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Designated according to Article 29 of Regulation (EU) No 305/2011

Member of EOTA
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European Technical Assessment ETA 12/0045 of 18/3/2020

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011:	**Eurofins Expert Services Oy**
Trade name of the construction product	**Sewatek penetration seal**
Product family to which the construction product belongs	**Fire stopping and Fire Sealing Products**
Manufacturer	**Sewatek Oy** **Sepäntie 4** **FI-07230 Askola** **Finland**
Manufacturing plant	**Sewatek Oy** **Sepäntie 4** **FI-07230 Askola** **Finland**
This European Technical Assessment contains	**30 pages including 2 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	**European Assessment Document** **EAD 350454-00-1104, edition September 2017**
This ETA replaces	**ETA 12/0045 issued on April 4, 2019**

II Specific Part

1 Technical description of the product

Sewatek penetration seals consist of NBR cellular rubber pipe surrounded by PVC plastic pipe, together known as Sewatek penetration pipe. Sewatek penetration seals can be mounted as a single unit or as a group. Penetrations are classified as a group of penetration seals (clusters) or a single penetration seal. Fire resistance class of a cluster is allowed to extend to an equivalent single penetration seal but not vice versa. Minimum distances between penetration devices are given in Annex 1.

The Sewatek penetration pipe can be fastened mechanically inside the ABS plastic or steel frame. The Sewatek penetration pipes are mounted before casting. Purpose of the frame is to keep penetration seal in its planned position during casting of concrete wall or floor. At both ends of the frame there are protective and removable cellular foam or TPE plugs during the casting.

In Sewatek pipe closure devices (D-series) there are in addition to Sewatek penetration pipe also aluminium collars with fire band filling. The Sewatek pipe closure devices (D-series) is designed be mounted into a drilled hole with a diameter of 42, 62, 92, 105 or 140 mm.

In Sewatek SD/HD penetration pipe there is similar fire band than in D-series integrated inside Sewatek penetration pipe. SD/HD penetration pipes are mounted as Sewatek penetration pipes.

After casting (Sewatek penetration pipe and SD/HD-pipes) or mounting (D-series) the Sewatek penetration seal is thus surrounded by concrete. Also the possible ABS plastic or steel frame is mainly covered by concrete. Penetrating pipes and cables can be installed after hardening of concrete.

The Sewatek penetration pipes, SD/HD pipes and D-series pipe closure devices D42, D62 and D92 are designed to be used with copper, zink-plated carbon steel-, steel, composite- and other plastic pipes and as well as with cables. Pipe closure devices D105 and D140 are intended to be used with steel and plastic sewage pipes.

Sewatek D2 is a combination of Sewatek penetration pipe and an endpiece with or without fire band. It can be used in flexible or rigid constructions. The products are used with building services such as pipes and cables. It can also be used blank as a reservation for future installations.

2 Specification of the intended uses in accordance with the applicable European Assessment Document, EAD

2.1 Intended uses

The Penetration seal is intended to be used temporarily or permanent reinstate the fire resistance performance of rigid concrete wall and roof/floor constructions which are provided with apertures which are penetrated by various cables or metallic or plastic pipes.

The minimum thickness of the concrete wall is 100 mm and roof/floor slab 150 mm or 240 mm. The density of concrete wall shall be at least 650 kg/m3 ± 200 kg/m3 and roof/floor slab at least 850 kg/m³. In case of a rigid low density rigid wall (650 ± 200 kg/m3), thickness of the wall shall be at least 94 mm or 100 mm. In case standardized flexible wall, thickness of the wall shall be at least 94 mm. The detailed properties are given in annex 1.

The provisions made in this European Technical Assessment are based on an assumed intended working life of 25 years provided that the product is subjected to appropriate use and maintenance[1].

2.2 Use category

The penetration seal is intended for internal use also at temperatures below 0 °C, and can therefore according to EAD 350454-00-1104 clause 1.2 be categorize as Type Y2. The product meets also requirements of types Z1 and Z2.

PVC pipe and NBR cellular rubber is inside the construction and thus the product is not susceptible to UV radiation after installation.

2.3 Design

This European Technical Assessment is based on the assumption that all plans needed have been made correctly according to the regulations valid on the building site

2.4 Execution of construction works

It is the responsibility of the manufacturer to ensure that proper information for the use of the Sewatek penetration seal is enclosed to each delivery, including general guidance on the basis of this ETA and the specific installation instructions and construction details. With regard to the assumed working life regular maintenance is necessary. The manufacturer shall provide with written documents which contain descriptions about type and frequency of the maintenance.

The completed building (the works) shall comply with the building regulations (regulations on the works) applicable in the Member States in which the building is to be constructed. The procedures foreseen in the Member State for demonstrating compliance with the building regulations shall also be followed by the entity held responsible for this act. An ETA for Sewatek penetration seal does not amend this process in any way.

[1] This means that it is expected that when this working life has elapsed, the real working life may be, in normal use conditions, considerably longer without major degradation affecting the essential requirements of the works. The indications given as to the working life of Sewatek penetration system cannot be interpreted as a guarantee given by the producer or the assessment body. They should only be regarded as a means for the specifiers to choose the appropriate criteria for penetration seals in relation to the expected, economically reasonable working life of the works

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

Table 1. Basic requirements for construction works and essential characteristics

Basic requirement and essential characteristics	Performance
BWR 1. Mechanical resistance and stability	
Not relevant	
BWR 2. Safety in case of fire	
Reaction to fire of materials and components, EN 13501-1	Euroclass F (not assessed)
Resistance to fire, EN 13501-2	EI 15 – EI 120 (in end uses and with the provisions presented in the Annex 1)
External fire performance of roof covering	Not relevant
BWR 3. Hygiene, health and the environment	
Vapour permeability and moisture resistance	No performance assessed
Watertightness	No performance assessed
Content, emission and/or release of dangerous substances	Declaration of the manufacturer
BWR 4. Safety and accessibility in use	No performance assessed
BWR 5. Protection against noise	
Air sound insulation, EN ISO 717-1	Clause 3.3
BWR 6. Energy economy and heat retention	No performance assessed
BWR 7. Sustainable use of natural resources	
Sustainable use of natural resources	No performance assessed
General aspects	
Aspects of durability, ISO 188 and ISO 2440	Clause 3.4

3.1 Safety in case of fire, BWR 2

3.1.1 Reaction to fire

The classification of the main materials with regard to reaction to fire is not assessed.

3.1.2 Resistance to fire

For floors and walls, classification with regard to resistance to fire is based on full scale testing as specified in EN 13501-2. Fire resistance classes are presented in Annex 1.

3.2 Hygiene, health and environment, BWR 3

3.2.1 Dangerous substances

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 EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

3.3 Protection against noise, BWR 5

3.3.1 Airborne sound insulation of walls and floors

Influence of single penetration seal on R_W highest is 0-2 dB, when concrete thickness ≥ 200 mm

3.4 General aspects

Aspects of durability

Test results of exposed specimens show no big changes in properties compared to unexposed ones.

Identification

The components and materials are identified as being of a generic type or giving a brand name, as described in Annex 1 and specified in the manufacturer's Contents of delivery list. The component under a given brand name may be changed by the manufacturer to another with corresponding performance.

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

EC Decision for AVCP is System 1. 1999/0454/EC

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 at Eurofins Expert Services Oy.

Issued in Espoo on March 18, 2020
by Eurofins Expert Services Oy

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ANNEX 1

Table 1. Sewatek penetrations (without pipe closure device) mounted in 100 mm thick low density rigid wall (or in some cases 150 mm thick wall, see the table)

* The insulation around pipes is continuous and interrupted (CI) or local and interrupted (LI). Thickness is following unless stated otherwise in the table:

sw = stone wool insulation, 20 mm thick when pipes ø ≤ 54 mm and 30 mm thick when pipes ø > 54 mm

gw = glass wool insulation, 20 mm thick when pipes ø ≤ 54 mm and 30 mm thick when pipes ø > 54 mm

cr = cellular rubber insulation, 13 mm thick

The length of insulation is 350 mm unless stated otherwise in the table

** a_1 = distance between service pipe and outer surface of PVC pipe (Annex 2 page 4)

a_2 = minimum distance between penetration seals (Annex 2 page 4). In case a single penetration, minimum distance to another single penetration is 200 mm according to the test standard EN 1366. Distances are measured from the outer edge of the penetration seal device.

e_n= pipe wall thickness

Type of the pipe	**Insulation*** (thickness/length)	**a_1/a_2** [mm]**	**Fire resistance class**
Copper pipes			
Mounted as a group of penetration seals			
ø ≤ 35 mm, e_n ≤ 1.5 mm	LI (cr)	12.5 / 10	EI 30 - U/C
ø ≤ 35, e_n ≤ 1,5 mm	LI (sw)	12,5/100	EI 120 - U/C
ø ≤ 42 mm, e_n≤ 1.5 mm	LI (sw)	16.5 / 25	EI 60 - U/C
ø ≤ 54 mm, e_n≤ 1.5 mm	LI (sw)	10.5 / 25	EI 45 - U/C
ø ≤ 64, e_n ≤ 2,0 mm	LI (sw 30/500)	13/70	EI 60 - U/C
Mounted as a single penetration seal			
ø ≤ 10 mm, e_n≤ 1.0 mm	not required	20 /single	EI 120 - U/C
ø ≤ 28 mm, e_n≤ 1.2 mm	LI (cr)	11 / single	EI 90 - U/C
ø ≤ 89, e_n ≤ 2,5 mm	CI (sw 30/-)	18/single	EI 90 - U/C
ø ≤ 35 mm, e_n≤ 1.5 mm	LI (sw)	12.5 / single	EI 120 - U/C
ø ≤ 42 mm, e_n≤ 1.5 mm	CI (gw/sw)	9 / single	EI 90 - U/C
ø ≤ 54 mm, e_n≤ 1.5 mm	LI (sw)	10.5 / single	EI 60 - U/C
ø ≤ 76.1 mm, e_n≤ 2.0 mm	CI (gw/sw)	24.5 / single	EI 60 - U/C
Zink-plated carbon steel pipes			
Mounted as a group of penetration seals			
ø ≤ 22 mm, e_n ≤ 1.5 mm	not required	9 / 30	EI 120 - U/C
ø ≤ 54 mm, e_n ≤ 1.5 mm	LI (sw)	10.5 / 25	EI 120 - U/C
Mounted as a single penetration seal			
ø ≤ 28 mm, e_n ≤ 1.5 mm	not required	11 / single	EI 60 - U/C
Steel pipes			
Mounted as a group of penetration seals			
ø < 27 mm, e_n ≤ 2.3 mm	not required	6.6 / 30	EI 120 - U/C
ø < 77 mm, e_n ≤ 2.9 mm	LI (sw)	7 / 35	EI 120 - U/C

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ø < 89 mm, e_n ≤ 3.2 mm	CI (sw)	18.1 / 35	EI 120 - U/C
Mounted as a single penetration seal			
ø < 89 mm, pipe e_n ≤ 3.2 mm	CI (gw/sw)	18 / single	EI 90 - U/C
Thickness of the rigid wall 150 mm			
ø ≤ 41,8 mm, pipe e_n ≤ 3,3 mm	not required	9/single	EI 120 - U/C
Composite pipes			
Mounted as a group of penetration seals			
ø ≤ 25 mm, e_n ≤ 2.5 mm	not required	7.5 / 30	EI 120 - U/C
ø ≤ 32 mm, e_n ≤ 3.0 mm	LI (cr)	14 / 10	EI 60 - U/C
ø ≤ 40 mm, e_n ≤ 4.0 mm	LI (sw)	10 / 10	EI 120 - U/C
ø ≤ 63 mm, e_n ≤ 6.0 mm	LI (sw)	13.5 / 30	EI 120 - U/C
Mounted as a single penetration seal			
ø ≤ 40 mm, e_n ≤ 4.0 mm	not required	10 / single	EI 60 - U/C
ø ≤ 50 mm, e_n ≤ 4.0 mm	not required	12.5 / single	EI 30 - U/C
Thickness of the rigid wall 150 mm			
ø ≤ 40, pipe e_n ≤ 4,0 mm, gasket	not required	10/single	EI 120 - U/C
Other plastic pipes			
Mounted as a group of penetration seals			
Pex-pipe in covering pipe ø ≤ 22/34 mm, e_n ≤ 3.0/2.5 mm	not required	13 / 10	EI 90 - U/C
Mounted as a single penetration seal			
Pex-pipe in covering pipe ø ≤ 15/25 mm, pipe e_n ≤ 2.5/2.5	not required	7.5 / single	EI 120 - U/C
Cables			
Mounted in a Sewatek S-penetration seal			
Singular cable ø ≤ 17.5 mm (a_2 ≥ 110 mm), cables in a device ø ≤ 11.0 mm (a_2 ≥ 3 mm)	none	single	EI 120 - U/C
Thickness of the rigid wall 150 mm			
Two cable penetrations groups next to each other, one with 3 singular cables ø ≤ 9,0 mm and another with 3 singular cables Ø ≤ 11,0 mm	not required	9/11 /3	EI 90 - U/C
Blank penetration seals			
Mounted in a Sewatek S-penetration seal			
Blank ø 32 mm penetration pipe for singular cable ø ≤ 17.5 mm (a_2 ≥ 110 mm) or cables in a device ø ≤ 11.0 mm (a_2 ≥ 3 mm)	none	single	EI 120 - C/C
Mounted as a group of penetration seals			
Blank ø 40 mm penetration pipe for pipes ø ≤ 18, CR-plugs	none	14.5 / 30	EI 120 - C/C
Plug			
Mounted as a single penetration seal			

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ZZ-plug ø 65 mm in a hole ø 62 mm	none	single	EI 120

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Table 2. Sewatek penetrations with pipe closure devices D42, D62, D92, D105, D140 SD125, SD60 and SD90 mounted in 100 mm thick low density rigid wall (or in some cases 150 mm thick wall, see the table for details)

* The insulation around pipes is continuous and interrupted (CI) or local and interrupted (LI). Thickness is following unless stated otherwise in the table:

sw = stone wool insulation, 20 mm thick when pipes ø ≤ 54 mm and 30 mm thick when pipes ø > 54 mm

gw = glass wool insulation, 20 mm thick when pipes ø ≤ 54 mm and 30 mm thick when pipes ø > 54 mm

cr = cellular rubber insulation, 13 mm thick

The Length of insulation is 350 mm unless stated otherwise in the table

** a_1 = distance between service pipe and outer surface of PVC pipe (Annex 2 page 4)

a_2 = minimum distance between penetration seals (Annex 2 page 4). In case a single penetration, minimum distance to another single penetration is 200 mm according to the test standard EN 1366. Distances are measured from the outer edge of the penetration seal device

e_n= pipe wall thickness

Penetration seals D42, D62, D92			
Type of the pipe	**Insulation*** (thickness/length)	**a_1/a_2** [mm]**	**Fire resistance class**
Copper pipes			
Mounted as a group of penetration seals			
ø ≤ 35 mm, pipe e_n ≤ 1.5 mm	LI (sw)	9.8 / 8	EI 60 - U/C
ø ≤ 42 mm, pipe e_n ≤ 1.5 mm	LI (sw)	10 / 18	EI 60 - U/C
ø ≤ 35, pipe e_n ≤ 1,5 mm	LI (sw)	15/98	EI 120 - U/C
ø ≤ 42, pipe e_n ≤ 1,5 mm	LI (sw 20/350)	10/58	EI 90 - U/C
Mounted as a single penetration seal			
ø ≤ 10 mm, pipe e_n ≤ 1.0 mm	not required	15.1 / single	EI 90 - U/C
ø ≤ 10 mm, pipe e_n ≤ 0.8 mm	LI (sw or cr)	15.1 / single	EI 120 - U/C
ø ≤ 28 mm, pipe e_n ≤ 1.2 mm	LI (cr) or CI (gw/sw)	6 / single	EI 60 - U/C
ø ≤ 42 mm, pipe e_n ≤ 1.5 mm	LI (sw)	9 / single	EI 90 - U/C
ø ≤ 64, pipe e_n ≤ 2,0 mm	CI (sw 30/-)	14/single	EI 90 - U/C
Zink-plated carbon steel pipes			
Mounted as a group of penetration seals			
ø ≤ 28 mm, pipe e_n ≤ 1.5 mm	not required	17 / 8	EI 60 - U/C
ø ≤ 35 mm, pipe e_n ≤ 1.5 mm	LI (sw)	9.8 / 8	EI 60 - U/C
ø ≤ 35, pipe e_n ≤ 1,5 mm	LI (sw)	15/98	EI 120 - U/C
ø ≤ 42 mm, pipe e_n ≤ 1.5 mm	LI (sw)	10 / 18	EI 60 - U/C
ø ≤ 42, pipe e_n ≤ 1,5 mm	LI (sw)	10/58	EI 90 - U/C
Mounted as a single penetration seal			
ø ≤ 12 mm, pipe e_n ≤ 1.0 mm	not required	14.1 / single	EI 120 - U/C
ø ≤ 28 mm, pipe e_n ≤ 1.5 mm	not required	6.1 / single	EI 90 - U/C

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ø ≤ 42 mm, pipe e_n ≤ 1.5 mm	not required	9 / single	EI 45 - U/C
ø ≤ 42 mm, pipe e_n ≤ 1.5 mm	LI (sw) or CI (gw)	9 / single	EI 120 - U/C
Steel pipes			
Mounted as a group of penetration seals			
ø < 27 mm, pipe e_n ≤ 2.3 mm	not required	6.6 / 8	EI 90 - U/C
ø < 43 mm, pipe e_n ≤ 2.6 mm	LI (sw)	13.5 / 18	EI 120 - U/C
ø < 61 mm, pipe e_n ≤ 2.9 mm	LI (sw)	15.9 / 28	EI 120 - U/C
Mounted as a single penetration seal			
ø ≤ 17 mm, pipe e_n ≤ 2.5 mm	not required	11.6 / single	EI 120 - U/C
ø ≤ 35 mm, pipe e_n ≤ 3.0 mm	not required	12.5 / single	EI 60 - U/C
ø ≤ 42 mm, pipe e_n ≤ 3.0 mm	LI (sw) or CI (gw)	9 / single	EI 120 - U/C
Composite pipes			
Mounted as a group of penetration seals			
ø ≤ 40 mm, pipe e_n ≤ 4.0 mm	CI (sw)	11 / 18	EI 120 - U/C
ø ≤ 40, pipe e_n ≤ 4,0 mm	not required	11/98	EI 120 - U/C
ø ≤ 63 mm, pipe e_n ≤ 6.0 mm	CI (sw)	14.5 / 28	EI 120 - U/C
Mounted as a single penetration seal			
ø ≤ 40 mm, pipe e_n ≤ 4.0 mm	none	10-12 / single	EI 120 - U/C
ø ≤ 40 mm, pipe e_n ≤ 4.0 mm	CI (gw)	10-12 / single	EI 120 - U/C
Other plastic pipes			
Mounted as a group of penetration seals			
Pex-pipe in covering pipe 15/25 - 28/54 mm, pipe wall thickness ≤ 4.0/3.0 mm	not allowed	19 / 8	EI 120 - U/C
Pex-pipe in covering pipe 15/25 (4 pcs in a R92-device), e_n ≤ 2.5/2.5 mm	not allowed	15.8-21 / 8	EI 120 - U/C
Plastic (Polypropylene) sewer pipes			
Mounted as a single penetration seal			
ø ≤ 32, pipe e_n ≤ 2 mm	not required	15/single	EI 120 - U/C
ø ≤ 50, pipe e_n ≤ 3,0 mm	not required	16/single	EI 120 - U/C
Cables			
Mounted as a single penetration seal			
Singular cable in a bundle ø≤ 12.5 mm, cable bundle total ø ≤ 42 mm	none	9 / single	EI 60 - U/C
Single cable ø ≤ 12.5 mm	none	14.1 / single	EI 120 - U/C
Single cable ø ≤ 24,0	LI (sw 20/50)	9/single	EI 120 - U/C
Singular cable Ø≤ 21 mm in a bundle, cable bundle total ø ≤ 63 mm	not required	10/single	EI 90 - U/C
Mounted as a group of penetration seals			
Singular cable Ø≤ 17 mm in a bundle, cable bundle total ø ≤ 40 mm	not required	13,5/58	EI 60 - U/C
Blank penetration seals			
Mounted as a group of penetration seals			

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Blank D42/62/92, device sealed with TPE or cellular rubber plug	none	16 / 8	EI 90 - C/C
Penetration seals D105, D140			
Type of the pipe e_n= pipe wall thickness	**Insulation***	**a_1/a_2** [mm]**	**Fire resistance class**
Steel pipes			
Mounted as a single penetration seal			
ø < 110 mm, pipe e_n ≤ 4,0 mm	CI (sw)	15 / single	EI 120 - U/C
Other plastic pipes			
Mounted as a single penetration seal			
Polypropylene ø ≤ 110 mm, pipe e_n ≤ 4.0 mm	CI (sw)	15 / single	EI 120 - U/C
Plastic (Polypropylene) sewer pipes			
Mounted as a single penetration seal			
ø ≤ 110, pipe e_n ≤ **3,5** mm	not required	15/single	EI 120 - U/C
ø ≤ 110, pipe e_n ≤ 6,5 mm	not required	15/single	EI 120 - U/C
ø ≤ 110, e_n ≤ 3,5 mm	LI (sw 40/350)	15/single	EI 120 - U/C
ø ≤ 110, pipe e_n ≤ 6,5 mm	CI (sw 30/-)	15/single	EI 120 - U/C
Mounted as a group of penetration seal, thickness of the rigid wall 150 mm			
ø ≤ 110[3], pipe e_n ≤ 3,6 mm	not required	15/60	EI 120 - U/C
Cast iron sewer pipes			
Mounted as a single penetration seal			
ø ≤ 110, pipe e_n ≤ 3,5 mm	CI (sw800 40/-)	15/single	EI 120 - U/C

Penetration seals SD60, SD90, SD125				
Type of the pipe e_n= pipe wall thickness	**Insulation***	**a_1/a_2** [mm]**	**Fire resistance class**	**penetration type**
Composite pipes				
Mounted as a group of penetration seals				
ø ≤ 75, pipe e_n ≤ 7,5 mm	not required	25/35	EI 30 - U/C	SD125
Other plastic pipes				
Mounted as a group of penetration seals				
Pex-pipe in covering pipe 22/34, pipe e_n ≤ 3,0 mm	not required	13/60	EI 60 - U/C	SD60
Mounted as a single penetration seal, thickness of the rigid wall 150 mm				
Pex-pipe in covering pipe 15/28 (4 pcs in a SD 90-device), pipe e_n ≤ 2,5 mm	not required	8/single	EI 120 - U/C	SD90
Cables				

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Mounted as a group of penetration seals				
Singular cable Ø≤13 mm in plastic conduit ø ≤ 25 mm	not required	7,5/60	EI 120 - U/C	SD40
Cable bundle ≤ ø 35 mm in plastic conduit Ø≤40, singular cable in the bundle ≤ Ø17 mm	not required	17,5/50	EI 120 - U/C	SD75
Plastic conduit ø ≤ 50 mm without cables	not required	20/70	EI 120 - U/C	SD90
2x plastic conduit Ø≤25 mm with singular cable (Ø≤13 mm) + 2x plastic conduit Ø≤32 mm with cable bundle (Ø≤ 28) in which singular cable Ø≤ 13 mm in a SD-device	not required	15/70	EI 120 - U/C	SD90
Plastic (Polypropylene) sewer pipes				
Mounted as a single penetration seal				
ø ≤ 75, pipe e_n ≤ 3,0 mm	not required	25/single	EI 90 - U/C	SD125

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Table 3. Sewatek penetrations (without pipe closure devices) mounted in 240 mm thick concrete floor (or in some cases 150 mm or 200 mm thick concrete floor, see the table)

* The insulation around pipes is continuous and interrupted (CI) or local and interrupted (LI). Thickness is following unless stated otherwise in the table:

sw = stone wool insulation, 20 mm thick when pipes ø ≤ 54 mm and 30 mm thick when pipes ø > 54 mm

gw = glass wool insulation, 20 mm thick when pipes ø ≤ 54 mm and 30 mm thick when pipes ø > 54 mm

cr = cellular rubber insulation, 13 mm thick

The Length of insulation is 350 mm unless stated otherwise in the table

** a_1 = distance between service pipe and outer surface of PVC pipe (Annex 2 page 4)

a_2 = minimum distance between penetration seals (Annex 2 page 4). In case a single penetration, minimum distance to another single penetration is 200 mm according to the test standard EN 1366. Distances are measured from the outer edge of the penetration seal device

Type of the pipe e_n= pipe wall thickness	**Insulation***	**a_1/a_2** [mm]**	**Fire resistance class**
Copper pipes			
Mounted as a group of penetration seals			
ø ≤ 22 mm, e_n ≤ 1.0 mm	not required	9 / 30	EI 120 - U/C
ø ≤ 28 mm, e_n ≤ 1.2 mm	not required	16 / 10	EI 60 - U/C
ø ≤ 35 mm, e_n ≤ 1.5 mm	LI (cr/sw)	12.5 / 10	EI 120 - U/C
ø ≤ 54 mm, e_n ≤ 1.5 mm	LI (sw)	10.5 / 25	EI 90 - U/C
ø ≤ 89 mm, e_n ≤ 2.0 mm	CI (sw)	18.1 / 35	EI 120 - U/C
Thickness of construction 200 mm			
ø ≤ 35 mm***, pipe e_n ≤ 1,5 mm *** Support max. 1500 mm from construction	LI (sw 20/single)	12,5/60	EI 120 - U/C
Zink-plated carbon steel pipes			
Mounted as a group of penetration seals			
ø ≤ 42 mm, e_n ≤ 1.5 mm	not required	9 / 10	EI 120 - U/C
ø ≤ 54 mm, e_n ≤ 1.5 mm	not required	10.5 / 25	EI 120 - U/C
ø ≤ 89 mm, e_n ≤ 2.0 mm	CI (sw)	18.1 / 35	EI 120 - U/C
Thickness of construction 200 mm			
ø ≤ 35 mm***, pipe e_n ≤ 1,5 mm, only two penetrations next to each other *** Support max. 1500 mm from construction	not required	12,5/10	EI 120 - U/C
Steel pipes			
Mounted as a group of penetration seals			
ø < 49 mm, e_n ≤ 2.6 mm	not required	13.4 / 25	EI 120 - U/C
ø < 61 mm e_n ≤ 2.9 mm	LI (sw)	14.9 / 30	EI 120 - U/C
ø < 89 mm e_n ≤ 3.2 mm	CI (sw)	18.1 / 35	EI 120 - U/C
Thickness of construction 200 mm			

ø < 33,8 mm***, pipe wall thickness ≤ 3,0 mm only two penetrations next to each other	not required	13/10	EI 120 - U/C
Mounted as a double penetration seal, mounted in ≥ 150 mm thick floor			
ø < 43 mm, e_n ≤ 2.6 mm	not required	9 / 10 (two pipes)	EI 60 - C/U
Composite pipes			
Mounted as a group of penetration seals			
ø ≤ 32 mm, e_n ≤ 3.0 mm	not required	14 / 10	EI 120 - U/C
ø ≤ 63 mm, e_n ≤ 6.0 mm	LI (sw)	13.5 / 30	EI 120 - U/C
Mounted as a single penetration seal, thickness of construction 200 mm			
ø ≤ 32 mm, pipe e_n ≤ 3,5 mm	not required	14/200	EI 120 - U/C
Other plastic pipes			
Mounted as a group of penetration seals			
pex-pipe in covering pipe ø ≤ 22/34, pipe e_n ≤ 3.0/2.5 mm	none	13 / 10	EI 120 - U/C
Cables			
Mounted in a Sewatek S-penetration seal			
Singular cable ø ≤ 12.5 mm (a_2=110 mm), cables in a device ø ≤ 11.0 mm (a_2=3 mm)	none	single	EI 60 - U/C
ø ≤ 6 mm, 3 pieces in a ø 32 mm penetration pipe (a_2 between pipes 3 mm) mounted in ≥150 mm thick floor	none	single	EI 60 - U/C
Singular cable ø ≤ 12.5 mm (a_2=110 mm), cables in a device ø ≤ 11.0 mm (a_2=3 mm)	none	single	EI 60 - U/C
Blank penetration seals			
Mounted as a single penetration seal			
penetration pipe ø 40 mm, empty space ø ≤ 18 mm, TPE-plug	none	single	EI 120 - C/C

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Table 4. Sewatek penetrations with pipe closure devices D42, D62, D92, HD40, HD60, HD75, HD90, D82, D105, and D140 mounted in 240 mm thick concrete floor (or in some cases 150 mm or 200 mm thick floor, see the table).

* The insulation around pipes is continuous and interrupted (CI) or local and interrupted (LI). Thickness is following unless stated otherwise in the table:

sw = stone wool insulation, 20 mm thick when pipes ø ≤ 54 mm and 30 mm thick when pipes ø > 54 mm

gw = glass wool insulation, 20 mm thick when pipes ø ≤ 54 mm and 30 mm thick when pipes ø > 54 mm

cr = cellular rubber insulation, 13 mm thick

The Length of insulation is 350 mm unless stated otherwise in the table

** a_1 = distance between service pipe and outer surface of PVC pipe (Annex 2 page 4)

a_2 = minimum distance between penetration seals (Annex 2 page 4). In case a single penetration, minimum distance to another single penetration is 200 mm according to the test standard EN 1366. Distances are measured from the outer edge of the penetration seal device

e_n= pipe wall thickness

Penetration seals D42, D62, D92			
Type of the pipe	**Insulation*** (thickness/length)	**a_1/a_2** [mm]**	**Fire resistance class**
Copper pipes			
Mounted as a group of penetration seals			
ø ≤ 42 mm, pipe e_n ≤ 1.5 mm	LI (sw)	10 / 18	EI 120 - U/C
ø ≤ 64 mm, pipe e_n ≤ 2.0 mm	CI (sw)	14 / 28	EI 120 - U/C
Zink-plated carbon steel pipes			
Mounted as a group of penetration seals			
ø ≤ 42 mm, pipe e_n ≤ 1.5 mm	not required	10 / 8	EI 120 - U/C
ø ≤ 64 mm, pipe e_n ≤ 2.0 mm	CI (sw)	14 /28	EI 120 - U/C
Steel pipes			
Mounted as a group of penetration seals			
ø < 43 mm, pipe e_n ≤ 2.6 mm	not required	9.8 / 8	EI 120 - U/C
ø < 61 mm, pipe e_n ≤ 2.9 mm	LI (sw)	15.9 / 28	EI 120 - U/C
Composite pipes			
Mounted as a group of penetration seals			
ø ≤ 40 mm, pipe e_n ≤ 4.0 mm	CI (sw)	11 / 18	EI 120 - U/C
ø ≤ 63 mm, pipe e_n ≤ 6.0 mm	CI (sw)	14.5 / 28	EI 120 - U/C
Mounted as a single penetration seal			
ø ≤ 40 mm, pipe e_n ≤ 4.0 mm	none	13 / single	EI 120 - U/C
ø ≤ 63 mm, pipe e_n ≤ 6.0 mm	LI (sw)	14.5 / single	EI 120 - U/C
thickness of construction 200 mm			
ø ≤ 40 mm, pipe e_n ≤ 4,5 mm	not required	11/200	EI 120 - U/C
Other plastic pipes			

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Mounted as a group of penetration seals			
Pex-pipe in covering pipe ø ≤ 28/54 mm, pipe e_n ≤ 4.0/3.0 mm	not allowed	19 / 8	EI 120 - U/C
Plastic sewer pipes			
Mounted as a single penetration seal, thickness of construction 200 mm			
ø ≤ 50 mm, pipe e_n ≤ 3,0 mm	not required	21/ single	EI 120 - U/C
Cables			
Mounted as a single penetration seal			
Singular cable in a bundle ø ≤ 12.5 mm, cable bundle total ø ≤ 64 mm	none	14 / single	EI 120 - U/C
Single MMJ-cable ø ≤ 21.5 mm	none	10.3 / single	EI 120 - U/C
Single aluminium power cable ø ≤ 44 mm	none	9 /single	EI 120 - U/C
Mounted as a single penetration seal, thickness of construction 200 mm			
Singular cable in a bundle Ø ≤ 21 mm, cable bundle total Ø 63 mm	not required	10/single	EI 120 - U/C
Blank penetration seals			
Mounted as a group of penetration seals			
Blank D42/62/92, device sealed with TPE or cellular rubber plug	none	16*** / 8	EI 120 - C/C
*** in this case a_1 = thickness of PVC pipe and cellular rubber			
Penetration seals D105 and D140			
Type of the pipe	**Insulation***	**a_1/a_2** [mm]**	**Fire resistance class**
Steel pipes			
Mounted as a single penetration seal			
ø ≤ 110 mm, pipe e_n ≤ 4.5 mm	CI (sw)	20 /single	EI 120 - U/C
Other plastic pipes			
Mounted as a single penetration seal			
Polypropylene ø ≤ 110 mm, pipe e_n ≤ 3.8 mm	CI (sw)	20 /single	EI 120 - U/C
Plastic sewer pipes			
Mounted as a single penetration seal, thickness of construction 200 mm			
ø ≤ 75 mm, pipe e_n ≤ 3,0 mm	not required	15/ single	EI 120 - U/C
ø ≤ 110 mm, pipe e_n ≤ 4,5 mm	not required	15/ single	EI 120 - U/C
ø ≤ 110 mm, pipe e_n ≤ 6,0 mm	not required	15/ single	EI 120 - U/C

ANNEX 1

ø ≤ 110 mm, pipe e_n ≤ 4,0 mm	not required	15/ single	EI 120 - U/C
ø ≤ 110 mm, pipe e_n ≤ 4,0 mm	CI (sw 30/-)	15/ single	EI 120 - U/C
ø ≤ 110 mm, pipe e_n ≤ 6,0 mm	CI (sw 30/-)	15/ single	EI 120 - U/C
Mounted as a single penetration seal, thickness of construction 150 mm			
ø ≤ 110 mm, pipe en ≤ 3,8 mm	-	single	EI 120 - U/C
Mounted as a group of penetration seals, thickness of construction 200 mm			
ø ≤ 110 mm, pipe e_n ≤ 4,2 mm	not required	15/60	EI 120 - U/C
Cast iron sewer pipes			
Mounted as a single penetration seal, thickness of construction 200 mm			
ø ≤ 110 mm, pipe e_n ≤ 3,5 mm	LI (sw 30/350)	15/200	EI 120 - U/C
Composite pipes			
Mounted as a single penetration seal, thickness of construction 150 mm			
ø ≤ 75 mm, pipe en ≤ 8,0 mm	CI (sw 30/-)	single	EI 120 - U/C

Penetration seals HD40, HD60, HD75, HD90				
Type of the pipe	**Insulation***	**a_1/a_2** [mm]**	**Fire resistance class**	**penetration type**
Copper pipes				
Mounted as a group of penetration seals, thickness of construction 200 mm				
ø ≤ 42 mm, pipe e_n ≤ 1,5 mm	LI (sw 20/350)	9/60	EI 120 - U/C	HD60
Zink-plated carbon steel pipes				
Mounted as a group of penetration seals, thickness of construction 200 mm				
ø ≤ 42 mm, pipe e_n ≤ 1,5 mm	LI (sw 20/350)	9/60	EI 120 - U/C	HD60
Steel pipes				
Mounted as a group of penetration seals, thickness of construction 200 mm				
ø ≤ 42,2 mm, pipe e_n ≤ 2,5 mm	not required	9/60	EI 120 - U/C	HD60
Other plastic pipes				
Mounted as a group of penetration seals, thickness of construction 200 mm				
Pex-pipe ø22 in covering pipe Ø34, pipe e_n ≤ 3,0 mm	not required	13/60	EI 120 - U/C	HD60
Mounted as a single penetration seal, thickness of construction 200 mm				
Pex-pipe ø28 in covering pipe Ø54, pipe e_n ≤ 4,0 mm	not required	18/200	EI 120 - U/C	HD60
Cables				

ANNEX 1

Mounted as a single penetration seal, Thickness of construction 200 mm				
Single cable ø ≤ 21,0 mm	not required	9,5/60	EI 120 - U/C	HD40
Single cable ø ≤ 24,0 mm	not required	18/single	EI 120 - U/C	HD60
Singular cable in a bundle Ø ≤ 21 mm, cable bundle total ø 63 mm	not required	9/30	EI 120 - U/C	HD90
Cable bundle ≤ Ø 38 mm in plastic conduit Ø≤40, singular cable in the bundle ≤ Ø17 mm	not required	-/single	EI 120 - U/C	HD75
Mounted as a group of penetration seals, thickness of construction 200 mm				
Singular cable in a bundle Ø ≤ 17 mm, cable bundle total Ø≤ 40 mm	not required	-/60	EI 120 - U/C	HD60

ANNEX 1

Table 5. Sewatek penetrations with penetration seal D2-40, D2-60 and D2-90 mounted in 92 mm, 94 mm or 150 mm thick low density rigid wall.

* The insulation around pipes is continuous and interrupted (CI) or local and interrupted (LI). The length of local insulation of the pipes is 350 mm on both sides of the separating construction. The insulation is stone wool (sw) (20 mm or 30 mm, nominal density 60 kg/m³).

** a_1 = distance between service pipe and outer surface of PVC pipe (Annex 2 page 4)

a_2 = minimum distance between penetration seals (Annex 2 page 4). In case a single penetration, minimum distance to another single penetration is 200 mm according to the test standard EN 1366. Distances are measured from the outer edge of the penetration seal device

e_n= pipe wall thickness

Type of the pipe	**Penetration seal**	**Insulation*** (thickness/length)	**a_1/a_2** [mm]**	**Fire resistance class**
Copper pipes				
Mounted as a single penetration seal				
ø ≤ 18 mm and ø ≤ 35 mm in a device, pipe e_n ≤ 1.0 mm and 1.5 mm	D2-90)	LI (sw) 30 mm / 350 mm	- / 200	EI 120 - U/C
ø ≤ 54 mm, pipe e_n ≤ 1.5 mm, rubber casket	D2-90	LI (sw) 30 mm / 350 mm	18 / 200	EI 90 - U/C
Mounted as a group of penetration seals				
ø ≤ 10 mm, pipe e_n ≤ 1.0 mm	D2-40	LI (sw) 20 mm / 350 mm	15 / 80	EI 120 - U/C
ø ≤ 42 mm, pipe e_n ≤ 1.5 mm	D2-60	LI (sw) 20 mm / 350 mm	9 / 60	EI 60 - U/C
Ø ≤ 54 mm, pipe e_n ≤ 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	18 / 70	EI 60 - U/C
wall thickness 150 mm				
ø ≤ 18 mm and ø ≤ 35 mm in a device, pipe e_n ≤ 1.5 mm and 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	- / 10	EI 120 - U/C
Zinc-coated steel pipes				
Mounted as a single penetration seal				
ø ≤ 18 mm and ø ≤ 35 mm in a device, pipe e_n ≤ 1.0 mm and 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	- / 200	EI 120 - U/C
Mounted as a group of penetration seals				
ø ≤ 12 mm, pipe e_n ≤ 1.2 mm	D2-40	not required	14 / 80	EI 120 - U/C
ø ≤ 28 mm, pipe e_n ≤ 1.8 mm	D2-60	not required	16 / 60	EI 60 - U/C
ø ≤ 54 mm, pipe e_n ≤ 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	18 / 70	EI 120 - U/C
wall thickness 150 mm				
ø ≤ 18 mm and ø ≤ 35 mm in a device, pipe e_n ≤ 1.5 mm and 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	- / 10	EI 120 - U/C
Steel pipes				
Mounted as a single penetration seal				

ø ≤ 18 mm and ø ≤ 35 mm in a device, pipe e_n ≤ 1.0 mm and 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	- / 200	EI 120 - U/C
Mounted as a group of penetration seals				
DN10, ø ≤ 17.2 mm, pipe e_n ≤ 2.5 mm	D2-40	not required	11 / 80	EI 90 - U/C
DN20, ø ≤ 27.8 mm, pipe e_n ≤ 2.7 mm	D2-60	not required	16 / 60	EI 60 - U/C
DN50, ø ≤ 60.2 mm, pipe e_n ≤ 3.5 mm	D2-90	LI (sw) 30 mm / 350 mm	15 / 70	EI 120 - U/C
wall thickness 150 mm				
ø ≤ 18 mm and ø ≤ 35 mm in a device, pipe e_n ≤ 1.5 mm and 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	- / 10	EI 120 - U/C
Composite pipes				
Mounted as a single penetration seal				
ø ≤ 16 mm and ø ≤ 32 mm in a device, pipe e_n ≤ 2.5 mm and 4.0 mm	D2-90	not required	- / 200	EI 15 - U/C
Mounted as a group of penetration seals				
ø ≤ 16 mm, pipe e_n ≤ 2.0 mm	D2-40	not required	12 / 80	EI 120 - U/C
ø ≤ 25 mm, pipe e_n ≤ 2.5 mm	D2-40	not required	7.5 / 10 in line	EI 60 - U/C
ø ≤ 40 mm, pipe e_n ≤ 4.0 mm	D2-60	not required	10 / 60	EI 60 - U/C
ø ≤ 40 mm, pipe e_n ≤ 4.0 mm	D2-60	CI (sw) 20 mm / -	10 / 60	EI 120 - U/C
wall thickness 150 mm				
ø ≤ 16 mm and ø ≤ 32 mm in a device, pipe e_n ≤ 2.0 mm and 4.0 mm	D2-90	LI (sw) 30 mm / 350 mm	- / 10	EI 120 - U/C
Plastic PEX-pipes				
Mounted as a single penetration seal				
Pex-pipe 15/28, pipe e_n ≤ 2.5 mm	D2-60	not required	16 / 200	EI 120 - U/C
4 x Pex-pipe 15/28, pipe e_n ≤ 2.5 mm	D2-90	not required	7 / 200	EI 120 - U/C
Pex-pipe 28/54, pipe e_n ≤ 4.0 mm	D2-90	not required	18 / 200	EI 120 - U/C
wall thickness 94 mm				
7 x Pex-pipe 15, pipe e_n ≤ 2.0 mm	D2-60	not required	7.5 / 200	EI 60 - U/C
Mounted as a group of penetration seals				
Pex-pipe 15, pipe e_n ≤ 2.5 mm	D2-40	not required	12.5 / 60	EI 120 - U/C
Pex-pipe 40, pipe e_n ≤ 3.7 mm	D2-60	not required	10 / 60	EI 120 - U/C
Plastic sewer pipes				
Mounted as a single penetration seal				
ø ≤ 32 mm, pipe e_n ≤ 1.8 mm	D2-60	not required	14 / 200	EI 120 - U/C
ø ≤ 50 mm, pipe e_n ≤ 1.8 mm	D2-90	not required	20 / 200	EI 120 - U/C
Cables				

ANNEX 1

Mounted as a single penetration seal				
Single cable max ø of the cable ≤ 22 mm MMJ 5x10 mm^2	D2-40	not required	9.5 / 200	EI 120 - U/C
Singular cables in a bundle, max ø of the bundle ≤ 47 mm max ø of the cables ≤ 22 mm, 13 mm, 11 mm 5 x cable (MMJ 3x1.5 mm^2) + 5 x cable (MMJ 3x2.5 mm^2) + 1 x cable (MMJ 5x10 mm^2)	D2-90	not required	20 /200	EI 60 - U/C
Cable conduit ø ≤ 50.0 mm, conduit wall thickness ≤ 1.5 mm, with singular cables in a bundle, max ø of the bundle ≤ 47 mm max ø of the cables ≤ 22 mm, 13 mm, 11 mm 5 x cable (MMJ 3x1.5 mm^2) + 5 x cable (MMJ 3x2.5 mm^2) + 1 x cable (MMJ 5x10 mm^2)	D2-90	not required	20 / 200	EI 90 - U/C
Blank penetration				
Mounted as a group penetration seals				
Hole ≤ 90.0 mm, no services	D2-90	not required	- / 70	EI 120 - U/C

ANNEX 1

Table 6. Sewatek penetrations with penetration seal D2-40, D2-60 and D2-90 mounted in 92 mm or in same cases 94 mm thick flexible wall (see the notes).

* The insulation around pipes is continuous and interrupted (CI) or local and interrupted (LI). The length of local insulation of the pipes is 350 mm on both sides of the separating construction. The insulation is stone wool (sw) (20 mm or 30 mm, nominal density 60 kg/m³).

** a_1 = distance between service pipe and outer surface of PVC pipe (Annex 2 page 4)

a_2 = minimum distance between penetration seals (Annex 2 page 4). In case a single penetration, minimum distance to another single penetration is 200 mm according to the test standard EN 1366. Distances are measured from the outer edge of the penetration seal device

e_n= pipe wall thickness

Type of the pipe	**Penetration seal**	**Insulation*** (thickness/length)	**a_1/a_2** [mm]**	**Fire resistance class**
Copper pipes				
Mounted as a single penetration seal				
ø ≤ 18 mm and ø ≤ 35 mm in a device, pipe e_n ≤ 1.0 mm and 1.5 mm	D2-90)	LI (sw) 30 mm / 350 mm	- / 200	EI 120 - U/C
ø ≤ 54 mm, pipe e_n ≤ 1.5 mm, rubber casket	D2-90	LI (sw) 30 mm / 350 mm	18 / 200	EI 90 - U/C
Mounted as a group of penetration seals				
ø ≤ 10 mm, pipe e_n ≤ 1.0 mm	D2-40	LI (sw) 20 mm / 350 mm	15 / 80	EI 120 - U/C
ø ≤ 42 mm, pipe e_n ≤ 1.5 mm	D2-60	LI (sw) 20 mm / 350 mm	9 / 60	EI 60 - U/C
Ø ≤ 54 mm, pipe e_n ≤ 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	18 / 70	EI 60 - U/C
Zinc-coated steel pipes				
Mounted as a single penetration seal				
ø ≤ 18 mm and ø ≤ 35 mm in a device, pipe e_n ≤ 1.0 mm and 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	- / 200	EI 120 - U/C
Mounted as a group of penetration seals				
ø ≤ 12 mm, pipe e_n ≤ 1.2 mm	D2-40	not required	14 / 80	EI 120 - U/C
ø ≤ 28 mm, pipe e_n ≤ 1.8 mm	D2-60	not required	16 / 60	EI 60 - U/C
ø ≤ 54 mm, pipe e_n ≤ 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	18 / 70	EI 120 - U/C
Steel pipes				
Mounted as a single penetration seal				
ø ≤ 18 mm and ø ≤ 35 mm in a device, pipe e_n ≤ 1.0 mm and 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	- / 200	EI 120 - U/C
Mounted as a group of penetration seals				
DN10, ø ≤ 17.2 mm, pipe e_n ≤ 2.5 mm	D2-40	not required	11 / 80	EI 90 - U/C
DN20, ø ≤ 27.8 mm, pipe e_n ≤	D2-60	not required	16 / 60	EI 60 - U/C

2.7 mm				
DN50, ø ≤ 60.2 mm, pipe e_n ≤ 3.5 mm	D2-90	LI (sw) 30 mm / 350 mm	15 / 70	EI 120 - U/C
Composite pipes				
Mounted as a single penetration seal				
ø ≤ 16 mm and ø ≤ 32 mm in a device, pipe e_n ≤ 2.5 mm and 4.0 mm	D2-90	not required	- / 200	EI 15 - U/C
Mounted as a group of penetration seals				
ø ≤ 16 mm, pipe e_n ≤ 2.0 mm	D2-40	not required	12 / 80	EI 120 - U/C
ø ≤ 25 mm, pipe e_n ≤ 2.5 mm	D2-40	not required	7.5 / 10 in line	EI 60 - U/C
ø ≤ 40 mm, pipe e_n ≤ 4.0 mm	D2-60	not required	10 / 60	EI 60 - U/C
ø ≤ 40 mm, pipe e_n ≤ 4.0 mm	D2-60	CI (sw) 20 mm / -	10 / 60	EI 120 - U/C
Plastic PEX-pipes				
Mounted as a single penetration seal				
Pex-pipe 15/28, pipe e_n ≤ 2.5 mm	D2-60	not required	16 / 200	EI 120 - U/C
4 x Pex-pipe 15/28, pipe e_n ≤ 2.5 mm	D2-90	not required	7 / 200	EI 120 - U/C
Pex-pipe 28/54, pipe e_n ≤ 4.0 mm	D2-90	not required	18 / 200	EI 120 - U/C
Mounted as a group of penetration seals				
Pex-pipe 15, pipe e_n ≤ 2.5 mm	D2-40	not required	12.5 / 60	EI 120 - U/C
Pex-pipe 40, pipe e_n ≤ 3.7 mm	D2-60	not required	10 / 60	EI 120 - U/C
94 mm thick flexible wall				
7 x Pex-pipe 15, pipe e_n ≤ 2.0 mm	D2-60	not required	7.5 / 200	EI 60 - U/C
Plastic sewer pipes				
Mounted as a single penetration seal				
ø ≤ 32 mm, pipe e_n ≤ 1.8 mm	D2-60	not required	14 / 200	EI 120 - U/C
ø ≤ 50 mm, pipe e_n ≤ 1.8 mm	D2-90	not required	20 / 200	EI 120 - U/C
Cables				
Mounted as a single penetration seal				
Single cable max ø of the cable ≤ 22 mm MMJ 5x10 mm^2	D2-40	not required	9.5 / 200	EI 120 - U/C
Singular cables in a bundle, max ø of the bundle ≤ 47 mm max ø of the cables ≤ 22 mm, 13 mm, 11 mm 5 x cable (MMJ 3x1.5 mm^2) + 5 x cable (MMJ 3x2.5 mm^2) + 1 x cable (MMJ 5x10 mm^2)	D2-90	not required	20 /200	EI 60 - U/C
Cable conduit ø ≤ 50.0 mm, conduit wall thickness ≤ 1.5 mm, with singular cables in a bundle, max ø of the bundle ≤ 47 mm max ø of the cables ≤ 22 mm, 13 mm, 11 mm	D2-90	not required	20 / 200	EI 90 - U/C

5 x cable (MMJ 3x1.5 mm^2) + 5 x cable (MMJ 3x2.5 mm^2) + 1 x cable (MMJ 5x10 mm^2)				
Blank penetration				
Mounted as a group penetration seal				
Hole ≤ 90.0 mm, no services	D2-90	not required	- / 70	EI 120 - U/C

ANNEX 1

Table 7. Sewatek penetrations with penetration seals D2-90 mounted in 150 mm thick high density rigid floor.

* The insulation around pipes is local and interrupted (LI). The length of local insulation of the pipes is 350 mm on both sides of the separating construction. The insulation is stone wool (sw) (20 mm or 30 mm, nominal density 60 kg/m³).

** a_1 = distance between service pipe and outer surface of PVC pipe (Annex 2 page 4)

a_2 = minimum distance between penetration seals (Annex 2 page 4). In case a single penetration, minimum distance to another single penetration is 200 mm according to the test standard EN 1366. Distances are measured from the outer edge of the penetration seal device

e_n= pipe wall thickness

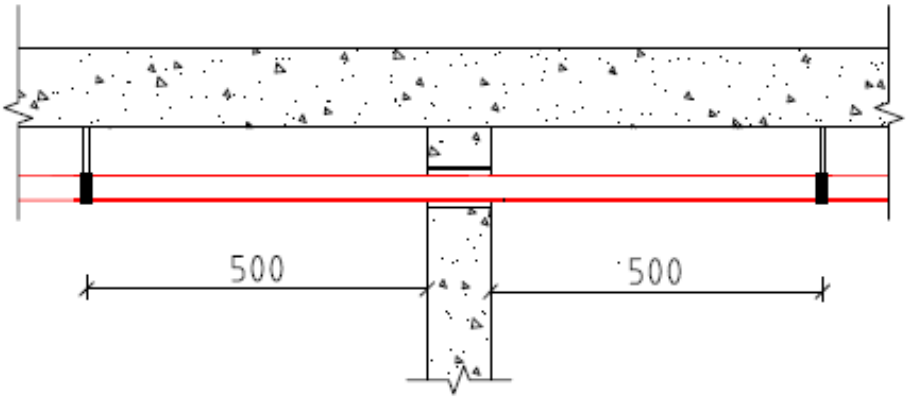
Type of the pipe	**Penetration seal**	**Insulation*** (thickness/length)	**a_1/a_2** [mm]**	**Fire resistance class**
Copper pipes				
Mounted as a group of penetration seals				
ø ≤ 18 mm and ø ≤ 35 mm in a device, pipe e_n ≤ 1.0 mm and 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	- / 10	EI 120 - U/C
Zinc-coated steel pipes				
Mounted as a group of penetration seals				
ø ≤ 18 mm and ø ≤ 35 mm in a device, pipe e_n ≤ 1.0 mm and 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	- / 10	EI 120 - U/C
Steel pipes				
Mounted as a group of penetration seals				
ø ≤ 18 mm and ø ≤ 35 mm in a device, pipe e_n ≤ 1.0 mm and 1.5 mm	D2-90	LI (sw) 30 mm / 350 mm	- / 10	EI 120 - U/C
Composite pipes				
Mounted as a group of penetration seals				
ø ≤ 16 mm and ø ≤ 32 mm in a device, pipe e_n ≤ 2.0 mm and 4.0 mm	D2-90	LI (sw) 30 mm / 350 mm	- / 30	EI 120 - U/C

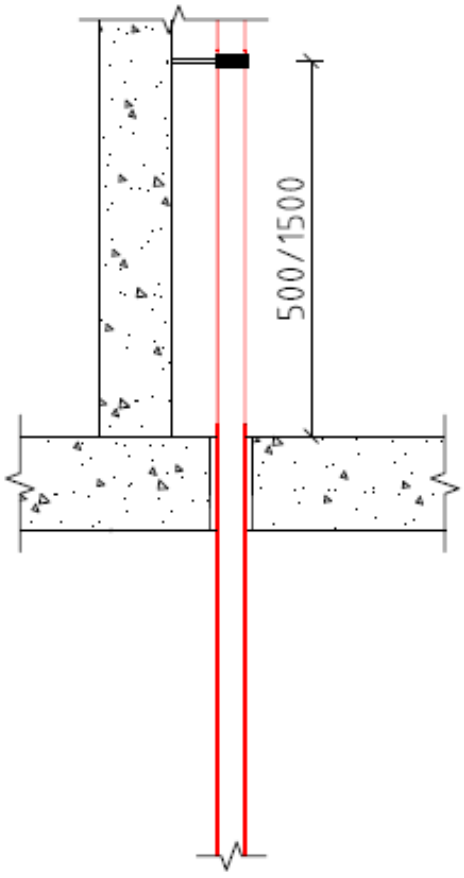
ANNEX 2

Supporting for pipes and cables

Wall

Supporting of pipes and cables max 500 mm from construction on both sides, in rigid or flexible wall.





Floor

Supporting of pipes max 1500 mm and cables max 500 mm above the construction, in high density rigid floor.

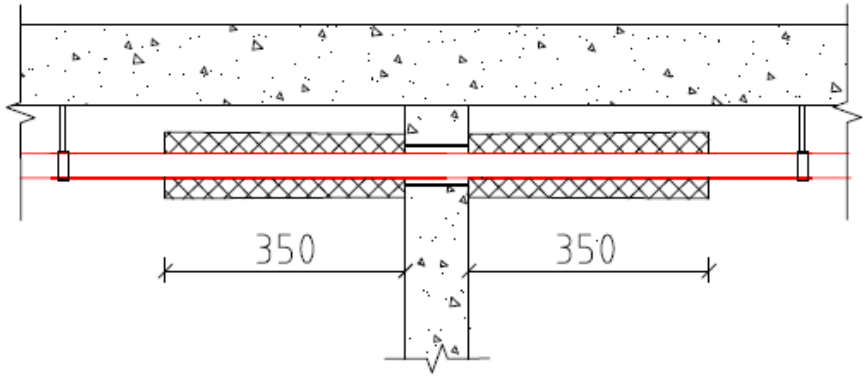
ANNEX 2

Insulation for pipes in the wall

Insulation materials and thicknesses			
Material	Rating	Density	Thickness
Stone wool with alum. foil. (sw)	A2	60 kg/m^3	if Ø<54 thickness 20 mm else 30 mm
Glass wool with alum. foil (gw)	A2	75 kg/m^3	if Ø<54 thickness 20 mm else 30 mm
Cellular rubber (cr)	B	45-80 kg/m^3	thickness 13 mm

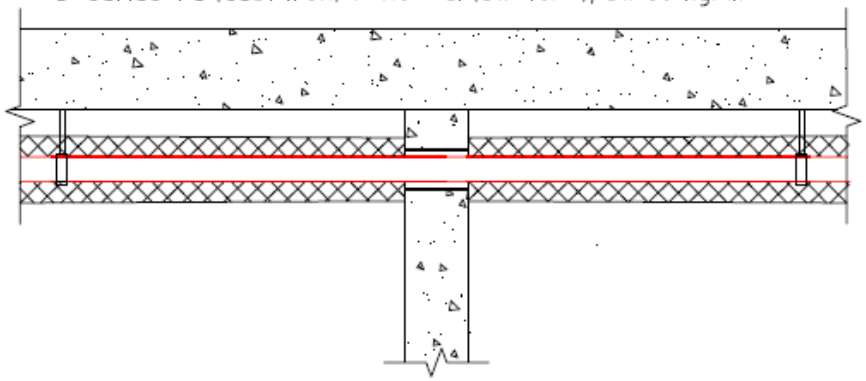
Wall
Local Interrupted, LI
Except:

- D-series: Plastic ϕ 110, Uponor PP MD – LI (sw 40/350)
- S-series: Cu Ø ≤ 64 – LI (sw 30 / 500)
- D-series: Single cable Ø ≤ 24,0 – LI (sw 20/50)



Wall
Continuous Interrupted, CI

- D-series: Fe (Cast iron) ϕ 110 – CI (sw 40/-), sw 80 kg/m^3



ANNEX 2

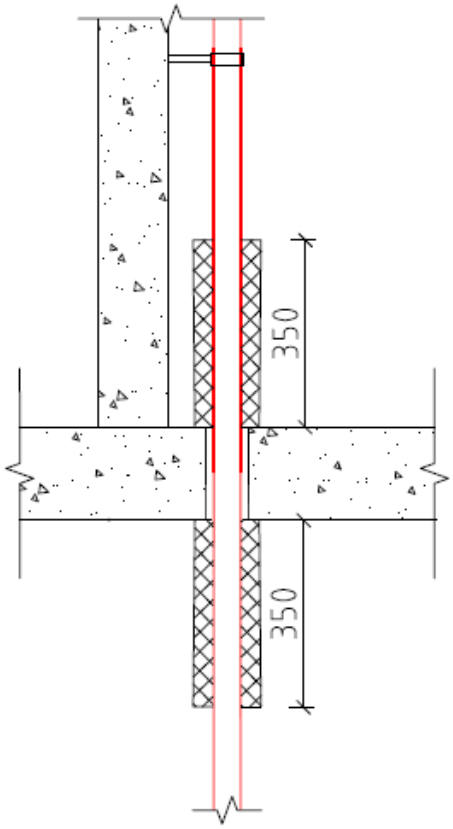
Insulation for pipes in the floor

Insulation materials and thicknesses			
Material	Rating	Density	Thickness
Stone wool with alum. foil. (sw)	A2	60 kg/m^3	if Ø<54 thickness 20 mm else 30 mm
Glass wool with alum. foil (gw)	A2	75 kg/m^3	if Ø<54 thickness 20 mm else 30 mm
Cellular rubber (cr)	B	45-80 kg/m^3	thickness 13 mm

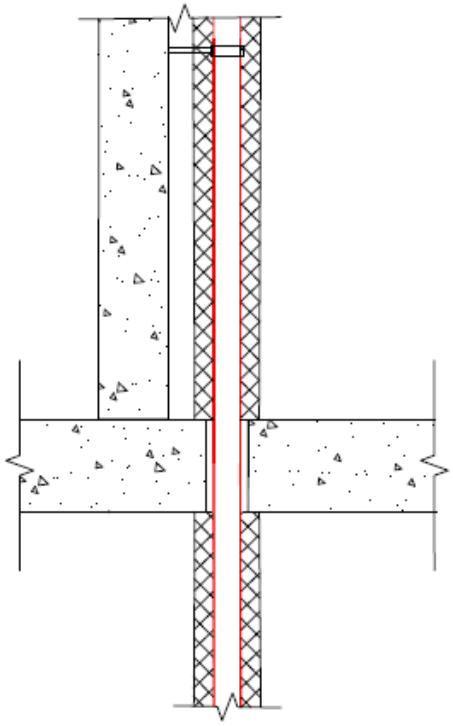
Floor
Local Interrupted, LI

Except:

- H-series: Cu Ø ≤ 35 – LI (sw 20/200)

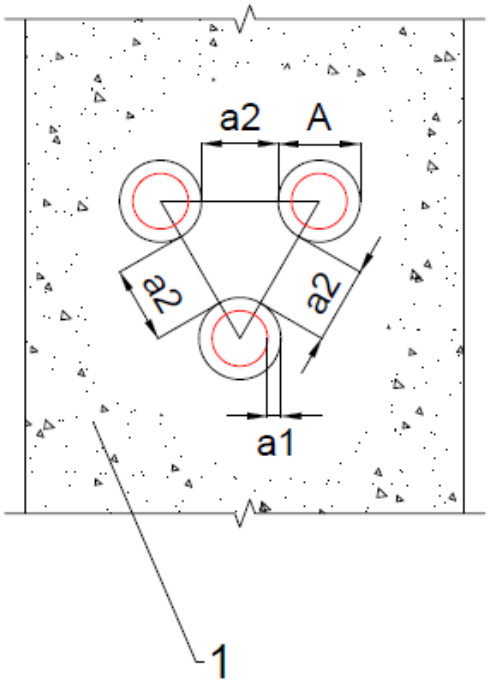


Floor
Continuous Interrupted, CI



ANNEX 2

The principle of measurement of the seals in cluster and the area of the pipes diameter and wall thickness covered



The method of defining the presented a2 measurements in cluster formation

1	Supporting construction
a1	Seperation between service pipe and supporting construction
a2	Separation between penetration seals
A	A Sewatek penetration seal diameter in total