DECLARATION OF PERFORMANCE
No.: DoP 11/2019

1. Unique identification code of product-type:

INTU FR WRAP L

2. Intended uses:

Restoring the fire resistance of flexible walls, rigid walls, and rigid ceilings when they carry installation penetrations for plastic pipes (with or without insulation), insulated metal pipes, single or in bundles, with or without heating cable, cables, or cables in conduits

3. Manufacturer:

ALFASEAL GROUP Sp. z o.o.
ul. Kineskopowa 1, 05-500 Piaseczno

4. Authorized representative:

Not applicable

5. System or systems of Assessment and Verification of Constancy of Performance (AVCP):

System 1

6a. Harmonised standard:	**Not applicable**
Notified body or bodies:	**Not applicable**
6b. European Assessment Document:	**EAD 350454-00-1104**
European Technical Assessment:	**ETA-18/0593 of 30.09.2025**
Technical Assessment Body:	**ITB, ul. Filtrowa 1, 00-611 Warszawa**
Notified body or bodies:	**No. 1488**

7. Declared performance:

Tabela 1.

Basic requirements	Performance characteristics
BWR 2 Safety in case to fire	
Reaction to fire	Class E
Resistance to fire	Tabels B1.1 ÷ 32.6

Table B1.1. Resistance to fire classification of plastic pipes (without insulation) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and and Fig. B1:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-HD/ PE/PE-X/ ABS/ SAN+PVC	D ≤ 32	2.0 – 6.8	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		6.9 – 10.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	32 < D ≤ 50	2.6 – 6.7	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		6.8	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		6.9 – 10.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	50 < D ≤ 63	2.9 – 6.7	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		6.8	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		6.9 – 10.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	63 < D ≤ 75	3.3 – 6.7	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		6.8	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		6.9 – 10.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	75 < D ≤ 90	3.5 – 4.1	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		4.2	-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C
		4.2 – 10.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	90 < D ≤ 110	4.2	-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C
		4.2 – 10.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	110 < D ≤ 125	4.8 – 9.5	-	1 x 100.0 x 6.0	EI 120-U/C EI 120-C/C
		9.5	-	1 x 100.0 x 10.0	EI 180-U/C EI 180-C/C
		9.6 – 10.0	-	1 x 100.0 x 6.0	EI 120-U/C EI 120-C/C
	125 < D ≤ 160	6.2 – 9.4	-	1 x 100.0 x 10.0	EI 120-U/C EI 120-C/C
		9.5	-	1 x 100.0 x 10.0	EI 180-U/C EI 180-C/C
		9.6 – 10.0	-	1 x 100.0 x 10.0	EI 120-U/C EI 120-C/C
	160 < D ≤ 200	7.7	-	1 x 100.0 x 16.0	EI 90-U/C EI 90-C/C
		7.8 – 11.9	-	1 x 100.0 x 16.0	EI 60-U/C EI 60-C/C

Table B1.1, cont. Resistance to fire classification of plastic pipes (without insulation) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B1:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-RT	D ≤ 20	2.0 – 7.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	20 < D ≤ 25	2.5	-	1 x 60.0 x 2.0	
	25 < D ≤ 40	4.0	-	1 x 60.0 x 2.0	
	40 < D ≤ 63	6.3	-	1 x 60.0 x 2.0	
	63 < D ≤ 75	7.5	-	1 x 60.0 x 2.0	
PE-X	D ≤ 20	2.0	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		2.1 – 7.5	-	1 x 60.0 x 2.0	EI 180 / E 240-U/C EI 180 / E 240-C/C
	20 < D ≤ 25	2.5	-	1 x 60.0 x 2.0	EI 180 / E 240-U/C EI 180 / E 240-C/C
	25 < D ≤ 40	4.0	-	1 x 60.0 x 2.0	
	40 < D ≤ 63	6.3	-	1 x 60.0 x 2.0	
	63 < D ≤ 75	7.5	-	1 x 60.0 x 2.0	
PE-Xa	D ≤ 20	2.0 – 5.8	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 32	3.0	-	1 x 60.0 x 2.0	
	32 < D ≤ 40	3.7	-	1 x 60.0 x 2.0	
	40 < D ≤ 50	4.6	-	1 x 60.0 x 2.0	
	50 < D ≤ 63	5.8	-	1 x 60.0 x 2.0	
PP-R	D ≤ 20	2.3 – 3.3	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		3.4	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	20 < D ≤ 25	3.2 – 4.1	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		4.2	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	25 < D ≤ 32	3.8 – 5.3	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		5.4	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	32 < D ≤ 40	4.4 – 6.6	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		6.7	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C

Table B1.1, cont. Resistance to fire classification of plastic pipes (without insulation) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B1:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R	40 < D ≤ 50	5.2 – 8.2	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		8.3	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	50 < D ≤ 63	6.1 –10.4	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		10.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	63 < D ≤ 75	6.8 –12.4	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	63 < D ≤ 75	12.6 – 18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	75 < D ≤ 90	8.2 –18.3	-	1 x 60.0 x4.0	
	90 < D ≤ 110	10.0 – 18.3	-	1 x 60.0 x 4.0	
PP	D ≤ 50	1.8 – 12.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	50 < D ≤ 75	1.9 – 12.4	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
		12.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		12.6 – 18.4	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
	75 < D ≤ 90	2.3 – 18.3	-	1 x 60.0 x 2.0	EI 120 / E 180-U/C EI 120 / E 180-C/C
		2.3 – 18.3	-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C
		18.4	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
	90 < D ≤ 110	2.7 – 18.3	-	1 x 60.0 x 2.0	EI 120 / E 180-U/C EI 120 / E 180-C/C
		2.7 – 18.3	-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C
		18.4	-	1 x 60.0 x 2.0	
	110 < D ≤ 125	3.8 – 16.7	-	1 x 100.0 x 6.0	EI 60-U/C EI 60-C/C
	125 < D ≤ 160	5.5 – 12.5	-	1 x 100.0 x 10.0	
	160 < D ≤ 170	6.1 – 11.3	-	1 x 100.0 x 12.0	
	170 < D ≤ 185	6.9 – 9.5	-	1 x 100.0 x 14.0	
	160 < D ≤ 200	7.7	-	1 x 100.0 x 16.0	

Table B1.1, cont. Resistance to fire classification of plastic pipes (without insulation) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B1:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PVC-U/ PVC-C	D ≤ 25	1.5 – 1.7	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		1.8 – 3.6	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	D ≤ 25	3.7 – 4.2	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
	25 < D ≤ 50	1.8 – 3.6	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		3.7 – 4.2	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
		4.3 – 8.1	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	50 < D ≤ 75	1.9 – 3.5	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
		3.6	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		3.7 – 4.2	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
		4.3 – 8.1	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	75 < D ≤ 110	2.2 – 3.5	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		3.6	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
			-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
		3.7 – 4.1	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
			-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C
		4.2	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
		4.3 – 8.1	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C

Table B1.1, cont. Resistance to fire classification of plastic pipes (without insulation) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B1:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PVC-U/ PVC-C	110 < D ≤ 125	3.4 – 6.1	-	1 x 100.0 x 8.0	EI 120-U/C EI 120-C/C
		6.2	-	1 x 100.0 x 8.0	EI 120-U/C EI 120-C/C
			-	1 x 100.0 x 10.0	EI 240-U/C EI 240-C/C
		6.3 – 9.5	-	1 x 100.0 x 6.0	EI 180-U/C EI 180-C/C
	125 < D ≤ 160	6.2	-	1 x 100.0 x 10.0	EI 240-U/C EI 240-C/C
		6.3 – 9.5	-	1 x 100.0 x 10.0	EI 180-U/C EI 180-C/C
	160 < D ≤ 200	5.9	-	1 x 100.0 x 16.0	EI 180-U/C EI 180-C/C
		6.0 – 7.7	-	1 x 100.0 x 16.0	EI 120-U/C EI 120-C/C

Table B1.2. Resistance to fire classification of MLC pipes (without insulation) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B1:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-RT/AL/ PE-RT	D ≤ 20	2.0	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	20 < D ≤ 25	2.5	-	1 x 60.0 x 2.0	
	25 < D ≤ 40	4.0	-	1 x 60.0 x 2.0	
	40 < D ≤ 63	6.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		6.3	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	20 < D ≤ 75	7.5	-	1 x 60.0 x 2.0	
PE-X/AL/ PE-X	D ≤ 20	2.0 – 7.5	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 25	2.5	-	1 x 60.0 x 2.0	
	25 < D ≤ 32	3.0	-	1 x 60.0 x 2.0	
	32 < D ≤ 40	4.0	-	1 x 60.0 x 2.0	
	40 < D ≤ 50	5.5	-	1 x 60.0 x 2.0	
	50 < D ≤ 63	6.0	-	1 x 60.0 x 2.0	
	63 < D ≤ 75	7.5	-	1 x 60.0 x 2.0	
PP-R/AL/ PP-R	D ≤ 20	3.2 – 3.4	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 32	4.7 – 5.4	-	1 x 60.0 x 2.0	
	32 < D ≤ 40	5.7 – 6.7	-	1 x 60.0 x 2.0	
	40 < D ≤ 50	6.9 – 8.3	-	1 x 60.0 x 2.0	
	50 < D ≤ 63	8.5 – 10.5	-	1 x 60.0 x 2.0	
	63 < D ≤ 75	10.0 – 12.5	-	1 x 60.0 x 2.0	
	75 < D ≤ 90	12.3 – 15.0	-	1 x 60.0 x 4.0	
	90 < D ≤ 110	15.1 – 18.2	-	1 x 60.0 x 4.0	
		18.3	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C

Table B1.3. Resistance to fire classification of composite pipes (without insulation) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B1:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R/ PP-R-GF/ PP-R	D ≤ 20	2.8 – 10.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 32	3.7 – 4.3	-	1 x 60.0 x 4.0	
		4.4 – 5.4	-	1 x 60.0 x 2.0	
	32 < D ≤ 40	4.4 – 5.4	-	1 x 60.0 x 4.0	
		5.5 – 6.7	-	1 x 60.0 x 2.0	
	20 < D ≤ 50	5.2 – 6.8	-	1 x 60.0 x 4.0	
		6.9 – 12.5	-	1 x 60.0 x 2.0	
		12.6 – 18.2	-	1 x 60.0 x 4.0	
		18.3	-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C
	50 < D ≤ 63	6.3 – 8.6	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		8.7 – 12.5	-	1 x 60.0 x 2.0	
		12.6 – 18.2	-	1 x 60.0 x 4.0	
		18.3	-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C
	63 < D ≤ 75	7.2 – 10.2	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		10.3 – 12.5	-	1 x 60.0 x 2.0	
		12.6 – 18.2	-	1 x 60.0 x 4.0	
		18.3	-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C
	75 < D ≤ 90	8.4 – 18.2	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		18.3	-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C
	90 < D ≤ 110	10.0 – 18.2	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		18.3	-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C

Table B1.4. Resistance to fire classification of bundle of max. 3 plastic pipes (max. 2 x PE-HD, D ≤ 32 mm x t = 2.0 mm + max. 1 x PVC-U, D ≤ 50 mm x t = 1.8 mm) penetration seal in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L, length of 60.0 mm and thickness of 2.0 mm (separate tape/wrap for each pipe or one tape/wrap for whole bundle) in accordance with Annex A and Fig. B1:

Fire resistance class:
EI 240-U/C
EI 240-C/C

Table B1.5. Resistance to fire classification of MLC pipes (without insulation) penetration seals in flexible or rigid wall thickness of: t ≥ 100 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B1:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-RT/AL/PE-RT	D ≤ 20	2.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		2.1 – 7.5	-	1 x 60.0 x 2.0	EI 45 / E 90-U/C EI 45 / E 90-C/C
	20 < D ≤ 25	2.5	-	1 x 60.0 x 2.0	
	25 < D ≤ 40	4.0	-	1 x 60.0 x 2.0	
	40 < D ≤ 63	6.3	-	1 x 60.0 x 2.0	
	63 < D ≤ 75	7.5	-	1 x 60.0 x 2.0	
PE-X/AL/PE-X	D ≤ 20	2.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		2.1 – 7.5	-	1 x 60.0 x 2.0	EI 45 / E 120-U/C EI 45 / E 120-C/C
	20 < D ≤ 25	2.5	-	1 x 60.0 x 2.0	
	25 < D ≤ 40	4.0	-	1 x 60.0 x 2.0	
	40 < D ≤ 63	6.3	-	1 x 60.0 x 2.0	
	63 < D ≤ 75	7.5	-	1 x 60.0 x 2.0	
PP-R/AL/PP-R	D ≤ 20	3.4	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		3.5 – 10.0	-	1 x 60.0 x 4.0	
	20 < D ≤ 50	8.3	-	1 x 60.0 x 4.0	
	50 < D ≤ 63	10.5	-	1 x 60.0 x 4.0	
	63 < D ≤ 75	12.5	-	1 x 60.0 x 4.0	
	75 < D ≤ 90	15.0	-	1 x 60.0 x 4.0	
	90 < D ≤ 110	18.3	-	1 x 60.0 x 4.0	

Table B1.6. Resistance to fire classification of plastic pipes (without insulation) penetration seals in flexible or rigid wall thickness of: t ≥ 100 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B1:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-M (Magnaplast Ultra dB)	D ≤ 110	3.4	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C

Table B1.7. Resistance to fire classification of composite pipes (without insulation) penetration seals in flexible or rigid wall thickness of: t ≥ 100 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B1:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R/PP-R-GF/PP-R	D ≤ 20	2.8 – 3.4	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 32	4.1 – 4.8	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		4.9 – 5.4	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	32 < D ≤ 40	5.0 – 6.1	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		6.2 – 6.7	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	40 < D ≤ 50	6.0 – 7.9	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		8.0 – 8.4	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	50 < D ≤ 75	8.7 – 12.2	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		12.3 – 12.5	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	75 < D ≤ 90	10.3 – 14.8	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		14.9 – 15.0	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	90 < D ≤ 110	12.5 – 18.2	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C

Table B2.1. Resistance to fire classification of plastic pipes (without insulation) penetration seals in flexible or rigid wall thickness of: t ≥ 100 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B2:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-HD/ PE/PE-X/ ABS/ SAN+PVC	D ≤ 32	2.0	-	1 x 60.0 x 2.0	EI 60-U/C
		2.1 – 9.9	-	1 x 60.0 x 4.0	EI 60-C/C
		10.0	-	1 x 60.0 x 4.0	EI 90-U/C EI 90-C/C
	32 < D ≤ 50	2.5 – 9.9	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		10.0	-	1 x 60.0 x 4.0	EI 90-U/C EI 90-C/C
	50 < D ≤ 75	3.2 – 9.9	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		10.0	-	1 x 60.0 x 4.0	EI 90-U/C EI 90-C/C
	75 < D ≤ 110	4.2 – 9.9	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		10.0	-	1 x 60.0 x 4.0	EI 90-U/C EI 90-C/C
PP	D ≤ 32	1.8	-	1 x 60.0 x 2.0	EI 90 / E 120-U/C EI 90 / E 120-C/C
		1.9 – 2.7	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		2.8 – 16.0	-	1 x 60.0 x 4.0	EI 45-U/C EI 45-C/C
	32 < D ≤ 50	2.0 – 2.7	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		2.8 – 18.3	-	1 x 60.0 x 4.0	EI 45-U/C EI 45-C/C
	50 < D ≤ 75	2.3 – 2.7	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		2.8 – 18.3	-	1 x 60.0 x 4.0	EI 45-U/C EI 45-C/C
	75 < D ≤ 110	2.7	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
		2.8 – 18.3	-	1 x 60.0 x 4.0	EI 45-U/C EI 45-C/C
PVC-U/ PVC-C	D ≤ 32	1.8	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-U/C
		1.9 – 4.2	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
	32 < D ≤ 50	1.9 – 4.1	-	1 x 60.0 x 4.0	EI 45-U/C EI 45-C/C
		4.2	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
	50 < D ≤ 75	2.0 – 4.1	-	1 x 60.0 x 4.0	EI 45-U/C EI 45-C/C
		4.2	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C
	75 < D ≤ 110	2.2 – 4.1	-	1 x 60.0 x 4.0	EI 45-U/C EI 45-C/C
		4.2	-	1 x 60.0 x 4.0	EI 60-U/C EI 60-C/C

Table B3.1. Resistance to fire classification of plastic pipes (without insulation) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B3:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-HD/ PE/PE-X/ ABS/ SAN+PVC	D ≤ 110	4.2	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
PP	D ≤ 110	2.7	-	1 x 60.0 x 4.0	EI 90-U/C EI 90-C/C
PP-R	D ≤ 110	18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
PVC-U/ PVC-C	D ≤ 110	4.0	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C

Table B4.1. Resistance to fire classification of plastic pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B4:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-HD/ PE/PE-X/ ABS/ SAN+PVC	D ≤ 110	10.0	9	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
PP	D ≤ 110	2.7	9	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
PP-R	D ≤ 110	18.3	9	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C

Table B4.2. Resistance to fire classification of plastic pipes with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B4:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-HD/ PE/PE-X/ ABS/ SAN+PVC	D ≤ 110	4.2 – 10.0	13	1 x 60.0 x 6.0	EI 120-U/C EI 120-C/C
	110 < D ≤ 125	4.8 – 14.5	13	1 x 100.0 x 8.0	EI 60-U/C EI 60-C/C
		14.6	13	1 x 100.0 x 8.0	EI 90-U/C EI 90-C/C
	125 < D ≤ 160	6.2 – 14.5	13	1 x 100.0 x 12.0	EI 60-U/C EI 60-C/C
		14.6	13	1 x 100.0 x 12.0	EI 90-U/C EI 90-C/C
PP	D ≤ 110	2.7 – 18.3	13	1 x 60.0 x 6.0	EI 120-U/C EI 120-C/C

Table B4.3. Resistance to fire classification of composite pipes with flexible elastomeric foam (FEF) , with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B4:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R/ PP-R-GF/ PP-R	D ≤ 110	18.3	9	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C

Table B5.1. Resistance to fire classification of plastic pipes with polyethylene foam (PE), with reaction to fire class E, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B5:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP	D ≤ 75	2.7	9	1 x 60.0 x 2.0	EI 60-U/C EI 60-C/C
		12.5	13	1 x 60.0 x 4.0	
	75 < D ≤ 110	12.5	13	1 x 60.0 x 4.0	
PVC-U/ PVC-C	D ≤ 32	2.0	9	1 x 60.0 x 4.0	EI 120 / E 180-U/C EI 120 / E 180-C/C

Table B5.2. Resistance to fire classification of MLC pipes with polyethylene foam (PE), with reaction to fire class E_L, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B5:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-X/AL/ PE-X	D ≤ 32	3.0	9	1 x 60.0 x 2.0	EI 120-U/C

Table B5.3. Resistance to fire classification of MLC pipes with polyethylene foam (PE), with reaction to fire class B_L-s1,d0, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B5:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-RT/AL/ PE-RT	D ≤ 20	2.0 – 3.0	9	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 25	2.5	9	1 x 60.0 x 2.0	
	25 < D ≤ 32	3.0	9	1 x 60.0 x 2.0	
PE-X/AL/ PE-X	D ≤ 20	2.0	9	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C

ALFASEAL GROUP Sp. z o.o.
Kineskopowa 1 St.
05-500 Piaseczno, Poland
VAT: PL1231274821
alfaseal.pl
intuseal.com
+48 22 498 7 498
sprzedaz@alfaseal.pl

Table B5.4. Resistance to fire classification of composite pipes with polyethylene foam (PE), with reaction to fire class E_L, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B5:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R/PP-R-GF/PP-R	D ≤ 50	6.9 – 8.3	9	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C

Table B5.5. Resistance to fire classification of composite pipes with polyethylene foam (PE), with reaction to fire class B_L-s1,d0, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B5:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R/PP-R-GF/PP-R	D ≤ 20	2.8 – 3.4	9	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C

Table B6.1. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) type penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B6a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 15.0	1.0 – 1.4	9	1 x 60.0 x 2.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 180-C/U EI 180-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
		≥ 1.5	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
			10 - 22	1 x 60.0 x 4.0	EI 180-C/U EI 180-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	15.0 < D ≤ 22.0	1.1 – 1.4	9	1 x 60.0 x 2.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
		≥ 1.5	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	22.0 < D ≤ 28.0	1.2 – 1.4	9	1 x 60.0 x 2.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
		≥ 1.5	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	28.0 < D ≤ 42.0	1.3 – 1.4	9	1 x 60.0 x 2.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	

Table B6.1, cont. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B6a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	28.0 < D ≤ 42.0	≥ 1.5	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	42.0 < D ≤ 54.0	≥ 1.5	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	54.0 < D ≤ 64.0	≥ 1.6	9	1 x 60.0 x 2.0	EI 30 / E 240-C/U EI 30 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 30 / E 60-C/U EI 30 / E 60-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 60-C/U EI 60-C/C
	64.0 < D ≤ 76.1	≥ 1.7	9	1 x 60.0 x 2.0	EI 30 / E 240-C/U EI 30 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 30 / E 60-C/U EI 30 / E 60-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 60-C/U EI 60-C/C
	76.1 < D ≤ 88.9	≥ 1.8	9	1 x 60.0 x 2.0	EI 30 / E 240-C/U EI 30 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 30 / E 60-C/U EI 30 / E 60-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 60-C/U EI 60-C/C
	88.9 < D ≤ 108.0	≥ 2.0	9	1 x 60.0 x 2.0	EI 30 / E 240-C/U EI 30 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 30 / E 60-C/U EI 30 / E 60-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 60-C/U EI 60-C/C

Table B6.1, cont. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B6a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	D ≤ 42.4	2.0 – 2.5	9	1 x 60.0 x 2.0	EI 180-C/U EI 180-C/C
			10 – 22	1 x 60.0 x 4.0	
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
		≥ 2.6	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	42.4 < D ≤ 48.3	2.1 – 2.5	9	1 x 60.0 x 2.0	EI 180-C/U EI 180-C/C
			10 – 22	1 x 60.0 x 4.0	
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
		≥ 2.6	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	48.3 < D ≤ 60.3	2.2 – 2.5	9	1 x 60.0 x 2.0	EI 180-C/U EI 180-C/C
			10 – 22	1 x 60.0 x 4.0	
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
		≥ 2.6	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	

Table B6.1, cont. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B6a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	60.3 < D ≤ 76.1	2.4 – 2.5	9	1 x 60.0 x 2.0	EI 180-C/U EI 180-C/C
			10 – 22	1 x 60.0 x 4.0	
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
		≥ 2.6	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	76.1 < D ≤ 88.9	≥ 2.6	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	88.9 < D ≤ 114.3	≥ 3.1	9	1 x 60.0 x 2.0	EI 90 / E 240-C/U EI 90 / E 240-C/C
			10 – 23	1 x 60.0 x 4.0	
			24 – 36	1 x 60.0 x 6.0	EI 90 / E 180-C/U EI 90 / E 180-C/C
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 180-C/U EI 180-C/C
	114.3 < D ≤ 139.7	≥ 3.6	9	1 x 60.0 x 2.0	EI 90 / E 240-C/U EI 90 / E 240-C/C
			10 – 23	1 x 60.0 x 4.0	
			24 – 36	1 x 60.0 x 6.0	EI 90 / E 180-C/U EI 90 / E 180-C/C
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 180-C/U EI 180-C/C
	139.7 < D ≤ 159.0	≥ 4.0	9	1 x 60.0 x 2.0	EI 90 / E 240-C/U EI 90 / E 240-C/C
			10 – 23	1 x 60.0 x 4.0	
			24 – 36	1 x 60.0 x 6.0	EI 90 / E 180-C/U EI 90 / E 180-C/C
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 180-C/U EI 180-C/C
	159.0 < D ≤ 168.3	≥ 4.0	50	1 x 60.0 x 2.0	EI 90-C/U EI 90-C/C
	168.3 < D ≤ 219.0	≥ 4.0	50	1 x 60.0 x 2.0	

Table B6.2. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B6a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 12.7	≥ 0.8	9	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
	12.7 < D ≤ 15.0	≥ 0.9	9	1 x 60.0 x 4.0	
	15.0 < D ≤ 22.23	≥ 1.0	9	1 x 60.0 x 4.0	
steel	D ≤ 18.0	1.2 – 1.4	9	1 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
			10 – 25	1 x 60.0 x 4.0	
		≥ 1.5	9	1 x 60.0 x 2.0	
			10 – 25	1 x 60.0 x 4.0	
			26 – 37	1 x 60.0 x 6.0	
			38 – 50	1 x 60.0 x 8.0	
	18.0 < D ≤ 28.0	1.3 – 1.4	9	1 x 60.0 x 2.0	
			10 – 25	1 x 60.0 x 4.0	
		≥ 1.5	9	1 x 60.0 x 2.0	
			10 – 25	1 x 60.0 x 4.0	
			26 – 37	1 x 60.0 x 6.0	
			38 – 50	1 x 60.0 x 8.0	
	28.0 < D ≤ 48.3	1.4	9	1 x 60.0 x 2.0	
			10 – 25	1 x 60.0 x 4.0	
		≥ 1.5	9	1 x 60.0 x 2.0	
			10 – 25	1 x 60.0 x 4.0	
			26 – 37	1 x 60.0 x 6.0	
			38 – 50	1 x 60.0 x 8.0	
	48.3 < D ≤ 66.7	≥ 1.5	9	1 x 60.0 x 2.0	
			10 – 25	1 x 60.0 x 4.0	
			26 – 37	1 x 60.0 x 6.0	
			38 – 50	1 x 60.0 x 8.0	
	66.7 < D ≤ 76.1	≥ 1.6	25	1 x 60.0 x 4.0	
			26 – 37	1 x 60.0 x 6.0	
			38 – 50	1 x 60.0 x 8.0	
	76.1 < D ≤ 88.9	≥ 1.8	25	1 x 60.0 x 4.0	
			26 – 37	1 x 60.0 x 6.0	
			38 – 50	1 x 60.0 x 8.0	

Table B6.2, cont. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B6a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	88.9 < D ≤ 108.0	≥ 2.0	25	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			26 – 37	1 x 60.0 x 6.0	
			38 – 50	1 x 60.0 x 8.0	
	108.0 < D ≤ 114.3	≥ 2.2	50	1 x 60.0 x 8.0	
	114.3 < D ≤ 139.7	≥ 3.1	50	1 x 60.0 x 8.0	
	139.7 < D ≤ 168.3	≥ 4.0	50	1 x 60.0 x 8.0	
	168.3 < D ≤ 219.1	≥ 4.0	50[1)]	1 x 60.0 x 8.0	
	219.1 < D ≤ 273.0	≥ 4.6	50[2)]	1 x 60.0 x 8.0	
	273.0 < D ≤ 323.9	≥ 5.2	50[2)]	1 x 60.0 x 8.0	
	323.9 < D ≤ 355.6	≥ 5.6	50[2)]	1 x 60.0 x 8.0	

1) Pipe additionally insulated with mineral wool density of 35 kg/m³, local insulation (case LI) dimensions of: 40 x 500 mm (thickness x length)

2) Pipe additionally insulated with mineral wool density of 35 kg/m³, local insulation (case LI) dimensions of: 50 x 500 mm (thickness x length)

Table B6.3. Resistance to fire classification of steel pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 100 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B6a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	D ≤ 42.4	2.0 – 2.8	9	1 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
			10 - 22	1 x 60.0 x 4.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
		≥ 2.9	9	1 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
			10 - 22	1 x 60.0 x 4.0	
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	42.4 < D ≤ 48.3	≥ 2.1	9	1 x 60.0 x 2.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			10 - 22	1 x 60.0 x 4.0	
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 120-C/U EI 120-C/C
	48.3 < D ≤ 60.3	≥ 2.3	9	1 x 60.0 x 2.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			10 - 22	1 x 60.0 x 4.0	
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 120-C/U EI 120-C/C
	60.3 < D ≤ 76.1	≥ 2.7	9	1 x 60.0 x 2.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			10 - 22	1 x 60.0 x 4.0	

Table B6.3, cont. Resistance to fire classification of steel pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 100 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B6a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	60.3 < D ≤ 76.1	≥ 2.7	23 – 36	1 x 60.0 x 6.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 120-C/U EI 120-C/C
	76.1 < D ≤ 88.9	≥ 2.9	9	1 x 60.0 x 2.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			10 – 22	1 x 60.0 x 4.0	
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 120-C/U EI 120-C/C
	88.9 < D ≤ 114.3	≥ 3.3	9	1 x 60.0 x 2.0	EI 45 / E 120-C/U EI 45 / E 120-C/C
			10 – 22	1 x 60.0 x 4.0	EI 45 / E 90-C/U EI 45 / E 90-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 90-C/U EI 90-C/C
	114.3 < D ≤ 139.7	≥ 3.6	9	1 x 60.0 x 2.0	EI 45 / E 120-C/U EI 45 / E 120-C/C
			10 – 22	1 x 60.0 x 4.0	EI 45 / E 90-C/U EI 45 / E 90-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 90-C/U EI 90-C/C
	139.7 < D ≤ 168.3	≥ 4.0	9	1 x 60.0 x 2.0	EI 45 / E 120-C/U EI 45 / E 120-C/C
			10 – 22	1 x 60.0 x 4.0	EI 45 / E 90-C/U EI 45 / E 90-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 90-C/U EI 90-C/C

Table B7.1. Resistance to fire classification of copper pipes with polyethylene foam (PE), with reaction to fire class E, continuous insulation (case CS) penetration seal in rigid wall thickness of: t ≥ 150 mm made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B7:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 6.35	≥ 0.8	9	1 x 60.0 x 4.0	EI 240-C/U EI 240-C/C
	6.35 < D ≤ 15.88	≥ 1.0	9	1 x 60.0 x 4.0	EI 180 / E 240-C/U EI 180 / E 240-C/C

Table B7.2. Resistance to fire classification of copper pipes with polyethylene foam (PE), with reaction to fire class B_L-s1,d0, continuous insulation (case CS) penetration seal in rigid wall thickness of: t ≥ 150 mm made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B7:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 12.7	≥ 0.8	9	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
	12.7 < D ≤ 22.23	≥ 1.0	9	1 x 60.0 x 4.0	

Table B7.3. Resistance to fire classification of bundle of max. 3 copper pipes (max. 2 x D ≤ 6.35 mm x t = 0.8 mm + max. 1 x D ≤ 15.88 mm x t = 1.0 mm) with continuous PE foam insulation, with reaction to fire class E, (thickness of 9 mm) penetration seal in rigid wall thickness of: t ≥ 150 mm made with use of single row of INTU FR WRAP or INTU FR WRAP L, length of 60 mm and thickness of 4.0 mm (separate tape / wrap for each pipe or one wrap for whole bundle) in accordance with Annex A and Fig. B7:

Fire resistance class: EI 180-C/U EI 180-C/C

Table B8.1. Resistance to fire classification of steel pipes with mineral wool mat local sustained insulation (case LS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B8:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	D ≤ 42.4	≥ 1.5	20 x 300	1 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
			(21 – 30) x 500	1 x 60.0 x 2.0	
		≥ 2.0	(21 – 40) x 600	1 x 60.0 x 2.0	
	42.4 < D ≤ 66.7	≥ 1.5	30 x 500	1 x 60.0 x 2.0	
		≥ 2.0	(31 – 40) x 600	1 x 60.0 x 2.0	
	66.7 < D ≤ 108.0	≥ 2.0	40 x 600	1 x 60.0 x 2.0	

Table B9.1. Resistance to fire classification of single F cable (A-2Y(L)2Y 20X2X0,6) penetration seal in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L, length of 60.0 mm and thickness of 2.0 mm and INTU FR MASTIC gap filling in accordance with Annex A and Fig. B9:

Fire resistance class: EI 120

Table B10.1. Resistance to fire classification of mixed bundle of single copper pipe (C/U end configuration) with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS), with additional single cable 4 x 1.5 mm² and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 25 mm and pipe wall thickness of: tp = 1.5 mm penetration seal in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L, in accordance with Annex A and Fig. B10:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
single copper pipe	D ≤ 12.7	≥ 0.8	9	1 x 60.0 x 4.0	EI 120
	12.7 < D ≤ 22.23	≥ 1.0	9	1 x 60.0 x 4.0	

Table B10.2. Resistance to fire classification of mixed bundle of double copper pipe (C/U end configuration) with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS), with additional single cable 4 x 1.5 mm² and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 25 mm and pipe wall thickness of: t_p = 1.5 mm penetration seal in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L, in accordance with Annex A and Fig. B10:

Pipe material	Copper pipe No. 1 max. diameter x min. wall thickness [mm]	Copper pipe No. 2 max. diameter x min. wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
double copper pipe	12.7 x 0.8	12.7 x 0.8	9	1 x 60.0 x 4.0	EI 120
	12.7 x 0.8	22.23 x 1.0	9	1 x 60.0 x 4.0	

Table B11.1. Resistance to fire classification of mixed bundle of single copper pipe (C/U end configuration) with polyethylene foam (PE), with reaction to fire class E, continuous insulation (case CS), with additional single A1 cable (E-YY-J 5x1,5; RE NYY-J 5x1,5 RE; VV 5x1,5) and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 32 mm and pipe wall thickness of: tp = 2.0 mm penetration seal in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L, in accordance with Annex A and Fig. B11:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
single copper pipe	D ≤ 6.35	≥ 0.8	9	1 x 60.0 x 4.0	EI 240
	6.35 < D ≤ 15.88	≥ 1.0	9	1 x 60.0 x 4.0	EI 180 / E 240

Table B11.2. Resistance to fire classification of mixed bundle of double copper pipe (C/U end configuration) with polyethylene foam (PE), with reaction to fire class E, continuous insulation (case CS), with additional single A1 cable (E-YY-J 5x1,5; RE NYY-J 5x1,5 RE; VV 5x1,5) and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 32 mm and pipe wall thickness of: t_p = 2.0 mm penetration seal in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L, in accordance with Annex A and Fig. B11:

Pipe material	Copper pipe No. 1 max. diameter x min. wall thickness [mm]	Copper pipe No. 2 max. diameter x min. wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
double copper pipe	6.0 x 0.8	6.0 x 0.8	9	1 x 60.0 x 4.0	EI 120 / E 180
	6.0 x 0.8	15.0 x 1.0	9	1 x 60.0 x 4.0	

ALFASEAL GROUP Sp. z o.o.
Kineskopowa 1 St.
05-500 Piaseczno, Poland
VAT: PL1231274821
alfaseal.pl
intuseal.com
+48 22 498 7 498
sprzedaz@alfaseal.pl

Table B11.3. Resistance to fire classification of mixed bundle of single copper pipe (C/U end configuration) with polyethylene foam (PE) with reaction to fire class B_L-s1,d0, continuous insulation (case CS), with additional single cable 4 x 1.5 mm² and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 25 mm and pipe wall thickness of: t_p = 1.5 mm penetration seal in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L, in accordance with Annex A and Fig. B11:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
single copper pipe	D ≤ 12.7	≥ 0.8	9	1 x 60.0 x 4.0	EI 120
	12.7 < D ≤ 22.23	≥ 1.0	9	1 x 60.0 x 4.0	

Table B11.4. Resistance to fire classification of mixed bundle of double copper pipe (C/U end configuration) with polyethylene foam (PE), with reaction to fire class B_L-s1,d0, continuous insulation (case CS), with additional single cable 4 x 1.5 mm² and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 25 mm and pipe wall thickness of: t_p = 1.5 mm penetration seal in rigid wall thickness of: t ≥ 150 mm, made with use of single row of INTU FR WRAP or INTU FR WRAP L, in accordance with Annex A and Fig. B11:

Pipe material	Copper pipe No. 1 max. diameter x min. wall thickness [mm]	Copper pipe No. 2 max. diameter x min. wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
double copper pipe	12.7 x 0.8	12.7 x 0.8	9	1 x 60.0 x 4.0	EI 120
	12.7 x 0.8	22.23 x 1.0	9	1 x 60.0 x 4.0	

Table B12.1. Resistance to fire classification of plastic pipes (without insulation) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B12:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP	D ≤ 50	1.8	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		1.9	-	2 x 60.0 x 2.0	EI 120 / E 180-U/C EI 120 / E 180-C/C
		2.0 – 12.5	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.6 – 18.4	-	2 x 60.0 x 4.0	
	50 < D ≤ 75	1.9	-	2 x 60.0 x 2.0	EI 120 / E 180-U/C EI 120 / E 180-C/C
		2.0 – 12.5	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.6 – 18.4	-	2 x 60.0 x 4.0	
	75 < D ≤ 90	2.2 – 18.4	-	2 x 60.0 x 4.0	
	90 < D ≤ 110	2.7 – 18.4	-	2 x 60.0 x 4.0	
	110 < D ≤ 125	3.4 – 14.5	-	2 x 60.0 x 6.0	EI 60-U/C EI 60-C/C
		14.6	-	2 x 60.0 x 6.0	EI 120-U/C EI 120-C/C
	125 < D ≤ 160	4.9 – 14.5	-	2 x 60.0 x 10.0	EI 60-U/C EI 60-C/C
		14.6	-	2 x 60.0 x 10.0	EI 120-U/C EI 120-C/C

Table B12.2. Resistance to fire classification of plastic pipes (without insulation) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B12:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-HD/ PE/PE-X/ ABS/ SAN+PVC	D ≤ 32	2.0 – 6.8	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		6.9 – 10.0	-	2 x 60.0 x 4.0	
	32 < D ≤ 50	2.4 – 6.8	-	2 x 60.0 x 2.0	
		6.9 – 10.0	-	2 x 60.0 x 4.0	
	50 < D ≤ 75	3.0 – 6.8	-	2 x 60.0 x 2.0	
		6.9 – 10.0	-	2 x 60.0 x 4.0	
	75 < D ≤ 90	3.5 – 10.0	-	2 x 60.0 x 4.0	
	90 < D ≤ 110	4.2 – 10.0	-	2 x 60.0 x 4.0	
PE-Xa	D ≤ 20	2.0 – 5.8	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 32	3.0	-	2 x 60.0 x 2.0	
	32 < D ≤ 40	3.7	-	2 x 60.0 x 2.0	
	40 < D ≤ 50	4.6	-	2 x 60.0 x 2.0	
	50 < D ≤ 63	5.8	-	2 x 60.0 x 2.0	
PP-R	D ≤ 20	2.3 – 10.0	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 32	3.3 – 12.5	-	2 x 60.0 x 2.0	
		12.6 – 16.0	-	2 x 60.0 x 4.0	
	32 < D ≤ 50	4.8 – 12.5	-	2 x 60.0 x 2.0	
		12.6 – 18.3	-	2 x 60.0 x 4.0	
	50 < D ≤ 63	5.8 – 12.5	-	2 x 60.0 x 2.0	
		12.6 – 18.3	-	2 x 60.0 x 4.0	
	63 < D ≤ 75	6.8 – 12.5	-	2 x 60.0 x 2.0	
		12.6 – 18.3	-	2 x 60.0 x 4.0	
	75 < D ≤ 90	8.2 – 18.3	-	2 x 60.0 x 4.0	
	90 < D ≤ 110	10.0 – 18.3	-	2 x 60.0 x 4.0	
PVC-U/ PVC-C	D ≤ 50	1.8 – 3.6	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		3.7 – 4.2	-	2 x 60.0 x 4.0	
	50 < D ≤ 75	1.9 – 3.6	-	2 x 60.0 x 2.0	
		3.7 – 4.2	-	2 x 60.0 x 4.0	
	75 < D ≤ 90	2.0 – 4.2	-	2 x 60.0 x 4.0	
	90 < D ≤ 110	2.2 – 4.2	-	2 x 60.0 x 4.0	

Table B12.2, cont. Resistance to fire classification of plastic pipes (without insulation) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B12:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP	D ≤ 50	1.8	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		1.9	-	2 x 60.0 x 2.0	EI 120 / E 180-U/C EI 120 / E 180-C/C
		2.0 – 12.5	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.6 – 18.4	-	2 x 60.0 x 4.0	
	50 < D ≤ 75	1.9	-	2 x 60.0 x 2.0	EI 120 / E 180-U/C EI 120 / E 180-C/C
		2.0 – 12.5	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.6 – 18.4	-	2 x 60.0 x 4.0	
	75 < D ≤ 90	2.2 – 18.4	-	2 x 60.0 x 4.0	
	90 < D ≤ 110	2.7 – 18.4	-	2 x 60.0 x 4.0	

Table B12.3. Resistance to fire classification of MLC pipes (without insulation) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B12:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-RT/ AL/PE-RT	D ≤ 20	2.0 – 3.0	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 25	2.5	-	2 x 60.0 x 2.0	
	25 < D ≤ 32	3.0	-	2 x 60.0 x 2.0	
	32 < D ≤ 40	4.0	-	2 x 60.0 x 2.0	EI 90 / E 120-U/C EI 90 / E 120-C/C
	40 < D ≤ 63	6.0	-	2 x 60.0 x 2.0	
PE-X/AL/ PE-X	D ≤ 32	3.0 – 6.0	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	32 < D ≤ 40	3.8	-	2 x 60.0 x 2.0	
	40 < D ≤ 63	6.0	-	2 x 60.0 x 2.0	
PP-R/AL/ PP-R	D ≤ 20	2.8 – 10.0	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 32	4.4 – 12.5	-	2 x 60.0 x 2.0	
		12.6 – 16.0	-	2 x 60.0 x 4.0	
	32 < D ≤ 50	6.9 – 12.5	-	2 x 60.0 x 2.0	
		12.6 – 18.3	-	2 x 60.0 x 4.0	
	50 < D ≤ 63	8.7 – 12.5	-	2 x 60.0 x 2.0	
		12.6 – 18.3	-	2 x 60.0 x 4.0	
	63 < D ≤ 75	10.3 – 12.5	-	2 x 60.0 x 2.0	
		12.6 – 18.3	-	2 x 60.0 x 4.0	
	75 < D ≤ 90	12.4 – 18.3	-	2 x 60.0 x 4.0	
	90 < D ≤ 110	15.1 – 18.3	-	2 x 60.0 x 4.0	

Table B12.4. Resistance to fire classification of composite pipes (without insulation) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B12:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R/ PP-R-GF/PP-R	D ≤ 20	2.8 – 10.0	-	2 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 32	4.4 – 12.5	-	2 x 60.0 x 2.0	
		12.6 – 15.1	-	2 x 60.0 x 4.0	
	32 < D ≤ 50	6.7 – 12.5	-	2 x 60.0 x 2.0	
		12.6 – 15.1	-	2 x 60.0 x 4.0	
	50 < D ≤ 63	8.4 – 12.5	-	2 x 60.0 x 2.0	
		12.6 – 15.1	-	2 x 60.0 x 4.0	
	63 < D ≤ 75	10.0 – 12.5	-	2 x 60.0 x 2.0	
		12.6 – 15.1	-	2 x 60.0 x 4.0	
	75 < D ≤ 110	15.1	-	2 x 60.0 x 4.0	

Table B13.1. Resistance to fire classification of plastic pipes (without insulation) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B13:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-HD/ PE/PE-X/ ABS/ SAN+PVC	D ≤ 110	4.2	-	2 x 60.0 x 4.0	**EI 120-U/C EI 120-C/C**
PP	D ≤ 110	2.7	-	2 x 60.0 x 4.0	**EI 120-U/C EI 120-C/C**
PP-R	D ≤ 110	18.3	-	2 x 60.0 x 4.0	**EI 120-U/C EI 120-C/C**
PVC-U/ PVC-C	D ≤ 110	3.2	-	2 x 60.0 x 4.0	**EI 120-U/C EI 120-C/C**

Table B14.1. Resistance to fire classification of MLC pipes with polyethylene foam (PE), with reaction to fire class E_L, continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B14:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-RT/AL/ PE-RT	D ≤ 32	3.0	9	2 x 60.0 x 2.0	**EI 120-U/C EI 120-C/C**
PE-X/AL/ PE-X	D ≤ 32	3.0	9	2 x 60.0 x 2.0	**EI 120-U/C EI 120-C/C**

Table B14.2. Resistance to fire classification of MLC pipes with polyethylene foam (PE), with reaction to fire class B_L-s1,d0, continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B14:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-RT/AL/ PE-RT	D ≤ 20	2.0	9	2 x 60.0 x 2.0	**EI 120-U/C EI 120-C/C**
PE-X/AL/ PE-X	D ≤ 20	2.0	9	2 x 60.0 x 2.0	**EI 120-U/C EI 120-C/C**

Table B14.3. Resistance to fire classification of composite pipes with polyethylene foam (PE), with reaction to fire class E_L, continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B14:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R/PP-R-GF/PP-R	D ≤ 50	5.9 – 8.9	9	2 x 60.0 x 2.0	**EI 120-U/C EI 120-C/C**

Table B14.4. Resistance to fire classification of composite pipes with polyethylene foam (PE), with reaction to fire class B_L-s1,d0, continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B14:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R/PP-R-GF/PP-R	D ≤ 20	2.8 – 3.4	9	2 x 60.0 x 2.0	**EI 120-U/C EI 120-C/C**

Table B15.1. Resistance to fire classification of plastic pipes with mineral wool mat continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L placed on the pipe, under the insulation in accordance with Annex A and Fig. B15a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R	D ≤ 20	2.3	20	2 x 60.0 x 2.0	**EI 120-U/C EI 120-C/C**
		6.8 – 12.5	30	2 x 60.0 x 2.0	
	20 < D ≤ 75	6.8 – 12.5	30	2 x 60.0 x 2.0	

Table B15.2. Resistance to fire classification of plastic pipes with mineral wool mat continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L placed on the insulation in accordance with Annex A and Fig. B15b:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R	D ≤ 20	2.3	20	2 x 60.0 x 2.0	**EI 120-U/C EI 120-U/C**
		6.8 – 12.5	30	2 x 60.0 x 6.0	
	20 < D ≤ 75	6.8 – 12.5	30	2 x 60.0 x 6.0	

Table B16.1. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B16:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 15.0	≥ 1.0	9	2 x 60.0 x 2.0	**EI 120-C/U EI 120-C/C**
			10 – 22	2 x 60.0 x 4.0	
			23 – 36	2 x 60.0 x 6.0	
			37 – 50	2 x 60.0 x 8.0	
	15.0 < D ≤ 22.0	≥ 1.1	9	2 x 60.0 x 2.0	**EI 30-C/U EI 30-C/C**
			10 – 22	2 x 60.0 x 4.0	
			23 – 36	2 x 60.0 x 6.0	
			37 – 49	2 x 60.0 x 8.0	
			50	2 x 60.0 x 8.0	**EI 90 / E 120-C/U EI 90 / E 120-C/C**
	22.0 < D ≤ 28.0	≥ 1.2	9	2 x 60.0 x 2.0	**EI 30-C/U EI 30-C/C**
			10 – 22	2 x 60.0 x 4.0	
			23 – 36	2 x 60.0 x 6.0	
			37 – 49	2 x 60.0 x 8.0	
			50	2 x 60.0 x 8.0	**EI 90 / E 120-C/U EI 90 / E 120-C/C**
	28.0 < D ≤ 42.0	≥ 1.3	9	2 x 60.0 x 2.0	**EI 30-C/U EI 30-C/C**
			10 – 22	2 x 60.0 x 4.0	
			23 – 36	2 x 60.0 x 6.0	
			37 – 49	2 x 60.0 x 8.0	
			50	2 x 60.0 x 8.0	**EI 90 / E 120-C/U EI 90 / E 120-C/C**
	42.0 < D ≤ 54.0	≥ 1.5	9	2 x 60.0 x 2.0	**EI 30-C/U EI 30-C/C**
			10 – 22	2 x 60.0 x 4.0	
			23 – 36	2 x 60.0 x 6.0	
			37 – 49	2 x 60.0 x 8.0	
			50	2 x 60.0 x 8.0	**EI 90 / E 120-C/U EI 90 / E 120-C/C**
steel	D ≤ 42.4	≥ 2.0	9	2 x 60.0 x 2.0	**EI 120-C/U EI 120-C/C**
			10 – 22	2 x 60.0 x 4.0	
			23 – 36	2 x 60.0 x 6.0	
			37 – 50	2 x 60.0 x 8.0	
	42.4 < D ≤ 48.3	≥ 2.1	9	2 x 60.0 x 2.0	**EI 90 / E 120-C/U EI 90 / E 120-C/C**
			10 – 22	2 x 60.0 x 4.0	
			23 – 36	2 x 60.0 x 6.0	
			37 – 49	2 x 60.0 x 8.0	
			50	2 x 60.0 x 8.0	**EI 120-C/U EI 120-C/C**

Table B16.1, cont. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B16:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	48.3 < D ≤ 60.3	≥ 2.2	9	2 x 60.0 x 2.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			10 – 22	2 x 60.0 x 4.0	
			23 – 36	2 x 60.0 x 6.0	
			37 – 49	2 x 60.0 x 8.0	
			50	2 x 60.0 x 8.0	EI 120-C/U EI 120-C/C
	60.3 < D ≤ 76.1	≥ 2.4	9	2 x 60.0 x 2.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			10 – 22	2 x 60.0 x 4.0	
			23 – 36	2 x 60.0 x 6.0	
			37 – 49	2 x 60.0 x 8.0	
			50	2 x 60.0 x 8.0	EI 120-C/U EI 120-C/C
	76.1 < D ≤ 88.9	≥ 2.6	9	2 x 60.0 x 2.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			10 – 22	2 x 60.0 x 4.0	
			23 – 36	2 x 60.0 x 6.0	
			37 – 49	2 x 60.0 x 8.0	
			50	2 x 60.0 x 8.0	EI 120-C/U EI 120-C/C
	88.9 < D ≤ 114.3	≥ 3.1	9	2 x 60.0 x 2.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			10 – 22	2 x 60.0 x 4.0	EI 30-C/U EI 30-C/C
			23 – 36	2 x 60.0 x 6.0	
			37 – 50	2 x 60.0 x 8.0	
	114.3 < D ≤ 139.7	≥ 3.6	9	2 x 60.0 x 2.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			10 – 22	2 x 60.0 x 4.0	EI 30-C/U EI 30-C/C
			23 – 36	2 x 60.0 x 6.0	
			37 – 50	2 x 60.0 x 8.0	
	139.7 < D ≤ 159.0	≥ 4.0	9	2 x 60.0 x 2.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			10 – 22	2 x 60.0 x 4.0	EI 30-C/U EI 30-C/C
			23 – 36	2 x 60.0 x 6.0	
			37 – 50	2 x 60.0 x 8.0	

Table B16.2. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B16:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 12.7	≥ 0.8	9	2 x 60.0 x 4.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			9[1)]	2 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
	12.7 < D ≤ 15.0	≥ 0.9	9	2 x 60.0 x 4.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			9[1)]	2 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
	15.0 < D ≤ 22.23	≥ 1.0	9	2 x 60.0 x 4.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			9[1)]	2 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
steel	D ≤ 18.0	1.2 – 1.4	9	2 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
			10 – 25	2 x 60.0 x 4.0	
		≥ 1.5	9	2 x 60.0 x 2.0	
			10 – 25	2 x 60.0 x 4.0	
			26 – 37	2 x 60.0 x 6.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			38 – 50	2 x 60.0 x 8.0	
	18.0 < D ≤ 28.0	1.3 – 1.4	13	2 x 60.0 x 2.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			14 – 24	2 x 60.0 x 4.0	
			25	2 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			26 – 37	2 x 60.0 x 6.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			38 – 50	2 x 60.0 x 8.0	
		≥ 1.5	9	2 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
			10 – 25	2 x 60.0 x 4.0	
			26 – 37	2 x 60.0 x 6.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			38 – 50	2 x 60.0 x 8.0	

Table B16.2, cont. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B16:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	28.0 < D ≤ 48.3	≥ 1.4	13	2 x 60.0 x 2.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			14 – 24	2 x 60.0 x 4.0	
			25	2 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			26 – 37	2 x 60.0 x 6.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			38 – 50	2 x 60.0 x 8.0	
	48.3 < D ≤ 66.7	≥ 1.5	13	2 x 60.0 x 2.0	
			14 – 24	2 x 60.0 x 4.0	
			25	2 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			26 – 37	2 x 60.0 x 6.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			38 – 50	2 x 60.0 x 8.0	
	66.7 < D ≤ 76.1	≥ 1.6	13	2 x 60.0 x 2.0	EI 45 / E 120-C/U EI 45 / E 120-C/C
			14 – 24	2 x 60.0 x 4.0	
			25	2 x 60.0 x 4.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			26 – 37	2 x 60.0 x 6.0	
			38 – 49	2 x 60.0 x 8.0	
			50	2 x 60.0 x 8.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
steel	76.1 < D ≤ 88.9	≥ 1.8	13	2 x 60.0 x 2.0	EI 45 / E 120-C/U EI 45 / E 120-C/C
			14 – 24	2 x 60.0 x 4.0	
			25	2 x 60.0 x 4.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			26 – 37	2 x 60.0 x 6.0	
			38 – 49	2 x 60.0 x 8.0	
			50	2 x 60.0 x 8.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
	88.9 < D ≤ 108.0	≥ 2.0	13	2 x 60.0 x 2.0	EI 45 / E 120-C/U EI 45 / E 120-C/C
			14 – 24	2 x 60.0 x 4.0	
			25	2 x 60.0 x 4.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
			26 – 37	2 x 60.0 x 6.0	
			38 - 49	2 x 60.0 x 8.0	
			50	2 x 60.0 x 8.0	EI 90 / E 120-C/U EI 90 / E 120-C/C

[1)] Pipe additionally insulated with mineral wool density of 35 kg/m³, local insulation (case LI) dimensions of: 20 x 200 mm (thickness x length)

Table B17.1. Resistance to fire classification of copper pipes with polyethylene foam (PE), with reaction to fire class B_L-s1,d0, continuous insulation (case CS) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B17:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 12.7	≥ 0.8	9	2 x 60.0 x 4.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			9[1)]	2 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
	12.7 < D ≤ 15.0	≥ 0.9	9	2 x 60.0 x 4.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			9[1)]	2 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
	15.0 < D ≤ 22.23	≥ 1.0	9	2 x 60.0 x 4.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			9[1)]	2 x 60.0 x 4.0	EI 120-C/U EI 120-C/C

[1)] Pipe additionally insulated with mineral wool density of 35 kg/m³, local insulation (case LI) dimensions of: 20 x 200 mm (thickness x length)

Table B18.1. Resistance to fire classification of steel pipes with mineral wool mat local sustained insulation (case LS) penetration seals in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B18:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	D ≤ 42.4	≥ 1.5	20 x 300	2 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
			(21 – 30) x 500	2 x 60.0 x 2.0	
		≥ 2.0	(21 – 40) x 600	2 x 60.0 x 2.0	
		≥ 4.0	(41 – 50) x 600	2 x 60.0 x 2.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
		≥ 5.6	(41 – 50) x 750	2 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
	42.4 < D ≤ 66.7	≥ 1.5	30 x 500	2 x 60.0 x 2.0	
		≥ 2.0	(31 – 40) x 600	2 x 60.0 x 2.0	
		≥ 4.0	(41 – 50) x 600	2 x 60.0 x 2.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
		≥ 5.6	(41 – 50) x 750	2 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
	66.7 < D ≤ 108.0	≥ 2.0	40 x 600	2 x 60.0 x 2.0	
		≥ 4.0	(41 – 50) x 600	2 x 60.0 x 2.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
		≥ 5.6	(41 – 50) x 750	2 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
	108.0 < D ≤ 114.3	≥ 3.6	40 x 600	2 x 60.0 x 2.0	
			(41 – 50) x 600	2 x 60.0 x 2.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
			(41 – 50) x 750	2 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
	114.3 < D ≤ 168.3	≥ 4.0	50 x 600	2 x 60.0 x 2.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
		≥ 5.6	50 x 750	2 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
	168.3 < D ≤ 219.1	≥ 4.0	50 x 600	2 x 60.0 x 2.0	EI 90 / E 120-C/U EI 90 / E 120-C/C
		≥ 5.6	50 x 750	2 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
	219.1 < D ≤ 273.0	≥ 5.6	50 x 750	2 x 60.0 x 2.0	
	273.0 < D ≤ 323.9	≥ 5.6	50 x 750	2 x 60.0 x 2.0	
	323.9 < D ≤ 355.6	≥ 5.6	50 x 750	2 x 60.0 x 2.0	

Table B19.1. Resistance to fire classification of mixed bundle of single copper pipe (C/U end configuration) with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS), with additional single cable 4 x 1.5 mm² and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 25 mm and pipe wall thickness of: t_p = 1.5 mm penetration seal in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B19:

Pipe material	Copper pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class	Figure in Annex B
single copper pipe	D ≤ 12.7	≥ 0.8	9	2 x 60.0 x 4.0	EI 60 / E 120[1)]	B19b
			9	2 x 60.0 x 4.0	EI 90 / E 120	B19a,b, c,d
			9[2)]	2 x 60.0 x 4.0	EI 120	
	12.7 < D ≤ 22.23	≥ 1.0	9	2 x 60.0 x 4.0	EI 60 / E 120[1)]	B19b
			9	2 x 60.0 x 4.0	EI 90 / E 120	B19a,b, c,d
			9[2)]	2 x 60.0 x 4.0	EI 120	

[1)] Fire resistance class in case of penetration seals placed in 0 mm distance between the adjacent wraps.

[2)] Mixed bundle additionally insulated with wool density of 35 kg/m³, local insulation (case LI) dimensions of: 20 x 200 mm (thickness x length).

Table B19.2. Resistance to fire classification of mixed bundle of double copper pipe (C/U end configuration) with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS), with additional single cable 4 x 1.5 mm² and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 25 mm and pipe wall thickness of: t_p = 1.5 mm penetration seal in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B19:

Pipe material	Copper pipe No. 1 max. diameter x min. wall thickness [mm]	Copper pipe No. 2 max. diameter x min. wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class	Figure in Annex B
double copper pipe	12.7 x 0.8	12.7 x 0.8	9	2 x 60.0 x 4.0	EI 60 / E 120[1)]	B19b
			9	2 x 60.0 x 4.0	EI 90 / E 120	B19a,b, c,d
			9[2)]	2 x 60.0 x 4.0	EI 120	
	12.7 x 0.8	22.23 x 1.0	9	2 x 60.0 x 4.0	EI 60 / E 120[1)]	B19b
			9	2 x 60.0 x 4.0	EI 90 / E 120	B19a,b, c,d
			9[2)]	2 x 60.0 x 4.0	EI 120	

[1)] Fire resistance class in case of penetration seals placed in 0 mm distance between the adjacent wraps.

[2)] Mixed bundle additionally insulated with mineral wool density of 35 kg/m³, local insulation (case LI) dimensions of: 20 x 200 mm (thickness x length).

Table B20.1. Resistance to fire classification of mixed bundle of single copper pipe (C/U end configuration) with polyethylene foam (PE), with reaction to fire class B_L-s1,d0, continuous insulation (case CS), with additional single cable 4 x 1.5 mm² and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 25 mm and pipe wall thickness of: t_p = 1.5 mm penetration seal in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B20:

Pipe material	Copper pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
single copper pipe	D ≤ 12.7	≥ 0.8	9	2 x 60.0 x 4.0	EI 90 / E 120
			9[1)]	2 x 60.0 x 4.0	EI 120
	12.7 < D ≤ 22.23	≥ 1.0	9	2 x 60.0 x 4.0	EI 90 / E 120
			9[1)]	2 x 60.0 x 4.0	EI 120

[1)] Mixed bundle additionally insulated with mineral wool density of 35 kg/m³, local insulation (case LI) dimensions of: 20 x 200 mm (thickness x length).

Table B20.2. Resistance to fire classification of mixed bundle of double copper pipe (C/U end configuration) with polyethylene foam (PE), with reaction to fire class B_L-s1,d0, continuous insulation (case CS), with additional single cable 4 x 1.5 mm² and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 25 mm and pipe wall thickness of: t_p = 1.5 mm penetration seal in flexible or rigid wall thickness of: t ≥ 125 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B20:

Pipe material	Copper pipe No. 1 max. diameter x min. wall thickness [mm]	Copper pipe No. 2 max. diameter x min. wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
double copper pipe	12.7 x 0.8	12.7 x 0.8	9	2 x 60.0 x 4.0	EI 90 / E 120
			9[1)]	2 x 60.0 x 4.0	EI 120
	12.7 x 0.8	22.23 x 1.0	9	2 x 60.0 x 4.0	EI 90 / E 120
			9[1)]	2 x 60.0 x 4.0	EI 120

[1)] Mixed bundle additionally insulated with mineral wool density of 35 kg/m³, local insulation (case LI) dimensions of: 20 x 200 mm (thickness x length).

Table B21.1. Resistance to fire classification of plastic pipes with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS) penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B21:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP	D ≤ 160	4.9 – 14.5	13	2 x 60.0 x 12.0	EI 30-U/C EI 30-C/C
		14.6	13	2 x 60.0 x 12.0	EI 120-U/C EI 120-C/C

Table B22.1. Resistance to fire classification of AROT DVK conduit penetration seals in rigid wall thickness of: t ≥ 150 mm, made with use of double row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B22:

Conduit material	Conduit diameter [mm]	Conduit wave height [mm]	Services inside]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
AROT DVK	D ≤ 110	3.0	empty	2 x 60.0 x 4.0	EI 120-U/U EI 120-U/C EI 120-C/U EI 120-C/C
			Small cable: $Ø_{cable}$ ≤ 21 mm	2 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
			Cable bundle: $Ø_{bundle}$ ≤ 100 mm $Ø_{cable}$ ≤ 21 mm	2 x 60.0 x 4.0	EI 120-U/C EI 120-C/C

ALFASEAL GROUP Sp. z o.o.
Kineskopowa 1 St.
05-500 Piaseczno, Poland
VAT: PL1231274821
alfaseal.pl
intuseal.com
+48 22 498 7 498
sprzedaz@alfaseal.pl

Table B23.1. Resistance to fire classification of plastic pipes (without insulation) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 550 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B23:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-HT	D ≤ 50	1.8 – 1.9	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		2.0 – 2.7	-	1 x 60.0 x 4.0	
		2.8 – 3.9	-	1 x 100.0 x 10.0	
	50 < D ≤ 75	1.9	-	1 x 60.0 x 2.0	
		2.0 – 2.7	-	1 x 60.0 x 4.0	
		2.8 – 3.9	-	1 x 100.0 x 10.0	
	75 < D ≤ 110	2.7	-	1 x 60.0 x 4.0	
		2.8 – 3.9	-	1 x 100.0 x 10.0	
	110 < D ≤ 125	3.9	-	1 x 100.0 x 10.0	
	125 < D ≤ 160	3.9	-	1 x 100.0 x 10.0	
PP-M Magnaplast Ultra dB	D ≤ 50	2.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		2.1 – 3.4	-	1 x 60.0 x 4.0	
		3.5 – 4.9	-	1 x 100.0 x 10.0	EI 60-U/C EI 60-C/C
	50 < D ≤ 75	2.6	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		2.7 – 4.9	-	1 x 100.0 x 10.0	EI 60-U/C EI 60-C/C
	75 < D ≤ 110	3.4	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		3.5 – 4.9	-	1 x 100.0 x 10.0	EI 60-U/C EI 60-C/C
	110 < D ≤ 160	4.9	-	1 x 100.0 x 10.0	

Table B23.2. Resistance to fire classification of plastic pipes (without insulation) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B23:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-HD/ PE/PE-X/ ABS/ SAN+PVC	D ≤ 32	2.0 – 6.8	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		6.9 – 10.0	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	32 < D ≤ 50	2.5 – 6.8	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		6.9 – 10.0	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	50 < D ≤ 63	2.8 – 6.8	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		6.9 – 10.0	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	63 < D ≤ 75	3.0 – 6.8	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		6.9 – 10.0	-	1 x 60.0 x 4.0	EI 120-U/C
	75 < D ≤ 90	3.5 – 4.1	-	1 x 60.0 x 4.0	EI 120-C/C
		4.2	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
		4.3 – 9.5	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		4.3 – 9.5	-	1 x 100.0 x 10.0	EI 240-U/C EI 240-C/C
		9.6 – 10.0	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	90 < D ≤ 110	4.2	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
		4.3 – 9.5	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		4.3 – 9.5	-	1 x 100.0 x 10.0	EI 240-U/C EI 240-C/C
		9.6 – 10.0	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
	110 < D ≤ 125	4.8 – 5.8	-	1 x 100.0 x 6.0	EI 240-U/C EI 240-C/C
		5.9 – 6.2	-	1 x 100.0 x 6.0	EI 120-U/C EI 120-C/C
		5.9 – 6.2	-	1 x 100.0 x 10.0	EI 240-U/C EI 240-C/C
		6.3 – 9.5	-	1 x 100.0 x 6.0	EI 120-U/C EI 120-C/C
		6.3 – 9.5	-	1 x 100.0 x 10.0	EI 240-U/C EI 240-C/C
		9.6 – 9.9	-	1 x 100.0 x 6.0	EI 120-U/C EI 120-C/C

Table B23.2, cont. Resistance to fire classification of plastic pipes (without insulation) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B23:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-HD/ PE/PE-X/ ABS/ SAN+PVC	125 < D ≤ 160	6.2 – 9.5	-	1 x 100.0 x 10.0	EI 240-U/C EI 240-C/C
	160 < D ≤ 200	6.3 – 11.9	-	1 x 100.0 x 16.0	EI 120-U/C EI 120-C/C
PE-Xa	D ≤ 20	2.0 – 5.8	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 32	3.0	-	1 x 60.0 x 2.0	
	32 < D ≤ 40	3.7	-	1 x 60.0 x 2.0	
	40 < D ≤ 50	4.6	-	1 x 60.0 x 2.0	
	50 < D ≤ 63	5.8	-	1 x 60.0 x 2.0	
PP	D ≤ 50	1.5 – 12.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		12.6 – 18.4	-	1 x 60.0 x 4.0	
	50 < D ≤ 75	1.9 – 12.5	-	1 x 60.0 x 2.0	
		12.6 – 18.4	-	1 x 60.0 x 4.0	
	75 < D ≤ 90	2.3 – 18.4	-	1 x 60.0 x 4.0	
	90 < D ≤ 110	2.7 – 18.4	-	1 x 60.0 x 4.0	
	110 < D ≤ 125	3.1 – 15.2	-	1 x 100.0 x 6.0	EI 120-U/C EI 120-C/C
	125 < D ≤ 160	4.0 – 7.7	-	1 x 100.0 x 10.0	
	160 < D ≤ 200	7.7	-	1 x 100.0 x 16.0	EI 45-U/C EI 45-C/C
PP-R	D ≤ 20	2.3 – 4.1	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		4.2	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
		4.3 – 10.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 32	2.7 – 4.1	-	1 x 60.0 x 2.0	
		4.2	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
		4.3 – 12.5	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	32 < D ≤ 40	3.0 – 4.1	-	1 x 60.0 x 2.0	
		4.2	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
		4.3 – 12.5	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	40 < D ≤ 50	3.3 – 4.1	-	1 x 60.0 x 2.0	
		4.2	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
		4.3 – 12.5	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	50 < D ≤ 63	3.8 – 4.1	-	1 x 60.0 x 2.0	
		4.2	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
		4.3 – 12.5	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.4 – 18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C

Table B23.2, cont. Resistance to fire classification of plastic pipes (without insulation) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B23:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R	63 < D ≤ 75	4.2	-	1 x 60.0 x 2.0	EI 180-U/C EI 180-C/C
		4.3 – 12.5	-	1 x 60.0 x 2.0	EI 120-U/C
	75 < D ≤ 90	6,7 – 7,6	-	1 x 60.0 x 4.0	EI 120-C/C
		7.7 – 12.2	-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C
		12.3	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
		12.4 – 18.3	-	1 x 60.0 x 4.0	EI 120-U/C
	90 < D ≤ 110	10.0 – 12.2	-	1 x 60.0 x 4.0	EI 120-C/C
		12.3	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
		12.4 – 18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
PCV-U/ PVC-C	D ≤ 25	1.5	-	1 x 60.0 x 4.0	EI 120-U/U EI 120-U/C EI 120-C/U EI 120-C/C
	25 < D ≤ 32	1.5 – 4.2	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	32 < D ≤ 50	1.5 – 4.2	-	1 x 60.0 x 2.0	
	50 < D ≤ 75	1.8 – 4.2	-	1 x 60.0 x 2.0	
		1.9 – 4.2	-	1 x 60.0 x 2.0	
	75 < D ≤ 90	2.1 – 3.4	-	1 x 60.0 x 4.0	
		3.5 – 4.2	-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C
	90 < D ≤ 110	2.2	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
		2.3 – 4.2	-	1 x 60.0 x 4.0	EI 180-U/C EI 180-C/C
	110 < D ≤ 125	2.5 – 3.9	-	1 x 100.0 x 6.0	EI 120-U/C EI 120-C/C
		4.0 – 5.3	-	1 x 100.0 x 6.0	EI 240-U/C
		5.4 – 7.7	-	1 x 100.0 x 10.0	EI 240-C/C
	125 < D ≤ 160	3.2 – 7.6	-	1 x 100.0 x 10.0	EI 120-U/C EI 120-C/C
		7.7	-	1 x 100.0 x 10.0	EI 240-U/C EI 240-C/C
	160 < D ≤ 170	4.4 – 7.6	-	1 x 100.0 x 12.0	EI 120-U/C EI 120-C/C
		7.7	-	1 x 100.0 x 12.0	EI 240-U/C EI 240-C/C
	170 < D ≤ 185	6.1 – 7.6	-	1 x 100.0 x 14.0	EI 120-U/C EI 120-C/C
		7.7	-	1 x 100.0 x 14.0	EI 240-U/C
	185 < D ≤ 200	7.7	-	1 x 100.0 x 16.0	EI 240-C/C

Table B23.3. Resistance to fire classification of MLC pipes (without insulation) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B23:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-RT/AL/ PE-RT	D ≤ 20	2.0	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		2.1 – 7.5	-	1 x 60.0 x 2.0	EI 180 / E 240-U/C EI 180 / E 240-C/C
	20 < D ≤ 25	2.5	-	1 x 60.0 x 2.0	
	25 < D ≤ 32	3.2	-	1 x 60.0 x 2.0	
	32 < D ≤ 40	4.0	-	1 x 60.0 x 2.0	
	40 < D ≤ 63	6.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		6.3	-	1 x 60.0 x 2.0	EI 180 / E 240-U/C EI 180 / E 240-C/C
	63 < D ≤ 75	7.5	-	1 x 60.0 x 2.0	
PE-X/AL/ PE-X	D ≤ 20	2.0– 7.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	20 < D ≤ 32	3.0 – 7.4	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		7.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	32 < D ≤ 40	4.0	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	40 < D ≤ 63	6.0 – 7.4	-	1 x 60.0 x 2.0	
		7.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	63 < D ≤ 75	7.5	-	1 x 60.0 x 2.0	

Table B23.3, cont. Resistance to fire classification of MLC pipes (without insulation) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B23:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R/AL/ PP-R	D ≤ 20	2.8 – 3.3	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		3.4 – 10.0	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	20 < D ≤ 32	4.4 – 12.4	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.5	-	1 x 60.0 x 2.0	EI 240-U/C
		12.6 – 18.4	-	1 x 60.0 x 4.0	EI 240-C/C
	32 < D ≤ 50	6.9 – 12.4	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.5	-	1 x 60.0 x 2.0	EI 240-U/C
		12.6 – 18.4	-	1 x 60.0 x 4.0	EI 240-C/C
	50 < D ≤ 63	8.7 – 12.4	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.5	-	1 x 60.0 x 2.0	EI 240-U/C
		12.6 – 18.4	-	1 x 60.0 x 4.0	EI 240-C/C
	63 < D ≤ 75	10.3 – 12.4	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.5	-	1 x 60.0 x 2.0	EI 240-U/C
		12.6 – 18.4	-	1 x 60.0 x 4.0	EI 240-C/C
	75 < D ≤ 90	12.4 – 18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		18.4	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
	90 < D ≤ 110	15.1 – 18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		18.4	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C

Table B23.5. Resistance to fire classification of bundle of max. 3 plastic pipes (max. 3 x PE-HD. D ≤ 32 mm x t = 2.0 mm) penetration seal in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L, length of 60.0 mm and thickness of 4.0 mm in accordance with Annex A and Fig. B23:

Fire resistance class: EI 240-U/C EI 240-C/C

Table B24.1. Resistance to fire classification of plastic pipes (without insulation) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 550 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B24:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PVC-U PVC-C	D ≤ 110	4.2	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C

Table B23.4. Resistance to fire classification of composite pipes (without insulation) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B23:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R/ PP-R-GF/ PP-R	D ≤ 20	2.8 – 10.0	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	20 < D ≤ 32	4.4 – 12.4	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
	20 < D ≤ 32	12.6 – 18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		18.4	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
	32 < D ≤ 50	6.9 – 12.4	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		12.6 – 18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		18.4	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
	50 < D ≤ 63	8.7 – 12.5	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		12.6 – 18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		18.4	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
	63 < D ≤ 75	10.3 – 12.5	-	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		12.5	-	1 x 60.0 x 2.0	EI 240-U/C EI 240-C/C
		12.6 – 18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		18.4	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
	75 < D ≤ 90	11.2 – 18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		18.4	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
	90 < D ≤ 110	12.3 – 18.3	-	1 x 60.0 x 4.0	EI 120-U/C EI 120-C/C
		18.4	-	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C

Table B25.1. Resistance to fire classification of plastic pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B25:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-HD/ PE/PE-X/ ABS/ SAN+PVC	D ≤ 110	6.2	23	1 x 60.0 x 16.0	EI 120-U/C EI 120-C/C
		10.0	9 – 13	1 x 60.0 x 8.0	
	110 < D ≤ 160	6.2	23	1 x 60.0 x 16.0	
PP	D ≤ 110	2.7	9	1 x 60.0 x 8.0	EI 120-U/C EI 120-C/C
PP-R	D ≤ 110	18.3	9	1 x 60.0 x 8.0	EI 120-U/C EI 120-C/C

Table B25.2. Resistance to fire classification of composite pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B25:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R/ PP-R-GF/ PP-R	D ≤ 110	15.1	9	1 x 60.0 x 8.0	EI 120-U/C EI 120-C/C

Table B25.3. Resistance to fire classification of plastic pipes with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B25:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-HD/ PE/PE-X/ ABS/ SAN+PVC	D ≤ 110	4.2	13	1 x 60.0 x 6.0	EI 120-U/C EI 120-C/C
		4.3 – 10.0	13	1 x 60.0 x 6.0	EI 90-U/C EI 90-C/C
	110 < D ≤ 125	4.8 – 14.5	13	1 x 100.0 x 8.0	EI 45-U/C EI 45-C/C
		14.6	13	1 x 100.0 x 8.0	EI 90-U/C EI 90-C/C
	125 < D ≤ 160	6.2 – 14.5	13	1 x 100.0 x 12.0	EI 45-U/C EI 45-C/C
		14.6	13	1 x 100.0 x 12.0	EI 90-U/C EI 90-C/C
PP	D ≤ 160	4.0 – 14.5	13	1 x 100.0 x 12.0	EI 30-U/C EI 30-C/C
		14.6	13	1 x 100.0 x 12.0	EI 60-U/C EI 60-C/C

Table B26.1. Resistance to fire classification of plastic pipes with polyethylene foam (PE), with reaction to fire class E, continuous insulation (case CS) type penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B26:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP	D ≤ 75	12.5	9	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C
PVC-U/ PVC-C	D ≤ 32	2.0	9	1 x 60.0 x 4.0	EI 240-U/C EI 240-C/C

Table B26.2. Resistance to fire classification of MLC pipes with polyethylene foam (PE), with reaction to fire class E_L, continuous insulation (case CS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B26:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PE-RT/AL/ PE-RT	D ≤ 20	2.0 – 3.0	9	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 32	3.0	9	1 x 60.0 x 2.0	
PE-X/AL/ PE-X	D ≤ 20	2.0 – 3.0	9	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
	20 < D ≤ 32	3.0	9	1 x 60.0 x 2.0	

Table B26.3. Resistance to fire classification of composite pipes with polyethylene foam (PE), with reaction to fire class E_L, continuous insulation (case CS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B26:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R/ PP-R-GF/ PP-R	D ≤ 20	2.8	9	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		6.9 – 8.3	13	1 x 60.0 x 2.0	
	20 < D ≤ 50	6.9 – 8.3	13	1 x 60.0 x 2.0	

Table B27.1. Resistance to fire classification of plastic pipes with mineral wool mat continuous insulation (case CS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m3, made with use of single row of INTU FR WRAP or INTU FR WRAP L placed on the insulation in accordance with Annex A and Fig. B27:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
PP-R	D ≤ 20	2.3 – 3.4	20	1 x 60.0 x 2.0	EI 120-U/C EI 120-C/C
		6.8 – 12.5	30	1 x 60.0 x 6.0	
	20 < D ≤ 75	6.8 – 12.5	30	1 x 60.0 x 6.0	

Table B28.1. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B28a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 15.0	≥ 1.0	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
			10 – 22	1 x 60.0 x 4.0	
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	15.0 < D ≤ 22.0	≥ 1.1	9	1 x 60.0 x 2.0	EI 120 / E 240-C/U EI 120 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120 / E 180-C/U EI 120 / E 180-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 180-C/U EI 180-C/C
	22.0 < D ≤ 28.0	≥ 1.2	9	1 x 60.0 x 2.0	EI 120 / E 240-C/U EI 120 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120 / E 180-C/U EI 120 / E 180-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 180-C/U EI 180-C/C
	28.0 < D ≤ 42.0	≥ 1.3	9	1 x 60.0 x 2.0	EI 120 / E 240-C/U EI 120 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120 / E 180-C/U EI 120 / E 180-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 180-C/U EI 180-C/C
	42.0 < D ≤ 54.0	≥ 1.5	9	1 x 60.0 x 2.0	EI 120 / E 240-C/U
			10 – 22	1 x 60.0 x 4.0	EI 120 / E 180-C/U EI 120 / E 180-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 180-C/U EI 180-C/C
steel	D ≤ 42.4	≥ 2.0	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
			10 – 22	1 x 60.0 x 4.0	
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	

Table B28.1, cont. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B28a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	42.4 < D ≤ 48.3	2.1 – 2.5	9	1 x 60.0 x 2.0	EI 120 / E 240-C/U EI 120 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
		≥ 2.6	9 – 12	1 x 60.0 x 2.0	EI 120 / E 240-C/U EI 120 / E 240-C/C
			13	1 x 60.0 x 2.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			14 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			24 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	48.3 < D ≤ 60.3	2.3 – 2.5	9	1 x 60.0 x 2.0	EI 120 / E 240-C/U EI 120 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
		≥ 2.6	9 – 12	1 x 60.0 x 2.0	EI 120 / E 240-C/U EI 120 / E 240-C/C
			13	1 x 60.0 x 2.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			14 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			24 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	60.3 < D ≤ 76.1	≥ 2.6	9 – 12	1 x 60.0 x 2.0	EI 120 / E 240-C/U EI 120 / E 240-C/C
			13	1 x 60.0 x 2.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			14 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			24 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	

Table B28.1, cont. Resistance to fire classification of metal pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B28a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	76.1 < D ≤ 88.9	2.6 – 2.7	13	1 x 60.0 x 2.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
		≥ 2.8	9 – 12	1 x 60.0 x 2.0	EI 120 / E 240-C/U EI 120 / E 240-C/C
			13	1 x 60.0 x 2.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
			14 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			24 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	88.9 < D ≤ 114.3	≥ 3.2	9	1 x 60.0 x 2.0	EI 120 / E 240-C/U EI 120 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	114.3 < D ≤ 139.7	≥ 3.7	9	1 x 60.0 x 2.0	EI 120 / E 240-C/U EI 120 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	139.7 < D ≤ 159.0	≥ 4.0	9	1 x 60.0 x 2.0	EI 120 / E 240-C/U EI 120 / E 240-C/C
			10 – 22	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 50	1 x 60.0 x 8.0	
	159.0 < D ≤ 168.3	≥ 4.1	9	1 x 60.0 x 2.0	EI 90-C/U EI 90-C/C
			10 – 22	1 x 60.0 x 4.0	EI 60 / E 90-C/U EI 60 / E 90-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 60 / E 120-C/U EI 60 / E 120-C/C
	168.3 < D ≤ 219.0	≥ 4.5	9	1 x 60.0 x 2.0	EI 90-C/U EI 90-C/C
			10 – 22	1 x 60.0 x 4.0	EI 60 / E 90-C/U EI 60 / E 90-C/C
			23 – 36	1 x 60.0 x 6.0	
			37 – 49	1 x 60.0 x 8.0	
			50	1 x 60.0 x 8.0	EI 60 / E 120-C/U EI 60 / E 120-C/C

Table B28.2. Resistance to fire classification of steel pipes with flexible elastomeric foam (FEF), with reaction to fire class D_L-s3,d0, continuous insulation (case CS) penetration seals in rigid floor thickness of:t ≥ 150 mm and density of: ρ ≥ 550 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B28a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	D ≤ 168.3	≥ 4.0	23	1 x 60.0 x 4.0	EI 60-C/U EI 60-C/C

Table B28.3. Resistance to fire classification of copper pipes with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B28a:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 12.7	≥ 0.8	9	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
	12.7 < D ≤ 15.0	≥ 0.9	9	1 x 60.0 x 4.0	
	15.0 < D ≤ 22.23	≥ 1.0	9	1 x 60.0 x 4.0	

Table B28.4. Resistance to fire classification of steel pipes with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B28:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class	Figure in Annex B
steel	D ≤ 18.0	1.2 – 1.4	9	1 x 60.0 x 2.0	EI 120-C/U EI 120-C/C	B28a
			10 - 25	1 x 60.0 x 4.0		
	D ≤ 18.0	≥ 1.5	9	1 x 60.0 x 2.0		
			10 - 25	1 x 60.0 x 4.0		
			26 – 37	1 x 60.0 x 6.0		
			38 - 50	1 x 60.0 x 8.0		
	18.0 < D ≤ 28.0	1.3 – 1.4	9	1 x 60.0 x 2.0		
			10 - 25	1 x 60.0 x 4.0		
		≥ 1.5	9	1 x 60.0 x 2.0		
			10 - 25	1 x 60.0 x 4.0		
			26 – 37	1 x 60.0 x 6.0		
			38 - 50	1 x 60.0 x 8.0		
	28.0 < D ≤ 48.3	1.4	9	1 x 60.0 x 2.0		
			10 - 25	1 x 60.0 x 4.0		
		≥ 1.5	9	1 x 60.0 x 2.0		
			10 - 25	1 x 60.0 x 4.0		
			26 – 37	1 x 60.0 x 6.0		
			38 - 50	1 x 60.0 x 8.0		
	48.3 < D ≤ 66.7	≥ 1.5	9	1 x 60.0 x 2.0		
			10 - 25	1 x 60.0 x 4.0		
			26 – 37	1 x 60.0 x 6.0		
			38 - 50	1 x 60.0 x 8.0		
	66.7 < D ≤ 76.1	≥ 1.6	25	1 x 60.0 x 4.0		
			26 – 37	1 x 60.0 x 6.0		
			38 - 50	1 x 60.0 x 8.0		
	76.1 < D ≤ 88.9	≥ 1.8	25	1 x 60.0 x 4.0		
			26 – 37	1 x 60.0 x 6.0		
			38 - 50	1 x 60.0 x 8.0		
	88.9 < D ≤ 108.0	≥ 2.0	25	1 x 60.0 x 4.0		
			26 – 37	1 x 60.0 x 6.0		
			38 – 50	1 x 60.0 x 8.0		

Table B28.4, cont. Resistance to fire classification of steel pipes with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B28:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class	Figure in Annex B
steel	108.0 < D ≤ 114.3	≥ 2.2	50	1 x 60.0 x 8.0	EI 120-C/U EI 120-C/C	B28a
	114.3 < D ≤ 139.7	≥ 3.1	50	1 x 60.0 x 8.0		
	139.7 < D ≤ 168.3	≥ 4.0	50	1 x 60.0 x 8.0		
	168.3 < D ≤ 219.1	≥ 4.4	50[1)]	1 x 60.0 x 8.0	EI 90 / E 120-C/U EI 90 / E 120-C/C	B28b
	219.1 < D ≤ 273.0	≥ 4.9	50[1)]	1 x 60.0 x 8.0		
	273.0 < D ≤ 323.9	≥ 5.3	50[1)]	1 x 60.0 x 8.0		
	323.9 < D ≤ 355.6	≥ 5.6	50[1)]	1 x 60.0 x 8.0		

[1)] Pipe additionally insulated with mineral wool density of 35 kg/m³, local insulation (case LI) dimensions of: 50 x 700 mm (thickness x length)

Table B29.1. Resistance to fire classification of metal pipes with polyethylene foam (PE), with reaction to fire class E, continuous insulation (case CS) penetration seal in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B29:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 6.0	≥ 0.8	9	1 x 60.0 x 2.0	EI 240-C/U EI 240-C/C
	6.0 < D ≤ 15.88	≥ 1.0	9	1 x 60.0 x 2.0	
steel	D ≤ 42.4	2.1 – 2.8	20	1 x 60.0 x 2.0	EI 180 / E 240-C/U EI 180 / E 240-C/C
		≥ 2.9	20	1 x 60.0 x 2.0	
			21 – 25	1 x 60.0 x 4.0	
	42.4 < D ≤ 48.3	≥ 2.1	25	1 x 60.0 x 4.0	
	48.3 < D ≤ 60.3	≥ 2.3	25	1 x 60.0 x 4.0	
	60.3 < D ≤ 76.1	≥ 2.7	25	1 x 60.0 x 4.0	
	76.1 < D ≤ 88.9	≥ 2.9	25	1 x 60.0 x 4.0	
	88.9 < D ≤ 108.0	≥ 4.0	25	1 x 60.0 x 4.0	EI 60-C/U EI 60-C/C

Table B29.2. Resistance to fire classification of bundle of max. 3 copper pipes (max. 2 x D ≤ 6.35 mm x t = 0.8 mm + max. 1 x D ≤ 15.88 mm x t = 1.0 mm) with continuous PE foam insulation, with reaction to fire class E, (thickness of 9 mm) penetration seal in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L length of 60.0 mm and thickness of 4.0 mm in accordance with Annex A and Fig. B29:

Fire resistance class: EI 180 / E 240-C/U EI 180 / E 240-C/C

Table B29.3. Resistance to fire classification of copper pipes with polyethylene foam (PE), with reaction to fire class B_L-s1,d0, local sustained insulation (case LS) penetration seal in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B29:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 12.7	≥ 0.8	9 x 400	1 x 60.0 x 4.0	EI 120-C/U EI 120-C/C
	12.7 < D ≤ 22.23	≥ 1.0	9 x 400	1 x 60.0 x 4.0	

Table B30.1. Resistance to fire classification of steel pipes with mineral wool mat local sustained insulation (case LS) penetration seals in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B30:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
steel	D ≤ 42.4	≥ 1.5	20 x 300	1 x 60.0 x 2.0	EI 120-C/U EI 120-C/C
			(21 – 30) x 400	1 x 60.0 x 2.0	
		≥ 2.0	(21 – 40) x 600	1 x 60.0 x 2.0	
		≥ 4.0	(21 – 50) x 600	1 x 60.0 x 2.0	
	42.4 < D ≤ 66.7	≥ 1.5	30 x 500	1 x 60.0 x 2.0	
		≥ 2.0	(31 – 40) x 600	1 x 60.0 x 2.0	
		≥ 4.0	(31 – 50) x 600	1 x 60.0 x 2.0	
	66.7 < D ≤ 108.0	≥ 2.0	40 x 600	1 x 60.0 x 2.0	
		≥ 4.0	(41 – 50) x 600	1 x 60.0 x 2.0	
	108.0 < D ≤ 114.3	≥ 4.0	50 x 600	1 x 60.0 x 2.0	
	114.3 < D ≤ 139.7	≥ 4.0	50 x 600	1 x 60.0 x 2.0	
	139.7 < D ≤ 168.3	≥ 4.0	50 x 600	1 x 60.0 x 2.0	

Table B31.1. Resistance to fire classification of mixed bundle of single copper pipe (C/U end configuration) with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS), with additional single cable 4 x 1.5 mm² and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 25 mm and pipe wall thickness of: t_p = 1.5 mm penetration seal in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B31:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 12.7	≥ 0.8	9	1 x 60.0 x 4.0	EI 120
	12.7 < D ≤ 22.23	≥ 1.0	9	1 x 60.0 x 4.0	

Table B31.2. Resistance to fire classification of mixed bundle of double copper pipe (C/U end configuration) with flexible elastomeric foam (FEF), with reaction to fire class B_L-s2,d0, continuous insulation (case CS), with additional single cable 4 x 1.5 mm² and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 25 mm and pipe wall thickness of: t_p = 1.5 mm penetration seal in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B31:

Pipe material	Copper pipe No. 1 max. diameter x min. wall thickness [mm]	Copper pipe No. 2 max. diameter x min. wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	12.7 x 0.8	12.7 x 0.8	9	1 x 60.0 x 4.0	EI 120
	12.7 x 0.8	22.23 x 1.0	9	1 x 60.0 x 4.0	

Table B32.1. Resistance to fire classification of mixed bundle of single copper pipe (C/U end configuration) with polyethylene foam (PE), with reaction to fire class E, continuous insulation (case CS), with additional single A1 cable (E-YY-J 5x1,5; RE NYY-J 5x1,5 RE; VV 5x1,5) penetration seal in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B32:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 6.0	≥ 0.8	9	1 x 60.0 x 2.0	EI 240
	6.4 < D ≤ 15.6	≥ 1.0	9	1 x 60.0 x 2.0	

Table B32.2. Resistance to fire classification of mixed bundle of double copper pipe (C/U end configuration) with polyethylene foam (PE), with reaction to fire class E, continuous insulation (case CS), with additional single A1 cable (E-YY-J 5x1,5; RE NYY-J 5x1,5 RE; VV 5x1,5) penetration seal in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B32:

Pipe material	Copper pipe No. 1 max. diameter x min. wall thickness [mm]	Copper pipe No. 2 max. diameter x min. wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	6.0 x 0.8	6.0 x 0.8	9	1 x 60.0 x 2.0	EI 240
	6.0 x 0.8	15.6 x 1.0	9	1 x 60.0 x 2.0	

Table B32.3. Resistance to fire classification of mixed bundle of single copper pipe (C/U end configuration) with polyethylene foam (PE), with reaction to fire class E, continuous insulation (case CS), with additional single A1cable (E-YY-J 5x1,5; RE NYY-J 5x1,5 RE; VV 5x1,5) and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 32 mm and pipe wall thickness of: t_p = 2.0 mm penetration seal in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B32:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 6.0	≥ 0.8	9	1 x 60.0 x 4.0	EI 240
	6.0 < D ≤ 15.9	≥ 1.0	9	1 x 60.0 x 4.0	

Table B32.4. Resistance to fire classification of mixed bundle of double copper pipe (C/U end configuration) with polyethylene foam (PE), with reaction to fire class E, continuous insulation (case CS) type, with additional single cable type A1 (E-YY-J 5x1,5; RE NYY-J 5x1,5 RE; VV 5x1,5) and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 32 mm and pipe wall thickness of: t_p = 2.0 mm penetration seal in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B32:

Pipe material	Copper pipe No. 1 max. diameter x min. wall thickness [mm]	Copper pipe No. 2 max. diameter x min. wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	6.0 x 0.8	6.0 x 0.8	9	1 x 60.0 x 4.0	EI 240
	6.0 x 0.8	15.9 x 1.0	9	1 x 60.0 x 4.0	

Table B32.5. Resistance to fire classification of mixed bundle of single copper pipe (C/U end configuration) with polyethylene foam (PE), with reaction to fire class B_L-s1,d0, local insulation (case LS, insulation length of 400 mm) type, with additional single cable 4 x 1.5 mm² and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 25 mm and pipe wall thickness of: t_p = 1.5 mm penetration seal in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B32:

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	D ≤ 12.7	≥ 0.8	9 x 400	1 x 60.0 x 4.0	EI 120
	12.7 < D ≤ 22.23	≥ 1.0	9 x 400	1 x 60.0 x 4.0	

Table B32.6. Resistance to fire classification of mixed bundle of double copper pipe (C/U end configuration) with polyethylene foam (PE), with reaction to fire class B_L-s1,d0, local insulation (case LS, insulation length of 400 mm), with additional single cable 4 x 1.5 mm² and single PVC-U pipe (U/C end configuration) diameter of: D ≤ 25 mm and pipe wall thickness of: t_p = 1.5 mm penetration seal in rigid floor thickness of: t ≥ 150 mm and density of: ρ ≥ 1700 kg/m³, made with use of single row of INTU FR WRAP or INTU FR WRAP L in accordance with Annex A and Fig. B32:

Pipe material	Copper pipe No. 1 max. diameter x min. wall thickness [mm]	Copper pipe No. 2 max. diameter x min. wall thickness [mm]	Insulation thickness [mm]	Rows [pcs] x intumescent material length x thickness [mm]	Fire resistance class
copper	12.7 x 0.8	12.7 x 0.8	9 x 400	1 x 60.0 x 4.0	EI 120
	12.7 x 0.8	22.23 x 1.0	9 x 400	1 x 60.0 x 4.0	

BWR 3 Hygiene, heath and the environment	
Air permeability	NPD
Water permeability	NPD
Content, emission, release of dangerous substances	NPD
BWR 4 Safety and accessibility in use	
Mechanical resistance and stability	NPD
Resistance to impact/movement	NPD
Adhesion	NPD
Durability	Z_2
BWR 5 Protection against noise	
Aireborne sound insulation	NPD
BWR 6 Energy economy and heat retention	
Thermal properties	NPD
Water vapour permeability	NPD

8. Appropriate technical documentation or special technical documentation:

Not applicable

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:
Name: Michał Szyjkowski
Position: President of the Management Board

Piaseczno, 27.10.2025 ……
Place, date Signature

Edition 2