Institut für Brandschutztechnik
und Sicherheitsforschung

CLASSIFICATION REPORT

in acc. with EN 13501-2:2016

Product name: "**Hilti CFS-S ACR annular gap seal for timber building components**"

Classification Report No.: 319091602-C / ACR-en
Date: 13 October 2020
Date of translation: 02.03.2021
This Classification Report replaces report no. 319091602-A of 17.10.2019
Engineer: Manfred EGLAUER / AM
EXT: 871

Customer:	**Hilti Aktien Gesellschaft** Feldkirchner Strasse 100 FL-9494 Schaan Liechtenstein
Prepared by:	IBS - Institut für Brandschutztechnik und Sicherheitsforschung GmbH Petzoldstraße 45, A-4020 Linz
Notification No.:	1322

This Classification Report consists of **40** pages and may not be reproduced in whole or in part.

Institut für Brandschutztechnik und Sicherheitsforschung

TABLE OF CONTENTS

1. Introduction

This Classification Report defines the fire resistance class assigned to the installation situations of Hilti CFS-S ACR annular gap seal for timber building components in compliance with the procedures given in EN 13501-2:2016.

2. Details of classified building components and products

2.1. Function type

The function of the Hilti construction products listed in this Classification Report is to resist fire in horizontal and vertical orientations in cross-laminated timber constructions in accordance with the characteristic product behaviour defined in section 5 of EN 13502-2:2016.

2.1.1. Hilti CFS-S ACR

The firestop acrylic sealant Hilti CFS-S ACR is defined as an annular gap seal. The firestop acrylic sealant Hilti CFS-S ACR is applied alone or in combination with mineral wool (Euro class A1, $\rho \geq 40$ kg/m³, $\Theta > 1000$ °C) to seal annular gaps of pipes, cables and cable bundles.

2.2. Descriptions

The installation situations of “Hilti CFS-S ACR annular gap seal for timber building components” are fully described in the test reports referred to in section 3 of this Classification Report.

2.2.1. Products

2.2.1.1. Hilti CFS-S ACR

The construction product Hilti CFS-S ACR is an acrylic-based firestop sealant.

Hilti CFS-S ACR is assigned the following classification with regard to its reaction to fire in accordance with EN 13501-1:

Reaction to fire performance class E

(ETA-10/0292 of 31.01.2018, Austrian Institute of Construction Engineering (OIB))

2.2.2. Pipes

2.2.2.1. Metal pipes (hmp):

Copper	Heat conductivity λ ~ 380 W/(m*K)
Steel / C-steel	Heat conductivity λ ~ 58 W/(m*K)
Stainless steel	Heat conductivity λ ~ 15 W/(m*K)

2.2.2.2. Coated metal pipes (lmp):

Geberit Mepla	Application:	Potable water, heating
	Material:	PE-RT/aluminium/PE-RT

2.2.3. Insulations

ISOVER Protect	Mineral wool insulation, melting point as per DIN 4102-17: ≥ 1000°C, Density ≥ 80 kg/m³, Euro class $A2_L$-s1, d0

2.2.4. Test specimen description

2.2.4.1. Key

Test Report No. – Penetration sealant type – test specimen numbers of the current page

No.	Material	Dimensions (mm) Cable load	Orientation	Pipe-end configuration	Insulation Acc. to EN 1366-3:2009; Table 1				Mixed penetration seal / dimension l x w x h [mm]	Pipe sealing system, as per EN 1366-3 3.12							
					Type	Set-up	Length [mm]	Insulation thickness [mm]		Type	Inside diame-ter [mm]	Active components Layers	Thick-ness [mm]	Length [mm]	Installation		Joint seal depth [mm]	Fastening
Test specimen no.	Plastic or metal type Manufacturer type designation Cable group acc. to EN 1366-3:2009 Table A.1/2	Amount x outside diameter / wall thickness Cable designation acc. to EN 1366-3:2009 Table A.1/2 Spec. designation of cables / coaxial cables or wave-guides deviating from EN 1366-3:2009 Deviating cables /coaxial cables or waveguides	Angle between test specimen and supporting structure	Pipe-end configuration acc. to EN 1366-3:2009 Table 2	Manufacturer type designation	Pipe insulation acc. to EN 1366-3:2009 Table 1	Length of insulation on both sides of penetration seal	Insulation thickness	Type designation / dimensions	Type designation of pipe sealing system	Inside diameter of pipe sealing system	Amount of active layers	Total thickness of active layers	Length of the active insert according to EN 1366-3:2009 Illustration H.3	E - Fire Exposed side U - Unexposed side 2S- Both sides CEN - Centred	- I – inside - O - outside	Type designation, filling depth	Type designation and dimensions

2.2.4.2. Floor constructions

2.2.4.2.1. Test Report No. 318092507-1,Rev2

Tested in:	80 mm thick cross laminated timber floor (Binderholz BBS XL) with 3-layer structure Lamella thickness per layer 20 / 40 / 20 mm

TR 318092507-1,Rev2

No.	Material	Dimensions OD / wall thickness [mm]	Orientation	Pipe-end configuration	Insulation Acc. to EN 1366-3:2009; Table 1				Pipe sealing system, as per EN 1366-3 3.12							
											Active components					
					Type	Set-up	Length [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Layers	Thickness [mm]	Length [mm]	Installation	Joint and gap sealing, depth [mm]	Fastening
P1	Copper	1 x ∅28 / 1	90°	C/U	ISOVER Protect	LS	450	20	-	-	-	-	-	-	CFS-S ACR, 25	-
P2	Copper	1 x ∅42 / 1.2	90°	C/U	ISOVER Protect	LS	450	20	-	-	-	-	-	-		-
P3	Geberit Mepla	1 x ∅16 / 2.25	90°	U/C	ISOVER Protect	LS	500	20	-	-	-	-	-	-		-
P4	Geberit Mepla	1 x ∅40 / 3.5	90°	U/C	ISOVER Protect	LS	500	20	-	-	-	-	-	-		-

2.2.4.2.2. Test Report No. 318092507-2,Rev2

Tested in:	140 mm thick cross laminated timber floor (Binderholz BBS XL) with 5-layer structure Lamella thickness per layer 40 / 20 / 20 / 20 / 40 mm

TR 318092507-2,Rev2

No.	Material	Dimensions OD / wall thickness [mm]	Orientation	Pipe-end configuration	Insulation Acc. to EN 1366-3:2009; Table 1				Pipe sealing system, as per EN 1366-3 3.12							
											Active components					
					Type	Set-up	Length [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Layers	Thickness [mm]	Length [mm]	Installation	Joint and gap sealing, depth [mm]	Fastening
P1	Copper	1 x ∅28 / 1	90°	C/U	ISOVER Protect	LS	450	20	-	-	-	-	-	-	CFS-S ACR, 25	-
P2	Copper	1 x ∅42 / 1.2	90°	C/U	ISOVER Protect	LS	450	20	-	-	-	-	-	-		-
P3	Geberit Mepla	1 x ∅16 / 2.25	90°	U/C	ISOVER Protect	LS	500	20	-	-	-	-	-	-		-
P4	Geberit Mepla	1 x ∅40 / 3.5	90°	U/C	ISOVER Protect	LS	500	20	-	-	-	-	-	-		-
P48	Stainless steel	1 x ∅35 / 1.5	90°	C/U	ISOVER Protect	CS	∞	30	-	-	-	-	-	-		-
P49	C steel	1 x ∅42 / 1.5	90°	C/U	ISOVER Protect	CS	∞	40	-	-	-	-	-	-		-
P50	Stainless steel	1 x ∅15 / 1	90°	C/U	ISOVER Protect	CS	∞	20	-	-	-	-	-	-		-

2.2.4.2.3. Test Report No. 318092507-3,Rev2

Tested in:	100 mm thick cross laminated timber floor (Binderholz BBS XL) with 5-layer structure Lamella thickness per layer 20 / 20 / 20 / 20 / 20 mm

TR 318092507-3,Rev2

No.	Material	Dimensions OD / wall thickness [mm]	Orientation	Pipe-end configuration	Insulation Acc. to EN1366-3:2009; Table 1				Pipe sealing system, as per EN 1366-3 3.12							
					Type	Set-up	Length [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Active components: Layers	Active components: Thickness [mm]	Active components: Length [mm]	Installation	Joint and gap sealing, depth [mm]	Fastening
P1	Copper	1 x ∅88.9 / 2	90°	C/U	ISOVER Protect	LS	450	40	-	-	-	-	-	-	CFS-S ACR, 25	-
P2	Copper	1 x ∅76.1 / 1.5	90°	C/U	ISOVER Protect	LS	450	40	-	-	-	-	-	-		-
P3	Geberit Mepla	1 x ∅63 / 4.5	90°	U/C	ISOVER Protect	LS	600	20	-	-	-	-	-	-		-
P4	Geberit Mepla	1 x ∅63 / 4.5	90°	U/C	ISOVER Protect	LS	500	40	-	-	-	-	-	-		-

2.2.4.3. Wall constructions

2.2.4.3.1. Test Report No. 319091602-1,Rev1

Tested in:	100 mm thick cross laminated timber wall (Binderholz BBS XL) with 5-layer structure Lamella thickness per layer 20 / 20 / 20 / 20 / 20 mm

TR 319091602-1,Rev1

No.	Material	Dimensions OD / wall thickness [mm]	Orientation	Pipe-end configuration	Insulation Acc. to EN1366-3:2009; Table 1				Pipe sealing system, as per EN 1366-3 3.12							
					Type	Set-up	Length [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Active components			Installation	Joint and gap sealing, depth [mm]	Fastening
											Layers	Thickness [mm]	Length [mm]			
P1	Copper	1 x ∅10 / 1	90°	C/U	ISOVER Protect	LS	450	20	-	-	-	-	-	-	CFS-S ACR, 25	-
P2	Copper	1 x ∅42 / 1.2	90°	C/U	ISOVER Protect	LS	450	20	-	-	-	-	-	-		-
P3	Geberit Mepla	1 x ∅63 / 4.5	90°	U/C	ISOVER Protect	CS	∞	20	-	-	-	-	-	-		-
P4	Copper	1 x ∅88.9 / 2	90°	U/C	ISOVER Protect	LS	800	40	-	-	-	-	-	-		-

2.2.4.3.2. Test Report No. 319091602-2,Rev1

Tested in:	100 mm thick cross laminated timber wall (Binderholz BBS XL) with 5-layer structure Lamella thickness per layer 20 / 20 / 20 / 20 / 20 mm

TR 319091602-2,Rev1

No.	Material	Dimensions OD / wall thickness [mm]	Orientation	Pipe-end configuration	Insulation Acc. to EN1366-3:2009; Table 1				Pipe sealing system, as per EN 1366-3 3.12							
					Type	Set-up	Length [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Active components: Layers	Active components: Thickness [mm]	Active components: Length [mm]	Installation	Joint and gap sealing, depth [mm]	Fastening
P1	Copper	1 x ∅54 / 1.5	90°	C/U	ISOVER Protect	LS	450	20	-	-	-	-	-	-	CFS-S ACR, 25	-
P2	Geberit Mepla	1 x ∅16 / 2.25	90°	U/C	ISOVER Protect	CS	∞	20	-	-	-	-	-	-		-
P3	Geberit Mepla	1 x ∅40 / 3.5	90°	U/C	ISOVER Protect	LS	450	20	-	-	-	-	-	-		-
P4	Geberit Mepla	1 x ∅63 / 4.5	90°	U/C	ISOVER Protect	CS	∞	20	-	-	-	-	-	-		-

2.2.4.3.3. Test Report No. 319091602-3,Rev1

Tested in:	80 mm thick cross laminated timber wall (Binderholz BBS XL) with 3-layer structure Lamella thickness per layer 20 / 40 / 20 mm

TR 319091602-3,Rev1

No.	Material	Dimensions OD / wall thickness [mm]	Orientation	Pipe-end configuration	Insulation Acc. to EN1366-3:2009; Table 1				Pipe sealing system, as per EN 1366-3 3.12							
					Type	Set-up	Length [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Active components			Installation	Joint and gap sealing, depth [mm]	Fastening
											Layers	Thickness [mm]	Length [mm]			
P1	Copper	1 x ∅54 / 1.5	90°	C/U	ISOVER Protect	LS	450	20	-	-	-	-	-	-	CFS-S ACR, 25	-
P2	Geberit Mepla	1 x ∅16 / 2.25	90°	U/C	ISOVER Protect	CS	∞	20	-	-	-	-	-	-		-
P3	Geberit Mepla	1 x ∅40 / 3.5	90°	U/C	ISOVER Protect	LS	450	20	-	-	-	-	-	-		-
P4	Geberit Mepla	1 x ∅63 / 4.5	90°	U/C	ISOVER Protect	LS	450	20	-	-	-	-	-	-		-

3. Test reports and results

3.1. Test reports

Name of testing laboratory	Customer	Test Report No.	Test method
IBS Linz Petzoldstr. 45, A-4020 Linz	**HILTI AG** Feldkircher Str. 100 FL-9494 Schaan	319091602-3,Rev1 of 24.07.2020 (CLT W 80mm)	EN 1363-1: 1999 EN 1366-3: 2009
IBS Linz Petzoldstr. 45, A-4020 Linz	**HILTI AG** Feldkircher Str. 100 FL-9494 Schaan	319091602-2,Rev1 of 24.07.2020 (CLT W 100mm)	EN 1363-1: 1999 EN 1366-3: 2009
IBS Linz Petzoldstr. 45, A-4020 Linz	**HILTI AG** Feldkircher Str. 100 FL-9494 Schaan	319091602-1, Rev1 of 24.07.2020 (CLT W 100mm)	EN 1363-1: 1999 EN 1366-3: 2009
IBS Linz Petzoldstr. 45, A-4020 Linz	**HILTI AG** Feldkircher Str.100 FL-9494 Schaan	318092507-1,Rev2 of 12.10.2020 (CLT C 80mm)	EN 1363-1: 1999 EN 1366-3: 2009
IBS Linz Petzoldstr. 45, A-4020 Linz	**HILTI AG** Feldkircher Str. 100 FL-9494 Schaan	318092507-3,Rev2 of 12.10.2020 (CLT C 100mm)	EN 1363-1: 1999 EN 1366-3: 2009
IBS Linz Petzoldstr. 45, A-4020 Linz	**HILTI AG** Feldkircher Str. 100 FL-9494 Schaan	318092507-2,Rev2 of 12.10.2020 (CLT C 140mm)	EN 1363-1: 1999 EN 1366-3: 2009

3.2. Resistance to fire performance

Table 1: Terms of loading

Temperature-time curve:	Standard temperature-time curve (STTC) as specified in subsection 5.1.1 of EN 1363-1:2000. 2000.
Fire load:	Horizontal penetration seal (floor) Vertical penetration seal (wall)

Table 2: Test results

Test Report No. 318092507-1,Rev2 of 12.10.2020 EN 1366-3: 2009 in connection with EN 1363-1: 1999					
No.	**Pipe-end configuration**	**E - Integrity**			**I - Thermal insulation**
		Time until cotton wool pad ignition	Time until failure of gap gauge criteria	Time until occurrence of sustained flaming	Time until the maximum temperature rise exceeds 180 K on cold side
		[min]			
P1 - P2	C/U	≥ 60	≥ 60	≥ 60	≥ 60
P3 - P4	U/C	≥ 60	≥ 60	≥ 60	≥ 60
Specific supporting structure according to the specifications of EN 1366-3:2009, subsection 7.2.1 Floor construction in cross laminated timber made from spruce with a total thickness of 80 mm					

Test Report No. 318092507-2,Rev2 of 12.10.2020 EN 1366-3: 2009 in connection with EN 1363-1: 1999					
No.	**Pipe-end configuration**	**E - Integrity**			**I - Thermal insulation**
		Time until cotton wool pad ignition	Time until failure of gap gauge criteria	Time until occurrence of sustained flaming	Time until the maximum temperature rise exceeds 180 K on cold side
		[min]			
P1 - P2	C/U	≥ 120	≥ 120	≥ 120	≥ 120
P3 - P4	U/C	≥ 120	≥ 120	≥ 120	≥ 120
P48 - P50	C/U	≥ 120	≥ 120	≥ 120	≥ 120
Specific supporting structure according to the specifications of EN 1366-3:2009, subsection 7.2.1 Floor construction in cross laminated timber made from spruce with a total thickness of 140 mm					

Test Report No. 318092507-3,Rev2 of 12.10.2020 EN 1366-3: 2009 in connection with EN 1363-1: 1999					
No.	**Pipe-end configuration**	**E - Integrity**			**I - Thermal insulation**
		Time until cotton wool pad ignition	Time until failure of gap gauge criteria	Time until occurrence of sustained flaming	Time until the maximum tempera-ture rise exceeds 180 K on cold side
		[min]			
P1 - P2	C/U	≥ 90	≥ 90	≥ 90	≥ 90
P3 - P4	U/C	≥ 90	≥ 90	≥ 90	≥ 90
Specific supporting structure according to the specifications of EN 1366-3:2009, subsection 7.2.1 Floor construction in cross laminated timber made from spruce with a total thickness of 100 mm					

Test report 319091602-1 of 24.07.2020 EN 1366-3: 2009 in connection with EN 1363-1: 1999					
No.	**Pipe-end configuration**	**E - Integrity**			**I - Thermal insulation**
		Time until cotton wool pad ignition	Time until failure of gap gauge criteria	Time until occurrence of sustained flaming	Time until the maximum temperature rise exceeds 180 K on cold side
		[min]			
P1 - P2	C/U	≥ 90	≥ 90	≥ 90	≥ 90
P3	U/C	≥ 90	≥ 90	≥ 90	≥ 90
P4	C/U	≥ 90	≥ 90	≥ 90	≥ 90
Specific supporting structure according to the specifications of EN 1366-3:2009, subsection 7.2.1 Wall constructions in cross laminated timber made from spruce with a total thickness of 100 mm					

Test report 319091602-2 of 24.07.2020 EN 1366-3: 2009 in connection with EN 1363-1: 1999					
No.	**Pipe-end configuration**	**E - Integrity**			**I - Thermal insulation**
		Time until cotton wool pad ignition	Time until failure of gap gauge criteria	Time until occurrence of sustained flaming	Time until the maximum temperature rise exceeds 180 K on cold side
		[min]			
P1	C/U	≥ 90	≥ 90	≥ 90	≥ 90
P2 - P4	U/C	≥ 90	≥ 90	≥ 90	≥ 90
Specific supporting structure according to the specifications of EN 1366-3:2009, subsection 7.2.1 Wall constructions in cross laminated timber made from spruce with a total thickness of 100 mm					

Test report 319091602-3 of 24.07.2020 EN 1366-3: 2009 in connection with EN 1363-1: 1999					
No.	**Pipe-end configuration**	**E - Integrity**			**I - Thermal insulation**
		Time until cotton wool pad ignition	Time until failure of gap gauge crite-ria	Time until occurrence of sus-tained flam-ing	Time until the maximum temperature rise exceeds 180 K on cold side
		[min]			
P1	C/U	≥ 60	≥ 60	≥ 60	≥ 60
P2 - P4	U/C	≥ 60	≥ 60	≥ 60	≥ 60
Specific supporting structure according to the specifications of EN 1366-3:2009, subsection 7.2.1 Wall constructions in cross laminated timber made from spruce with a total thickness of 80 mm					

4. Classification and field of application

4.1. Reference for classification

This Classification is based on the normative reference EN 13501-2: 2016, section 7.

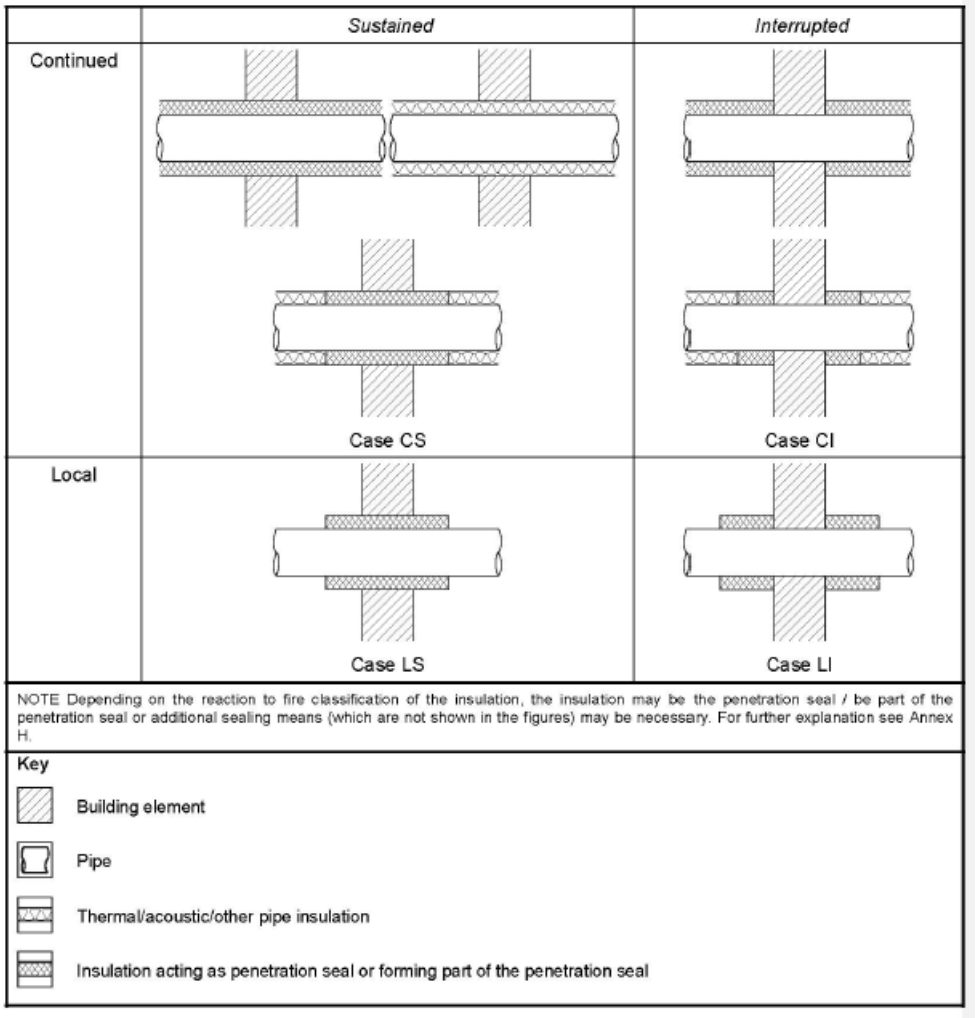
4.2. Reference for field of application

The field of direct application is based on the normative reference EN 1366-3:2009.

4.3. Definitions

4.3.1. Pipe insulation

This table contains terms that are used throughout the classification report for the various application fields of the pipe insulation.


Sustained
Interrupted
Continued
Case CS
Case CI
Local
Case LS
Case LI
NOTE Depending on the reaction to fire classification of the insulation, the insulation may be the penetration seal / be part of the penetration seal or additional sealing means (which are not shown in the figures) may be necessary. For further explanation see Annex H.
Key
Building element
Pipe
Thermal/acoustic/other pipe insulation
Insulation acting as penetration seal or forming part of the penetration seal

4.3.2. Positioning of sectional insulationsin the supporting structure

For both wall and floor application, the sectional insulation must be positioned symmetrically to the supporting structure.

4.3.3. Length of sectional insulation

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

4.3.4. Pipe orientation

4.3.4.1. Metal pipes with an insulation material of class A1 or A2

When a single metal pipe is tested perpendicular to the supporting structure, all angles between 90° and 45° are covered in accordance with EN 1366-3:2009 E.1.5.6.8.

4.3.5. Pipe support

Pipes and cables must be supported on both sides of the wall constructions or on the surface of the floor constructions at a distance of ≤ 350 mm.

4.3.6. Pipe-end configuration

Tests performed with pipe-end configuration U/U shall also cover the configurations C/U, U/C and C/C.

Tests performed with pipe-end configuration C/U shall also cover the configurations U/C and C/C.

Tests performed with pipe-end configuration U/C shall also cover the configuration C/C.

		Tested			
		U/U	*U/C*	*C/U*	*C/C*
Covered	*U/U*	Y	N	N	N
	U/C	Y	Y	N	N
	C/U	Y	Y	Y	N
	C/C	Y	Y	Y	Y
Y = acceptable, N = not acceptable					

4.3.7. Supporting structure (wall/floor)

Test results that include a specific supporting structure shall apply to separating building components made of the same material and with the same composition, at least with the same thickness and density, as the tested ones.

The covering of a horizontal supporting structure with inorganic materials (e.g. concrete covering) is acceptable.

Building components (supporting structures) shall be classified in relation to their fire resistance in compliance with EN 13501-2.

4.4. Hilti CFS-S ACR

4.4.1. Annular gaps

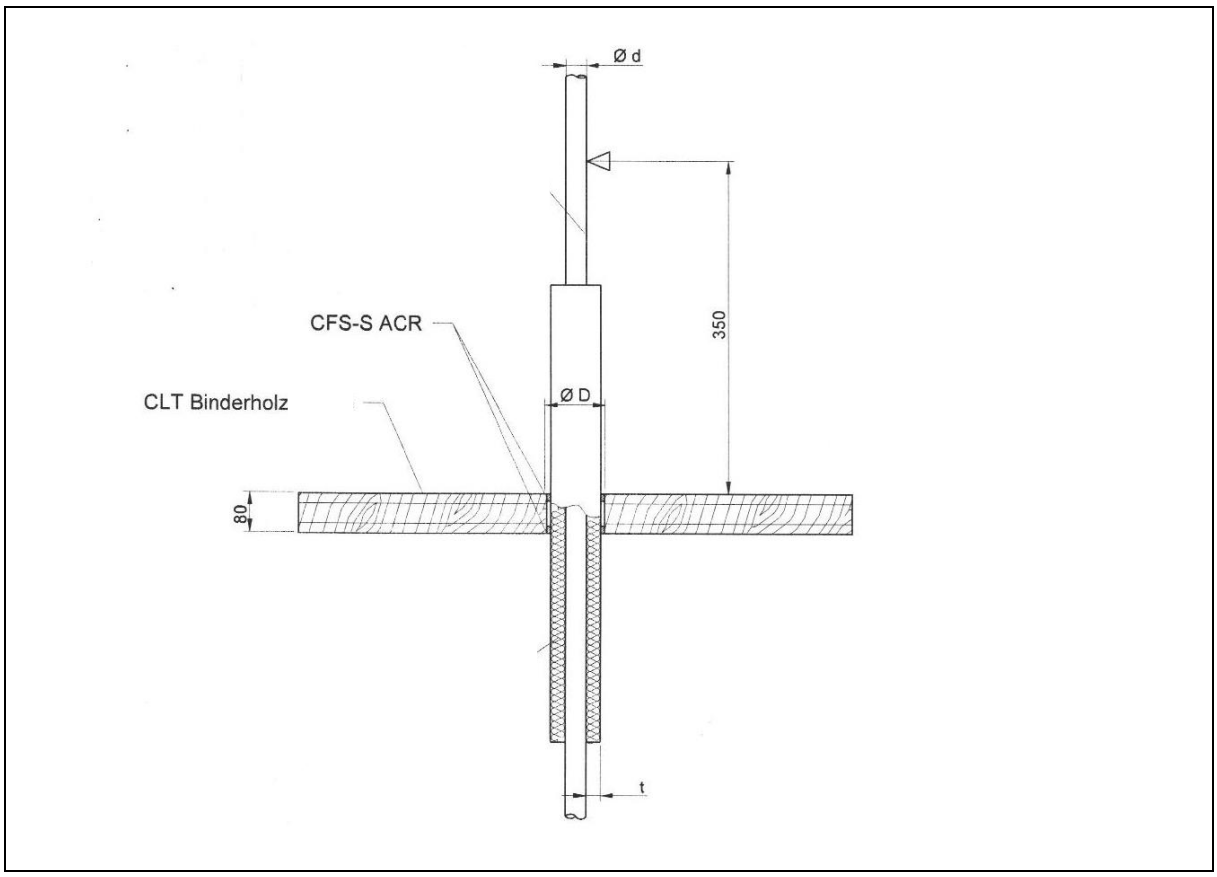
Maximum annular gap	≤ 15 mm
Filling depth	≥ 25 mm

4.4.2. Cross laminated timber floor ≥ 80 mm

4.4.2.1. Definition of supporting structure

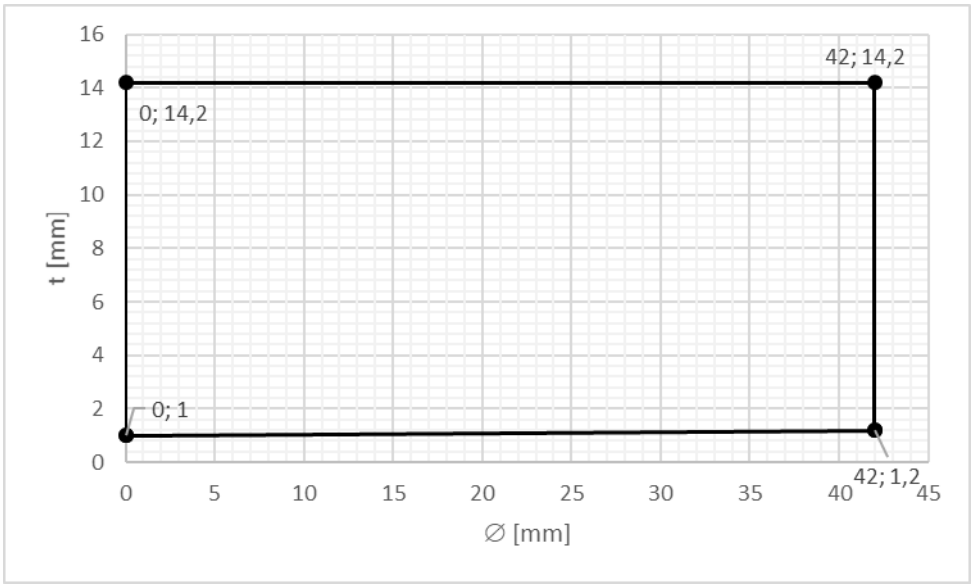
The floor must be ≥ 80 mm thick and have ≥ 3 layers of softwood, provided that each outer layer exhibits a thickness of ≥ 20 mm. Both PU and MUF adhesives are permitted. Edge glueing is not required.

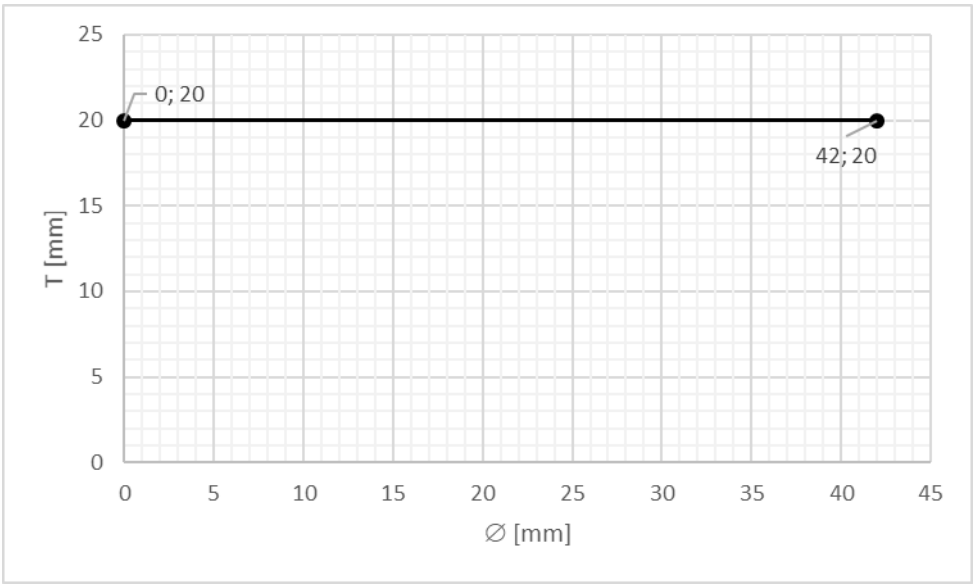
4.4.2.2. Detailed drawings



4.4.2.3. Metal pipes with non-combustible insulation

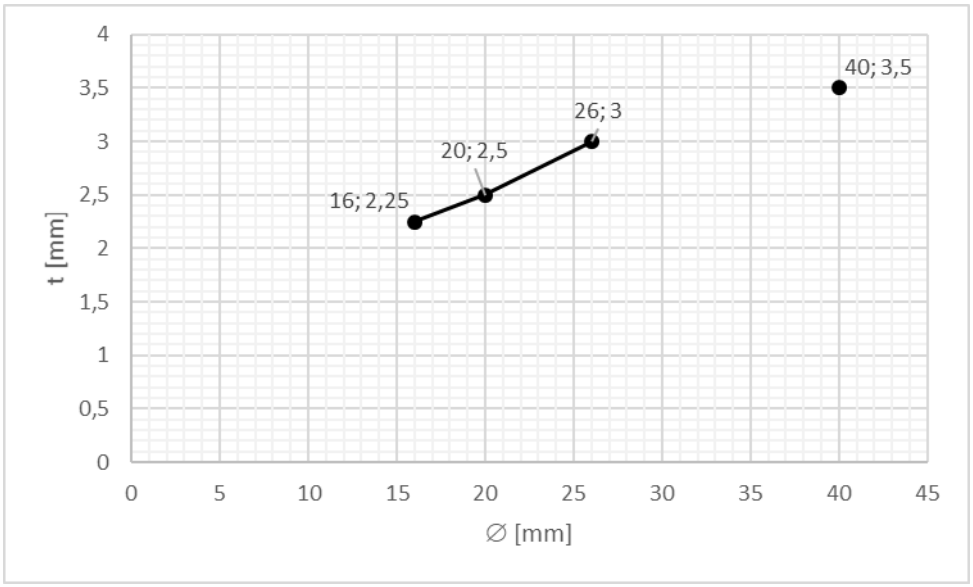
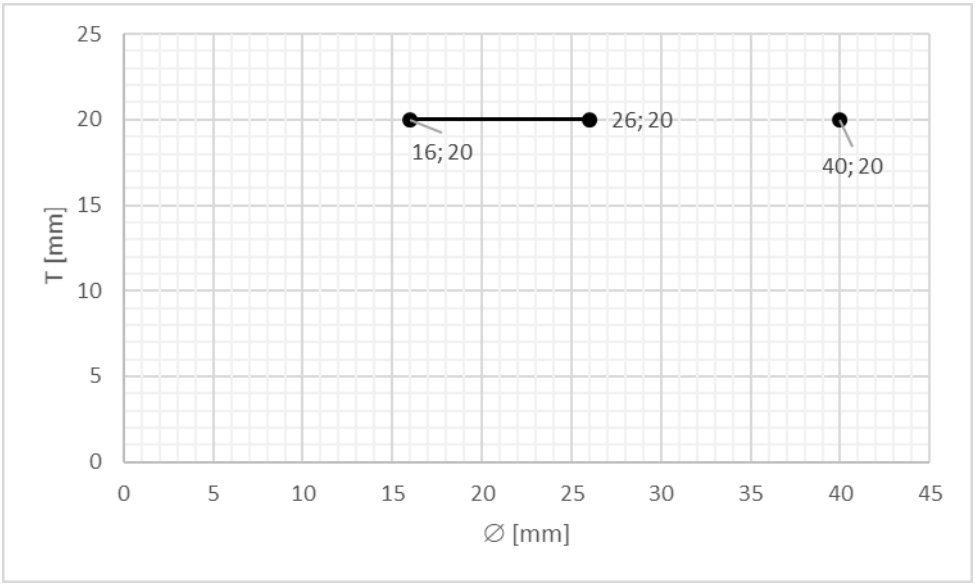
<table>
<tr><td rowspan="3">Copper pipe[1],
λ ≤ 380 W/mK

Insulation - LS / CS
Both sides ≥ 450 mm projecting</td><td>∅ = 0 - 42 mm</td><td rowspan="3">EI 60 – C/U</td></tr>
<tr><td>t = 1.0 – 14.2 mm</td></tr>
<tr><td>Mineral wool[2]
D = 20 mm</td></tr>
<tr><td colspan="2"> 


</td><td>318092507-1,Rev2
P1, P2</td></tr>
</table>

[1] Results on copper pipes also cover steel and stainless steel pipes
[2] Mineral wool of Euro Class A1 or A2 (densityρ ≥ 80 kg/m³; melting point Θ ≥ 1000 °C)

4.4.2.4. Aluminium composite pipes with non-combustible insulation

Geberit Mepla (rod) Insulation - LS / CS Both sides ≥ 500 mm projecting	∅ = 16 – 26, 40 mm t = 2.25 – 3, 3.5 mm Mineral wool[2] D = 20 mm	**EI 60 – U/C**
 		318092507-1,Rev2 P3 – P4

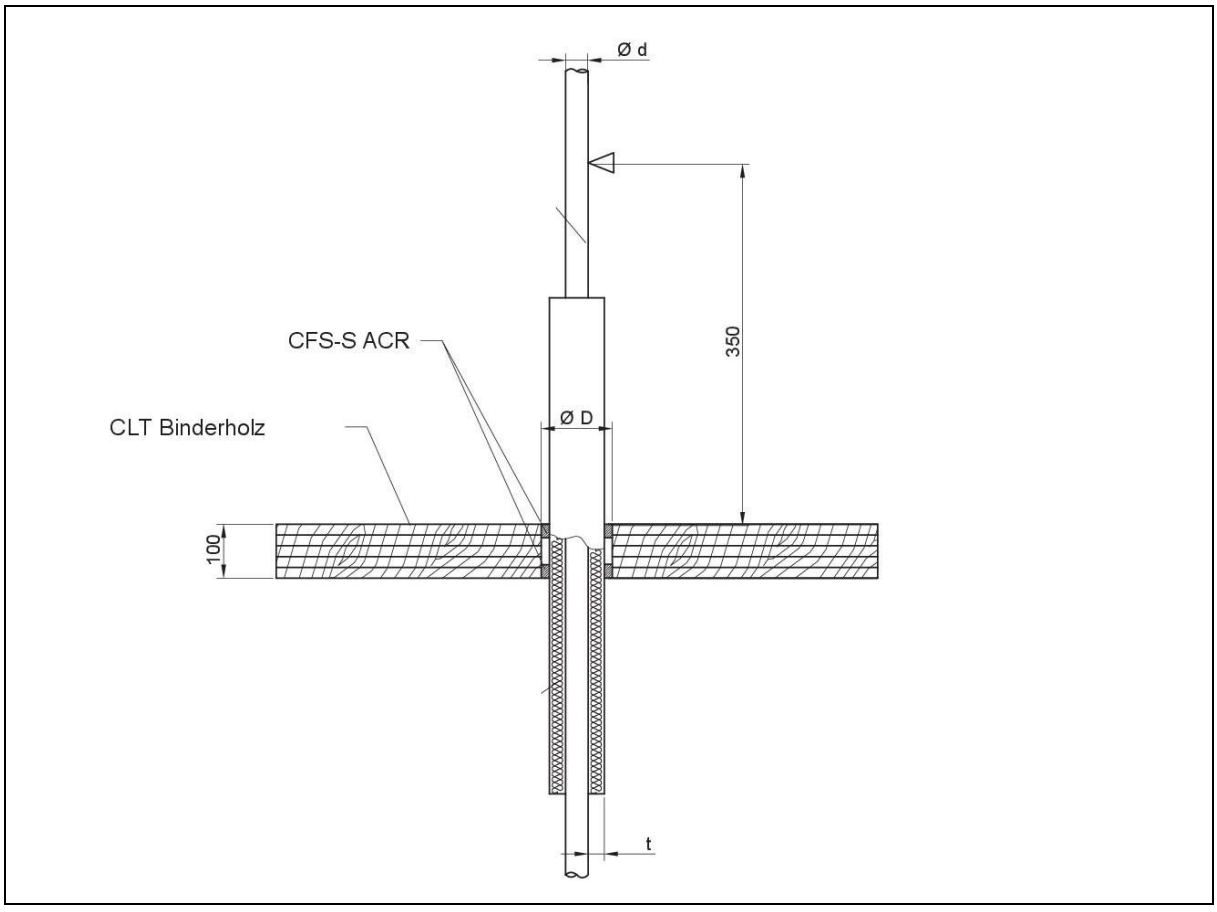
[2] Mineral wool of Euro Class A1 or A2 (densityρ ≥ 80 kg/m³; melting point Θ ≥ 1000 °C)

4.4.3. Cross laminated timber floor ≥ 100 mm

4.4.3.1. Definition of supporting structure

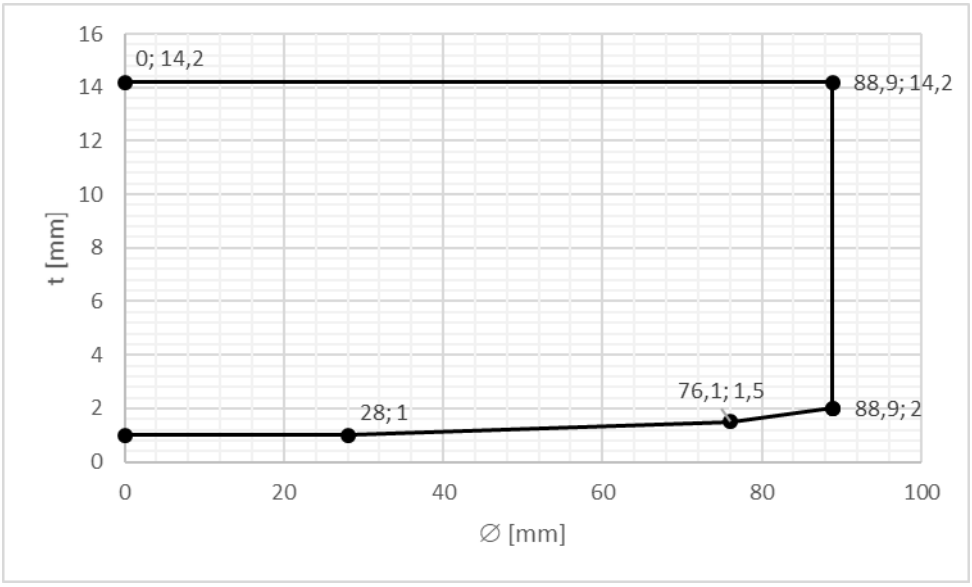
The floor must be ≥ 100 mm thick and have ≥ 3 layers of softwood, provided that each outer layer exhibits a thickness of ≥ 20 mm. Both PU and MUF adhesives are permitted. Edge glueing is not required.

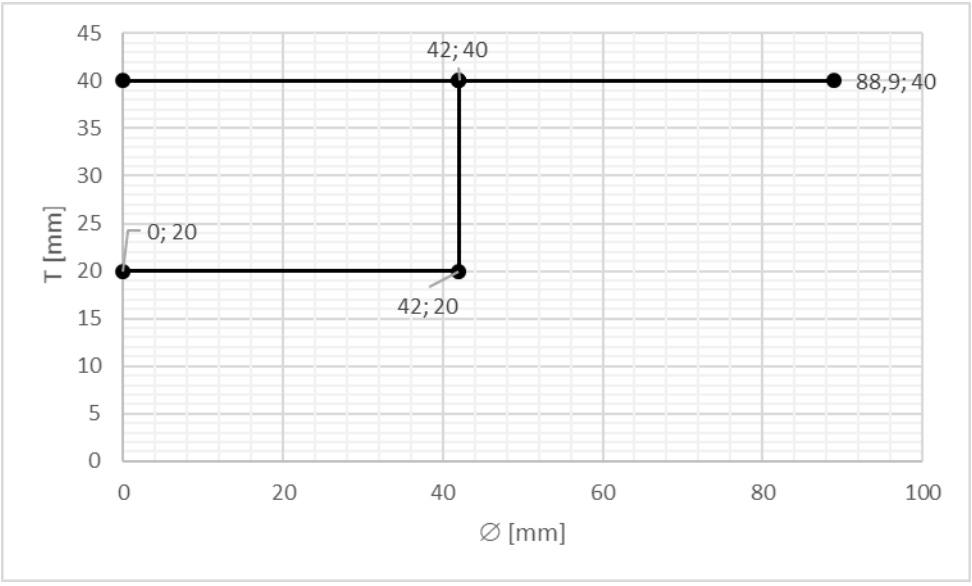
4.4.3.2. Detailed drawings



4.4.3.3. Metal pipes with non-combustible insulation

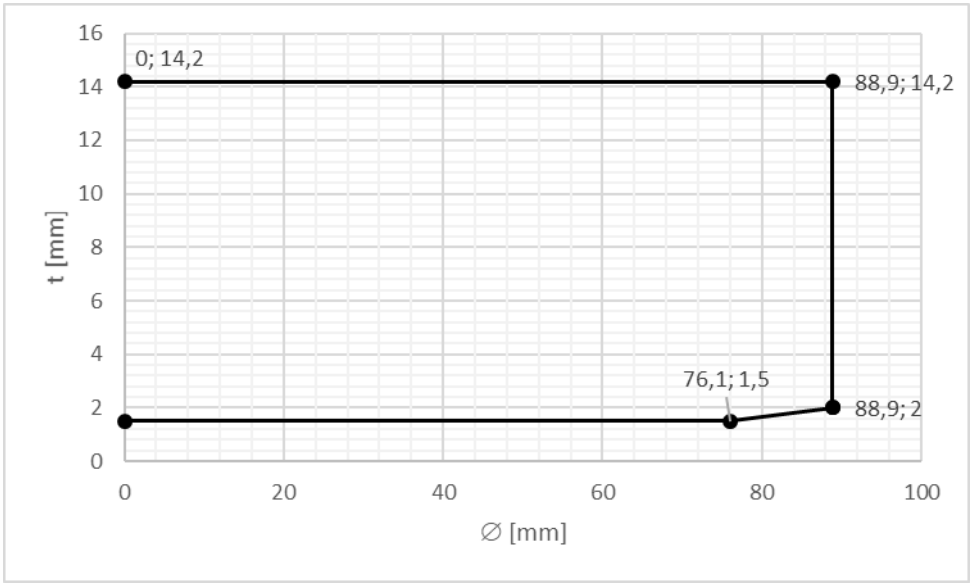
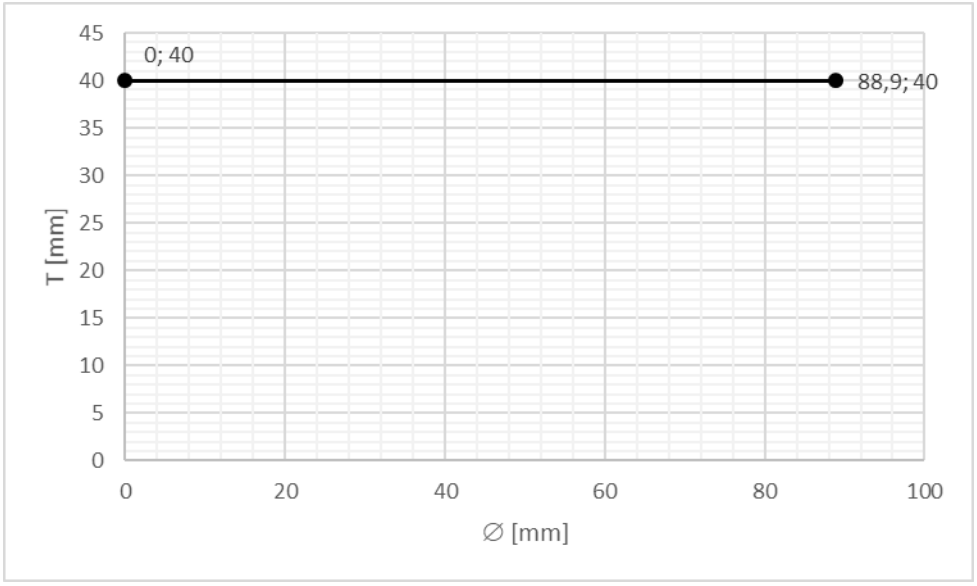
<table>
<tr><td rowspan="3">Copper pipe[1],
λ ≤ 380 W/mK

Insulation - LS / CS
Both sides ≥ 450 mm projecting</td><td>∅ = 0 - 42 mm</td><td rowspan="3">EI 60 – C/U</td></tr>
<tr><td>t = 1.0 – 14.2 mm</td></tr>
<tr><td>Mineral wool[2]
D = 20 mm</td></tr>
<tr><td colspan="2"> 


</td><td>318092507-1,Rev2
P1, P2

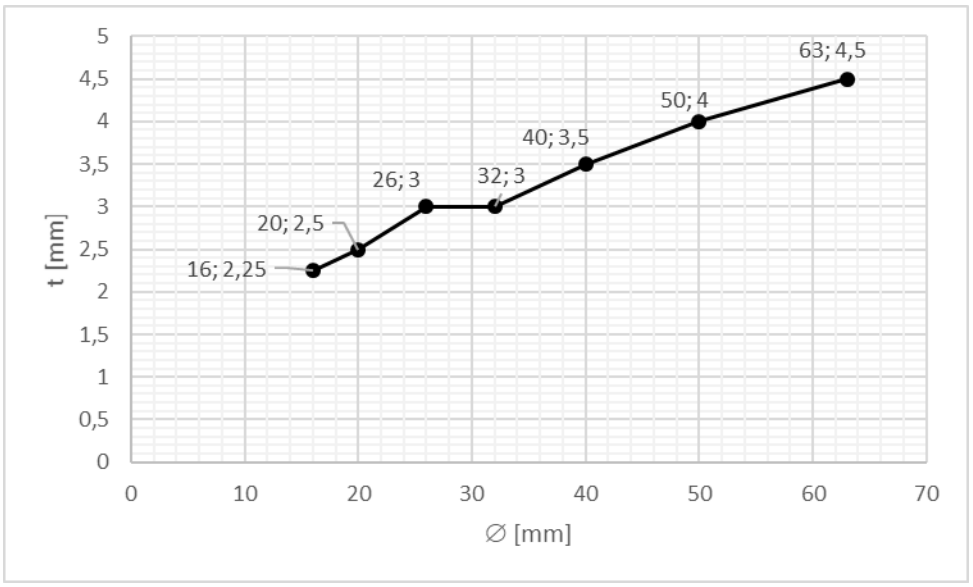
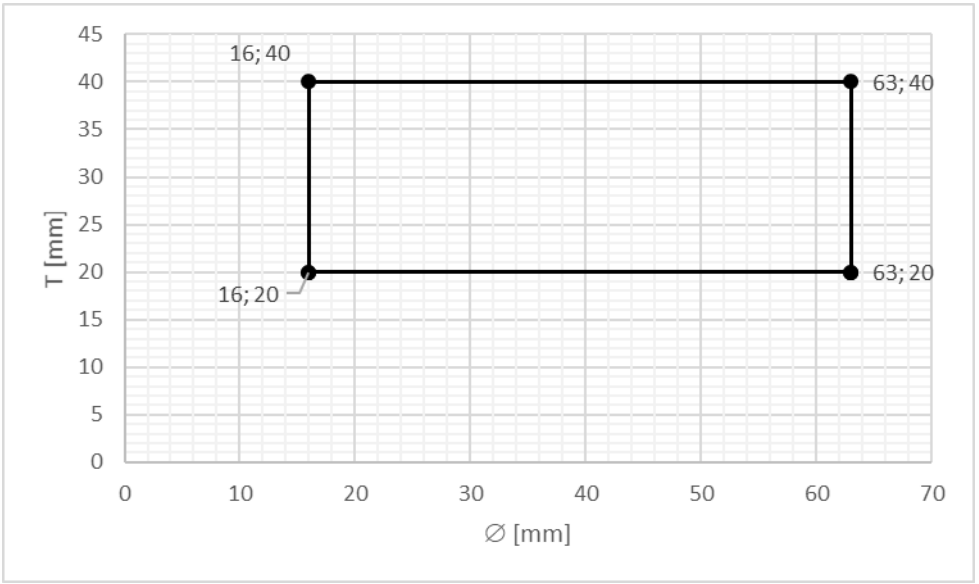
318092507-3,Rev2
P1, P2</td></tr>
</table>

[1] Results on copper pipes also cover steel and stainless steel pipes
[2] Mineral wool of Euro Class A1 or A2 (density ρ ≥ 80 kg/m³; melting point Θ ≥ 1000 °C)

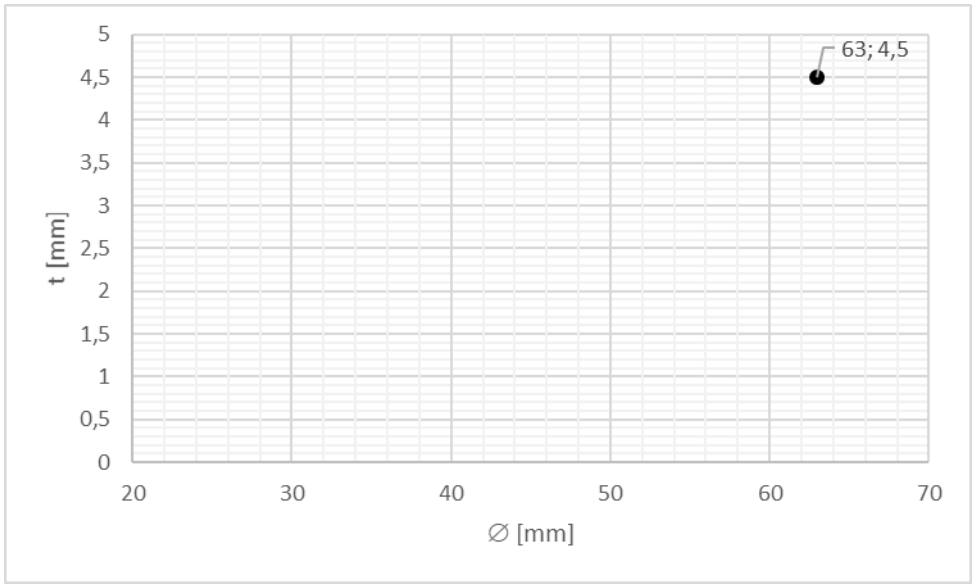
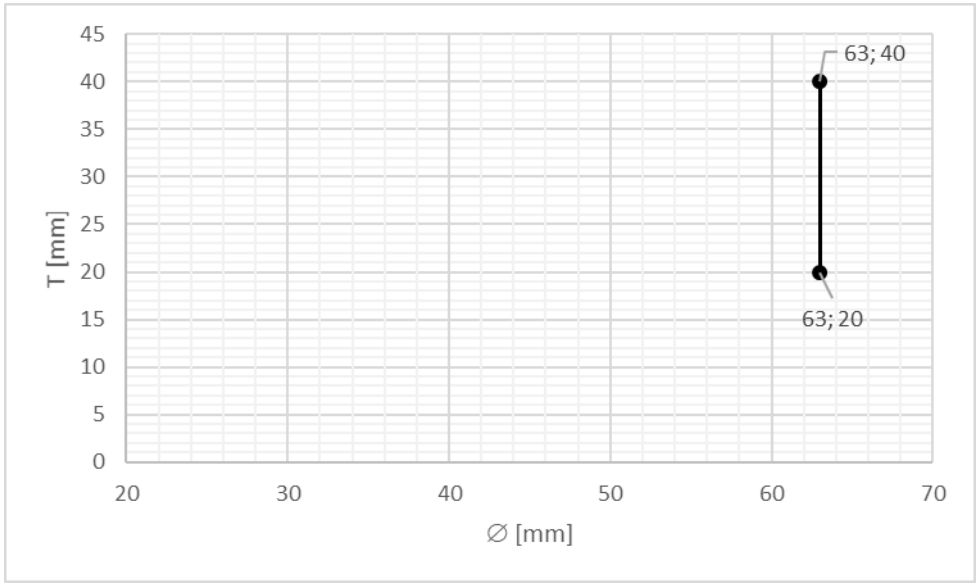
Copper pipe[1], λ ≤ 380 W/mK Insulation - LS / CS Both sides ≥ 450 mm projecting	∅ = 0 - 88.9 mm t = 1.5 – 14.2 mm Mineral wool[2] T = 20 - 40 mm	**EI 90 – C/U**
 		318092507-1,Rev2 P1, P2 318092507-3,Rev2 P1, P2

[1] Results on copper pipes also cover steel and stainless steel pipes
[2] Mineral wool of Euro Class A1 or A2 (density ρ ≥ 80 kg/m³; melting point Θ ≥ 1000 °C)

4.4.3.4. Aluminium composite pipes with non-combustible insulation

Geberit Mepla Insulation - LS / CS Both sides ≥ 500 mm projecting	∅ = 16; 40; 63 mm t = 2.25; 3.5; 4.5 mm Mineral wool[2] D = 20 mm	**EI 60 – U/C**
 		318092507-1,Rev2 P3 – P4 318092507-3,Rev2 P3 – P4

[2] Mineral wool of Euro Class A1 or A2 (densityρ ≥ 80 kg/m³; melting point Θ ≥ 1000 °C)

Geberit Mepla Insulation - LS / CS Both sides ≥ 500 mm projecting	∅ = 63 mm t = 4.5 mm Mineral wool[2] T = 20 – 40 mm	**EI 90 – U/C**
 		318092507-3,Rev2 P3 – P4

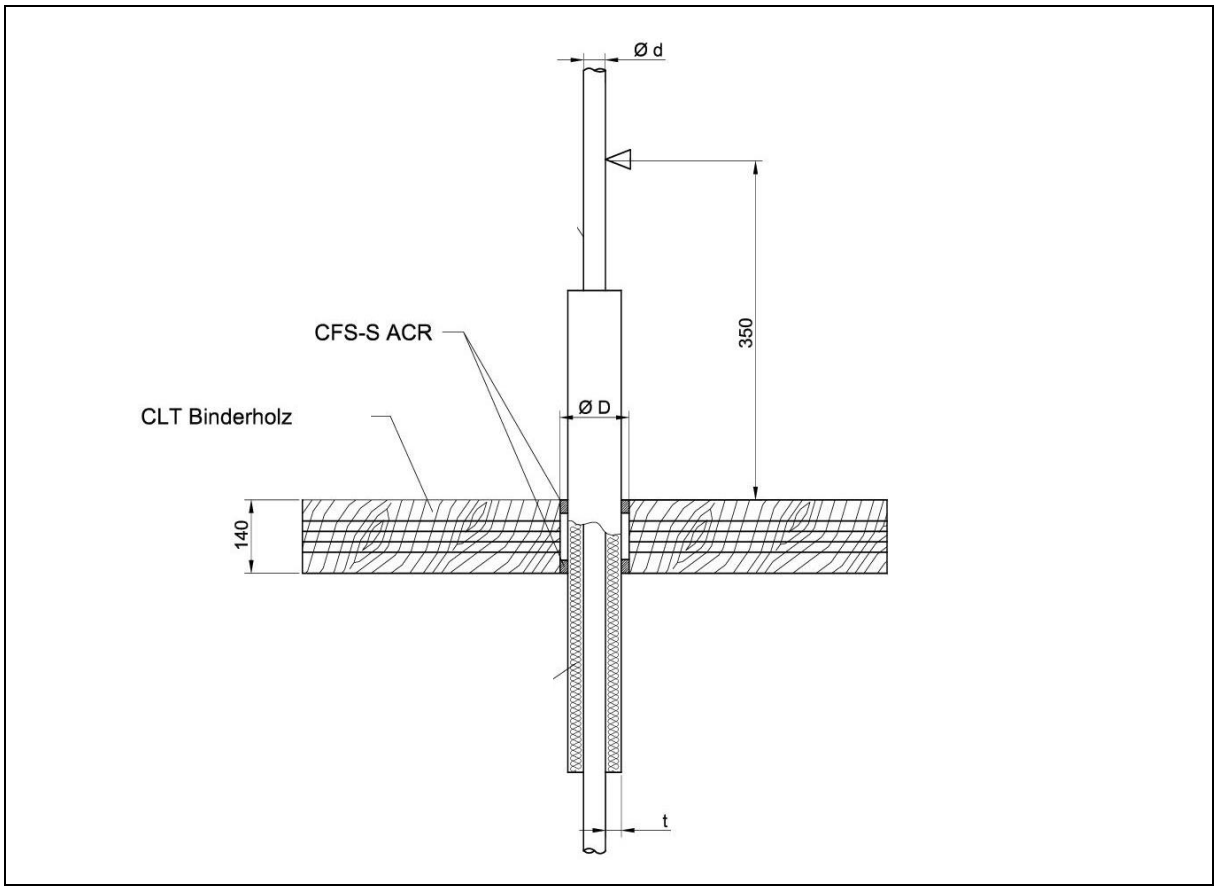
[2] Mineral wool of Euro Class A1 or A2 (density ρ ≥ 80 kg/m³; melting point Θ ≥ 1000 °C)

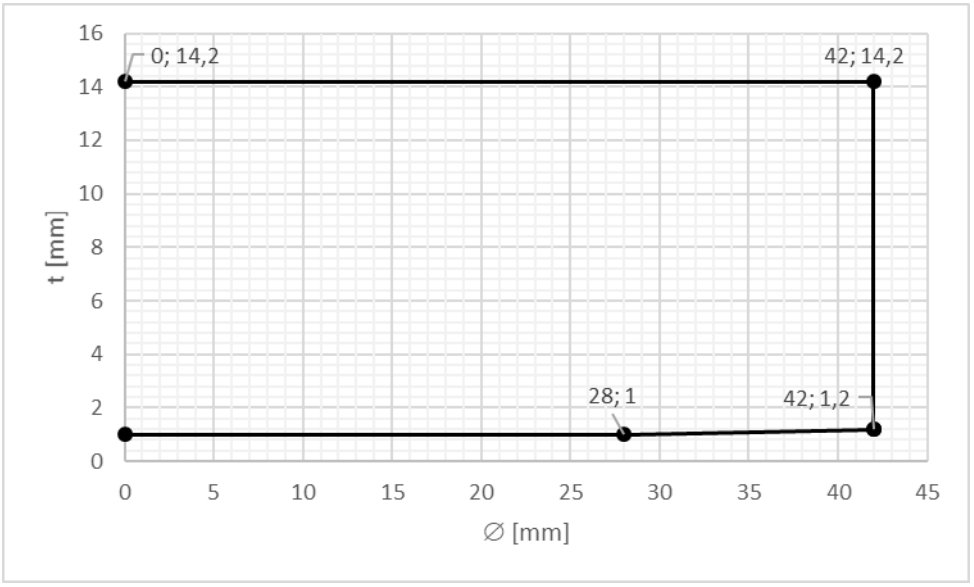
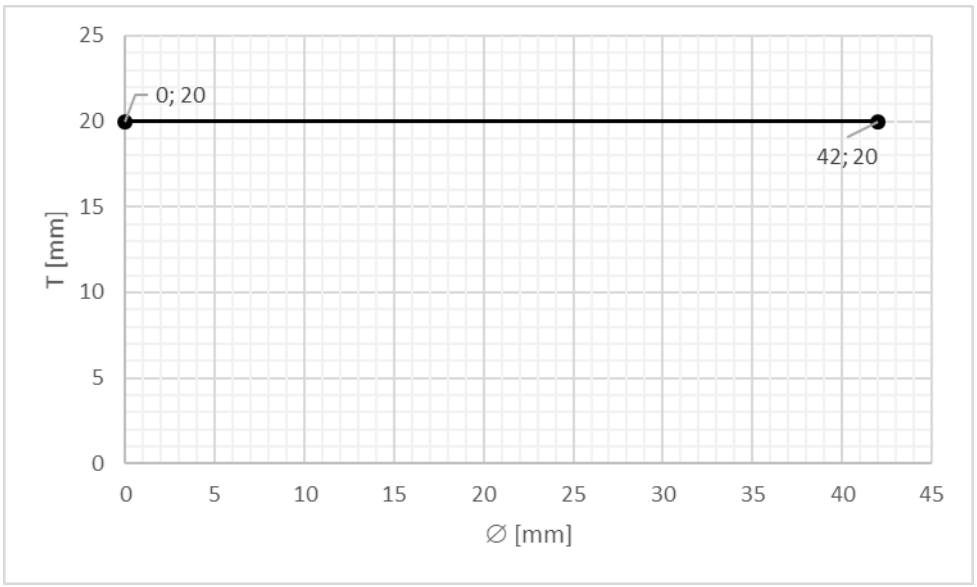
4.4.4. Cross laminated timber floor ≥ 140 mm

4.4.4.1. Definition of supporting structure

The floor must be ≥ 140 mm thick and have ≥ 3 layers of softwood, provided that each outer layer exhibits a thickness of ≥ 40 mm. Both PU and MUF adhesives are permitted. Edge glueing is not required.

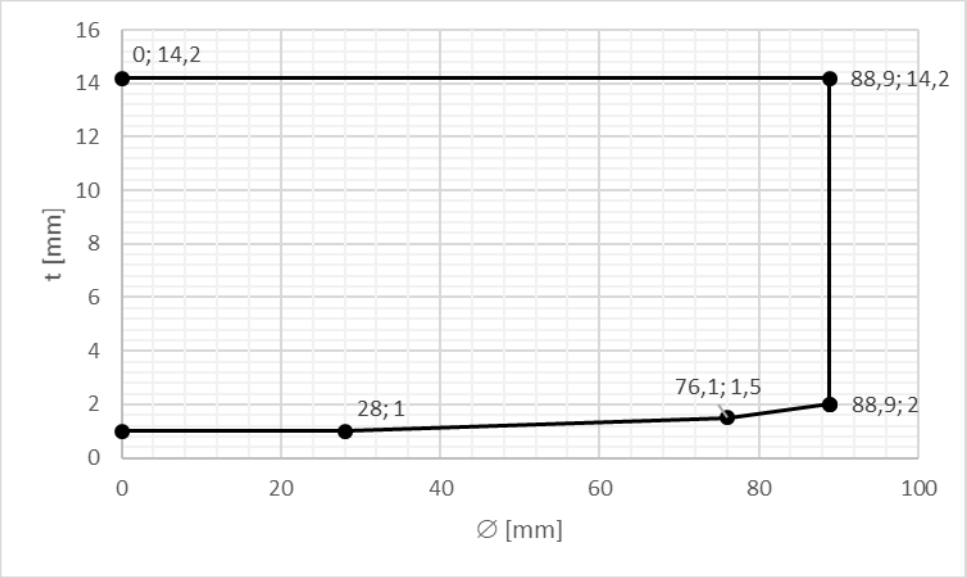
4.4.4.2. Detailed drawings

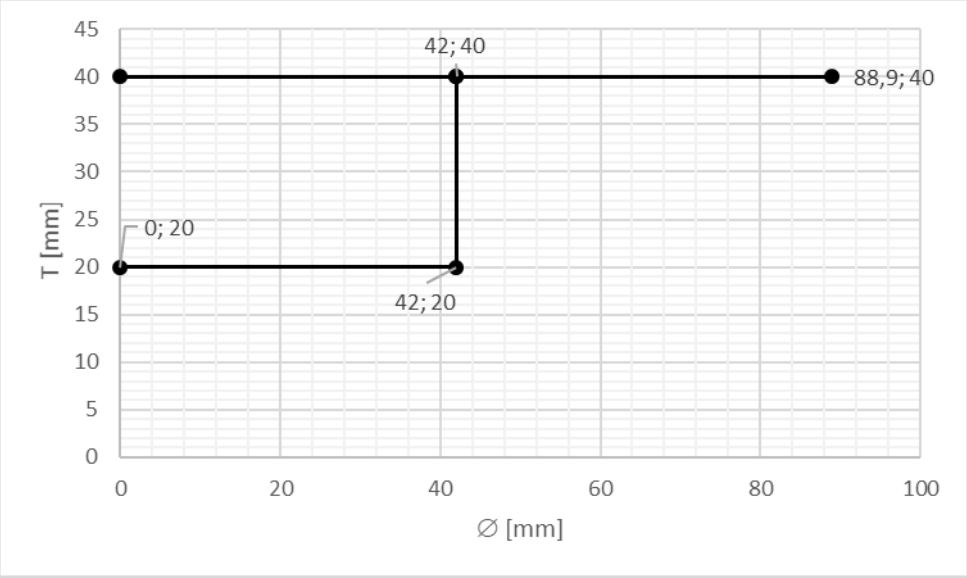


Copper pipe[1], λ ≤ 380 W/mK Insulation - LS / CS Both sides ≥ 450 mm projecting	∅ = 0- 42 mm t = 1.0 – 14.2 mm Mineral wool[2] D = 20 mm	**EI 120 – C/U**
 		318092507-2,Rev2 P1, P2, P28, P49, P50

[1] Results on copper pipes also cover steel and stainless steel pipes

<table>
<tr><td rowspan="3">Copper pipe[1],
λ ≤ 380 W/mK

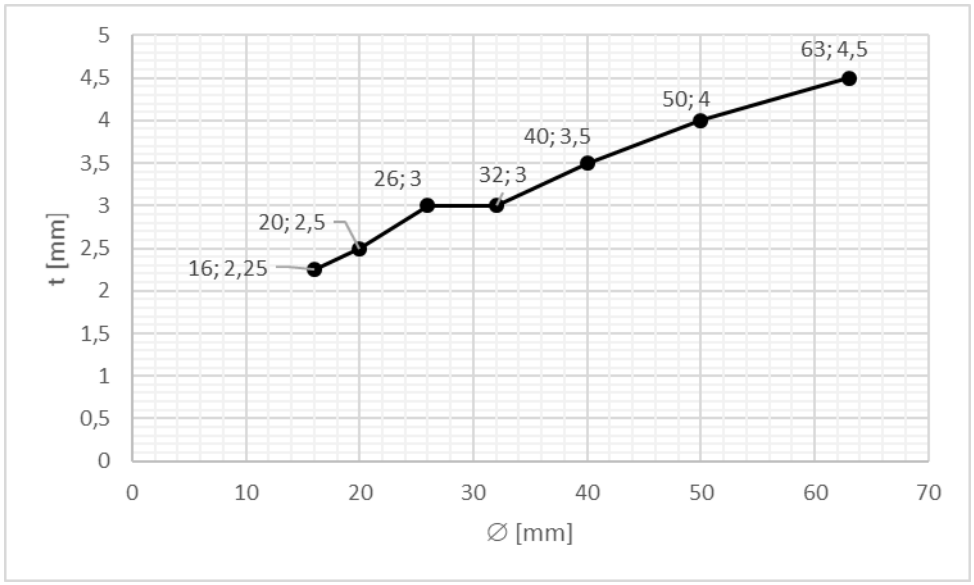
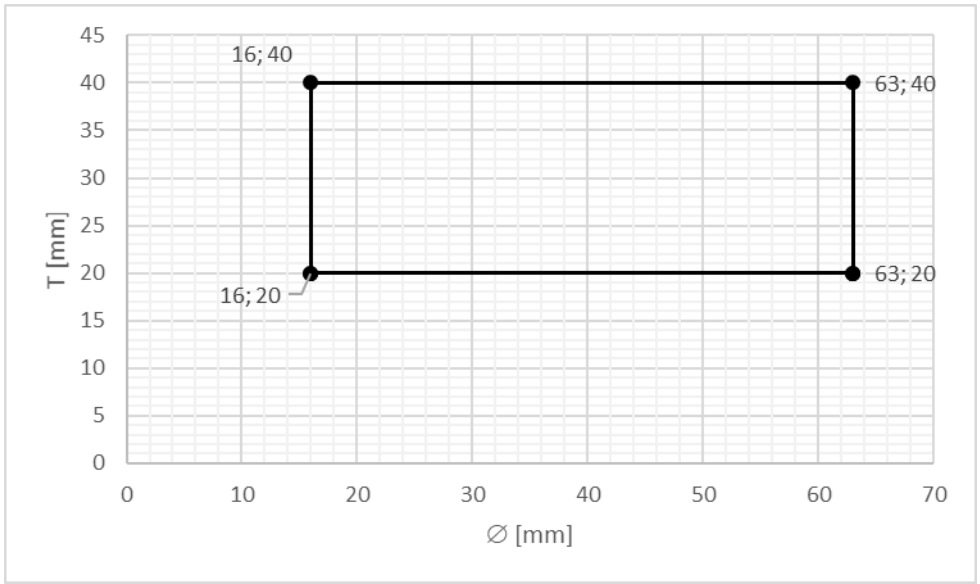
Insulation - LS / CS
Both sides ≥ 450 mm projecting</td><td>∅ = 0 - 88.9 mm</td><td rowspan="3">EI 90 – C/U</td></tr>
<tr><td>t = 1.0 – 14.2 mm</td></tr>
<tr><td>Mineral wool[2]
T = 20 - 40 mm</td></tr>
<tr><td colspan="2"> 


</td><td>318092507-2,Rev2
P1, P2

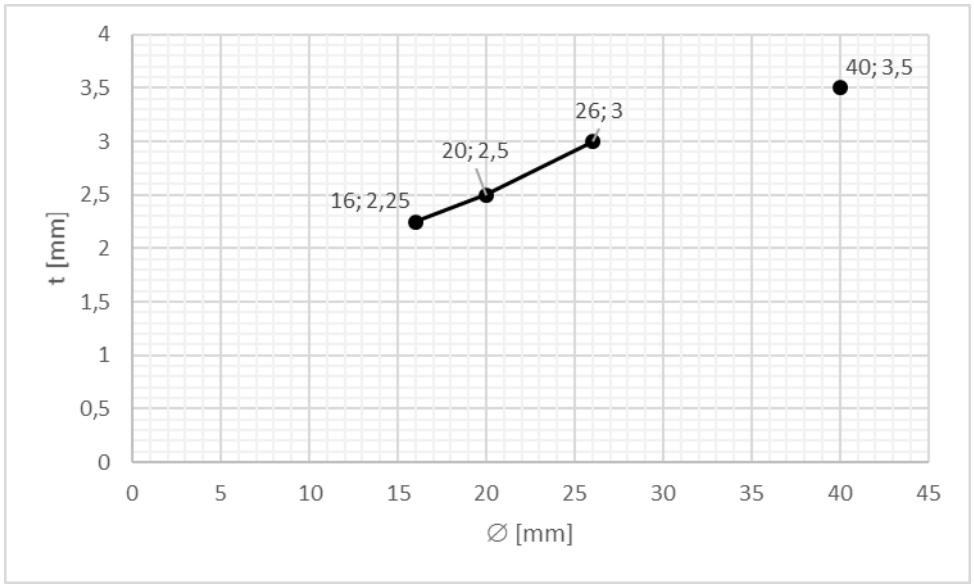
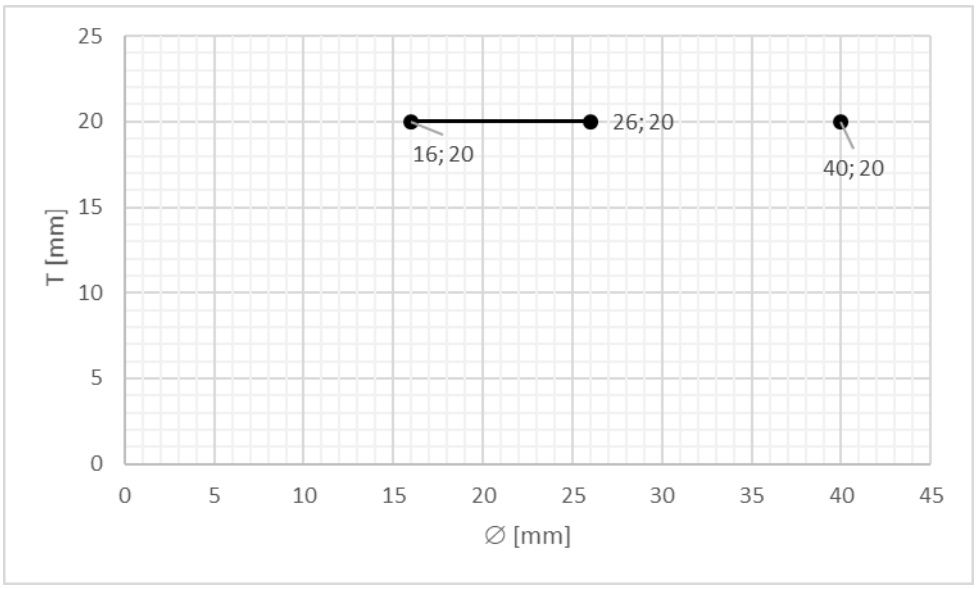
318092507-3,Rev2
P1, P2</td></tr>
</table>

[1] Results on copper pipes also cover steel and stainless steel pipes
[2] Mineral wool of Euro Class A1 or A2 (density ρ ≥ 80 kg/m³; melting point Θ ≥ 1000 °C)

4.4.4.3. Aluminium composite pipes with non-combustible insulation

Geberit Mepla Insulation - LS / CS Both sides ≥ 500 mm projecting	∅ = 16 - 63 mm t = 2.25 - 4.5 mm Mineral wool[2] T = 20 – 40 mm	**EI 90 – U/C**
 		318092507-2,Rev2 P3 – P4 318092507-3,Rev2 P3 – P4

[2] Mineral wool of Euro Class A1 or A2 (density ρ ≥ 80 kg/m³; melting point Θ ≥ 1000 °C)

Geberit Mepla (rod) Insulation - LS / CS Both sides ≥ 500 mm projecting	∅ = 16 – 26, 40 mm t = 2.25 – 3, 3.5 mm Mineral wool[2] D = 20 mm	**EI 120 – U/C**
 		318092507-2,Rev2 P3 – P4

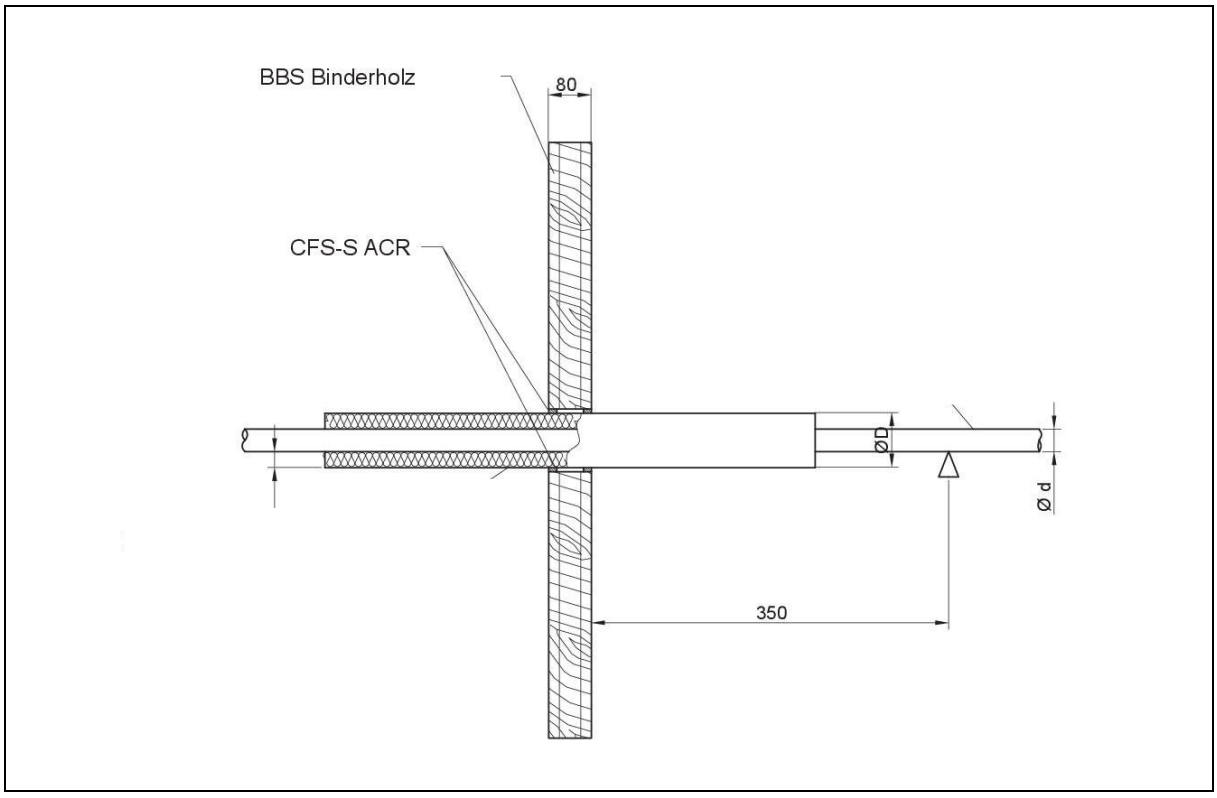
[2] Mineral wool of Euro Class A1 or A2 (density ρ ≥ 80 kg/m³; melting point Θ ≥ 1000 °C)

4.4.5. Cross laminated timber wall ≥ 80 mm

4.4.5.1. Definition of supporting structure

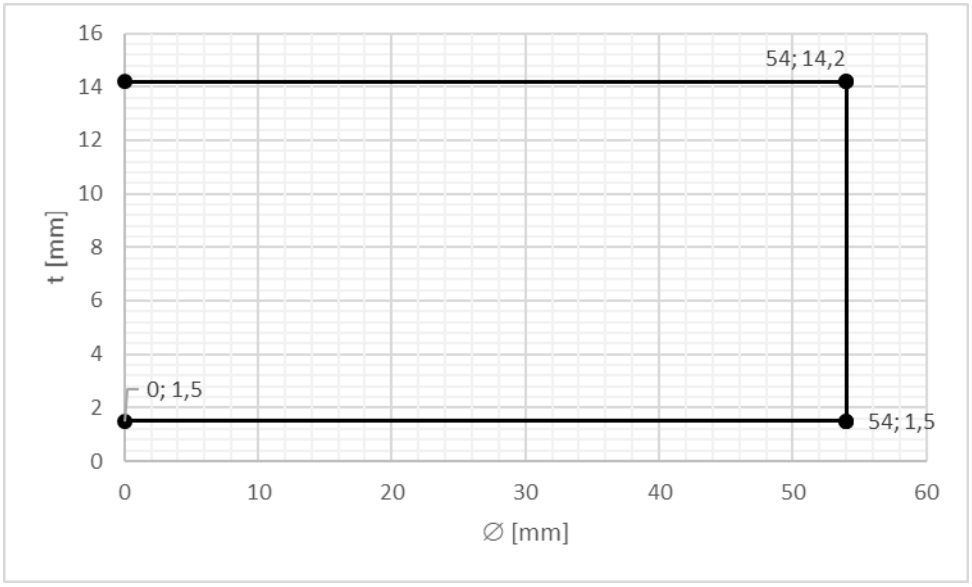
The wall must be ≥ 80 mm thick and have ≥ 3 layers of softwood, provided that each outer layer exhibits a thickness of ≥ 20 mm. Both PU and MUF adhesives are permitted. Edge glueing is not required.

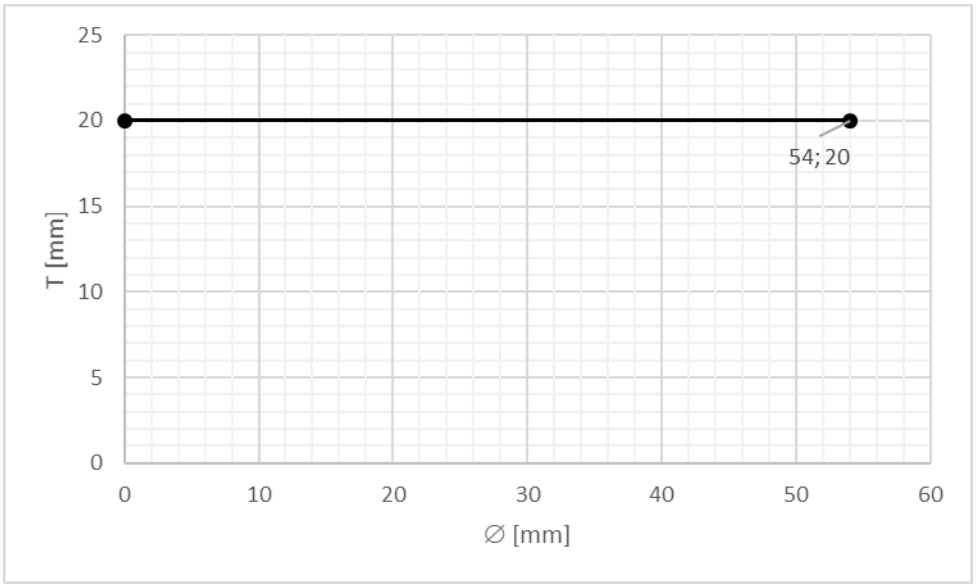
4.4.5.2. Detailed drawings



4.4.5.3. Metal pipes with non-combustible insulation

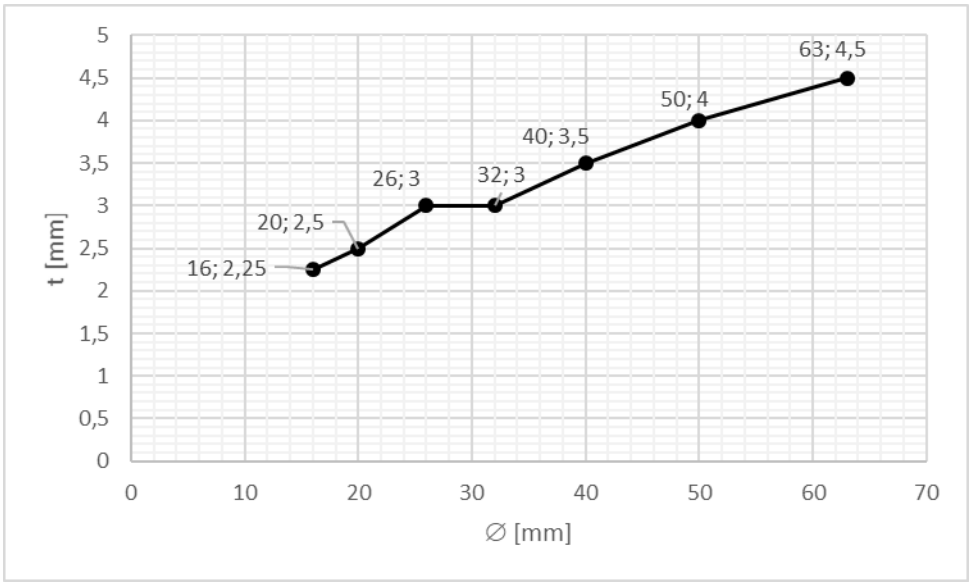
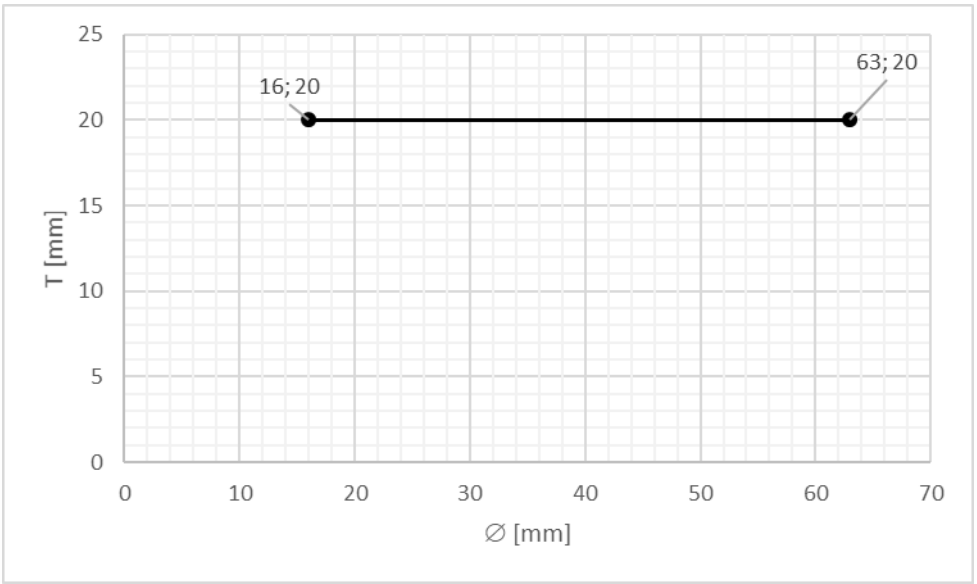
<table>
<tr><td rowspan="3">Copper pipe[1],
λ ≤ 380 W/mK

Insulation - LS / CS
Both sides ≥ 450 mm projecting</td><td>∅ = 0 - 54 mm</td><td rowspan="3">EI 60 – C/U</td></tr>
<tr><td>t = 1.5 – 14.2 mm</td></tr>
<tr><td>Mineral wool[2]
D = 20 mm</td></tr>
<tr><td colspan="2"> 


</td><td>319091602-3
P1</td></tr>
</table>

[1] Results on copper pipes also cover steel and stainless steel pipes
[2] Mineral wool of Euro Class A1 or A2 (density ρ ≥ 80 kg/m³; melting point Θ ≥ 1000 °C)

4.4.5.4. Aluminium composite pipes with non-combustible insulation

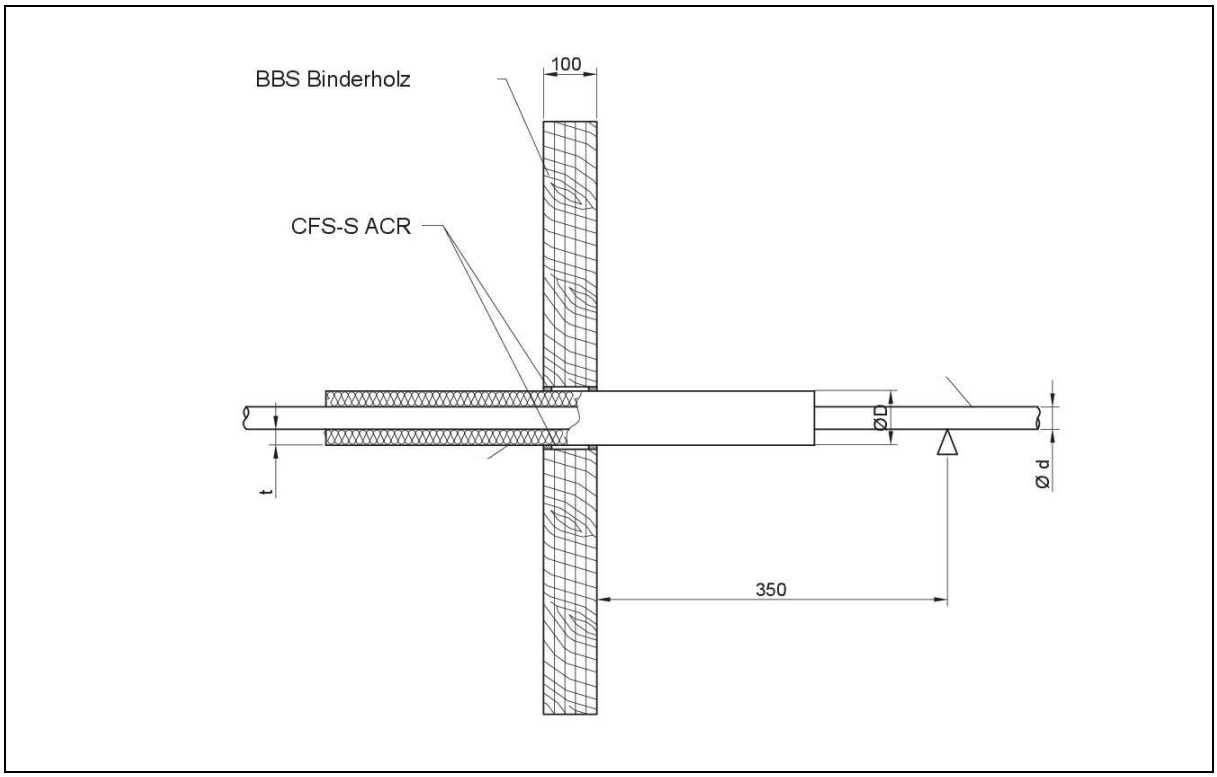
Geberit Mepla Insulation - CS	∅ = 16 - 63 mm t = 2.25 – 4.5 mm Mineral wool[2] D = 20 mm	**EI 60 – U/C**
 		319091602-3 P2, P3, P4

4.4.6. Cross laminated timber wall ≥ 100 mm

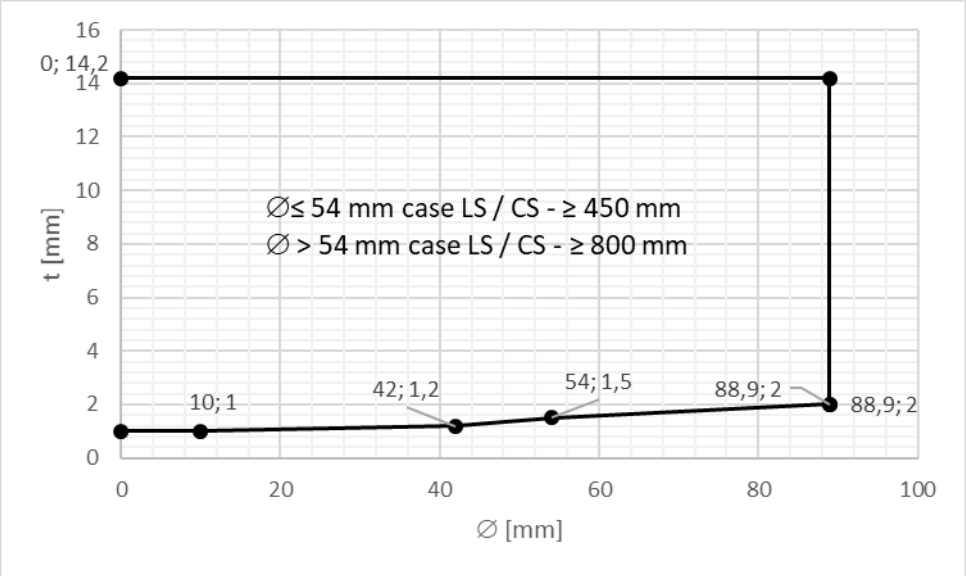
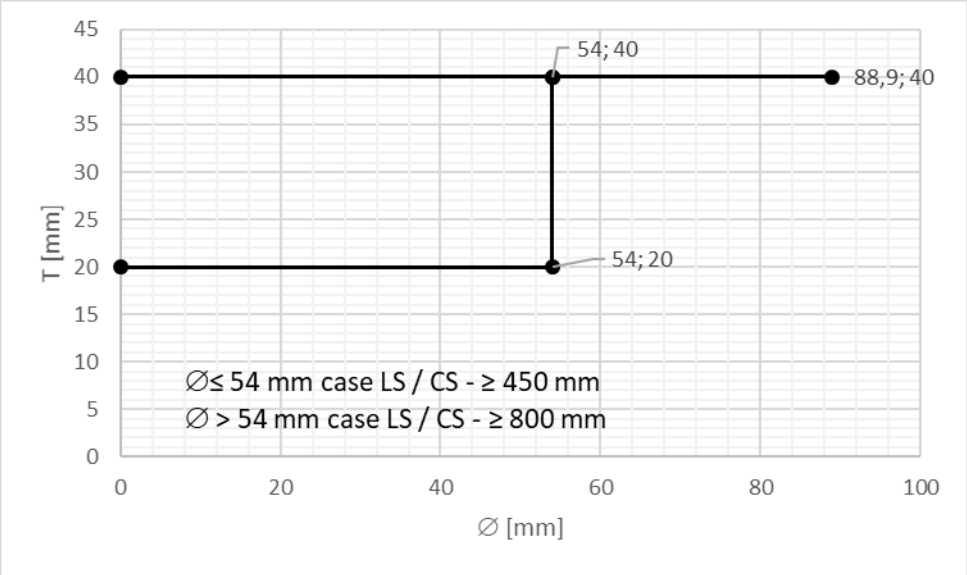
4.4.6.1. Definition of supporting structure

The wall must be ≥ 100 mm thick and have ≥ 3 layers of softwood, provided that each outer layer exhibits a thickness of ≥ 20 mm. Both PU and MUF adhesives are permitted. Edge glueing is not required.

4.4.6.2. Detailed drawings

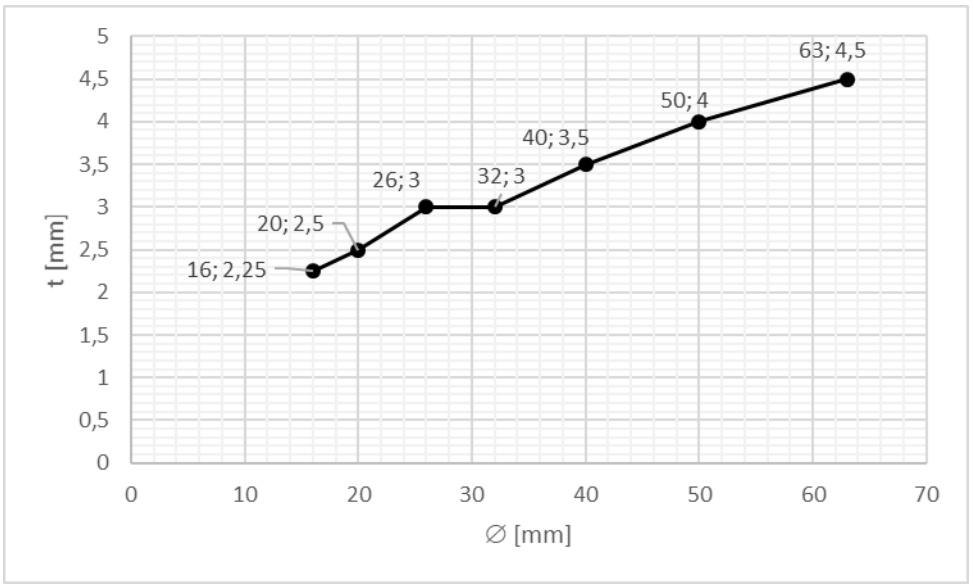
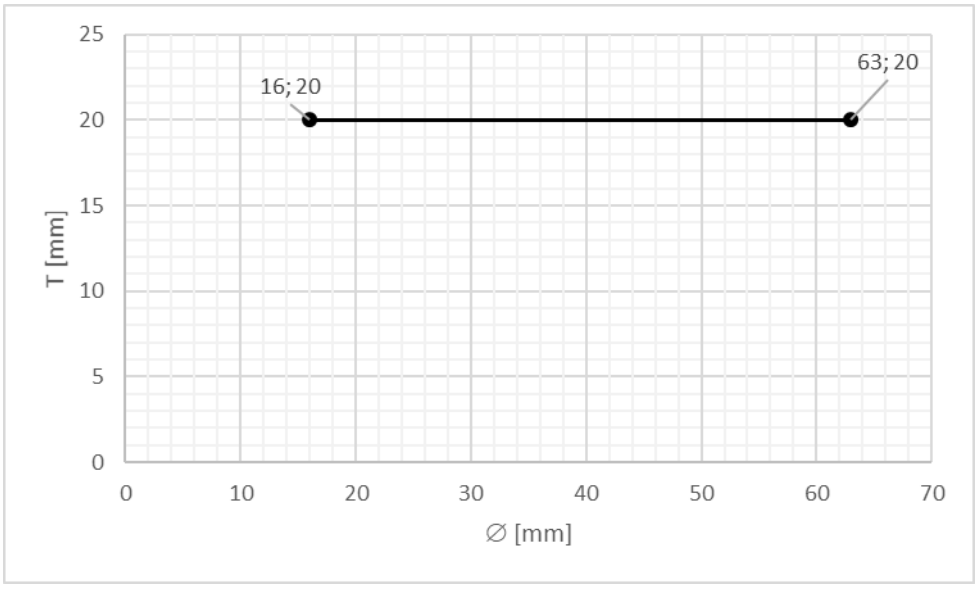


4.4.6.3. Metal pipes with non-combustible insulation

Copper pipe[1], λ ≤ 380 W/mK Insulation - LS / CS Both sides ≥ 450-800 mm projecting	∅ = 10 - 88.9 mm t = 1.0 – 14.2 mm Mineral wool[2] T = 20 - 40 mm	**EI 90 – C/U**
 		319091602-1 P1, P2, P4 319091602-2 P1

[1] Results on copper pipes also cover steel and stainless steel pipes

4.4.6.4. Aluminium composite pipes with non-combustible insulation

Geberit Mepla (rod) Insulation - LS / CS Both sides ≥ 500 mm projecting	∅ = 16 - 63 mm t = 2.25 – 4.5 mm Mineral wool[2] D = 20 mm	**EI 90 – U/C**
 		319091602-1 P3 319091602-2 P3, P4

5. Limitations

The classification given above result from the field of direct application according to EN 1366-3:2009-05 for Hilti CFS-S ACR annular gap seal for timber building components in wooden structures.

5.1. Warning

This report does not constitute any type approval or certification of the tested product.

IBS-INSTITUT FÜR BRANDSCHUTZTECHNIK UND SICHERHEITSFORSCHUNG GESELLSCHAFT M.B.H.
Akkreditierte Prüf-, Inspektions- und Zertifizierungsstelle

Unterzeichner	Manfred Eglauer
Datum/Zeit-UTC	2021-03-03T13:25:08+01:00
Prüfinformation	Informationen zur Prüfung der elektronischen Signatur finden Sie unter: https://www.signaturpruefung.gv.at

Mr Manfred EGLAUER
Engineer

Unterzeichner	Dipl.-Ing. Ulrich Stöckl
Datum/Zeit-UTC	2021-03-04T09:41:17+01:00
Prüfinformation	Informationen zur Prüfung der elektronischen Signatur finden Sie unter: https://www.signaturpruefung.gv.at

Mr Ulrich STÖCKL
Monitoring

Information on multiple electronic signatures on documents can be found here!