

UL-AU Certificate

Certificate
UL-AU-230009

Issue date
2025-08-28

Expiration date
2035-08-28



www.jasanz.org/register

This is to acknowledge that

Hilti (Aust.) Pty. Ltd

1G Homebush Bay Drive, PO Box 3217, Rhodes, NSW 2138, Australia

has had

**Firestopping Preformed Graphite
Based Wrap**

Model(s):

Hilti Firestop Bandage CFS-B

evaluated and meets the requirements of the standard

AS 1530.4:2014 and AS 4072.1:2005

The designated Certificate Holder is entitled to use the UL-AU Mark for the Certified Product manufactured at the production site(s) identified above, in accordance with the UL-AU Mark Scheme Service Agreement.

Only those Products bearing the UL-AU Mark for Australia should be considered as being covered by UL's UL-AU Mark Service.

A blue ink handwritten signature.

Stuart Foster (Certification Officer)

Certification Body:

UL International New Zealand Limited,
54 Tarndale Grove, Albany, Auckland 0632, New Zealand.

All dates are in Year-Month-Day format (YYYY-MM-DD).

UL-AU Certificate

Certificate No: UL-AU-230009

Original Date of Certification: 2025-08-28

Listing Category and File Ref: AUED.RS5418

Certification Marking: The UL-AU mark shall appear on certified products only and shall be used only in accordance with the UL-AU Mark Scheme Service Terms

Minimum size is not specified, as long as the Mark is legible

The following Supplementary Information shall be placed adjacent to the Certification Mark;

Firestopping – Intumescent Seals and Fire Pillows

AS 1530.4

Manufacturer: Hilti AG,

Feldkircherstrasse 100, FL-9494 Schaan, Liechtenstein Internet: www.hilti.com

Production Sites (Factory): Hilti Plant 4a

Trade Name or Trademark:

Hilti Firestop Bandage CFS-B

Model Details:

Hilti Firestop Bandage CFS-B

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Additional Information:

This certificate is evidence that prototypes of the nominated products and their configurations as detailed in Appendix's A to C conform to the following parameters:

1. Have been tested to AS 1530.4:2014 and AS 4072.1:2005 or an equivalent or more severe test and the Fire Resistance Level (FRL) nominated in Appendix C was achieved by the prototype for each nominated assembly of service penetration, building element and protection method configuration, without the assistance of an active fire suppression system.

2. Test results are detailed in a confidential test report that may be available from the certificate holder upon request. The information regarding the test parameters is included in the confidential technical file.

(i) the method and conditions of the test;

(ii) form of construction of the tested prototype; and

(iii) that restraint complied with AS 1530.4.

3. Testing was conducted at multiple locations by suitably accredited laboratories that are accredited by a signatory to the International Accreditation Cooperation Mutual Recognition Arrangement (ILAC-MRA) as recognised by NATA who is also a signatory body to this Agreement. The data has been reviewed by UL against the relevant accreditation schedules.

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Appendix A	
Conforming product configurations to achieve nominated FRL's	
A.1 Specific Parts and Supporting Constructions for Hilti Firestop Bandage CFS-B:	
	Technical description of product: Hilti Firestop Bandage CFS-B is a graphite-based pipe wrap used to reinstate the fire resistance performance of wall or floor constructions where they have been provided with apertures for the penetration of single or multiple services. The Hilti Firestop Bandage CFS-B is supplied in roll form, with binding wire used to wrap around pipes and pipe insulation to form a penetration seal. The bandage is cut to a length which suits the overall diameter of pipe or pipe and insulation and wrapped around the penetration twice. Hilti Firestop Bandage CFS-B is supplied in 125 mm width, 2 mm thick and 10 m length. Hilti Firestop Bandage CFS-B is used in conjunction with Hilti Firestop Acrylic CP 606 to seal annular spaces up to 15 mm. Hilti Firestop Acrylic CP 606 is equivalent to Hilti Firestop Acrylic CFS-S ACR Hilti Firestop Bandage CFS-B is used in conjunction with mortar and gypsum to seal annular spaces up to 50 mm. The mortar should be EN998-2- class M10. Intended use: The intended use of Hilti Firestop Bandage CFS-B is to reinstate the fire resistance performance of rigid floors and walls and flexible wall constructions where they are penetrated by various insulated metallic pipes The specific elements of construction that the system Hilti Firestop Bandage CFS-B may be used to provide a penetration seal in, are as specified in the following table.

<u>Construction Element</u>	Construction
<u>Rigid walls</u>	The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 550 kg/m ³ .
<u>Rigid floors:</u>	The floors must have a minimum thickness of 150 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 550 kg/m ³ .
<u>Flexible and Rigid walls</u>	The wall must have a minimum thickness of 100 mm and comprise timber or steel studs lined on both faces with a minimum of 2 layers of 12.5 mm thick, gypsum plaster boards. In timber stud walls, no part of the penetration shall be closer than 100 mm to a stud, the cavity must be closed between the penetration seal and the stud and a minimum 100 mm of insulation, is provided within the cavity between the penetration seal and the stud.
	The supporting construction must be classified for the required fire resistance period. The System, "Hilti Firestop Bandage CFS-B" may be used to provide a penetration seal with insulated metallic pipes. There is no minimum separation between adjacent seals. Services in walls shall be supported at maximum 400 mm from the face of the separating element for walls, and 400 mm above the surface of the floor.

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	The seals may only be penetrated by the services described in Appendix C; other parts or support constructions must not penetrate the seal. The service support construction must be fixed to the building element containing the penetration seal or a suitable adjacent building element, in such a manner that in the case of fire, no additional load is imposed on the seal. Furthermore, it is assumed that the unexposed face support is maintained for the required period of fire resistance. Pipes must be perpendicular to the seal surface. It is assumed that compressed air systems are switched off by other means in the case of fire. The function of the pipe seal in case of pneumatic dispatch systems, pressurised air systems etc. is guaranteed only when the systems are shut off in case of fire. The assessment does not cover the avoidance of destruction of the seal or of the abutting building element(s) by forces caused by temperature changes in case of fire. This must be considered when designing the piping system. This UL-AU certificate does not address any risks associated with leakage of dangerous liquids or gases caused by failure of the pipe(s) in case of fire.
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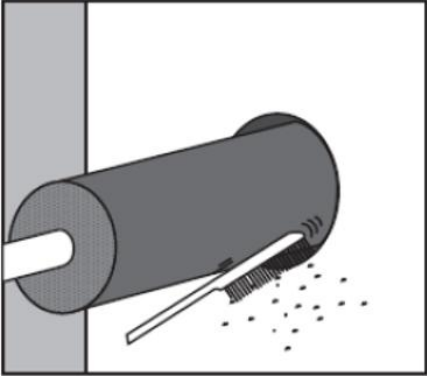
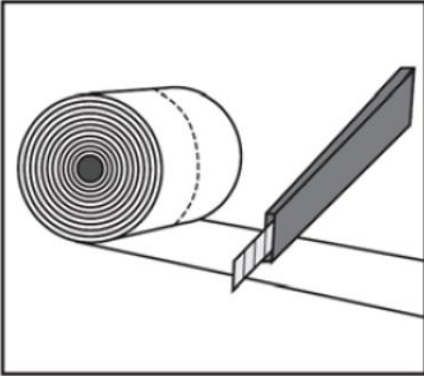
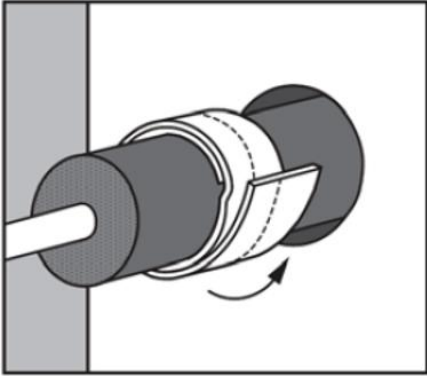
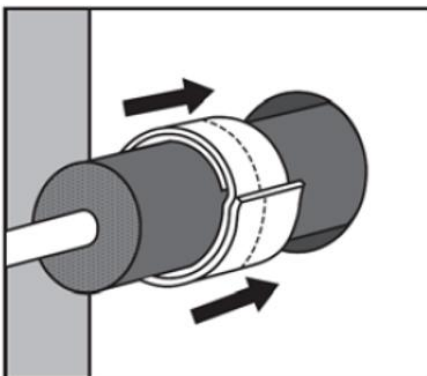
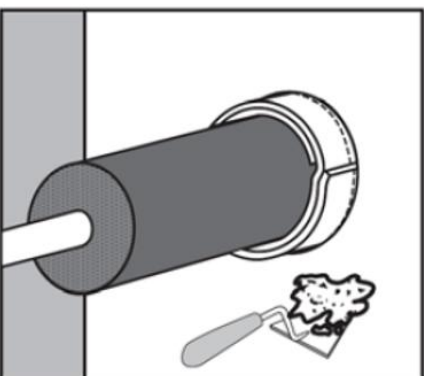
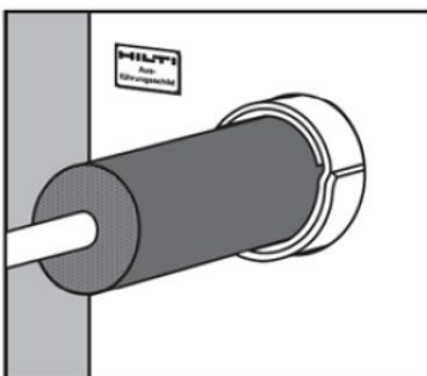
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APPENDIX B: DESCRIPTION OF THE PRODUCT "HILTI FIRESTOP BANDAGE CFS-B"

B.1 Installation

Installation of "Hilti Firestop Bandage CFS-B" shall be conducted as follows:

1  Clean opening.	2  Cut Hilti Firestop Bandage CFS-B to fit the outside diameter of the insulation. Consider the number of 2 layers.	3  Wrap Hilti Firestop Bandage CFS-B around the insulation. Secure the bandage with steel bands or wire (≥ 0.7 mm).
4  Install Hilti Firestop Bandage CFS-B on both sides within the opening in a depth of 62.5 mm.	5  Close the remaining gap with mortar or gypsum.	6  If it is necessary, an additional insulation over the bandage has to be installed.

Two layers of bandage are required around the pipe/insulation.

Baking paper can optionally be used for installation of CFS-B to position but must be removed on completion of installation.

B.1 Use, maintenance, repair

"Hilti Firestop Bandage CFS-B" should be installed and used as described earlier in this certificate. "Hilti Firestop Bandage CFS-B" seals which are damaged should not be used or if damaged after installation, should be removed and replaced with undamaged bandages.

In the area covered by the UL-AU certificate when the set-up recommendations have been followed, there is no maintenance protocol to be followed.

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APPENDIX C: RESISTANCE TO FIRE CLASSIFICATION OF PENETRATION SEALS MADE OF "HILTI FIRESTOP BANDAGE CFS-B"

C.1 General Information "Hilti Firestop Bandage CFS-B"

C.1.1 Penetration seal and bandage installation

Pipes insulated with elastomeric combustible insulation (see Appendix D) fire-stopped by wrapping the Hilti Firestop Bandage CFS-B twice around the insulation material.

Steel wire is utilised to hold the Hilti Firestop Bandage CFS-B together, positioned approximately in the first quarter measured from the flank.

The Hilti Firestop Bandage CFS-B is mounted on both sides of the penetration.

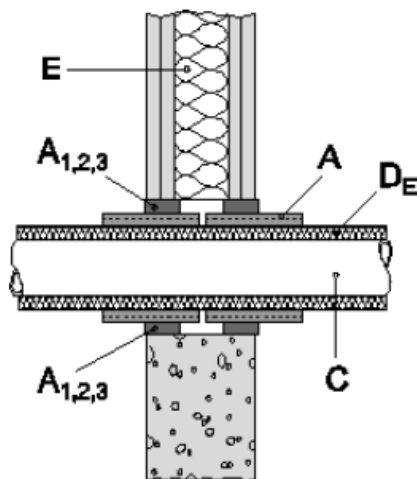
The Hilti Firestop Bandage CFS-B is then pushed into the penetration in line with the designated marking shown on centre of the Hilti Firestop Bandage CFS-B. In case of 100 mm thick walls the Hilti Firestop Bandage CFS-B was placed 50 mm inside and 75 mm outside the flexible wall.

C.1.1.1 Single Penetration Seal

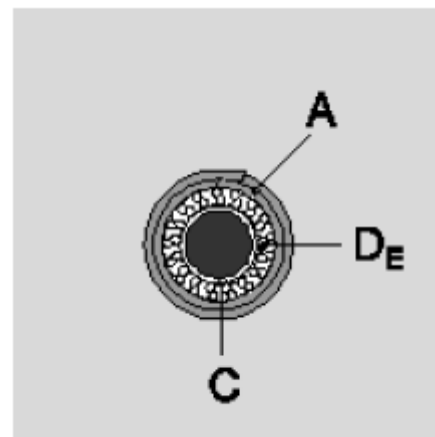
Single insulated pipes running through the penetration are sealed utilising two layers of Hilti Firestop Bandage CFS-B.

Installation scheme of bandage

A.1.1.2 Side View



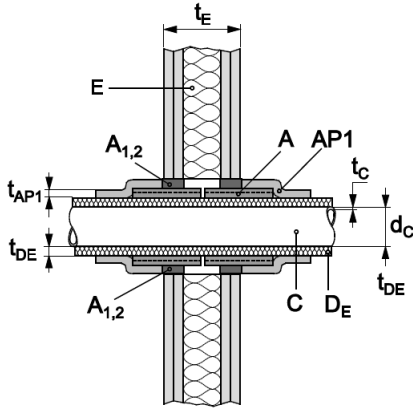
B.1.1.2 Front view



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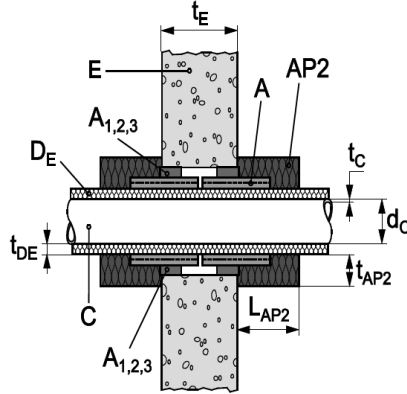
C.1.2 Pipe insulation with combustible and mineral wool insulation	
Specific insulation thickness with corresponding FRL (Fire Resistance Level) is shown at each section below.	
C.1.2.1 Elastomeric combustible insulation	
Pipes insulated with elastomeric butyl rubber-based insulation material are varying in thickness from 7.7 mm up to 45 mm in configuration (CS) Continued Sustained. See also table of elastomeric butyl rubber-based insulation at Appendix D. Thicknesses display generally measured values and correspond to nominal values with tolerances. Metallic pipes from diameter 323.9 mm on were insulated by a fixed thickness of 25 mm elastomeric butyl rubber-based insulation.	
C.1.2.2 Glass-fibre mineral wool insulation	
Instead of elastomeric butyl rubber-based insulation glass-fibre mineral wool insulation could be used for direct insulation of copper and steel pipes. Specific application please see corresponding chapters.	
C.1.2.3 Mineral wool insulation	
Instead of specified glass-fibre mineral wool insulation, mineral wool insulation, with a melting point > 1000°C and a density of min. 45 kg/m ³ can alternatively be used as pipe insulation. Insulation thickness depends on pipe diameter.	
C.1.3 Additional protection	
Additional insulation material (AP) is utilised for some applications and comprises of the following:	
AP1:	Armaflex AF elastomeric material for thermal insulation, 19 mm thick and 300 mm in length (LI) Local Interrupted.
	

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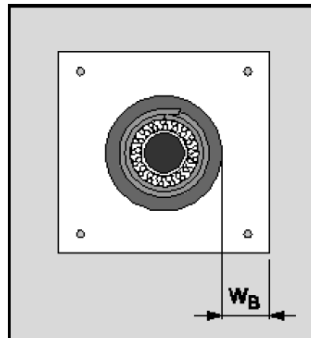
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AP2:	Mineral wool, density min. 60 kg/m ³ , melting point > 1000°C, min. 40 mm thick. Min. 250 mm in wrapping length, (LI) Local Interrupted configuration.
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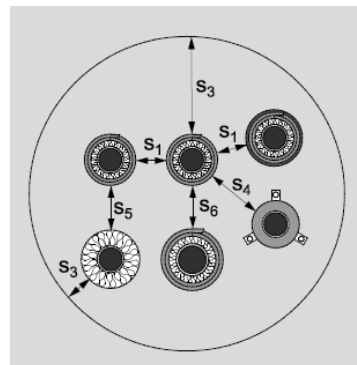
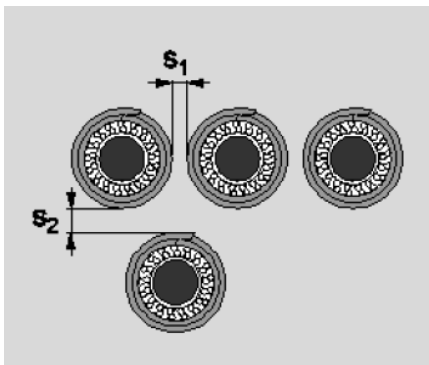


AP3:	Aperture Framing/Build Up Beading for flexible walls is applied by adding boards on both sides in two layers (2 x min.12.5 mm fire rated plasterboard fixed with drywall screws. The resulting strips around the pipe whole are at least 50 mm in width (WB). Final penetration seal thickness is 150 mm. When the wall thickness is greater than 150 mm, AP3 is not required.
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C.1.4 Distance to insulated pipes and other fire-stopped services

Distance of services to each other - references see below C.1.4.1 to C.1.4.5 These distances are valid for flexible, rigid wall and floor



Sketches refer to round-shaped openings and their typical annular space

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C.1.4.1	Distance to pipes firestopped by bandage in linear configuration - S1
Distance is ≥ 0 mm to each other for insulated pipes wrapped by bandage CFS-B and in some cases to additional protection according to FRL.	
C.1.4.2	Distance to pipes firestopped by bandage in cluster configuration – S2
Distance is ≥ 0 mm to each other for insulated pipes wrapped by bandage CFS-B and in some cases to additional protection according to FRL.	
C.1.4.3	Distances to seal edge – S3
In round openings, the distance to seal edge is up to 40 mm. In cases where no gap is left between construction and bandage, smoke tightness must be secured.	
C.1.4.4	Distance to Hilti Firestop Collar CFS-C EL – S4
Distance to Hilti Firestop Collar is shown to be zero.	
C.1.4.5	Distance to Mineral Wool Insulation – S5
Insulated pipes fire-stopped with Hilti Firestop Bandage CFS-B are tested to have a distance of zero to adjacent mineral wool ($\geq 1000^{\circ}\text{C}$, 45 kg/m^3) insulated penetrations (see C.1.2.3) or respectively to additional protection.	
C.1.5	Annular Gap
In flexible and rigid wall Hilti Firestop Acrylic CP 606 and gypsum is used to fill annular space. Mortar and gypsum is used in rigid walls and floors in full depth. Hilti Firestop Acrylic CP 606 is applied for gaps from 0 mm -15 mm at min. 25 mm in depth. Mortar or gypsum is used in rigid walls and floors; annular space is allowed from approximately 3 up to 50mm. Hilti firestop foam CFS F FX can be used for gaps up to 50 mm, to be installed to a full depth of flexible walls and to the full depth in rigid walls and floors. For flexible walls, square shape opening is recommended with using CFS F FX and aperture lining (Fire rated plasterboard min. 13 mm thick perpendicular to wall surface)	
C.1.6	Pipe Support
Pipe supports shall be provided as per building code requirements.	

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C.2 Testing of fire resistance in different constructions	
C.2.1 Flexible and rigid walls (≥ 100 mm)	
C.2.1.1 Set-up of walls	
Installation variations of insulated pipes protected by Hilti Firestop Bandage CFS-B	
Installation examples for dry wall and rigid walls:	
a) Standard installation b) Installation with additional protection AP1 c) Installation with additional protection aperture framing/build up (AP3)	
a)	
b)	
c)	

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C.2.1.2	Copper pipes
The field of application given is also valid for other metal pipes with lower heat conductivity than copper (approx. 350 W/mK at 20°C) and a melting point of minimum 1050°C, e. g. unalloyed steel, low alloyed steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni.	
C.2.1.2.1	Copper pipes are insulated with elastomeric butyl rubber-based insulation or glass wool insulation ranging in thickness from 7.5 mm to 36.5 mm

Service	Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_{DE} (mm)		FRL (Fire Resistance Level)		
			from	to		Additional protection	
					-	AP 1	AP 3
Copper	10 to 18	1 – 14.2	7.5	32	-/90/90	-	-
Copper	18 to 42	1 – 14.2	8.0	36.5	-/60/60	-/90/90	-
Copper	18 to 42	1 – 14.2	14.0	36.5	-/90/90	-	-
Copper	18 to 42	1 – 14.2	8.0	36.5	-	-	-/90/90
Copper	10 to 35	1 – 14.2	7.5	35	-	-	-/120/120
Copper ^{1a,2}	10 to 54	1 – 14.2	30	30	-/90/90	-	-
Copper ^{1a,1,2}	28 to 88.9	1/2 – 14.2	10/30	100	-	-/90/90	-
Copper ²	88.9	1 – 14.2	100	100	-	-/120/120	-

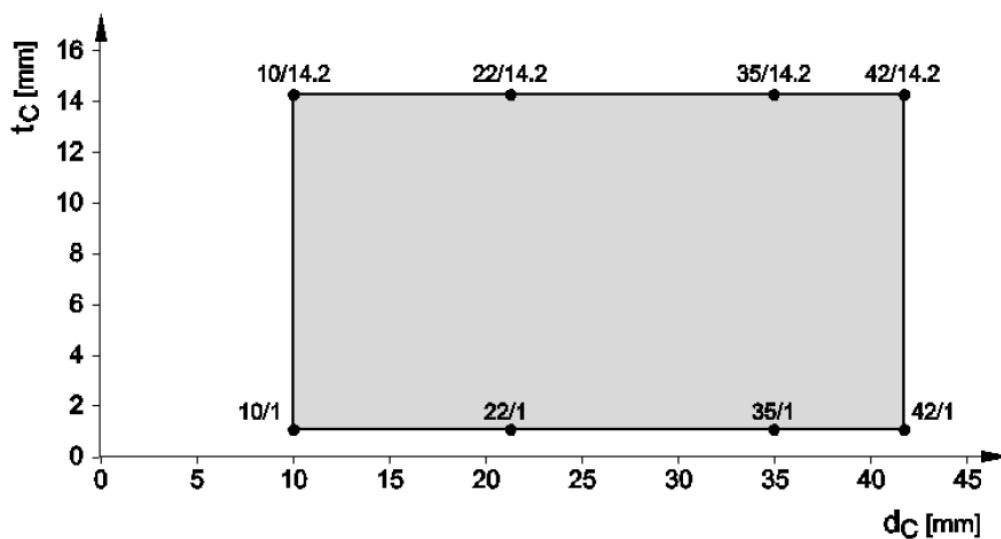
^{1a} zero separation of pipes from 30 mm insulation on to each other and 100 mm to other services

¹ separation of pipes to each other or other services 100 mm

² alternative glass fibre wool insulation according to C.1.2.2

Copper pipes – relationship between wall thickness and pipe diameter

Graph shows pipe wall thickness (t_c) (mm) against pipe diameter $\varnothing d_c$ (mm)



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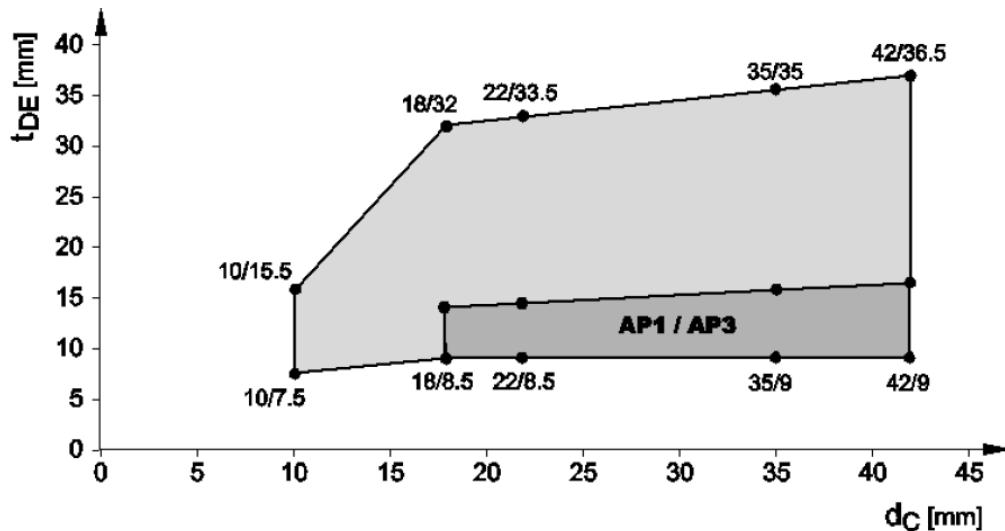
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Copper pipes, wall (≥ 100 mm) – -/90/90, (plus AP1 or AP3)

Additional protection (AP1 or AP3; dark area) is required for higher pipe diameters with low insulation thickness

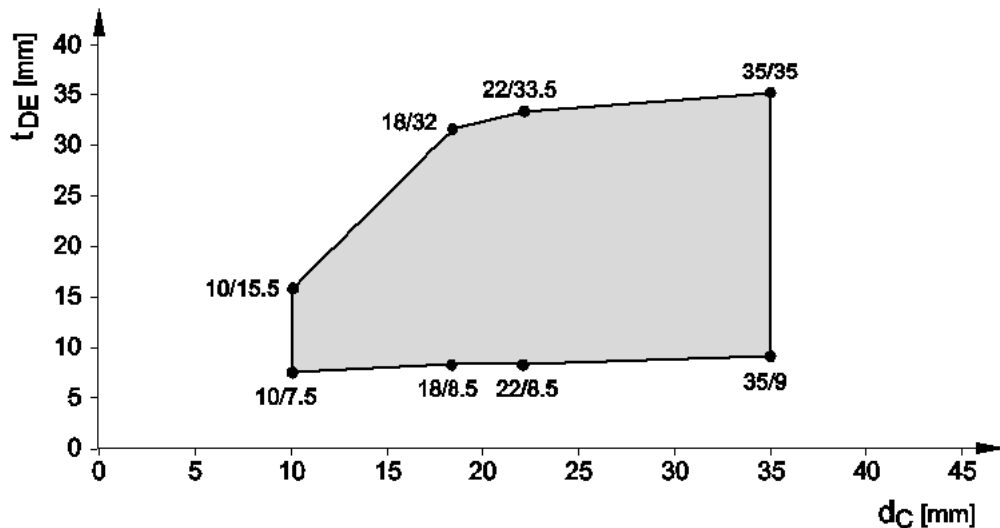
Graph shows assessed insulation thickness (t_{DE}) at certain pipe diameter $\varnothing d_c$ (mm)



Copper pipes, wall (≥ 100 mm) – -/120/120, plus AP3

Additional protection AP3 – penetration seal thickness 150 mm

Graph shows assessed insulation thickness (t_{DE}) at certain pipe diameter $\varnothing d_c$ (mm)



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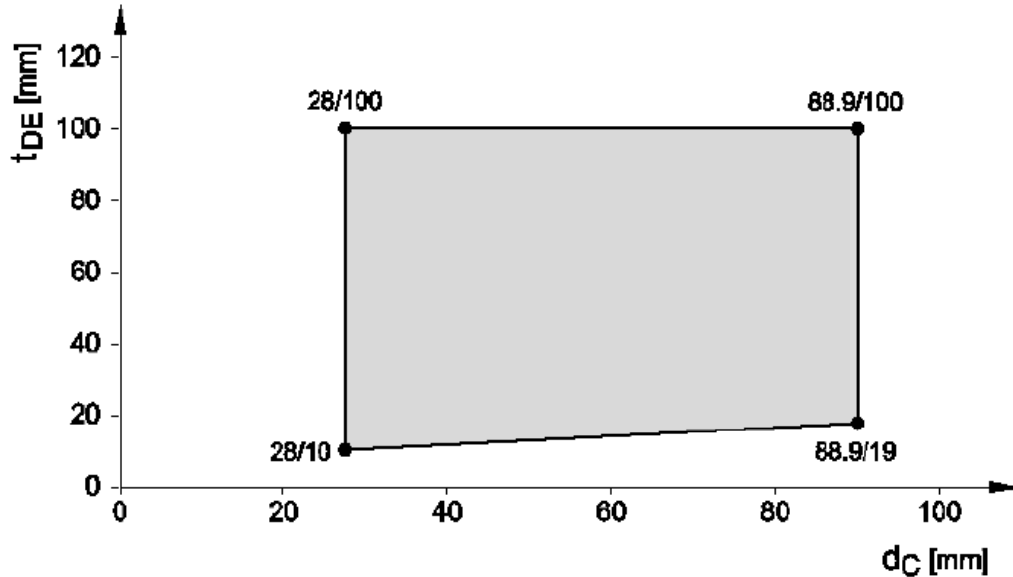
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Copper pipes, wall ($\varnothing$ 28 – 88.9), wall ($\geq$ 100 mm) – -/90/90

Butyl rubber based flexible foam insulation or glass fibre mineral wool insulation according to Appendix C.1.2.2

Graph shows assessed insulation thickness (t_{DE}) at certain pipe diameter $\varnothing d_c$ (mm)



C.2.1.2.2 Copper pipes with preinstalled Wicu Flex PE Insulation

Copper pipes are pre-insulated with PE insulation (CS) ranging in thickness from 12 mm up to 22 mm.

Copper service	Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_{DE} (mm)		FRL (Fire Resistance Level)	
			from	to	-	AP 3
PE Insulation Wicu flex	12 to 22	1.0/1.5 to 14.2	6	6	-/60/60	-/120/120

C.2.1.2.3 Copper pipes with PUR insulation

Copper pipes are insulated with PUR insulation of density 39.4 kg/m³ ranging in thickness from 12 mm up to 54 mm (CS).

Copper service	Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_{DE} (mm)		FRL (Fire Resistance Level)	
			from	to	-	AP 3
PUR Insulation	12 to 54	1.0/1.5 to 14.2	10	50	-/60/60	-/90/90

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C.2.1.3 Steel Pipes with elastomeric butyl rubber-based insulation or glass wool insulation

Applying the field of application given in C.2.1.3 for steel pipes is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1050°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni.

Service	Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_{DE} (mm)		FRL (Fire Resistance Level)		
			from	to	-	Additional protection	
						AP 1	AP 3
Steel	10.2 to 18	1 – 14.2	7.5	33.5	-/90/90	-	-
Steel	10.2 to 60	1 – 14.2	7.5	39	-	-	-/120/120
Steel	18 to 42	1 – 14.2	8.5	36.5	-/60/60	-/90/90	-
Steel	18 to 42	1 – 14.2	14.0	36.5	-/90/90	-	-
Steel	42.4 to 76	1.4 – 14.2	16.5	40.5	-/90/90	-	-
Steel	42.4 to 76	1.4 – 14.2	9.0	40.5	-	-/90/90	-
Steel	10.2 to 76	1 – 14.2	7.5	40.5	-	-/90/90	-
Steel	76 to 159	1.8/2.6 – 14.2	40.5	45	-/120/120	-	-
Steel ^{1a,1,2}	28 to 88.9	½ – 14.2	10/30	100	-	-/90/90	-
Steel ^{1,2}	88.9 to 114.3	2.0 – 14.2	40	40	-	-/90/90	-

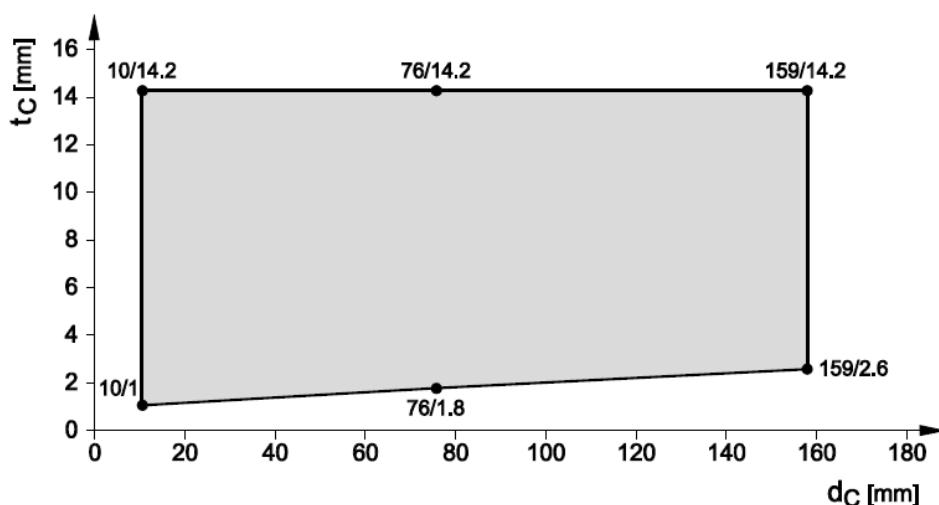
^{1a} zero separation of pipes from 30 mm insulation on to each other and 100 mm to other services

¹ separation of pipes to each other or other services 100 mm

² alternative glass fibre wool insulation according to C.1.2.2

Steel pipe, wall (≥ 100 mm) – relationship of wall thickness and pipe diameter

Graph shows pipe wall thickness (t_c) (mm) against pipe diameter $\varnothing d_c$ (mm)

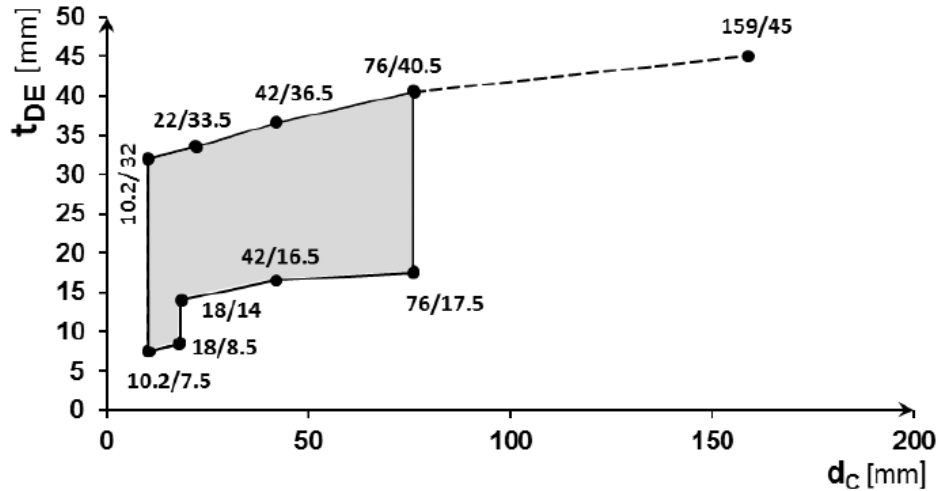


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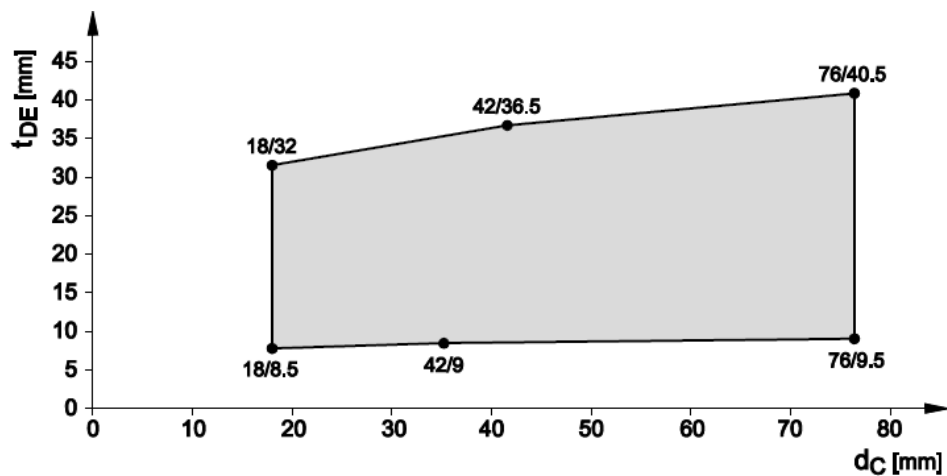
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Steel pipes, wall (≥ 100 mm) – -/90/90 / -/120/120 (dotted line) Graph shows assessed insulation thickness (t_{DE}) (mm) against pipe diameter $\varnothing d_c$ (mm)



Steel pipes, walls (≥ 100 mm) – -/90/90, plus AP 1

Graph shows assessed insulation thickness (t_{DE}) (mm) against certain pipe diameter $\varnothing d_c$ (mm)



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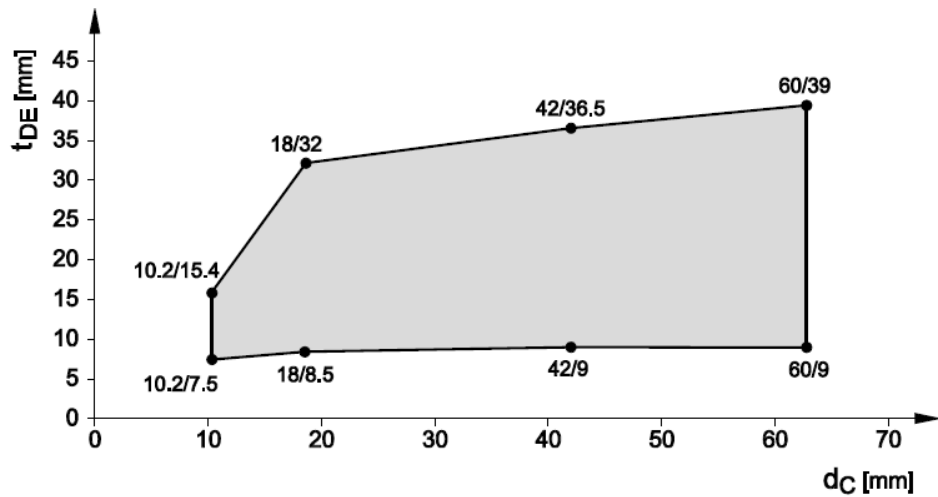
Certificate No: UL-AU-230009

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Steel pipes, walls (≥ 100 mm) – -/120/120, plus aperture framing/build up (AP 3)

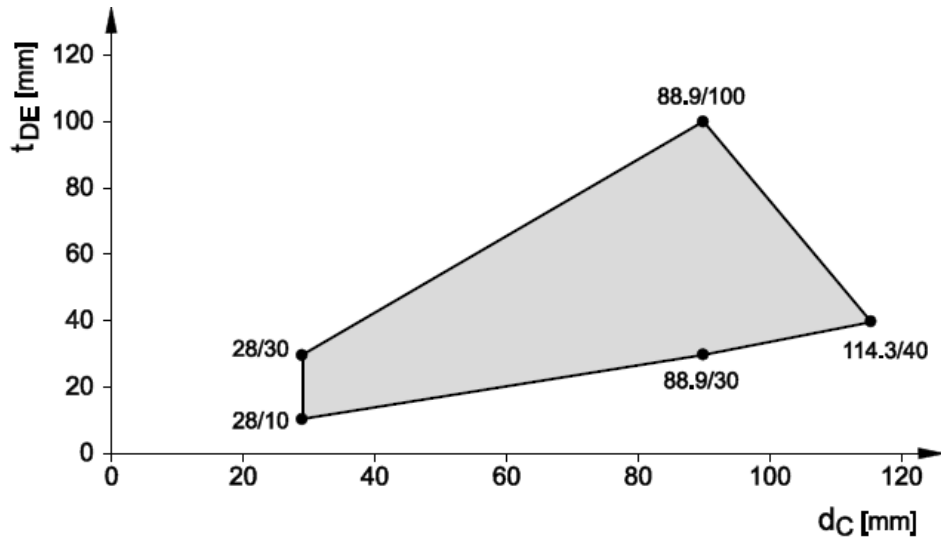
Additional AP 3, thickness of penetration seal 150 mm

Graph shows assessed insulation thickness (t_{DE}) (mm) against certain pipe diameter $\varnothing d_c$ (mm)



Steel pipes, walls (≥ 100 mm) – -/90/90 with AP 1 Butyl rubber based flexible foam insulation or glass fibre mineral wool insulation according to Appendix C.1.2.2

Graph shows assessed insulation thickness (t_{DE}) (mm) against certain pipe diameter $\varnothing d_c$ (mm)



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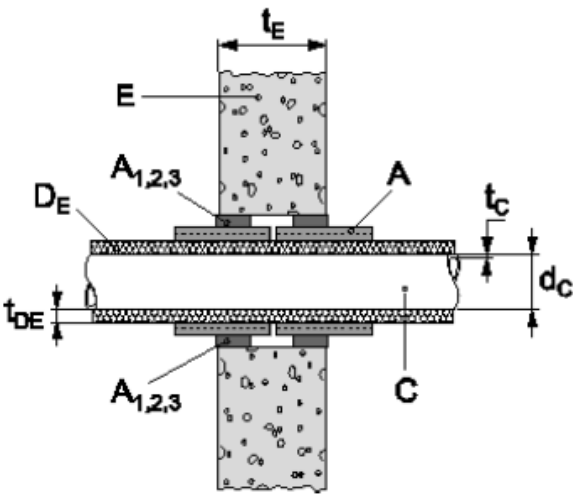
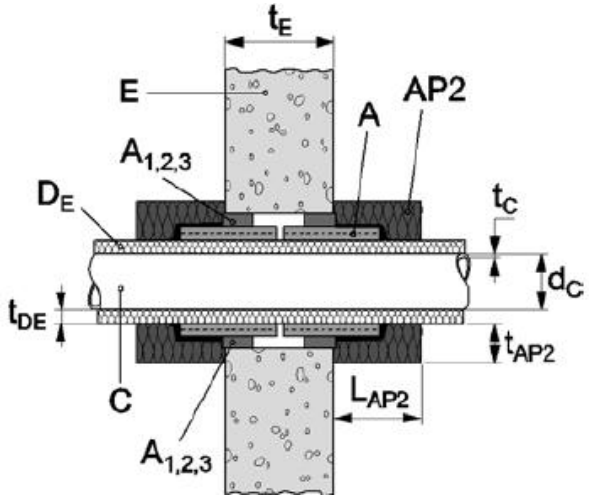
C.2.1.4 Copper Pipes with mineral wool insulation						
Copper pipes are also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1050°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni.						
Service	Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Insulation thickness t _{DE} (mm)	FRL (Fire Resistance Level)		
				Additional protection		
				-	AP 1	AP 3
Copper	10 to 22	1 – 14.2	40	-/90/90	-	-
Copper	18 to 42	1 – 14.2	40	-/60/60	-/90/90	-
Copper	22 to 42	1 – 14.2	40	-/90/90	-	-
Copper	18 to 42	1 – 14.2	40	-	-	-/90/90
Copper	10 to 35	1 – 14.2	40	-	-	-/120/120

C.2.1.5 Steel Pipes with mineral wool insulation						
Steel pipes are also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1050°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni.						
Service	Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Insulation thickness t _{DE} (mm)	FRL (Fire Resistance Level)		
				Additional protection		
				-	AP 1	AP 3
Steel	10 to 22	1 – 14.2	40	-/90/90	-	-
Steel	18 to 42	1 – 14.2	40	-/60/60	-/90/90	-
Steel	22 to 42	1 – 14.2	40	-/90/90	-	-
Steel	42.4 to 76	1.4 – 14.2	40	-/90/90	-	-
Steel	10.2 to 76	1 – 14.2	40	-	-/90/90	-
Steel	10.2 to 60	1 – 14.2	40	-	-	-/120/120

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C.2.2 Rigid Wall (≥ 200 mm)	
C.2.2.1 Set-up of rigid wall	
The wall must have a minimum thickness of 200 mm and comprise of concrete, aerated concrete or masonry, with a minimum density of 550 kg/m ³ .	
Installation variations of insulated pipes protected by Hilti Firestop Bandage CFS-B	
Installation examples:	
Standard Installation	Installation with additional protection AP2
	

C.2.2.2 Copper Pipes
C.2.2.2.1 Copper pipes with elastomeric butyl rubber-based insulation or glass wool insulation

Service	Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_{DE} (mm)		FRL (Fire Resistance Level)
			from	to	
Copper	10 to 42	1 to 14.2	7.5	36.5	-/90/90
Copper	10 to 35	1 to 14.2	7.5	35.0	-/120/120
Copper ^{1,2}	28 to 88.9	1/2 to 14.2	10/19	100	-/90/90

¹ separation of pipes to each other or other services 100 mm

² alternative glass fibre wool insulation according to Appendix C.1.2.2

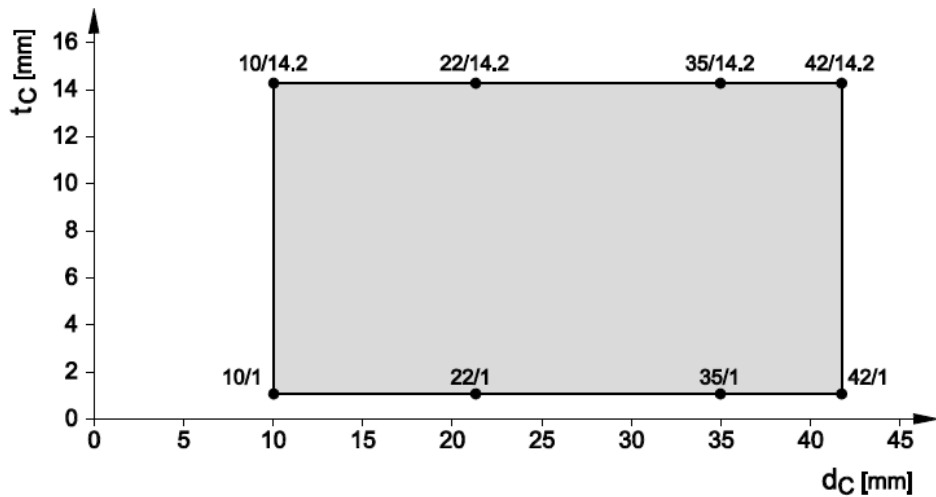
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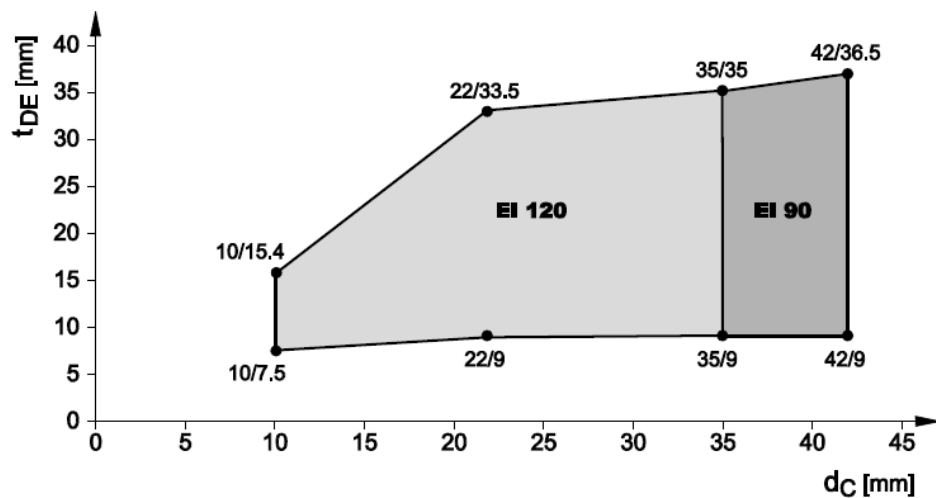
Copper pipes, rigid wall (≥ 200 mm) – Relationship between wall thickness and pipe diameter

Graph shows pipe wall thickness (t_c) (mm) against pipe diameter $\varnothing d_c$ (mm)



Copper pipes, rigid wall (≥ 200 mm) – -/120/120 / -/90/90

Graph shows assessed insulation thickness (t_{DE}) (mm) against certain pipe diameter $\varnothing d_c$ (mm)



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C.2.2.3 Steel Pipes with elastomeric butyl rubber-based insulation or glass wool insulation

Applying the field of application given in C.2.2.3 for steel pipes is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1050°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni.

Service	Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_{DE} (mm)		FRL (Fire Resistance Level)	
			from	to	-	AP 2
Steel	10.2 to 60	1 to 14.2	7.5	39	-/120/120	-
Steel	76 to 159	1.85 to 14.2	17.5	45	-/90/90	-
Steel	159	2 to 14.2	16	45	-/120/120	-
Steel	159 to 813	2 to 14.2	25	25	-	-/120/120
Steel ^{1a,1,2}	28 to 88.9	1/2 to 14.2	10/30	30	-/90/90	-
Steel ^{1,2}	88.9 to 159	2.0 to 14.2	40	80	-/90/90	-

^{1a} -/120/120; zero separation of pipes at 30 mm insulation on to each other and 100 mm to other services

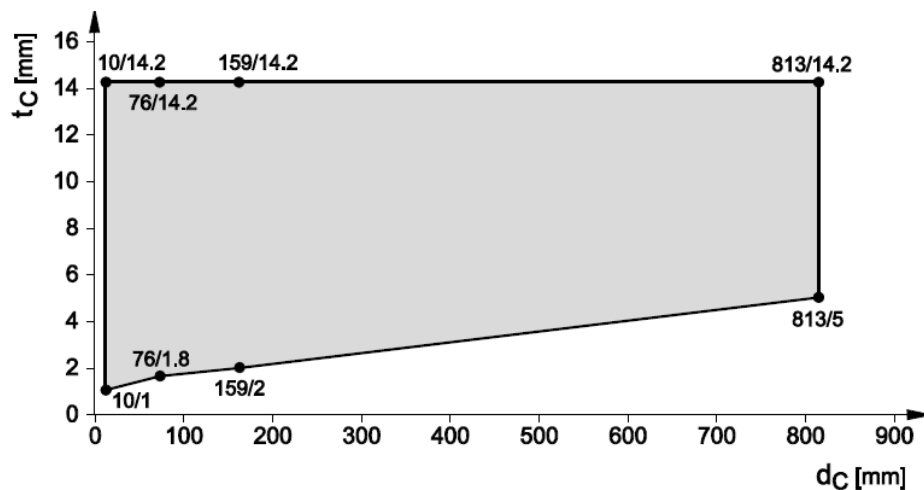
¹ separation of pipes to each other or other services 100 mm

² alternative glass fibre wool insulation according Appendix C.1.2.2

AP 2 insulation was applied in a length of 500 mm for pipe Ø 813. Therefore, this is valid for pipes ranging from Ø 159 to Ø 813 mm.

Steel pipes, rigid wall (≥ 200 mm) – relation wall thickness towards pipe diameter

Graph shows pipe wall thickness (t_c) towards pipe diameter ($\varnothing d_c$)



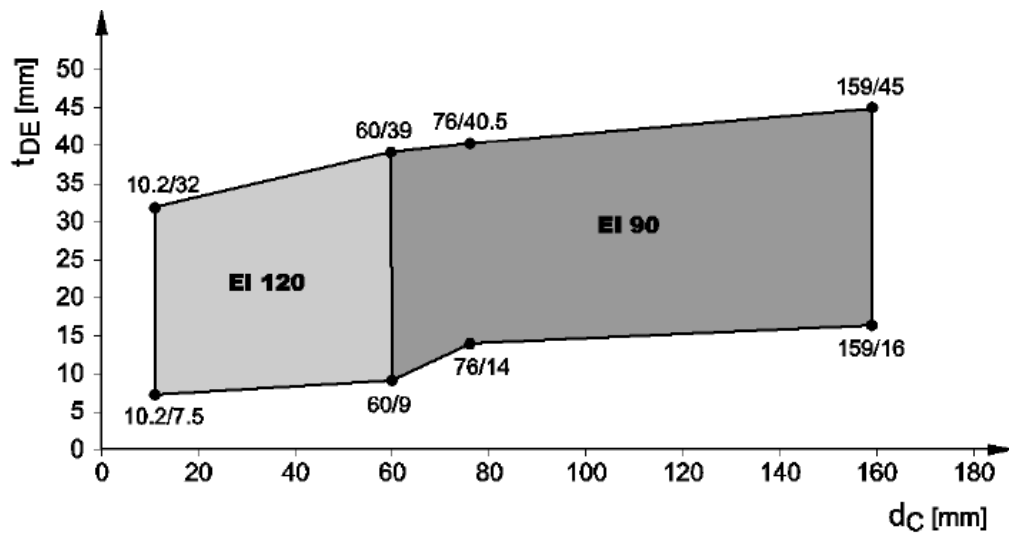
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Steel pipes, rigid wall (≥ 200 mm) – -/120/90

Graph shows assessed insulation thickness (t_{DE}) at certain pipe diameter ($\varnothing d_C$)

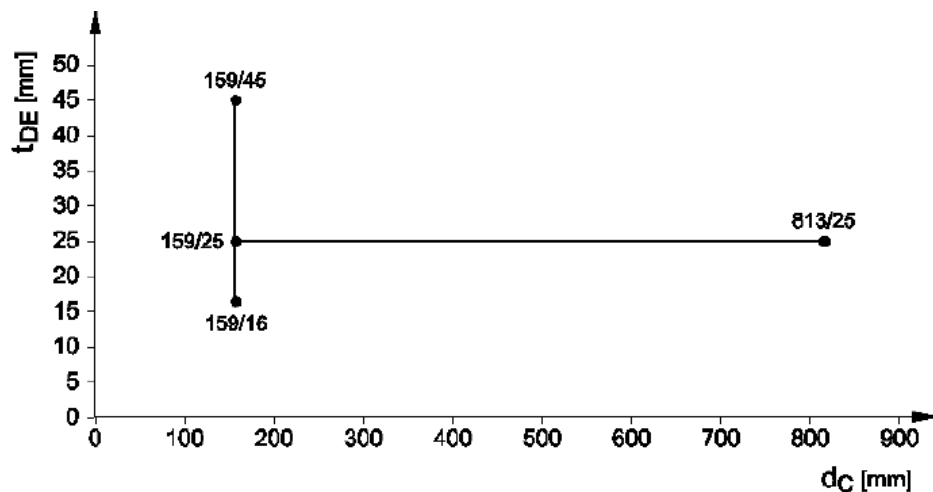


Steel pipes, rigid wall (≥ 200 mm) – -/120/120

Insulated large pipes from $\varnothing 159$ up to 813 mm

Elastomeric insulation plus additional protection mineral wool (AP2, Klimarock 40 mm)

Graph shows assessed insulation thickness (t_{DE}) at certain pipe diameter ($\varnothing d_C$)



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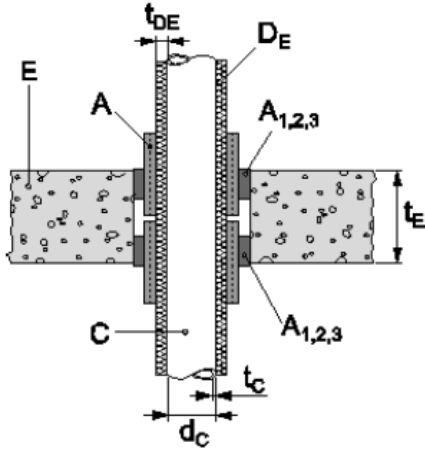
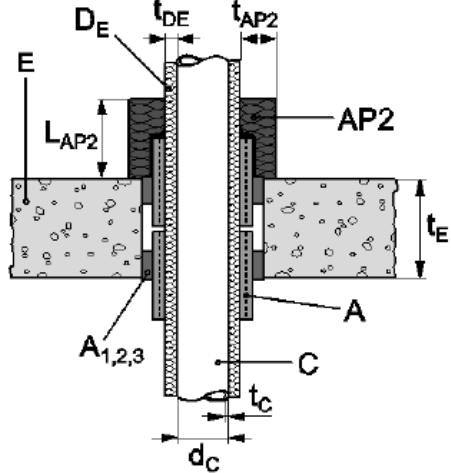
C.2.2.4 Copper Pipes with mineral wool insulation				
Copper pipes are also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1050°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni.				
Service	Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Insulation thickness t _{DE} (mm)	FRL (Fire Resistance Level)
				-
Copper	10 to 42	1 – 14.2	40	-/90/90
Copper	10 to 35	1 – 14.2	40	-/120/120

C.2.2.5 Steel Pipes with mineral wool insulation					
Applying the field of application given in C.2.2.5 for steel pipes is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1050°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni.					
Service	Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Insulation thickness t _{DE} (mm)	FRL (Fire Resistance Level)	
					Additional protection
				-	AP 2
Steel	10 to 60	1 – 14.2	40	-/120/120	-
Steel	76 to 159*	1.8 – 14.2	40	-/90/90	-/90/90
Steel	159	4 – 14.2	40	-/120/120	-
Steel	159-813**	2 – 14.2	40	-	-/120/120
* AP2 insulation is applied in length of 250mm. ** AP 2 insulation is applied in a length of 500mm for pipe range Ø159mm to Ø813mm. Maximum allowable pipe wall thickness 14.2mm					

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C.2.3 Floor	
C.2.3.1 Set-up of floor (≥ 150 mm)	
The supporting construction is built of at least lightweight concrete slabs of a thickness of 150 mm and a density of 550 kg/m ³ .	
Installation variation of insulated pipes protected by Hilti Firestop Bandage CFS-B	
Installation examples:	
Standard Installation	Installation with additional protection AP2
	

C.2.3.2 Copper Pipes
C.2.3.2.1 Copper pipes with elastomeric butyl rubber-based flexible foam insulation

Service	Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_{DE} (mm)		FRL (Fire Resistance Level)		
			from	to	-	AP1	AP2
Copper	10 to 35	1 to 14.2	7.5	35.0	-/120/120	-	-
Copper	35 to 42	1 to 14.2	9.0	36.5	-/60/60	-	-/120/120
Copper ^{1,2}	42	1.2	9.0	35.0	-/120/120	-	-
^{1,2} Copper	28 to 88.9	1/2 to 14.2	10.0	100	-/90/90	-	-

¹ separation of pipes to each other or other services 100 mm

² alternative glass fibre wool insulation according to Appendix C.1.2.2

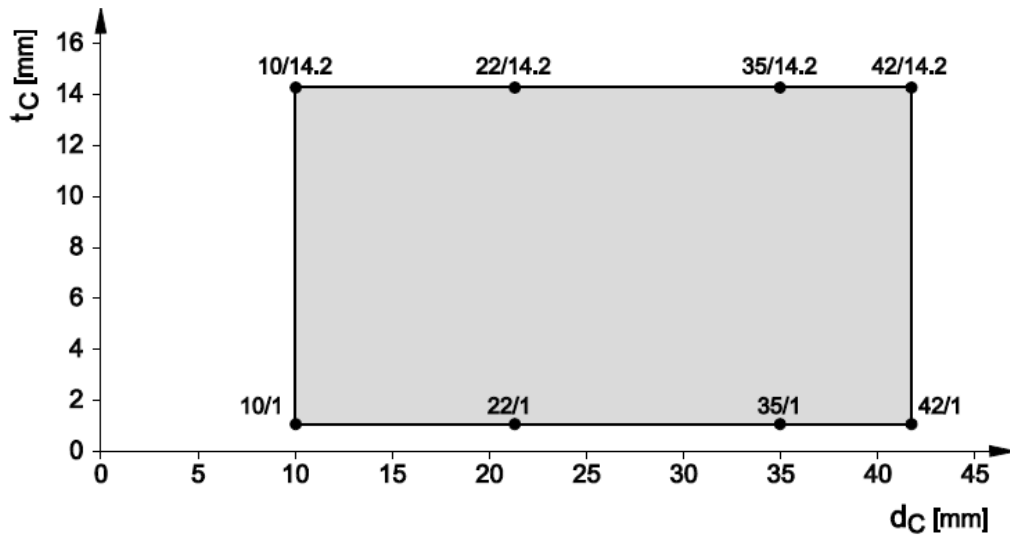
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Copper pipes, rigid floor (≥ 150 mm) – relation wall thickness towards pipe diameter

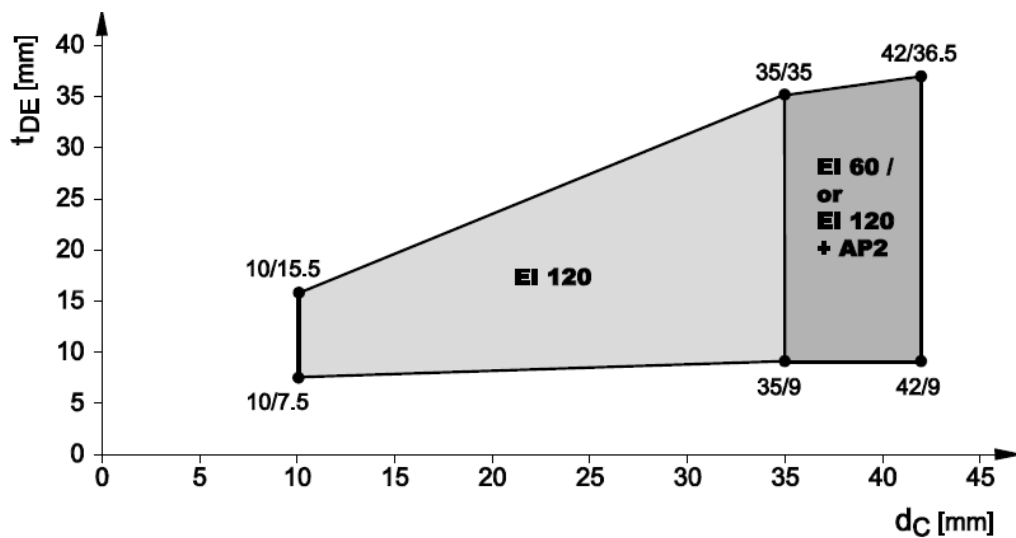
Graph shows pipe wall thickness (t_c) towards pipe diameter ($\varnothing d_c$)



Copper pipes, floor (≥ 150 mm) – -/120/120 / -/60/60 / -/120/120 plus AP2

Additional protection AP2 (mineral wool) is required from $\varnothing 35$ to 42 mm to reach -/120/120

Graph shows assessed insulation thickness (t_{DE}) at certain pipe diameter ($\varnothing d_c$)



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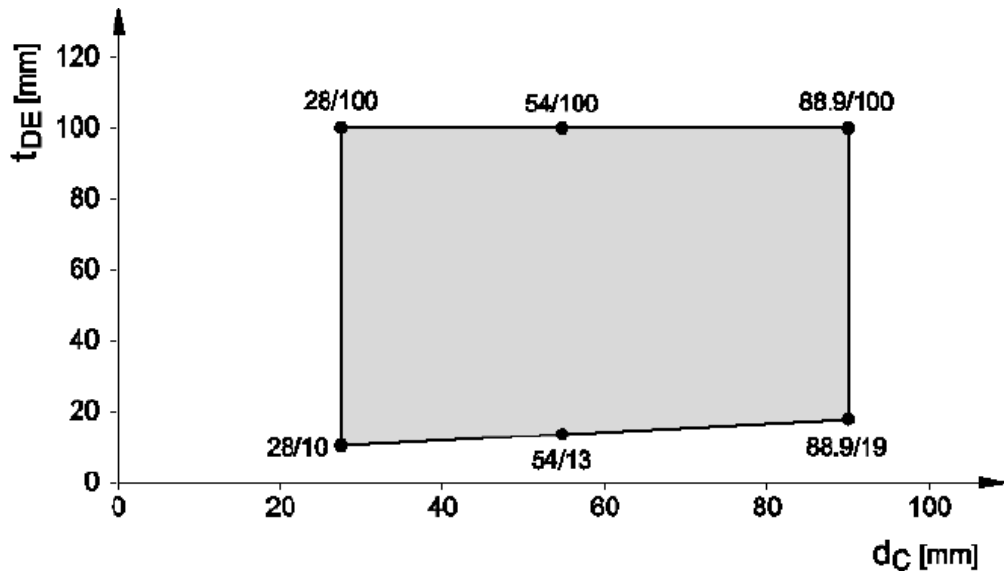
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Copper pipes, (Ø 28 to 88.9), floor (≥ 150 mm) – -/90/90

Elastomeric Butyl rubber based flexible foam insulation or glass-fibre mineral wool insulation according to Appendix C.1.2.2

Graph shows assessed insulation thickness (t_{DE}) at certain pipe diameter (Ø d_c)



C.2.3.2.2 Copper pipes with pre-installed Wicu Flex PE Insulation

Copper pipes are pre-insulated with PE insulation (CS) ranging in thickness from 12 mm up to 22 mm.

Copper Service	Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_{DE} (mm)		FRL (Fire Resistance Level)
			from	to	
Wicu Flex*	22	1.0 to 14.2	6.0	6.0	-/180/180

* Distance to next penetration ≥ 150 mm; first pipe support ≥ 250 mm

C.2.3.2.3 Copper pipes with PUR insulation

Copper pipes are insulated with PUR insulation of density 39.4 kg/m³ ranging in thickness from 12 mm up to 54 mm (CS).

Copper Service	Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_{DE} (mm)		FRL (Fire Resistance Level)
			from	to	
PUR insulation*	12 to 54	1.5 to 14.2	10.0	50.0	-/120/120

* Distance to next penetration ≥ 150 mm; first pipe support ≥ 250 mm

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C.2.3.3 Steel pipes

Service	Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_{DE} (mm)		FRL (Fire Resistance Level)	
			from	to	-	AP2
Steel	10.2 to 60	1 to 14.2	7.5	39.0	-/120/120	-
Steel	60 to 76	1 to 14.2	9.0	40.5	-/90/90	-/120/120
Steel	76 to 108	1.8 to 14.2	14.0	42.5	-/90/90	-
Steel	10.2 to 114.3	1 to 14.2	15.5	42.5	-/120/120	-
Steel ³	76 to 159	1.8 to 14.2	9.5	45	-	-/120/120
Steel ³	159 to 323.9	1.8 to 14.2	25	25	-	-/120/120
Steel ⁴	76 to 159	1.8 to 14.2	9.0	45	-/60/60	-
Steel ^{1,2}	88.9 to 159	2.0 to 14.2	25	80	-/90/90	-
Steel ^{1,2,5}	28 to 54	1/2 to 14.2	10	40	-/90/90	-

¹ separation of pipes to each other or other services 100 mm

² alternative glass fibre wool insulation according to Appendix C.1.2.2

³ till Ø159 mm insulation thickness is up to 45 mm; pipe diameter above elastomeric butyl rubber-based insulation is 25 mm.

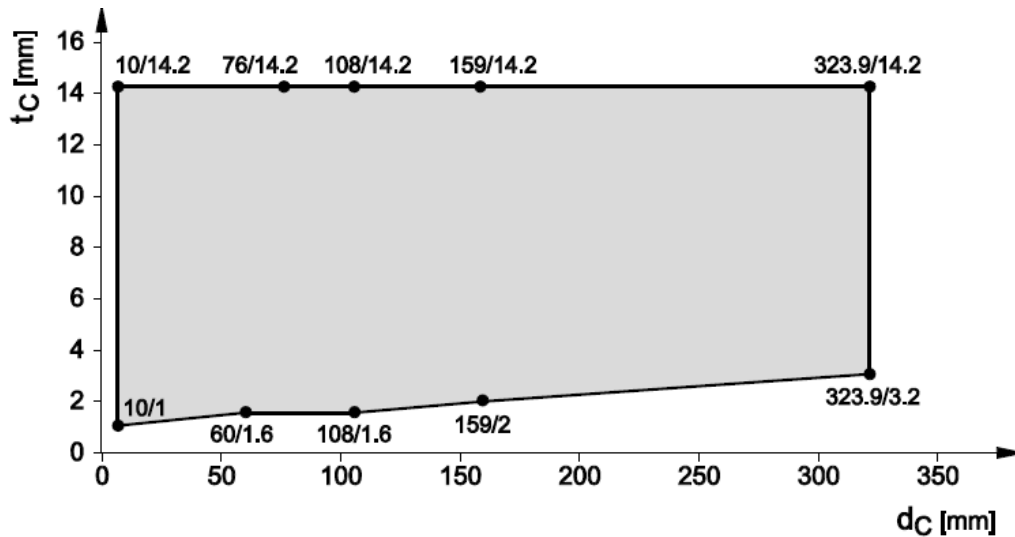
AP2 – Klima Rock Insulation 40 mm at a length of 500 mm.

⁴ mineral insulation thickness above Ø 114.3 mm is increased to 16 mm.

⁵ with only one wrapping

Steel pipes, floor (≥ 150 mm) – relation wall thickness towards pipe diameter

Graph shows pipe wall thickness (t_c) towards pipe diameter ($\varnothing d_c$)



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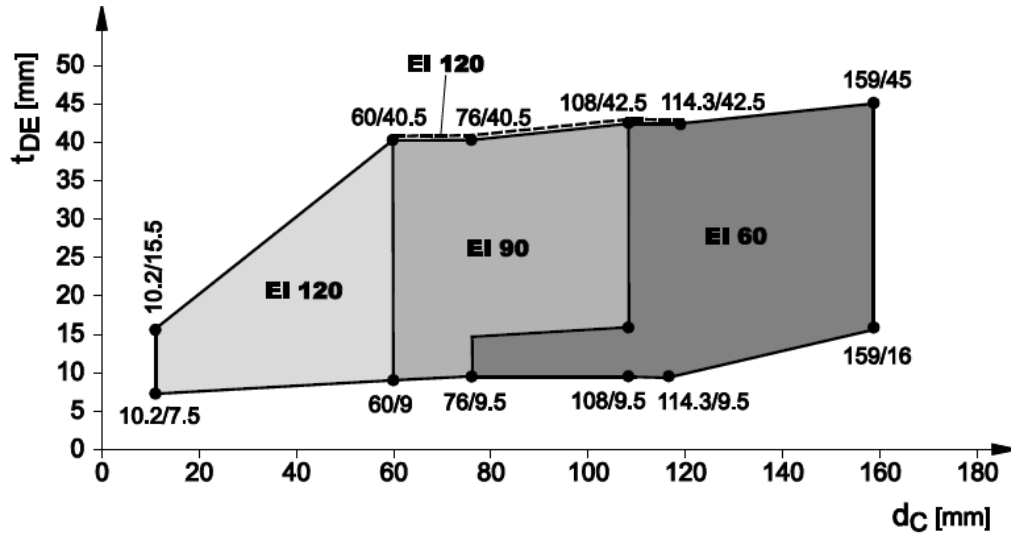
Original Date of Certification: 2025-08-28

Steel pipes, floor (≥ 150 mm) – -/120/120 / -/90/90 / -/60/60

Different insulation thickness results in distinct FRL

-/120/120 FRL is valid for highest insulation thickness up to $\varnothing$ 114 mm (dotted line)

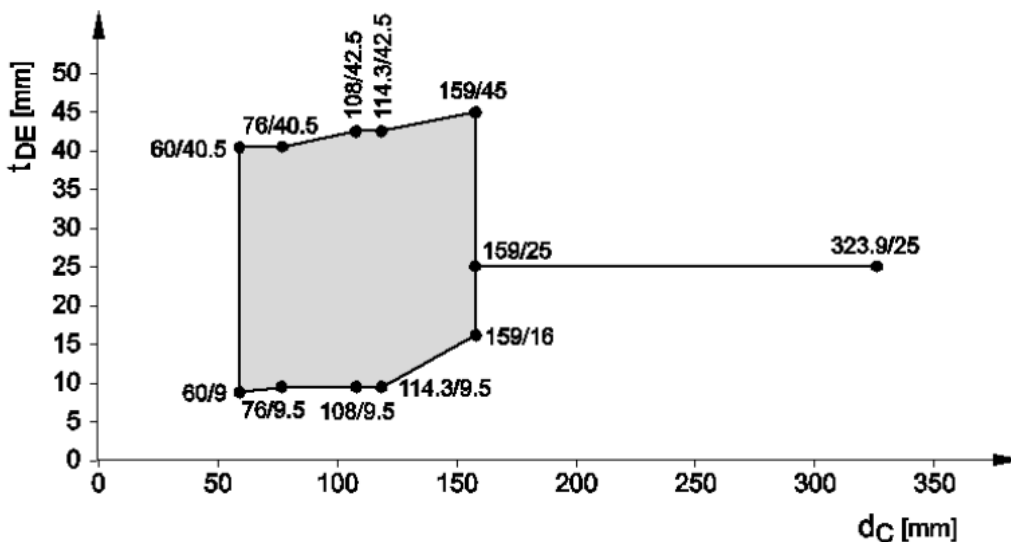
Graph shows assessed insulation thickness (t_{DE}) at certain pipe diameter ($\varnothing d_C$)



Steel pipes, floor (≥ 150 mm) – -/120/120 plus AP2

Pipes insulation with elastomeric butyl rubber-based insulation are additional protected by AP2 (Klimrock 40 mm)

Graph shows assessed insulation thickness (t_{DE}) at certain pipe diameter ($\varnothing d_C$)



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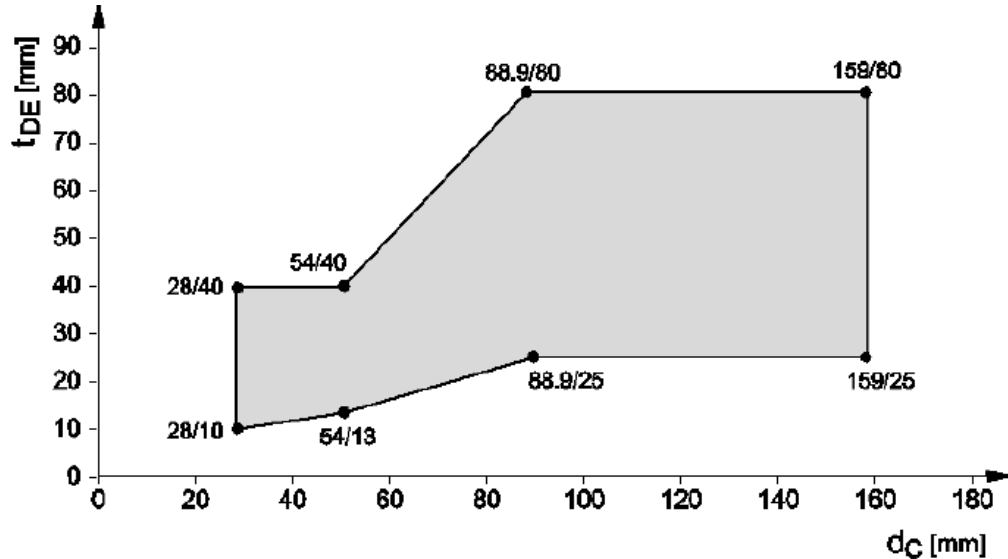
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Steel pipes, (Ø 28 – 88.9), floor (≥ 150 mm) – -/90/90

Elastomeric Butyl rubber-based flexible foam insulation or glass-fibre mineral wool insulation according to Appendix C.1.2.2

Graph shows assessed insulation thickness (t_{DE}) at certain pipe diameter (Ø d_c)



C.2.3.4 Copper Pipes with mineral wool insulation

Copper pipes are also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1050°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni.

Service	Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_{DE} (mm)	FRL (Fire Resistance Level)	
				Additional protection	
				-	AP 2
Copper	10 to 35	1 – 14.2	40	-/120/120	
Copper	35 to 42*	1 – 14.2	40	-/60/60	-/120/120

* AP2 insulation is applied in length of 250mm.

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C.2.3.5 Steel Pipes with mineral wool insulation

Applying the field of application given in C.2.3.5 for steel pipes is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1050°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni.

Service	Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_{DE} (mm)	FRL (Fire Resistance Level)	
					Additional protection
				-	AP 2
Steel	10.2 to 60	1 – 14.2	40	-/120/120	-
Steel	60 to 76*	1 – 14.2	40	-/90/90	-/120/120
Steel	76 to 108	1.8 – 14.2	40	-/90/90	-
Steel	10.2 to 114.3	1 – 14.2	40	-/120/120	
Steel	76 to 323.9**	1.8 – 14.2	40		-/120/120
Steel	76 to 159*	2 – 14.2	40	-/60/60	-/120/120

* AP2 insulation is applied in length of 250mm.

** till Ø159mm insulation thickness is up to 45mm, pipe diameter above insulation is 25mm.

AP 2 – Klima Rock Insulation 40mm is applied on pipe Ø323.9mm at a length of 500mm.

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APPENDIX D: ABBREVIATIONS USED IN DRAWINGS; LIST OF ELASTOMERIC BUTYL RUBBER BASED FOAM INSULATION

D.1.1 Abbreviations used in drawings	
Abbreviation	Description
A	Hilti firestop Bandage CFS-B
A ₁	Annular gap seal with Hilti Firestop Acrylic Sealant CFS-S ACR
A ₂	Annular gap seal with gypsum plaster
A ₃	Annular gap seal with cementitious mortar
C	Service (metal pipes)
D _E	Pipe insulation, combustible, butyl based elastomeric foamed material
d _C	Pipe diameter (nominal outside diameter)
E	Building element (wall, floor)
S ₁	Minimum distance between single insulation pipes
S ₂	Minimum distance between clustered pipes
S ₃	Minimum distance between penetrating pipes and building element
S ₄	Minimum distance between single insulation pipes and Collar CFS-C EL
S ₅	Minimum distance between single insulation pipes and Conlit shell or Klimrock
t _C	Pipe wall thickness
t _{D_E}	Insulation thickness
t _E	Thickness of building element
L _D	Length of insulation
AP1	Additional protection by elastomeric, butyl rubber-based insulation
AP2	Additional protection by mineral wool (Klimrock)
AP3	Additional protection by aperture framing/build up

List of elastomeric butyl rubber-based foam insulation

Producer	Assessed Type of foamed elastomeric thermal isolation or equivalent
Armacell GmbH	• ² Armaflex AF, ^{3,4} Armaflex SH, ¹ Armaflex Ultima, ⁶ Armaflex HT
NMC Group	• ³ Insul-Tube (nmc), ³ Insul-Tube H-Plus (nmc),
Kaimann GmbH	• ² Kaiflex KK plus, ⁴ Kaiflex KK,
L'Isolante K-Flex	• ¹ Isolante K-Flex HT, ⁵ Isolante K-Flex ECO, ² Isolante K-Flex ST, ³ Isolante K-Flex H, ² Isolante K-Flex ST Plus

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Appendix B

Test report details – report reference.

Name of Test Institute	Owner	Number of Report	Date of Test	Test standard
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	16821A date 16.12.2014	14.10.2014	EN 1366-3: 2009
		16822A date 16.12.2014	15.10.2014	
		16823A date 16.12.2014	16.10.2014	
		16825A date 30.01.2015	09.12.2014	
		16826A date 30.01.2015	10.12.2014	
		16906A date 30.01.2015	10.12.2014	
		17158B date 09.10.2015	18.05.2015	
		17218A date 20.11.2015	09.06.2015	
		17219A date 20.11.2015	10.06.2015	
		17220A date 20.11.2015	11.06.2015	
Bodycote Warringtonfire	Hilti Entwicklungsgesellschaft mbH Hiltistraße 6, 86916 Kaufering, Germany	WF No. 174951 date 30.09.2008	22.07.2008	EN 1366-3: 2004 & prEN 1366-3.2: October 2007
MPA NRW		WF Assessment Report No. 177180 date 13.10.2008	n/a	prEN 1366-3.2: October 2007
		MPA No. 210004978 date 02.08.2007	18.04.2007	
		MPA No. 210004978-01 date 13.02.2008	17.09.2007	
		MPA No. 210004978-02 date 12.06.2008	08.05.2008	
EFFECTIS France	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	Efectis No. 07-E-317-C date 10.04.2008	11.10.2007	EN 1366-3: 2006
		Efectis No. 08-E-079-A date 07.07.2008	13.03.2008	
SINTEF NBL	Hilti AG Hiltistraße 6, 86916 Kaufering, Germany	SINTEF No. 103080.25 date 05.05.2008	10.04.2008	prEN 1366-3: 2006
IBS Linz	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	319091602-3 date 11.10.2019	19.09.2019	EN 1366-3: 2009
		319091602-2 date 11.10.2019	17.09.2019	
		319091602-1 date 11.10.2019	16.09.2019	
		318092507-3 date 22.07.2019	22.05.2019	

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Name of Test Institute	Owner	Number of Report	Date of Test	Test standard
IBS Linz	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	318092507-2 date 22.07.2019	14.05.2019	EN 1366-3: 2009
		318092507-1 date 26.04.2019	18.12.2018	
		319091602-4 date 23.07.2020	06.05.2020	
		319091602-5 date 22.07.2020	08.05.2020	
		318092507-5 date 22.07.2020	23.04.2020	
WFRGENT nv		19692A date 24.04.2020	28.05.2019	
		19693A date 24.04.2020	28.05.2019	
		19928A date 10.04.2020	16.10.2019	
		19930A date 10.04.2020	15.10.2019	
AFITI		HILTI AG Feldkircher Str. 100	8920/13	
AFITI	8921/13		17.10.2013	
AFITI	8922/13		15.10.2013	
Warringtonfire	15862A		27.11.2013	
Warringtonfire	15863A		29.11.2013	
AFITI	8891/13		29.11.2013	
AFITI	8889/13		18.07.2013	
AFITI	8890/13		23.07.2013	
WFRGENT nv	17219C		10.06.2015	
Warringtonfire	15864A		28.11.2013	
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan		18270A date 26.07.2017	17.03.2017
		18271A date 26.07.2017	29.03.2017	
		18272A date 14.07.2017	17.03.2017	
		18269A date 14.07.2017	28.03.2017	
Bodycote Warringtonfire	Hilti Entwicklungsgesellschaft mbH Hiltistraße 6, 86916 Kaufering, Germany	179848 date 01.05.2009	06.02.2009	EN 1366-3: 2004