HENSOMASTIK®
Mixed Penetration Seal EI 90 / EI 120

According to the European Technical Assessment
ETA 15/0295 of 14/12/2017

Technical data sheet and assembly instructions for the
HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120

1. Technical description of the HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120

HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120 is a system consisting of 2 × ≥ 50 mm thick mineral fibre boards coated on the outsides with **HENSOMASTIK® 5 KS Farbe/viskos** and designed as a seal for metal pipes, plastic pipes, and electric cables serving to restore the fire safety of flexible walls and solid wall structures and solid floor structures carrying the various metal supply lines with insulation, plastic pipes, composite pipes, and electric cables.

HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120 does not contain any dangerous substances as defined in Directive 67/548/EEC and (EC) Directive No. 1272/2008 or on the EGDS Indicative List of Regulated Dangerous Substances with respect to the assembly conditions for the construction product and the resulting release scenarios.

The applicable usage category of **HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120** with respect to BWR 3 (hygiene, health, and environment) is IA/1, S/W3.

The resistance to wind load (positive and negative pressure) of the **HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120** has been tested positive according to DIN EN 12211.
Test report no. 311002506/2/2017 / HFB Engineering GmbH, Leipzig

2. Technical data of the penetration seal system components

2.1 HENSOMASTIK® 5 KS Farbe, HENSOMASTIK® 5 KS viskos, HENSOMASTIK® 5 KS SP

HENSOMASTIK® 5 KS is an ablative, medium-viscosity, and non-hygroscopic, water-based fire protection coating in the versions "**Farbe", "viskos",** and **"SP"**.
This is a dispersion coating we manufacture ourselves with organic binders, water, mineral fillers, pigments, and additives.
The fire protection coating **HENSOMASTIK® 5 KS** is part of the **Green Product** line at Rudolf Hensel GmbH, classified as "low emission", and it does not contain any solvents, borates, plasticisers, halogens, formaldehydes, or alkylphenol ethoxylates (APEs).

Properties of HENSOMASTIK® 5 KS
- Free from solvents and APEO, no VOC emissions
- Free from halogens, borates and plasticizers
- Resistant to mechanical stress
- Impermeable to water according to DIN 1048
- Resistant to oil and petrol
- Weatherproof and UV-resistant according to DIN 53 384
- Resistant against aging
- Also flexible in higher dry film thicknesses

Environment
- Environmental Product Declaration: EPD-RHG-20140204-IAA1-DE
- DGNB Navigator registered: CDDWRA
- AgBB-tested, VOC emission class A+

Work safety: Processing **HENSOMASTIK® 5 KS** must comply with the regulations for work safety and environmental protection **GISCODE:** M-DF01
Before using **HENSOMASTIK® 5 KS Farbe/SP/viskos,** please consult its safety data sheet available as a PDF download from **www.rudolf-hensel.de**

Storage: The storage and transport temperatures must lie within +5 °C and +30 °C (free of frost!).
HENSOMASTIK® 5 KS Farbe/SP/viskos can be stored for up to twelve months in the original packaging. Carefully seal opened packaging after use!

Technical data and properties

Product versions	HENSOMASTIK® 5 KS Farbe	HENSOMASTIK® 5 KS viskos	HENSOMASTIK® 5 KS SP
Colour	White	White	White
Consistency	Liquid	Viscous	Viscous
Apparent density	1.28 – 1.42 g/cm³	1.27 – 1.41 g/cm³	1.28 – 1.45 g/cm³
Usage category with respect to weathering effects	Typ X: Also designed for outdoor use	Typ X: Also designed for outdoor use	Typ X: Also designed for outdoor use
Fire properties as defined in DIN EN 13501-1	Class E	Class E	Class E
VOC content	< 1 g/l	< 1 g/l	< 1 g/l
Classified and approved according to	ETAG 026-2	ETAG 026-2	ETAG 026-2
Application	• Material, surface and ambient air temperatures > +5 °C, relative humidity < 80 % • Before application stir up thoroughly with slow speed! • Application by brush, roller or airless spraying • Airless spraying: delivery capacity > 5.5 l/min; hose length max. 15 m; material pressure min. 200 bar • Remove filters from airless pump and spraying gun • Remove suction hose from airless pump • Nozzle size for airless spraying: 0.023" – 0.027" • Coverage rate: approx. 1.4 mm wet = 1.0 mm dry = approx. 1.8 kg/m² • Thinning with max. 3 % water	• Material, surface and ambient air temperatures > +5 °C, relative humidity < 80 % • Before application stir up thoroughly with slow speed! • Application by brush, roller or airless spraying • Airless spraying: delivery capacity > 5.5 l/min; hose length max. 15 m; material pressure min. 200 bar • Remove filters from airless pump and spraying gun • Remove suction hose from airless pump • Nozzle size for airless spraying: 0.025" – 0.031" • Coverage rate: approx. 1.4 mm wet = 1.0 mm dry = approx. 1.8 kg/m² • Thinning with max. 3 % water	• Material, surface and ambient air temperatures > +8 °C to max. +30 °C • Recommended material temperature > +15 °C • Application by trowel or out of the cartridge
	Check surface for appropriate adhesion! Free from dust, dirt, grease or other separating layers.		
	Clean working tools immediately after use with water!		
Work Safety	Use HENSOMASTIK® 5 KS Farbe, viskos and SP in accordance with all applicable local and national regulations.		
Giscode	M-DF01		
Environment, Health and Safety	As regulations are often revised please request for the actual safety data sheet before using the product.		
Storage and transport	Storage and transport at min. ≥ +5 °C to max. +30 °C.		
	Free from frost!		
	Opened containers must be sealed carefully after use!		
Best before	At least 12 months in unopened containers.		

2.2 **Mineral fibre boards**
The tested and approved Hardrock 040 mineral fibre boards (complying with DIN EN 13162) in **HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120** exhibit an apparent density of about 150 kg/m³ and a melting point ≥ 1,000 °C and comply with EN 13501-1 construction material class A1 (non-combustible). Board thickness of the **HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120:** 2x ≥ 50 mm

2.3 **Pipe collars**
Air Fire Tech Rorcol V 30 / V 60 / AV 60, ETA 13/0758
AWM II, ETA-11/0208
HENSOTHERM® 7 KS Gewebe 50 as an intumescent pipe wrap for plastic pipes **up to Ø 160 mm** in the HENSOMASTIK® Mixed Penetration Sealing up to EI 120 in flexible walls, solid walls and floors according to ETA 16/0369

2.4 **Sectional insulations for non-combustible pipes**

2.4.1 **ROCKWOOL RS 800** with a melting point ≥ 1,000 °C, non-combustible A2L-s1, d0 according to EN 13501-1
ROCKWOOL Klimarock: Non-combustible, A1

2.4.2 **Sectional insulations wrapped in HENSOTHERM® 7 KS Gewebe 125**
HENSOTHERM® 7 KS Gewebe 125: Construction material approval ETA 16/0369 and ETA 15/0295, indoor and outdoor applications, usage categories: Y2/Z1/Z2, highly flexible, fabric secured with clips, straps, or galvanised wire

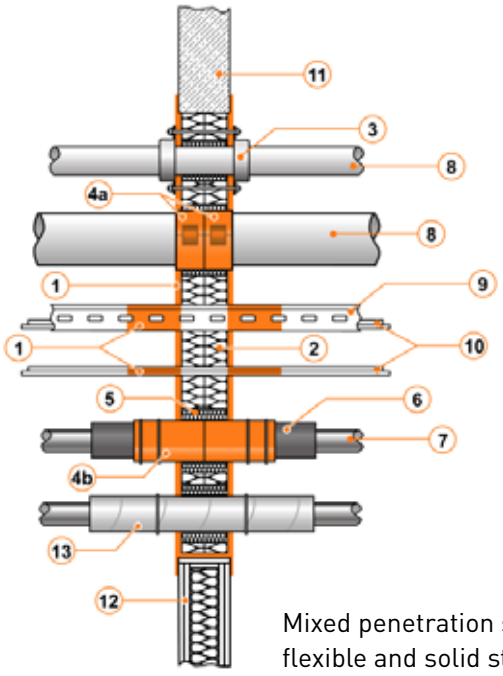
Armaflex AF: Euroclass B/BL-s3,d0 according to EN 13501-1
Kaiflex ST: Euroclass BL-s3,d0 according to EN 13501-1
Armaflex Ultima: Euroclass BL-s1, d0
Armaflex LS: BL-s2, d0
Kaiflex KK plus: BL-s2, d0

Product versions	**HENSOTHERM® 7 KS Gewebe**	
	50 Measurement: 15,000 x 50 x 2 mm (LxWxH)	**125** Measurement: 10,000 x 125 x 1 mm (LxWxH)
Application	• Application on combustible pipes and synthetic rubber • Wrapping with the required number of layers • Fixing of the finished wrappings with duct tape • For more details, please consult the respective assembly instruction.	• Application on synthetic rubber • Wrapping with the required number of layers • Fixing of the finished wrappings with wiring • For more details, please consult the respective assembly instruction.
	HENSOTHERM® 7 KS Gewebe 50 and 125 can easily be cut by knife or scissors.	
	HENSOTHERM® 7 KS Gewebe 50 and 125 should not be overcoated!	
Work Safety	**Use HENSOTHERM® 7 KS Gewebe 50 and 125** in accordance with all applicable local and national regulations.	
Giscode	Inapplicable	
Environment, Health and Safety	As regulations are often revised please request for the actual safety data sheet before using the product.	
Storage and transport	In dry conditions	
Best before	At least 24 months	

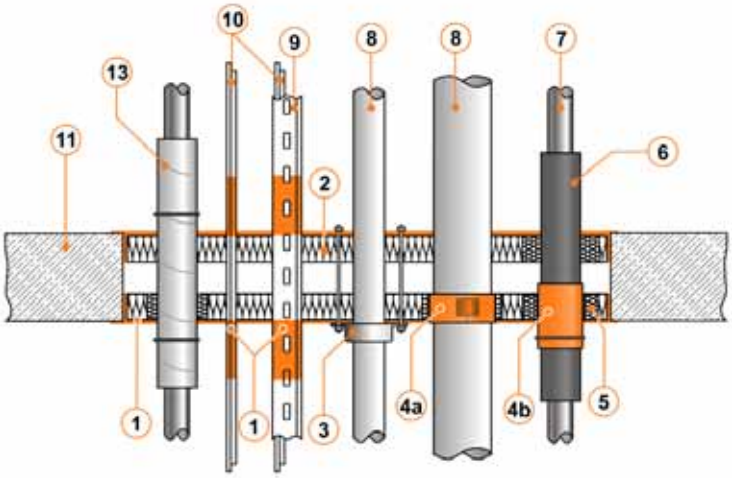
3. Overview of HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120

HENSOMASTIK® Mixed Penetration Seal systems are used to seal metal pipes, combustible pipes and electric cables, thereby restoring the fire safety of wall and floor structures provided with openings for supply lines.

HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120 in flexible, solid structural walls and rigid floors	
1	HENSOMASTIK® 5 KS Farbe or HENSOMASTIK® 5 KS viskos
2	Mineral fibre boards 2x ≥ 50 mm
3	Air Fire Tech Rorcol V 30 / V 60 / AV 60 or AWM II
4a	HENSOTHERM® 7 KS Gewebe 50
4b	HENSOTHERM® 7 KS Gewebe 125
5	HENSOMASTIK® 5 KS SP
6	Sectional insulation
7	Non-combustible pipes
8	Combustible pipes
9	Cable tray
10	Electric cables
11	Solid structural wall
12	Flexible wall
13	ROCKWOOL RS 800
14	Labelling plate



Mixed penetration seal in flexible and solid structural walls



Mixed penetration seal in rigid floors

4. Applications of HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120

Flexible walls

The wall must be at least 100 mm thick and consist of a wood or steel strut frame* lined on both sides with at least two layers of 12.5 mm thick fire protection boards.

* There must be a minimum distance of 100 mm between the seal and the supports, and this gap must be filled with at least 100 mm of Class A1 or A2 insulating material (as defined in EN 13501-1). The supporting structure must have been classified for the required fire resistance period as defined in EN 13501-2.

Solid structural walls

The wall must be at least 100 mm thick and be of concrete, aerated concrete, or masonry with a minimum density of 650 kg / m³.

HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120 in flexible and solid structural walls

Installation situation	Thickness of mineral fibre boards	Max sealant size in m² / H x W
Lightweight wall ≥ 100 mm	2 x ≥ 50 mm	2.4 m² 2,000 mm x 1,200 mm
Solid wall ≥ 100 mm	2 x ≥ 50 mm	2.4 m² 2,000 mm x 1,200 mm

Rigid floors

The floor thickness must be at least 150 mm thick and built out of concrete, aerated concrete, or masonry with a minimum density of 650 kg / m³.

HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120 in rigid floors

Installation situation	Thickness of mineral fibre boards	Max sealant size in m² / H x W
Rigid floors ≥ 150 mm	2 x ≥ 50 mm	2.4 m² 2,000 mm x 1,200 mm

HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120 can be used as sealant in conjunction with insulated metal pipes, combustible pipes, and electric cables, single or bundled.

The maximum **sealing size in flexible and solid structural wall structures** is 2,000 mm × 1,200 mm (H × W) and in **rigid floor** structures 2,000 mm × 1,200 mm.
Also an empty seal can be installed. Supply lines must be protected at a max distance of 250 mm from both sides of the wall structure and from the top of the floor structure.

LS = local sustained in the sealing area | **LI = local interrupted** in the sealing area

Pipe end configuration	Test condition		
	U/U	C/U	U/C
In the furnace	Uncapped	Capped	Uncapped
On the outside	Uncapped	Uncapped	Capped

NOTE: These assembly instructions are for your consultation. They do not serve in lieu of the details in the underlying European Technical Assessment **ETA 15/0295**. The complete ETA 15/0295 must be printed out and made available at the installation site.

5. Assembly instructions for HENSOTHERM® 7 KS Gewebe 50

HENSOTHERM® 7 KS Gewebe 50 pipe wrap for plastic and composite pipes in the HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120

- Intumescent pipe wrap for sealing plastic and composite pipes **up to Ø 160 mm** in flexible walls, solid walls and solid floors
- Flexible; easy and fast installation
- Low space requirement due to low installation height
- Measurements of the pipe wrap 50 mm width, 2 mm thick and 15 m long
- **The following combustible pipes are certified:** PVC-U, PE-HD, PP-HT, Geberit Silent-db20, Geberit Silent-PP, Geberit Mepla, KE KELIT KELOX, POLO-KAL NG, POLO-KAL 3S, RAUPIANO PLUS, Flex-Schlauch
- **ETA 16/0369** and **ETA 15/0295**

Outer pipe diameter	Installation	Number of layers	Material requirements in wall installation	Material requirements in floor installation
32 mm	Wall / Floor	2	2x 250 mm	250 mm
40 mm	Wall / Floor	2	2x 300 mm	300 mm
50 mm	Wall / Floor	2	2x 360 mm	360 mm
56 mm	Wall / Floor	2	2x 420 mm	420 mm
63 mm	Wall / Floor	3	2x 680 mm	680 mm
75 mm	Wall / Floor	3	2x 790 mm	790 mm
90 mm	Wall / Floor	4	2x 1,250 mm	1,250 mm
110 mm	Wall / Floor	4	2x 1,500 mm	1,500 mm
125 mm	Wall / Floor	5	2x 2,160 mm	2,160 mm
140 mm	Wall / Floor	6	2x 2,890 mm	2,890 mm
160 mm	Wall / Floor	6	2x 3,260 mm	3,260 mm

Assembly instructions:

Clean reveals and rough opening

Cut **HENSOTHERM® 7 KS Gewebe 50** to size acc. to the requirements

Wrapping* of both sides of the combustible pipe flush with the surface of the penetration seal

Fixing of the finished wrappings with duct tape

Professional installation of the **HENSOMASTIK® Mixed Penetration Seal**

Sealing of the ring gap with **HENSOMASTIK® 5 KS SP**

Smoothening of the surface with a spatula

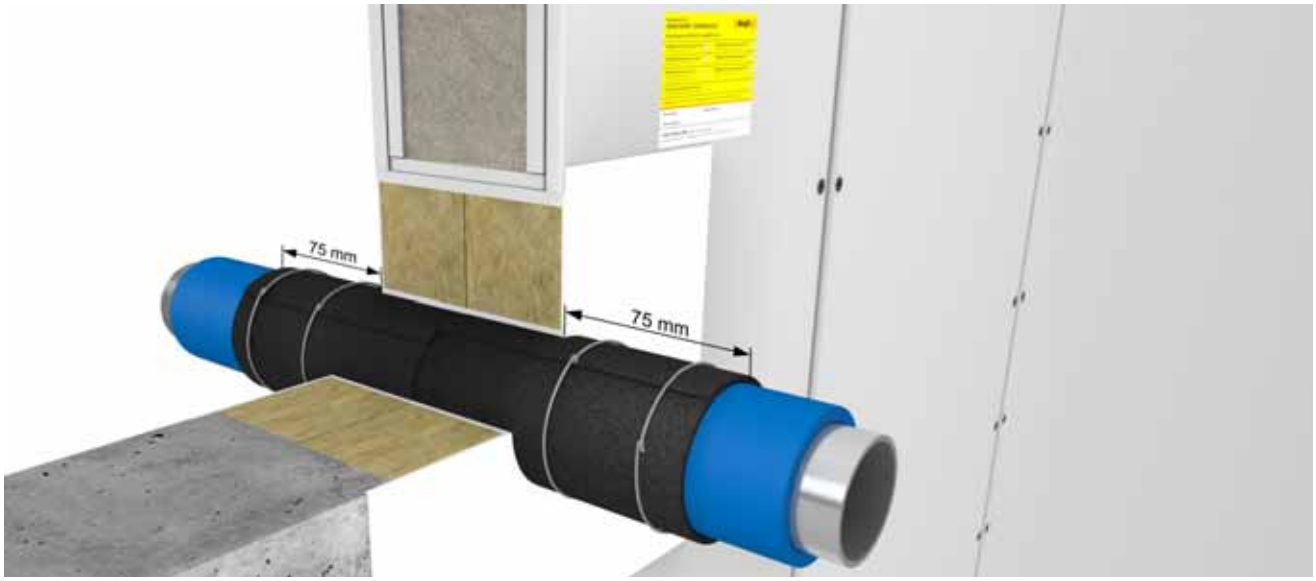
Marking of the **HENSOMASTIK® Mixed Penetration Seal**

***IMPORTANT!**

The **thick coated side of the HENSOTHERM® 7 KS Gewebe 50 must be** wrapped on the outer wall of the pipe!

6. Assembly instructions for HENSOTHERM® 7 KS Gewebe 125

HENSOTHERM® 7 KS Gewebe 125 pipe wrap for incombustible pipes with insulation in the HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120



Installation in lightweight and solid walls

Copper and steel pipes with Armaflex Ultima and HENSOTHERM® 7 KS Gewebe 125

Pipes	Pipe diameter [mm]	Pipe wall thickness [mm]	Layers of HENSOTHERM® 7 KS Gewebe 125	Insulation thickness [mm]	Insulation length [mm]	Classification
Copper and steel	≤ 15	1.0 – 14.2	2	13 – 25	1,000 mm (LS)	EI 120 U/C
	≤ 15	1.0 – 14.2	2	13 – 25	(CS)	
	> 15 ≤ 54	1.5 – 14.2	2	25	1,000 mm (LS)	EI 90 U/C
	> 15 ≤ 54	1.5 – 14.2	2	25	(CS)	
Steel	> 54 ≤ 88.9	3.2 – 14.2	2	25	1,000 mm (LS)	EI 120 U/C
	> 54 ≤ 88.9	3.2 – 14.2	2	25	(CS)	EI 90 U/C

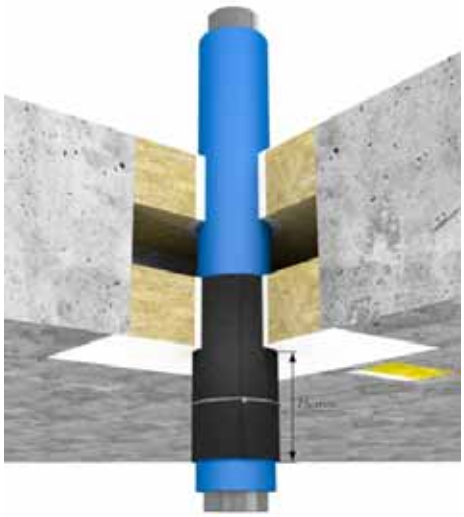
Copper and steel pipes with Armaflex LS and HENSOTHERM® 7 KS Gewebe 125

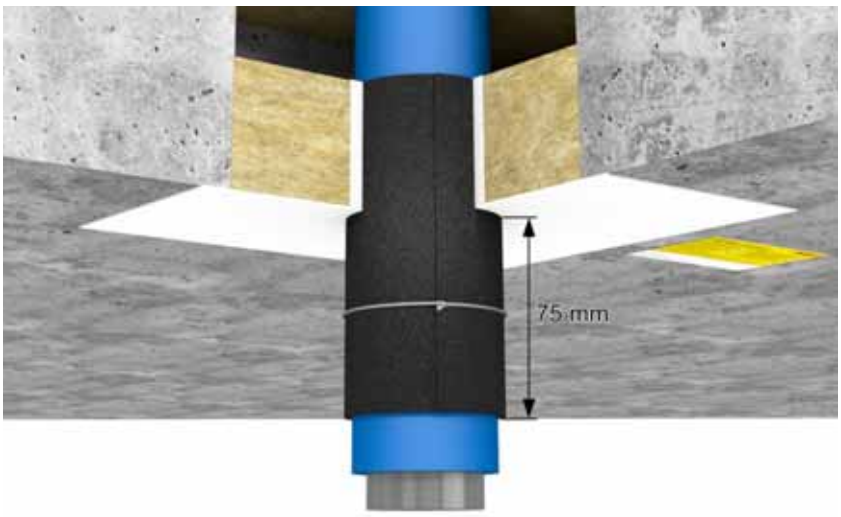
Pipes	Pipe diameter [mm]	Pipe wall thickness [mm]	Layers of HENSOTHERM® 7 KS Gewebe 125	Insulation thickness [mm]	Insulation length [mm]	Classification
Copper and steel	≤ 15	1.0 – 14.2	2	13 – 25	1,000 mm (LS)	EI 120 U/C
	≤ 15	1.0 – 14.2	2	13 – 25	(CS)	EI 120 U/C
	> 15 ≤ 54	1.5 – 14.2	2	25	(CS)	
Steel	88.9	3.2 – 14.2	2	25	1,000 mm (LS)	EI 90 U/C
	> 54 ≤ 88.9	3.2 – 14.2	2	25	(CS)	

Copper and steel pipes with Kaiflex KK plus and HENSOTHERM® 7 KS Gewebe 125

Pipes	Pipe diameter [mm]	Pipe wall thickness [mm]	Layers of HENSOTHERM® 7 KS Gewebe 125	Insulation thickness [mm]	Insulation length [mm]	Classification
Steel	88.9	3.2 – 14.2	2	28.5	1,000 mm (LS)	EI 120 U/C
	> 54 ≤ 88.9	3.2 – 14.2	2	28.5	(CS)	EI 90 U/C
	88.9	3.2 – 14.2	2	28.5	(CS)	EI 120 U/C

6.1 Assembly instructions for HENSOTHERM® 7 KS Gewebe 125





Installation in rigid floors

Copper and steel pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 125

Pipes	Pipe diameter [mm]	Pipe wall thickness [mm]	Layers of HENSOTHERM® 7KS Gewebe 125	Insulation thickness [mm]	Insulation length [mm]	Classification
Steel and cast iron	≤10	1.0 – 5.0	2	11	1,000 mm (LS)	EI 120 C/U
	≤22	1.0 – 11	2	18	1,000 mm (LS)	
	≤54	1.5 – 14.2	2	28.5	1,000 mm (LS)	EI 90 C/U
	≤60.3	2.9 – 14.2	2	29	1,000 mm (LS)	EI 120 C/U
	≤88.9	3.2 – 14.2	2	30.5	1,000 mm (LS)	EI 90 C/U
Copper	≤10	1.0 – 5.0	2	12.5	1,000 mm (LS)	EI 120 C/U
	≤22	1.0 – 11	2	18	1,000 mm (LS)	
	≤54	1.5 – 14.2	2	28.5	1,000 mm (LS)	EI 90 C/U

Copper and steel pipes with Armaflex Ultima and HENSOTHERM® 7 KS Gewebe 125

Pipes	Pipe diameter [mm]	Pipe wall thickness [mm]	Layers of HENSOTHERM® 7KS Gewebe 125	Insulation thickness [mm]	Insulation length [mm]	Classification
Copper and steel	≤15	1.0 – 14.2	2	13	1,000 mm (LS)	EI 120 U/C
	>15 ≤54	1.5 – 14.2	2	25	1,000 mm (LS)	
	≤15	1.0 – 14.2	2	13	(CS)	EI 90 U/C
	>15 ≤54	1.5 – 14.2	2	25	(CS)	
Steel	54	1.5 – 14.2	2	25	(CS)	EI 120 U/C
	>54 ≤88.9	3.2 – 14.2	2	25	1,000 mm (LS)	
	>54 ≤88.9	3.2 – 14.2	2	25	(CS)	

6.1 Assembly instructions for HENSOTHERM® 7 KS Gewebe 125 in rigid floors

Copper and steel pipes with Armaflex LS and HENSOTHERM® 7 KS Gewebe 125

Pipes	Pipe diameter [mm]	Pipe wall thickness [mm]	Layers of HENSOTHERM® 7KS Gewebe 125	Insulation thickness [mm]	Insulation length [mm]	Classification
Copper and steel	≤15	1.0–14.2	2	13	1,000 mm (LS)	EI 90 U/C
	≥15 ≤54	1.5–14.2	2	25	1,000 mm (LS)	
	54	1.5–14.2	2	25	1,000 mm (LS)	EI 120 U/C
	≤15	1.0–14.2	2	13	(CS)	
	>15 ≤54	1.5–14.2	2	25	(CS)	
Steel	>54 ≤88.9	3.2–14.2	2	25	1,000 mm (LS)	
	>54 ≤88.9	3.2–14.2	2	25	(CS)	

Copper and steel pipes with Kaiflex KK plus and HENSOTHERM® 7 KS Gewebe 125

Pipes	Pipe diameter [mm]	Pipe wall thickness [mm]	Layers of HENSOTHERM® 7KS Gewebe 125	Insulation thickness [mm]	Insulation length [mm]	Classification
Copper and steel	≤15	1.0–14.2	2	11	1,000 mm (LS)	EI 90 U/C
	≥15 <54	1.0–14.2	2	21	1,000 mm (LS)	
	54	1.5–14.2	2	21	1,000 mm (LS)	EI 60 U/C
	≤15	1.0–14.2	2	11	(CS)	EI 90 U/C
	>15 <54	1.0–14.2	2	21	(CS)	
Steel	88.9	3.2–14.2	2	21	1,000 mm (LS)	EI 90 U/C
	>54 ≤88.9	3.2–14.2	2	21	(CS)	EI 90 U/C
	88.9	3.2–14.2	2	21	(CS)	EI 120 U/C

7. Assembly instructions for HENSOMASTIK® Mixed Penetration Seal EI 90 / EI 120 in flexible and solid wall with a wall thickness of minimum 100 mm

HENSOMASTIK® Mixed Penetration Seals may be applied by trained and qualified personnel only. The Mixed Penetration Seal system may not be processed at material, substrate, or air temperatures below +5 °C or at air humidities exceeding 80 %. Before installation, the reveals and the rough opening of the structural element must be cleaned and all loose parts removed!

Up to 60 % of **HENSOMASTIK® Mixed Penetration Seals** can be covered with supply lines. Retrofits on **HENSOMASTIK® Mixed Penetration Seals** are possible when 60 % of the area has not yet been covered.

Step 1: Transfer the measurements of the rough opening of the structural element (length × width) to the boards, and cut these to size. These must be used to cut out the individual pieces that must be custom-fitted in all openings between the lines and between these and the reveal.

TIP: A contour gauge (template) can be used to transfer electric cables, pipes, and cable runs to the fire protection panel.

Step 2: The outsides of the cut mineral wool panels are coated with a fire protection coating at least 1 mm thick in the dried state.

TIP: This can be obtained in only the one operation with **HENSOMASTIK® 5 KS viskos** as the most cost-effective solution after the cut pieces have been fitted.

Alternatively, prefabricated or ready-coated mineral fibre boards can be used as the cut pieces.

Step 3: Before installation, the reveal and the cut edges of the mineral fibre boards or the reveal of the carcase opening must be coated with **HENSOMASTIK® 5 KS Farbe, HENSOMASTIK® 5 KS viskos,** or **HENSOMASTIK® 5 KS SP.** Not until afterwards may the cut pieces be installed in the rough opening.

Step 4: Gaps, joints, and gussets are filled completely with **HENSOMASTIK® 5 KS SP.** Gaps, joints, or gussets wider than 10 mm are first stuffed with loose mineral fibre material towards the centre of the mixed penetration seal and then filled with **HENSOMASTIK® 5 KS SP.** Bear in mind that the circumferential gap around pipes may not be wider than 10 mm!

Step 5: Tape off the circumference of the opening **2 cm** above the rough opening of the structural element. This will allow you to coat the circumferences of the transitions/join between the mineral fibre boards and the wall or the floor at least **2 cm** beyond the mineral fibre board with at least 1 mm (dry film thickness) of **HENSOMASTIK® 5 KS Farbe** or **HENSOMASTIK® 5 KS viskos.**

For **wall and floor installations,** cables and cable runs must be coated **30 cm** as measured from the wall/sealant with at least **1 mm** (dry film thickness) of **HENSOMASTIK® 5 KS Farbe** or **HENSOMASTIK® 5 KS viskos.**

IMPORTANT! Floor sealant must be protected additionally against access!

Finally, the ready **HENSOMASTIK® Mixed Penetration Seal** is fitted visibly and permanently with a **labelling plate** containing all the details and provided for this purpose. This labelling plate is available from Rudolf Hensel GmbH.

Top coating of the penetration sealing – If required it is possible to overcoat with HENSOTOP 84 or HENSOTOP 84 AQ (50 – 100 µm dry film thickness) in RAL or NCS colour shades. Individual colour shades on request.

NOTE: These assembly instructions are for your consultation. They do not serve in lieu of the details in the underlying European Technical Assessment **ETA 15/0295**. The complete ETA 15/0295 must be printed out and made available at the installation site.

ANNEX A – Resistance to Fire Classification – HENSOMASTIK® Mixed Penetration Seal EI90/EI120 8

A.1 Flexible and rigid wall constructions acc. to 1.2.1 with wall thickness of minimum 100 mm 8

A.1.2 Cables and Trays 10

A.1.3 Plastic and composite pipes with AWM II pipe collars 11

A.1.4 Plastic and composite pipes with RORCOL V30 pipe collars 13

A.1.5 Plastic and composite pipes with RORCOL V60 pipe collars 17

A.1.6 Metal, plastic and composite pipes with RORCOL AV60 pipe collars 21

A.1.7 Plastic and composite pipes with HENSOTHERM® 7 KS Gewebe 50 25

A.1.8 Composite pipes with Rockwool RS 800 insulation 1000 mm (LS) 29

A.1.9 Composite pipes with Rockwool RS 800 insulation 500 mm (LS) 30

A.1.10 Metal pipes with Rockwool R 800 /RS 800 insulation, Local Sustained (LS), Continuous Sustained (CS) or Local Interrupted (LI) 33

A.1.11 Metal pipes with Klimarock insulation (CS) 37

A.1.12 Metal pipes with Armaflex Protect insulation 1000 mm (LS) 38

A.1.13 Metal pipes with synthetic rubber insulation 39

A.1.14 Composite pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50 44

A.2 Rigid floor constructions acc. to 1.2.1 with floor thickness of minimum 150 mm 46

A.2.2 Cables and trays 48

A.2.3 Plastic pipes and conduits with AWM II pipe collars 49

A.2.4 Plastic and composite pipes with HENSOTHERM® 7 KS Gewebe 50 51

A.2.5 Composite pipes with Rockwool RS 800 insulation (LS) 54

A.2.6 Metal pipes with Rockwool RS 800 insulation (LI) 55

A.2.7 Metal pipes with Klimarock insulation (CS) 56

A.2.8 Metal pipes with Armaflex Protect insulation (LS) 57

A.2.9 Metal pipes with synthetic rubber insulation 58

A.2.10 Composite pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50 63

A.3 Rigid floor constructions acc. to 1.2.1 with floor thickness of minimum 150 mm (without distance) 64

A.3.1 Plastic pipes with HENSOTHERM® 7 KS Gewebe 50 64

A.3.2 Plastic and composite pipes with RORCOL V30 pipe collars 66

A.3.3 Plastic and composite pipes with RORCOL V60 pipe collars 70

A.3.4 Plastic and composite pipes with RORCOL AV60 pipe collars 74

A.3.5 Composite pipes with Rockwool RS 800 insulation (LS) 78

A.3.6 Metal pipes with synthetic rubber insulation 79

A.3.7 Composite pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50 80

ANNEX A – Resistance to Fire Classification – HENSOMASTIK® Mixed Penetration Seal EI90/EI120

A.1 Flexible and rigid wall constructions acc. to 1.2.1 with wall thickness of minimum 100 mm

A.1.1.1 Service Types

Services	Types
Cables	• Sheathed electrical cables up to 80 mm diameter • Telecom cables up to 21 mm diameter
Cable bundles	• Bundles of the above up to 100 mm in diameter
Cable Supports	• Perforated and unperforated steel cable trays and ladders
Plastic pipes with AWM II pipe collars	• PE pipes in accordance with EN 1519-1, EN 12666-1, EN12201-2 • Friaphon (by FRIATEC) pipes • PVC-U pipes in accordance with EN 1329-1, EN 1453-1 and EN 1452-1 • PP pipes in accordance with EN 1852-1: 2009
Plastic pipes with RORCOL V30/V60 pipe collars	• PE pipes in accordance with EN 1519-1, EN 12666-1, EN12201-2, 1451-1 • PVC-U pipes in accordance with EN 1329-1, EN 1453-1 and EN 1452-1 • PP pipes in accordance with EN 1451-1 • PP R pipes in accordance with EN ISO 15874-2 • PP H pipes in accordance with EN ISO 15494 • Raupiano Plus pipes • POLO-KAL 3S pipes • POLO-KAL NG pipes • FRIAPHON pipes • RAUTITAN pipes
Metal, composite and plastic pipes with RORCOL AV60 pipe collars	• Copper • Mild & stainless steel • FX flexible tubes with EN 61386 • Geberit Mepla • HENCO multiple-layer • KO6 KELIT • RAUTITAN stabil • FRIATHERM multi-press • JRG Sanipex MT • PYTHON beverages line • TECEflex
Plastic pipes with HENSOTHERM® 7 KS Gewebe 50	• PE pipes in accordance with EN 1519-1, EN 12666-1, EN12201-2 • PVC-U pipes in accordance with EN 1329-1, EN 1453-1 and EN 1452-1 • PP pipes in accordance with EN 1852-1: 2009 • PP pipes in accordance with EN 1451-1
Composite pipes with Rockwool RS 800 insulation	• KE KELIT KELOX • Geberit Mepla • Viega Raxofix • Viega Sanfix Fosta
Metal pipes with Rockwool RS800 insulation	• Copper • Mild & stainless steel • Cast Iron

Metal pipes with Armaflex Protect insulation	• Copper • Mild & stainless steel • Cast Iron
Metal pipes with synthetic rubber insulation	• Copper • Mild & stainless steel • Cast Iron
Composite pipes with synthetic rubber insulation and HENSOTHERM® 7 KS Gewebe	• Geberit Mepla • KE KELIT KELOX

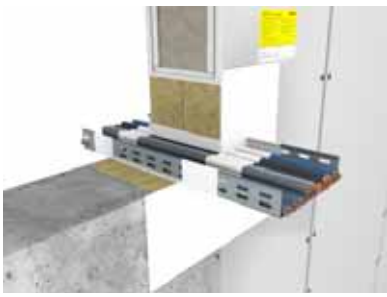
A.1.1.2 Permitted Distances

Maximum seal size: 2000 mm high x 1200 mm wide

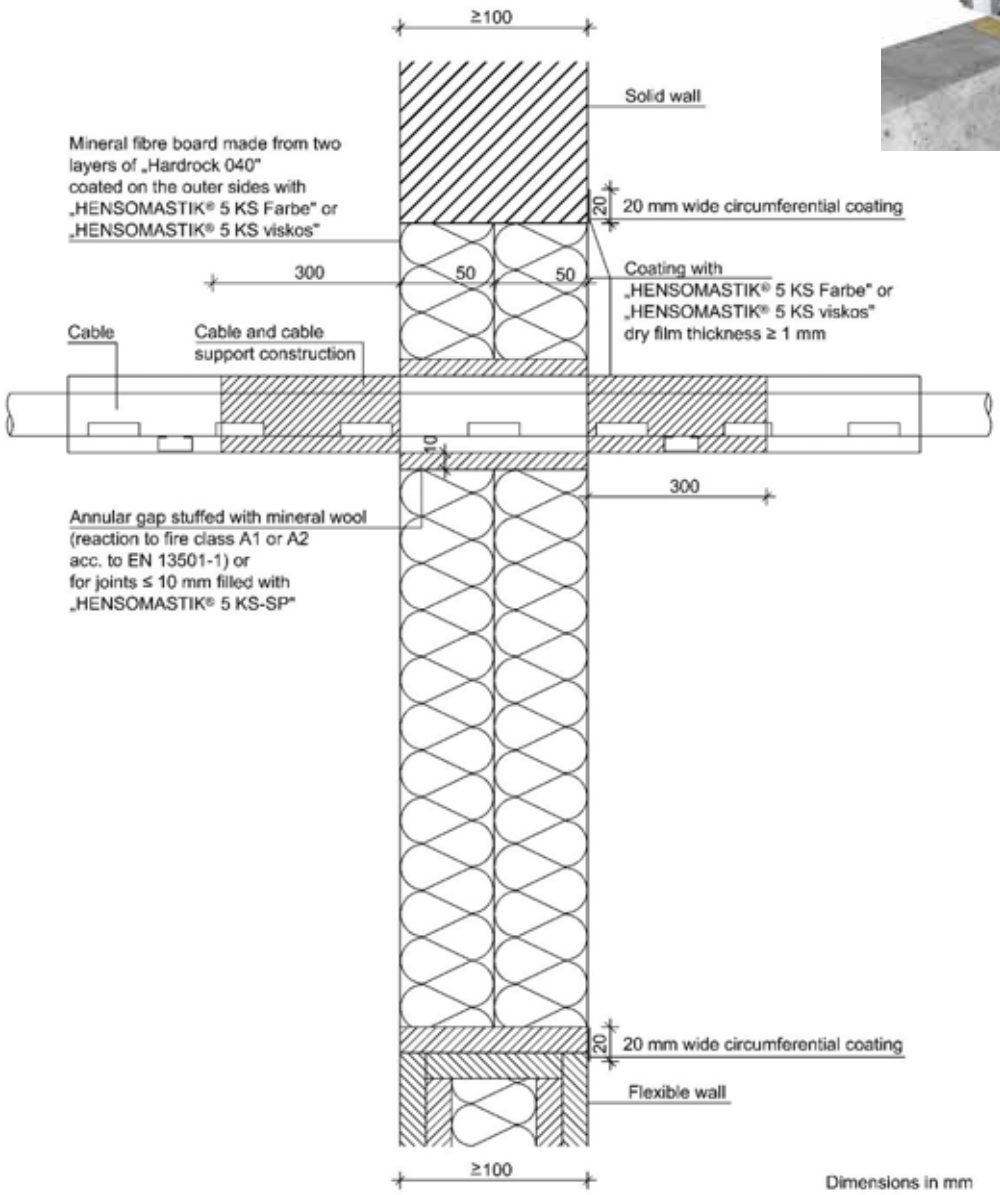
a1: between cable/cable trays and metal pipes ≥ 50 mm
a2: between cable/cable trays and plastic pipes ≥ 50 mm
a3: between metal pipes and plastic pipes ≥ 25 mm
a4: between plastic pipes ≥ 40 mm
a5: between metal pipes ≥ 40 mm
a6: between cable trays ≥ 30 mm
b1: between cable/cable trays and the upper seal edge: ≥ 25 mm
b2: between cable/cable trays and the side seal edge: ≥ 25 mm
b3: between cable/cable trays and the lower seal edge: ≥ 50 mm
b4: between metal pipes and the side seal edge: ≥ 30 mm
b5: between plastic pipes and the side seal edge: ≥ 30 mm

Distance 1st support service ≤ 250 mm

A.1.2 Cables and Trays



Construction details:

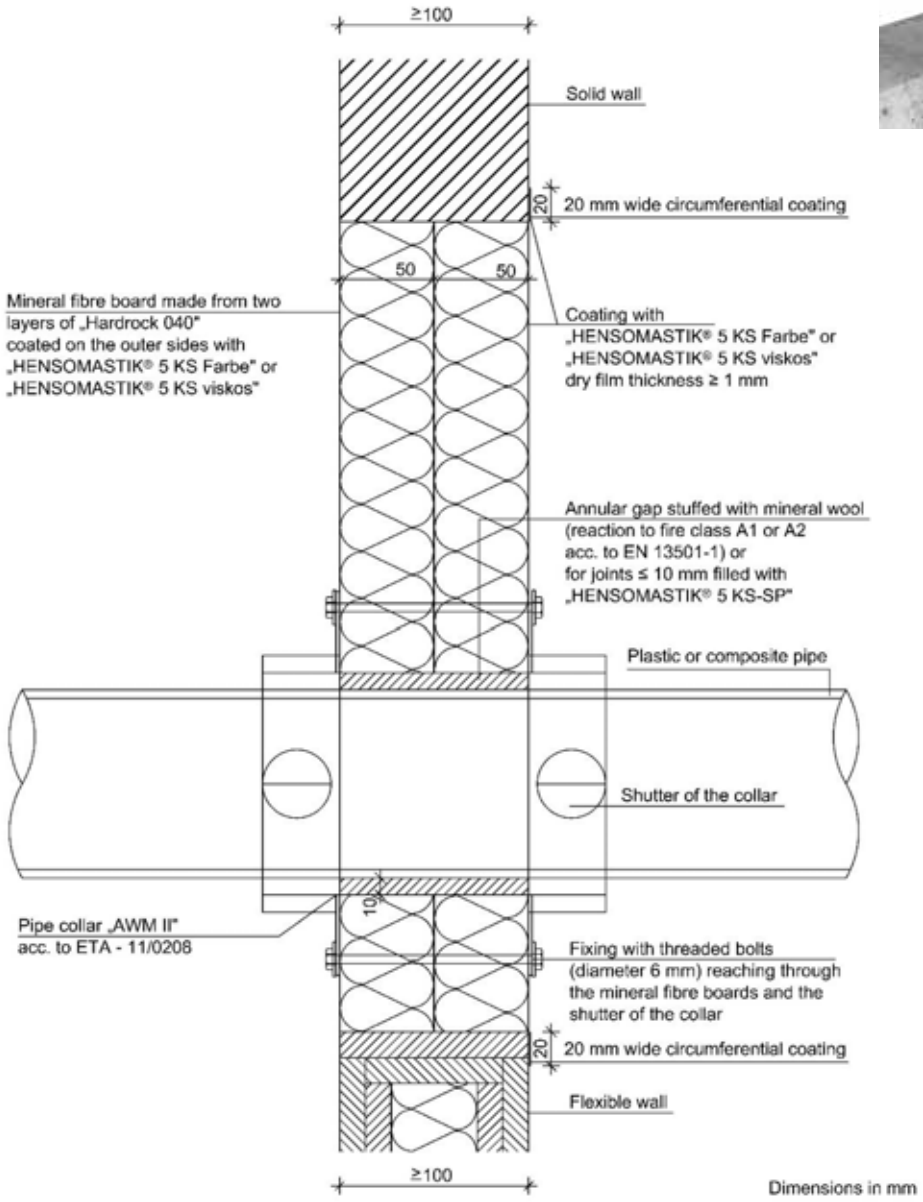


A.1.2.1 Cables and trays with HENSOMASTIK® 5 KS Farbe

Services	Insulation/Coating	Classification
Sheathed electrical cables up to 80 mm diameter	1 mm DFT HENSOMASTIK® 5KS Farbe coating extending 300 mm from both faces of the seal	**EI 90**
Telecoms cables up to 21 mm diameter		
Bundles of above cables up to 100 mm diameter		
Cable supports		

A.1.3 Plastic and composite pipes with AWM II pipe collars

Construction details:



A.1.3.1 Friaphon pipes with AWM II pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Classification
Friaphon pipe	52	2.8	**EI 90 U/U**
	78	4.9	
	110	5.3	
	135	5.6	

A.1.3.2 KE KELIT KELOX pipes with AWM II pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Classification
KE KELIT KELOX	63	4.5	**EI 90 U/U**

A.1.3.3 Geberit Mepla pipes with AWM II pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Classification
Geberit Mepla	63	4.5	**EI 90 U/U**

A.1.3.4 PVC-U pipes with AWM II pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Classification
PVC-U	≥32 ≤50	1.8-5.6	**EI 90 U/U**
	≥50 ≤110	1.8-12.3	
	>110 ≤125	1.8-9.2	
	≥125 ≤160	2.5-3.2	
	160	11.9	**EI 60 U/U**

A.1.3.5 PE pipes with AWM II pipe collars

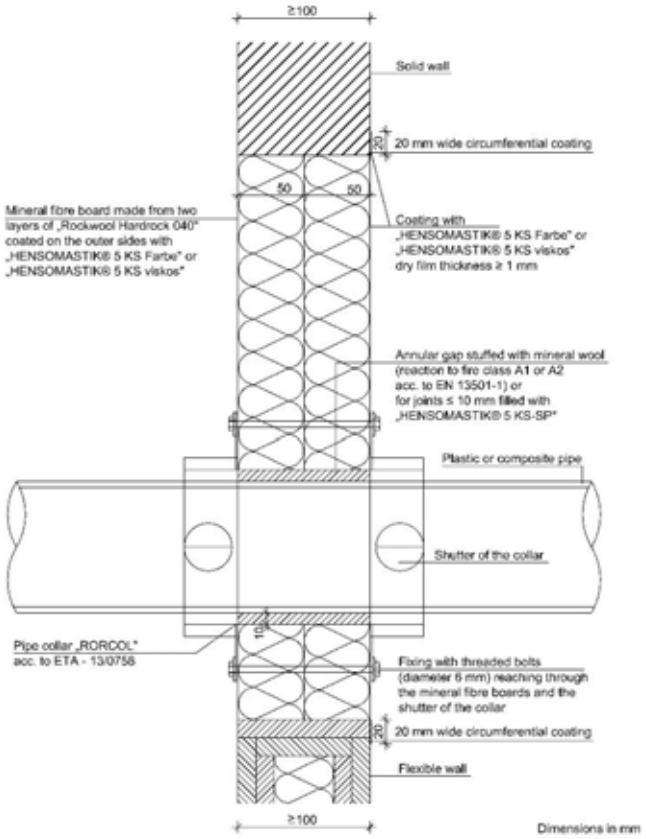
Pipes	Pipe diameter mm	Pipe wall thickness mm	Classification
PE	≥32 ≤50	1.8-4.6	**EI 90 U/U**
	>50 ≤110	2.7-3.1	
	>110 ≤125	2.7-11.4	
	>125 ≤160	3.1-11.4	

A.1.3.6 PP pipes with AWM II pipe collars

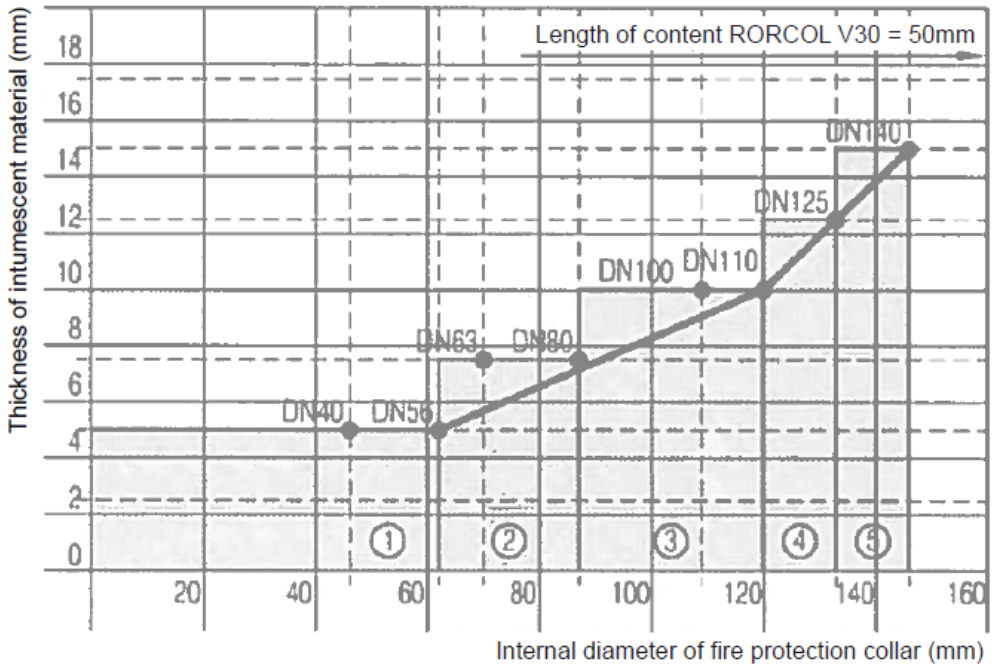
Pipes	Pipe diameter mm	Pipe wall thickness mm	Classification
PP	32-50	1.8-4.6	**EI 90 U/U**
	110	2.7	
	110	11.2	**EI 60 U/U**

A.1.4 Plastic and composite pipes with RORCOL V30 pipe collars

Construction details:



Design groups for RORCOL V30 Collar:



A.1.4.1 PVC-U pipes to EN ISO 1452-1 with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PVC-U	32	1.6 – 2.6	None	EI 120 U/U
			PE / ≤ 5	
	>32 ≤62	2.6 – 3.4	None	
			PE / ≤ 5	
	>62 ≤87	3.4 – 4.2	None	
			PE / ≤ 5	
	>87 ≤110	4.2	None	
			PE / ≤ 5	

A.1.4.2 PE pipes to EN 1519-1, EN 12201-2, EN12666-1, ABS pipes to EN 1455-1 and SAN PVC to EN 1565-1 with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PE	32	3.0 – 3.6	None	EI 120 U/U
			Elastomer / ≤ 9	
			PE / ≤ 9	
			Elastomer / ≤ 25	
	>32 ≤56	3.0 – 3.6	None	
			Elastomer / ≤ 9	
			PE / ≤ 9	
			Elastomer / ≤ 25	
	>56 ≤62	3.6 – 4.9	None	
			Elastomer / ≤ 9	
			PE / ≤ 9	
			Elastomer / ≤ 25	
	>62 ≤87	4.9 – 6.0	None	
			Elastomer / ≤ 9	
			PE / ≤ 9	
			Elastomer / ≤ 25	
	>87 ≤ 110	6.0	None	
			Elastomer / ≤ 9	
			PE / ≤ 9	
			Elastomer / ≤ 25	
	110	4.3 – 6.0	None	
			Elastomer / ≤ 9	
			PE / ≤ 9	
			Elastomer / ≤ 25	
	>110 ≤125	4.3 – 4.9	None	
			Elastomer / ≤ 9	
	>125 ≤135	6.0	None	

A.1.4.3 PE pipes to EN 12201-2, with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PE	125	11.4	PE 5	**EI 90 U/U**

A.1.4.4 PE pipes to EN 1445-1, with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PE	32	1.8 – 2.5	None	**EI 120 U/U**
			Elastomer / ≤ 25	
			PE / ≤ 4	
	>32 ≤50	1.8 – 2.5	None	
			Elastomer / ≤ 25	
			PE / ≤ 4	
	>50 ≤62	2.5 – 4.0	None	
			Elastomer / ≤ 25	
	>62 ≤87	4.0 – 5.4	None	
			Elastomer / ≤ 25	
	>87 ≤ 110	5.4	None	
			Elastomer / ≤ 25	
	125	3.1 – 3.5	None	

A.1.4.5 PP pipes to EN 1451-1 with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PP	32	1.8 – 2.5	None	**EI 90 U/U**
			Elastomer / ≤ 25	
			PE / ≤ 4	
	>32 ≤50	1.8 – 2.5	None	
			Elastomer / ≤ 25	
			PE / ≤ 4	
	>50 ≤62	2.5 – 4.0	None	
			Elastomer / ≤ 25	
	>62 ≤87	4.0 – 5.4	None	
			Elastomer / ≤ 25	
	>87 ≤ 110	5.4	None	
			Elastomer / ≤ 25	
	125	3.1 – 3.5	None	

A.1.4.6 PP R pipes to EN ISO 15874-2, with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PP R	50	8.3	Uninstalled	**EI 120 U/U**
			PE / ≤ 10	
			Elastomer / ≤ 25	

A.1.4.7 PP H pipes to EN ISO 15494, with RORCOL V30 pipe collars

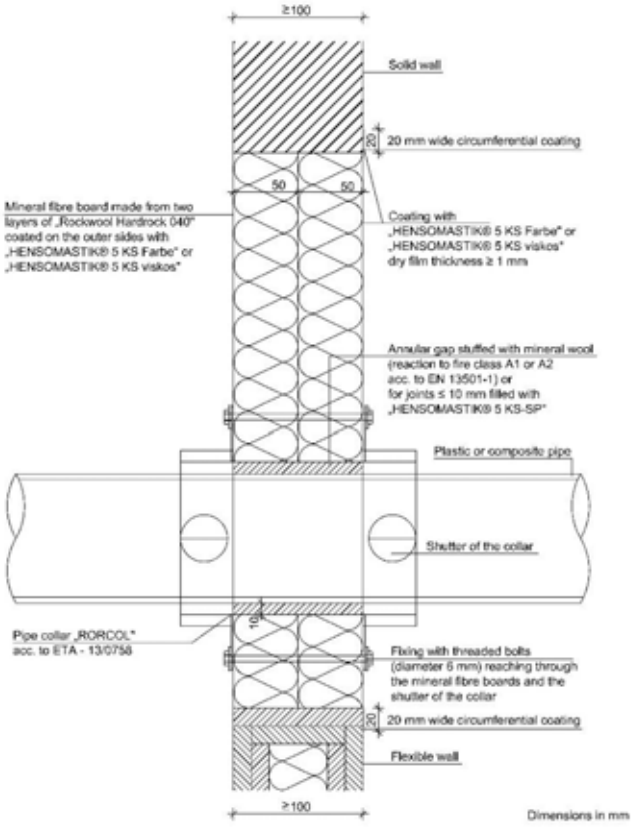
Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PP H	110	10.0	PE / 4	**EI 90 U/U**

A.1.4.8 Special pipes with RORCOL V30 pipe collars

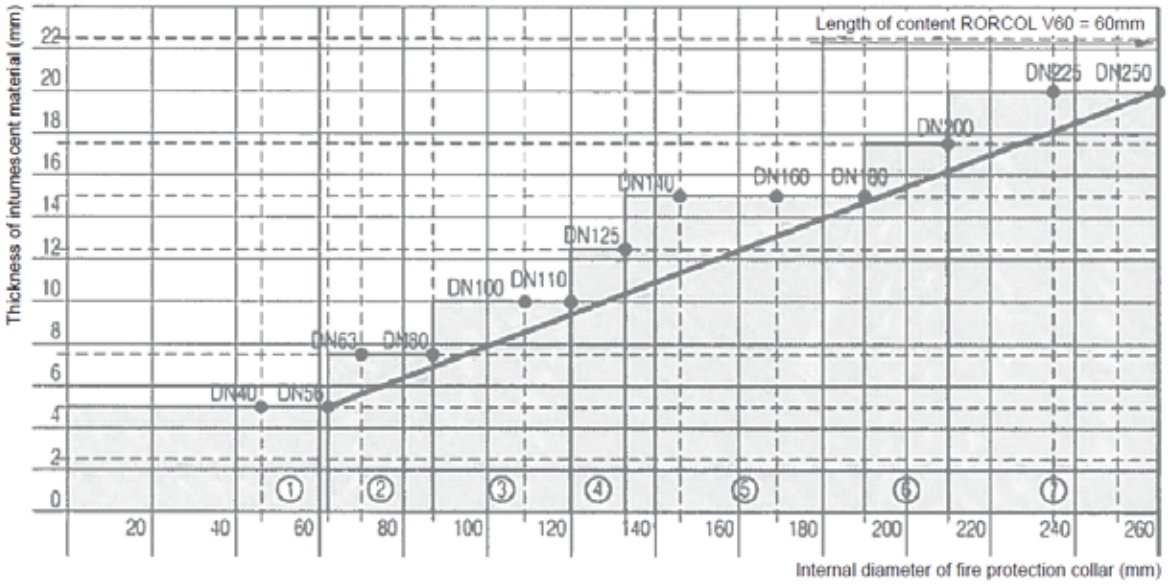
Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
Raupiano Plus	50	1.8	None	**EI 120 U/U**
			Elastomer / ≤ 9	
	110	2.7	None	
			Elastomer / ≤ 9	
	125	3.1	None	
			Elastomer / ≤ 9	
POLO-KAL 3S	110	4.8	None	
	125	5.3		
POLO-KAL NG	50	2.0	None	
	110	3.4		
	125	3.9		
FRIAPHON	52	2.8	Elastomer / ≤ 6	**EI 120 U/U**
	110	5.3	None	**EI 90 U/U**
			Elastomer / ≤ 25	
RAUTITAN flex	50	6.9	None	**EI 90 U/U**
			Elastomer / ≤ 9	**EI 120 U/U**

A.1.5 Plastic and composite pipes with RORCOL V60 pipe collars

Construction details:



Design groups for RORCOL V60 Collar:



A.1.5.1 PVC-U pipes to EN ISO 1452-1 with RORCOL V60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PVC-U	32	1.6 – 2.6	None	EI 120 U/U
			PE / ≤ 5	
	>32 ≤62	2.6 – 3.4	None	
			PE / ≤ 5	
	>62 ≤87	3.4 – 4.2	None	
			PE / ≤ 5	
	>87 ≤110	4.2	None	
			PE / ≤ 5	

A.1.5.2 PE pipes to EN 1519-1, EN 12201-2, EN12666-1, ABS pipes to EN 1455-1 and SAN PVC to EN 1565-1 with RORCOL V60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PE	32	3.0 – 3.3	None	EI 120 U/U
			Elastomer / ≤ 9	
			PE / ≤ 10	
			Geberit Isol / ≤ 17	
			Elastomer / ≤ 25	
			Aluminium lined glass wool / ≤ 20	
	>32 ≤56	3.0 – 3.3	None	
			Elastomer / ≤ 9	
			PE / ≤ 10	
			Geberit Isol / ≤ 17	
			Elastomer / ≤ 25	
			Aluminium lined glass wool / ≤ 20	
	>56 ≤62	3.6 – 4.8	None	
			Elastomer / ≤ 9	
			PE / ≤ 10	
			Geberit Isol / ≤ 17	
			Elastomer / ≤ 25	
	>62 ≤87	4.8 – 6.0	None	
			Elastomer / ≤ 9	
			PE / ≤ 10	
			Geberit Isol / ≤ 17	
			Elastomer / ≤ 25	
	>87 ≤ 110	6.0	None	
			PE / ≤ 10	
			Geberit Isol / ≤ 17	
			Elastomer / ≤ 25	
	>87 ≤125	6.0	Elastomer / ≤ 9	
	>110 ≤200	6.2	None	

A.1.5.3 PE pipes to EN 12201-2, with RORCOL V60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PE	125	11.4	PE 5	**EI 90 U/U**

A.1.5.4 PP pipes to EN 1451-1 with RORCOL V60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PP	32	1.8 – 2.5	None	**EI 90 U/U**
			Elastomer / ≤ 25	
			PE / ≤ 4	
	>32 ≤50	1.8 – 2.5	None	
			Elastomer / ≤ 25	
			PE / ≤ 4	
	>50 ≤62	2.5 – 4.0	None	
			Elastomer / ≤ 25	
	>62 ≤87	4.0 – 5.4	None	
			Elastomer / ≤ 25	
	>87 ≤ 110	5.4	None	
			Elastomer / ≤ 25	
	125	3.1 – 3.5	None	

A.1.5.5 PP R pipes to EN ISO 15874-2, with RORCOL V60 pipe collars

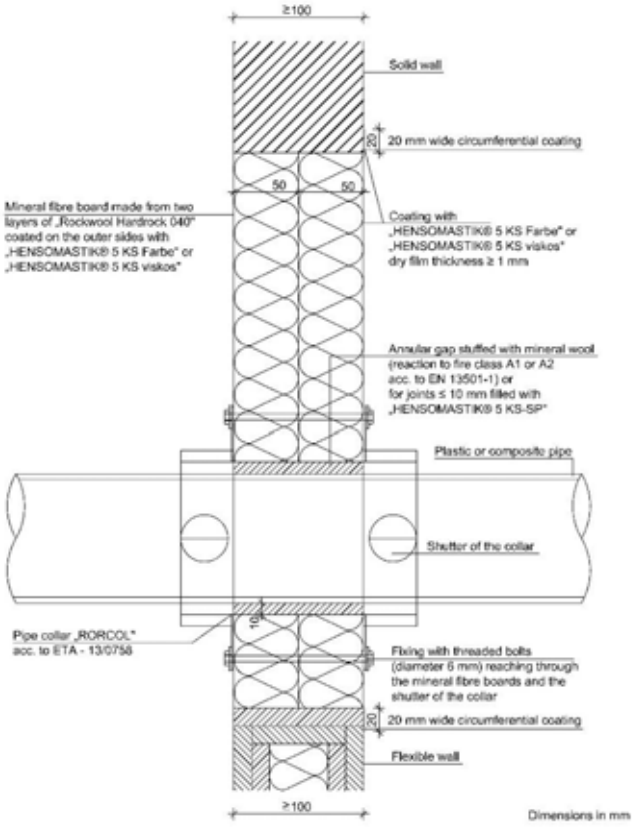
Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PP R	16	8.3 – 10.3	Elastomer / ≤ 43	**EI 120 U/U**
			None	
			Aluminium lined glass wool / ≤ 50	
			PE / ≤ 10	
	>16 ≤50	8.3 – 10.3	Elastomer / ≤ 43	
			None	
			Aluminium lined glass wool / ≤ 50	
			PE / ≤ 10	
	>50 ≤63	10.5	Elastomer / ≤ 43	
			None	
			Aluminium lined glass wool / ≤ 50	
	63	10.5 – 14.5	Elastomer / ≤ 43	
			None	
			Aluminium lined glass wool / ≤ 50	
	>63 ≤90	14.5 – 15.0	Elastomer / ≤ 43	

A.1.5.6 PP H pipes to EN ISO 15494, with RORCOL V60 pipe collars

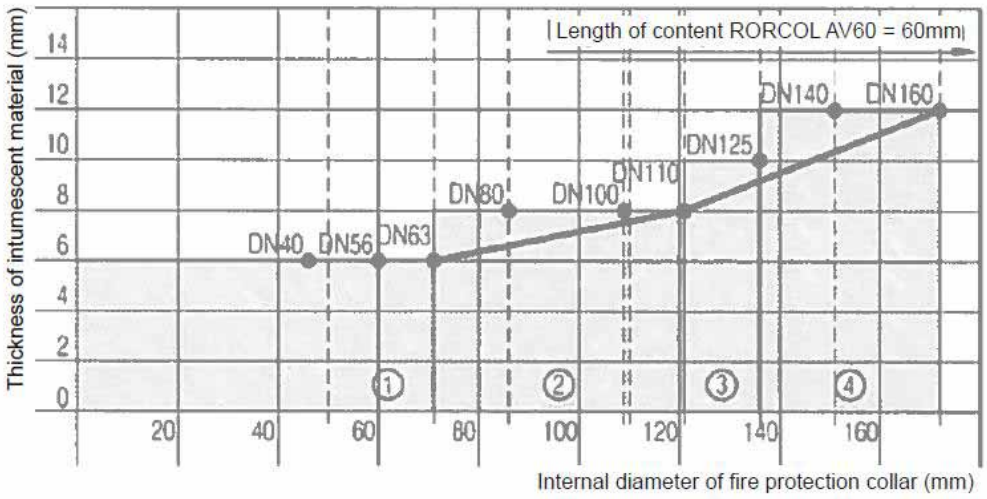
Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PP H	110	10.0	PE / 4	**EI 90 U/U**

A.1.6 Metal, plastic and composite pipes with RORCOL AV60 pipe collars

Construction details:



Design groups for RORCOL AV60 Collar:



A.1.6.1 Metal pipes to EN 13501-1 with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
Copper Mild & stainless steel	≤ 22	1.0 – 14.2	Aluminium lined glass wool / ≥ 20	**EI 120 U/U**
	≤ 54	1.5 – 14.2	Aluminium lined glass wool / ≥ 20	

A.1.6.2 Flex tubes to EN 61386-22 with RORCOL AV60 pipe collars

Flex Tube	Tube diameter mm	Cable size	Number Cable / FX flexible tube	Classification
FX flex tube	≤ 50	without cable		**EI 90**
		≤ 5 x 2.5 mm²	≤ 2	
	≤ 40	≤ 5 x 6.0 mm²	1	

A.1.6.3 Geberit av60 pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
Geberit Mepla	63	4.5	Elastomer / 9	**EI 90 U/C**

A.1.6.4 HENCO multiple-layer pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
HENCO multiple-layer	20	2.0	PE / 4	**EI 120 U/C**
			Elastomer / 6	

A.1.6.5 K06 KELIT PN20 pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
K06 KELIT PN20	20	2.8	Aluminium lined glass wool / 20	**EI 120 U/C**
			PE / 4	
	26	3.5	PE / 10	
	90	12.3	Elastomer / 19 - 43	

A.1.6.6 RAUTITAN stabil pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
RAUTITAN stabil	40	6.0	Elastomer / 32	**EI 120 U/C**

A.1.6.7 FRIATHERM multi-press pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
FRIATHERM multi-press	16	2.0	PE / 4	**EI 120 U/C**
			Elastomer / 6	

A.1.6.8 JRG Sanipex MT pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
JRG Sanipex MT	26	3.0	Aluminium lined glass wool / 20	**EI 120 U/C**

A.1.6.9 PYTHON beverages line pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PYTHON beverages line	40 mm bundle (8 pipes of 13 mm each)	1.7	None	**EI 120 U/U**
	80 mm bundle (2 pipes of 13 mm each, 2 pipes of 15 mm each, 6 cables of 3 x 1.5 mm² each)	1.7 – 1.75	Elastomer / 19	

A.1.6.10 TECEflex pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
TECEflex	26	4.0	None	**EI 120 U/C**
			PE / ≤ 10	
			Elastomer / ≤ 9	
	63	6.0	Elastomer / 9 – 32	
			Aluminium lined glass wool / 20 - 50	

A.1.6.11 OMEGA application #1 with RORCOL AV60 pipe collars and flex tubes to EN 61386-22

Flex Tube	Tube diameter mm	Number of flexible tubes	Cable size	Number Cable / FX flexible tube	Classification
FX flexible tubes	≤ 20	≤ 5	without cable		EI 120
		≤ 4	≤ 5 x 1.5 mm²	1	
		1	≤ 5 x 2.5 mm²	1	
	≤ 25	≤ 6	without cable		
		≤ 3	≤ 5 x 1.5 mm²	1	
		≤ 2	≤ 5 x 2.5 mm²	1	
		1	≤ 5 x 6.0 mm²	1	

A.1.6.12 Multiple lead-throughs #1 with RORCOL AV60 pipe collars, HENCO multiple-layer and TECEflex pipes

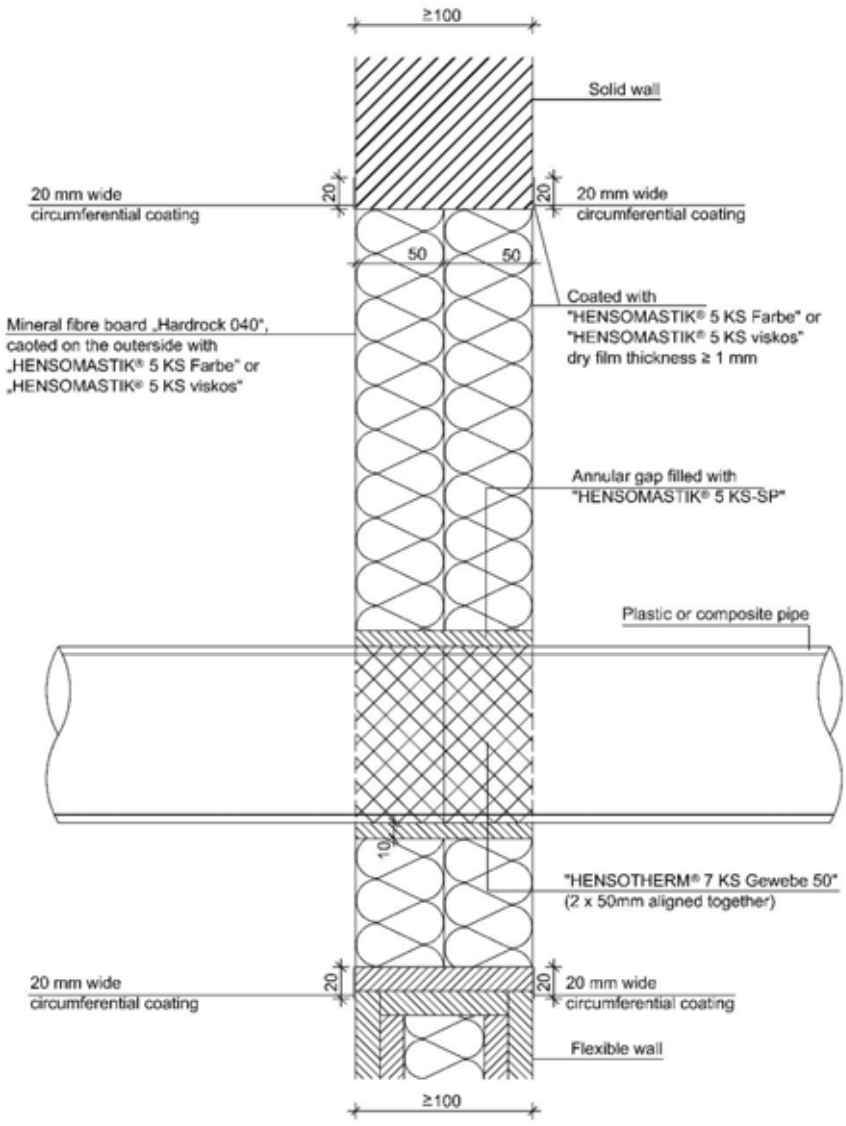
Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
HENCO multiple-layer	20	2.0	PE / 4	EI 120 U/C
			Elastomer / 6	
TECEflex	26	4.0	PE / 10	
			Elastomer / 9	

A.1.6.13 Multiple lead-throughs #2 (electrical) with RORCOL AV60 pipe collars and flex tubes to EN 61386-22

Flex Tube	Tube diameter mm	Cable size	Number Cable / FX flexible tube	Classification
FX flexible tubes	≤ 50	without cable		EI 90
		≤ 5 x 2.5 mm²	≤ 2	
	≤ 40	≤ 5 x 6.0 mm²	1	

A.1.7 Plastic and composite pipes with HENSOTHERM® 7 KS Gewebe 50

Construction details:



Dimensions in mm

A.1.7.1 PVC-U pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness Mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
PVC-U	≤ 50	1.8-5.6	2	EI 90 U/U
	≥50 <75	1.8-5.6	3	
	≥75 <90	4.3- 6.7	4	
	≥90 ≤110	8.1	4	
	>125 ≤140	4.1	6	
	≤50	1.8-5.6	2	EI 120 U/U
	>50 ≤75	1.9-5.6	3	

A.1.7.2 PE-HD pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
PE-HD	≥50 ≤56	3.0	2	EI 90 U/U
	>56 ≤75	3.0	3	
	>75 ≤110	4.3	4	
	>110 ≤125	4.8	5	
	75	3.0	3	EI 120 U/U
	125	4.8	5	

A.1.7.3 PE-HD pipes with Schallschutz PE4 with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
PE-HD	56	3.0	3	EI 90 U/U

A.1.7.4 PP-HT pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
PP-HT	≤50	1.8	2	EI 90 U/U
	>50 ≤75	1.8-1.9	3	
	>75 ≤90	1.9-2.2	4	
	>90 ≤110	2.2-2.7	5	

A.1.7.5 PP-HT pipes with Schallschutz PE 4 with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
PP-HT	50	1.8	3	EI 90 U/U

A.1.7.6 Geberit Silent-PP pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
Geberit Silent-PP	≤50	2.0	2	EI 90 U/U
	>50 ≤75	2.0-2.6	3	
	>75 ≤90	2.6-3.1	4	
	>90 ≤110	3.1-3.6	4	
	>110 ≤125	4.2	5	
	75	2.6	3	EI 120 U/U
	125	4.2	5	

A.1.7.7 Geberit Silent-db20 pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
Geberit Silent-db20	≤56	3.2	2	EI 90 U/U
	>56 ≤75	3.2-3.6	3	
	>75 ≤90	3.6-5.5	4	
	>90 ≤110	6.0	5	
	75	3.6	3	EI 120 U/U
	110	6.0	4	

A.1.7.8 POLO-KAL NG pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
POLO-KAL NG	≤50	2.0	2	EI 90 U/U
	>50 ≤75	2.0-2.6	3	
	>75 ≤110	2.6-3.4	4	
	>110 ≤125	3.4-3.9	5	
	>125 ≤160	4.9	6	
	75	2.6	3	EI 120 U/U
	>75 ≤110	2.6-3.4	4	
	>100 ≤125	3.4-3.9	5	

A.1.7.9 POLO-KAL 3S pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
POLO-KAL 3S	≤75	3.8	3	EI 90 U/U
	>75 ≤110	4.8	4	
	110	4.8	4	EI 120 U/U

A.1.7.10 RAUPIANO PLUS pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness Mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
RAUPIANO PLUS	≤50	1.8	2	**EI 90 U/U**
	>50 ≤75	1.8-2.5	3	
	>75 ≤110	2.5-2.7	4	
	>110 ≤125	3.1	5	
	75	2.5	3	**EI 120 U/U**
	125	3.1	5	

A.1.7.11 PE 80/PE 100 pipes with HENSOTHERM® 7 KS Gewebe 50

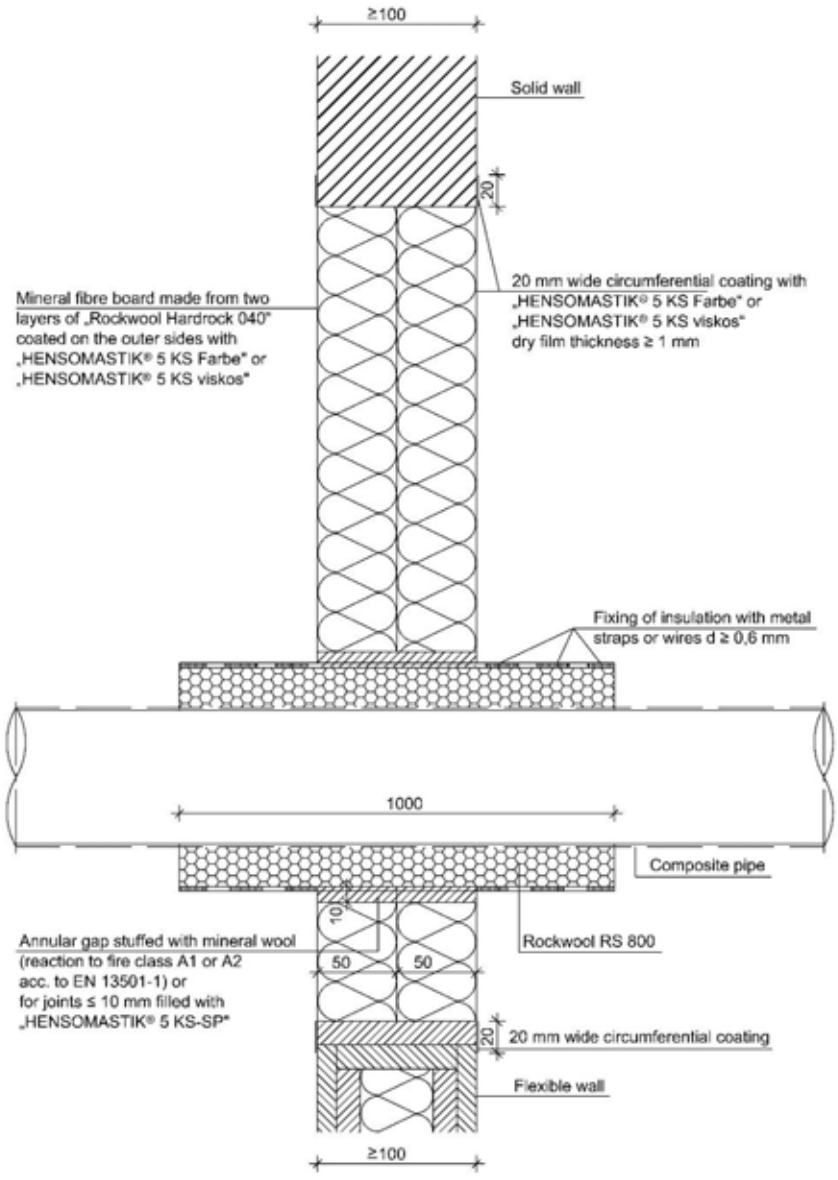
Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
PE 80/PE 100	≤50	3.0-6.9	2	**EI 120 U/C**
	>50 ≤75	3.0-6.9	3	**EI 90 U/C**
	>75 ≤110	2.7-6.6	4	**EI 90 U/C**
	110	6.6	4	**EI 120 U/C**

A.1.7.12 Flex-Schlauch with/without cables with HENSOTHERM® 7 KS Gewebe 50

Services	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
Flex-Schlauch	25-32	2.0	2	**EI 90 C/C**

A.1.8 Composite pipes with Rockwool RS 800 insulation 1000 mm (LS)

Construction details:



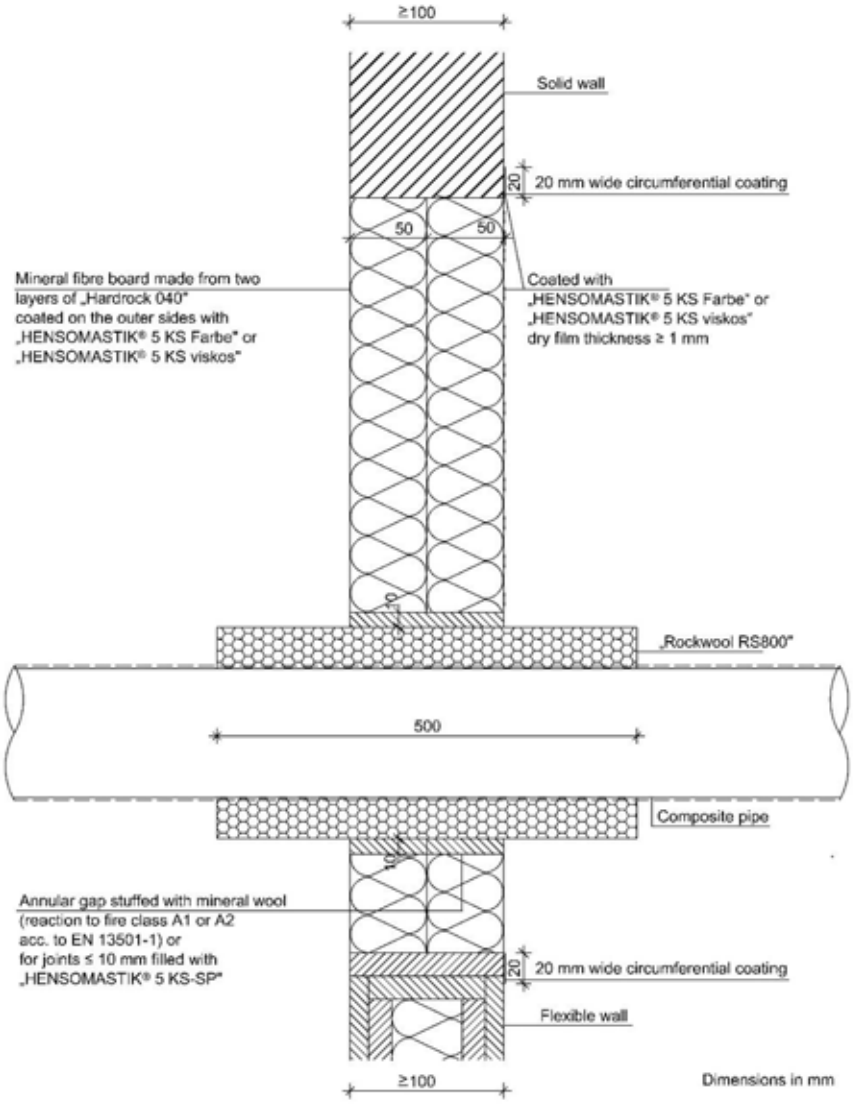
The length of the local insulation may be increased but not reduced. Dimensions in mm

A.1.8.1 KE KELIT KELOX pipes with Rockwool RS 800 insulation

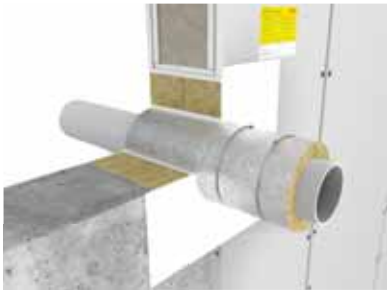
Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
KE KELIT KELOX	63	4.5	30	1000 mm (LS)	**EI 90 U/C**

A.1.9 Composite pipes with Rockwool RS 800 insulation 500 mm (LS)

Construction details:

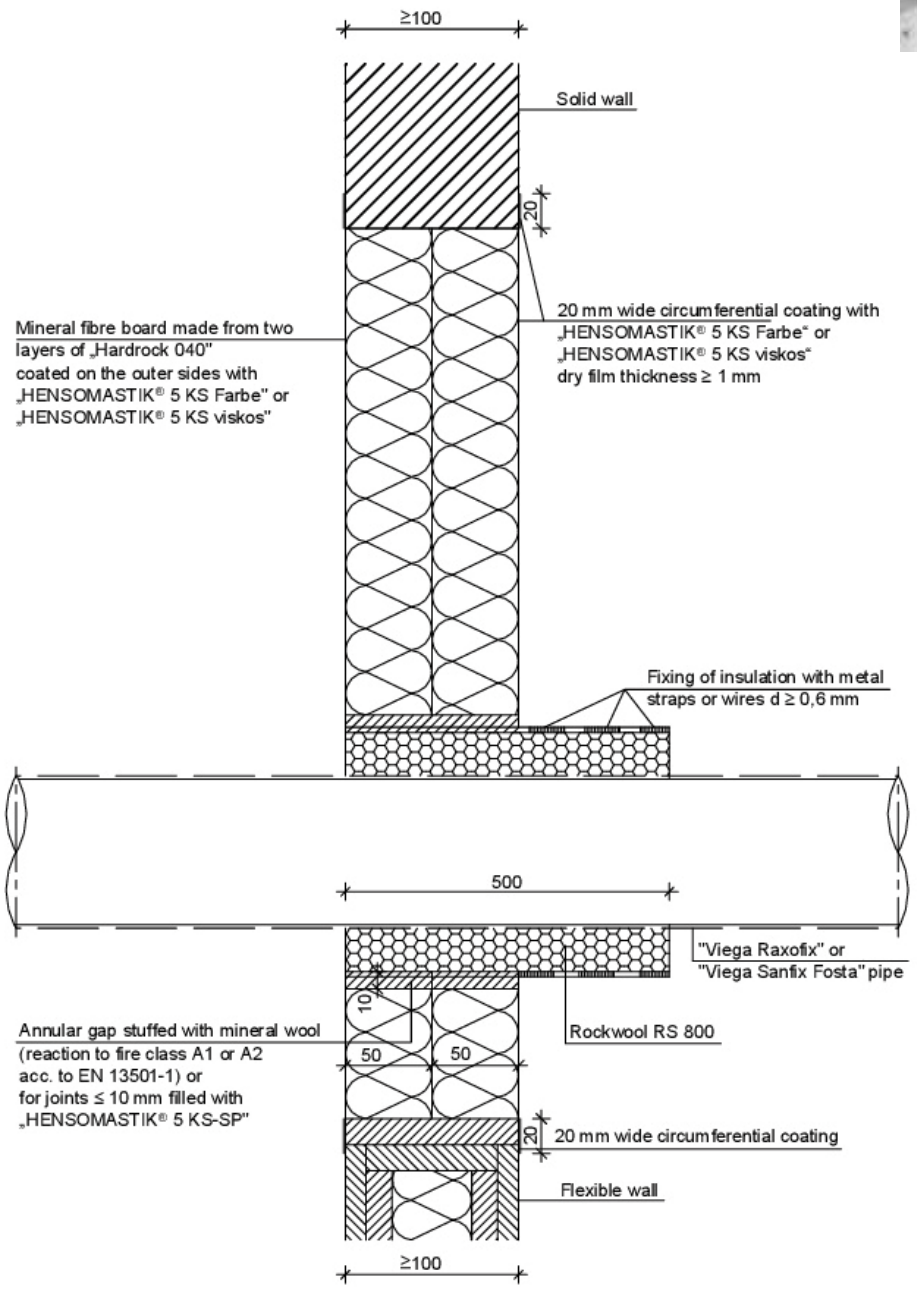


The length of the local insulation may be increased but not reduced.



A.1.9 Composite pipes with Rockwool RS 800 insulation 500 mm (LS)

Construction details:



The length of the local insulation may be increased but not reduced. Dimensions in mm

A.1.9.1 Geberit Mepla pipes with Rockwool RS 800 insulation

Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Geberit Mepla	16	2.3	20-80	500 mm (LS)	**EI 90 U/C**
	32	3.0	20-80	500 mm (LS)	
	40	3.5	20-80	500 mm (LS)	
	50	4.0	30-80	500 mm (LS)	
	63	4.5	30-80	500 mm (LS)	
	75	5.0	30-80	500 mm (LS)	

A.1.9.2 Viega Raxofix pipes with Rockwool RS 800 insulation

Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Viega Raxofix	16	2.2	20-60	500 mm (LS)	**EI 120 U/C**
	63	4.5	20-60	500 mm (LS)	

The insulation was flushed with the mineral fibre board fire side.

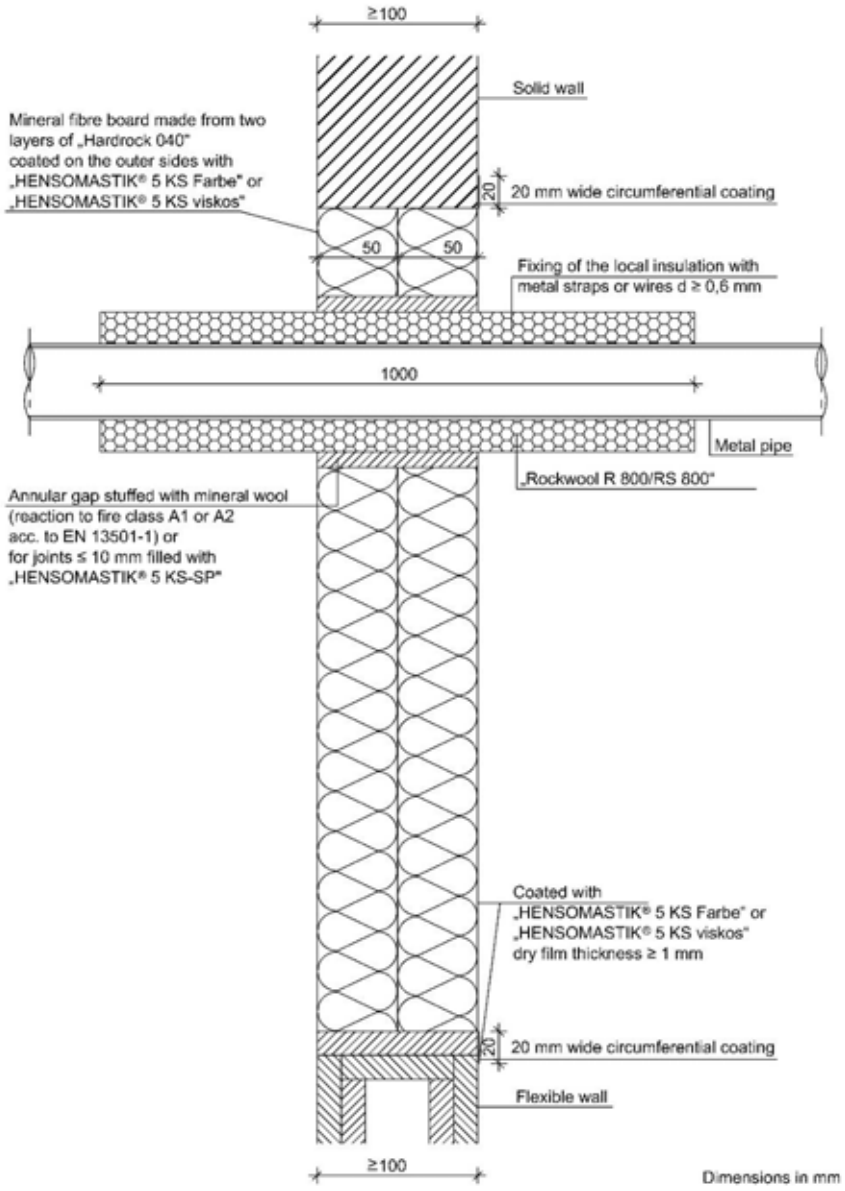
A.1.9.3 Viega Sanfix Fosta pipes with Rockwool RS 800 insulation

Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Viega Sanfix Fosta	16	2.2	20-60	500 mm (LS)	**EI 120 U/C**
	63	4.5	20-60	500 mm (LS)	

The insulation was flushed with the mineral fibre board fire side.

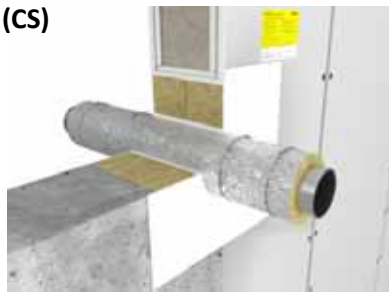
A.1.10 Metal pipes with Rockwool R 800 /RS 800 insulation, Local Sustained (LS)

Construction details:

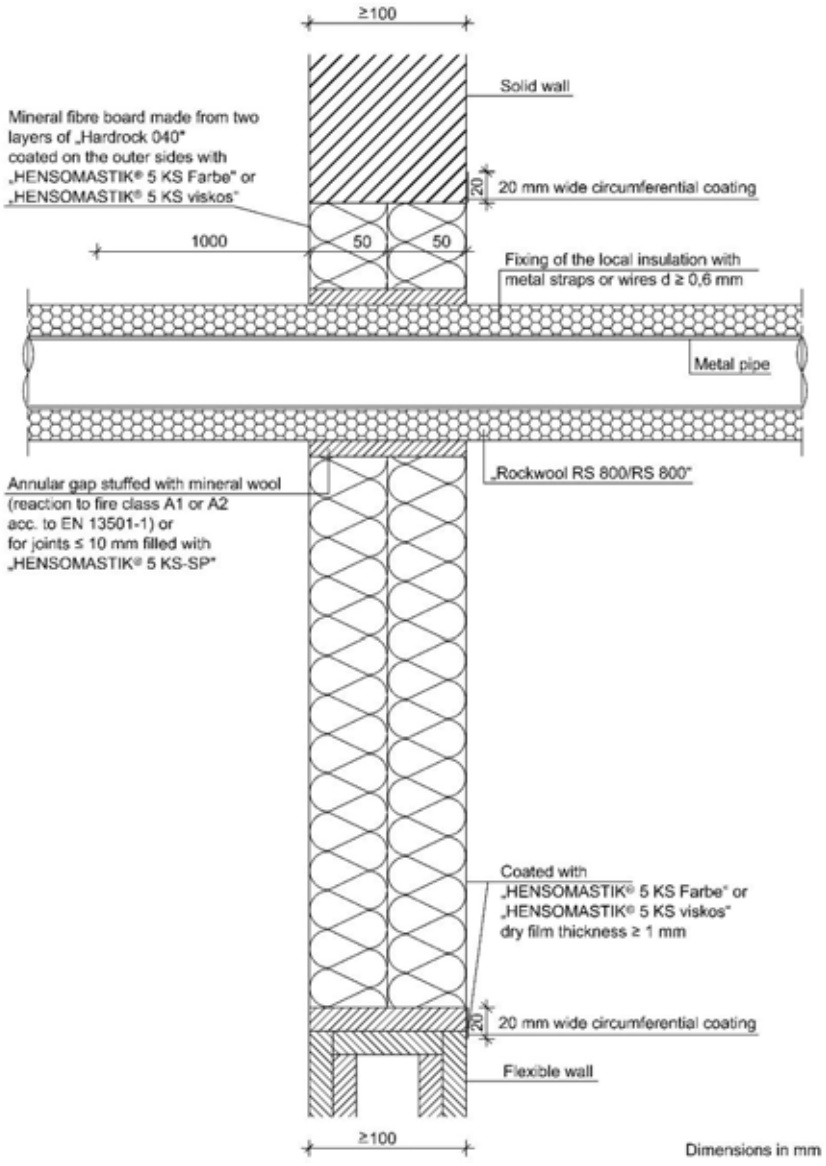


The length of the local insulation may be increased but not reduced.

A.1.10 Metal pipes with Rockwool R 800 /RS 800 insulation, Continuous Sustained (CS)



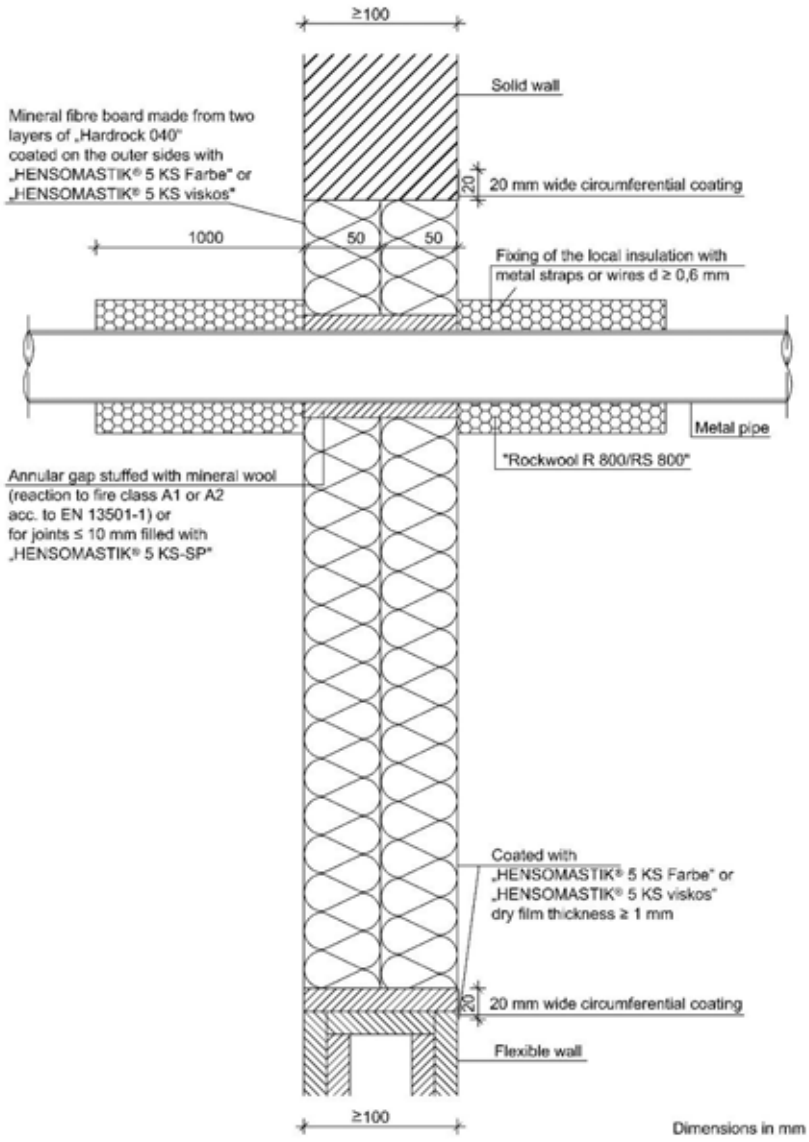
Construction details:



The length of the local insulation may be increased but not reduced.

A.1.10 Metal pipes with Rockwool R 800 /RS 800 insulation, Local Interrupted (LI)

Construction details:



The length of the local insulation may be increased but not reduced.

A.1.10.1 Copper and steel pipes with Rockwool R 800 / RS 800 (CS/LS)

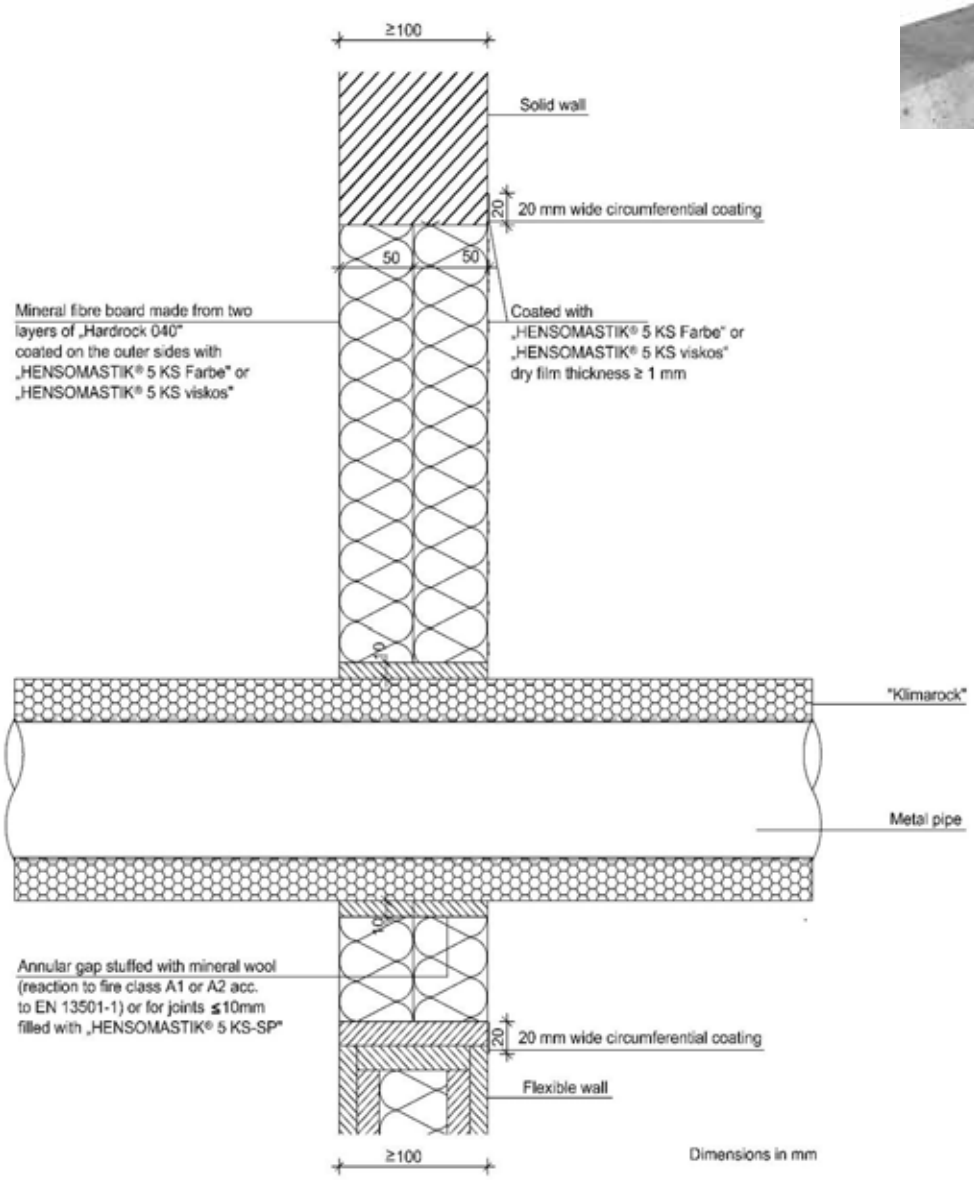
Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Copper and steel	≤15	1.0-14.2	20	(CS)	**EI 90 U/C**
	>15 ≤22	1.0-14.2	20	(CS)	
	>22 ≤42	1.0-14.2	20	1000 mm (LS)	

A.1.10.2 Copper and steel pipes with Rockwool R 800 / RS 800 (LI)

Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Copper	≤15	1.0-7.0	19	2 x 1000 mm (LI)	**EI 120 U/C**
	>15 ≤22	1.0-11.0	20	2 x 1000 mm (LI)	
	>22 ≤42	1.5-14.2	20	2 x 1000 mm (LI)	
	>42 ≤76.1	2.0-14.2	25	2 x 1000 mm (LI)	
	>76.1 ≤88.9	2.0-14.2	30	2 x 1000 mm (LI)	**EI 90 U/C**
Steel and cast iron	≤22	1.0-11	20	2 x 1000 mm (LI)	
	>22 ≤48.3	2.6-14.2	20	2 x 1000 mm (LI)	
	>48.3 ≤139.7	4.0-14.2	30	2 x 1000 mm (LI)	

A.1.11 Metal pipes with Klimarock insulation (CS)

Construction details:

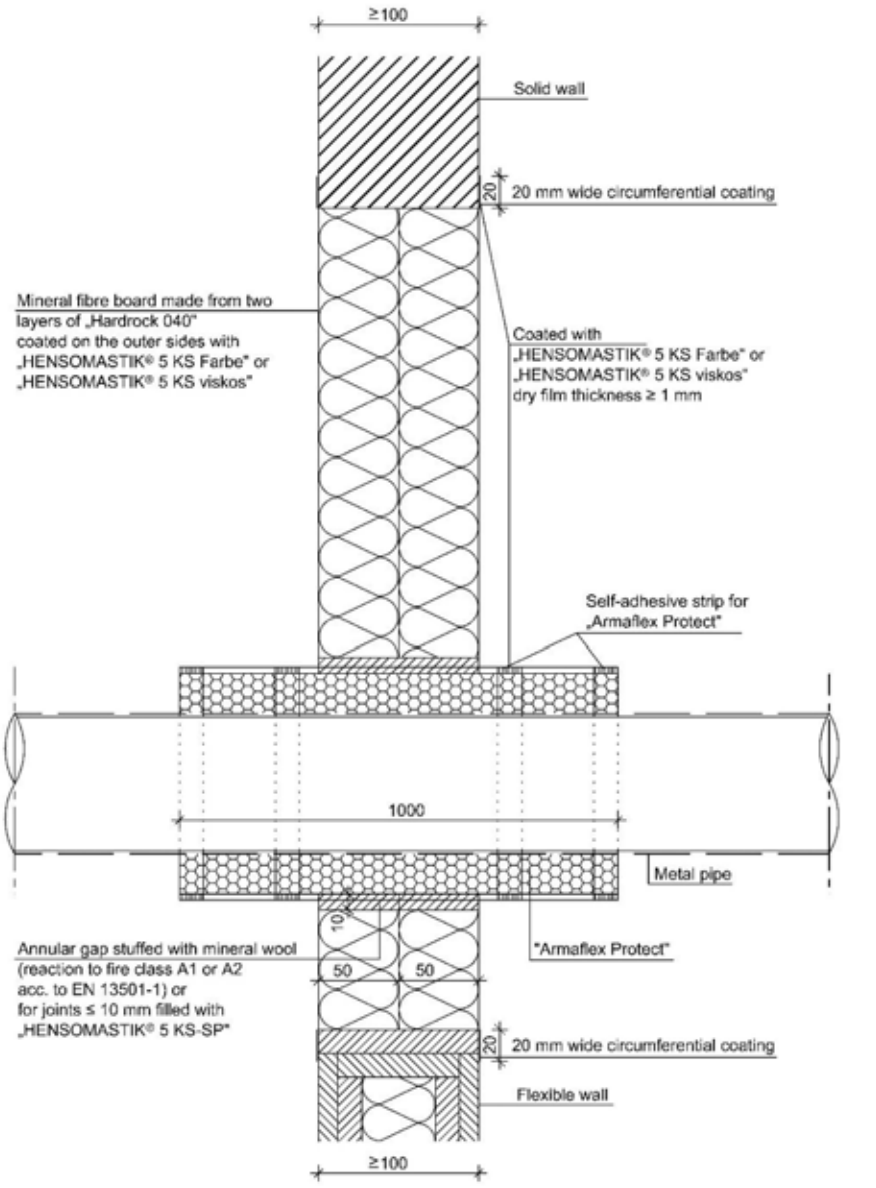


A.1.11.1 Copper and steel pipes with Klimarock insulation

Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Copper and steel	≤15	1.0-14.2	20	(CS)	**EI 120 U/C**
	>15 ≤54	1.0-14.2	20	(CS)	**EI 90 U/C**
steel	>54 ≤ 89	4.5 – 14.2	30	(CS)	**EI120 U/C**

A.1.12 Metal pipes with Armaflex Protect insulation 1000 mm (LS)

Construction details:



The length of the local insulation may increased but not reduced.

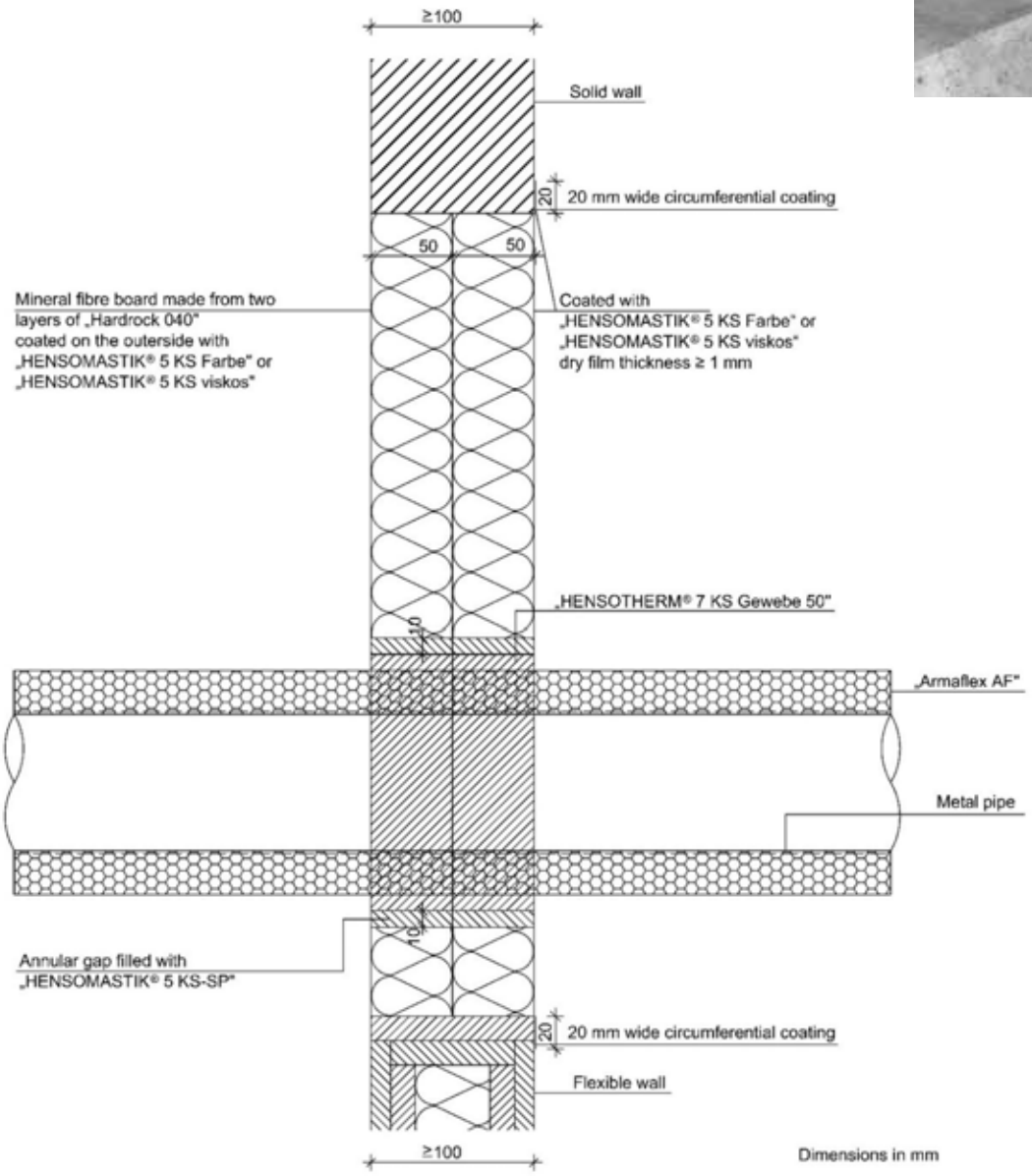
Dimensions in mm

A.1.12.1 Metal pipes with Armaflex Protect insulation

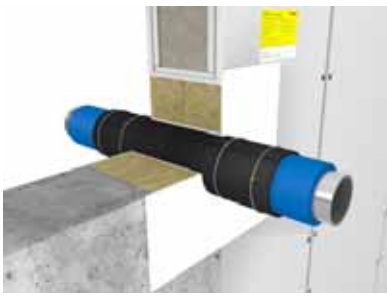
Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Copper and steel	≤22	1.0-14.2	19-20	1000 mm (LS)	**EI 90 U/C**
	≤42	1.5-14.2	25	1000 mm (LS)	
	≤76.1	2.0-14.2	25	1000 mm (LS)	

A.1.13 Metal pipes with synthetic rubber insulation (CS)

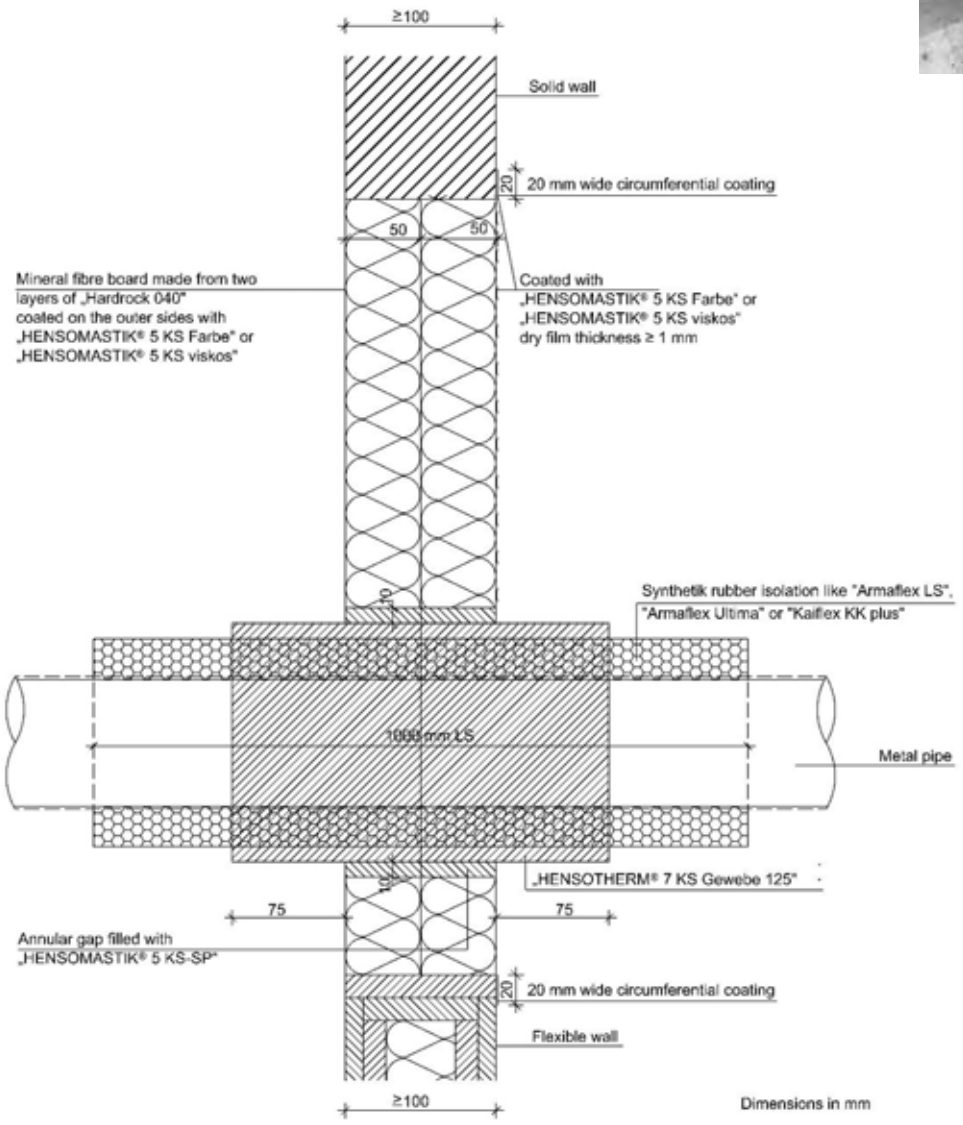
Construction details:



A.1.13 Metal pipes with synthetic rubber insulation (LS)

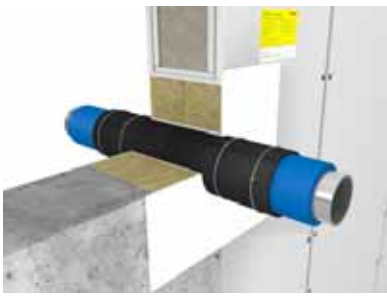


Construction details:

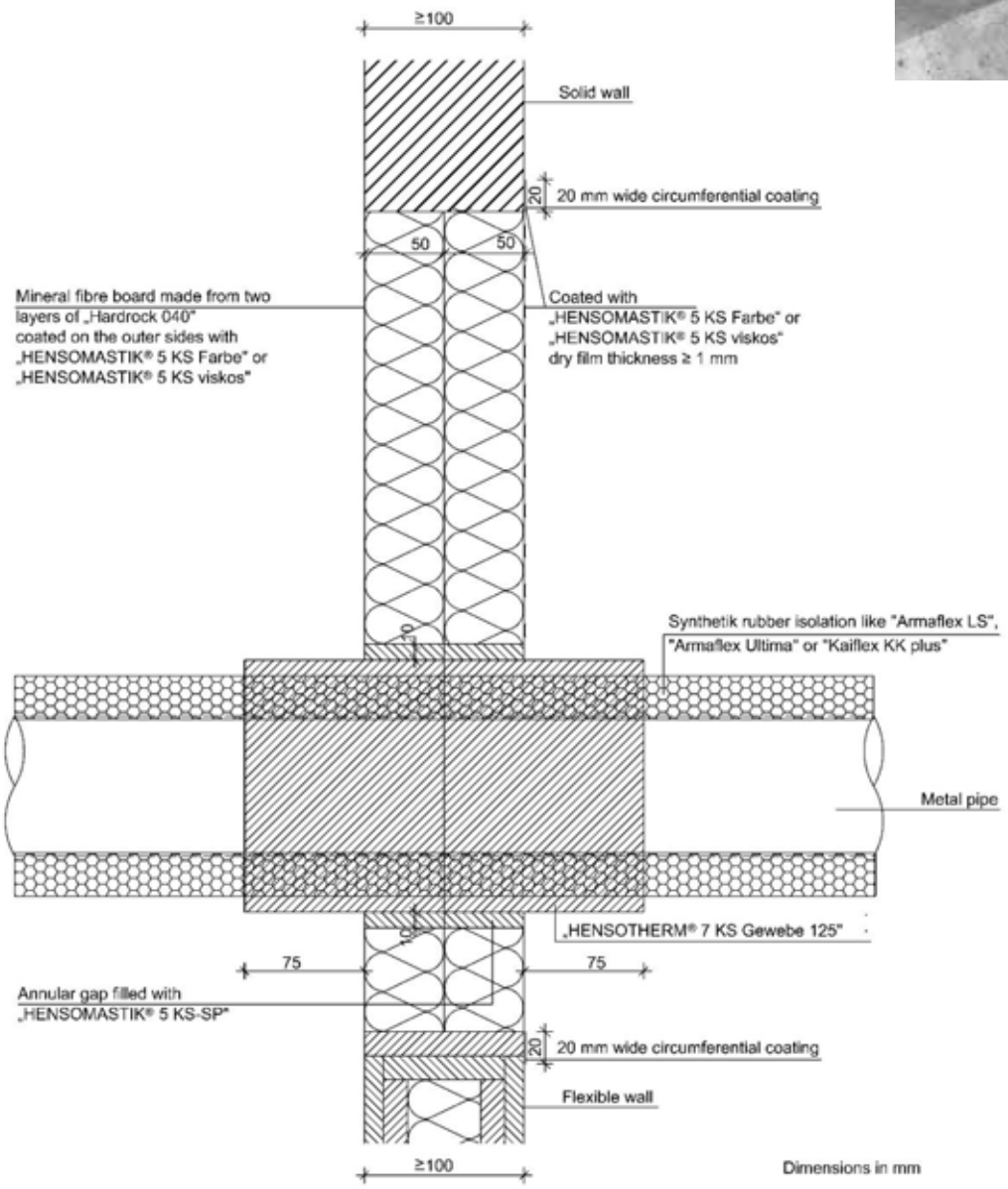


The length ofthe local insulation may be increased but not reduced.

A.1.13 Metal pipes with synthetic rubber insulation (CS)



Construction details:



A.1.13.1 Copper and steel pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50

Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 50	Insulation thickness mm	Insulation length mm	Classification
Copper and steel	≤15	1.0-14.2	1	11-36.5	(CS)	EI 90 C/U
	>15 ≤42	1.0-14.2	2	13.5-36.5	(CS)	
	>42 ≤54	1.2-14.2	2	13.5-38	(CS)	
Steel	>54 ≤88.9	1.5-14.2	2	41.5	(CS)	
Copper and steel	≤15	1.0-14.2	1	11-36.5	(CS)	EI 120 C/U
	>15 ≤42	1.0-14.2	2	11-13.5	(CS)	
	54	1.5-14.2	2	38.0	(CS)	

A.1.13.2 Copper and steel pipes with Armaflex Ultima and HENSOTHERM® 7 KS Gewebe 125

Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 125	Insulation thickness mm	Insulation length mm	Classification
Copper or steel	≤15	1.0-14.2	2	13-25	1000 mm (LS)	EI 120 U/C
	≤15	1.0-14.2	2	13-25	(CS)	
	>15 ≤54	1.5-14.2	2	25	1000 mm (LS)	EI 90 U/C
	>15 ≤54	1.5-14.2	2	25	(CS)	
Steel	>54 ≤88.9	3.2-14.2	2	25	1000 mm (LS)	EI 120 U/C
	>54 ≤88.9	3.2- 14.2	2	25	(CS)	EI 90 U/C

A.1.13.3 Copper and steel pipes with Armaflex LS and HENSOTHERM® 7 KS Gewebe 125

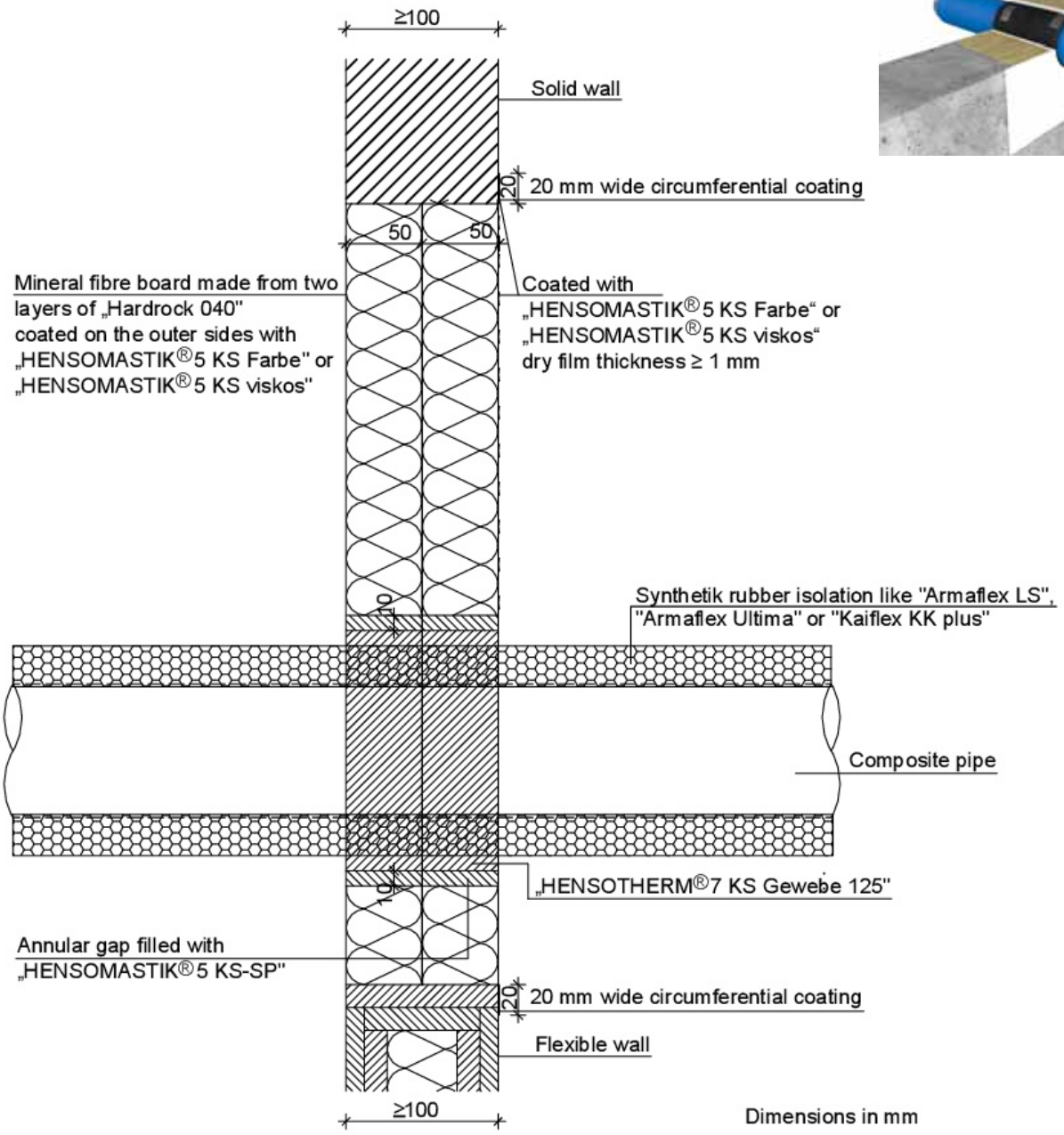
Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 125	Insulation thickness mm	Insulation length mm	Classification
Copper and steel	≤15	1.0-14.2	2	13-25	1000 mm (LS)	EI 120 U/C
	>15 ≤54	1.5-14.2	2	25	1000 mm (LS)	EI 60 U/C
	≤15	1.0-14.2	2	13-25	(CS)	EI 120 U/C
	>15 ≤54	1.5-14.2	2	25	(CS)	
Steel	>54 ≤88.9	3.2-14.2	2	25	1000 mm (LS)	EI 60 U/C
	88.9	3.2-14.2	2	25	1000 mm (LS)	EI 90 U/C
	>54 ≤88.9	3.2-14.2	2	25	(CS)	

A.1.13.4 Copper and steel pipes with Kaiflex KK plus and HENSOTHERM® 7 KS Gewebe 125

Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 125	Insulation thickness mm	Insulation length mm	Classification
Copper or steel	15	1.0-14.2	2	11	1000 mm (LS)	**EI 60 U/C**
	15	1.0-14.2	2	11	(CS)	
	≥15 ≤54	1.5-14.2	2	21	1000 mm (LS)	**EI 45 U/C**
	≥15 ≤54	1.5-14.2	2	21	(CS)	
Steel	>54 ≤88.9	3.2-14.2	2	28,5	1000 mm (LS)	**EI 45 U/C**
	88.9	3.2-14.2	2	28,5	1000 mm (LS)	**EI 120 U/C**
	>54 ≤88.9	3.2-14.2	2	28,5	(CS)	**EI 90 U/C**
	88.9	3.2-14.2	2	28,5	(CS)	**EI 120 U/C**

A.1.14 Composite pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50

Construction details:



A.1.14.1 Geberit Mepla pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50

Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 50	Insulation thickness mm	Insulation length mm	Classification
Geberit Mepla	32	3.0	1	9.0-36.5	(CS)	EI90 U/C
	40	3.5	1	13.5-36.5	(CS)	
	50	4.0	1	13.5-36.5	(CS)	
	63	4.5	1	13.5-36.5	(CS)	
	75	5.0	2	14-40.5	(CS)	
	32	3.0	1	9.0-13.5	(CS)	EI 120 U/C
	40	3.5	1	9.0-13.5	(CS)	

A.1.14.2 KE KELIT KELOX pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50

Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 50	Insulation thickness mm	Insulation length mm	Classification
KE KELIT KELOX	16	2.0	1	13.0-36.5	(CS)	EI 120 U/C
	20	2.25	1	13.5-36.5	(CS)	
	25	2.5	1	13.5-36.5	(CS)	
	32	3.0	1	13.5-36.5	(CS)	
	40	4.0	1	13.5-36.5	(CS)	
	50	4.5	2	14.0-40.5	(CS)	
	63	6.0	2	14.0-40.5	(CS)	

A.2 Rigid floor constructions acc. to 1.2.1 with floor thickness of minimum 150 mm

A.2.1.1 Service Types

Services	Types
Cables	• Sheathed electrical cables up to 80 mm diameter • Telecom cables up to 21 mm diameter
Cable bundles	• Bundles of the above up to 100 mm in diameter
Cable Supports	• Perforated and unperforated steel cable trays and ladders
Plastic pipes with AWM II pipe collars	• PE pipes in accordance with EN 1519-1, EN 12666-1, EN12201-2 • Friaphon (by FRIATEC) pipes • PVC-U pipes in accordance with EN 1329-1, EN 1453-1, EN 1452-1 • PP pipes in accordance with EN 1451-1
Plastic pipes with RORCOL V30/V60 pipe collars	• PE pipes in accordance with EN 1519-1, EN 12666-1, EN12201-2, 1451-1 • PVC-U pipes in accordance with EN 1329-1, EN 1453-1 and EN 1452-1 • PP pipes in accordance with EN 1451-1 • PP R pipes in accordance with EN ISO 15874-2 • PP H pipes in accordance with EN ISO 15494 • Raupiano Plus pipes • POLO-KAL 3S pipes • POLO-KAL NG pipes • FRIAPHON pipes • RAUTITAN pipes
Metal, composite and plastic pipes with RORCOL AV60 pipe collars	• Copper • Mild & stainless steel • FX flexible tubes with EN 61386-22 • Geberit Mepla • HENCO multiple-layer • K06 KELIT • RAUTITAN stabil • FRIATHERM multi-press • JRG Sanipex MT • TECEflex
Plastic pipes with HENSOTHERM® 7 KS Gewebe 50	• PE pipes in accordance with EN 1519-1, EN 12666-1, EN12201-2 • PVC-U pipes in accordance with EN 1329-1, EN 1453-1, EN 1452-1 • PP pipes in accordance with EN 1451-1
Metal pipes with Rockwool RS800 (LI) insulation	• Copper • Mild & stainless steel • Cast Iron
Metal pipes with Rockwool RS800 (LS) insulation	• Copper • Mild & stainless steel • Cast Iron
Metal pipes with Armaflex AF (LS) insulation	• Copper • Mild & stainless steel • Cast Iron
Metal pipes with Armaflex Protect (LS) insulation	• Copper • Mild & stainless steel • Cast Iron
Metal pipes with synthetic rubber insulation	• Copper • Mild & stainless steel • Cast Iron

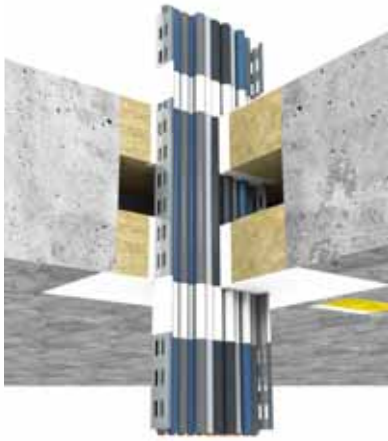
A.2.1.2 Permitted Distances

Maximum seal size: 2000 mm x 1200 mm

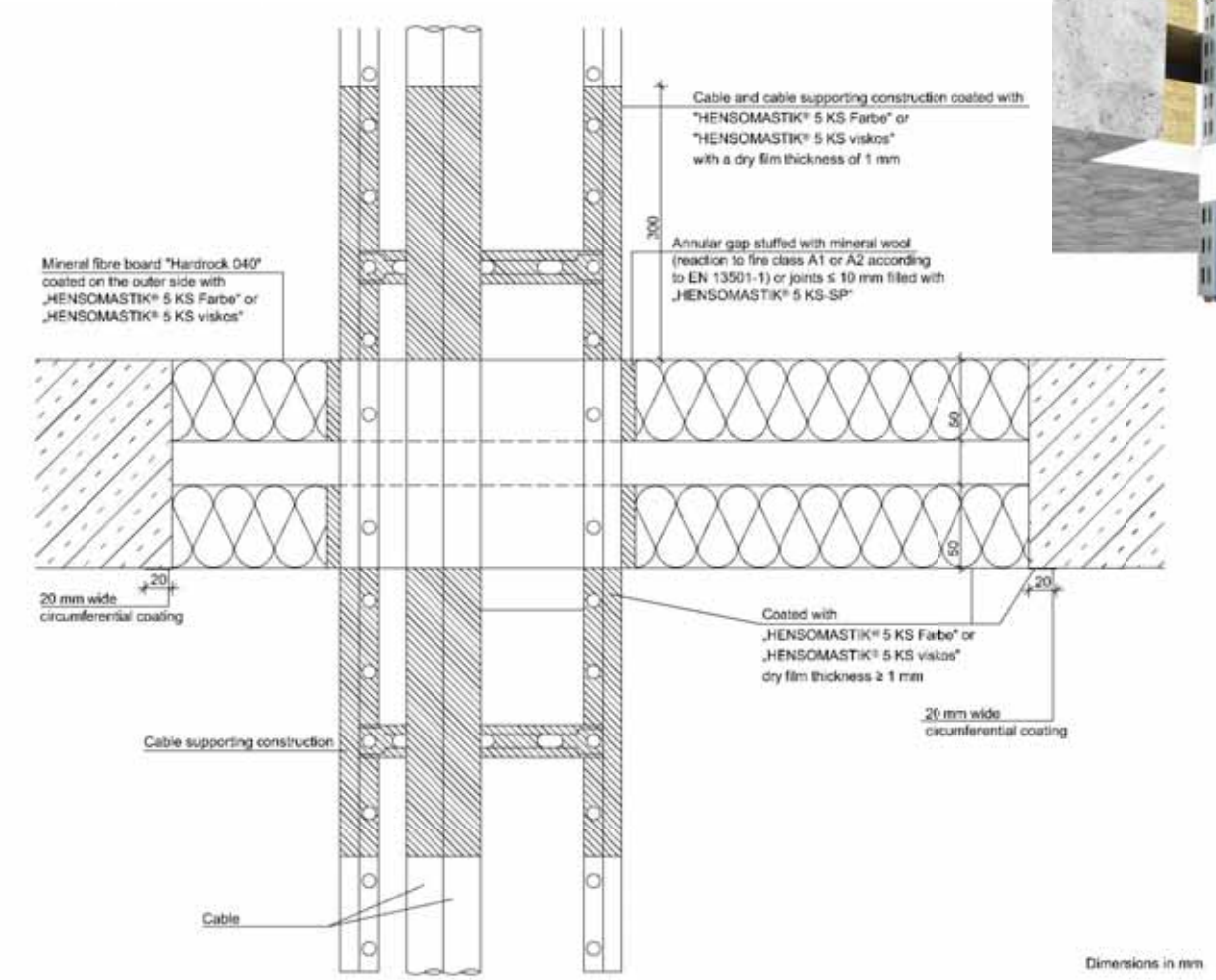
a1: between cable/cable trays and metal pipes ≥ 50 mm
a2: between cable/cable trays and plastic pipes ≥ 50 mm
a3: between metal pipes and plastic pipes ≥ 25 mm
a4: between plastic pipes ≥ 40 mm
a5: between metal pipes ≥ 40 mm
a6: between cable trays ≥ 30 mm
b1: between cable/cable trays and the upper seal edge: ≥ 25 mm
b2: between cable/cable trays and the side seal edge: ≥ 25 mm
b3: between cable/cable trays and the lower seal edge: ≥ 0 mm
b4: between metal pipes and the side seal edge: ≥ 30 mm
b5: between plastic pipes and the side seal edge: ≥ 30 mm

Distance 1st support pipe service ≤ 450 mm
Distance 1st support cable/cable trays ≤ 240 mm

A.2.2 Cables and trays



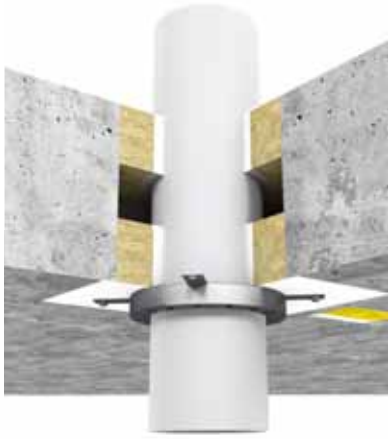
Construction details:



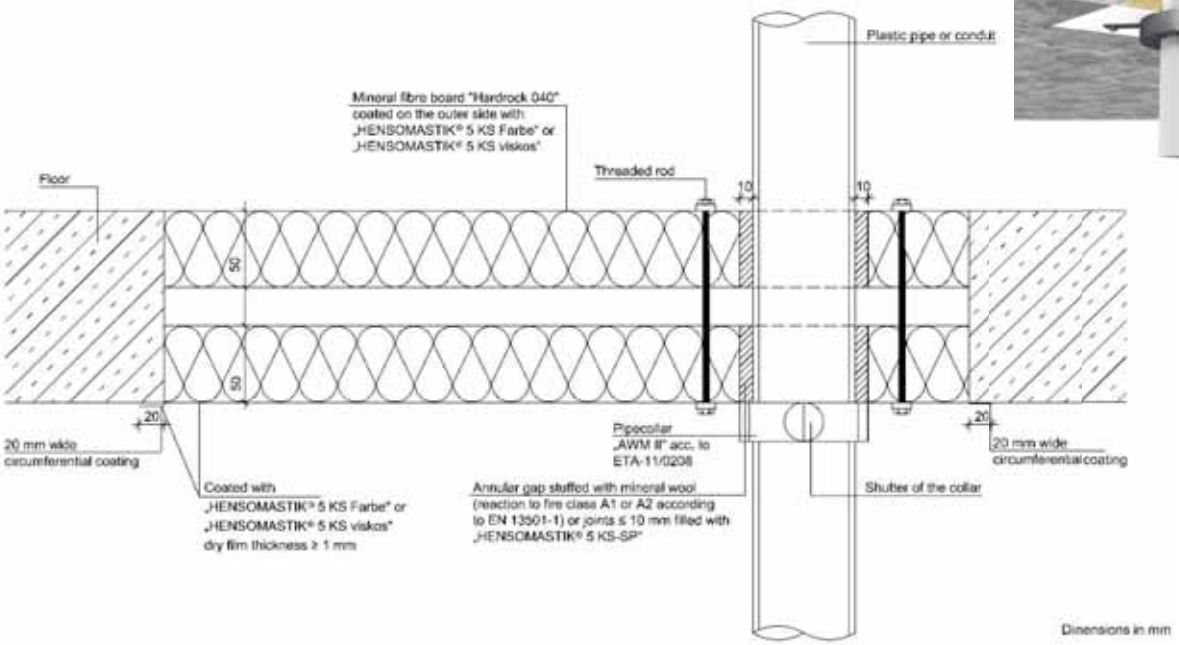
A.2.2.1 Cables with HENSOMASTIK® 5 KS Farbe

Services	Insulation/Coating	Classification
Sheathed electrical cables up to 21 mm diameter	1 mm DFT HENSOMASTIK® 5 KS Farbe coating extending 300 mm from both faces of the seal	**EI 90**
Telecoms cables up to 21 mm diameter		
Bundles of above cables up to 100 mm diameter		
Cable supports		

A.2.3 Plastic pipes and conduits with AWM II pipe collars



Construction details:



A.2.3.1 Friaphon pipes with AWM II pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Classification
Friaphon	52	2.8	**EI 90 U/U**
	78	4.9	
	110	5.3	
	135	5.6	

A.2.3.2 PVC-U pipes with AWM II pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Classification
PVC-U	≥32 ≤50	1.8-5.6	**EI 120 U/U**
	≥63 ≤110	1.8-12.3	
	≥140 ≤160	3.2	**EI 90 U/U**
	≥140 ≤160	11.8	**EI 60 U/U**

A.2.3.3 PE-HD pipes with AWM II pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Classification
PE-HD	≥32 ≤50	1.8-4.6	**EI 120 U/U**
	≥63 ≤110	2.7-10.0	
	125	3.1-11.4	
	≥140 ≤160	4.0-14.6	

A.2.3.4 PP-HT pipes with AWM II pipe collars

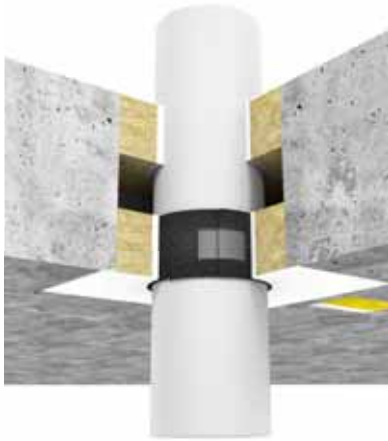
Pipes	Pipe diameter mm	Pipe wall thickness mm	Classification
PP-HT	≥32 ≤50	1.8-4.6	**EI 120 U/U**
	≥63 ≤110	2.7-10.0	

A.2.3.5 Polyolefin conduits with AWM II collars

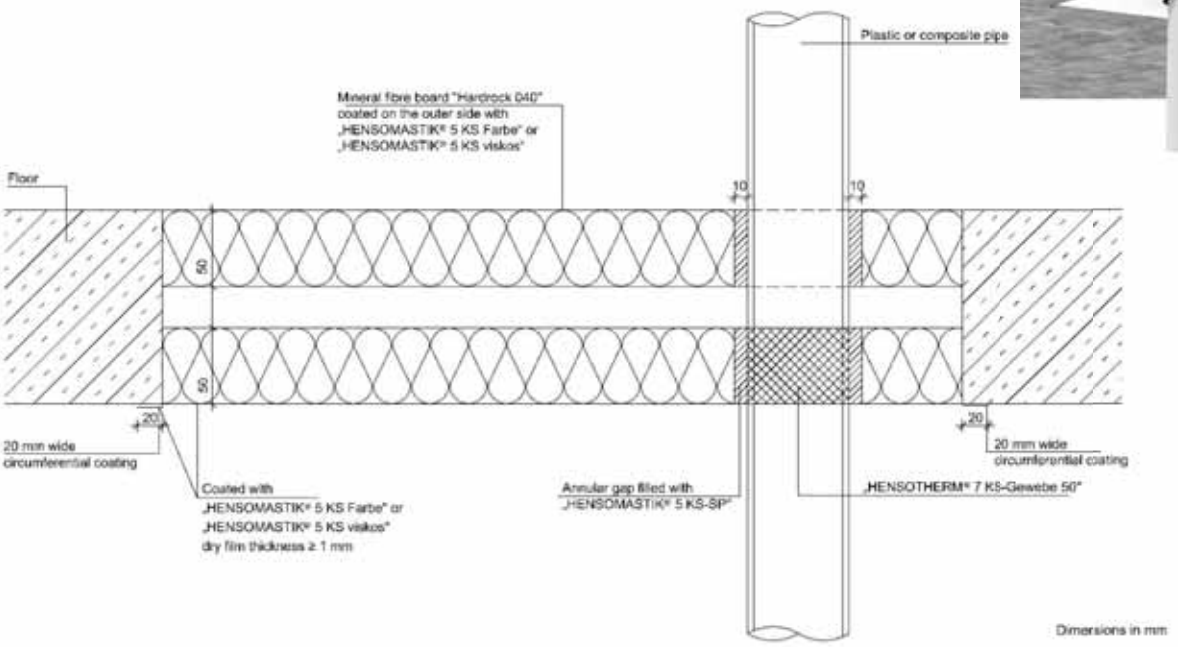
Services	Pipe diameter mm	Cables*	Classification
Polyolefin conduits bundled to fill a 125 mm Ø collar	16	None	**EI 120 U/C**
	20	None	
	25	None	
	32	None	
	40	None	
	50	None	
	63	None	
	16	1x JY(ST) 2x2x0.6	
	20	1x A2	
	25	1x A1	
	32	1x F	
	40	2x A1	
	50	2x A1, 2x F	
	63	4x A1, 3x F	

* Cables as designated in EN 1366-3: 2009

A.2.4 Plastic and composite pipes with HENSOTHERM® 7 KS Gewebe 50



Construction details:



A.2.4.1 PVC-U pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
PVC-U	≤50	2.4-3.7	2	EI 90 U/U
	>50 ≤75	3.6-5.6	3	
	>75 ≤90	4.3-6.7	4	
	≤50	3.7	2	EI 120 U/U
	≤75	3.6	3	

A.2.4.2 PE-HD pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
PE-HD	≤50	3.0	2	EI 90 U/U
	>50 ≤56	3.0	2	
	>56 ≤75	3.0	3	
	>75 ≤90	3.5	4	
	90	3.5	4	EI 120 U/U

A.2.4.3 PP-HT pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
PP-HT	≤50	1.8	2	**EI 60 U/U**
	>50 ≤75	1.8-1.9	3	**EI 90 U/U**
	>75 ≤90	1.9-2.2	4	

A.2.4.4 Geberit Silent-PP pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
Geberit Silent-PP	≤50	1.8	2	**EI 90 U/U**
	>50 ≤75	2.6	3	
	>75 ≤90	2.6-2.9	4	
	75	2.6	3	**EI 120 U/U**

A.2.4.5 Geberit Silent-db20 pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
Geberit Silent-db20	≤56	3.2	2	**EI 120 U/U**
	>56 ≤75	3.6	3	**EI 90 U/U**
	>75 ≤90	5.5	4	
	90	5.5	4	**EI 120 U/U**

A.2.4.6 POLO-KAL NG pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
POLO-KAL NG	≤50	2.0	2	**EI 90 U/U**
	>50 ≤75	2.6	3	**EI 120 U/U**
	>75 ≤90	3.0	4	

A.2.4.7 Flex-Schlauch with/without cables with HENSOTHERM® 7 KS Gewebe 50

Services	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
Flex-Schlauch	25	2.0	2	**EI 120 C/C**
	32	2.0	2	

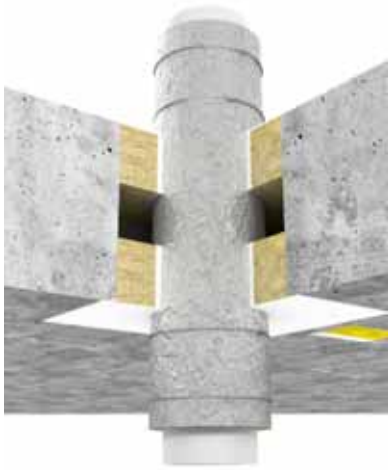
A.2.4.8 Geberit Mepla pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
Geberit Mepla	≤32	3.0	3	**EI 120 U/U**
	>32 ≤63	4.5	4	

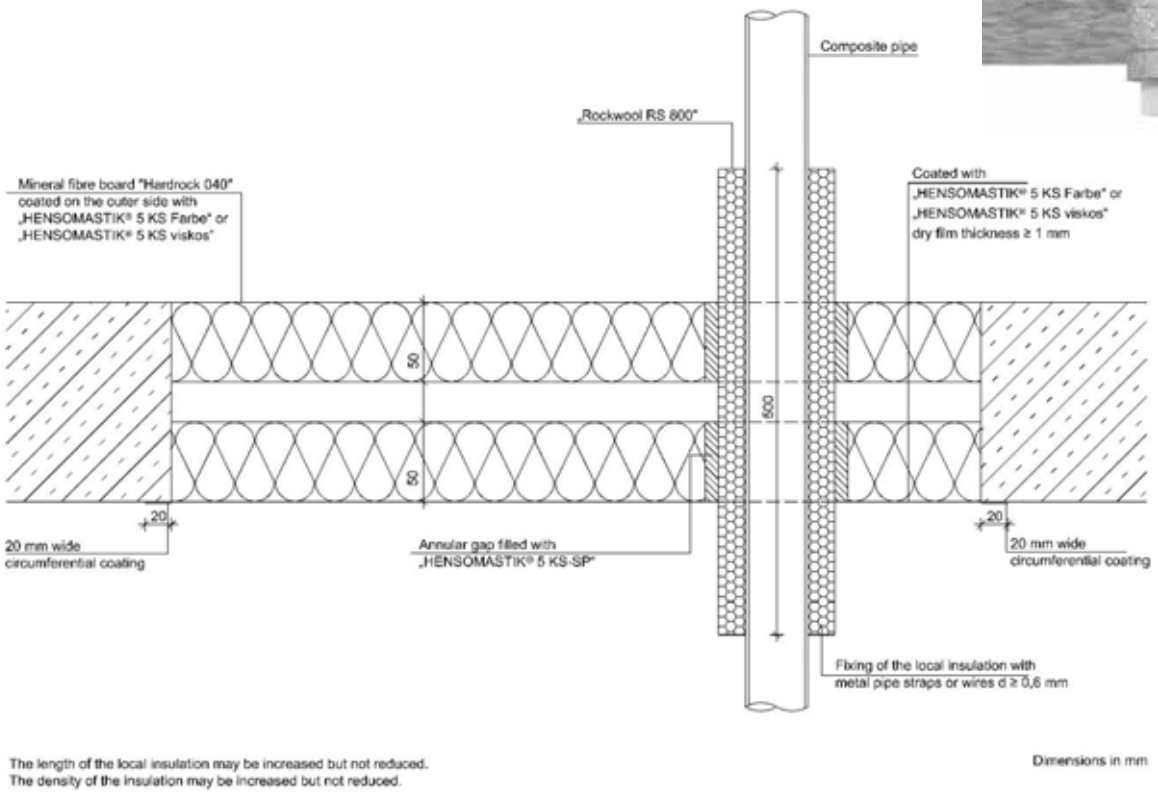
A.2.4.9 POLO-KAL 3S pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
POLO-KAL 3S	75	3.8	3	**EI 120 U/U**
	90	4.5	4	

A.2.5 Composite pipes with Rockwool RS 800 insulation (LS)



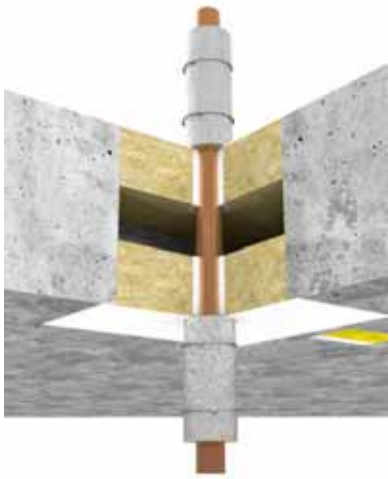
Construction details:



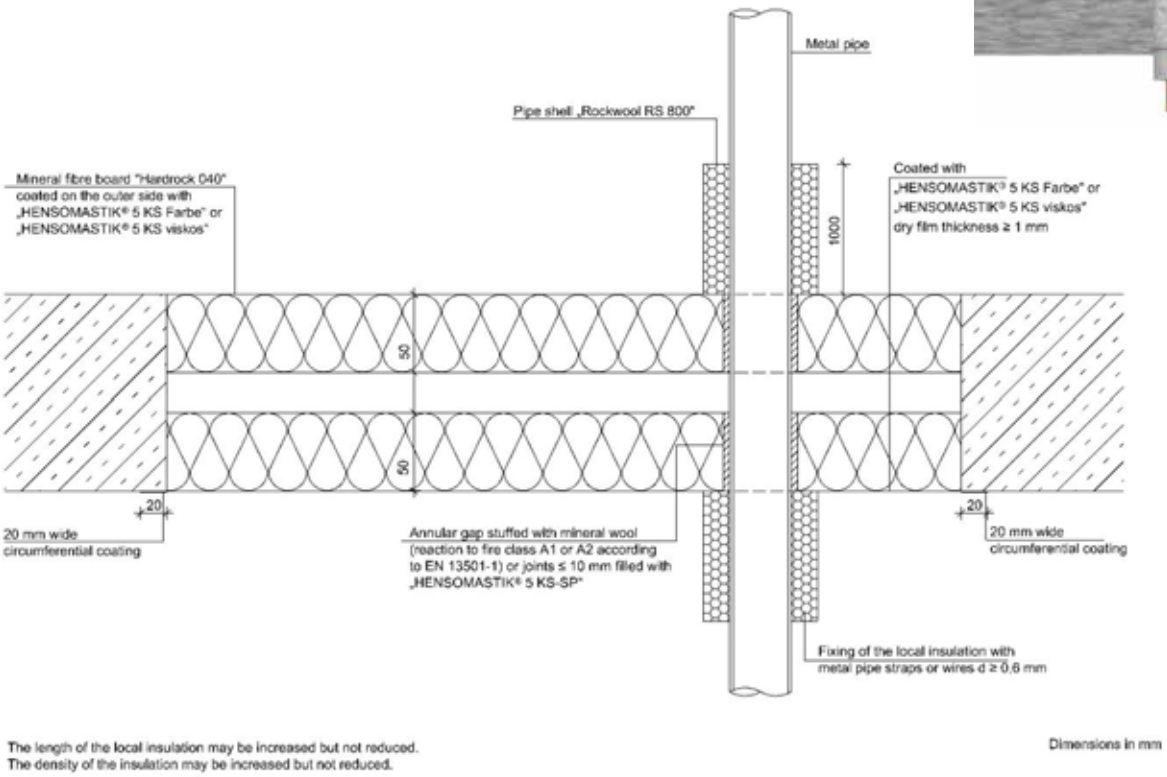
A.2.5.1 Geberit Mepla pipes with Rockwool RS 800 insulation 500 mm (LS)

Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Geberit Mepla	32	3.0	20-80	500 mm (LS)	**EI 120 U/C**
	40	3.5	20-80	500 mm (LS)	
	50	4.0	20-80	500 mm (LS)	
	63	4.5	20-80	500 mm (LS)	
	75	5.0	30-80	500 mm (LS)	

A.2.6 Metal pipes with Rockwool RS 800 insulation (LI)



Construction details:



The length of the local insulation may be increased but not reduced.
The density of the insulation may be increased but not reduced.

Dimensions in mm

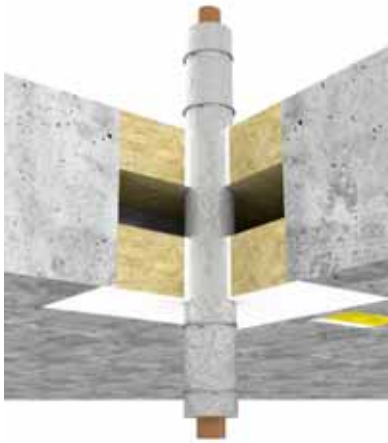
A.2.6.1 Copper pipes with Rockwool RS 800 insulation

Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Copper	≤20	1.0-11	20	2 x 1000 mm (LI)	**EI 120 U/C**
	≤42	1.5-14.2	20	2 x 1000 mm (LI)	
	≤88.9	2.0-14.2	30	2 x 1000 mm (LI)	

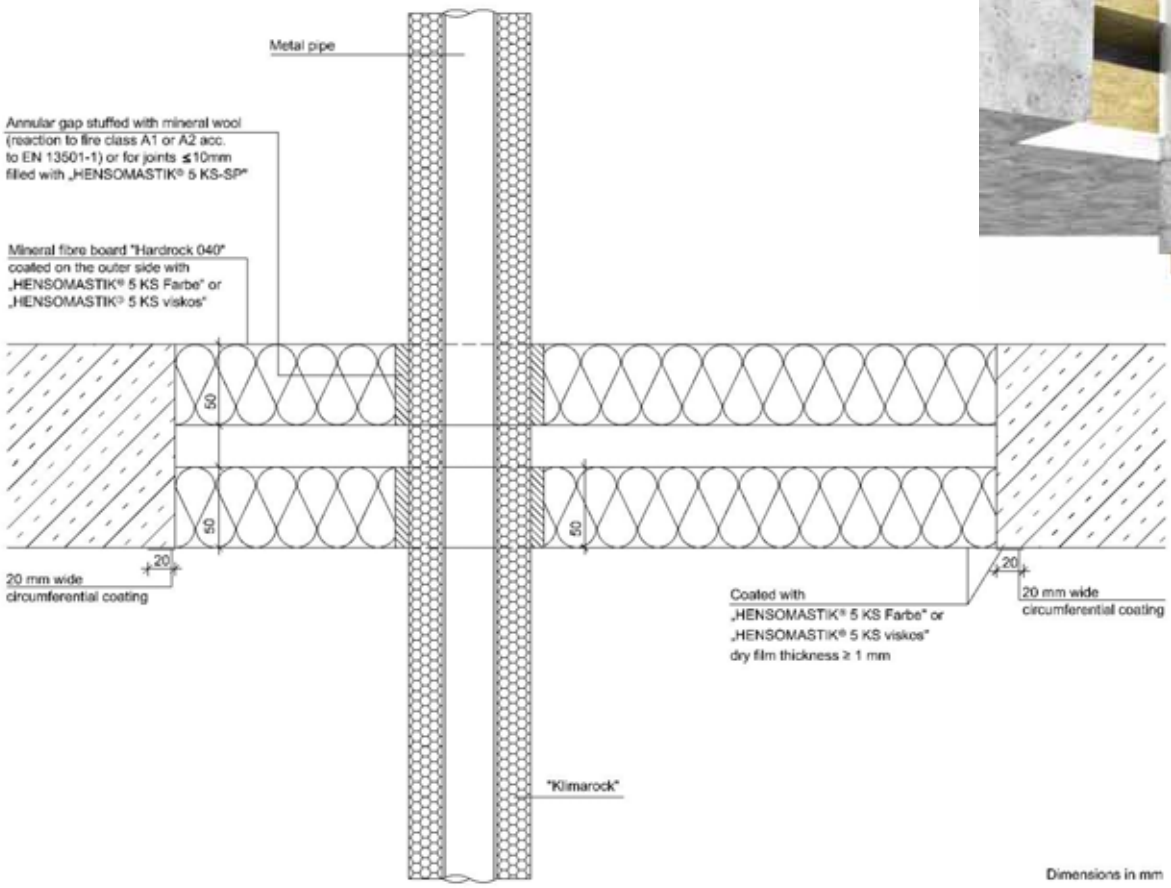
A.2.6.2 Steel or cast iron pipes with Rockwool RS 800 insulation

Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Steel or cast iron	≤20	1.0-11	20	2 x 1000 mm (LI)	**EI 120 U/C**
	≤48.3	2.6-14.2	20	2 x 1000 mm (LI)	
	≤139.7	4.0-14.2	30	2 x 1000 mm (LI)	

A.2.7 Metal pipes with Klimarock insulation (CS)



Construction details:

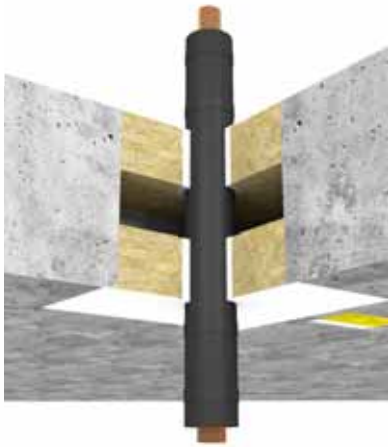


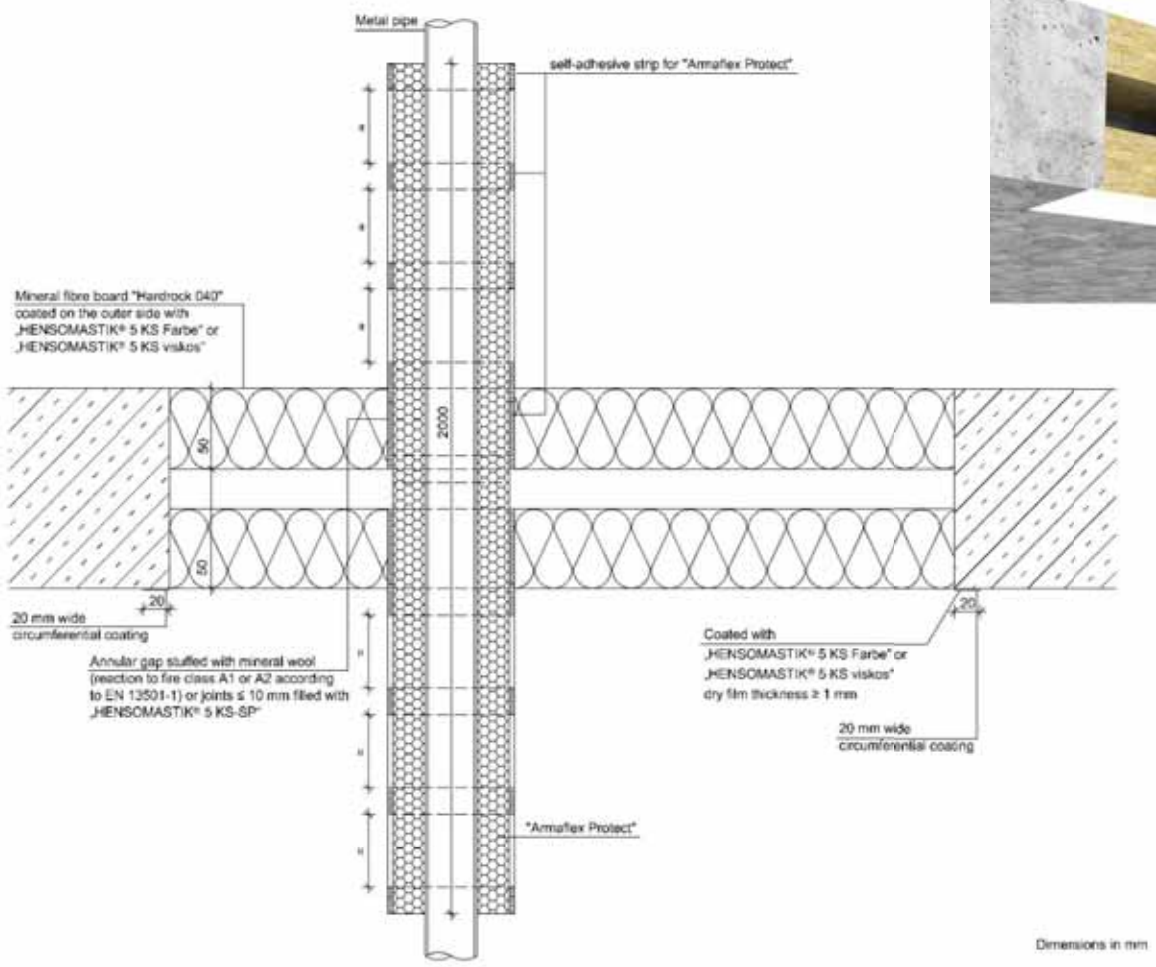
A.2.7.1 Copper and steel pipes with Klimarock insulation

Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Copper and steel	≤15	1.0-14.2	20	(CS)	**EI 120 U/C**
	>15 ≤54	1.5-14.2	20	(CS)	
Steel	> 54 ≤88.9	3.2-14.2	30	(CS)	**EI 90 U/C**

A.2.8 Metal pipes with Armaflex Protect insulation (LS)

Construction details:



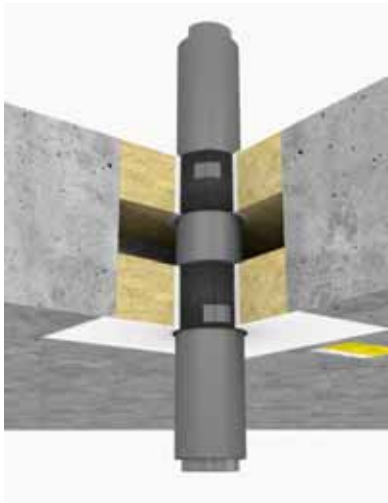


The length of the local insulation may be increased but not reduced.

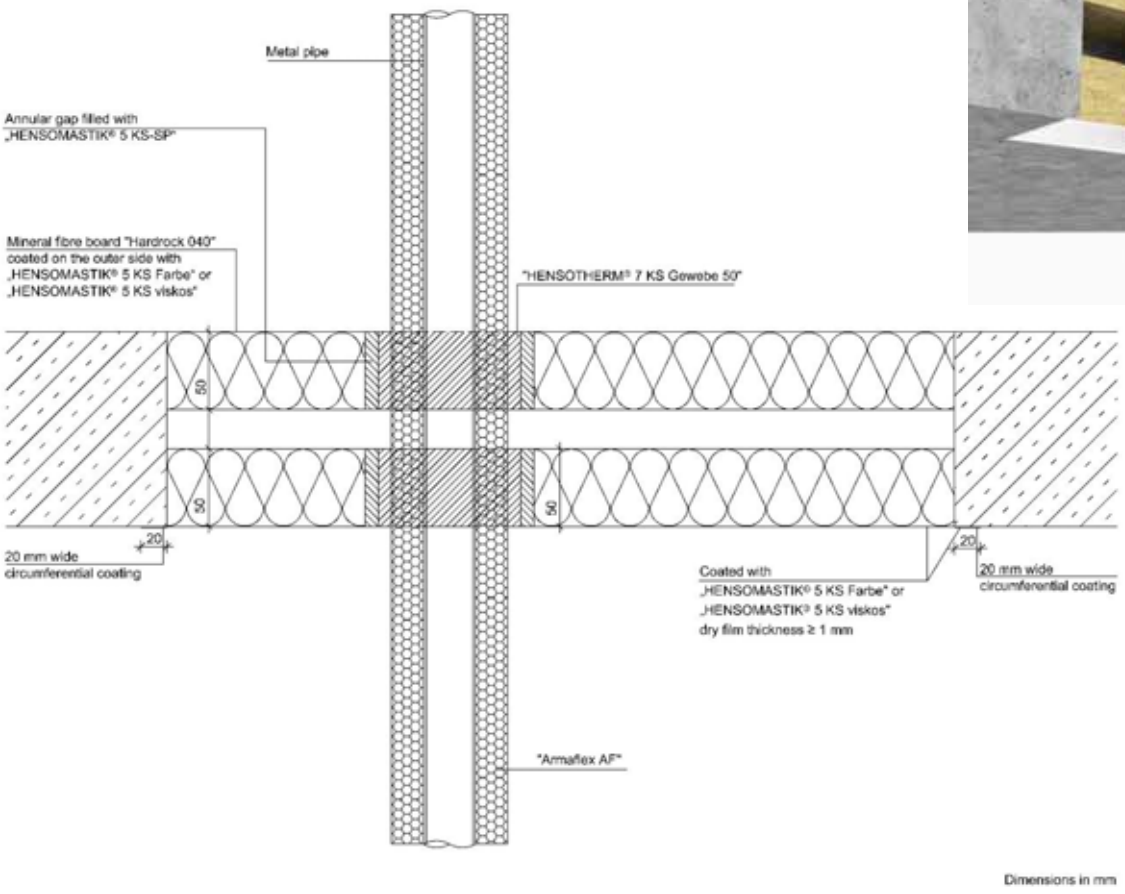
A.2.8.1 Steel or cast iron pipes with Armaflex Protect (LS) insulation, 2000 mm long

Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Copper, steel or cast iron	≤15	1.0-11.0	19	2000 mm (LS)	**EI 120 U/C**
	>15 ≤22	1.0-11.0	20	2000 mm (LS)	
	>22 ≤42	1.5-14.2	25	2000 mm (LS)	
	>42 ≤76.1	2.0-14.2	25	2000 mm (LS)	

A.2.9 Metal pipes with synthetic rubber insulation (CS)

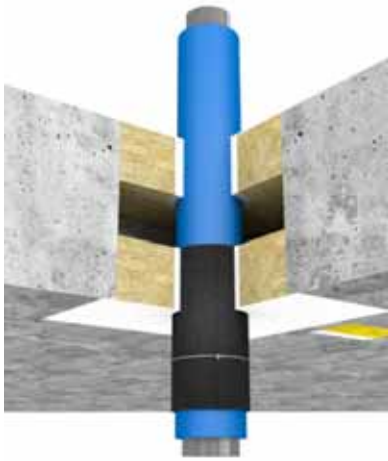


Construction details:

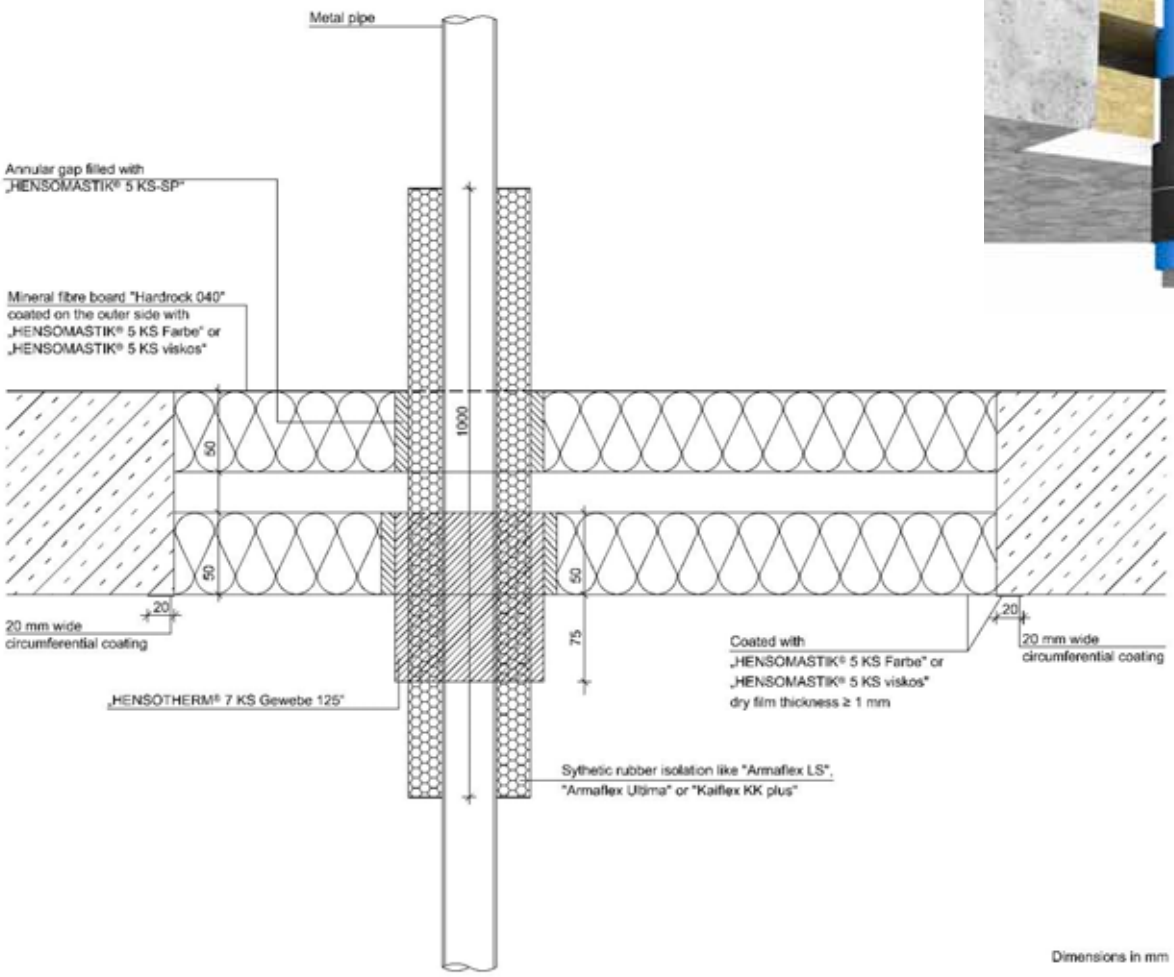


Dimensions in mm

A.2.9 Metal pipes with synthetic rubber insulation (LS)

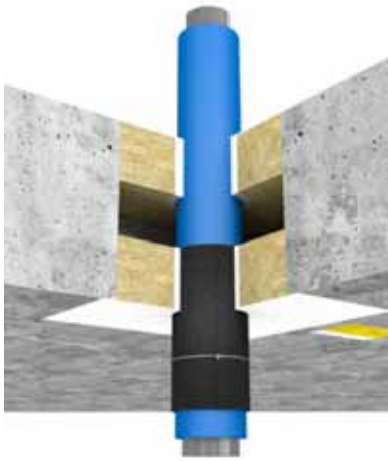


Construction details:

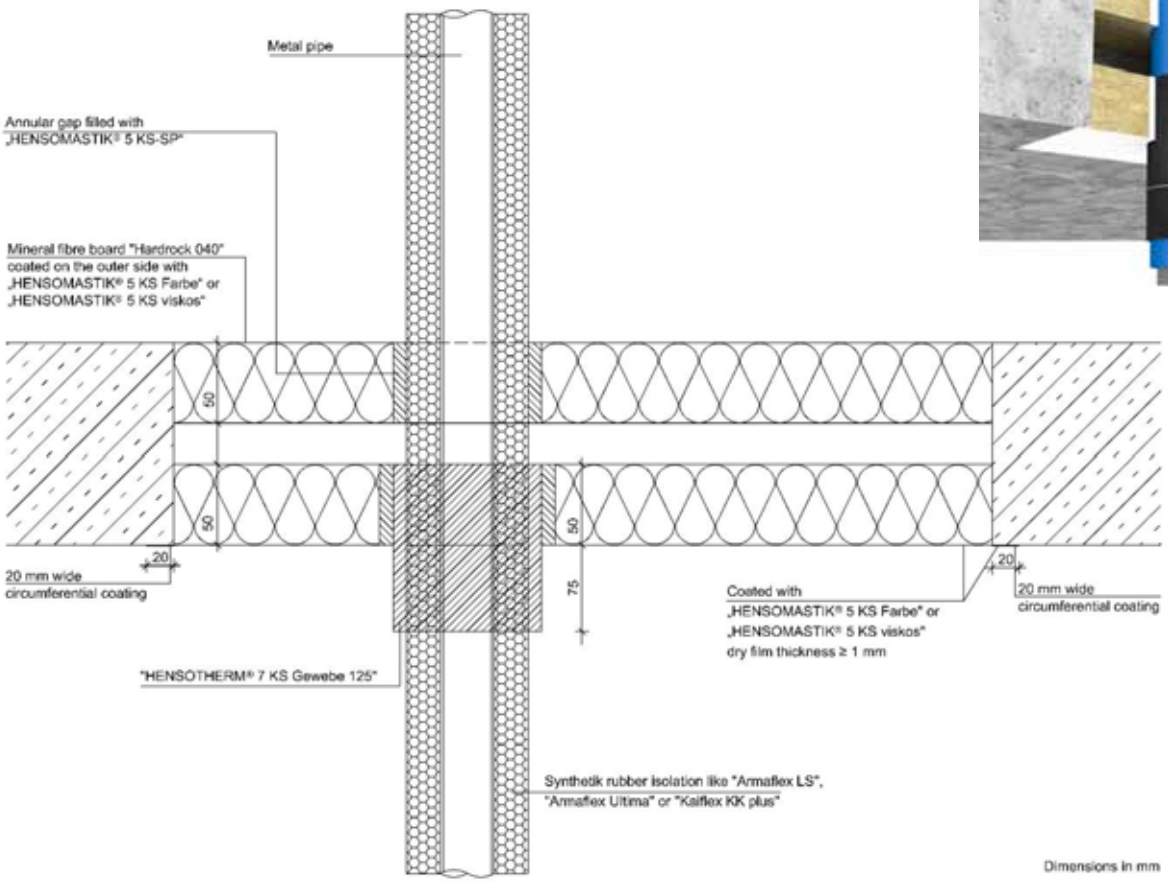


The length ofthe local insulation may be increased but not reduced.

A.2.9 Metal pipes with synthetic rubber insulation (CS) / (LS)



Construction details:



A.2.9.1 Copper and steel pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50

Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 50	Insulation thickness mm	Insulation length mm	Classification
Copper and steel	≤15	1.0-14.2	1	11	(CS)	**EI 120 C/U**
	>15 ≤42	1.0-14.2	2	13.5-36.5	(CS)	
	>42 ≤54	1.2-14.2	2	13.5-38	(CS)	**EI 90 C/U**
Steel	>54 <88.9	3.2-14.2	2	14.5-41.5	(CS)	**EI 90 C/U**
	88.9	3.2-14.2	2	41.5	(CS)	**EI 120 C/U**

A.2.9.2 Copper and steel pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 125

Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 125	Insulation thickness mm	Insulation length mm	Classification
Steel and cast iron	≤10	1.0-5.0	2	11	1000 mm (LS)	**EI 120 C/U**
	≤22	1.0-11	2	18	1000 mm (LS)	
	≤54	1.5-14.2	2	28.5	1000 mm (LS)	**EI 90 C/U**
	≤60.3	2.9-14.2	2	29	1000 mm (LS)	**EI 120 C/U**
	≤88.9	3.2-14.2	2	30.5	1000 mm (LS)	**EI 90 C/U**
Copper	≤10	1.0-5.0	2	12.5	1000 mm (LS)	**EI 120 C/U**
	≤22	1.0-11	2	18	1000 mm (LS)	
	≤54	1.5-14.2	2	28.5	1000 mm (LS)	**EI 90 C/U**

A.2.9.3 Copper and steel pipes with Armaflex Ultima and HENSOTHERM® 7 KS Gewebe 125

Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 125	Insulation thickness mm	Insulation length mm	Classification
Copper and steel	≤15	1.0-14.2	2	13	1000 mm (LS)	**EI 120 U/C**
	>15 ≤54	1.5-14.2	2	25	1000 mm (LS)	
	≤15	1.0-14.2	2	13	(CS)	**EI 90 U/C**
	>15 ≤54	1.5-14.2	2	25	(CS)	
Steel	54	1.5-14.2	2	25	(CS)	**EI 120 U/C**
	>54 ≤88.9	3.2-14.2	2	25	1000 mm (LS)	
	>54 ≤88.9	3.2-14.2	2	25	(CS)	

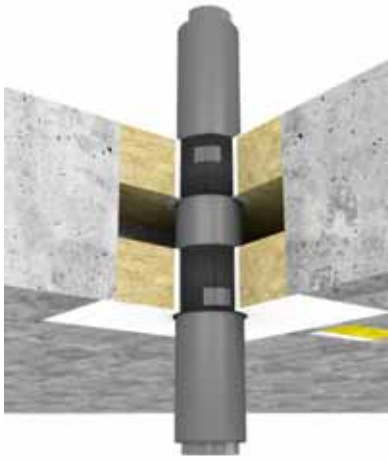
A.2.9.4 Copper and steel pipes with Armaflex LS and HENSOTHERM® 7 KS Gewebe 125

Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 125	Insulation thickness mm	Insulation length mm	Classification
Copper and steel	≤15	1.0-14.2	2	13	1000 mm (LS)	**EI 90 U/C**
	≥15 ≤54	1.5-14.2	2	25	1000 mm (LS)	
	54	1.5-14.2	2	25	1000 mm (LS)	**EI 120 U/C**
	≤15	1.0-14.2	2	13	(CS)	
	>15 ≤54	1.5-14.2	2	25	(CS)	
Steel	>54 ≤88.9	3.2-14.2	2	25	1000 mm (LS)	
	>54 ≤88.9	3.2-14.2	2	25	(CS)	

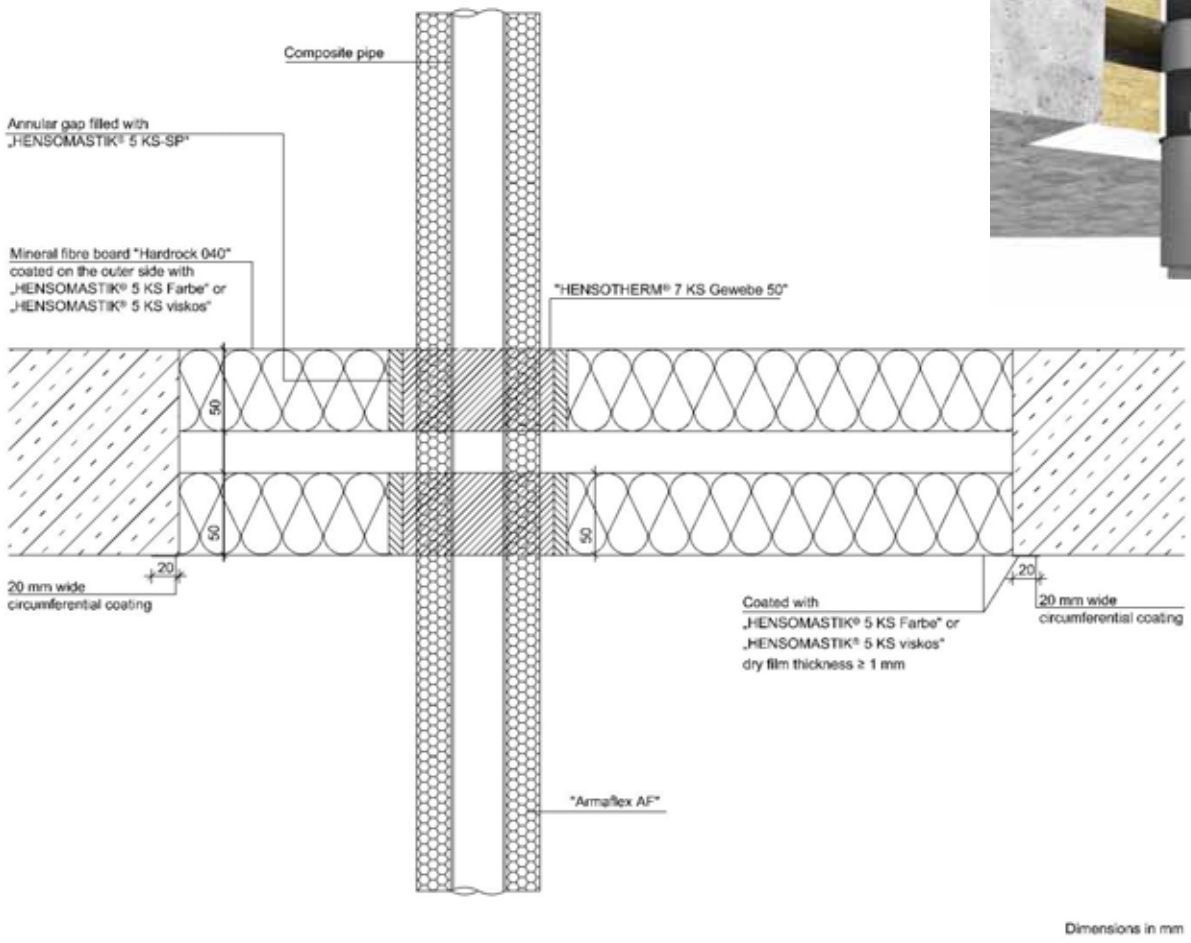
A.2.9.5 Copper and steel pipes with Kaiflex KK plus and HENSOTHERM® 7 KS Gewebe 125

Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 125	Insulation thickness mm	Insulation length mm	Classification
Copper and steel	≤15	1.0-14.2	2	11	1000 mm (LS)	**EI 90 U/C**
	≥15 <54	1.0-14.2	2	21	1000 mm (LS)	
	54	1.5-14.2	2	21	1000 mm (LS)	**EI 60 U/C**
	≤15	1.0-14.2	2	11	(CS)	**EI 90 U/C**
	≥15 ≤54	1.0-14.2	2	21	(CS)	
Steel	>54 ≤88.9	3.2-14.2	2	21	1000 mm (LS)	**EI 60 U/C**
	88.9	3.2-14.2	2	21	1000 mm (LS)	**EI 90 U/C**
	>54 ≤88.9	3.2-14.2	2	21	(CS)	**EI 90 U/C**
	88.9	3.2-14.2	2	21	(CS)	**EI 120 U/C**

A.2.10 Composite pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50



Construction details:

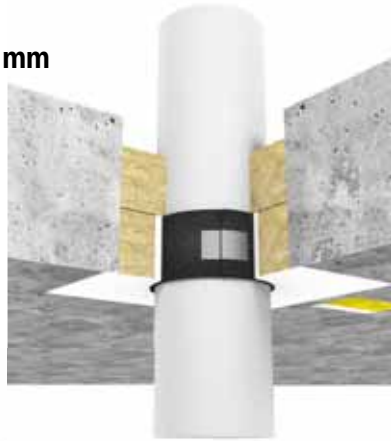


A.2.10.1 Geberit Mepla pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50

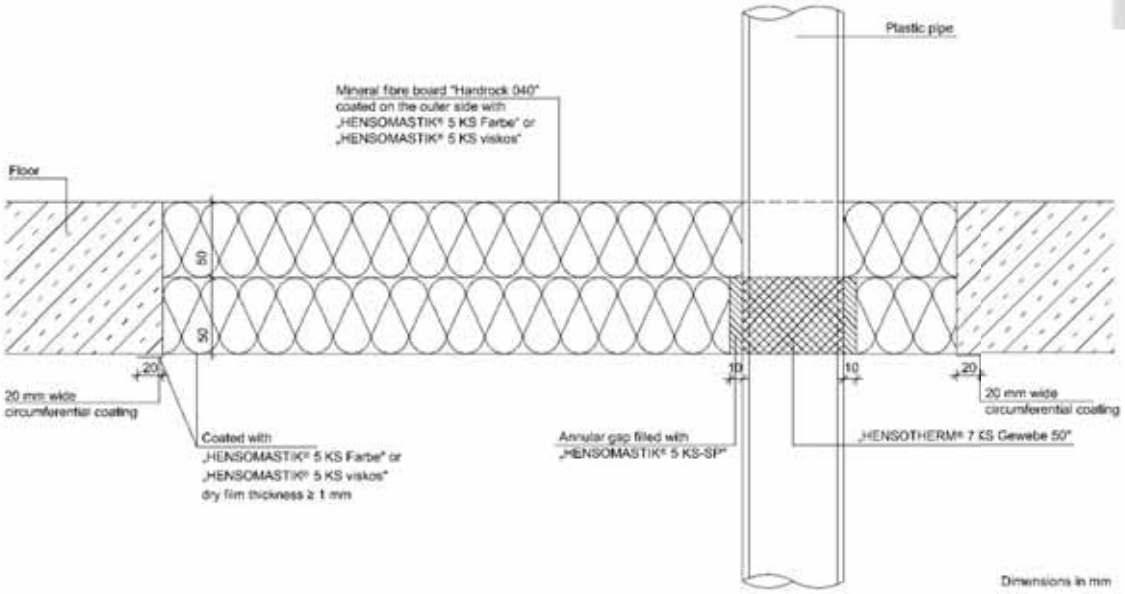
Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 50	Insulation thickness mm	Insulation length mm	Classification
Geberit Mepla	≤32	3.0	1	13.0	(CS)	**EI 120 U/C**
	40	3.5	1	13.5-36.5	(CS)	
	50	4.0	2	14.0-40.5	(CS)	
	63	4.5	2	14.0-40.5	(CS)	
	75	5.0	2	14.0-40.5	(CS)	

A.3 Rigid floor constructions acc. to 1.2.1 with floor thickness of minimum 150 mm (without distance)

A.3.1 Plastic pipes with HENSOTHERM® 7 KS Gewebe 50



Construction details:



A.3.1.1 PVC-U pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
PVC-U	≤50	1.8-5.6	2	EI 90 U/U
	>50 ≤75	1.8-5.6	3	
	>75 ≤110	1.9-8.1	4	
	>110 ≤125	3.7	5	
	125	6.5	5	EI 60 U/U
	>50 ≤75	5.6	2	EI 120 U/U
	110	2.2	4	

A.3.1.2 PE-HD pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
PE-HD	56	3.0	2	EI 90 U/U
	110	4.3	4	EI 120 U/U
	>110 ≤125	4.8	5	EI 90 U/U

A.3.1.3 PP-HT pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
PP-HT	50	1.8	2	**EI 120 U/U**
	125	3.9	5	**EI 90 U/U**

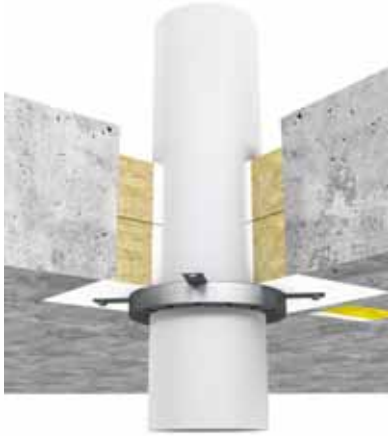
A.3.1.4 POLO-KAL NG pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
POLO-KAL NG	≤50	2.0	2	**EI 120 U/U**
	110	3.4	4	
	>110 ≤125	3.9	5	

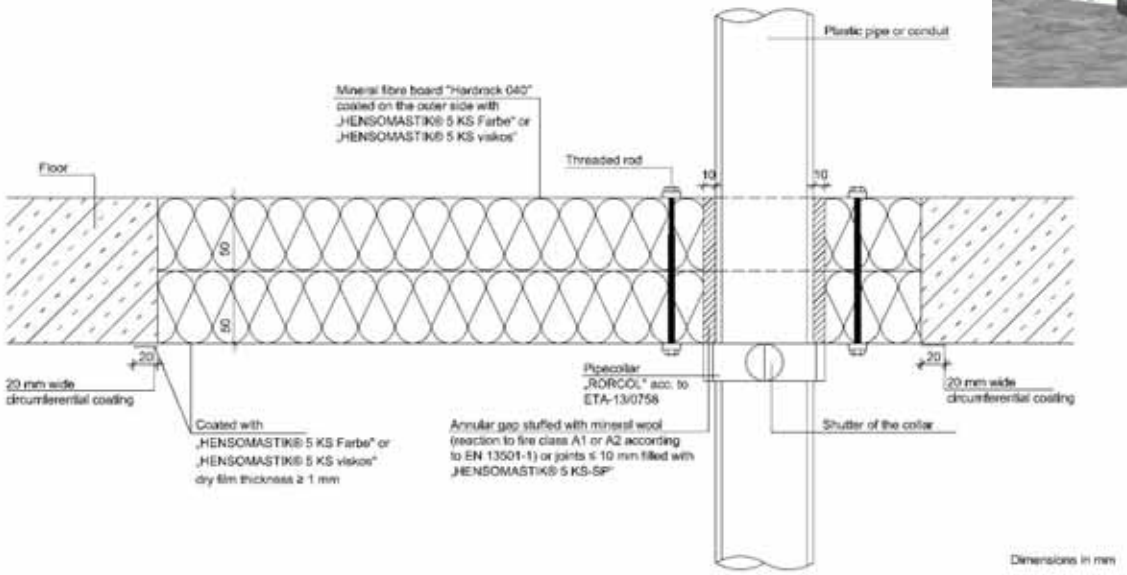
A.3.1.5 POLO-KAL 3S pipes with HENSOTHERM® 7 KS Gewebe 50

Pipes	Maximum Pipe diameter mm	Pipe wall thickness Mm	Layers of HENSOTHERM® 7 KS Gewebe 50	Classification
POLO-KAL 3S	≤75	3.8	3	**EI 120 U/U**
	>75 ≤110	4.8	4	**EI 90 U/U**
	>110 ≤125	5.3	5	**EI 120 U/U**

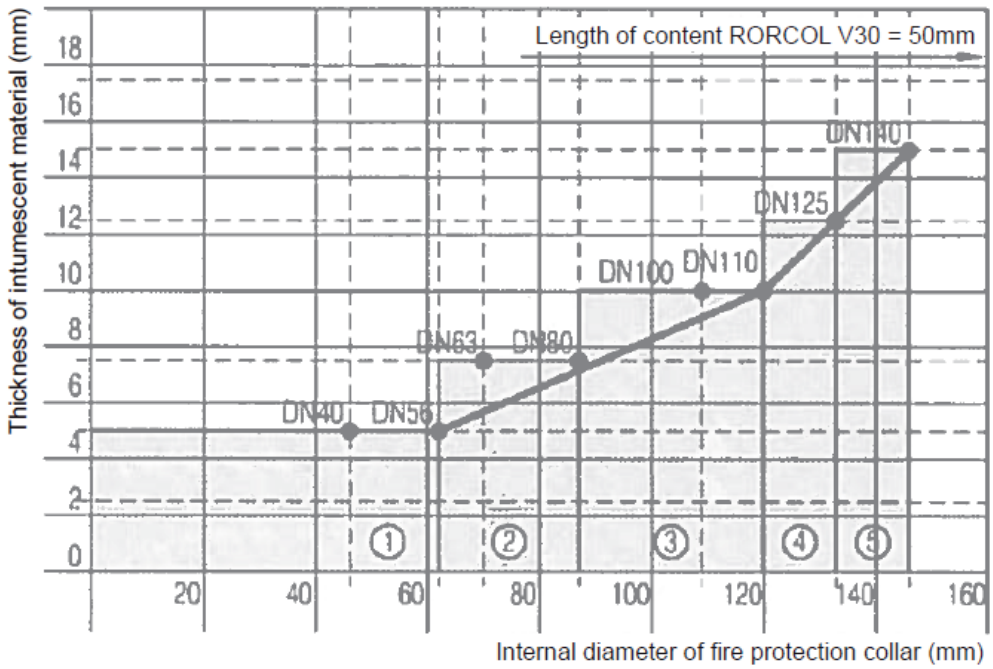
A.3.2 Plastic and composite pipes with RORCOL V30 pipe collars



Construction details:



Design groups for RORCOL V30 Collar:



A.3.2.1 PVC-U pipes to EN ISO 1452-1 with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PVC-U	≥20 ≤32	1.6 – 4.5	None	EI 120 U/U
			Elastomer / ≤ 5	
		1.5 – 4.5	PE / ≤ 5	
	>32 ≤62	4.5 – 5.1	None	
			Elastomer / ≤ 5	
	>62 ≤87	5.1 – 6.7	None	
			Elastomer / ≤ 5	
	>87 ≤90	6.7	Elastomer / ≤ 5	
	>87 ≤110	4.2	None	

A.3.2.2 PVC-U pipes to EN ISO 1452-1 with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PVC-U	≥20 ≤32	1.5 – 4.5	None	EI 90 U/U
			PE / ≤ 5	
			Elastomer / ≤ 13	
	>32 ≤62	4.5 – 5.1	None	
			PE / ≤ 5	
			Elastomer / ≤ 13	
	>62 ≤87	5.1 – 6.7	None	
			PE / ≤ 5	
			Elastomer / ≤ 13	
	>87 ≤90	6.7	Elastomer / ≤ 13	
	>87 <110	6.6 – 6.7	None	
			PE / ≤ 5	
	110	4.2 – 6.6	None	
			PE / ≤ 5	

A.3.2.3 PE pipes to EN 1519-1, EN 12201-2, EN12666-1, ABS pipes to EN 1455-1 and SAN PVC to EN 1565-1 with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PE	≥32 ≤50	3.0 – 3.6	PE / ≤ 9	EI 120 U/U
	≥32 ≤56	3.0 – 3.6	None	
			Elastomer / ≤ 25	
	>56 ≤62	3.6 – 4.9	None	
			Elastomer / ≤ 25	
	>62 ≤87	4.9 – 6.0	None	
			Elastomer / ≤ 25	
	>87 <110	6.0	None	
			Elastomer / ≤ 25	
	110	4.3 – 6.0	None	
			Elastomer / ≤ 25	
	125	4.9	None	
	135	6.0	None	

A.3.2.4 PE pipes to EN 12201-2, with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PE	110	10.0	PE / 5	**EI 90 U/U**
	125	11.4		

A.3.2.5 PP pipes to EN 1451-1 with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PP	>32 ≤50	1.8 – 4.1	None	**EI 120 U/U**
			Elastomer / ≤ 25	
			PE / ≤ 4	
	≤ 50	1.8 – 4.1	Aluminium lined glass wool / ≤ 20	
	>50 ≤58	4.1 – 4.8	None	
			Elastomer / ≤ 25	
	>58 ≤87	4.8 – 5.4	None	
			Elastomer / ≤ 25	
	>87 ≤ 110	5.4	None	
			Elastomer / ≤ 25	
	110	2.7 – 5.4	None	
			Elastomer / ≤ 25	
	125	3.5	None	

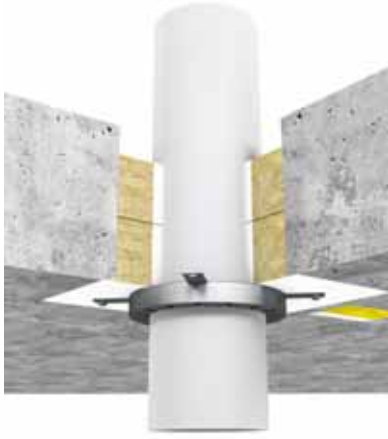
A.3.2.6 PP R pipes to EN ISO 15874-2, with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PP R K00 KELIT HIT pipe PN20	50	8.3	Uninstalled	**EI 120 U/U**
			PE / ≤ 10	**EI 90 U/U**
			Elastomer / ≤ 25	**EI 120 U/U**
			Aluminium lined glass wool / ≤ 50	**EI 120 U/C**

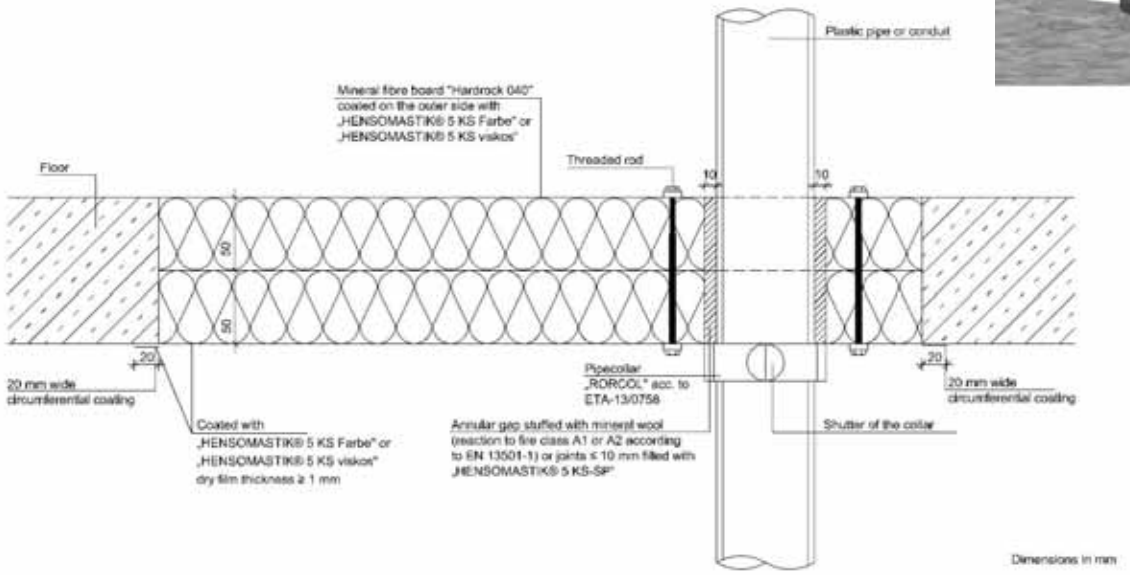
A.3.2.7 Special pipes with RORCOL V30 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
Raupiano Plus	50	1.8	None	**EI 120 U/U**
			Elastomer / ≤ 6	
	75	1.9	None	
	110	2.7		
	125	3.1		
POLO-KAL 3S	75	3.8	None	
	110	4.8		
	125	5.3		
POLO-KAL NG	50	2.0	None	
	75	2.6		
	110	3.4		
	125	3.9		
RAUTITAN flex	50	6.9	None PE / ≤ 10	
			Elastomer / ≤ 25	

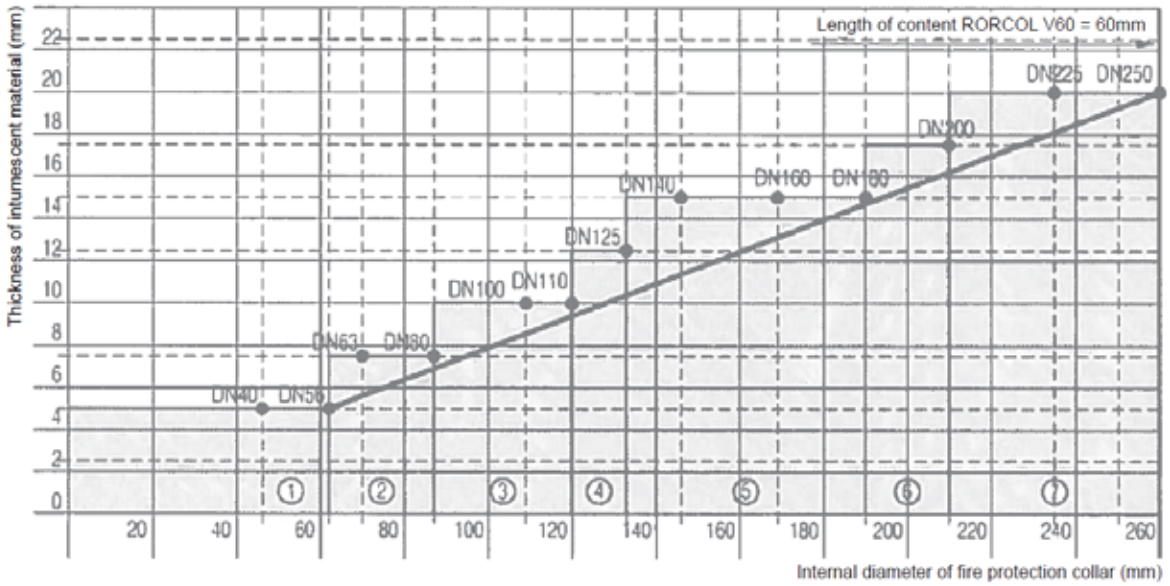
A.3.3 Plastic and composite pipes with RORCOL V60 pipe collars



Construction details:



Design groups for RORCOL V60 Collar:



A.3.3.1 PVC-U pipes to EN ISO 1452-1 with RORCOL V60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PVC-U	≥20 ≤32	1.5 – 4.5	PE / ≤ 5	EI 120 U/U
	≥20 ≤32	1.6 – 4.5	None	
			Elastomer / ≤ 13	
	>32 ≤62	4.5 – 5.1	None	
			Elastomer / ≤ 13	
	>62 ≤87	5.1 – 6.7	None	
	>62 ≤90	6.7	Elastomer / ≤ 13	
	>87 ≤110	6.6 – 6.7	None	
			Elastomer / ≤ 13	

A.3.3.2 PVC-U pipes to EN ISO 1452-1 with RORCOL V60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PVC-U	≥20 ≤32	1.5 – 4.5	None	EI 90 U/U
			PE / ≤ 5	
			Elastomer / ≤ 13	
	>32 ≤62	4.5 – 5.1	None	
			PE / ≤ 5	
			Elastomer / ≤ 13	
	>62 ≤87	5.1 – 6.7	None	
			PE / ≤ 5	
			Elastomer / ≤ 13	
	>87 ≤90	6.6 – 6.7	None	
			PE / ≤ 5	
	>87 ≤90	6.7	Elastomer / ≤ 13	
	110	4.2 – 6.6	None	
			PE / ≤ 5	

A.3.3.3 PE pipes to EN 1519-1, EN 12201-2, EN12666-1, ABS pipes to EN 1455-1 and SAN PVC to EN 1565-1 with RORCOL V60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PE	≥32 ≤50	3.0 – 3.6	PE / ≤ 5	EI 120 U/U
	≥32 ≤56	3.0 – 3.6	None	
			Elastomer / ≤ 25	
	>56 ≤62	3.6 – 4.9	None	
			Elastomer / ≤ 25	
	>62 ≤87	4.9 – 6.0	None	
			Elastomer / ≤ 25	
	>87 ≤ 110	6.0	None	
			Elastomer / ≤ 25	
	110	4.3 – 6.0	None	
			Elastomer / ≤ 25	
	125	4.9	None	
	135	6.0	None	

A.3.3.4 PE pipes to EN 12201-2, with RORCOL V60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PE	110	10.0	PE / 5	**EI 90 U/U**
	125	11.4		

A.3.3.5 PP pipes to EN 1451-1 with RORCOL V60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
	>32 ≤50	1.8 – 4.1	None	
			Elastomer / ≤ 25	
			PE / ≤ 4	
	≤ 50	1.8 – 4.1	Aluminium lined glass wool / ≤ 20	
	>50 ≤58	4.1 – 4.8	None	
			Elastomer / ≤ 25	
	>58 ≤87	4.8 – 5.4	None	
			Elastomer / ≤ 25	
	>87 ≤ 110	5.4	None	
			Elastomer / ≤ 25	
	110	2.7 – 5.4	None	
			Elastomer / ≤ 25	
	125	3.5	None	

A.3.3.6 PP R pipes to EN ISO 15874-2, with RORCOL V60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PP R	≥16 ≤50	8.3 – 10.3	Elastomer / ≤ 43	**EI 120 U/C**
			None	**EI 120 U/U**
			Elastomer / ≤ 25	
			PE / ≤ 10	**EI 120 U/C**
			Aluminium lined glass wool / ≤ 50	**EI 90 U/U**
	>50 ≤62	10.3 – 14.5	Elastomer / ≤ 43	**EI 120 U/C**
	>62 ≤90	14.5 – 15.0	Elastomer / ≤ 43	**EI 120 U/C**

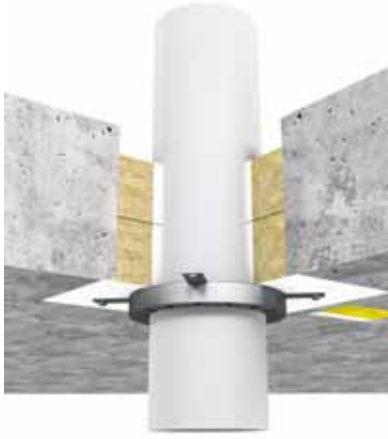
A.3.3.7 PVC-U pipes to EN 1401-1, with RORCOL V60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
PVC	110	3.2	PE / ≤5	**EI 90 U/U**
	125		None	**EI 120 U/U**

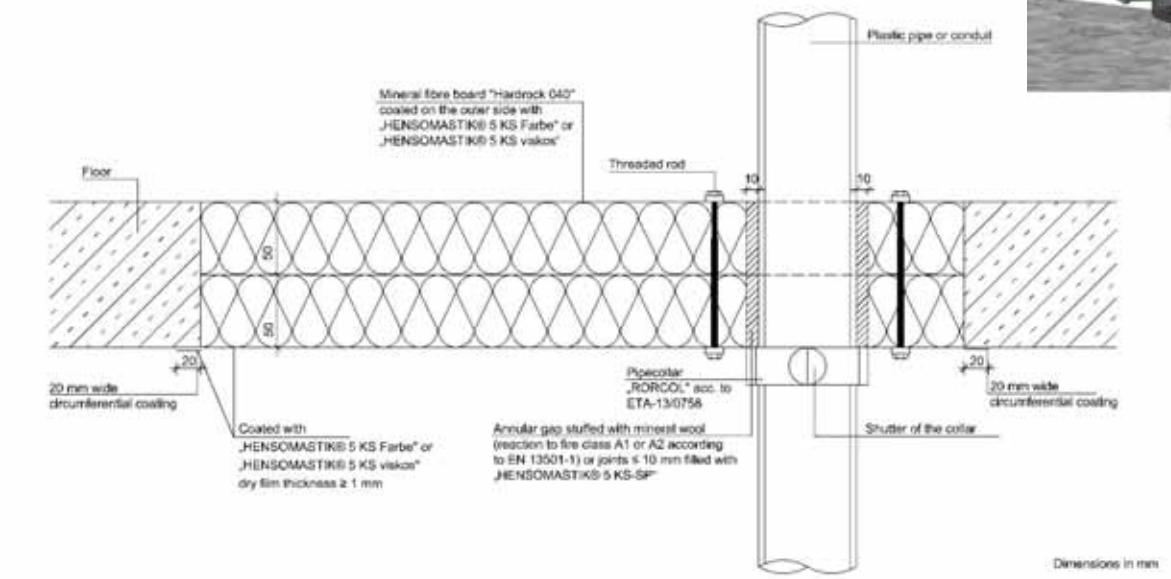
A.3.3.8 Special pipes with RORCOL V60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
Raupiano Plus	50	1.8	None	EI 120 U/U
			Elastomer / ≤ 6	
	75	1.9	None	
	110	2.7		
	125	3.1		
POLO-KAL 3S	75	3.8	None	
	110	4.8		
	125	5.3		
POLO-KAL NG	50	2.0	None	
	75	2.6		
	110	3.4		
	125	3.9		
RAUTITAN flex	50	6.9	None	
			PE / ≤ 10	
			Elastomer / ≤ 25	

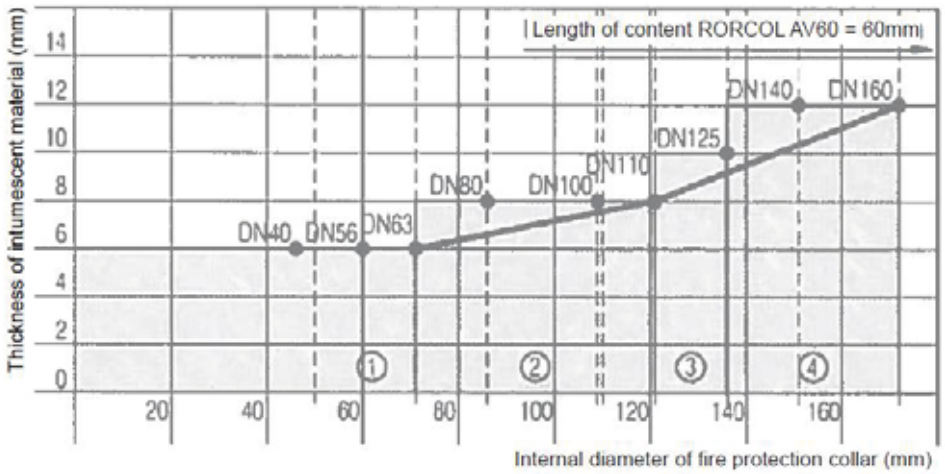
A.3.4 Plastic and composite pipes with RORCOL AV60 pipe collars



Construction details:



Design groups for RORCOL AV60 Collar:



A.3.4.1 Metal pipes to EN 13501-1 with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
Copper Mild & stainless steel	≤ 12	1.0 – 14.2	Elastomer / ≥ 6	**EI 120 U/U**
	≤ 18	1.0 – 14.2	Elastomer / ≥ 9	
	≤ 22	1.0 – 14.2	Elastomer / ≥ 13	
	≤ 42	1.5 – 14.2	Elastomer / ≥ 19	
	≤ 42	1.0 – 14.2	Aluminium lined glass wool / ≥ 20	**EI 90 U/U**

A.3.4.2 Flex tubes to EN 61386-22 with RORCOL AV60 pipe collars

Flex Tube	Tube diameter mm	Cable size	Number Cable / FX flexible tube	Classification
FX flex tube	≤ 50	without cable		**EI 120**
		≤ 5 x 6.0 mm²	≤ 5	

A.3.4.3 Geberit Mepla pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
Geberit Mepla	32	3.0	Aluminium lined glass wool / 20	**EI 90 U/C**
	40	3.5	Elastomer / 13	**EI 120 U/C**
	63	4.5	Aluminium lined glass wool / 50	
	63	4.5	Elastomer / 9	**EI 90 U/C**

A.3.4.4 HENCO multiple-layer pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
HENCO multiple-layer	20	2.0	PE / 4	**EI 90 U/C**
			Elastomer / 6	

A.3.4.5 RAUTITAN stabil pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
RAUTITAN stabil	32	4.7	Elastomer / 9	**EI 120 U/C**
	40	6.0	Aluminium lined glass wool / 20	**EI 90 U/C**

A.3.4.6 FRIATHERM multi-press pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
FRIATHERM multi-press	16	2.0	Elastomer / 6	**EI 120 U/C**

A.3.4.7 JRG Sanipex MT pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
JRG Sanipex MT	26	3.0	Aluminium lined glass wool / 20	**EI 120 U/C**

A.3.4.8 TECEflex pipes with RORCOL AV60 pipe collars

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
TECEflex	20	3.4	PE / 4	**EI 90 U/C**
			Elastomer / 6	
	26	4.0	PE / 10	**EI 120 U/C**
			Elastomer / 9	**EI 90 U/C**
	32	4.0	Aluminium lined glass wool / 20	**EI 120 U/C**
	63	6.0	Elastomer / 9 – 32	**EI 120 U/C**
			Aluminium lined glass wool / 20	
			Aluminium lined glass wool / 20 – 50	**EI 90 U/C**

A.3.4.9 OMEGA application #1 with RORCOL AV60 pipe collars and flex tubes to EN 61386-22

Flex Tube	Tube diameter mm	Number of flexible tubes	Cable size	Number Cable / FX flexible tube	Classification
FX flexible tubes	≤ 20	≤ 4	without cable		EI 120
		≤ 2	≤ 5 x 1.5 mm²	1	
	≤ 25	≤ 5	without cable		
		≤ 3	≤ 5 x 2.5 mm²	1	
	≤ 32	≤ 2	without cable		
			≤ 5 x 2.5 mm²	1	
	≤ 40	1	without cable		
			≤ 5 x 6.0 mm²	1	
	≤ 50	1	without cable		
			≤ 5 x 2.5 mm²	≤ 2	

A.3.4.10 OMEGA application #2 with RORCOL AV60 pipe collars, flex tubes to EN 61386-22 and metal pipes

Flex Tube	Tube diameter mm	Number of flexible tubes	Cable size	Number Cable / FX flexible tube	Classification
FX flexible tubes	≤ 25	1	without cable		EI 120
			≤ 5 x 6.0 mm²	1	
Metal pipes	≤ 10	-	1.0 – 14.2	Elastomer / ≥ 9	
	≤ 18				

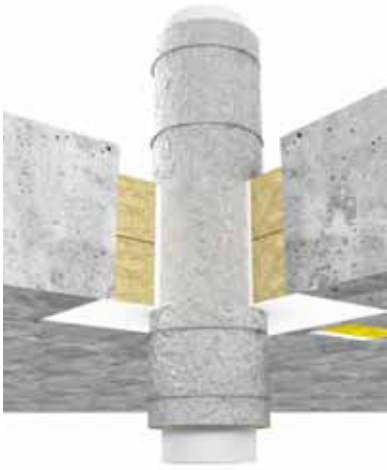
A.3.4.11 Multiple lead-throughs #1 with RORCOL AV60 pipe collars, HENCO multiple-layer and TECEflex pipes

Pipes	Pipe diameter mm	Pipe wall thickness mm	Pipe insulation CS / thickness mm	Classification
HENCO multiple-layer	20	2.0	PE / 4	EI 90 U/C
			Elastomer / 6	
TECEflex	26	4.0	PE / 4 – 10	
			Elastomer / 6 - 9	

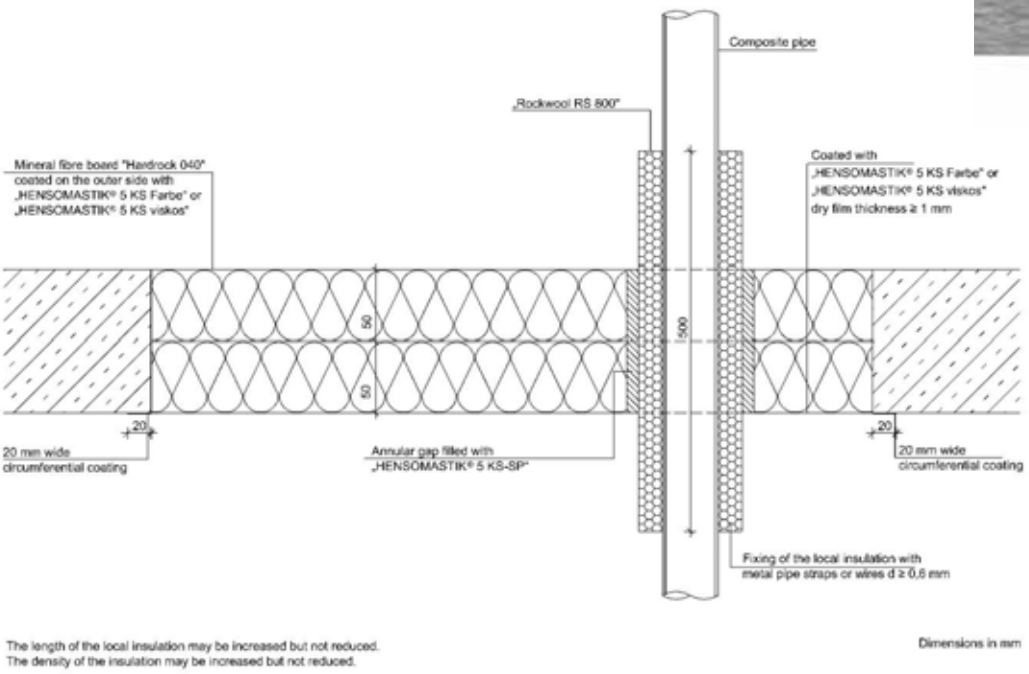
A.3.4.12 Multiple lead-throughs #2 with RORCOL AV60 pipe collars, flex tubes to EN 61386-22 and metal pipes

Flex Tube	Tube diameter mm	Number of flexible tubes	Cable size	Number Cable / FX flexible tube	Classification
FX flexible tubes	≤ 25	1	without cable		EI 120
			≤ 5 x 6.0 mm²	1	
Metal pipes	≤ 10	-	1.0 – 14.2	Elastomer / ≥ 9	
	≤ 18				

A.3.5 Composite pipes with Rockwool RS 800 insulation (LS)



Construction details:

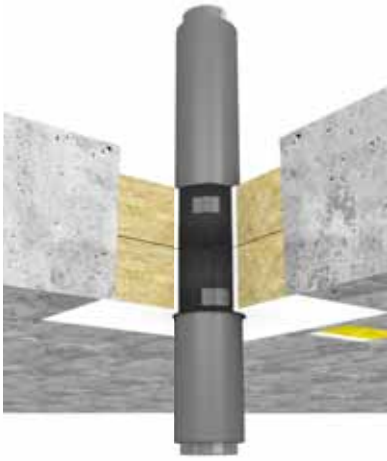


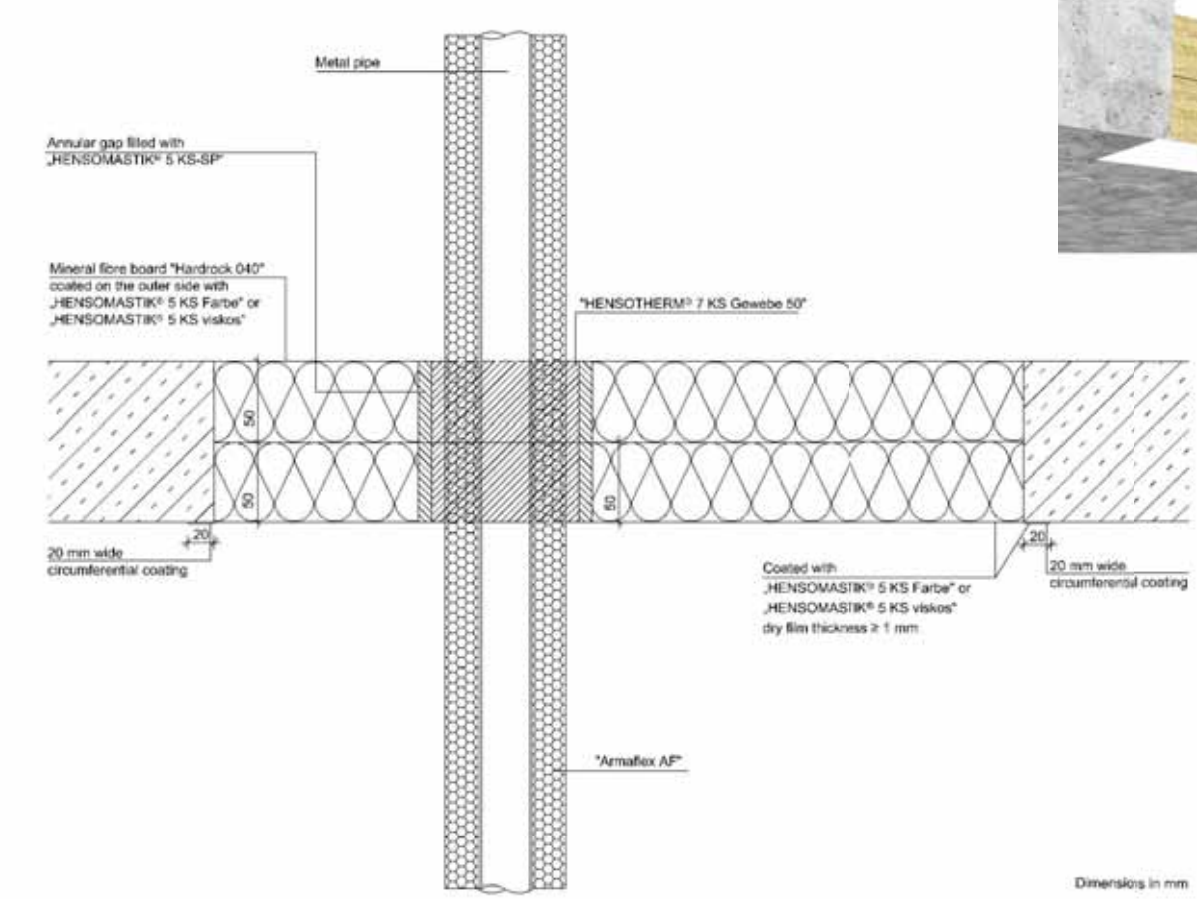
A.3.5.1 Geberit Mepla pipes with Rockwool RS 800 insulation (LS)

Pipes	Pipe diameter mm	Pipe wall thickness mm	Insulation thickness mm	Insulation length mm	Classification
Geberit Mepla	16	2.3	20-80	500 mm (LS)	**EI 120 U/C**
	32	3.0	20-80	500 mm (LS)	**EI 90 U/C**
	32	3.0	80	500 mm (LS)	**EI 120 U/C**
	40	4.0	20-80	500 mm (LS)	**EI 90 U/C**
	40	4.0	80	500 mm (LS)	**EI 120 U/C**
	50	4.5	30-80	500 mm (LS)	**EI 90 U/C**
	63	6.0	30-80	500 mm (LS)	**EI 90 U/C**
	75	7.5	30-80	500 mm (LS)	**EI 60 U/C**
	75	7.5	30	500 mm (LS)	**EI 120 U/C**

A.3.6 Metal pipes with synthetic rubber insulation (CS)

Construction details:

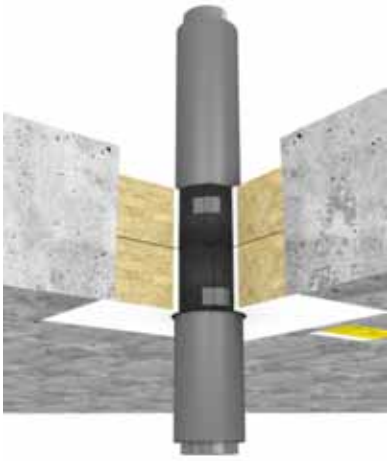




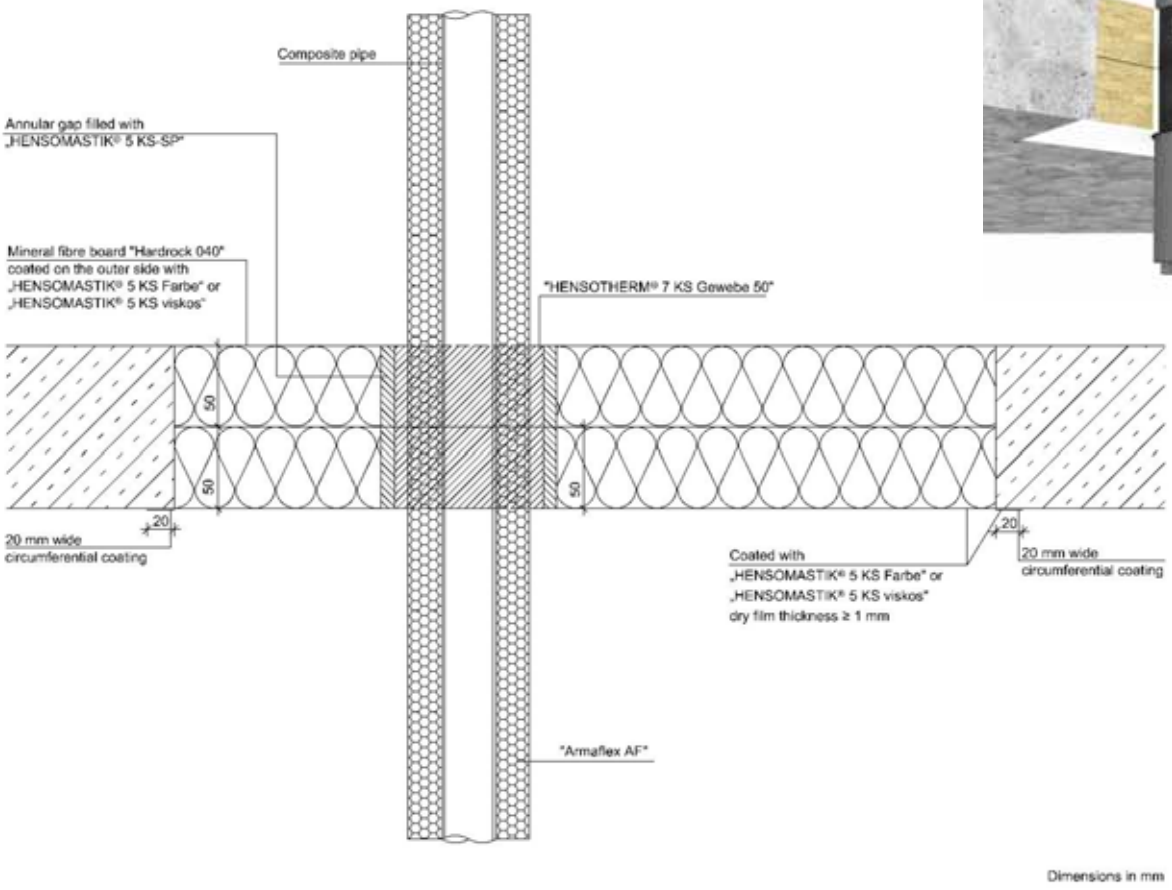
A.3.6.1 Copper and steel pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50

Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 50	Insulation thickness mm	Insulation length mm	Classification
Copper and steel	15	1.0-14.2	1	11	(CS)	**EI 120 C/U**
	>15 ≤42	1.2-14.2	2	13.5-36.5	(CS)	
	>42 ≤54	1.2-14.2	2	13.5	(CS)	
	>42 ≤54	1.2-14.2	2	13.5-38	(CS)	**EI 90 C/U**
Steel	>54 ≤88.9	3.2-14.2	2	41.5	(CS)	**EI 90 C/U**
	88.9	3.2-14.2	2	14.5	(CS)	**EI 60 C/U**

A.3.7 Composite pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50 (CS)



Construction details:



A.3.7.1 Geberit Mepla pipes with Armaflex AF and HENSOTHERM® 7 KS Gewebe 50

Pipes	Pipe diameter mm	Pipe wall thickness mm	Layers of HENSO-THERM® 7 KS Gewebe 50	Insulation thickness mm	Insulation length mm	Classification
Geberit Mepla	32	3.0	1	13.0-36.5	(CS)	**EI 120 U/C**
	40	4.0	2	13.0-36.5	(CS)	
	50	4.5	2	14.0-40.5	(CS)	
	63	6.0	2	14.0-40.5	(CS)	
	75	7.5	2	14.0-40.5	(CS)	

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