



# European Technical Assessment **ETA 12/0045** of 04/04/2019

## I General Part

<b>Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011:</b>	<b>Eurofins Expert Services Oy</b>
<b>Trade name of the construction product</b>	<b>Sewatek penetration seal</b>
<b>Product family to which the construction product belongs</b>	<b>Fire stopping and Fire Sealing Products</b>
<b>Manufacturer</b>	<b>Sewatek Oy Sepäntie 4 FI-07230 Monninkylä Finland</b>
<b>Manufacturing plant</b>	<b>Sewatek Oy Sepäntie 4 FI-07230 Monninkylä Finland</b>
<b>This European Technical Assessment contains</b>	<b>21 pages including 2 Annexes which form an integral part of this assessment</b>
<b>This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of</b>	<b>European Assessment Document EAD 350454-00-1104, edition September 2017</b>
<b>This ETA replaces</b>	<b>ETA 12/0045 issued on January 8, 2016</b>

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## 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 thrilled 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.

### 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  $650 \text{ kg/m}^3 \pm 200 \text{ kg/m}^3$  and roof/floor slab at least  $850 \text{ kg/m}^3$ .

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<sup>1</sup>.

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<sup>1</sup> 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

## **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 categorized as Type Y2. The product meets also requirements of types Z1 and Z2.

PVC pipe and NBR cellular rubber together with ABS frame are inside the concrete and are also covered with 10 mm mortar or concrete layer at both ends 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.

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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
<b>BWR 1. Mechanical resistance and stability</b>	
Not relevant	
<b>BWR 2. Safety in case of fire</b>	
Reaction to fire of materials and components, EN 13501-1	Euroclass F (not assessed)
Resistance to fire, EN 13501-2	EI 30 – EI 120 ( in end uses and with the provisions presented in the Annex 1)
External fire performance of roof covering	Not relevant
<b>BWR 3. Hygiene, health and the environment</b>	
Vapour permeability and moisture resistance	No performance assessed
Watertightness	No performance assessed
Content, emission and/or release of dangerous substances	Declaration of the manufacturer
<b>BWR 4. Safety and accessibility in use</b>	No performance assessed
<b>BWR 5. Protection against noise</b>	
Air sound insulation, EN ISO 717-1	Clause 3.3
<b>BWR 6. Energy economy and heat retention</b>	No performance assessed
<b>BWR 7. Sustainable use of natural resources</b>	
Sustainable use of natural resources	No performance assessed
<b>General aspects</b>	
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  $\geq 200$  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 April 4, 2019  
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  $\varnothing \leq 54$  mm and 30 mm thick when pipes  $\varnothing > 54$  mm

gw = glass wool insulation, 20 mm thick when pipes  $\varnothing \leq 54$  mm and 30 mm thick when pipes  $\varnothing > 54$  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
<b>Copper pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing \leq 35$ mm, $e_n \leq 1.5$ mm	LI (cr)	12.5 / 10	EI 30 - U/C
$\varnothing \leq 35$ , $e_n \leq 1,5$ mm	LI (sw)	12,5/100	EI 120 - U/C
$\varnothing \leq 42$ mm, $e_n \leq 1.5$ mm	LI (sw)	16.5 / 25	EI 60 - U/C
$\varnothing \leq 54$ mm, $e_n \leq 1.5$ mm	LI (sw)	10.5 / 25	EI 45 - U/C
$\varnothing \leq 64$ , $e_n \leq 2,0$ mm	LI (sw 30/500)	13/70	EI 60 - U/C
<i>Mounted as a single penetration seal</i>			
$\varnothing \leq 10$ mm, $e_n \leq 1.0$ mm	not required	20 / single	EI 120 - U/C
$\varnothing \leq 28$ mm, $e_n \leq 1.2$ mm	LI (cr)	11 / single	EI 90 - U/C
$\varnothing \leq 89$ , $e_n \leq 2,5$ mm	CI (sw 30/-)	18/single	EI 90 - U/C
$\varnothing \leq 35$ mm, $e_n \leq 1.5$ mm	LI (sw)	12.5 / single	EI 120 - U/C
$\varnothing \leq 42$ mm, $e_n \leq 1.5$ mm	CI (gw/sw)	9 / single	EI 90 - U/C
$\varnothing \leq 54$ mm, $e_n \leq 1.5$ mm	LI (sw)	10.5 / single	EI 60 - U/C
$\varnothing \leq 76.1$ mm, $e_n \leq 2.0$ mm	CI (gw/sw)	24.5 / single	EI 60 - U/C
<b>Zink-plated carbon steel pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing \leq 22$ mm, $e_n \leq 1.5$ mm	not required	9 / 30	EI 120 - U/C
$\varnothing \leq 54$ mm, $e_n \leq 1.5$ mm	LI (sw)	10.5 / 25	EI 120 - U/C
<i>Mounted as a single penetration seal</i>			
$\varnothing \leq 28$ mm, $e_n \leq 1.5$ mm	not required	11 / single	EI 60 - U/C
<b>Steel pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing < 27$ mm, $e_n \leq 2.3$ mm	not required	6.6 / 30	EI 120 - U/C
$\varnothing < 77$ mm, $e_n \leq 2.9$ mm	LI (sw)	7 / 35	EI 120 - U/C

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$\varnothing < 89$ mm, $e_n \leq 3.2$ mm	CI (sw)	18.1 / 35	EI 120 - U/C
<i>Mounted as a single penetration seal</i>			
$\varnothing < 89$ mm, pipe $e_n \leq 3.2$ mm	CI (gw/sw)	18 / single	EI 90 - U/C
<i>Thickness of the rigid wall 150 mm</i>			
$\varnothing \leq 41,8$ mm, pipe $e_n \leq 3,3$ mm	not required	9/single	EI 120 - U/C
<b>Composite pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing \leq 25$ mm, $e_n \leq 2.5$ mm	not required	7.5 / 30	EI 120 - U/C
$\varnothing \leq 32$ mm, $e_n \leq 3.0$ mm	LI (cr)	14 / 10	EI 60 - U/C
$\varnothing \leq 40$ mm, $e_n \leq 4.0$ mm	LI (sw)	10 / 10	EI 120 - U/C
$\varnothing \leq 63$ mm, $e_n \leq 6.0$ mm	LI (sw)	13.5 / 30	EI 120 - U/C
<i>Mounted as a single penetration seal</i>			
$\varnothing \leq 40$ mm, $e_n \leq 4.0$ mm	not required	10 / single	EI 60 - U/C
$\varnothing \leq 50$ mm, $e_n \leq 4.0$ mm	not required	12.5 / single	EI 30 - U/C
<i>Thickness of the rigid wall 150 mm</i>			
$\varnothing \leq 40$ , pipe $e_n \leq 4,0$ mm, gasket	not required	10/single	EI 120 - U/C
<b>Other plastic pipes</b>			
<i>Mounted as a group of penetration seals</i>			
Pex-pipe in covering pipe $\varnothing \leq 22/34$ mm, $e_n \leq 3.0/2.5$ mm	not required	13 / 10	EI 90 - U/C
<i>Mounted as a single penetration seal</i>			
Pex-pipe in covering pipe $\varnothing \leq 15/25$ mm, pipe $e_n \leq 2.5/2.5$	not required	7.5 / single	EI 120 - U/C
<b>Cables</b>			
<i>Mounted in a Sewatek S-penetration seal</i>			
Singular cable $\varnothing \leq 17.5$ mm ( $a_2 \geq 110$ mm), cables in a device $\varnothing \leq 11.0$ mm ( $a_2 \geq 3$ mm)	none	single	EI 120 - U/C
<i>Thickness of the rigid wall 150 mm</i>			
Two cable penetrations groups next to each other, one with 3 singular cables $\varnothing \leq 9,0$ mm and another with 3 singular cables $\varnothing \leq 11,0$ mm	not required	9/11 / 3	EI 90 - U/C
<b>Blank penetration seals</b>			
<i>Mounted in a Sewatek S-penetration seal</i>			
Blank $\varnothing 32$ mm penetration pipe for singular cable $\varnothing \leq 17.5$ mm ( $a_2 \geq 110$ mm) or cables in a device $\varnothing \leq 11.0$ mm ( $a_2 \geq 3$ mm)	none	single	EI 120 - C/C
<i>Mounted as a group of penetration seals</i>			
Blank $\varnothing 40$ mm penetration pipe for pipes $\varnothing \leq 18$ , CR-plugs	none	14.5 / 30	EI 120 - C/C
<b>Plug</b>			
<i>Mounted as a single penetration seal</i>			
ZZ-plug $\varnothing 65$ mm in a hole $\varnothing 62$ mm	none	single	EI 120



## ANNEX 1

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  $\varnothing \leq 54$  mm and 30 mm thick when pipes  $\varnothing > 54$  mm

gw = glass wool insulation, 20 mm thick when pipes  $\varnothing \leq 54$  mm and 30 mm thick when pipes  $\varnothing > 54$  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

<b>Penetration seals D42, D62, D92</b>			
<b>Type of the pipe</b>	<b>Insulation*</b> (thickness/length)	<b><math>a_1/a_2</math>**</b> <b>[mm]</b>	<b>Fire resistance class</b>
<b>Copper pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing \leq 35$ mm, pipe $e_n \leq 1.5$ mm	LI (sw)	9.8 / 8	EI 60 - U/C
$\varnothing \leq 42$ mm, pipe $e_n \leq 1.5$ mm	LI (sw)	10 / 18	EI 60 - U/C
$\varnothing \leq 35$ , pipe $e_n \leq 1,5$ mm	LI (sw)	15/98	EI 120 - U/C
$\varnothing \leq 42$ , pipe $e_n \leq 1,5$ mm	LI (sw 20/350)	10/58	EI 90 - U/C
<i>Mounted as a single penetration seal</i>			
$\varnothing \leq 10$ mm, pipe $e_n \leq 1.0$ mm	not required	15.1 / single	EI 90 - U/C
$\varnothing \leq 10$ mm, pipe $e_n \leq 0.8$ mm	LI (sw or cr)	15.1 / single	EI 120 - U/C
$\varnothing \leq 28$ mm, pipe $e_n \leq 1.2$ mm	LI (cr) or CI (gw/sw)	6 / single	EI 60 - U/C
$\varnothing \leq 42$ mm, pipe $e_n \leq 1.5$ mm	LI (sw)	9 / single	EI 90 - U/C
$\varnothing \leq 64$ , pipe $e_n \leq 2,0$ mm	CI (sw 30/-)	14/single	EI 90 - U/C
<b>Zink-plated carbon steel pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing \leq 28$ mm, pipe $e_n \leq 1.5$ mm	not required	17 / 8	EI 60 - U/C
$\varnothing \leq 35$ mm, pipe $e_n \leq 1.5$ mm	LI (sw)	9.8 / 8	EI 60 - U/C
$\varnothing \leq 35$ , pipe $e_n \leq 1,5$ mm	LI (sw)	15/98	EI 120 - U/C
$\varnothing \leq 42$ mm, pipe $e_n \leq 1.5$ mm	LI (sw)	10 / 18	EI 60 - U/C
$\varnothing \leq 42$ , pipe $e_n \leq 1,5$ mm	LI (sw)	10/58	EI 90 - U/C
<i>Mounted as a single penetration seal</i>			
$\varnothing \leq 12$ mm, pipe $e_n \leq 1.0$ mm	not required	14.1 / single	EI 120 - U/C
$\varnothing \leq 28$ mm, pipe $e_n \leq 1.5$ mm	not required	6.1 / single	EI 90 - U/C
$\varnothing \leq 42$ mm, pipe $e_n \leq 1.5$ mm	not required	9 / single	EI 45 - U/C

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

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Blank D42/62/92, device sealed with TPE or cellular rubber plug	none	16 / 8	EI 90 - C/C
<b>Penetration seals D105, D140</b>			
<b>Type of the pipe</b> e <sub>n</sub> = pipe wall thickness	<b>Insulation*</b>	<b>a<sub>1</sub>/a<sub>2</sub>**</b> [mm]	<b>Fire resistance class</b>
<b>Steel pipes</b>			
<i>Mounted as a single penetration seal</i>			
∅ < 110 mm, pipe e <sub>n</sub> ≤ 4,0 mm	CI (sw)	15 / single	EI 120 - U/C
<b>Other plastic pipes</b>			
<i>Mounted as a single penetration seal</i>			
Polypropylene ∅ ≤ 110 mm, pipe e <sub>n</sub> ≤ 4.0 mm	CI (sw)	15 / single	EI 120 - U/C
<b>Plastic (Polypropylene) sewer pipes</b>			
<i>Mounted as a single penetration seal</i>			
∅ ≤ 110, pipe e <sub>n</sub> ≤ 3,5 mm	not required	15/single	EI 120 - U/C
∅ ≤ 110, pipe e <sub>n</sub> ≤ 6,5 mm	not required	15/single	EI 120 - U/C
∅ ≤ 110, e <sub>n</sub> ≤ 3,5 mm	LI (sw 40/350)	15/single	EI 120 - U/C
∅ ≤ 110, pipe e <sub>n</sub> ≤ 6,5 mm	CI (sw 30/-)	15/single	EI 120 - U/C
<i>Mounted as a group of penetration seal, thickness of the rigid wall 150 mm</i>			
∅ ≤ 110 <sup>3</sup> , pipe e <sub>n</sub> ≤ 3,6 mm	not required	15/60	EI 120 - U/C
<b>Cast iron sewer pipes</b>			
<i>Mounted as a single penetration seal</i>			
∅ ≤ 110, pipe e <sub>n</sub> ≤ 3,5 mm	CI (sw800 40/-)	15/single	EI 120 - U/C

<b>Penetration seals SD60, SD90, SD125</b>				
<b>Type of the pipe</b> e <sub>n</sub> = pipe wall thickness	<b>Insulation*</b>	<b>a<sub>1</sub>/a<sub>2</sub>**</b> [mm]	<b>Fire resistance class</b>	<b>penetration type</b>
<b>Composite pipes</b>				
<i>Mounted as a group of penetration seals</i>				
∅ ≤ 75, pipe e <sub>n</sub> ≤ 7,5 mm	not required	25/35	EI 30 - U/C	SD125
<b>Other plastic pipes</b>				
<i>Mounted as a group of penetration seals</i>				
Pex-pipe in covering pipe 22/34, pipe e <sub>n</sub> ≤ 3,0 mm	not required	13/60	EI 60 - U/C	SD60
<i>Mounted as a single penetration seal, thickness of the rigid wall 150 mm</i>				
Pex-pipe in covering pipe 15/28 (4 pcs in a SD 90-device), pipe e <sub>n</sub> ≤ 2,5 mm	not required	8/single	EI 120 - U/C	SD90
<b>Cables</b>				

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

## ANNEX 1

**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  $\varnothing \leq 54$  mm and 30 mm thick when pipes  $\varnothing > 54$  mm

gw = glass wool insulation, 20 mm thick when pipes  $\varnothing \leq 54$  mm and 30 mm thick when pipes  $\varnothing > 54$  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
<b>Copper pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing \leq 22$ mm, $e_n \leq 1.0$ mm	not required	9 / 30	EI 120 - U/C
$\varnothing \leq 28$ mm, $e_n \leq 1.2$ mm	not required	16 / 10	EI 60 - U/C
$\varnothing \leq 35$ mm, $e_n \leq 1.5$ mm	LI (cr/sw)	12.5 / 10	EI 120 - U/C
$\varnothing \leq 54$ mm, $e_n \leq 1.5$ mm	LI (sw)	10.5 / 25	EI 90 - U/C
$\varnothing \leq 89$ mm, $e_n \leq 2.0$ mm	CI (sw)	18.1 / 35	EI 120 - U/C
<i>Thickness of construction 200 mm</i>			
$\varnothing \leq 35$ mm***, pipe $e_n \leq 1,5$ mm *** Support max. 1500 mm from construction	LI (sw 20/single)	12,5/60	EI 120 - U/C
<b>Zink-plated carbon steel pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing \leq 42$ mm, $e_n \leq 1.5$ mm	not required	9 / 10	EI 120 - U/C
$\varnothing \leq 54$ mm, $e_n \leq 1.5$ mm	not required	10.5 / 25	EI 120 - U/C
$\varnothing \leq 89$ mm, $e_n \leq 2.0$ mm	CI (sw)	18.1 / 35	EI 120 - U/C
<i>Thickness of construction 200 mm</i>			
$\varnothing \leq 35$ mm***, pipe $e_n \leq 1,5$ mm, only two penetrations next to each other *** Support max. 1500 mm from construction	not required	12,5/10	EI 120 - U/C
<b>Steel pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing < 49$ mm, $e_n \leq 2.6$ mm	not required	13.4 / 25	EI 120 - U/C
$\varnothing < 61$ mm $e_n \leq 2.9$ mm	LI (sw)	14.9 / 30	EI 120 - U/C
$\varnothing < 89$ mm $e_n \leq 3.2$ mm	CI (sw)	18.1 / 35	EI 120 - U/C
<i>Thickness of construction 200 mm</i>			

## ANNEX 1

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

## ANNEX 1

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  $\varnothing \leq 54$  mm and 30 mm thick when pipes  $\varnothing > 54$  mm

gw = glass wool insulation, 20 mm thick when pipes  $\varnothing \leq 54$  mm and 30 mm thick when pipes  $\varnothing > 54$  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
<b>Copper pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing \leq 42$ mm, pipe $e_n \leq 1.5$ mm	LI (sw)	10 / 18	EI 120 - U/C
$\varnothing \leq 64$ mm, pipe $e_n \leq 2.0$ mm	CI (sw)	14 / 28	EI 120 - U/C
<b>Zink-plated carbon steel pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing \leq 42$ mm, pipe $e_n \leq 1.5$ mm	not required	10 / 8	EI 120 - U/C
$\varnothing \leq 64$ mm, pipe $e_n \leq 2.0$ mm	CI (sw)	14 / 28	EI 120 - U/C
<b>Steel pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing < 43$ mm, pipe $e_n \leq 2.6$ mm	not required	9.8 / 8	EI 120 - U/C
$\varnothing < 61$ mm, pipe $e_n \leq 2.9$ mm	LI (sw)	15.9 / 28	EI 120 - U/C
<b>Composite pipes</b>			
<i>Mounted as a group of penetration seals</i>			
$\varnothing \leq 40$ mm, pipe $e_n \leq 4.0$ mm	CI (sw)	11 / 18	EI 120 - U/C
$\varnothing \leq 63$ mm, pipe $e_n \leq 6.0$ mm	CI (sw)	14.5 / 28	EI 120 - U/C
<i>Mounted as a single penetration seal</i>			
$\varnothing \leq 40$ mm, pipe $e_n \leq 4.0$ mm	none	13 / single	EI 120 - U/C
$\varnothing \leq 63$ mm, pipe $e_n \leq 6.0$ mm	LI (sw)	14.5 / single	EI 120 - U/C
<i>thickness of construction 200 mm</i>			
$\varnothing \leq 40$ mm, pipe $e_n \leq 4,5$ mm	not required	11/200	EI 120 - U/C
<b>Other plastic pipes</b>			
<i>Mounted as a group of penetration seals</i>			

## ANNEX 1

Pex-pipe in covering pipe $\varnothing \leq 28/54$ mm, pipe $e_n \leq 4.0/3.0$ mm	not allowed	19 / 8	EI 120 - U/C
<b>Plastic sewer pipes</b>			
<i>Mounted as a single penetration seal, thickness of construction 200 mm</i>			
$\varnothing \leq 50$ mm, pipe $e_n \leq 3,0$ mm	not required	21/ single	EI 120 - U/C
<b>Cables</b>			
<i>Mounted as a single penetration seal</i>			
Singular cable in a bundle $\varnothing \leq 12.5$ mm, cable bundle total $\varnothing \leq 64$ mm	none	14 / single	EI 120 - U/C
Single MMJ-cable $\varnothing \leq 21.5$ mm	none	10.3 / single	EI 120 - U/C
Single aluminium power cable $\varnothing \leq 44$ mm	none	9 /single	EI 120 - U/C
<i>Mounted as a single penetration seal, thickness of construction 200 mm</i>			
Singular cable in a bundle $\varnothing \leq 21$ mm, cable bundle total $\varnothing 63$ mm	not required	10/single	EI 120 - U/C
<b>Blank penetration seals</b>			
<i>Mounted as a group of penetration seals</i>			
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			
<b>Penetration seals D105 and D140</b>			
<b>Type of the pipe</b>	<b>Insulation*</b>	<b><math>a_1/a_2^{**}</math> [mm]</b>	<b>Fire resistance class</b>
<b>Steel pipes</b>			
<i>Mounted as a single penetration seal</i>			
$\varnothing \leq 110$ mm, pipe $e_n \leq 4.5$ mm	CI (sw)	20 /single	EI 120 - U/C
<b>Other plastic pipes</b>			
<i>Mounted as a single penetration seal</i>			
Polypropylene $\varnothing \leq 110$ mm, pipe $e_n \leq 3.8$ mm	CI (sw)	20 /single	EI 120 - U/C
<b>Plastic sewer pipes</b>			
<i>Mounted as a single penetration seal, thickness of construction 200 mm</i>			
$\varnothing \leq 75$ mm, pipe $e_n \leq 3,0$ mm	not required	15/ single	EI 120 - U/C
$\varnothing \leq 110$ mm, pipe $e_n \leq 4,5$ mm	not required	15/ single	EI 120 - U/C
$\varnothing \leq 110$ mm, pipe $e_n \leq 6,0$ mm	not required	15/ single	EI 120 - U/C
$\varnothing \leq 110$ mm, pipe $e_n \leq 4,0$ mm	not required	15/ single	EI 120 - U/C
$\varnothing \leq 110$ mm, pipe $e_n \leq 4,0$ mm	CI (sw 30/-)	15/ single	EI 120 - U/C
$\varnothing \leq 110$ mm, pipe $e_n \leq 6,0$ mm	CI (sw 30/-)	15/ single	EI 120 - U/C
<i>Mounted as a group of penetration seals, thickness of construction 200 mm</i>			
$\varnothing \leq 110$ mm, pipe $e_n \leq 4,2$ mm	not required	15/60	EI 120 - U/C
<b>Cast iron sewer pipes</b>			
<i>Mounted as a single penetration seal, thickness of construction 200 mm</i>			

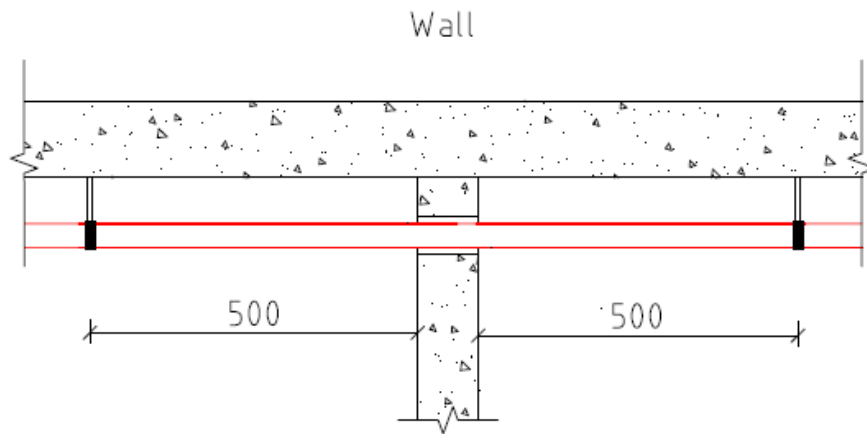


## ANNEX 1

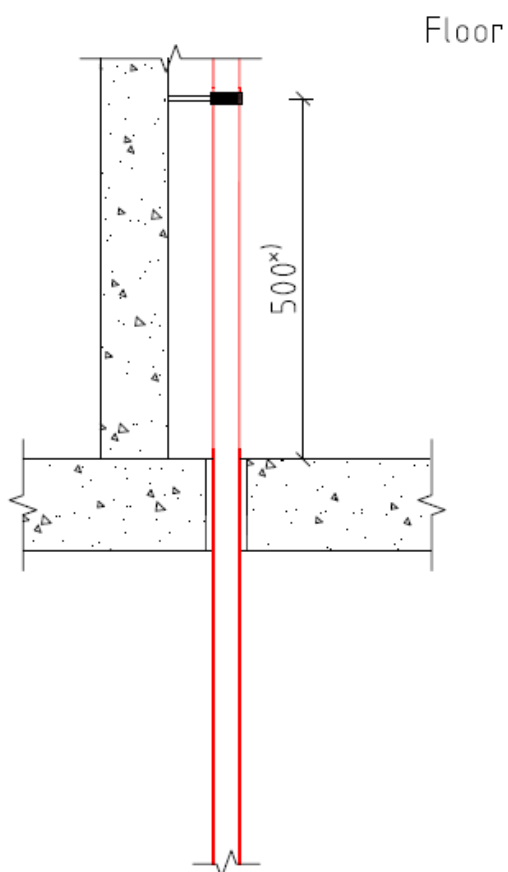
$\varnothing \leq 110$ mm, pipe $e_n \leq 3,5$ mm	LI (sw 30/350)	15/200	EI 120 - U/C
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<b>Penetration seals HD40, HD60, HD75, HD90</b>				
Type of the pipe	Insulation*	$a_1/a_2^{**}$ [mm]	Fire resistance class	penetration type
<b>Copper pipes</b>				
<i>Mounted as a group of penetration seals, thickness of construction 200 mm</i>				
$\varnothing \leq 42$ mm, pipe $e_n \leq 1,5$ mm	LI (sw 20/350)	9/60	EI 120 - U/C	HD60
<b>Zink-plated carbon steel pipes</b>				
<i>Mounted as a group of penetration seals, thickness of construction 200 mm</i>				
$\varnothing \leq 42$ mm, pipe $e_n \leq 1,5$ mm	LI (sw 20/350)	9/60	EI 120 - U/C	HD60
<b>Steel pipes</b>				
<i>Mounted as a group of penetration seals, thickness of construction 200 mm</i>				
$\varnothing \leq 42,2$ mm, pipe wall thickness $\leq 2,5$ mm	not required	9/60	EI 120 - U/C	HD60
<b>Other plastic pipes</b>				
<i>Mounted as a group of penetration seals, thickness of construction 200 mm</i>				
Pex-pipe $\varnothing 22$ in covering pipe $\varnothing 34$ , pipe $e_n \leq 3,0$ mm	not required	13/60	EI 120 - U/C	HD60
<i>Mounted as a single penetration seal, thickness of construction 200 mm</i>				
Pex-pipe $\varnothing 28$ in covering pipe $\varnothing 54$ , pipe $e_n \leq 4,0$ mm	not required	18/200	EI 120 - U/C	HD60
<b>Cables</b>				
<i>Mounted as a single penetration seal, Thickness of construction 200 mm</i>				
Single cable $\varnothing \leq 21,0$ mm	not required	9,5/60	EI 120 - U/C	HD40
Single cable $\varnothing \leq 24,0$ mm	not required	18/single	EI 120 - U/C	HD60
Singular cable in a bundle $\varnothing \leq 21$ mm, cable bundle total $\varnothing 63$ mm	not required	9/30	EI 120 - U/C	HD90
Cable bundle $\leq \varnothing 38$ mm in plastic conduit $\varnothing \leq 40$ , singular cable in the bundle $\leq \varnothing 17$ mm	not required	-/single	EI 120 - U/C	HD75
<i>Mounted as a group of penetration seals, thickness of construction 200 mm</i>				
Singular cable in a bundle $\varnothing \leq 17$ mm, cable bundle total $\varnothing \leq 40$ mm	not required	-/60	EI 120 - U/C	HD60

## Supporting for pipes



Supporting of pipes, cover pipes and cables 500 mm from construction on both sides, in standard wall.



x) H-series, 1500 mm

- Cu  $\varnothing \leq 35$  mm
- ZnFe  $\varnothing \leq 35$  mm
- Fe  $\varnothing < 33,8$  mm

## ANNEX 2

### Insulation for pipes in the wall

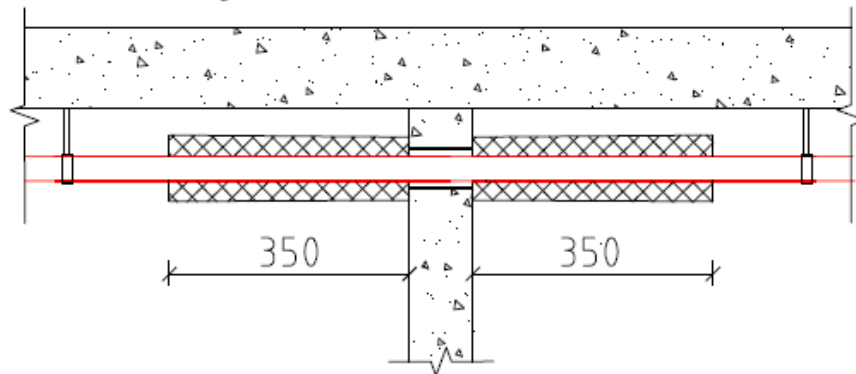
Insulation materials and thicknesses			
Material	Rating	Density	Thickness
Stone wool with alum. foil. (sw)	A2	60 kg/m <sup>3</sup>	if $\varnothing < 54$ thickness 20 mm else 30 mm
Glass wool with alum. foil. (gw)	A2	75 kg/m <sup>3</sup>	if $\varnothing < 54$ thickness 20 mm else 30 mm
Cellular rubber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

Wall

Local Interrupted, LI

Except:

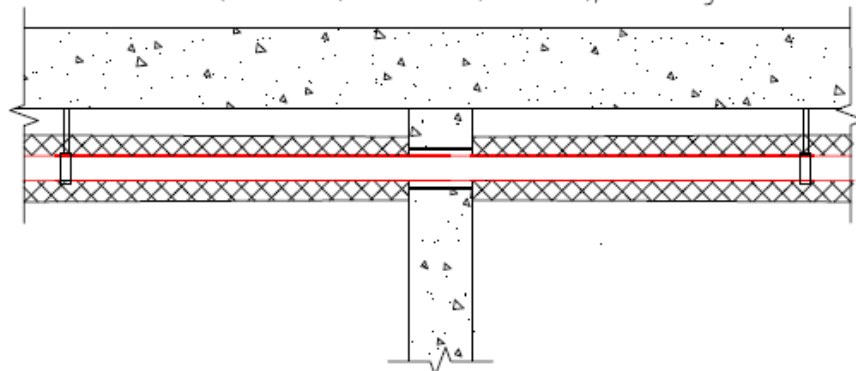
- D-series: Plastic  $\varnothing$  110, Uponor PP MD - LI (sw 40/350)
- S-series: Cu  $\varnothing \leq 64$  - LI (sw 30 / 500)
- D-series: Single cable  $\varnothing \leq 24,0$  - LI (sw 20/50)



Wall

Continuous Interrupted, CI

- D-series: Fe (Cast iron)  $\varnothing$  110 - CI (sw 40/-), sw 80 kg/m<sup>3</sup>



## ANNEX 2

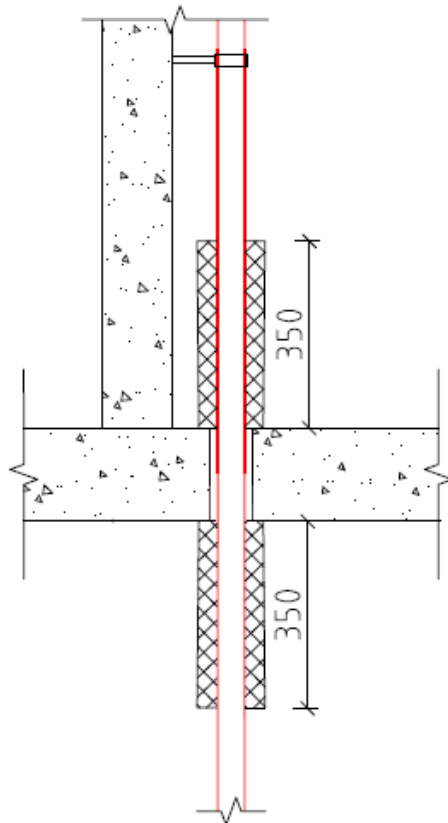
### Insulation for pipes in the floor

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

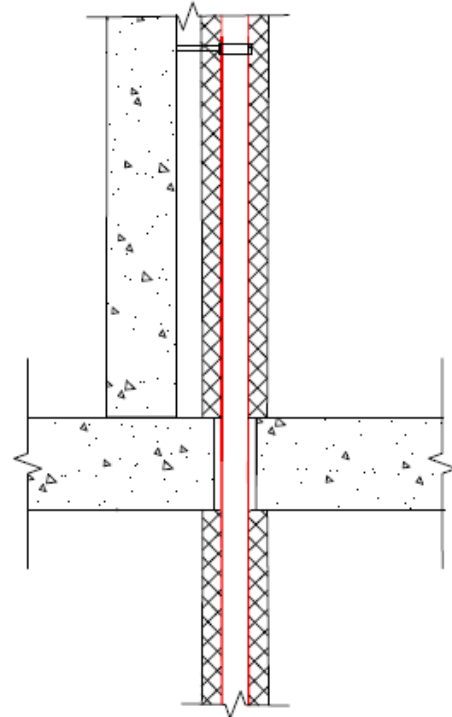
Floor  
Local Interrupted, LI

Except:

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

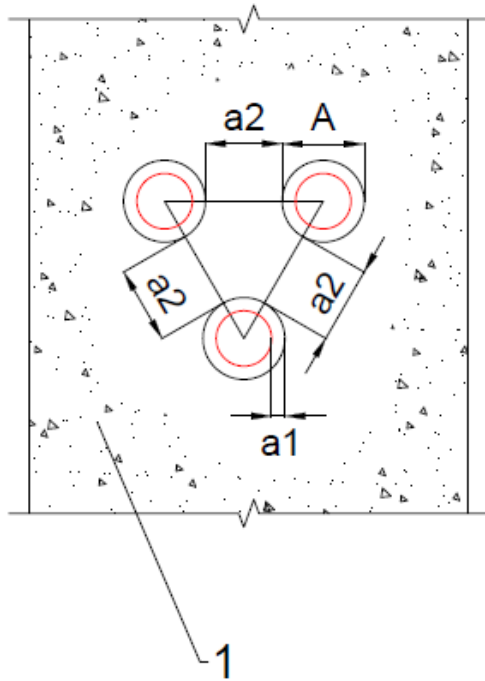


Floor  
Continuous Interrupted, CI



## 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 Separation between service pipe and supporting construction
- a2 Separation between penetration seals
- A A Sewatek penetration seal diameter in total