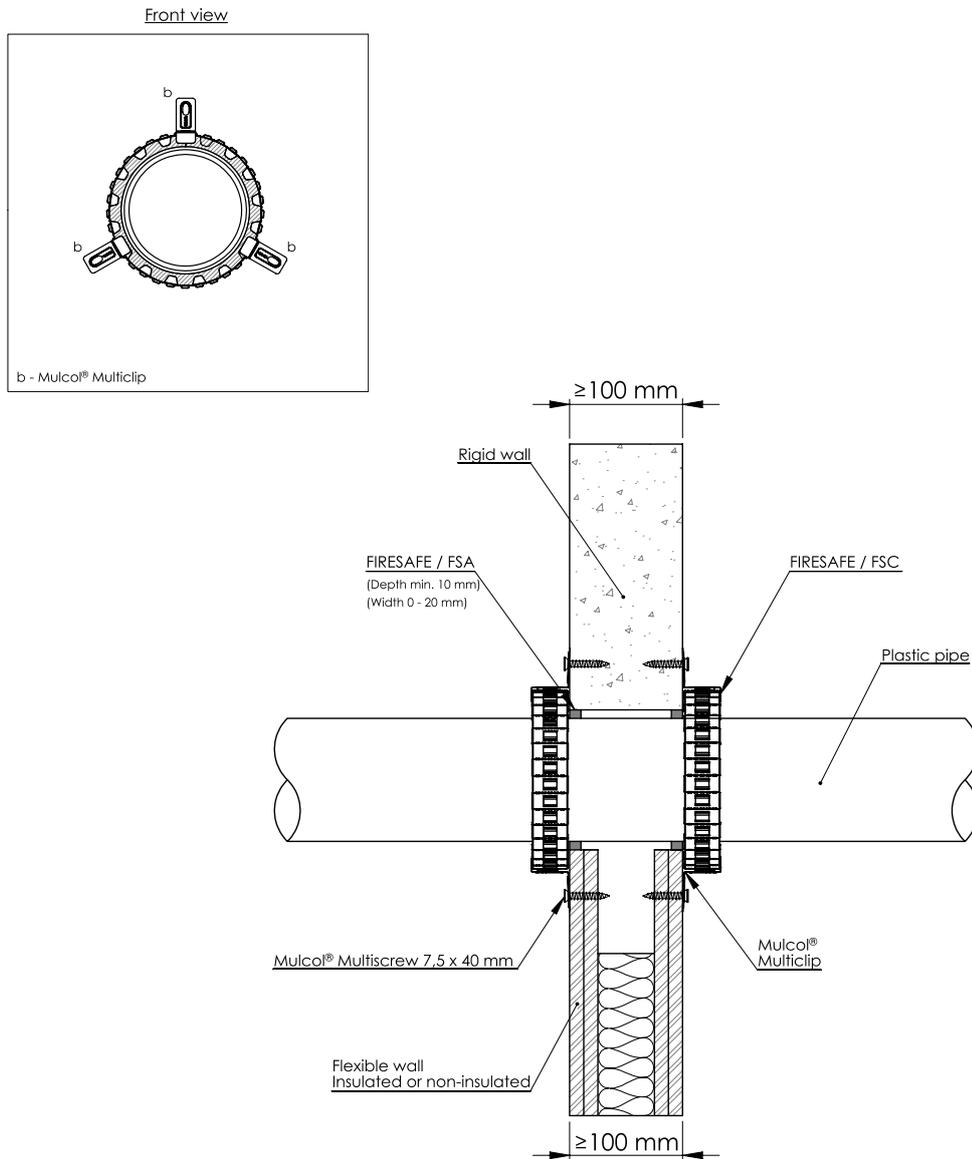


Drawing: FW.E-MC30-AD-MM1.2.10

| Services                 | Pipe dimensions (mm) |                | Product        | Classification |
|--------------------------|----------------------|----------------|----------------|----------------|
|                          | Outer dimension      | Wall thickness |                |                |
| Rectangular plastic duct | $\leq 220 \times 90$ | 1.0            | FIRESAFE / FSC | EI 45 U/C      |
|                          |                      | 2.0            |                | EI 120 U/C     |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.1 Plastic pipes**



Drawing: FW.E-MC30-PP-10.0.10

| Services                     | Pipe dimensions (mm)   |                | Product        | Classification       |           |
|------------------------------|------------------------|----------------|----------------|----------------------|-----------|
|                              | Outer dimension        | Wall thickness |                |                      |           |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \varnothing 40$  | 2.4 - 6.6      | FIRESAFE / FSC | EI 120 U/U           |           |
|                              |                        | 6.6 - 14.6     |                | EI 90 U/C            |           |
|                              | $\leq \varnothing 50$  | 3.0 - 6.6      |                | EI 120 U/U           |           |
|                              | $\leq \varnothing 110$ | 3.1 - 6.6      |                | EI 90 U/U, E 120 U/U |           |
|                              |                        | 6.6 - 7.4      |                | EI 60 U/U            |           |
|                              |                        | 7.4 - 10.0     |                | EI 30 U/U            |           |
|                              | $\leq \varnothing 125$ | 10.0 - 14.6    |                | EI 120 U/U           |           |
|                              |                        | 3.1 - 4.9      |                | EI 90 U/U, E 120 U/U |           |
|                              |                        | 4.9 - 7.4      |                | EI 45 U/U            |           |
|                              |                        | 7.4 - 11.4     |                | EI 30 U/U            |           |
|                              | $\leq \varnothing 160$ | 11.4 - 14.6    |                | EI 90 U/C            |           |
|                              |                        | 7.4 - 14.6     |                | EI 90 U/U            |           |
|                              |                        | 4.0            |                | EI 30 U/U            |           |
|                              |                        |                |                | 4.0 - 14.6           | EI 90 U/C |

**A.1.11 Directly through wall - ≥ 100 mm - Combustible pipes**

**A.1.11.1 Plastic pipes**

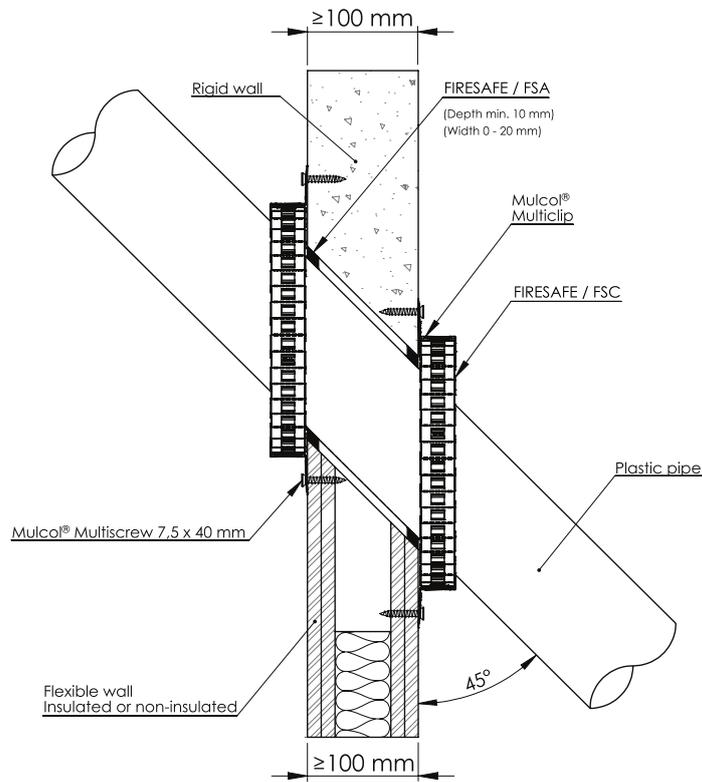
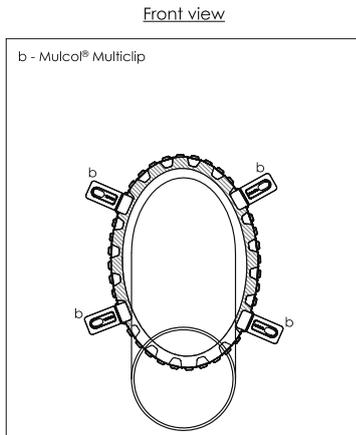
| Services                     | Pipe dimensions (mm) |                | Product                  | Classification |
|------------------------------|----------------------|----------------|--------------------------|----------------|
|                              | Outer dimension      | Wall thickness |                          |                |
| PE-HD / PE-X / ABS / SAN+PVC | ≤ Ø 160              | 4.0 - 9.5      | FIRESAFE / FSC<br>double | EI 120 U/U     |
|                              |                      | 9.5 - 14.6     |                          | EI 60 U/U      |
|                              | ≤ Ø 250              | 7.7            |                          | EI 120 U/C     |
| EI 60 U/C                    |                      |                |                          |                |

| Services | Pipe dimensions (mm) |                | Product        | Classification           |            |
|----------|----------------------|----------------|----------------|--------------------------|------------|
|          | Outer dimension      | Wall thickness |                |                          |            |
| PP       | ≤ Ø 40               | 6.3 - 9.1      | FIRESAFE / FSC | EI 120 U/C               |            |
|          |                      | 1.8 - 6.3      |                | EI 120 U/U               |            |
|          | ≤ Ø 110              | 2.7 - 6.3      |                | EI 90 U/U                |            |
|          |                      | 6.3 - 7.1      |                | EI 30 U/U                |            |
|          |                      | 7.1 - 14.6     |                | EI 120 U/C               |            |
|          |                      | 2.7 - 9.1      |                | EI 120 U/U               |            |
|          | ≤ Ø 125              | 3.1            |                | EI 90 U/U, E 120 U/U     |            |
|          |                      | 3.1 - 7.1      |                | EI 30 U/U                |            |
|          |                      | 7.1 - 11.4     |                | EI 120 U/C               |            |
|          |                      | 3.1 - 9.1      |                | EI 90 U/U, E 120 U/U     |            |
|          | ≤ Ø 160              | 4.0            |                | EI 45 U/U, E 60 U/U      |            |
|          |                      | 4.0 - 6.2      |                | EI 30 U/U                |            |
|          |                      | 6.2 - 14.6     |                | EI 120 U/C               |            |
|          |                      | 9.1            |                | EI 90 U/C                |            |
|          |                      | 4.0 - 9.1      |                | EI 120 U/U               |            |
|          |                      | 9.1 - 14.6     |                | FIRESAFE / FSC<br>double | EI 60 U/U  |
|          |                      |                |                |                          | EI 120 U/C |

| Services   | Pipe dimensions (mm) |                | Product        | Classification           |            |
|------------|----------------------|----------------|----------------|--------------------------|------------|
|            | Outer dimension      | Wall thickness |                |                          |            |
| PVC(-U/-C) | ≤ Ø 40               | 1.9 - 9.3      | FIRESAFE / FSC | EI 120 U/U               |            |
|            |                      | 9.3 - 12.3     |                | EI 90 U/U, E 120 U/U     |            |
|            |                      | 12.3 - 14.6    |                | EI 30 U/U                |            |
|            | ≤ Ø 110              | 2.2 - 9.3      |                | EI 120 U/U               |            |
|            |                      | 9.3 - 12.3     |                | EI 90 U/U, E 120 U/U     |            |
|            |                      | 12.3 - 14.6    |                | EI 30 U/U                |            |
|            | ≤ Ø 125              | 2.5 - 9.3      |                | EI 120 U/U               |            |
|            |                      | 9.3 - 11.8     |                | EI 90 U/U, E 120 U/U     |            |
|            |                      | 11.8 - 14.6    |                | EI 30 U/U                |            |
|            | ≤ Ø 160              | 1.8 - 11.8     |                | EI 90 U/U, E 120 U/U     |            |
|            |                      | 11.8 - 14.6    |                | EI 30 U/U                |            |
|            |                      | 1.8 - 11.8     |                | EI 120 U/U               |            |
|            |                      | 11.8 - 14.6    |                | EI 60 U/U                |            |
|            | ≤ Ø 315              | 7.7            |                | FIRESAFE / FSC<br>double | EI 120 U/C |
|            |                      |                |                |                          | EI 90 U/C  |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.2 Plastic pipes perpendicular to  $45^\circ$**

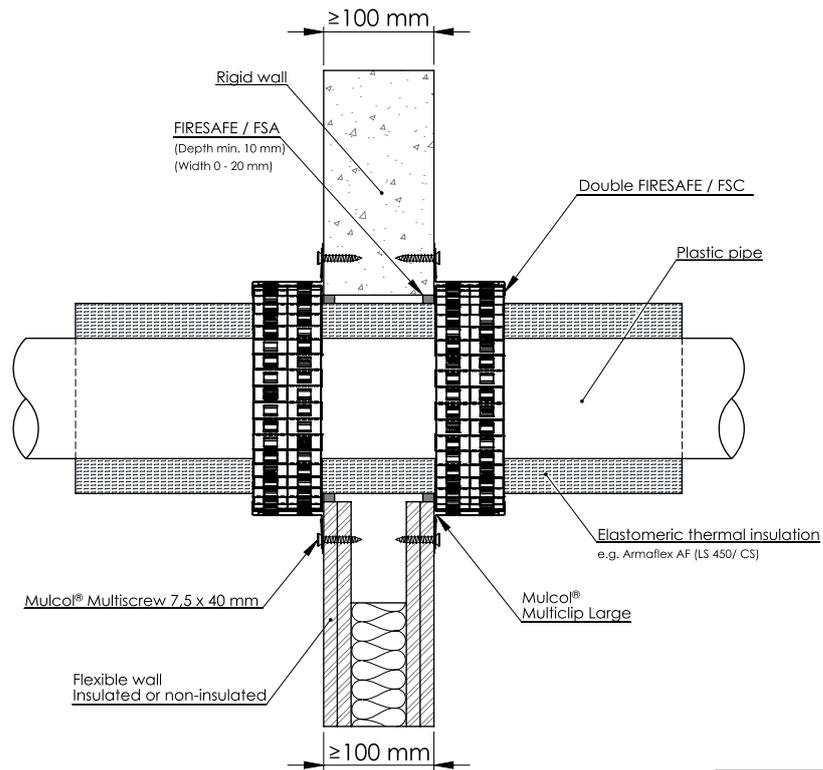
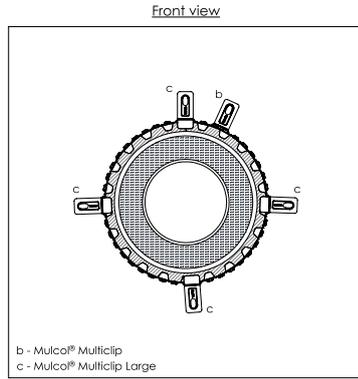


Drawing: FW.E-MC30o-PP-10.1.10

| Services                     | Pipe dimensions (mm)   |                        | Product               | Classification      |
|------------------------------|------------------------|------------------------|-----------------------|---------------------|
|                              | Outer dimension        | Wall thickness         |                       |                     |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \varnothing 110$ | 2.7                    | FIRESAFE / FSC        | EI 60 U/C           |
|                              |                        | 3.4 - 10.0             | FIRESAFE / FSC double | EI 120 U/C          |
| 2.7                          |                        | FIRESAFE / FSC         | EI 45 U/C, E 60 U/C   |                     |
| 3.4                          |                        | FIRESAFE / FSC         | EI 120 U/C            |                     |
| PP                           | $\leq \varnothing 110$ | 3.4 - 10.0             | FIRESAFE / FSC double | EI 60 U/C           |
|                              |                        | 2.7                    | FIRESAFE / FSC        | EI 45 U/C, E 60 U/C |
| $\leq \varnothing 125$       |                        | 2.5                    | FIRESAFE / FSC        | EI 30 U/C, E 45 U/C |
| PVC(-U/-C)                   |                        | $\leq \varnothing 110$ | 3.4                   | FIRESAFE / FSC      |
|                              | 3.4 - 10.0             |                        | FIRESAFE / FSC double | EI 60 U/C           |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.3 Plastic pipes - Elastomer LS 450 / CS**

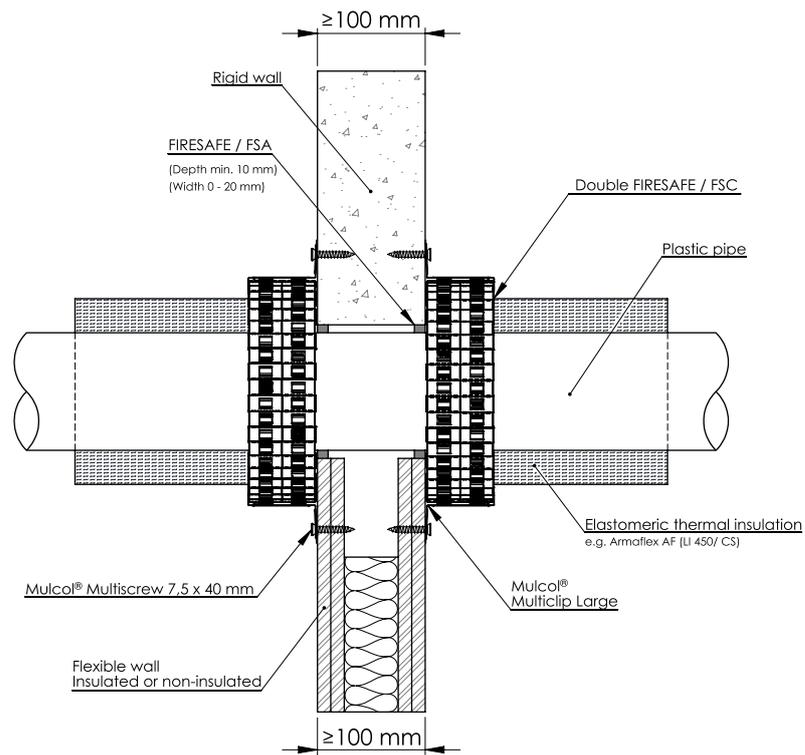
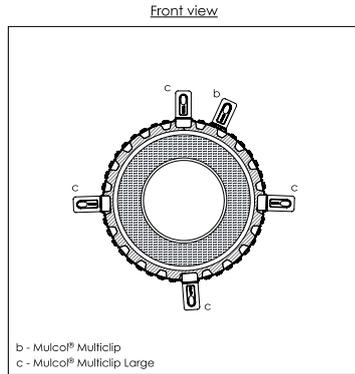


Drawing: FW,E-MC60-PP-20.0.22.LS

| Services   | Pipe dimensions (mm) |                | Insulation  |                |               | Product                  | Classification         |
|------------|----------------------|----------------|---|----------------|---------------|--------------------------|------------------------|
|            | Outer dimensions     | Wall thickness | Type  | Thickness (mm) | Configuration |                          |                        |
| PVC(-U/-C) | $\leq \text{Ø } 110$ | 3.2            | ArmaFlex AF<br>(min. class<br>$B_L$ -s3, d0<br>$B$ -s3, d0) | 9 - 32         | LS 450 / CS   | FIRESAFE / FSC<br>double | EI 90 U/U<br>E 120 U/U |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.4 Plastic pipes - Elastomer LI 450 / CI**

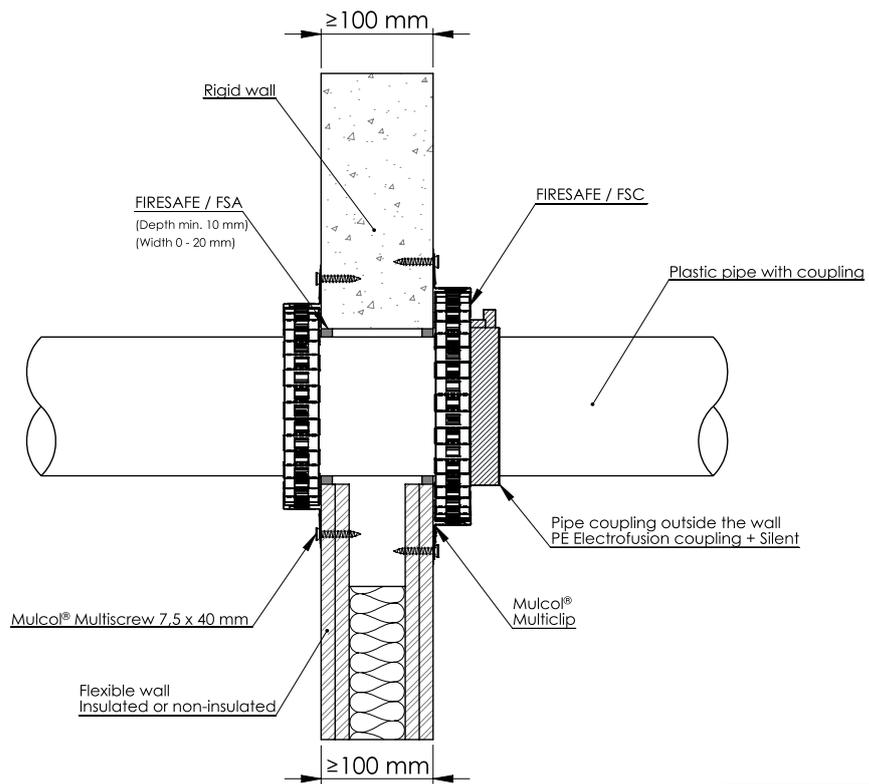
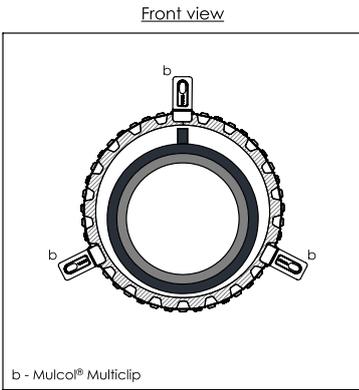


Drawing: FW.E-MC60-PP-20.0.22.LI

| Services   | Pipe dimensions (mm) |                | Insulation  |                |               | Product                  | Classification    |
|------------|----------------------|----------------|---|----------------|---------------|--------------------------|-------------------|
|            | Outer dimensions     | Wall thickness | Type  | Thickness (mm) | Configuration |                          |                   |
| PVC(-U/-C) | $\leq \text{Ø } 110$ | 3.2            | ArmaFlex AF<br>(min. class<br>$B_L$ -s3, d0<br>$B$ -s3, d0) | 9 - 32         | LI 450 / CI   | FIRESAFE / FSC<br>double | <b>EI 120 U/U</b> |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.5 Plastic pipes with socket**

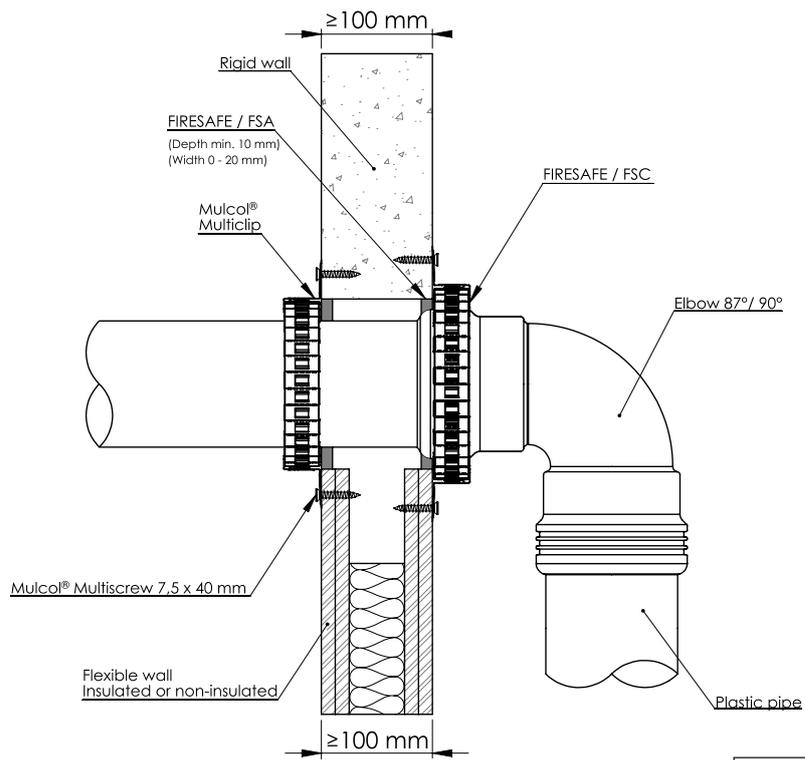
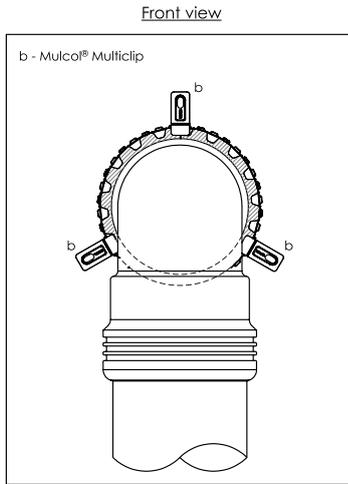


Drawing: FW.E-MC30-PP-10.0.60

| Services                     | Pipe dimensions (mm) |                | Product        | Classification      |
|------------------------------|----------------------|----------------|----------------|---------------------|
|                              | Outer dimension      | Wall thickness |                |                     |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 4.3 - 7.4      | FIRESAFE / FSC | EI 120 U/C          |
|                              | $\leq \text{Ø } 125$ | 7.4            |                | EI 60 U/C, E 90 U/C |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.6 Plastic pipes with elbow**

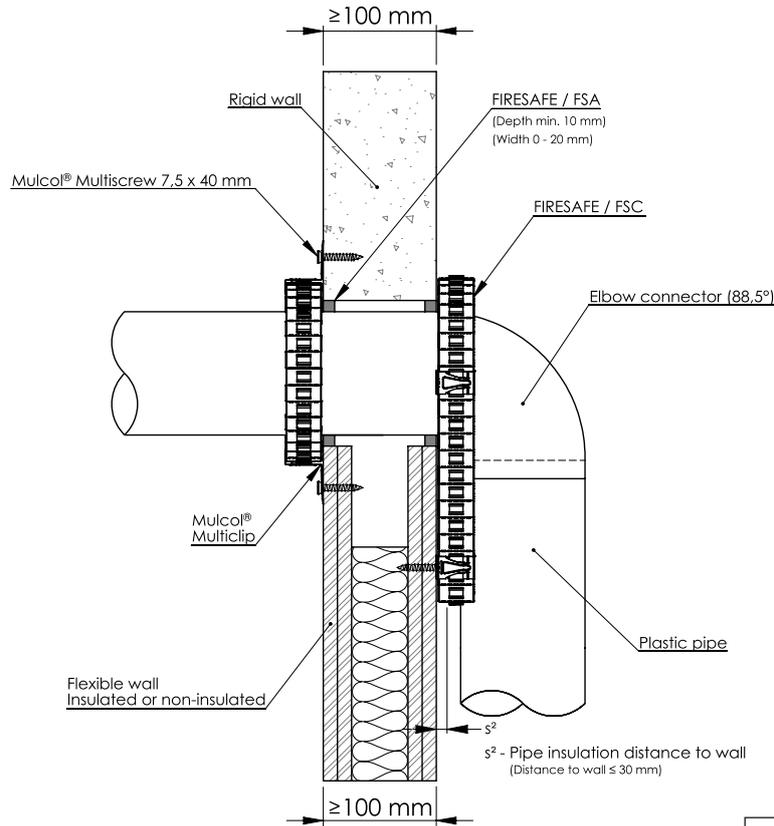
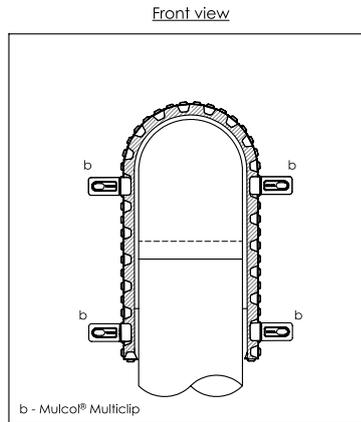


Drawing: FW.E-MC30-PP-10.0.70

| Services   | Pipe dimensions (mm)   |                | Product        | Classification |
|------------|------------------------|----------------|----------------|----------------|
|            | Outer dimension        | Wall thickness |                |                |
| PP         | $\leq \varnothing 125$ | 3.1            | FIRESAFE / FSC | EI 90 U/C      |
| PVC(-U/-C) |                        | 2.5            |                | EI 90 U/U      |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.7 Plastic pipes with elbow and U-shape FIRESAFE / FSC**

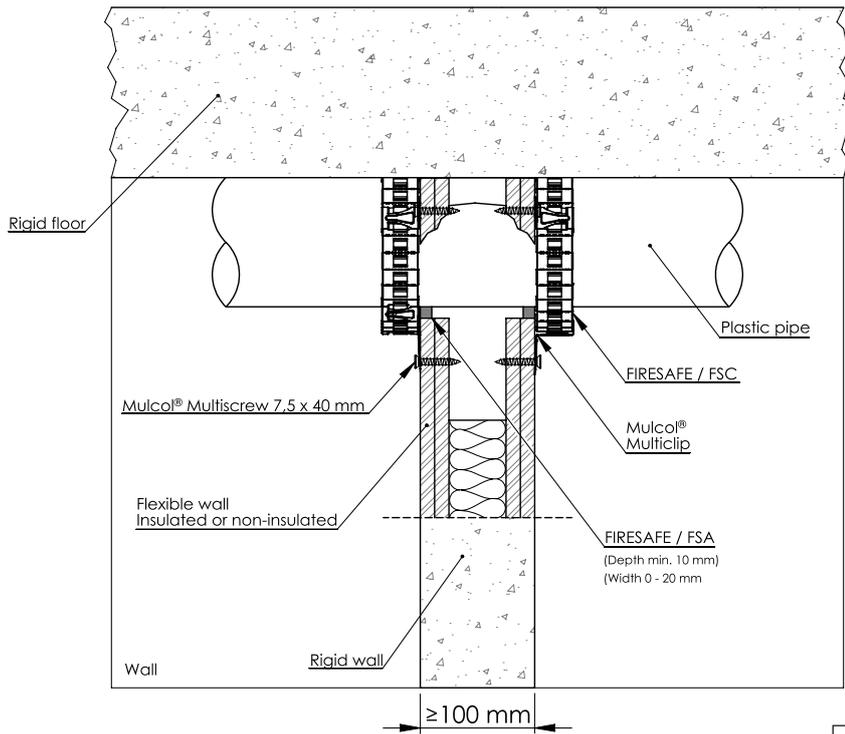
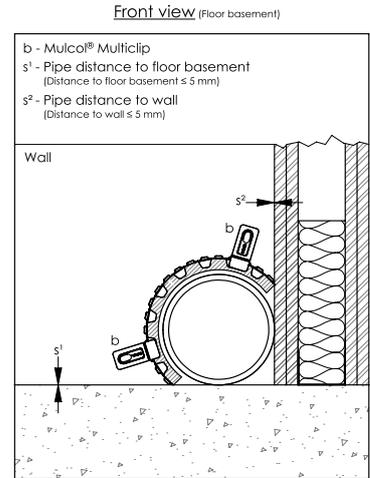
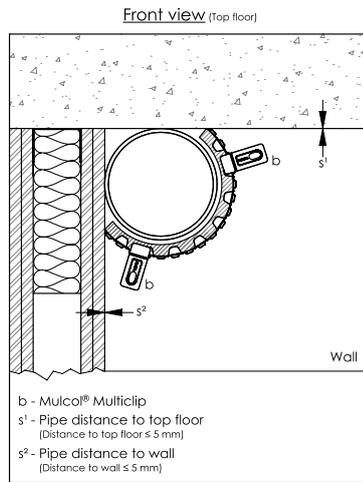


Drawing: FW.E-MC30u-PP-10.0.70

| Services                     | Pipe dimensions (mm) |                | Product        | Classification |
|------------------------------|----------------------|----------------|----------------|----------------|
|                              | Outer dimension      | Wall thickness |                |                |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 3.4            | FIRESAFE / FSC | EI 120 U/C     |
| PP                           |                      |                |                |                |
| PVC(-U/-C)                   |                      |                |                |                |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.8 Plastic pipes in corner**

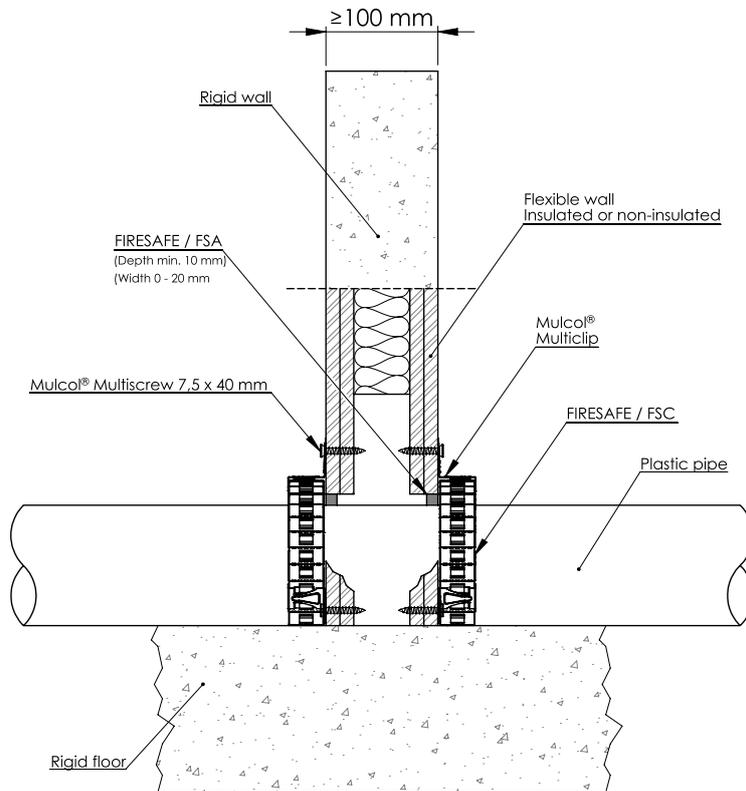
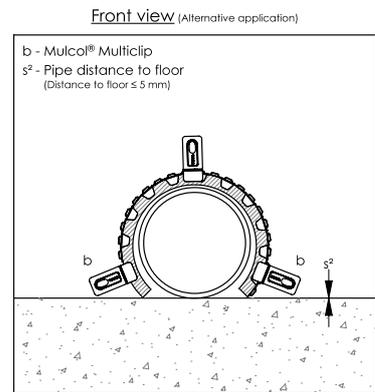
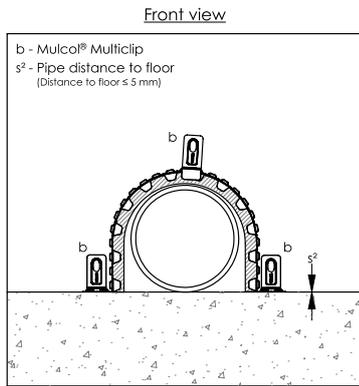


Drawing: FW,E-MC30F-PP-10.0.10

| Services   | Pipe dimensions (mm) |                | Product        | Classification       |
|------------|----------------------|----------------|----------------|----------------------|
|            | Outer dimension      | Wall thickness |                |                      |
| PVC(-U/-C) | $\leq \text{Ø } 110$ | 2.2            | FIRESAFE / FSC | EI 90 U/U, E 120 U/U |
|            |                      | 3.2            |                |                      |

# A.1.11 Directly through wall - $\geq 100$ mm - Combustible pipes

## A.1.11.9 Plastic pipes at zero distance to floor



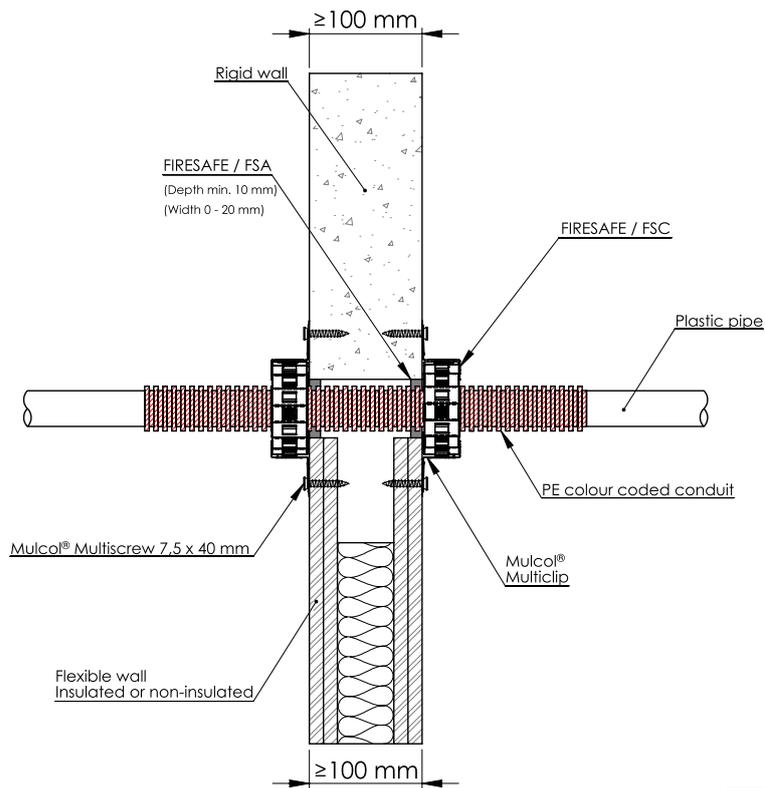
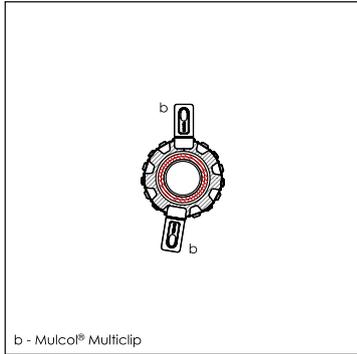
Drawing: FW.E-MC30f-PP-10.0.10

| Services                     | Pipe dimensions (mm) |                | Product        | Classification |
|------------------------------|----------------------|----------------|----------------|----------------|
|                              | Outer dimension      | Wall thickness |                |                |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 90$  | 2.8            | FIRESAFE / FSC | EI 90 U/U      |
| PVC(-U/-C)                   | $\leq \text{Ø } 110$ | 2.2            |                |                |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.10 Plastic pipes in conduit**

Front view



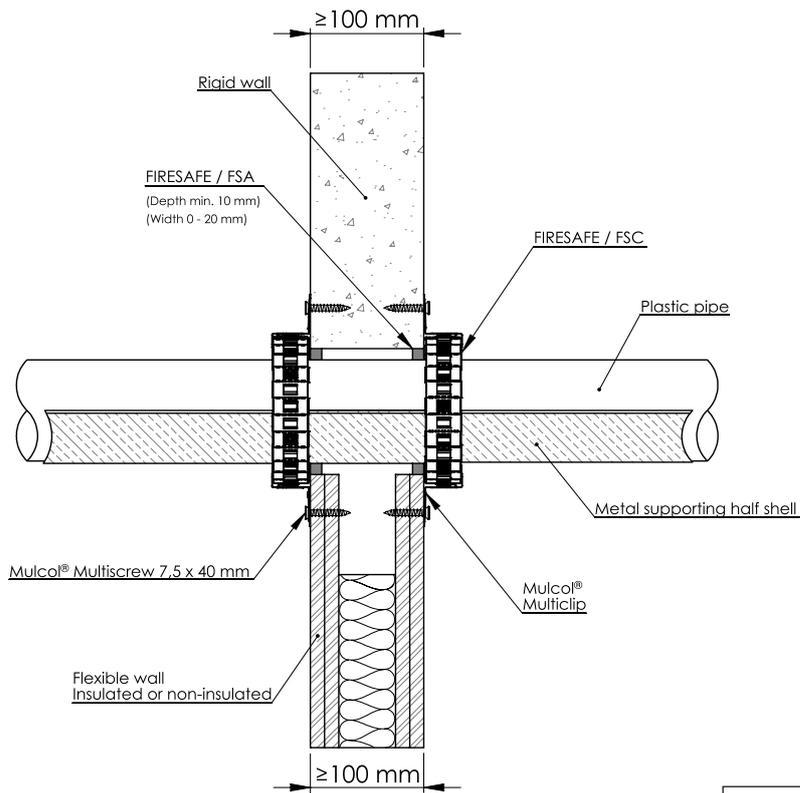
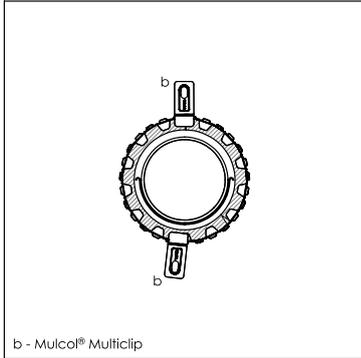
Drawing: FW.E-MC30-PP-10.0.30

| Services | Pipe dimensions (mm) |                | Insulation |               |                            | Product        | Classification   |
|----------|----------------------|----------------|------------|---------------|----------------------------|----------------|------------------|
|          | Outer dimensions     | Wall thickness | Type       | Diameter (mm) | Configuration              |                |                  |
| PE-Xa    | $\leq \text{Ø } 25$  | 3.5            | PE conduit | 32            | LS 300 / CS<br>LI 300 / CI | FIRESAFE / FSC | <b>EI 90 U/C</b> |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.1 Plastic pipes - Steel half shell support**

Front view

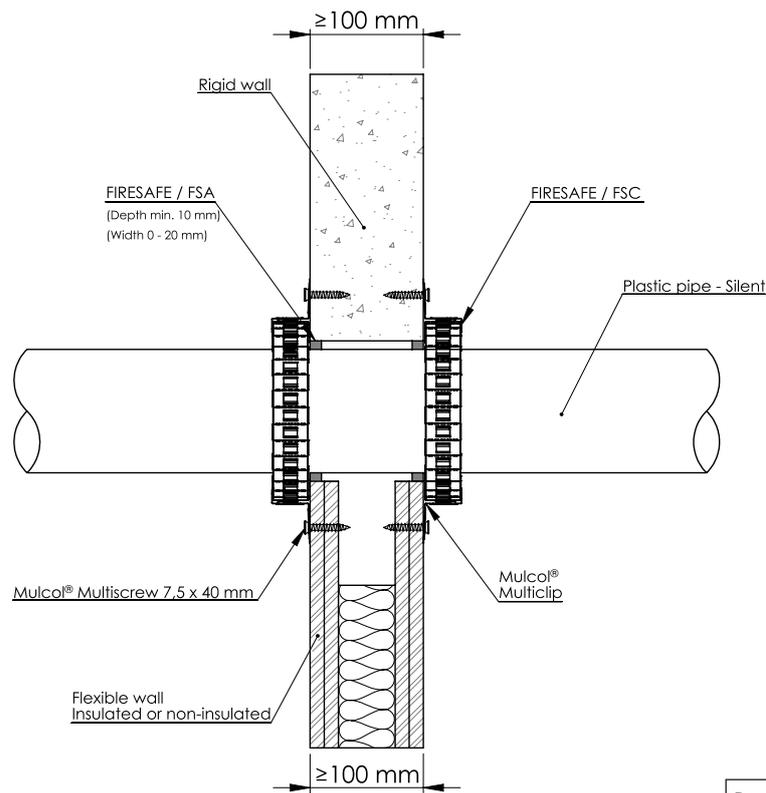
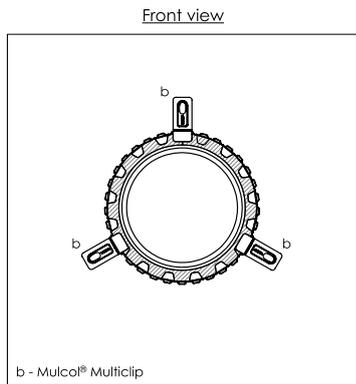


Drawing: FW.E-MC30-PP-10.0.50

| Services                     | Pipe dimensions (mm)  |                | Product        | Classification |
|------------------------------|-----------------------|----------------|----------------|----------------|
|                              | Outer dimension       | Wall thickness |                |                |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \varnothing 90$ | 2.8            | FIRESAFE / FSC | EI 90 U/C      |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.12 Plastic pipes (Silent)**



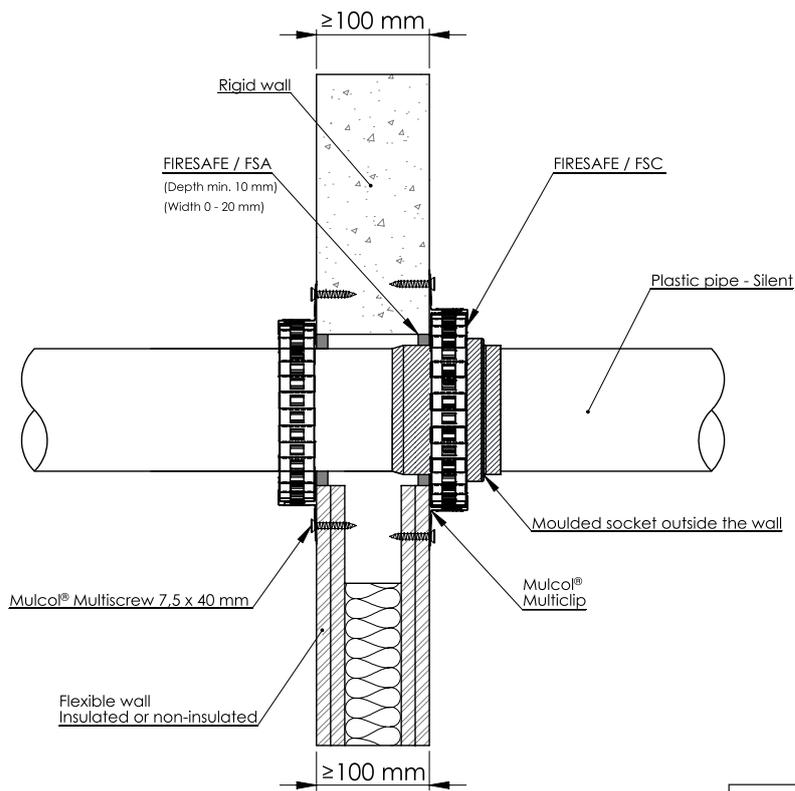
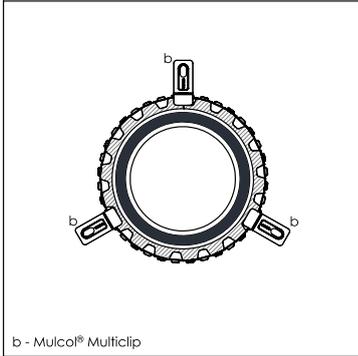
Drawing: FW.E-MC30-PPS-10.0.10

| Services             | Pipe dimensions (mm) |                | Product               | Classification       |
|----------------------|----------------------|----------------|-----------------------|----------------------|
|                      | Outer dimension      | Wall thickness |                       |                      |
| Wavin SiTech+        | $\leq \text{Ø } 32$  | 2.0 - 3.6      | FIRESAFE / FSC        | EI 120 U/U           |
| Geberit Silent dB 20 | $\leq \text{Ø } 110$ | 3.6            |                       | EI 90 U/U, E 120 U/U |
|                      |                      | 6.0            |                       | EI 120 U/U           |
| Wavin SiTech+        | $\leq \text{Ø } 160$ | 5.0            | FIRESAFE / FSC double | EI 90 U/U, E 120 U/U |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.13 Plastic pipes (Silent) with socket**

Front view

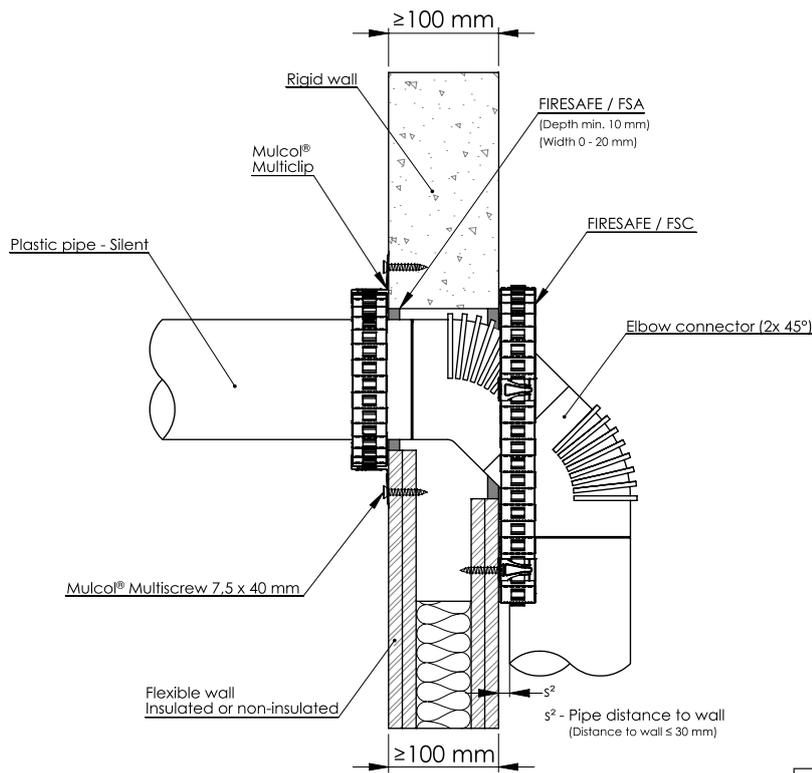
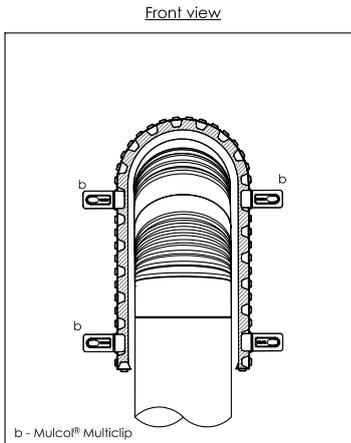


Drawing: FW.E-MC30-PPS-10.0.60

| Services      | Pipe dimensions (mm) |                | Product        | Classification |
|---------------|----------------------|----------------|----------------|----------------|
|               | Outer dimension      | Wall thickness |                |                |
| Raupiano Plus | $\leq \text{Ø } 110$ | 2.7            | FIRESAFE / FSC | EI 120 U/C     |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.14 Plastic pipes (Silent) with elbow**

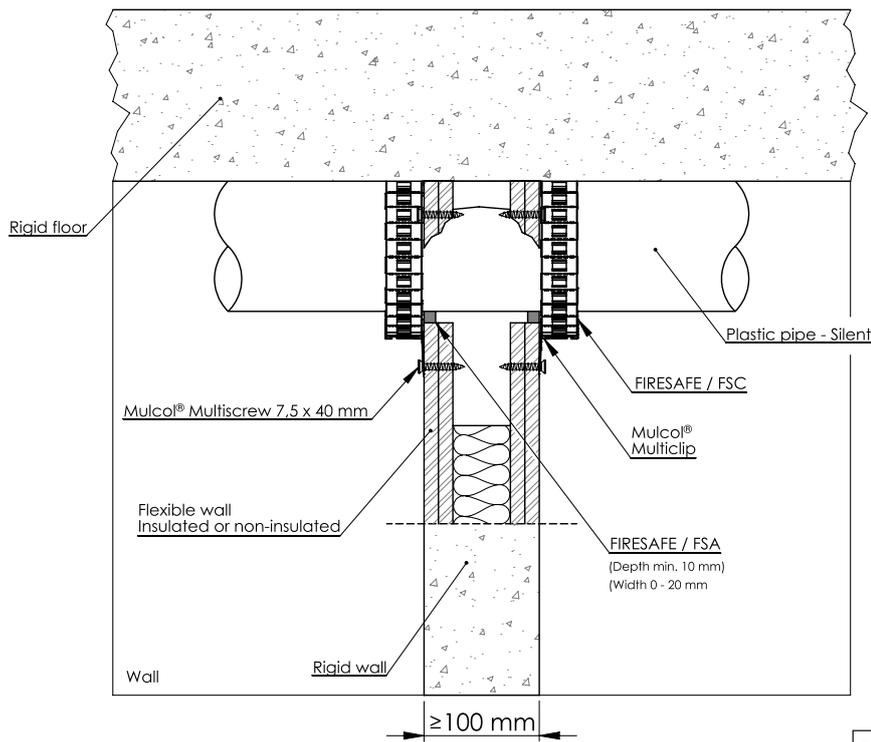
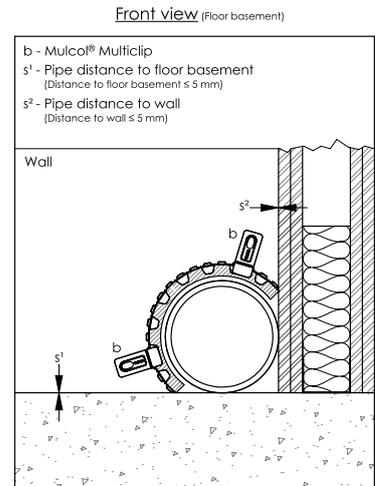
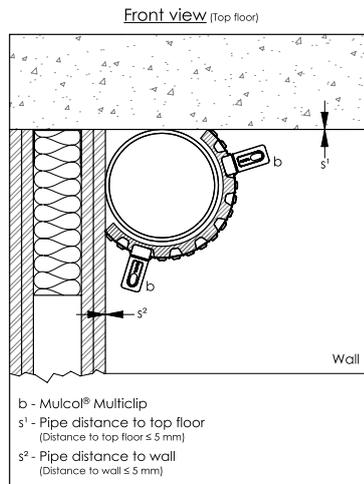


Drawing: FW.E-MC30u-PPS-10.0.80

| Services             | Pipe dimensions (mm) |                | Product        | Classification       |
|----------------------|----------------------|----------------|----------------|----------------------|
|                      | Outer dimension      | Wall thickness |                |                      |
| Wavin SiTech+        | $\leq \text{Ø } 110$ | 3.6            | FIRESAFE / FSC | EI 60 U/U            |
| Geberit Silent dB 20 |                      | 6.0            |                | EI 90 U/U, E 120 U/U |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.15 Plastic pipes (Silent) in corner**

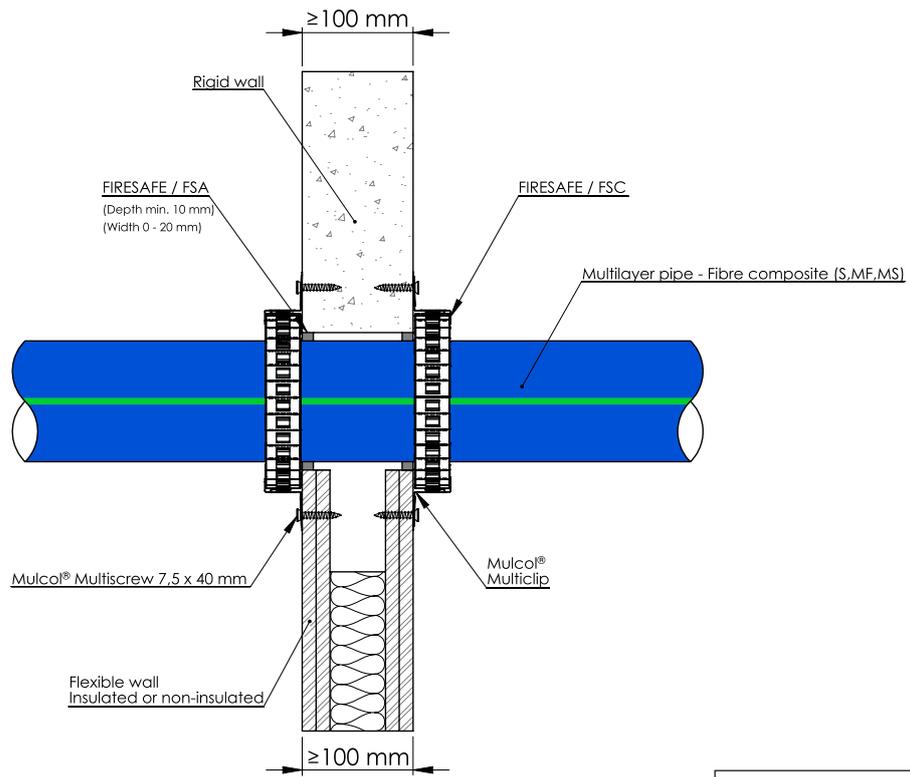
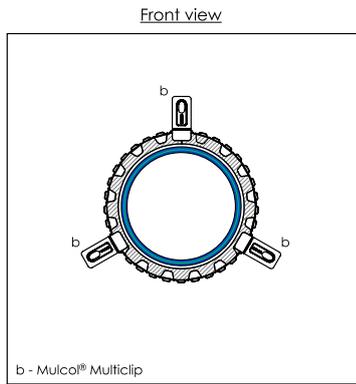


Drawing: FW.E-MC30c-PPS-10.0.10

| Services                            | Pipe dimensions (mm)   |                | Product        | Classification |
|-------------------------------------|------------------------|----------------|----------------|----------------|
|                                     | Outer dimension        | Wall thickness |                |                |
| Geberit Silent dB 20, bottom corner | $\leq \varnothing 110$ | 6.0            | FIRESAFE / FSC | EI 120 U/U     |
| Geberit Silent dB 20, top corner    |                        |                |                | EI 60 U/U      |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.16 PP-R Multilayer pipes**

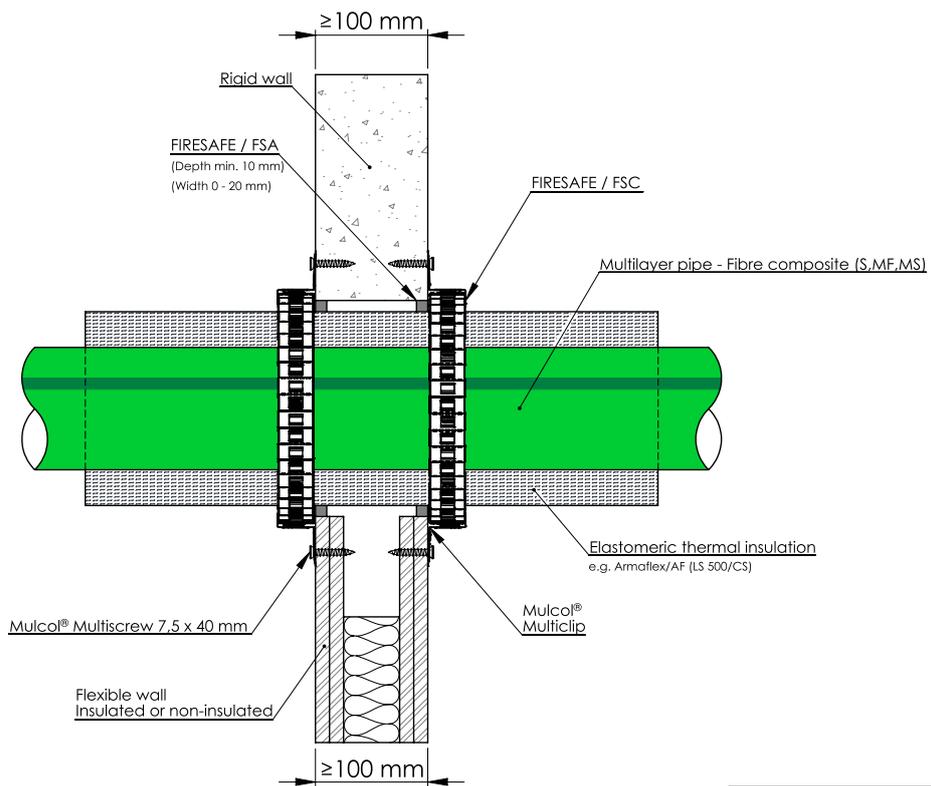
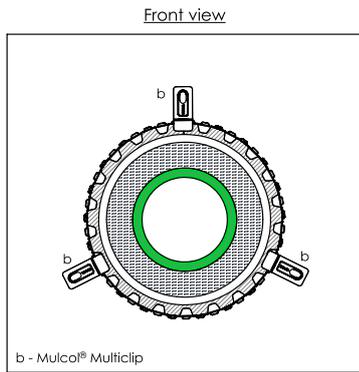


Drawing: FW.E-MC30-MLF-10.0.10

| Services          | Pipe dimensions (mm) |                | Product        | Classification |
|-------------------|----------------------|----------------|----------------|----------------|
|                   | Outer dimension      | Wall thickness |                |                |
| Aquatherm Blue-MF | $\leq \text{Ø } 20$  | 2.8            | FIRESAFE / FSC | EI 90 U/C      |
|                   | $\leq \text{Ø } 110$ | 10.0           |                | EI 60 U/C      |
|                   | $\leq \text{Ø } 160$ | 14.6           |                | EI 90 U/C      |
| Aquatherm Red-MF  | $\leq \text{Ø } 110$ | 15.1           |                |                |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.17 PP-R Multilayer pipes - Elastomer LS 500 / CS**

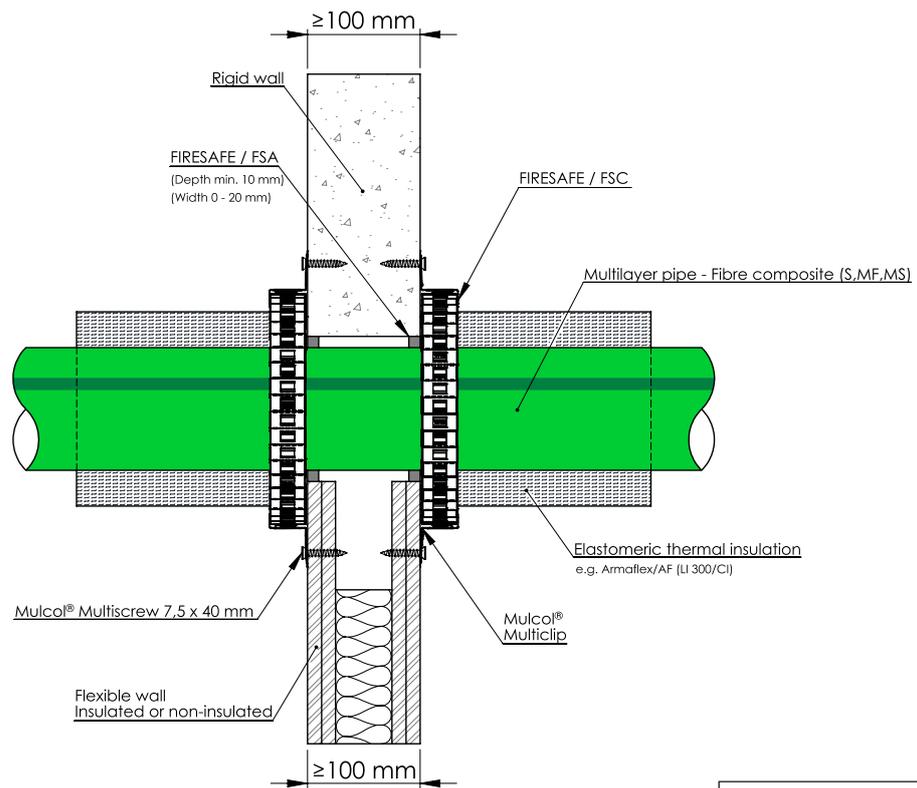
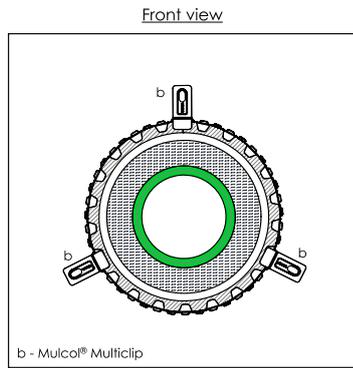


Drawing: FW-E-MC30-MLF-10.0.22.LS

| Services           | Pipe dimensions (mm)   |                | Insulation  |                |               | Product           | Classification |
|--------------------|------------------------|----------------|---|----------------|---------------|-------------------|----------------|
|                    | Outer dimensions       | Wall thickness | Type  | Thickness (mm) | Configuration |                   |                |
| Aquatherm Green-S  | $\leq \varnothing 110$ | 18.3           | ArmaFlex AF<br>(min. class<br>B <sub>L</sub> -s3, d0<br>B-s3, d0) | 9 - 32         | LS 500 / CS   | FIRESAFE /<br>FSC | EI 90 U/C      |
| Aquatherm Green-MS |                        | 15.2           |   |                |               |                   |                |
| Aquatherm Green-MF |                        | 15.1           |   |                |               |                   |                |
| Aquatherm Blue-MF  | $\leq \varnothing 20$  | 2.8            |   | 9              |               |                   |                |
|                    | $\leq \varnothing 110$ | 10.0           | EI 90 U/C<br>E 120 U/C  |                |               |                   |                |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.18 PP-R Multilayer pipes - Elastomer LI 300 / CI**

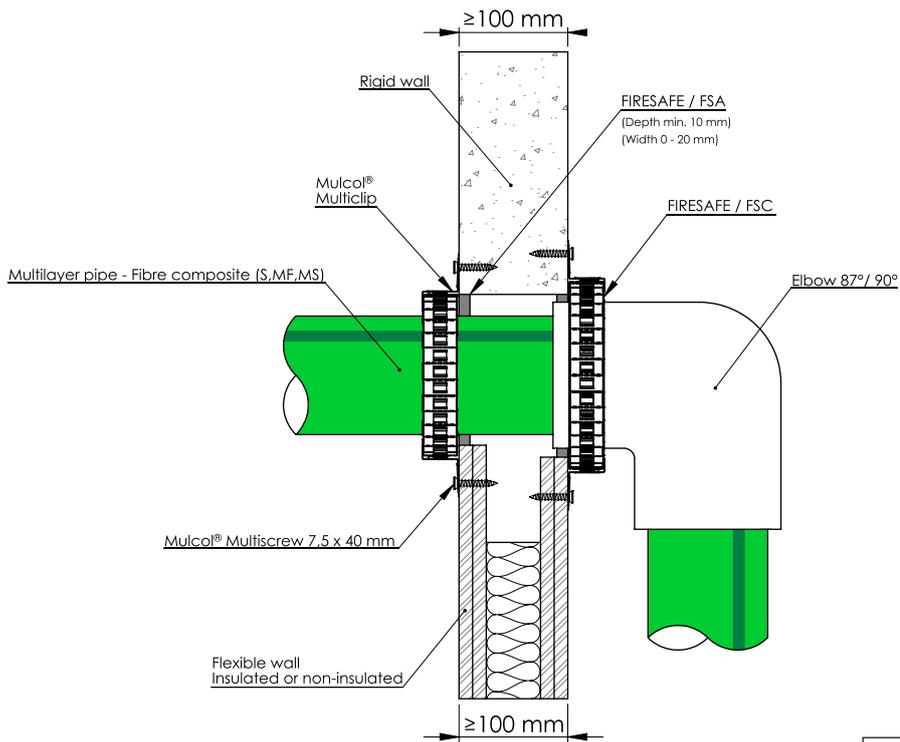
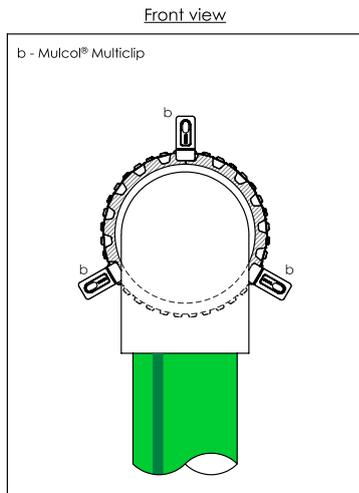


Drawing: FW.E-MC30-MLF-10.0.22.LI

| Services          | Pipe dimensions (mm)   |                | Insulation  |                |               | Product           | Classification |
|-------------------|------------------------|----------------|---|----------------|---------------|-------------------|----------------|
|                   | Outer dimensions       | Wall thickness | Type  | Thickness (mm) | Configuration |                   |                |
| Aquatherm Blue-MF | $\leq \varnothing 110$ | 10.0 - 14.6    | ArmaFlex AF<br>(min. class<br>B <sub>L</sub> -s3, d0<br>B-s3, d0) | 9 - 32         | LI 300 / CI   | FIRESAFE /<br>FSC | EI 90 U/C      |
|                   | $\leq \varnothing 160$ | 14.6           |   |                |               |                   |                |
|                   | $\leq \varnothing 110$ | 10.0 - 14.6    |   | 32             |               |                   | EI 120 U/C     |
|                   | $\leq \varnothing 160$ | 14.6           |   |                |               |                   |                |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.19 PP-R Multilayer pipes with elbow**

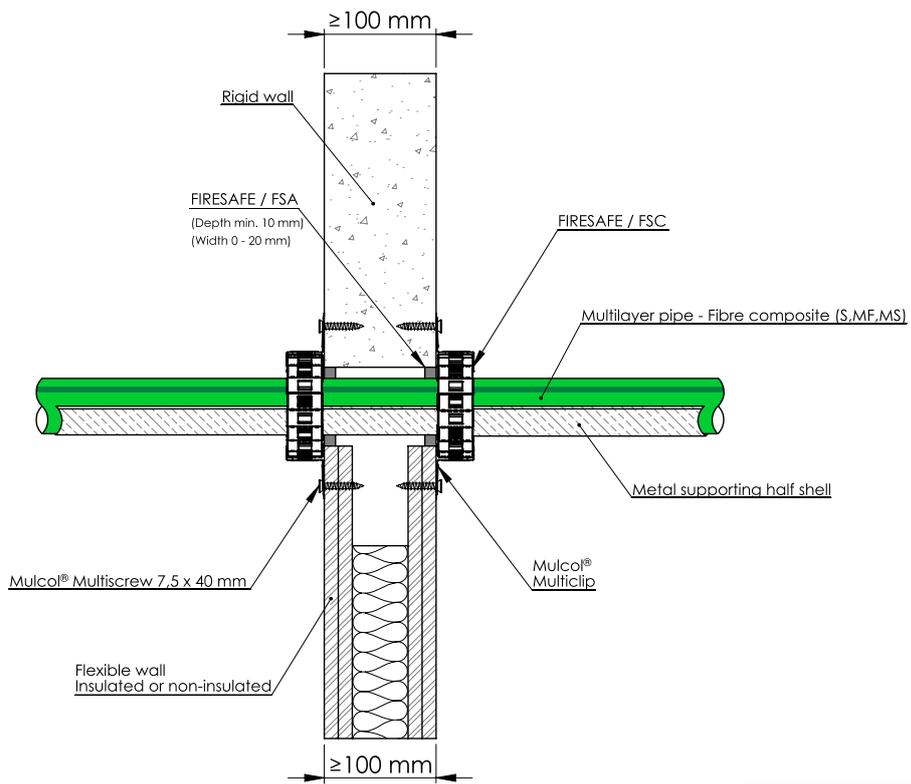
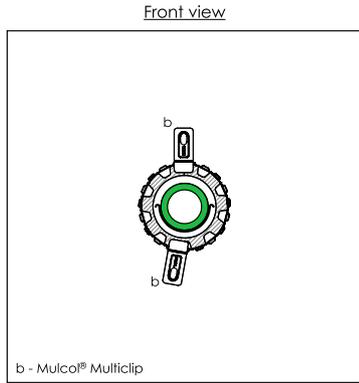


Drawing: FW.E-MC30-MLF-10.0.70

| Services          | Pipe dimensions (mm) |                | Product        | Classification       |
|-------------------|----------------------|----------------|----------------|----------------------|
|                   | Outer dimension      | Wall thickness |                |                      |
| Aquatherm Blue-MF | $\leq \text{Ø } 110$ | 10.0           | FIRESAFE / FSC | EI 90 U/C, E 120 U/C |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.20 PP-R Multilayer pipes - Steel half shell support**

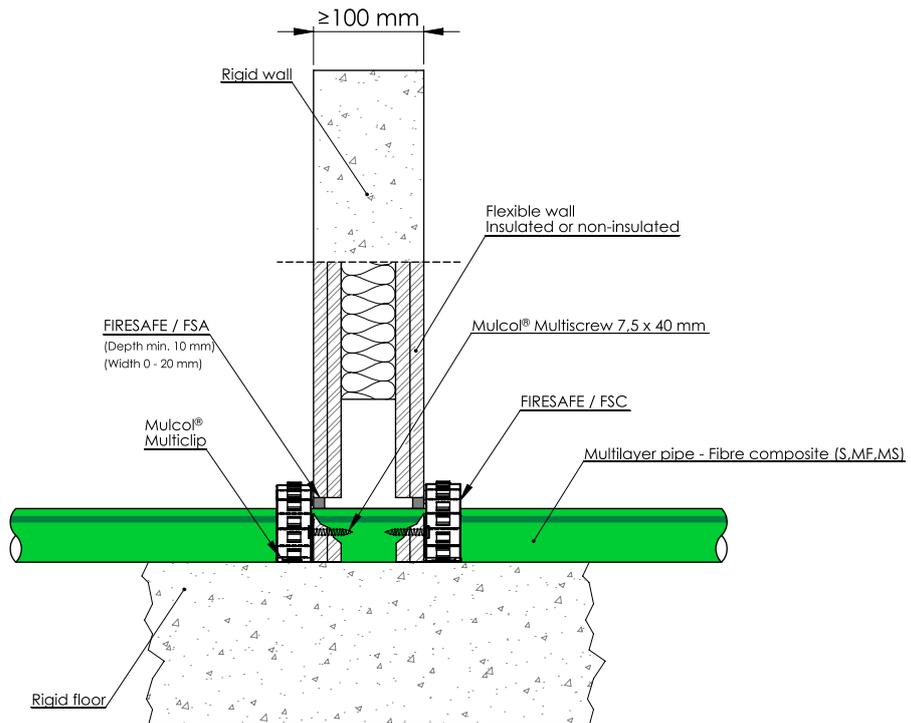
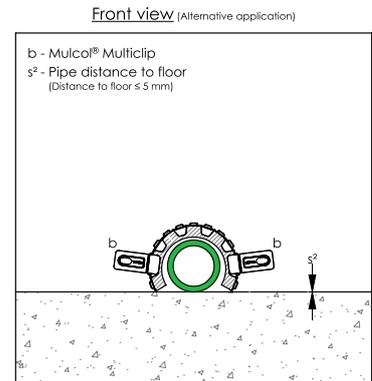
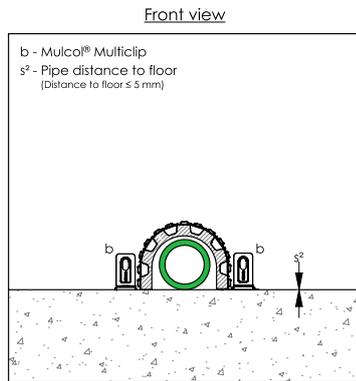


Drawing: FW.E-MC30-MLF-10.0.50

| Services           | Pipe dimensions (mm) |                | Product        | Classification |
|--------------------|----------------------|----------------|----------------|----------------|
|                    | Outer dimension      | Wall thickness |                |                |
| Aquatherm Green-MS | $\leq \text{Ø } 50$  | 6.9            | FIRESAFE / FSC | EI 90 U/C      |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.21 PP-R Multilayer at zero distance to floor**

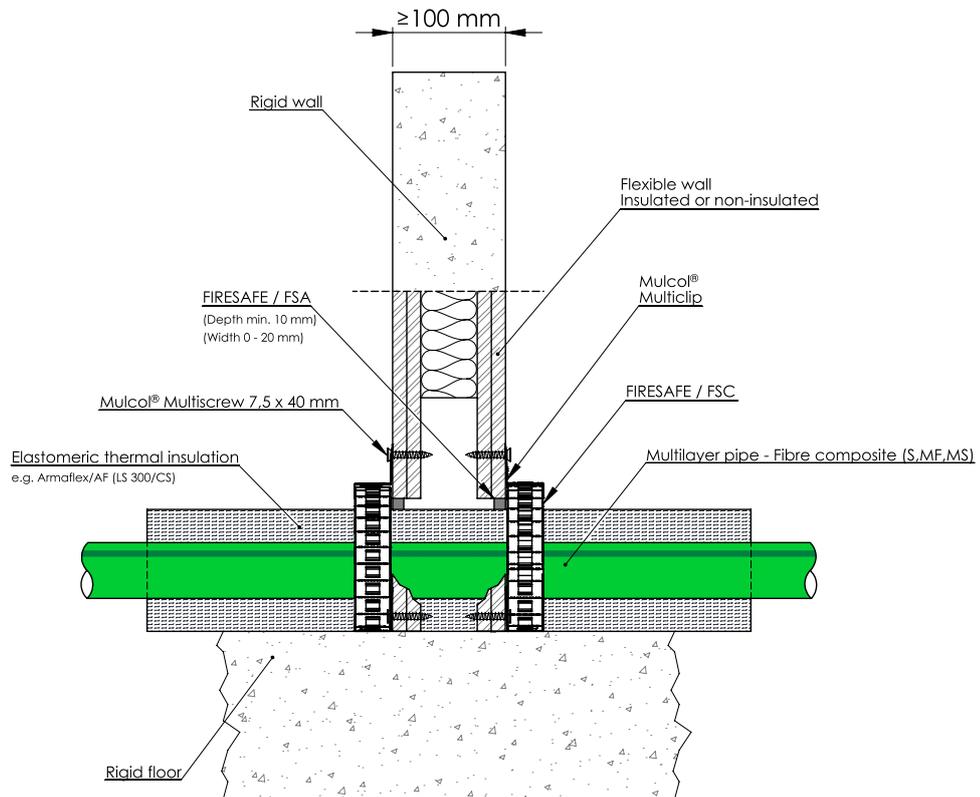
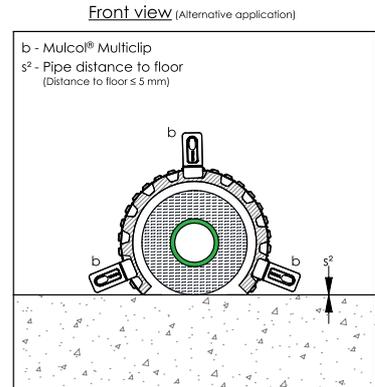
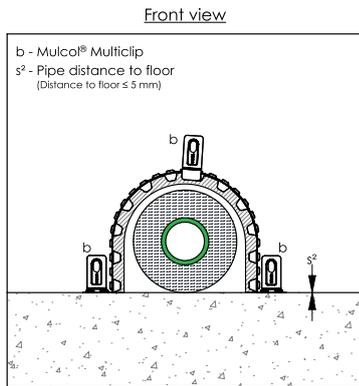


Drawing: FW,E-MC30f-MLF-10.0.10

| Services           | Pipe dimensions (mm) |                | Product        | Classification |
|--------------------|----------------------|----------------|----------------|----------------|
|                    | Outer dimension      | Wall thickness |                |                |
| Aquatherm Green-MF | $\leq \text{Ø } 50$  | 6.9            | FIRESAFE / FSC | EI 90 U/C      |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.22 PP-R Multilayer pipes at zero distance to floor - Elastomer LS 300 / CS**



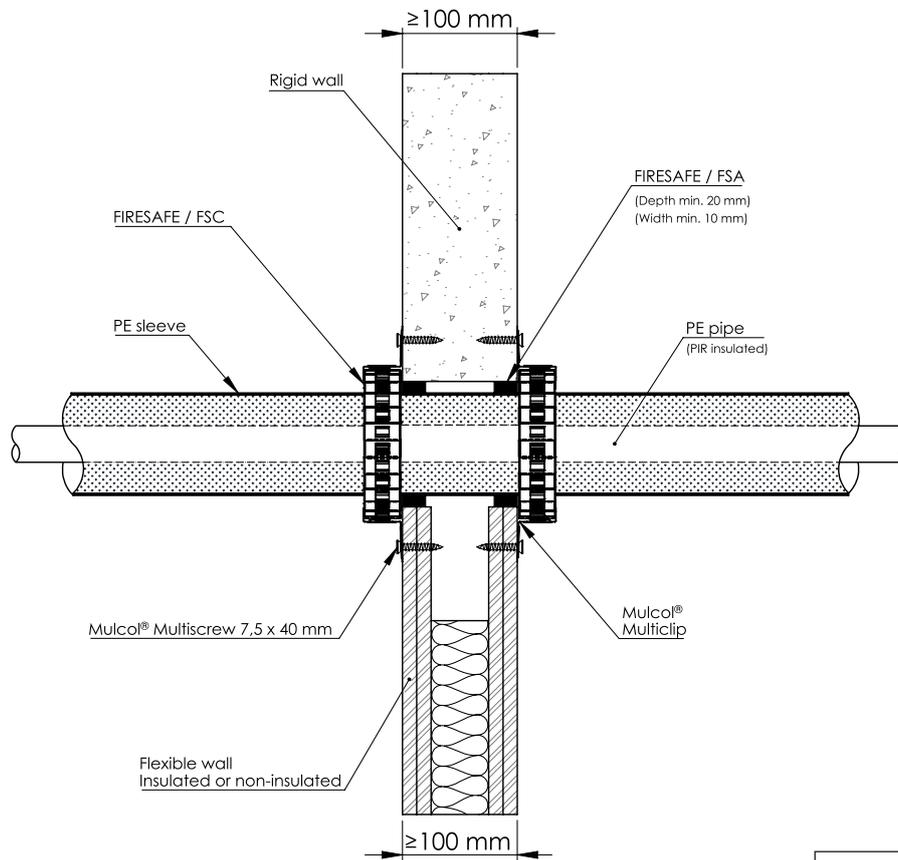
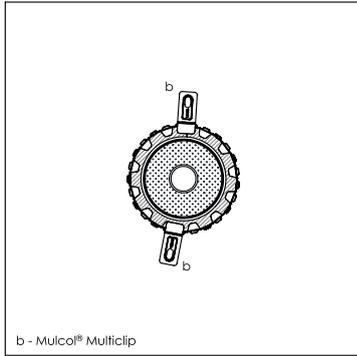
Drawing: FW.E-MC30f-MLF-10.0.22

| Services          | Pipe dimensions (mm) |                | Insulation   |                |               | Product        | Classification |
|-------------------|----------------------|----------------|--|----------------|---------------|----------------|----------------|
|                   | Outer dimensions     | Wall thickness | Type   | Thickness (mm) | Configuration |                |                |
| Aquatherm Blue-MF | $\leq \text{Ø } 50$  | 6.9            | ArmaFlex AF (min. class B <sub>L</sub> -s3, d0 B-s3, d0) | 9 - 32         | LS 300 / CS   | FIRESAFE / FSC | EI 90 U/C      |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.23 PE Pipe insulated PIR**

Front view



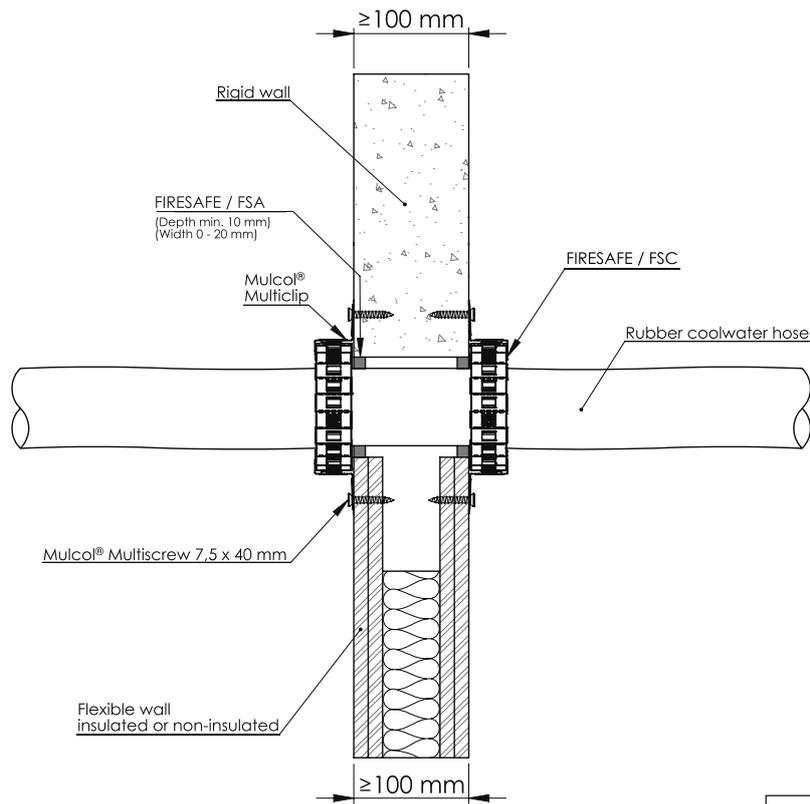
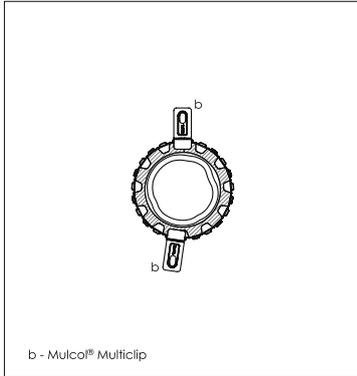
Drawing: FW-MC30-PP\_pr-10.0.23

| Services | Pipe dimensions (mm) |                | Insulation             |                |               | Product        | Classification |
|----------|----------------------|----------------|------------------------|----------------|---------------|----------------|----------------|
|          | Outer dimensions     | Wall thickness | Type                   | Thickness (mm) | Configuration |                |                |
| PE       | $\leq \text{Ø } 50$  | $\geq 5.0$     | PIR / PUR + PE coating | 20             | CS            | FIRESAFE / FSC | EI 60 C/U      |

**A.1.11 Directly through wall -  $\geq 100$  mm - Combustible pipes**

**A.1.11.24 Rubber cool-water hose**

Front view

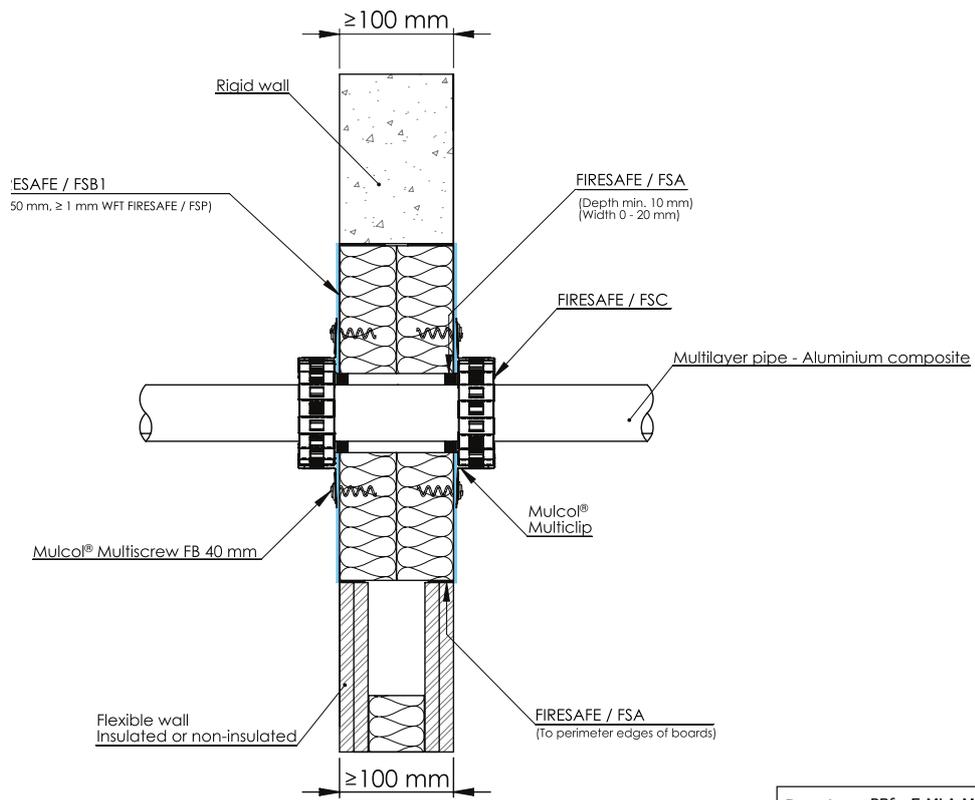
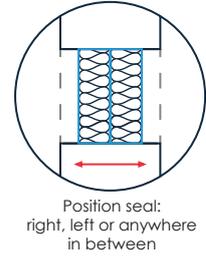
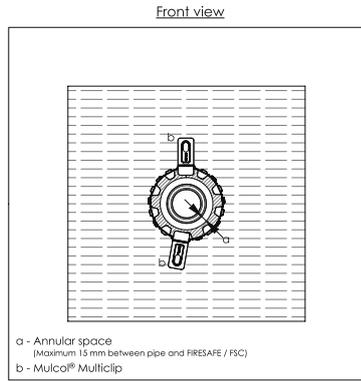


Drawing: FW-CWH-10.0.10

| Services               | Pipe dimensions (mm) |                | Product        | Classification |
|------------------------|----------------------|----------------|----------------|----------------|
|                        | Outer dimension      | Wall thickness |                |                |
| Rubber cool-water hose | $\leq \text{Ø } 75$  | 6.0            | FIRESAFE / FSC | EI 60 U/C      |

**A.1.12 FIRESAFE / FSB1 - 2x50 mm - Multilayer pipes (MLC)**

**A.1.12.1 Multilayer pipes (MLC)**

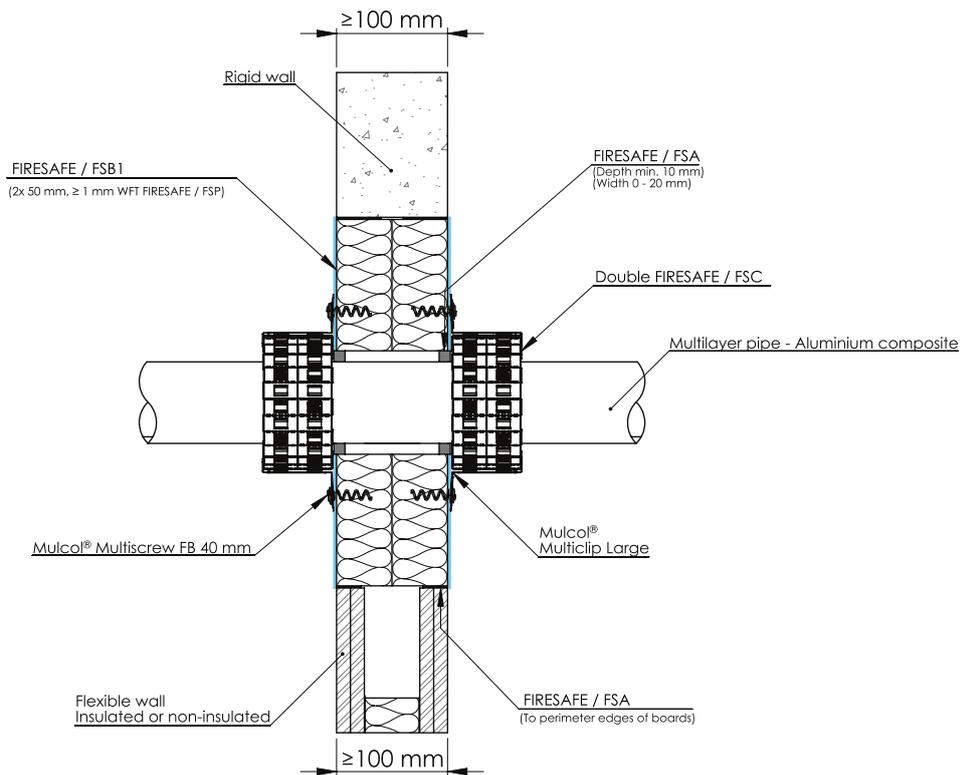
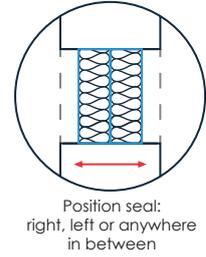
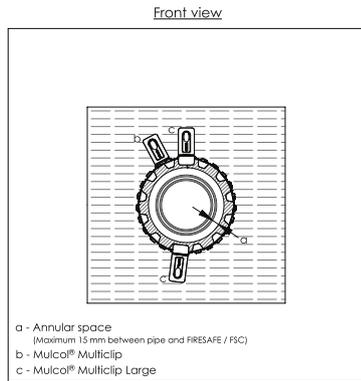


Drawing: PBfw.E-MLA-MC30-MFB1.0.10

| Services               | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification       |
|------------------------|----------------------|----------------|----------------|-------------------------------------|----------------------|
|                        | Outer dimension      | Wall thickness |                |                                     |                      |
| Multilayer pipes (MLC) | ≤ Ø 20               | 2.0            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 120 U/C           |
|                        | ≤ Ø 25               | 3.5            |                |                                     |                      |
|                        | ≤ Ø 32               | 3.0            |                |                                     |                      |
|                        | ≤ Ø 40               | 3.5            |                |                                     |                      |
|                        | ≤ Ø 40               | 4.0            |                |                                     |                      |
|                        | ≤ Ø 50               | 4.0            |                |                                     |                      |
|                        | ≤ Ø 63               | 4.5            |                |                                     | EI 90 U/C, E 120 U/C |

**A.1.12 FIRESAFE / FSB1 - 2x50 mm - Multilayer pipes (MLC)**

**A.1.12.2 Multilayer pipes (MLC) - double FIRESAFE / FSC**

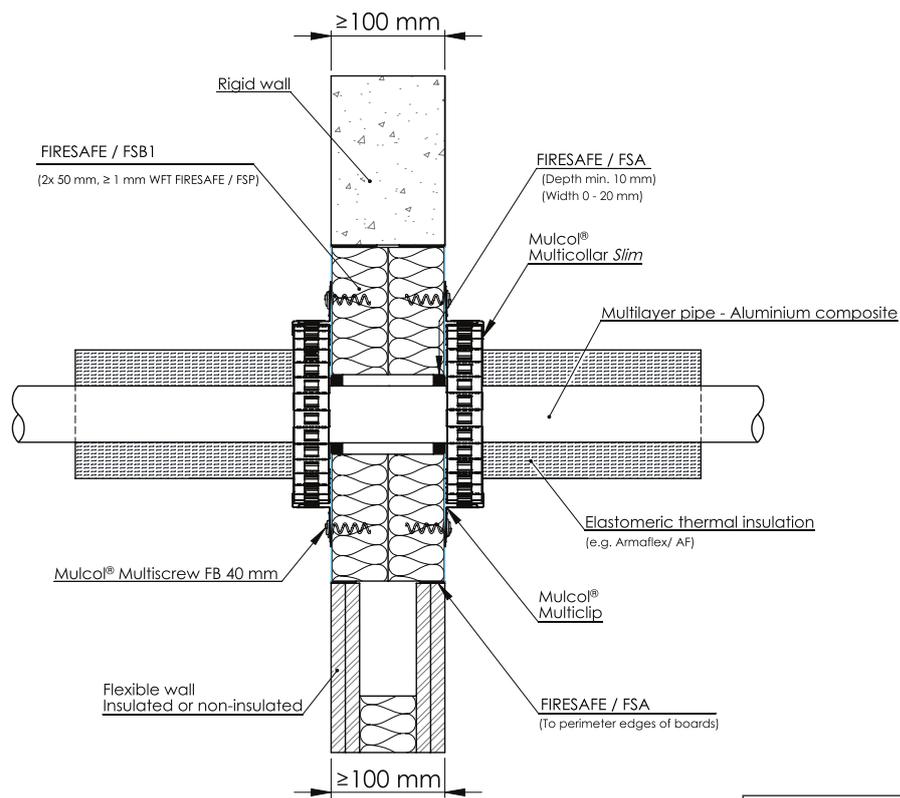
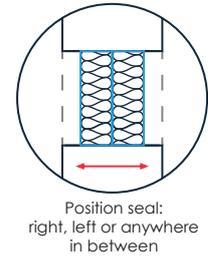
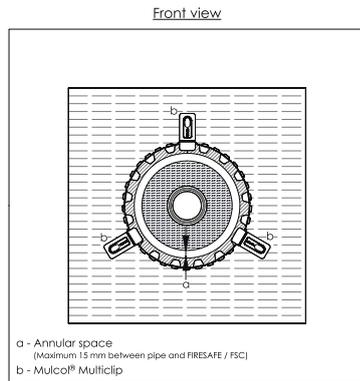


Drawing: PBFw.E-MLA-MC60-MFB1.0.10

| Services               | Pipe dimensions (mm) |                | Product                  | Sealing (mm)                          | Classification       |
|------------------------|----------------------|----------------|--------------------------|---------------------------------------|----------------------|
|                        | Outer dimension      | Wall thickness |                          |                                       |                      |
| Multilayer pipes (MLC) | ≤ Ø 75               | 6.0            | FIRESAFE / FSC<br>Double | FIRESAFE / FSA<br>0-20 x ≥ 5<br>(wxd) | EI 90 U/C, E 120 U/C |

## A.1.12 FIRESAFE / FSB1 - 2x50 mm - Multilayer pipes (MLC)

### A.1.12.3 Multilayer pipes (MLC) - Elastomer LI 300 / CI

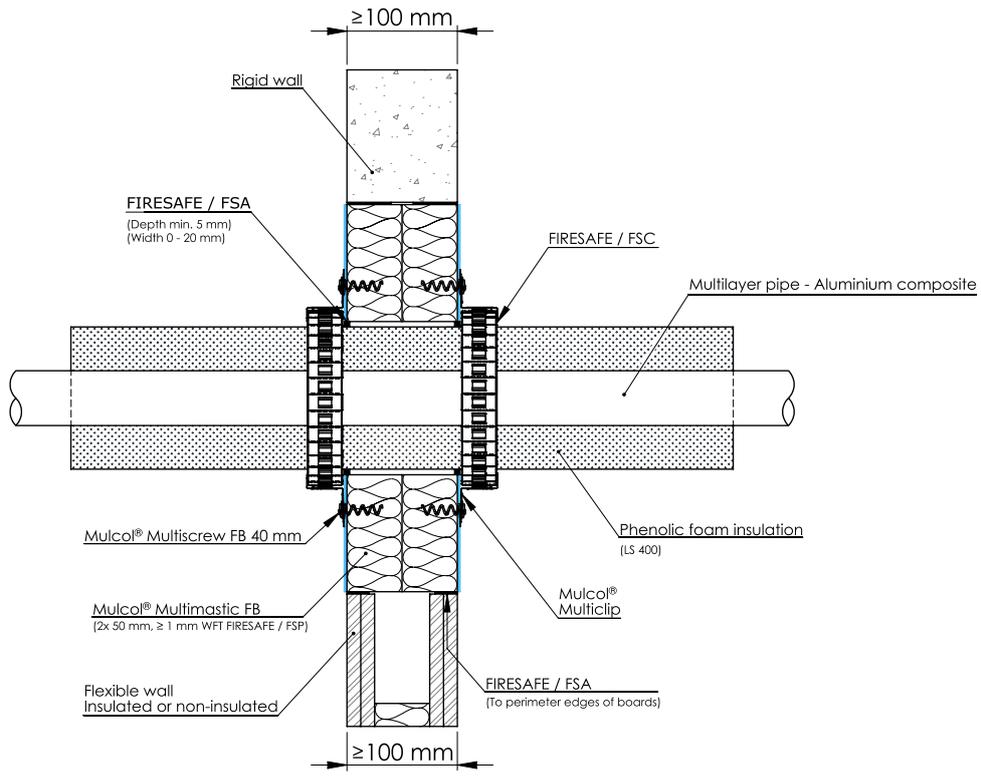
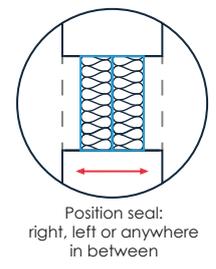
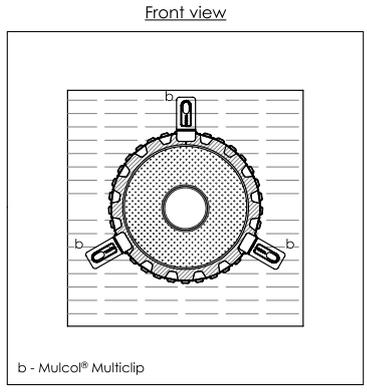


Drawing: PBfw.E-MLA-MC30-10.0.22

| Services               | Pipe dimensions (mm) |                | Insulation   |                |               | Product        | Sealing (mm)                           | Classification |
|------------------------|----------------------|----------------|--|----------------|---------------|----------------|--|----------------|
|                        | Outer dimension      | Wall thickness | Type   | Thickness (mm) | Configuration |                |  |                |
| Multilayer pipes (MLC) | ≤ Ø 50               | 4.0            | ArmaFlex AF<br>(min. class B-s3, d0<br>B <sub>L</sub> -s3, d0) | 9 - 32         | LI 300 / CI   | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 120 U/C     |

**A.1.12 FIRESAFE / FSB1 - 2x50 mm - Multilayer pipes (MLC)**

**A.1.12.4 Multilayer pipes (MLC) - Phenolic foam LS 400 / CS**

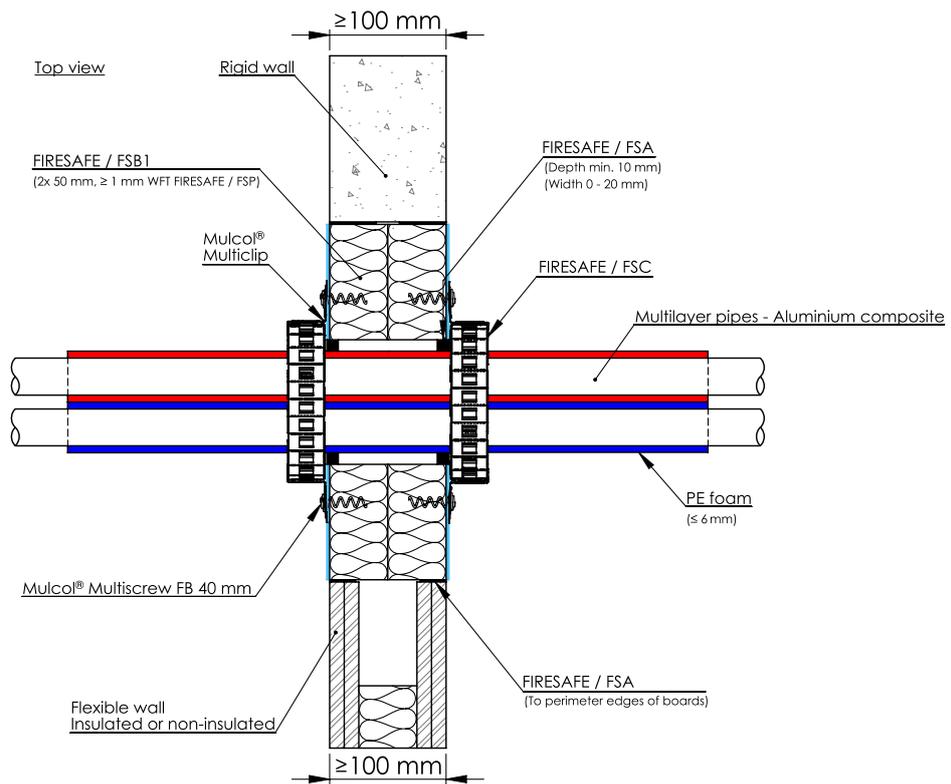
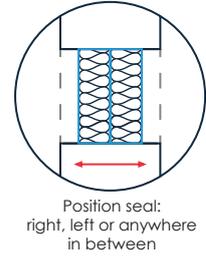
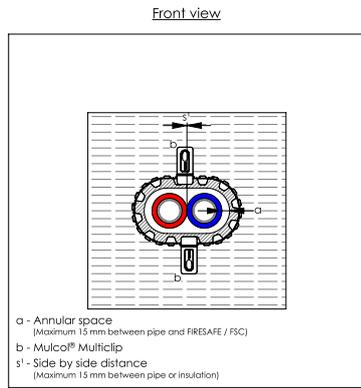


Drawing: PBfw.E-MLA-MC30-MFB1.0.22

| Services               | Pipe dimensions (mm) |                | Insulation            |                |               | Product           | Sealing (mm)                          | Classification |
|------------------------|----------------------|----------------|-----------------------|----------------|---------------|-------------------|---------------------------------------|----------------|
|                        | Outer dimension      | Wall thickness | Type                  | Thickness (mm) | Configuration |                   |                                       |                |
| Multilayer pipes (MLC) | ≤ Ø 20               | 2.0            | Kingspan<br>Kooltherm | 15 - 40        | LS 400 / CS   | FIRESAFE /<br>FSC | FIRESAFE / FSA<br>0-20 x ≥ 5<br>(wxd) | EI 60 U/C      |
|                        | ≤ Ø 40               | 3.5            |                       |                |               |                   |                                       |                |
|                        | ≤ Ø 63               | 4.5            |                       | 20 - 40        |               |                   |                                       |                |

**A.1.12 FIRESAFE / FSB1 - 2x50 mm - Multilayer pipes (MLC)**

**A.1.12.5 Multiple Multilayer pipes (MLC) - PE foam**

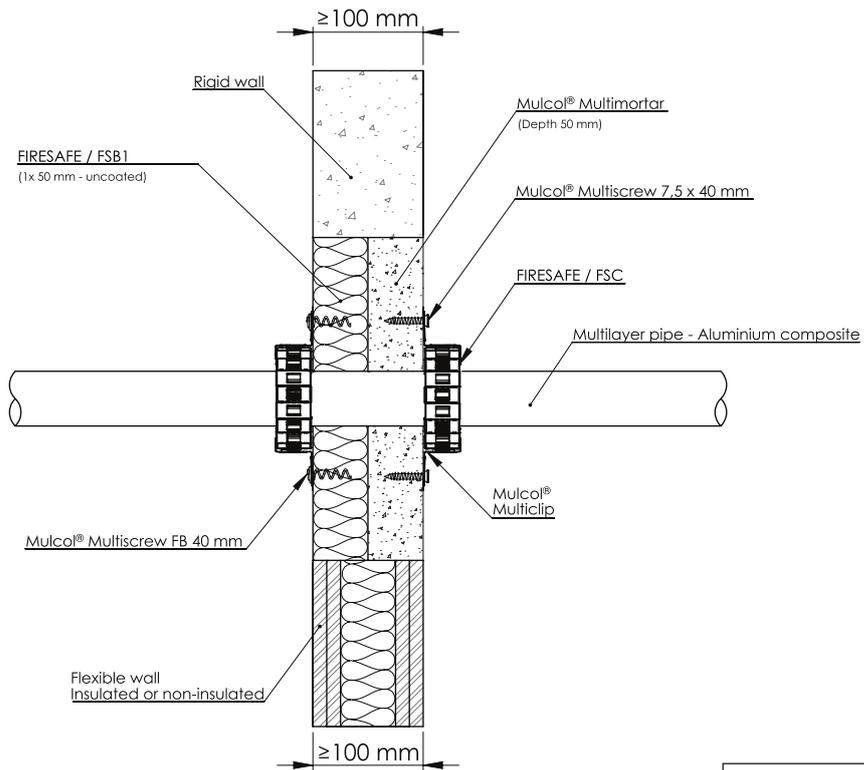
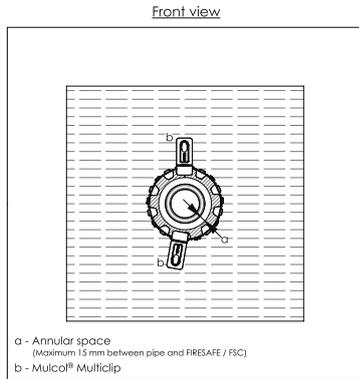


Drawing: PBfw.E-MC30-MLP2-10.0.23

| Services               | Pipe dimensions (mm) |                | Number of pipes | Insulation |                |                            | Product                 | Sealing                            | Classification |
|------------------------|----------------------|----------------|-----------------|------------|----------------|----------------------------|-------------------------|------------------------------------|----------------|
|                        | Outer dimension      | Wall thickness |                 | Type       | Thickness (mm) | Configuration              |                         |                                    |                |
| Multilayer pipes (MLC) | ≤ Ø 15               | 2.0            | ≤ 12            | PE foam    | 6              | LS 400 / CS<br>LI 400 / CI | FIRESAFE / FSA<br>/ FSC | FIRESAFE / FSA<br>0-20 x ≥ 5 (wxd) | EI 120 U/C     |

**A.1.13 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.13.1 Multilayer pipes (MLC)**

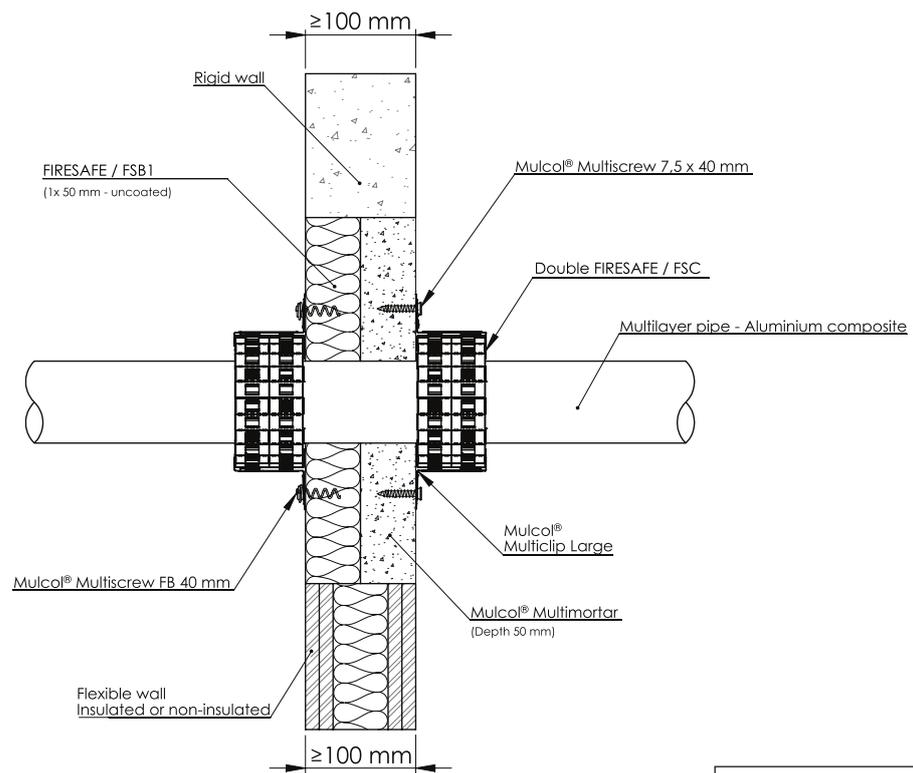
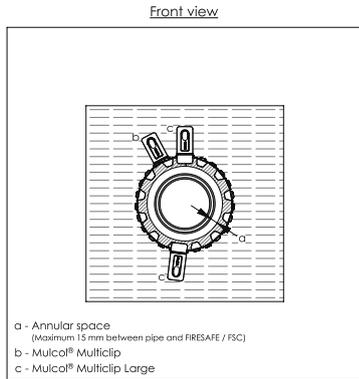


Drawing: FW.E-MLA-MM2.5.10

| Services               | Pipe dimensions (mm) |                | Product        | Classification       |
|------------------------|----------------------|----------------|----------------|----------------------|
|                        | Outer dimension      | Wall thickness |                |                      |
| Multilayer pipes (MLC) | $\leq \text{Ø } 32$  | 3.2            | FIRESAFE / FSC | EI 45 C/U, E 90 C/U  |
|                        |                      | 3.2 - 4.0      |                | EI 45 U/C, E 90 U/C  |
|                        | $\leq \text{Ø } 50$  | 4.0            |                | EI 60 U/C, E 120 U/C |

**A.1.13 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.13.2 Multilayer pipes (MLC) - double FIRESAFE / FSC**

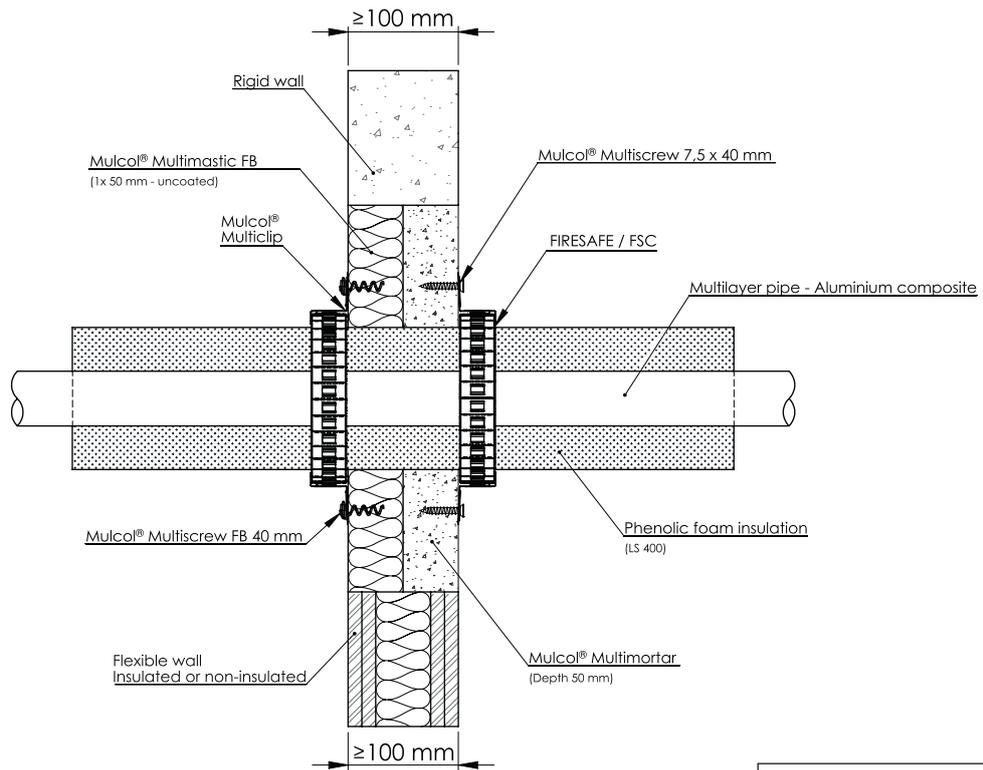
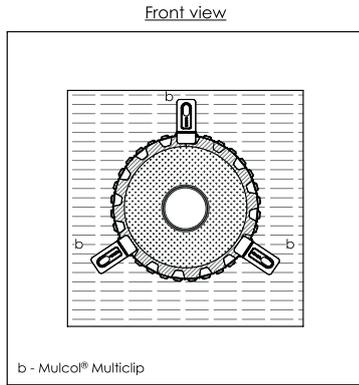


Drawing: FW.E-MLA-MM2.5.10

| Services               | Pipe dimensions (mm) |                | Product               | Classification       |
|------------------------|----------------------|----------------|-----------------------|----------------------|
|                        | Outer dimension      | Wall thickness |                       |                      |
| Multilayer pipes (MLC) | $\leq \text{Ø } 75$  | 6.0            | FIRESAFE / FSC double | EI 90 U/C, E 120 U/C |

**A.1.13 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.13.3 Multilayer pipes (MLC) - Phenolic foam**

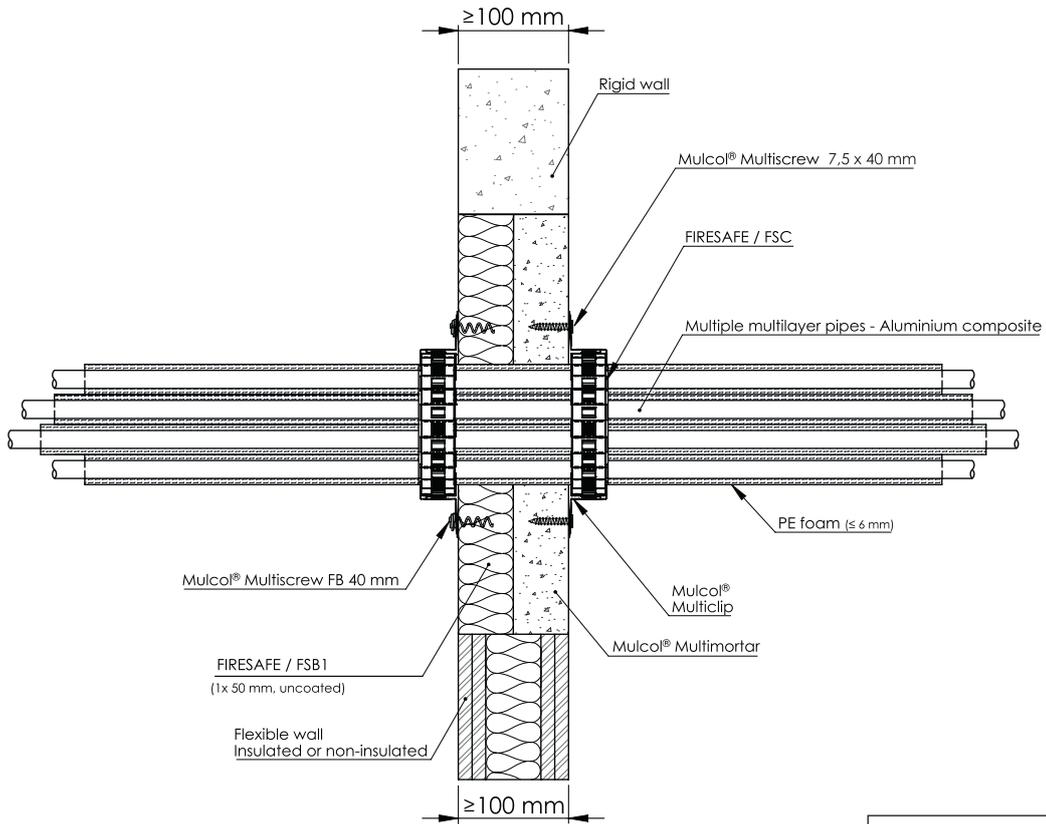
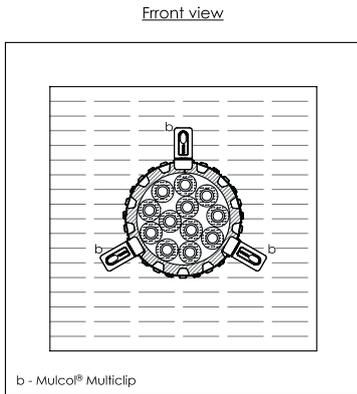


Drawing: FW.E-MLA-MM2.5.10

| Services               | Pipe dimensions (mm) |                | Insulation         |                |               | Product        | Classification |
|------------------------|----------------------|----------------|--------------------|----------------|---------------|----------------|----------------|
|                        | Outer dimension      | Wall thickness | Type               | Thickness (mm) | Configuration |                |                |
| Multilayer pipes (MLC) | $\leq \text{Ø } 20$  | 2.0            | Kingspan Kooltherm | 15 - 40        | LS 400 / CS   | FIRESAFE / FSC | EI 60 U/C      |
|                        | $\leq \text{Ø } 40$  | 3.5            |                    |                |               |                |                |
|                        | $\leq \text{Ø } 63$  | 4.5            |                    |                |               |                |                |

**A.1.13 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.13.4 Multiple Multilayer pipes (MLC) - PE foam**



Drawing: FW.E-MC30-MLA\_pr-MM2.5.40-T

| Services               | Pipe dimensions (mm) |                |              | Insulation |                |                            | Product        | Classification         |
|------------------------|----------------------|----------------|--------------|------------|----------------|----------------------------|----------------|------------------------|
|                        | Outer diameter       | Wall thickness | No. of pipes | Type       | Thickness (mm) | Configuration              |                |                        |
| Multilayer pipes (MLC) | $\leq \text{Ø } 15$  | 2.0            | $\leq 12$    | PE foam    | $\leq 6$       | LS 400 / CS<br>LI 400 / CI | FIRESAFE / FSC | EI 30 U/C<br>E 120 U/C |

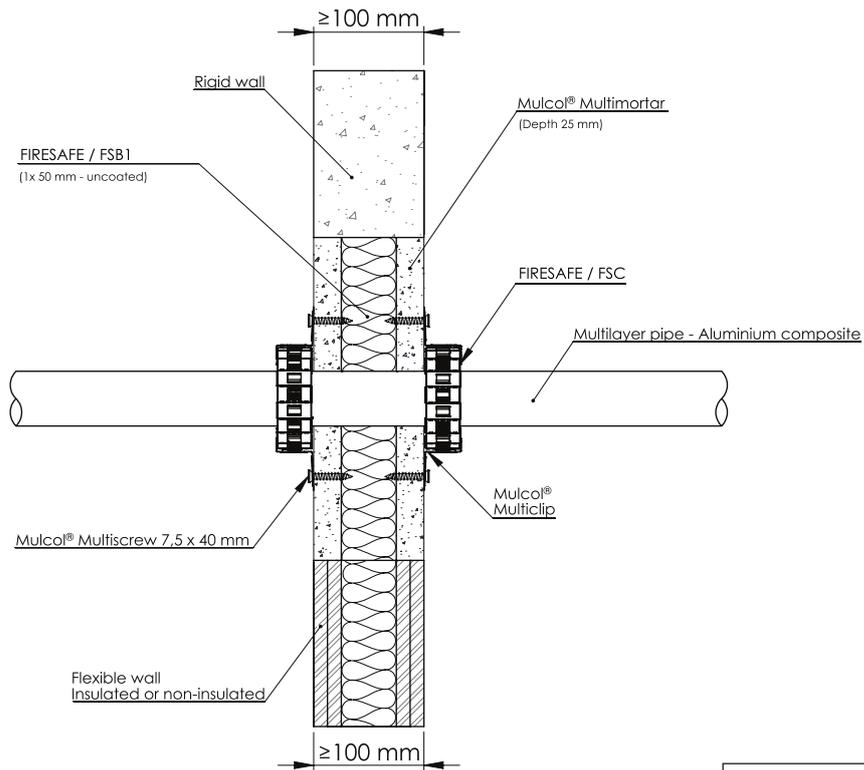
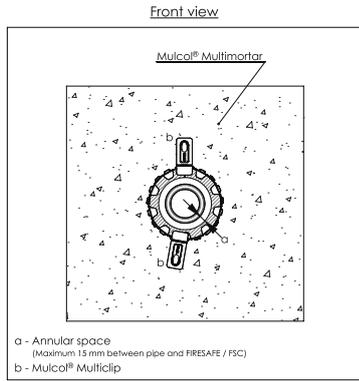
**A.1.14**

**Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm -**

**Multilayer pipes (MLC)**

**A.1.14.1**

**Multilayer pipes (MLC)**



Drawing: FW-MLA-MM3.4.10

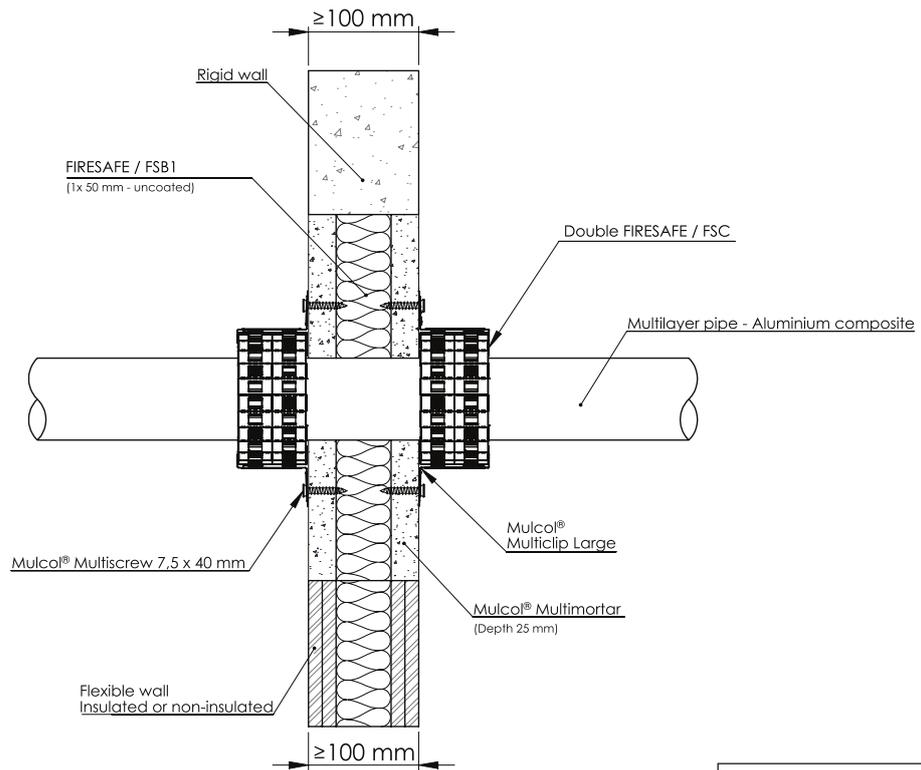
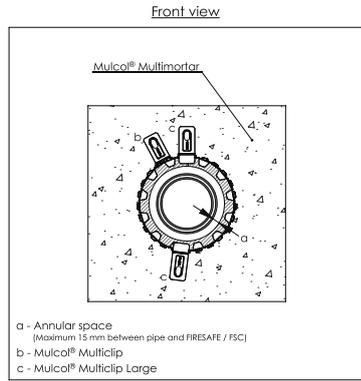
| Services               | Pipe dimensions (mm) |                | Product        | Classification       |
|------------------------|----------------------|----------------|----------------|----------------------|
|                        | Outer dimension      | Wall thickness |                |                      |
| Multilayer pipes (MLC) | $\leq \text{Ø } 32$  | 3.2            | FIRESAFE / FSC | EI 45 C/U, E 90 C/U  |
|                        |                      | 3.2 - 4.0      |                | EI 45 U/C, E 90 U/C  |
|                        | $\leq \text{Ø } 50$  | 4.0            |                | EI 60 U/C, E 120 U/C |

**A.1.14**

**Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.14.2**

**Multilayer pipes (MLC) - double FIRESAFE / FSC**



Drawing: FW-MLA-MM3.4.10

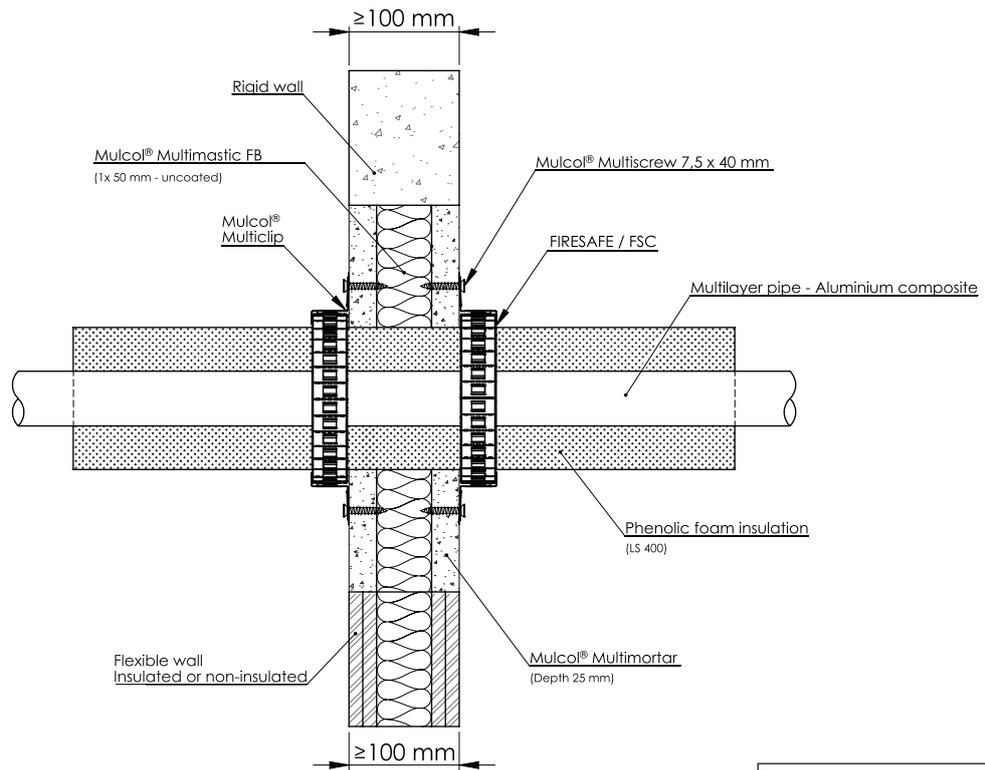
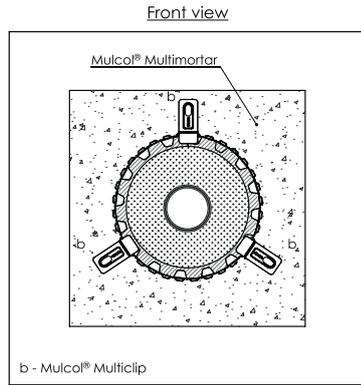
| Services               | Pipe dimensions (mm) |                | Product               | Classification       |
|------------------------|----------------------|----------------|-----------------------|----------------------|
|                        | Outer dimension      | Wall thickness |                       |                      |
| Multilayer pipes (MLC) | $\leq \text{Ø } 75$  | 6.0            | FIRESAFE / FSC double | EI 90 U/C, E 120 U/C |

**A.1.14**

**Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.14.3**

**Multilayer pipes (MLC) - Phenolic foam**



Drawing: FW.E-MLA-MM2.5.10

| Services               | Pipe dimensions (mm) |                | Insulation         |                |               | Product        | Classification |
|------------------------|----------------------|----------------|--------------------|----------------|---------------|----------------|----------------|
|                        | Outer dimension      | Wall thickness | Type               | Thickness (mm) | Configuration |                |                |
| Multilayer pipes (MLC) | $\leq \text{Ø } 20$  | 2.0            | Kingspan Kooltherm | 15 - 40        | LS 400 / CS   | FIRESAFE / FSC | EI 60 U/C      |
|                        | $\leq \text{Ø } 40$  | 3.5            |                    |                |               |                |                |
|                        | $\leq \text{Ø } 63$  | 4.5            |                    |                |               |                |                |

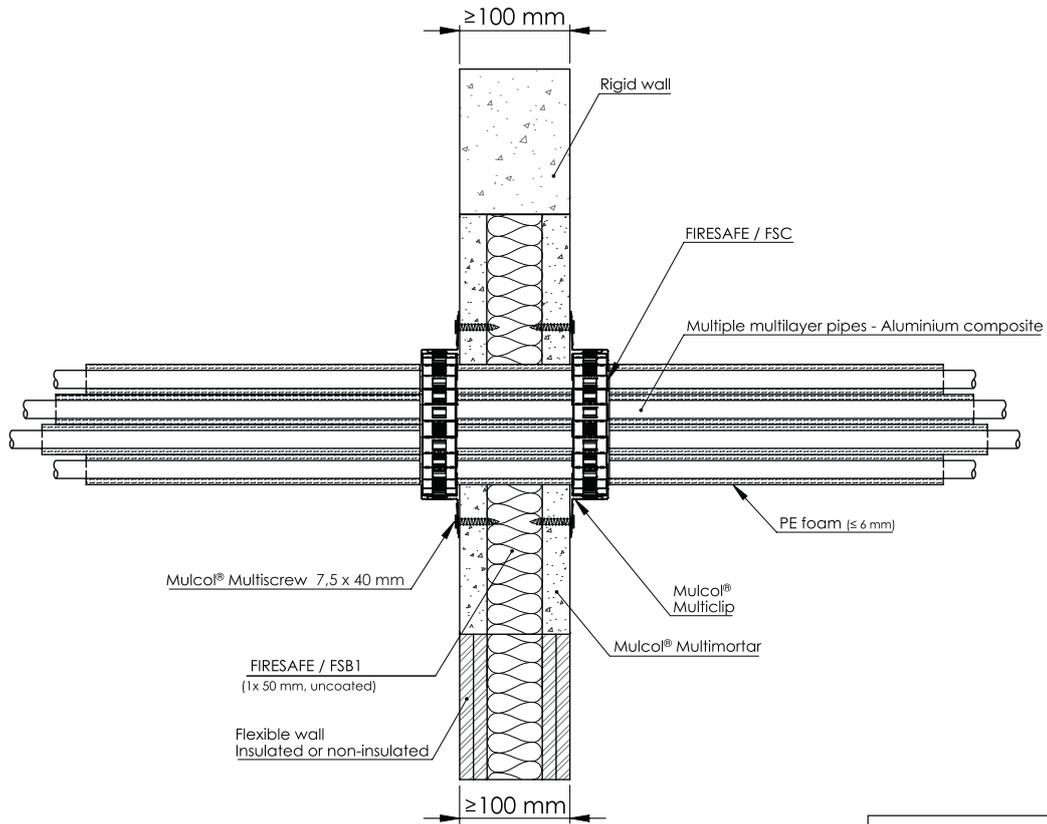
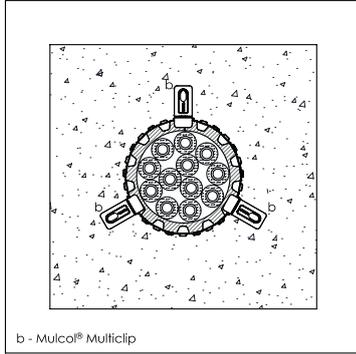
**A.1.14**

**Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.14.4**

**Multiple Multilayer pipes (MLC) - PE foam**

Front view

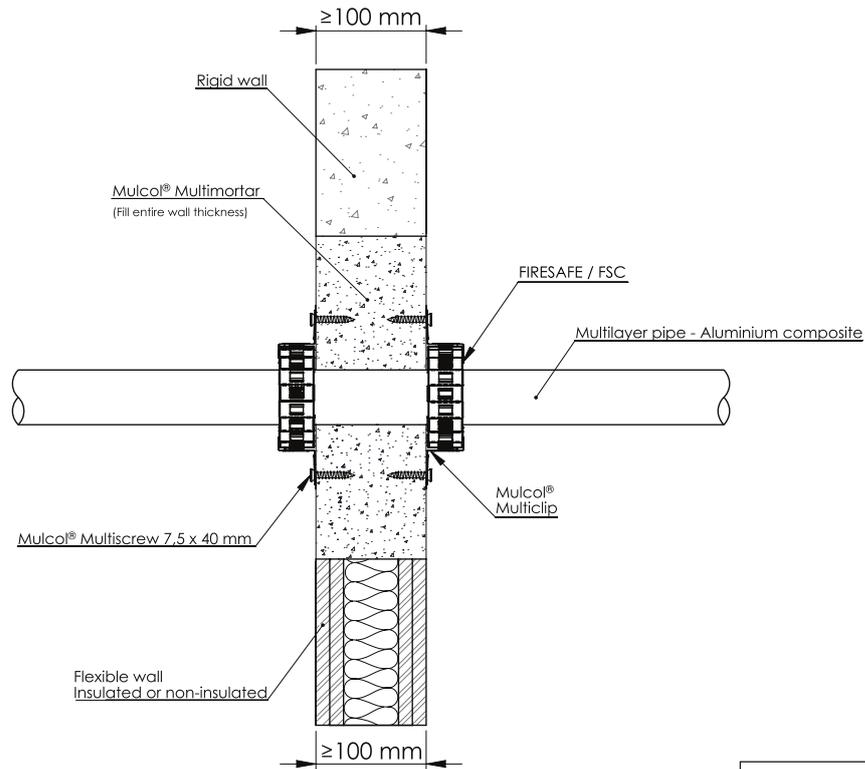
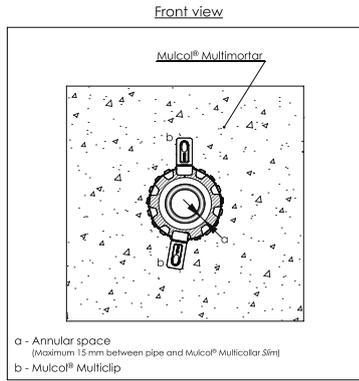


Drawing: FW.E-MC30-MLA\_pr-MM3.4.40-T

| Services               | Pipe dimensions (mm) |                |              | Insulation |                |                            | Product        | Classification         |
|------------------------|----------------------|----------------|--------------|------------|----------------|----------------------------|----------------|------------------------|
|                        | Outer diameter       | Wall thickness | No. of pipes | Type       | Thickness (mm) | Configuration              |                |                        |
| Multilayer pipes (MLC) | $\leq \text{Ø } 15$  | 2.0            | $\leq 12$    | PE foam    | $\leq 6$       | LS 400 / CS<br>LI 400 / CI | FIRESAFE / FSC | EI 30 U/C<br>E 120 U/C |

**A.1.15 Multimortar -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.15.1 Multilayer pipes (MLC)**

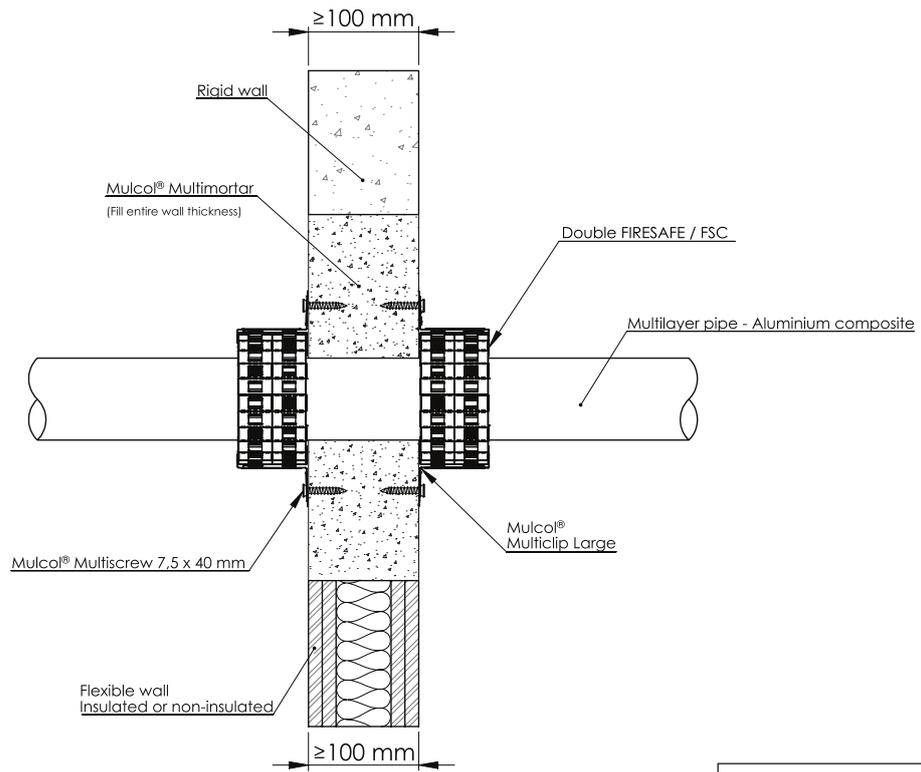
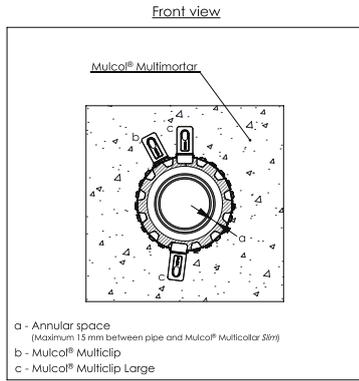


Drawing: FW.E-MLA-MM2.5.10

| Services               | Pipe dimensions (mm) |                | Product        | Classification                             |
|------------------------|----------------------|----------------|----------------|--|
|                        | Outer dimension      | Wall thickness |                |  |
| Multilayer pipes (MLC) | $\leq \text{Ø } 20$  | 2.0            | FIRESAFE / FSC | EI 120 U/C                                 |
|                        | $\leq \text{Ø } 25$  | 3.5            |                |  |
|                        | $\leq \text{Ø } 32$  | 3.0            |                | EI 45 C/U, E 90 C/U<br>EI 45 U/C, E 90 U/C |
|                        |                      | 3.2            |                |  |
|                        |                      | 3.2 - 4.0      |                |  |
|                        | $\leq \text{Ø } 40$  | 3.5            |                | EI 120 U/C                                 |
|                        | $\leq \text{Ø } 50$  | 4.0            |                |  |
|                        | $\leq \text{Ø } 63$  | 4.5            |                | EI 60 U/C, E 90 U/C                        |
| $\leq \text{Ø } 75$    | 6.0                  |                |                |  |

**A.1.15 Multimortar -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.15.2 Multilayer pipes (MLC) - double FIRESAFE / FSC**

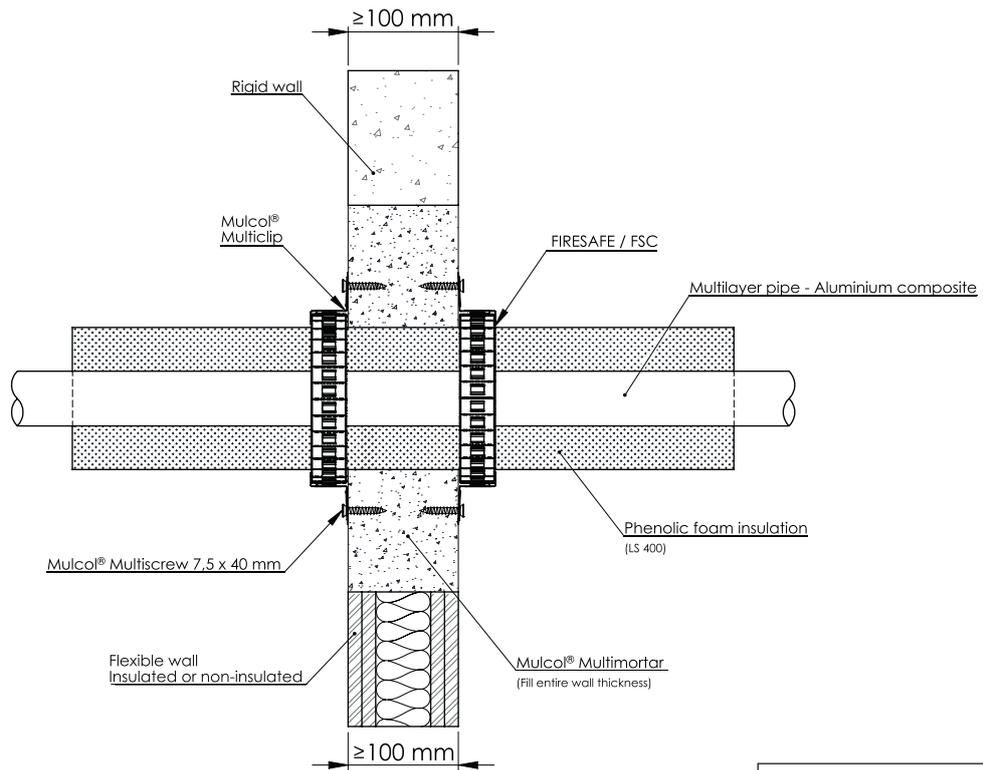
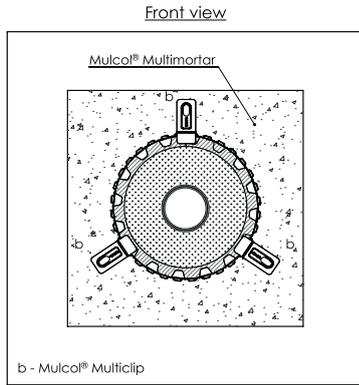


Drawing: FW.E-MLA-MM1.2.10

| Services               | Pipe dimensions (mm) |                | Product               | Classification       |
|------------------------|----------------------|----------------|-----------------------|----------------------|
|                        | Outer dimension      | Wall thickness |                       |                      |
| Multilayer pipes (MLC) | $\leq \text{Ø } 75$  | 6.0            | FIRESAFE / FSC double | EI 90 U/C, E 120 U/C |

**A.1.15 Multimortar -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.15.3 Multilayer pipes (MLC) - Phenolic foam**

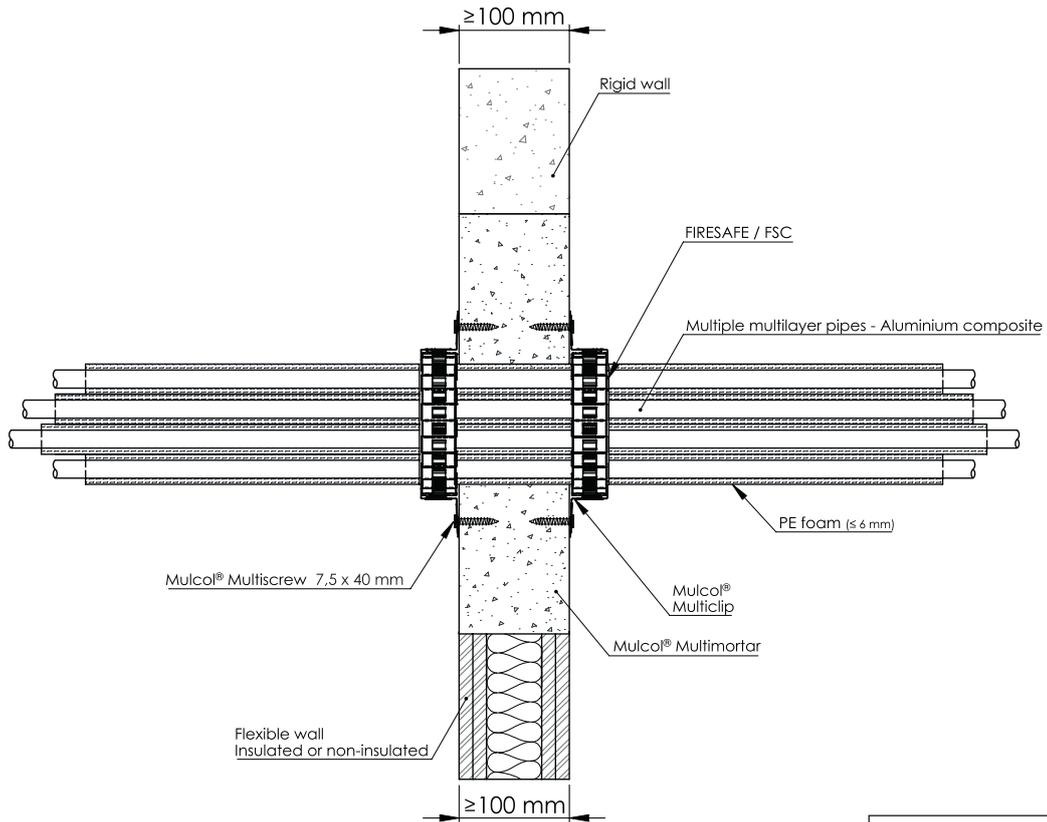
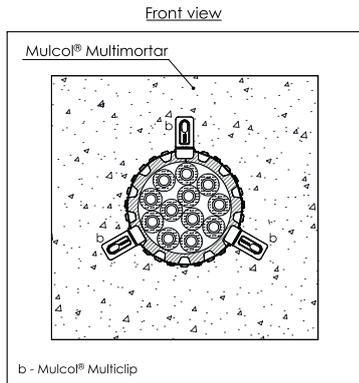


Drawing: FW-MC30-MLA-MM1.2.22

| Services               | Pipe dimensions (mm) |                | Insulation         |                |               | Product        | Classification |
|------------------------|----------------------|----------------|--------------------|----------------|---------------|----------------|----------------|
|                        | Outer dimension      | Wall thickness | Type               | Thickness (mm) | Configuration |                |                |
| Multilayer pipes (MLC) | $\leq \text{Ø } 20$  | 2.0            | Kingspan Kooltherm | 15 - 40        | LS 400 / CS   | FIRESAFE / FSC | EI 60 U/C      |
|                        | $\leq \text{Ø } 40$  | 3.5            |                    | 20 - 40        |               |                |                |
|                        | $\leq \text{Ø } 63$  | 4.5            |                    |                |               |                |                |

**A.1.15 Multimortar -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.15.4 Multiple Multilayer pipes (MLC) - PE foam**

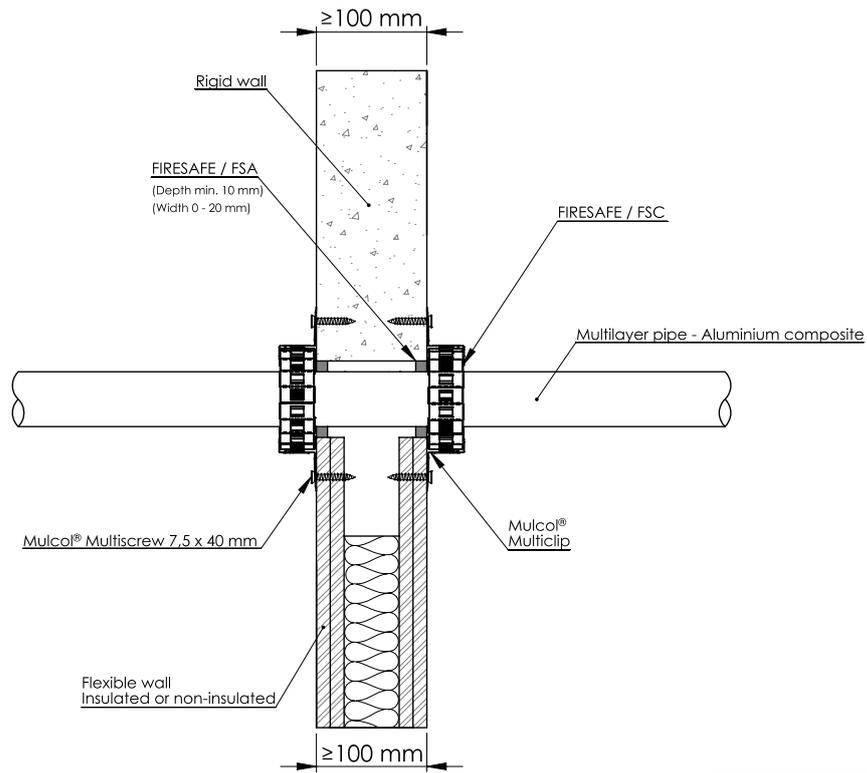
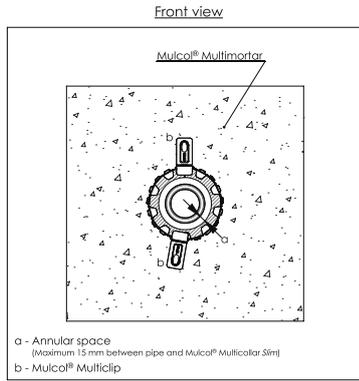


Drawing: FW-MC30-MLA\_pr-MM1.2.40-T

| Services               | Pipe dimensions (mm) |                |              | Insulation |                |                            | Product        | Classification         |
|------------------------|----------------------|----------------|--------------|------------|----------------|----------------------------|----------------|------------------------|
|                        | Outer diameter       | Wall thickness | No. of pipes | Type       | Thickness (mm) | Configuration              |                |                        |
| Multilayer pipes (MLC) | $\leq \text{Ø } 15$  | 2.0            | $\leq 12$    | PE foam    | $\leq 6$       | LS 400 / CS<br>LI 400 / CI | FIRESAFE / FSC | EI 30 U/C<br>E 120 U/C |

**A.1.16 Directly through wall -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.16.1 Multilayer pipes (MLC)**

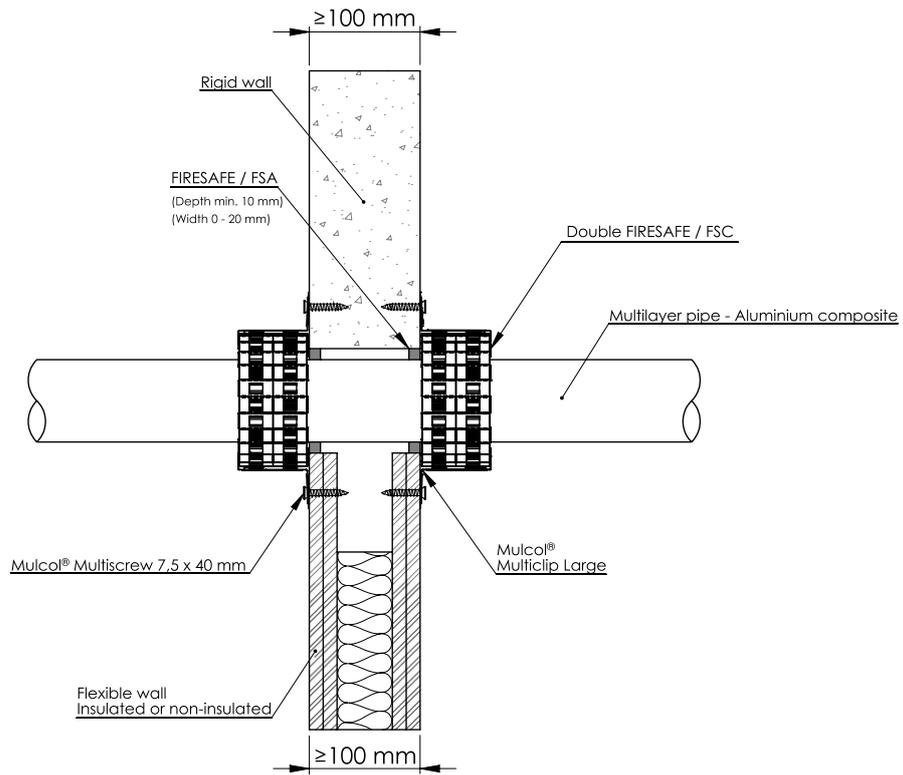
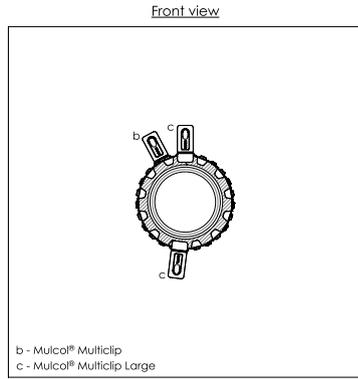


Drawing: FW.E-MLA-MM2.5.10

| Services               | Pipe dimensions (mm) |                | Product        | Classification      |
|------------------------|----------------------|----------------|----------------|---------------------|
|                        | Outer dimension      | Wall thickness |                |                     |
| Multilayer pipes (MLC) | $\leq \text{Ø } 20$  | 2.0            | FIRESAFE / FSC | EI 120 U/C          |
|                        | $\leq \text{Ø } 25$  | 3.5            |                |                     |
|                        | $\leq \text{Ø } 32$  | 3.0            |                |                     |
|                        | $\leq \text{Ø } 40$  | 3.5            |                |                     |
|                        | $\leq \text{Ø } 50$  | 4.0            |                |                     |
|                        | $\leq \text{Ø } 63$  | 4.5            |                |                     |
|                        | $\leq \text{Ø } 75$  | 6.0            | FIRESAFE / FSC | EI 60 U/C, E 90 U/C |

**A.1.16 Directly through wall -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.16.2 Multilayer pipes (MLC) - double FIRESAFE / FSC**



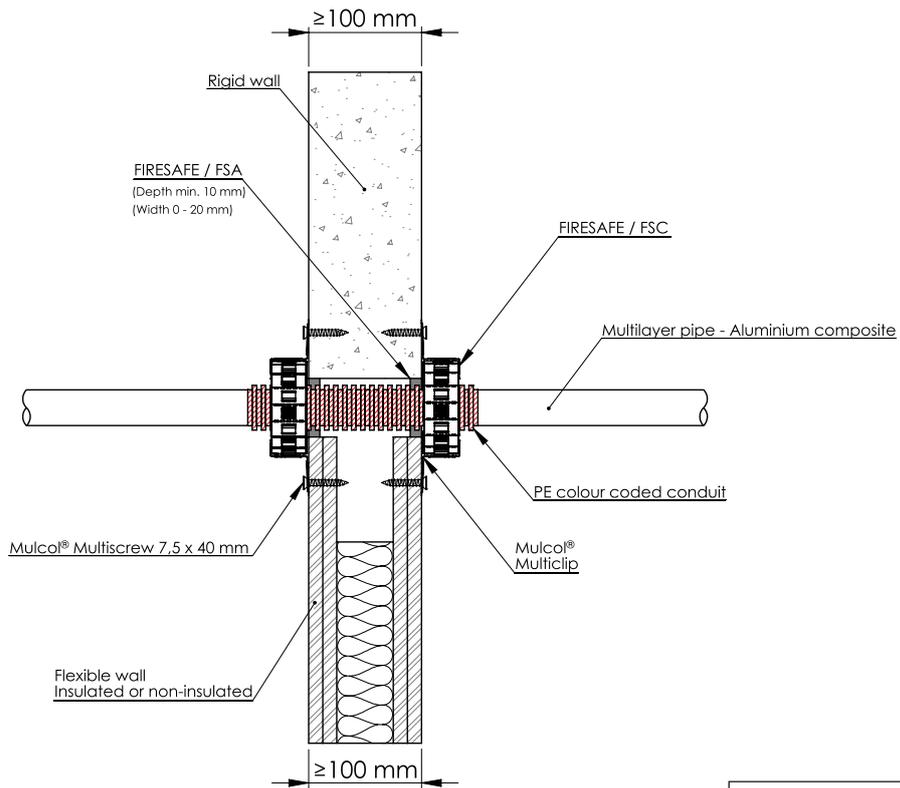
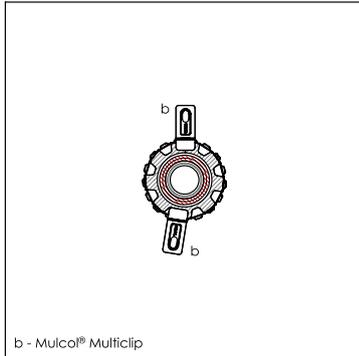
Drawing: FW.E-MC60-MLA-20.0.10

| Services               | Pipe dimensions (mm) |                | Product               | Classification       |
|------------------------|----------------------|----------------|-----------------------|----------------------|
|                        | Outer dimension      | Wall thickness |                       |                      |
| Multilayer pipes (MLC) | $\leq \text{Ø } 75$  | 6.0            | FIRESAFE / FSC double | EI 90 U/C, E 120 U/C |

**A.1.16 Directly through wall -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.16.3 Multilayer pipes (MLC) - PE conduit LS 50 / CS**

Front view

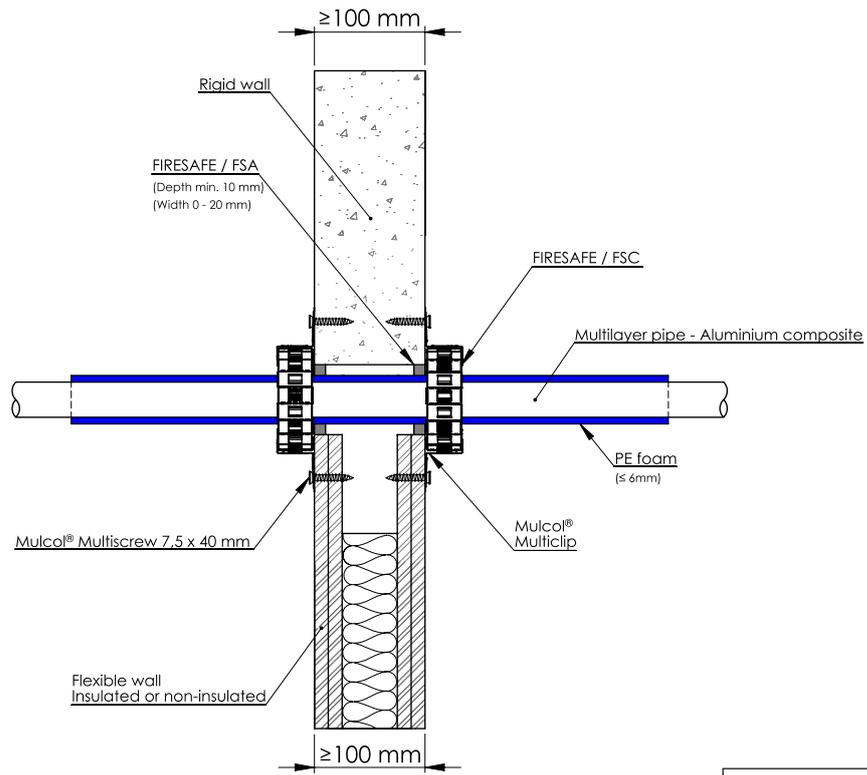
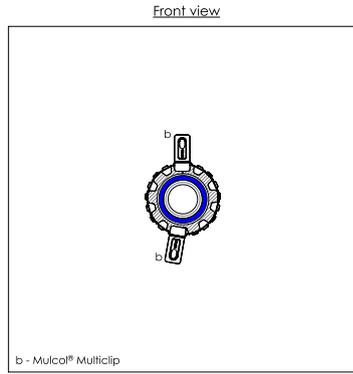


Drawing: FW.E-MC30-MLA-10.0.30

| Services               | Pipe dimensions (mm) |                | Conduit           |                      |               | Product        | Classification |
|------------------------|----------------------|----------------|-------------------|----------------------|---------------|----------------|----------------|
|                        | Outer dimensions     | Wall thickness | Type              | Outer dimension (mm) | Configuration |                |                |
| Multilayer pipes (MLC) | $\leq \text{Ø } 32$  | 3.0            | PE-conduit ribbed | 40                   | LS 50 / CS    | FIRESAFE / FSC | EI 90 U/C      |

**A.1.16 Directly through wall -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.16.4 Multilayer pipes (MLC) - PE conduit LS-LI 300 / CS-CI**

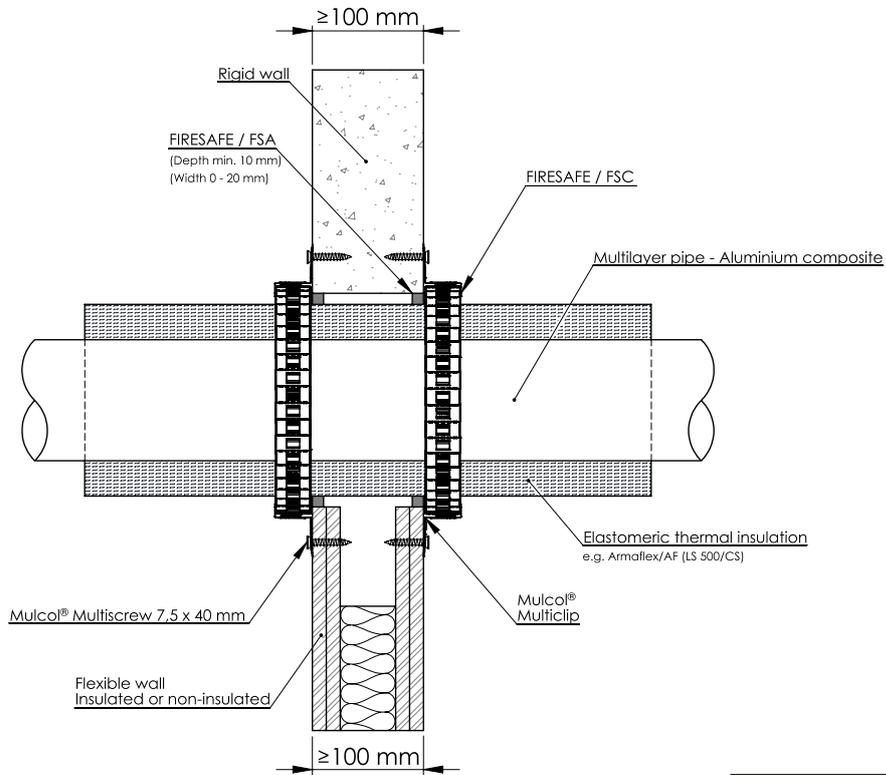
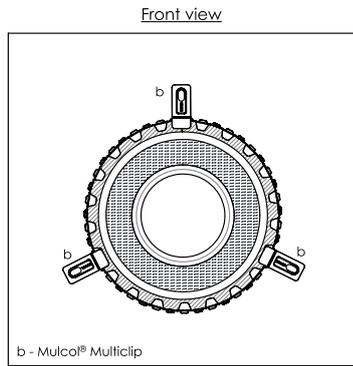


Drawing: FW.E-MC30-MLA\_pr-10.0.25

| Services               | Pipe dimensions (mm)  |                | Insulation |                |                            | Product        | Classification |
|------------------------|-----------------------|----------------|------------|----------------|----------------------------|----------------|----------------|
|                        | Outer dimensions      | Wall thickness | Type       | Thickness (mm) | Configuration              |                |                |
| Multilayer pipes (MLC) | $\leq \varnothing 20$ | 2.0            | PE Foam    | 6              | LS 300 / CS<br>LI 300 / CI | FIRESAFE / FSC | EI 120 U/C     |
|                        | $\leq \varnothing 26$ |                |            |                |                            |                |                |
|                        | $\leq \varnothing 32$ | 3.0            |            |                |                            |                |                |

**A.1.16 Directly through wall -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.16.5 Multilayer pipes (MLC) - Elastomer LS-LI 500 / CS-CI**

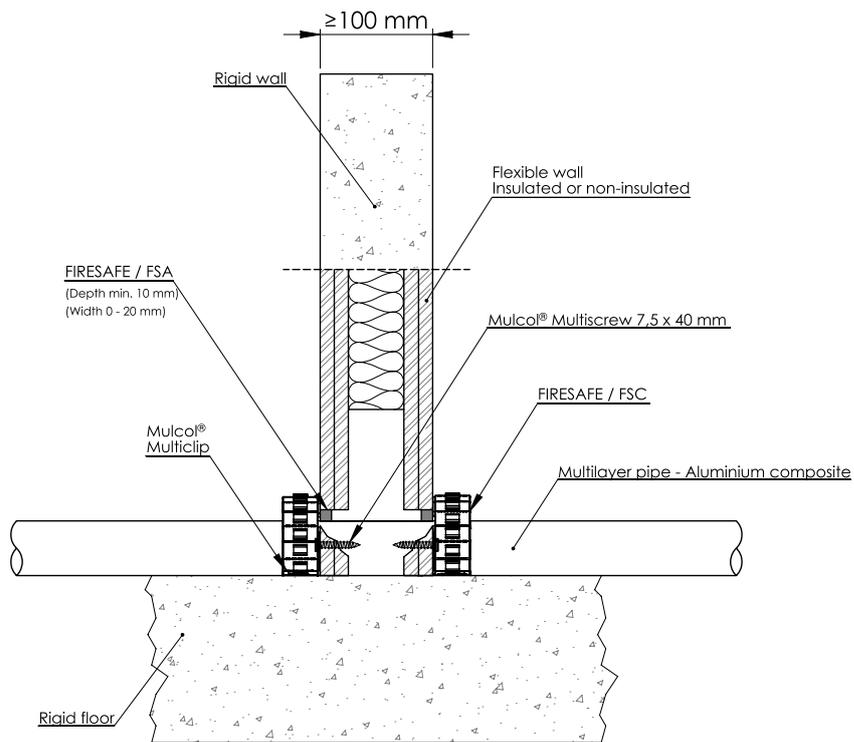
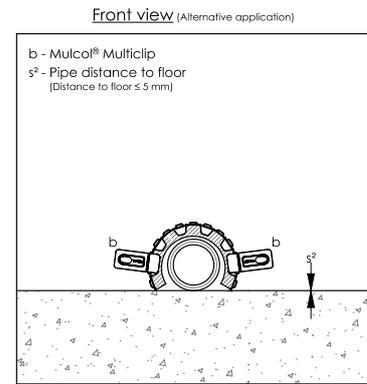
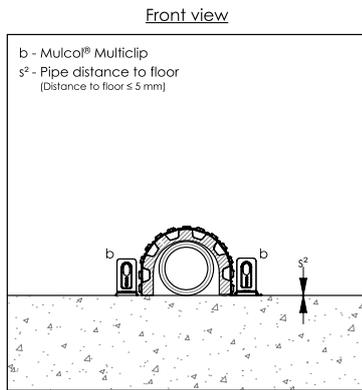


Drawing: FW.E-MC30-MLA-10.0.22.LS

| Services               | Pipe dimensions (mm) |                | Insulation   |                |                            | Product        | Sealing (mm)                             | Classification         |
|------------------------|----------------------|----------------|--|----------------|----------------------------|----------------|--|------------------------|
|                        | Outer dimension      | Wall thickness | Type   | Thickness (mm) | Configuration              |                |  |                        |
| Multilayer pipes (MLC) | $\leq \text{Ø } 20$  | 3.0 - 4.0      | ArmaFlex AF (min. class B-s3, d0 B <sub>L</sub> -s3, d0) | 9 - 32         | LS 500 / CS<br>LI 500 / CI | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$ (wxd) | EI 120 U/C             |
|                        | $\leq \text{Ø } 32$  | 3.0            |  |                |                            |                |  | EI 120 U/C             |
|                        | $\leq \text{Ø } 40$  | 3.5 - 4.0      |  |                |                            |                |  | EI 120 U/C             |
|                        | $\leq \text{Ø } 50$  | 4.0            |  |                |                            |                |  | EI 90 U/C<br>E 120 U/C |
|                        | $\leq \text{Ø } 63$  | 4.5            |  |                |                            |                |  | EI 120 U/C             |
|                        | $\leq \text{Ø } 75$  | 4.7 - 6.0      |  |                |                            |                |  | EI 90 U/C<br>E 120 U/C |
|                        | $\leq \text{Ø } 75$  | 6.0 - 7.5      |  |                |                            |                |  | EI 120 U/C             |
|                        | $\leq \text{Ø } 90$  | 7.0            |  |                |                            |                |  | EI 90 U/C              |
|                        | $\leq \text{Ø } 110$ | 10.0           |  | 9              |                            |                | EI 120 U/C                               |                        |
|                        |                      |                |  | 9 - 32         |                            |                | EI 90 U/C                                |                        |
|                        |                      |                |  | 32             |                            |                | EI 120 U/C                               |                        |

**A.1.16 Directly through wall -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.16.6 Multilayer pipes (MLC) at zero distance to floor**

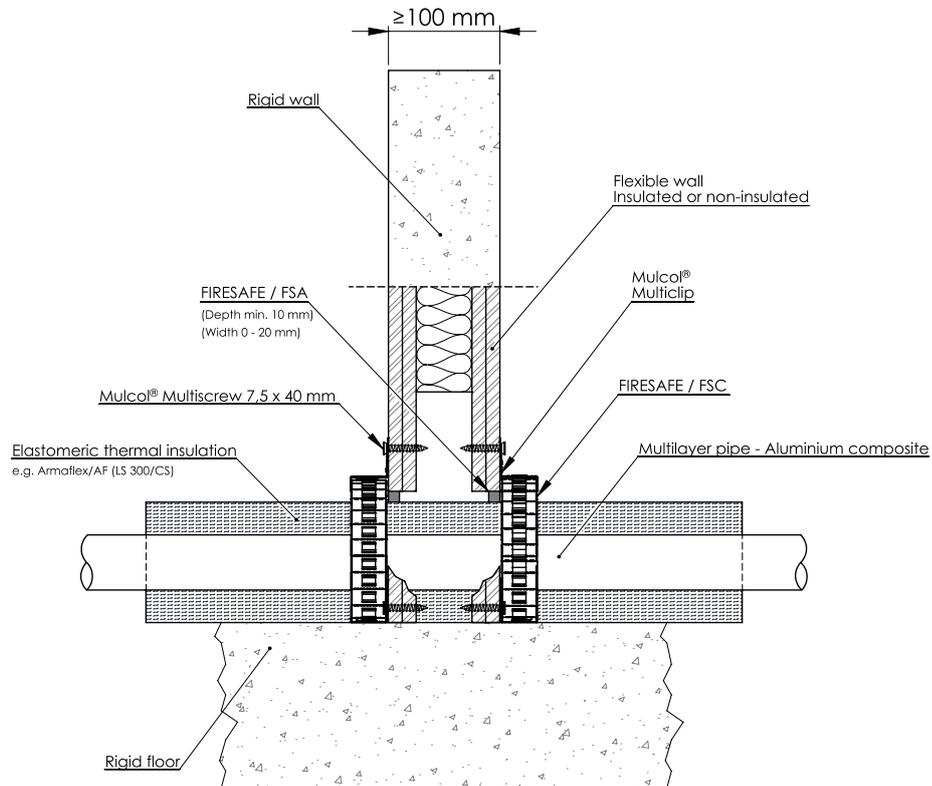
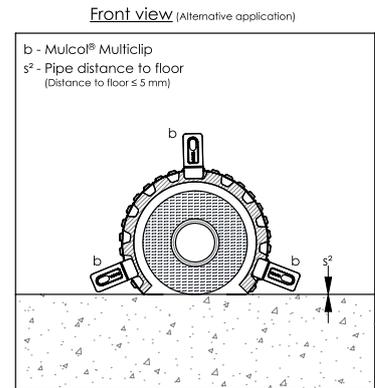
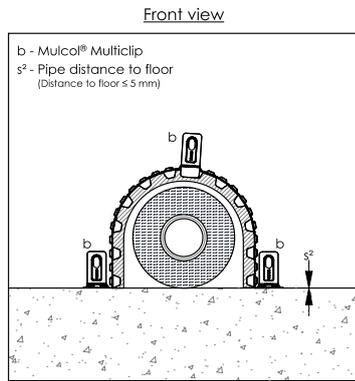


Drawing: FW.E-MC30F-MLA-10.0.10

| Services               | Pipe dimensions (mm) |                | Product        | Classification |
|------------------------|----------------------|----------------|----------------|----------------|
|                        | Outer dimension      | Wall thickness |                |                |
| Multilayer pipes (MLC) | $\leq \text{Ø } 32$  | 3.0            | FIRESAFE / FSC | EI 90 U/C      |

**A.1.16 Directly through wall -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.16.7 Multilayer pipes (MLC) at zero distance to floor - Elastomer LS-LI 300 / CS-CI**

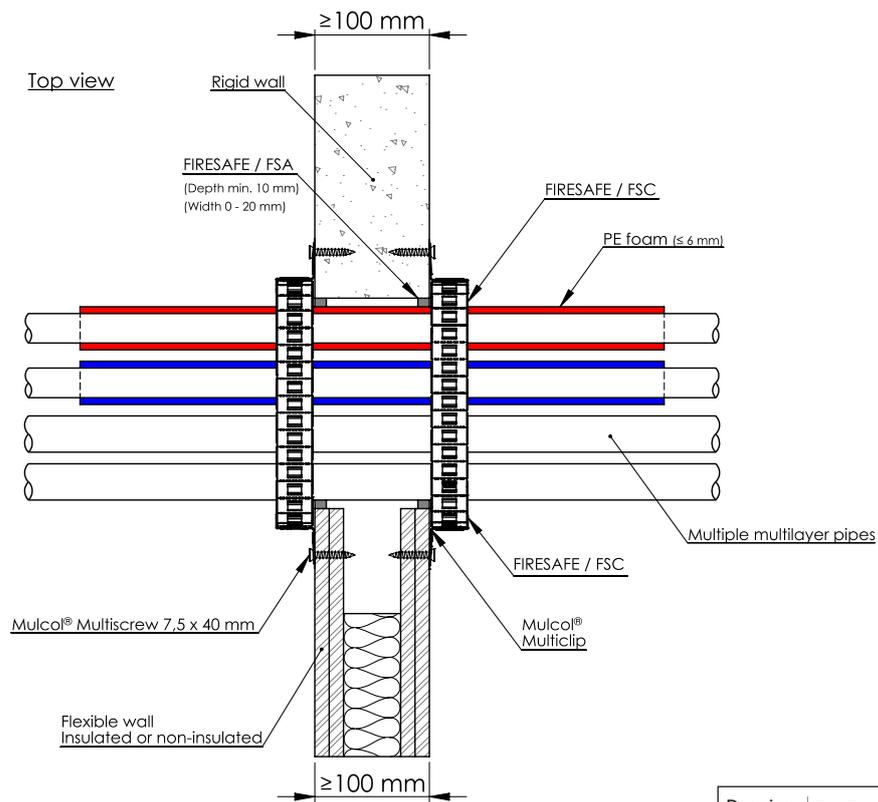
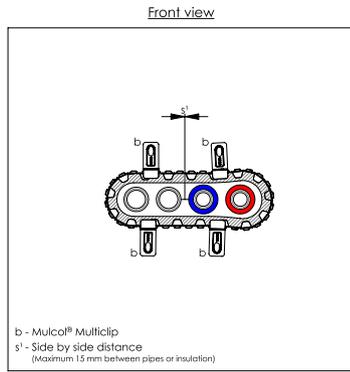


Drawing: FW.E-MC30f-MLA-10.0.22

| Services               | Pipe dimensions (mm)  |                | Insulation  |                |                            | Product           | Classification |
|------------------------|-----------------------|----------------|---|----------------|----------------------------|-------------------|----------------|
|                        | Outer dimensions      | Wall thickness | Type  | Thickness (mm) | Configuration              |                   |                |
| Multilayer pipes (MLC) | $\leq \varnothing 32$ | 3.0            | ArmaFlex AF<br>(min. class<br>B <sub>L</sub> -s3, d0<br>B-s3, d0) | 9 - 32         | LS 300 / CS<br>LI 300 / CI | FIRESAFE /<br>FSC | EI 90 U/C      |
|                        | $\leq \varnothing 50$ | 4.0            |   |                |                            |                   |                |

**A.1.16 Directly through wall -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.16.8 Multiple Multilayer pipes (MLC) - PE Foam LS-LI 300 / CS-CI**

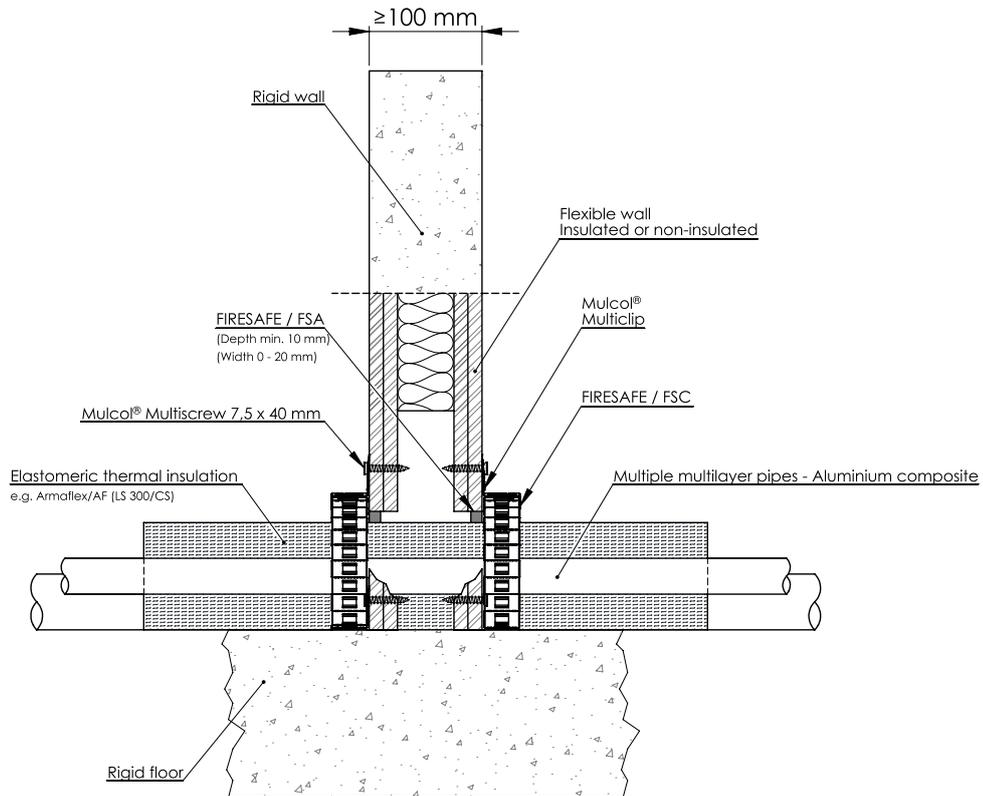
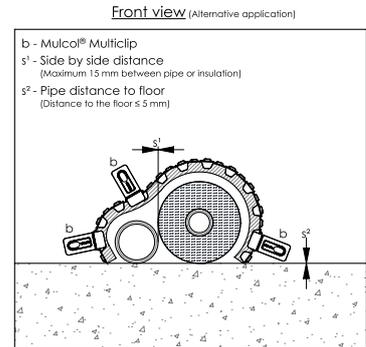
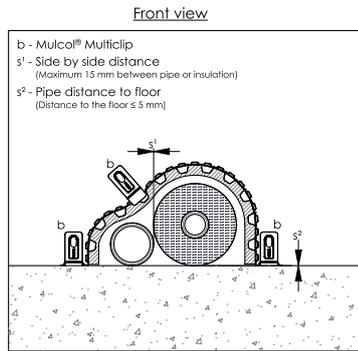


Drawing: | FW,E-MC30-MLP4-10.0.40

| Services               | Pipe dimensions (mm) |                | Insulation |                |                            | Product        | Classification |
|------------------------|----------------------|----------------|------------|----------------|----------------------------|----------------|----------------|
|                        | Outer dimensions     | Wall thickness | Type       | Thickness (mm) | Configuration              |                |                |
| Multilayer pipes (MLC) | ≤ Ø 26               | 3.0            | PE Foam    | 6              | LS 300 / CS<br>LI 300 / CI | FIRESAFE / FSC | EI 120 U/C     |
|                        | ≤ Ø 32               | 4.0            | -          | -              | -                          |                |                |

**A.1.16 Directly through wall -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.16.9 Multiple Multilayer pipes (MLC) at zero distance to floor - Elastomer LS-LI 300 / CS-CI**

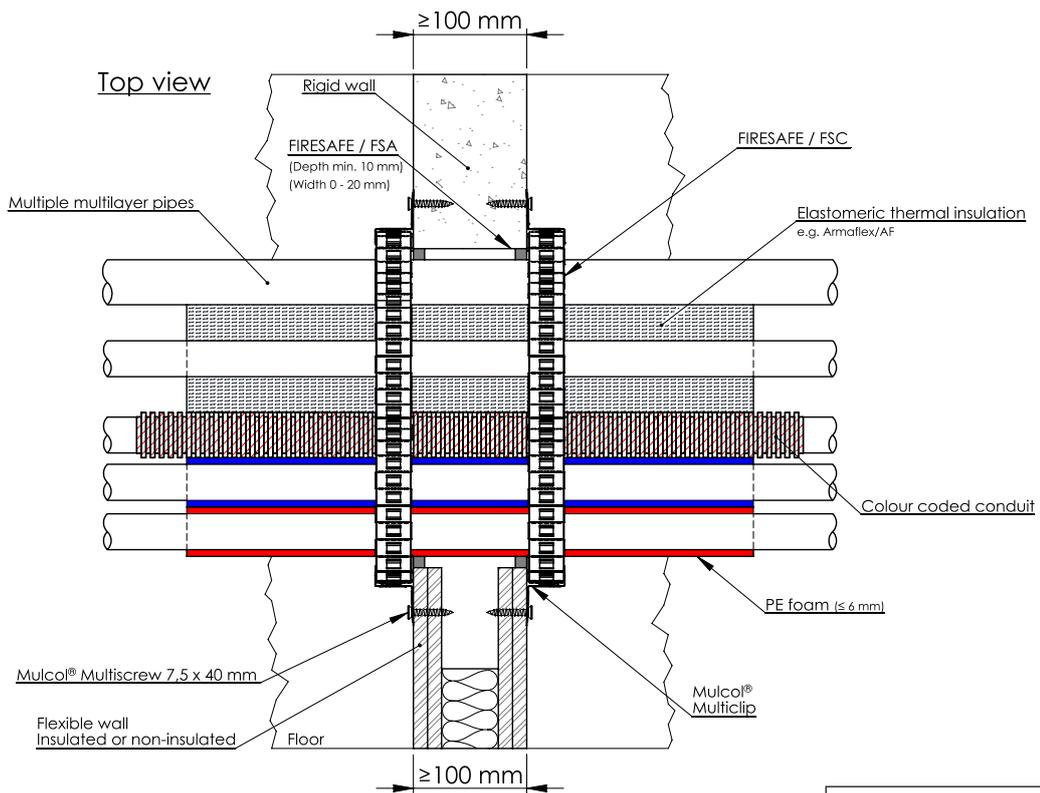
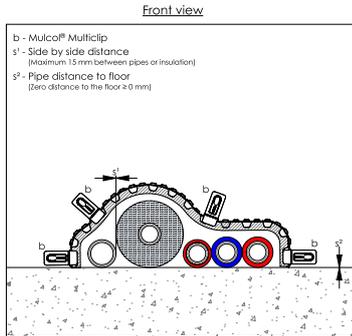


Drawing: FW.E-MC30f-MLP2-10.0.40

| Services               | Pipe dimensions (mm) |                | Insulation   |                |                            | Product        | Classification |
|------------------------|----------------------|----------------|--|----------------|----------------------------|----------------|----------------|
|                        | Outer dimensions     | Wall thickness | Type   | Thickness (mm) | Configuration              |                |                |
| Multilayer pipes (MLC) | $\leq \text{Ø } 32$  | 3.0            | ArmaFlex AF (min. class B <sub>L</sub> -s3, d0 B-s3, d0) | 9 - 32         | LS 300 / CS<br>LI 300 / CI | FIRESAFE / FSC | EI 90 U/C      |
|                        | $\leq \text{Ø } 50$  | 4.0            | -  |                |                            |                |                |

**A.1.16 Directly through wall -  $\geq 100$  mm - Multilayer pipes (MLC)**

**A.1.16.10 Multiple Multilayer pipes (MLC) at zero distance to floor - Elastomer, PE Foam, PE conduit LS-LI 300 / CS-CI**



Drawing: FW.E-MC30f-MLP5-10.0.40

| Services               | Pipe dimensions (mm)  |                | Insulation   |                |                            | Product           | Classification |
|------------------------|-----------------------|----------------|--|----------------|----------------------------|-------------------|----------------|
|                        | Outer dimensions      | Wall thickness | Type   | Thickness (mm) | Configuration              |                   |                |
| Multilayer pipes (MLC) | $\leq \varnothing 32$ | 3.0            | PE Foam  | 6              | LS 300 / CS<br>LI 300 / CI | FIRESAFE /<br>FSC | EI 120 U/C     |
|                        |                       |                | PE-conduit ribbed  | 4              |                            |                   |                |
|                        |                       |                | ArmaFlex AF (min. class B <sub>L</sub> -s3, d0 B-s3, d0) | 9 - 32         |                            |                   |                |
|                        | $\leq \varnothing 40$ | 4.0            | -  |                |                            |                   |                |

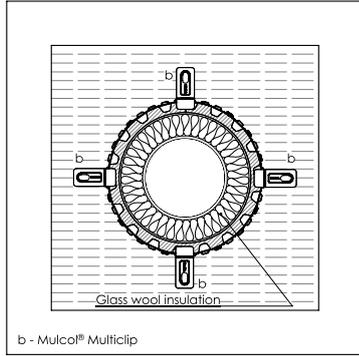
**A.1.17**

**FIRESAFE / FSB1 - 2x50 mm - Metal pipes insulated mineral wool**

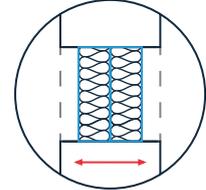
**A.1.17.1**

**Steel pipes - FIRESAFE / FSB1 - Glass wool LS 400 / CS**

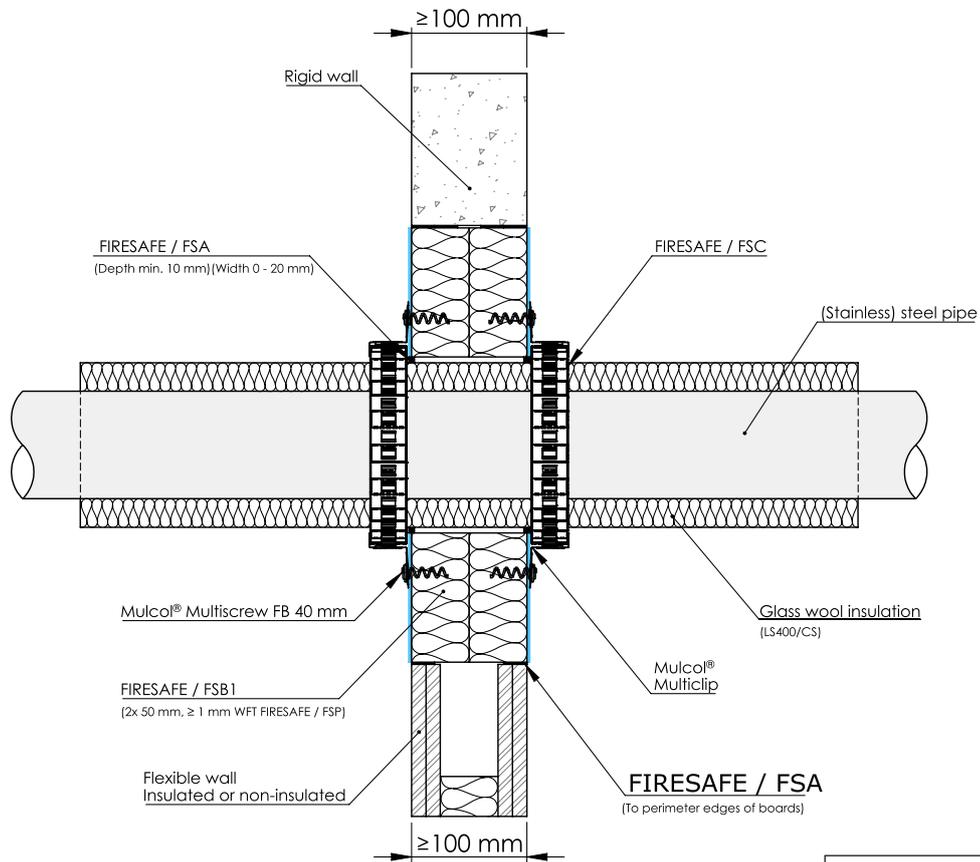
Front view



b - Mulcol® Multiclip



Position seat:  
right, left or anywhere  
in between

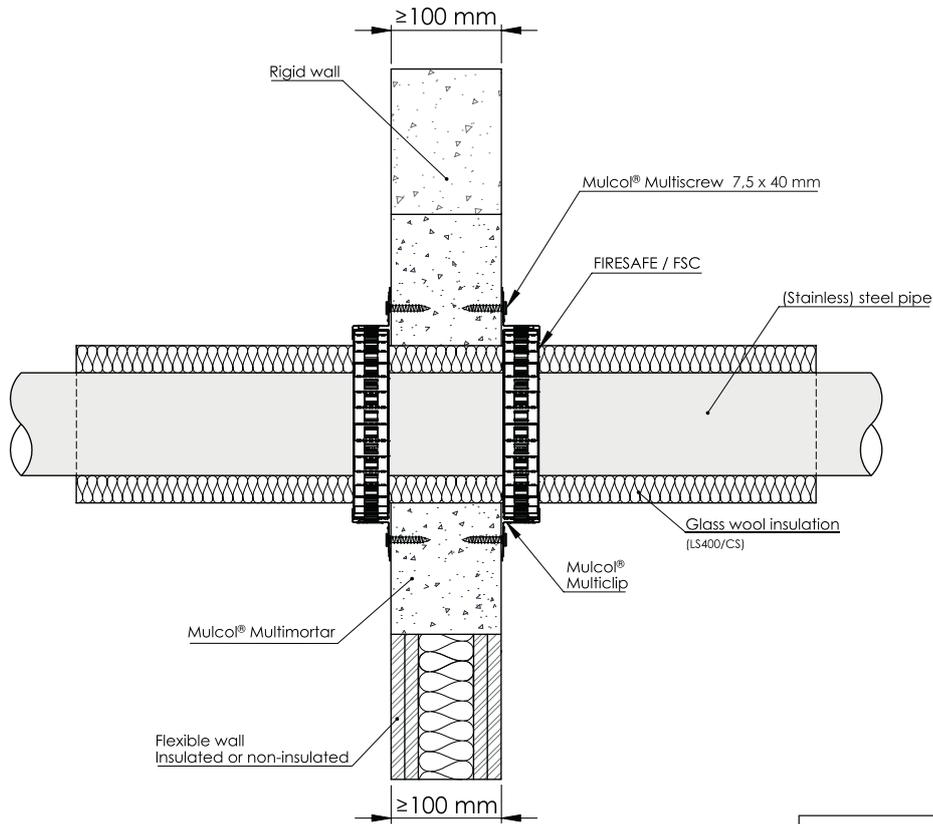
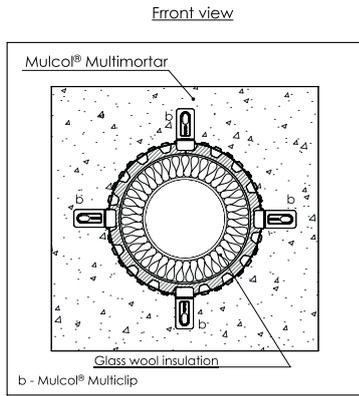


Drawing: PBfw.E-ST-MC30-MFB1.2.20

| Services                      | Pipe dimensions (mm) |                | Insulation                           |                |               | Product        | Sealing (mm)                       | Classification |
|-------------------------------|----------------------|----------------|--------------------------------------|----------------|---------------|----------------|------------------------------------|----------------|
|                               | Outer dimension      | Wall thickness | Type                                 | Thickness (mm) | Configuration |                |                                    |                |
| (Stainless) Steel / cast iron | ≤ Ø 76.2             | ≥ 3.3          | Glass wool (≥ 33 kg/m <sup>3</sup> ) | 30             | LS 400 / CS   | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 5 (wxd) | EI 90 C/U      |
|                               | ≤ Ø 139.7            | ≥ 4.0          |                                      | 50             |               |                |                                    | E 120 C/U      |
|                               |                      |                |                                      |                |               |                |                                    | EI 60 C/U      |
|                               |                      |                |                                      |                |               |                |                                    | E 90 C/U       |

**A.1.18 Multimortar -  $\geq 100$  mm - Metal pipes insulated mineral wool**

**A.1.18.1 Steel pipes - Multimortar - Glass wool LS 400 / CS**

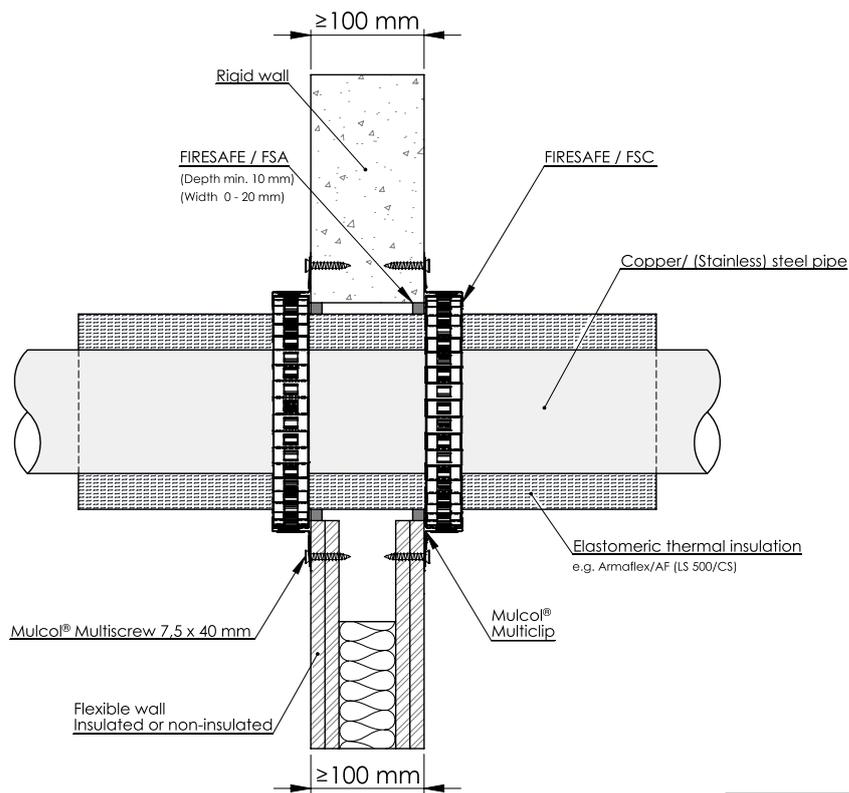
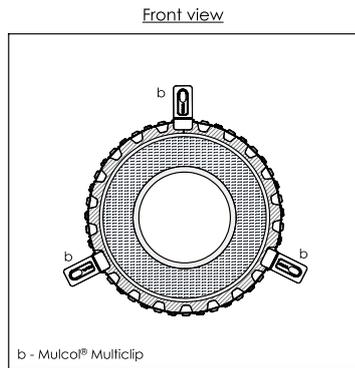


Drawing: FW.E-MC30-ST-MM1.2.21

| Services                      | Pipe dimensions (mm)     |                | Insulation   |                |               | Product        | Classification       |
|-------------------------------|--------------------------|----------------|--|----------------|---------------|----------------|----------------------|
|                               | Outer dimension          | Wall thickness | Type   | Thickness (mm) | Configuration |                |                      |
| (Stainless) Steel / cast iron | $\leq \varnothing 76.2$  | $\geq 3.3$     | Isover   | $\geq 30$      | LS 400 / CS   | FIRESAFE / FSC | EI 90 C/U, E 120 C/U |
|                               | $\leq \varnothing 139.7$ | $\geq 4.0$     | Climclover<br>Glass wool<br>( $\geq 33 \text{ kg/m}^3$ ) | $\geq 50$      |               |                | EI 60 C/U, E 90 C/U  |

**A.1.19 Directly through wall -  $\geq 100$  mm - Metal pipes insulated elastomer**

**A.1.19.1 Copper and steel pipes - Elastomer LS 500 / CS**

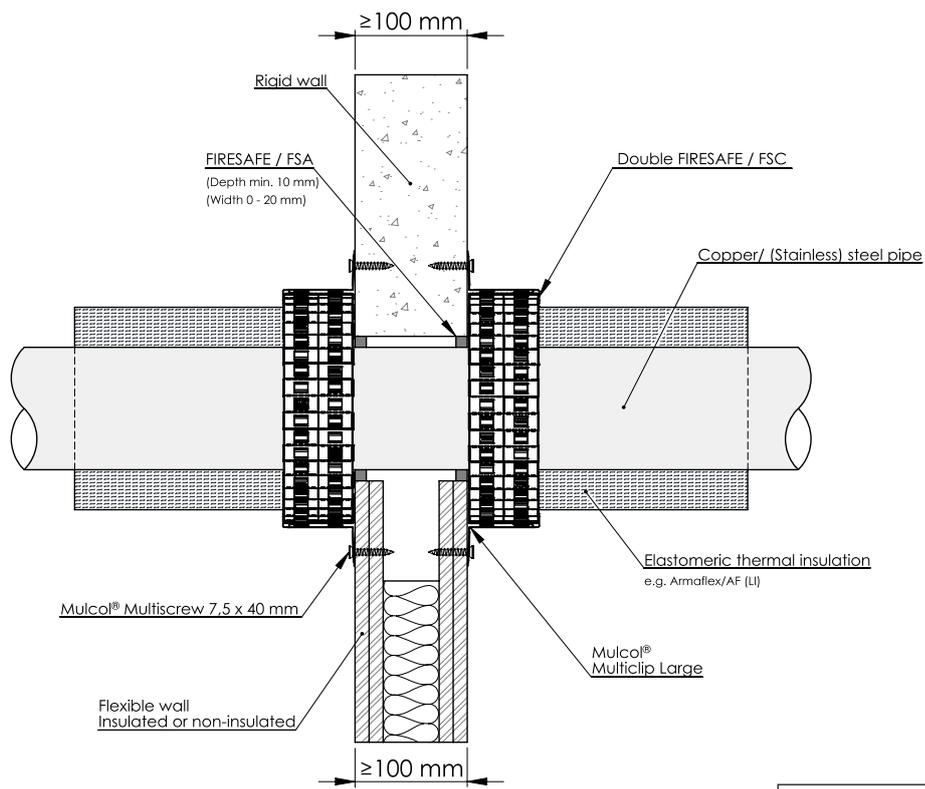
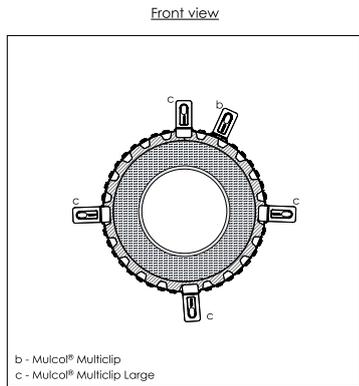


Drawing: FW.E-MC30-CU-10.0.22.LS

| Services                               | Pipe dimensions (mm)     |                | Insulation   |                |               | Product              | Classification       |                      |
|--|--------------------------|----------------|--|----------------|---------------|----------------------|----------------------|----------------------|
|  | Outer dimension          | Wall thickness | Type   | Thickness (mm) | Configuration |                      |                      |                      |
| Copper / (Stainless) Steel / cast iron | $\leq \varnothing 54$    | $\geq 1.5$     | ArmaFlex AF (min. class B <sub>L</sub> -s3, d0 B-s3, d0) | 9 - 32         | LS 500 / CS   | FIRESAFE / FSC       | EI 60 C/U, E 120 C/U |                      |
|  |                          |                |  | 32             |               |                      |                      | EI 90 C/U, E 120 C/U |
|  | $\leq \varnothing 88.9$  | $\geq 2.0$     |  | 9 - 32         | CS            |                      |                      | EI 45 C/U, E 120 C/U |
| (Stainless) Steel / cast iron          | $\leq \varnothing 219.1$ | $\geq 4.0$     |  |                | LS 500 / CS   |                      |                      | EI 60 C/U, E 120 C/U |
|  |                          |                |  | CS             |               | EI 90 C/U, E 120 C/U |                      |                      |

**A.1.19 Directly through wall -  $\geq 100$  mm - Metal pipes insulated elastomer**

**A.1.19.2 Copper and steel pipes - Elastomer CI**

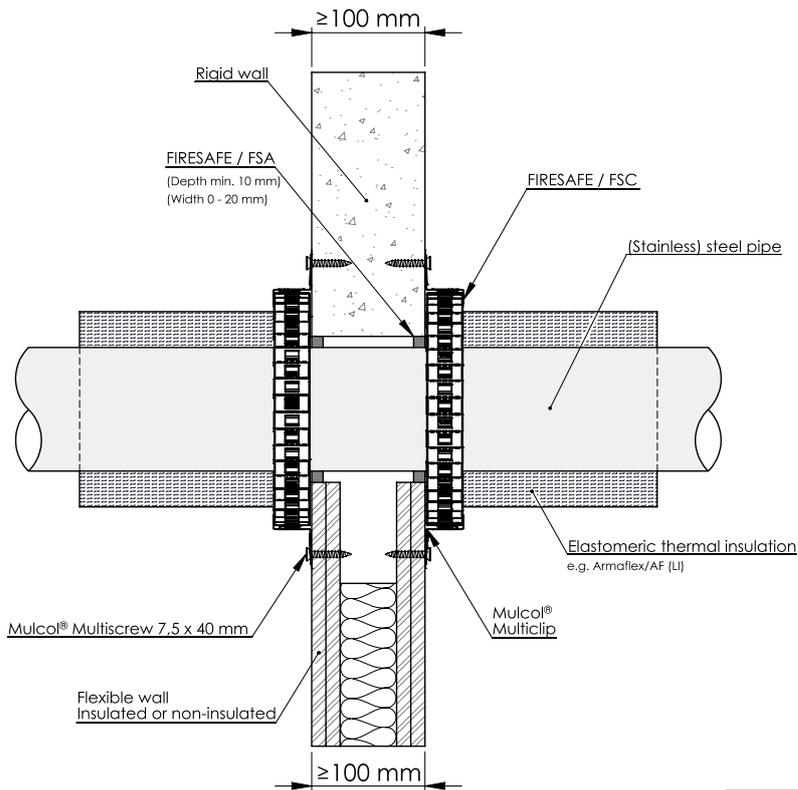
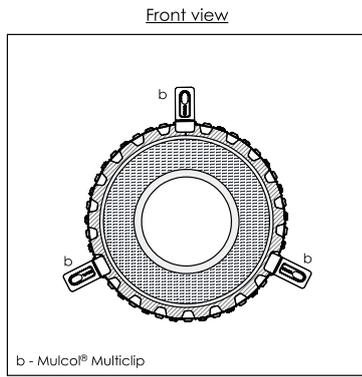


Drawing: FW.E-MC60-CU-20.0.22.LI

| Services                                    | Pipe dimensions (mm)    |                | Insulation  |                |               | Product        | Classification       |
|---|-------------------------|----------------|---|----------------|---------------|----------------|----------------------|
|   | Outer dimension         | Wall thickness | Type  | Thickness (mm) | Configuration |                |                      |
| Copper/<br>(Stainless) Steel /<br>cast iron | $\leq \varnothing 88.9$ | $\geq 2.0$     | ArmaFlex AF<br>(min. class<br>B <sub>L</sub> -s3, d0<br>B-s3, d0) | 9 - 32         | CI            | FIRESAFE / FSC | EI 120 C/U           |
|   |                         |                |   | 32             |               |                | EI 60 C/U, E 120 C/U |

**A.1.19 Directly through wall -  $\geq 100$  mm - Metal pipes insulated elastomer**

**A.1.19.3 Steel pipes - Elastomer CI**



Drawing: FW,E-MC30-ST-10.0.22\_LI

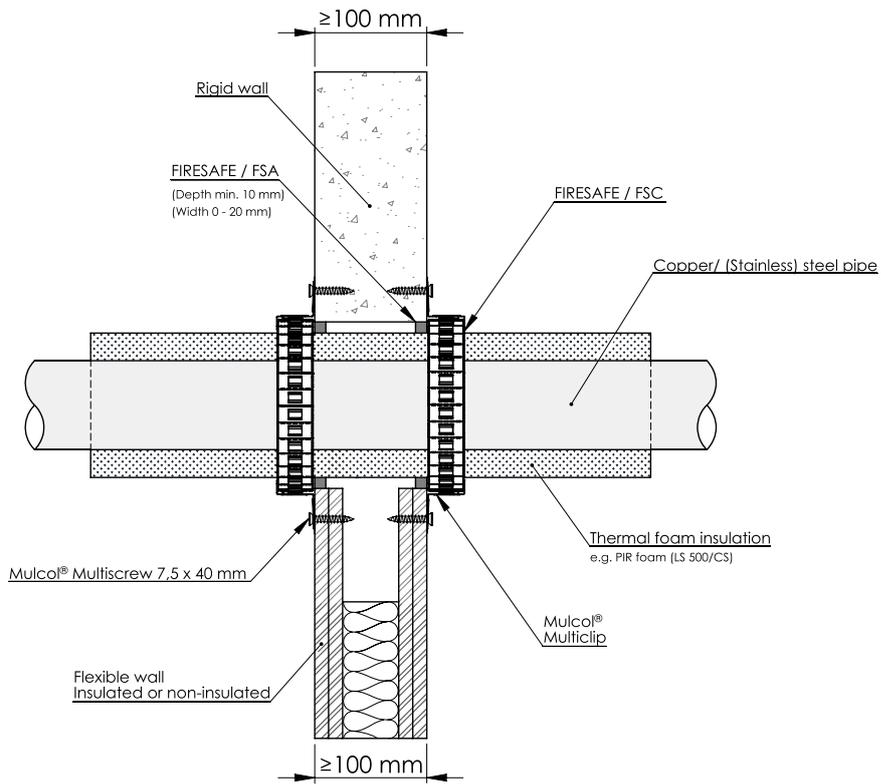
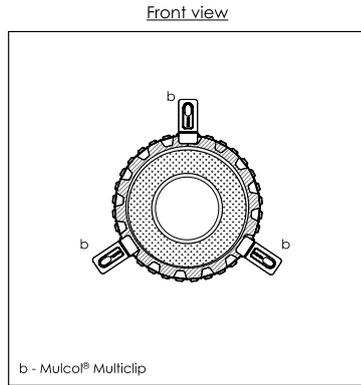
| Services                      | Pipe dimensions (mm)     |                | Insulation   |                |               | Product        | Classification       |
|-------------------------------|--------------------------|----------------|--|----------------|---------------|----------------|----------------------|
|                               | Outer dimension          | Wall thickness | Type   | Thickness (mm) | Configuration |                |                      |
| (Stainless) Steel / cast iron | $\leq \varnothing 168.3$ | $\geq 4.5$     | ArmaFlex AF (min. class B <sub>L</sub> -s3, d0 B-s3, d0) | 32             | CI            | FIRESAFE / FSC | EI 120 C/U           |
|                               |                          |                |  | 9 - 32         |               |                | EI 60 C/U, E 120 C/U |

**A.1.20**

**Directly through wall -  $\geq 100$  mm - Metal pipes insulated elastomer**

**A.1.20.1**

**Copper and steel pipes - PIR / PUR foam LS 500 / CS**

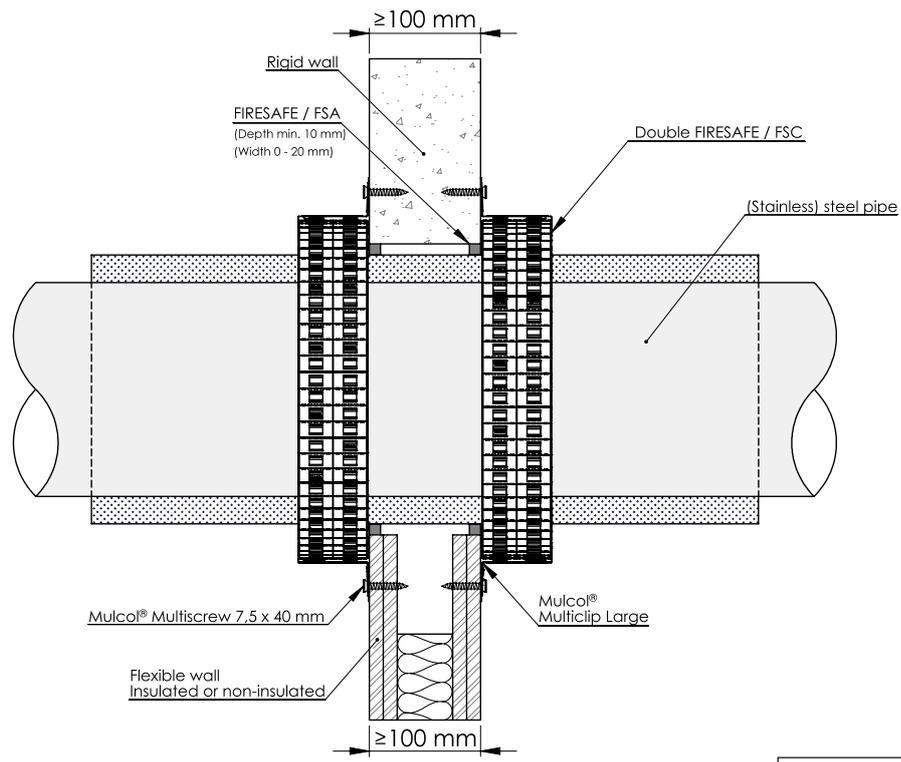
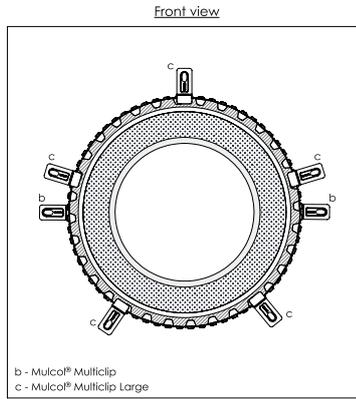


Drawing: FW.E-MC30-CU-10.0.25

| Services                               | Pipe dimensions (mm)  |                | Insulation |                |               | Product        | Classification       |
|--|-----------------------|----------------|------------|----------------|---------------|----------------|----------------------|
|  | Outer dimension       | Wall thickness | Type       | Thickness (mm) | Configuration |                |                      |
| Copper / (Stainless) Steel / cast iron | $\leq \text{Ø } 54$   | $\geq 1.5$     | PIR / PUR  | 25             | LS 500 / CS   | FIRESAFE / FSC | EI 60 C/U, E 120 C/U |
|  | $\leq \text{Ø } 76.1$ | $\geq 2.0$     |            |                |               |                |                      |

**A.1.20 Directly through wall -  $\geq 100$  mm - Metal pipes insulated elastomer**

**A.1.20.2 Steel pipes - PIR / PUR foam LS 500 / CS**



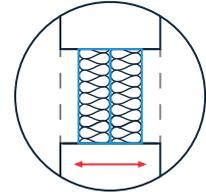
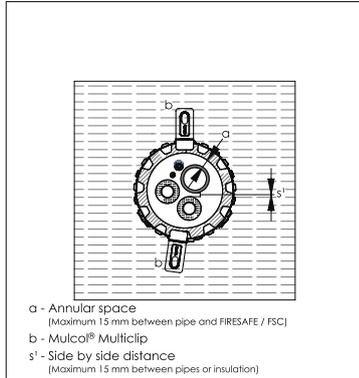
Drawing: FW.E-MC60-ST250-20.0.25

| Services                      | Pipe dimensions (mm)     |                | Insulation |                |               | Product        | Classification       |
|-------------------------------|--------------------------|----------------|------------|----------------|---------------|----------------|----------------------|
|                               | Outer dimension          | Wall thickness | Type       | Thickness (mm) | Configuration |                |                      |
| (Stainless) Steel / cast iron | $\leq \varnothing 219.1$ | $\geq 4.0$     | PIR / PUR  | 25             | LS 500 / CS   | FIRESAFE / FSC | EI 60 C/U, E 120 C/U |
|                               |                          |                |            |                | CS            |                | EI 90 C/U, E 120 C/U |

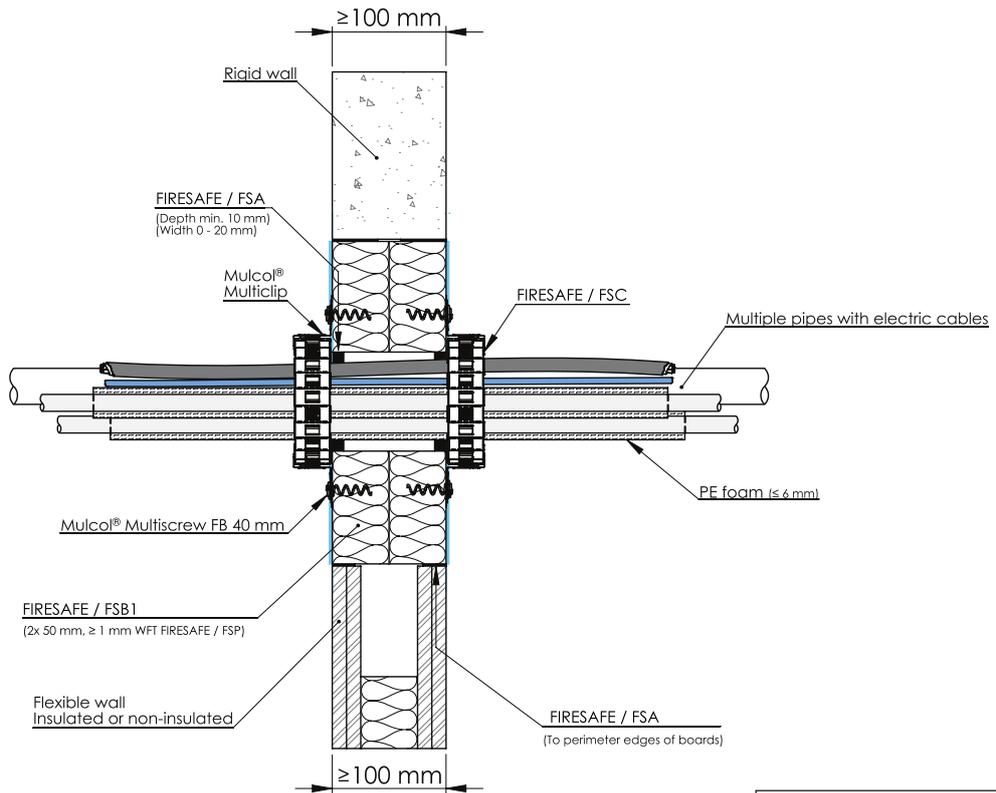
## A.1.21 FIRESAFE / FSB1 - 2x50 mm - Multiple services

### A.1.21.1 Airconditioning set

Front view



Position seat:  
right, left or anywhere  
in between



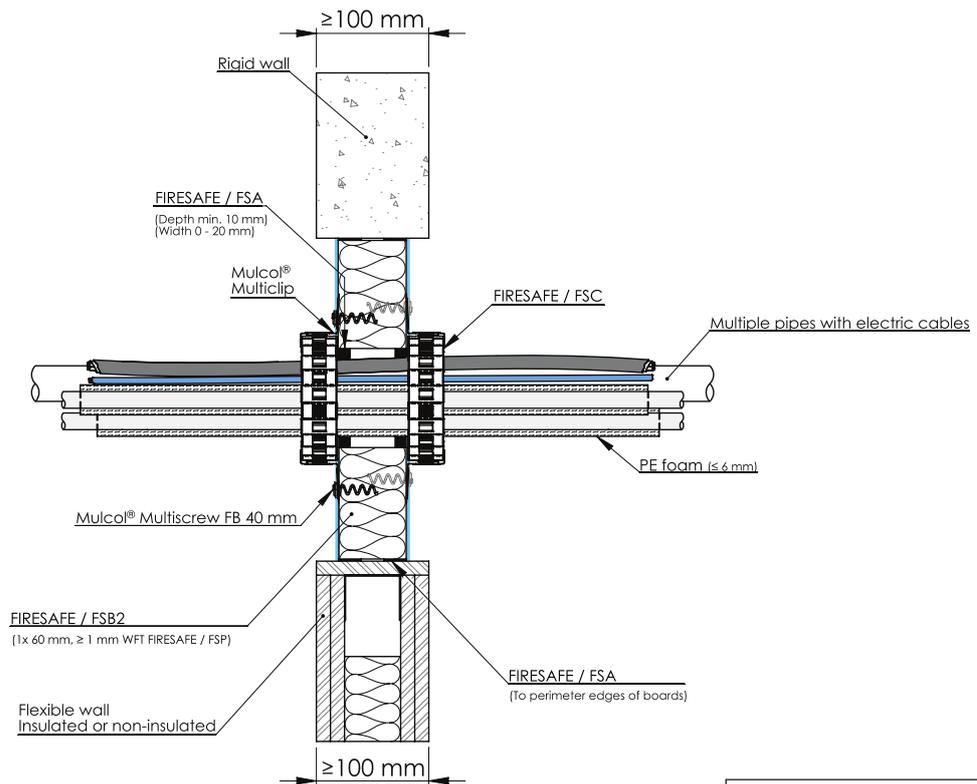
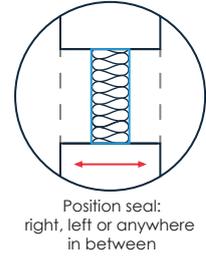
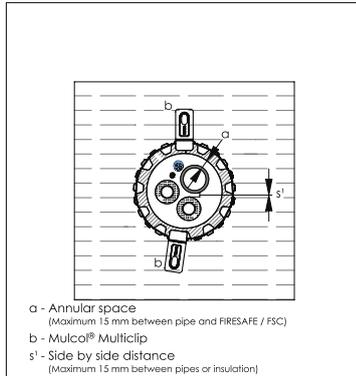
Drawing: PBFw,E-MLP5-MFB1.2.40

| Services                     | Pipe dimensions (mm)                   |                | Insulation |                |                            | Product        | Classification         |
|------------------------------|--|----------------|------------|----------------|----------------------------|----------------|------------------------|
|                              | Outer diameter                         | Wall thickness | Type       | Thickness (mm) | Configuration              |                |                        |
| Set of airconditioning pipes | $2x \leq \varnothing 15$               | 1.5            | PE foam    | $\geq 6$       | LS 400 / CS<br>LI 400 / CI | FIRESAFE / FSC | EI 60 C/U<br>E 120 C/U |
| PVC-U / PVC-C                | $\leq \varnothing 40$                  | 3.0            | -          | -              | -                          |                | EI 60 U/U<br>E 120 U/U |
| Telecommunication cable      | UTP Cat 5/6                            | -              | -          | -              | -                          |                | EI 60<br>E 120         |
| Sheathed cable               | $\leq 5 \times 2.5$<br>mm <sup>2</sup> | -              | -          | -              | -                          |                |                        |

## A.1.22 FIRESAFE / FSB2 - 1x60 mm - Multiple services

### A.1.22.1 Airconditioning set

Front view



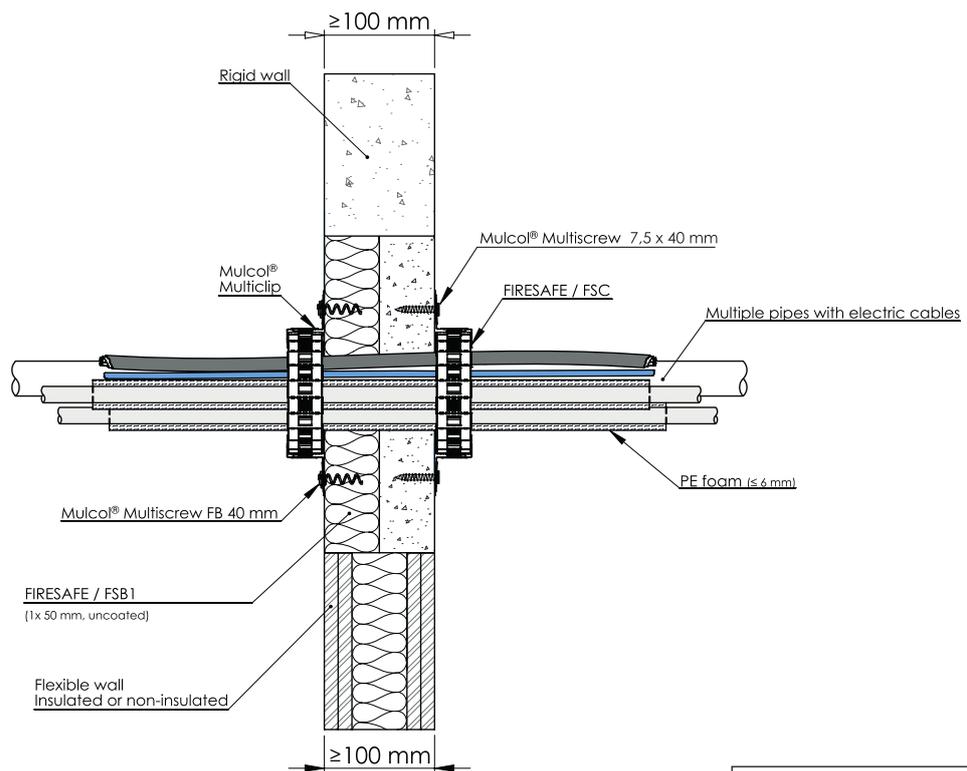
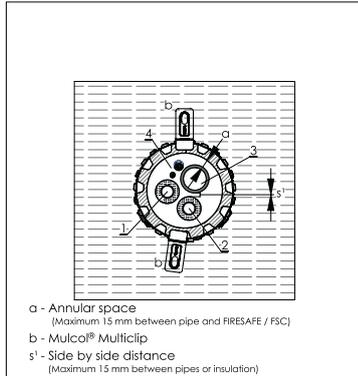
Drawing: PBfw.E-MLP5-MFB2.1.40

| Services                     | Pipe dimensions (mm)                   |                | Insulation |                |                            | Product        | Classification         |
|------------------------------|--|----------------|------------|----------------|----------------------------|----------------|------------------------|
|                              | Outer diameter                         | Wall thickness | Type       | Thickness (mm) | Configuration              |                |                        |
| Set of airconditioning pipes | $2x \leq \varnothing 15$               | 1.5            | PE foam    | $\geq 6$       | LS 400 / CS<br>LI 400 / CI | FIRESAFE / FSC | EI 60 C/U<br>E 120 C/U |
| PVC-U / PVC-C                | $\leq \varnothing 40$                  | 3.0            | -          | -              | -                          |                | EI 60 U/U<br>E 120 U/U |
| Telecommunication cable      | UTP Cat 5/6                            | -              | -          | -              | -                          |                | EI 60<br>E 120         |
| Sheathed cable               | $\leq 5 \times 2.5$<br>mm <sup>2</sup> | -              | -          | -              | -                          |                |                        |

## A.1.23 Multimortar + FIRESAFE / FSB - $\geq 100$ mm - Multiple services

### A.1.23.1 Airconditioning set

Front view

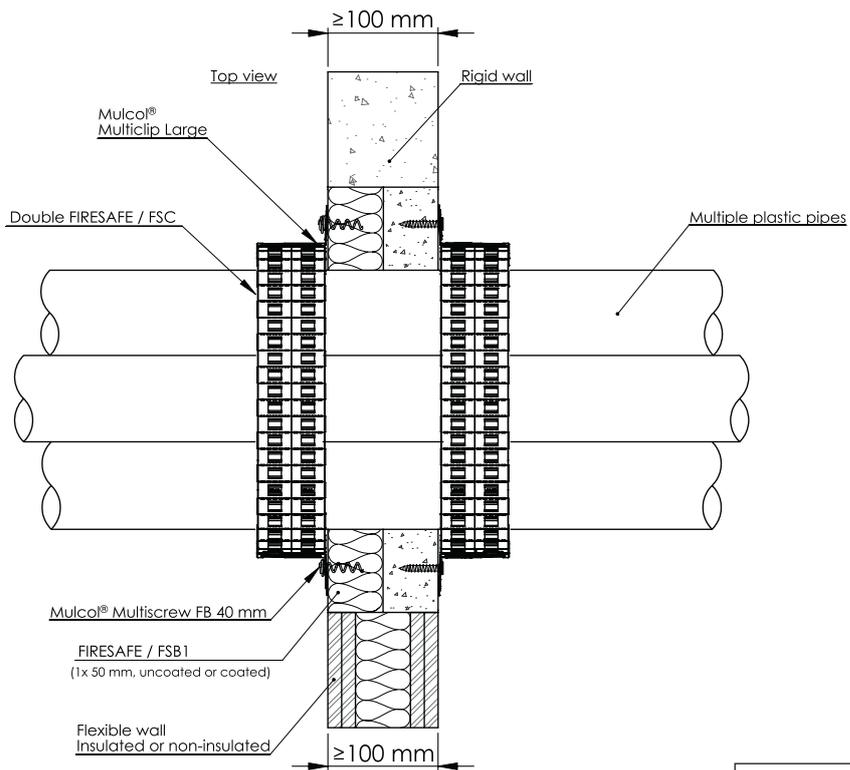
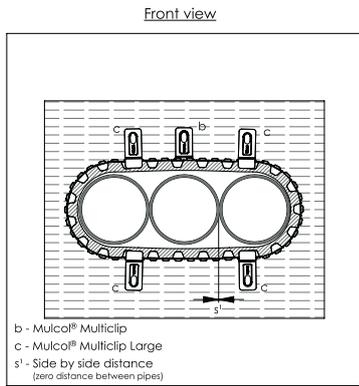


Drawing: FW.E-MC30-MLP5-MM2.5.40

| Services                     | Pipe dimensions (mm)                          |                | Insulation |                |                            | Product        | Classification         |
|------------------------------|---|----------------|------------|----------------|----------------------------|----------------|------------------------|
|                              | Outer diameter                                | Wall thickness | Type       | Thickness (mm) | Configuration              |                |                        |
| Set of airconditioning pipes | $2x \leq \varnothing 15$                      | 1.5            | PE foam    | $\geq 6$       | LS 400 / CS<br>LI 400 / CI | FIRESAFE / FSC | EI 60 C/U<br>E 120 C/U |
| PVC-U / PVC-C                | $\leq \varnothing 40$                         | 3.0            |            |                |                            |                | EI 60 U/U<br>E 120 U/U |
| Telecommunication cable      | UTP Cat 5/6                                   |                |            |                |                            |                |                        |
| Sheathed cable               | $\leq \text{YMKV } 5 \times 2.5 \text{ mm}^2$ |                |            |                |                            |                | EI 60<br>E 120         |

**A.1.23 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Multiple services**

**A.1.23.2 Multiple plastic pipes**



Drawing: FW.E-MC60-MLP3-MM2.5.10

| Services                       | Pipe dimensions (mm)    |                | Product               | Classification       |
|--------------------------------|-------------------------|----------------|-----------------------|----------------------|
|                                | Outer dimension         | Wall thickness |                       |                      |
| PE(-HD) / PE-X / ABS / SAN+PVC | $3x \leq \text{Ø } 110$ | 2.7            | FIRESAFE / FSC double | EI 90 U/C, E 120 U/C |

**A.1.24**

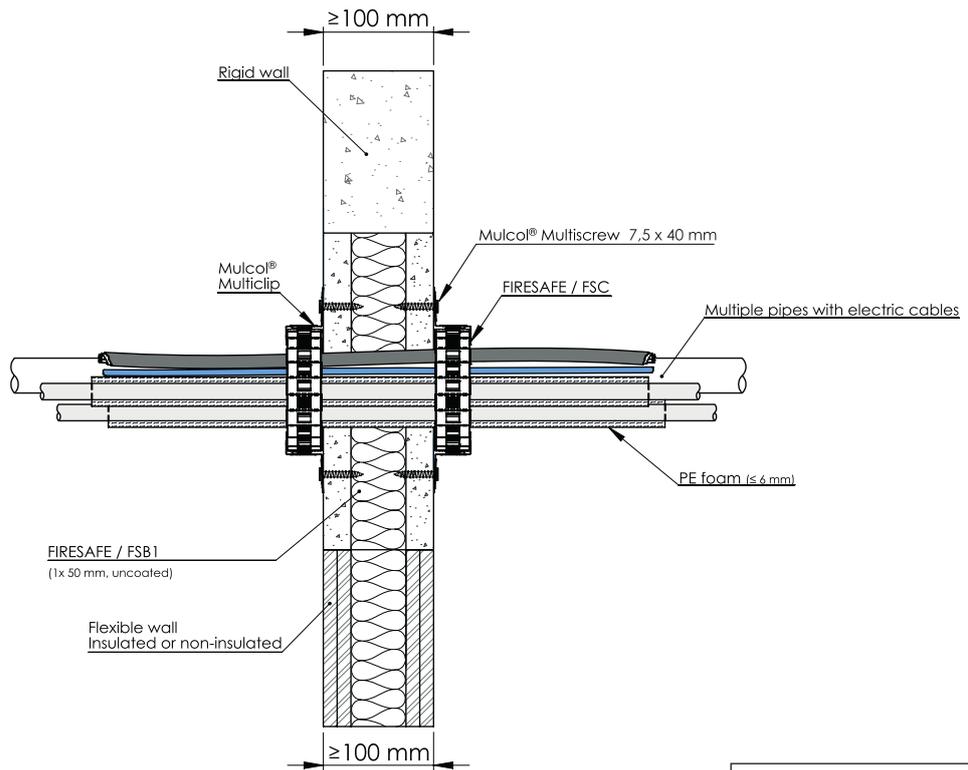
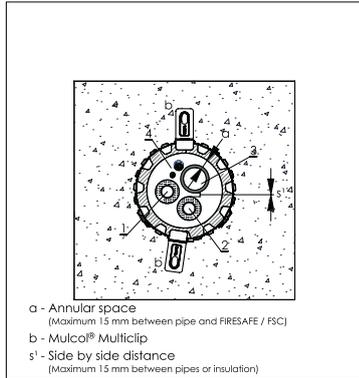
**Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm -**

**Multiple services**

**A.1.24.1**

**Airconditioning set**

Front view



Drawing: FW-MC30-MLP5-MM3.4.40

| Services                     | Pipe dimensions (mm)                |                | Insulation |                |                            | Product        | Classification         |
|------------------------------|-------------------------------------|----------------|------------|----------------|----------------------------|----------------|------------------------|
|                              | Outer diameter                      | Wall thickness | Type       | Thickness (mm) | Configuration              |                |                        |
| Set of airconditioning pipes | $2x \leq \varnothing 15$            | 1.5            | PE foam    | $\geq 6$       | LS 400 / CS<br>LI 400 / CI | FIRESAFE / FSC | EI 60 C/U<br>E 120 C/U |
| PVC-U / PVC-C                | $\leq \varnothing 40$               | 3.0            | -          | -              | -                          |                | EI 60 U/U<br>E 120 U/U |
| Telecommunication cable      | UTP Cat 5/6                         | -              | -          | -              | -                          |                | EI 60<br>E 120         |
| Sheathed cable               | $\leq$ YMKV 5 x 2.5 mm <sup>2</sup> | -              | -          | -              | -                          |                |                        |

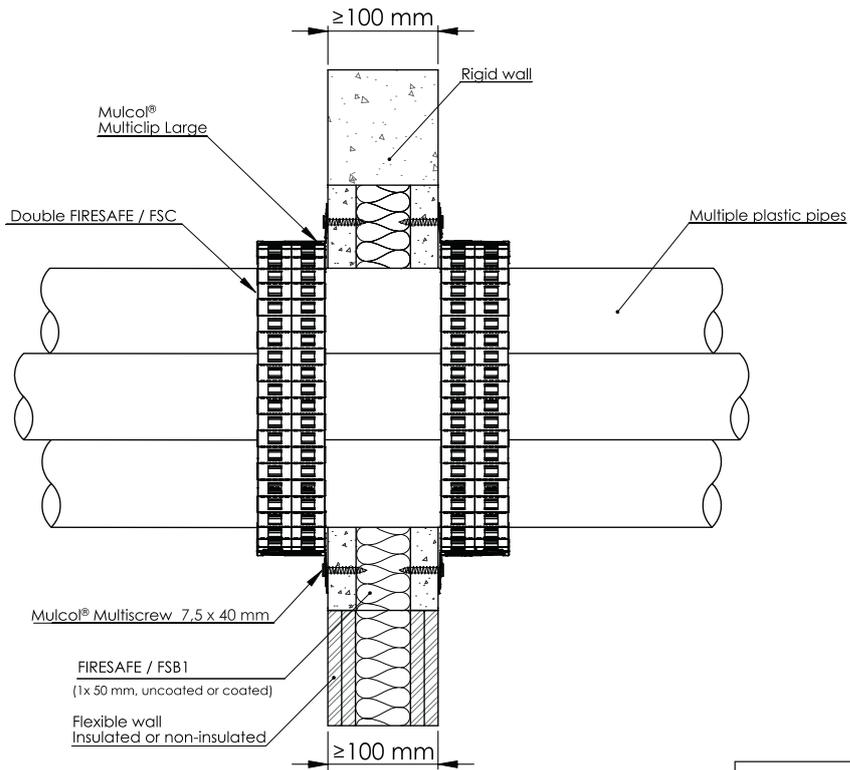
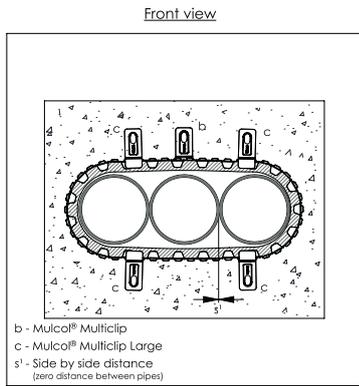
**A.1.24**

**Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm -**

**Multiple services**

**A.1.24.2**

**Multiple plastic pipes**



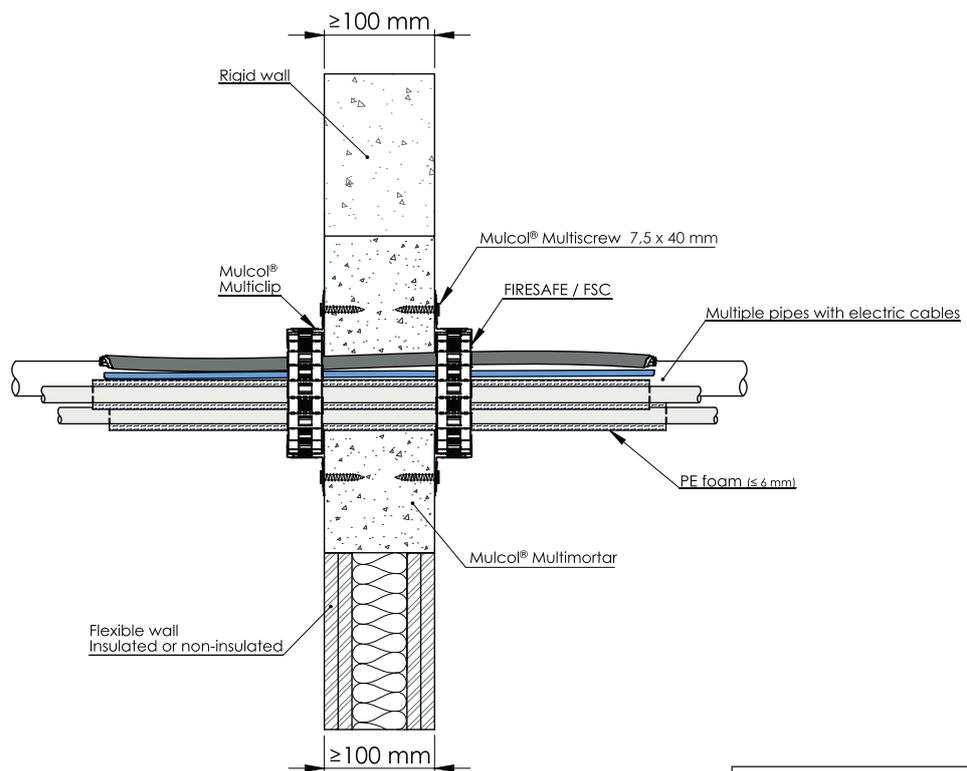
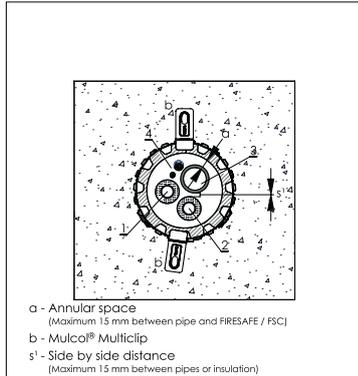
Drawing: FW.E-MC60-MLP3-MM3.4.10

| Services                       | Pipe dimensions (mm)    |                | Product               | Classification       |
|--------------------------------|-------------------------|----------------|-----------------------|----------------------|
|                                | Outer dimension         | Wall thickness |                       |                      |
| PE(-HD) / PE-X / ABS / SAN+PVC | $3x \leq \text{Ø } 110$ | 2.7            | FIRESAFE / FSC double | EI 90 U/C, E 120 U/C |

## A.1.25 Multimortar - $\geq 100$ mm - Multiple services

### A.1.25.1 Airconditioning set

Front view

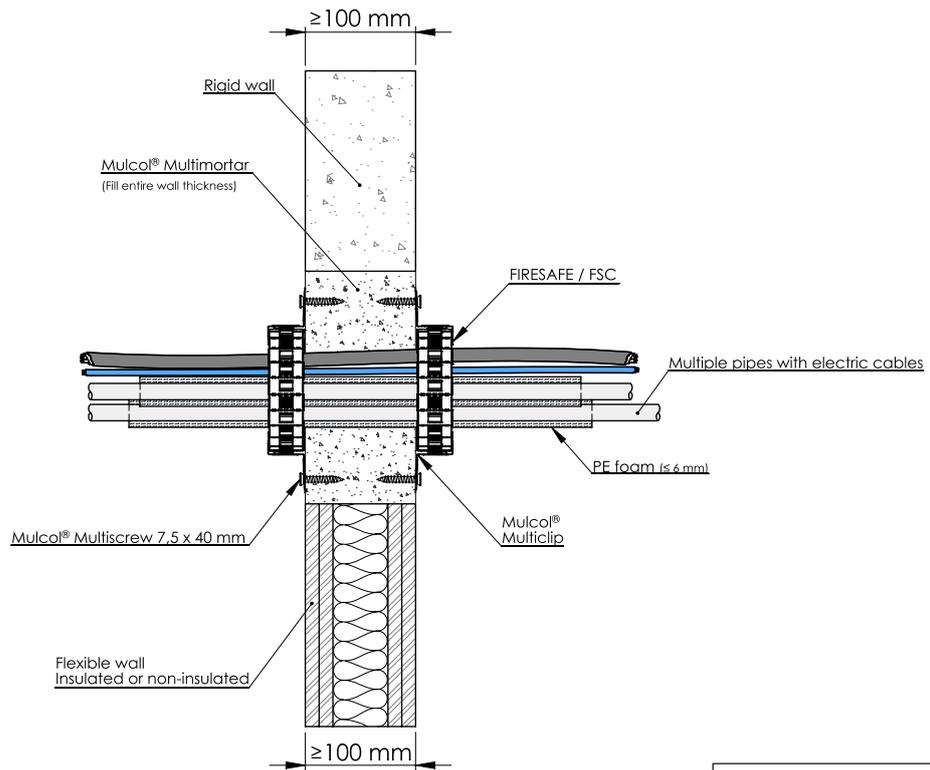
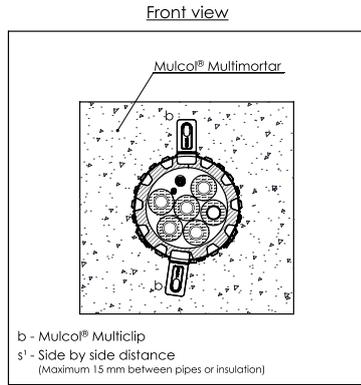


Drawing: FW.E-MC30-MLP5-MM1.2.40

| Services                     | Pipe dimensions (mm)                          |                | Insulation |                |                            | Product        | Classification         |
|------------------------------|---|----------------|------------|----------------|----------------------------|----------------|------------------------|
|                              | Outer diameter                                | Wall thickness | Type       | Thickness (mm) | Configuration              |                |                        |
| Set of airconditioning pipes | $2x \leq \varnothing 15$                      | 1.5            | PE foam    | $\geq 6$       | LS 400 / CS<br>LI 400 / CI | FIRESAFE / FSC | EI 60 C/U<br>E 120 C/U |
| PVC-U / PVC-C                | $\leq \varnothing 40$                         | 3.0            | -          | -              | -                          |                | EI 60 U/U<br>E 120 U/U |
| Telecommunication cable      | UTP Cat 5/6                                   | -              | -          | -              | -                          |                | EI 60<br>E 120         |
| Sheathed cable               | $\leq \text{YMKV } 5 \times 2.5 \text{ mm}^2$ | -              | -          | -              | -                          |                |                        |

**A.1.25 Multimortar -  $\geq 100$  mm - Multiple services**

**A.1.25.2 Multiple airconditioning sets**

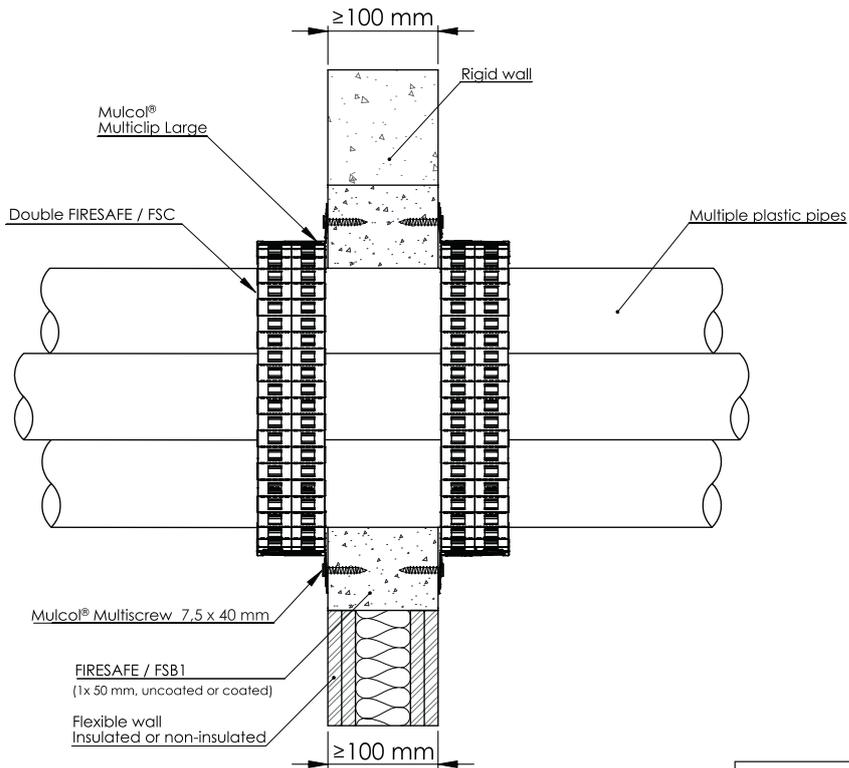
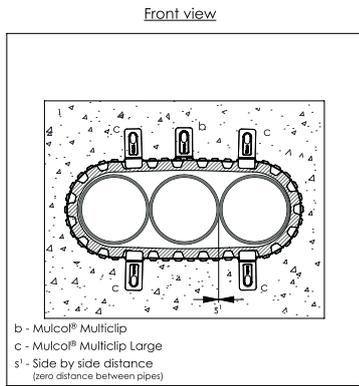


Drawing: FW.E-MC30-MLP6-MM1.2.23

| Services                               | Pipe dimensions (mm)                |                | Insulation |                |               | Product        | Classification        |
|--|-------------------------------------|----------------|------------|----------------|---------------|----------------|-----------------------|
|  | Outer diameter                      | Wall thickness | Type       | Thickness (mm) | Configuration |                |                       |
| Multiple sets of airconditioning pipes | 6x $\leq \varnothing 15$            | 1.5            | PE foam    | $\leq 6$       | LS 400 / CS   | FIRESAFE / FSC | EI 60 C/U<br>E 90 C/U |
|  |                                     |                |            |                | LI 400 / CI   |                |                       |
| Sheathed cable $\leq 3$ pcs.           | $\leq$ YMKV 5 x 2.5 mm <sup>2</sup> | -              | -          | -              | -             |                |                       |

**A.1.25 Multimortar -  $\geq 100$  mm - Multiple services**

**A.1.25.3 Multiple plastic pipes**

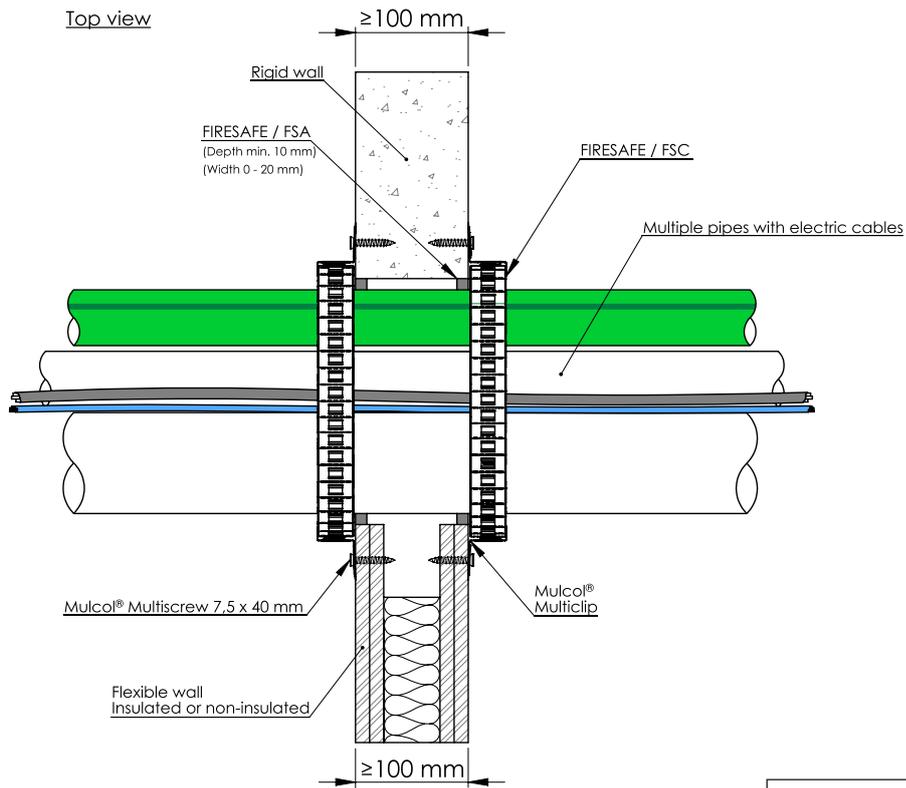
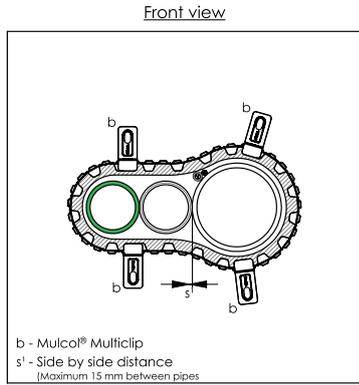


Drawing: FW.E-MC60-MLP3-MM1.2.10

| Services                       | Pipe dimensions (mm)    |                | Product               | Classification       |
|--------------------------------|-------------------------|----------------|-----------------------|----------------------|
|                                | Outer dimension         | Wall thickness |                       |                      |
| PE(-HD) / PE-X / ABS / SAN+PVC | $3x \leq \text{Ø } 110$ | 2.7            | FIRESAFE / FSC double | EI 90 U/C, E 120 U/C |

**A.1.26 Directly through wall -  $\geq 100$  mm - Multiple services**

**A.1.26.1 Multiple pipes and cables**

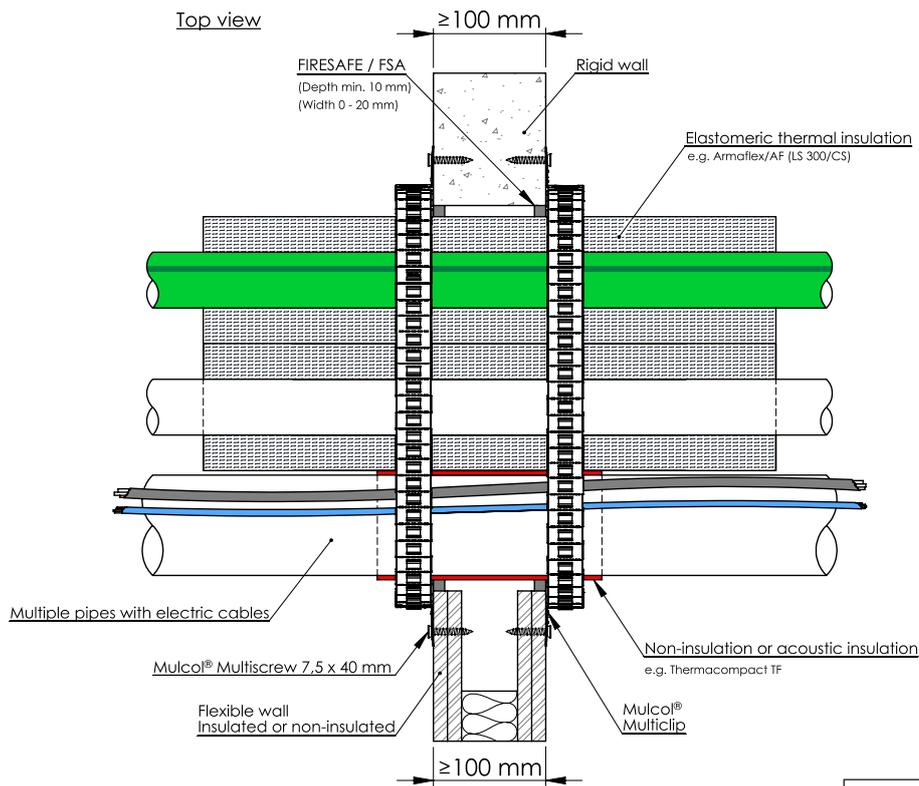
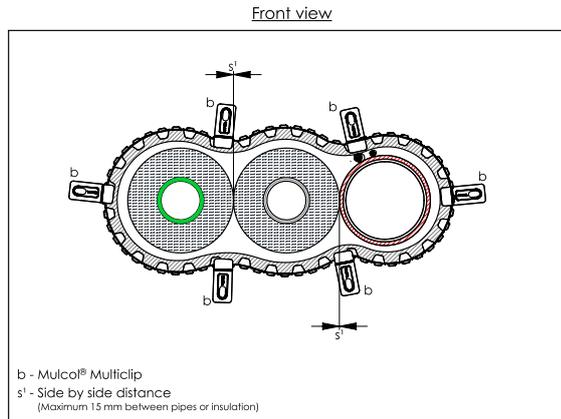


Drawing: FW.E-MC30-MLP3-EC-10.0.10

| Services                       | Pipe dimensions (mm)             |                | Product        | Classification       |
|--------------------------------|----------------------------------|----------------|----------------|----------------------|
|                                | Outer dimension                  | Wall thickness |                |                      |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \varnothing 90$            | 2.8            | FIRESAFE / FSC | EI 120 U/U           |
| Multilayer pipes (MLC)         | $\leq \varnothing 50$            | 4.0            |                | EI 90 U/C, E 120 U/C |
| Aquatherm Green-MF             |                                  | 6.9            |                | EI 120 U/C           |
| Telecommunication cable        | UTP Cat 5/6                      | -              |                | EI 120               |
| Sheathed cable                 | $\leq 5 \times 2.5 \text{ mm}^2$ | -              |                |                      |

**A.1.26 Directly through wall -  $\geq 100$  mm - Multiple services**

**A.1.26.2 Multiple pipes and cables - Elastomer LS-LI 300 / CS-CI**

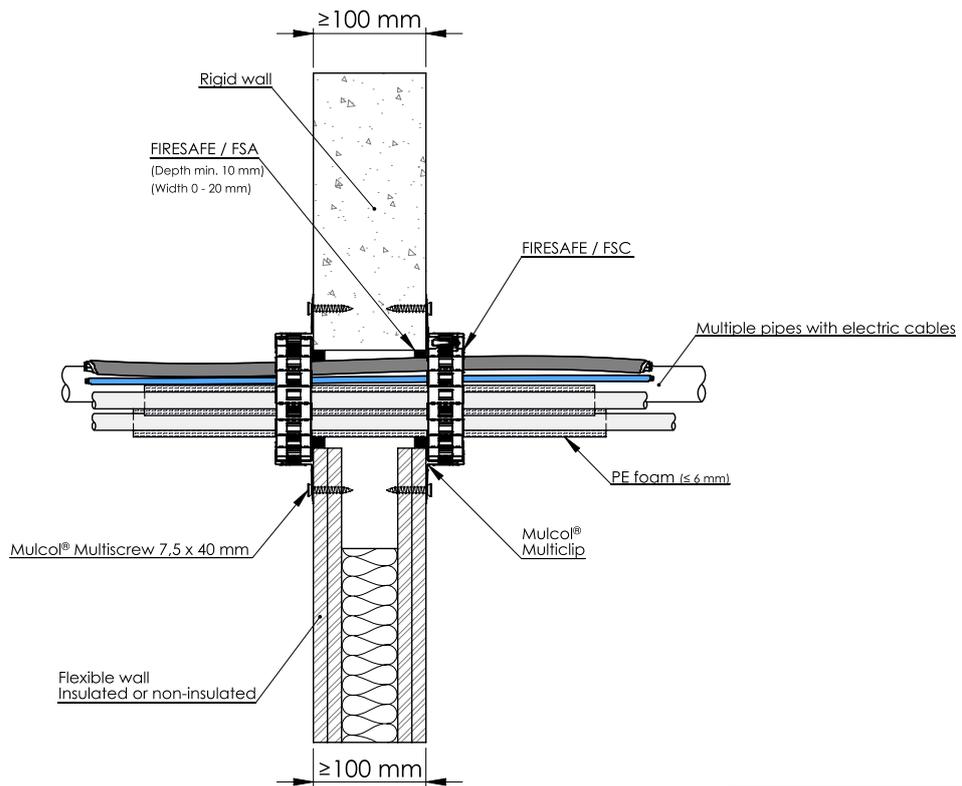
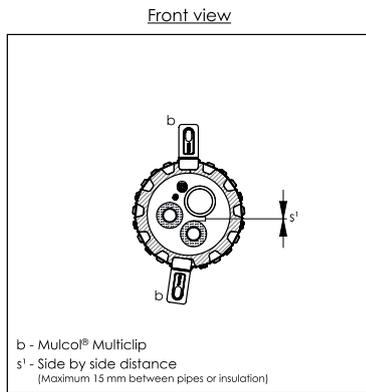


Drawing: FW.E-MC30-MLP3-EC-10.0.40

| Services                       | Pipe dimensions (mm)                         |                | Insulation   |                |                            | Product        | Classification |
|--------------------------------|--|----------------|--|----------------|----------------------------|----------------|----------------|
|                                | Outer diameter                               | Wall thickness | Type   | Thickness (mm) | Configuration              |                |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 90$                          | 2.8            | ArmaFlex AF<br>(min. class B <sub>L</sub> -s3, d0<br>B-s3, d0) | 4              | LS 300 / CS<br>LI 300 / CI | FIRESAFE / FSC | EI 60 C/U      |
| Multilayer pipes (MLC)         | $\leq \text{Ø } 50$                          | 4.0            |  | 9 - 32         |                            |                |                |
| Aquatherm Green-MF             |  | 6.9            |  |                |                            |                |                |
| Telecommunication cable        | UTP Cat 5/6                                  | -              | -  | -              | -                          | EI 60          |                |
| Sheathed cable                 | $\leq \text{YMK } 5 \times 2.5 \text{ mm}^2$ | -              | -  | -              | -                          |                |                |

**A.1.26 Directly through wall -  $\geq 100$  mm - Multiple services**

**A.1.26.3 Airconditioning set**

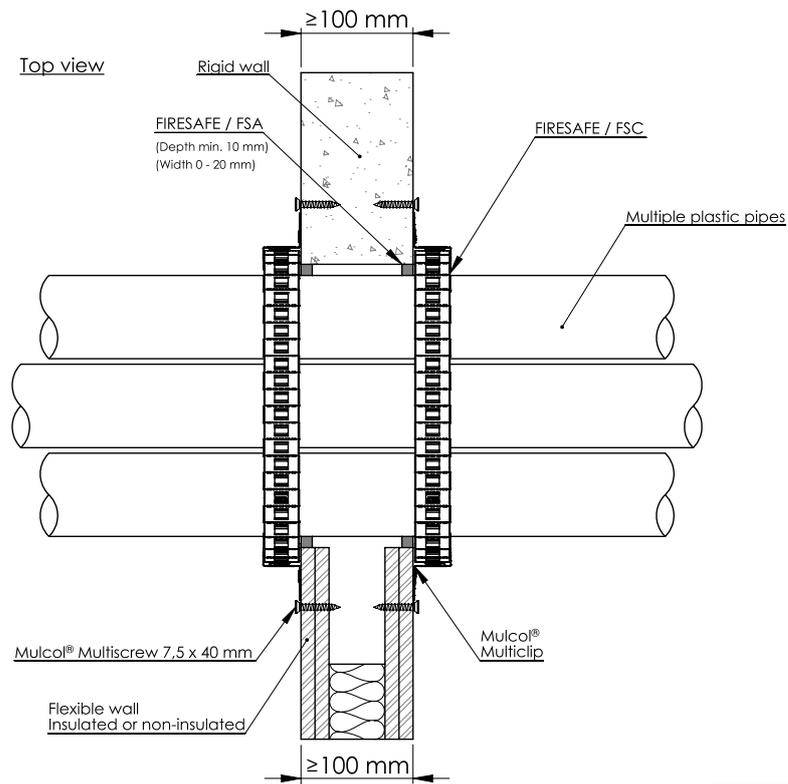
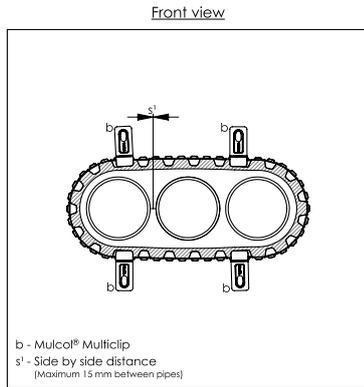


Drawing: FW.E-MC30-MLP5-EC-10.0.40

| Services                     | Pipe dimensions (mm)                |                | Insulation |                |                            | Product        | Classification |
|------------------------------|-------------------------------------|----------------|------------|----------------|----------------------------|----------------|----------------|
|                              | Outer diameter                      | Wall thickness | Type       | Thickness (mm) | Configuration              |                |                |
| Set of airconditioning pipes | $2x \leq \varnothing 15$            | 1.5            | PE foam    | $\geq 6$       | LS 400 / CS<br>LI 400 / CI | FIRESAFE / FSC | EI 60 C/U      |
| PVC-U / PVC-C                | $\leq \varnothing 40$               | 3.0            | -          | -              | -                          |                | EI 120 U/U     |
| Telecommunication cable      | UTP Cat 5/6                         | -              | -          | -              | -                          |                | EI 120         |
| Sheathed cable               | $\leq$ YMKV 5 x 2.5 mm <sup>2</sup> | -              | -          | -              | -                          |                |                |

**A.1.26 Directly through wall -  $\geq 100$  mm - Multiple services**

**A.1.26.4 Multiple plastic pipes**



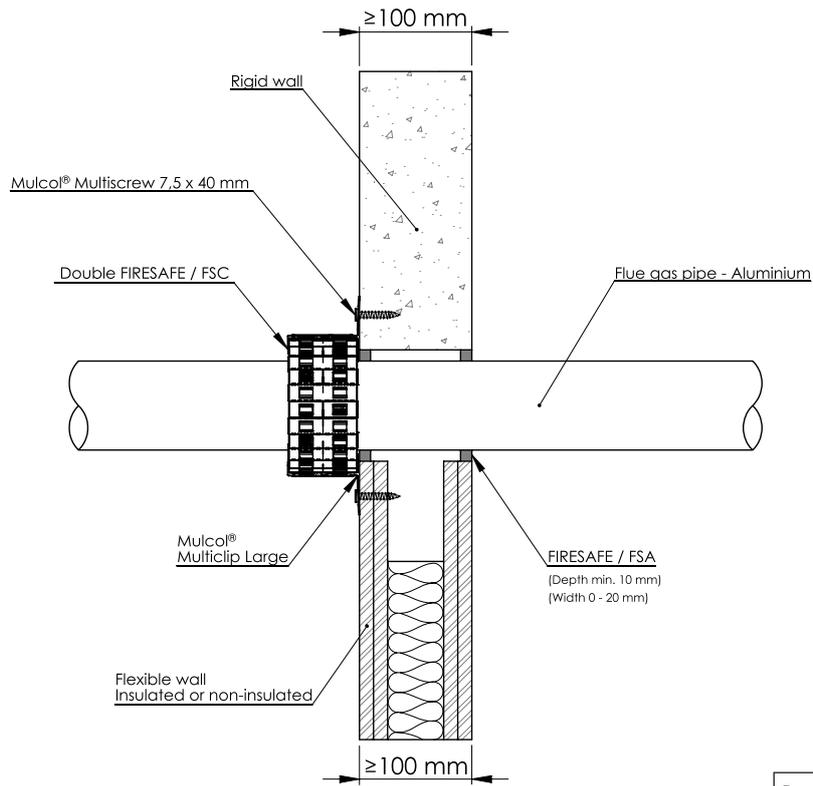
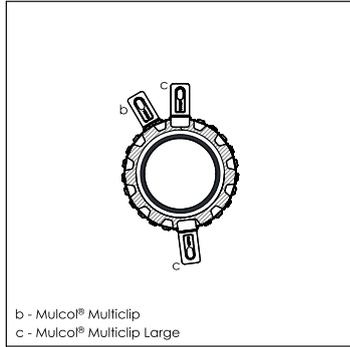
Drawing: FW.E-MC30-MLP3-10.0.10

| Services                       | Pipe dimensions (mm)    |                | Product                  | Classification       |
|--------------------------------|-------------------------|----------------|--------------------------|----------------------|
|                                | Outer dimension         | Wall thickness |                          |                      |
| PE(-HD) / PE-X / ABS / SAN+PVC | $3x \leq \text{Ø } 110$ | 2.7            | FIRESAFE / FSC<br>double | EI 90 U/C, E 120 U/C |

**A.1.27 Directly through wall -  $\geq 100$  mm - Flue gas pipes**

**A.1.27.1 Aluminium flue gas pipes**

Front view



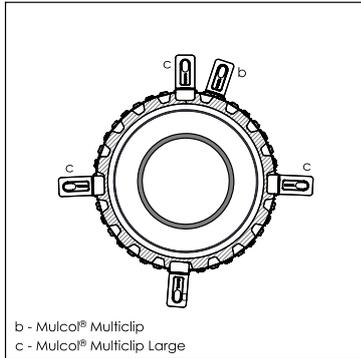
Drawing: FW.E-MC60-RGA-21.0.10

| Services  | Pipe dimensions (mm) |                | Product               | Classification      |
|-----------|----------------------|----------------|-----------------------|---------------------|
|           | Outer dimension      | Wall thickness |                       |                     |
| Aluminium | $\leq \text{Ø } 80$  | 1.5            | FİRESAFE / FSC double | EI 15 U/C, E 90 U/C |
|           | $\leq \text{Ø } 130$ |                |                       | E 90 U/C            |

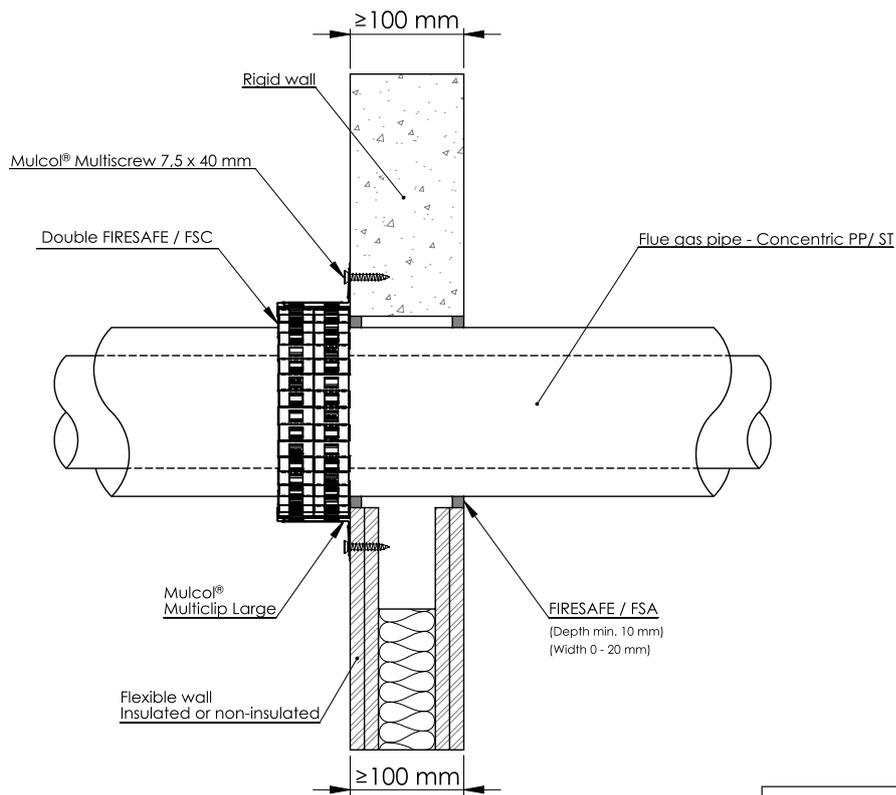
**A.1.27 Directly through wall -  $\geq 100$  mm - Flue gas pipes**

**A.1.27.2 Concentric steel flue gas pipes**

Front view



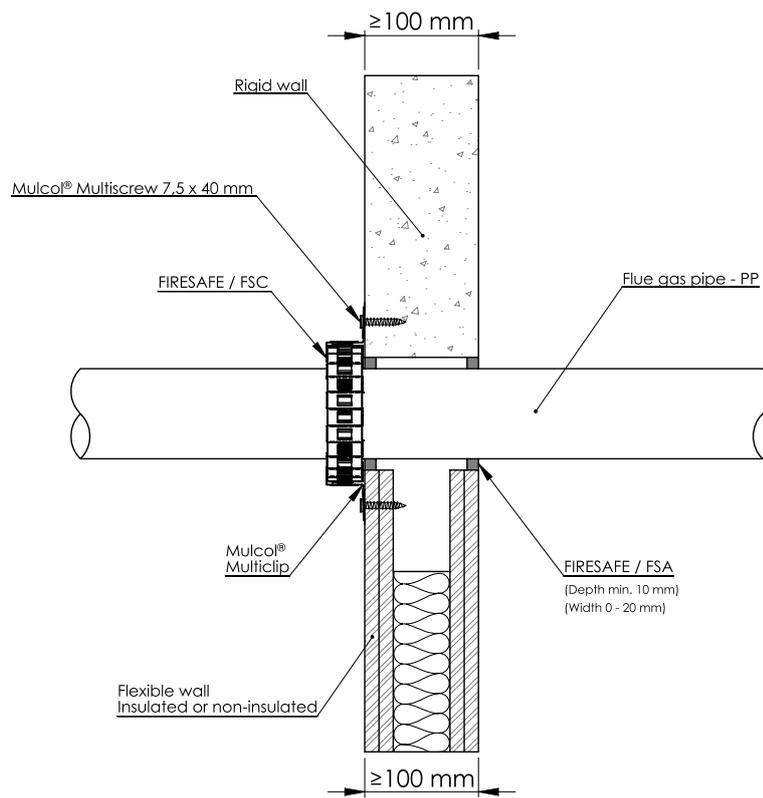
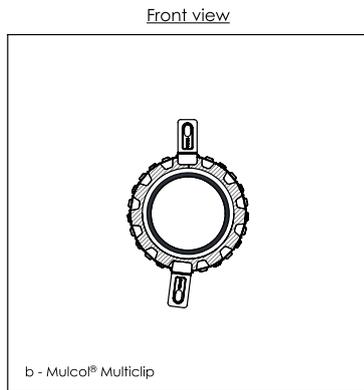
b - Mulcol® Multiclip  
c - Mulcol® Multiclip Large



| Services                              | Pipe dimensions (mm) |                      | Product               | Classification  |
|---------------------------------------|----------------------|----------------------|-----------------------|-----------------|
|                                       | Outer pipe dimension | Inner pipe dimension |                       |                 |
| Steel / PP flue gas system concentric | $\leq \text{Ø } 110$ | $\leq \text{Ø } 60$  | FIRESAFE / FSC double | <b>E 90 U/C</b> |
|                                       | $\leq \text{Ø } 125$ | $\leq \text{Ø } 80$  |                       |                 |
|                                       | $\leq \text{Ø } 150$ | $\leq \text{Ø } 100$ |                       |                 |
|                                       | $\leq \text{Ø } 200$ | $\leq \text{Ø } 130$ |                       |                 |

**A.1.27 Directly through wall -  $\geq 100$  mm - Flue gas pipes**

**A.1.27.3 Plastic flue gas pipes**



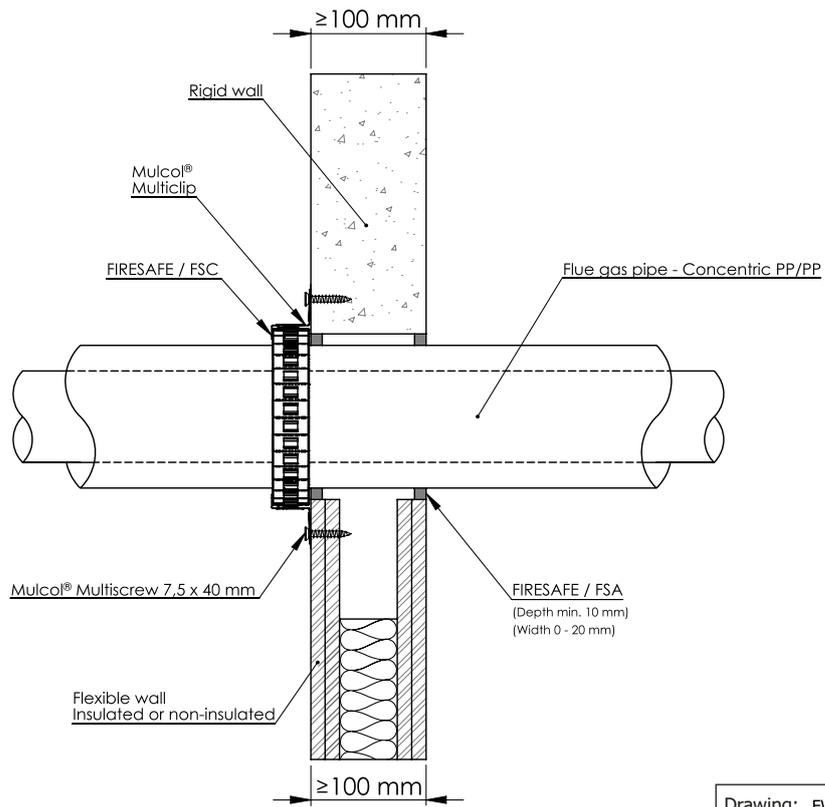
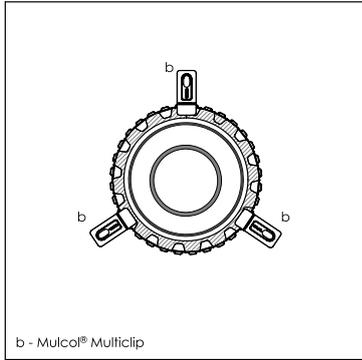
Drawing: FW.E-MC30-RGA\_PP-11.0.10

| Services | Pipe dimensions (mm) |                | Product        | Classification |
|----------|----------------------|----------------|----------------|----------------|
|          | Outer dimension      | Wall thickness |                |                |
| PP       | $\leq \text{Ø } 40$  | 1.8 - 4.0      | FIRESAFE / FSC | EI 90 U/U      |
|          | $\leq \text{Ø } 125$ | 3.1 - 4.0      |                |                |

**A.1.27 Directly through wall -  $\geq 100$  mm - Flue gas pipes**

**A.1.27.4 Concentric plastic flue gas pipes**

Front view

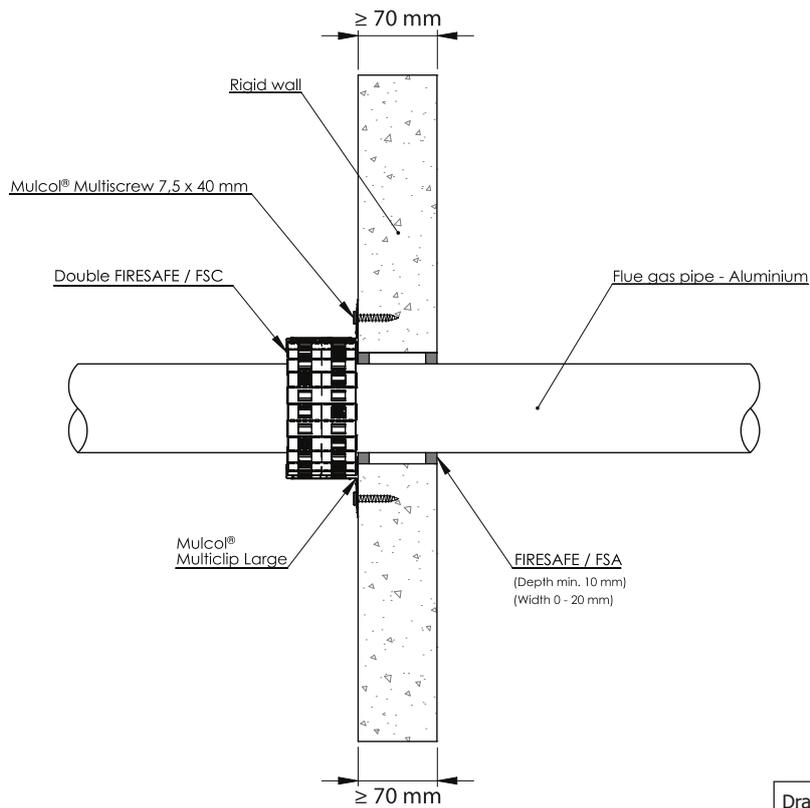
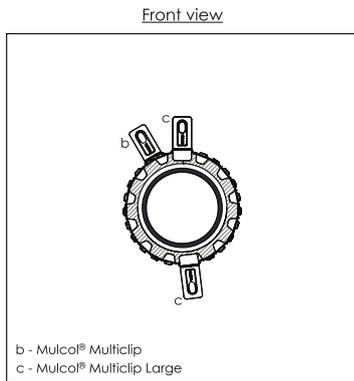


Drawing: FW.E-MC30-RGAT\_PP-11.0.10

| Services | Pipe dimensions (mm) |                | Product        | Classification |
|----------|----------------------|----------------|----------------|----------------|
|          | Outer dimension      | Wall thickness |                |                |
| PP / PP  | $\leq \text{Ø } 40$  | 1.8 - 4.0      | FIRESAFE / FSC | EI 90 U/U      |
|          | $\leq \text{Ø } 125$ | 3.1 - 4.0      |                |                |

**A.2.1 Directly through wall -  $\geq 70$  mm - Flue gas pipes**

**A.2.1.1 Aluminium flue gas pipes**



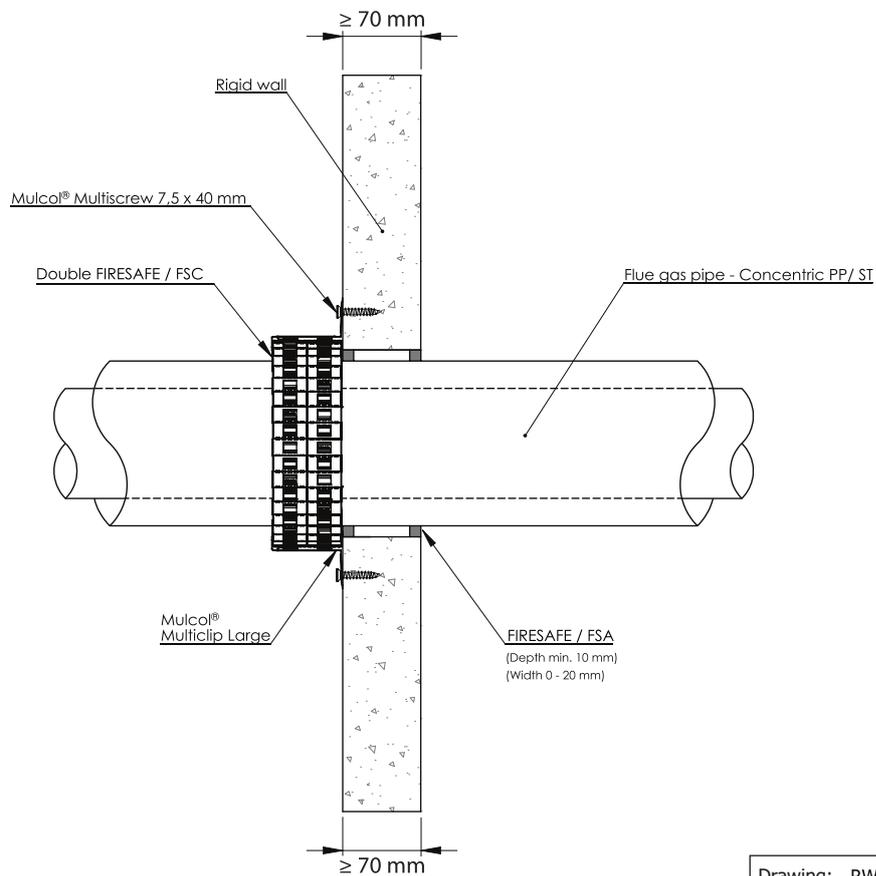
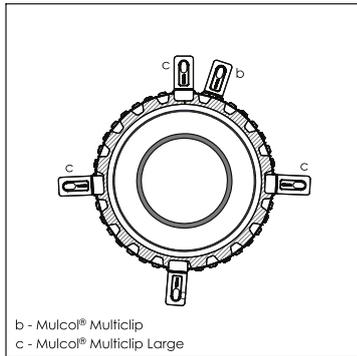
Drawing: RW.E-MC60-RGA-21.0.10

| Services  | Pipe dimensions (mm) |                | Product                  | Classification      |
|-----------|----------------------|----------------|--------------------------|---------------------|
|           | Outer dimension      | Wall thickness |                          |                     |
| Aluminium | $\leq \text{Ø } 80$  | 1.5            | FIRESAFE / FSC<br>double | EI 15 U/C, E 90 U/C |
|           | $\leq \text{Ø } 130$ |                |                          | E 90 U/C            |

## A.2.1 Directly through wall - $\geq 70$ mm - Flue gas pipes

### A.2.1.2 Concentric steel flue gas pipes

Front view

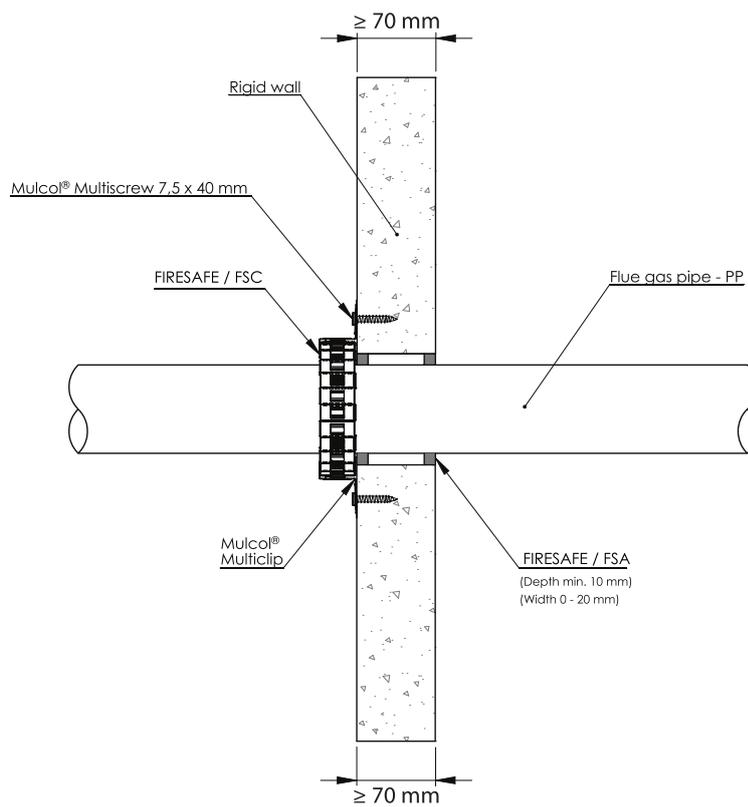
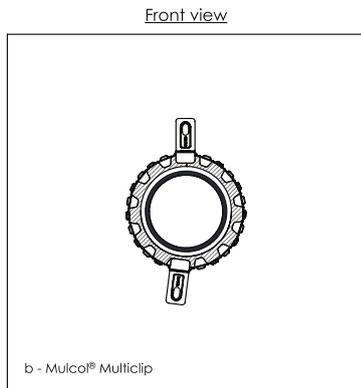


Drawing: RW.E-MC60-RGAT-21.0.10

| Services                              | Pipe dimensions (mm) |                      | Product                  | Classification  |
|---------------------------------------|----------------------|----------------------|--------------------------|-----------------|
|                                       | Outer pipe dimension | Inner pipe dimension |                          |                 |
| Steel / PP flue gas system concentric | $\leq \text{Ø } 110$ | $\leq \text{Ø } 60$  | FİRESAFE / FSC<br>double | <b>E 90 U/C</b> |
|                                       | $\leq \text{Ø } 125$ | $\leq \text{Ø } 80$  |                          |                 |
|                                       | $\leq \text{Ø } 150$ | $\leq \text{Ø } 100$ |                          |                 |
|                                       | $\leq \text{Ø } 200$ | $\leq \text{Ø } 130$ |                          |                 |

**A.2.1 Directly through wall -  $\geq 70$  mm - Flue gas pipes**

**A.2.1.3 Plastic flue gas pipes**



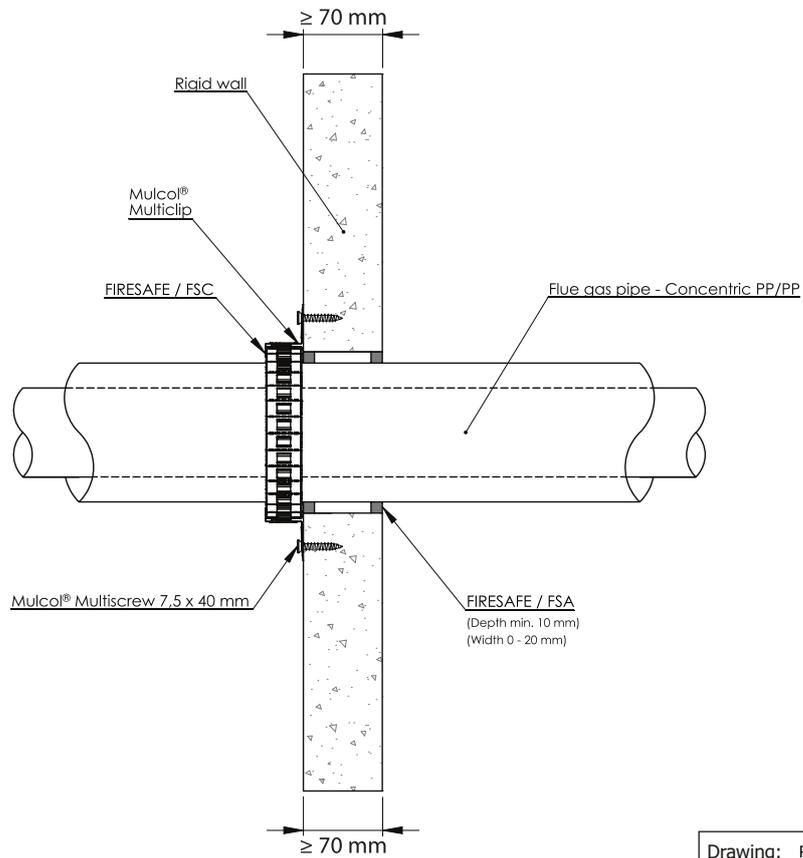
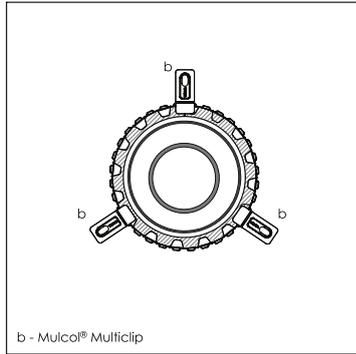
Drawing: RW.E-MC30-RGA\_PP-11.0.10

| Services | Pipe dimensions (mm) |                | Product        | Classification |
|----------|----------------------|----------------|----------------|----------------|
|          | Outer dimension      | Wall thickness |                |                |
| PP       | $\leq \text{Ø } 40$  | 1.8 - 4.0      | FIRESAFE / FSC | EI 90 U/U      |
|          | $\leq \text{Ø } 125$ | 3.1 - 4.0      |                |                |

**A.2.1 Directly through wall -  $\geq 70$  mm - Flue gas pipes**

**A.2.1.4 Concentric plastic flue gas pipes**

Front view



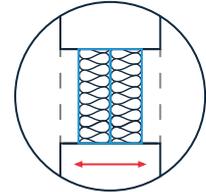
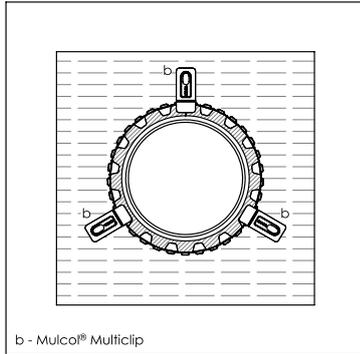
Drawing: RW.E-MC30-RGAT\_PP-11.0.10

| Services | Pipe dimensions (mm) |                | Product        | Classification |
|----------|----------------------|----------------|----------------|----------------|
|          | Outer dimension      | Wall thickness |                |                |
| PP / PP  | $\leq \text{Ø } 40$  | 1.8 - 4.0      | FIRESAFE / FSC | EI 90 U/U      |
|          | $\leq \text{Ø } 125$ | 3.1 - 4.0      |                |                |

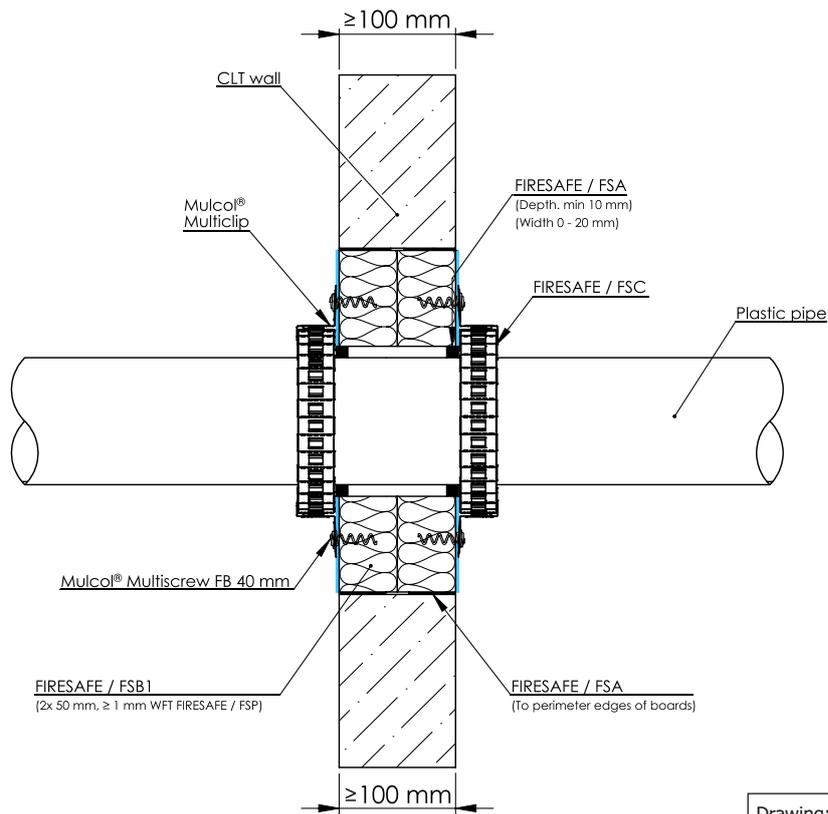
**A.3.1 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes**

**A.3.1.1 Plastic pipes**

Front view



Position seat:  
right, left or anywhere  
in between



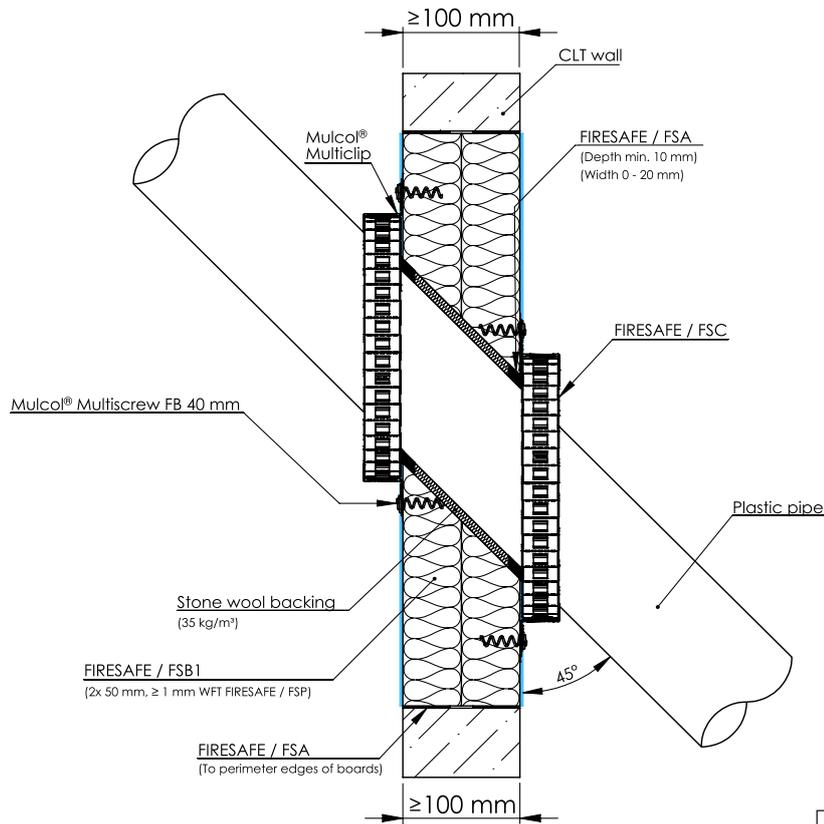
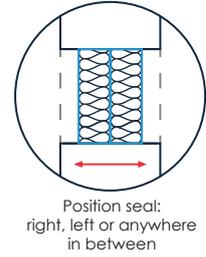
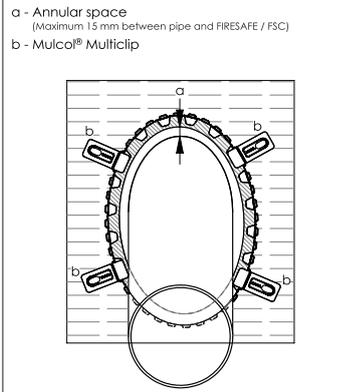
Drawing: WCLT.E-MC30-PP-MFB1.2.10

| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification |
|--------------------------------|----------------------|----------------|----------------|--|----------------|
|                                | Outer dimension      | Wall thickness |                |  |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 2.7 - 6.6      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 90 U/U      |
| PP                             |                      | 2.7            |                |  |                |
| PVC(-U/-C)                     |                      |                |                |  |                |

### A.3.1 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes

#### A.3.1.2 Plastic pipes perpendicular to 45°

Front view



Drawing: WCLT.E-MC30-PP-MFB1-10.1.10

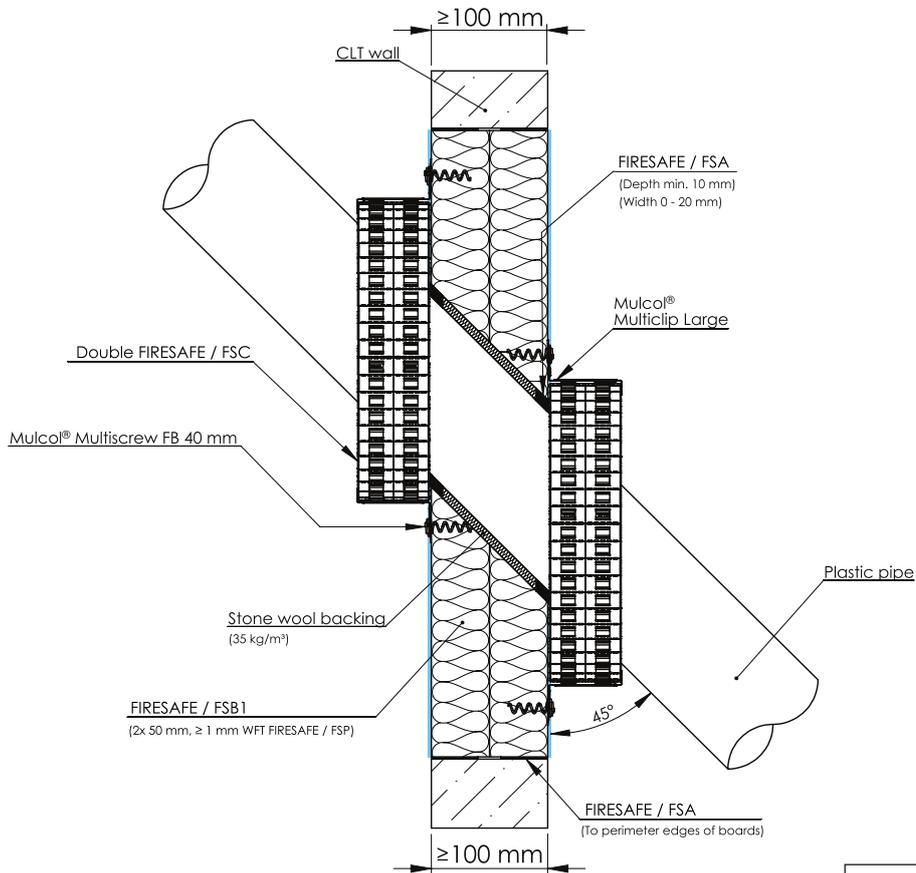
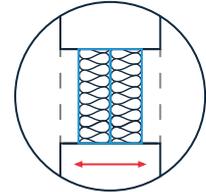
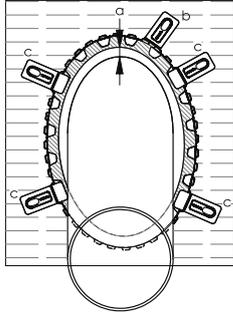
| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification |
|--------------------------------|----------------------|----------------|----------------|--|----------------|
|                                | Outer dimension      | Wall thickness |                |  |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 2.7            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 90 U/C      |
| PP                             |                      |                |                |  |                |
| PVC(-U/-C)                     |                      |                |                |  |                |

### A.3.1 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes

#### A.3.1.3 Plastic pipes perpendicular to 45° - double FIRESAFE / FSC

Front view

- a - Annular space  
(Maximum 15 mm between pipe and FIRESAFE / FSC)
- b - Mulcol® Multiclip
- c - Mulcol® Multiclip Large

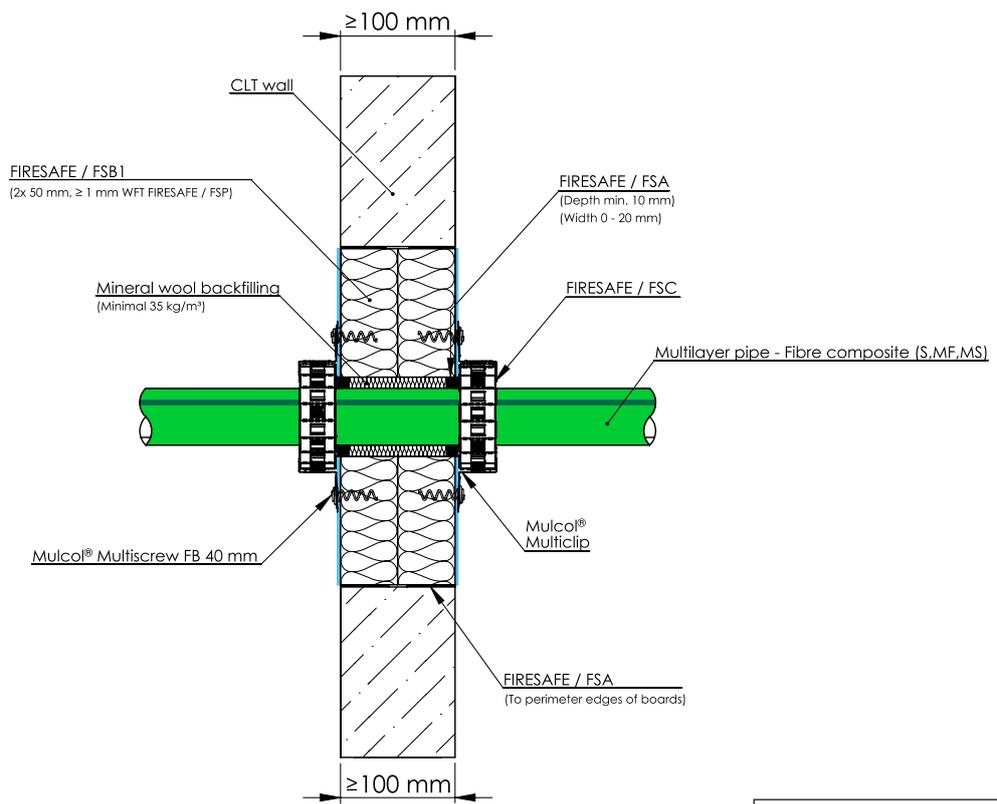
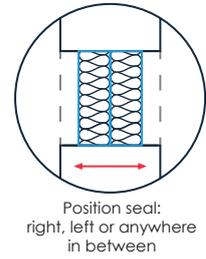
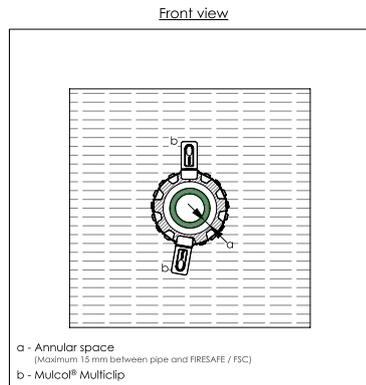


Drawing: WCLTE-MC60-PP-MFB1-20.1.10

| Services                       | Pipe dimensions (mm) |                | Product                  | Sealing (mm)                           | Classification |
|--------------------------------|----------------------|----------------|--------------------------|--|----------------|
|                                | Outer dimension      | Wall thickness |                          |  |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 2.7            | FIRESAFE / FSC<br>Double | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 90 U/U      |
|                                |                      | 2.7 - 10.0     |                          |  | EI 90 U/C      |
| PP                             |                      | 2.7            |                          |  | EI 30 U/U      |
|                                |                      | 3.4            |                          |  | EI 90 U/C      |
| PVC(-U/-C)                     |                      | 3.4 - 10.0     |                          |  | EI 60 U/C      |
|                                |                      | 2.7            |                          |  | EI 30 U/U      |
|                                | 3.4                  | EI 90 U/C      |                          |  |                |
|                                |                      | 3.4 - 10.0     | EI 60 U/C                |  |                |

**A.3.1 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes**

**A.3.1.4 PP-R multilayer pipes**

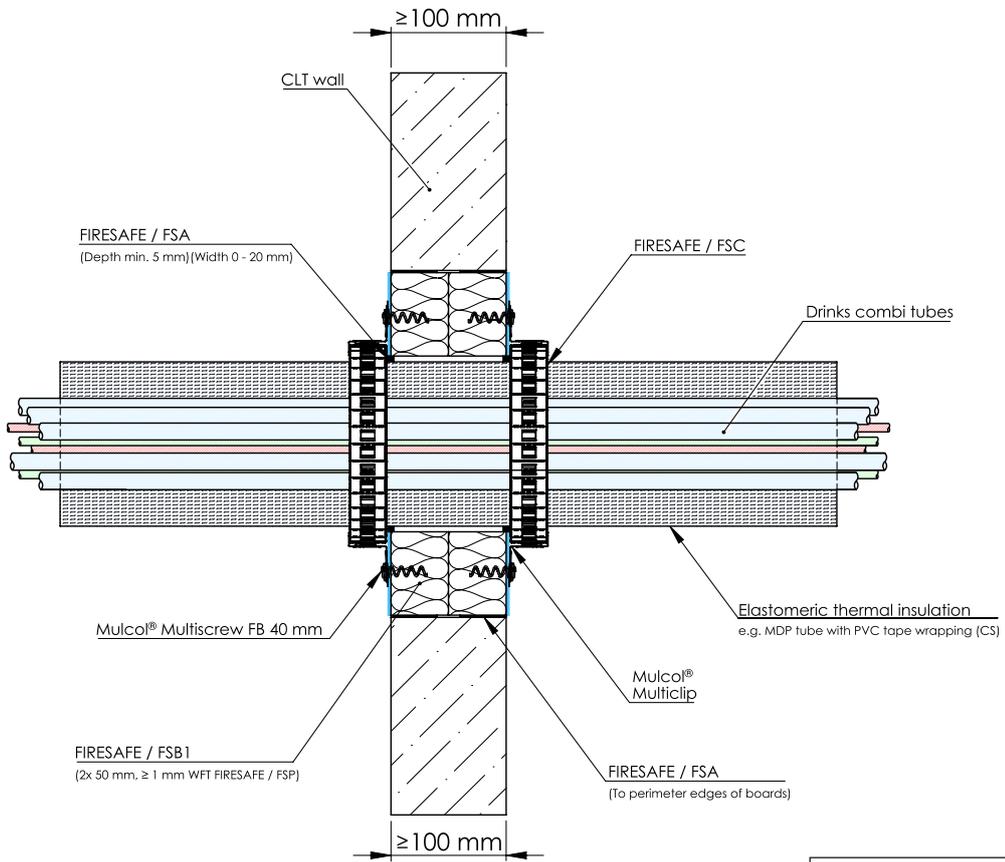
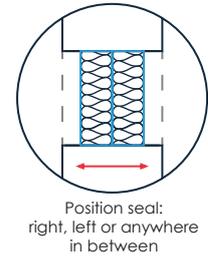
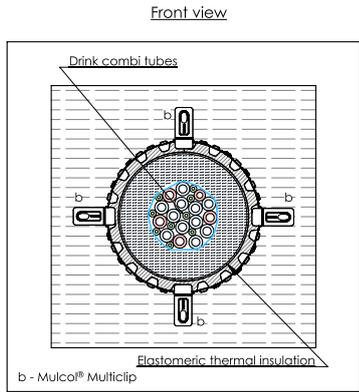


Drawing: WCLT.E-MC30-MLF-MFB1.2.10

| Services        | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|-----------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                 | Outer dimension      | Wall thickness |                |                                     |                |
| Aquatherm Green | ≤ Ø 50               | 6.9            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 90 U/C      |

**A.3.1 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes**

**A.3.1.5 Drinks tubing system**



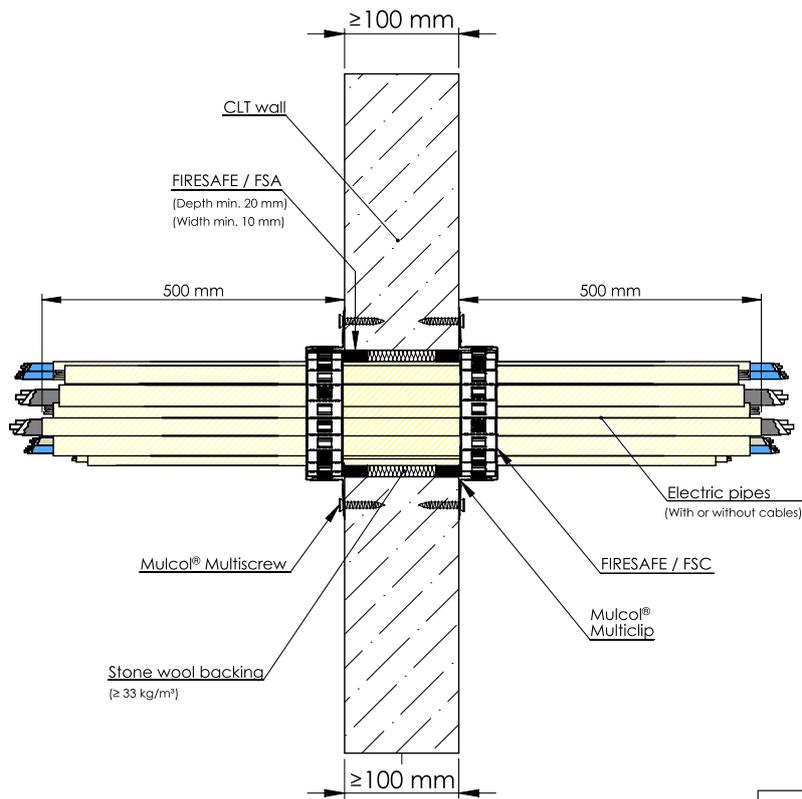
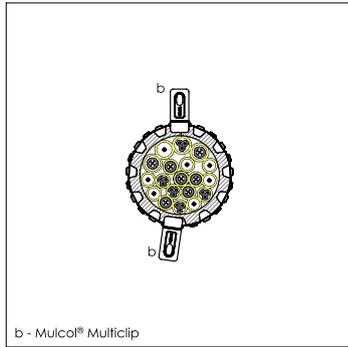
Drawing: WCLT.E-MC30-DCT52-MFB1.2.22

| Services             | Dimensions (mm) |           | Insulation       |                |               | Product        | Sealing (mm)                       | Classification |
|----------------------|-----------------|-----------|------------------|----------------|---------------|----------------|------------------------------------|----------------|
|                      | Outer dimension | Hoses no. | Type             | Thickness (mm) | Configuration |                |                                    |                |
| Drinks tubing system | ≤ Ø 145         | ≤ 52      | Elastomeric foam | 8 - 35         | CS            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 5 (wxd) | EI 60 U/C      |

### A.3.2 Directly through wall - $\geq 100$ mm - Cables, trays and conduits

#### A.3.2.1 Multiple PVC conduits

Front view



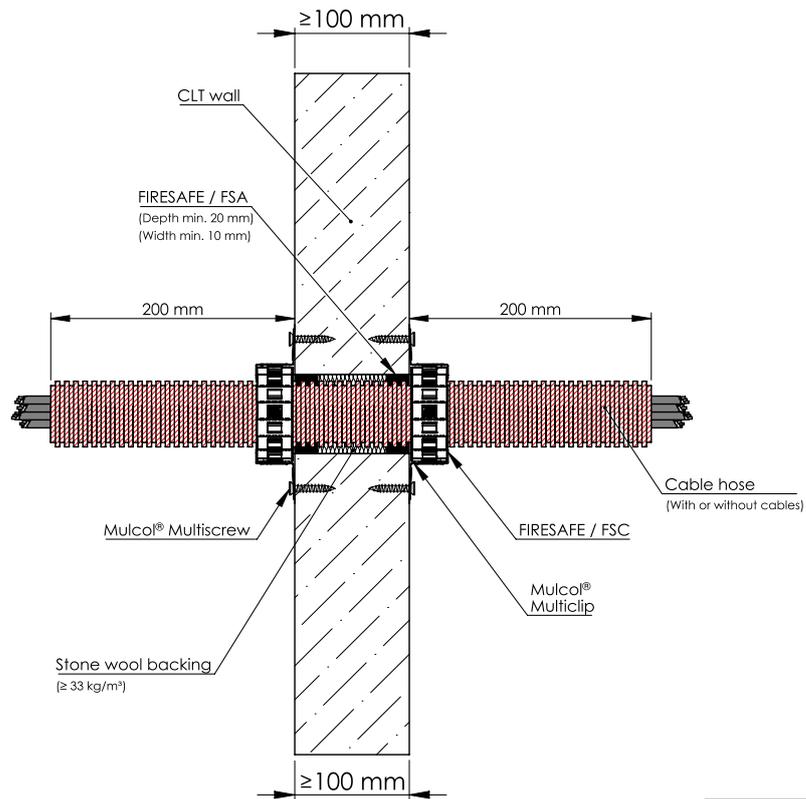
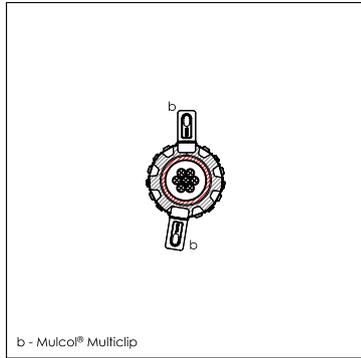
Drawing: WCLT.E-MC30-EPB-10.0.40

| Services   | Length of conduit | Product        | Allowed cables  | Classification |
|--|-------------------|----------------|---|----------------|
| Multiple PVC conduits max. $\leq \varnothing 80$ mm, max. $\leq \varnothing 19$ mm each with or without cables | $\geq 500$ mm     | FIRESAFE / FSC | Sheathed cables $\leq \varnothing 10.2$ mm<br>Unsheathed cables $\leq \varnothing 5$ mm | EI 90 U/U      |

### A.3.2 Directly through wall - $\geq 100$ mm - Cables, trays and conduits

#### A.3.2.2 Flexible conduit with cables

Front view

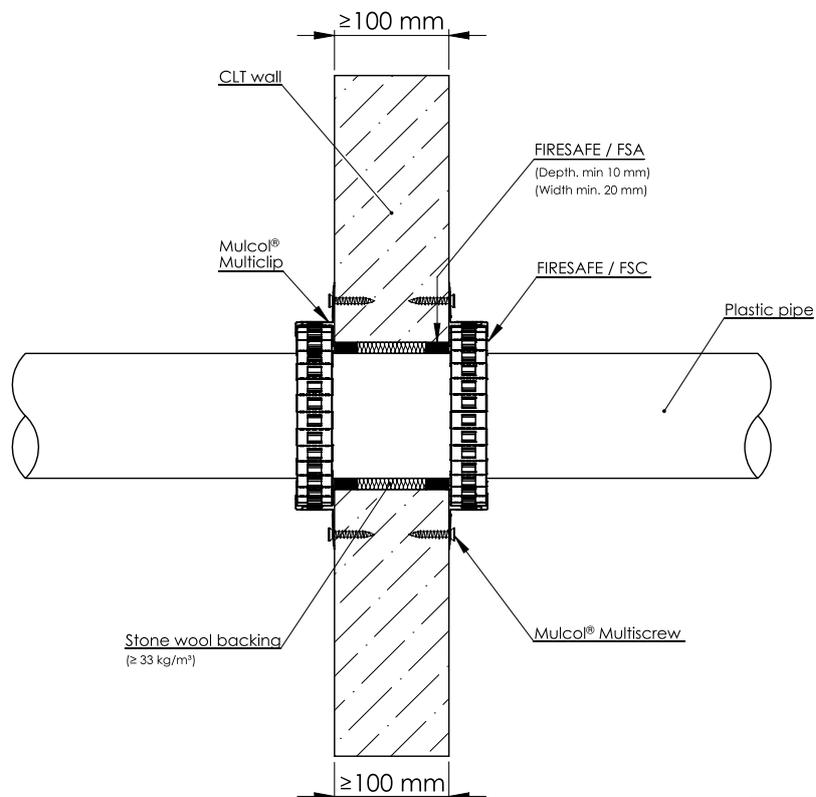
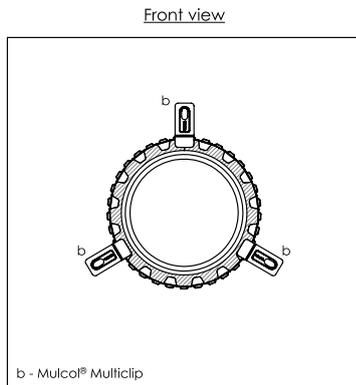


Drawing: WCLT.E-MC30-ECH-10.0.30

| Services   | Length of conduit | Product        | Allowed cables   | Classification   |
|--|-------------------|----------------|--|------------------|
| Ribbed PE-sleeve conduit<br>$\leq \text{Ø } 63$ mm, with or without cables | $\geq 200$ mm     | FIRESAFE / FSC | Sheathed cables $\leq \text{Ø } 60$ mm<br>(single or bundled)<br>Telecommunication cables<br>$\leq \text{Ø } 21$ mm in a<br>tied bundle $\leq \text{Ø } 60$ mm | <b>EI 90 U/U</b> |

### A.3.3 Directly through wall - $\geq 100$ mm - Combustible pipes

#### A.3.3.1 Plastic pipes



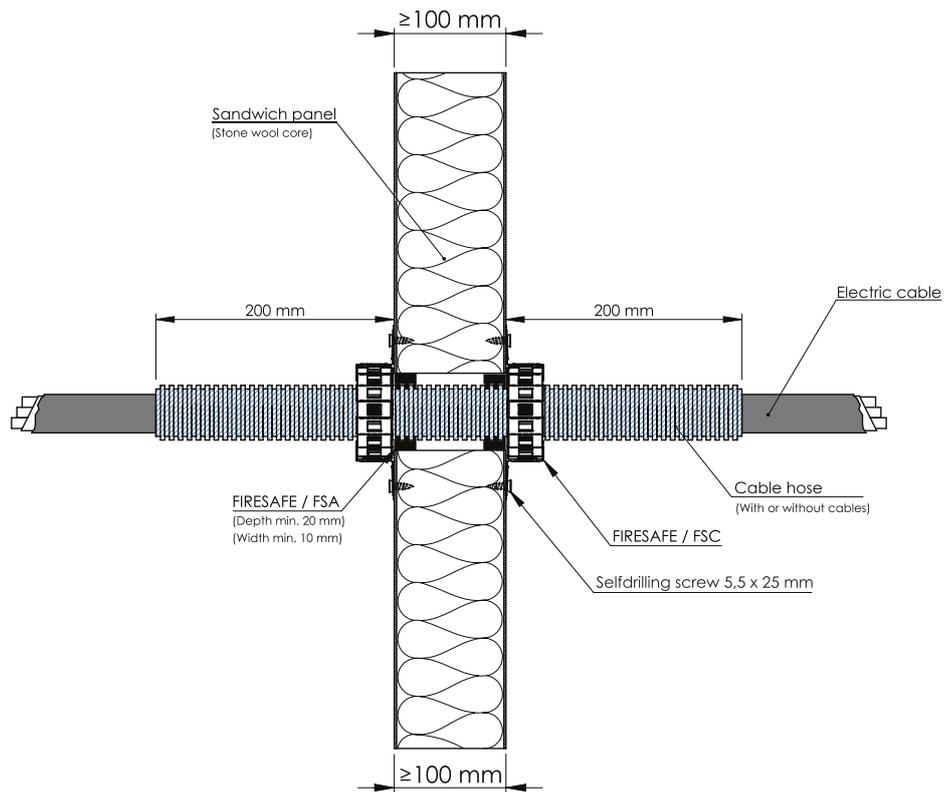
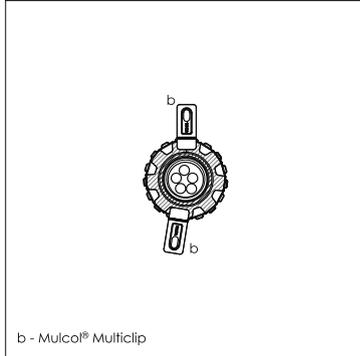
Drawing: WCLT.E-MC30-PP-10.0.10

| Services                          | Pipe dimensions (mm)   |                | Product        | Sealing (mm)                             | Classification |  |                |  |           |
|-----------------------------------|------------------------|----------------|----------------|--|----------------|--|----------------|--|-----------|
|                                   | Outer dimension        | Wall thickness |                |  |                |  |                |  |           |
| PE(-HD) / PE-X /<br>ABS / SAN+PVC | $\leq \varnothing 40$  | 2.3 - 10.0     | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$ (wxd) | EI 60 U/U      |  |                |  |           |
|                                   | $\leq \varnothing 110$ | 2.7 - 10.0     |                |  | EI 90 U/U      |  |                |  |           |
|                                   | $\leq \varnothing 125$ | 2.7            |                |  | EI 90 U/C      |  |                |  |           |
| PP                                | $\leq \varnothing 40$  | 3.9            |                |  | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$ (wxd) | EI 90 U/U      |  |           |
|                                   | $\leq \varnothing 40$  | 2.3            |                |  |                |  | EI 60 U/U      |  |           |
|                                   | $\leq \varnothing 110$ | 2.3 - 10.0     |                |  |                |  | EI 90 U/U      |  |           |
|                                   | $\leq \varnothing 110$ | 2.7 - 10.0     |                |  |                |  | EI 90 U/C      |  |           |
| PVC(-U/-C)                        | $\leq \varnothing 125$ | 2.7            |                |  |                |  | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$ (wxd) | EI 60 U/U |
|                                   | $\leq \varnothing 40$  | 3.1            |                |  |                |  |                |  | EI 90 U/U |
|                                   | $\leq \varnothing 40$  | 2.3 - 10.0     | EI 90 U/C      |  |                |  |                |  |           |
|                                   | $\leq \varnothing 110$ | 2.7 - 10.0     | EI 60 U/U      |  |                |  |                |  |           |
|                                   | $\leq \varnothing 110$ | 3.2 - 8.1      | EI 90 U/U      |  |                |  |                |  |           |

## A.4.1 Directly through wall - $\geq 100$ mm - Cables, trays and conduits

### A.4.1.1 Flexible conduit with cable

Front view

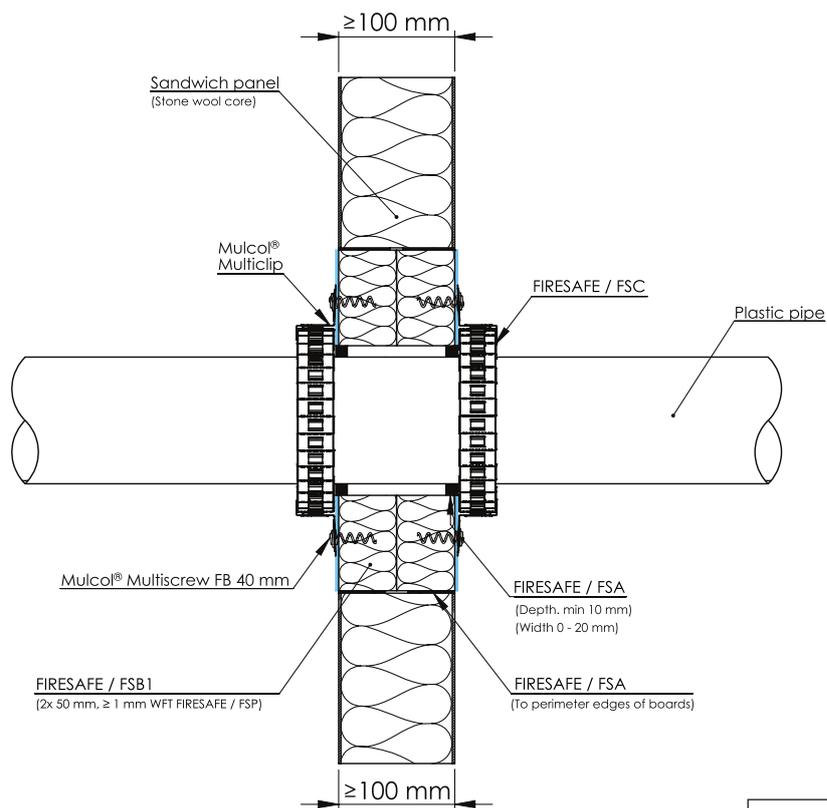
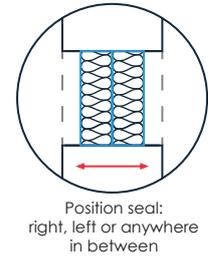
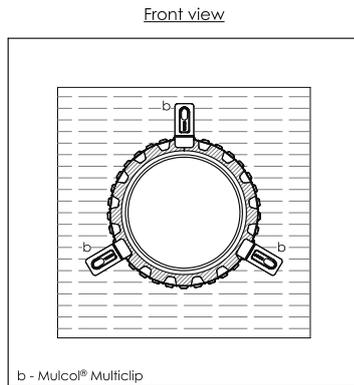


Drawing: SW.E-MC30-ECH-10.0.30

| Services   | Length of conduit | Product        | Allowed cables                         | Classification   |
|--|-------------------|----------------|--|------------------|
| Ribbed PE-sleeve conduit $\leq \text{Ø } 40$ mm, with or without cable | $\geq 200$ mm     | FIRESAFE / FSC | Sheathed cables $\leq \text{Ø } 28$ mm | <b>EI 90 U/C</b> |

## A.4.2 FIRESAFE / FSB1 - 2x 50 mm - Combustible pipes

### A.4.2.1 Plastic pipes



Drawing: SW.E-MC30-PP-MFB1.2.10

| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification |
|--------------------------------|----------------------|----------------|----------------|--|----------------|
|                                | Outer dimension      | Wall thickness |                |  |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 40               | 2.3 - 9.3      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 60 U/U      |
|                                | ≤ Ø 110              | 2.7 - 6.6      |                |  | EI 120 U/U     |
|                                |                      | 6.6 - 9.3      |                |  | EI 60 U/U      |
|                                | ≤ Ø 125              | 3.1 - 9.3      |                |  | EI 60 U/C      |
|                                | ≤ Ø 160              | 4.0 - 9.5      |                |  |                |

**A.4.2 FIRESAFE / FSB1 - 2x 50 mm - Combustible pipes**

**A.4.2.1 Plastic pipes**

| Services | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification |
|----------|----------------------|----------------|----------------|--|----------------|
|          | Outer dimension      | Wall thickness |                |  |                |
| PP       | ≤ Ø 40               | 2.3 - 9.3      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 60 U/U      |
|          | ≤ Ø 110              | 2.7            |                |  | EI 120 U/U     |
|          |                      | 2.7 - 9.3      |                |  | EI 60 U/U      |
|          | ≤ Ø 125              | 3.1 - 9.3      |                |  | EI 60 U/C      |
| ≤ Ø 160  | 4.0 - 9.1            |                |                |  |                |

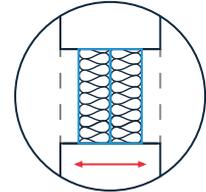
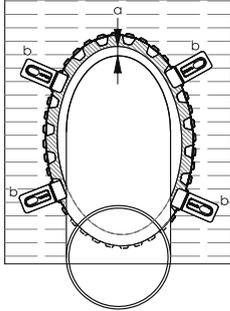
| Services   | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification |
|------------|----------------------|----------------|----------------|--|----------------|
|            | Outer dimension      | Wall thickness |                |  |                |
| PVC(-U/-C) | ≤ Ø 40               | 2.3 - 9.3      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 60 U/U      |
|            | ≤ Ø 110              | 2.7            |                |  | EI 120 U/U     |
|            |                      | 2.7 - 9.3      |                |  | EI 60 U/U      |
|            | ≤ Ø 125              | 3.1 - 9.3      |                |  | EI 60 U/C      |
| ≤ Ø 160    | 4.0 - 9.1            |                |                |  |                |

## A.4.2 FIRESAFE / FSB1 - 2x 50 mm - Combustible pipes

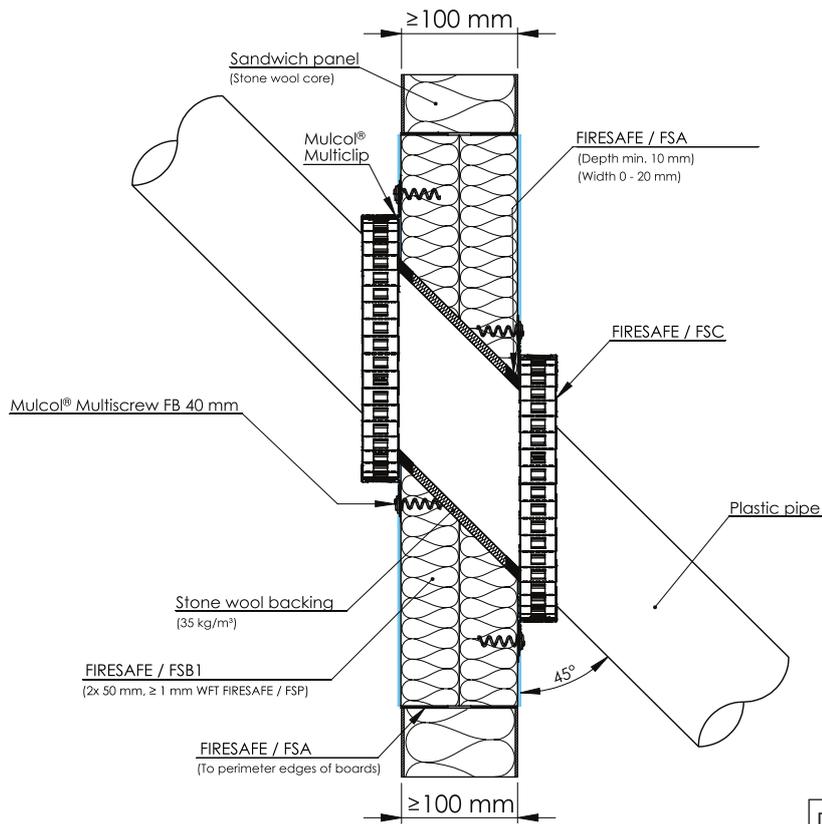
### A.4.2.2 Plastic pipes perpendicular to 45°

Front view

- a - Annular space  
(Maximum 15 mm between pipe and FIRESAFE / FSC)
- b - Mulcol® Multiclip



Position seal:  
right, left or anywhere  
in between



Drawing: SW,E-MC30-PP-MFB1-10.1.10

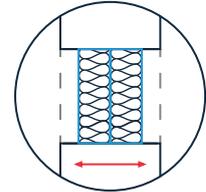
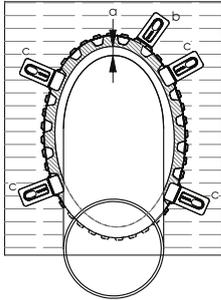
| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification |
|--------------------------------|----------------------|----------------|----------------|--|----------------|
|                                | Outer dimension      | Wall thickness |                |  |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 2.7            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 90 U/C      |
| PP                             |                      |                |                |  |                |
| PVC(-U/-C)                     |                      |                |                |  |                |

## A.4.2 FIRESAFE / FSB1 - 2x 50 mm - Combustible pipes

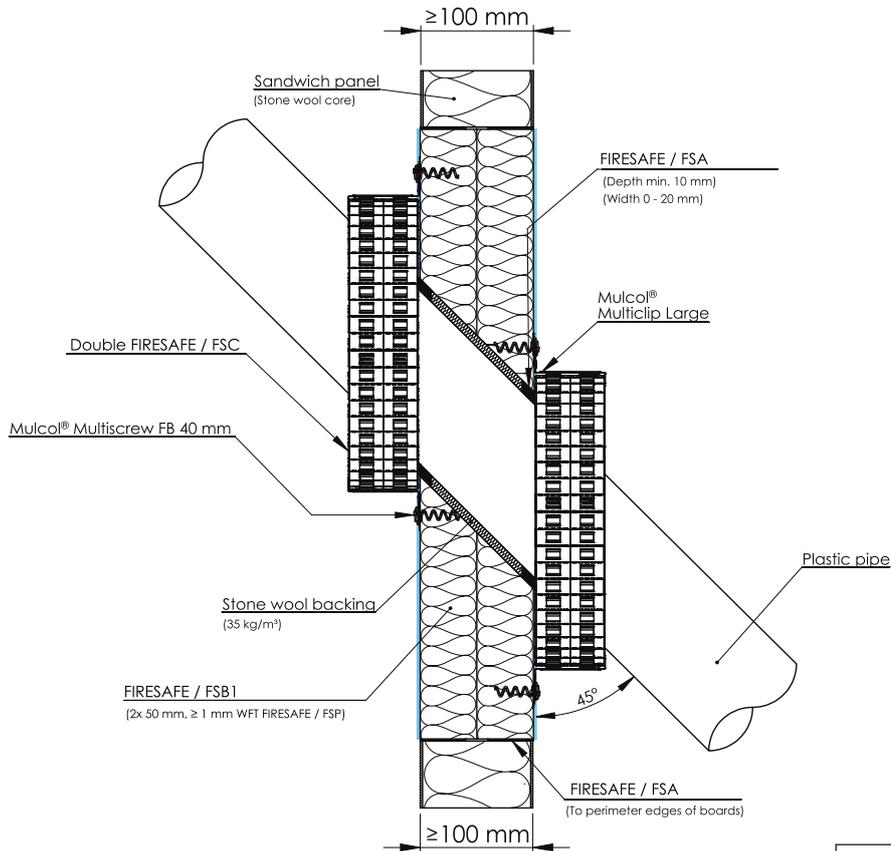
### A.4.2.3 Plastic pipes perpendicular to 45° - double FIRESAFE / FSC

Front view

- a - Annular space  
(Maximum 15 mm between pipe and FIRESAFE / FSC)
- b - Mulcol® Multiclip
- c - Mulcol® Multiclip Large



Position seal:  
right, left or anywhere  
in between



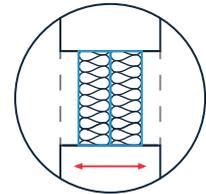
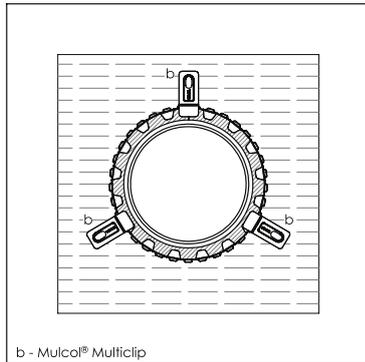
Drawing: SW.E-MC60-PP-MFB1-20.1.10

| Services                       | Pipe dimensions (mm) |                | Product                  | Sealing (mm)                              | Classification |
|--------------------------------|----------------------|----------------|--------------------------|---|----------------|
|                                | Outer dimension      | Wall thickness |                          |   |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 2.7            | FIRESAFE / FSC<br>double | FIRESAFE /<br>FSA<br>0-20 x ≥ 10<br>(wxd) | EI 90 U/U      |
|                                |                      | 3.4 - 10.0     |                          |   | EI 120 U/C     |
| 2.7                            |                      | EI 30 U/U      |                          |   |                |
| 3.4                            |                      | EI 120 U/C     |                          |   |                |
| 3.4 - 10.0                     |                      | EI 60 U/C      |                          |   |                |
| 2.7                            |                      | EI 30 U/U      |                          |   |                |
| PVC(-U/-C)                     | 3.4                  | EI 120 U/C     |                          |   |                |
|                                | 3.4 - 10.0           | EI 60 U/C      |                          |   |                |

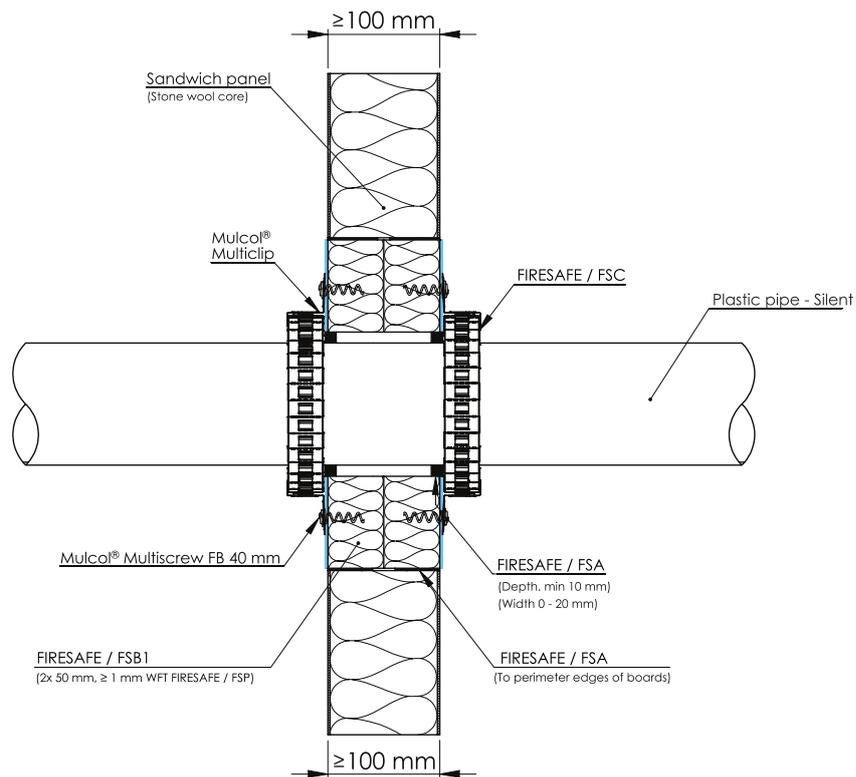
## A.4.2 FIRESAFE / FSB1 - 2x 50 mm - Combustible pipes

### A.4.2.4 Plastic pipes (Silent)

Front view



Position seat:  
right, left or anywhere  
in between

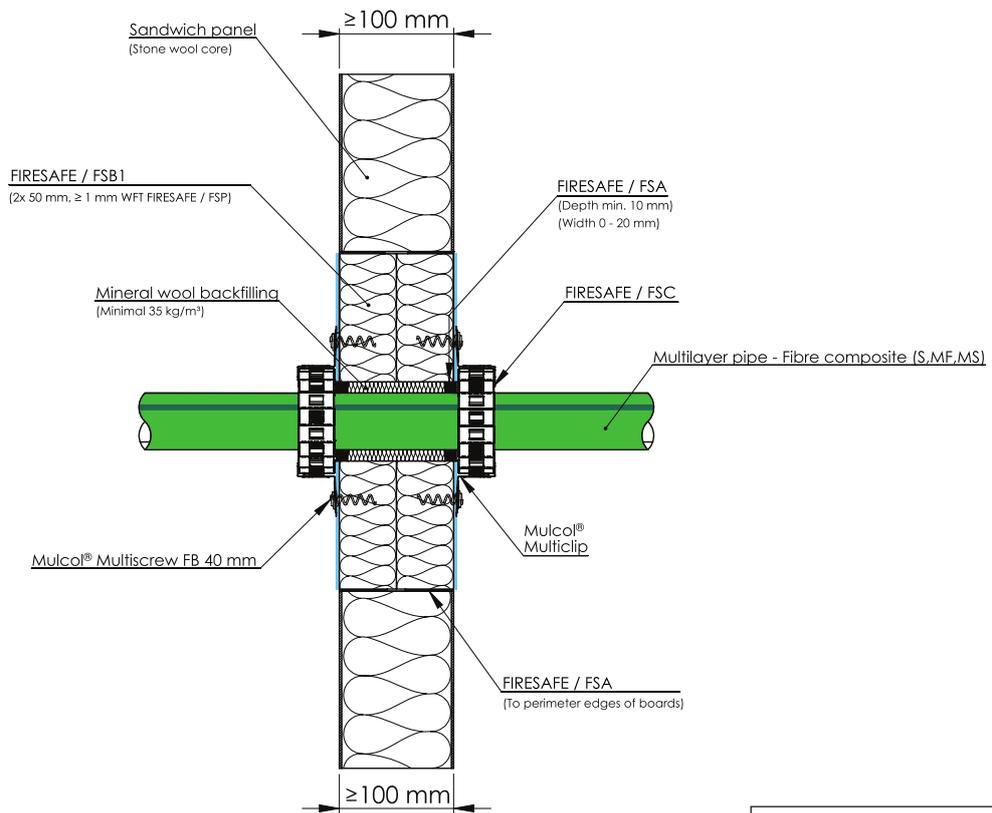
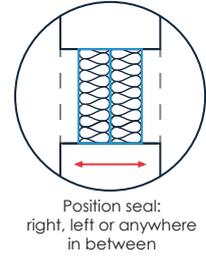
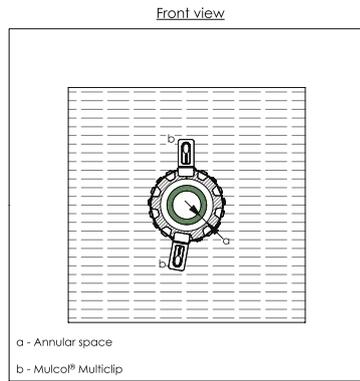


Drawing: SW.E-MC30-PPS-MFB1.2.10

| Services            | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|---------------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                     | Outer dimension      | Wall thickness |                |                                     |                |
| Geberit Silent dB20 | ≤ Ø 110              | 6.0            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 60 U/U      |

## A.4.2 FIRESAFE / FSB1 - 2x 50 mm - Combustible pipes

### A.4.2.5 PP-R multilayer pipes

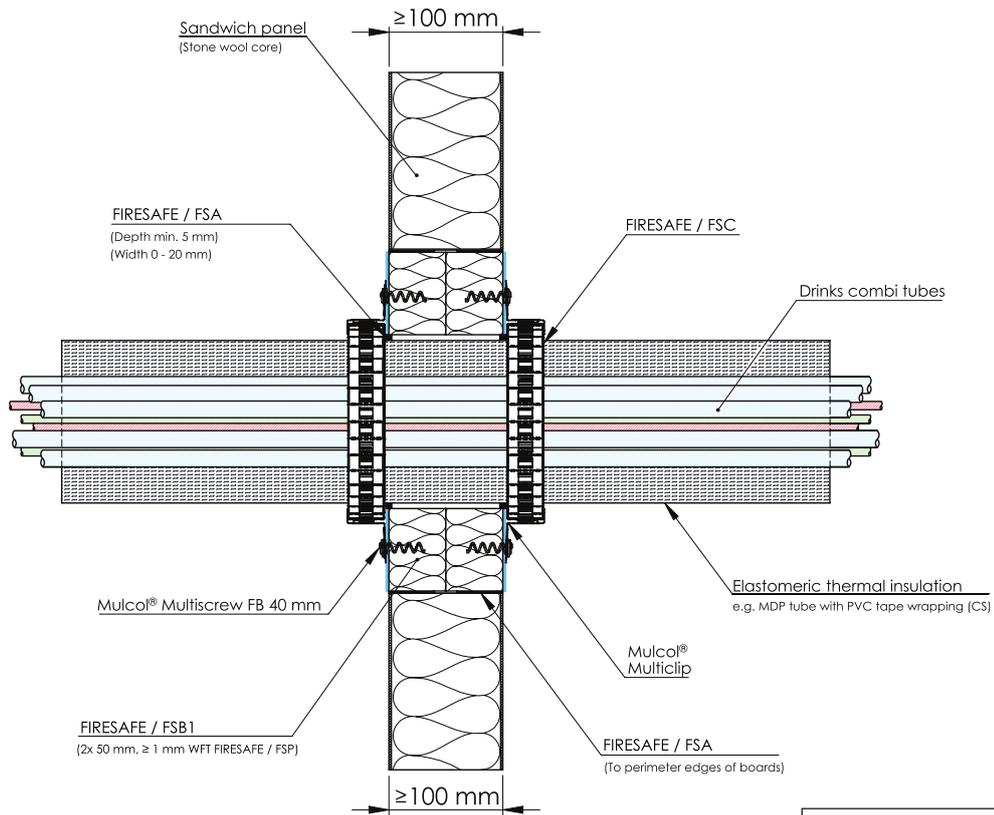
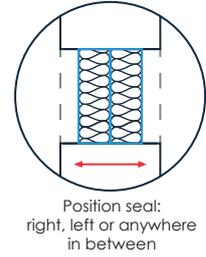
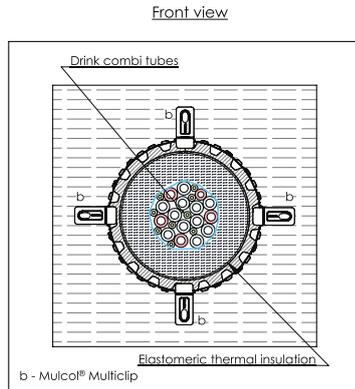


Drawing: SW.E-MC30-MLF-MFB1.2.10

| Services        | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|-----------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                 | Outer dimension      | Wall thickness |                |                                     |                |
| Aquatherm Green | ≤ Ø 50               | 6.9            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 120 U/C     |

## A.4.2 FIRESAFE / FSB1 - 2x 50 mm - Combustible pipes

### A.4.2.6 Drinks tubing system

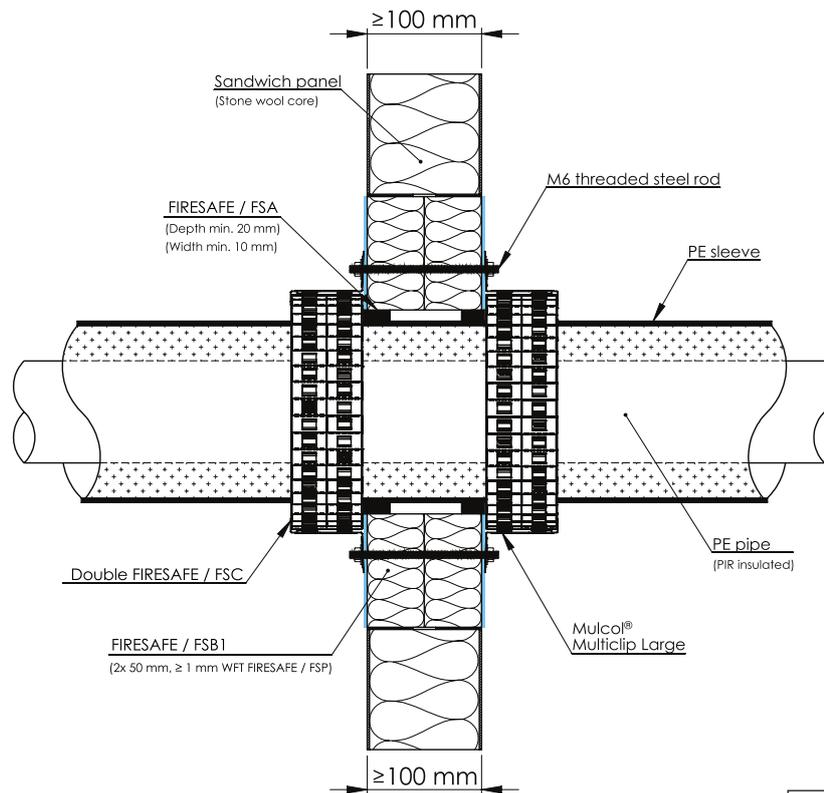
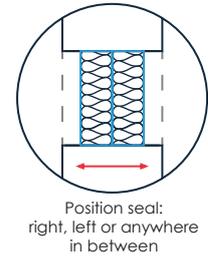
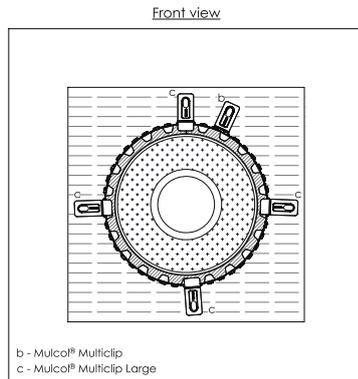


Drawing: SW,E-MC30-DCT52-MFB1.2.22

| Services             | Dimensions (mm)      |           | Insulation       |                |               | Product        | Sealing (mm)                            | Classification |
|----------------------|----------------------|-----------|------------------|----------------|---------------|----------------|---|----------------|
|                      | Outer dimension      | Hoses no. | Type             | Thickness (mm) | Configuration |                |   |                |
| Drinks tubing system | $\leq \text{Ø } 145$ | $\leq 52$ | Elastomeric foam | 8 - 35         | CS            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 5$ (wxd) | EI 60 U/C      |

## A.4.2 FIRESAFE / FSB1 - 2x 50 mm - Combustible pipes

### A.4.2.7 PE Pipe insulated PIR

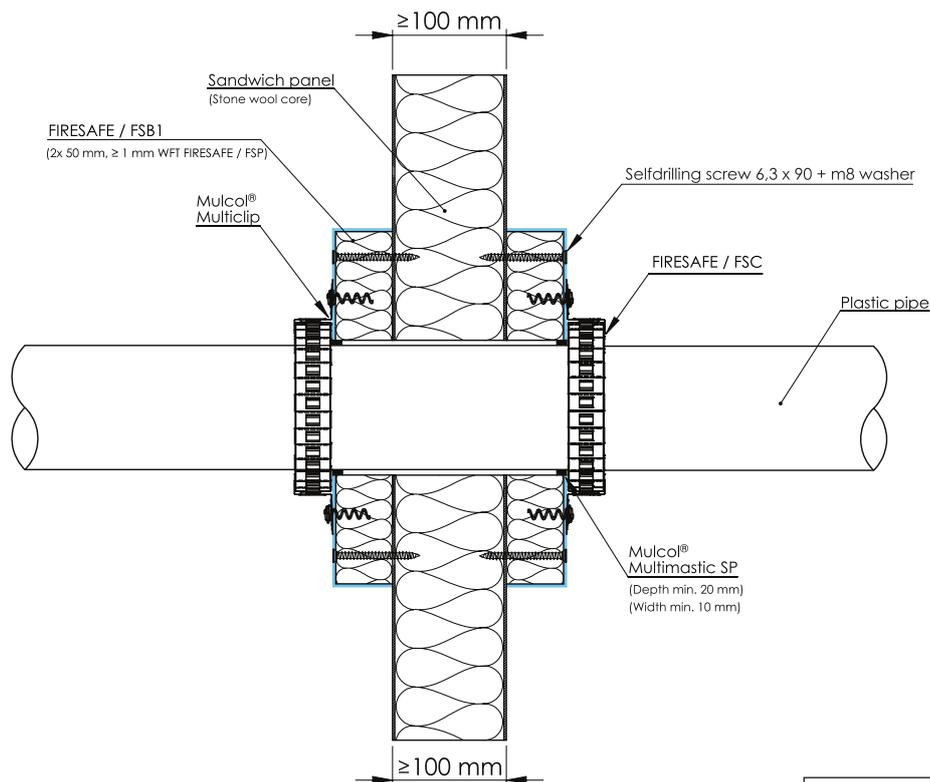
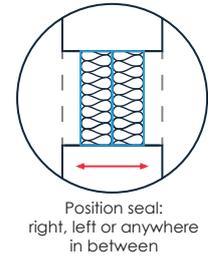
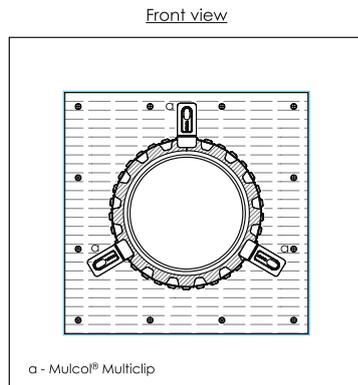


Drawing: SW,E-MC60-PP\_pr-MFB1.2.23

| Services | Pipe dimensions (mm) |                | Insulation             |                |               | Product        | Classification |
|----------|----------------------|----------------|------------------------|----------------|---------------|----------------|----------------|
|          | Outer dimensions     | Wall thickness | Type                   | Thickness (mm) | Configuration |                |                |
| PE       | ≤ Ø 160              | ≥ 3.5          | PIR / PUR + PE coating | 30             | CS            | FIRESAFE / FSC | EI 120 U/C     |

## A.4.3 FIRESAFE / FSB1 Pattress fixed to wall - 2x50 mm - Combustible pipes

### A.4.3.1 Plastic pipes

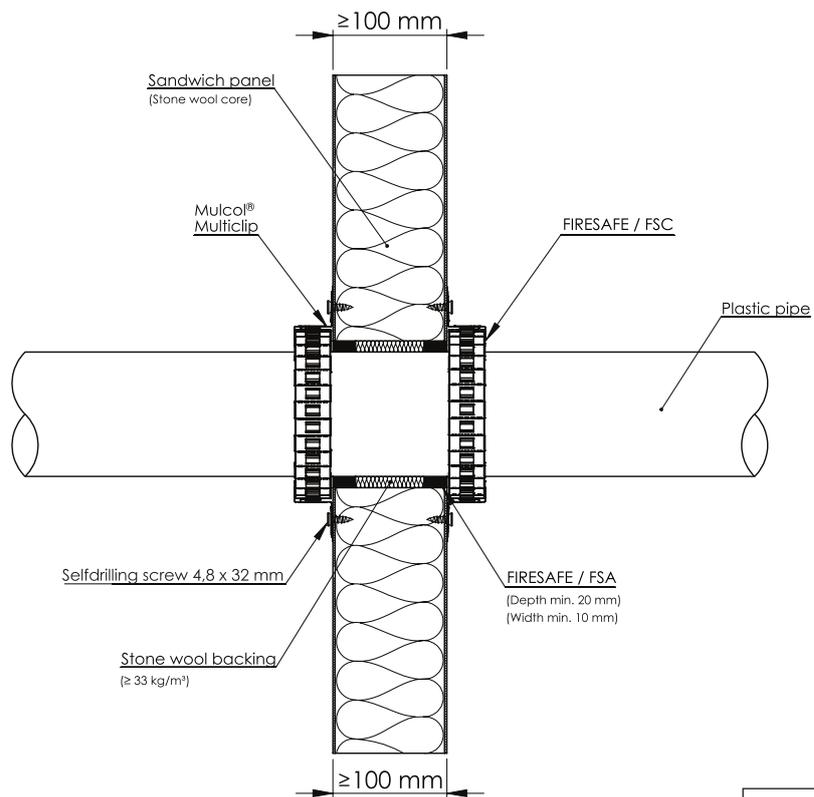
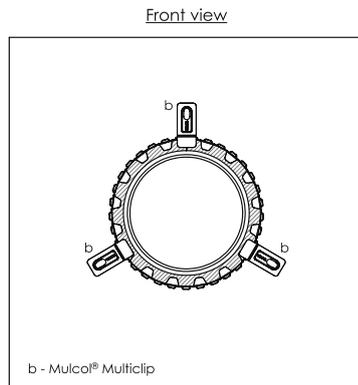


Drawing: SW.E-MC30-PP-MFB1.2.10\_pat

| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification      |  |                     |
|--------------------------------|----------------------|----------------|----------------|--|---------------------|--|---------------------|
|                                | Outer dimension      | Wall thickness |                |  |                     |  |                     |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 40               | 2.4            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 30 U/U, E 90 U/U |  |                     |
|                                | ≤ Ø 110              | 3.4            |                |  | EI 90 U/U           |  |                     |
| PP                             | ≤ Ø 40               | 2.3 - 2.7      |                |  |                     |  | EI 30 U/U, E 90 U/U |
|                                | ≤ Ø 110              | 2.7            |                |  |                     |  | EI 90 U/U           |
| PVC(-U/-C)                     | ≤ Ø 40               | 2.4            |                |  |                     |  |                     |
|                                | ≤ Ø 110              | 3.4            |                |  |                     |  |                     |

## A.4.4 Directly through wall - $\geq 100$ mm - Combustible pipes

### A.4.4.1 Plastic pipes - FIRESAFE / FSC fixed with screws

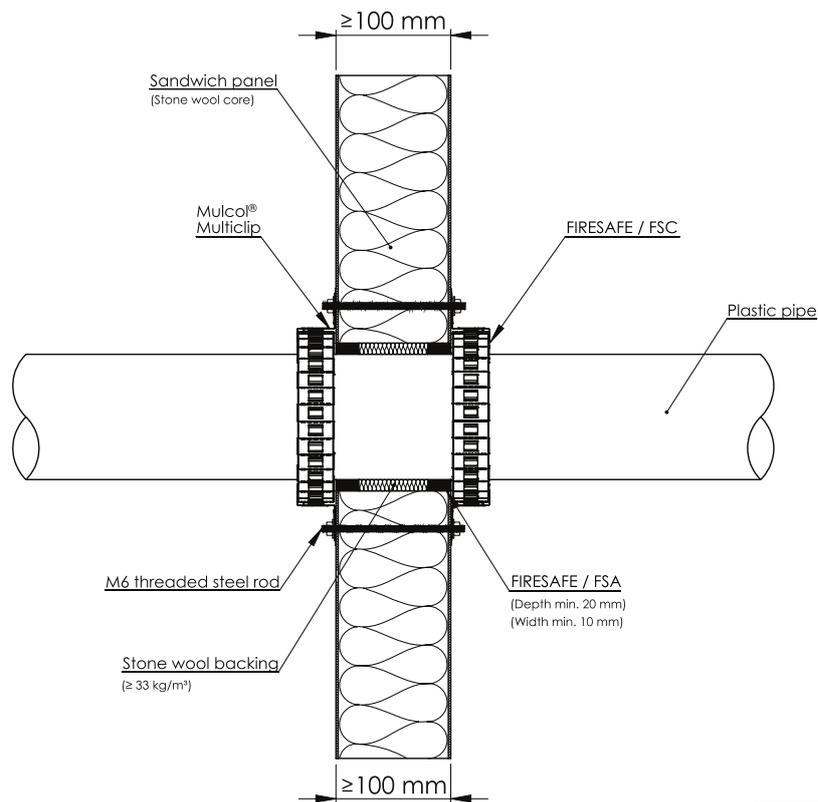
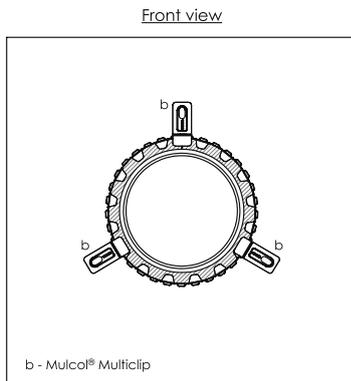


Drawing: SW.E-MC30-PP-10.0.10\_S

| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                                | Classification      |
|--------------------------------|----------------------|----------------|----------------|---|---------------------|
|                                | Outer dimension      | Wall thickness |                |   |                     |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 40$  | 2.4            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$<br>(wxd) | EI 90 U/U           |
|                                | $\leq \text{Ø } 110$ | 3.4            |                |   | EI 45 U/U, E 90 U/U |
| PP                             | $\leq \text{Ø } 40$  | 2.3            |                |   | EI 90 U/U           |
|                                | $\leq \text{Ø } 110$ | 2.7            |                |   | EI 45 U/U, E 90 U/U |
| PVC(-U/-C)                     | $\leq \text{Ø } 40$  | 2.4            |                |   | EI 90 U/U           |
|                                | $\leq \text{Ø } 110$ | 3.4            |                |   | EI 45 U/U, E 90 U/U |

## A.4.4 Directly through wall - $\geq 100$ mm - Combustible pipes

### A.4.4.2 Plastic pipes - FIRESAFE / FSC fixed with bolts

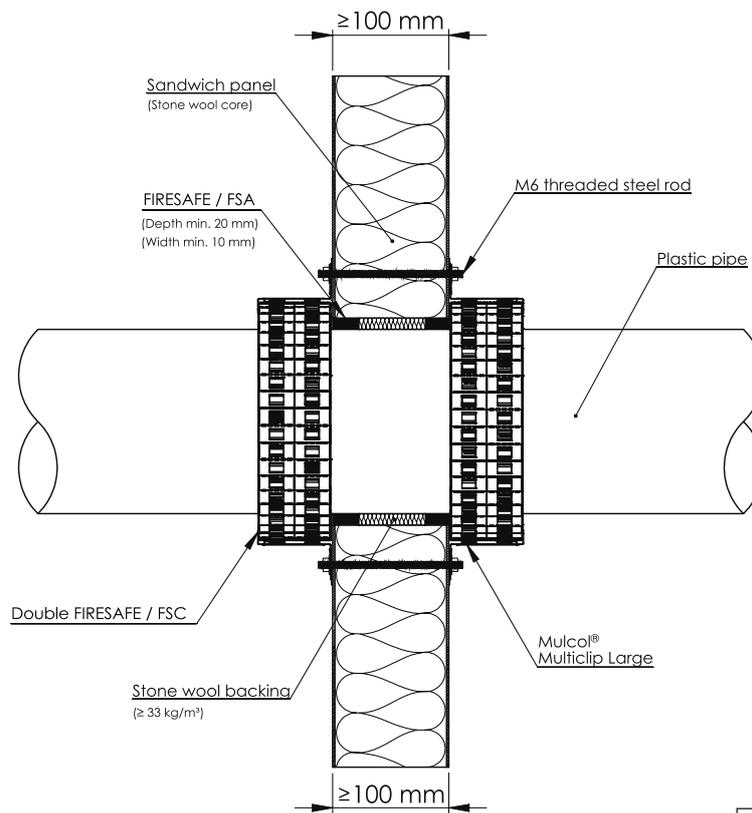
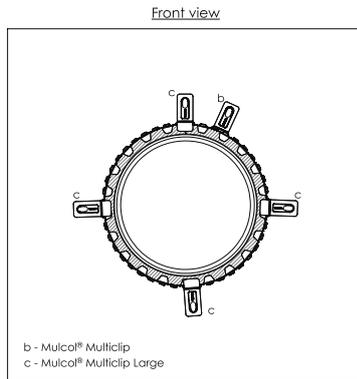


Drawing: SW.E-MC30-PP-10.0.10

| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                                | Classification |
|--------------------------------|----------------------|----------------|----------------|---|----------------|
|                                | Outer dimension      | Wall thickness |                |   |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 40$  | 2.4            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$<br>(wxd) | EI 120 U/U     |
|                                | $\leq \text{Ø } 125$ | 3.1            |                |   | EI 120 U/C     |
| PP                             | $\leq \text{Ø } 40$  | 2.3            |                |   | EI 120 U/U     |
| PVC(-U/-C)                     | $\leq \text{Ø } 40$  | 2.4            |                |   |                |

## A.4.4 Directly through wall - $\geq 100$ mm - Combustible pipes

### A.4.4.3 Plastic pipes - double FIRESAFE / FSC

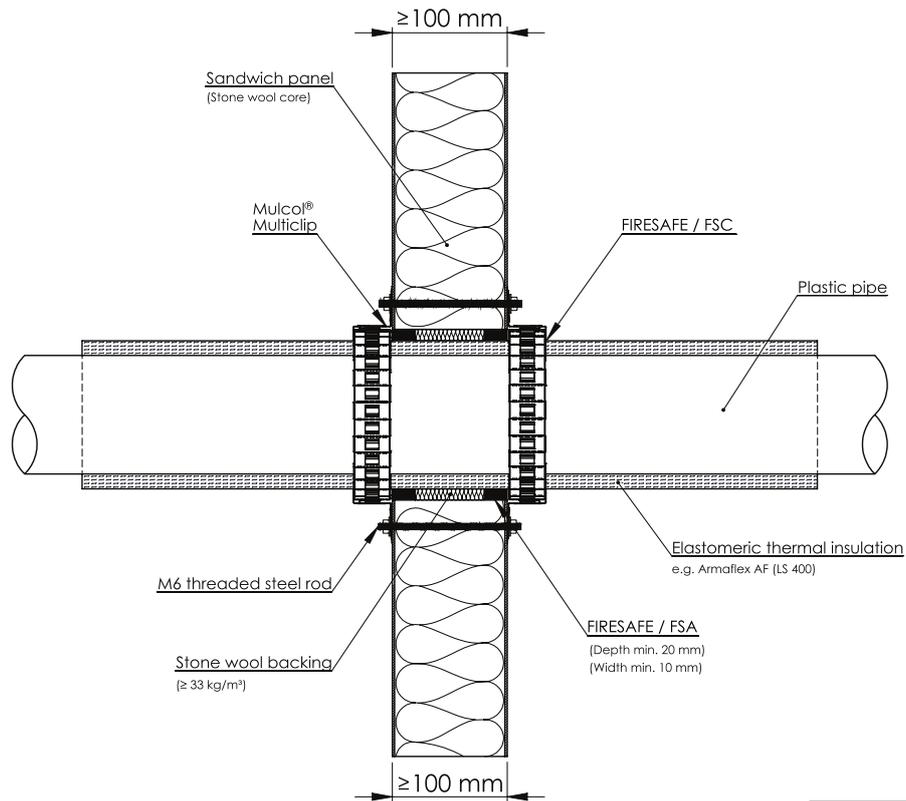
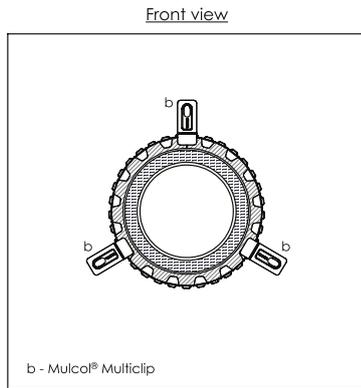


Drawing: SW.E-MC60-PP-10.0.10

| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                                | Classification |
|--------------------------------|----------------------|----------------|----------------|---|----------------|
|                                | Outer dimension      | Wall thickness |                |   |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 160$ | 4.9            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$<br>(wxd) | EI 120 U/C     |

## A.4.4 Directly through wall - $\geq 100$ mm - Combustible pipes

### A.4.4.4 Plastic pipes - Elastomer LS 400 / CS

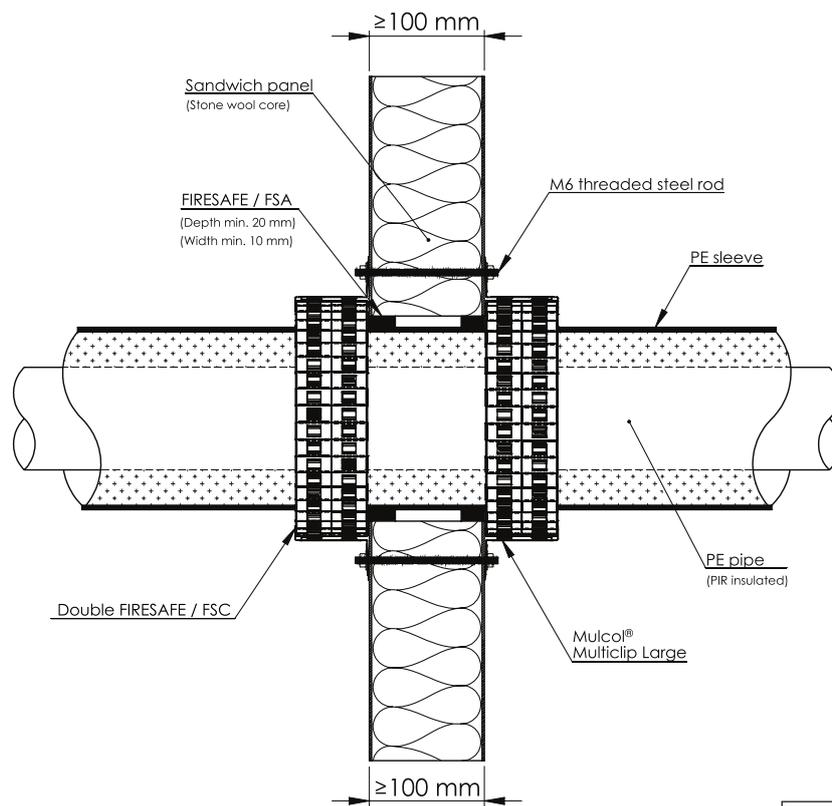
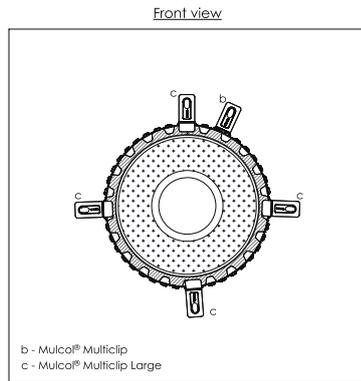


Drawing: SW.E-MC30-PP-10.0.22

| Services                       | Pipe dimensions (mm)   |                | Insulation   |                |               | Product        | Classification |
|--------------------------------|------------------------|----------------|--|----------------|---------------|----------------|----------------|
|                                | Outer dimensions       | Wall thickness | Type   | Thickness (mm) | Configuration |                |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \varnothing 110$ | 2.7            | ArmaFlex AF (min. class B <sub>L</sub> -s3, d0 B-s3, d0) | 14.5           | LS 400 / CS   | FIRESAFE / FSC | EI 120 U/U     |

**A.4.4 FIRESAFE / FSB1 - 2x 50 mm - Combustible pipes**

**A.4.4.5 PE Pipe insulated PIR**

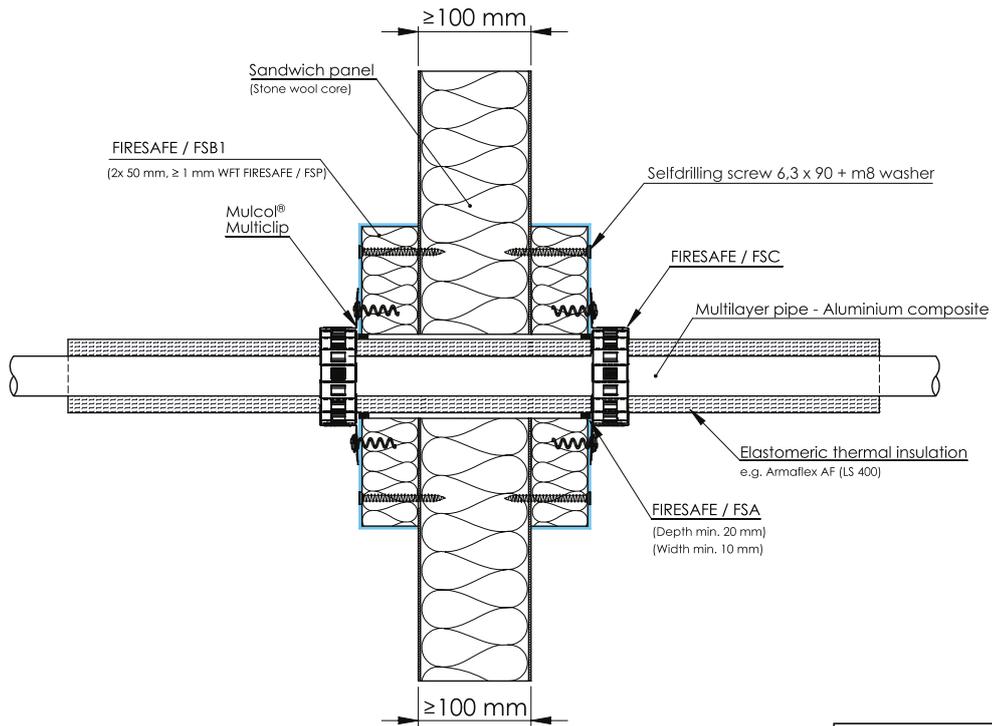
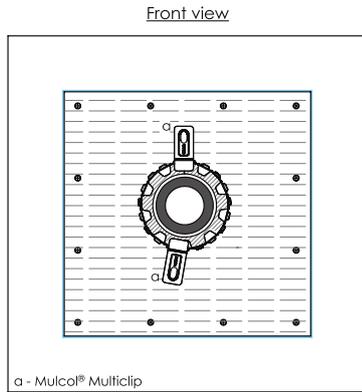


Drawing: SW,E-MC60-PP\_pr-10.0.23

| Services | Pipe dimensions (mm) |                | Insulation             |                |               | Product        | Classification |
|----------|----------------------|----------------|------------------------|----------------|---------------|----------------|----------------|
|          | Outer dimensions     | Wall thickness | Type                   | Thickness (mm) | Configuration |                |                |
| PE       | ≤ Ø 160              | ≥ 3.5          | PIR / PUR + PE coating | 30             | CS            | FIRESAFE / FSC | EI 120 C/U     |

## A.4.5 FIRESAFE / FSB1 Pattress fixed to wall - 2x50 mm - Multilayer pipe (MLC)

### A.4.5.1 Multilayer pipe (MLC) - Elastomer LS 400 / CS



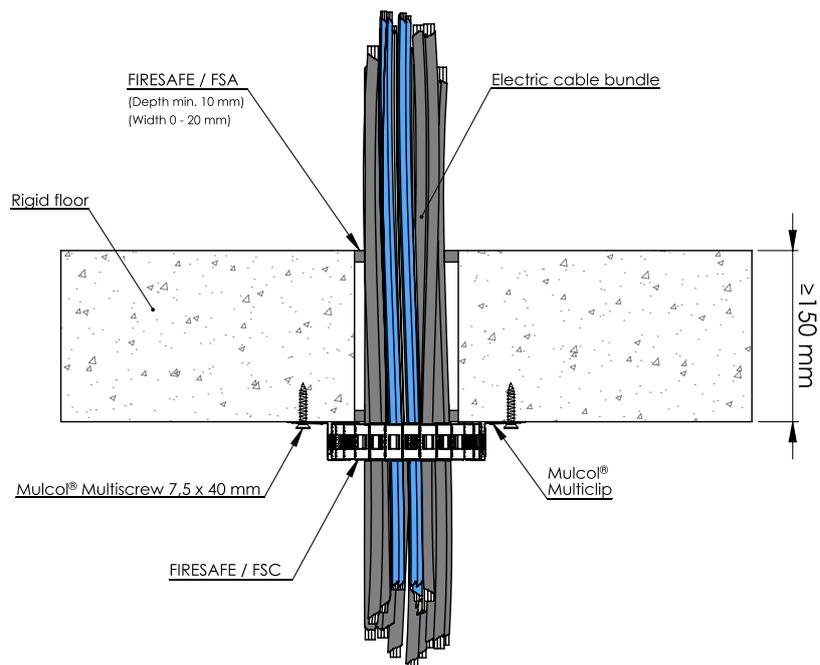
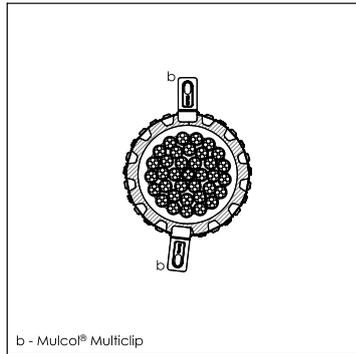
Drawing: SW-E-MC30-MLA-MFB1.2.10\_pat

| Services               | Pipe dimensions (mm) |                | Insulation   |                |               | Product        | Classification |
|------------------------|----------------------|----------------|--|----------------|---------------|----------------|----------------|
|                        | Outer dimension      | Wall thickness | Type   | Thickness (mm) | Configuration |                |                |
| Multilayer pipes (MLC) | ≤ Ø 32               | 3.0            | ArmaFlex AF (min. class B-s3, d0 B <sub>L</sub> -s3, d0) | 13             | LS 400 / CS   | FIRESAFE / FSC | EI 90 U/C      |

**B.1.1 Directly through floor - Cables, trays and conduits**

**B.1.1.1 Cable bundle**

Bottom view



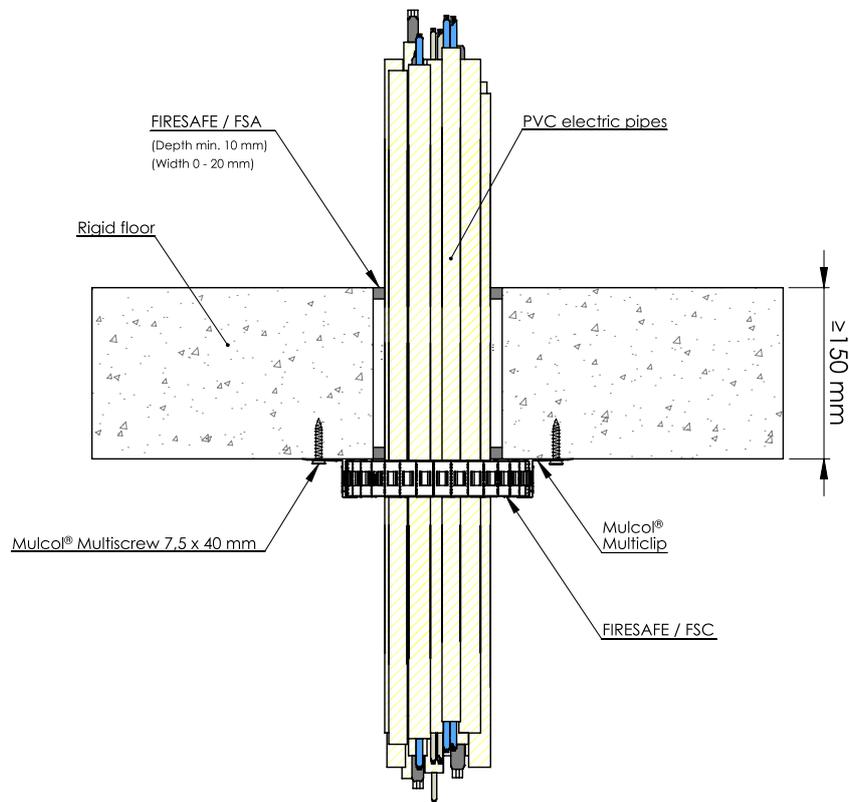
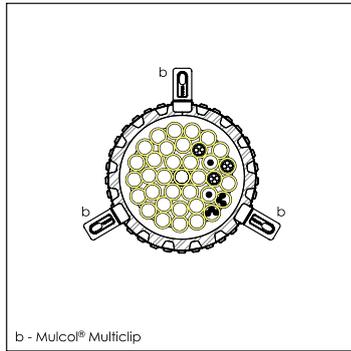
Drawing: RFE-MC30-ECB-11.0.10

| Services   | Product        | Aperture (mm) | Sealing (mm)                        | Classification |
|--|----------------|---------------|-------------------------------------|----------------|
| Multiple electrical / telecommunication cables<br>max. 42 pcs. | FIRESAFE / FSC | ≤ Ø 80        | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 120         |

## B.1.1 Directly through floor - Cables, trays and conduits

### B.1.1.2 Multiple PVC conduits

Bottom view



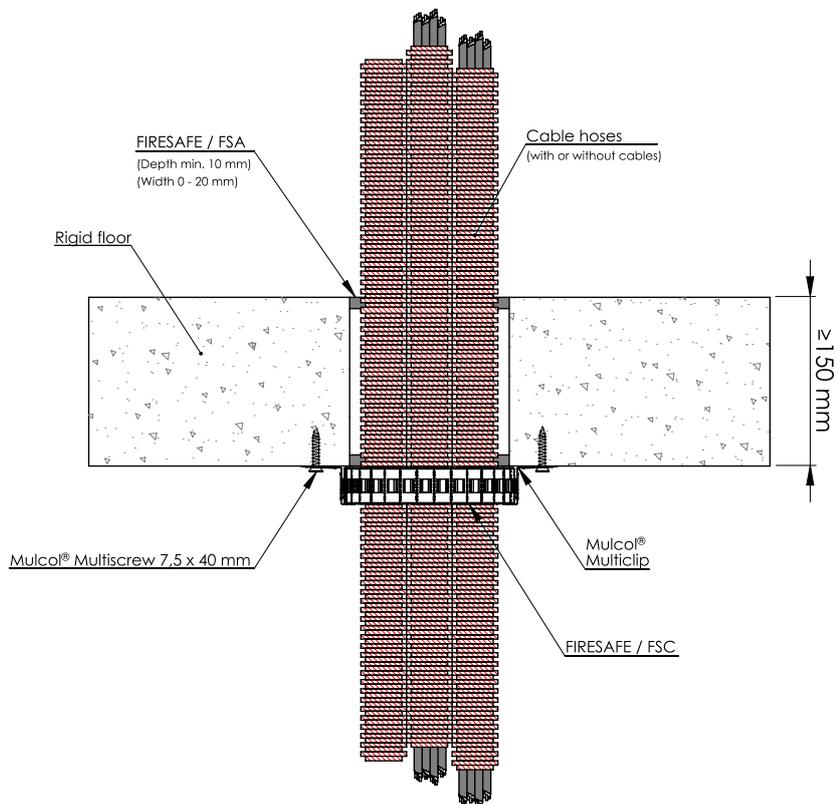
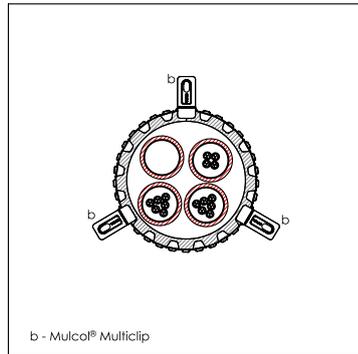
Drawing: RFE-MC30-EPB-11.0.10

| Services   | Product        | Aperture (mm)          | Sealing (mm)                             | Classification    |
|--|----------------|------------------------|--|-------------------|
| Multiple PVC conduits max. 18 pcs., max. $\leq \varnothing 25$ mm with or without cables | FIRESAFE / FSC | $\leq \varnothing 100$ | FIRESAFE / FSA<br>0-20 x $\geq 10$ (wxd) | <b>EI 120 U/U</b> |

## B.1.1 Directly through floor - Cables, trays and conduits

### B.1.1.3 Multiple flexible conduits with cables

Bottom view

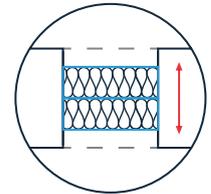
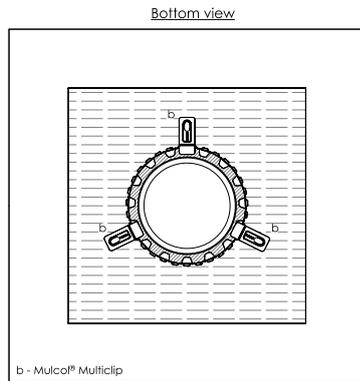


Drawing: RF.E-MC30-ECHB-11.0.30

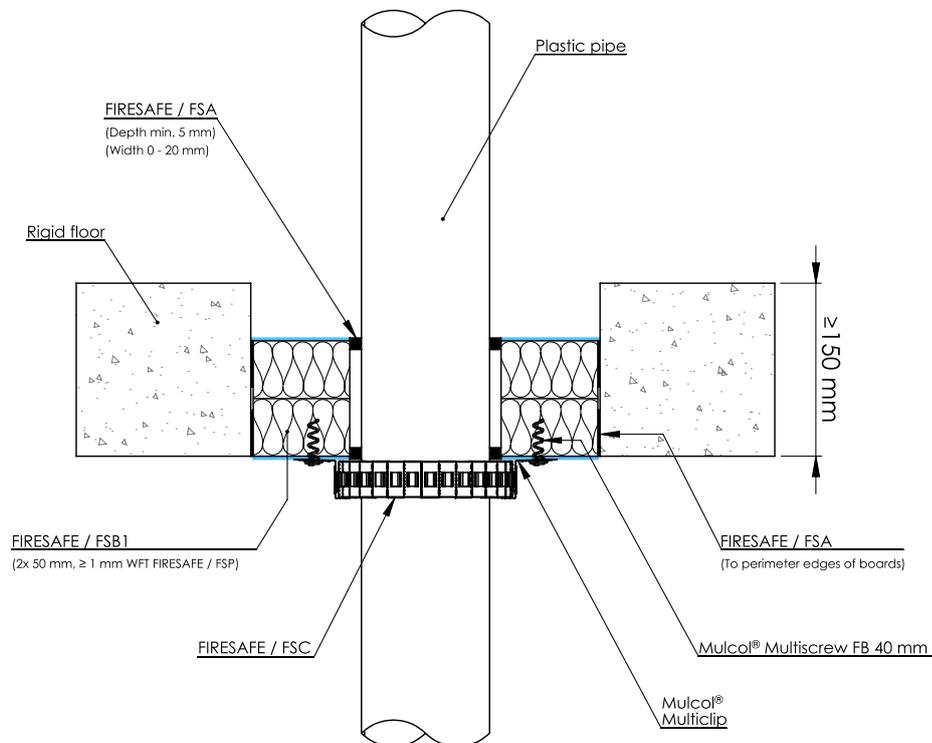
| Services  | Number of sleeves | Product        | Allowed cables   | Classification   |
|---|-------------------|----------------|--|------------------|
| Ribbed PE-sleeve conduit<br>≤ Ø 63 mm, with or without cables | ≤ 5               | FIRESAFE / FSC | Sheathed cables ≤ Ø 21 mm<br>(single or bundled)<br>Telecommunication cables | <b>EI 60 U/U</b> |

## B.1.2 FIRESAFE / FSB1 - 2x50 mm no cavity - Combustible pipes

### B.1.2.1 Plastic pipes



Position seal:  
top, bottom or anywhere  
in between

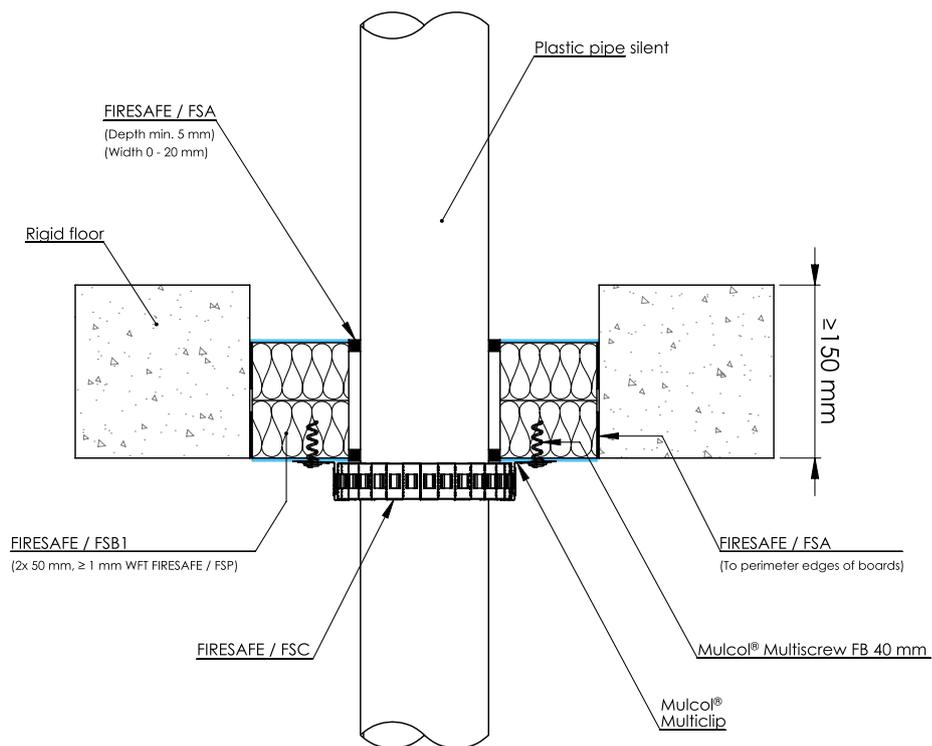
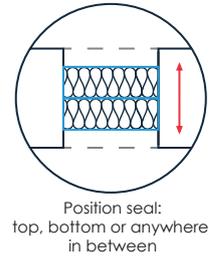
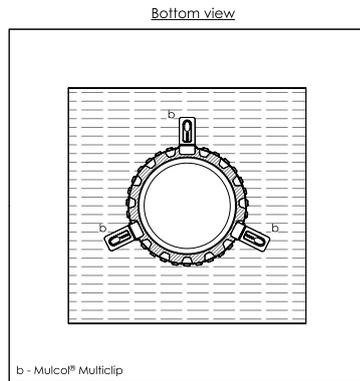


Drawing: PBrf.E-PP-MFB1.2.10

| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                       | Classification       |                                    |                     |
|--------------------------------|----------------------|----------------|----------------|------------------------------------|----------------------|------------------------------------|---------------------|
|                                | Outer dimension      | Wall thickness |                |                                    |                      |                                    |                     |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 2.7            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 5 (wxd) | EI 90 U/U            |                                    |                     |
|                                |                      | 2.7 - 6.6      |                |                                    | EI 60 U/U            |                                    |                     |
| PP                             |                      | 2.7            |                |                                    | EI 90 U/U            |                                    |                     |
|                                |                      | 2.7 - 6.3      |                |                                    | EI 60 U/U            |                                    |                     |
| PVC(-U/-C)                     |                      | 2.7            |                |                                    | EI 90 U/U            |                                    |                     |
|                                |                      | 2.7 - 6.3      |                |                                    | EI 60 U/U            |                                    |                     |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 160              | 4.0            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 5 (wxd) | EI 90 U/C, E 120 U/C |                                    |                     |
|                                |                      | 4.0 - 14.6     |                |                                    | EI 60 U/C            |                                    |                     |
| PP                             |                      | 4.0            |                |                                    | FIRESAFE / FSC       | FIRESAFE / FSA<br>0-20 x ≥ 5 (wxd) | EI 45 U/C, E 60 U/C |
|                                |                      | 4.0 - 14.6     |                |                                    |                      |                                    | EI 60 U/C           |
| PVC(-U/-C)                     |                      | 4.0            |                |                                    | FIRESAFE / FSC       | FIRESAFE / FSA<br>0-20 x ≥ 5 (wxd) | EI 60 U/C           |
|                                |                      | 4.0 - 14.6     |                |                                    |                      |                                    | EI 45 U/C, E 60 U/C |

## B.1.2 FIRESAFE / FSB1 - 2x50 mm no cavity - Combustible pipes

### B.1.2.2 Plastic pipes (Silent)

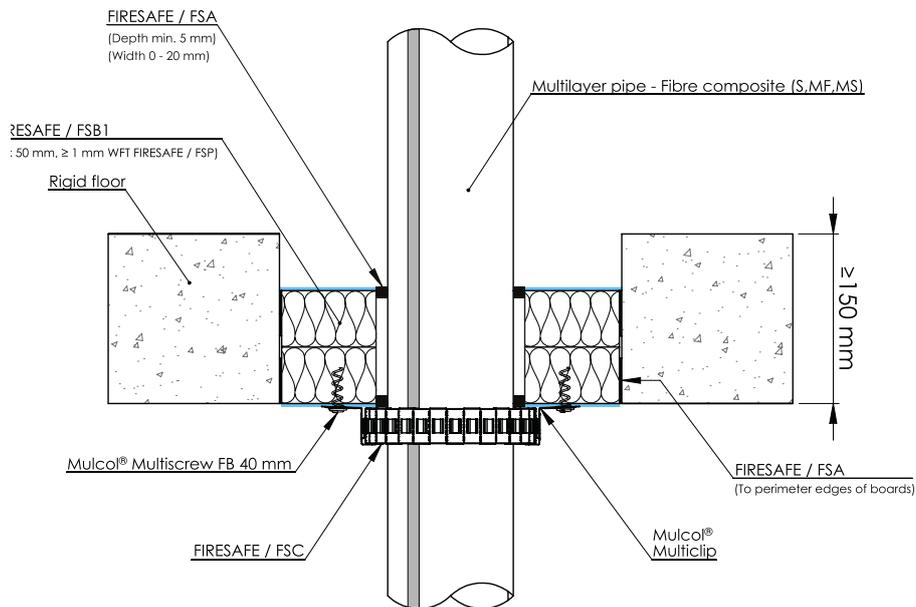
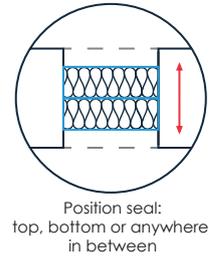
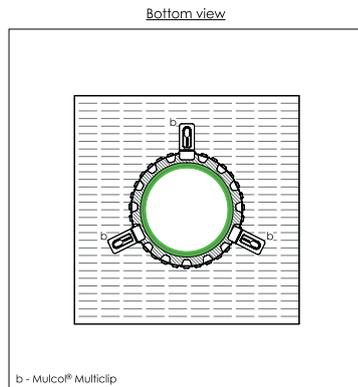


Drawing: PBrf.E-PPS-MFB1.2.10

| Services            | Pipe dimensions (mm) |                | System         | Sealing (mm)                       | Classification |
|---------------------|----------------------|----------------|----------------|------------------------------------|----------------|
|                     | Outer dimension      | Wall thickness |                |                                    |                |
| Geberit Silent dB20 | ≤ Ø 110              | 6.0            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 5 (wxd) | EI 90 U/U      |

## B.1.2 FIRESAFE / FSB1 - 2x50 mm no cavity - Combustible pipes

### B.1.2.3 PP-R Multilayer pipes

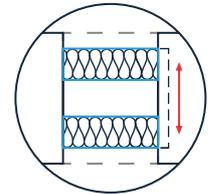
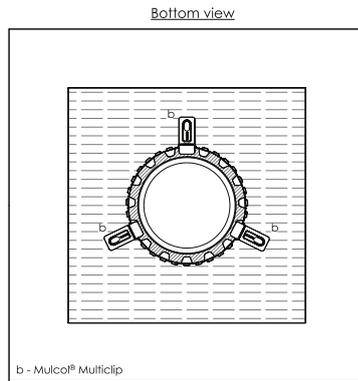


Drawing: PBrf.E-MLF-11.0.10

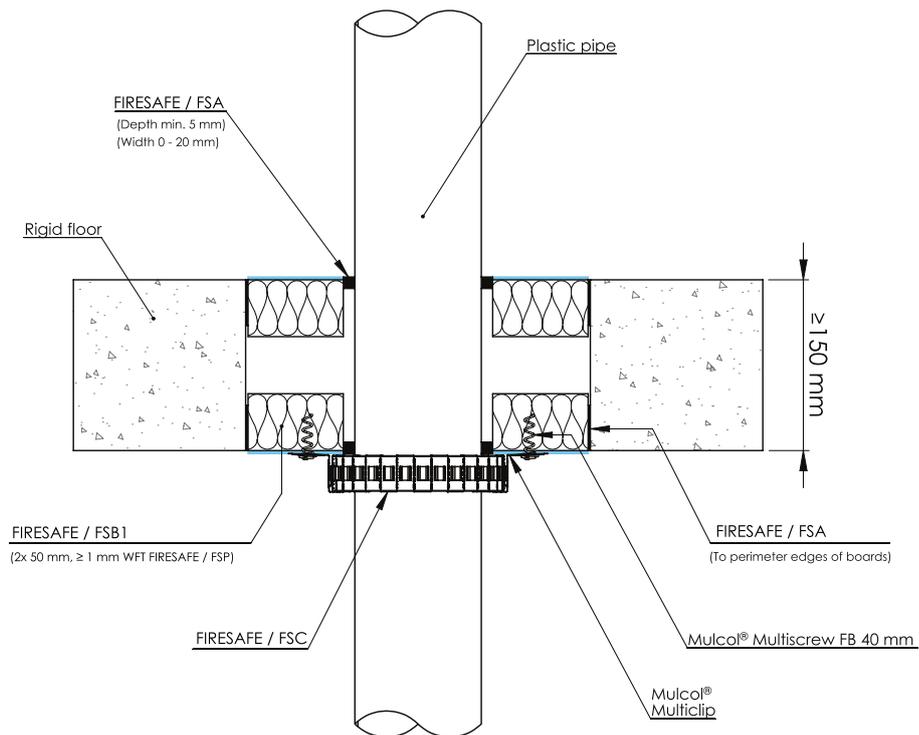
| Services           | Pipe dimensions (mm) |                | System         | Sealing (mm)                       | Classification |
|--------------------|----------------------|----------------|----------------|------------------------------------|----------------|
|                    | Outer dimension      | Wall thickness |                |                                    |                |
| Aquatherm Green-MF | ≤ Ø 50               | 6.9            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 5 (wxd) | EI 90 U/C      |
|                    | ≤ Ø 110              | 10.0           |                |                                    | EI 60 U/C      |

## B.1.3 FIRESAFE / FSB1 - 2x50 mm cavity 50 mm - Combustible pipes

### B.1.3.1 Plastic pipes



Position seal:  
top, bottom or anywhere  
in between

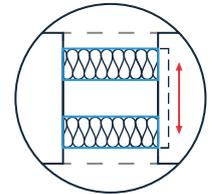
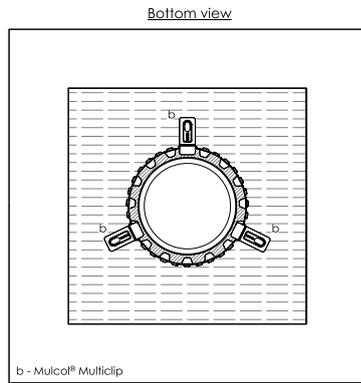


Drawing: PBrf.E-PP-MFB1.2.10.C

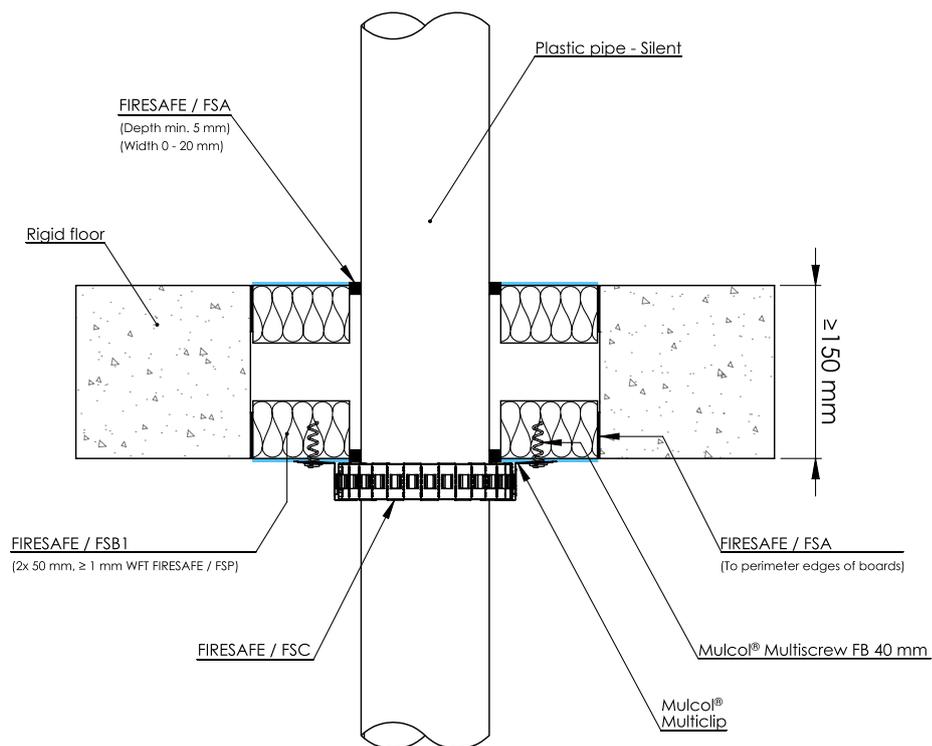
| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|--------------------------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                                | Outer dimension      | Wall thickness |                |                                     |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 2.7            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 90 U/U      |
|                                |                      | 2.7 - 6.6      |                |                                     | EI 60 U/U      |
|                                |                      | 2.7 - 3.1      |                |                                     | EI 120 U/C     |
| ≤ Ø 125                        | 3.1                  | EI 90 U/U      |                |                                     |                |
| PP                             | ≤ Ø 110              | 2.7            |                |                                     | EI 60 U/U      |
|                                |                      | 2.7 - 6.3      |                |                                     | EI 90 U/U      |
| PVC(-U/-C)                     | ≤ Ø 110              | 2.7            | EI 60 U/U      |                                     |                |
|                                |                      | 2.7 - 6.3      | EI 90 U/U      |                                     |                |

## B.1.3 FIRESAFE / FSB1 - 2x50 mm cavity 50 mm - Combustible pipes

### B.1.3.2 Plastic pipes (Silent)



Position seal:  
top, bottom or anywhere  
in between

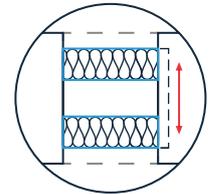
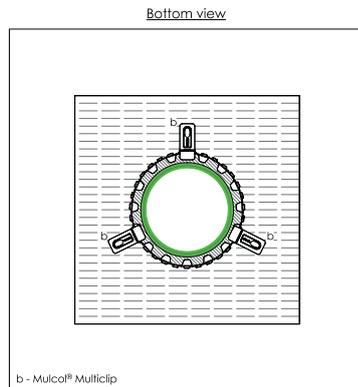


Drawing: PBrf-PPS-MFB1.2.10.C

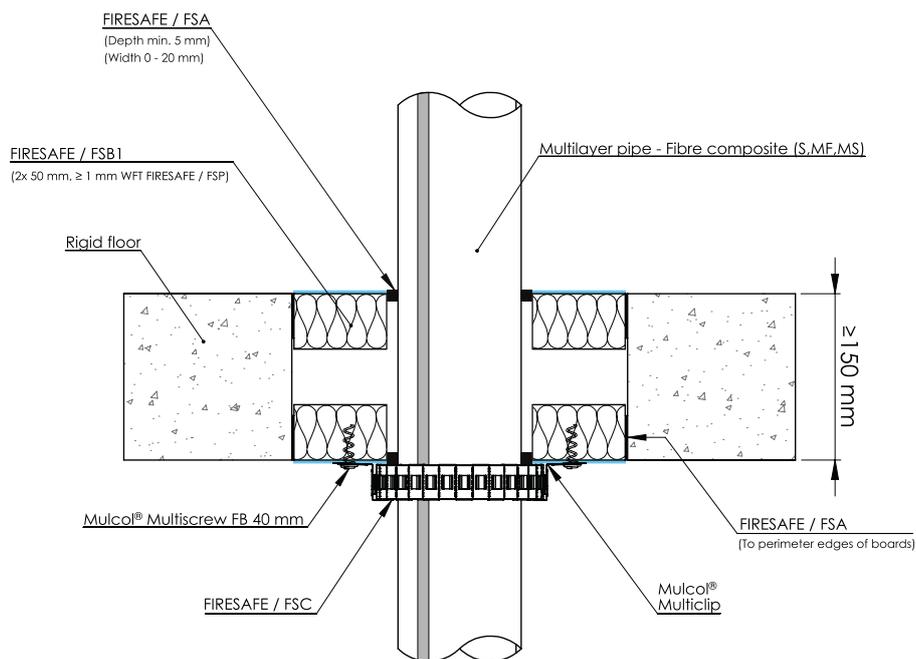
| Services            | Pipe dimensions (mm) |                | Product        | Sealing (mm)                       | Classification |
|---------------------|----------------------|----------------|----------------|------------------------------------|----------------|
|                     | Outer dimensions     | Wall thickness |                |                                    |                |
| Geberit Silent dB20 | ≤ Ø 110              | 6.0            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 5 (wxd) | EI 90 U/U      |

## B.1.3 FIRESAFE / FSB1 - 2x50 mm cavity 50 mm - Combustible pipes

### B.1.3.3 PP-R Multilayer pipes



Position seal:  
top, bottom or anywhere  
in between

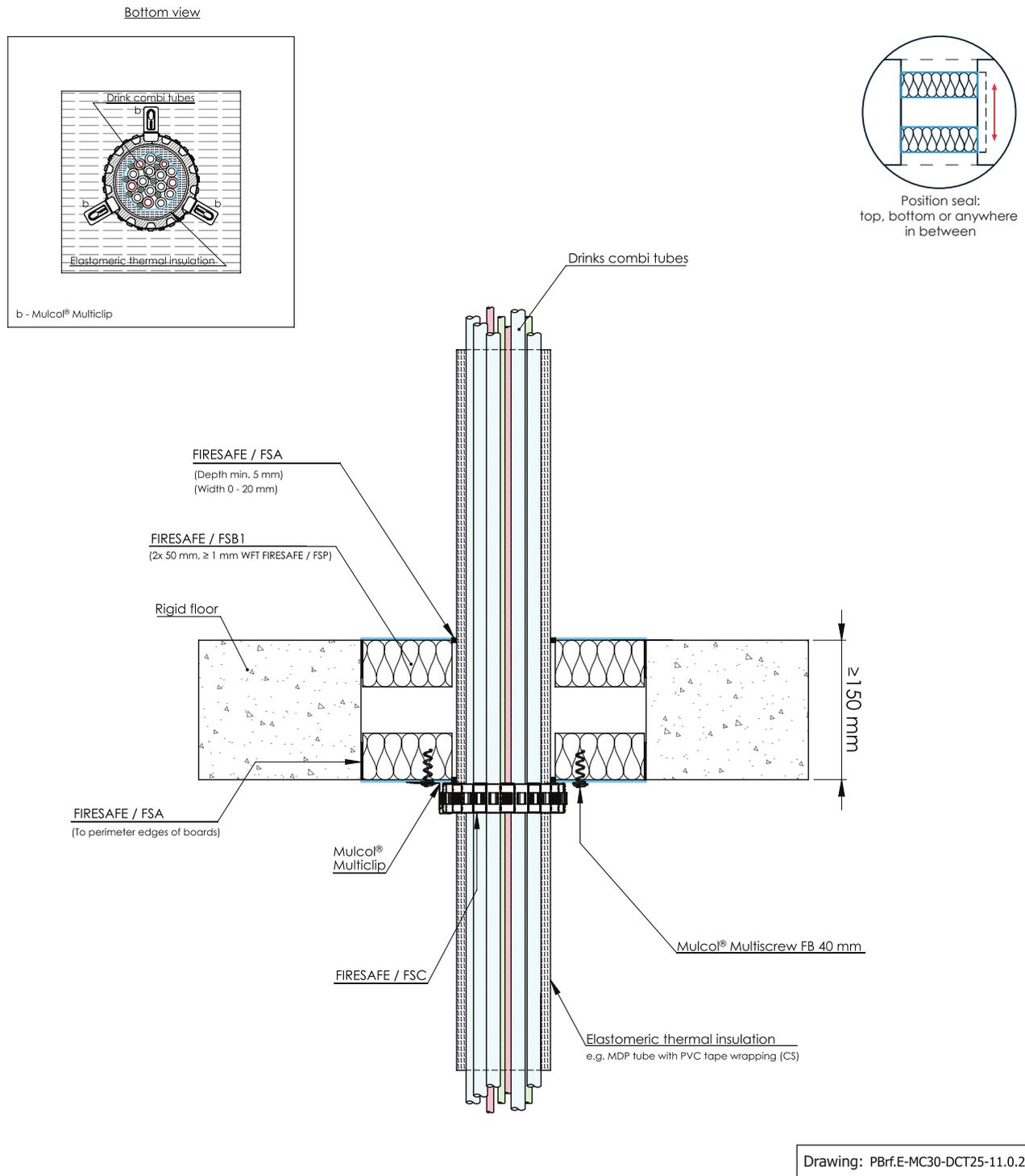


Drawing: PBrf.E-MLF-11.0.10.C

| Services           | Pipe dimensions (mm) |                | System         | Sealing (mm)                       | Classification |
|--------------------|----------------------|----------------|----------------|------------------------------------|----------------|
|                    | Outer dimension      | Wall thickness |                |                                    |                |
| Aquatherm Green-MF | ≤ Ø 50               | 6.9            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 5 (wxd) | EI 90 U/C      |
|                    | ≤ Ø 110              | 10.0           |                |                                    | EI 120 U/C     |

## B.1.3 FIRESAFE / FSB1 - 2x50 mm cavity 50 mm - Combustible pipes

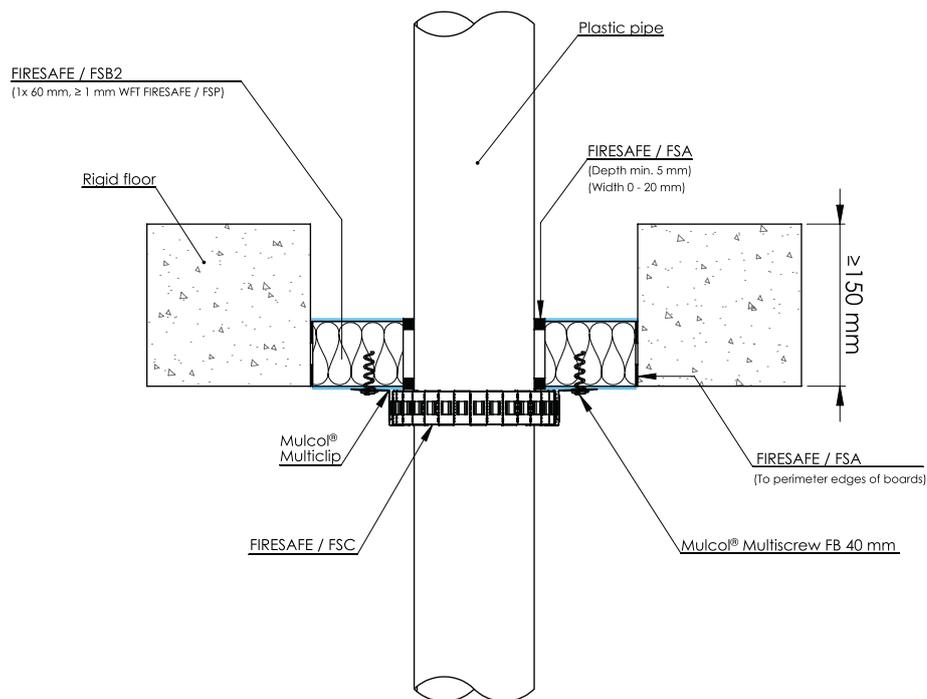
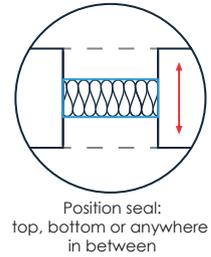
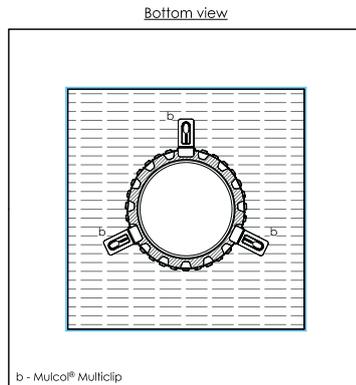
### B.1.3.4 Drinks tubing system



| Services             | Dimensions (mm) |              | Insulation       |                |               | Product        | Sealing (mm)                       | Classification |
|----------------------|-----------------|--------------|------------------|----------------|---------------|----------------|------------------------------------|----------------|
|                      | Outer dimension | No. of Hoses | Type             | Thickness (mm) | Configuration |                |                                    |                |
| Drinks tubing system | ≤ Ø 47          | ≤ 3          | Elastomeric foam | 8 - 35         | CS            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 5 (wxd) | EI 120 U/C     |
|                      | ≤ Ø 90          | ≤ 3          |                  |                |               |                |                                    |                |
|                      | ≤ Ø 100         | ≤ 25         |                  |                |               |                |                                    |                |
|                      | ≤ Ø 145         | ≤ 52         |                  |                |               |                |                                    |                |

## B.1.4 FIRESAFE / FSB1 - 1x60 mm - Combustible pipes

### B.1.4.1 Plastic pipes

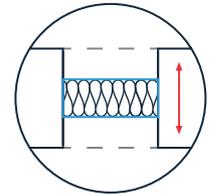
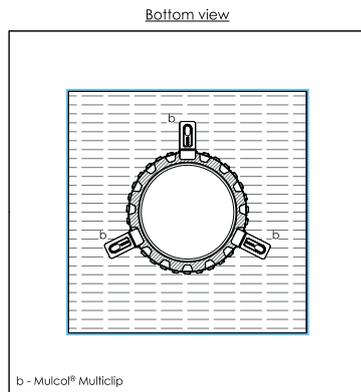


Drawing: PBrf.E-PP-MFB2.1.10

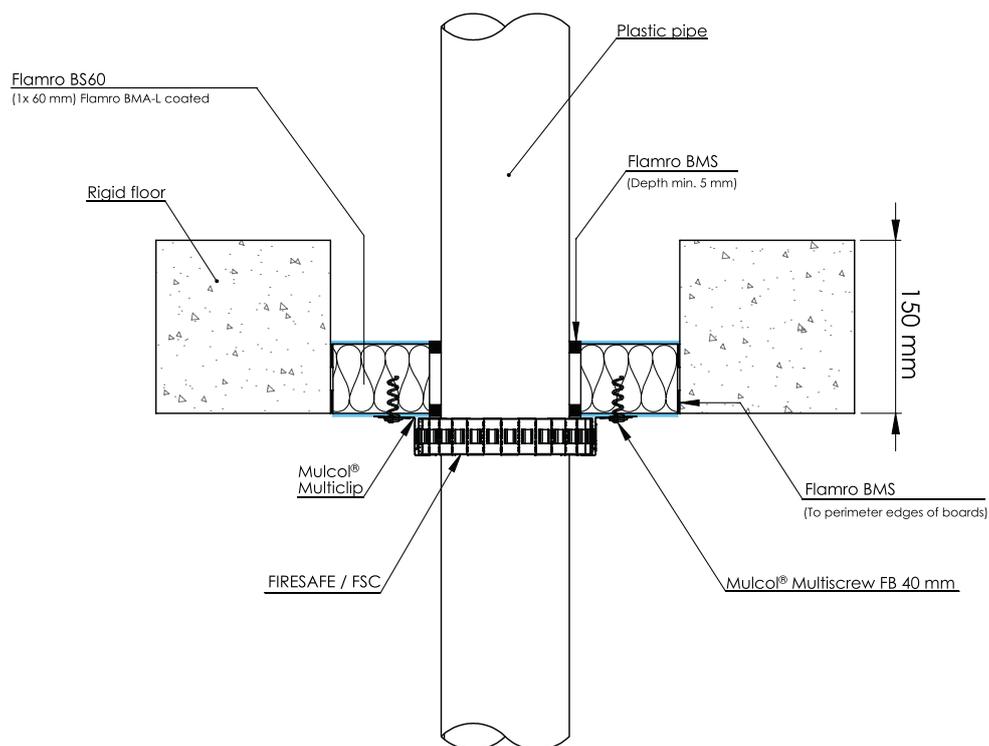
| Services                       | Pipe dimensions (mm)   |                        | Product        | Sealing (mm)                            | Classification       |                     |
|--------------------------------|------------------------|------------------------|----------------|---|----------------------|---------------------|
|                                | Outer dimension        | Wall thickness         |                |   |                      |                     |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \varnothing 40$  | 2.4                    | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 5$ (wxd) | EI 60 U/U, E 90 U/U  |                     |
|                                |                        | 2.4 - 6.6              |                |   | EI 30 U/U            |                     |
| PP                             |                        | 1.8                    |                |   | EI 90 U/U, E 180 U/U |                     |
|                                |                        | 1.8 - 5.5              |                |   | EI 30 U/U            |                     |
| PVC(-U/-C)                     |                        | $\leq \varnothing 110$ |                |   | 2.4                  | EI 60 U/U, E 90 U/U |
|                                |                        |                        |                |   | 2.4 - 4.3            | EI 30 U/U           |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \varnothing 125$ | 2.7                    | EI 120 U/U     |   |                      |                     |
|                                |                        | 2.7 - 6.6              | EI 30 U/U      |   |                      |                     |
| PP                             | $\leq \varnothing 125$ | 3.9                    | EI 120 U/C     |   |                      |                     |
|                                |                        | 3.9 - 7.4              | EI 45 U/C      |   |                      |                     |
|                                |                        | 3.1 - 7.1              |                |   |                      |                     |

## B.1.5 SVT Flamro BS60 - 1x60 mm - Combustible pipes

### B.1.5.1 Plastic pipes



Position seal:  
top, bottom or anywhere  
in between

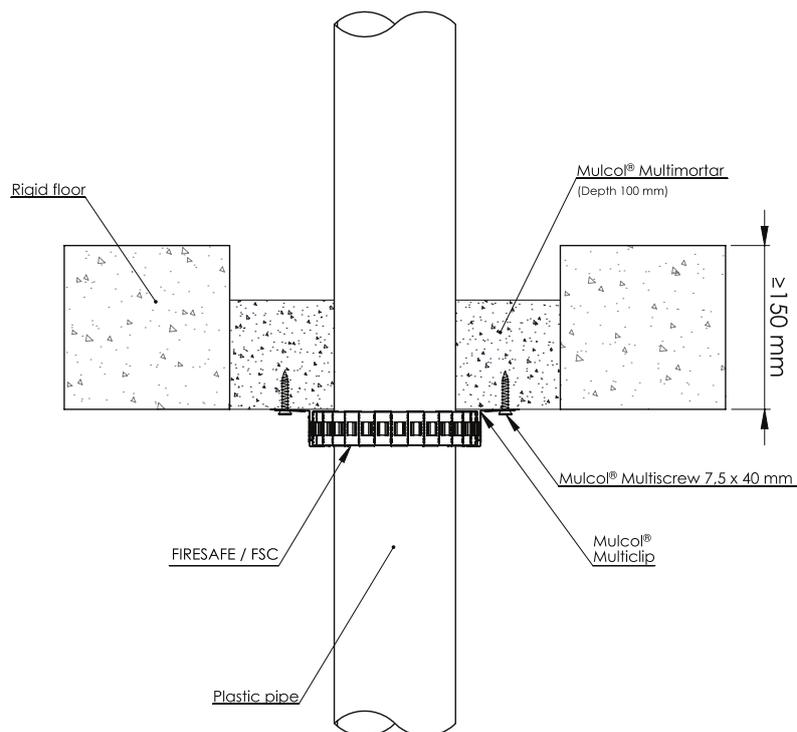
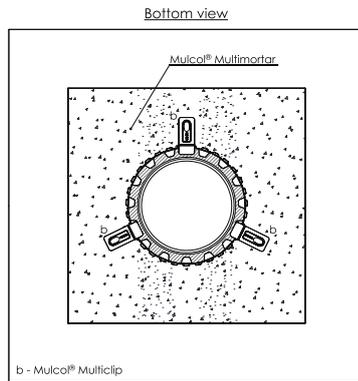


Drawing: PBrf.E-PP-BS2.1.10

| Services                       | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification        |
|--------------------------------|----------------------|----------------|----------------|-------------------------------------|-----------------------|
|                                | Outer dimension      | Wall thickness |                |                                     |                       |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 125$ | 3.9            | FIRESAFE / FSC | Flamro BMS<br>0-20 x $\geq 5$ (wxd) | EI 120 U/C, E 180 U/C |

## B.1.6 Multimortar - $\geq 100$ mm - Combustible pipes

### B.1.6.1 Plastic pipes

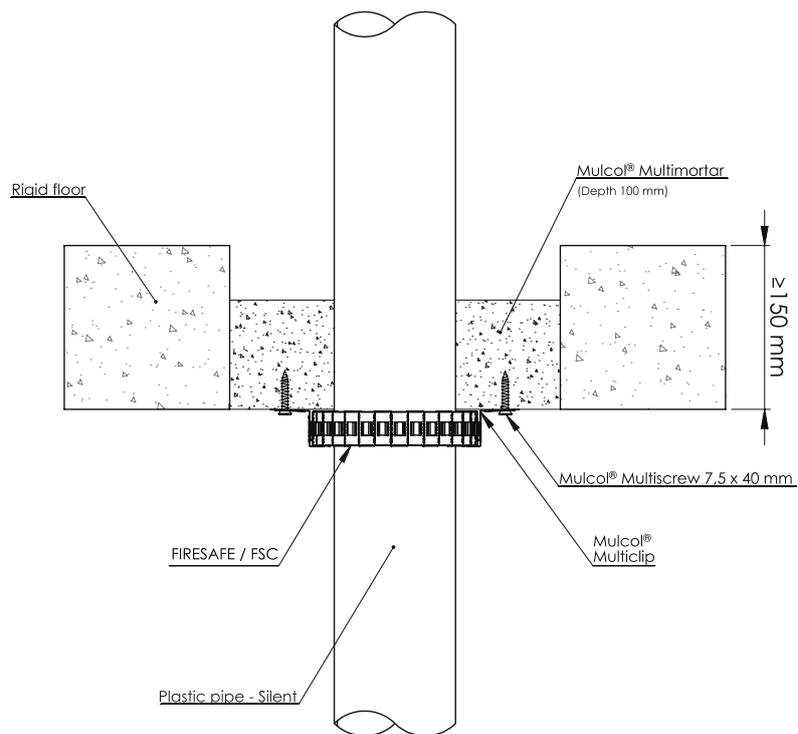
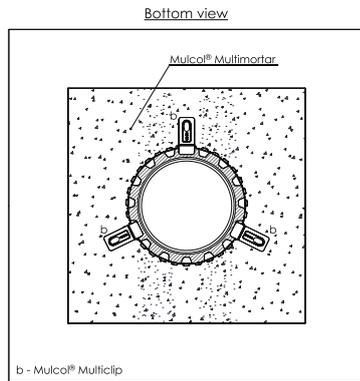


Drawing: RF.E-MC30-PP-MM1.2.10

| Services                     | Pipe dimensions (mm)   |                | Product        | Classification      |
|------------------------------|------------------------|----------------|----------------|---------------------|
|                              | Outer dimension        | Wall thickness |                |                     |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \varnothing 110$ | 2.7            | FIRESAFE / FSC | EI 120 U/U          |
|                              |                        | 2.7 - 6.6      |                | EI 60 U/U, E 90 U/U |
| PP                           |                        | 2.7            |                | EI 90 U/U           |
|                              |                        | 2.4 - 6.3      |                | EI 60 U/U           |
| PVC(-U/-C)                   |                        | 2.7            |                | EI 90 U/U           |
|                              |                        | 2.4 - 6.3      |                | EI 45 U/U, E 60 U/U |

**B.1.6 Multimortar -  $\geq 100$  mm - Combustible pipes**

**B.1.6.2 Plastic pipes (Silent)**

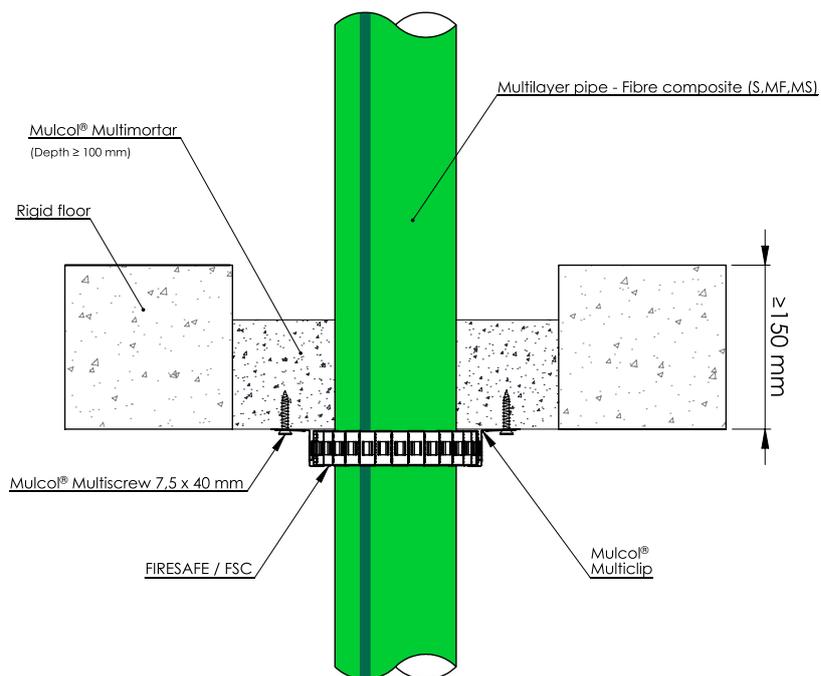
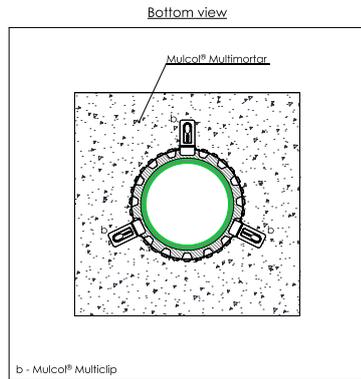


Drawing: RFE-MC30-PPS-MM1.2.10

| Services             | Pipe dimensions (mm) |                | Product        | Classification |
|----------------------|----------------------|----------------|----------------|----------------|
|                      | Outer dimension      | Wall thickness |                |                |
| Geberit Silent dB 20 | $\leq \text{Ø } 110$ | 6.0            | FIRESAFE / FSC | EI 90 U/U      |

**B.1.6 Multimortar -  $\geq 100$  mm - Combustible pipes**

**B.1.6.3 PP-R Multilayer pipes**

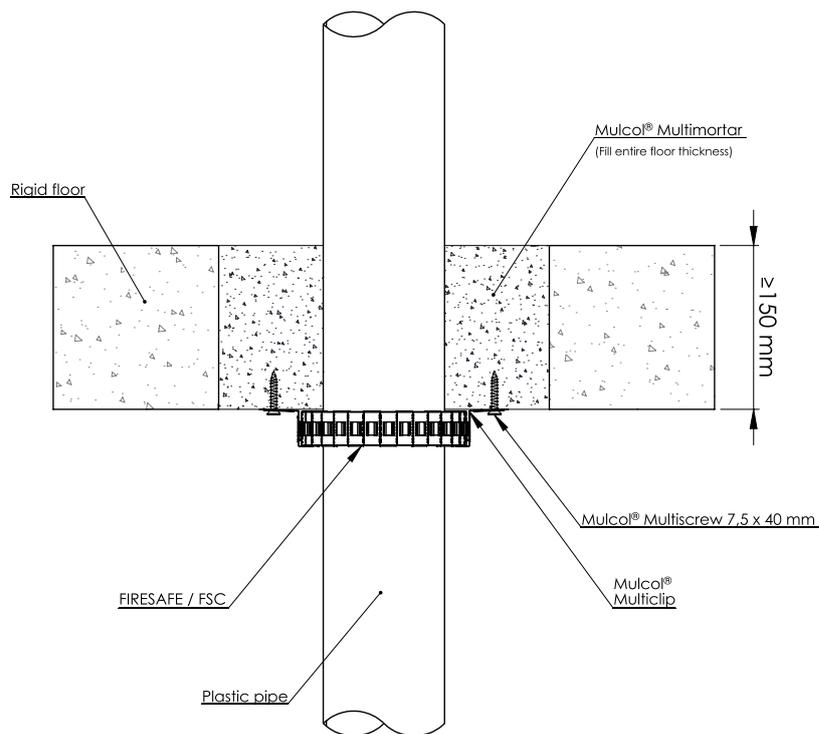
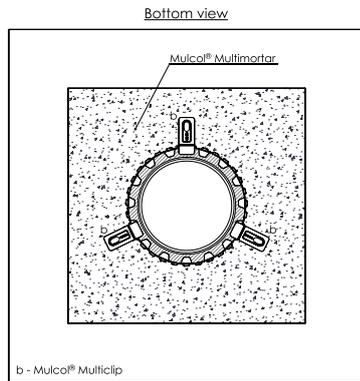


Drawing: RFE-MC30-MLF-MM1.2.10

| Services        | Pipe dimensions (mm) |                | Product        | Classification |
|-----------------|----------------------|----------------|----------------|----------------|
|                 | Outer dimension      | Wall thickness |                |                |
| Aquatherm Green | $\leq \text{Ø } 50$  | 6.9            | FIRESAFE / FSC | EI 90 U/C      |
| Aquatherm Blue  | $\leq \text{Ø } 110$ | 10.0           |                | EI 60 U/C      |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.1 Plastic pipes**



Drawing: RFE-MC30-PP-MM1.3.10

| Services                     | Pipe dimensions (mm) |                | Product        | Sealing (mm)                                | Classification |
|------------------------------|----------------------|----------------|----------------|---|----------------|
|                              | Outer dimension      | Wall thickness |                |   |                |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 40$  | 2.4 - 6.6      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$<br>(wxd) | EI 120 U/U     |
|                              |                      | 6.6 - 14.6     |                |   | EI 120 U/C     |
|                              | $\leq \text{Ø } 110$ | 2.7 - 6.6      |                |   | EI 90 U/U      |
|                              |                      | 6.6            |                |   | EI 120 U/U     |
|                              |                      | 6.6 - 14.6     |                |   | EI 120 U/C     |
|                              | $\leq \text{Ø } 160$ | 4.0            |                |   | EI 60 U/U      |
|                              |                      | 4.0 - 14.6     |                |   | EI 60 U/C      |
|                              | 14.6                 | EI 120 U/C     |                |   |                |

**B.1.7 Multimortar - ≥ 150 mm - Combustible pipes**

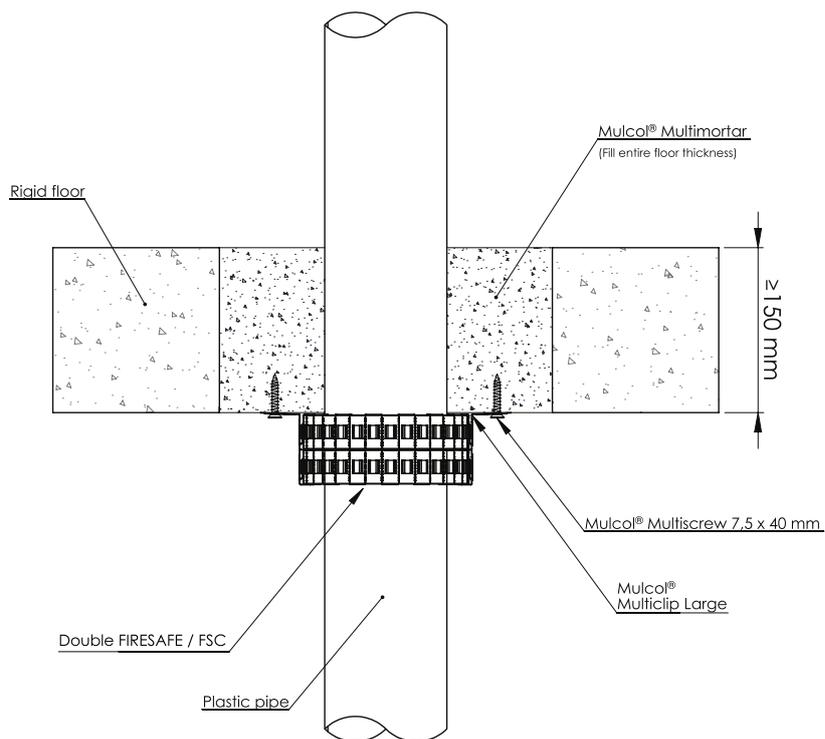
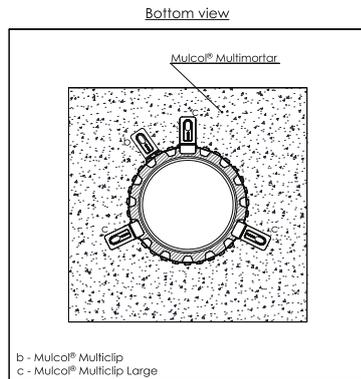
**B.1.7.1 Plastic pipes**

| Services | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification |
|----------|----------------------|----------------|----------------|--|----------------|
|          | Outer dimension      | Wall thickness |                |  |                |
| PP       | ≤ Ø 40               | 1.8 - 6.3      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 120 U/U     |
|          |                      | 6.3 - 14.6     |                |  | EI 120 U/C     |
|          | ≤ Ø 110              | 2.7 - 6.3      |                |  | EI 90 U/U      |
|          |                      | 6.3 - 14.6     |                |  | EI 90 U/C      |
|          |                      | 14.6           |                |  | EI 120 U/C     |
|          | ≤ Ø 125              | 3.1 - 4.0      |                |  | EI 90 U/U      |
|          |                      | 4.0 - 4.8      |                |  | EI 60 U/U      |
|          |                      | 4.8 - 14.6     |                |  | EI 90 U/C      |
|          |                      | 14.6           |                |  | EI 120 U/C     |
|          | ≤ Ø 160              | 4.0            |                |  | EI 90 U/U      |
|          |                      | 4.0 - 14.6     |                |  | EI 90 U/C      |
|          |                      | 14.6           |                |  | EI 120 U/C     |

| Services   | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification |
|------------|----------------------|----------------|----------------|--|----------------|
|            | Outer dimension      | Wall thickness |                |  |                |
| PVC(-U/-C) | ≤ Ø 40               | 1.9 - 8.2      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 120 U/U     |
|            |                      | 8.2 - 14.6     |                |  | EI 120 U/C     |
|            | ≤ Ø 110              | 2.2 - 8.2      |                |  | EI 120 U/U     |
|            |                      | 8.2 - 12.3     |                |  | EI 90 U/U      |
|            |                      | 12.3 - 14.6    |                |  | EI 120 U/C     |
|            | ≤ Ø 125              | 2.5 - 4.0      |                |  | EI 60 U/U      |
|            |                      | 4.0 - 14.6     |                |  | EI 60 U/C      |
|            | ≤ Ø 160              | 1.8 - 4.0      |                |  | EI 30 U/U      |
|            |                      | 4.0            |                |  | EI 60 U/U      |
|            |                      | 4.0 - 14.6     |                |  | EI 60 U/C      |
|            |                      | 14.6           |                |  | EI 120 U/C     |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.2 Plastic pipes - double FIRESAFE / FSC**

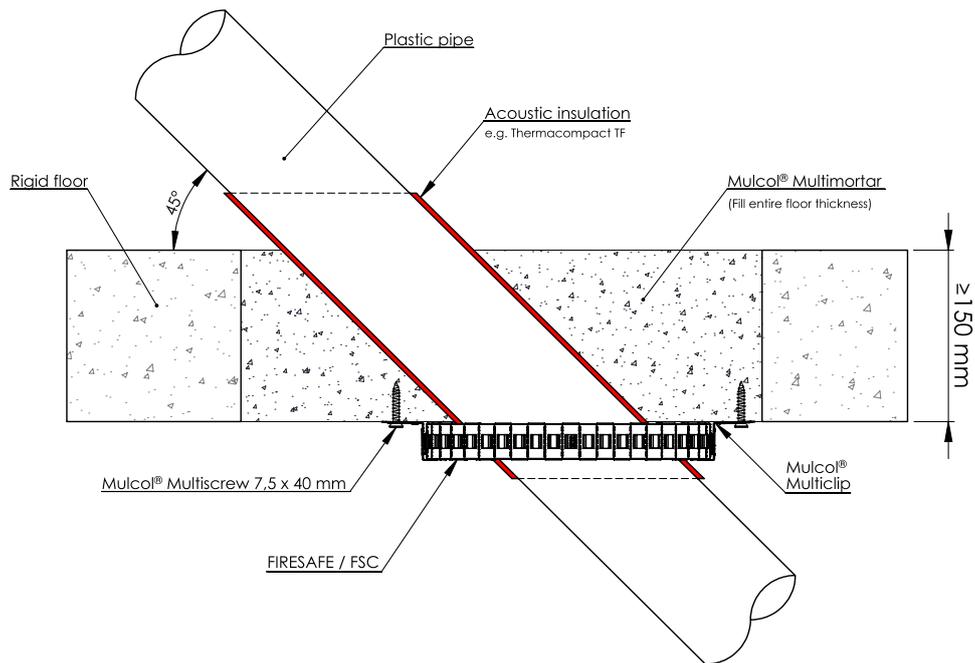
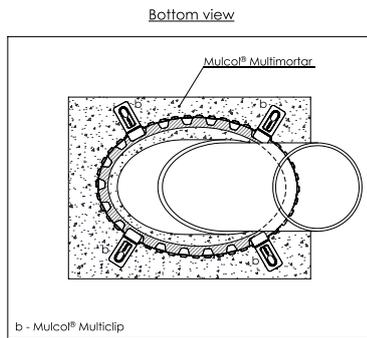


Drawing: RFE-MC60-PP-MM1.3.10

| Services                     | Pipe dimensions (mm) |                | Product                  | Classification |
|------------------------------|----------------------|----------------|--------------------------|----------------|
|                              | Outer dimension      | Wall thickness |                          |                |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 160$ | 4.0            | FIRESAFE / FSC<br>double | EI 90 U/U      |
|                              | $\leq \text{Ø } 250$ | 4.0 - 14.6     |                          | EI 90 U/C      |
| PVC(-U/-C)                   | $\leq \text{Ø } 160$ | 3.2 - 11.8     |                          | EI 90 U/U      |
|                              | $\leq \text{Ø } 315$ | 7.7            |                          | EI 120 U/C     |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.3 Plastic pipes perpendicular to 45°**

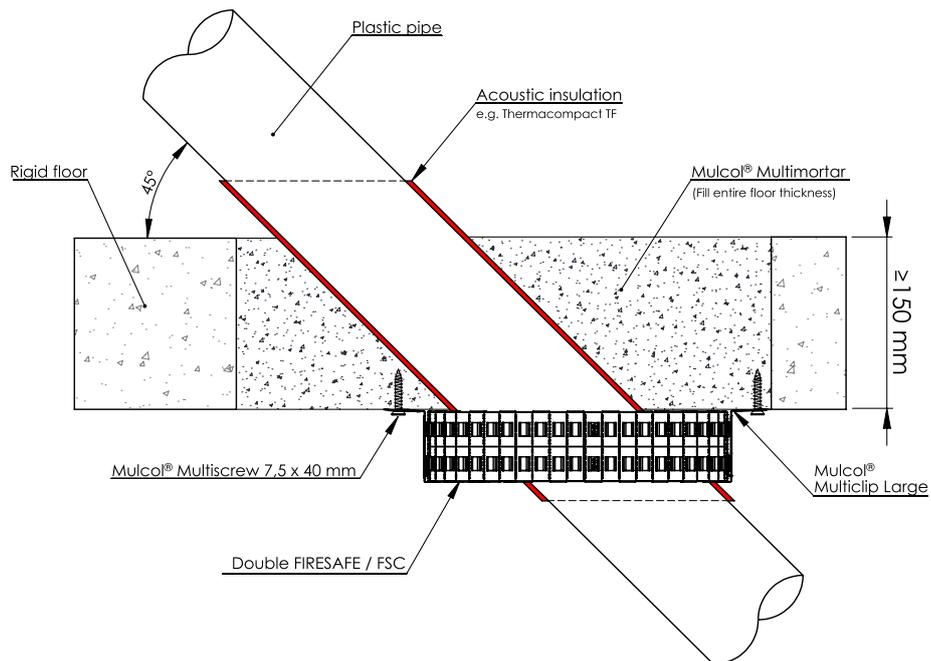
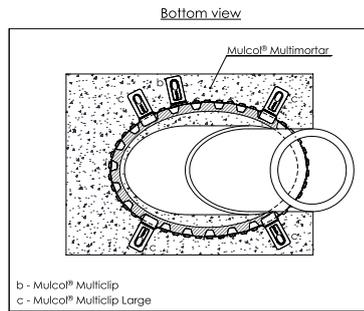


Drawing: RFE-MC30o-PP-MM1.3.10

| Services                     | Pipe dimensions (mm) |                | Product        | Classification |
|------------------------------|----------------------|----------------|----------------|----------------|
|                              | Outer dimension      | Wall thickness |                |                |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 3.4            | FIRESAFE / FSC | EI 60 U/U      |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.4 Plastic pipes perpendicular to 45° - double FIRESAFE / FSC**

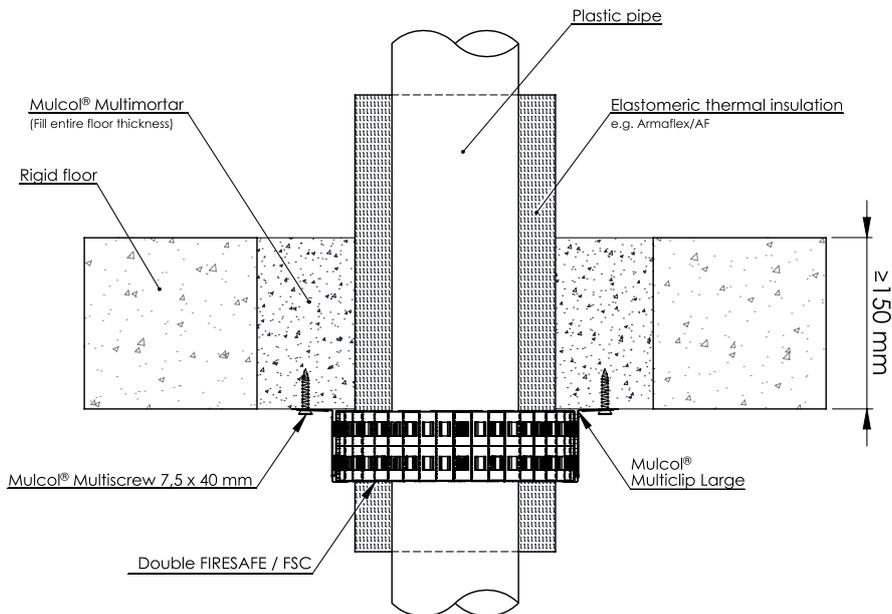
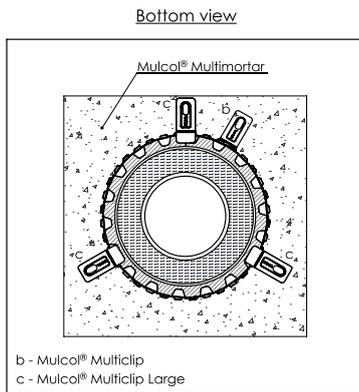


Drawing: RFE-MC60o-PP-MM1.3.10

| Services                     | Pipe dimensions (mm)   |                | Product                  | Classification |
|------------------------------|------------------------|----------------|--------------------------|----------------|
|                              | Outer dimension        | Wall thickness |                          |                |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \varnothing 110$ | 3.4 - 10.0     | FIRESAFE / FSC<br>double | EI 60 U/U      |
|                              |                        | 10.0           |                          | EI 90 U/U      |
| 3.4                          |                        | EI 120 U/U     |                          |                |
| 3.4 - 10.0                   |                        | EI 90 U/U      |                          |                |
| 10.0                         |                        | EI 60 U/U      |                          |                |
| PP                           |                        |                |                          | EI 90 U/U      |
| PVC(-U/-C)                   |                        |                |                          | EI 60 U/U      |
|                              |                        |                |                          | EI 90 U/U      |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.5 Plastic pipes - Elastomer LS-LI 450 / CS-CI**



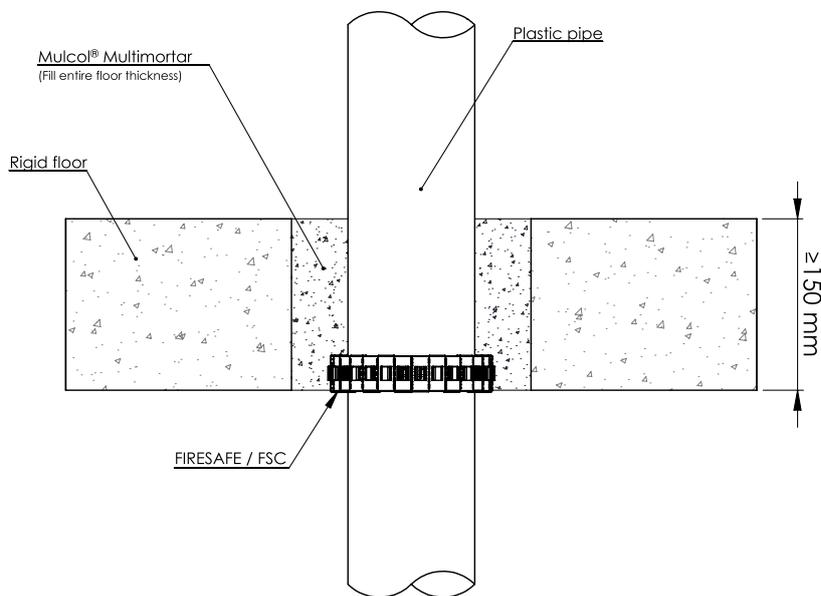
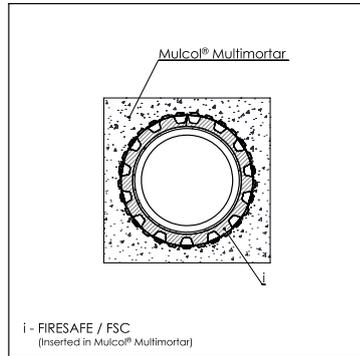
Drawing: RFE-MC60-PP-MM1.3.22

| Services   | Pipe dimensions (mm)   |                | Insulation   |                |                            | Product                  | Classification |
|------------|------------------------|----------------|--|----------------|----------------------------|--------------------------|----------------|
|            | Outer dimensions       | Wall thickness | Type   | Thickness (mm) | Configuration              |                          |                |
| PVC(-U/-C) | $\leq \varnothing 110$ | 3.2            | ArmaFlex AF<br>(min. class B-s3, d0<br>B <sub>L</sub> -s3, d0) | 9 - 32         | LS 450 / CS<br>LI 450 / CI | FIRESAFE / FSC<br>double | EI 120 U/U     |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.6 Plastic pipes - FIRESAFE / FSC recessed into soffit**

Bottom view

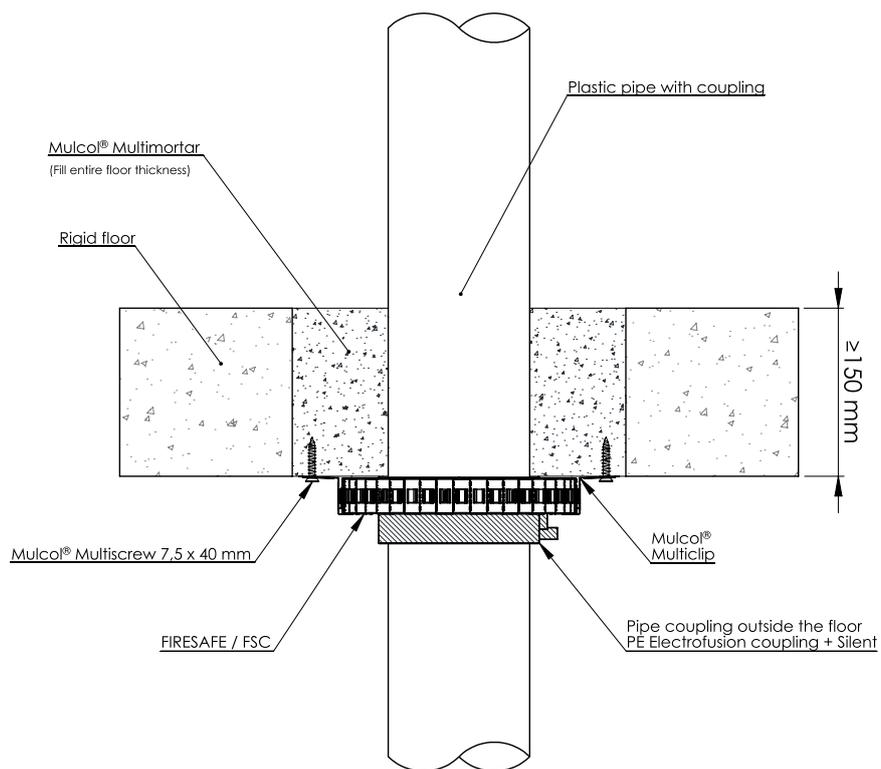
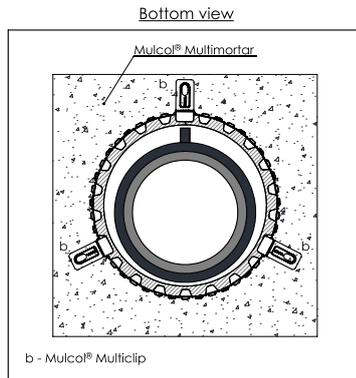


Drawing: RFE-MC30i-PP-MM1.3.10

| Services | Pipe dimensions (mm) |                | Product        | Classification |
|----------|----------------------|----------------|----------------|----------------|
|          | Outer dimension      | Wall thickness |                |                |
| PP       | $\leq \text{Ø } 110$ | 6.3            | FIRESAFE / FSC | EI 30 U/U      |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.7 Plastic pipes with socket**

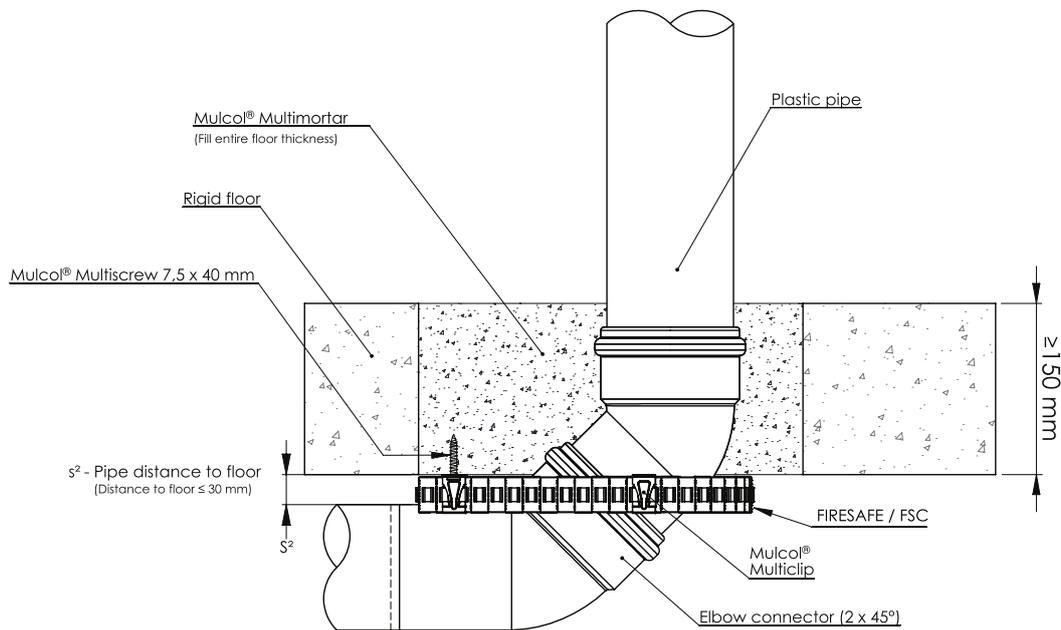
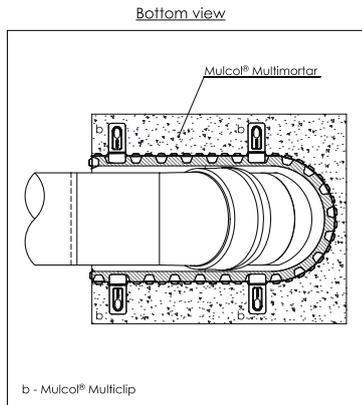


Drawing: RFE-MC30-PP-MM1.3.60

| Services                     | Pipe dimensions (mm) |                | Product        | Classification |
|------------------------------|----------------------|----------------|----------------|----------------|
|                              | Outer dimension      | Wall thickness |                |                |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 4.3            | FIRESAFE / FSC | EI 90 U/C      |
|                              | $\leq \text{Ø } 125$ | 7.4            |                | EI 60 U/C      |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.8 Plastic pipes with elbow and U-shape FIRESAFE / FSC**

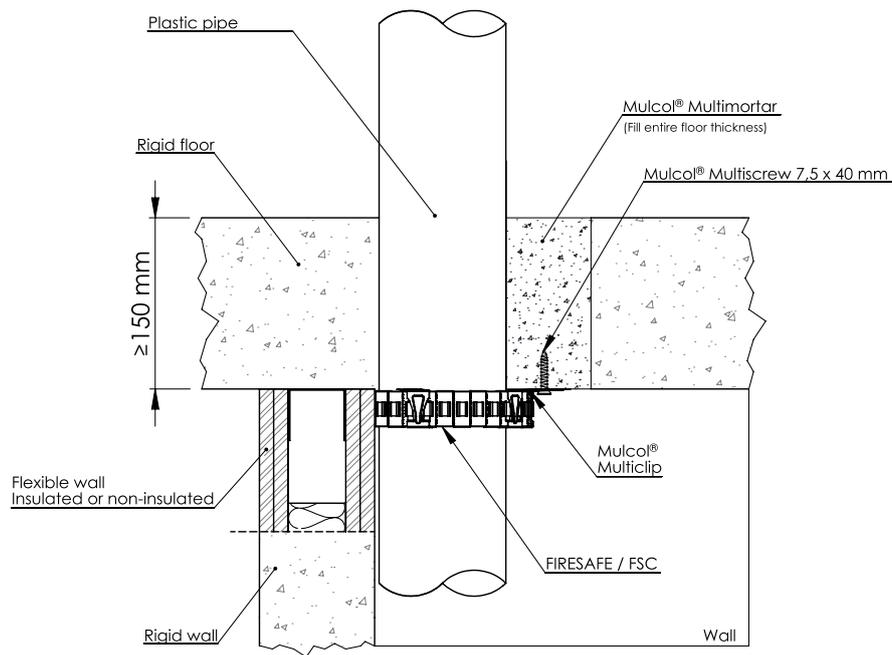
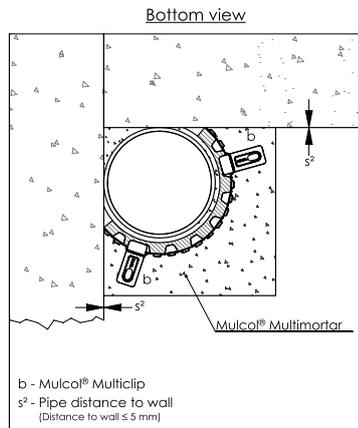


Drawing: RFE-MC30u-PP-MM1.3.80

| Services                     | Pipe dimensions (mm) |                | Product               | Classification       |
|------------------------------|----------------------|----------------|-----------------------|----------------------|
|                              | Outer dimension      | Wall thickness |                       |                      |
| PVC(-U/-C)                   | $\leq \text{Ø } 50$  | 2.7 - 3.0      | FIRESAFE / FSC        | EI 90 U/U            |
|                              |                      | 2.7            |                       | EI 120 U/U           |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 2.7 - 6.6      | FIRESAFE / FSC double | EI 60 U/U, E 120 U/U |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.9 Plastic pipes in corner**

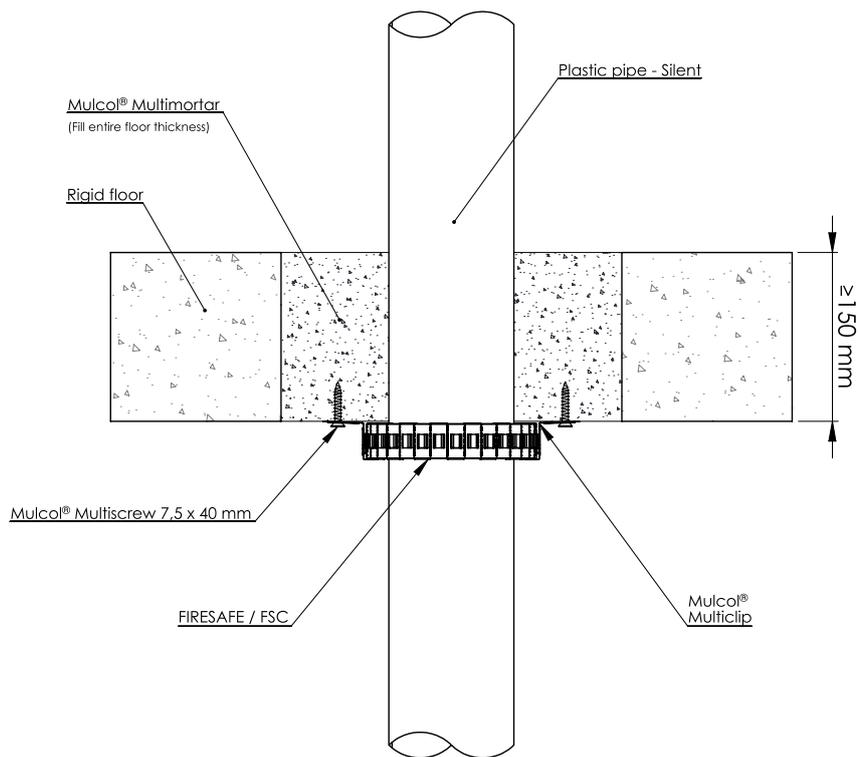
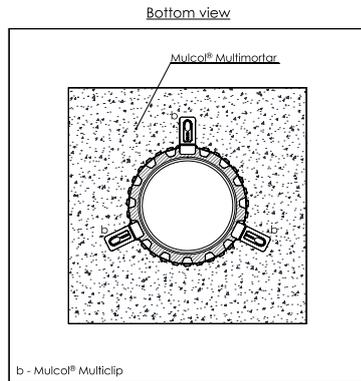


Drawing: RF.E-MC30c-PP-MM1.3.10

| Services                     | Pipe dimensions (mm) |                | Product        | Classification |
|------------------------------|----------------------|----------------|----------------|----------------|
|                              | Outer dimension      | Wall thickness |                |                |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \text{Ø } 110$ | 6.6            | FIRESAFE / FSC | EI 120 U/U     |
| PP                           |                      | 6.3            |                | EI 90 U/U      |
| PVC(-U/-C)                   | $\leq \text{Ø } 125$ | 7.4            |                | EI 60 U/C      |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.10 Plastic pipes (Silent)**

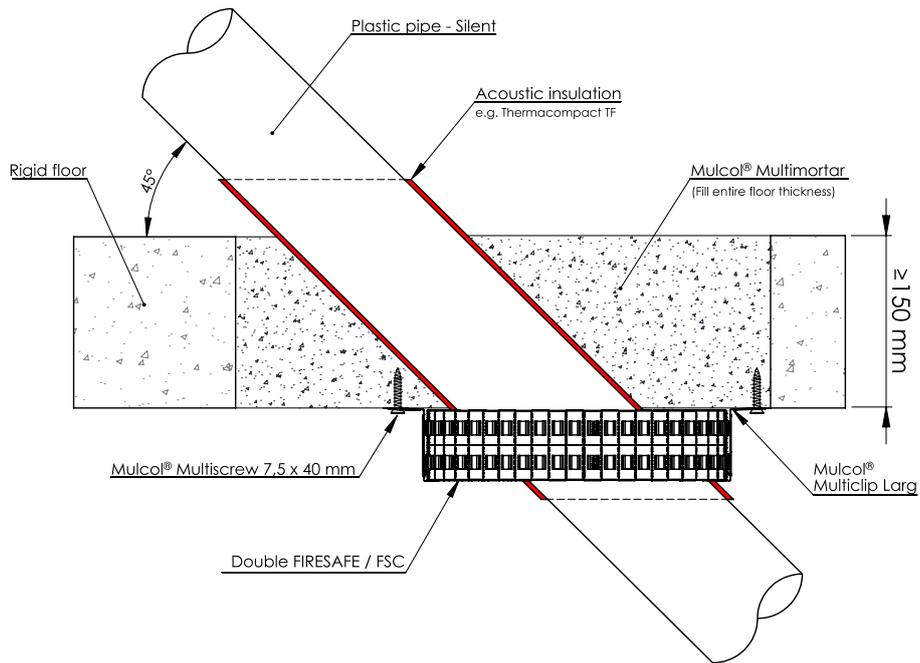
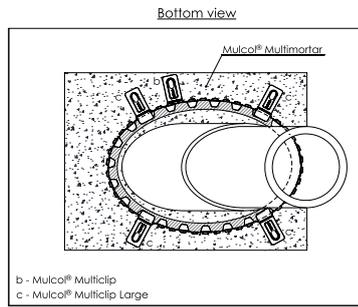


Drawing: RF.E-MC30-PPS-MM1.3.10

| Services             | Pipe dimensions (mm) |                | Product        |   | Classification    |
|----------------------|----------------------|----------------|----------------|---|-------------------|
|                      | Outer dimension      | Wall thickness |                |   |                   |
| Geberit Silent dB 20 | $\leq \text{Ø } 56$  | 3.2 - 7.0      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$<br>(wxd) | <b>EI 120 U/U</b> |
|                      | $\leq \text{Ø } 110$ | 6.0 - 7.0      |                |   |                   |
|                      | $\leq \text{Ø } 160$ | 7.0            |                |   |                   |
| Raupiano Plus        | $\leq \text{Ø } 50$  | 1.8 - 4.0      |                |   |                   |
|                      | $\leq \text{Ø } 110$ | 2.7 - 4.0      |                |   |                   |
|                      | $\leq \text{Ø } 160$ | 4.0            |                |   |                   |
| Wavin SiTech+        | $\leq \text{Ø } 110$ | 3.6            |                |   |                   |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.11 Plastic pipes (Silent) perpendicular to 45° - double FIRESAFE / FSC**

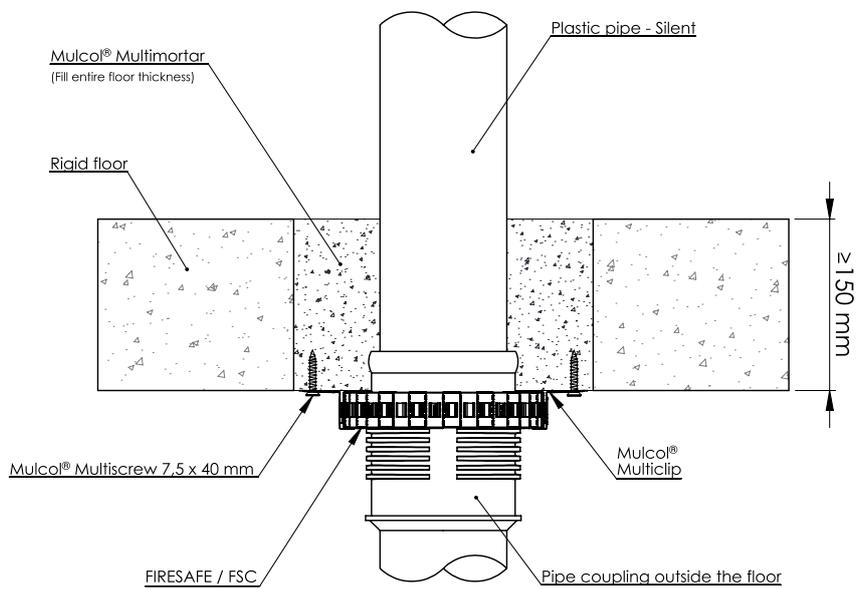
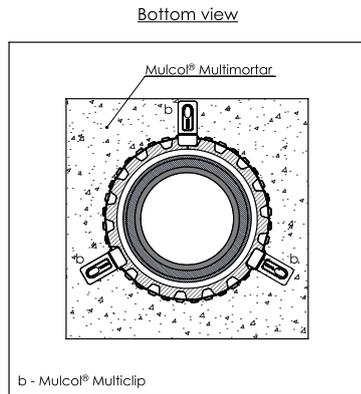


Drawing: RF.E-MC60o-PPS-MM1.3.10

| Services             | Pipe dimensions (mm) |                | Product                  | Classification |
|----------------------|----------------------|----------------|--------------------------|----------------|
|                      | Outer dimension      | Wall thickness |                          |                |
| Geberit Silent dB 20 | $\leq \text{Ø } 110$ | 6.0            | FIRESAFE / FSC<br>double | EI 120 U/U     |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.12 Plastic pipes (Silent) with socket**

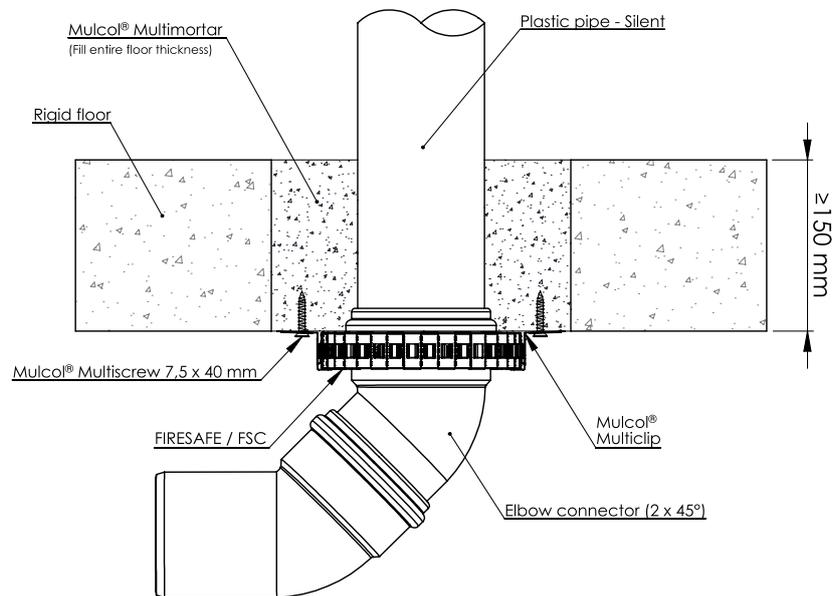
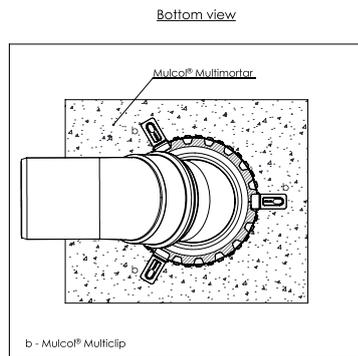


Drawing: RFE-MC30-PPS-MM1.3.60

| Services             | Pipe dimensions (mm) |                | Product        | Classification |
|----------------------|----------------------|----------------|----------------|----------------|
|                      | Outer dimension      | Wall thickness |                |                |
| Geberit Silent dB 20 | $\leq \text{Ø } 110$ | 6.0            | FIRESAFE / FSC | EI 120 U/C     |
| Raupiano Plus        |                      | 2.7            |                | EI 120 U/U     |
| Wavin SiTech+        |                      | 3.6            |                |                |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.13 Plastic pipes (Silent) with elbow**

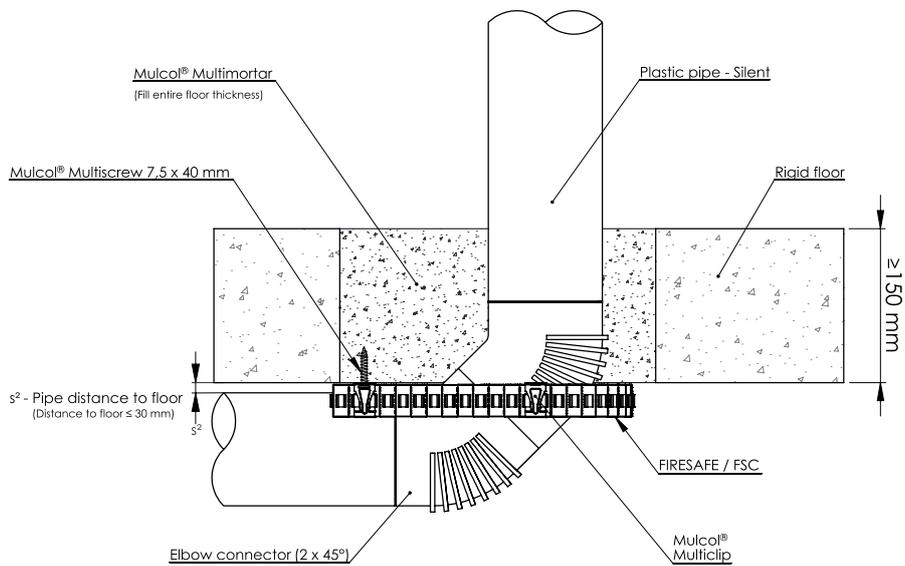
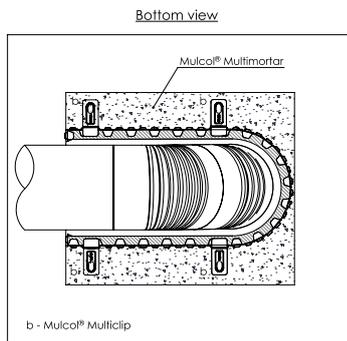


Drawing: RF.E-MC30-PPS-MM1.3.80

| Services             | Pipe dimensions (mm) |                | Product        | Classification |
|----------------------|----------------------|----------------|----------------|----------------|
|                      | Outer dimension      | Wall thickness |                |                |
| Geberit Silent dB 20 | $\leq \text{Ø } 110$ | 6.0            | FIRESAFE / FSC | EI 90 U/U      |
| Wavin AS             |                      | 5.3            |                | EI 120 U/U     |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.14 Plastic pipes (Silent) with elbow and U-shape FIRESAFE / FSC**

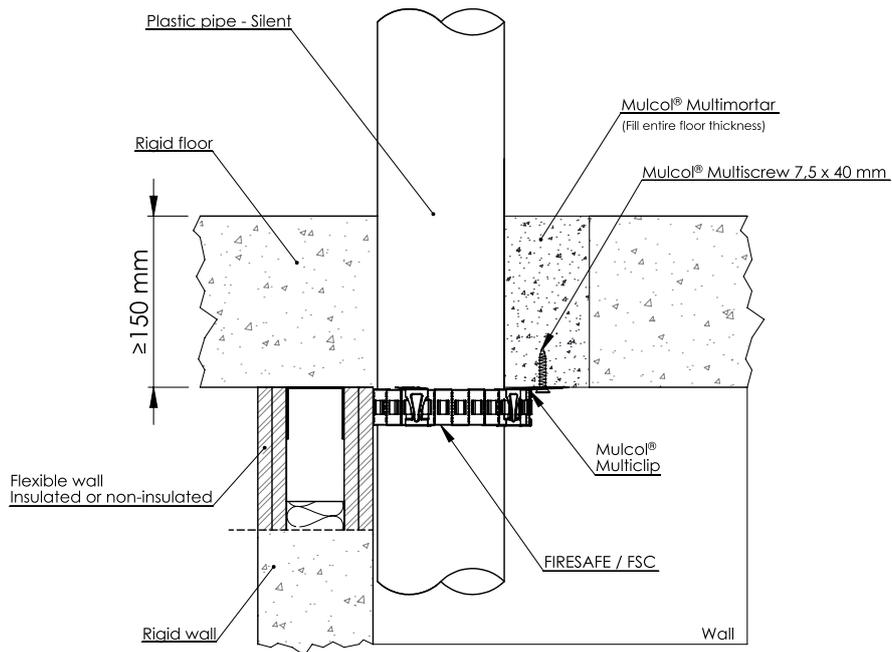
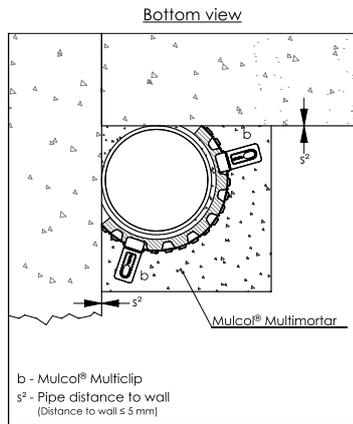


Drawing: RF.E-MC30u-PPS-MM1.3.80

| Services             | Pipe dimensions (mm) |                | Product        | Classification |
|----------------------|----------------------|----------------|----------------|----------------|
|                      | Outer dimension      | Wall thickness |                |                |
| Geberit Silent dB 20 | $\leq \text{Ø } 110$ | 6.0            | FIRESAFE / FSC | EI 90 U/U      |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.15 Plastic pipes (Silent) in corner**

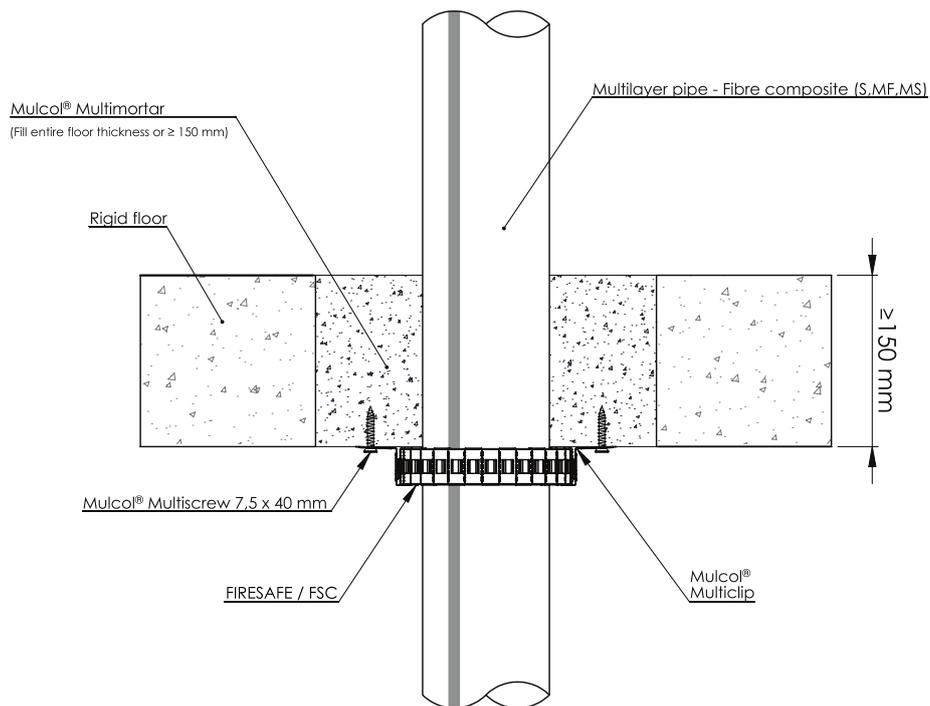
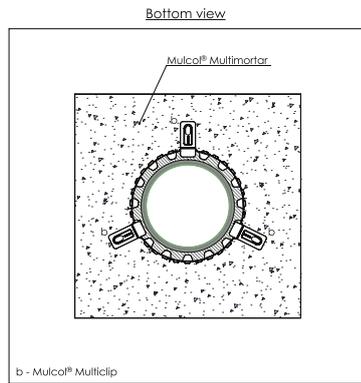


Drawing: RFE-MC30c-PPS-MM1.3.10

| Services             | Pipe dimensions (mm) |                | Product        | Classification |
|----------------------|----------------------|----------------|----------------|----------------|
|                      | Outer dimension      | Wall thickness |                |                |
| Geberit Silent dB 20 | $\leq \text{Ø } 110$ | 6.0            | FIRESAFE / FSC | EI 120 U/C     |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.16 PP-R Multilayer pipes**

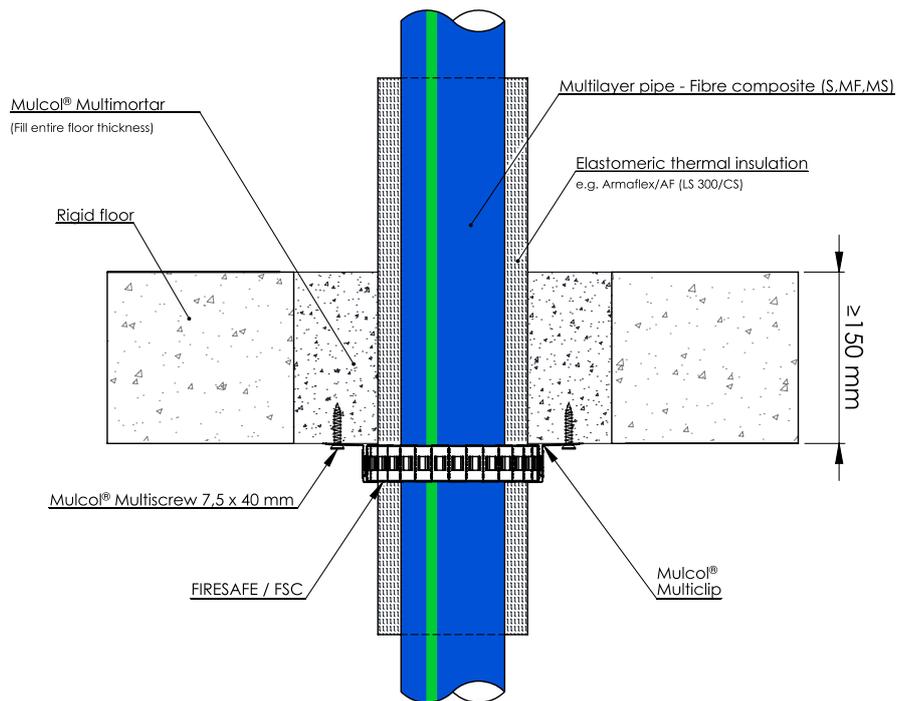
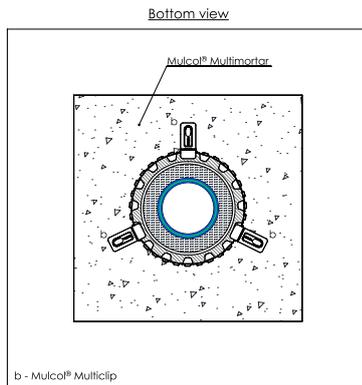


Drawing: RFE-MC30-MLF-MM1.3.10

| Services           | Pipe dimensions (mm) |                | Product               | Classification |
|--------------------|----------------------|----------------|-----------------------|----------------|
|                    | Outer dimension      | Wall thickness |                       |                |
| Aquatherm Blue-MF  | $\leq \text{Ø } 20$  | 2.8            | FIRESAFE / FSC        | EI 120 U/C     |
|                    | $\leq \text{Ø } 110$ | 10.0 - 14.6    |                       | EI 90 U/C      |
|                    | $\leq \text{Ø } 160$ | 14.6           |                       |                |
| Aquatherm Green-MF | $\leq \text{Ø } 50$  | 6.9            | FIRESAFE / FSC        | EI 120 U/C     |
| Aquatherm Red-MF   | $\leq \text{Ø } 110$ | 15.1           |                       |                |
| Aquatherm Blue-MF  | $\leq \text{Ø } 250$ | 22.7           | FIRESAFE / FSC double | EI 120 U/C     |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.17 PP-R Multilayer pipes - Elastomer LS-LI 300 / CS-CI**

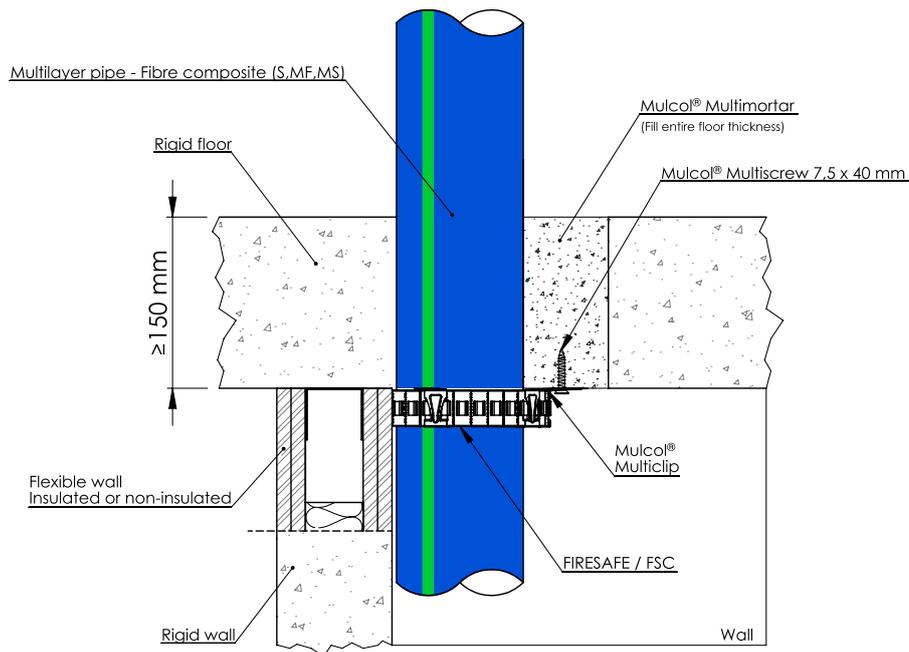
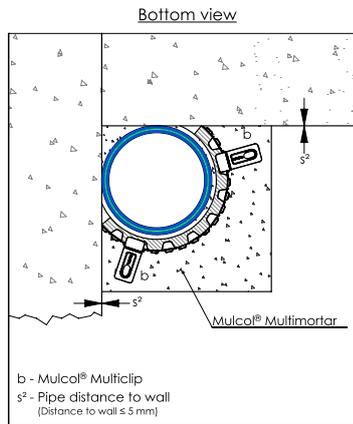


Drawing: RFE-MC30-MLF-MM1.3.22

| Services           | Pipe dimensions (mm)   |                | Insulation   |                |                            | Product        | Classification |
|--------------------|------------------------|----------------|--|----------------|----------------------------|----------------|----------------|
|                    | Outer dimensions       | Wall thickness | Type   | Thickness (mm) | Configuration              |                |                |
| Aquatherm Green-MF | $\leq \varnothing 110$ | 18.3           | ArmaFlex AF (min. class B-s3, d0 B <sub>L</sub> -s3, d0) | 9 - 32         | LS 300 / CS<br>LI 300 / CI | FIRESAFE / FSC | EI 120 U/C     |
|                    |                        | 15.2           |  |                |                            |                |                |
|                    |                        | 15.1           |  |                |                            |                |                |
| Aquatherm Blue-MF  | $\leq \varnothing 20$  | 2.8            |  |                |                            |                |                |
|                    | $\leq \varnothing 110$ | 10.0           |  |                |                            |                |                |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.18 PP-R Multilayer pipes in corner**

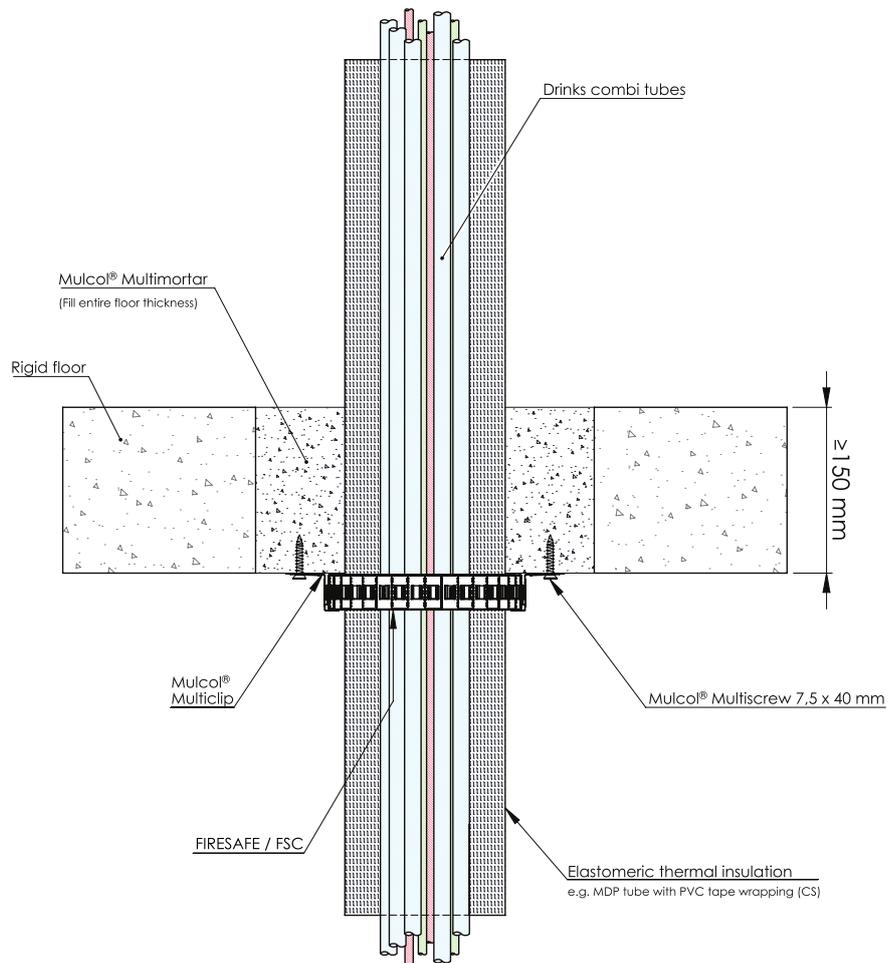
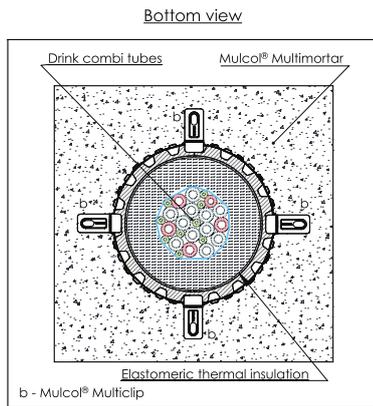


Drawing: RFE-MC30c-MLF-MM1.3.10

| Services          | Pipe dimensions (mm) |                | Product        | Classification |
|-------------------|----------------------|----------------|----------------|----------------|
|                   | Outer dimension      | Wall thickness |                |                |
| Aquatherm Blue-MF | $\leq \text{Ø } 110$ | 10.0           | FIRESAFE / FSC | EI 90 U/C      |

**B.1.7 Multimortar -  $\geq 150$  mm - Combustible pipes**

**B.1.7.19 Drinks tubing system**

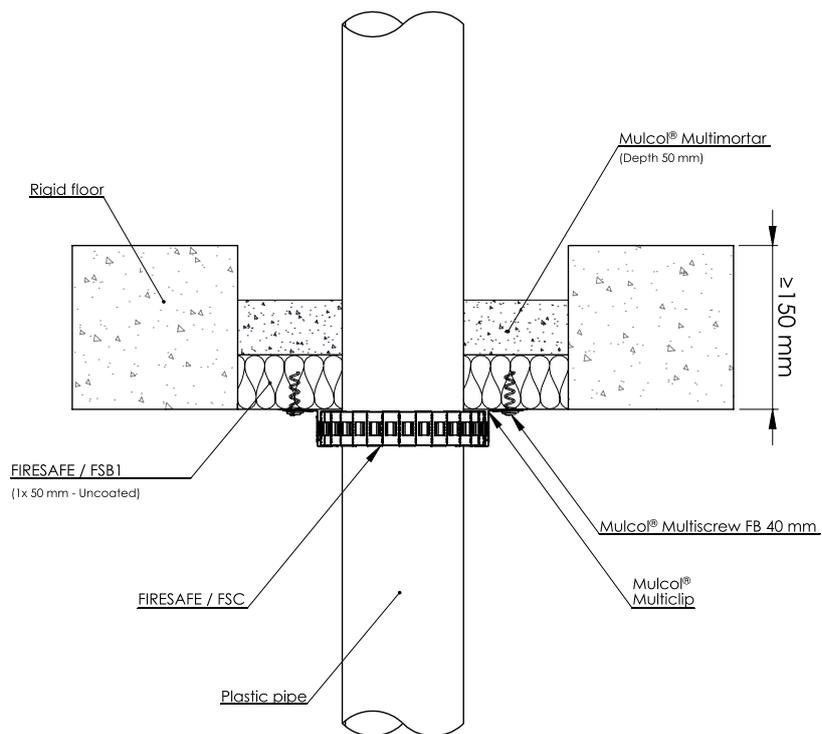
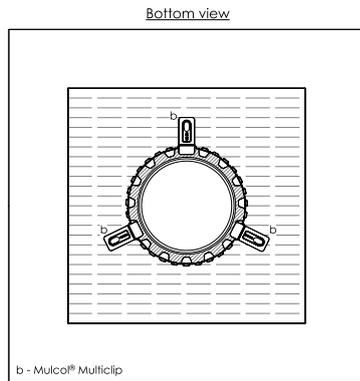


Drawing: RFE-MC30-DCP52-MM1.3.10

| Services             | Dimensions (mm)      |           | Insulation       |                |               | Product        | Classification |
|----------------------|----------------------|-----------|------------------|----------------|---------------|----------------|----------------|
|                      | Outer dimension      | Hoses no. | Type             | Thickness (mm) | Configuration |                |                |
| Drinks tubing system | $\leq \text{Ø } 145$ | $\leq 52$ | Elastomeric foam | 8 - 35         | CS            | FIRESAFE / FSC | EI 120 U/C     |

**B.1.8 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Combustible pipes**

**B.1.8.1 Plastic pipes**

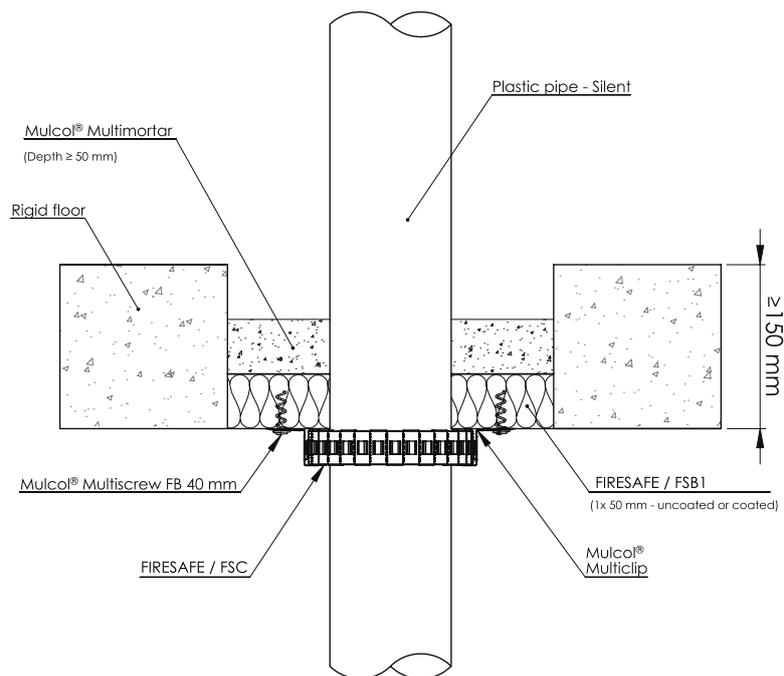
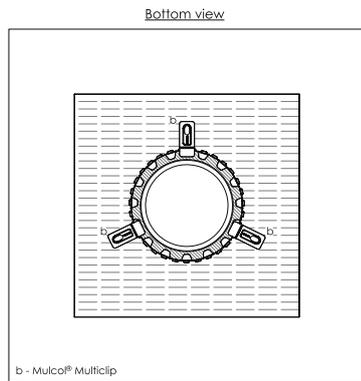


Drawing: RFE-MC30-PP-MM2.5.10

| Services                     | Pipe dimensions (mm)   |                | Product        | Classification |
|------------------------------|------------------------|----------------|----------------|----------------|
|                              | Outer dimension        | Wall thickness |                |                |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \varnothing 110$ | 2.7            | FIRESAFE / FSC | EI 120 U/U     |
| PP                           |                        | 2.7 - 6.6      |                | EI 60 U/U      |
| PVC(-U/-C)                   |                        | 2.7 - 6.3      |                |                |

**B.1.8 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Combustible pipes**

**B.1.8.2 Plastic pipes (Silent)**

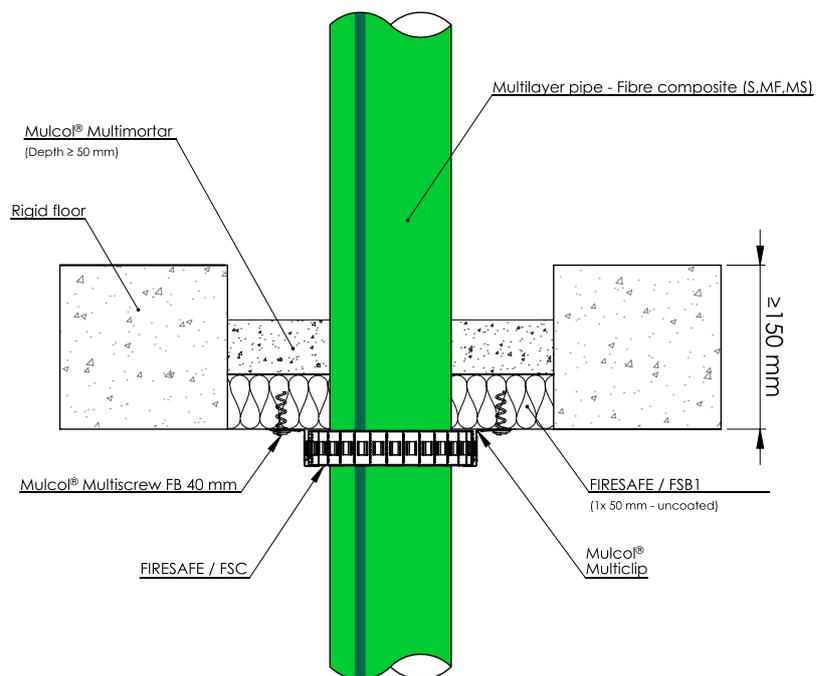
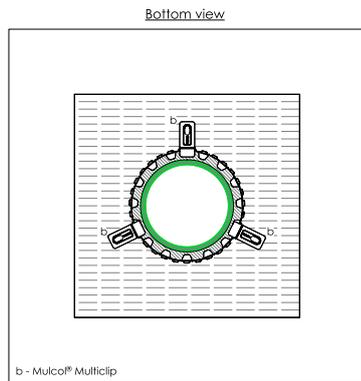


Drawing: RFE-PPS-MM2.5.10

| Services             | Pipe dimensions (mm) |                | Product        | Classification |
|----------------------|----------------------|----------------|----------------|----------------|
|                      | Outer dimension      | Wall thickness |                |                |
| Geberit Silent dB 20 | $\leq \text{Ø } 110$ | 6.0            | FIRESAFE / FSC | EI 60 U/U      |

**B.1.8 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Combustible pipes**

**B.1.8.3 PP-R Multilayer pipes**

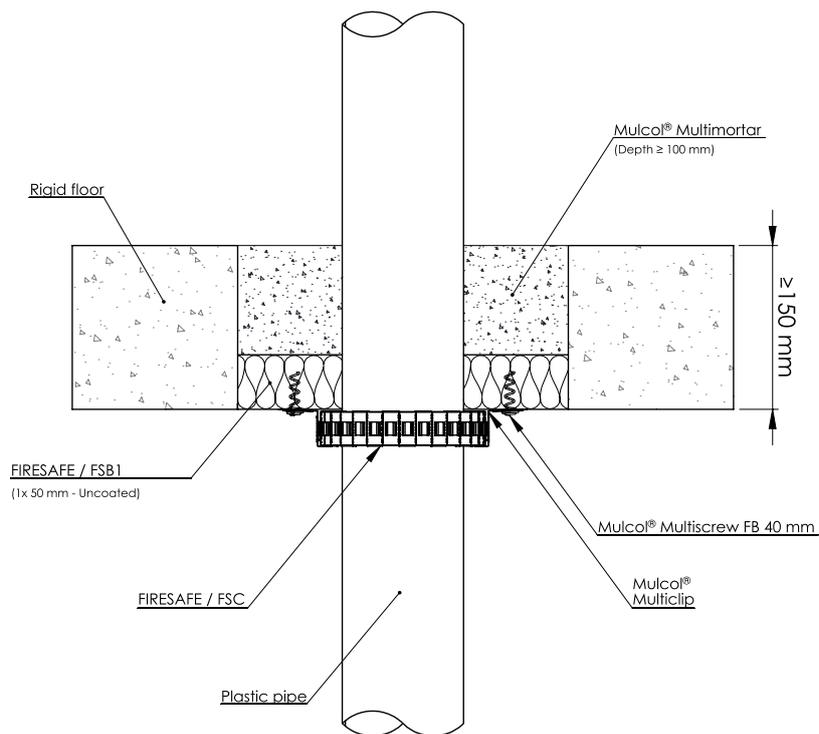
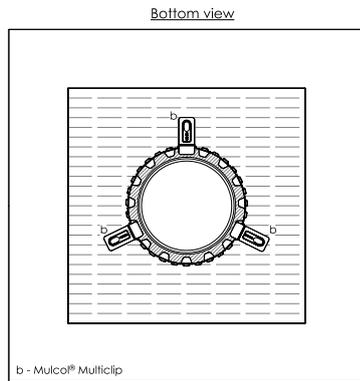


Drawing: RFE-MC30-MLF-MM2.5.10

| Services        | Pipe dimensions (mm) |                | Product        | Classification |
|-----------------|----------------------|----------------|----------------|----------------|
|                 | Outer dimension      | Wall thickness |                |                |
| Aquatherm Green | $\leq \text{Ø } 50$  | 6.9            | FIRESAFE / FSC | EI 60 U/C      |
| Aquatherm Blue  | $\leq \text{Ø } 110$ | 10.0           |                |                |

**B.1.9 Multimortar + FIRESAFE / FSB -  $\geq 150$  mm - Combustible pipes**

**B.1.9.1 Plastic pipes**

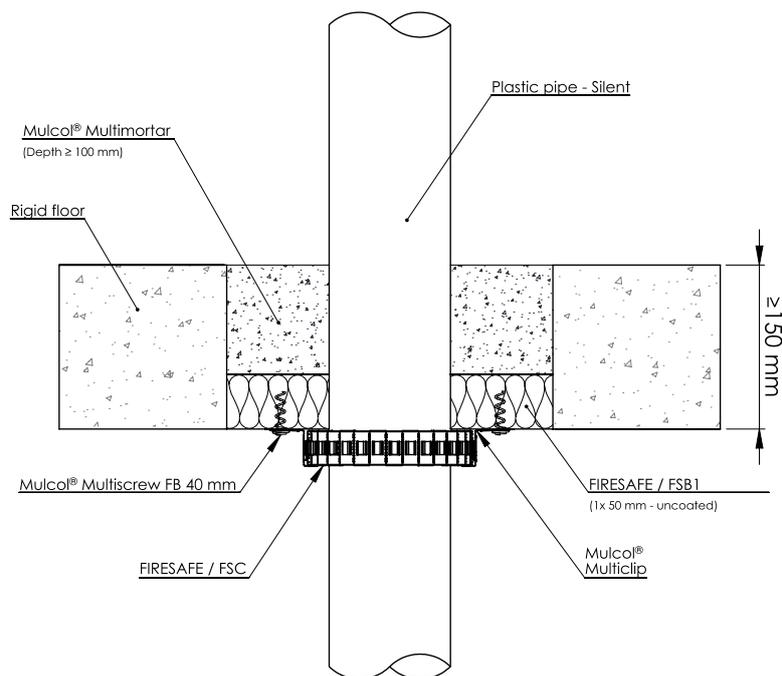
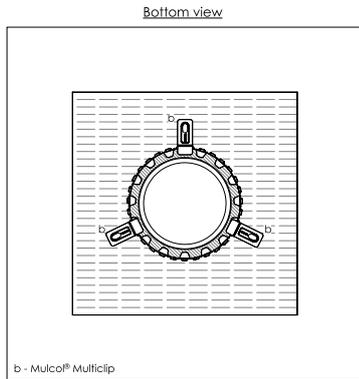


Drawing: RFE-MC30-PP-MM2.7.10

| Services                     | Pipe dimensions (mm)   |                | Product        | Classification |
|------------------------------|------------------------|----------------|----------------|----------------|
|                              | Outer dimension        | Wall thickness |                |                |
| PE-HD / PE-X / ABS / SAN+PVC | $\leq \varnothing 110$ | 2.7            | FIRESAFE / FSC | EI 120 U/U     |
|                              |                        | 2.7 - 3.1      |                | EI 120 U/C     |
|                              | $\leq \varnothing 125$ | 3.1            |                |                |
| PP                           | $\leq \varnothing 110$ | 2.7 - 6.6      |                | EI 60 U/U      |
| PVC(-U/-C)                   |                        | 2.7 - 6.3      |                |                |

**B.1.9 Multimortar + FIRESAFE / FSB -  $\geq 150$  mm - Combustible pipes**

**B.1.9.2 Plastic pipes (Silent)**

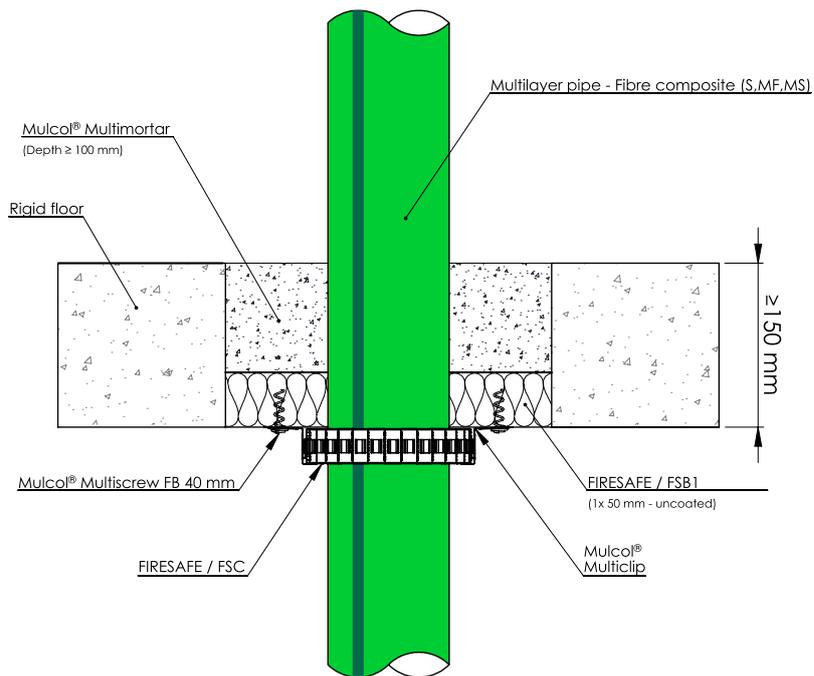
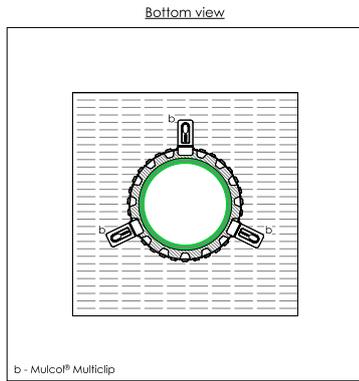


Drawing: RFE-MC30-PPS-MM2.7.10

| Services             | Pipe dimensions (mm) |                | Product        | Classification |
|----------------------|----------------------|----------------|----------------|----------------|
|                      | Outer dimension      | Wall thickness |                |                |
| Geberit Silent dB 20 | $\leq \text{Ø } 110$ | 6.0            | FIRESAFE / FSC | EI 60 U/U      |

**B.1.9 Multimortar + FIRESAFE / FSB -  $\geq 150$  mm - Combustible pipes**

**B.1.9.3 PP-R Multilayer pipes**

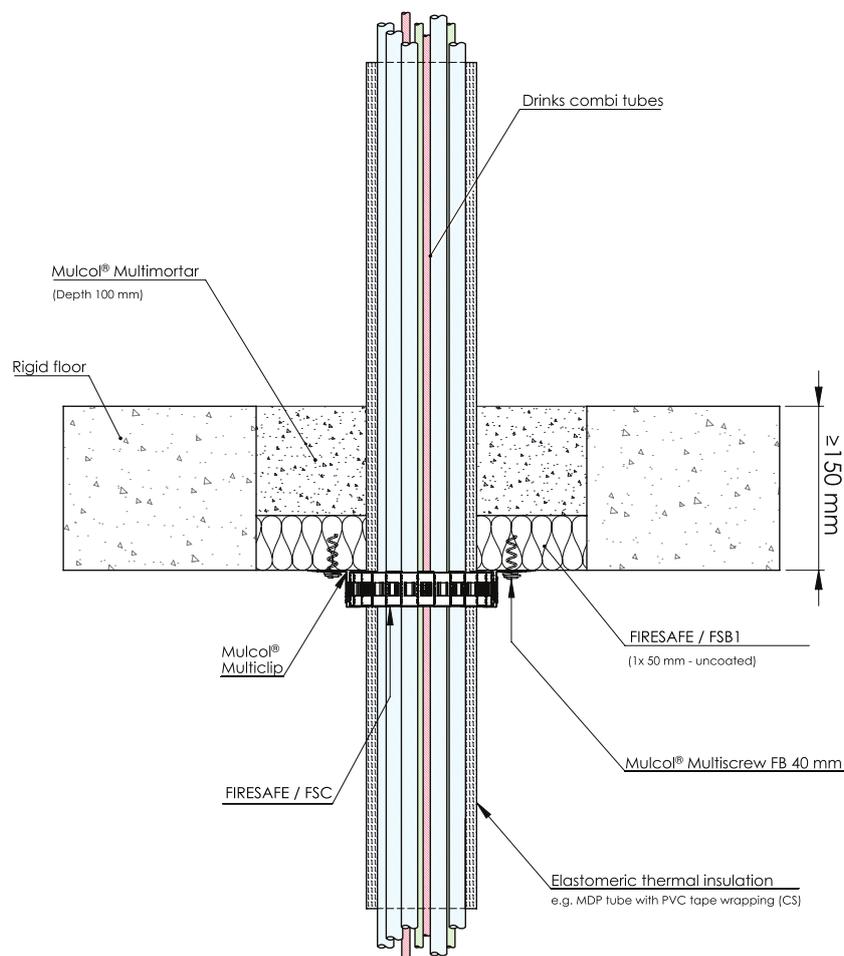
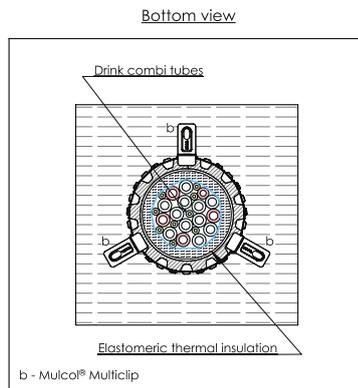


Drawing: RFE-MC30-MLF-MM2.7.10

| Services        | Pipe dimensions (mm) |                | Product        | Classification |
|-----------------|----------------------|----------------|----------------|----------------|
|                 | Outer dimension      | Wall thickness |                |                |
| Aquatherm Green | $\leq \text{Ø } 50$  | 6.9            | FIRESAFE / FSC | EI 60 U/C      |
| Aquatherm Blue  | $\leq \text{Ø } 110$ | 10.0           |                |                |

## B.1.9 Multimortar + FIRESAFE / FSB - $\geq 150$ mm - Combustible pipes

### B.1.9.4 Drinks tubing system

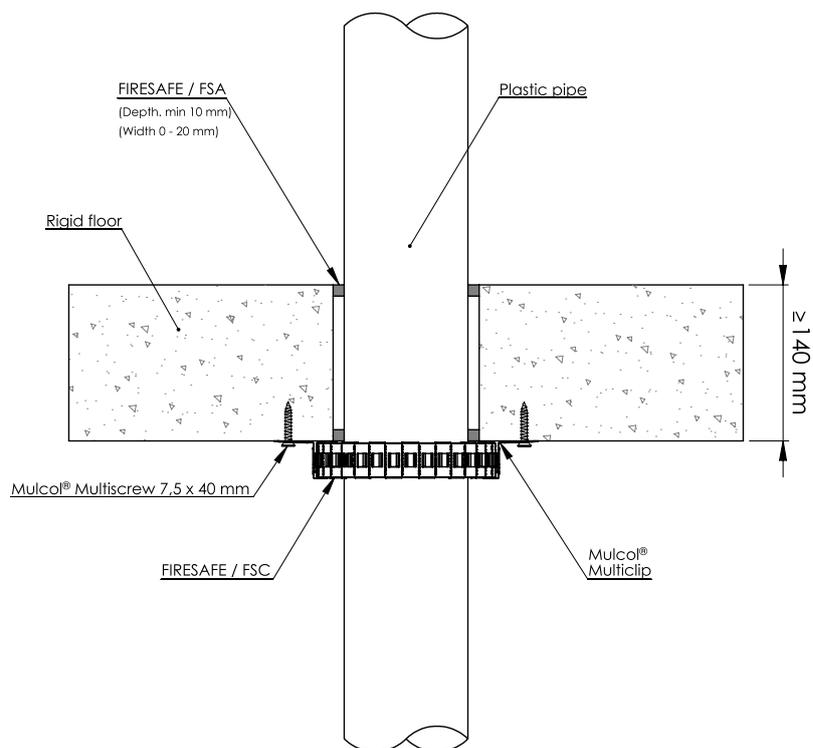
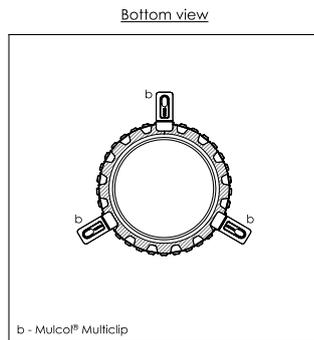


Drawing: RFE-DCP25-MM2.2.10

| Services             | Dimensions (mm)      |           | Insulation       |                |               | Product        | Classification |
|----------------------|----------------------|-----------|------------------|----------------|---------------|----------------|----------------|
|                      | Outer dimension      | Hoses no. | Type             | Thickness (mm) | Configuration |                |                |
| Drinks tubing system | $\leq \text{Ø } 145$ | $\leq 52$ | Elastomeric foam | 8 - 35         | CS            | FIRESAFE / FSC | EI 120 U/C     |

## B.1.10 Directly through floor - Combustible pipes

### B.1.10.1 Plastic pipes



Drawing: RFE-MC30-PP-11.0.10

| Services                     | Pipe dimensions (mm) |                | Product        | Sealing (mm)                           | Classification |
|------------------------------|----------------------|----------------|----------------|--|----------------|
|                              | Outer dimension      | Wall thickness |                |  |                |
| PE-HD / PE-X / ABS / SAN+PVC | ≤ Ø 40               | 2.4 - 6.6      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 120 U/U     |
|                              |                      | 2.7 - 6.6      |                |  | EI 90 U/U      |
|                              | ≤ Ø 110              | 6.6            |                |  | EI 120 U/U     |
|                              |                      | 6.6 - 14.6     |                |  | EI 120 U/C     |
|                              | ≤ Ø 160              | 4.0            |                |  | EI 60 U/U      |
|                              |                      | 4.0 - 14.6     |                |  | EI 60 U/C      |
|                              | 14.6                 | EI 120 U/C     |                |  |                |

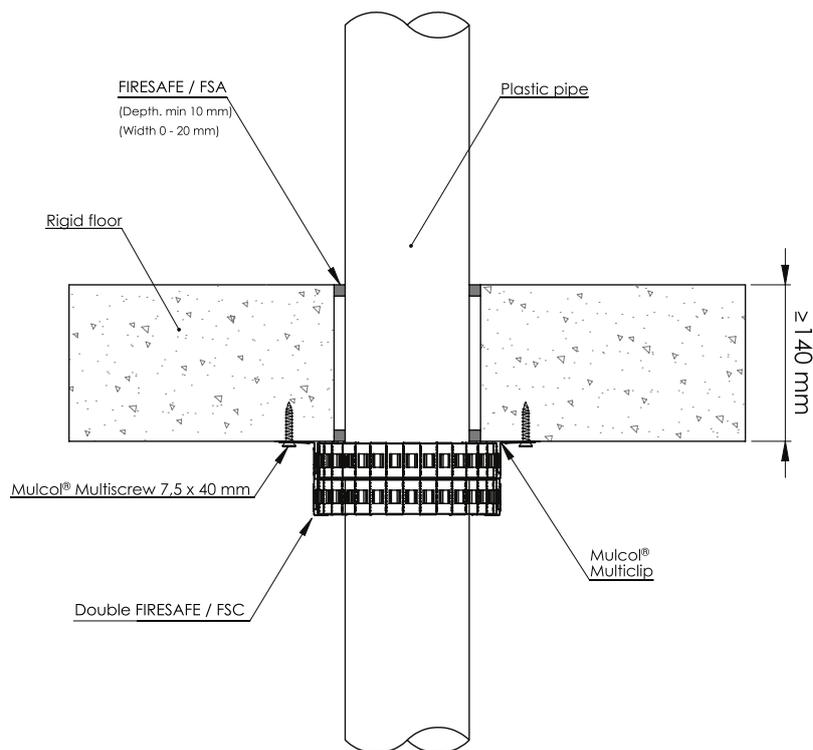
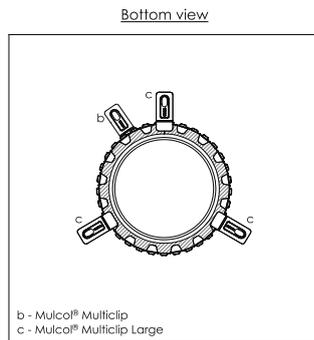
**B.1.10 Directly through floor - Combustible pipes**

**B.1.10.1 Plastic pipes**

| Services        | Pipe dimensions (mm) |                      | Product        | Sealing (mm)                           | Classification |
|-----------------|----------------------|----------------------|----------------|--|----------------|
|                 | Outer dimension      | Wall thickness       |                |  |                |
| PP              | ≤ Ø 40               | 1.8 - 6.3            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 120 U/U     |
|                 |                      | ≤ Ø 110              |                |  | 2.7 - 6.3      |
|                 | 6.3 - 14.6           |                      |                |  | EI 90 U/C      |
|                 | 14.6                 |                      |                |  | EI 120 U/C     |
|                 | ≤ Ø 125              | 3.1 - 4.0            |                |  | EI 90 U/U      |
|                 |                      | 4.0 - 4.8            |                |  | EI 60 U/U      |
|                 |                      | 4.0 - 14.6           |                |  | EI 90 U/C      |
|                 |                      | 14.6                 |                |  | EI 120 U/C     |
|                 | ≤ Ø 160              | 4.0                  |                |  | EI 90 U/U      |
|                 |                      | 4.0 - 14.6           |                |  | EI 90 U/C      |
|                 |                      | 14.6                 |                |  | EI 120 U/C     |
|                 | Services             | Pipe dimensions (mm) |                |  | Product        |
| Outer dimension |                      | Wall thickness       |                |  |                |
| PVC(-U/-C)      | ≤ Ø 40               | 1.9 - 8.2            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 120 U/U     |
|                 |                      | ≤ Ø 110              |                |  | 2.2 - 8.2      |
|                 | 8.2 - 14.6           |                      |                |  | EI 120 U/C     |
|                 | ≤ Ø 125              | 2.5 - 4.0            |                |  | EI 60 U/U      |
|                 |                      | 4.0 - 14.6           |                |  | EI 60 U/C      |
|                 | ≤ Ø 160              | 1.8 - 4.0            |                |  | EI 30 U/U      |
|                 |                      | 4.0                  |                |  | EI 60 U/U      |
|                 |                      | 4.0 - 14.6           |                |  | EI 60 U/C      |
|                 |                      | 14.6                 |                |  | EI 120 U/C     |

## B.1.10 Directly through floor - Combustible pipes

### B.1.10.2 Plastic pipes - double FIRESAFE / FSC

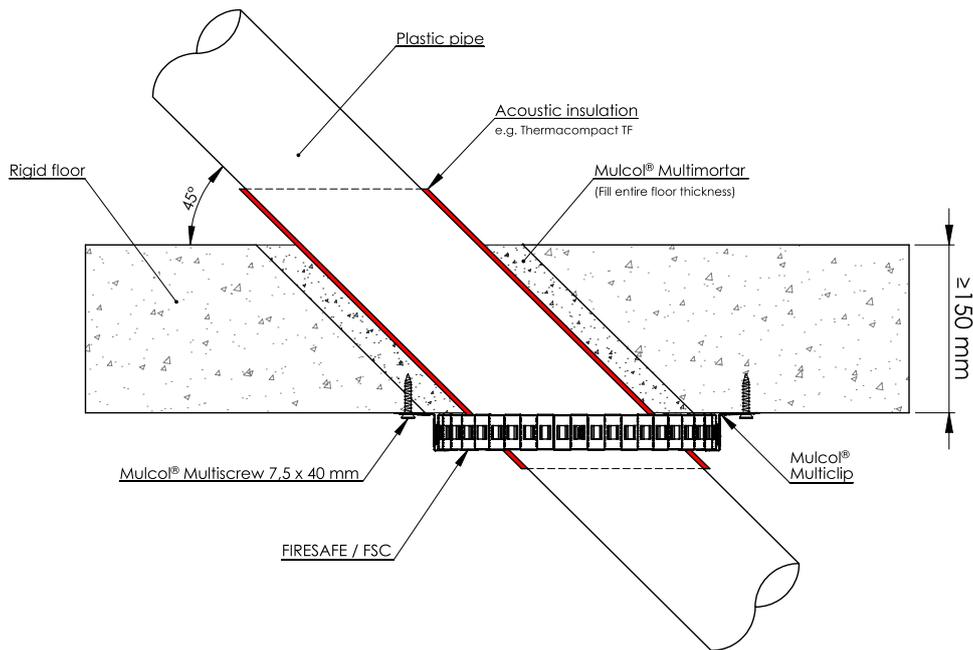
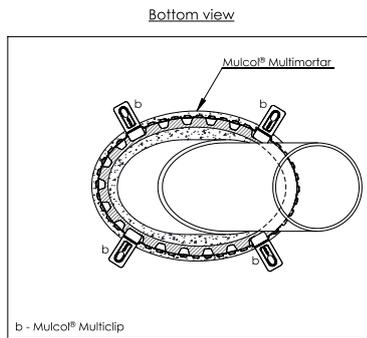


Drawing: RFE-MC60-PP-11.0.10

| Services                     | Pipe dimensions (mm) |                | Product                  | Sealing (mm)                              | Classification |
|------------------------------|----------------------|----------------|--------------------------|---|----------------|
|                              | Outer dimension      | Wall thickness |                          |   |                |
| PE-HD / PE-X / ABS / SAN+PVC | ≤ Ø 160              | 4.0            | FIRESAFE / FSC<br>double | FIRESAFE /<br>FSA<br>0-20 x ≥ 10<br>(wxd) | EI 90 U/U      |
|                              |                      | 4.0 - 14.6     |                          |   | EI 90 U/C      |
| ≤ Ø 250                      | 7.7                  | EI 90 U/U      |                          |   |                |
| PVC(-U/-C)                   | ≤ Ø 160              | 3.2 - 11.8     |                          |   | EI 120 U/C     |
|                              |                      | 7.7 - 14.6     |                          |   |                |
|                              | ≤ Ø 315              | 7.7            |                          |   |                |

**B.1.10 Directly through floor - Combustible pipes**

**B.1.10.3 Plastic pipes perpendicular to 45°**

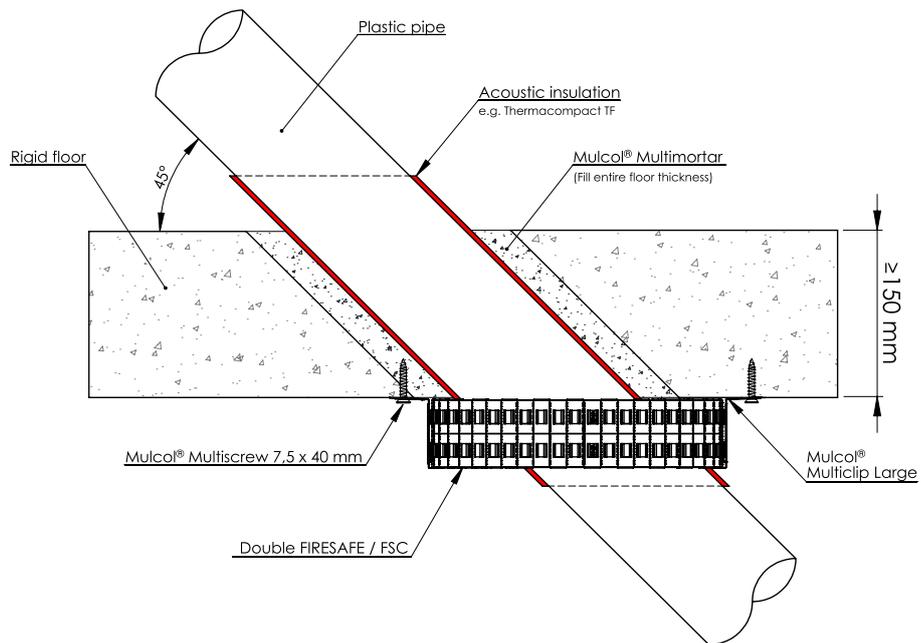
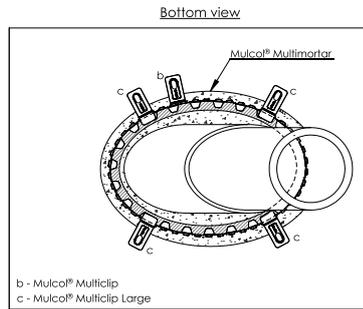


Drawing: RFE-MC30o-PP-11.1.10

| Services                     | Pipe dimensions (mm) |                | Product        | Sealing (mm) | Classification |
|------------------------------|----------------------|----------------|----------------|--------------|----------------|
|                              | Outer dimension      | Wall thickness |                |              |                |
| PE-HD / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 3.4            | FIRESAFE / FSC | Multimortar  | EI 60 U/U      |

**B.1.10 Directly through floor - Combustible pipes**

**B.1.10.4 Plastic pipes perpendicular to 45° - double FIRESAFE / FSC**



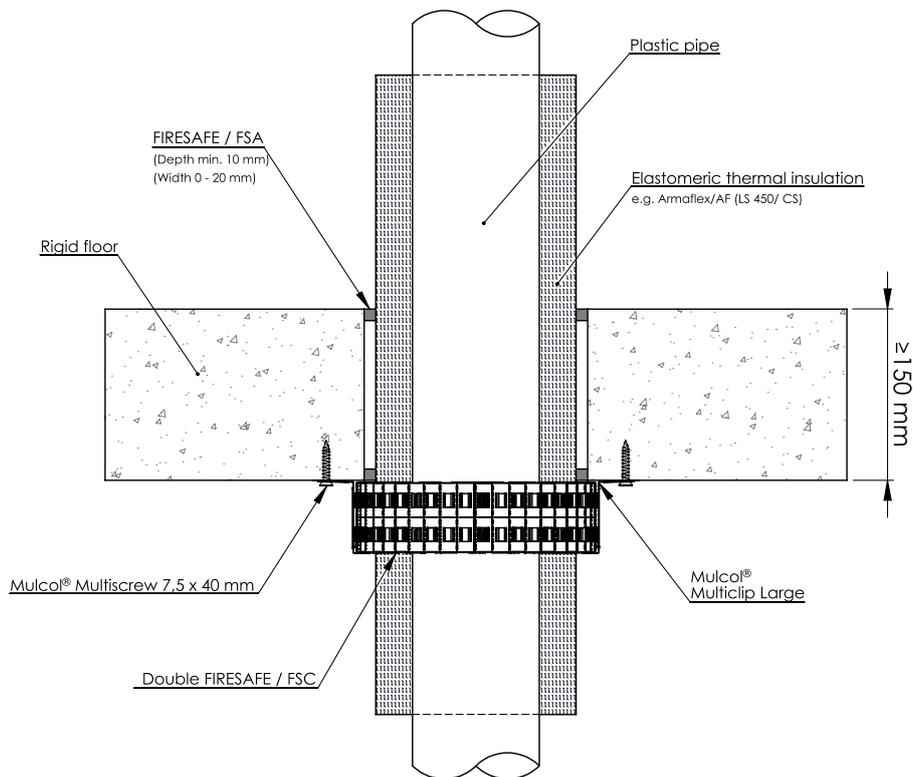
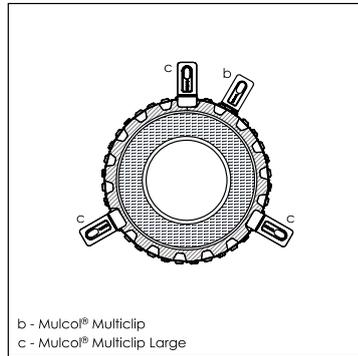
Drawing: RFE-MC60o-PP-21.1.10

| Services                     | Pipe dimensions (mm) |                | Product                  | Sealing (mm) | Classification |
|------------------------------|----------------------|----------------|--------------------------|--------------|----------------|
|                              | Outer dimension      | Wall thickness |                          |              |                |
| PE-HD / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 3.4 - 10.0     | FIRESAFE / FSC<br>double | Multimortar  | EI 60 U/U      |
|                              |                      | 10.0           |                          |              | EI 90 U/U      |
| PP                           |                      | 3.4            |                          |              | EI 120 U/U     |
|                              |                      | 3.4 - 10.0     |                          |              | EI 90 U/U      |
| PVC(-U/-C)                   |                      | 10.0           |                          |              | EI 60 U/U      |
|                              |                      |                |                          |              | EI 90 U/U      |

## B.1.10 Directly through floor - Combustible pipes

### B.1.10.5 Plastic pipes - Elastomer insulation LS-LI 450 / CS-CI

Bottom view

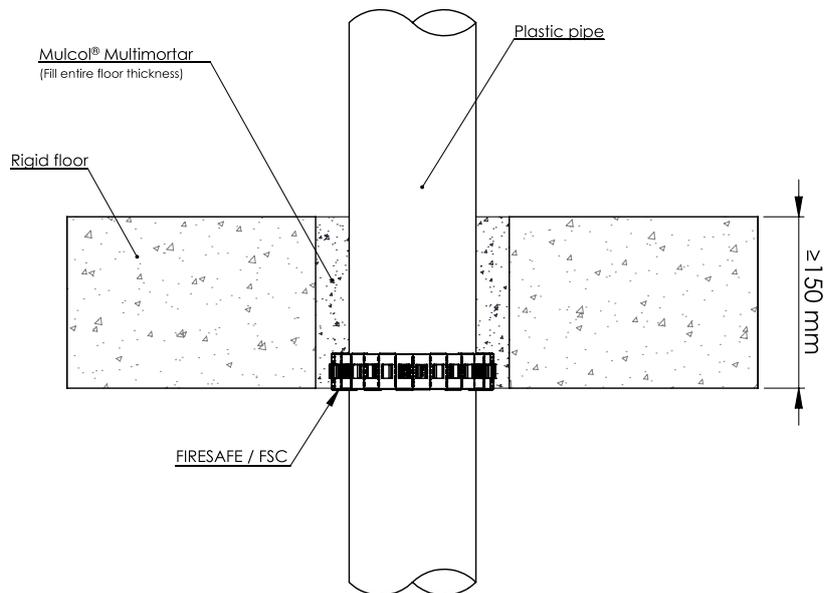
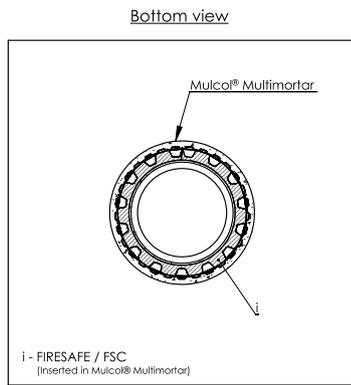


Drawing: RFE-MC60-PP-21.0.22

| Services   | Pipe dimensions (mm) |                | Insulation  |                |                            | Product                     | Sealing (mm)                              | Classification |
|------------|----------------------|----------------|---|----------------|----------------------------|-----------------------------|---|----------------|
|            | Outer dimensions     | Wall thickness | Type  | Thickness (mm) | Configuration              |                             |   |                |
| PVC(-U/-C) | ≤ Ø 110              | 3.2            | ArmaFlex AF<br>(min. class<br>B-s3, d0<br>B <sub>L</sub> -s3, d0) | 9 - 32         | LS 450 / CS<br>LI 450 / CI | FIRESAFE /<br>FSC<br>double | FIRESAFE /<br>FSA<br>0-20 x ≥ 10<br>(wxd) | EI 120 U/U     |

**B.1.10 Directly through floor - Combustible pipes**

**B.1.10.6 Plastic pipes - FIRESAFE / FSC recessed into soffit**



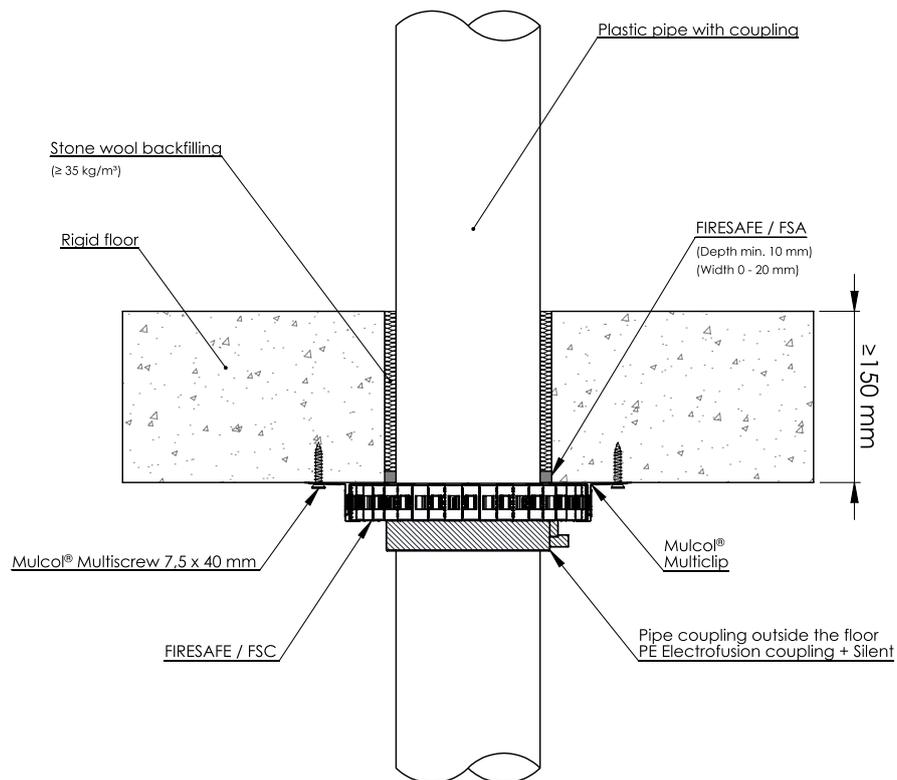
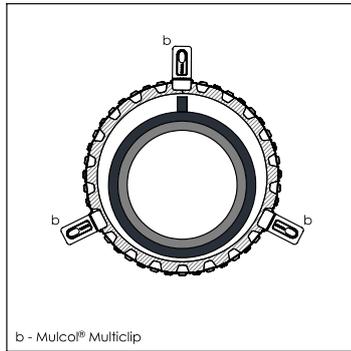
Drawing: RFE-MC30i-PP-15.0.10

| Services | Pipe dimensions (mm) |                | Product        | Sealing (mm) | Classification |
|----------|----------------------|----------------|----------------|--------------|----------------|
|          | Outer dimension      | Wall thickness |                |              |                |
| PP       | ≤ Ø 110              | 6.3            | FIRESAFE / FSC | Multimortar  | EI 30 U/U      |

## B.1.10 Directly through floor - Combustible pipes

### B.1.10.7 Plastic pipes with socket

Bottom view

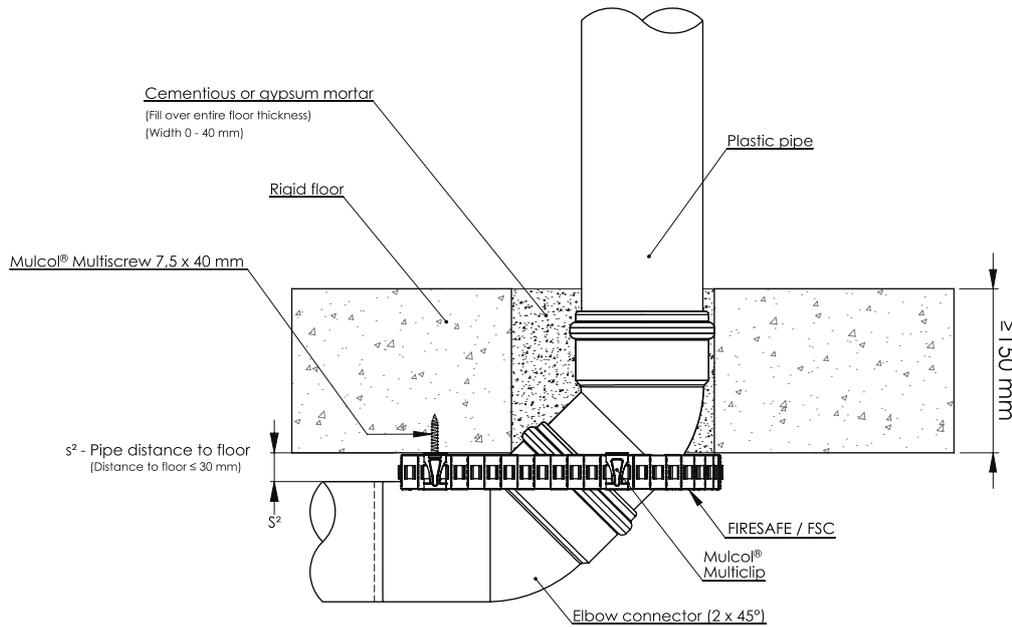
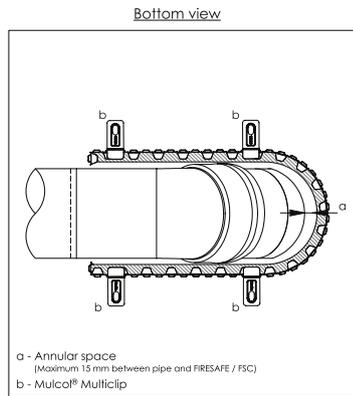


Drawing: RFE-MC30-PP-11.0.60

| Services                     | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|------------------------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                              | Outer dimension      | Wall thickness |                |                                     |                |
| PE-HD / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 4.3            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 90 U/C      |
|                              | ≤ Ø 125              | 7.4            |                |                                     | EI 60 U/C      |

**B.1.10 Directly through floor - Combustible pipes**

**B.1.10.8 Plastic pipes with elbow and U-shape FIRESAFE / FSC**

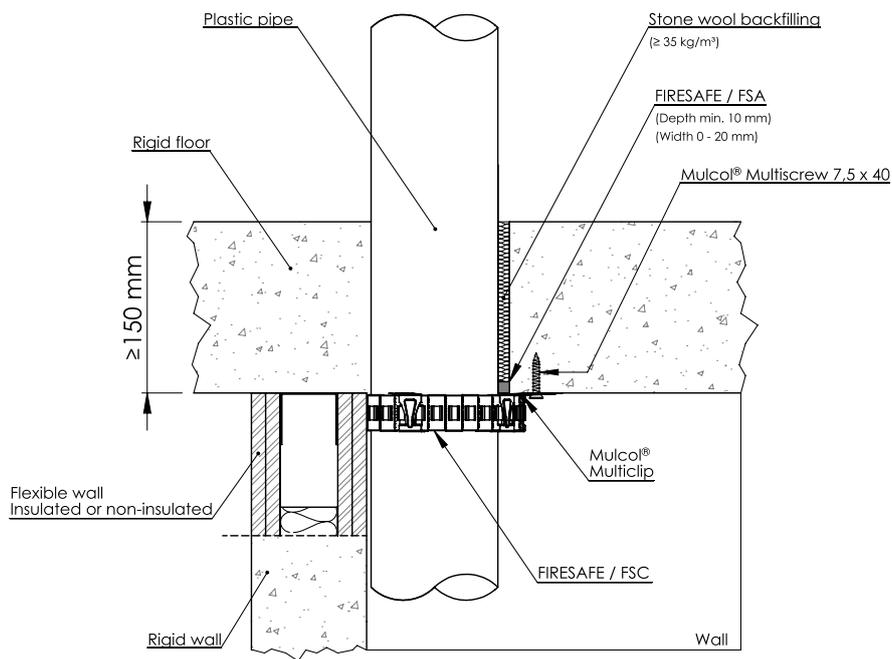
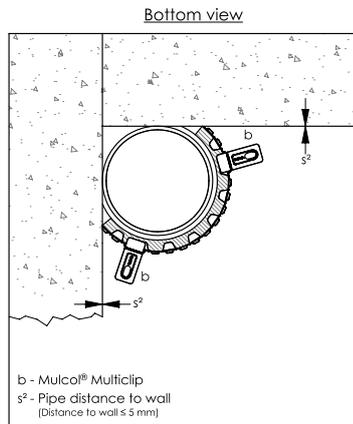


Drawing: RFE-MC30u-MM1.3.10

| Services   | Pipe dimensions (mm) |                | Product        | Sealing (mm) | Classification      |
|------------|----------------------|----------------|----------------|--------------|---------------------|
|            | Outer dimension      | Wall thickness |                |              |                     |
| PVC(-U/-C) | ≤ Ø 50               | 3.0            | FIRESAFE / FSC | Multimortar  | EI 90 U/U           |
|            | ≤ Ø 110              | 3.2            |                |              | EI 45 U/U, E 60 U/U |

## B.1.10 Directly through floor - Combustible pipes

### B.1.10.9 Plastic pipes in corner



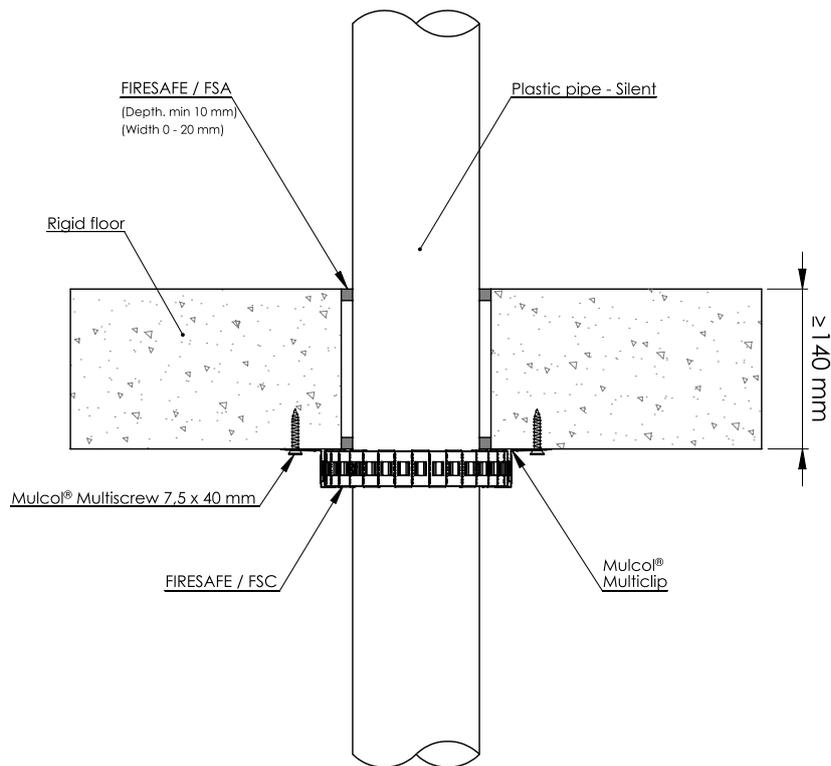
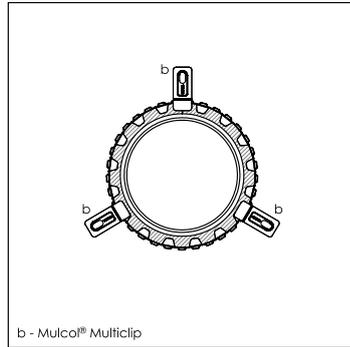
Drawing: RFE-MC30c-PP-31.0.10

| Services                     | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|------------------------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                              | Outer dimension      | Wall thickness |                |                                     |                |
| PE-HD / PE-X / ABS / SAN+PVC | ≤ Ø 110              | 6.6            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-30 x ≥ 10 (wxd) | EI 120 U/U     |
| PP                           |                      | 6.3            |                |                                     | EI 90 U/U      |
| PVC(-U/-C)                   | ≤ Ø 125              | 7.4            |                |                                     | EI 60 U/C      |

## B.1.10 Directly through floor - Combustible pipes

### B.1.10.10 Plastic pipes (Silent)

Bottom view

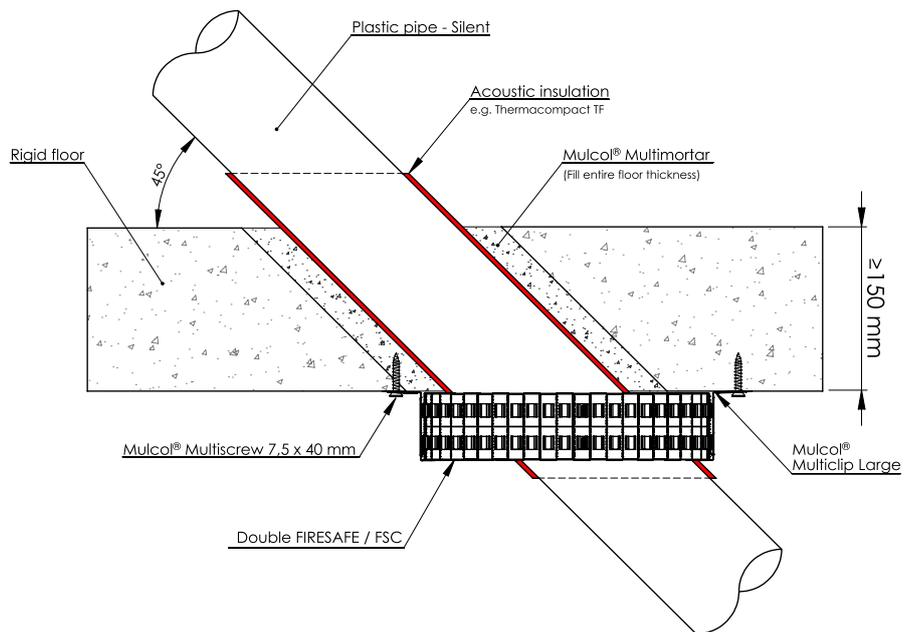
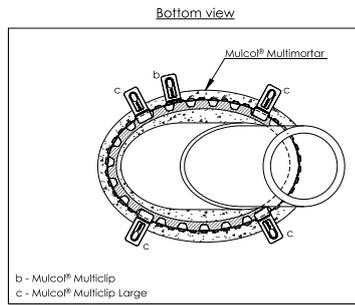


Drawing: RFE-MC30-PPS-11.0.10

| Services             | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|----------------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                      | Outer dimension      | Wall thickness |                |                                     |                |
| Geberit Silent dB 20 | ≤ Ø 56               | 3.2 - 7.0      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 120 U/U     |
|                      | ≤ Ø 110              | 6.0 - 7.0      |                |                                     |                |
|                      | ≤ Ø 160              | 7.0            |                |                                     |                |
| Raupiano Plus        | ≤ Ø 50               | 1.8 - 4.0      |                |                                     |                |
|                      | ≤ Ø 110              | 2.7 - 4.0      |                |                                     |                |
|                      | ≤ Ø 160              | 4.0            |                |                                     |                |
| Wavin SiTech+        | ≤ Ø 110              | 3.6            |                |                                     |                |

**B.1.10 Directly through floor - Combustible pipes**

**B.1.10.11 Plastic pipes (Silent) perpendicular to 45° - double FIRESAFE / FSC**



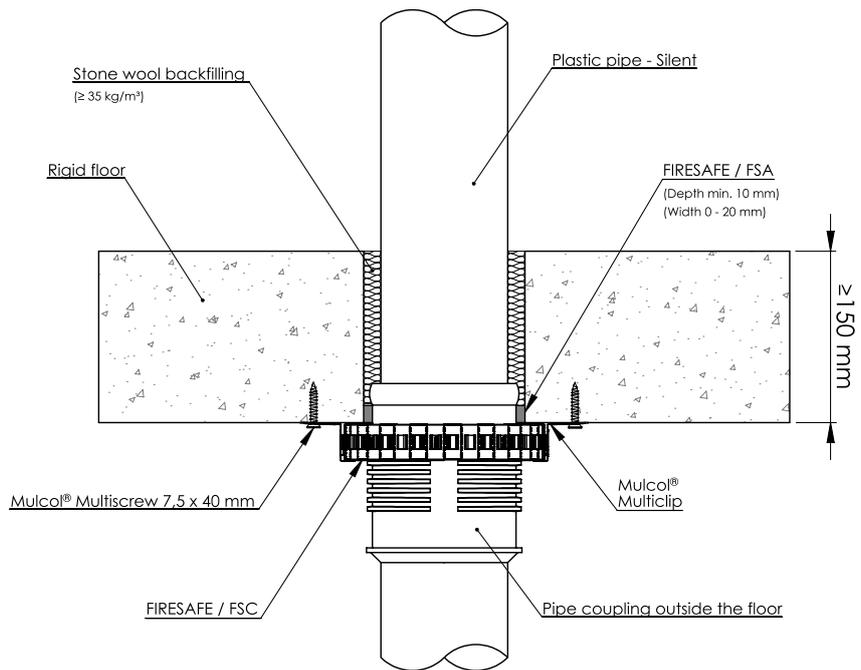
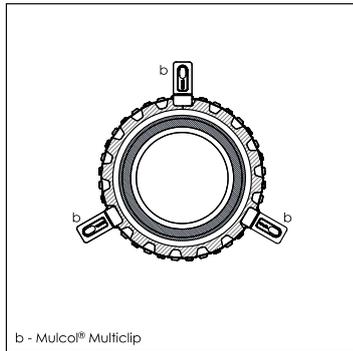
Drawing: RF.E-MC60o-PPS-21.1.10

| Services             | Pipe dimensions (mm) |                | Product                  | Sealing (mm) | Classification |
|----------------------|----------------------|----------------|--------------------------|--------------|----------------|
|                      | Outer dimension      | Wall thickness |                          |              |                |
| Geberit Silent dB 20 | ≤ Ø 110              | 6.0            | FIRESAFE / FSC<br>double | Multimortar  | EI 120 U/U     |

**B.1.10 Directly through floor - Combustible pipes**

**B.1.10.12 Plastic pipes (Silent) with socket**

Bottom view

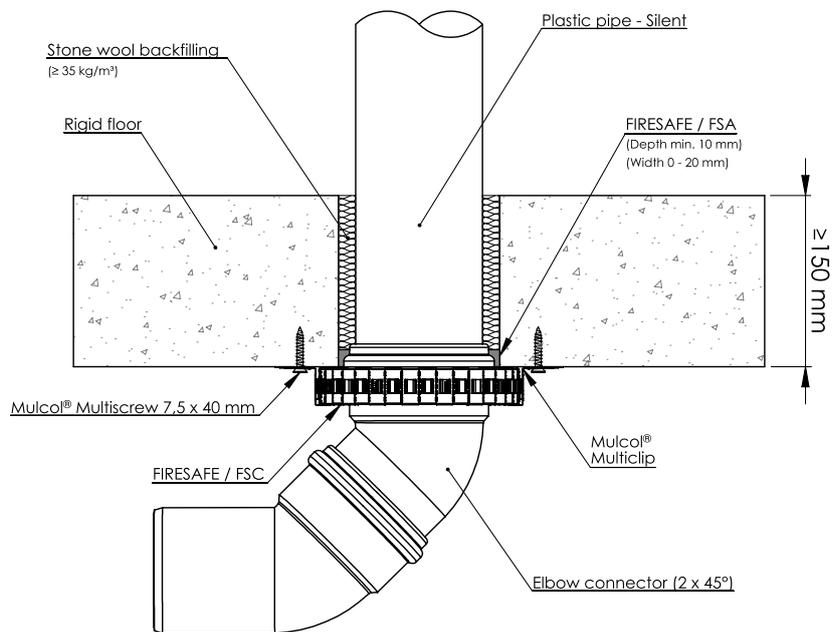
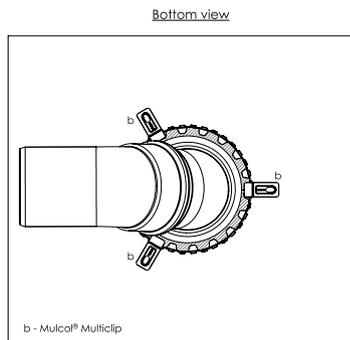


Drawing: RFE-MC30-PPS-11.0.60

| Services             | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|----------------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                      | Outer dimension      | Wall thickness |                |                                     |                |
| Geberit Silent dB 20 | ≤ Ø 110              | 6.0            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 120 U/C     |
| Raupiano Plus        |                      | 2.7            |                |                                     |                |
| Wavin SiTech+        |                      | 3.6            |                |                                     |                |

**B.1.10 Directly through floor - Combustible pipes**

**B.1.10.13 Plastic pipes (Silent) with elbow**

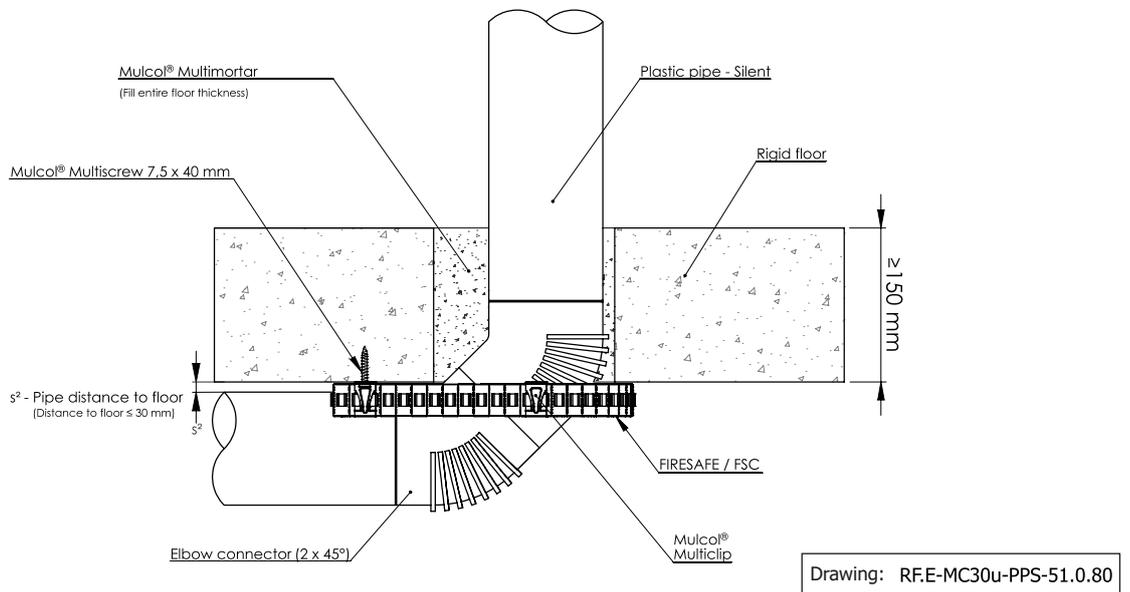
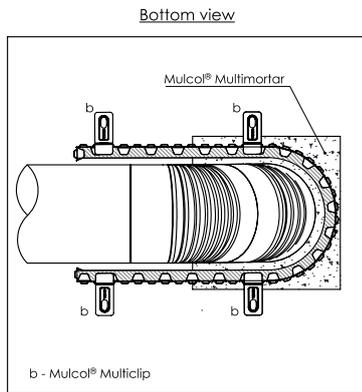


Drawing: RFE-MC30-PPS-11.0.80

| Services             | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|----------------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                      | Outer dimension      | Wall thickness |                |                                     |                |
| Geberit Silent dB 20 | ≤ Ø 110              | 6.0            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 90 U/U      |
| Wavin AS             |                      | 5.3            |                |                                     | EI 120 U/U     |

**B.1.10 Directly through floor - Combustible pipes**

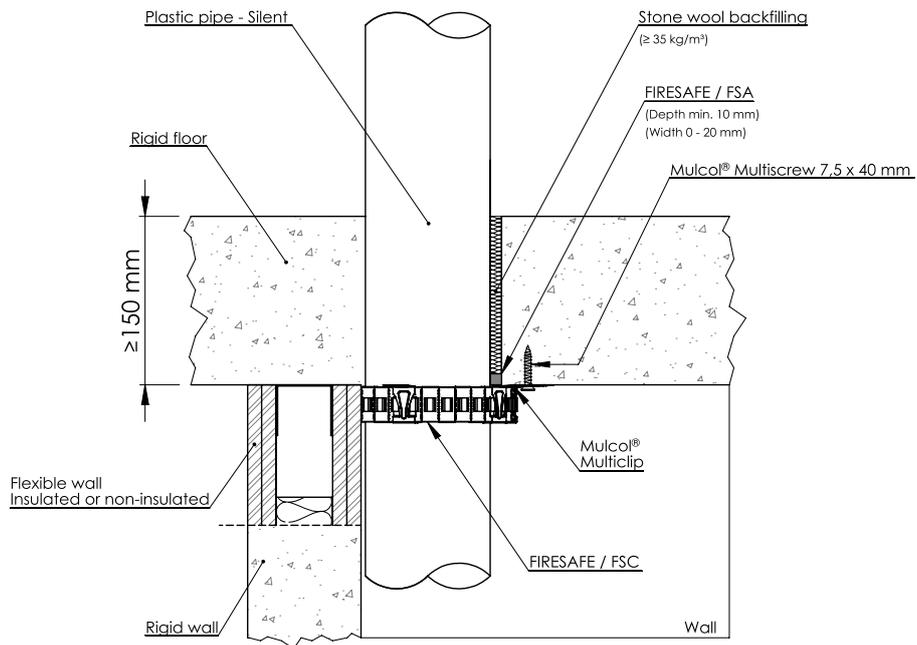
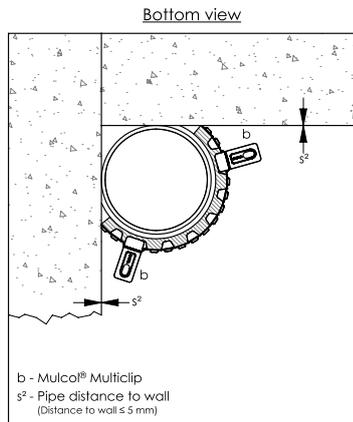
**B.1.10.14 Plastic pipes (Silent) with elbow and U-shape FIRESAFE / FSC**



| Services             | Pipe dimensions (mm) |                | Product        | Sealing (mm) | Classification |
|----------------------|----------------------|----------------|----------------|--------------|----------------|
|                      | Outer dimension      | Wall thickness |                |              |                |
| Geberit Silent dB 20 | ≤ Ø 110              | 6.0            | FIRESAFE / FSC | Multimortar  | EI 90 U/U      |

**B.1.10 Directly through floor - Combustible pipes**

**B.1.10.15 Plastic pipes (Silent) in corner**



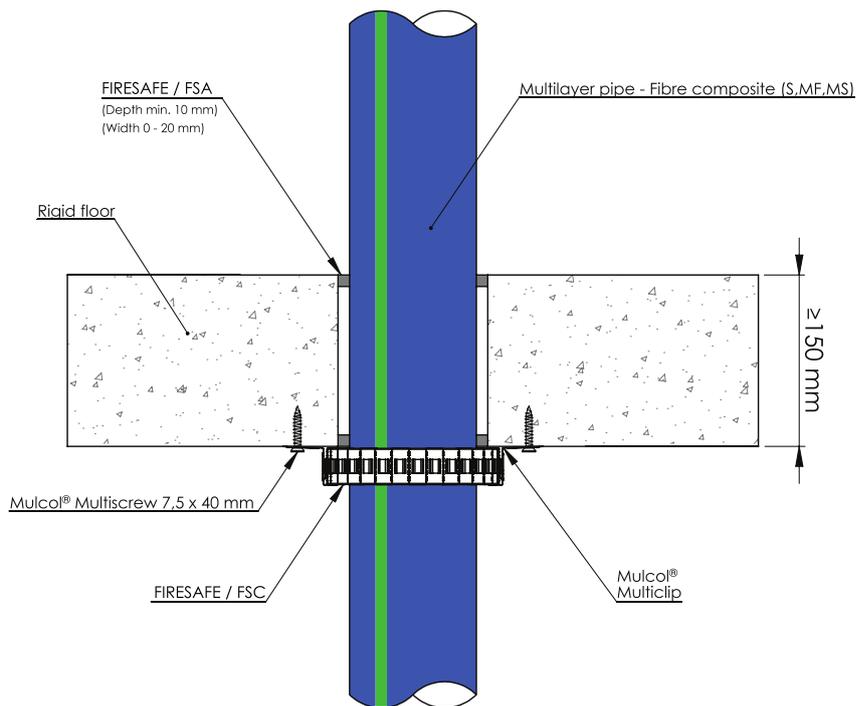
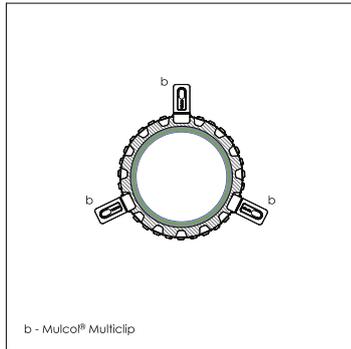
Drawing: RFE-MC30c-PPS-31.0.10

| Services             | Pipe dimensions (mm) |                | Product        | Sealing (mm)                      | Classification |
|----------------------|----------------------|----------------|----------------|-----------------------------------|----------------|
|                      | Outer dimension      | Wall thickness |                |                                   |                |
| Geberit Silent dB 20 | ≤ Ø 110              | 6.0            | FIRESAFE / FSC | FIRESAFE FSA<br>0-20 x ≥ 10 (wxd) | EI 120 U/C     |

**B.1.10 Directly through floor - Combustible pipes**

**B.1.10.16 PP-R Multilayer pipes**

Bottom view

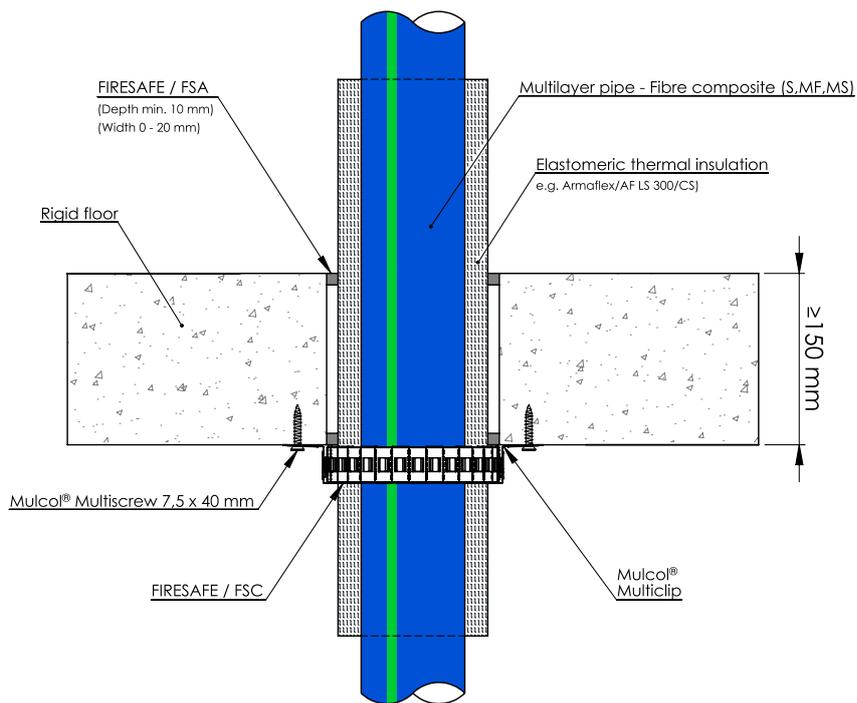
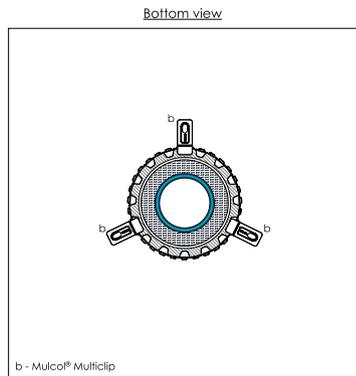


Drawing: RFE-MC30-MLF-MM1.3.10

| Services          | Pipe dimensions (mm) |                | Product                  | Sealing (mm)                           | Classification |
|-------------------|----------------------|----------------|--------------------------|--|----------------|
|                   | Outer dimension      | Wall thickness |                          |  |                |
| Aquatherm Blue-MF | ≤ Ø 20               | 2.8            | FIRESAFE / FSC           | FIRESAFE / FSA<br>0-20 x ≥ 10<br>(wxd) | EI 120 U/C     |
|                   | ≤ Ø 110              | 10.0 - 14.6    |                          |  | EI 90 U/C      |
|                   | ≤ Ø 160              | 14.6           |                          |  |                |
| Aquatherm Red-MF  | ≤ Ø 110              | 15.1           |                          |  |                |
| Aquatherm Blue-MF | ≤ Ø 250              | 22.7           | FIRESAFE / FSC<br>double |  | EI 120 U/C     |

**B.1.10 Directly through floor - Combustible pipes**

**B.1.10.17 PP-R Multilayer pipes - Elastomer LS-LI 300 / CS-CI**

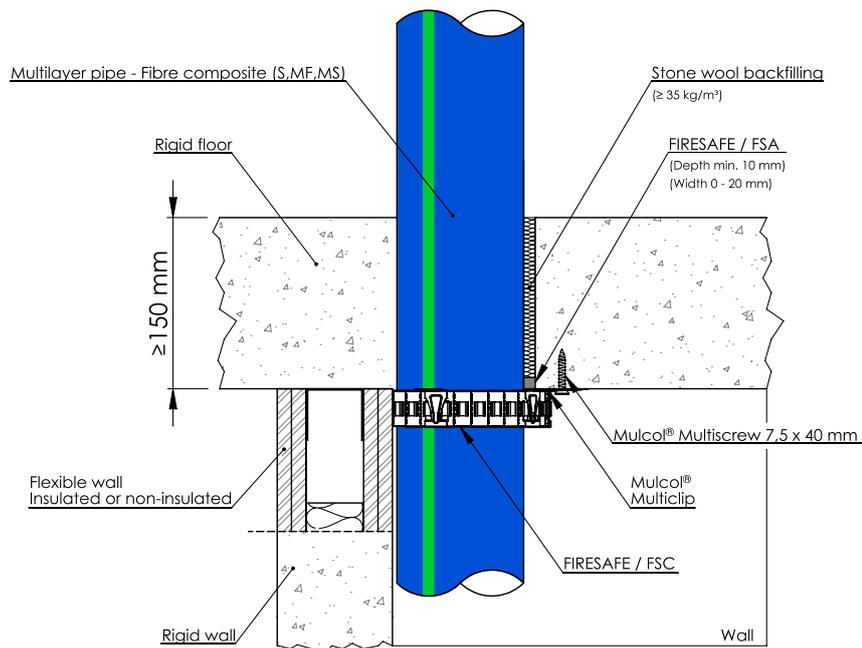
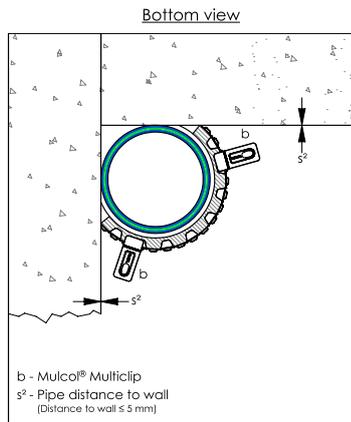


Drawing: RF.E-MC30-MLF-11.0.22

| Services           | Pipe dimensions (mm) |                | Insulation   |                |                            | Product        | Sealing (mm)                        | Classification |
|--------------------|----------------------|----------------|--|----------------|----------------------------|----------------|-------------------------------------|----------------|
|                    | Outer dimensions     | Wall thickness | Type   | Thickness (mm) | Configuration              |                |                                     |                |
| Aquatherm Green-MF | ≤ Ø 110              | 18.3           | ArmaFlex AF (min. class B-s3, d0 B <sub>L</sub> -s3, d0) | 9 - 32         | LS 300 / CS<br>LI 300 / CI | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 120 U/C     |
|                    |                      | 15.2           |  |                |                            |                |                                     |                |
|                    |                      | 15.1           |  |                |                            |                |                                     |                |
| Aquatherm Blue-MF  | ≤ Ø 20               | 2.8            |  |                |                            |                |                                     |                |
|                    | ≤ Ø 110              | 10.0           |  |                |                            |                |                                     |                |

**B.1.10 Directly through floor - Combustible pipes**

**B.1.10.18 PP-R Multilayer pipes in corner**

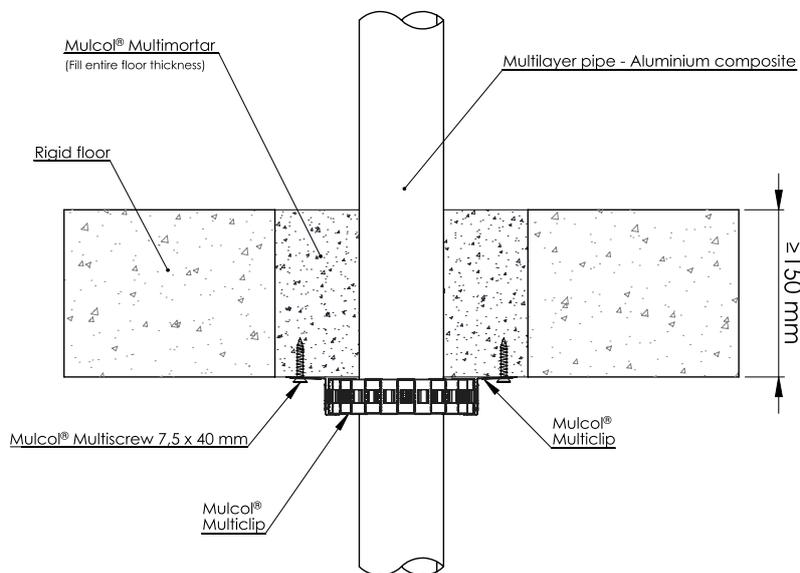
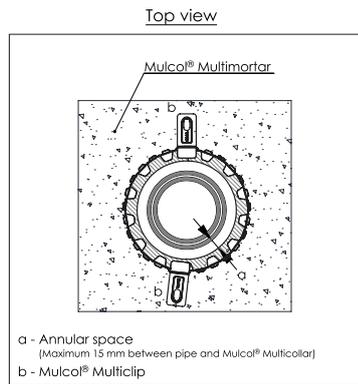


Drawing: RFE-MC30c-MLF-31.0.10

| Services          | Pipe dimensions (mm) |                | Product        | Sealing (mm)                            | Classification |
|-------------------|----------------------|----------------|----------------|---|----------------|
|                   | Outer dimension      | Wall thickness |                |   |                |
| Aquatherm Blue-MF | $\leq \text{Ø } 110$ | 10.0           | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$ wxd) | EI 90 U/C      |

**B.1.11 Multimortar -  $\geq 150$  mm - Multilayer pipes (MLC)**

**B.1.11.1 Multilayer pipes (MLC)**

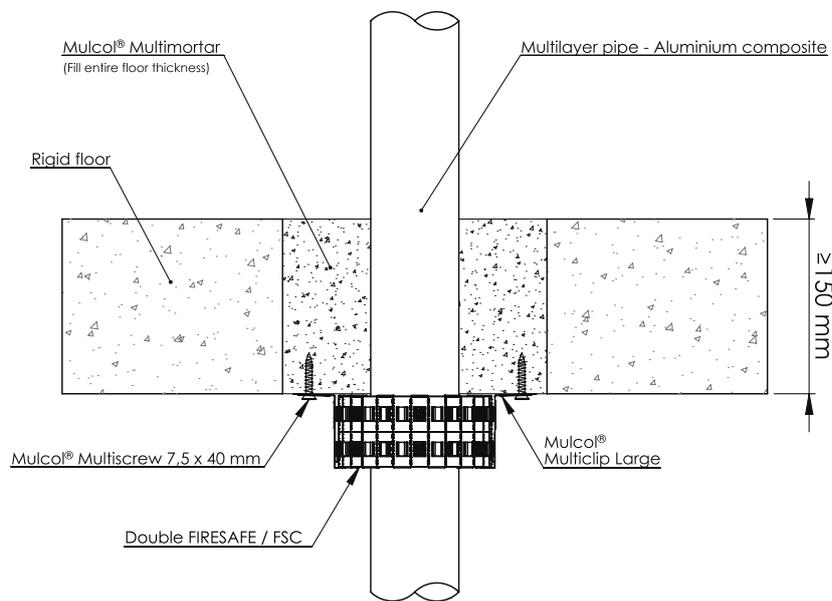
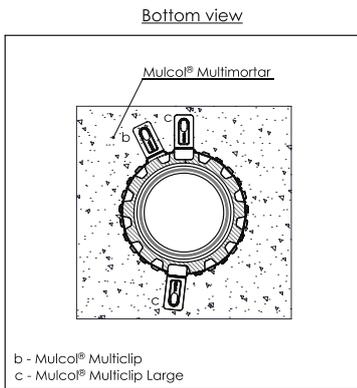


Drawing: RFE-MC30-MLA-MM1.3.10

| Services               | Pipe dimensions (mm) |                | Product        | Classification       |
|------------------------|----------------------|----------------|----------------|----------------------|
|                        | Outer dimension      | Wall thickness |                |                      |
| Multilayer pipes (MLC) | $\leq \text{Ø } 20$  | 2.0            | FIRESAFE / FSC | EI 120 U/C           |
|                        | $\leq \text{Ø } 25$  | 3.5            |                |                      |
|                        | $\leq \text{Ø } 32$  | 3.0            |                |                      |
|                        | $\leq \text{Ø } 50$  | 4.0            |                | EI 60 U/C, E 120 U/C |
|                        | $\leq \text{Ø } 63$  | 4.5            |                |                      |
|                        | $\leq \text{Ø } 75$  | 6.0            |                |                      |

**B.1.11 Multimortar -  $\geq 150$  mm - Multilayer pipes (MLC)**

**B.1.11.2 Multilayer pipes (MLC) - double FIRESAFE / FSC**

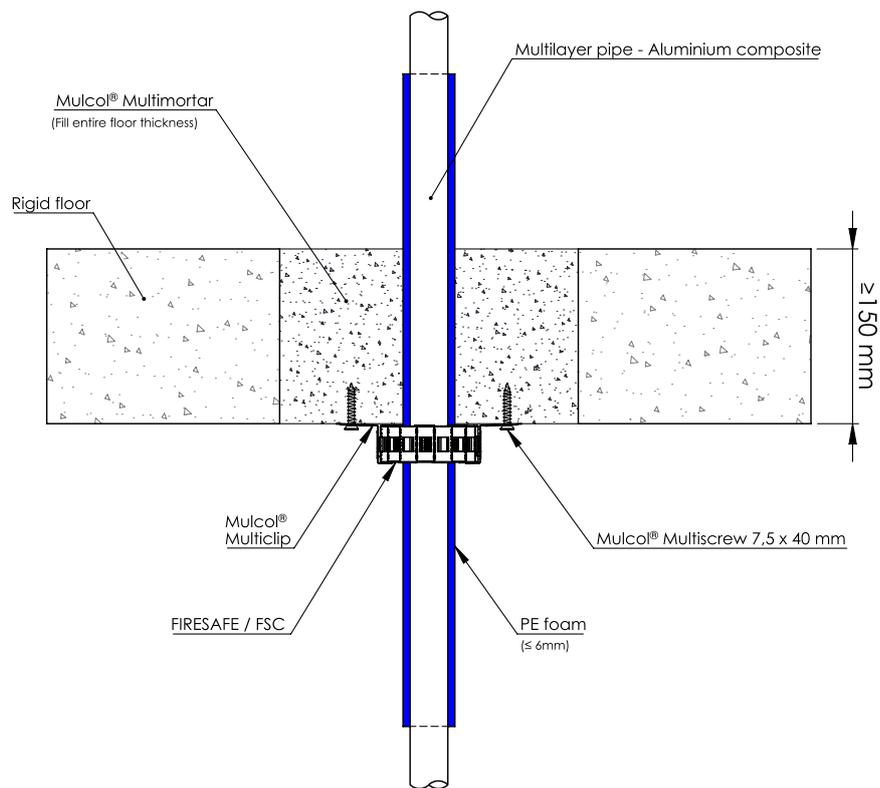
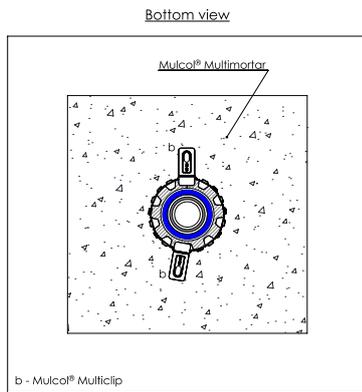


Drawing: RFE-MC60-MLA-MM1.3.10

| Services               | Pipe dimensions (mm) |                | Product               | Classification |
|------------------------|----------------------|----------------|-----------------------|----------------|
|                        | Outer dimension      | Wall thickness |                       |                |
| Multilayer pipes (MLC) | $\leq \text{Ø } 63$  | 4.5            | FIRESAFE / FSC double | EI 90 U/C      |
|                        | $\leq \text{Ø } 75$  | 6.0            |                       |                |

**B.1.11 Multimortar -  $\geq 150$  mm - Multilayer pipes (MLC)**

**B.1.11.3 Multilayer pipes (MLC) - PE foam LS-LI 300 / CS-CI**



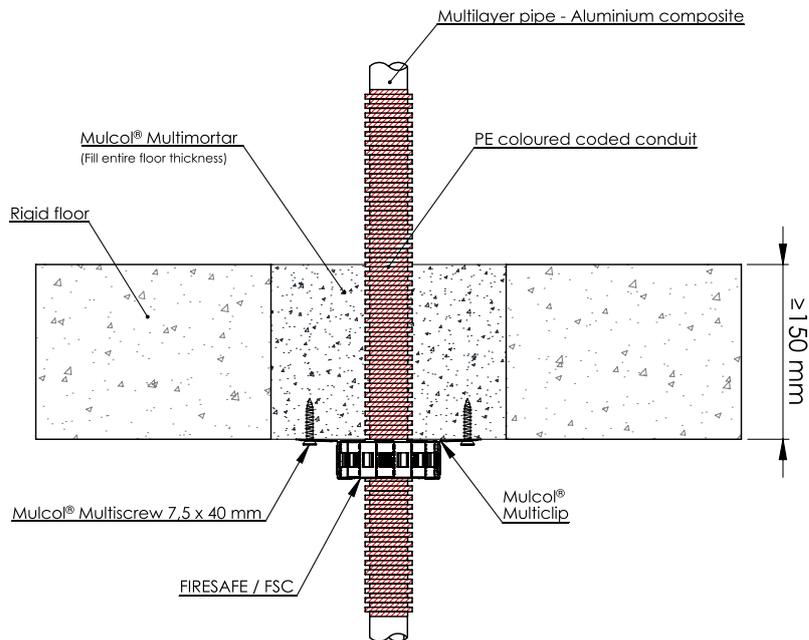
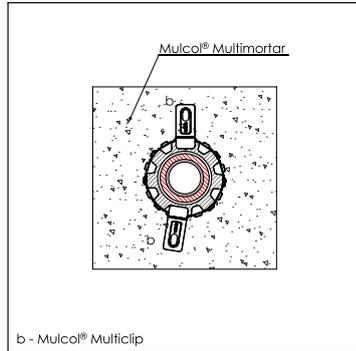
Drawing: RFE-MC30-MLA\_pr-MM1.3.23

| Services               | Pipe dimensions (mm) |                | Insulation |                |                            | Product        | Classification    |
|------------------------|----------------------|----------------|------------|----------------|----------------------------|----------------|-------------------|
|                        | Outer dimensions     | Wall thickness | Type       | Thickness (mm) | Configuration              |                |                   |
| Multilayer pipes (MLC) | $\leq \text{Ø } 32$  | 3.0            | PE foam    | 6              | LS 300 / CS<br>LI 300 / CI | FIRESAFE / FSC | <b>EI 120 U/C</b> |

**B.1.11 Multimortar -  $\geq 150$  mm - Multilayer pipes (MLC)**

**B.1.11.4 Multilayer pipes (MLC) - PE conduit**

Bottom view



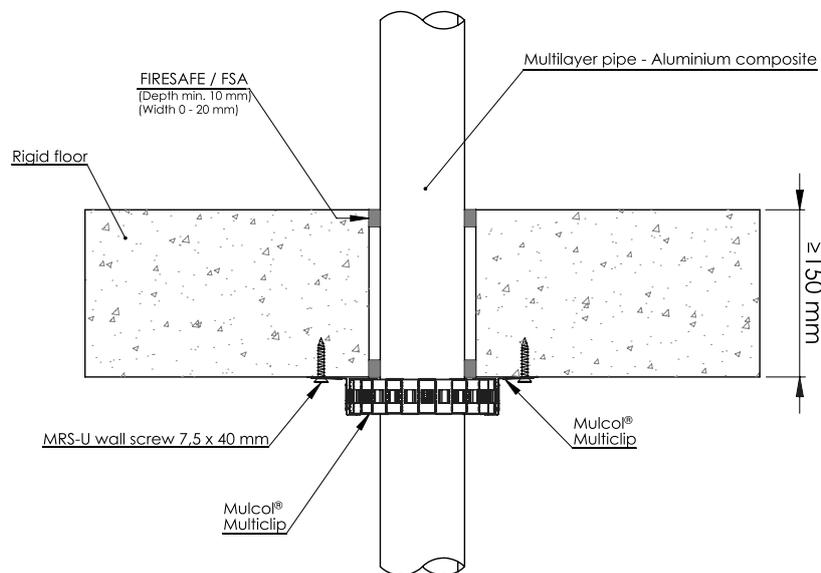
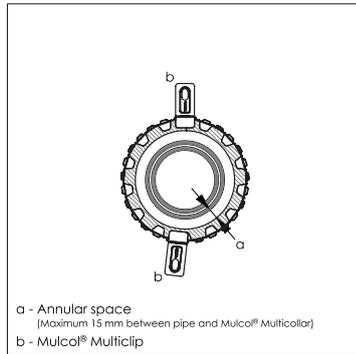
Drawing: RF.E-MC30-MLA-MM1.3.30

| Services               | Pipe dimensions (mm) |                | Conduit           |                      |               | Product        | Classification    |
|------------------------|----------------------|----------------|-------------------|----------------------|---------------|----------------|-------------------|
|                        | Outer dimensions     | Wall thickness | Type              | Outer dimension (mm) | Configuration |                |                   |
| Multilayer pipes (MLC) | $\leq \text{Ø } 32$  | 3.0            | PE-conduit ribbed | 40                   | LS 50 / CS    | FIRESAFE / FSC | <b>EI 120 U/C</b> |

## B.1.12 Directly through floor - Multilayer pipes (MLC)

### B.1.12.1 Multilayer pipes (MLC)

Bottom view

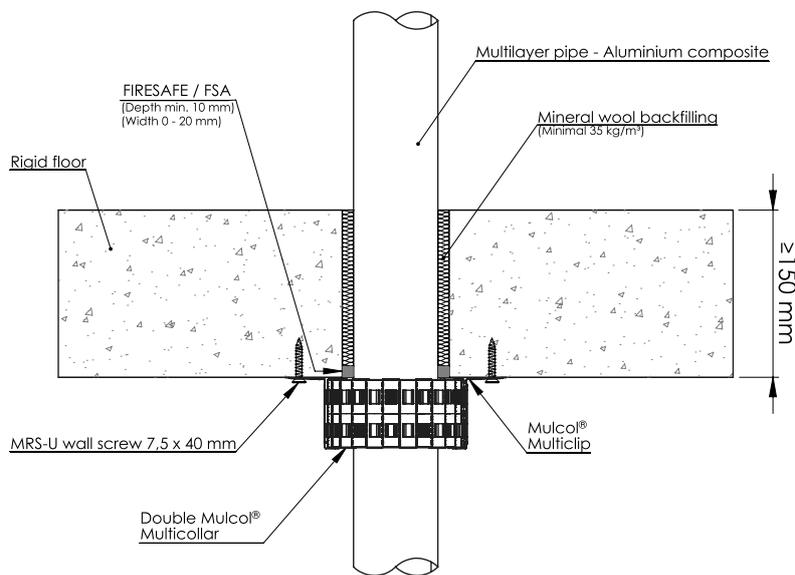
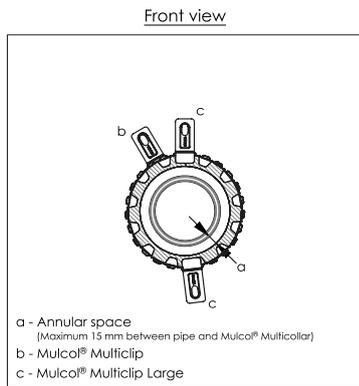


Drawing: RFE-MLA-11.0.10

| Services               | Pipe dimensions (mm) |                | Product        | Sealing (mm)                       | Classification       |
|------------------------|----------------------|----------------|----------------|------------------------------------|----------------------|
|                        | Outer dimension      | Wall thickness |                |                                    |                      |
| Multilayer pipes (MLC) | ≤ Ø 20               | 2.0            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 wxd) | EI 120 U/C           |
|                        | ≤ Ø 25               | 3.5            |                |                                    |                      |
|                        | ≤ Ø 32               | 3.0            |                |                                    |                      |
|                        | ≤ Ø 50               | 4.0            |                |                                    |                      |
|                        | ≤ Ø 63               | 4.5            |                |                                    |                      |
|                        | ≤ Ø 75               | 6.0            |                |                                    | EI 60 U/C, E 120 U/C |

**B.1.12 Directly through floor - Multilayer pipes (MLC)**

**B.1.12.2 Multilayer pipes (MLC) - double FIRESAFE / FSC**



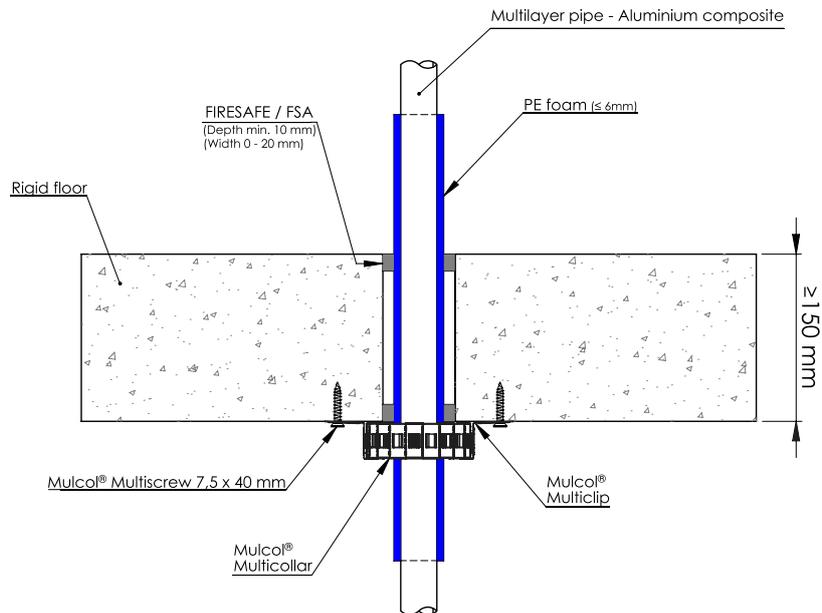
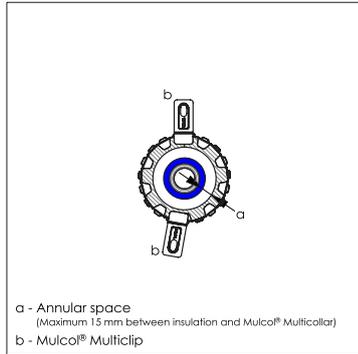
Drawing: RFE-MLA-21.0.10

| Services               | Pipe dimensions (mm) |                | Product                  | Sealing (mm)                       | Classification |
|------------------------|----------------------|----------------|--------------------------|------------------------------------|----------------|
|                        | Outer dimension      | Wall thickness |                          |                                    |                |
| Multilayer pipes (MLC) | ≤ Ø 63               | 4.5            | FIRESAFE / FSC<br>double | FIRESAFE / FSA<br>0-20 x ≥ 10 wxd) | EI 90 U/C      |
|                        | ≤ Ø 75               | 6.0            |                          |                                    |                |

**B.1.12 Directly through floor - Multilayer pipes (MLC)**

**B.1.12.3 Multilayer pipes (MLC) - PE foam LS-LI 300 / CS-CI**

Top view

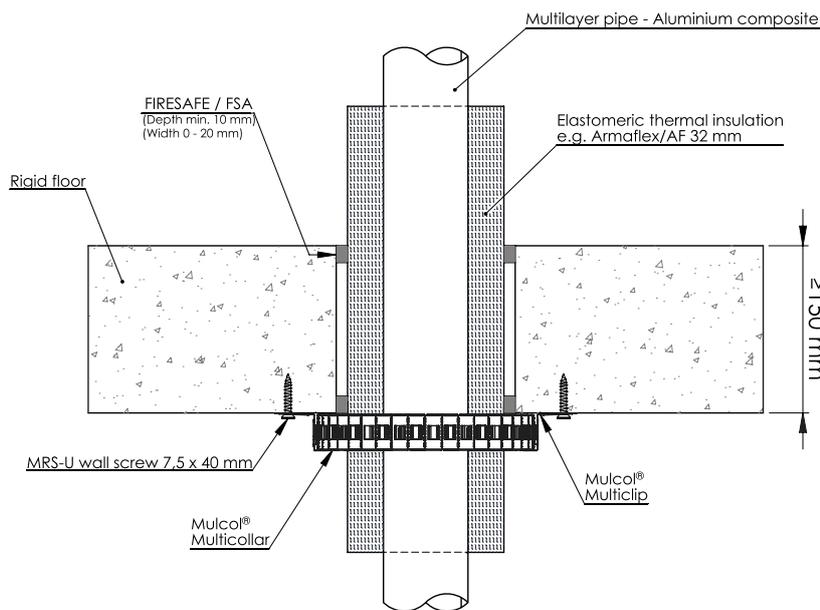
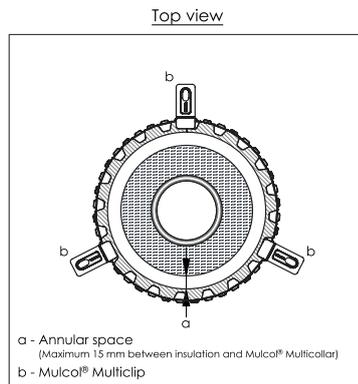


Drawing: RFE-MLA\_pr-11.0.22

| Services               | Pipe dimensions (mm) |                | Insulation |                |                            | Product        | Sealing (mm)                        | Classification |
|------------------------|----------------------|----------------|------------|----------------|----------------------------|----------------|-------------------------------------|----------------|
|                        | Outer dimensions     | Wall thickness | Type       | Thickness (mm) | Configuration              |                |                                     |                |
| Multilayer pipes (MLC) | ≤ Ø 32               | 3.0            | PE foam    | 6              | LS 300 / CS<br>LI 300 / CI | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 120 U/C     |

## B.1.12 Directly through floor - Multilayer pipes (MLC)

### B.1.12.4 Multilayer pipes (MLC) - Elastomer LS-LI 500 / CS-CI



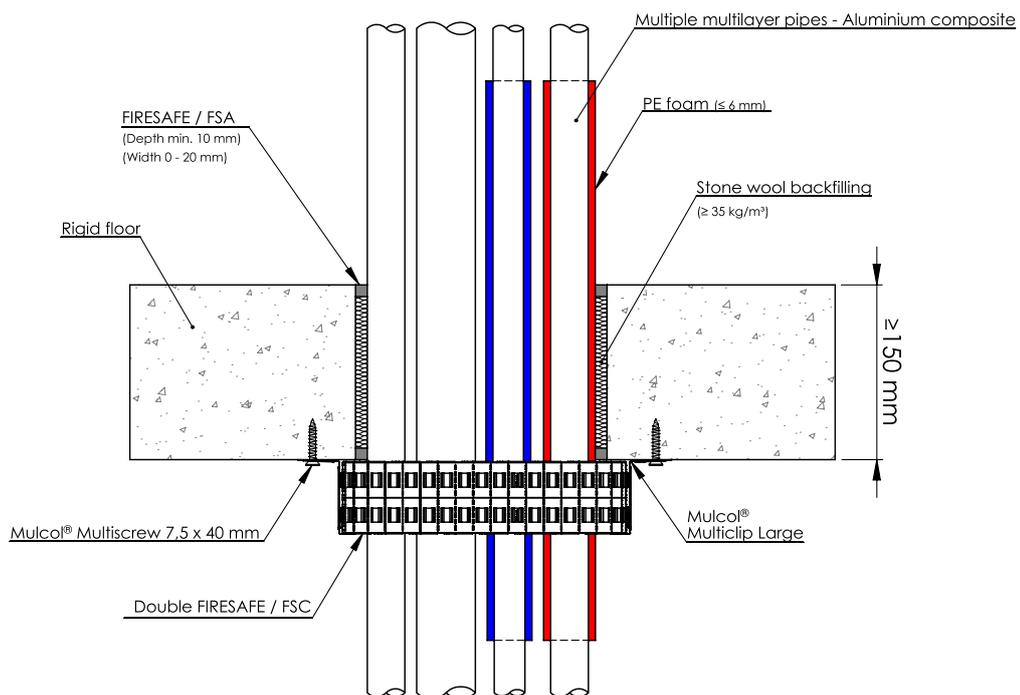
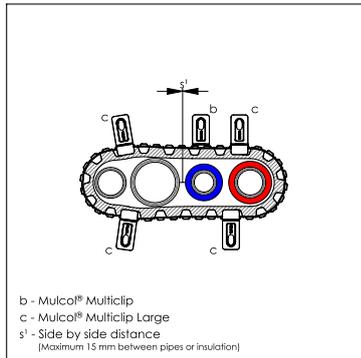
Drawing: RFE-MC30-MLA\_pr-MM1.3.23

| Services               | Pipe dimensions (mm) |                | Insulation  |                |                            | Product           | Sealing (mm)                              | Classification |
|------------------------|----------------------|----------------|---|----------------|----------------------------|-------------------|---|----------------|
|                        | Outer dimensions     | Wall thickness | Type  | Thickness (mm) | Configuration              |                   |   |                |
| Multilayer pipes (MLC) | ≤ Ø 20               | 2.0            | ArmaFlex AF<br>(min. class<br>B-s3, d0<br>B <sub>L</sub> -s3, d0) | 9 - 32         | LS 500 / CS<br>LI 500 / CI | FIRESAFE /<br>FSC | FIRESAFE /<br>FSA<br>0-20 x ≥ 10<br>(wxd) | EI 120 U/C     |
|                        | ≤ Ø 32               | 3.0            |   |                |                            |                   |   |                |
|                        | ≤ Ø 40               | 3.5            |   |                |                            |                   |   |                |
|                        | ≤ Ø 50               | 4.0            |   |                |                            |                   |   |                |
|                        | ≤ Ø 63               | 4.5            |   |                |                            |                   |   |                |
|                        | ≤ Ø 75               | 6.0            |   |                |                            |                   |   |                |
|                        | ≤ Ø 90               | 7.0            |   |                |                            |                   |   |                |
|                        | ≤ Ø 90               |                |   | 32             |                            |                   |   |                |
| ≤ Ø 110                | 10.0                 | 9 - 32         | EI 90 U/C<br>EI 120 U/C<br>EI 90 U/C                              |                |                            |                   |   |                |

## B.1.12 Directly through floor - Multilayer pipes (MLC)

### B.1.12.5 Multiple Multilayer pipes (MLC) - PE foam LS-LI 300 / CS-CI

Bottom view

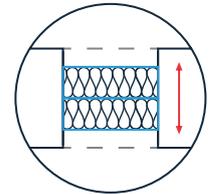
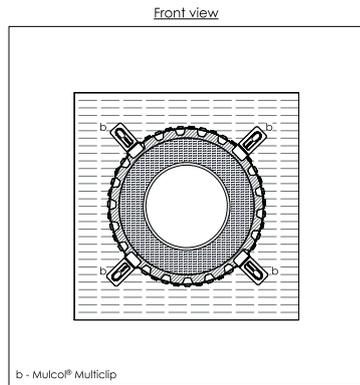


Drawing: RFE-MC60-MLP4-21.0.40

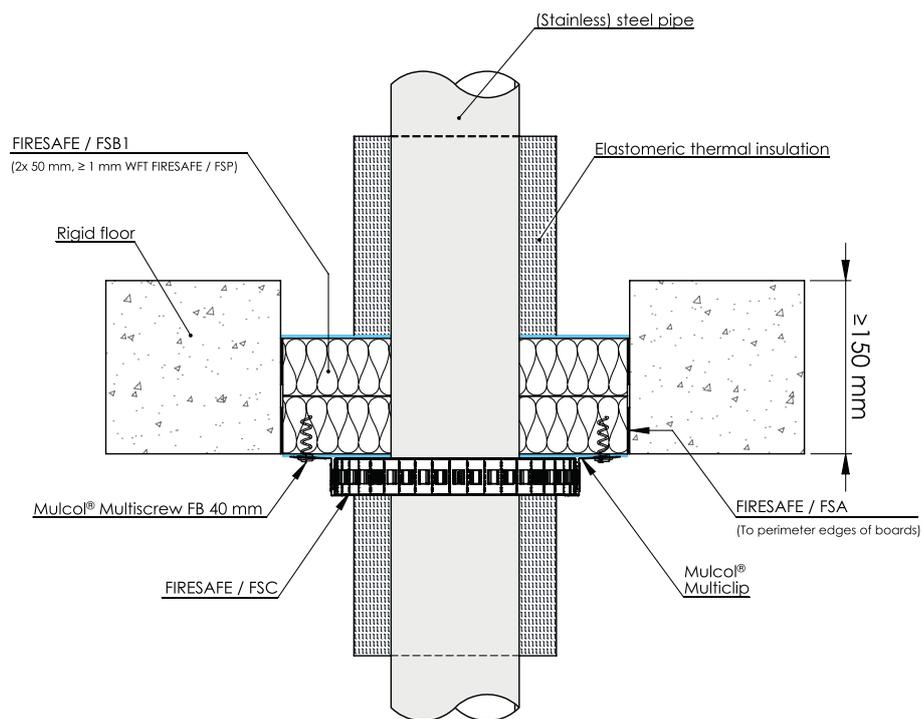
| Services               | Pipe dimensions (mm) |                | Insulation |                |                            | Product           | Sealing (mm)                              | Classification         |
|------------------------|----------------------|----------------|------------|----------------|----------------------------|-------------------|---|------------------------|
|                        | Outer dimensions     | Wall thickness | Type       | Thickness (mm) | Configuration              |                   |   |                        |
| Multilayer pipes (MLC) | ≤ Ø 32               | 3.0            | -          | -              | LS 300 / CS<br>LI 300 / CI | FIRESAFE /<br>FSC | FIRESAFE /<br>FSA<br>0-20 x ≥ 10<br>(wxd) | EI 120 U/C             |
|                        | ≤ Ø 50               | 4.0            |            |                |                            |                   |   | EI 90 U/C<br>E 120 U/C |
|                        | ≤ Ø 26               | 3.0            | PE foam    | 6              |                            |                   |   | EI 120 U/C             |
|                        | ≤ Ø 32               |                |            |                |                            |                   |   |                        |

**B.1.13 FIRESAFE / FSB1 - 2x50 mm - Metal pipes**

**B.1.13.1 Steel pipes - Elastomer LI 300 / CI**



Position seal:  
top, bottom or anywhere  
in between

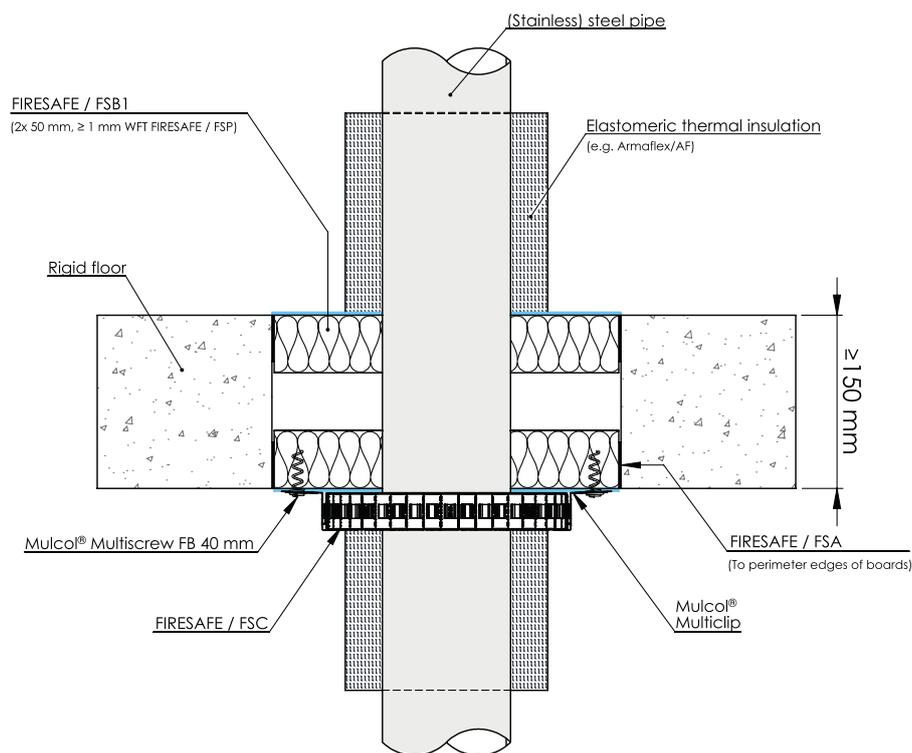
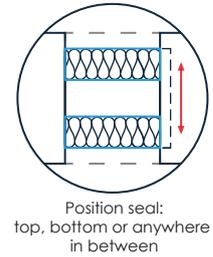
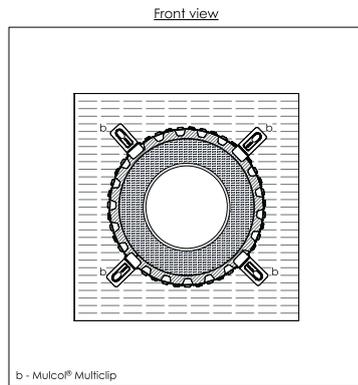


Drawing: PBrf.E-ST-11.0.22.LI

| Services                      | Pipe dimensions (mm) |                | Insulation                                      |                |               | Product        | Sealing (mm)                        | Backing                                   | Classification        |
|-------------------------------|----------------------|----------------|---|----------------|---------------|----------------|-------------------------------------|---|-----------------------|
|                               | Outer dimension      | Wall thickness | Type  | Thickness (mm) | Configuration |                |                                     |   |                       |
| (Stainless) Steel / cast iron | ≤ Ø 114.3            | ≥ 3.6          | ArmaFlex AF                                     | 9 - 32         | LI 300 / CI   | FIRESAFE / FSC | Multimastic SP<br>0-20 x ≥ 10 (wxd) | 25 mm stone wool (≥ 33kg/m <sup>3</sup> ) | EI 60 C/U<br>E 90 C/U |
|                               |                      |                | (min. class B-s3, d0<br>B <sub>L</sub> -s3, d0) | 32             |               |                |                                     |   | EI 90 C/U             |

**B.1.14 FIRESAFE / FSB1 - 2x50 mm cavity 50 mm - Metal pipes**

**B.1.14.1 Steel pipes - Elastomer LI 300 / CI**

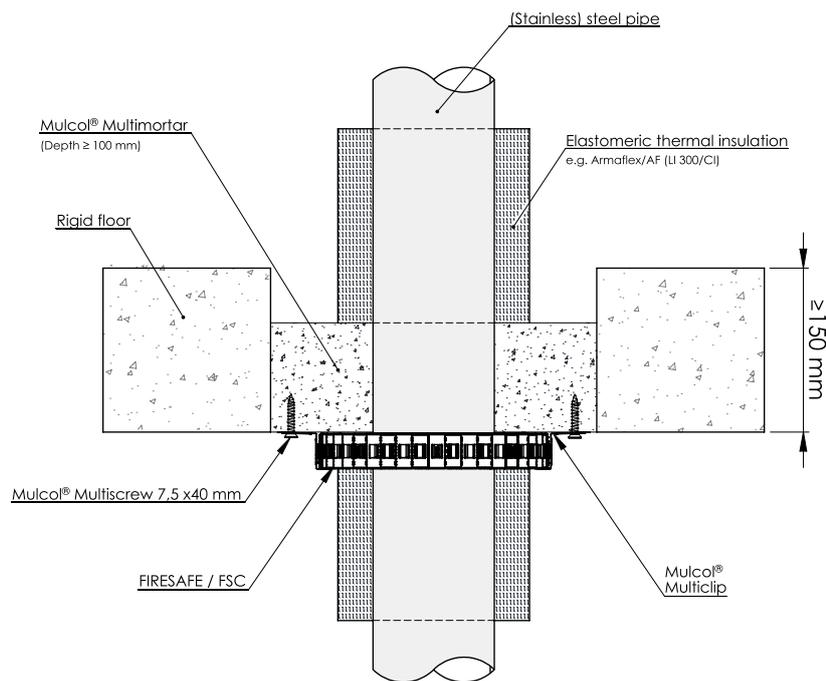
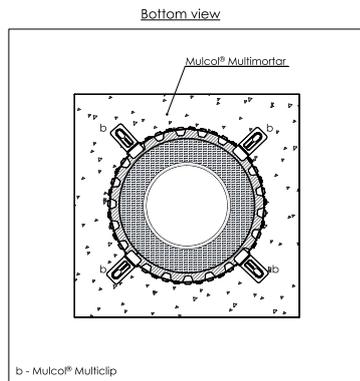


Drawing: PBrf.E-ST-11.0.22.LI.C

| Services                      | Pipe dimensions (mm) |                | Insulation                                      |                |               | Product        | Sealing (mm)                           | Backing   | Classification        |
|-------------------------------|----------------------|----------------|---|----------------|---------------|----------------|--|---|-----------------------|
|                               | Outer dimension      | Wall thickness | Type  | Thickness (mm) | Configuration |                |  |   |                       |
| (Stainless) Steel / cast iron | ≤ Ø 114.3            | ≥ 3.6          | ArmaFlex AF                                     | 9 - 32         | LI 300 / CI   | FIRESAFE / FSC | Multimastic SP<br>0-20 x ≥ 10<br>(wxd) | 25 mm<br>stone wool<br>(≥ 33kg/m <sup>3</sup> ) | EI 60 C/U<br>E 90 C/U |
|                               |                      |                | (min. class B-s3, d0<br>B <sub>L</sub> -s3, d0) | 32             |               |                |  |   | EI 90 C/U             |

**B.1.15 Multimortar -  $\geq 100$  mm - Metal pipes**

**B.1.15.1 Steel pipes - Elastomer LI 300 / CI**

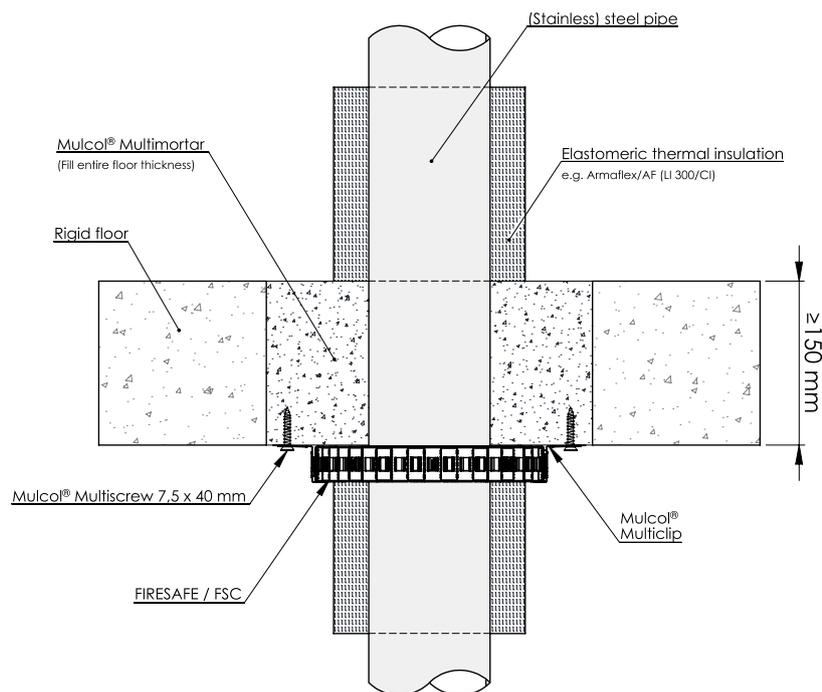
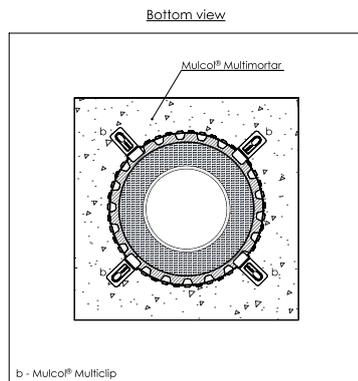


Drawing: RFE-MC30-ST-MM1.2.22

| Services                      | Dimensions (mm)        |                | Insulation   |                |               | Product        | Classification   |
|-------------------------------|------------------------|----------------|--|----------------|---------------|----------------|------------------|
|                               | Outer dimension        | Wall thickness | Type   | Thickness (mm) | Configuration |                |                  |
| (Stainless) Steel / cast iron | $\leq \text{Ø } 114.3$ | $\geq 3.6$     | ArmaFlex AF (min. class B-s3, d0 B <sub>1</sub> -s3, d0) | 32             | LI 300 / CI   | FIRESAFE / FSC | <b>EI 90 C/U</b> |

**B.1.16 Multimortar - ≥ 150 mm - Metal pipes**

**B.1.16.1 Steel pipes - Elastomer LI 300 / CI**

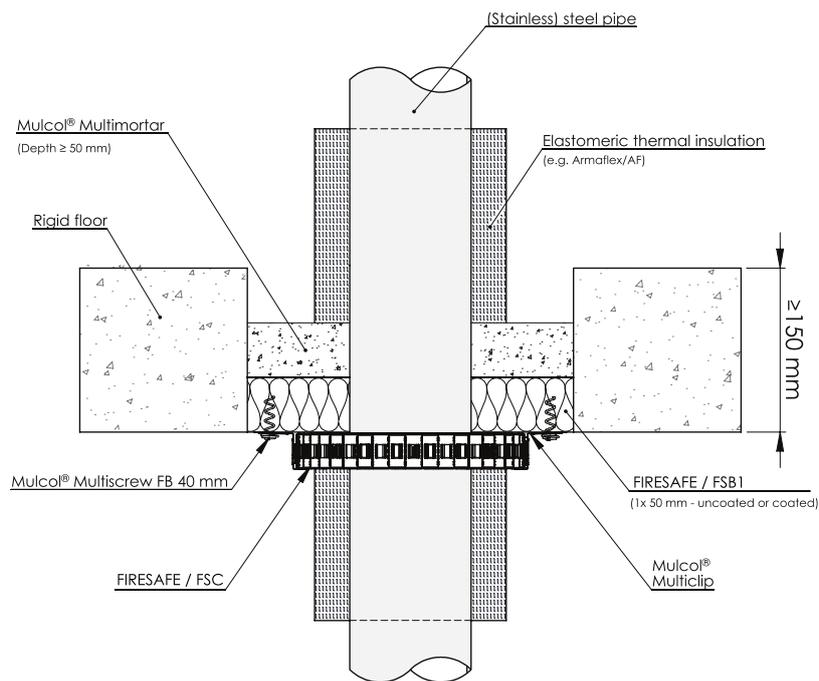
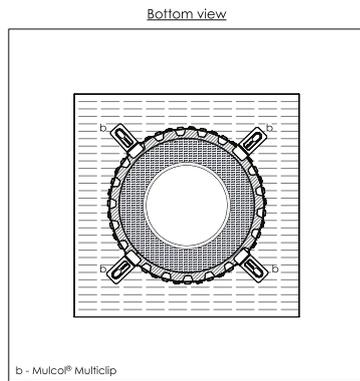


Drawing: RFE-MC30-ST-MM1.3.22

| Services                      | Dimensions (mm) |                | Insulation   |                |               | Product        | Classification   |
|-------------------------------|-----------------|----------------|--|----------------|---------------|----------------|------------------|
|                               | Outer dimension | Wall thickness | Type   | Thickness (mm) | Configuration |                |                  |
| (Stainless) Steel / cast iron | ≤ Ø 114.3       | ≥ 3.6          | ArmaFlex AF (min. class B-s3, d0 B <sub>1</sub> -s3, d0) | 32             | LI 300 / CI   | FIRESAFE / FSC | <b>EI 90 C/U</b> |

**B.1.17 Multimortar + FIRESAFE / FSB -  $\geq 100$  mm - Metal pipes**

**B.1.17.1 Steel pipes - Elastomer LI 300 / CI**

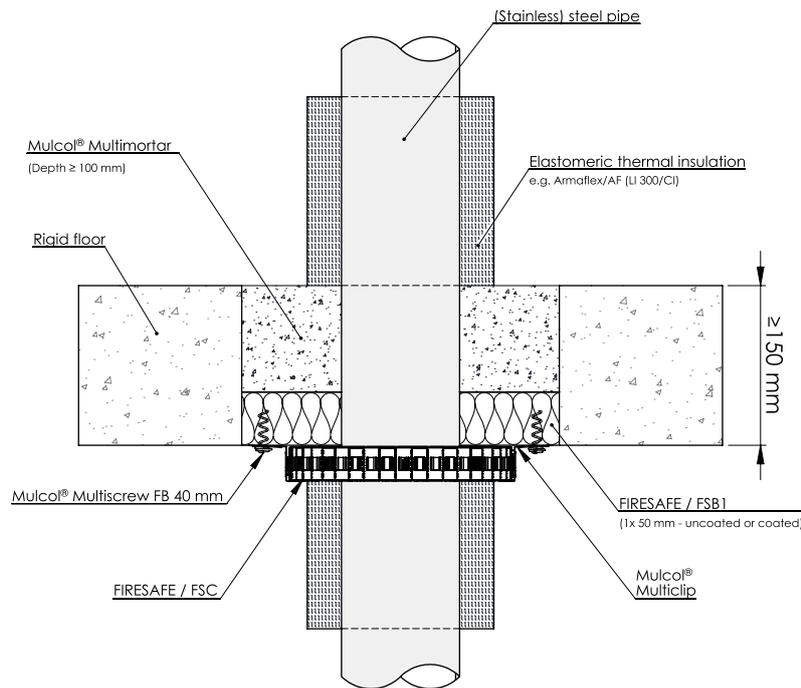
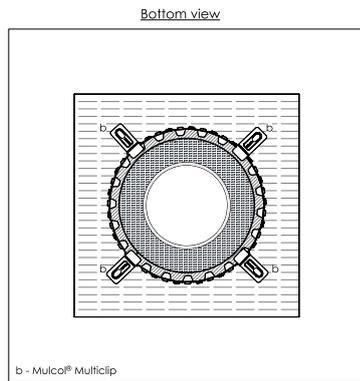


Drawing: RFE-ST-MM2.5.22

| Services                      | Dimensions (mm)        |                | Insulation  |                |               | Product        | Classification   |
|-------------------------------|------------------------|----------------|---|----------------|---------------|----------------|------------------|
|                               | Outer dimension        | Wall thickness | Type  | Thickness (mm) | Configuration |                |                  |
| (Stainless) Steel / cast iron | $\leq \text{Ø } 114.3$ | $\geq 3.6$     | ArmaFlex (min. class B-s3, d0 B <sub>1</sub> -s3, d0) | 32             | LI 300 / CI   | FIRESAFE / FSC | <b>EI 90 C/U</b> |

**B.1.18 Multimortar + FIRESAFE / FSB -  $\geq 150$  mm - Metal pipes**

**B.1.18.1 Steel pipes - Elastomer LI 300 / CI**



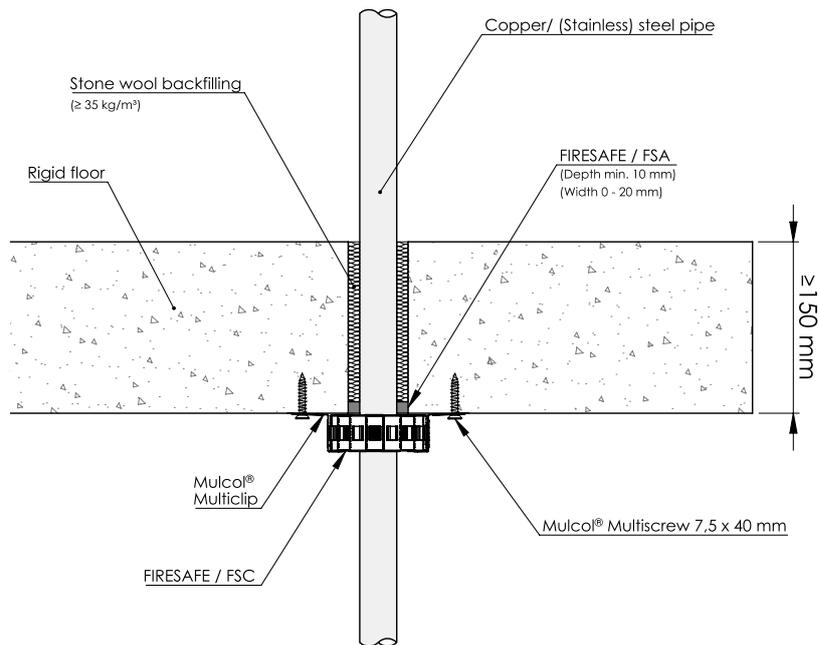
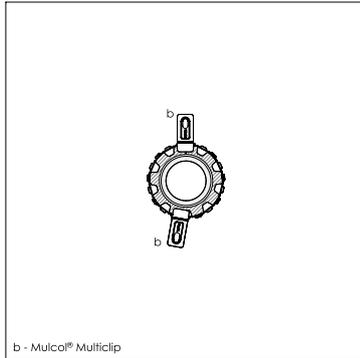
Drawing: RFE-MC30-ST-MM2.7.22

| Services                      | Dimensions (mm)        |                | Insulation  |                |               | Product        | Classification |
|-------------------------------|------------------------|----------------|---|----------------|---------------|----------------|----------------|
|                               | Outer dimension        | Wall thickness | Type  | Thickness (mm) | Configuration |                |                |
| (Stainless) Steel / cast iron | $\leq \text{Ø } 114.3$ | $\geq 3.6$     | ArmaFlex (min. class B-s3, d0 B <sub>1</sub> -s3, d0) | 32             | LI 300 / CI   | FIRESAFE / FSC | EI 90 C/U      |

## B.1.19 Directly through floor - Metal pipes

### B.1.19.1 Copper and steel pipes

Bottom view



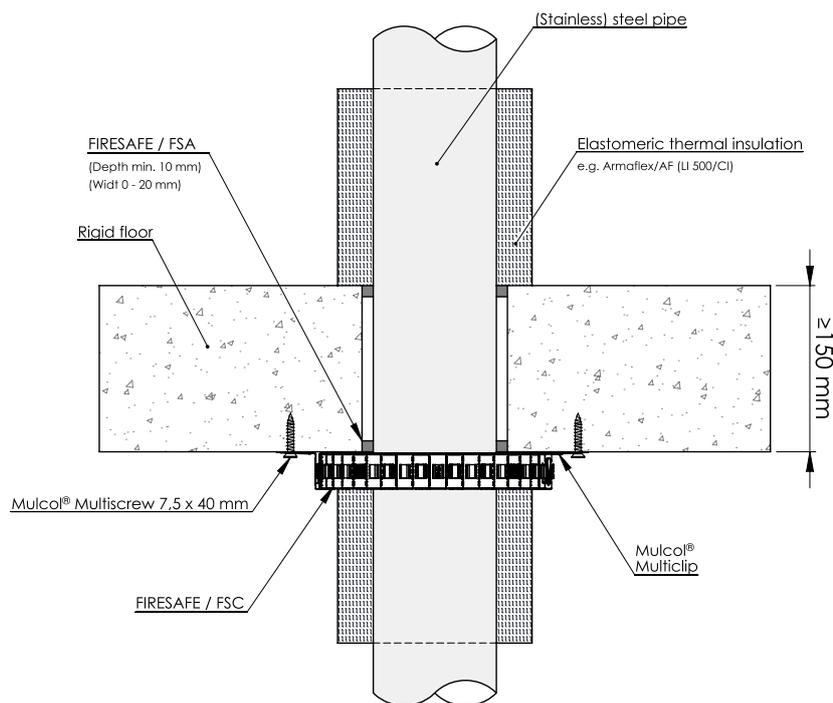
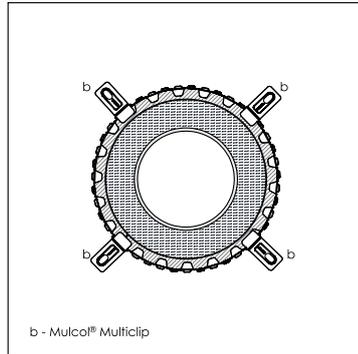
Drawing: RFE-MC30-CU-11.0.10

| Services                               | Pipe dimensions (mm) |                | Product        | Sealing (mm)                    | Backing                              | Classification         |
|--|----------------------|----------------|----------------|---------------------------------|--------------------------------------|------------------------|
|  | Outer dimension      | Wall thickness |                |                                 |                                      |                        |
| Copper / (stainless) steel / cast iron | ≤ Ø 35               | ≥ 1.5          | FIRESAFE / FSC | FIRESAFE / FSA 0-20 x ≥ 10 wxd) | Stone wool (≥ 35 kg/m <sup>3</sup> ) | EI 20 U/C<br>E 120 U/C |

## B.1.19 Directly through floor - Metal pipes

### B.1.19.2 Copper and steel pipes - Elastomer LI 500 / CI

Bottom view



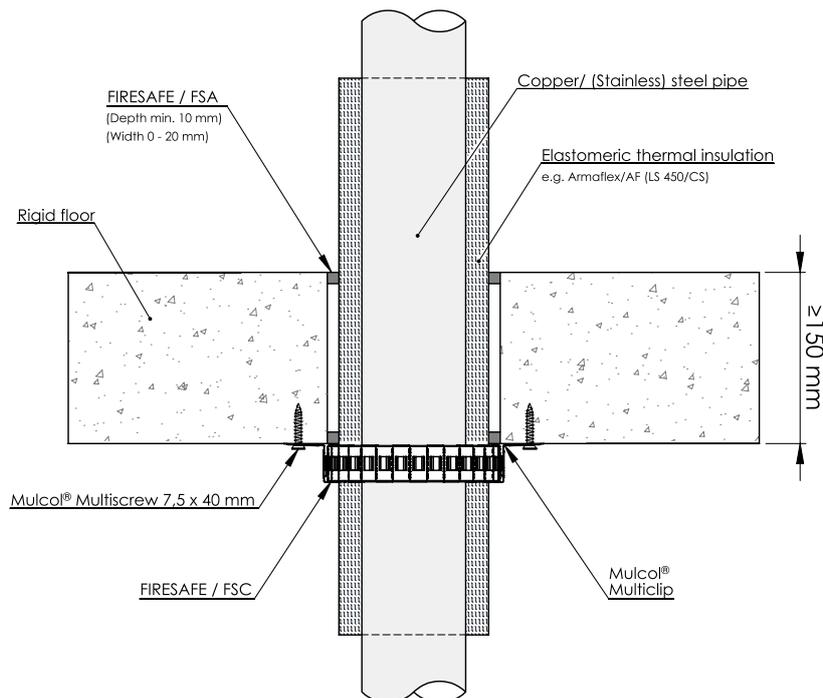
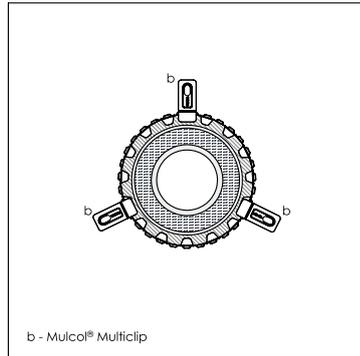
Drawing: RF.E-MC30-ST-11.0.22.LI

| Services  | Pipe dimensions (mm) |                | Insulation                              |                |               | Product           | Sealing (mm)                              | Classification |
|---|----------------------|----------------|---|----------------|---------------|-------------------|---|----------------|
|   | Outer dimensions     | Wall thickness | Type                                    | Thickness (mm) | Configuration |                   |   |                |
| Copper /<br>(stainless)<br>steel / cast<br>iron | ≤ Ø 114.3            | ≥ 3.6          | ArmaFlex AF<br>(min. class<br>B-s3, d0) | 9 - 32         | LI 500 / CI   | FIRESAFE /<br>FSC | FIRESAFE /<br>FSA<br>0-20 x ≥ 10<br>(wxd) | EI 60 U/C      |
|   | ≤ Ø 168.3            | ≥ 4.5          |   | 32             |               |                   |   | E 90 U/C       |
|   | ≤ Ø 114.3            | ≥ 3.6          | B <sub>L</sub> -s3, d0)                 | 32             |               |                   |   | EI 90 U/C      |
|   | ≤ Ø 168.3            | ≥ 4.5          |   |                |               |                   |   |                |

## B.1.19 Directly through floor - Metal pipes

### B.1.19.3 Copper and steel pipes - Elastomer LS 450 / CS

Bottom view

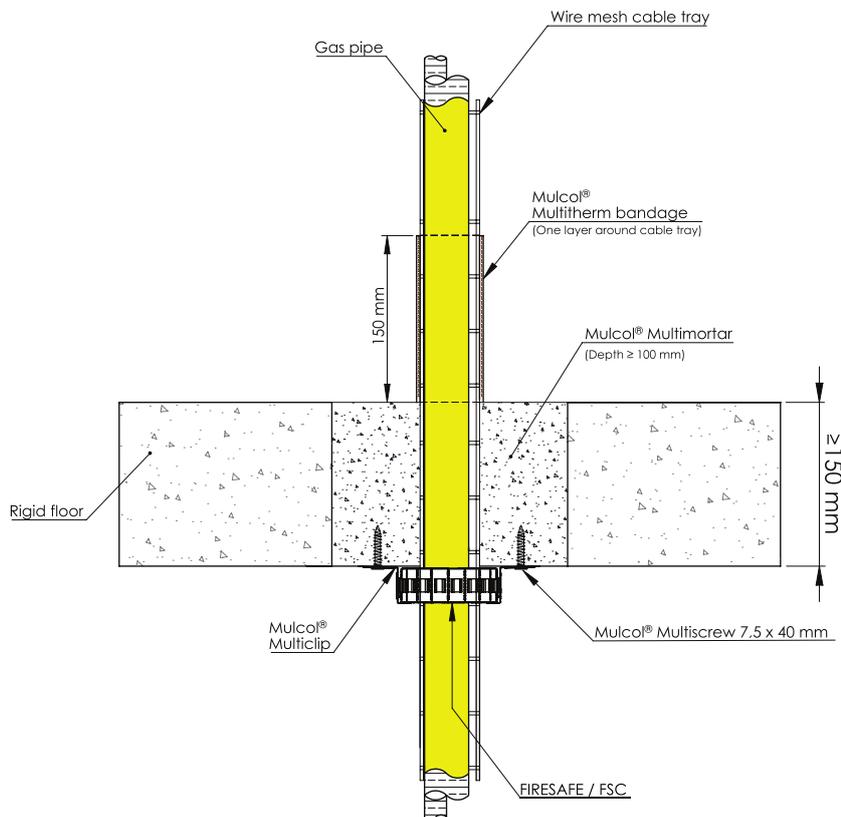
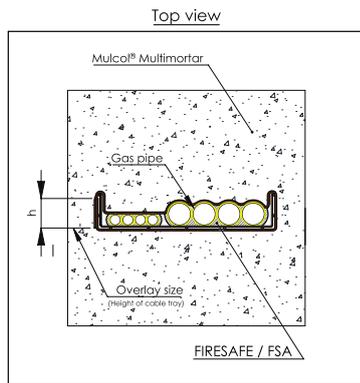


Drawing: RF.E-MC30-ST-11.0.22.LI

| Services                               | Pipe dimensions (mm) |                | Insulation   |                |               | Product        | Sealing (mm)                        | Classification        |
|--|----------------------|----------------|--|----------------|---------------|----------------|-------------------------------------|-----------------------|
|  | Outer dimensions     | Wall thickness | Type   | Thickness (mm) | Configuration |                |                                     |                       |
| Copper / (stainless) steel / cast iron | ≤ Ø 88.9             | ≥ 2.0          | ArmaFlex AF (min. class B-s3, d0 B <sub>L</sub> -s3, d0) | 32             | LS 450 / CS   | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 45 U/C<br>E 90 U/C |
|  |                      |                |  |                | CS            |                |                                     | EI 60 U/C<br>E 90 U/C |
| (Stainless) steel / cast iron          | ≤ Ø 114.3            | ≥ 3.6          |  | 9 - 32         | LS 450 / CS   |                |                                     | EI 60 U/C             |
|  | ≤ Ø 168.3            | ≥ 4.5          |  |                |               |                |                                     |                       |

**B.1.20 Multimortar -  $\geq 150$  mm - Gas pipes**

**B.1.20.1 Corrugated stainless steel tube gas (CSST) pipes - Multitherm Bandage**



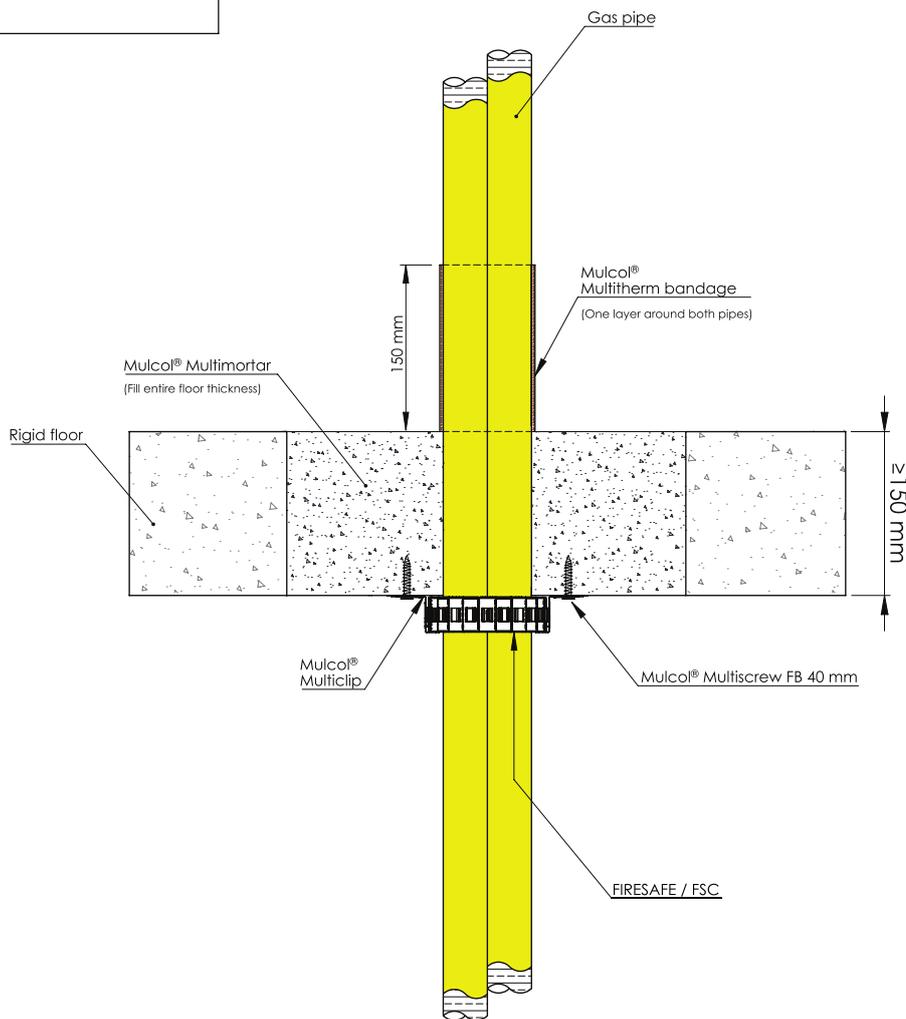
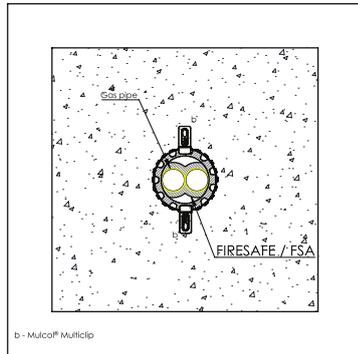
Drawing: RFE-CT-GFS-MC30-MM1.3.10

| Services   | Number of pipes | Product                           | Sealing (mm)                     | Classification |
|--|-----------------|-----------------------------------|----------------------------------|----------------|
| CFS CSST gas pipe $\leq \varnothing 20$ mm in wire mesh cable tray | $\leq 4$        | FIRESAFE / FSC<br>bottom of floor | LI 150 one layer<br>top of floor | EI 120 U/C     |
| CFS CSST gas pipe $\leq \varnothing 41$ mm in wire mesh cable tray | $\leq 4$        |                                   |                                  |                |

**B.1.20 Multimortar -  $\geq 150$  mm - Gas pipes**

**B.1.20.2 Corrugated stainless steel tube gas (CSST) pipes - Multitherm Bandage**

Bottom view

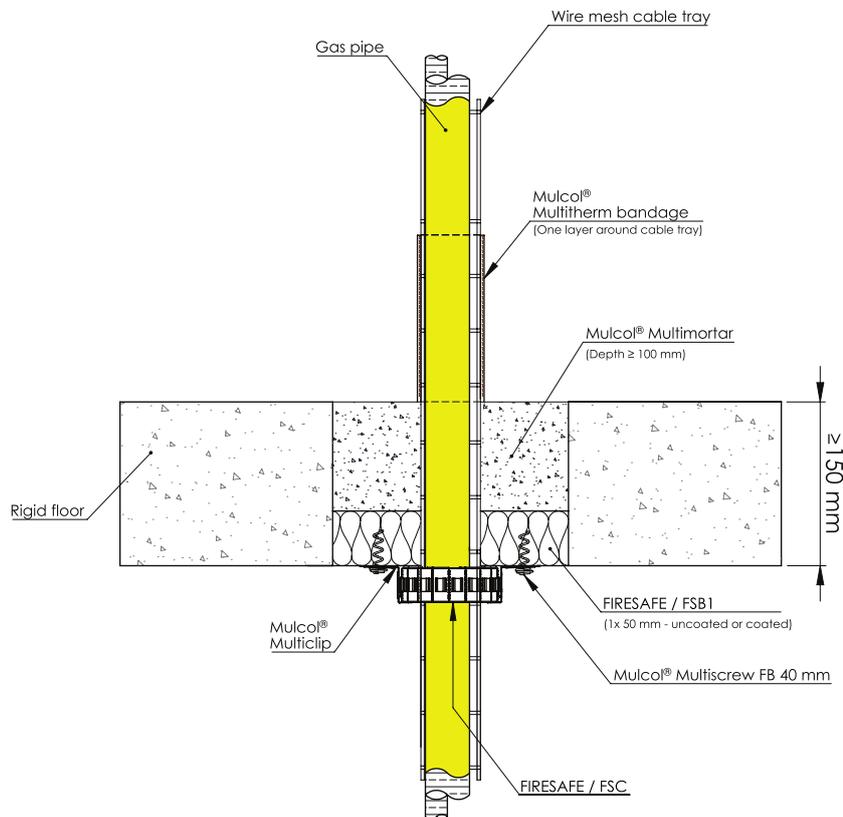
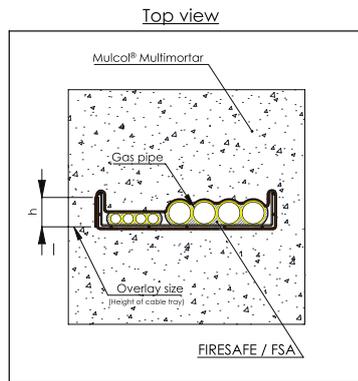


Drawing: RFE-GFS2-MC30-MM1.3.10

| Services                                   | Number of pipes | Product                           | Sealing (mm)                     | Classification    |
|--|-----------------|-----------------------------------|----------------------------------|-------------------|
| CFS CSST gas pipe $\leq \varnothing 41$ mm | $\leq 2$        | FIRESAFE / FSC<br>bottom of floor | LI 150 one layer<br>top of floor | <b>EI 120 U/C</b> |

**B.1.21 Multimortar + FIRESAFE / FSB - 150 mm - Gas pipes**

**B.1.21.1 Corrugated stainless steel tube gas (CSST) pipes - Multitherm Bandage**

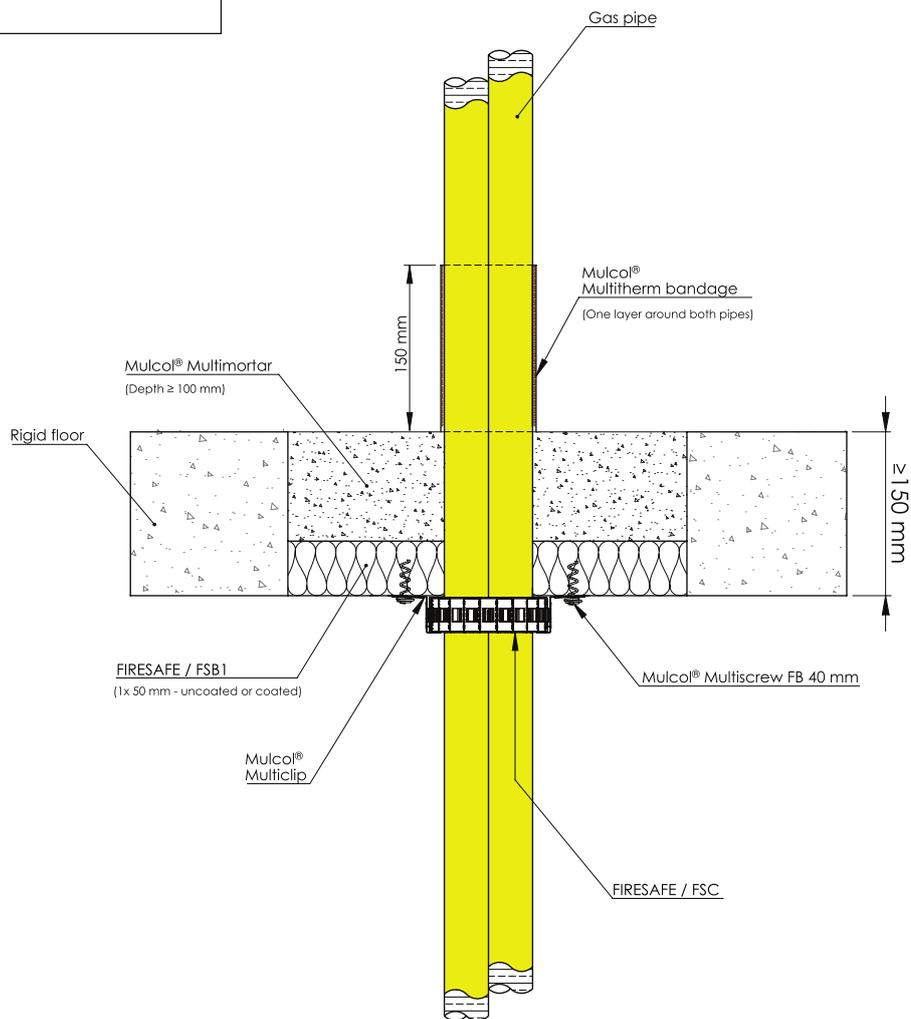
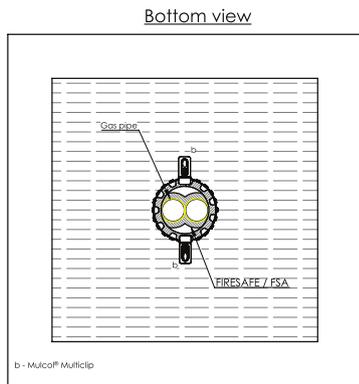


Drawing: Rf.E-CT-GFS-MM2.2.10

| Services  | Number of pipes | Product                           | Sealing (mm)                     | Classification |
|---|-----------------|-----------------------------------|----------------------------------|----------------|
| CFS CSST gas pipe $\leq \varnothing 20$ mm<br>in wire mesh cable tray | $\leq 4$        | FIRESAFE / FSC<br>bottom of floor | LI 150 one layer<br>top of floor | EI 120 U/C     |
| CFS CSST gas pipe $\leq \varnothing 41$ mm<br>in wire mesh cable tray | $\leq 4$        |                                   |                                  |                |

**B.1.21 Multimortar + FIRESAFE / FSB - 150 mm - Gas pipes**

**B.1.21.2 Corrugated stainless steel tube gas (CSST) pipes - Multitherm Bandage**

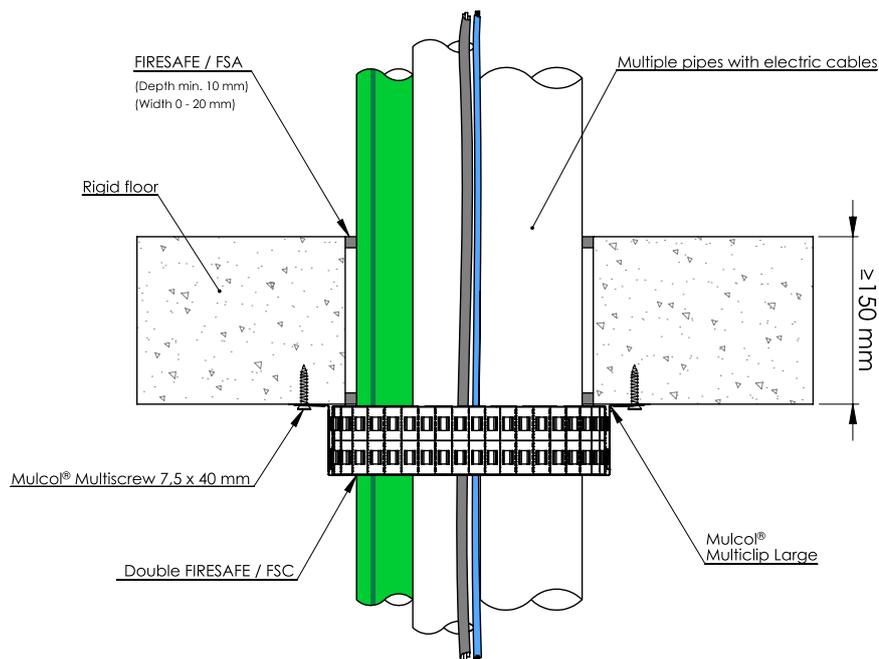
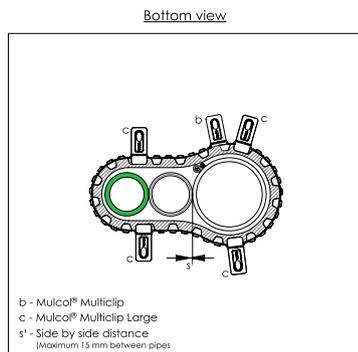


Drawing: RFE-GFS2-MM2.2.10

| Services                    | Number of pipes | Product                           | Sealing (mm)                     | Classification    |
|-----------------------------|-----------------|-----------------------------------|----------------------------------|-------------------|
| CFS CSST gas pipe ≤ Ø 41 mm | ≤ 2             | FIRESAFE / FSC<br>bottom of floor | LI 150 one layer<br>top of floor | <b>EI 120 U/C</b> |

## B.1.22 Directly through floor - Multiple services

### B.1.22.1 Multiple pipes and cables



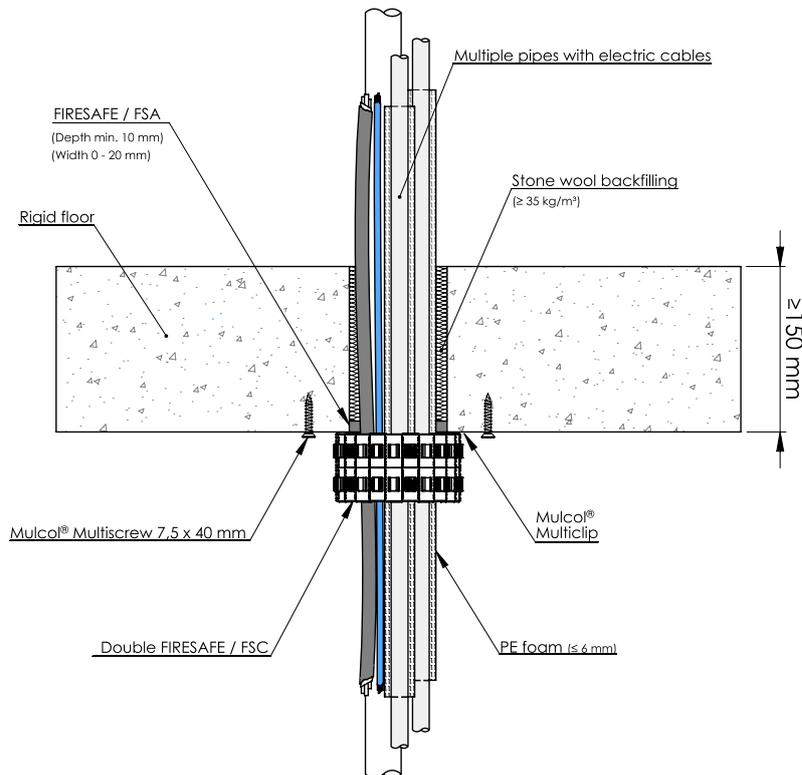
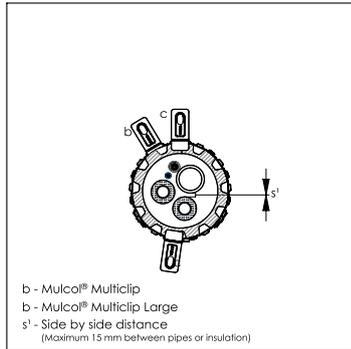
Drawing: RFE-MC60-MLP3-21.0.10

| Services                       | Pipe dimensions (mm)                |                | Product        | Sealing (mm)                             | Classification |
|--------------------------------|-------------------------------------|----------------|----------------|--|----------------|
|                                | Outer dimension                     | Wall thickness |                |  |                |
| PE(-HD) / PE-X / ABS / SAN+PVC | $\leq \varnothing 90$               | 2.8            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$ (wxd) | EI 120 U/U     |
| Multilayer pipes (MLC)         | $\leq \varnothing 50$               | 4.0            |                |  | EI 120 U/C     |
| Aquatherm Green-MF             |                                     | 6.9            |                |  | EI 120         |
| Telecommunication cable        | UTP Cat 5/6                         | -              |                |  |                |
| Sheathed cable                 | $\leq 5 \times 2.5$ mm <sup>2</sup> | -              |                |  |                |

## B.1.22 Directly through floor - Multiple services

### B.1.22.2 Airconditioning set

Bottom view



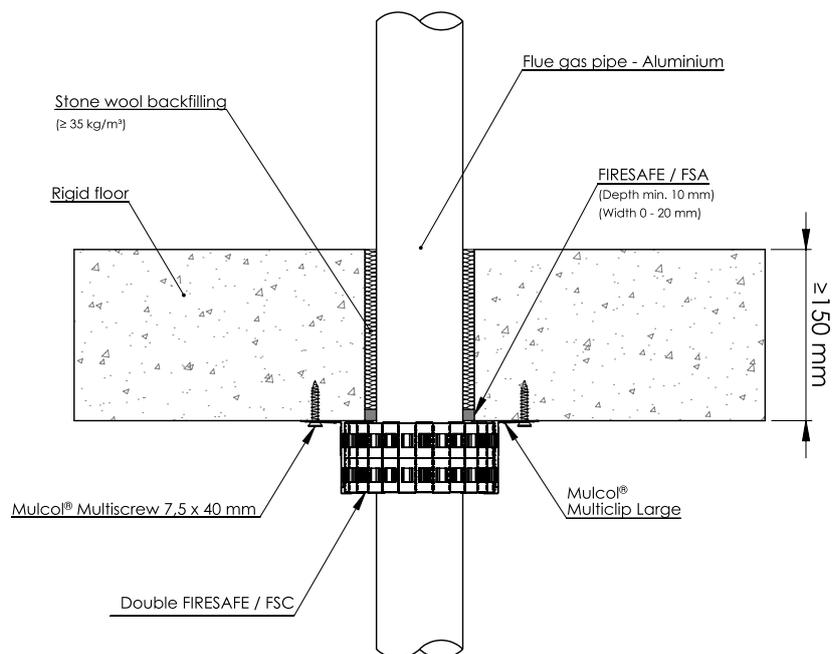
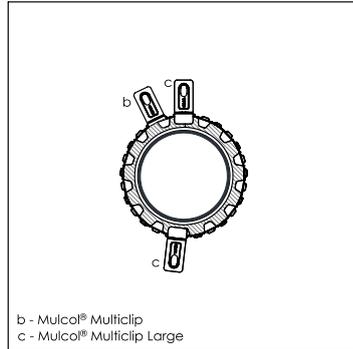
Drawing: RF.E-MC60-MLP5-21.0.40

| Services                     | Pipe dimensions (mm)                          |                | Insulation |                |                            | Product        | Classification |
|------------------------------|---|----------------|------------|----------------|----------------------------|----------------|----------------|
|                              | Outer diameter                                | Wall thickness | Type       | Thickness (mm) | Configuration              |                |                |
| Set of airconditioning pipes | $2x \leq \varnothing 15$                      | 1.5            | PE foam    | $\geq 6$       | LS 400 / CS<br>LI 400 / CI | FİRESAFE / FSC | EI 120 C/U     |
| PVC-U / PVC-C                | $\leq \varnothing 32$                         | 3.0            | -          | -              | -                          |                | EI 120 U/U     |
| Telecommunication cable      | UTP Cat 5/6                                   | -              | -          | -              | -                          |                | EI 120         |
| Sheathed cable               | $\leq \text{YMKV } 5 \times 2.5 \text{ mm}^2$ | -              | -          | -              | -                          |                | EI 120         |

## B.1.23 Directly through floor - Flue gas pipes

### B.1.23.1 Aluminium flue gas pipes

Bottom view



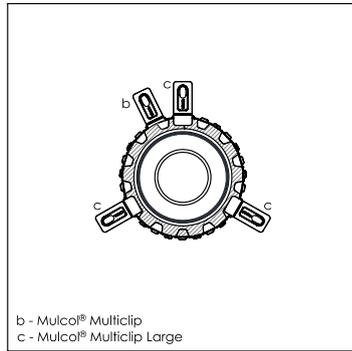
Drawing: RF.E-MC60-RGA-21.0.10

| Services  | Pipe dimensions (mm) |                | Product               | Sealing (mm)                     | Classification      |
|-----------|----------------------|----------------|-----------------------|----------------------------------|---------------------|
|           | Outer dimension      | Wall thickness |                       |                                  |                     |
| Aluminium | ≤ Ø 80               | 1.5            | FIRESAFE / FSC double | FIRESAFE / FSA 0-20 x ≥ 10 (wxd) | EI 15 U/C, E 90 U/C |
|           | ≤ Ø 130              |                |                       |                                  | E 90 U/C            |

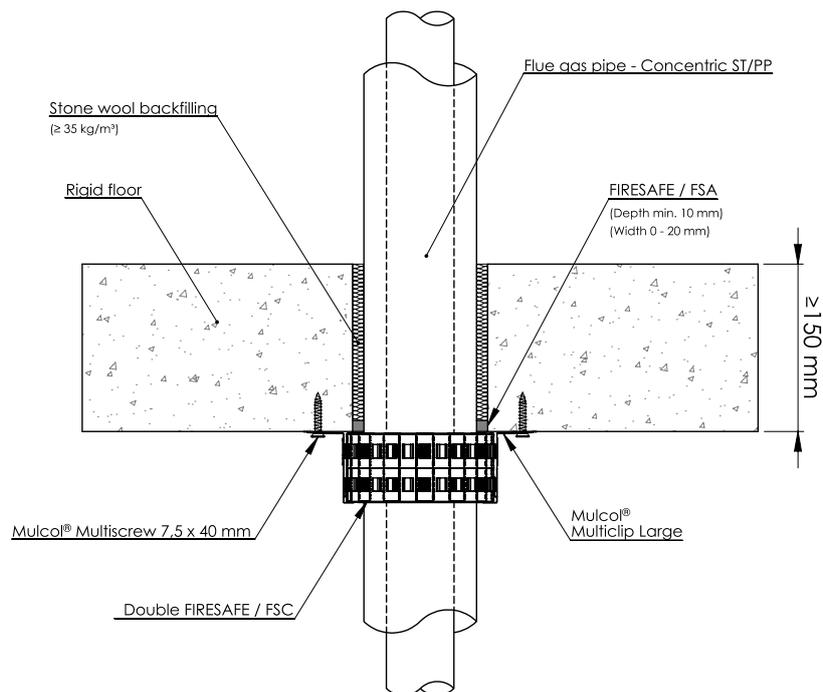
## B.1.23 Directly through floor - Flue gas pipes

### B.1.23.2 Concentric steel/PP flue gas pipes

Bottom view



b - Mulcol® Multiclip  
c - Mulcol® Multiclip Large



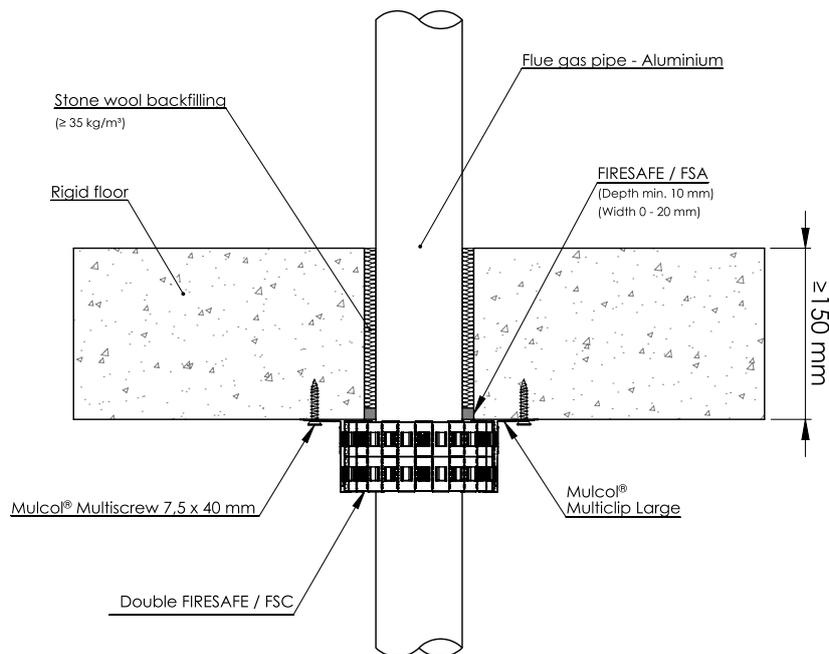
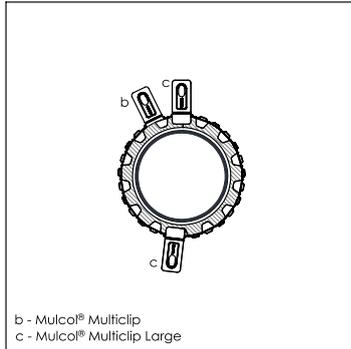
Drawing: RFE-MC60-RGAT-21.0.10

| Services                            | Pipe dimensions (mm) |                      | Product               | Sealing (mm)                        | Classification  |
|-------------------------------------|----------------------|----------------------|-----------------------|-------------------------------------|-----------------|
|                                     | Outer pipe dimension | Inner pipe dimension |                       |                                     |                 |
| Steel/PP flue gas system concentric | ≤ Ø 110              | ≤ Ø 60               | FIRESAFE / FSC double | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | <b>E 90 U/C</b> |
|                                     | ≤ Ø 125              | ≤ Ø 80               |                       |                                     |                 |
|                                     | ≤ Ø 150              | ≤ Ø 100              |                       |                                     |                 |
|                                     | ≤ Ø 200              | ≤ Ø 130              |                       |                                     |                 |

## B.1.23 Directly through floor - Flue gas pipes

### B.1.23.3 Plastic flue gas pipes

Bottom view



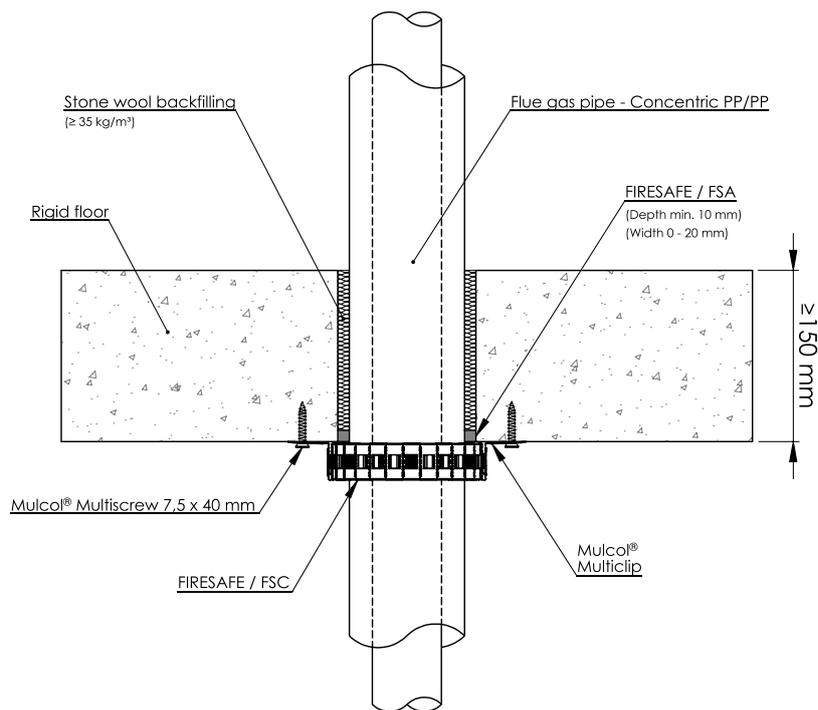
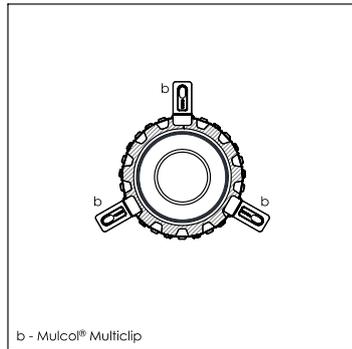
Drawing: RFE-MC60-RGA-21.0.10

| Services | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|----------|----------------------|----------------|----------------|-------------------------------------|----------------|
|          | Outer dimension      | Wall thickness |                |                                     |                |
| PP       | ≤ Ø 40               | 1.8 - 4.0      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 90 U/U      |
|          | ≤ Ø 125              | 3.1 - 4.0      |                |                                     |                |

## B.1.23 Directly through floor - Flue gas pipes

### B.1.23.4 Concentric plastic flue gas pipes

Bottom view



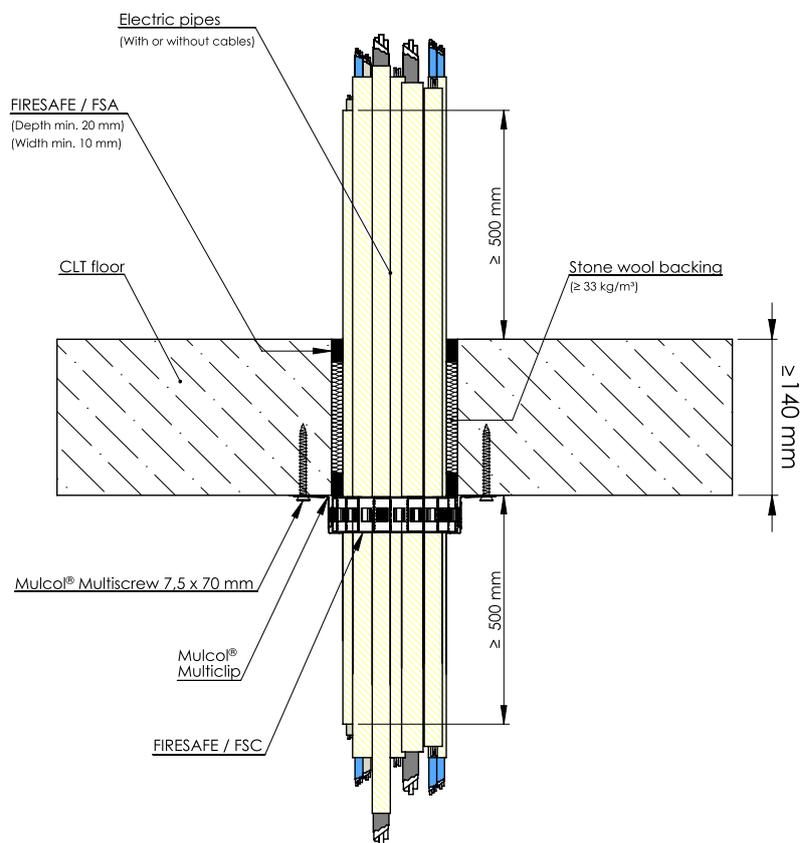
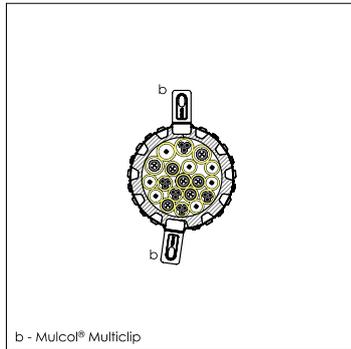
Drawing: RFE-MC30-RGAT\_PP-11.0.10

| Services | Pipe dimensions (mm) |                | Product        | Sealing (mm)                             | Classification |
|----------|----------------------|----------------|----------------|--|----------------|
|          | Outer dimension      | Wall thickness |                |  |                |
| PP / PP  | $\leq \text{Ø } 40$  | 1.8 - 4.0      | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$ (wxd) | EI 90 U/U      |
|          | $\leq \text{Ø } 125$ | 3.1 - 4.0      |                |  |                |

## B.2.1 Directly through floor - Cables, trays and conduits

### B.2.1.1 Multiple plastic conduits

Bottom view



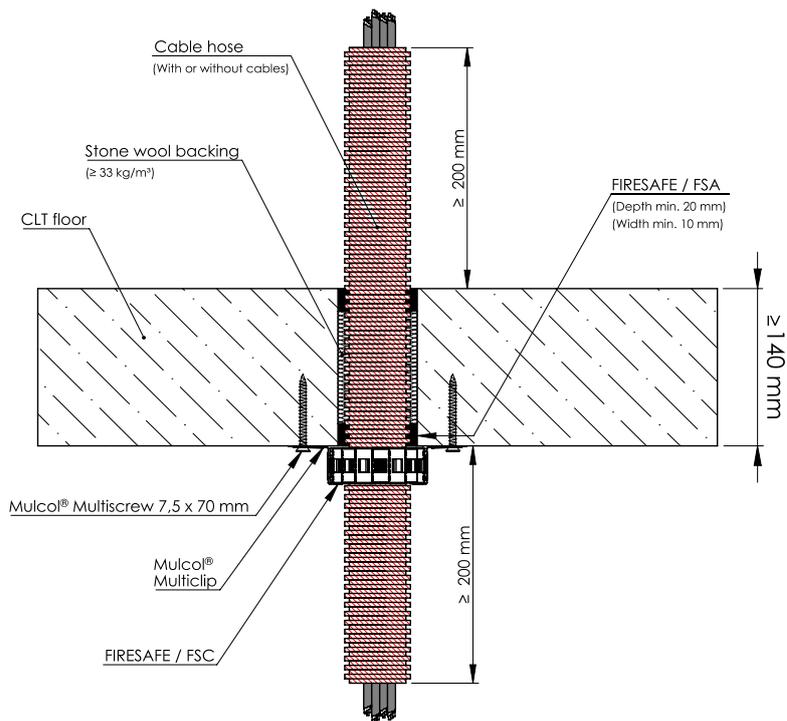
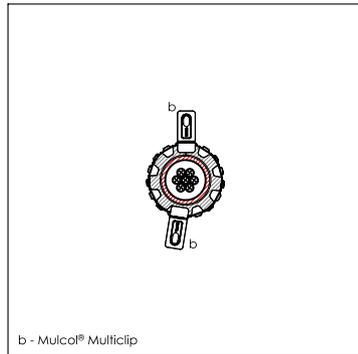
Drawing: FCLTE-MC30-EPB-11.0.40

| Services  | Length of conduit | Product        | Allowed cables  | Classification       |
|---|-------------------|----------------|---|----------------------|
| Multiple PVC conduits max. ≤ Ø 80 mm<br>max. ≤ Ø 19 mm each<br>with or without cables | ≥ 500 mm          | FIRESAFE / FSC | Sheathed cables ≤ Ø 10.2 mm<br>Unsheathed cables ≤ Ø 5 mm | EI 90 U/U, E 120 U/U |

## B.2.1 Directly through floor - Cables, trays and conduits

### B.2.1.2 Flexible conduits with cables

Bottom view



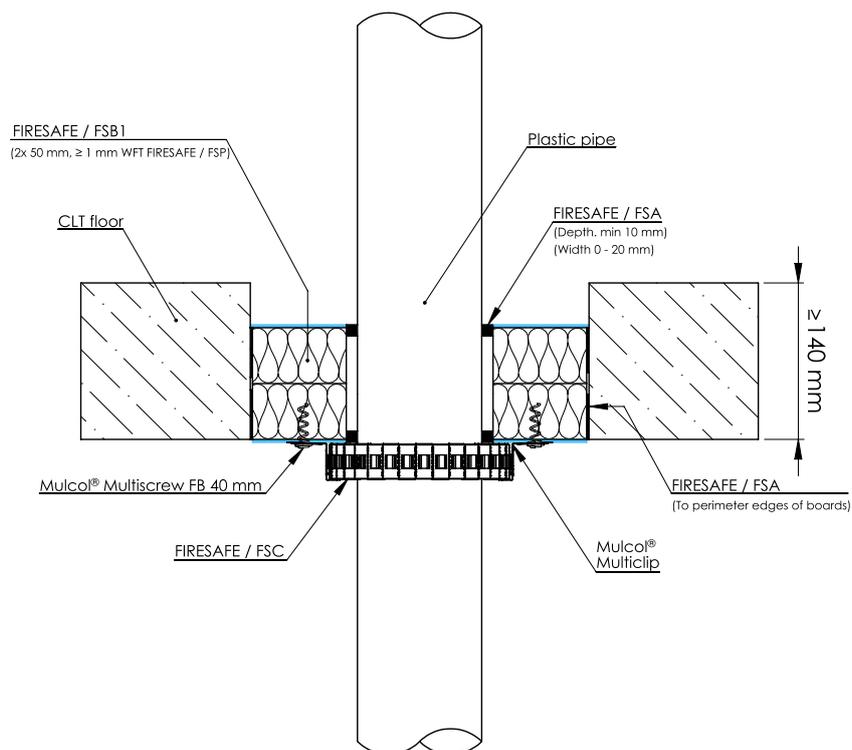
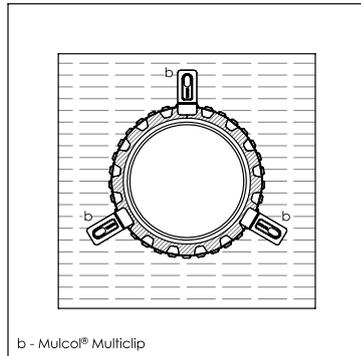
Drawing: FCLTE-MC30-ECH-11.0.30

| Services  | Length of conduit     | Product        | Allowed cables   | Classification              |
|---|-----------------------|----------------|--|-----------------------------|
| Ribbed PE-sleeve conduit<br>$\leq \text{Ø } 63 \text{ mm}$ , with or without cables | $\geq 200 \text{ mm}$ | FIRESAFE / FSC | Sheathed cables $\leq \text{Ø } 60 \text{ mm}$<br>(single or bundled)<br>Telecommunication cables<br>$\leq \text{Ø } 21 \text{ mm}$ in a<br>tied bundle $\leq \text{Ø } 60 \text{ mm}$ | <b>EI 90 U/U, E 120 U/U</b> |

## B.2.2 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes

### B.2.2.1 Plastic pipes

Bottom view



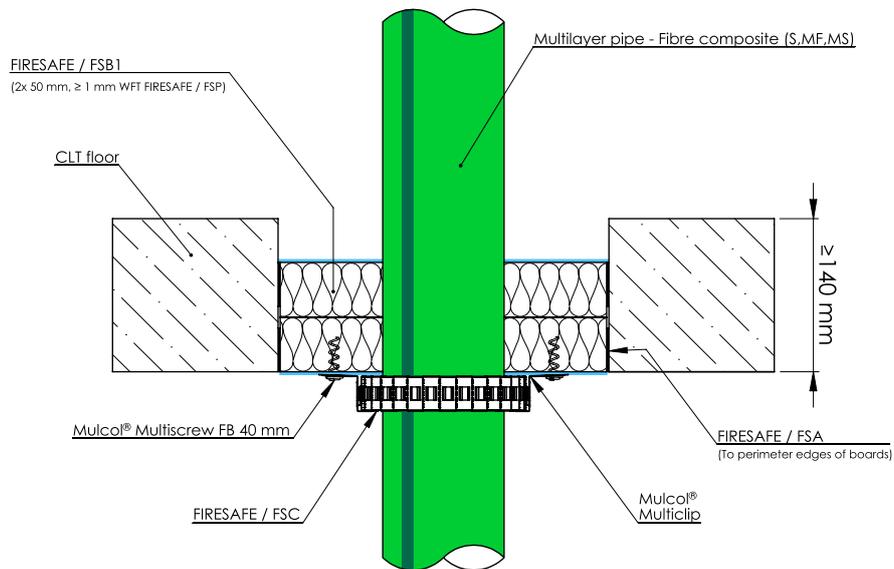
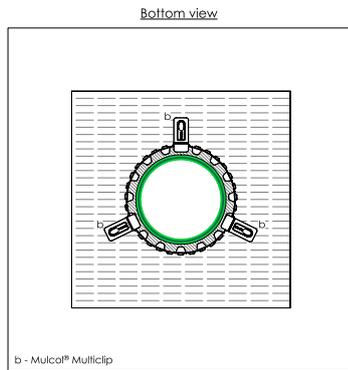
Drawing: FCLT.E-MC30-PP-MFB1.2.10

| Services                  | Pipe dimensions (mm)   |                | Product        | Sealing (mm)                             | Classification   |
|---------------------------|------------------------|----------------|----------------|--|------------------|
|                           | Outer dimension        | Wall thickness |                |  |                  |
| PE-HD/ PE / ABS / SAN+PVC | $\leq \varnothing 110$ | 2.7            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x $\geq 10$ (wxd) | <b>EI 45 U/U</b> |
|                           |                        | 2.7 - 6.6      |                |  |                  |
| PP                        |                        | 2.7            |                |  |                  |
|                           |                        | 2.7 - 6.3      |                |  |                  |
| PVC-U / PVC-C             |                        | 2.7            |                |  |                  |
|                           | 2.7 - 6.3              |                |                |  |                  |



## B.2.2 FIRESAFE / FSB1 - 2x50 mm - Combustible pipes

### B.2.2.3 PP-R Multilayer pipes



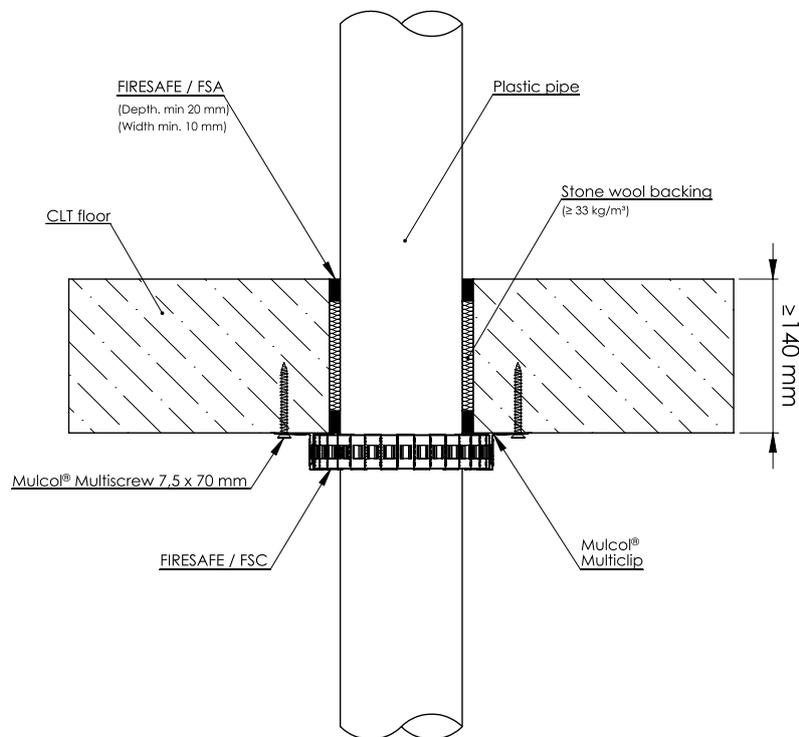
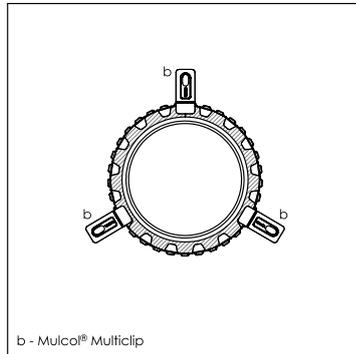
Drawing: FCLT.E-MC30-MLF-MFB1.2.10

| Services           | Pipe dimensions (mm) |                | Product        | Classification |
|--------------------|----------------------|----------------|----------------|----------------|
|                    | Outer dimension      | Wall thickness |                |                |
| Aquatherm Green-MF | ≤ Ø 50               | 6.9            | FIRESAFE / FSC | EI 45 U/C      |
| Aquatherm Blue-MF  | ≤ Ø 110              | 10.0           |                |                |

## B.2.3 Directly through the floor - Combustible pipes

### B.2.3.1 Plastic pipes

Bottom view



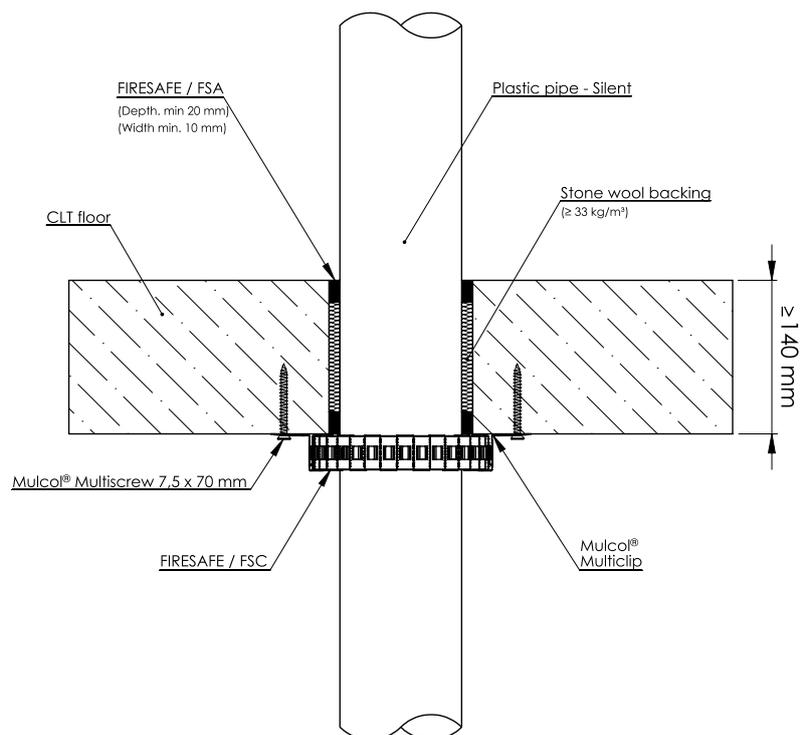
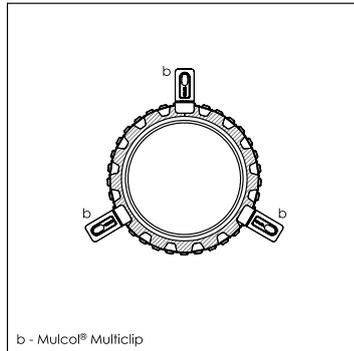
Drawing: FCLT.E-MC30-PP-11.0.10

| Services                  | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|---------------------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                           | Outer dimension      | Wall thickness |                |                                     |                |
| PE-HD/ PE / ABS / SAN+PVC | ≤ Ø 40               | 2.3 - 10.0     | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 90 U/U      |
|                           | ≤ Ø 110              | 2.7 - 10.0     |                |                                     | EI 120 U/C     |
|                           | ≤ Ø 125              | 3.9            |                |                                     | EI 120 U/U     |
| PP                        | ≤ Ø 40               | 2.3            |                |                                     | EI 90 U/U      |
|                           |                      | 2.3 - 10.0     |                |                                     | EI 120 U/C     |
|                           | ≤ Ø 110              | 2.7 - 10.0     |                |                                     | EI 90 U/U      |
| PVC-U / PVC-C             | ≤ Ø 125              | 3.1            | EI 120 U/C     |                                     |                |
|                           | ≤ Ø 40               | 2.3 - 10.0     | EI 90 U/U      |                                     |                |
|                           |                      | 2.7 - 10.0     | EI 120 U/U     |                                     |                |
| ≤ Ø 110                   | 3.2 - 8.1            |                |                |                                     |                |

## B.2.3 Directly through the floor - Combustible pipes

### B.2.3.2 Plastic pipes (Silent)

Bottom view



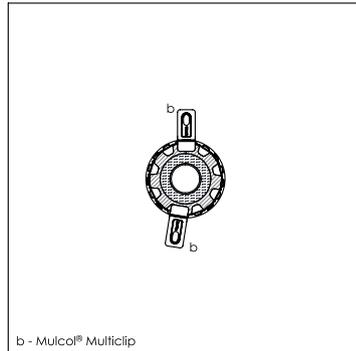
Drawing: FCLTE-MC30-PPS-11.0.10

| Services             | Pipe dimensions (mm) |                | Product        | Sealing (mm)                        | Classification |
|----------------------|----------------------|----------------|----------------|-------------------------------------|----------------|
|                      | Outer dimension      | Wall thickness |                |                                     |                |
| Geberit Silent dB 20 | ≤ Ø 110              | 6.0            | FIRESAFE / FSC | FIRESAFE / FSA<br>0-20 x ≥ 10 (wxd) | EI 120 U/U     |
| Raupiano Plus        |                      | 2.7            |                |                                     |                |
|                      | ≤ Ø 160              | 4.0            |                |                                     | EI 60 U/C      |

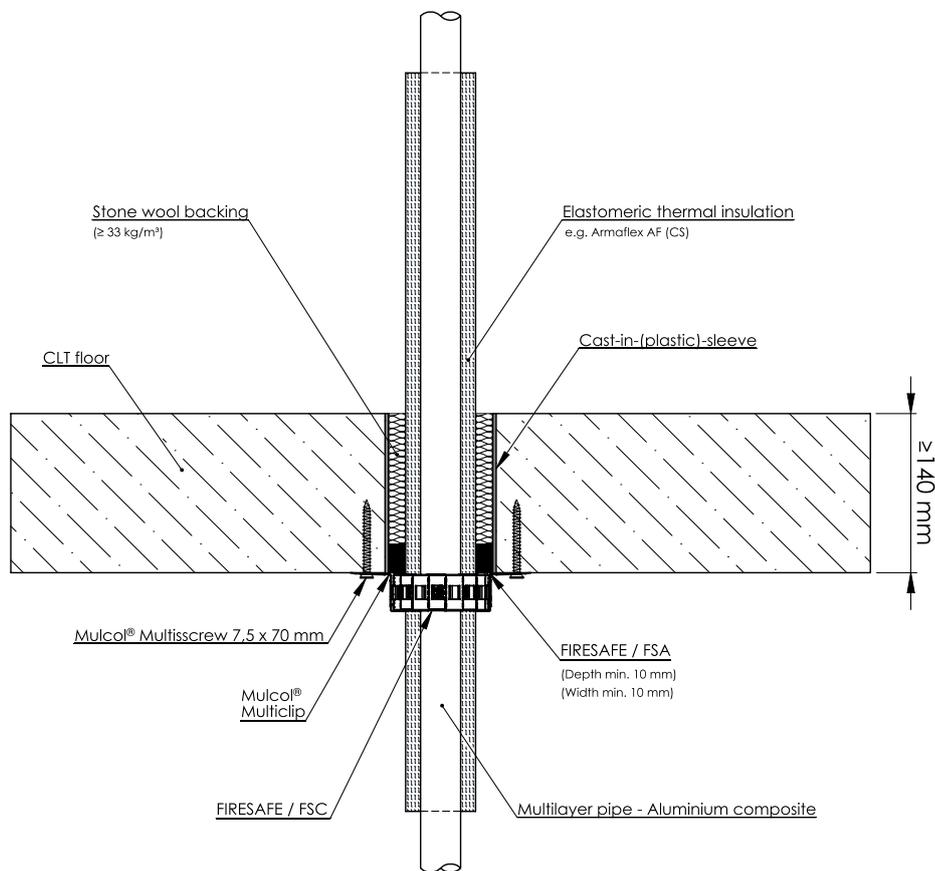
## B.2.4 Directly through the floor - Cast-in sleeve

### B.2.4.1 Multilayer pipes (MLC) - Elastomer CS

Bottom view



b - Mulcol® Multiclip



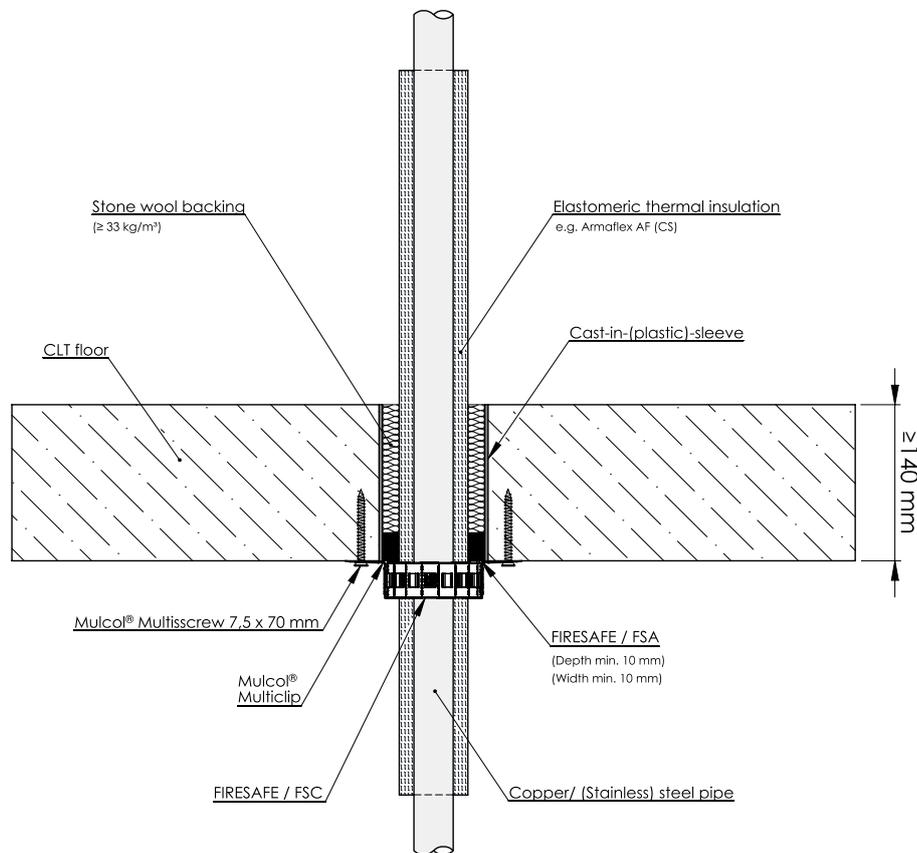
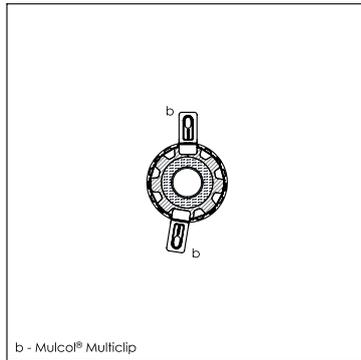
Drawing: FCLTmk.E-MC30-MLA-MSP1.1.22

| Services               |  | Pipe dimensions (mm)  |                | Insulation   |                |               | Product        | Classification    |
|------------------------|--|-----------------------|----------------|--|----------------|---------------|----------------|-------------------|
|                        |  | Outer dimension       | Wall thickness | Type   | Thickness (mm) | Configuration |                |                   |
| Multilayer pipes (MLC) | with or without plastic cast-in sleeve $\leq \varnothing 75$ | $\leq \varnothing 32$ | $\geq 3.0$     | ArmaFlex AF (min. class B-s3, d0 B <sub>L</sub> -s3, d0) | 13             | CS            | FIRESAFE / FSC | <b>EI 120 C/U</b> |

## B.2.4 Directly through the floor - Cast-in sleeve

### B.2.4.2 Copper and steel pipes - Elastomer CS

Bottom view

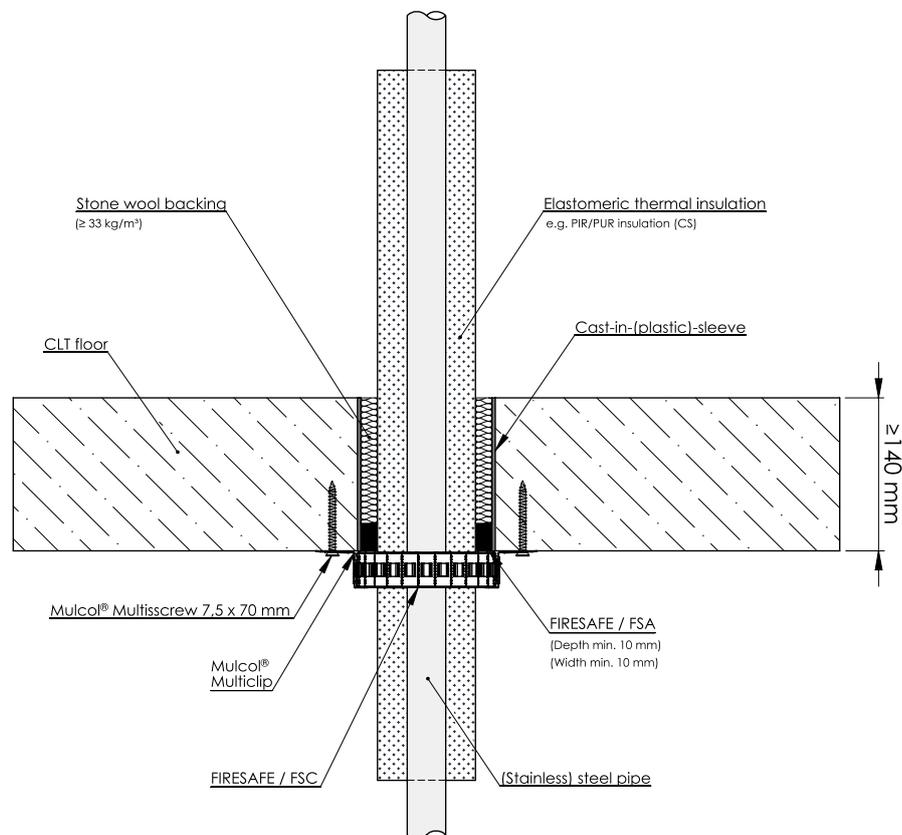
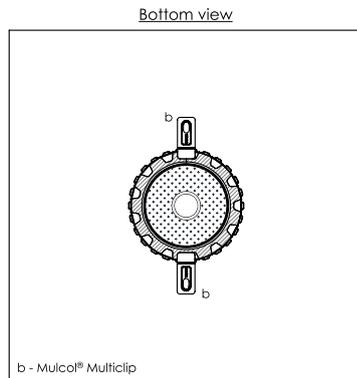


Drawing: FCLTmk.E-MC30-CU-MSP1.1.22

| Services                               |  | Pipe dimensions (mm)  |                | Insulation   |                |               | Product        | Classification         |
|--|--|-----------------------|----------------|--|----------------|---------------|----------------|------------------------|
|  |  | Outer dimension       | Wall thickness | Type   | Thickness (mm) | Configuration |                |                        |
| Copper / (stainless) steel / cast iron | with or without plastic cast-in sleeve $\leq \varnothing 75$ | $\leq \varnothing 35$ | $\geq 1.5$     | ArmaFlex AF (min. class B-s3, d0 B <sub>L</sub> -s3, d0) | 13             | CS            | FIRESAFE / FSC | EI 60 C/U<br>E 120 C/U |

## B.2.4 Directly through the floor - Cast-in sleeve

### B.2.4.3 Steel pipes - PUR-PE CS

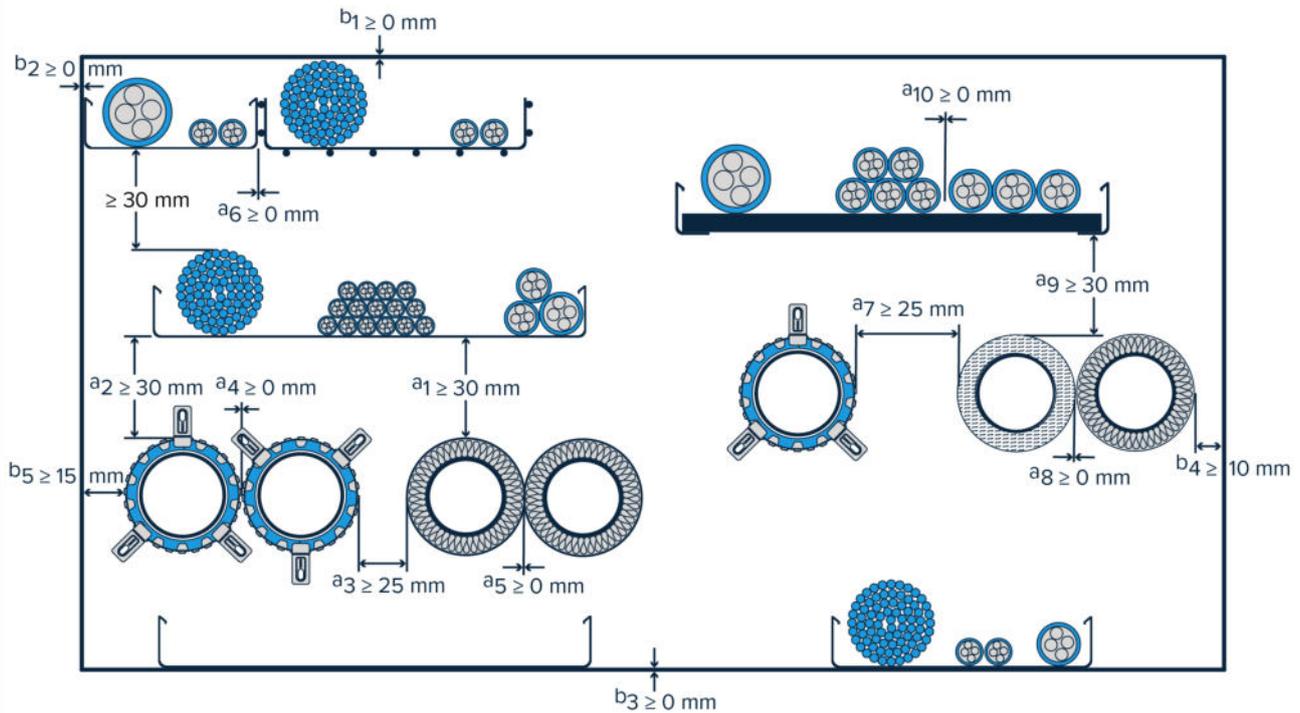


Drawing: FCLTmk.E-MC30-ST-MSP1.1.22

| Services                      |   | Pipe dimensions (mm) |                | Insulation |                |               | Product        | Classification    |
|-------------------------------|---|----------------------|----------------|------------|----------------|---------------|----------------|-------------------|
|                               |   | Outer dimension      | Wall thickness | Type       | Thickness (mm) | Configuration |                |                   |
| (Stainless) steel / cast iron | with or without plastic cast-in sleeve $\leq \text{Ø } 125$ | $\leq \text{Ø } 32$  | $\geq 2.0$     | PUR-PE     | 30             | CS            | FIRESAFE / FSC | <b>EI 120 C/U</b> |

## C.1 Wall constructions - General

### C.1.1 Mutual distances & distance to first support



#### Mutual distances Mixed Penetration Seal

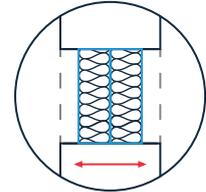
- a<sub>1</sub> Distance between cables/cable trays and metal pipes
- a<sub>2</sub> Distance between cables/cable trays and plastic pipes
- a<sub>3</sub> Distance between metal pipes and plastic pipes
- a<sub>4</sub> Distance between plastic pipes
- a<sub>5</sub> Distance between metal pipes with non-combustible insulation
- a<sub>6</sub> Distance between cable trays
- a<sub>7</sub> Distance between plastic pipes and pipes with combustible insulation
- a<sub>8</sub> Distance between pipes with non-combustible insulation and pipes with combustible insulation
- a<sub>9</sub> Distance between cables/cable trays and pipes with combustible insulation
- a<sub>10</sub> Distance between cables stacked together or in a row
- b<sub>1</sub> Distance between cables/cable trays and the upper seal edge
- b<sub>2</sub> Distance between cables/cable trays and the side seal edge
- b<sub>3</sub> Distance between cables/cable tray and the lower seal edge
- b<sub>4</sub> Distance between metal pipes and all seal edges
- b<sub>5</sub> Distance between plastic pipes and all seal edges

#### Service support construction

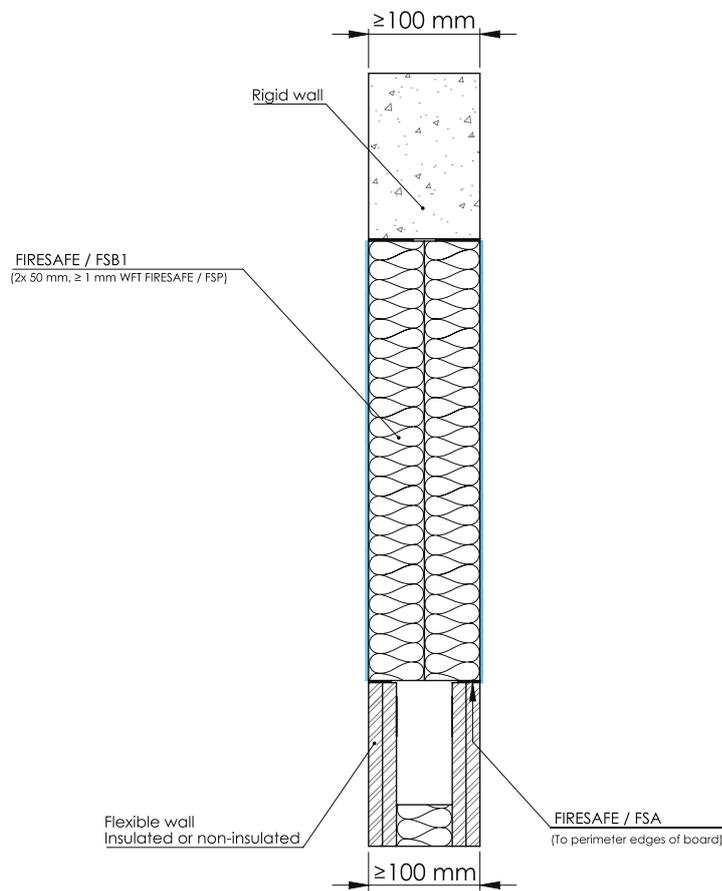
First support for all services at 450 mm, except cable trays at 250 mm.

**C.1.2 Wall constructions - Maximum seal dimensions flexible or rigid wall**

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



Position seal:  
right, left or anywhere  
in between

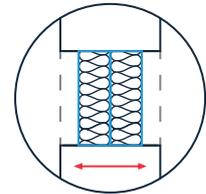


Drawing: PBFw.E-BS-MFB1.2.10

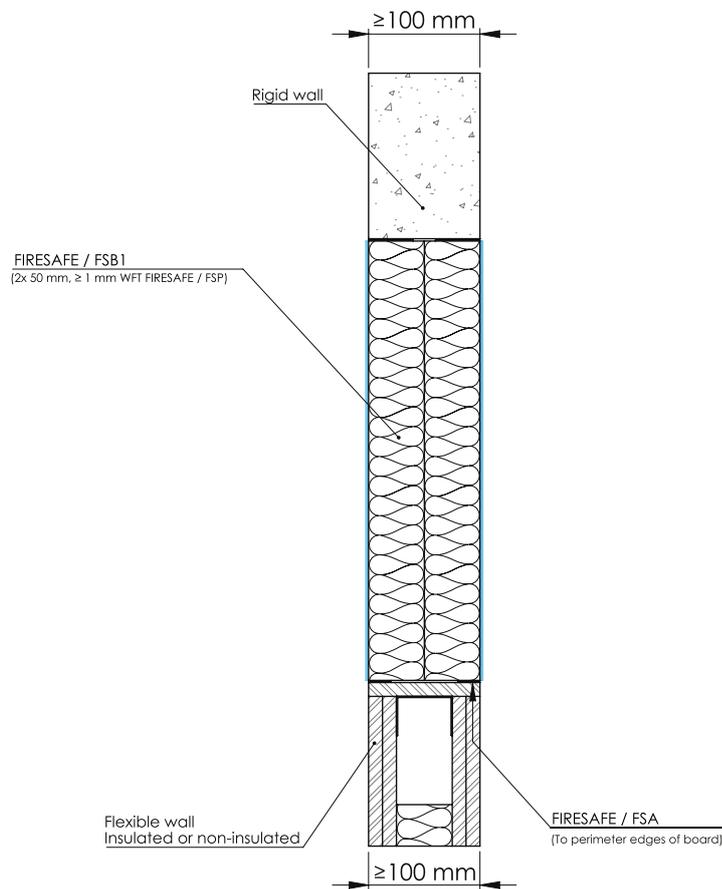
| Services  | Classification     |
|---|--------------------|
| Maximum seal size 1500 x 2500 mm (width x height or height x width)<br>With a maximum surface of 3 m <sup>2</sup> | <b>EI 60</b>       |
| Maximum circular seal size Ø 1954 mm  |                    |
| Maximum seal size 1200 x 1200 mm<br>With a maximum surface of 1.44 m <sup>2</sup>                                 | <b>EI 60, E 90</b> |
| Maximum circular seal size Ø 1354 mm  |                    |
| Maximum seal size 625 x 475 mm (w x h)<br>With a maximum surface of 0.24 m <sup>2</sup>                           | <b>EI 120</b>      |
| Maximum circular seal size Ø 550 mm   |                    |

**C.1.2 Wall constructions - Maximum seal dimensions flexible or rigid wall**

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



Position seal:  
right, left or anywhere  
in between



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

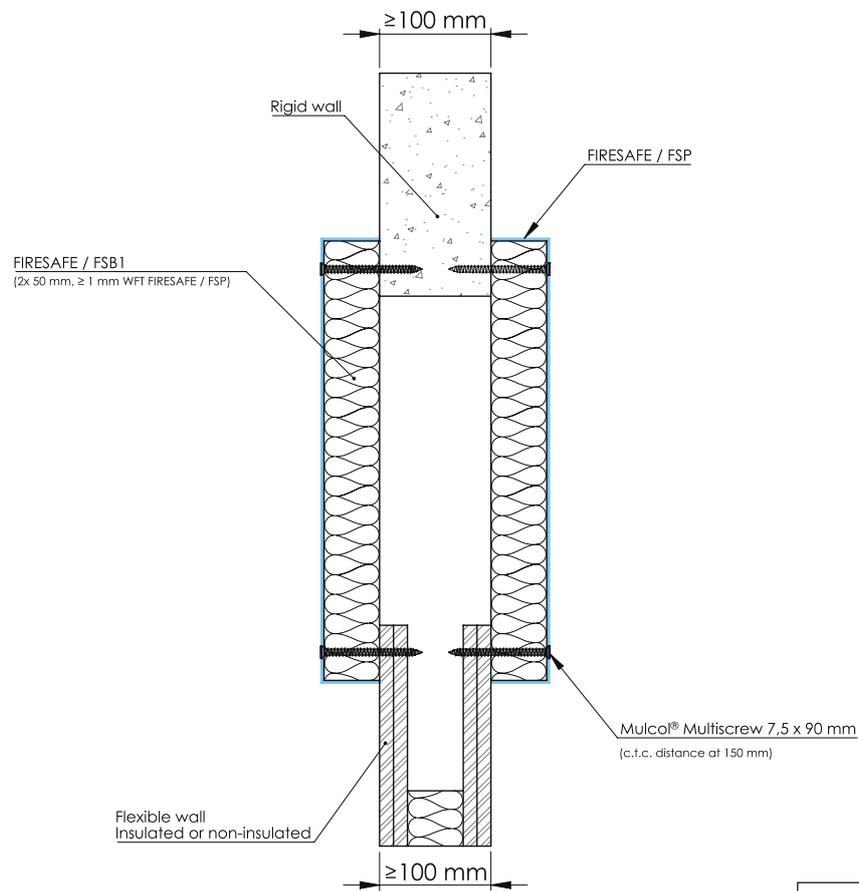
| Services   | Classification |
|--|----------------|
| Maximum seal size 1500 x 2500 mm (width x height or height x width)<br>With a maximum surface of 3 m <sup>2</sup>    | EI 120         |
| Maximum circular seal size Ø 1954 mm   |                |
| Maximum seal size 1200 x 2000 mm (width x height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

**C.1.2**

**Wall constructions - Maximum seal dimensions flexible or rigid wall**

**C.1.2.3**

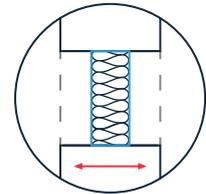
**FIRESAFE / FSB1 - 2x 50 mm - Pattress**



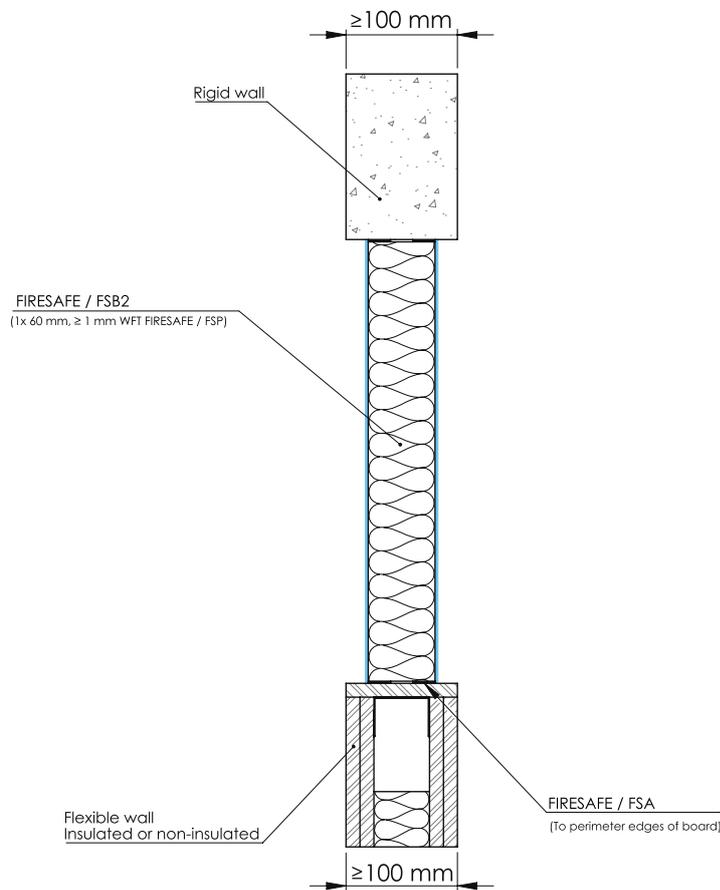
| Services  | Classification |
|---|----------------|
| Maximum seal size 750 x 1250 mm (width x height or height x width)<br>With a maximum surface of 0.75 m <sup>2</sup> | <b>EI 120</b>  |
| Maximum circular seal size Ø 1093 mm  |                |

**C.1.2 Wall constructions - Maximum seal dimensions flexible or rigid wall**

**C.1.2.4 FIRESAFE / FSB2 - 1x 60 mm with aperture framing**



Position seal:  
right, left or anywhere  
in between

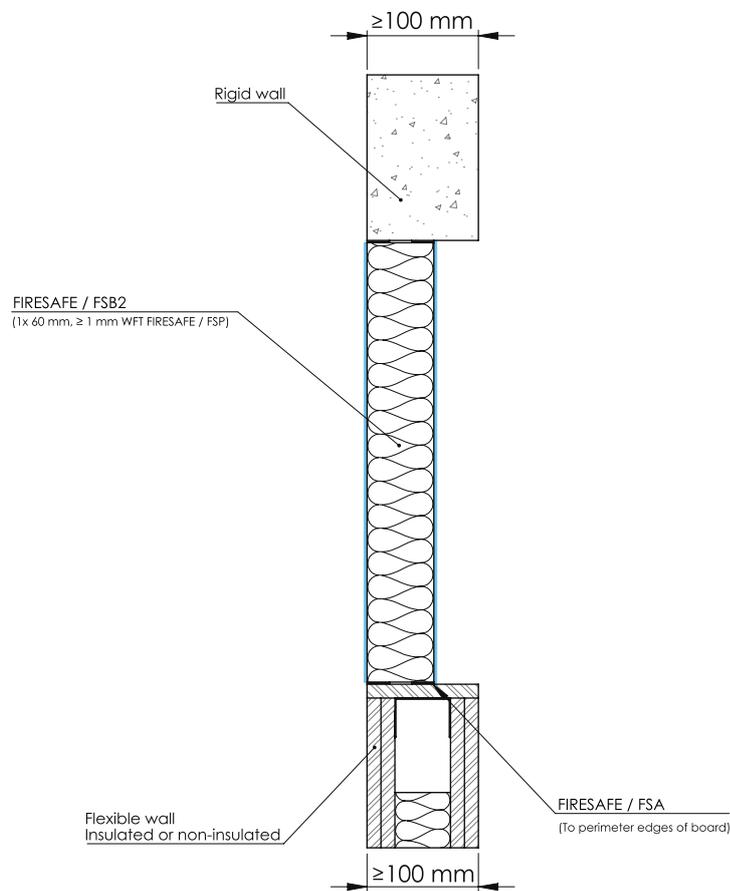


Drawing: PBfw.E-BS-MFB2.1.10

| Services  | Classification     |
|---|--------------------|
| Maximum seal size 1500 x 2500 mm (width x height or height x width)<br>With a maximum surface of 3.0 m <sup>2</sup> | <b>EI 60</b>       |
| Maximum circular seal size Ø 1954 mm  |                    |
| Maximum seal size 1200 x 1200 mm<br>With a maximum surface of 1.44 m <sup>2</sup>                                   | <b>EI 60, E 90</b> |
| Maximum circular seal size Ø 1354 mm  |                    |
| Maximum seal size 563 x 525 mm (width x height or height x width)<br>With a maximum surface of 0.24 m <sup>2</sup>  | <b>EI 90</b>       |
| Maximum circular seal size Ø 548 mm   |                    |
| Maximum seal size 450 x 420 mm (width x height or height x width)<br>With a maximum surface of 0.19 m <sup>2</sup>  | <b>EI 120</b>      |
| Maximum circular seal size Ø 491 mm   |                    |

**C.1.2 Wall constructions - Maximum seal dimensions flexible or rigid wall**

**C.1.2.5 FIRESAFE / FSB2 - 1x 60 mm with aperture framing**



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

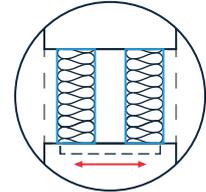
| Services  | Classification     |
|---|--------------------|
| Maximum seal size 1500 x 2500 mm (width x height or height x width)<br>With a maximum surface of 3.0 m <sup>2</sup> | <b>EI 60</b>       |
| Maximum circular seal size Ø 1954 mm  |                    |
| Maximum seal size 1200 x 1200 mm<br>With a maximum surface of 1.44 m <sup>2</sup>                                   | <b>EI 60, E 90</b> |
| Maximum circular seal size Ø 1354 mm  |                    |
| Maximum seal size 563 x 525 mm (width x height or height x width)<br>With a maximum surface of 0.24 m <sup>2</sup>  | <b>EI 90</b>       |
| Maximum circular seal size Ø 548 mm   |                    |
| Maximum seal size 450 x 420 mm (width x height or height x width)<br>With a maximum surface of 0.19 m <sup>2</sup>  | <b>EI 120</b>      |
| Maximum circular seal size Ø 491 mm   |                    |

**C.1.3**

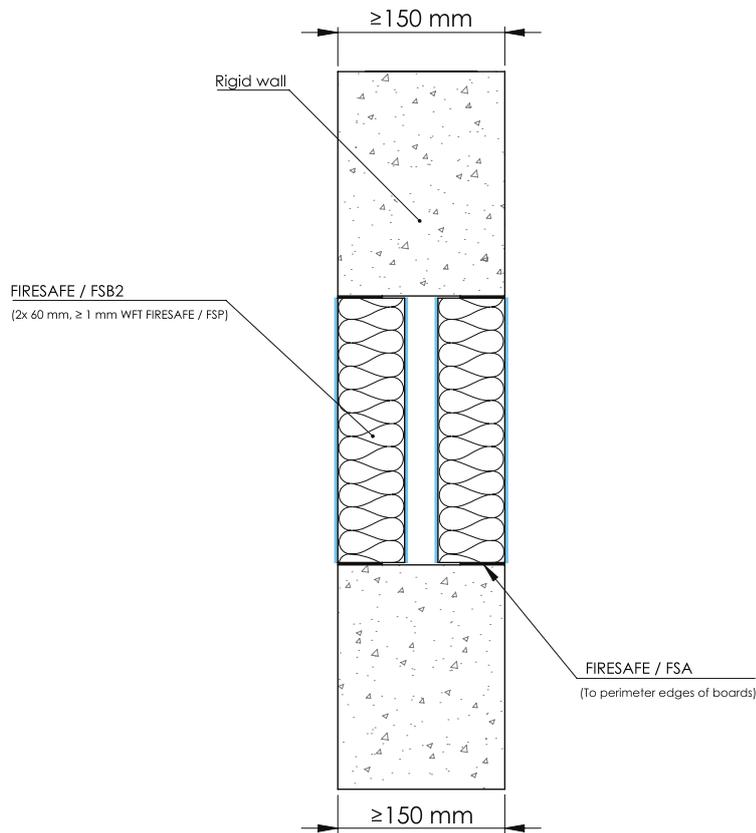
**Wall constructions - Maximum seal dimensions rigid wall**

**C.1.3.1**

**FIRESAFE / FSB2 - 2x 60 mm with cavity ≤ 30 mm**



Position seal:  
right, left or any in between

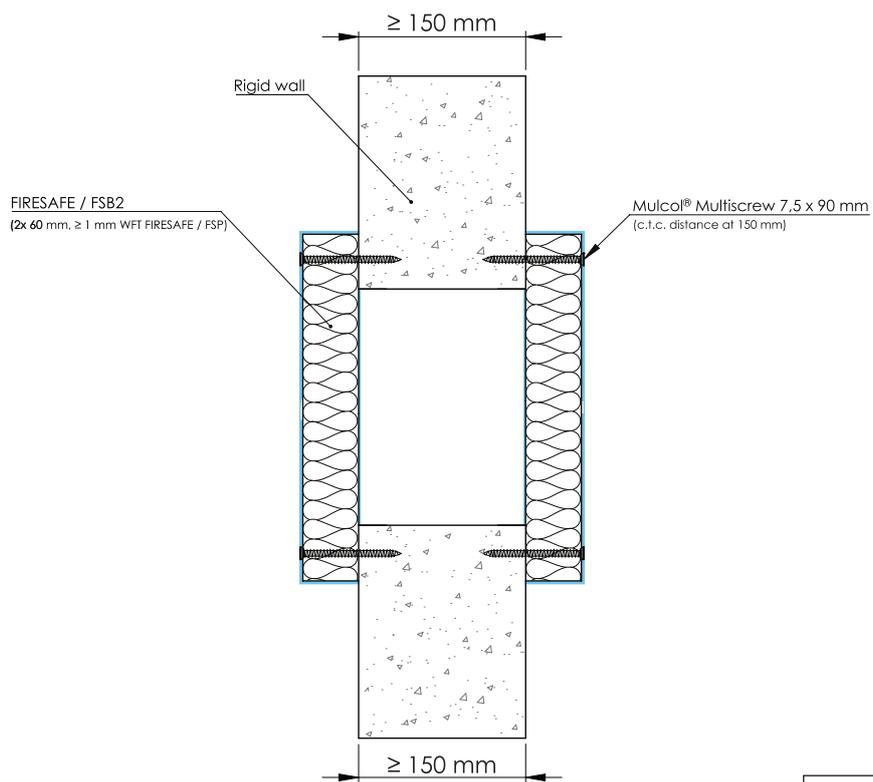


Drawing: RW150.E-BS-MFB2.2.10

| Services   | Classification |
|--|----------------|
| Maximum seal size 1500 x 1500 mm<br>With a maximum surface of 1.8 m <sup>2</sup> | <b>EI 240</b>  |
| Maximum circular seal size Ø 1354 mm   |                |

**C.1.3 Wall constructions - Maximum seal dimensions rigid wall**

**C.1.3.2 FIRESAFE / FSB2 - 2x 60 mm - Pattress fixed to wall**

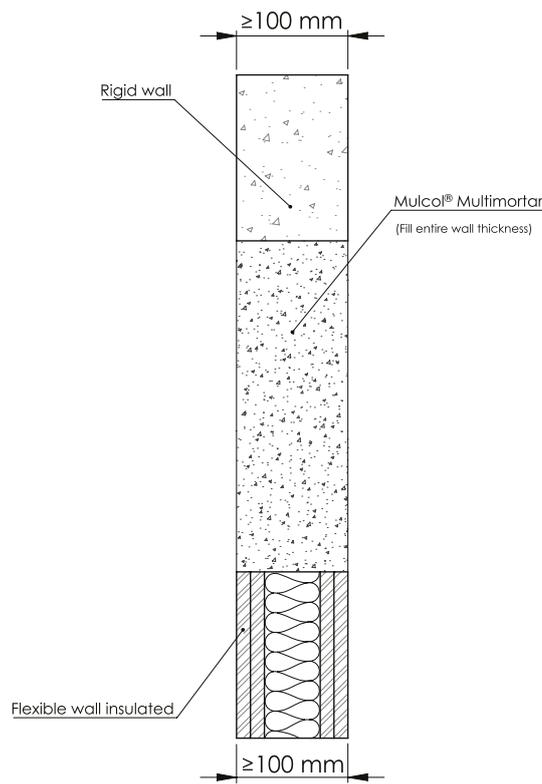


Drawing: PBPrw150.E-BS-MFB2.2.10

| Services   | Classification |
|--|----------------|
| Maximum seal size 750 x 600 mm (width x height or height x width)<br>With a maximum surface of 0.45 m <sup>2</sup> | <b>EI 240</b>  |
| Maximum circular seal size Ø 757 mm  |                |

**C.1.4 Wall constructions - Maximum seal dimensions flexible or rigid wall**

**C.1.4.1 Multimortar -  $\geq 100$  mm**

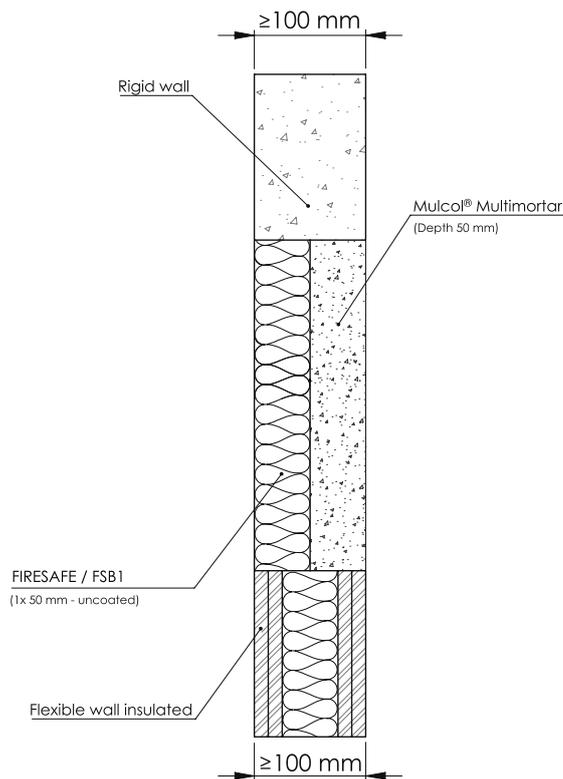


Drawing: FW.E-BS-MM1.2.10

| Services  | Classification |
|---|----------------|
| Maximum seal size 1500 x 2500 mm (width x height or height x width)<br>With a maximum surface of 3 m <sup>2</sup>   | <b>EI 120</b>  |
| Maximum circular seal size $\varnothing$ 1954 mm  |                |
| Maximum seal size 1200 x 2000 mm (width x height or height x width)<br>With a maximum surface of 2.4 m <sup>2</sup> | <b>EI 180</b>  |
| Maximum circular seal size $\varnothing$ 1748 mm  |                |

**C.1.4 Wall constructions - Maximum seal dimensions flexible or rigid wall**

**C.1.4.2 Multimortar + FIRESAFE / FSB system -  $\geq 100$  mm**

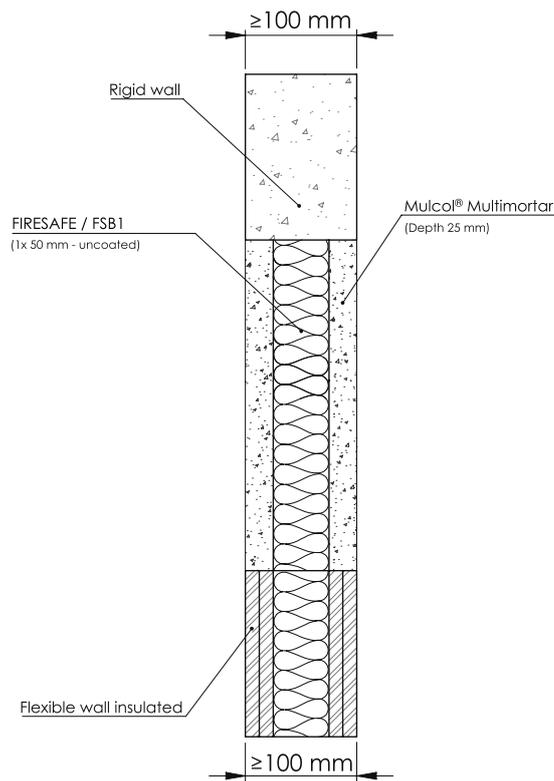


Drawing: FW.E-BS-MM2.5.10

| Services   | Classification     |
|--|--------------------|
| Maximum seal size 1500 x 2500 mm (width x height or height x width)<br>With a maximum surface of 3 m <sup>2</sup>    | <b>EI 60</b>       |
| Maximum circular seal size Ø 1954 mm   |                    |
| Maximum seal size 1200 x 1200 mm (width x height or height x width)<br>With a maximum surface of 1.44 m <sup>2</sup> | <b>EI 60, E 90</b> |
| Maximum circular seal size Ø 1354 mm   |                    |
| Maximum seal size 625 x 750 mm (width x height or height x width)<br>With a maximum surface of 0.38 m <sup>2</sup>   | <b>EI 120</b>      |
| Maximum circular seal size Ø 691 mm  |                    |

**C.1.4 Wall constructions - Maximum seal dimensions flexible or rigid wall**

**C.1.4.3 Multimortar 25 mm + FIRESAFE / FSB + Multimortar 25 mm -  $\geq 100$  mm**



Drawing: FW.E-BS-MM3.4.10

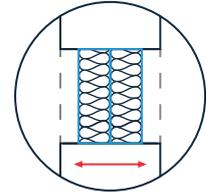
| Services   | Classification     |
|--|--------------------|
| Maximum seal size 1500 x 2500 mm (width x height or height x width)<br>With a maximum surface of 3 m <sup>2</sup>    | <b>EI 60</b>       |
| Maximum circular seal size Ø 1954 mm   |                    |
| Maximum seal size 1200 x 1200 mm (width x height or height x width)<br>With a maximum surface of 1.44 m <sup>2</sup> | <b>EI 60, E 90</b> |
| Maximum circular seal size Ø 1354 mm   |                    |
| Maximum seal size 625 x 750 mm (width x height or height x width)<br>With a maximum surface of 0.38 m <sup>2</sup>   | <b>EI 120</b>      |
| Maximum circular seal size Ø 691 mm  |                    |

**C.1.5**

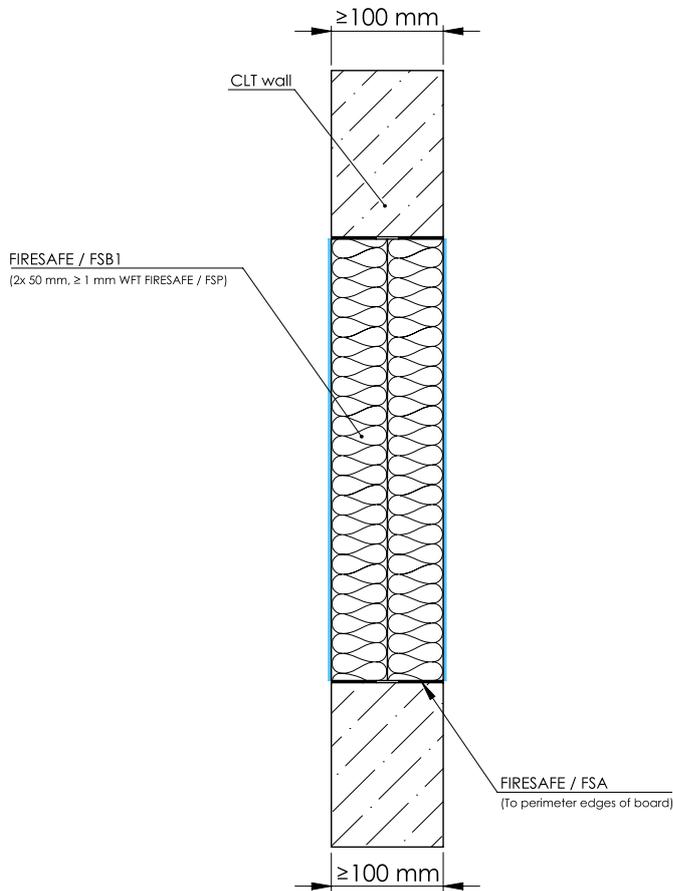
**Wall constructions - Maximum seal dimensions CLT wall**

**C.1.5.1**

**FIRESAFE / FSB1 - 2x 50 mm no aperture framing**



Position seal:  
right, left or anywhere  
in between

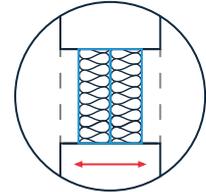


Drawing: WCLT.E-BS-MFB1.2.10

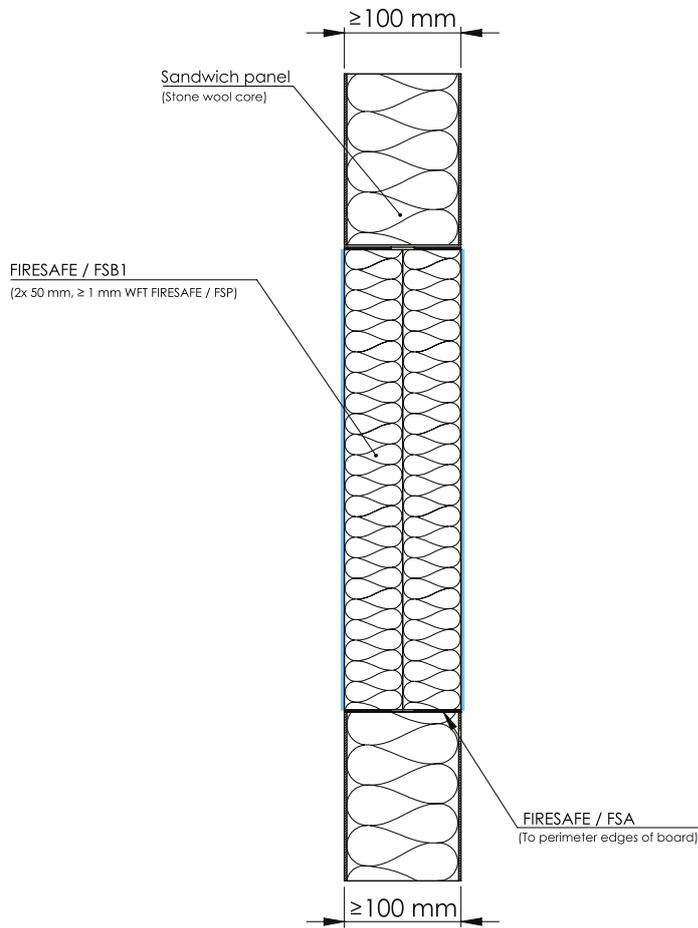
| Services  | Classification |
|---|----------------|
| Maximum seal size 500 x 500 mm<br>With a maximum surface of 0.25 m <sup>2</sup> | <b>EI 90</b>   |
| Maximum circular seal size Ø 564 mm   |                |

**C.1.6 Wall constructions - Maximum seal dimensions Sandwich panel**

**C.1.6.1 Maximum seal dimensions - FIRESAFE / FSB1 - 2x 50 mm no aperture framing**



Position seal:  
right, left or anywhere  
in between

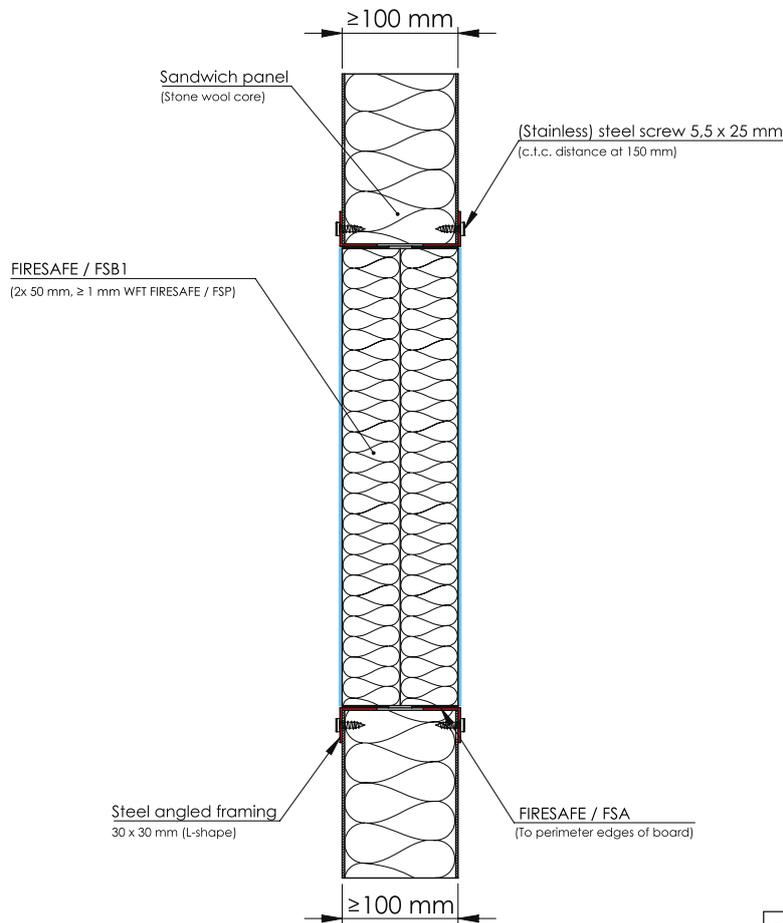
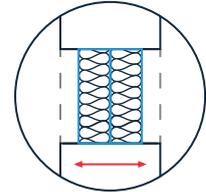


Drawing: SW.E-BS\_B-MFB1.2.10

| Services  | Classification |
|---|----------------|
| Maximum seal size 500 x 600 mm (width x height or height x width)<br>With a maximum surface of 0.3 m <sup>2</sup> | <b>EI 90</b>   |
| Maximum circular seal size Ø 618 mm   |                |

**C.1.6 Wall constructions - Maximum seal dimensions Sandwich panel**

**C.1.6.2 Maximum seal dimensions - FIRESAFE / FSB1 - 2x 50 mm with aperture framing**

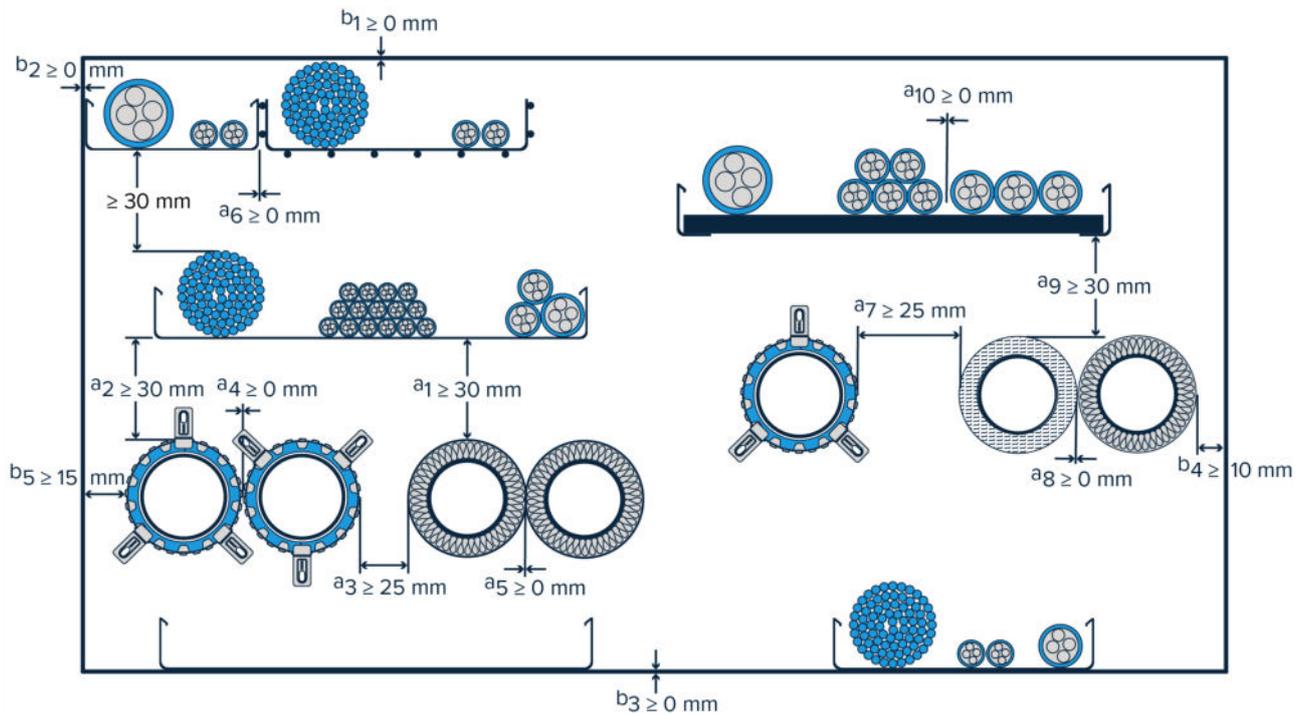


Drawing: SW,E-BS-MFB1.2.10

| Services  | Classification |
|---|----------------|
| Maximum seal size 1200 x 1000 mm (width x height or height x width)<br>With a maximum surface of 1.2 m <sup>2</sup> | <b>EI 120</b>  |
| Maximum circular seal size Ø 1236 mm  |                |

## C.2 Rigid floor - General

### C.2.1 Mutual distances & distance to first support



#### Mutual distances Mixed Penetration Seal

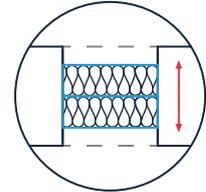
- $a_1$  Distance between cables/cable trays and metal pipes
- $a_2$  Distance between cables/cable trays and plastic pipes
- $a_3$  Distance between metal pipes and plastic pipes
- $a_4$  Distance between plastic pipes
- $a_5$  Distance between metal pipes with non-combustible insulation
- $a_6$  Distance 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

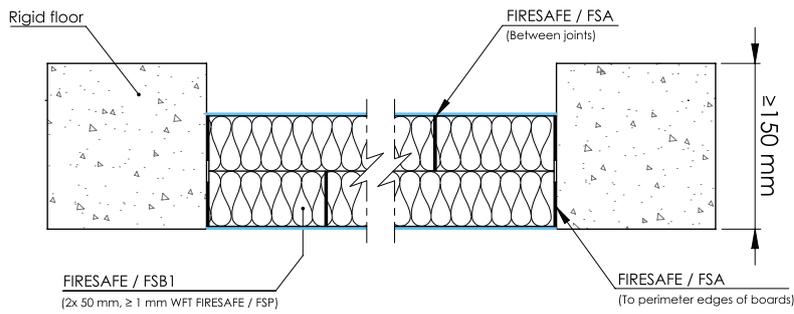
First support for all services at 450 mm, except cable trays at 250 mm.

**C.2.2 Rigid floor - FIRESAFE / FSP - Maximum seal dimensions**

**C.2.2.1 FIRESAFE / FSB1 - 2x 50 mm no cavity**



Position seal:  
top, bottom or anywhere  
in between

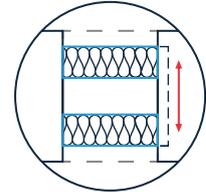


Drawing: PBrf.E-BS-MFB1.2.10

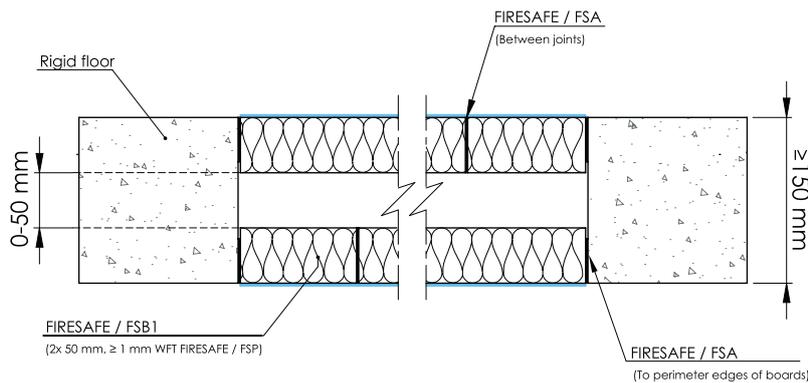
| Services  | Classification      |
|---|---------------------|
| Maximum seal size 1200 x 1200 mm<br>Maximum seal size 9000 x 900 mm   | <b>EI 90, E 120</b> |
| Maximum circular seal size Ø 1354 mm                                  |                     |
| Maximum seal size 600 x 400 mm<br>Maximum circular seal size Ø 553 mm | <b>EI 120</b>       |
| Maximum seal size 450 x 450 mm  |                     |
| Maximum circular seal size Ø 508 mm                                   | <b>EI 240</b>       |

**C.2.2 Rigid floor - FIRESAFE / FSP - Maximum seal dimensions**

**C.2.2.2 FIRESAFE / FSB1 - 2x 50 mm cavity ≤ 50 mm**



Position seal:  
top, bottom or anywhere  
in between

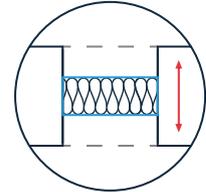


Drawing: PBrf.E-BS-MFB1.2.10.C

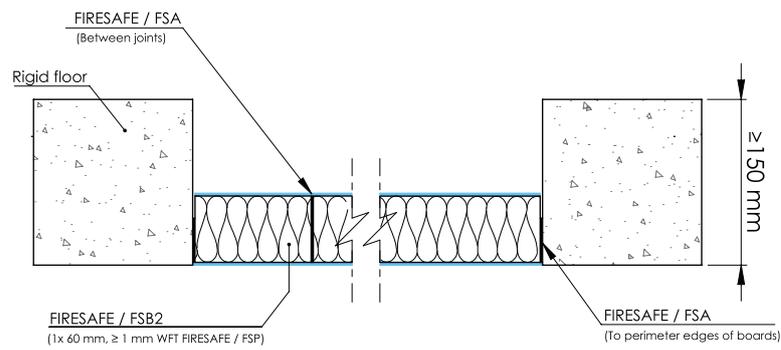
| Services  | Classification      |
|---|---------------------|
| Maximum seal size 1200 x 1200 mm<br>Maximum seal size 9000 x 900 mm   | <b>EI 90, E 120</b> |
| Maximum circular seal size Ø 1354 mm                                  |                     |
| Maximum seal size 1200 x 600 mm<br>Maximum seal size 9000 x 600 mm    | <b>EI 120</b>       |
| Maximum circular seal size Ø 957 mm                                   |                     |
| Maximum seal size 450 x 450 mm<br>Maximum circular seal size Ø 508 mm | <b>EI 240</b>       |

**C.2.2 Rigid floor - FIRESAFE / FSP - Maximum seal dimensions**

**C.2.2.3 FIRESAFE / FSB2 - 1x 60 mm**



Position seal:  
top, bottom or anywhere  
in between

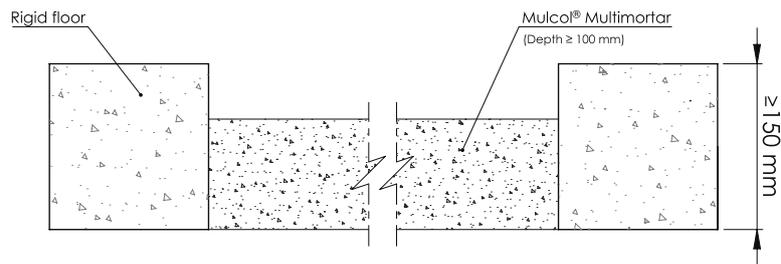


Drawing: PBrf.E-BS-MFB2.1.10

| Services  | Classification      |
|---|---------------------|
| Maximum seal size 1200 x 1200 mm<br>Maximum seal size 9000 x 900 mm | <b>EI 90, E 120</b> |
| Maximum circular seal size Ø 1354 mm                                |                     |

**C.2.3 Rigid floor - Multimortar - Maximum seal dimensions**

**C.2.3.1 Multimortar -  $\geq 100$  mm**

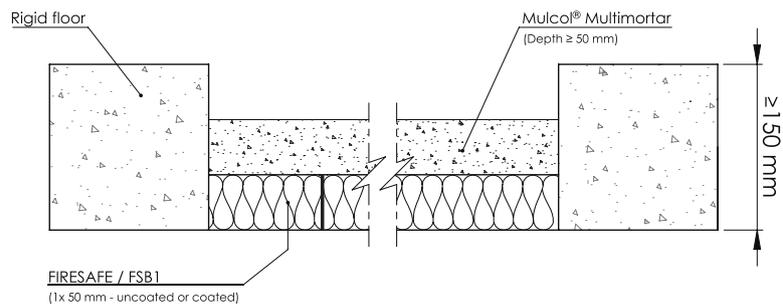


Drawing: RFE-BS-MM1.3.10

| Services   | Classification |
|--|----------------|
| Maximum seal size 1200 x 1000 mm                 | <b>EI 180</b>  |
| Maximum seal size 8800 x 880 mm                  |                |
| Maximum circular seal size $\varnothing$ 1236 mm |                |
| Maximum seal size 1000 x 750 mm                  | <b>EI 240</b>  |
| Maximum circular seal size $\varnothing$ 977 mm  |                |

**C.2.3 Rigid floor - Multimortar - Maximum seal dimensions**

**C.2.3.2 Multimortar + FIRESAFE / FSB system -  $\geq 100$  mm**

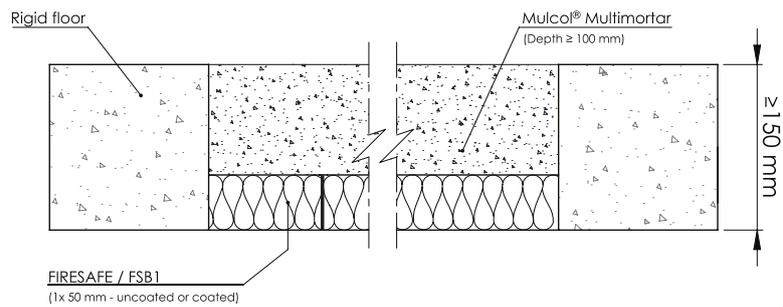


Drawing: RFE-BS-MM2.5.10

| Services  | Classification |
|---|----------------|
| Maximum seal size 1200 x 1000 mm<br>Maximum seal size 8800 x 880 mm | <b>EI 180</b>  |
| Maximum circular seal size $\varnothing$ 1236 mm                    |                |

**C.2.3 Rigid floor - Multimortar - Maximum seal dimensions**

**C.2.3.3 Multimortar + FIRESAFE / FSB system -  $\geq 150$  mm**

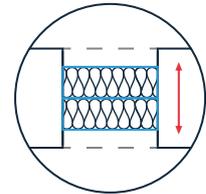


Drawing: RFE-BS-MM2.2.10

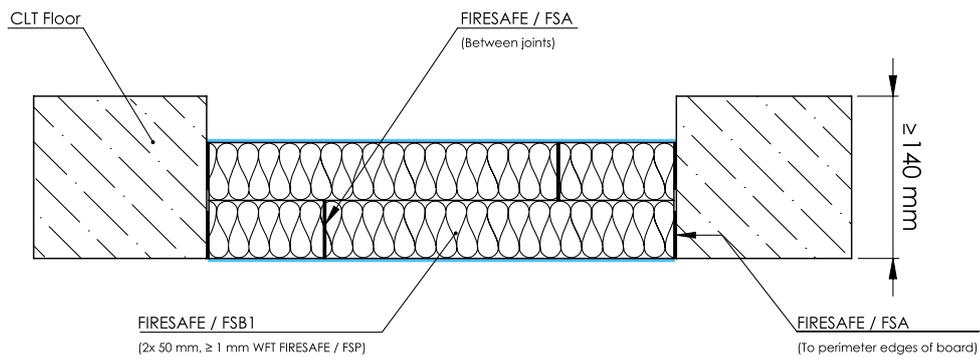
| Services   | Classification |
|--|----------------|
| Maximum seal size 1200 x 1000 mm                 | <b>EI 180</b>  |
| Maximum seal size 8800 x 8800 mm                 |                |
| Maximum circular seal size $\varnothing$ 1236 mm |                |
| Maximum seal size 450 x 450 mm                   | <b>EI 240</b>  |
| Maximum circular seal size $\varnothing$ 508 mm  |                |

**C.2.4 CLT floor - FIRESAFE / FSP - Maximum seal dimensions**

**C.2.4.1 FIRESAFE / FSB1 - 2x 50 mm no cavity**



Position seal:  
top, bottom or anywhere  
in between



Drawing: FCLT.E-BS-MFB1.2.10

| Services                            | Classification |
|-------------------------------------|----------------|
| Maximum seal size 500 x 800 mm      | EI 120         |
| Maximum circular seal size Ø 713 mm |                |

## C.3 Wall configurations

### C.3.1 Allowed wall configurations

The use of FIRESAFE / FSP 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.

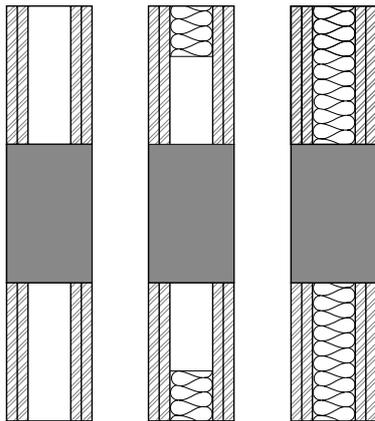
Field of direct application rules for double-sided flexible wall constructions:

- 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/m<sup>3</sup>. In case of hollow brick wall the same rules regarding aperture framing apply as for double-sided flexible walls.

Allowed constructions (not limited by):

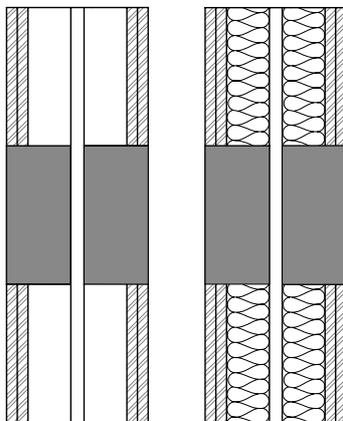
Flexible walls, not insulated, partially removed insulation or fully insulated with any type of insulation.

e.g.:



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

e.g.:



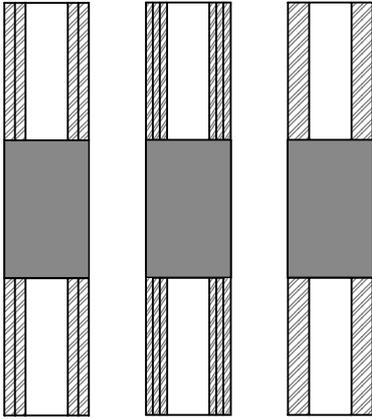
### C.3 Wall configurations

#### 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.:

