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

European Technical Assessment

ETA 17/0837
of 20/07/2018

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: UL International (UK) Ltd

Trade name of the construction product

MULCOL® MULTITHERM BANDAGE

Product family to which the construction product belongs

Fire Stopping and Sealing Product:
• Penetration Seals

Manufacturer

Mulcol International BV
Arnesteinweg 18
4338 PD Middelburg
The Netherlands

Manufacturing plant(s)

L/001

This European Technical Assessment contains

44 pages including 2 Annexes which forms 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

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

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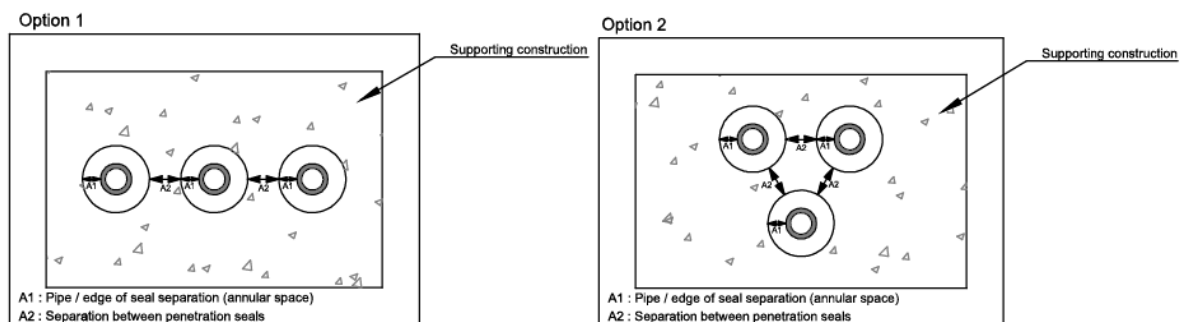
I. SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of the product

- 1) Mulcol® Multitherm Bandage is a pipe wrap device used to form penetration seals where aluminium composite pipes and metal pipes penetrate walls and floors.
- 2) The Mulcol® Multitherm Bandage is supplied as a 3000 x 150 x 3 mm roll, to be cut to size for wrapping around pipes in 1, 2 or 3 layers.
- 3) Services penetrating the Mulcol® Multitherm Bandage are required to be supported at maximum 350 mm from both faces of walls and from the top face of floors.
- 4) The permitted separation between apertures and annular spaces for the services/seals are indicated below (other configurations specific dimensions are given in Annex A and B:

| Filling material (a ₁) | | | Minimum distance between aperture edges, distance A ₂ , |
|---|---|---|--|
| Mulcol® Multisealant GR with Mulcol® Multitherm Backing | Mulcol® Multisealant GR with Mulcol® Stone wool Backing | Mulcol® Multisealant A or Multimastic SP both faces | |
| Annular gap 15 to 75 mm / full depth | Annular gap 15 to 50 mm / 20 mm depth to both faces with 60 mm stone wool | Annular gap ≤ 20 mm / depth ≥ 10 mm | 100 mm |

Visualisation of annular space and separation between penetration seals



- 5) The following products are used in conjunction with Mulcol® Multitherm Bandage to form the penetration seal:

- Mulcol® Multimastic FB1;
- Mulcol® Multisealant A;
- Mulcol® Multisealant GR with backing stone wool $\geq 35 \text{ kg/m}^3$;
- Mulcol® Multimastic SP;
- Mulcol® Multimastic C;
- Mulcol® Multimastic GR;
- Mulcol® Multifoam 2K;
- Mulcol® Multisealant GR with Mulcol® Multitherm Backing;

- 6) Pipe materials referred to in Annex A are as follows:

| Material | Standards |
|---------------------|---------------------|
| Steel | EN 1507 |
| Copper | EN 10255 / EN 12449 |
| Aluminium Composite | EN ISO 15494 |

- 7) The applicant has submitted a written declaration that the product and/or constituents of the product contains no substances which have been classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No. 1272/2008 and listed in the 'indicative list on dangerous substances' of the EGDS – taking into account the installation conditions of the construction product and the release scenarios resulting from there.

In addition to the specific clauses relating to dangerous substances contained in this European Technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

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

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

Detailed information and data is given in Annex A.

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

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

| | |
|-----------------|--|
| Flexible walls: | The wall must have a minimum thickness of 100 mm and comprise steel studs lined on both faces with minimum 2 layers of 12.5 mm thick boards. |
| Rigid walls: | The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 650 kg/m ³ . |
| Rigid floors: | The floor must have a minimum thickness of 150 mm and comprise aerated concrete or concrete with a minimum density of 600±200 kg/m ³ , class G4/600 or heavier. |

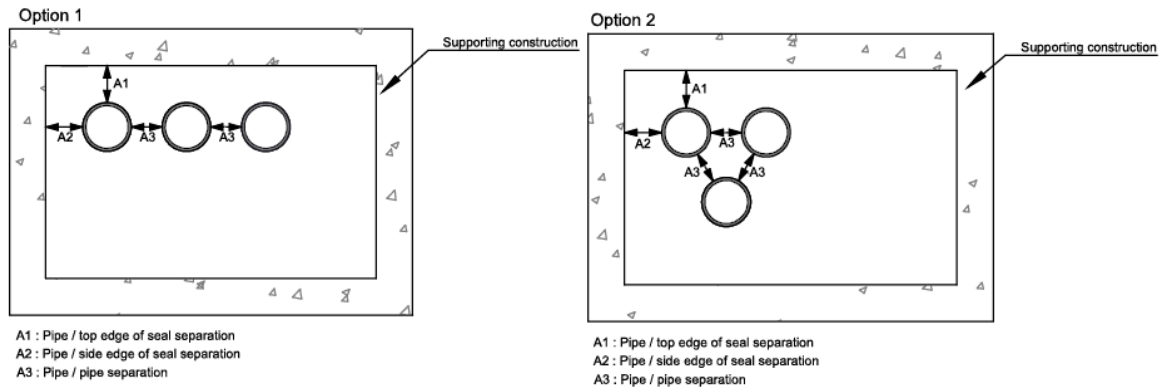
The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period.

- 2) General conditions – Flexible wall
The pipe penetrations can be applied in any type of insulated or non insulated flexible all construction (partition) provided that the following conditions are met. The total thickness of the flexible wall (for example walls with wooden or steel framing) shall be at least 100 mm. The wall shall consist out of in total four board layers with a thickness of 12.5 mm each. A minimum distance of 100 mm to a stud shall be held. When wooden studs are used, at least 100 mm of insulation class A1 or A2 according to EN 13501-2 shall be present between the penetration seal and the stud(s).
- 3) General conditions – Mixed Penetration Seals – Multiple Mulcol® Multitherm Bandage devices with the same or different services, may be incorporated in coated firestop board system Mulcol® Multimastic FB1 subject to the conditions specified in Annex A. The performance of the seal is restricted to the contained service/Mulcol® Multitherm Bandage device with the lowest classification, as given in Annex A.

In the Mulcol® Multimastic FB1 system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A₁ to A₃ according to Figure E.1 of EN 1366-3: 2009, See Figure 2):

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

Figure 2 Figure E.1 of EN 1366-3: 2009



- 4) The system Mulcol® Multitherm Bandage may be used to provide a penetration seal with specific supporting constructions and substrates (for details see Annex A).
- 5) The provisions made in this European Technical Assessment are based on an assumed working life of the Mulcol® Multitherm Bandage of 30 years, provided that the conditions laid down in the manufacturers datasheet and instructions for the packaging/transport/storage/installation/ use/repair are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer, 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 Z₁: intended for use at internal conditions with high humidity, excluding temperatures below 0°C.
- 7) General Conditions – Installation in coated firestop board system – Mulcol® Multimastic FB1 (2x50 mm)

The aperture size in the floor may be up to 1200 mm wide and 2400 mm long and the wall may be up to 2400 mm wide and 1200 mm high. The Mulcol® Multimastic FB1 board system has a total thickness of 100 mm (2 x 50 mm) with a coating Mulcol® Multimastic C. The coating is applied with a thickness 1 mm on the outwards pointing faces of each panel (no coating between the boards). The coating shall also be applied circumferential over the opening of the rock wool with the adjacent construction (overlap minimal 25 mm). The joints between the different board elements and the aperture edge shall be glued together with Mulcol® Multimastic SP. A cavity of maximum 50 mm between the rock wool panels may be present.

For further information regarding the placing instructions and the field of application of the Mulcol® Multimastic FB1 (2 x 50 mm) penetration seal system reference is made to the European Technical Assessment ETA 16/0985 dated January 25, 2017 or ETA 16/0563 dated August 23, 2016.

The system Mulcol® Multitherm Bandage may be used to provide a penetration seal with specific supporting constructions and substrates (for details see Annex A).

8) General Conditions – Installation in Mulcol® Multifoam 2K system.

The aperture size in the floor may be up to 450 mm wide and 450 mm long and in the wall may be up to 450 mm wide and 500 mm wide. The Mulcol® Multifoam 2K system has a minimum total thickness of 144 mm in both walls (via pattress if necessary) and floors.

For further information regarding the placing instructions and the field of application of the Mulcol® Multifoam 2K penetration seal system reference is made to the European Technical Assessment ETA-17/0977.

9) Pipe types

The follow aluminium composite pipe types 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).

10) General conditions for bandage installation

The bandage shall be applied interrupted at the aperture over a distance of 150 mm (1 or 2 layers) on both sides from the point where the pipe emerges out of the wall (LI in accordance with Table 1 of EN 1366-3:2009). One or Two layers of Mulcol® Multitherm Bandage shall be applied continuously in such manner that the end of the wrap is situated at the bottom of the pipe and an overlap of minimal 10 mm is accomplished.

11) Penetrations with an annular gap filled with Mulcol® Multisealant GR or Mulcol® Multifoam 2K you may also use a plastic pipe sleeve.

12) When using the Mulcol® Multitherm Bandage at floors, iron wire should be used in some cases with a thickness of at least 0.6 mm. The iron wire should only be applied to the underside of the floor.

A minimum of 3 iron wires are required per length of 150 mm Multitherm bandage. See Annex B

13) Method of wrapping layers of Mulcol® Multitherm Bandage:

Figure 1 (1x150 mm)

a: Minimum 10 mm overlap

b: Mulcol Multitherm Bandage

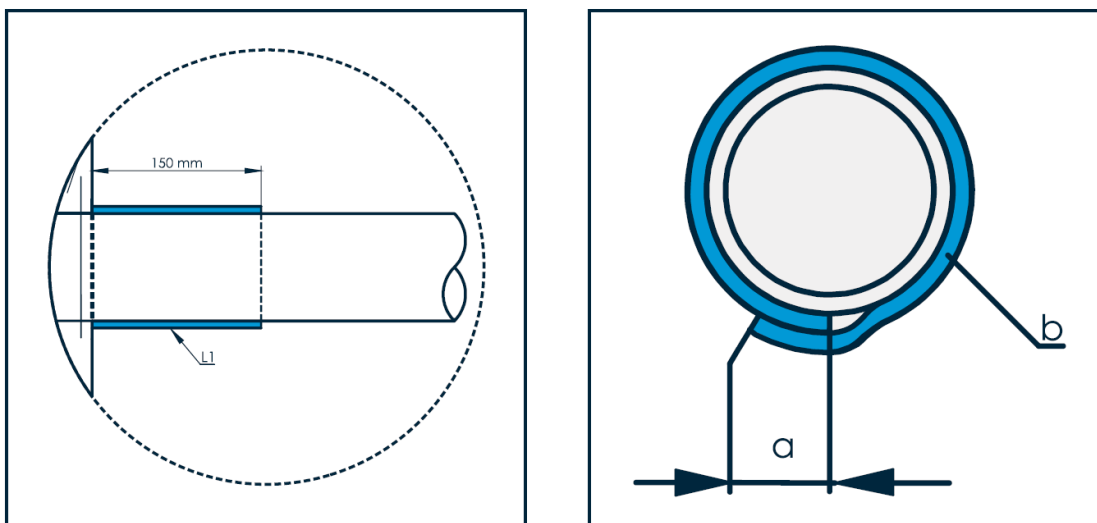


Figure 2 (2x150 mm)
a: Minimum 10 mm overlap
b: Mulcol Multitherm Bandage

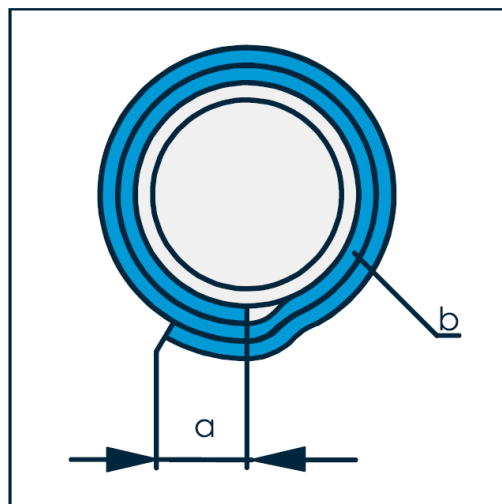
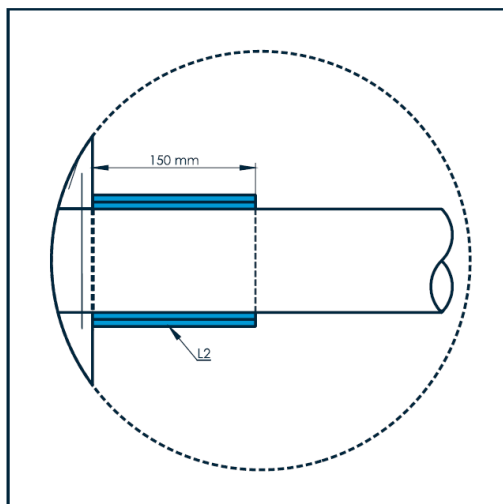


Figure 3 (3x150 mm)
a: Minimum 10 mm overlap
b: Mulcol Multitherm Bandage

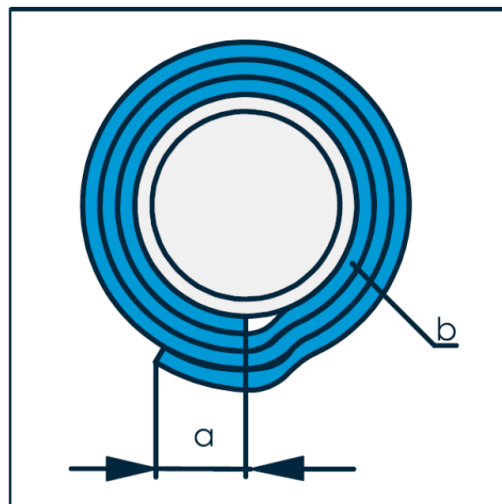
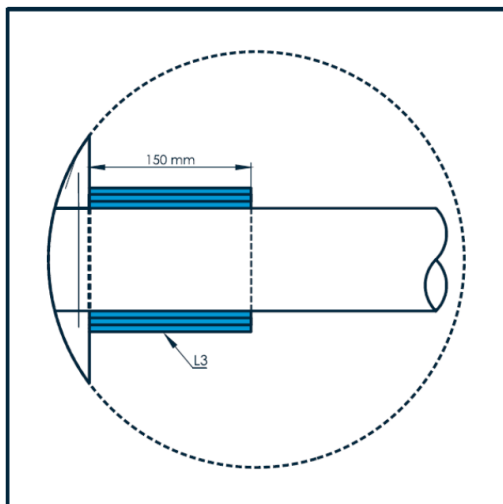
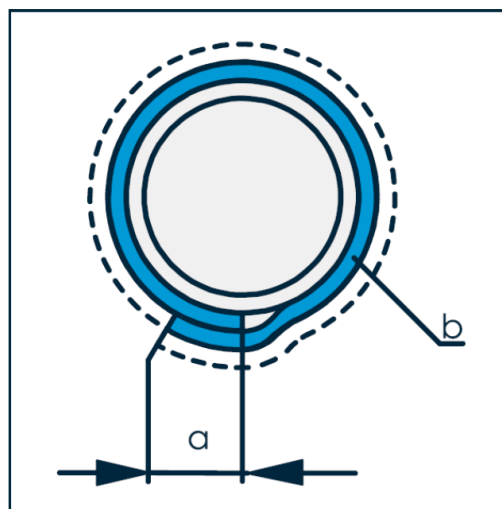
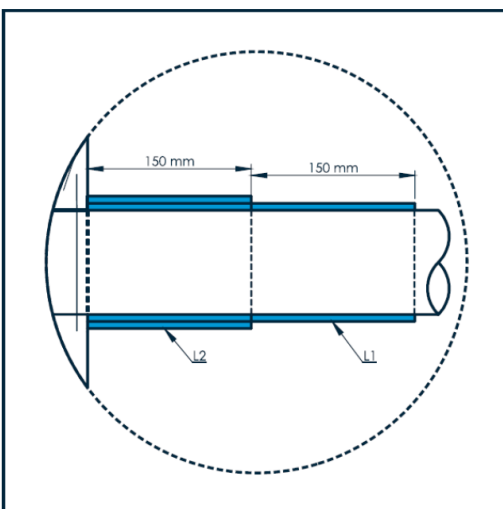


Figure 4 (2x150 mm + 1x150 mm)
a: Minimum 10 mm overlap
b: Mulcol Multitherm Bandage



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

| Product Type: Pipe closure | | Intended use: Penetration Seal |
|--|--|--|
| Assessment method | Essential characteristic | Product performance |
| BWR 2 Safety in case of fire | | |
| EN 13501-1 | Reaction to fire | Class 'E' |
| EN 13501-2 | Resistance to fire | Annex A |
| BWR 3 Hygiene, health and environment | | |
| EN 1026 | Air permeability | No performance determined |
| EAD 350454-00-1104, Annex C | Water permeability | No performance determined |
| Declaration of manufacturer & EN 16516 | Content, emission and/or release of dangerous substances | Use categories: IA1, S/W3 Declaration of manufacturer |
| BWR 4 Safety in use | | |
| EOTA TR 001:2003 | Mechanical resistance and stability | No performance determined |
| EOTA TR 001:2003 | Resistance to impact/movement | |
| EOTA TR 001:2003 | Adhesion | |
| EAD 350454-00-1104, Clause 2.2.9 | Durability | Z ₁ |
| BWR 5 Protection against noise | | |
| EN 10140-1,2,4,5/ EN ISO 717-1 | Airborne sound insulation | No performance determined |
| BWR 6 Energy economy and heat retention | | |
| EN 12664, EN 12667, EN 12939, EN ISO 8990, EN ISO 6946, EN ISO 14683, EN ISO 10211, EN ISO 10456 | Thermal properties | No performance determined |
| EN ISO 12572, EN 12086, EN ISO 10456 | Water vapour permeability | No performance determined |

4 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE (HEREINAFTER AVCP) SYSTEM 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 fire stopping, fire sealing and fire protective products, published in the Official Journal of the European Union (OJEU) L178/52 of 14/07/1999, see <http://eur-lex.europa.eu/JOIndex.do>) of the European Commission¹, as amended, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table(s) applies (apply).

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

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

Tasks of the manufacturer:

Factory production control

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

The manufacturer may only use initial / raw / constituent materials stated in the technical documentation of this European Technical Assessment.

The factory production control shall be in accordance with the Control Plan of 9th August 2017 relating to the European Technical Assessment ETA 17/0837 issued on 20/07/18 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 (UK) Ltd.

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

¹ Official Journal of the European Communities L178/52 of 14/7/1999

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.

(b) Installation instruction:

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

6 Issued on:

20th July 2018

Report by:



C. Johnson
Staff Engineer
Building and Life Safety Technologies

Reviewed by:



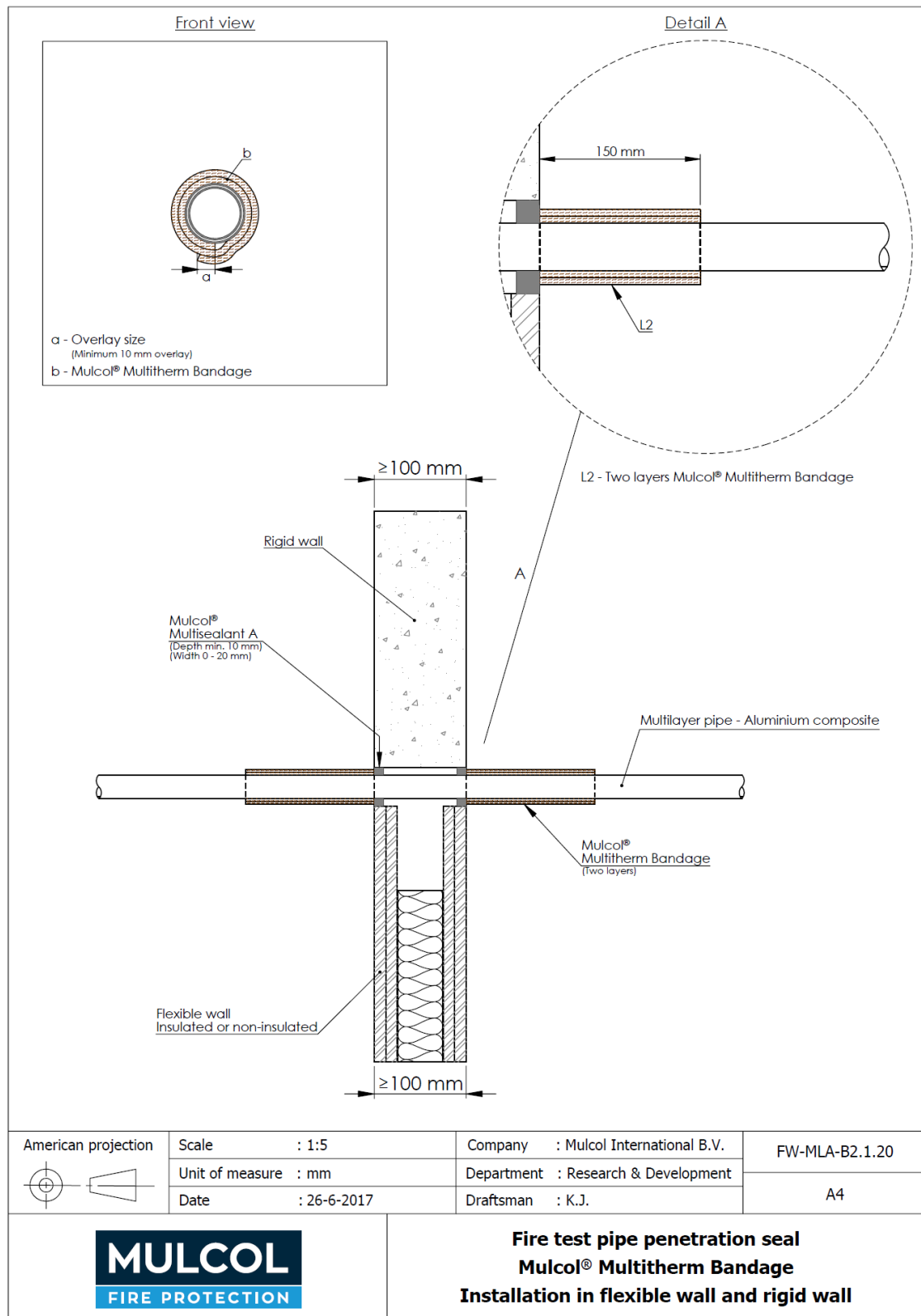
C. W. Miles
Business Manager – Europe & Latin America
Building and Life Safety Technologies

For and on behalf of UL International (UK) Ltd.

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

A.1 Aluminium composite pipes

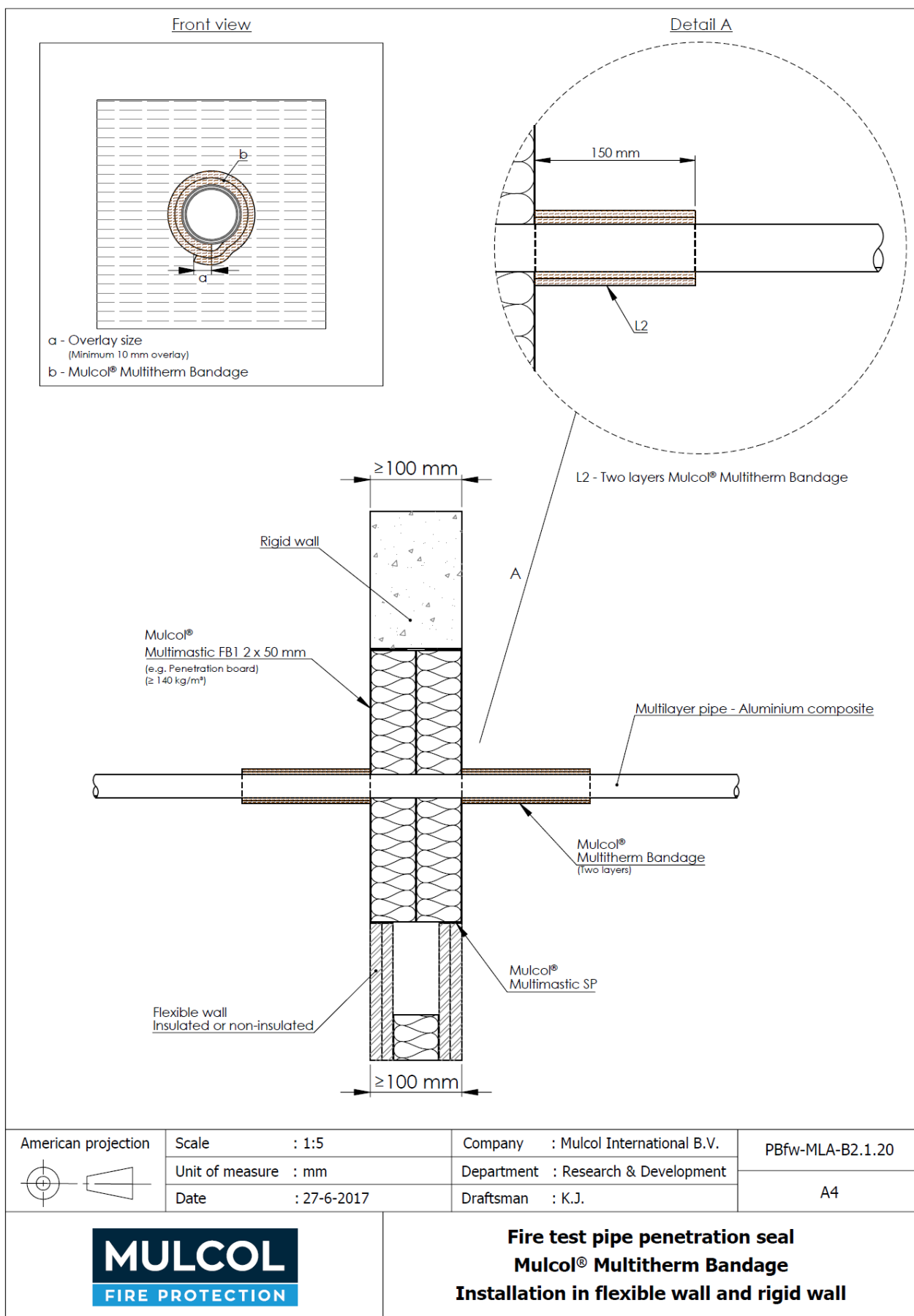
A.1.1 Aluminium composite pipes, with two layers Mulcol® Multitherm Bandage to both sides of the wall (LI 150)



| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 150) | Mulcol® Multimastic SP (both faces) | Classification* |
|---------------------------|--------------------------------|------------------------------|---|--|-------------------|
| Henco PE-Xc/AL/PE-Xc | $\leq 16 / \leq 20$ | 2.0 | two (see fig. 2 according to I.2.13) | Annular gap ≤ 20 mm / depth ≥ 10 mm | EI 120 U/C |
| Uponor PE-Xa Aqua pipe | ≤ 25 | 3.5 | | | |
| Henco PE-Xc/AL/PE-Xc | ≤ 26 | 3.0 | | | |

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

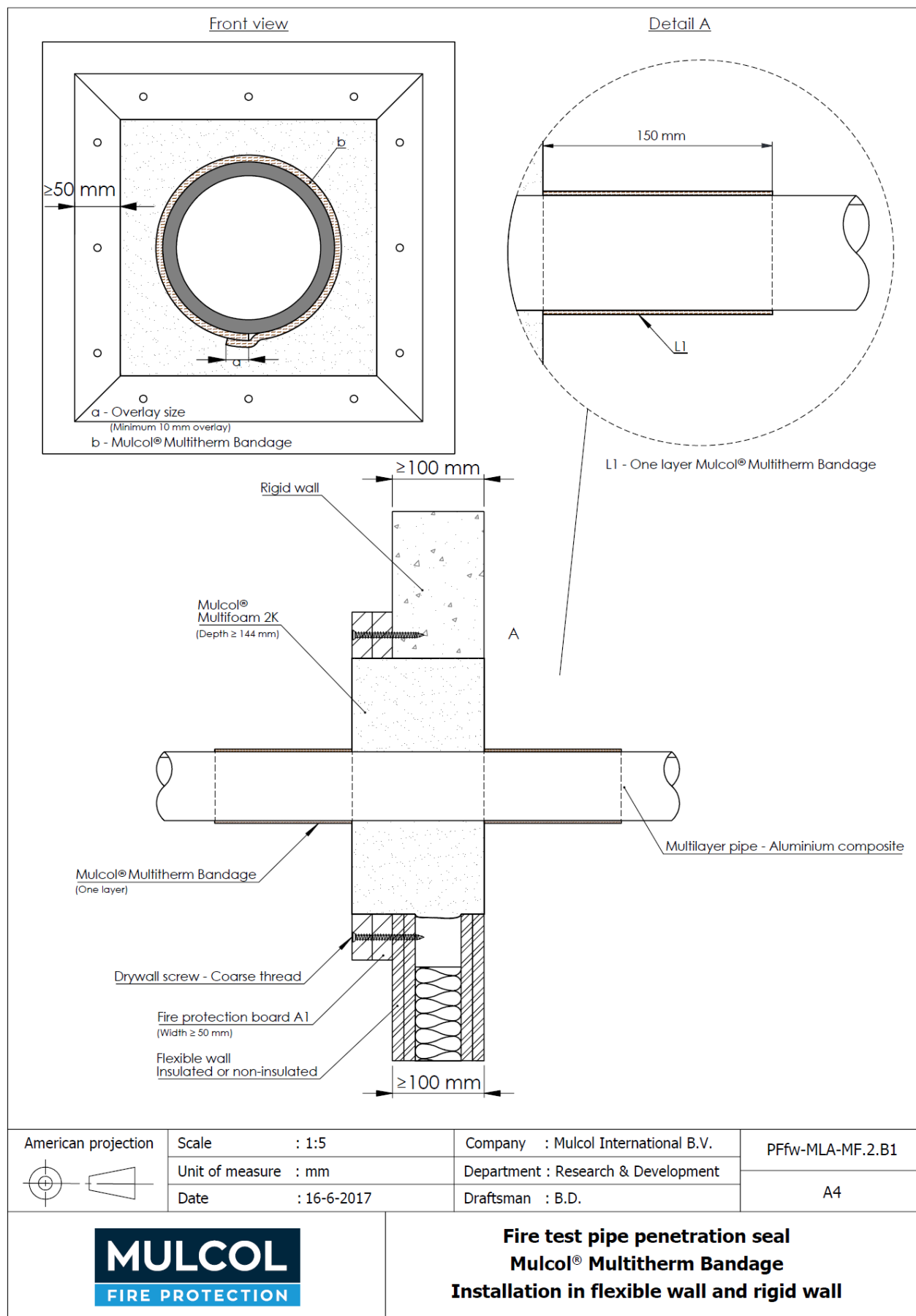
A.1.1.1 Aluminium composite pipes, with two layers Mulcol® Multitherm Bandage to both sides of the wall (LI 150) through Mulcol® Multimastic FB1.



| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 150) | Mulcol® Multimastic SP (both faces) | Classification* |
|---------------------------|--------------------------------|------------------------------|---|--|-------------------|
| Henco PE-Xc/AL/PE-Xc | $\leq 16 / \leq 20$ | 2.0 | two (see fig. 2 according to I.2.13) | Annular gap ≤ 20 mm / depth ≥ 10 mm | EI 120 U/C |
| Uponor PE-Xa Aqua pipe | ≤ 25 | 3.5 | | | |
| Henco PE-Xc/AL/PE-Xc | ≤ 26 | 3.0 | | | |

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

A.1.2 Aluminium composite pipes, with one layer Mulcol® Multitherm Bandage to both sides of the wall (LI 150) through Mulcol® Multifoam 2K.



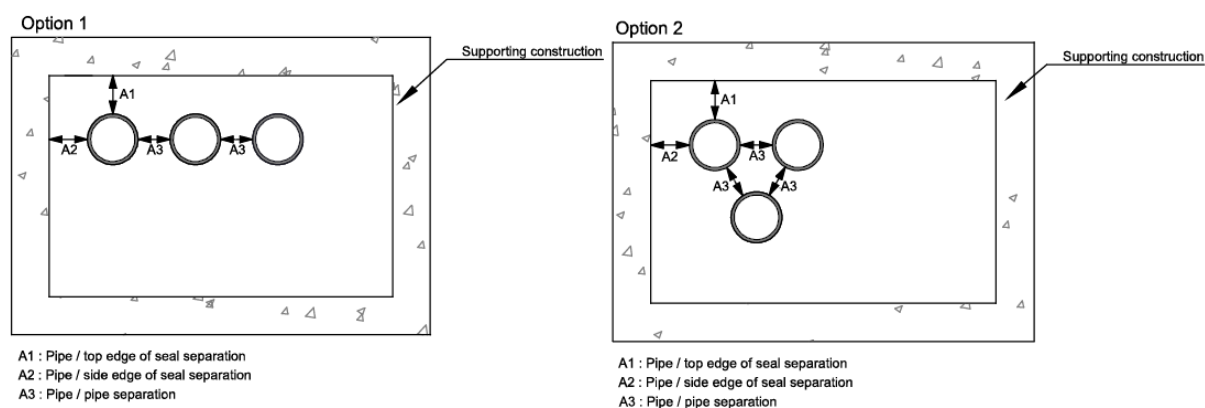
| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 150) | Classification* |
|------------------------|--------------------------|------------------------|--------------------------------------|------------------------|
| Henco PE-Xc/AL/PE-Xc | $\leq 16 / \leq 20$ | 2.0 | one (see fig. 1 according to I.2.13) | EI 120 U/C |
| Uponor PE-Xa Aqua pipe | ≤ 25 | 3.5 | | EI 120 U/C |
| Henco PE-Xc/AL/PE-Xc | $\leq 26 / \leq 32$ | 3.0 | | EI 120 U/C |
| | ≤ 40 | 3.5 | | E 120 U/C EI 90 U/C |
| Uponor PE-RT/AL/PE-RT | ≤ 40 | 4.0 | | E 120 U/C EI 90 U/C |
| Henco PE-Xc/AL/PE-Xc | ≤ 50 | 4.0 | | E 120 U/C EI 90 U/C |
| | ≤ 63 | 4.5 | | E 120 U/C EI 90 U/C |
| | ≤ 75 | 6.0 | | E 120 U/C EI 90 U/C |

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

In the Mulcol® Multifoam 2K penetration seal system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 to A3 according to Figure E.1 of EN 1366-3:2009):

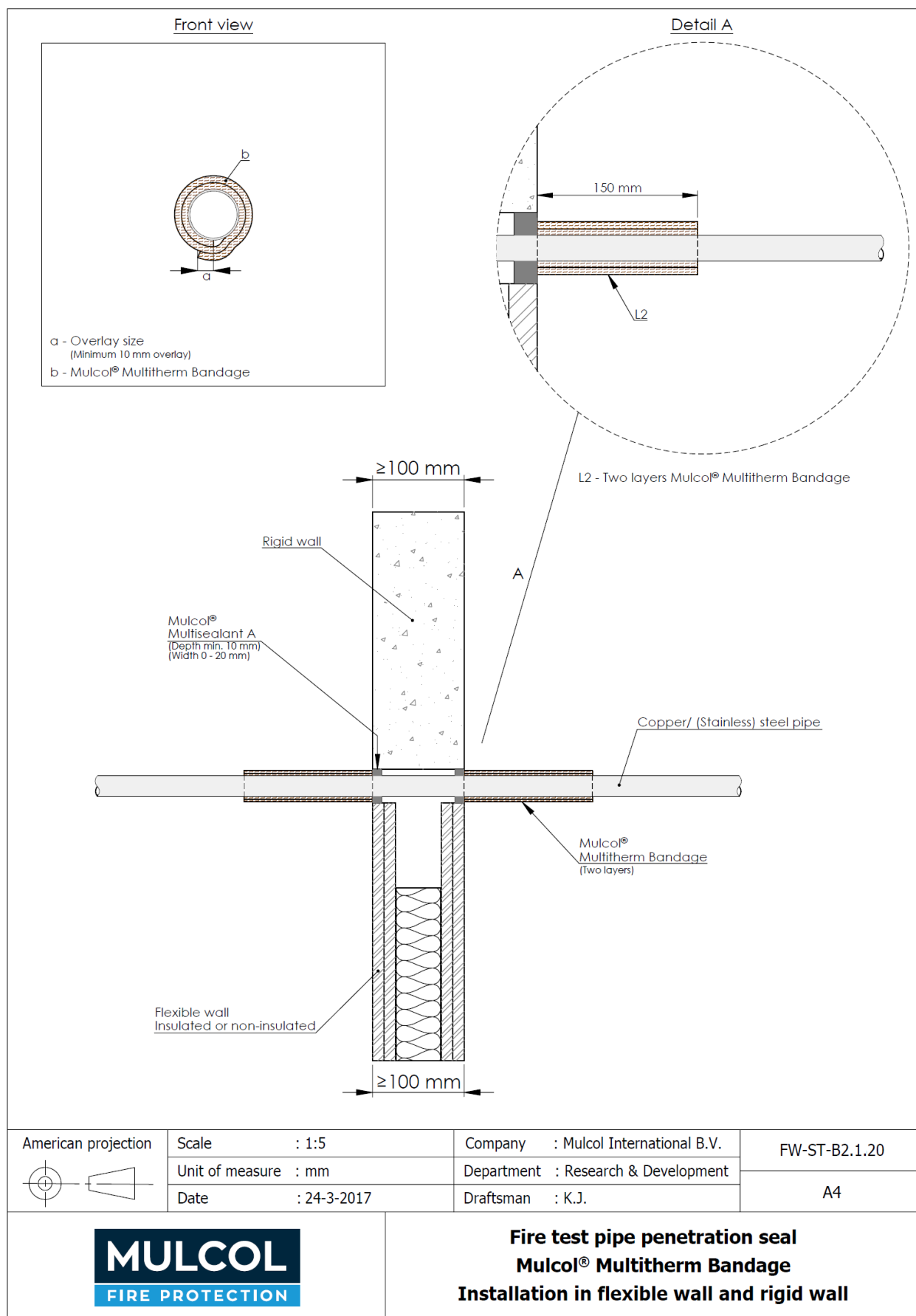
- distance A1 = 30 mm;
- distance A2 = 30 mm;
- distance A3 = 30 mm.

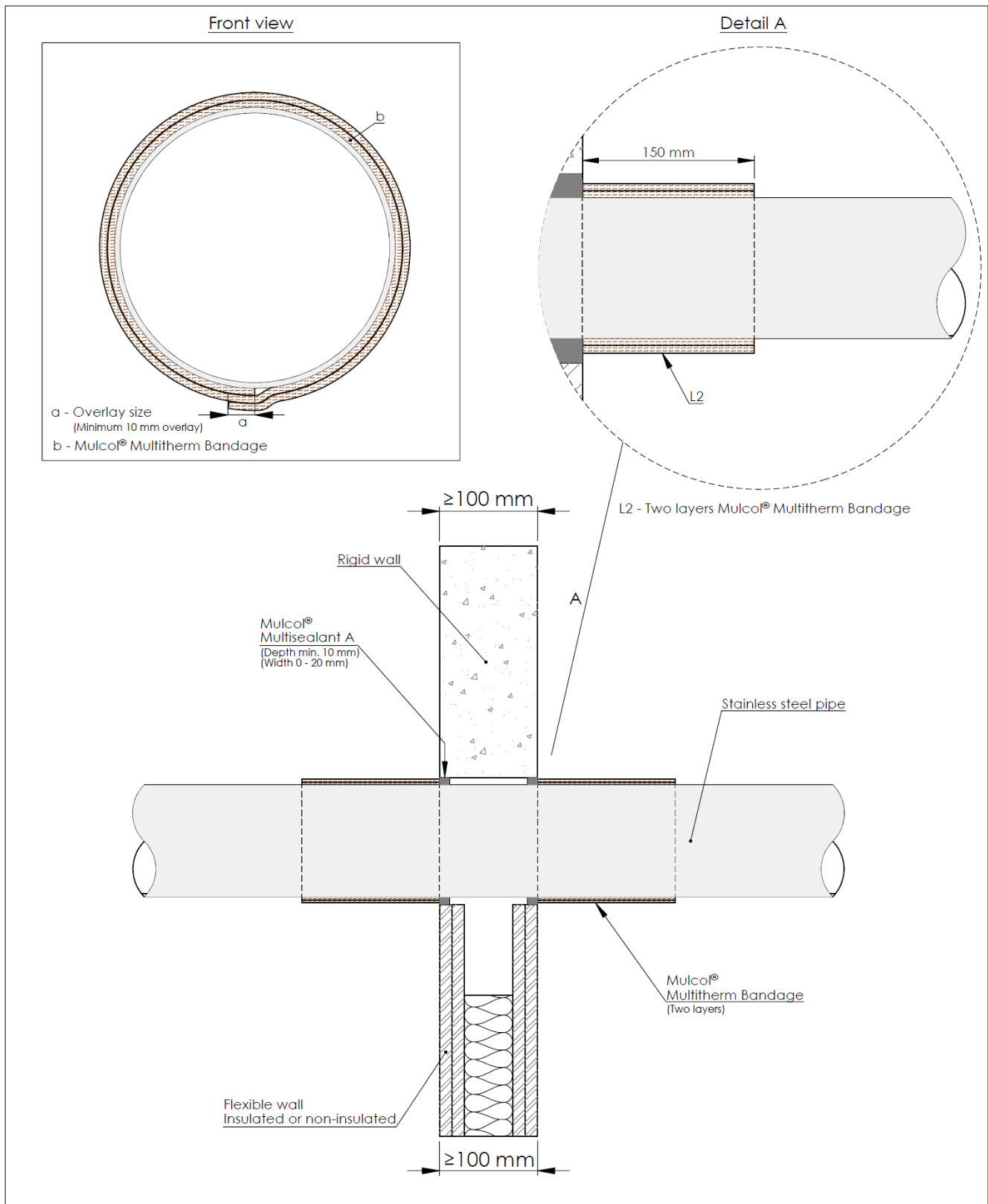
Figure E.1 out of the standard EN 1366-3:2009



A.2 Metal pipes

A.2.1 Metal pipes with two layers Mulcol® Multitherm Bandage to both sides of the wall (LI 150)

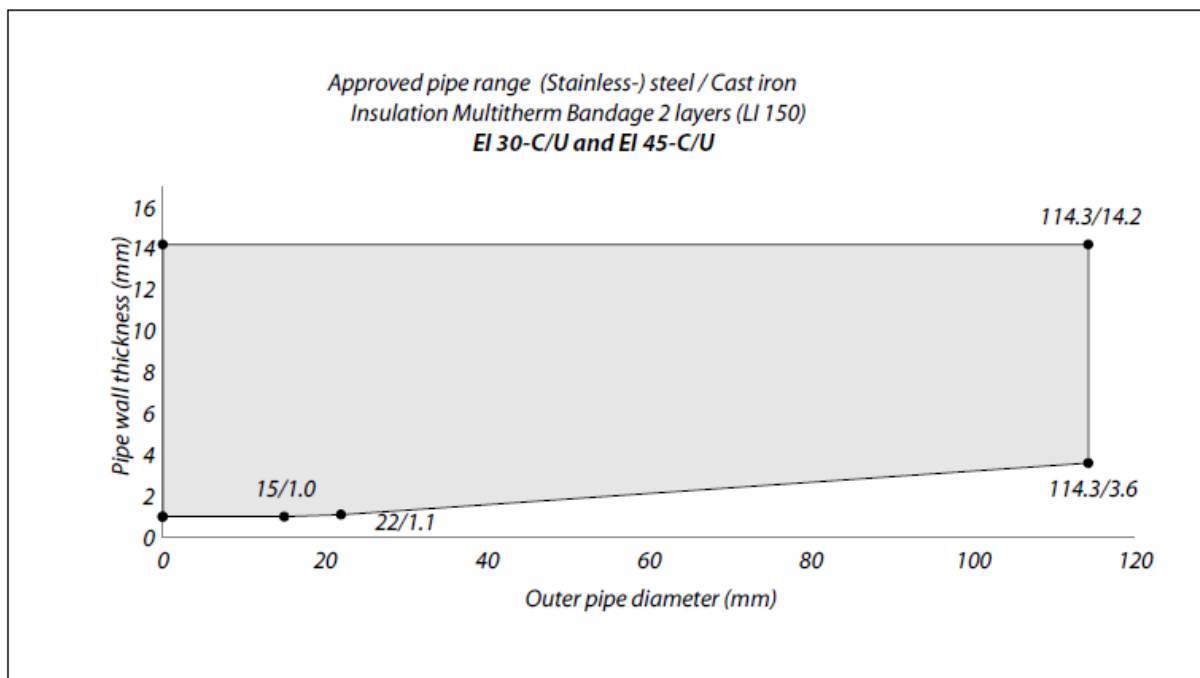
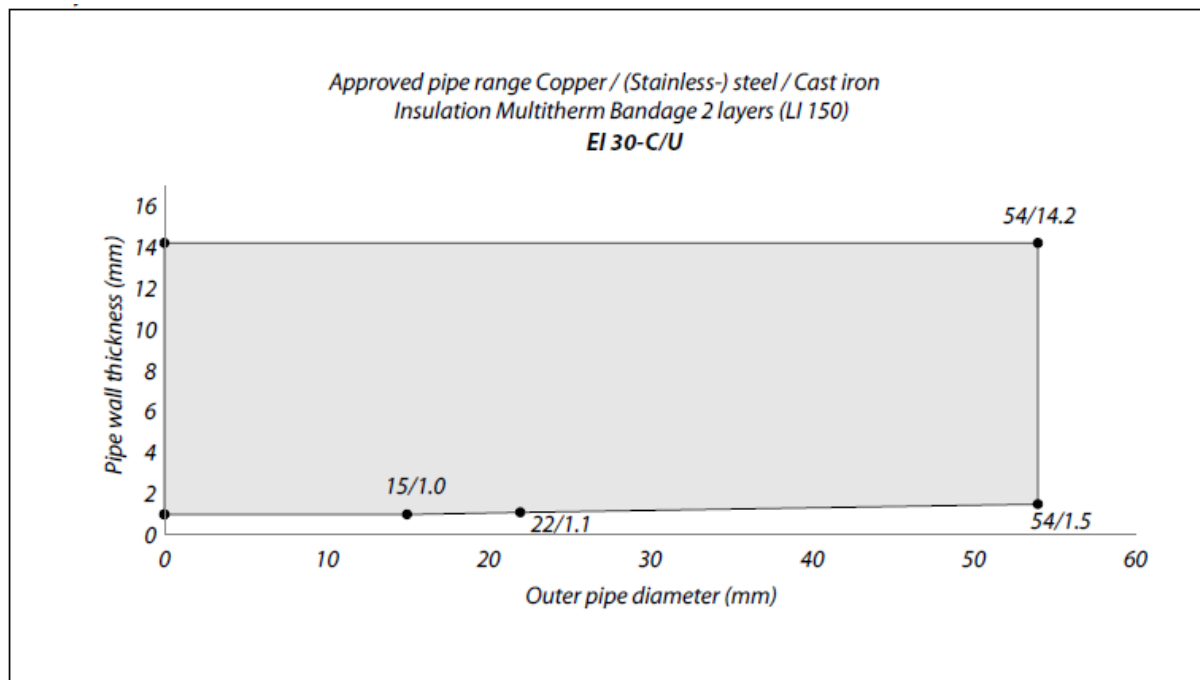




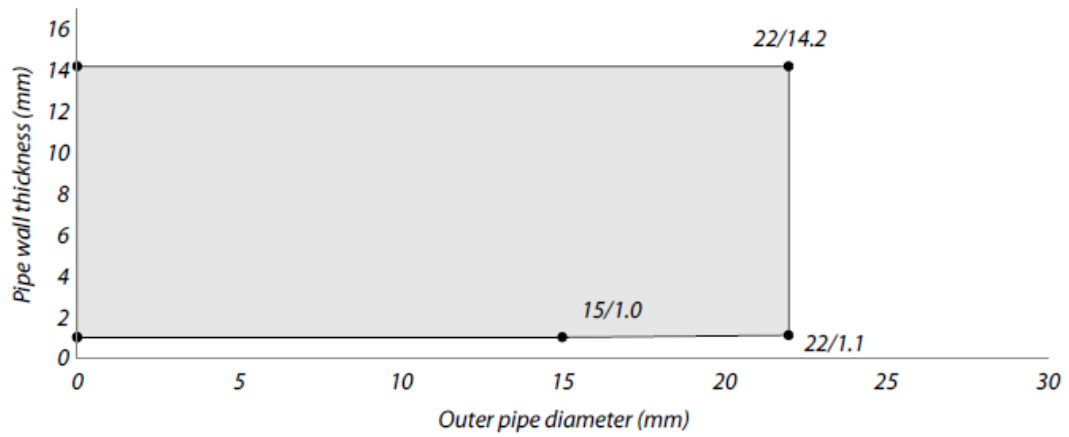
| | | | |
|-------------------------|----------------------|--|---------------|
| American projection | Scale : 1:5 | Company : Mulcol International B.V. | FW-ST-B2.1.20 |
| | Unit of measure : mm | Department : Research & Development | |
| | Date : 11-4-2017 | Draftsman : K.J. | A4 |
| | | Fire test pipe penetration seal Mulcol® Multitherm Bandage Installation in flexible wall and rigid wall | |

| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 150) | Mulcol® Multisealant A (both faces) | Classification* |
|---|--------------------------|------------------------|---|--|------------------------|
| Copper/ (Stainless) Steel / Cast Iron | 15 | 1.0-14.2 | two (see fig. 2 according to I.2.13) | Annular gap \leq 20 mm / depth \geq 10 mm | EI 120 C/U |
| | 22 | 1.1-14.2 | | | E 120 C/U EI 30 C/U |
| | 54 | 1.5-14.2 | | | E 120 C/U EI 45 C/U |
| (Stainless) Steel / Cast Iron | 114.3 | 3.6-14.2 | | | E 120 C/U EI 45 C/U |

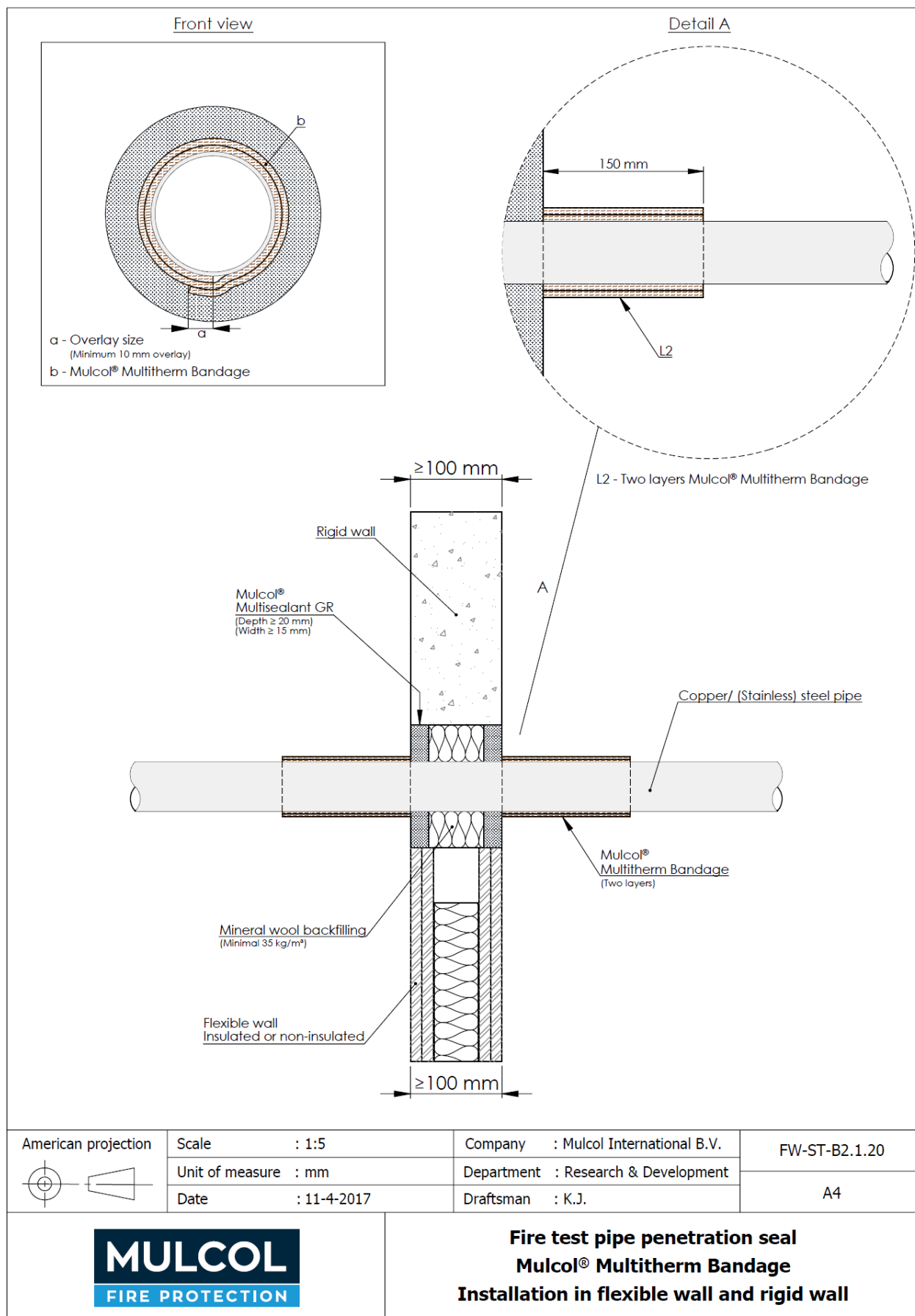
* C/U pipe end configuration applies to C/C also



Approved pipe range Copper / (Stainless-) steel / Cast iron
Insulation Multitherm Bandage 2 layers (LI 150)
EI 30-C/U, EI 45-C/U, EI 60-C/U, EI 90-C/U and EI 120-C/U

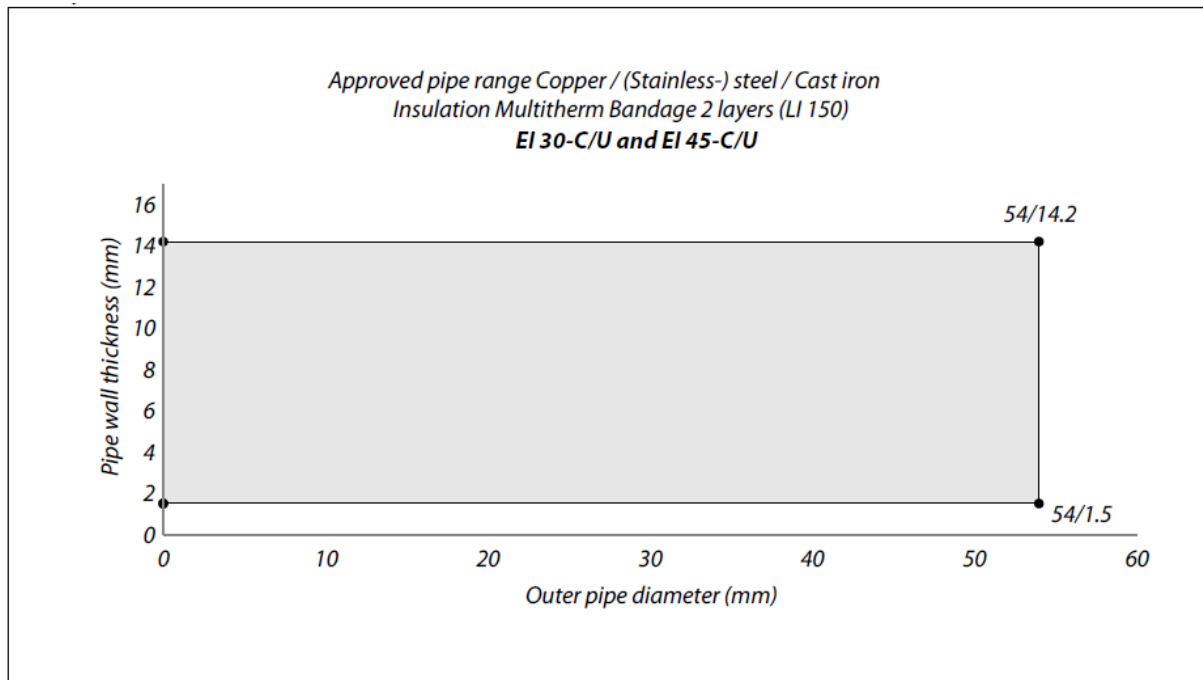


A.2.2 Metal pipes with two layers Mulcol® Multitherm Bandage to both sides of the wall (LI 150) with Mulcol® MULTISEALANT GR

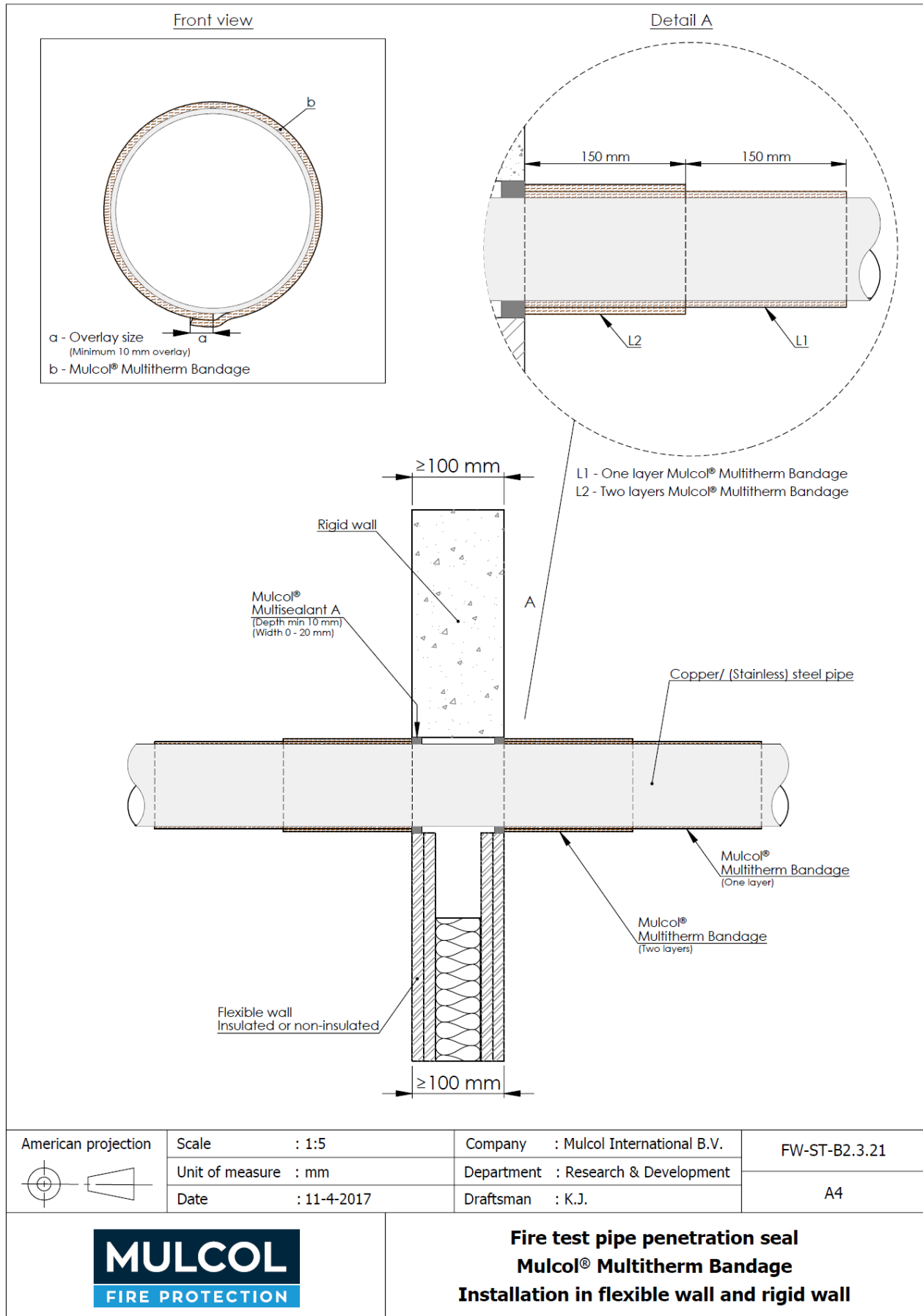


| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 150) | Annular Gap Mulcol® Multisealant GR (both faces) | Classification* |
|---|--------------------------|------------------------|---|---|--------------------------------------|
| Copper/ (Stainless) Steel / Cast Iron | 54 | 1.5-14.2 | Two (see fig.2 according to I.2.13) | Flexible wall 15 to 50 mm / rigid wall 15 to 75 mm | E 120 C/U EI 45 C/U |

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

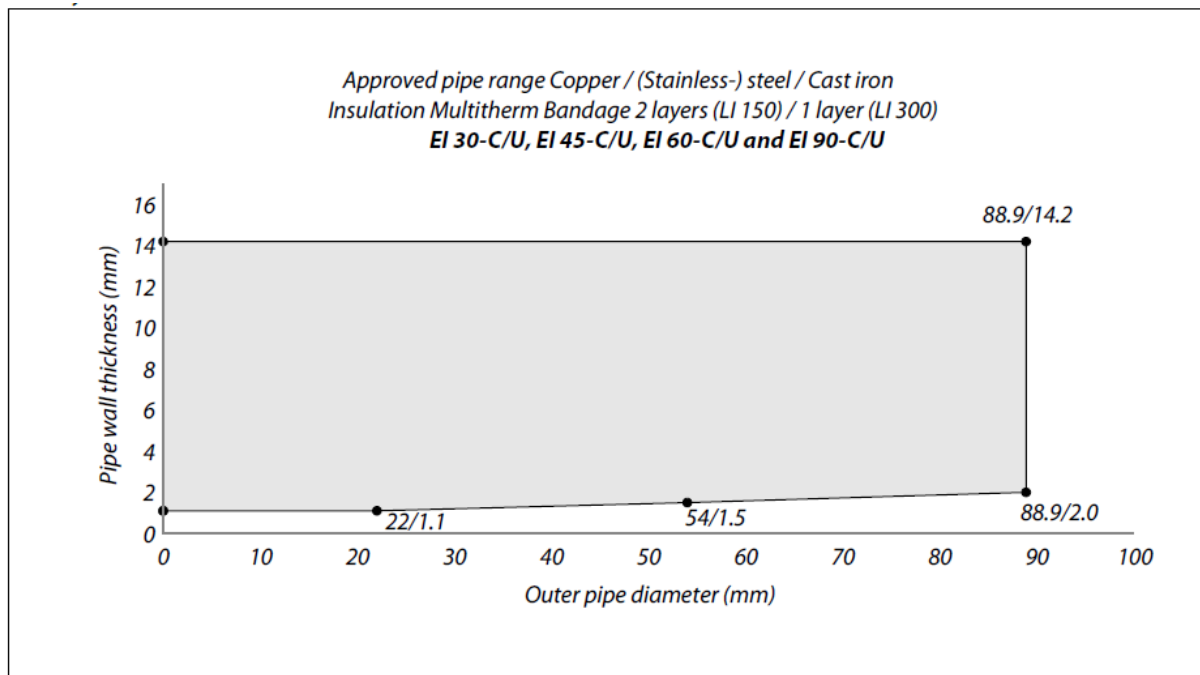
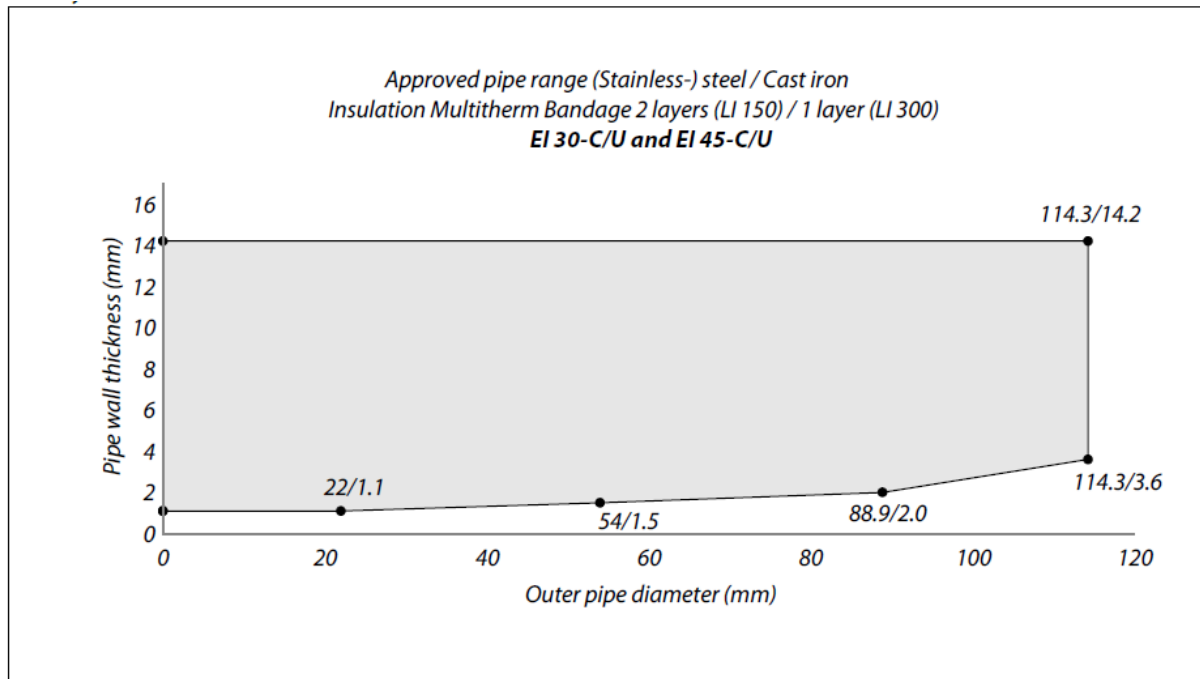


A.2.3 Metal pipes with two layers (LI 150) / one layer (LI 300) Mulcol® Multitherm Bandage to both sides of the wall

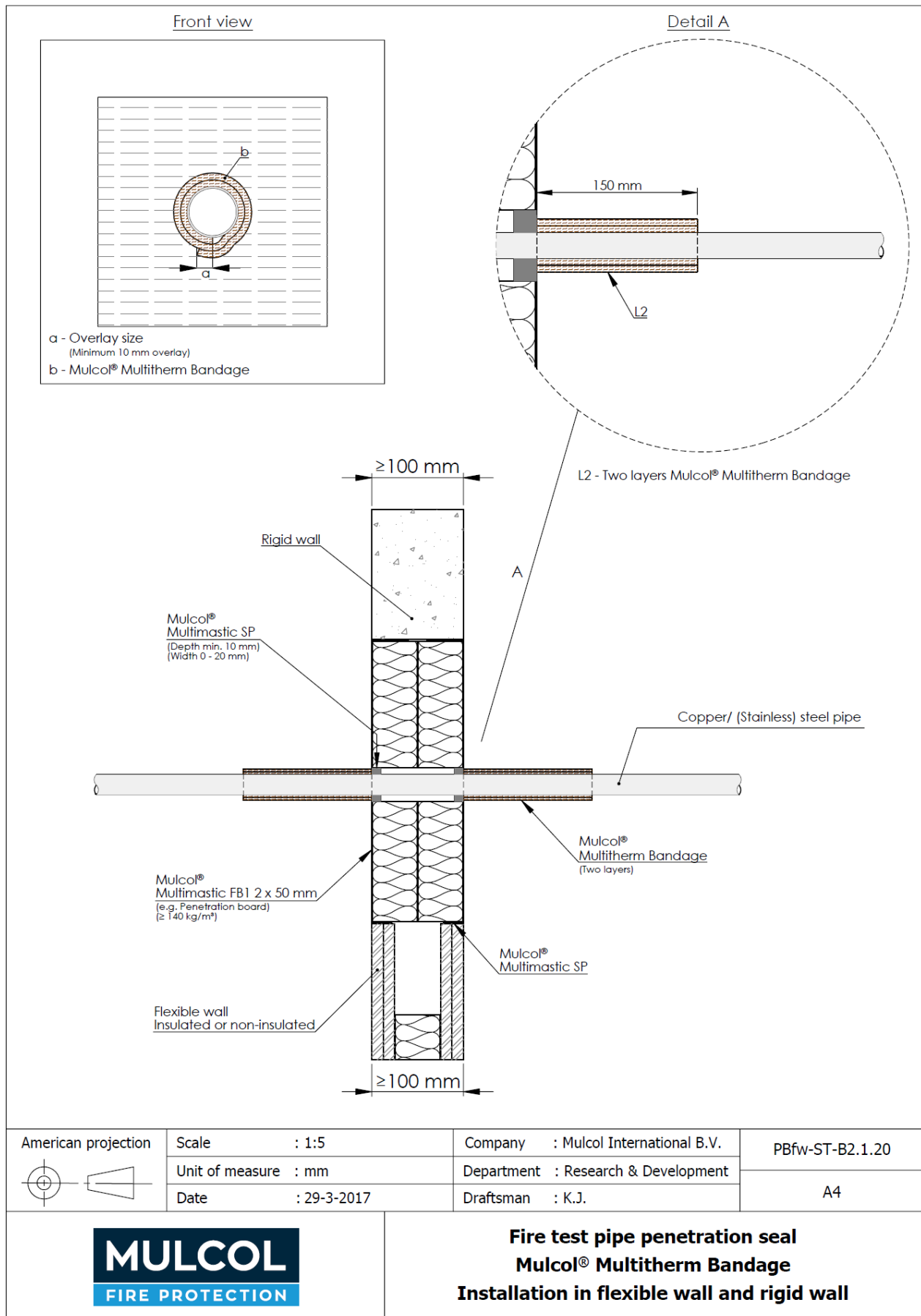


| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 300) | Mulcol® Multisealant A (both faces) | Classification* |
|---|--------------------------|------------------------|---|--|--------------------------------------|
| Copper/ (Stainless) Steel / Cast Iron | 22 | 1.1-14.2 | two/one (see fig. 4 according to I.2.13) | Annular gap ≤ 20 mm / depth ≥ 10 mm | E 120 C/U EI 90 C/U |
| | 54 | 1.5-14.2 | | | |
| | 88.9 | 2.0-14.2 | | | |
| (Stainless) Steel / Cast Iron | 114.3 | 3.6-14.2 | | | E 120 C/U EI 45 C/U |

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

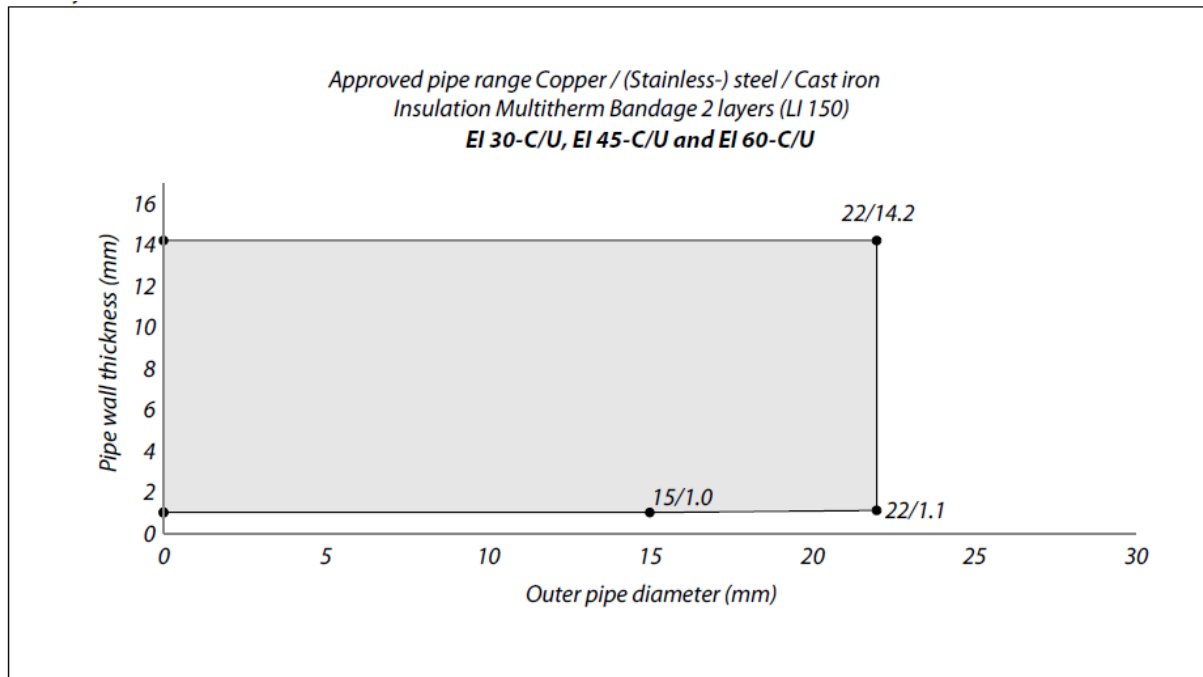


A.2.4 Metal pipes, , with two layers Mulcol® Multitherm Bandage to both sides of the wall (LI 150) through Mulcol® Multimastic FB1

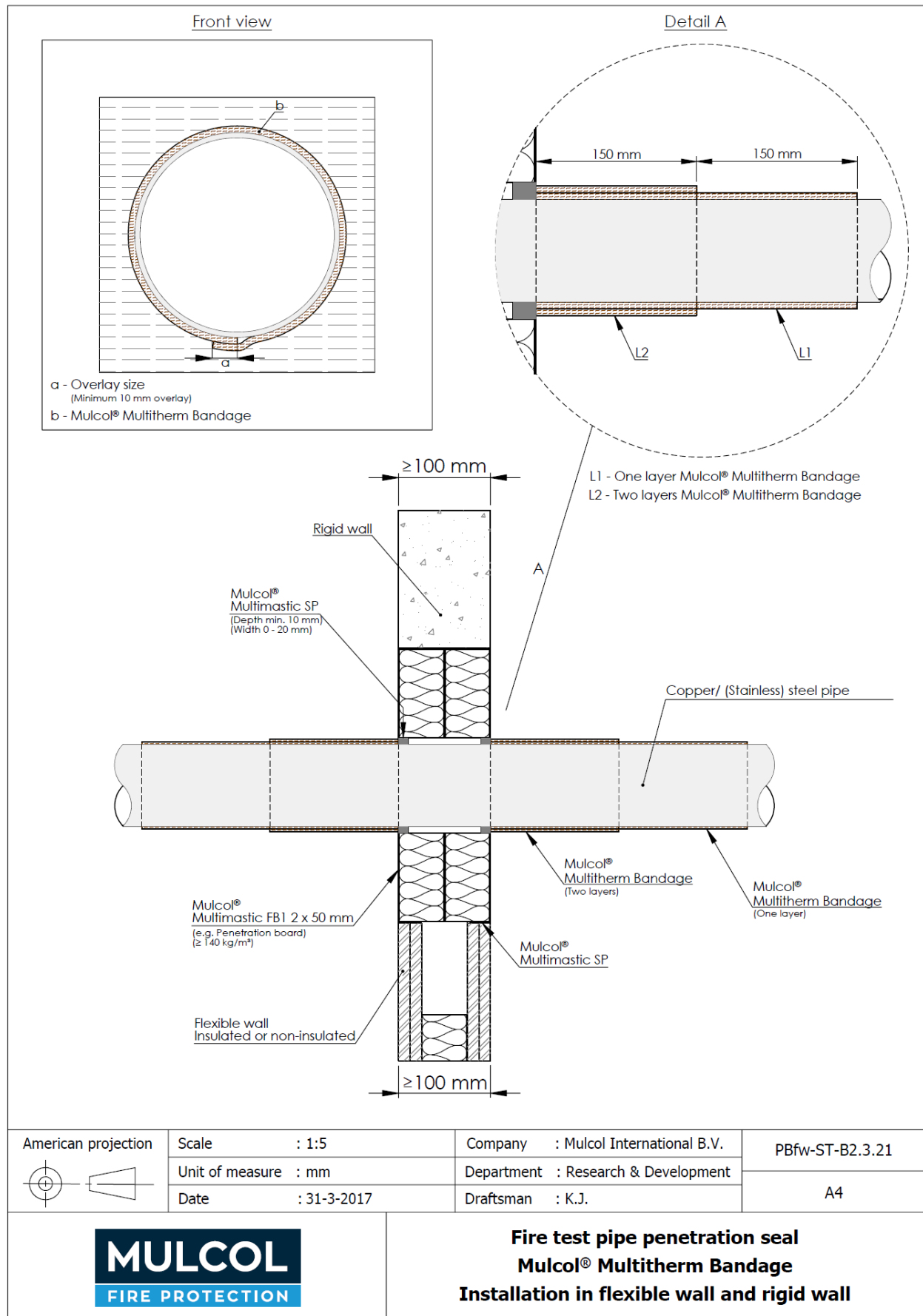


| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 150) | Mulcol® Multisealant SP (both faces) | Classification* |
|---|--------------------------|------------------------|---|--|--------------------------------------|
| Copper/ (Stainless) Steel) / Cast Iron | 15 | 1.0-14.2 | Two (see fig. 2 according to I.2.13) | Annular gap ≤ 20 mm / depth ≥ 10 mm | E 120 C/U EI 60 C/U |
| | 22 | 1.1-14.2 | | | |

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

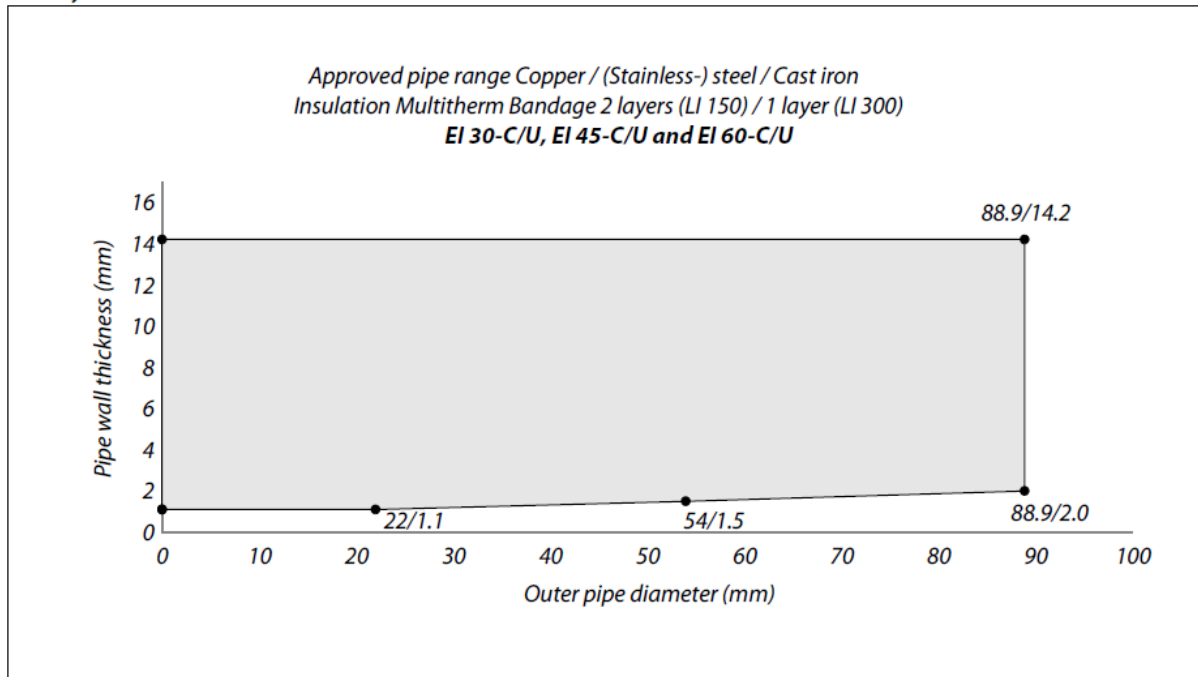


A.2.5 Metal pipes with two layers (LI 150) / one layer (LI 300) Mulcol® Multitherm Bandage to both sides of the wall, through Mulcol® Multimastic FB1



| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 300) | Mulcol® Multisealant SP (both faces) | Classification* |
|---|--------------------------|------------------------|---|--|--------------------------------------|
| Copper/ (Stainless) Steel / Cast Iron | 22 | 1.1-14.2 | two/one (see fig. 4 according to I.2.13) | Annular gap \leq 20 mm / depth \geq 10 mm | E 120 C/U EI 60 C/U |
| | 54 | 1.5-14.2 | | | |
| | 88.9 | 2.0-14.2 | | | |

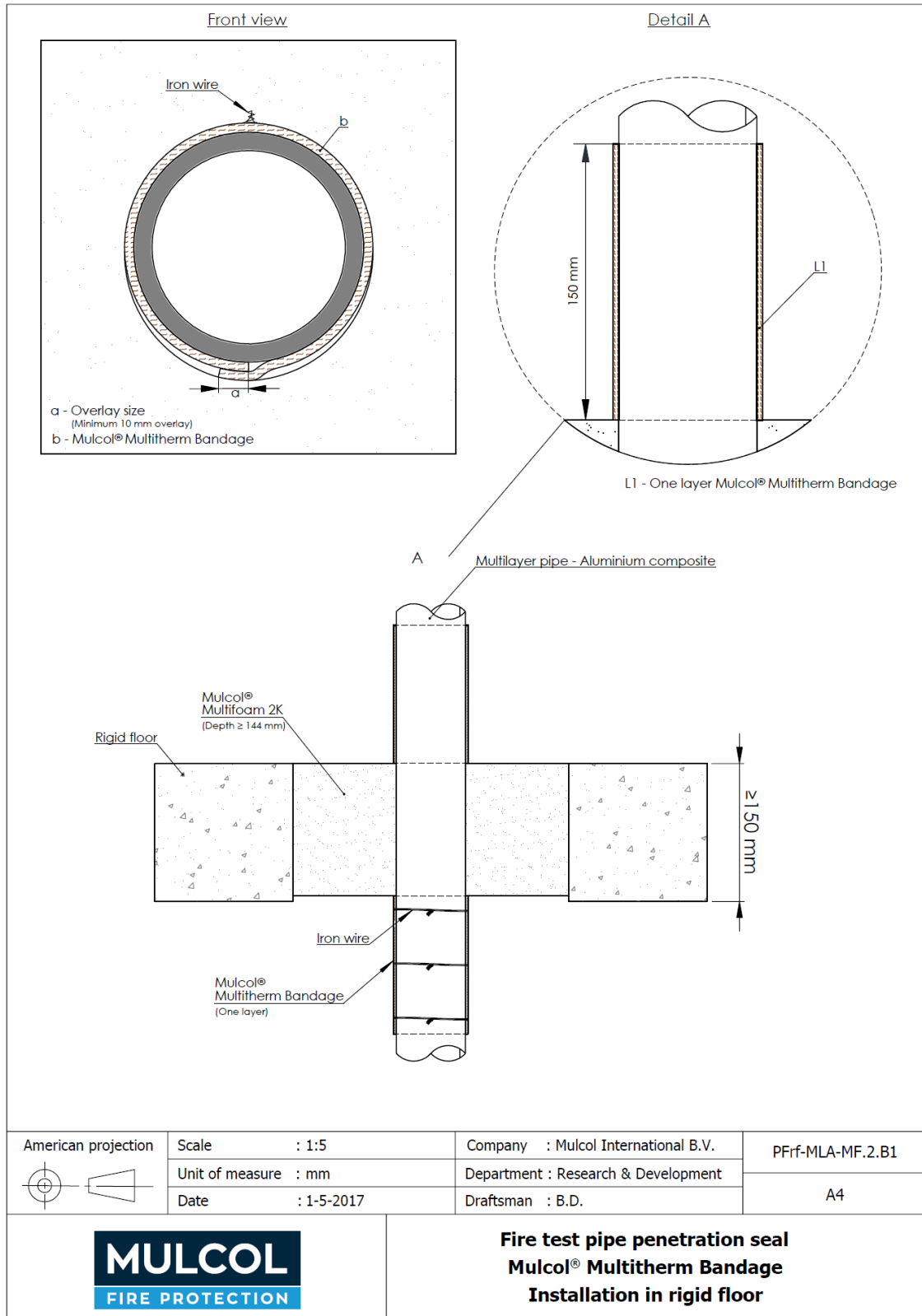
* C/U pipe end configuration applies to C/C also



Annex B - Resistance to Fire Classification – Mulcol® Multitherm Bandage - Rigid floor constructions according to Section 2 1) with floor thickness of minimum 150 mm

B.1 Aluminium composite pipes

B.1.1 Aluminium composite pipes with one layer Mulcol® Multitherm Bandage (LI 150) to both faces of the floor, through Mulcol® Multifoam 2K



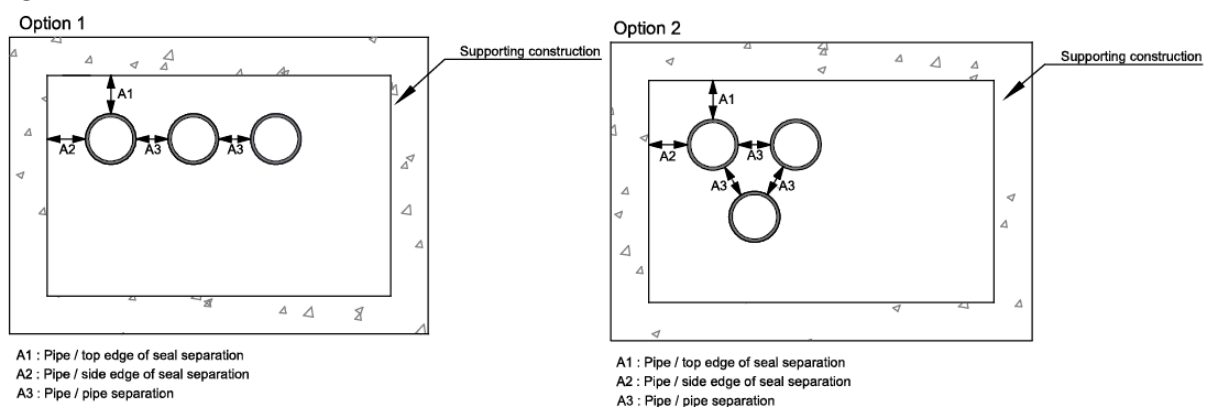
| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 150) | Additional components | Classification* |
|------------------------|--------------------------|------------------------|--------------------------------------|--|------------------------|
| Henco PE-Xc/AL/PE-Xc | $\leq 16 / \leq 20$ | 2.0 | one (see fig. 1 according to I.2.13) | 3 x steel wire around wraps to underside | E 120 U/C EI 90 U/C |
| Uponor PE-Xa Aqua pipe | ≤ 25 | 3.5 | | | E 120 U/C EI 90 U/C |
| Henco PE-Xc/AL/PE-Xc | $\leq 26 / \leq 32$ | 3.0 | | | E 120 U/C EI 90 U/C |
| | ≤ 40 | 3.5 | | | E 120 U/C EI 90 U/C |
| Uponor PE-RT/AL/PE-RT | ≤ 40 | 4.0 | | | E 120 U/C EI 90 U/C |
| Henco PE-Xc/AL/PE-Xc | ≤ 50 | 4.0 | | | E 120 U/C EI 90 U/C |
| | ≤ 63 | 4.5 | | | E 120 U/C EI 90 U/C |
| | ≤ 75 | 6.0 | | | E 120 U/C EI 90 U/C |

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

In the Mulcol® Multifoam 2K penetration seal system the following minimum distances between the apertures edges and between the pipes shall be applied (distance A1 to A3 according to Figure E.1 of EN 1366-3:2009):

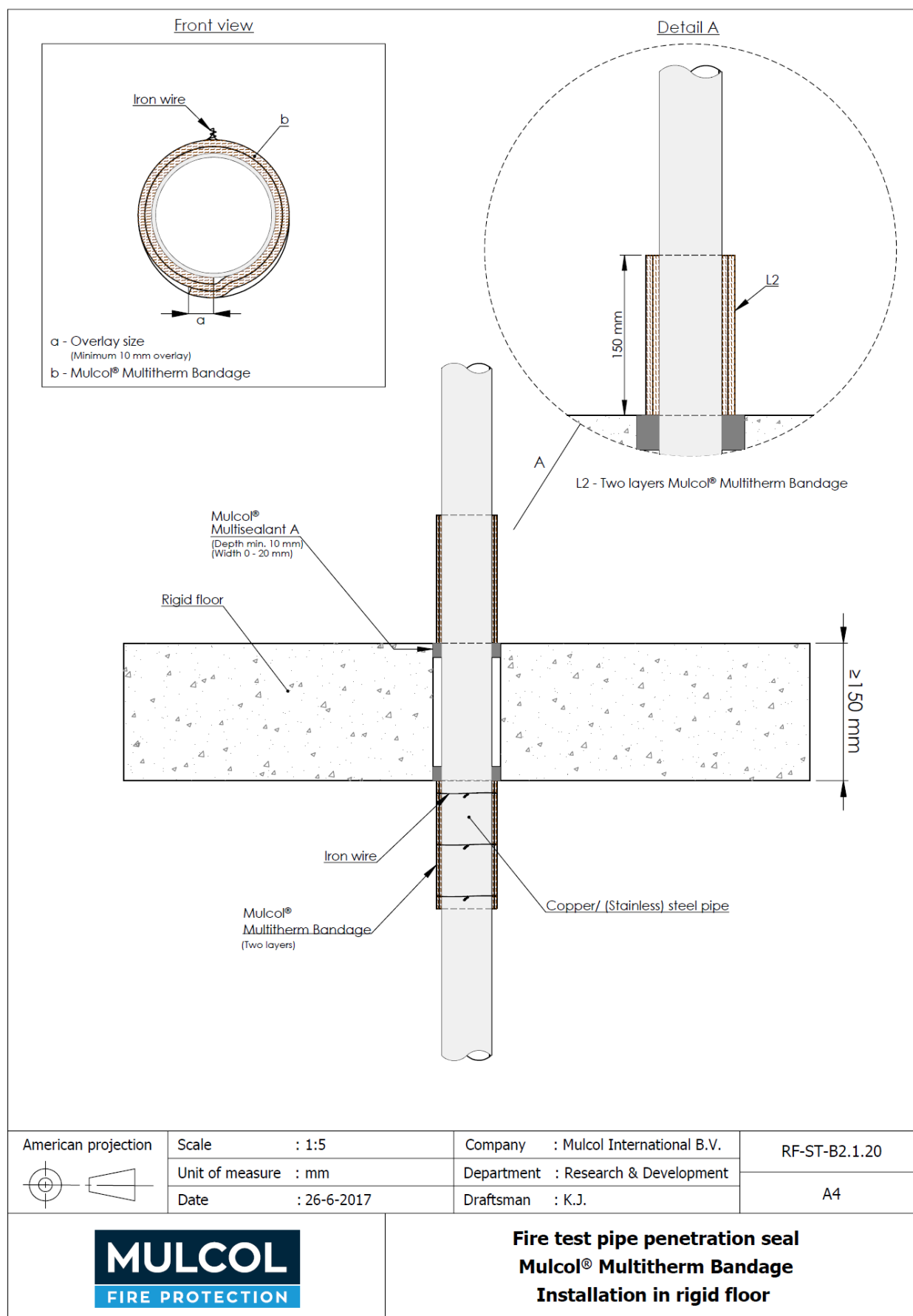
- distance A1 = 30 mm;
- distance A2 = 30 mm;
- distance A3 = 30 mm.

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



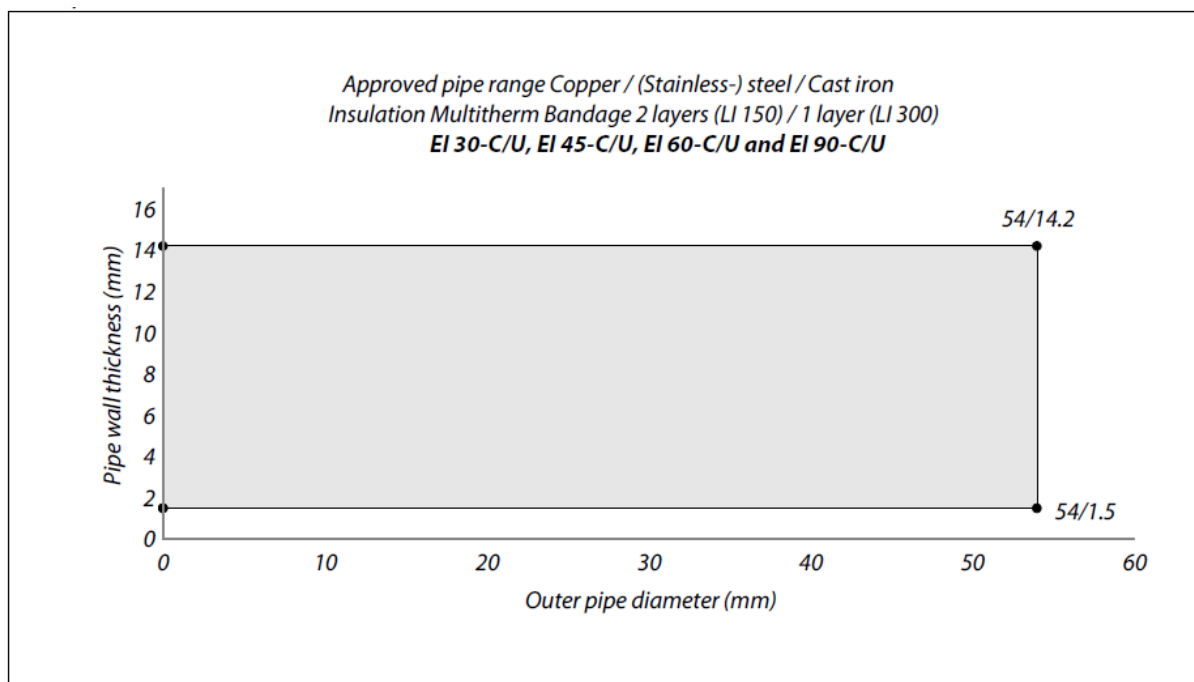
B.2 Metal pipes

B.2.1 Metal pipes with two Mulcol® Multitherm Bandage to both faces of the floor (LI 150)

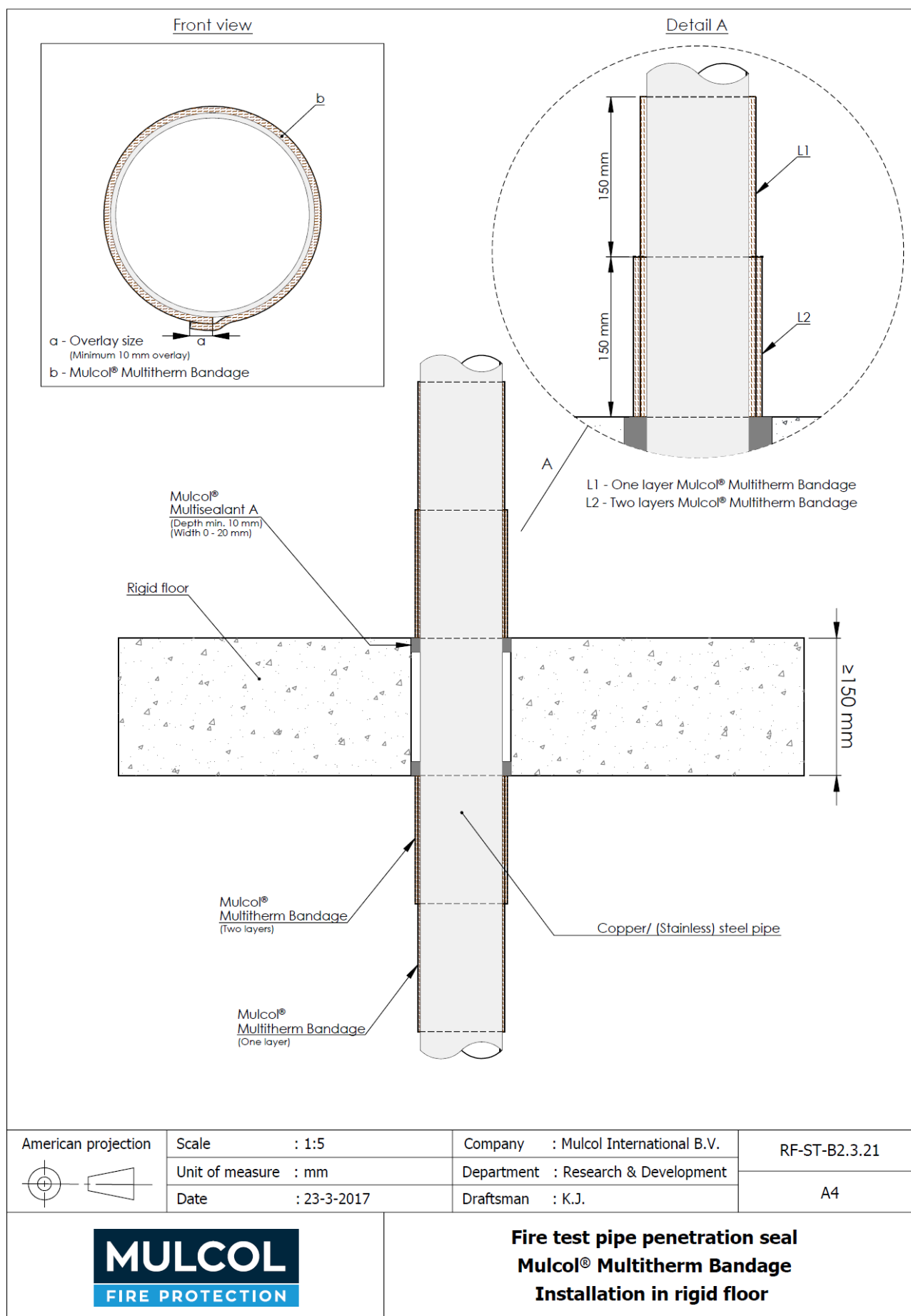


| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 150) | Mulcol® Multisealant A (both faces) | Additional components | Classification* |
|--|--------------------------|------------------------|--------------------------------------|---|--|--------------------------------------|
| Copper / (Stainless) steel / Cast iron | 54 | 1.5 to 14.2 | two (see fig. 4 according to I.2.13) | Annular gap \leq 20 mm / depth \geq 10 mm | 3 x steel wire around wraps to underside | E 120 C/U EI 90 C/U |

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

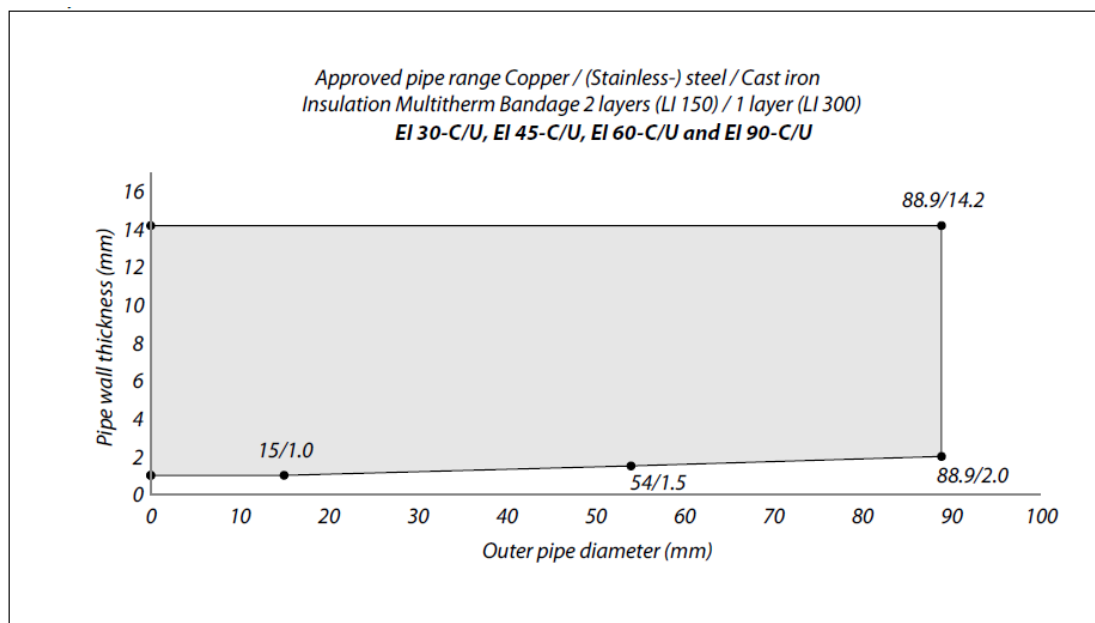
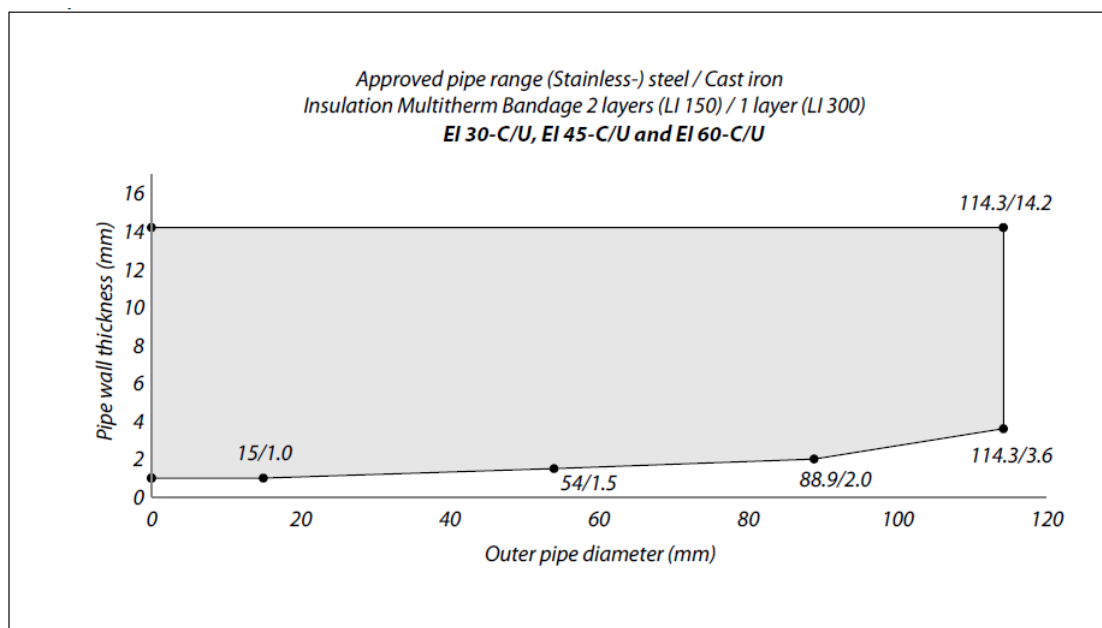


B.2.2 Metal pipes with one (LI 300) / two (LI 150) Mulcol® Multitherm Bandage to both faces of the floor

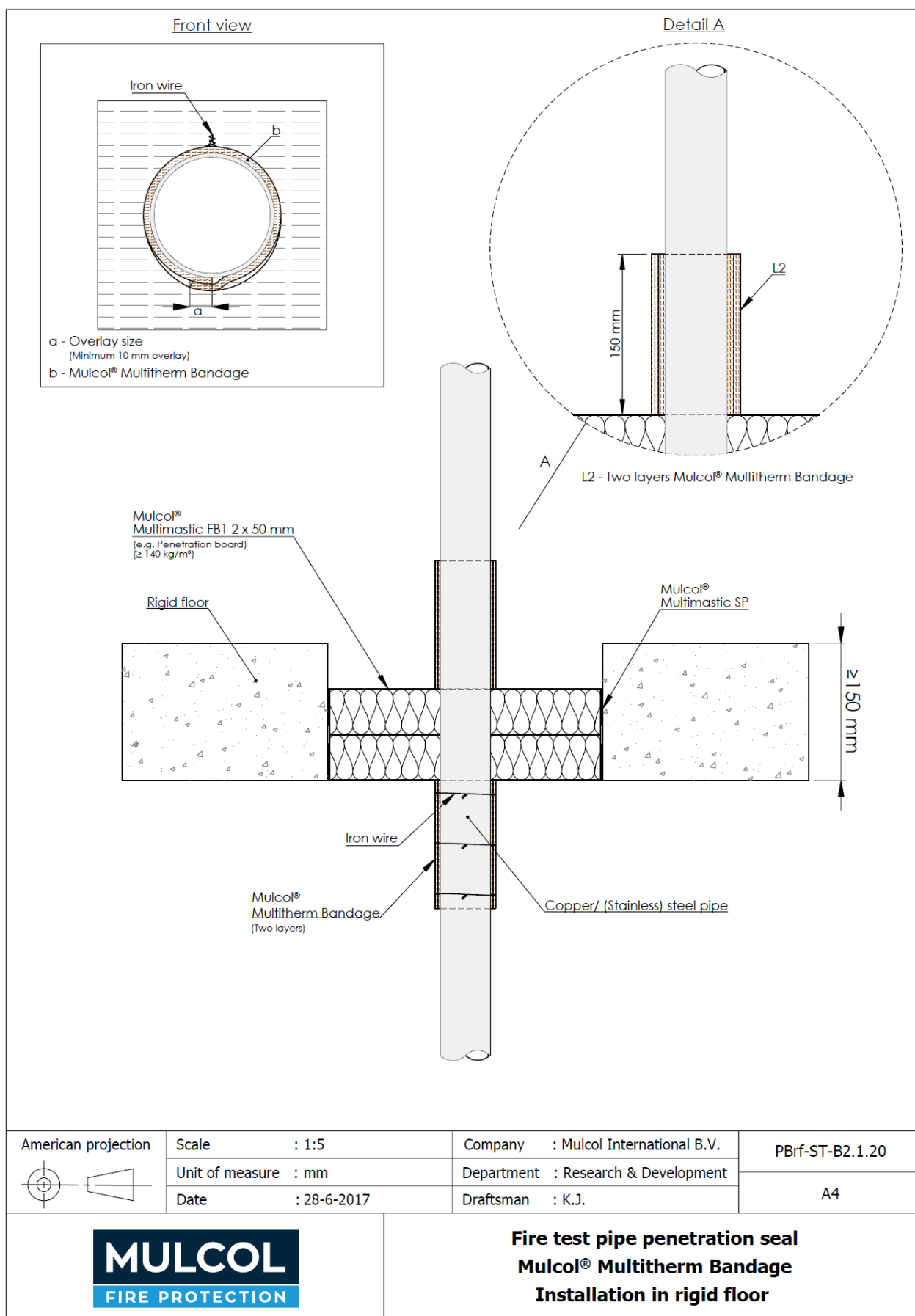


| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 300) | Mulcol® Multisealant A (both faces) | Additional components | Classification* |
|--|--------------------------|------------------------|--|---|---|------------------------|
| Copper/ (Stainless) Steel / Cast Iron | 15 | 1.0-14.2 | one/two (see fig.4 according to I.2.13) | Annular gap ≤ 20 mm / depth ≥ 10 mm | N/A | EI 60 C/U |
| | 54 | 1.5-14.2 | | | | |
| | 88.9 | 2.0-14.2 | | | | |
| | 15 | 1.0-14.2 | | | 6 x steel wire around wraps to underside | E 120 C/U EI 90 C/U |
| | 54 | 1.5-14.2 | | | | |
| | 88.9 | 2.0-14.2 | | | | |
| (Stainless) Steel / Cast Iron | 114.3 | 3.6-14.2 | | | 6 x steel wire around wraps to underside | E 120 C/U EI 60 C/U |

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

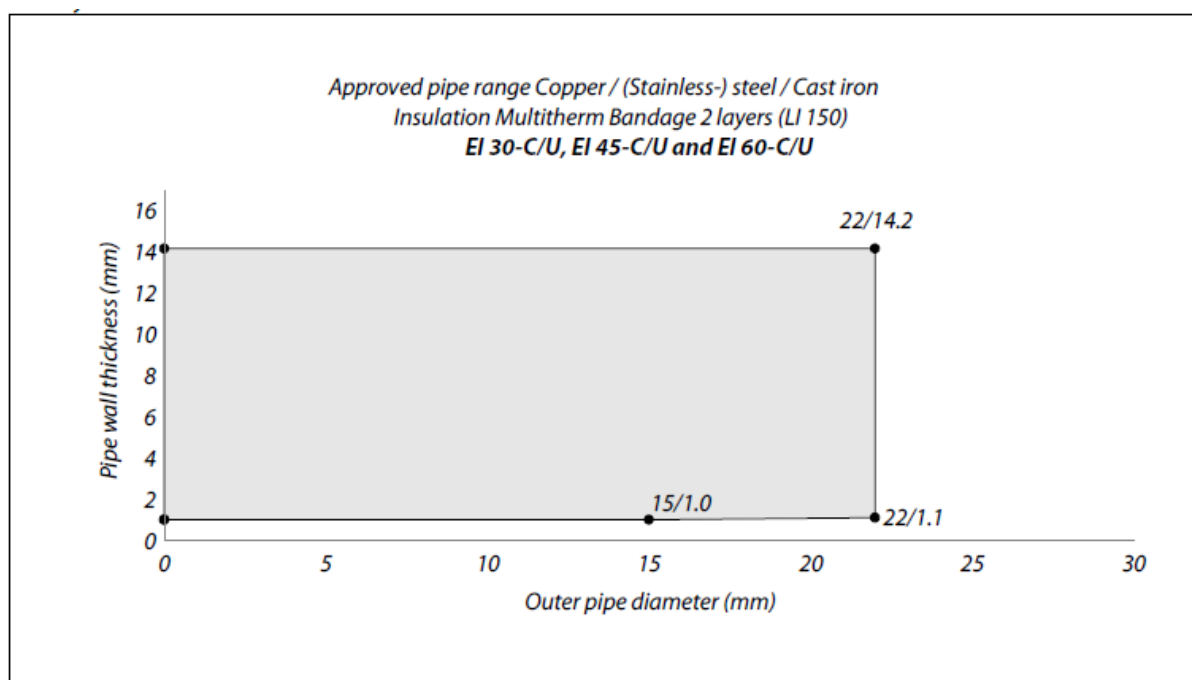


B.2.3 Metal pipes with two Mulcol® Multitherm Bandage (LI 150) to both faces of the floor, through Mulcol® Multimastic FB1

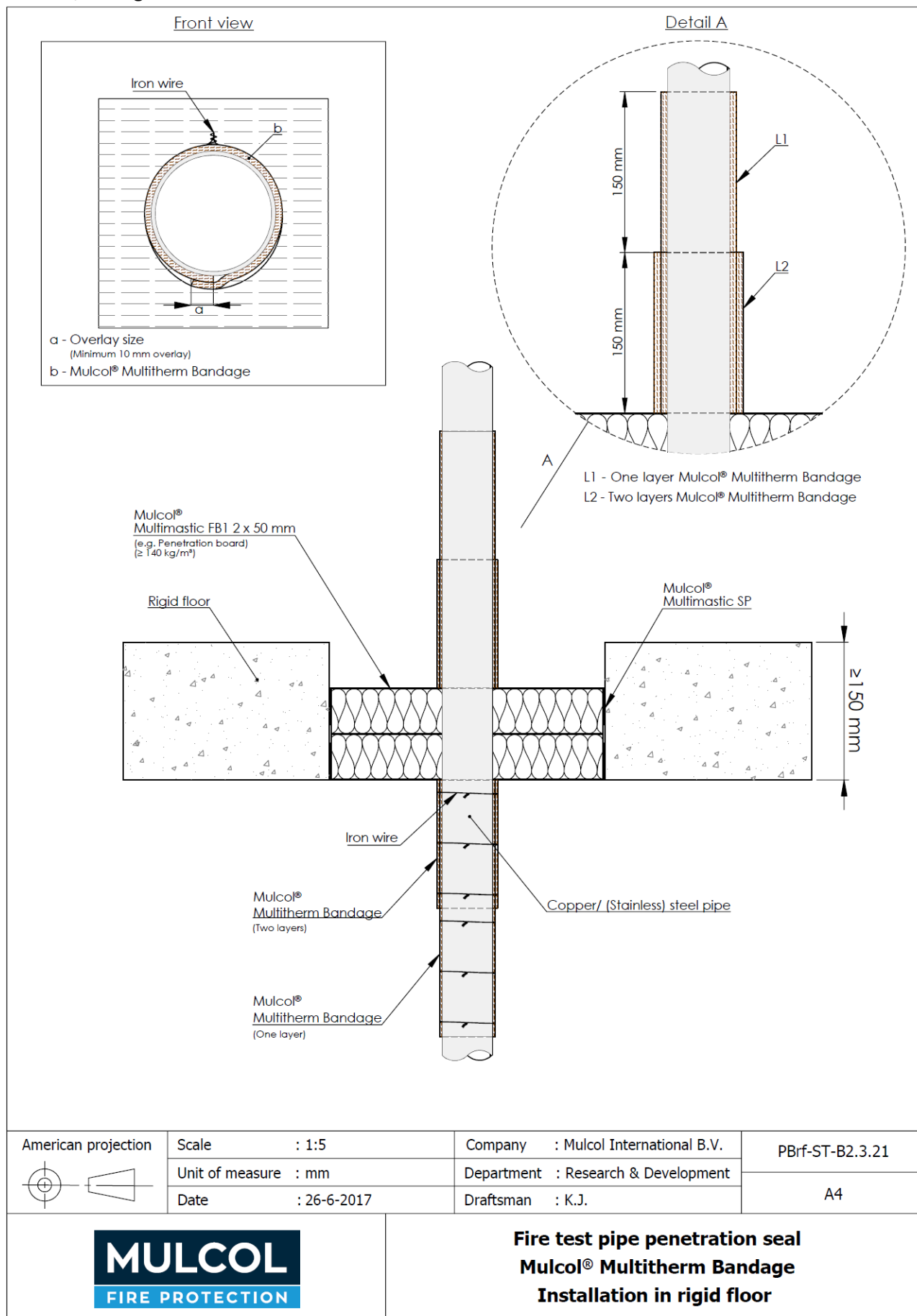


| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 150) | Mulcol® Multisealant SP (both faces) | Additional Components | Classification* |
|--|--------------------------|------------------------|---|---|--|--------------------------------------|
| Copper / (Stainless) steel / Cast iron | 15 | 1.0 to 14.2 | two (see fig. 2 according to I.2.13) | Annular gap \leq 20 mm / depth \geq 10 mm | 3 x steel wire around wraps to underside | E 120 C/U EI 60 C/U |
| | 22 | 1.1 to 14.2 | | | | |

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

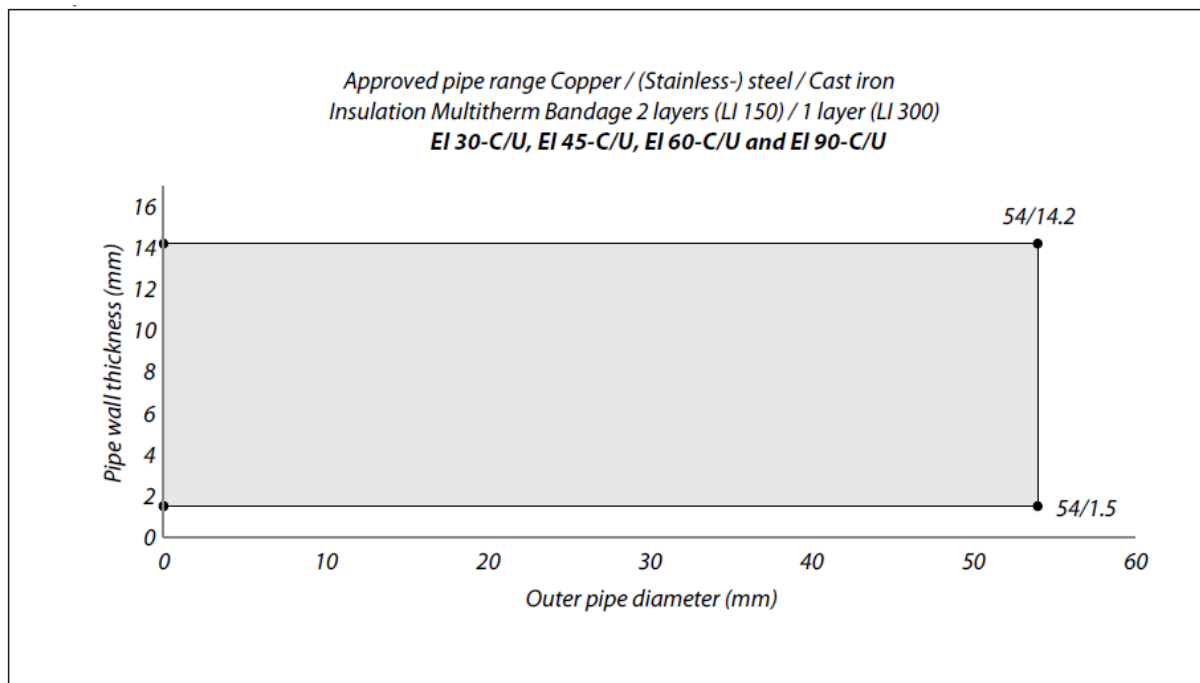


B.2.4 Metal pipes with one (LI 300) / two (LI 150) Mulcol® Multitherm Bandage to both faces of the floor, through Mulcol® Multimastic FB1

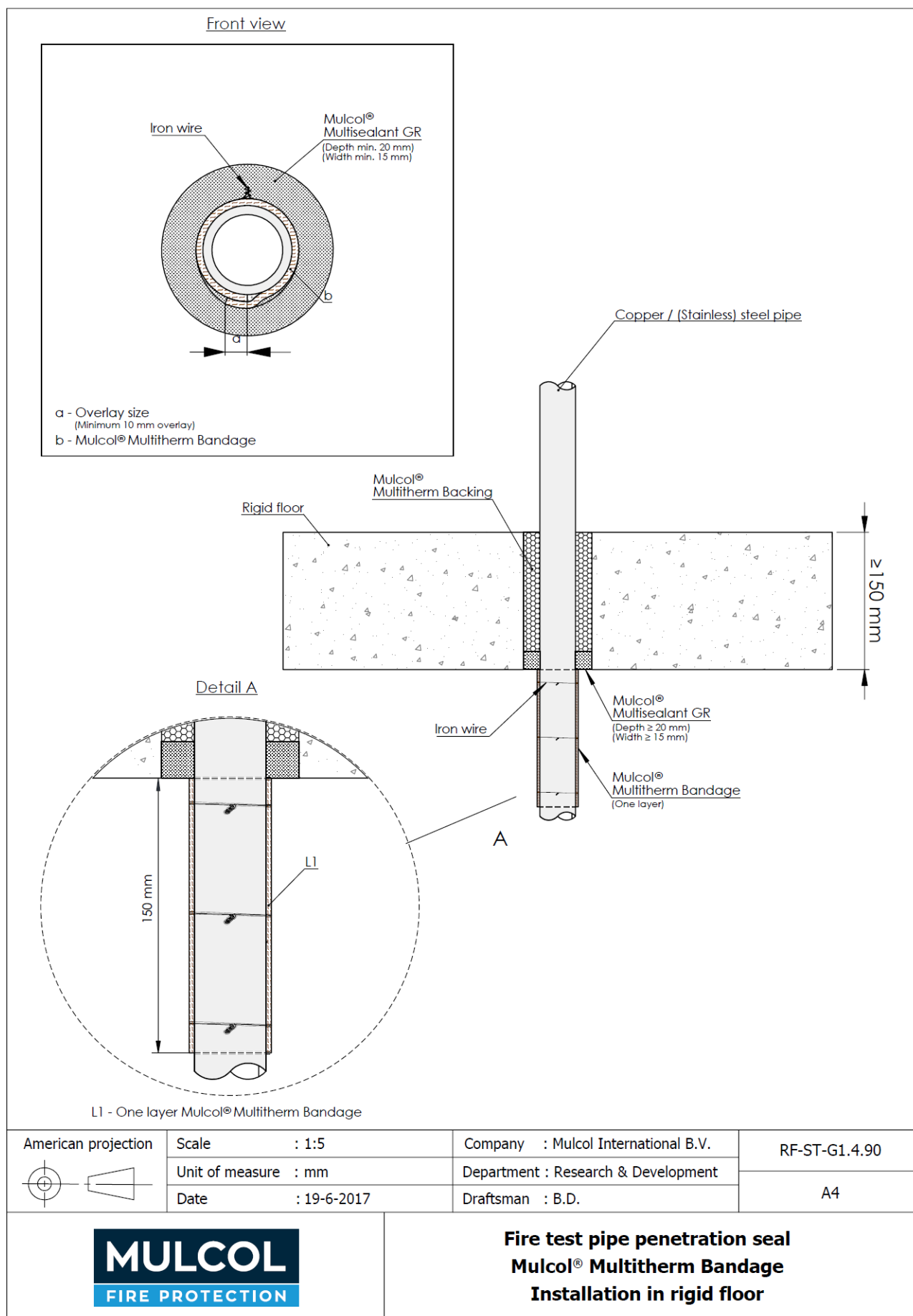


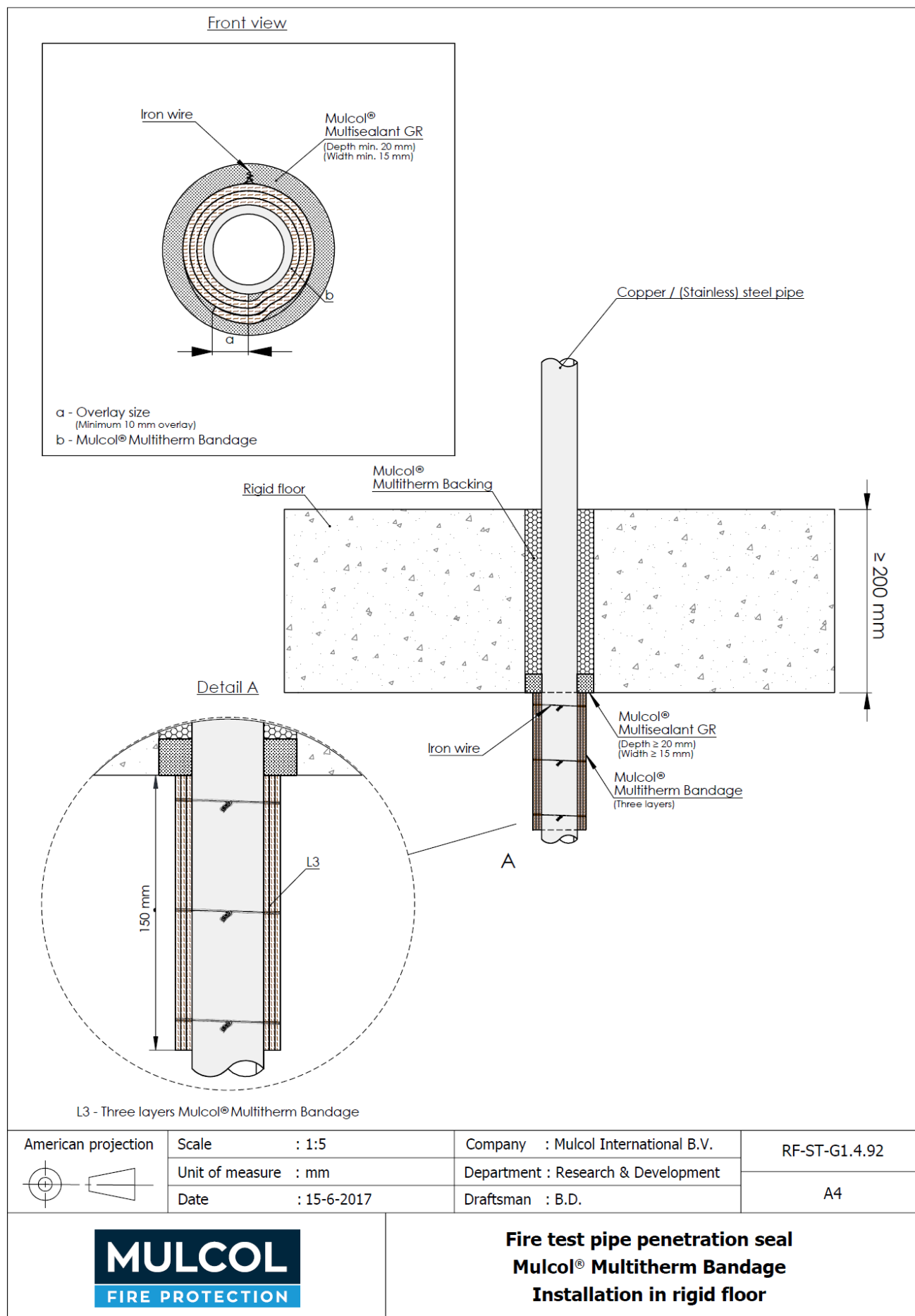
| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Layers each face (LI 300) | Mulcol® Multisealant SP (both faces) | Additional Components | Classification* |
|--|--------------------------|------------------------|---|---|--|-----------------|
| Copper / (Stainless) steel / Cast iron | 54 | 1.5 to 14.2 | one/two (see fig.4 according to I.2.13) | Annular gap ≤ 20 mm / depth ≥ 10 mm | N/A | EI 60 C/U |
| | | | | | 6 x steel wire around wraps to underside | EI 90 C/U |

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



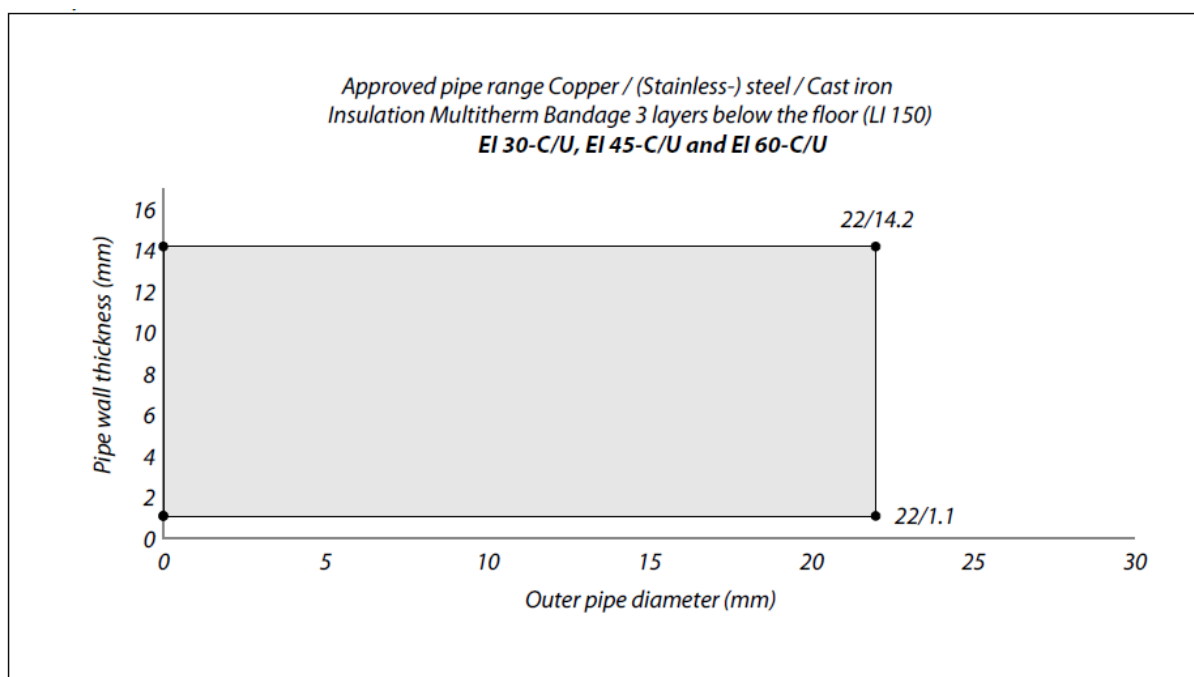
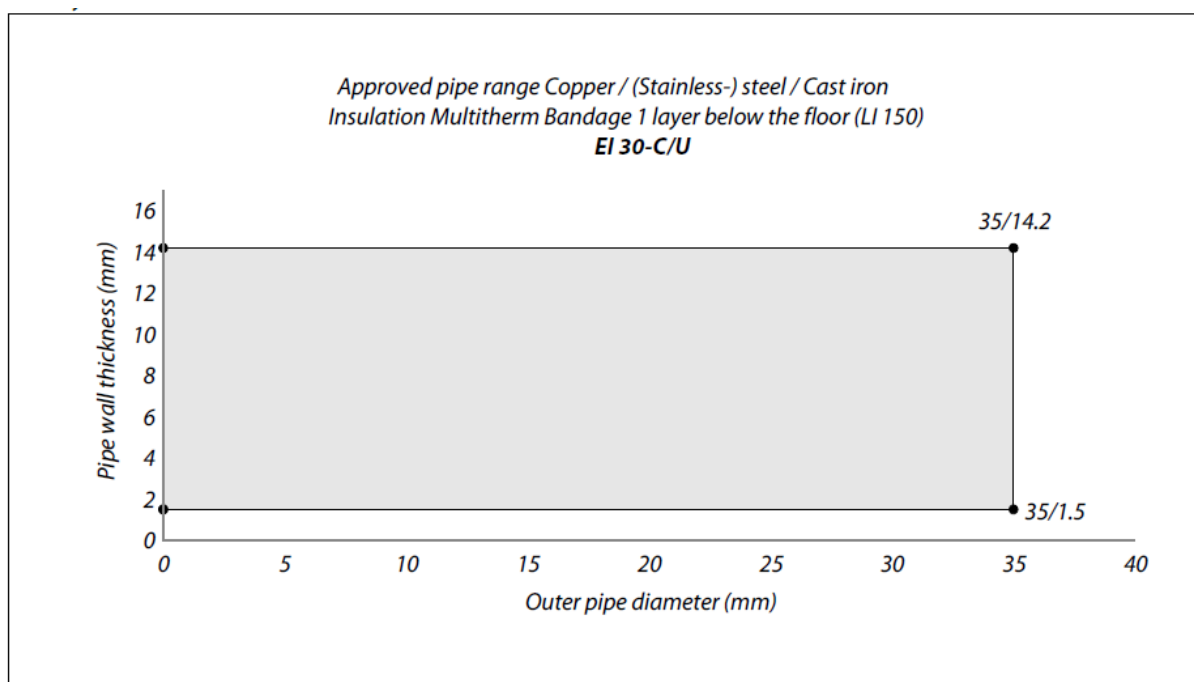
B.2.5 Metal pipes with one or three Mulcol® Multitherm Bandage below the floor, with Mulcol® MULTISEALANT GR



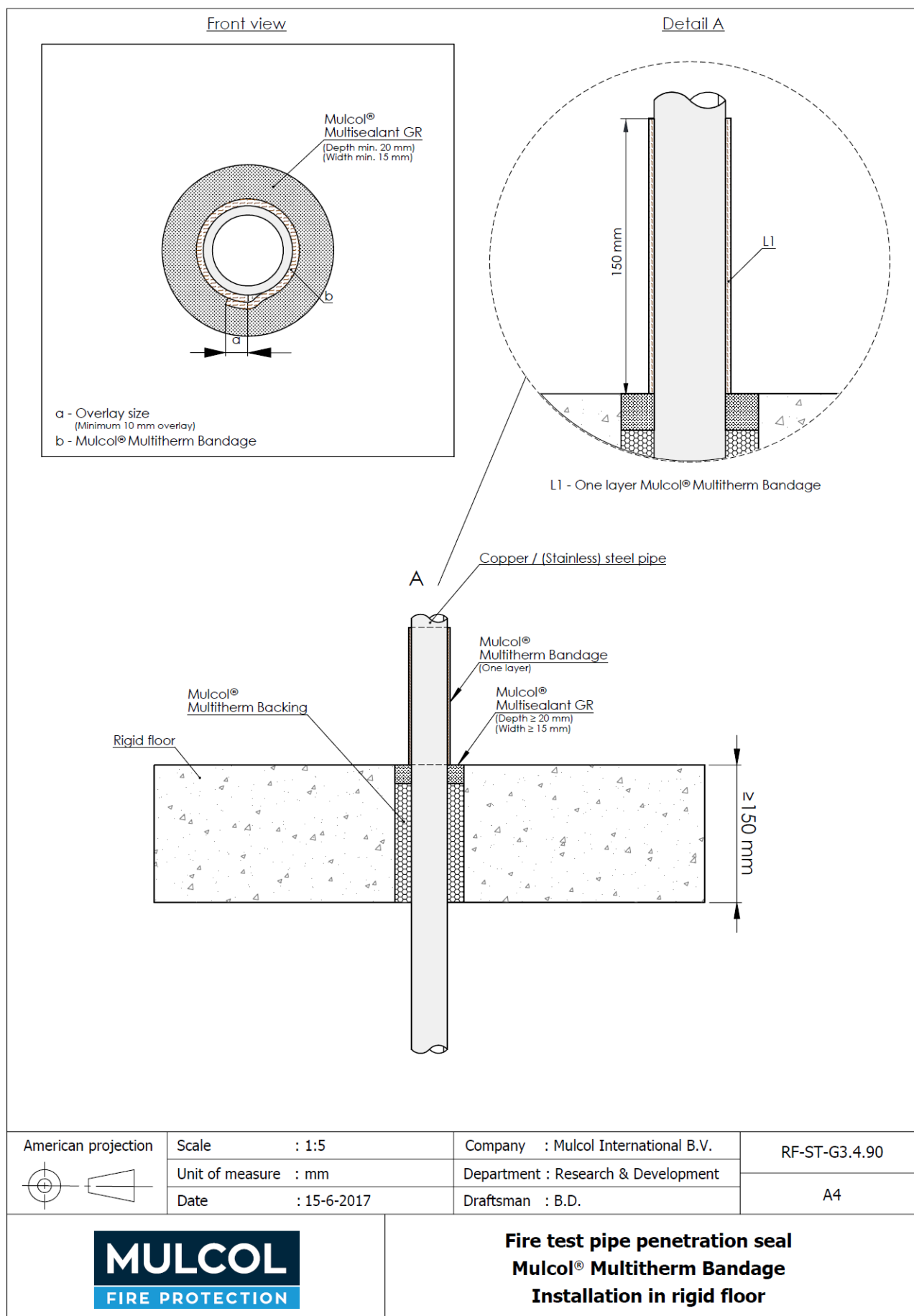


| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Annular Space mm | Layers below the floor | Additional components | Classification* |
|---|--------------------------|------------------------|------------------|--|---|------------------------|
| Copper / (Stainless-) steel / Cast iron | 35 | 1.5 to 14.2 | 15 to 75 | one (see fig. 1 according to I.2.13) | 3 x steel wires around wraps to the underside | E 120 C/U EI 30 C/U |
| | 22 | 1.1 to 14.2 | | three (see fig. 3 according to I.2.13) | | E 120 C/U EI 60 C/U |

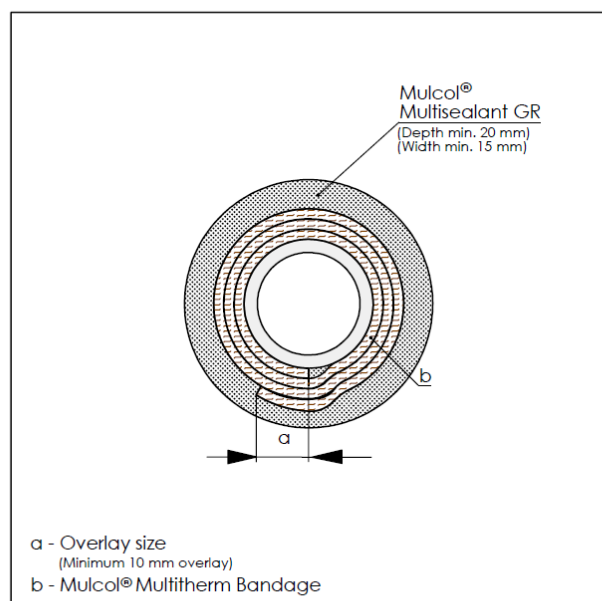
* C/U pipe end configuration applies to C/C also



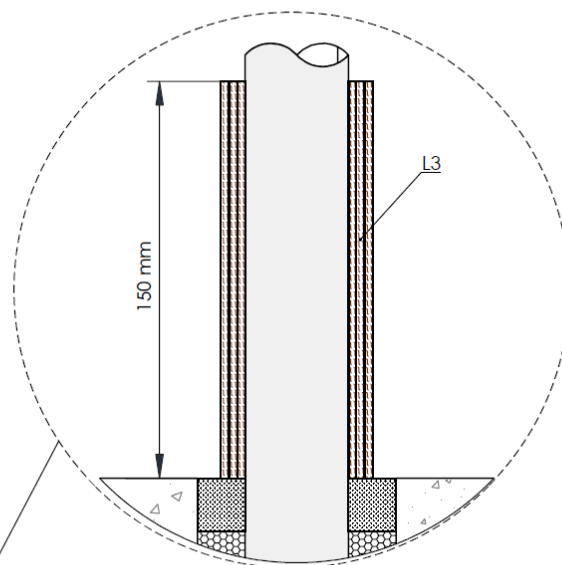
B.2.6 Metal pipes with one or three Mulcol® Multitherm Bandage above the floor, with Mulcol® MULTISEALANT GR



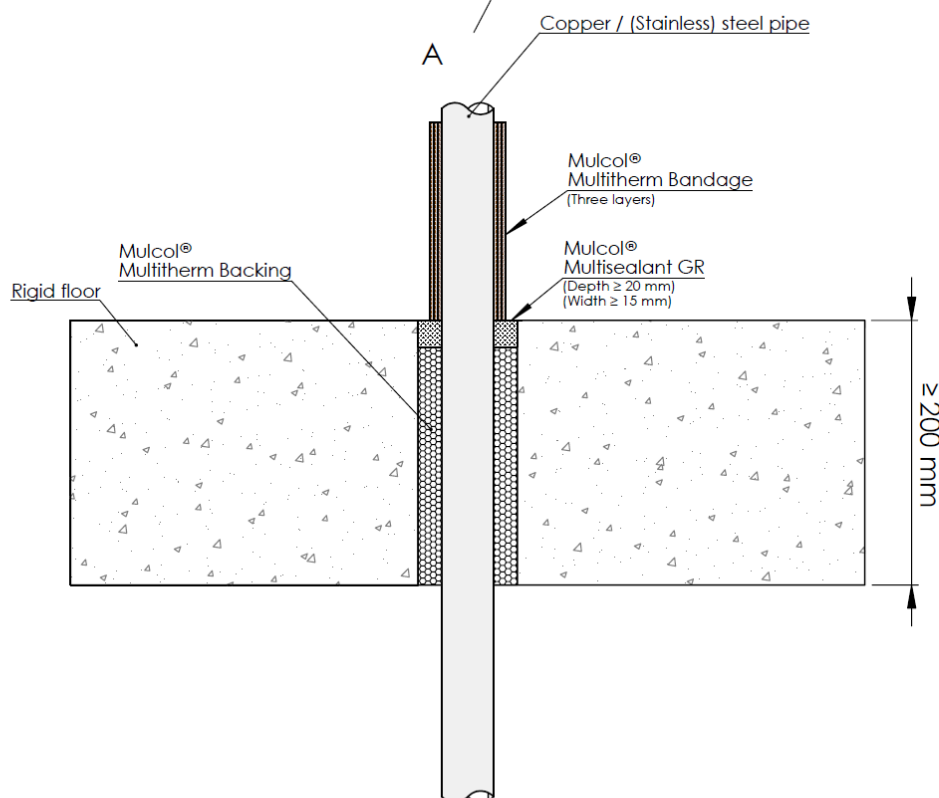
Front view



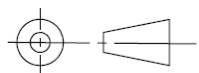
Detail A



L3 - Three layers Mulcol® Multitherm Bandage



American projection



Scale : 1:5

Unit of measure : mm

Date : 15-6-2017

Company : Mulcol International B.V.

Department : Research & Development

Draftsman : B.D.

RF-ST-G3.4.92

A4



Fire test pipe penetration seal
Mulcol® Multitherm Bandage
Installation in rigid floor

| Pipe material | Maximum Pipe diameter mm | Pipe wall thickness mm | Annular Space mm | Layers above the floor | Additional components | Classification* |
|---|--------------------------|------------------------|------------------|--|-----------------------|------------------------|
| Copper / (Stainless-) steel / Cast iron | 35 | 1.5 to 14.2 | 15 to 75 | One (see fig. 1 according to I.2.13) | N/A | E 120 C/U EI 30 C/U |
| | 22 | 1.1 to 14.2 | | three (see fig. 3 according to I.2.13) | | E 120 C/U EI 60 C/U |

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

