Austrian Institute of Construction Engineering
Schenkenstrasse 4 | T +43 1 533 65 50
1010 Vienna | Austria | F +43 1 533 64 23
www.oib.or.at | mail@oib.or.at

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European Technical Assessment

ETA-13/0117 of 10.01.2019

General part

Technical Assessment Body issuing the European Technical Assessment	Österreichisches Institut für Bautechnik (OIB) Austrian Institute of Construction Engineering
Trade name of the construction product	ZZ P40
Product family to which the construction product belongs	Fire Stopping and Fire Sealing Products: Penetration Seals
Manufacturer	Karl Zimmermann Miltzstraße 29 51061 Köln GERMANY
Manufacturing plant	Karl Zimmermann GmbH Marconistraße 7-9 50769 Köln GERMANY
This European Technical Assessment contains	33 pages including Annexes A-1 to G-2 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	European Assessment Document EAD 350454-00-1104 „Fire stopping and fire sealing products – Penetration seals"
This European Technical Assessment replaces	European technical approval ETA-13/0117 with validity from 28.06.2013 to 27.06.2018

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Specific parts

1 Technical description of the product

"ZZ P40" is a kit to be used as pipe penetration seal based on the pipe collar "ZZ 430" in combination with gap fillers and insulations (additional components).

Components of "ZZ P40"	**Characteristics**
ZZ 430	Pipe collar according to Annex B-1 of the ETA with sheet steel housing and an inlay made of intumescent material

Gap fillers (additional components)	**Characteristics**
Gap filler	Non-combustible material with classification A1 or A2-s1,d0 according to EN 13501-1 which is dimensionally stable as e.g. mortar, cement or gypsum joint filler
Mineral wool	Stone wool according to EN 14303 with classification A1 according to EN 13501-1, a minimum compacted apparent density of 40 kg/m³ and a melting point > 1000 °C according to DIN 4102-17 (e.g. "Rockwool RL" from manufacturer "DEUTSCHE ROCKWOOL GmbH & Co. KG")

Insulations (additional components)	**Characteristics**
AF/Armaflex	Closed cell, flexible elastomeric foam (FEF) insulation in form of (slotted) tubes (can be provided with a self-adhesive device) with classification B_L-s3,d0 – including "Armaflex 520" – according to EN 13501-1 from manufacturer „Armacell GmbH"
AF/Armaflex Band selbstklebend (AF/Armaflex self-adhesive tape)	Closed cell, flexible elastomeric foam (FEF) insulation in form of tapes with a self-adhesive device with classification B-s3,d0 according to EN 13501-1 from manufacturer "Armacell GmbH"
Armaflex 520	Polychlorene-based adhesive, free from aromatic compounds (special adhesive for processing of all flexible Armaflex insulating material – except "HT/Armaflex") from manufacturer "Armacell GmbH"
Polyethylene sound insulation	Closed cell, flexible polyethylene foam insulation in form of stripes with a nominal thickness of up to 5 mm, a nominal density of 25 kg/m³ and classification E according to EN 13501-1 (e.g. "DIM PE-RO 5 B2" from manufacturer "W. Dimer GmbH")

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

2.1 Intended use

"ZZ P40" is intended to be used as a pipe penetration seal to temporarily or permanently reinstate the fire resistance performance of flexible wall constructions, rigid wall constructions and rigid floor constructions where they have been provided with apertures which are penetrated by various plastic pipes and multi-layer composite pipes.

"ZZ P40" can be installed only in the types of separating elements as specified in the following table.

Separating element	Construction
Flexible walls	> Steel studs or timber studs lined on both faces with minimum 2 layer of boards (minimum thickness 12,5 mm), or minimum one layer of boards (minimum thickness 25 mm) with classification A2-s1,d0 or A1 according to EN 13501-1 > For timber stud walls there shall be a minimum distance of 100 mm of the penetration seal to any timber stud. The cavity between the penetration seal and the timber stud has to be closed with minimum 100 mm of insulation with classification A1 or A2 according to EN 13501-1 > Minimum thickness 94 mm > Classification according to EN 13501-2: ≥ EI 60 > This European Technical Assessment does not cover sandwich panel constructions and flexible walls were the lining does not cover studs on both sides. Penetrations in such constructions shall be tested on a case by case basis
Rigid walls	> Aerated concrete, concrete, reinforced concrete, masonry > Minimum density 450 kg/m³ > Minimum thickness 100 mm > The rigid wall shall be classified in accordance with EN 13501-2 for the required fire resistance period
Rigid floors	> Aerated concrete, concrete, reinforced concrete > Minimum density 450 kg/m³ > Minimum thickness 150 mm > The rigid floor shall be classified in accordance with EN 13501-2 for the required fire resistance period

"ZZ P40" can only be configured as specified in the following tables. Other parts or service support constructions shall not penetrate the penetration seal.

Penetrating element	Construction characteristics for installation of the penetrating element – equipped with "ZZ 430" – in flexible walls, rigid walls and rigid floors
Plastic pipes	> PVC-U pipes according to EN ISO 1452-1 and DIN 8061 / DIN 8062 with diameters and wall thicknesses as defined in Annex D-2 and Annex G-2 of the ETA. For interpolation between pipe diameters and wall thicknesses see Annex D-2 and Annex G-2 of the ETA. > PE-HD pipes according to EN 1519-1, or EN 12201-2, or EN 12666-1 and DIN 8074 / DIN 8075 with diameters and wall thicknesses as defined in Annex D-1 and Annex G-1 of the ETA. For interpolation between pipe diameters and wall thicknesses see Annex D-1 and Annex G-1 of the ETA.
Multi-layer composite pipes	> "Uponor Uni Pipe Plus" and "Uponor MLC" from manufacturer "Uponor GmbH" with diameters and wall thicknesses as defined in Annex D-2 and Annex G-2 of the ETA.

2.2 Use condition

"ZZ P40" is intended for use at temperatures below 0°C and with exposure to UV, but with no exposure to rain, and can therefore – according to EAD 350454-00-1104 clause 2.2.9.3.1 – be categorized as Type Y_1. Since the requirements for Type Y_1 are met, also the requirements for Type Y_2, Z_1 and Z_2 are fulfilled.

Although a penetration seal is intended for indoor applications only, the construction process may result in it being subjected to more exposed conditions for a period before the building envelope is closed. For this case provisions shall be made to protect temporarily exposed penetration seals according to the ETA-holder's installation instructions.

2.3 Working life

The provisions made in this European Technical Assessment are based on an assumed working life of "ZZ P40" of 10 years, provided the conditions laid down in the technical literature of the manufacturer relating to packaging, transport, storage, installation, use and repair are met.

The indications given on the intended working life cannot be interpreted as a guarantee given by the producer or the Technical Assessment Body, but are to be regarded only as a means for selecting the appropriate product in relation to the expected economically reasonable working life of the works.

The real working life might be, in normal use conditions, considerably longer without major degradation affecting the Basic requirements for construction works.

2.4 General assumptions

2.4.1 It is assumed that

- damages to the penetration seal are repaired accordingly,
- the installation of the penetration seal does not affect the stability of the adjacent building element – even in case of fire,
- the lintel or floor above the penetration seal is designed structurally and in terms of fire protection such that no additional mechanical load (other than its own weight) is imposed on the penetration seal,
- the thermal movement in the pipe work will be accommodated in such way that it does not impose a load on the penetration seal,
- the installations are fixed to the adjacent building element (not to the penetration seal) in accordance with the relevant regulations in such a way that, in case of fire, no additional mechanical load is imposed to the penetration seal,
- the support of the installations is maintained for the required period of fire resistance and
- pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire.

2.4.2 This European Technical Assessment does not address any risks associated with the emission of dangerous liquids or gases caused by failure of the pipe(s) in case of fire nor does it prove the prevention of the transmission of fire through heat transfer via the medium in the pipes.

2.4.3 This European Technical Assessment does not verify the prevention of destruction of adjacent building elements with fire separating function or of the pipes themselves due to distortion forces caused by extreme temperatures. These risks shall be accounted for by taking appropriate measures when designing or installing the pipe work.

The mounting or hanging of the pipes or the layout of the pipe work shall be implemented in such a way that the pipes and the fire resistant building elements shall remain functional within a period of time which corresponds to the fire resistance period required.

2.4.4 The risk of downward spread of fire caused by burning material which drips through a pipe to floors below, is not considered in this European Technical Assessment (see EN 1366-3:2009, clause 1).

2.4.5 The durability assessment does not take account of the possible effect on the penetration seal of substances permeating through the pipe walls.

2.4.6 The assessment does not cover the avoidance of destruction of the penetration seal or of the adjacent building element(s) by forces caused by temperature changes in case of fire. This has to be considered when designing the piping system.

2.5 Manufacturing

The European Technical Assessment is issued for the product on the basis of agreed data / information, deposited with the Österreichisches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data / information being incorrect, should be notified to the Österreichisches Institut für Bautechnik before the changes are introduced.

The Österreichisches Institut für Bautechnik will decide whether or not such changes affect the European Technical Assessment and consequently the validity of the CE marking on the basis of the European Technical Assessment and if so whether further assessment or alterations to the European Technical Assessment, shall be necessary.

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

Basic requirements for construction works	Essential characteristic	Method of verification	Performance
BWR 2	Reaction to fire	EN 13501-1: 2007+A1:2009	Clause 3.1.1 of the ETA
	Resistance to fire	EN 13501-2: 2007+A1:2009 and EN 13501-2: 2016	Clause 3.1.2 of the ETA and Annex D-1, Annex D-2, Annex G-1 and Annex G-2 of the ETA
BWR 3	Air permeability	No performance assessed	
	Water permeability	No performance assessed	
	Content, emission and/or release of dangerous substances	No performance assessed	
BWR 4	Mechanical resistance and stability	No performance assessed	
	Resistance to impact / movement	No performance assessed	
	Adhesion	No performance assessed	
	Durability	EAD 350454-00-1104 clause 2.2.9	Clause 3.3.4 of the ETA
BWR 5	Airborne sound insulation	No performance assessed	
BWR 6	Thermal properties	No performance assessed	
	Water vapour permeability	No performance assessed	

3.1 Safety in case of fire (BWR 2)

3.1.1 Reaction to fire

The components of “ZZ P40” were assessed according to EAD 350454-00-1104 clause 2.2.1 and classified according to EN 13501-1:2007+A1:2009.

Component	Class according to EN 13501-1:2007+A1:2009
Intumescent inlay of ZZ 430	**E**
Sheet steel housing of ZZ 430	**A1**

3.1.2 Resistance to fire

"ZZ P40" was tested according to EAD 350454-00-1104 clause 2.2.2, prEN 1366-3.2:N185:2007-07 and EN 1366-3:2009 in conjunction with EN 1363-1:1999 and EN 1363-1:2012.

Based upon the gained test results and the field of application specified within prEN 1366-3.2:N185:2007-07 and EN 1366-3:2009 the pipe penetration seal "ZZ P40" has been classified according to EN 13501-2:2007+A1:2009 and EN 13501-2:2016.

The fire resistance classes of the pipe penetration seal "ZZ P40" in the relevant separating elements are listed in Annex D-1 to D-2 and Annex G-1 to G-2 of the ETA.

The resistance to fire classification listed in Annex D-1 to D-2 and Annex G-1 to G-2 of the ETA is only valid if "ZZ P40" is installed according to Annex A-1 to A-6 of the ETA.

3.2 Hygiene, health and the environment (BWR 3)

3.2.1 Air permeability

No performance assessed.

3.2.2 Water permeability

No performance assessed.

3.2.3 Content, emission and/or release of dangerous substances

No performance assessed.

3.3 Safety and accessibility in use (BWR 4)

3.3.1 Mechanical resistance and stability

No performance assessed.

3.3.2 Resistance to impact / movement

No performance assessed.

3.3.3 Adhesion

No performance assessed.

3.3.4 Durability

The metal housing of "ZZ 430" is made of austenitic stainless steel (alloy 1.4301) according to EN 10088-2.

According to EAD 350454-00-1104 clause 2.2.9.2.5 and Annex B of EN 10088-1 ferritic stainless steels have relatively low corrosion resistance and their use should normally be restricted to mild indoor or similarly protected environments and austenitic stainless steels are normally appropriate for use in all use conditions. These types of stainless steels are therefore appropriate for use in use condition Y_1.

The intumescent inlay of "ZZ 430" fulfils the requirements for use at temperatures below 0°C with exposure to UV, but with no exposure to rain, and can therefore – according to EAD 350454-00-1104 clause 2.2.9.3.1 – be categorized as Type Y_1.

"ZZ 430" fulfils the requirements for the intended use condition.

"ZZ P40" is therefore appropriate for use at temperatures below 0°C and with exposure to UV, but with no exposure to rain, and can – according to EAD 350454-00-1104 clause 2.2.9.3.1 – be categorized as Type Y_1. Since the requirements for Type Y_1 are met, also the requirements for Type Y_2, Z_1 and Z_2 are fulfilled.

3.4 Protection against noise (BWR 5)

3.4.1 Airborne sound insulation

No performance assessed.

3.5 Energy economy and heat retention (BWR 6)

3.5.1 Thermal properties

No performance assessed.

3.5.2 Water vapour permeability

No performance assessed.

4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

4.1 AVCP system

According to the Decision 1999/454/EC[1], amended by Decision 2001/596/EC[2] of the European Commission the system of assessment and verification of constancy of performance (see Annex V of Regulation (EU) No 305/2011) is given in the following table.

Product(s)	**Intended use(s)**	**Level(s) or class(es)** (resistance to fire)	**System** of assessment and verification of constancy of performance
Fire Stopping and Fire Sealing Products	for fire compartmentation and/or fire protection or fire performance	any	1

In addition, according to the Decision 1999/454/EC, amended by Decision 2001/596/EC of the European Commission the system(s) of assessment and verification of constancy of performance, with regard to reaction to fire, is given in the following table.

Product(s)	**Intended use(s)**	**Level(s) or class(es)** (reaction to fire)	**System** of assessment and verification of constancy of performance
Fire Stopping and Fire Sealing Products	for uses subject to regulations on reaction to fire	A1*, A2*, B*, C*	1
		A1**, A2**, B**, C**, D, E	3
		(A1 to E)***, F	4

* Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material)

** Products/materials not covered by footnote (*)

*** Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of class A1 according to Commission Decision 96/603/EC, as amended)

[1] Official Journal of the European Communities no. L 178, 14.7.1999, p. 52
[2] Official Journal of the European Communities no. L 209, 2.8.2001, p. 33

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

The notified product certification body shall visit the factory at least twice a year for surveillance of the manufacturer.

Issued in Vienna on 10.01.2019
by Österreichisches Institut für Bautechnik

The original document is signed by:

Rainer Mikulits
Managing Director

1 General

> "ZZ P40" can be used on plastic pipes and multi-layer composite pipes according to clause 2.1 of the ETA in walls (vertical separating element) and floors (horizontal separating element) according to clause 2.1 of the ETA.

> Each plastic pipe or multi-layer composite pipe which is to be sealed off has to be equipped with "ZZ 430" and protected by appropriate precautions as described in clause 2 of Annex A-2 to A-5 of the ETA.

> In some cases it is allowed to install "ZZ P40" on plastic pipes (Ø ≤ 110 mm) with pipe elbows and pipe couplings at the bottom side of the floor. For details see Annex F-1 of the ETA.

1.1 Pipe end configuration

> For plastic pipes classified with pipe end configuration U/U the pipe end configuration can be U/U, C/U, U/C, C/C.

> For multi-layer composite pipes classified with pipe end configuration U/C the pipe end configuration can be U/C and C/C.

1.2 Orientation of the penetrating elements

> Plastic pipes and multi-layer composite pipes have to be installed perpendicular to the surface of the separating element.

1.3 Service support constructions

> All types of plastic pipes and multi-layer composite pipes – in flexible walls and rigid walls – have to be supported on both sides of the separating element by service support constructions (e.g. pipe hangers) made of metal with a melting or decomposition point greater or equal than 842 °C for EI 30, or 945 °C for EI 60, or 1006 °C for EI 90, or 1049 °C for EI 120 (e.g. stainless steel or galvanized steel) according to the ETA-holder's installation instructions.

> All types of plastic pipes and multi-layer composite pipes – in rigid floors – have to be supported at least on the top side of the separating element by service support constructions (e.g. pipe hangers) made of metal with a melting or decomposition point greater or equal than 842 °C for EI 30, or 945 °C for EI 60, or 1006 °C for EI 90, or 1049 °C for EI 120 (e.g. stainless steel or galvanized steel) according to the ETA-holder's installation instructions.

> The first support (service support construction) for plastic pipes and multi-layer composite pipes in flexible walls, rigid walls and rigid floors has to be at maximum 650 mm (measured from the surface of the separating element).

> All types of plastic pipes and multi-layer composite pipes have to be fixed according to the ETA-holder's installation instructions to the service support construction.

ZZ P40 **- Details for installation -**	**ANNEX A-1**

2 Details for installation of "ZZ P40" (see Annex B-1 to F-1 of the ETA)

> "ZZ P40" has to be installed according to the ETA-holder's installation instructions.

> The smallest pipe collar corresponding to the relevant outer diameter of the pipe to be sealed off has to be used.

> The pipe collar appropriate for the diameter of the plastic pipe which has to be sealed off has to be selected from the table given in Annex B-1 of the ETA.

> The pipe collar appropriate for the diameter of the multi-layer composite pipe which has to be sealed off has to be selected from the table given in Annex D-2 and Annex G-2 of the ETA.

> The number of fixing lugs shall not be reduced.

2.1 Plastic pipes and multi-layer composite pipes in vertical separating elements

> For plastic pipes and multi-layer composite pipes in vertical separating elements the pipe collar "ZZ 430" has to be installed on both sides of the separating element (see Annex C-1 to Annex C-3 and Annex E-1 of the ETA).

2.2 Plastic pipes and multi-layer composite pipes in horizontal separating elements

> For plastic pipes and multi-layer composite pipes in horizontal separating elements the pipe collar "ZZ 430" has to be installed at the bottom side of the separating element (see Annex C-4 to Annex C-6 and Annex E-2 to Annex E-4 of the ETA).

> For plastic pipes with pipe elbows and pipe couplings within horizontal separating elements the pipe collar "ZZ 430" has to be installed at the bottom side of the separating element (see Annex F-1 of the ETA).

ZZ P40 **- Details for installation -**	**ANNEX A-2**

2.3 Fixing

> In case of pipe collars mounted on the surface of rigid walls or rigid floors the pipe collars have to be fixed by using screws and steel plugs or screw anchors that are suitable for the substrate (6 mm diameter in each case), washers and nuts according to the ETA holder's installation instructions. For the minimum number of fixing lugs to be fastened see Annex B-1 of the ETA (for details see Annex C-1 to Annex C-6 of the ETA).

> In case of pipe collars mounted on the surface of flexible walls the pipe collars have to be fixed by using threaded rods (thread size M6), washers and nuts according to the ETA holder's installation instructions. For the minimum number of fixing lugs to be fastened see Annex B-1 of the ETA (for details see Annex C-1 to Annex C-3 of the ETA).

> In case of pipe collars mounted on the surface of aerated concrete walls or floors the pipe collars have to be fixed by using dry-wall screws or chipboard screws (minimum diameter in each case 4,2 mm), washers and nuts according to the ETA holder's installation instructions For the minimum number of fixing lugs to be fastened see Annex B-1 of the ETA (for details see Annex C-1 to Annex C-6 of the ETA).

> Alternatively, in case of pipe collars mounted on the surface of separating element the pipe collars can be fixed by using threaded rods (thread size M6), washers and nuts according to the ETA holder's installation instructions. For the minimum number of fixing lugs to be fastened see Annex B-1 of the ETA (for details see Annex C-1 to Annex C-6 of the ETA).

> In case of pipe collars embedded into vertical separating elements the pipe collars have to be slided into the opening on both sides of the separating element so that 30 mm of the collar is projecting from the surface of the separating element according to the ETA holder's installation instructions. The annular gap has to be filled according to clause 2.5 of Annex A-5 of the ETA (for details see Annex E-1 of the ETA).

> In case of pipe collars embedded into horizontal separating elements the pipe collars have to be slided into the opening from the bottom side of the separating element so that 30 mm of the collar is projecting from the surface of the separating element according to the ETA holder's installation instructions. The annular gap has to be filled according to clause 2.5 of Annex A-5 of the ETA (for details see Annex E-2 to Annex E-4 of the ETA).

> In case of pipe collars installed around pipe elbows and pipe couplings the smallest pipe collar corresponding to the relevant outer diameter of the pipe elbows or pipe couplings to be sealed off has to be used. The annular space between the pipe and "ZZ 430" has to be ≤ 15 mm. The annular gap has to be filled according to clause 2.5 of Annex A-5 of the ETA (for details see Annex F-1 of the ETA).

ZZ P40 **- Details for installation -**	**ANNEX A-3**

2.4 Insulation

2.4.1 General

> Multi-layer composite pipes according to Annex D-2 and Annex G-2 of the ETA with an outer diameter > 16 mm have to be insulated with “AF/Armaflex” according to Annex D-2 and Annex G-2 of the ETA.

> Multi-layer composite pipes according to Annex D-2 and Annex G-2 of the ETA with an outer diameter of 16 mm can be insulated with “AF/Armaflex” according to Annex D-2 and Annex G-2 of the ETA.

> Plastic pipes as well as pipe couplings and pipe elbows can be insulated with polyethylene sound insulation according to clause 1 of the ETA. The length of the polyethylene sound insulation shall be ≥ 240 mm.

> Pipe collars on insulated pipes have to be installed on the insulation. The pipe collars shall not be covered by the insulation.

2.4.2 Installation of “AF/Armaflex”

> The thickness of the tube has to correspond with the provisions given in Annex D-2 and Annex G-2 of the ETA.

> The length of the tube has to be ≥ 425 mm (local-sustained LS or continued-sustained CS) on both sides of the separating element (measured from the surface of the separating element).

> The tube has to be continuous along the required minimum insulation length.

ZZ P40 **- Details for installation -**	**ANNEX A-4**

2.5 Annular gap

> The annular gap (maximum width 50 mm) between the pipe and flexible wall has to be completely (over the entire thickness of the separating element) filled with gap filler – non-combustible material with classification A1 or A2-s1,d0 according to EN 13501-1 e.g. gypsum joint filler – according to clause 1 of the ETA.

> Alternatively the annular gap (maximum width 50 mm) can be sealed off with minimum 25 mm gap filler – non-combustible material with classification A1 or A2-s1,d0 according to EN 13501-1 e.g. gypsum joint filler – on both sides of the separating element and backfilled with mineral wool – stone wool according to EN 14303 with classification A1 according to EN 13501-1 and a minimum compacted apparent density of 40 kg/m³ – according to clause 1 of the ETA (for details see Annex C-1 to Annex C-3 and Annex E-1 of the ETA).

> In case of non-insulated flexible walls it has to be ensured that the cavity of the flexible wall around the annular gap is filled to a depth of ≥ 200 mm with stone wool with classification A2-s1,d0 or A1 according to EN 13501-1.

> The annular gap (maximum width 50 mm) between the pipe and rigid wall or rigid floor has to be completely (over the entire thickness of the separating element) filled with gap filler – non-combustible material with classification A1 or A2-s1,d0 according to EN 13501-1 e.g. mortar – according to clause 1 of the ETA.

> Alternatively the annular gap (maximum width 50 mm) can be sealed off with minimum 25 mm gap filler – non-combustible material with classification A1 or A2-s1,d0 according to EN 13501-1 e.g. mortar – on both sides of the separating element and backfilled with mineral wool – stone wool according to EN 14303 with classification A1 according to EN 13501-1 and a minimum compacted apparent density of 40 kg/m³ – according to clause 1 of the ETA (for details see Annex C-1 to Annex C-6 and Annex E-1 to Annex E-4 of the ETA).

> The annular gap (maximum width 50 mm) between the pipe elbow or pipe coupling and rigid floor has to be completely (over the entire thickness of the separating element) filled with gap filler – non-combustible material with classification A1 or A2-s1,d0 according to EN 13501-1 e.g. mortar – according to clause 1 of the ETA.

> Alternatively the annular gap (maximum width 50 mm) can be sealed off with minimum 25 mm gap filler – non-combustible material with classification A1 or A2-s1,d0 according to EN 13501-1 e.g. mortar – on both sides of the separating element and backfilled with mineral wool – stone wool according to EN 14303 with classification A1 according to EN 13501-1 and a minimum compacted apparent density of 40 kg/m³ – according to clause 1 of the ETA (for details see Annex F-1 of the ETA).

ZZ P40 **- Details for installation -**	**ANNEX A-5**

3 Minimum working clearances

> The minimum working clearances for plastic pipes (a; for pipes only linear arrangement is permitted, no clusters) and the minimum clearance between the penetration seals are specified in Annex C-1, Annex C-4 and Annex E-1 to Annex E-2 of the ETA.

> The minimum working clearance between penetration seals for multi-layer composite pipes Ø > 16 mm is specified in Annex C-2, Annex C-5 and Annex E-3 of the ETA.

> The minimum working clearance between penetration seals for multi-layer composite pipes Ø 16 mm is specified in Annex C-3, Annex C-6 and Annex E-4 of the ETA. Two multi-layer composite pipes with an outer diameter of 16 mm can be sealed off with one pipe collar "ZZ 430-32".

4 Transport and storage

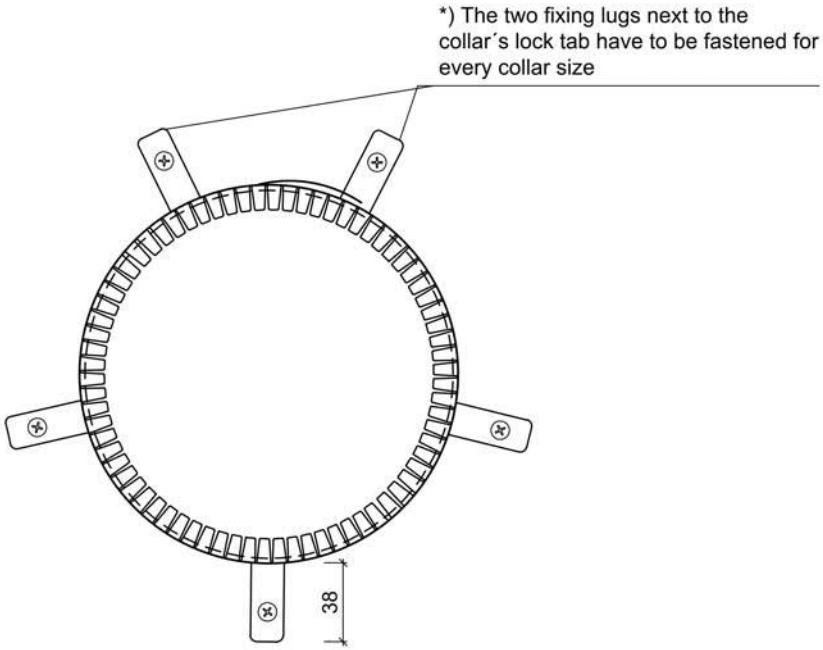
> The indications of the manufacturer regarding transport and storage (minimum and maximum storing temperature, maximum duration of storage) have to be followed.

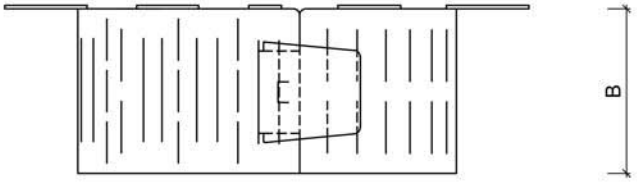
5 Use, maintenance and repair

> The fire resistance of the penetration seal shall not be negatively affected by future changes to buildings or building elements.

> The assessment of the fitness for use is based on the assumption that necessary maintenance and repair if required is carried out in accordance with the manufacturer's instructions during the assumed intended working life.

ZZ P40 **- Details for installation -**	**ANNEX A-6**





All dimensions in mm

Pipe outer diameter [mm]	Size of ZZ 430		Thickness of intumescent inlay [mm]	Width of intumescent inlay [mm]	Minimum number of fixing lugs to be fastened *) [pcs]
32	ZZ 430-32		7	7	3
40	ZZ 430-40		7	7	3
50	ZZ 430-110	ZZ 430-50	7	70	3
75		ZZ 430-75	7	70	3
90		ZZ 430-90	7	70	3
110		ZZ 430-110	7	70	4
125	ZZ 430-160	ZZ 430-125	12	80	4
140		ZZ 430-140	12	80	4
150		ZZ 430-150	12	80	5
160		ZZ 430-160	12	80	5

ZZ P40

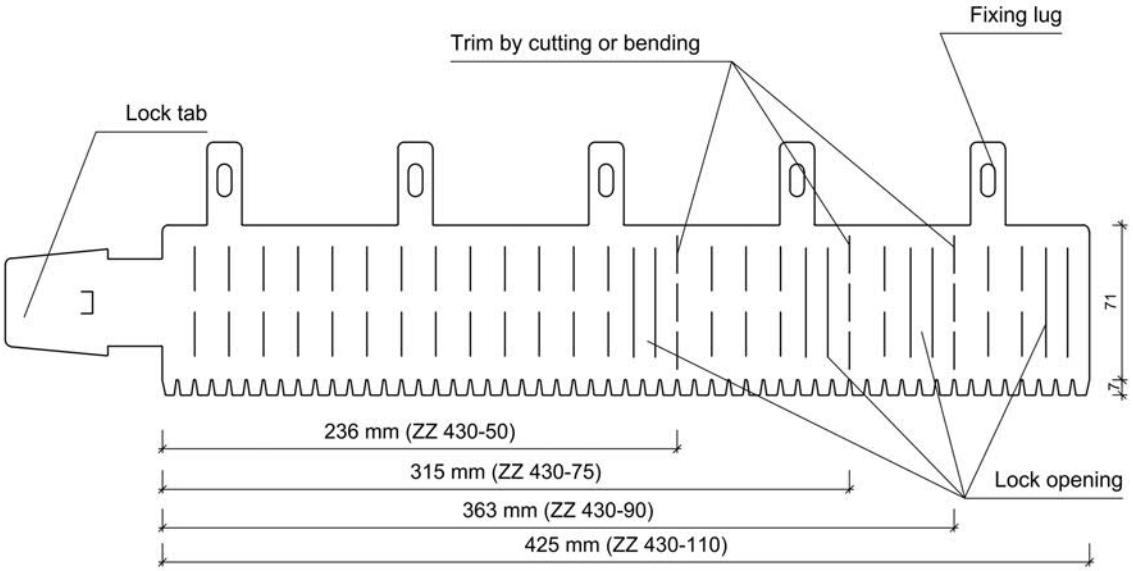
- Description of ZZ 430 -

- Dimensions of ZZ 430 for appropriate pipe diameter -

ANNEX B-1

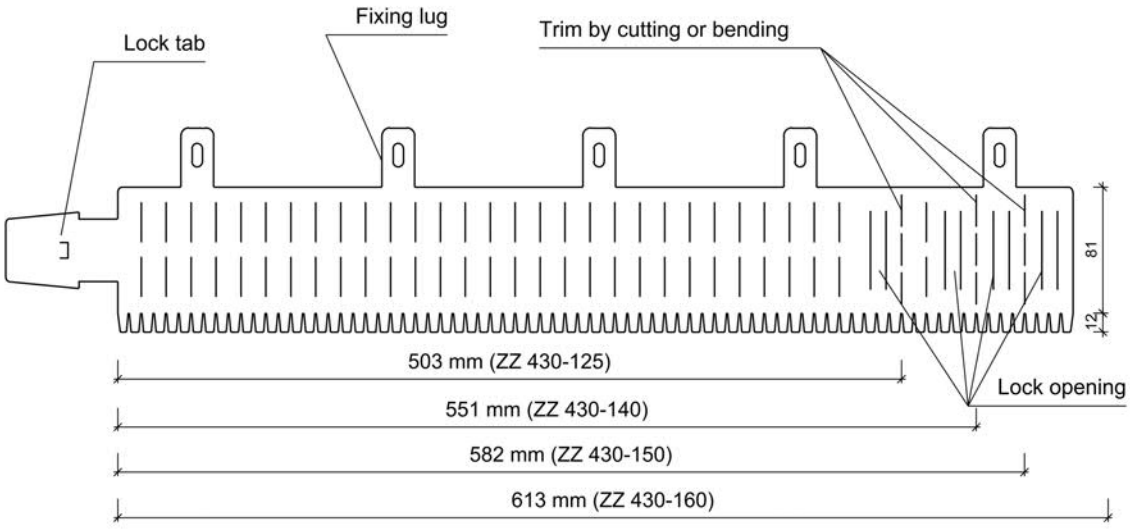
ZZ 430-110:

Material: stainless steel (1.4301) acc. to EN 10088
Sheet thickness: 0,6 mm +/- 0,1 mm



ZZ 430-160:

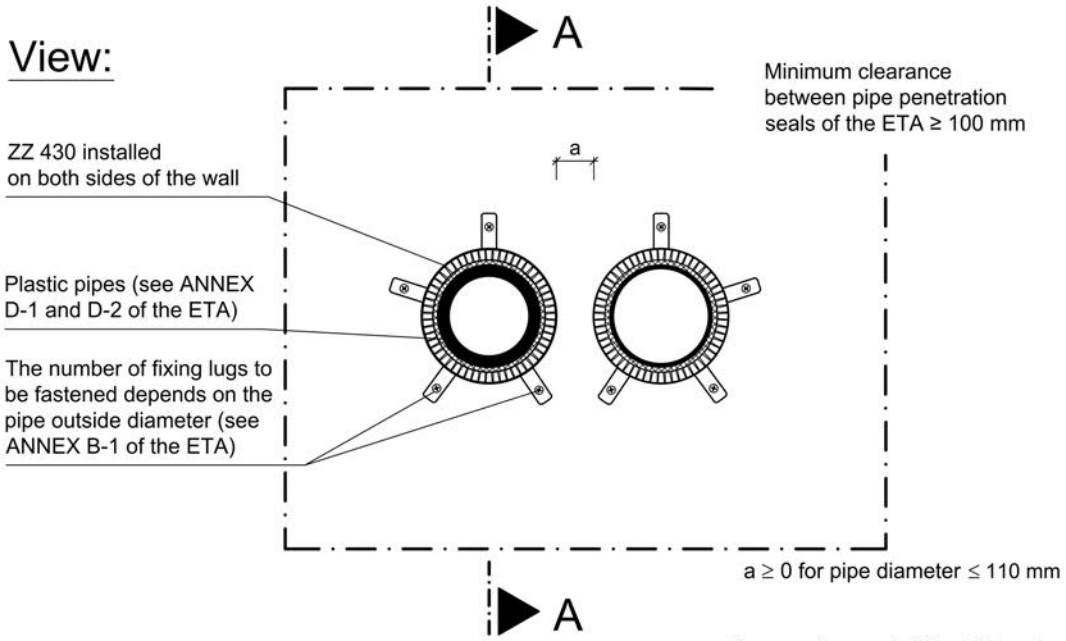
Material: stainless steel (1.4301) acc. to EN 10088
Sheet thickness: 0,6 mm +/- 0,1 mm



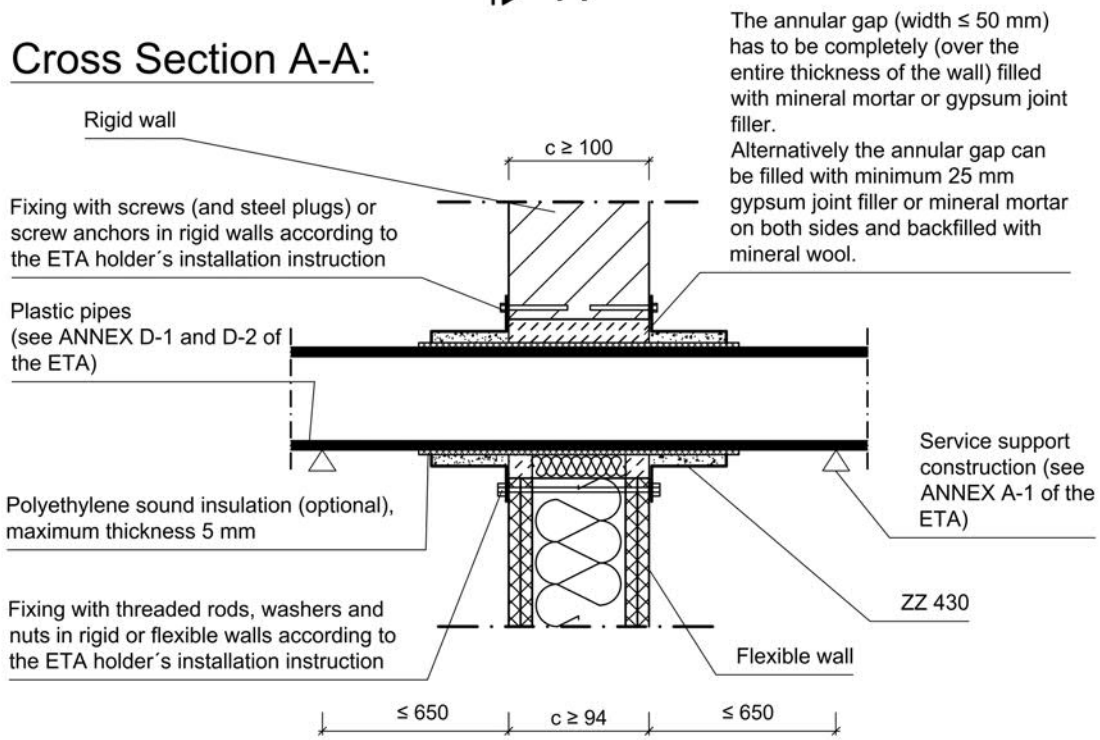
All dimensions in mm

ZZ P40 **- Description of ZZ 430 -** **- Dimensions of ZZ 430-110 and ZZ 430-160 -**	**ANNEX B-2**

View:



Cross Section A-A:



All dimensions in mm

Separating element	Wall thickness c [mm]	Fire resistance classification
Rigid wall	≥ 100	see ANNEX D-1 and D-2 of the ETA
Flexible wall	≥ 94	

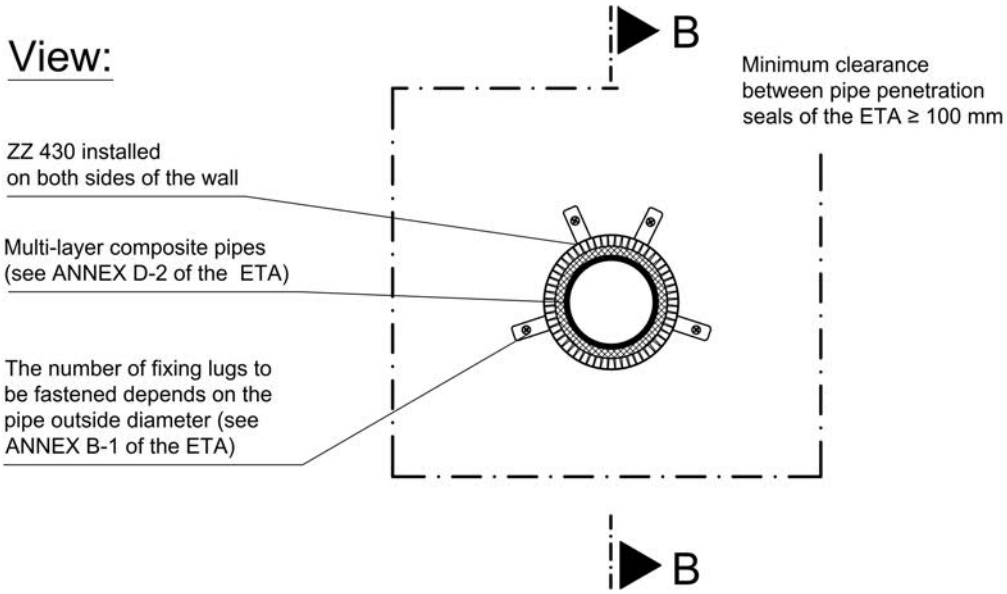
ZZ P40

- Surface mounted installation -

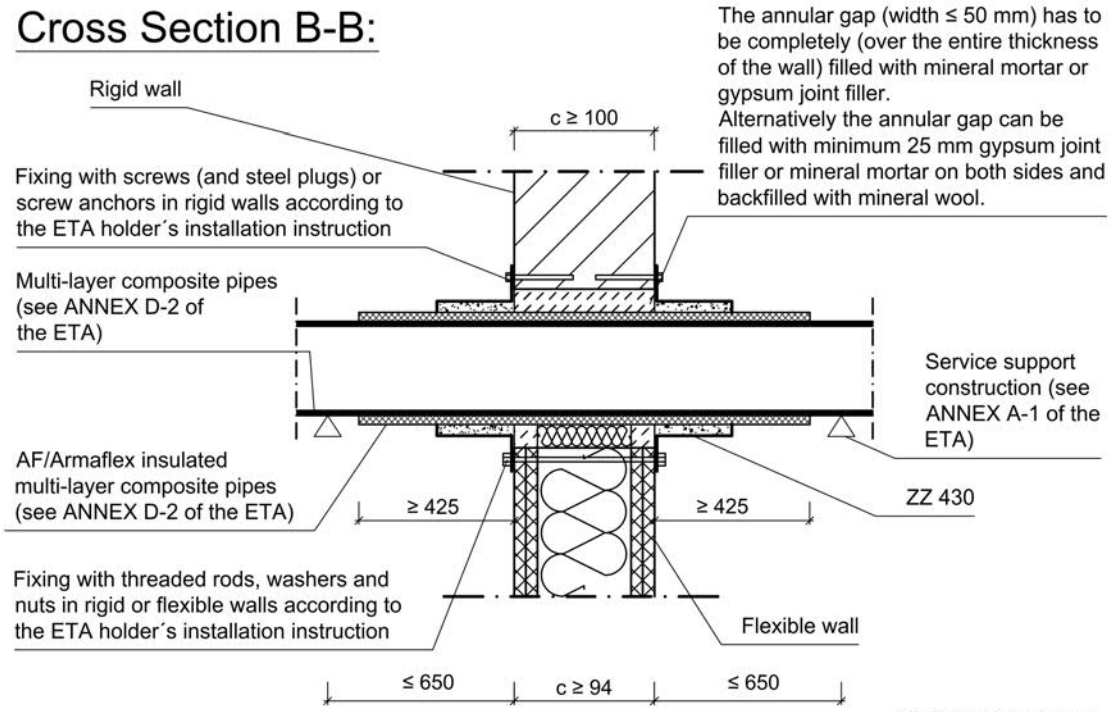
- Installation of plastic pipes in flexible wall and rigid wall -

ANNEX C-1

View:



Cross Section B-B:



All dimensions in mm

Separating element	Wall thickness c [mm]	Fire resistance classification
Rigid wall	≥ 100	see ANNEX D-2 of the ETA
Flexible wall	≥ 94	

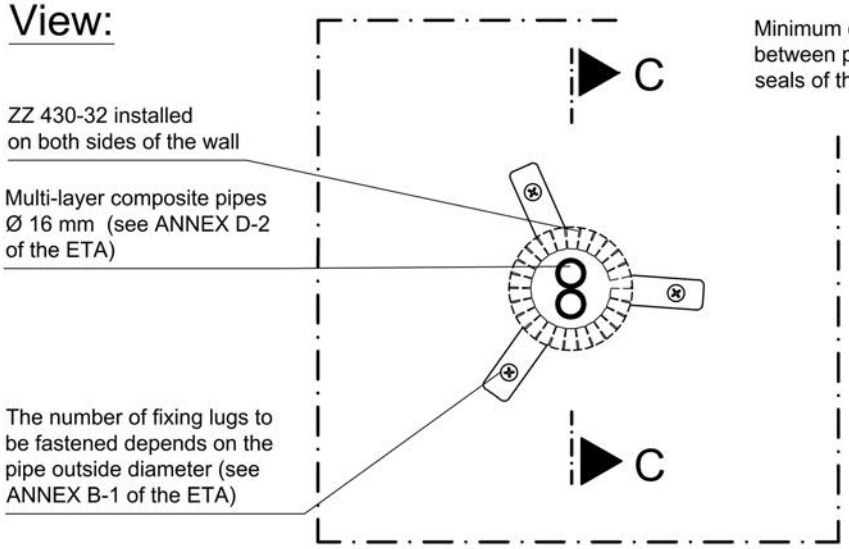
ZZ P40

- Surface mounted installation -

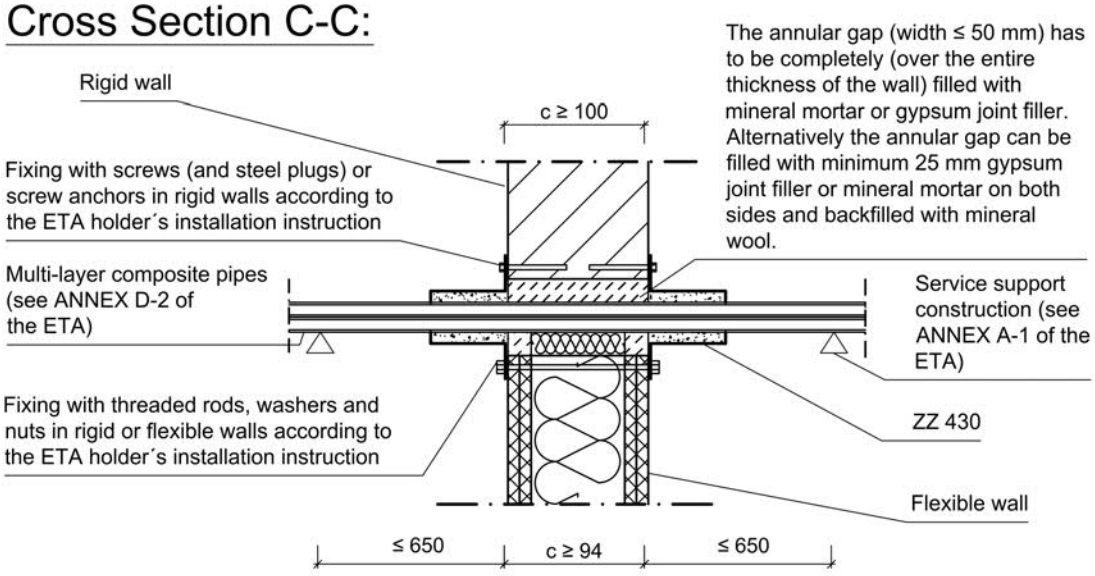
- Installation of multilayer-composite pipes in flexible wall and rigid wall -

ANNEX C-2

View:



Cross Section C-C:



All dimensions in mm

Separating element	Wall thickness c [mm]	Fire resistance classification
Rigid wall	≥ 100	see ANNEX D-2 of the ETA
Flexible wall	≥ 94	

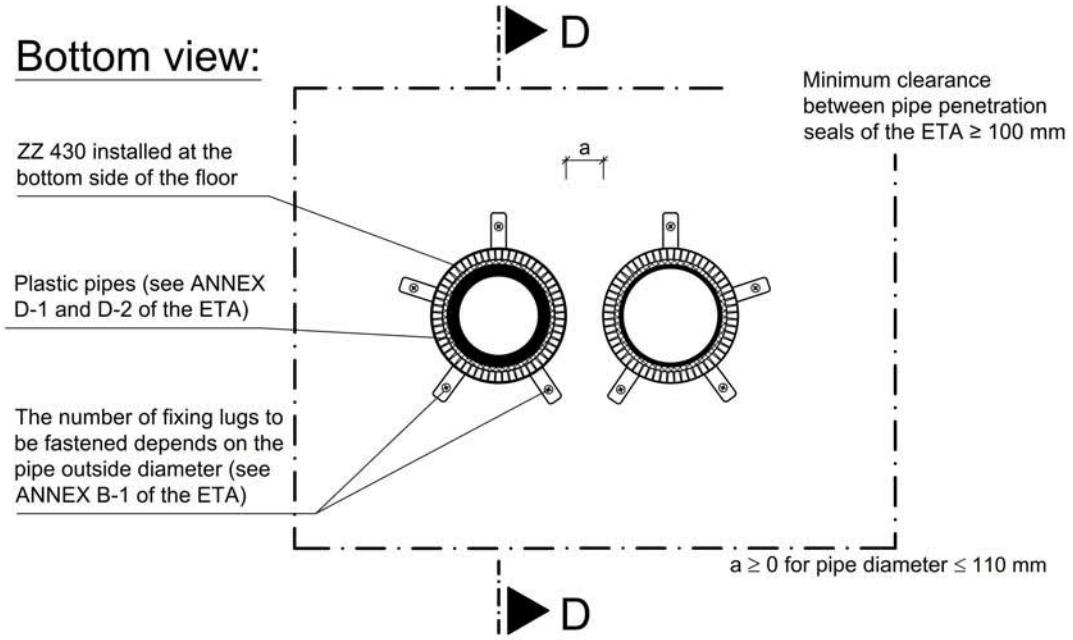
ZZ P40

- Surface mounted installation -

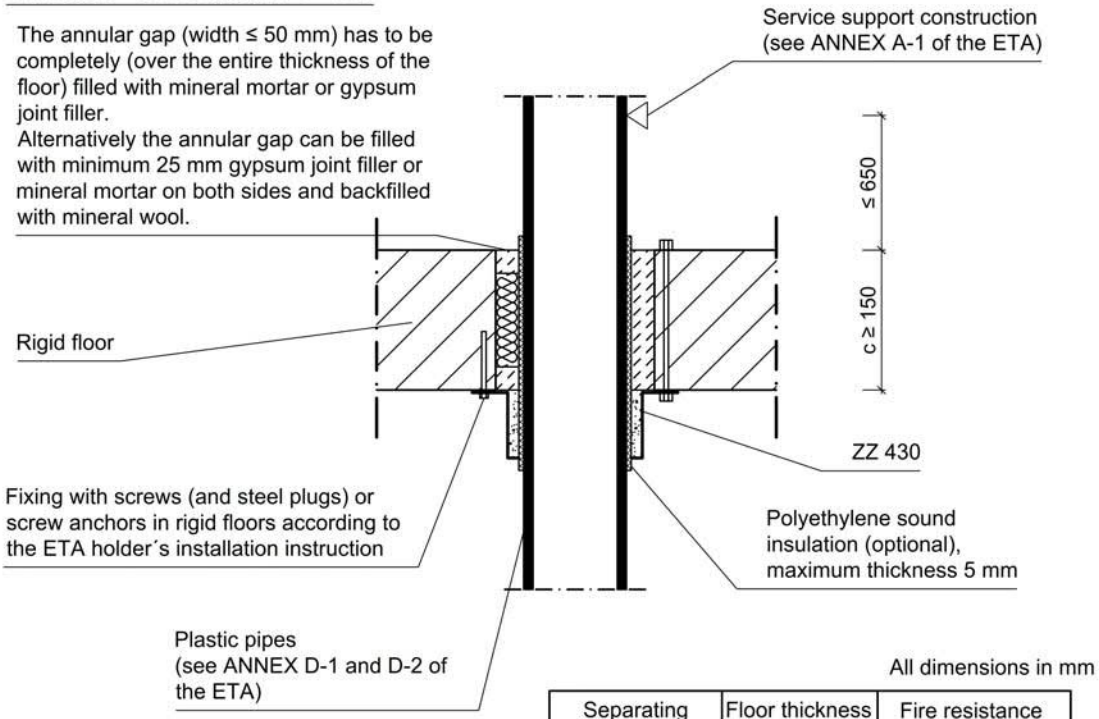
- Installation of multilayer-composite pipes in flexible wall and rigid wall -

ANNEX C-3

Bottom view:



Cross Section D-D:



All dimensions in mm

Separating element	Floor thickness c [mm]	Fire resistance classification
Rigid floor	≥ 150	see ANNEX D-1 and D-2 of the ETA

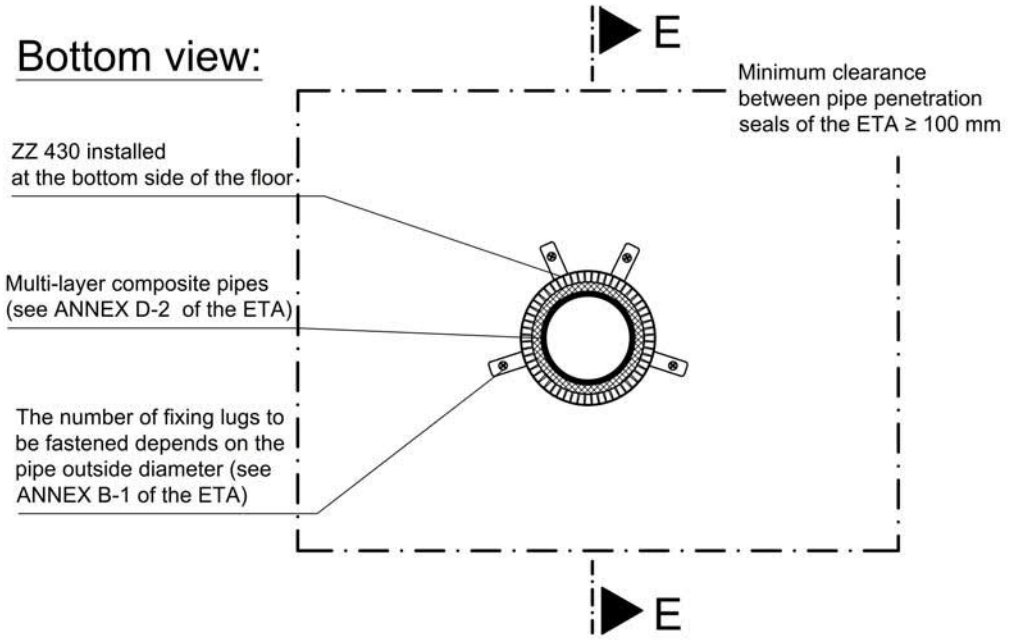
ZZ P40

- Surface mounted installation -

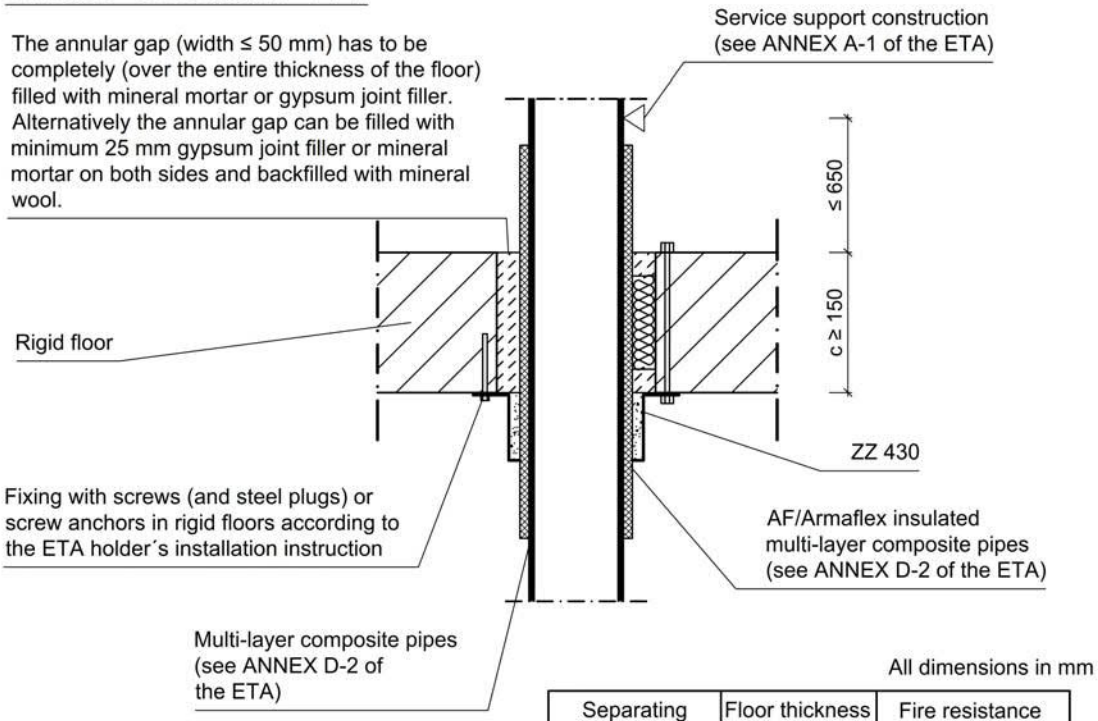
- Installation of plastic pipes in rigid floor -

ANNEX C-4

Bottom view:



Cross Section E-E:



All dimensions in mm

Separating element	Floor thickness c [mm]	Fire resistance classification
Rigid floor	≥ 150	see ANNEX D-2 of the ETA

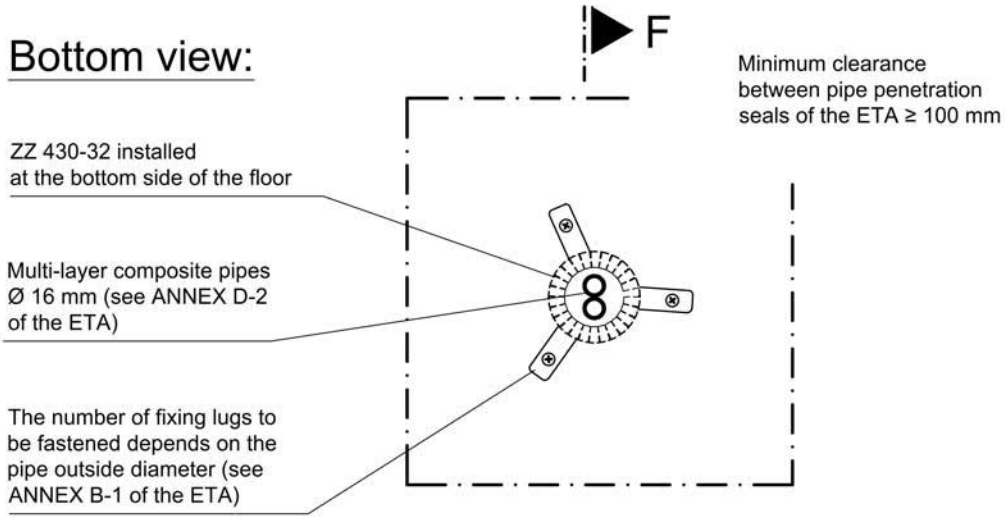
ZZ P40

- Surface mounted installation -

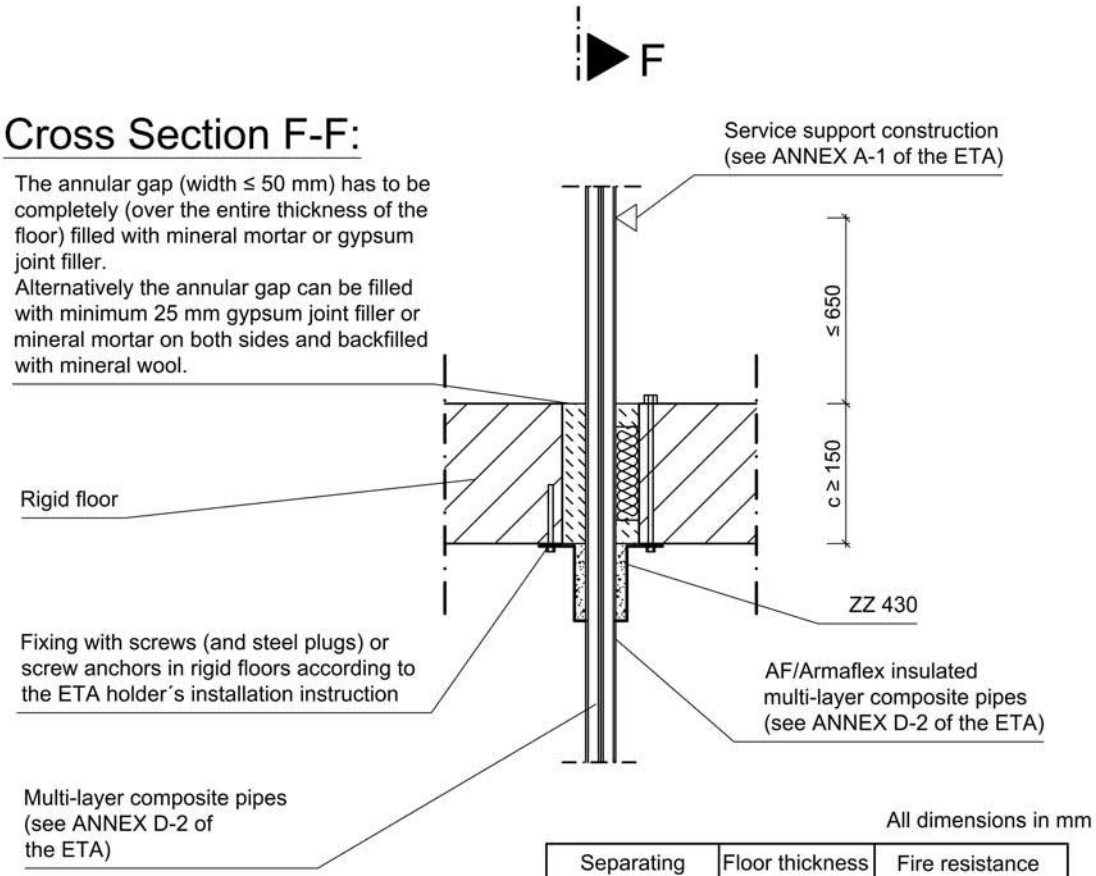
- Installation of multi-layer composite pipes in rigid floor -

ANNEX C-5

Bottom view:



Cross Section F-F:



All dimensions in mm

Separating element	Floor thickness c [mm]	Fire resistance classification
Rigid floor	≥ 150	see ANNEX D-2 of the ETA

ZZ P40

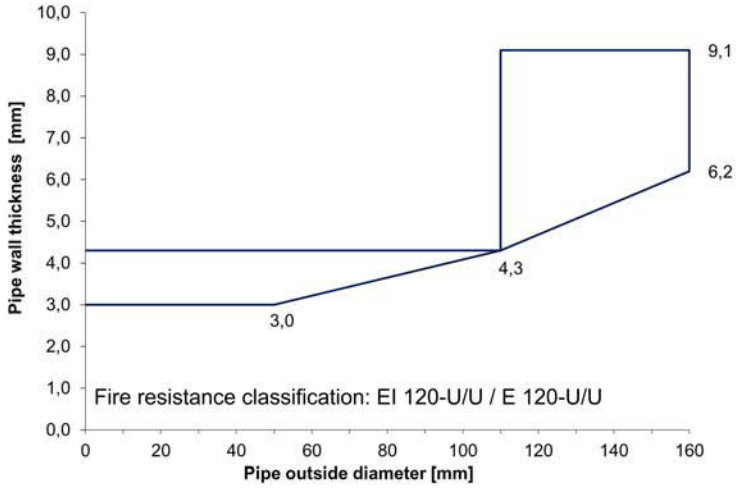
- Surface mounted installation -

- Installation of multi-layer composite pipes in rigid floor -

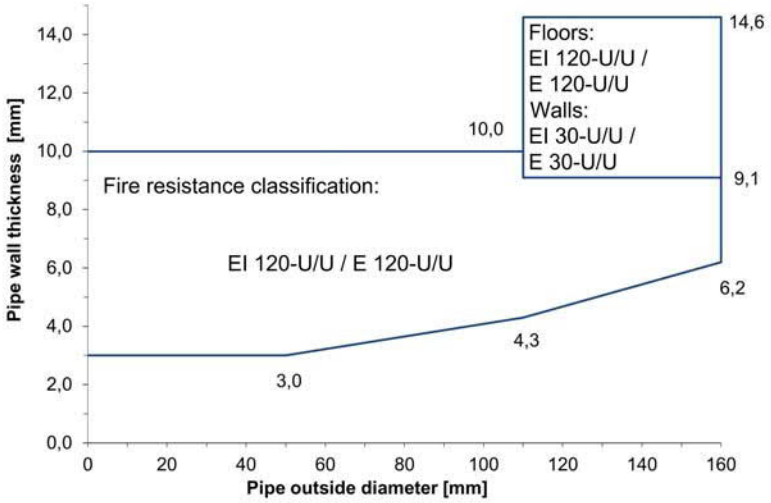
ANNEX C-6

Field of application of plastic pipes:

Plastic pipes made of PE-HD acc. to clause 2.1 of the ETA (U/U), (C/U), (U/C) and (C/C)



Plastic pipes made of PE-HD acc. to clause 2.1 of the ETA (U/U), (C/U), (U/C) and (C/C)



ZZ P40

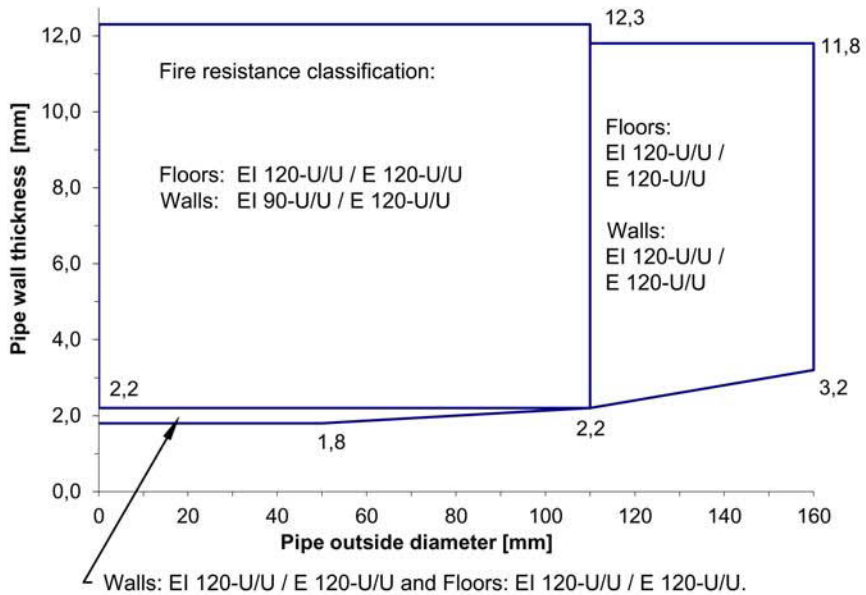
- Surface installation -

- Field of application and fire resistance classification -

ANNEX D-1

Field of application of plastic pipes:

Plastic pipes made of PVC-U acc. to clause 2.1 of the ETA (U/U), (C/U), (U/C) and (C/C)



Field of application of multi-layer composite pipes:

AF/Armaflex (acc. to clause 1 of the ETA) insulated multi-layer composite pipes "Uponor Uni Pipe PLUS" and "Uponor MLC" acc. to clause 2.1 of the ETA (U/C) and (C/C) with sustained insulation (LS or CS)

Penetrating element	Outer diameter of the pipe	Pipe wall thickness	Armaflex AF		ZZ 430	Fire resistance classification	
	[mm]	[mm]	Insulation thickness [mm]	Insulation length (LS, CS) [mm]	Size	Wall	Floor
Uponor Uni Pipe PLUS	16	2	-	-	ZZ 430-32	EI 120-U/C / E 120-U/C	EI 90-U/C / E 90-U/C
			9,5	≥ 425	ZZ 430-32	EI 60-U/C / E 120-U/C	EI 90-U/C / E 90-U/C
	20	2,25	9,5	≥ 425	ZZ 430-40		
	25	2,5			ZZ 430-50		
	32	3,0			ZZ 430-50		
Uponor MLC	40	4,0			ZZ 430-75		
	50	4,5			ZZ 430-75		
	63	6,0			ZZ 430-90		
	75	7,5			ZZ 430-110		
	90	8,5			ZZ 430-125	EI 90-U/C / E 120-U/C	EI 60-U/C / E 60-U/C
	110	10,0			ZZ 430-125		

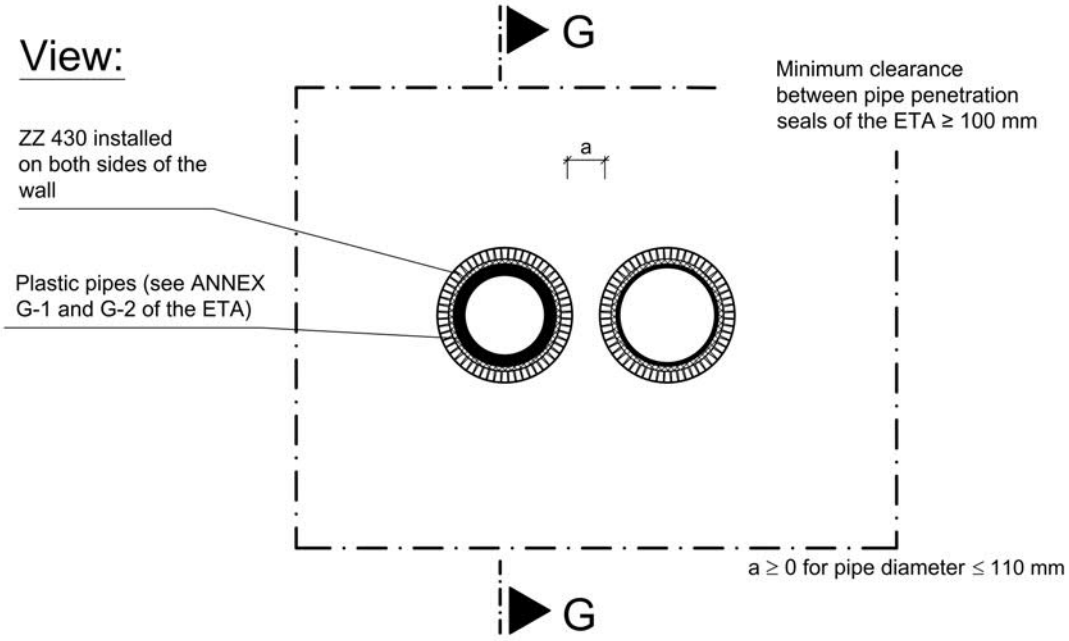
ZZ P40

- Surface installation -

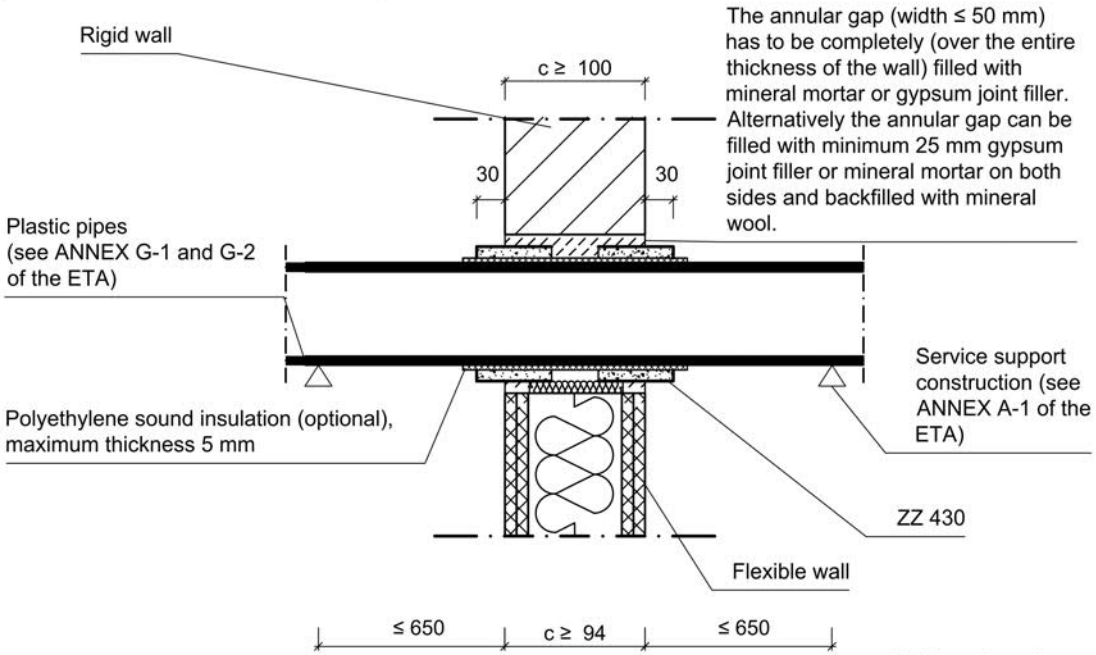
- Field of application and fire resistance classification -

ANNEX D-2

View:



Cross Section G-G:



All dimensions in mm

Separating element	Wall thickness c [mm]	Fire resistance classification
Rigid wall	≥ 100	see ANNEX G-1 and G-2 of the ETA
Flexible wall	≥ 94	

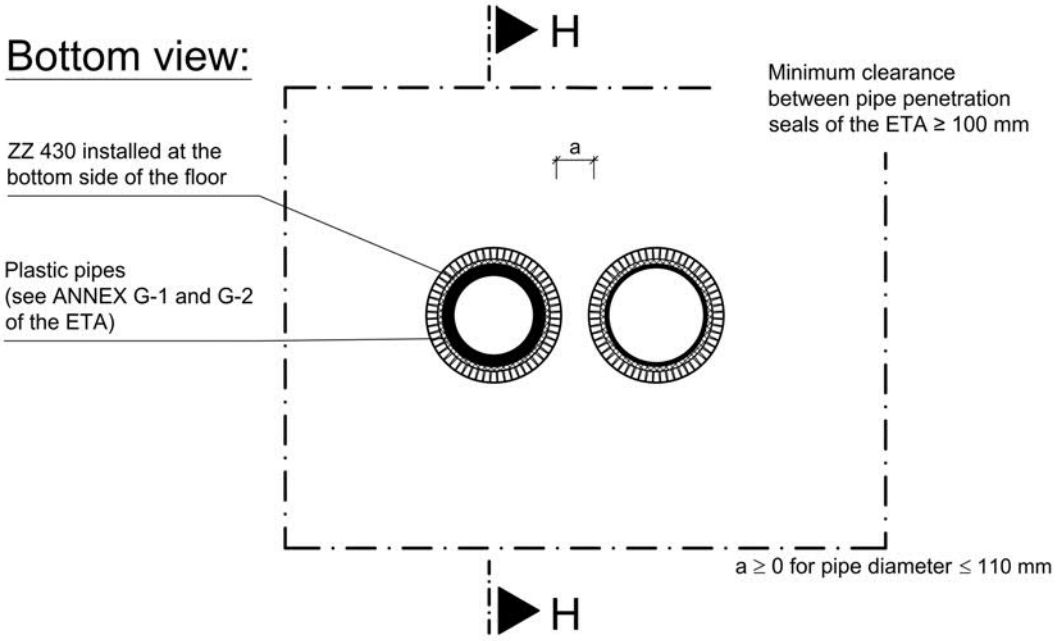
ZZ P40

- Embedded installation -

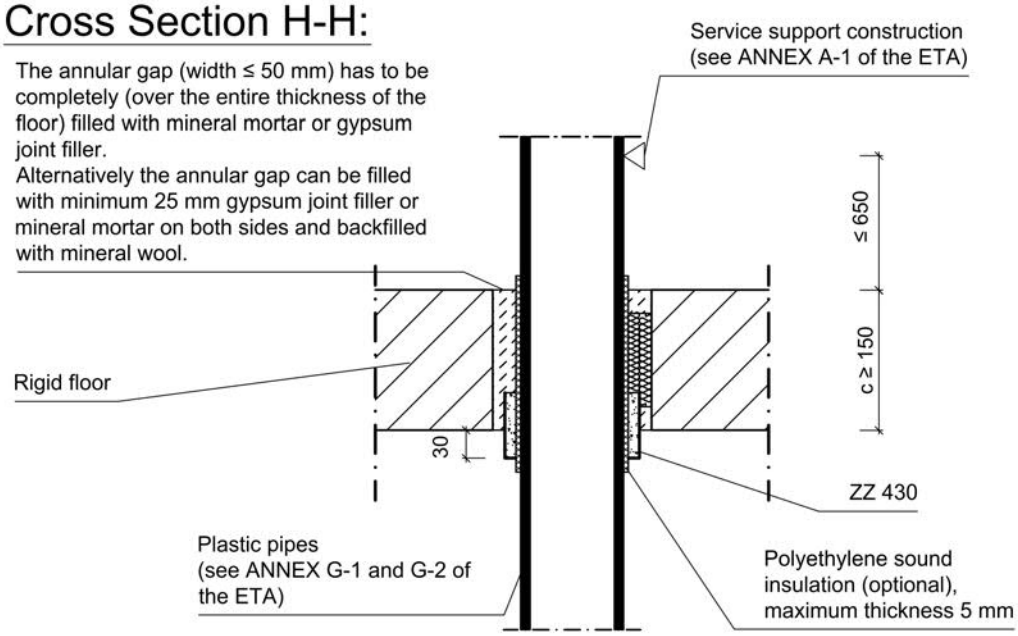
- Installation of plastic pipes in flexible wall and rigid wall -

ANNEX E-1

Bottom view:



Cross Section H-H:



All dimensions in mm

Separating element	Floor thickness c [mm]	Fire resistance classification
Rigid floor	≥ 150	see ANNEX G-1 and G-2 of the ETA

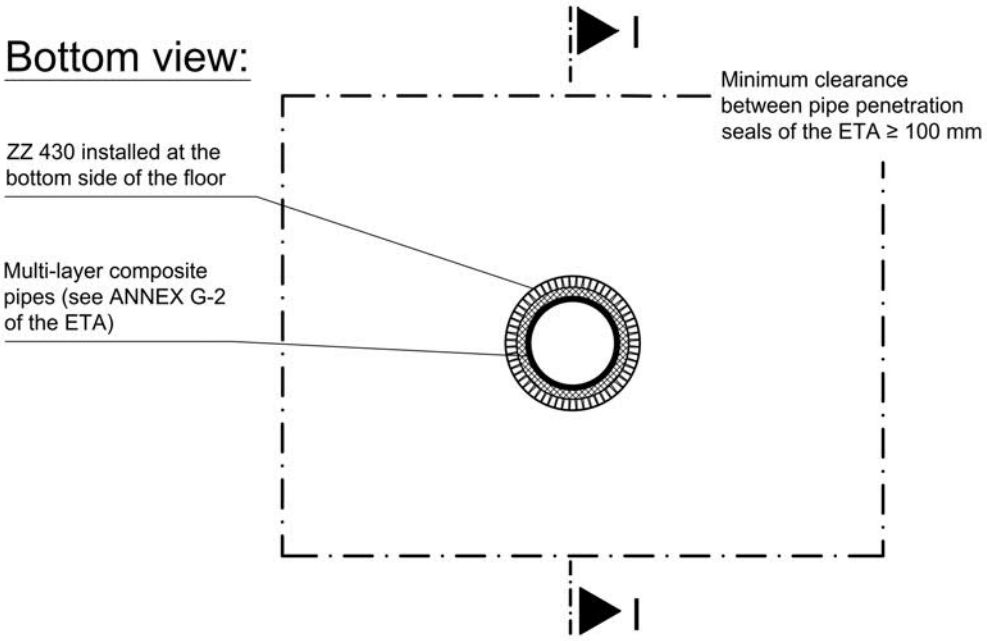
ZZ P40

- Embedded installation -

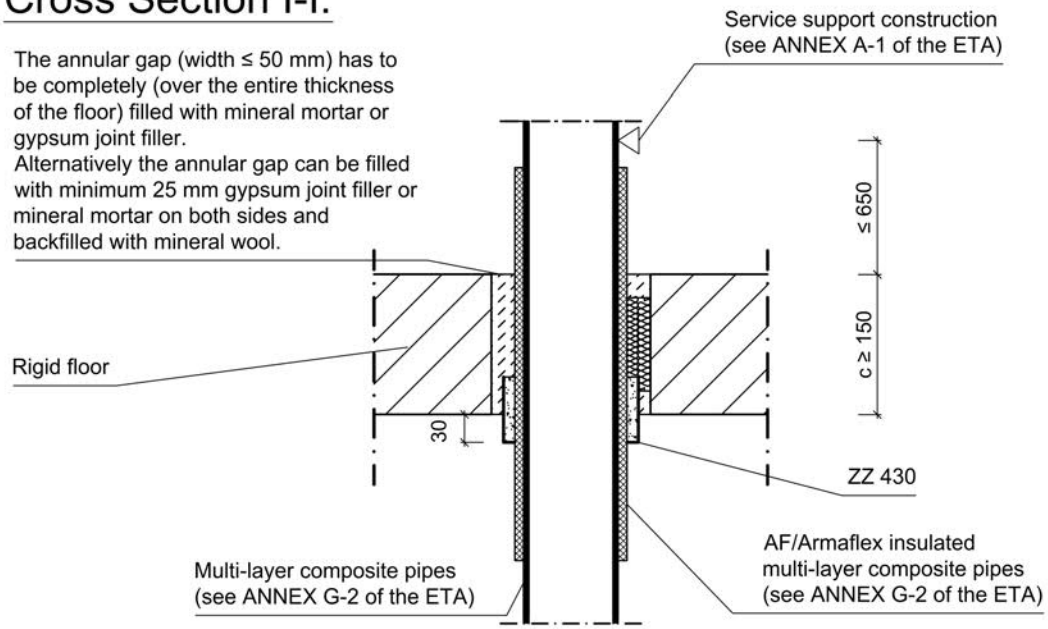
- Installation of plastic pipes in rigid floor -

ANNEX E-2

Bottom view:



Cross Section I-I:



All dimensions in mm

Separating element	Floor thickness c [mm]	Fire resistance classification
Rigid floor	≥ 150	see ANNEX G-2 of the ETA

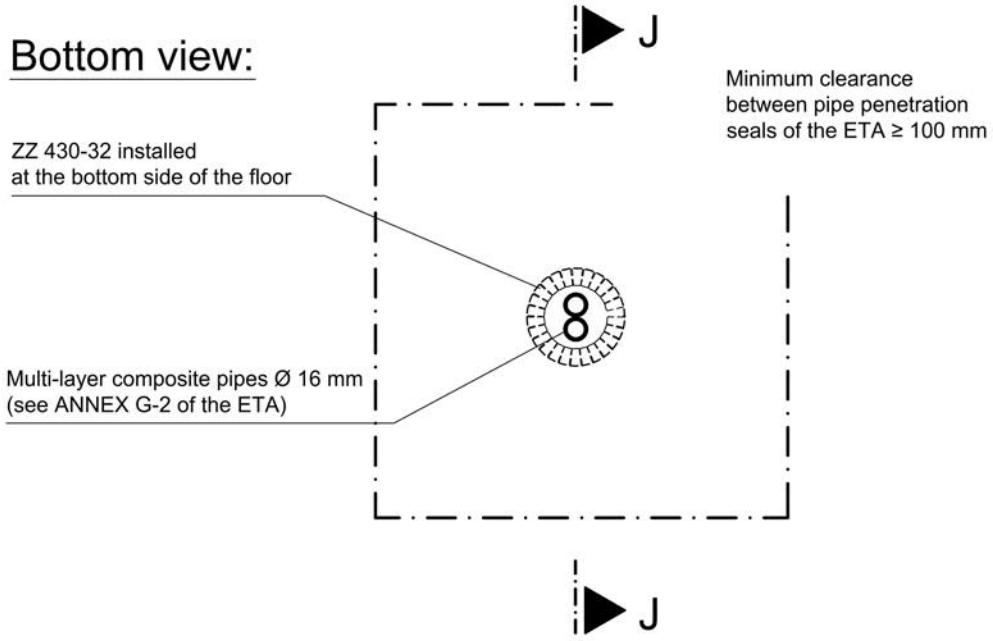
ZZ P40

- Embedded installation -

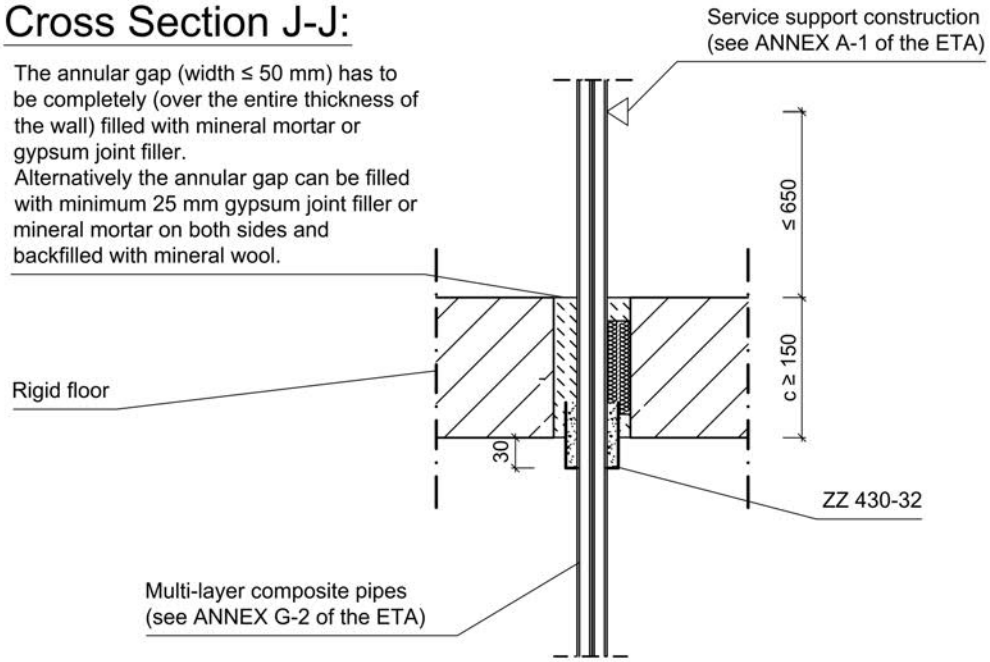
- Installation of multi-layer composite pipes in rigid floor -

ANNEX E-3

Bottom view:



Cross Section J-J:



All dimensions in mm

Separating element	Floor thickness c [mm]	Fire resistance classification
Rigid floor	≥ 150	see ANNEX G-2 of the ETA

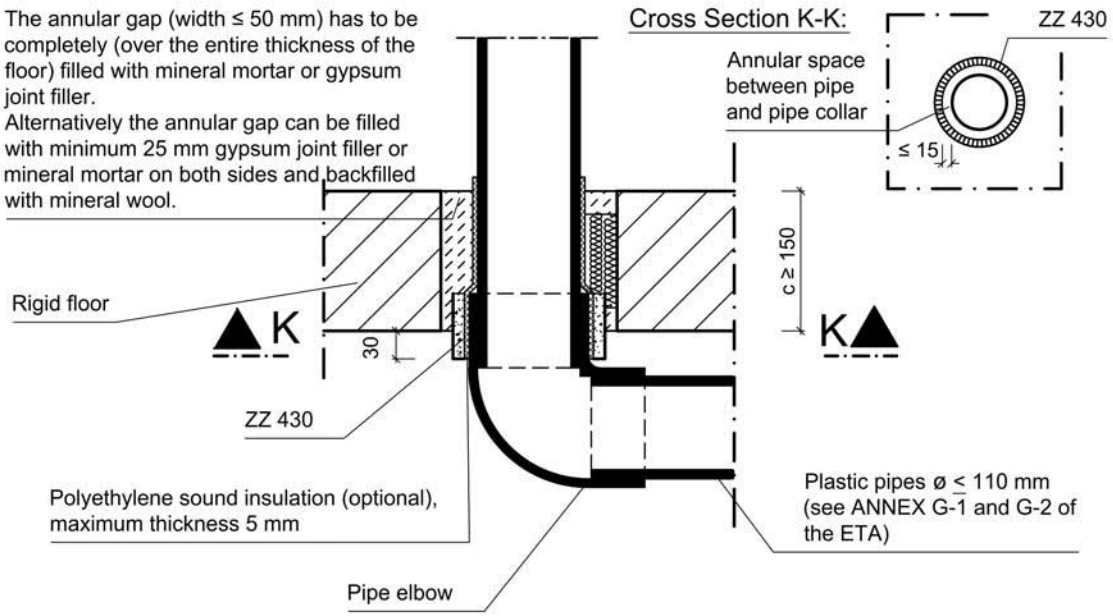
ZZ P40

- Embedded installation -

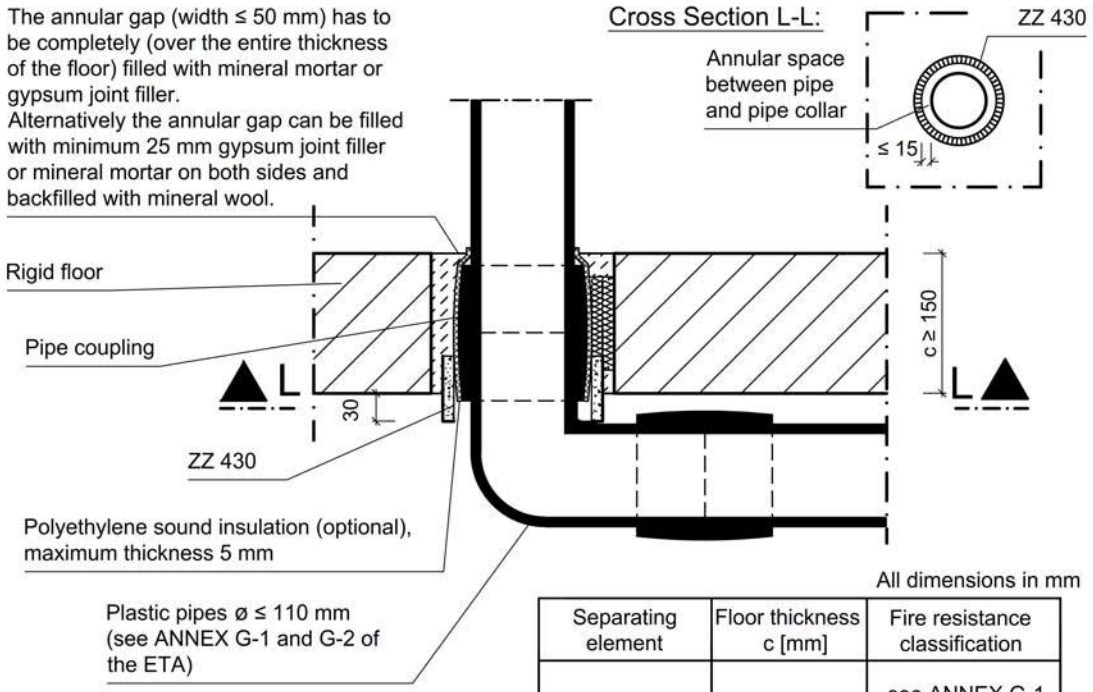
- Installation of multi-layer composite pipes in rigid floor -

ANNEX E-4

Installation around pipe elbows (plastic pipes ø ≤ 110 mm)



Installation around pipe couplings (plastic pipes ø ≤ 110 mm)



All dimensions in mm

Separating element	Floor thickness c [mm]	Fire resistance classification
Rigid floor	≥ 150	see ANNEX G-1 and G-2 of the ETA

ZZ P40

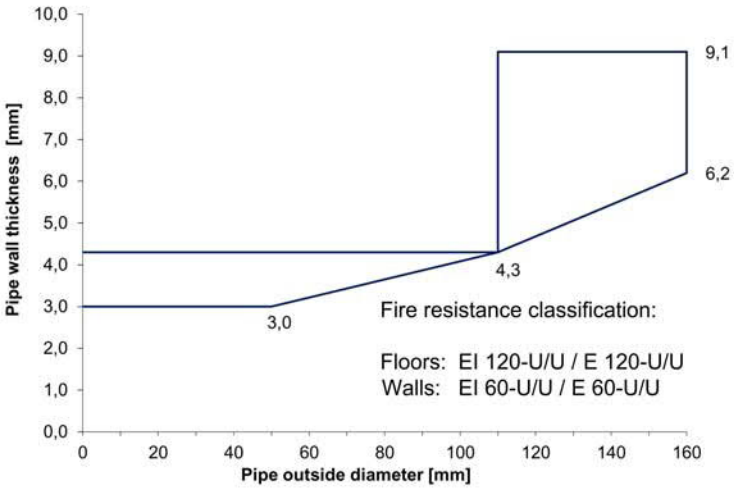
- Embedded installation -

- Installation of pipe elbows and pipe couplings in rigid floor -

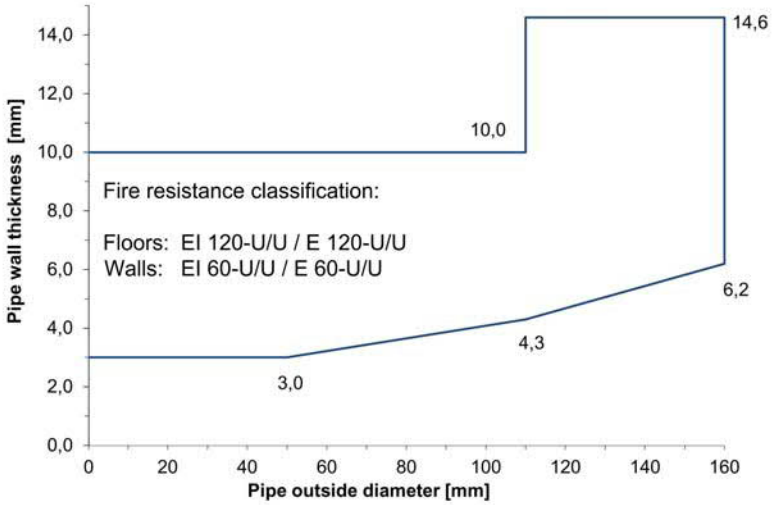
ANNEX F-1

Field of application of plastic pipes:

Plastic pipes made of PE-HD (EN 1519 and EN 12666-1) acc. to clause 2.1 of the ETA (U/U), (C/U), (U/C) and (C/C)



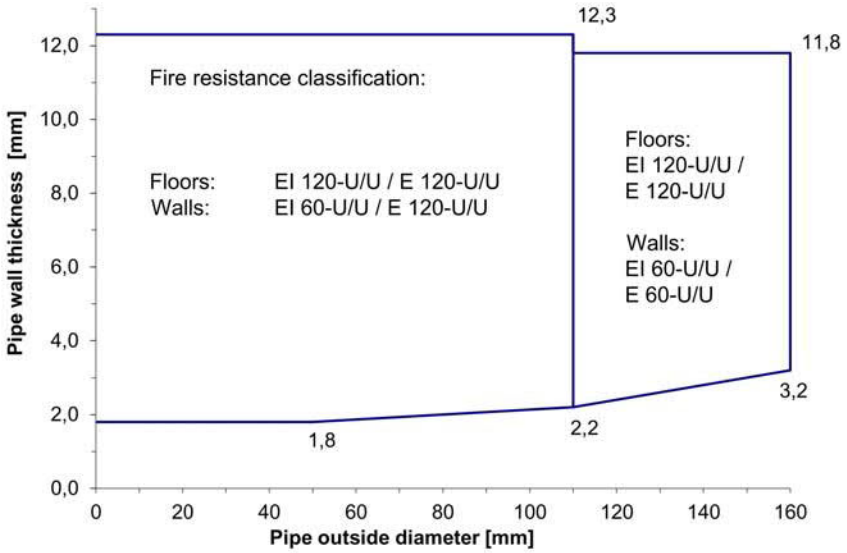
Plastic pipes made of PE-HD (EN 12201-2) acc. to clause 2.1 of the ETA (U/U), (C/U), (U/C) and (C/C)



ZZ P40 **- Embedded installation -** **- Field of application and fire resistance classification -**	**ANNEX G-1**

Field of application of plastic pipes:

Plastic pipes made of PVC-U acc. to clause 2.1 of the ETA (U/U), (C/U), (U/C) and (C/C)



Field of application of multi-layer composite pipes:

AF/Armaflex (acc. to clause 1 of the ETA) insulated multi-layer composite pipes "Uponor Uni Pipe Plus" and "Uponor MLC" acc. to clause 2.1 of the ETA (U/C) and (C/C) with sustained insulation (LS or CS)

Penetrating element	Outer diameter of the pipe	Pipe wall thickness	Armaflex AF		ZZ 430	Fire resistance classification
	[mm]	[mm]	Insulation thickness [mm]	Insulation length (LS, CS) [mm]	Size	Floor
Uponor Uni Pipe PLUS	16	2	-	-	ZZ 430-32	EI 90-U/C / E 90-U/C
			9,5	≥ 425	ZZ 430-40	
	20	2,25	9,5	≥ 425	ZZ 430-40	
	25	2,5			ZZ 430-50	
	32	3,0			ZZ 430-50	
Uponor MLC	40	4,0			ZZ 430-75	
	50	4,5			ZZ 430-75	
	63	6,0			ZZ 430-90	
	75	7,5			ZZ 430-110	
	90	8,5			ZZ 430-125	EI 60-U/C / E 60-U/C
	110	10,0			ZZ 430-125	

ZZ P40

- Embedded installation -

- Field of application and fire resistance classification -

ANNEX G-2