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European Technical Assessment

ETA 24/1204
of 20.12.2024

General part

Technical Assessment Body issuing the ETA: ITeC ITeC has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment).	
Trade name of the construction product	**COLLUM**
Product family to which the construction product belongs	Fire stopping and fire sealing products. Penetration seals.
Manufacturer	**ROTHO BLAAS SRL** Via dell'Adige 2/1 IT-39040 Cortaccia (BZ) Tel. + 39 0471 818400 Fax + 39 0471 818484 www.rothoblaas.com
Manufacturing plant(s)	ROTHO BLAAS SRL Manufacturing Plants: PS1
This European Technical Assessment contains	143 pages including 3 annexes which form an integral part of this assessment and Annex N, which contains confidential information and is not included in the European Technical Assessment when that assessment is publicly available.
This European Technical Assessment is issued in accordance with Regulation (EU) 305/2011, on the basis of	European Assessment Document EAD 350454-00-1104.

General comments

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document.

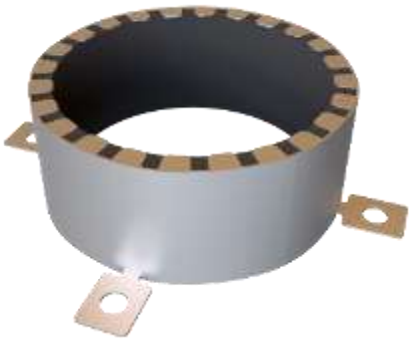
Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (excepted the confidential Annex(es)).

Specific parts of the European Technical Assessment

1 Technical description of the product

COLLUM is a service closure device, used as fire penetration seal, consisting of a fire protective inlay made of intumescent material contained in a collar housing of stainless steel with flanges for fixing to the constructive element.

COLLUM is supplied in different sizes and designs depending on the external diameter of the service to be protected (see figure 1). The detailed technical specification of COLLUM and the description of the installation procedure are given in Annex C.



COLLUM for service diameter between 30 mm and 315 mm

COLLUM for service diameter between 400 mm and 600 mm

Figure 1: COLLUM types.

The assembled penetration seals require additional components as described in Annex A and Annex C. These components cannot be CE marked based on this ETA.

2 Specification of the intended use(s) in accordance with the applicable EAD

COLLUM is used to reinstate the resistance to fire performance of a constructive element where it is penetrated by the following services (detailed specification in Annex A):

- Plastic pipes.
- Insulated steel pipes,
- Multilayer composite pipes,
- Cable bundles.

The constructive elements where COLLUM may be installed to provide a penetration seal are as follows (detailed specification in Annex B):

- Flexible walls (B.2.1).
- Lining walls (B.2.2).
- Sandwich panels walls (B.2.3).
- Timber (CLT) walls (B.2.4).
- Rigid walls (B.2.5).
- Rigid floors (B.3.1).
- Timber (CLT) floors (B.3.2).
- False ceilings (B.3.3).

The constructive element where the penetration seal is installed must be classified in accordance with EN 13501-2 [1] for the required fire resistance period.

COLLUM is intended for environmental conditions as defined for use category Type Y_1 according to EAD 350454-00-1104: intended for semi-exposed use at temperatures below 0°C, with exposure to UV but not to rain. Type Y_1 includes lower use categories (i.e., Type Y_2, Type Z_1 and Type Z_2).

The provisions made in this ETA are based on a working life of COLLUM of at least 25 years, provided that the conditions laid down in the manufacturer's instructions for the installation, use and maintenance are met. These provisions are based upon the current state of the art and the available knowledge and experience.

The indications given as to the working life of the product cannot be interpreted as a guarantee but are regarded only as a means for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

[1] EN 13501-2 Fire classification of construction products and building elements. Part 2: Classification using data from fire resistance tests, excluding ventilation services.

3 Performance of the product and reference to the methods used for its assessment

3.1 Performance of the product

The assessment of COLLUM has been performed in accordance with EAD 350454-00-1104 *Fire stopping and fire sealing products - Penetration seals* (September 2017).

Table 1: Performance of the product.

Product: COLLUM			**Intended use:** Fire penetration seal
Basic requirement	**Essential characteristic**		**Performance**
BWR 2 Safety in case of fire	Reaction to fire	Inlay material	E
		Steel housing	A1
	Resistance to fire		See Annex A
BWR 3 Hygiene, health and the environment	Content, emission and/or release of dangerous substances		VOC_{3d} = 0,760 mg/m^3 VOC_{28d} = 0,420 mg/m^3
BWR 4 Safety and accessibility in use	Durability		Type Y_1

The rest of characteristics included in EAD 350454-00-1104 have not been assessed in this ETA.

3.2 Methods used for the assessment

3.2.1 Reaction to fire

The performance of the inlay material of COLLUM has been tested according to EN ISO 11925-2 [2] and determined according to EN 13501-1 [3] and Regulation (EU) 2016/364. The collar housing made of stainless steel has a class A1 according to Decision 96/603/EC and Decision 2000/605/EC.

3.2.2 Content, emission and/or release of dangerous substances

For the release scenarios IA1 and IA2, the volatile organic compounds (VOC) have been determined in accordance with EN 16516 [4] after 3 days and after 28 days, using a loading factor of 1,0 m^2/m^3.

3.2.3 Resistance to fire

Tested and assessed according to EN 1366-3 [5], the fire resistance classification has been determined according to EN 13501-2 and is given in Annex A.

3.2.4 Durability

COLLUM has been tested and assessed for the environmental use category Type Y_1 in accordance with section 2.2.9 of EAD 350454-00-1104 and the EOTA Technical Report 024 [6], section 4.2.4 (for a 25-year working life). Stainless steel in accordance with EN 10088-1 [7] is intended for use category Type Y_1.

[2] EN ISO 11925-2 Reaction to fire tests. Ignitability of products subjected to direct impingement of flame. Part 2: Single-flame source test.

[3] EN 13501-1 Fire classification of construction products and building elements. Part 1: Classification using data from reaction to fire tests.

[4] EN 16516+A1 Construction products. Assessment of release of dangerous substances. Determination of emissions into indoor air.

[5] EN 1366-3 Fire resistance tests for service installations. Part 3: Penetration seals.

[6] EOTA TR 024 Characterisation, Aspects of Durability and Factory Production Control for Reactive Materials, Components and Products, Edition July 2009.

[7] EN 10088-1 Stainless steels. Part 1: List of stainless steels.

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

According to the Decision 1999/454/EC of the European Commission, the system of AVCP (see EC delegated Regulation (EU) No 568/2014 amending Annex V to Regulation (EU) 305/2011) given in the following table applies.

Table 2: AVCP System.

Product(s)	Intended use(s)	Level(s) or class(es)	System(s)
Fire stopping and fire sealing products	For fire compartmentation and/or fire protection or fire performance	Any	1

5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

All the necessary technical details for the implementation of the AVCP system are laid down in the *Control Plan* deposited with the ITeC and agreed in accordance with EAD 350454-00-1104, section 3.

The *Control Plan* is a confidential part of the ETA and only handed over to the notified product certification body involved in the assessment and verification of constancy of performance.

The factory production control operated by the manufacturer shall be in accordance with the above mentioned *Control Plan*.

Issued in Barcelona on 20 December 2024

by the Catalonia Institute of Construction Technology.

Ferran Bermejo Nualart

Technical Director, ITeC

ANNEX A. Resistance to fire performance

In this Annex, the resistance to fire performance of COLLUM is given (see the following Index). The classification is expressed in terms of classification of the supporting construction with fire-separating function being penetrated.

The supporting constructive elements shall meet the specification given in Annex B.

COLLUM installation and the additional components in the penetration seal shall meet the criteria given in Annex C.

The rules for the field of direct application of the test results given in EN 1366-3 can be applied.

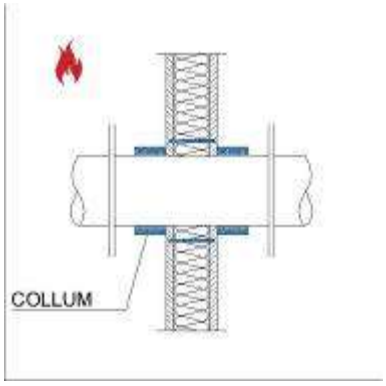
INDEX

A.1 Plastic pipes

A.1.1 Standard plastic pipes through the constructive element

A.1.1.1 Flexible wall

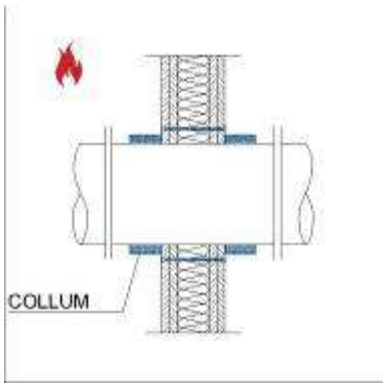
A.1.1.1.1 80 mm thick flexible wall



Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	4,2 – 15,1	EI 60 U/C
	110 < Ø ≤ 160	4,2 – 6,2	EI 60 U/C
PP	≤ 110	2,7 – 18,3	EI 60 U/C
	110 < Ø ≤ 160	2,7 – 3,9	EI 60 U/C
PVC	≤ 110	2,7 – 8,1	EI 60 U/C
	110 < Ø ≤ 160	2,7 – 3,2	EI 60 U/C
PPR	≤ 110	15,1	EI 60 U/C

A.1.1.1.2 100 mm thick flexible wall



Collar at both sides of the wall

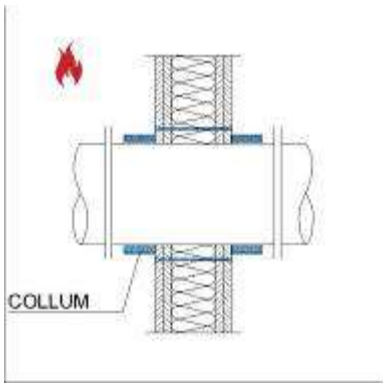
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	4,2 – 12,3	EI 120 U/C
	110 < Ø ≤ 160	6,2 – 16,0	EI 120 U/C
	160 < Ø ≤ 250	7,7 – 22,7	EI 120 U/C
PP	≤ 110	2,7 – 15,1	EI 120 U/C
		4,2	EI 120 U/U
	110 < Ø ≤ 160	3,9 – 14,6	EI 120 U/C
	160 < Ø ≤ 250	7,7 – 16	EI 120 U/C
PVC	≤ 110	3,2 – 8,1	EI 120 U/C
		6,6	EI 120 U/U
	110 < Ø ≤ 160	3,2 – 9,5	EI 120 U/C
	160 < Ø ≤ 250	6,2 – 18,4	EI 120 U/C
	315	23,2	EI 120 U/C [8]
PPR	≤ 110	15,1	EI 120 U/C

Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	9,3	EI 120 U/C
	110 < Ø ≤ 160	6,2	EI 120 U/C
PP	≤ 110	2,7	EI 120 U/C
	110 < Ø ≤ 160	3,9	EI 120 U/C
PVC	≤ 110	3,2 – 8,1	EI 120 U/C

[8] Classification valid for COLLUM 315 with H = 100 mm.

A.1.1.1.3 120 mm thick flexible wall



Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 63	3,0 – 8,6	EI 120 U/U [9]
	63 < Ø ≤ 110	4,2	EI 120 U/U [9]
		4,2 – 15,1	EI 120 U/C [9]
	≤ 110	3,0 – 12,3	EI 120 U/U
	110 < Ø ≤ 160	6,2 – 16,0	EI 120 U/C
	160 < Ø ≤ 250	7,7 – 22,7	EI 120 U/C
	315	9,7 – 28,6	EI 120 U/C
PP	≤ 63	1,8	EI 120 U/U [9]
		1,8 – 10,5	EI 120 U/C [9]
	63 < Ø ≤ 110	2,7	EI 120 U/U [9]
		2,7 – 15,1	EI 120 U/C [9]
	≤ 110	2,7 – 15,1	EI 120 U/U
	110 < Ø ≤ 160	3,9 – 14,6	EI 120 U/C
	160 < Ø ≤ 250	7,7 – 16,0	EI 120 U/C
PVC	≤ 63	3,0 – 5,8	EI 120 U/U [9]
	63 < Ø ≤ 110	3,2 – 8,1	EI 120 U/U [9]
	≤ 110	3,2 – 8,1	EI 120 U/U
	110 < Ø ≤ 160	3,2 – 9,5	EI 120 U/U
	160 < Ø ≤ 250	6,2 – 18,4	EI 120 U/C
	315	9,0 – 23,2	EI 120 U/C [10]
	400	9,8	EI 120 U/C
PPR	≤ 110	15,1	EI 120 U/C

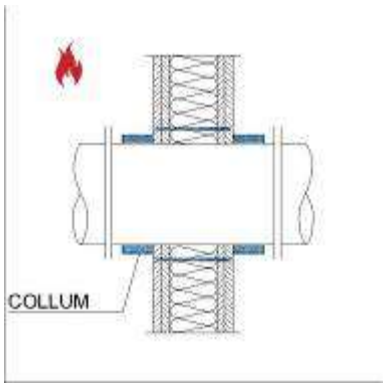
[9] Classification valid for COLLUM 3.

[10] Classification valid for COLLUM 315 with H = 100 mm for a pipe wall thickness of 23,2 mm.

Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 50	3,0	EI 120 U/C
	≤ 110	9,3	EI 120 U/C
PP	≤ 110	2,7	EI 120 U/U
	110 < Ø ≤ 160	3,9	EI 120 U/C
PVC	≤ 110	3,2 – 8,1	EI 120 U/C
		3,2	EI 120 U/U

A.1.1.1.4 125 mm thick flexible wall



Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 63	3,0 – 8,6	EI 120 U/U [11]
	63 < Ø ≤ 110	4,2	EI 120 U/U [11]
		4,2 – 15,1	EI 120 U/C [11]
	≤ 110	3,0 – 12,3	EI 120 U/U
	110 < Ø ≤ 160	6,2 – 16,0	EI 120 U/C
	160 < Ø ≤ 250	7,7 – 22,7	EI 120 U/C
	315	9,7 – 28,6	EI 120 U/C
PP	≤ 63	1,8	EI 120 U/U [11]
		1,8 – 10,5	EI 120 U/C [11]
	63 < Ø ≤ 110	2,7	EI 120 U/U [11]
		2,7 – 15,1	EI 120 U/C [11]
	≤ 110	2,7 – 15,1	EI 120 U/U
	110 < Ø ≤ 160	3,9 – 14,6	EI 120 U/C
	160 < Ø ≤ 250	7,7 – 16,0	EI 120 U/C
PVC	≤ 63	3,0 – 5,8	EI 120 U/U [11]
	63 < Ø ≤ 110	3,2 – 8,1	EI 120 U/U [11]
	≤ 110	3,2 – 8,1	EI 120 U/U
	110 < Ø ≤ 160	3,2 – 9,5	EI 120 U/U
	160 < Ø ≤ 250	6,2 – 18,4	EI 120 U/C
	315	9,0 – 23,2	EI 120 U/C [12]
	400	9,8	EI 120 U/C
PPR	≤ 110	15,1	EI 120 U/C

[11] Classification valid for COLLUM 3.

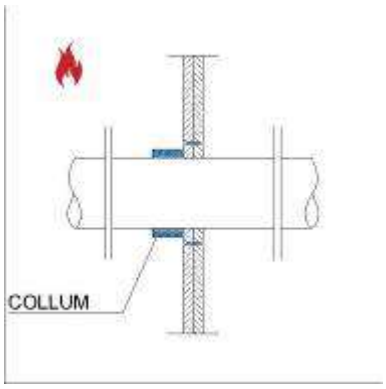
[12] Classification valid for COLLUM 315 with H = 100 mm for a pipe wall thickness of 23,2 mm.

Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 50	3,0	EI 120 U/C
	≤ 110	9,3	EI 120 U/C
	110 < Ø ≤ 160	6,2 – 16,0	EI 120 U/C
PP	≤ 110	2,7	EI 120 U/U
	110 < Ø ≤ 160	4,0	EI 120 U/C
PVC	≤ 63	3,0 – 8,1	EI 120 U/C
	≤ 110	3,2 – 8,1	EI 120 U/C
		3,2	EI 120 U/U

A.1.1.2 Lining wall

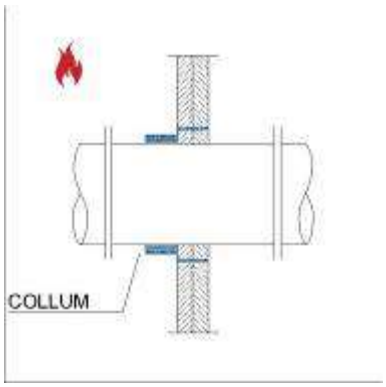
A.1.1.2.1 30 mm thick lining wall



Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	12,3	EI 60 U/C
PP	≤ 110	12,3	EI 60 U/C
PVC	≤ 110	8,1	EI 60 U/C
	110 < Ø ≤ 160	9,5	EI 60 U/C
PPR	≤ 110	15,1	EI 60 U/C

A.1.1.2.2 50 mm thick lining wall

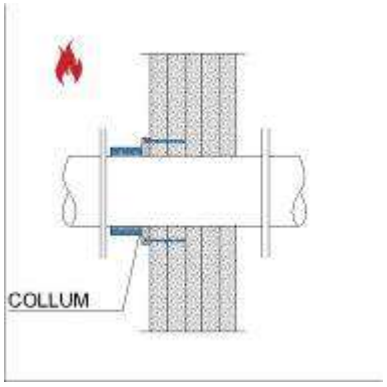


Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	12,3	EI 60 U/C
PP	≤ 110	12,3	EI 60 U/C
PVC	≤ 110	8,1	EI 120 U/C
	110 < Ø ≤ 160	11,8	EI 120 U/C
PPR	≤ 110	15,1	EI 60 U/C

A.1.1.3 Cross laminated timber (CLT) wall

A.1.1.3.1 137 mm thick CLT wall

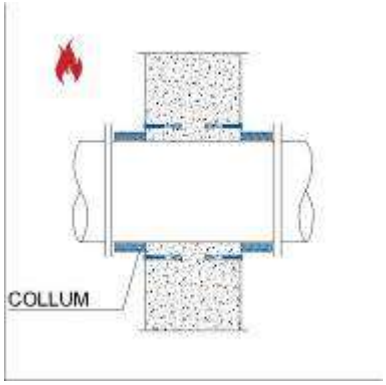


Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	3,0 – 4,2	EI 120 U/C
PP	≤ 110	2,7 – 3,4	EI 120 U/C
PVC	≤ 110	3,2 – 8,1	EI 120 U/C

A.1.1.4 Rigid wall

A.1.1.4.1 150 mm thick rigid wall



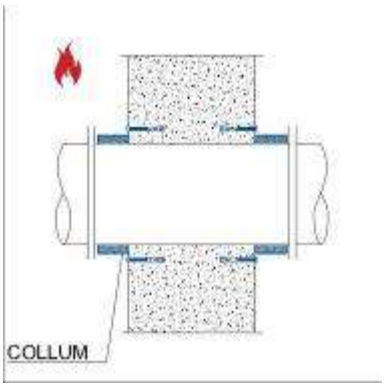
Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	4,2 – 12,3	EI 180 U/C
	110 < Ø ≤ 160	6,2 – 16,0	EI 180 U/C
PP	≤ 110	2,7 – 16,1	EI 180 U/C
	110 < Ø ≤ 160	3,9 – 14,6	EI 180 U/C
PVC	≤ 110	3,2 – 8,1	EI 180 U/C
	110 < Ø ≤ 160	3,2 – 11,0	EI 180 U/C
	500	14,6	EI 120 U/C

Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
PP	≤ 110	3,0	EI 120 U/U

A.1.1.4.2 200 mm thick rigid wall

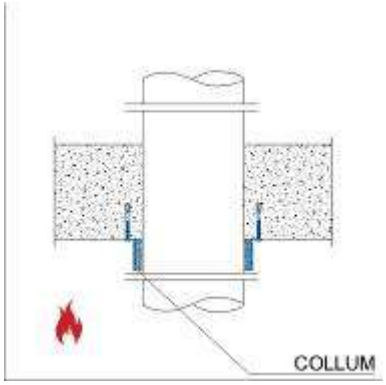


Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	2,7 – 4,2	EI 240 U/C
	110 < Ø ≤ 160	14,6	EI 240 U/C
PP	≤ 110	2,7 – 15,1	EI 240 U/C
	110 < Ø ≤ 160	14,6	EI 240 U/C
PVC	≤ 110	2,7 – 8,1	EI 240 U/C
	110 < Ø ≤ 160	2,7 – 11,8	EI 240 U/C
PPR	≤ 110	14,9	EI 240 U/C

A.1.1.5 Rigid floor

A.1.1.5.1 150 mm thick rigid floor



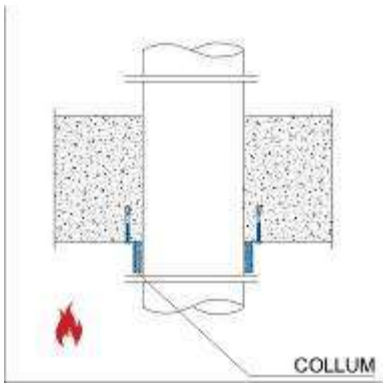
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 63	3,0	EI 180 U/U [13]
		3,0 – 8,6	EI 180 U/C [13]
	63 < Ø ≤ 110	4,2	EI 180 U/U [13]
		4,2 – 15,1	EI 180 U/C [13]
	≤ 110	4,2 – 15,1	EI 180 U/U
	110 < Ø ≤ 160	6,2 – 21,9	EI 180 U/C
	160 < Ø ≤ 250	7,7 – 22,7	EI 180 U/C
	315	9,0 – 28,6	EI 180 U/C
PP	≤ 63	1,8	EI 180 U/U [13]
		1,8 – 10,5	EI 180 U/C [13]
	63 < Ø ≤ 110	2,7	EI 180 U/U [13]
		2,7 – 15,1	EI 180 U/C [13]
	≤ 110	2,7	EI 180 U/U
		2,7 – 7,2	EI 180 U/C
		2,7 – 15,1	EI 120 U/U
	110 < Ø ≤ 160	3,9 – 14,6	EI 180 U/C
	160 < Ø ≤ 250	8,8 – 22,7	EI 180 U/C

[13] Classification valid for COLLUM 3.

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
PVC	≤ 63	3,0 – 5,8	EI 180 U/U [13]
	63 < Ø ≤ 110	3,2 – 8,1	EI 180 U/U [13]
	≤ 110	3,2 – 8,1	EI 180 U/U
	110 < Ø ≤ 160	3,2 – 11,8	EI 180 U/C
	160 < Ø ≤ 250	6,2 – 18,4	EI 180 U/C
	315	23,2	EI 180 U/C [14]
		7,7 – 23,2	EI 120 U/C
	600	11,0	EI 120 U/C

[14] Classification valid for COLLUM 315 with H = 100 mm for a pipe wall thickness of 23,2 mm.

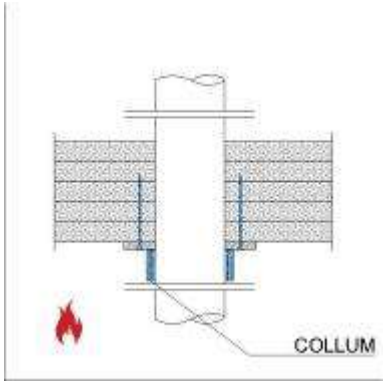
A.1.1.5.2 200 mm thick rigid floor



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	2,7 – 15,1	EI 240 U/C
PP	≤ 110	2,7 – 15,1	EI 240 U/C
PVC	≤ 110	2,7 – 8,1	EI 240 U/C
	110 < Ø ≤ 160	2,7 – 11,8	EI 240 U/C
	400	6,0	EI 180 U/C

A.1.1.6 Cross laminated timber (CLT) floor

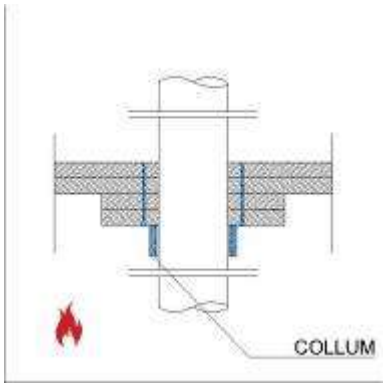
A.1.1.6.1 158 mm thick CLT floor



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	3,0 – 4,2	EI 120 U/C
PP	≤ 110	2,7 – 3,4	EI 120 U/C
PVC	≤ 110	3,2 – 6,6	EI 120 U/C

A.1.1.7 False ceiling

A.1.1.7.1 50 mm thick false ceiling

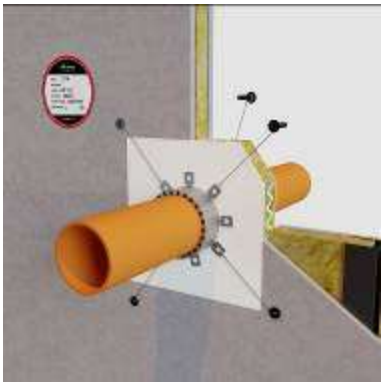


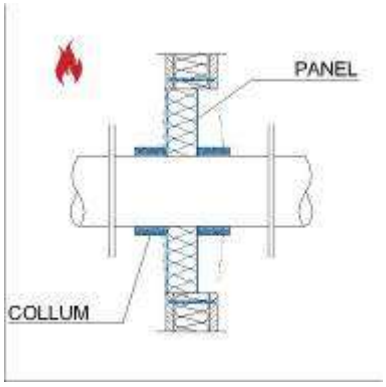
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	4,2 – 12,3	EI 120 U/C
	160 < Ø ≤ 250	18,4	EI 120 U/C
PP	≤ 110	2,7 – 18,2	EI 120 U/C
PVC	≤ 110	3,2 – 8,1	EI 120 U/C

A.1.2 Standard plastic pipes through PANEL [15]

A.1.2.1 Flexible wall

A.1.2.1.1 80 mm thick flexible wall





Collar at both sides of the wall

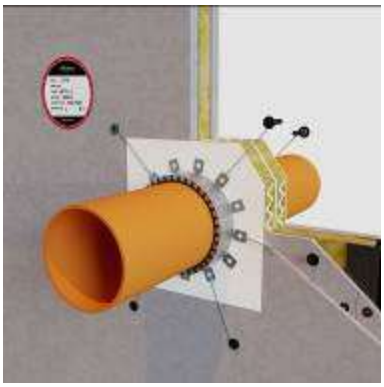
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	4,2 – 15,1	EI 60 U/C
	110 < Ø ≤ 160	4,2 – 6,2	EI 60 U/C
PP	≤ 110	2,7 – 18,3	EI 60 U/C
	110 < Ø ≤ 160	2,7 – 3,9	EI 60 U/C
PVC	≤ 110	2,7 – 8,1	EI 60 U/C
	110 < Ø ≤ 160	2,7 – 3,2	EI 60 U/C
PPR	≤ 110	15,1	EI 60 U/C

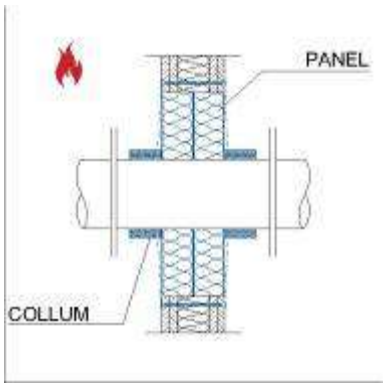
Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

[15] See specification of PANEL in Annex C, table C3.

A.1.2.1.2 100 mm thick flexible wall





Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	4,2 – 12,3	EI 120 U/C
	110 < Ø ≤ 160	6,2 – 16,0	EI 120 U/C
	160 < Ø ≤ 250	7,7 – 22,7	EI 120 U/C
PP	≤ 110	2,7 – 15,1	EI 120 U/C
		4,2	EI 120 U/U
	110 < Ø ≤ 160	3,9 – 14,6	EI 120 U/C
	160 < Ø ≤ 250	7,7 – 16	EI 120 U/C
PVC	≤ 110	3,2 – 8,1	EI 120 U/C
		6,6	EI 120 U/U
	110 < Ø ≤ 160	3,2 – 9,5	EI 120 U/C
	160 < Ø ≤ 250	6,2 – 18,4	EI 120 U/C
	315	23,2	EI 120 U/C [16]
PPR	≤ 110	15,1	EI 120 U/C

Collar at the fire exposed side only

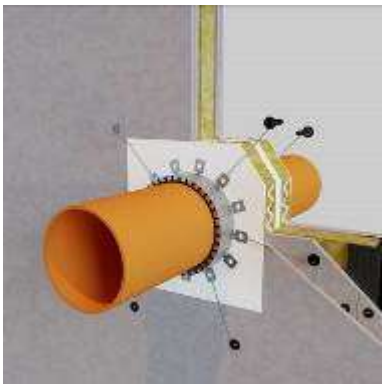
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	9,3	EI 120 U/C
	110 < Ø ≤ 160	6,2	EI 120 U/C
PP	≤ 110	2,7	EI 120 U/C
	110 < Ø ≤ 160	3,9	EI 120 U/C
PVC	≤ 110	3,2 – 8,1	EI 120 U/C

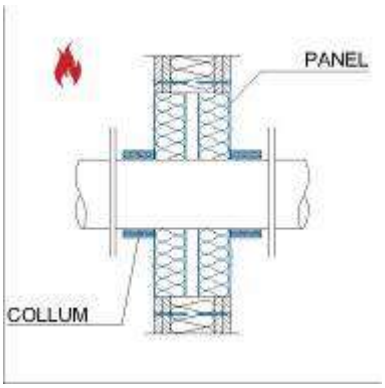
[16] Classification valid for COLLUM 315 with H = 100 mm.

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.1.2.1.3 120 mm thick flexible wall





Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	3,0 – 12,3	EI 120 U/U
		6,2 – 16,0	EI 120 U/C
	160 < Ø ≤ 250	7,7 – 22,7	EI 120 U/C
PP	≤ 110	2,7 – 15,1	EI 120 U/U
	110 < Ø ≤ 160	3,9 – 14,6	EI 120 U/C
	160 < Ø ≤ 250	7,7 – 16,0	EI 120 U/C
PVC	≤ 110	3,2 – 8,1	EI 120 U/U
	110 < Ø ≤ 160	3,2 – 9,5	EI 120 U/U
	160 < Ø ≤ 250	6,2 – 18,4	EI 120 U/C
	315	23,2	EI 120 U/C [17]
PPR	≤ 110	15,1	EI 120 U/C

Collar at the fire exposed side only

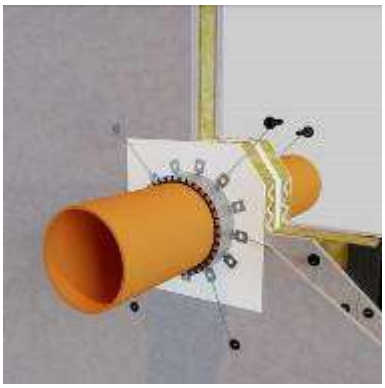
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 50	3,0	EI 120 U/C
	≤ 110	9,3	EI 120 U/C
PP	≤ 110	2,7	EI 120 U/U
	110 < Ø ≤ 160	3,9	EI 120 U/C
PVC	≤ 110	3,2 – 8,1	EI 120 U/C
		3,2	EI 120 U/U

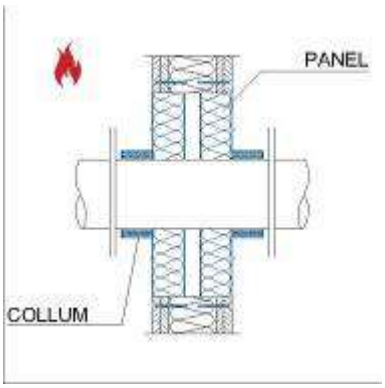
[17] Classification valid for COLLUM 315 with H = 100 mm.

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.1.2.1.4 125 mm thick flexible wall





Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	3,0 – 12,3	EI 120 U/U
	110 < Ø ≤ 160	6,2 – 16,0	EI 120 U/C
	160 < Ø ≤ 250	7,7 – 22,7	EI 120 U/C
PP	≤ 110	2,7 – 15,1	EI 120 U/U
	110 < Ø ≤ 160	3,9 – 14,6	EI 120 U/C
	160 < Ø ≤ 250	7,7 – 16,0	EI 120 U/C
PVC	≤ 110	3,2 – 8,1	EI 120 U/U
	110 < Ø ≤ 160	3,2 – 9,5	EI 120 U/U
	160 < Ø ≤ 250	6,2 – 18,4	EI 120 U/C
	315	23,2	EI 120 U/C [18]
PPR	≤ 110	15,1	EI 120 U/C

Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 50	3,0	EI 120 U/C
	≤ 110	9,3 – 10,5	EI 120 U/C
	110 < Ø ≤ 160	6,2 – 16,0	EI 120 U/C
PP	≤ 110	2,7	EI 120 U/C
	110 < Ø ≤ 160	4,0	EI 120 U/C
PVC	≤ 63	3,0 – 8,1	EI 120 U/C
	≤ 110	8,1	EI 120 U/C

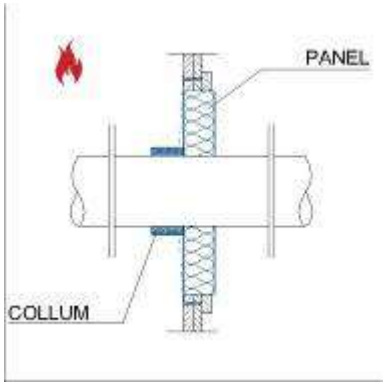
[18] Classification valid for COLLUM 315 with H = 100 mm.

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.1.2.2 Lining wall

A.1.2.2.1 30 mm thick lining wall



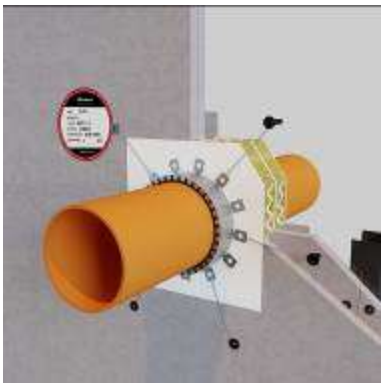
Collar at the fire exposed side only

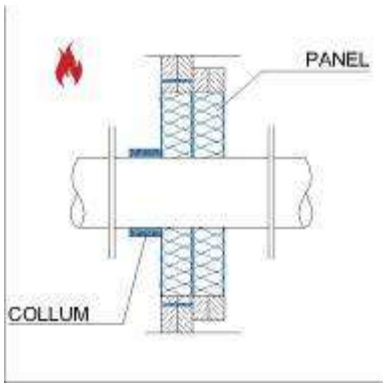
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	12,3	EI 60 U/C
PP	≤ 110	12,3	EI 60 U/C
PVC	≤ 110	8,1	EI 60 U/C
	110 < Ø ≤ 160	9,5	EI 60 U/C
PPR	≤ 110	15,1	EI 60 U/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.1.2.2.2 50 mm thick lining wall





Collar at the fire exposed side only

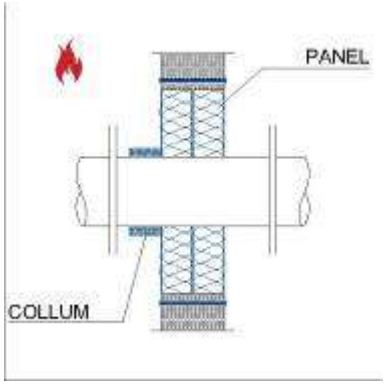
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	12,3	EI 60 U/C
PP	≤ 110	12,3	EI 60 U/C
PVC	≤ 110	8,1	EI 120 U/C
	110 < Ø ≤ 160	11,8	EI 120 U/C
PPR	≤ 110	15,1	EI 60 U/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.1.2.3 Sandwich panel wall

A.1.2.3.1 100 mm thick sandwich panel wall



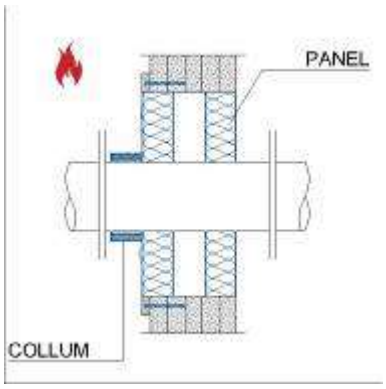
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
PVC	≤ 110	8,1	EI 120 U/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.1.2.4 Cross laminated timber (CLT) wall

A.1.2.4.1 137 mm thick CLT wall



Collar at the fire exposed side only

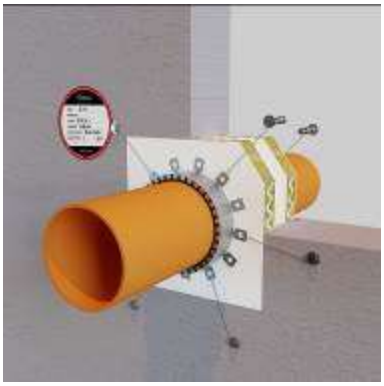
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	3,0 – 4,2	EI 120 U/C
PP	≤ 110	2,7 – 3,4	EI 120 U/C
PVC	≤ 110	3,2 – 8,1	EI 120 U/C

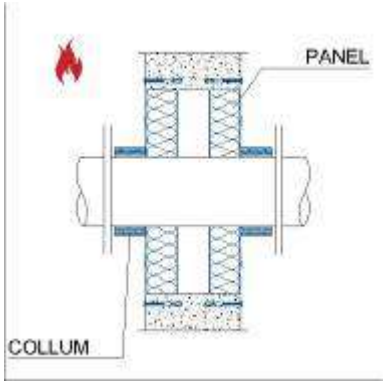
Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.1.2.5 Rigid wall

A.1.2.5.1 150 mm thick rigid wall





Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	4,2 – 12,3	EI 180 U/C
	110 < Ø ≤ 160	6,2 – 16,0	EI 180 U/C
PP	≤ 110	3,0	EI 180 U/U
		2,7 – 16,1	EI 180 U/C
	110 < Ø ≤ 160	3,9 – 14,6	EI 180 U/C
PVC	≤ 110	3,2 – 8,1	EI 180 U/C
		4,2	EI 90 U/C [19]
	110 < Ø ≤ 160	3,2 – 11,0	EI 180 U/C

Collar at the fire exposed side only

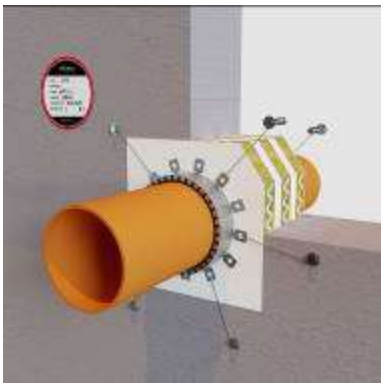
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
PP	≤ 110	3,0	EI 120 U/U

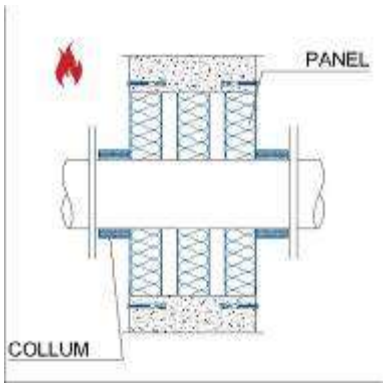
Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

[19] COLLUM can be fixed to PANEL with 4 steel spiral pigtail screws in accordance with section C.2.2. PANEL closing solution according to section B.5.2.1 with opening maximum dimensions of 900 mm x 450 mm.

A.1.2.5.2 200 mm thick rigid wall





Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	2,7 – 4,2	EI 240 U/C
		7,5	EI 60 U/C [20]
	110 < Ø ≤ 160	14,6	EI 240 U/C
PP	≤ 110	2,7 – 15,1	EI 240 U/C
		13,0	EI 60 U/C [19]
	110 < Ø ≤ 160	14,6	EI 240 U/C
PVC	≤ 110	2,7 – 8,1	EI 240 U/C
		6,6	EI 60 U/C [19]
	110 < Ø ≤ 160	2,7 – 11,8	EI 240 U/C
PPR	≤ 110	14,9	EI 240 U/C

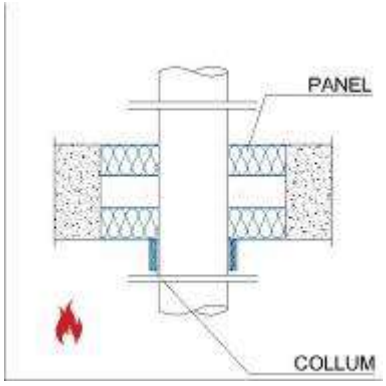
Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

[20] COLLUM can be fixed to PANEL with 4 steel spiral pigtail screws in accordance with section C.2.2. PANEL closing solution according to section B.2.5.2 with opening maximum dimensions of 450 mm x 300 mm and two layers of PANEL levelled to the surface at both sides of the wall.

A.1.2.6 Rigid floor

A.1.2.6.1 150 mm thick rigid floor



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	4,2 – 15,1	EI 180 U/U
	110 < Ø ≤ 160	6,2 – 21,9	EI 180 U/C
	160 < Ø ≤ 250	7,7 – 22,7	EI 180 U/C
PP	≤ 110	2,7	EI 180 U/U
		2,7 – 7,2	EI 180 U/C
		2,7 – 15,1	EI 120 U/U
	110 < Ø ≤ 160	3,9 – 14,6	EI 180 U/C
	160 < Ø ≤ 250	8,8 – 22,7	EI 180 U/C
PVC	≤ 110	3,2 – 8,1	EI 180 U/U
		4,2	EI 90 U/C [21]
	110 < Ø ≤ 160	3,2 – 11,8	EI 180 U/C
	160 < Ø ≤ 250	6,2 – 18,4	EI 180 U/C
	315	23,2	EI 180 U/C [22]

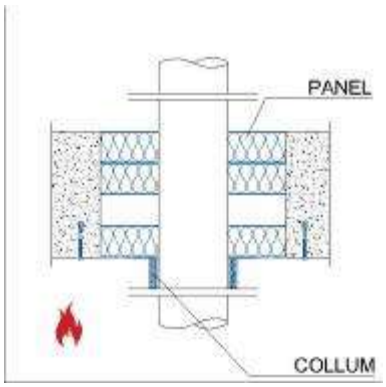
Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

[21] COLLUM can be fixed to PANEL with 4 steel spiral pigtail screws in accordance with section C.2.2. PANEL closing solution according to section B.3.1.1 with opening maximum dimensions of 900 mm x 450 mm.

[22] Classification valid for COLLUM 315 with H = 100 mm.

A.1.2.6.2 200 mm thick rigid floor



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	2,7 – 15,1	EI 240 U/C
		4,2 – 15,1	EI 180 U/U
		7,5	EI 60 U/C [23]
	110 < Ø ≤ 160	6,2 – 21,9	EI 180 U/C
	160 < Ø ≤ 250	7,7 – 22,7	EI 180 U/C
PP	≤ 110	2,7 – 15,1	EI 240 U/C
		2,7	EI 180 U/U
		13,0	EI 60 U/C [22]
	110 < Ø ≤ 160	3,9 – 14,6	EI 180 U/C
	160 < Ø ≤ 250	8,8 – 22,7	EI 180 U/C
PVC	≤ 110	2,7 – 8,1	EI 240 U/C
		3,2 – 8,1	EI 180 U/U
		6,6	EI 60 U/C [22]
	110 < Ø ≤ 160	2,7 – 11,8	EI 240 U/C
	160 < Ø ≤ 250	6,2 – 18,4	EI 180 U/C
	250 < Ø ≤ 315	23,2	EI 180 U/C

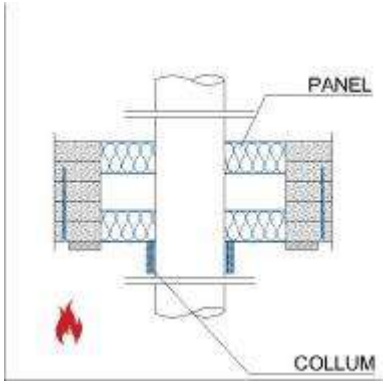
Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

[23] COLLUM can be fixed to PANEL with 4 steel spiral pigtail screws in accordance with section C.2.2. PANEL closing solution according to section B.3.1.2 with opening maximum dimensions of 450 mm x 300 mm and only one layer of PANEL levelled to the surface at the bottom side of the floor.

A.1.2.7 Cross laminated timber (CLT) floor

A.1.2.7.1 158 mm thick CLT floor



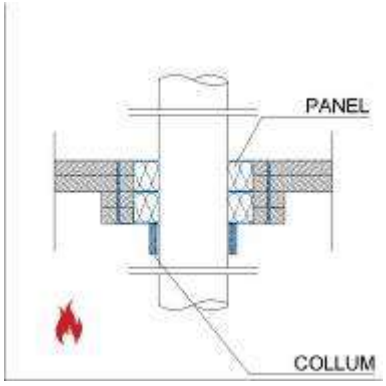
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	3,0 – 4,2	EI 120 U/C
PP	≤ 110	2,7 – 3,4	EI 120 U/C
PVC	≤ 110	3,2 – 6,6	EI 120 U/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.1.2.8 False ceiling

A.1.2.8.1 50 mm thick false ceiling



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
HDPE, PE, ABS, SAN+PVC	≤ 110	4,2 – 12,3	EI 120 U/C
	160 < Ø ≤ 250	18,4	EI 120 U/C
PP	≤ 110	2,7 – 18,2	EI 120 U/C
PVC	≤ 110	3,2 – 8,1	EI 120 U/C

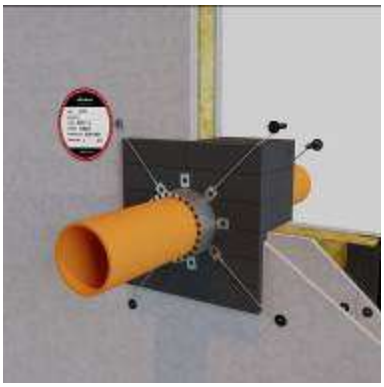
Installation notes:

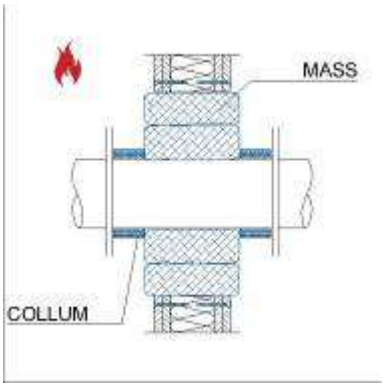
See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.1.3 Standard plastic pipes through MASS [24]

A.1.3.1 Flexible wall

A.1.3.1.1 120 mm thick flexible wall





Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
PVC	≤ 110	3,2 – 8,1	EI 120 U/C

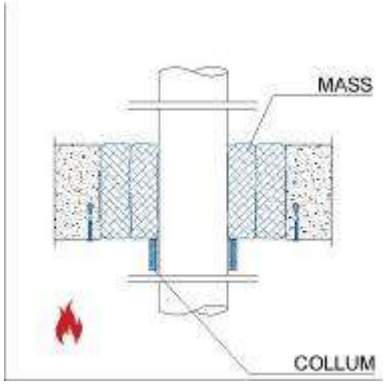
Installation notes:

See section C.2.3 for the installation provisions of COLLUM on MASS closing solution.

[24] See specification of MASS in Annex C, table C3.

A.1.3.2 Rigid floor

A.1.3.2.1 150 mm thick rigid floor



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
PVC	≤ 110	3,2 – 8,1	EI 180 U/C

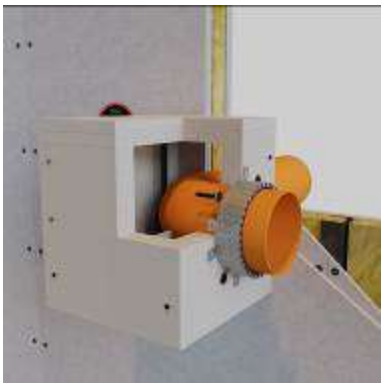
Installation notes:

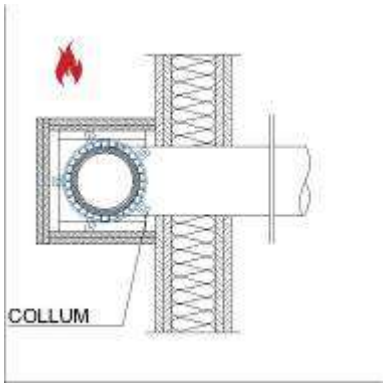
See section C.2.3 for the installation provisions of COLLUM on MASS closing solution.

A.1.4 Standard plastic pipes with an intermediate box

A.1.4.1 Flexible wall

A.1.4.1.1 120 mm thick flexible wall





Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
PVC	≤ 110	4,3	EI 120 U/C
	110 < Ø ≤ 160	3,2	EI 120 U/C

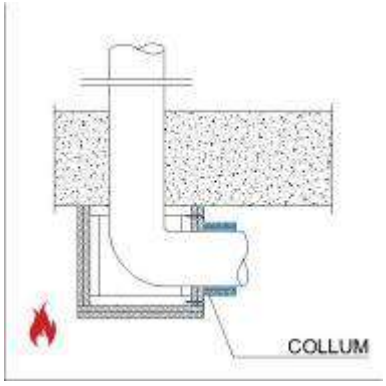
Installation notes:

The box shall be installed according to the manufacturer's instructions. The box is made of a double layer of 25 mm thick 'Type F' gypsum plasterboards coated with fiberglass, according to EN 15283-1, which are fixed with steel screws of Ø3,5 mm x 55 mm to an internal steel structure made of L-profiles of 30 mm x 30 mm x 1 mm, fixed to the wall with steel screws of Ø8 mm x 120 mm. The gypsum plasterboards fixed to each other with steel screws of Ø3,5 mm x 55 mm. The external dimensions of the box are 700 mm (horizontal) x 350 mm (vertical) x 300 mm (depth), and the internal dimensions are 600 mm x 250 mm x 250 mm. The installation of the box shall not cause any adverse effect on the resistance to fire of the wall.

COLLUM is installed at the fire exposed side of the wall, at the lateral sides of the box, fixed to the gypsum plasterboards with self-tapping steel screws Ø6 mm x 50 mm. No collar is required at the cold side of the wall.

A.1.4.2 Rigid floor

A.1.4.2.1 150 mm thick rigid floor



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
PVC	≤ 110	3,2	EI 180 U/C
	110 < Ø ≤ 160	4,0	EI 180 U/C

Installation notes:

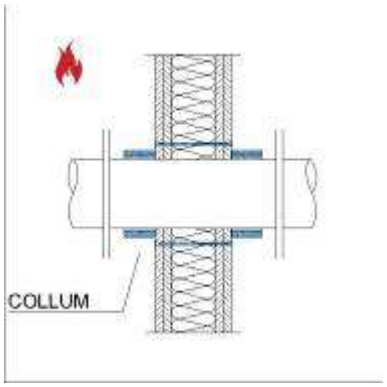
The box shall be installed according to the manufacturer's instructions. The box is made of a double layer of 25 mm thick 'Type F' gypsum plasterboards coated with fiberglass, according to EN 15283-1, which are fixed with steel screws of Ø3,5 mm x 55 mm to an internal steel structure made of L-profiles of 30 mm x 30 mm x 1 mm, fixed to the floor with steel anchors of Ø8 mm x 60 mm. The gypsum plasterboards fixed to each other with steel screws of Ø3,5 mm x 55 mm. The external dimensions of the box are 600 mm x 350 mm x 350 mm (height), and the internal dimensions are 500 mm x 250 mm x 300 mm. The installation of the box shall not cause any adverse effect on the resistance to fire of the floor.

COLLUM is installed at the fire exposed side, at the lateral sides of the box, fixed to the gypsum plasterboards with self-tapping steel screws Ø6 mm x 50 mm.

A.1.5 Acoustic plastic pipes through the constructive element

A.1.5.1 Flexible wall

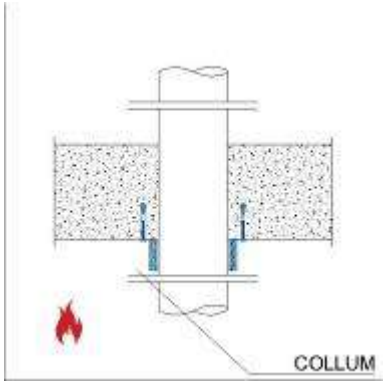
A.1.5.1.1 120 mm thick flexible wall



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
PEX-a pipe type AQUA of Uponor	≤ 63	8,7	EI 120 U/C
PVC-U pipe type FRIAPHON of Girpi	≤ 110	6,0	EI 120 U/C
Mineral reinforced PP-MD pipe type SiTech+ of Wavin	≤ 110	3,4	EI 120 U/C
Mineral reinforced PP-MD pipe type RAUPIANO PLUS of Rehau	≤ 110	2,5	EI 120 U/C
Mineral reinforced PE-S2 pipe type Silent-db20 of Geberit	≤ 110	6,0	EI 120 U/C
Mineral reinforced PP pipe type ASTO of Wavin	≤ 110	6,0	EI 120 U/C
Mineral reinforced PP-MX pipe type Silent-Pro of Geberit	≤ 110	6,0	EI 120 U/C
PP-R pipe type PhoNoFire of Coes Company	≤ 110	6,0	EI 120 U/C
PP-R pipe type POLO-KAL NG of Poloplast	≤ 110	3,4	EI 120 U/C
PP-R pipe type POLO-KAL 3S of Poloplast	≤ 110	4,8	EI 120 U/C
PP-R pipe type Decibel of Uponor	≤ 110	3,8	EI 120 U/C
PP-R pipe type Silenta of GF Hakan Plastik	≤ 110	3,4	EI 120 U/C
PP-R pipe type aquatherm blue SDR 11 MF of Aquatherm	≤ 110	10,0	EI 120 U/C
PP-R pipe type aquatherm green SDR 9 MF-RP of Aquatherm	≤ 110	12,3	EI 120 U/C
PP-R pipe type aquatherm red SDR 7,4 MF of Aquatherm	≤ 110	15,1	EI 120 U/C
MDPP pipe type SEA4 Master 3 Plus of Pipelife	≤ 110	3,4	EI 120 U/C

A.1.5.2 Rigid floor

A.1.5.2.1 150 mm thick rigid floor

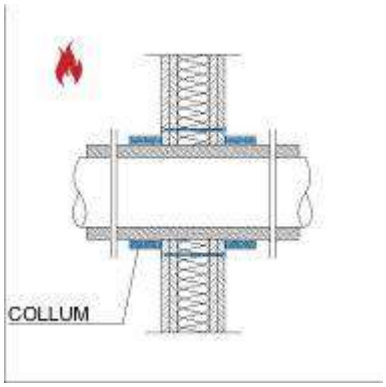


Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Classification
PVC-U pipe type FRIAPHON of Girpi	≤ 110	6,0	EI 180 U/C
Mineral reinforced PP pipe type SiTech+ of Wavin	≤ 110	3,4	EI 180 U/C
Mineral reinforced PP-MD pipe type RAUPIANO PLUS of Rehau	≤ 110	2,4	EI 180 U/C
Mineral reinforced PE-S2 pipe type Silent-db20 of Geberit	≤ 110	6,0	EI 180 U/C
Mineral reinforced PP pipe type ASTO of Wavin	≤ 110	5,3	EI 180 U/C
Mineral reinforced PP-MX pipe type Silent-Pro of Geberit	≤ 110	4,2	EI 180 U/C
PP-R pipe type PhoNoFire of Coes Company	≤ 110	6,0	EI 180 U/C
PP-R pipe type POLO-KAL NG of Poloplast	≤ 110	3,4	EI 180 U/C
PP-R pipe type POLO-KAL 3S of Poloplast	≤ 110	4,8	EI 180 U/C
PP-R pipe type Decibel of Uponor	≤ 110	3,8	EI 180 U/C
PP-R pipe type Silenta of GF Hakan Plastik	≤ 110	3,4	EI 180 U/C
PP-R pipe type aquatherm blue SDR 11 MF of Aquatherm	≤ 110	10,0	EI 180 U/C
PP-R pipe type aquatherm green SDR 9 MF-RP of Aquatherm	≤ 110	12,3	EI 180 U/C
PP-R pipe type aquatherm red SDR 7,4 MF of Aquatherm	≤ 110	15,1	EI 180 U/C

A.1.6 Insulated standard plastic pipes through the constructive element

A.1.6.1 Flexible wall

A.1.6.1.1 100 mm thick flexible wall



Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PP	≤ 110	4,5	≤ 20	EI 120 U/U
PPR	≤ 110	6,8	≤ 19	EI 120 U/C

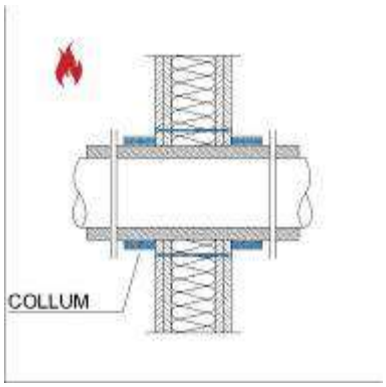
Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PP	≤ 110	4,5 – 6,6	≤ 20	EI 120 U/C
PVC	≤ 110	6,6	≤ 20	EI 120 U/C

Installation notes:

The selected COLLUM shall have at least 3 layers of intumescent strip for a total thickness (b) of the intumescent inlay of 12 mm.

A.1.6.1.2 120 mm thick flexible wall



Collar at both sides of the wall

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PP	≤ 110	4,5	≤ 20	EI 120 U/U

Collar at the fire exposed side only

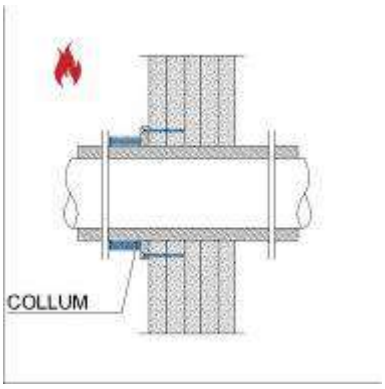
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PP	≤ 110	4,5 – 6,6	≤ 20	EI 120 U/C
PVC	≤ 110	6,6	≤ 20	EI 120 U/C
PPR	≤ 110	6,8	≤ 19	EI 120 U/C

Installation notes:

The selected COLLUM shall have at least 3 layers of intumescent strip for a total thickness (b) of the intumescent inlay of 12 mm.

A.1.6.2 Cross laminated timber (CLT) wall

A.1.6.2.1 137 mm thick CLT wall

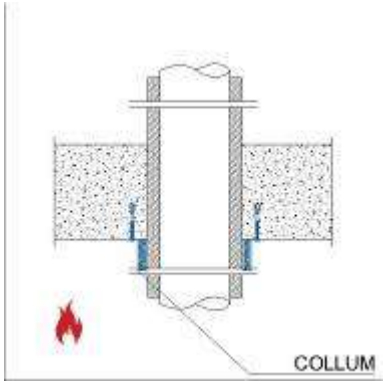


Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PPR	≤ 63	10,5	≤ 21,5	EI 120 U/C

A.1.6.3 Rigid floor

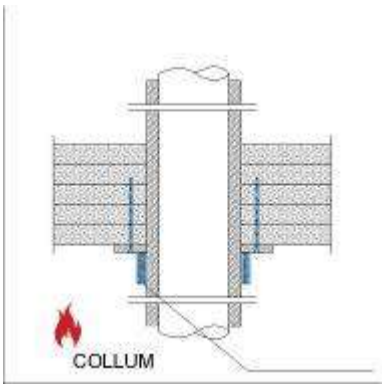
A.1.6.3.1 150 mm thick rigid floor



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PPR	≤ 110	4,2 – 4,8	≤ 19	EI 180 U/C

A.1.6.4 Cross laminated timber (CLT) floor

A.1.6.4.1 158 mm thick CLT floor

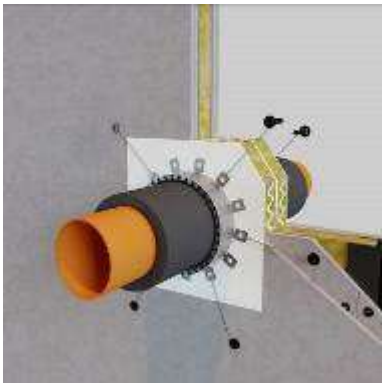


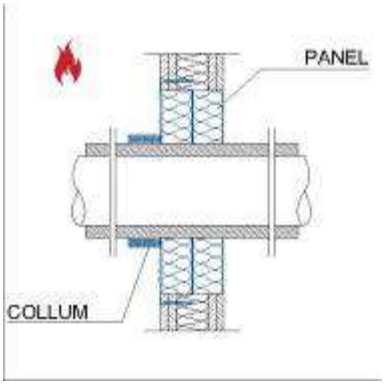
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PPR	≤ 63	10,5	≤ 17	EI 120 U/C

A.1.7 Insulated standard plastic pipes through PANEL

A.1.7.1 Flexible wall

A.1.7.1.1 100 mm thick flexible wall





Collar at both sides of the wall

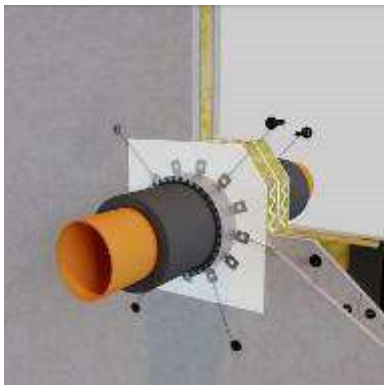
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PVC	≤ 110	8,1	≤ 19	EI 120 U/C

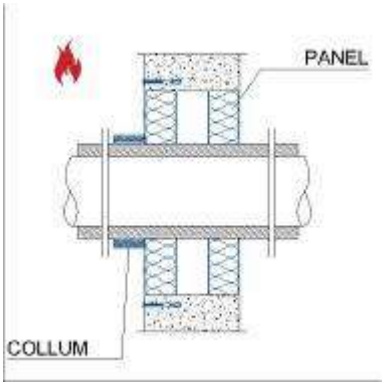
Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.1.7.2 Rigid wall

A.1.7.2.1 150 mm thick rigid wall





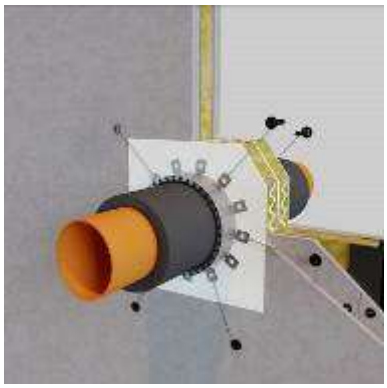
Collar at both sides of the wall

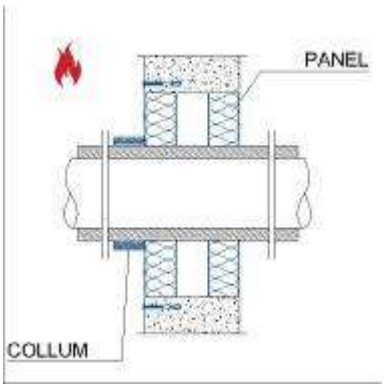
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PVC	≤ 110	4,5	≤ 20	EI 90 U/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution. COLLUM can be fixed to PANEL with 5 steel spiral pigtail screws in accordance with section C.2.2, with an PANEL maximum dimensions of 900 mm x 450 mm.

A.1.7.2.2 200 mm thick rigid wall





Collar at both sides of the wall

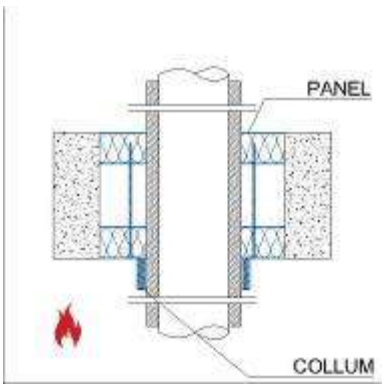
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PPR	≤ 110	10,0	≤ 40	EI 45 U/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution. COLLUM can be fixed to PANEL with 5 steel spiral pigtail screws in accordance with section C.2.2, with two layers of PANEL levelled to the surface at both sides of the wall and maximum dimensions of 300 mm x 300 mm.

A.1.7.3 Rigid floor

A.1.7.3.1 150 mm thick rigid floor

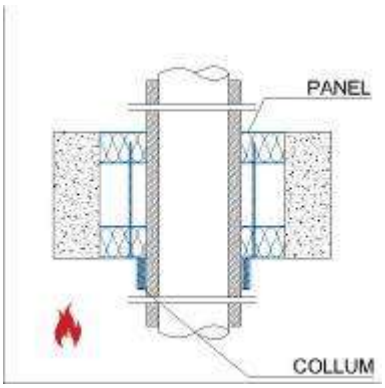


Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PVC	≤ 110	4,5	≤ 20	EI 90 U/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution. COLLUM can be fixed to PANEL with 5 steel spiral pigtail screws in accordance with section C.2.2, with an PANEL maximum dimensions of 900 mm x 450 mm.

A.1.7.3.2 200 mm thick rigid floor



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PPR	≤ 110	10,0	≤ 40	EI 45 U/C

Installation notes:

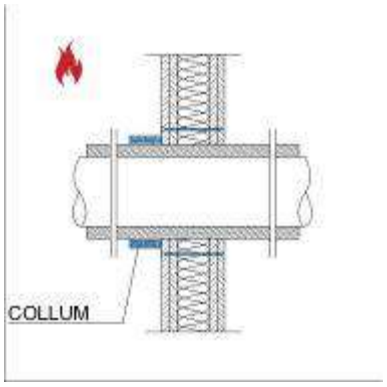
See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution. COLLUM can be fixed to PANEL with 5 steel spiral pigtail screws in accordance with section C.2.2, with two layers of PANEL levelled to the surface at both sides of the floor and maximum dimensions of 300 mm x 300 mm.

A.2 Insulated steel pipes

A.2.1 Insulated steel pipes through the constructive element

A.2.1.1 Flexible wall

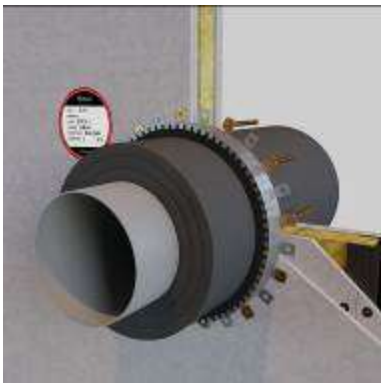
A.2.1.1.1 100 mm thick flexible wall

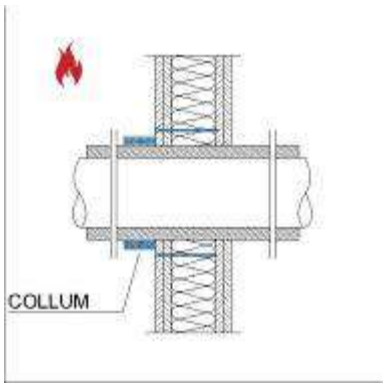


Collar at the fire exposed side only

Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 160	≥ 1,2	19,0 – 40,0	EI 120 C/C
≤ 180	≥ 9,0	40,0	EI 120 C/C

A.2.1.1.2 120 mm thick flexible wall





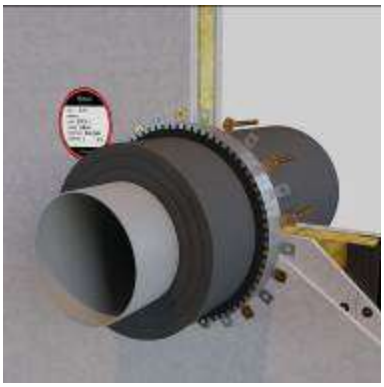
Collar at the fire exposed side only

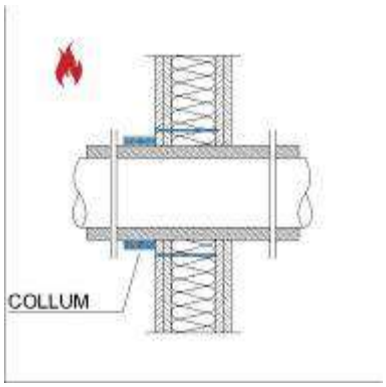
Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 20	≥ 1,0	9,0 – 60,0	EI 120 C/C
≤ 200	≥ 1,2	19,0 – 60,0	EI 120 C/C

Installation notes:

The selected size of COLLUM will always provide with an intumescent strip thickness (b) of at least 8 mm (2 layers) for insulation thicknesses ≤ 40 mm and 12 mm (3 layers) for insulation thicknesses between 40 mm and 60 mm.

A.2.1.1.3 125 mm thick flexible wall





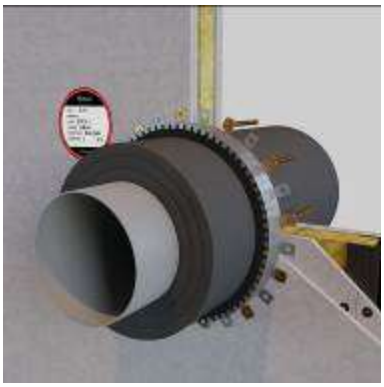
Collar at the fire exposed side only

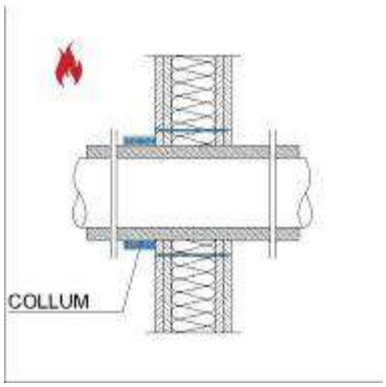
Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 20	≥ 1,0	9,0 – 60,0	EI 120 C/C
≤ 200	≥ 1,2	19,0 – 60,0	EI 120 C/C

Installation notes:

The selected size of COLLUM will always provide with an intumescent strip thickness (b) of at least 8 mm (2 layers) for insulation thicknesses ≤ 40 mm and 12 mm (3 layers) for insulation thicknesses between 40 mm and 60 mm.

A.2.1.1.4 135 mm thick flexible wall





Collar at the fire exposed side only

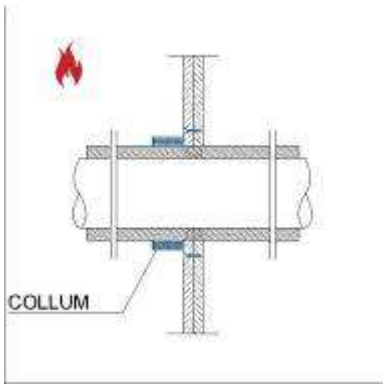
Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 20	≥ 1,0	9,0 – 60,0	EI 120 C/C
≤ 50	≥ 2,5	40,0	EI 120 U/C
≤ 160	≥ 4,0	40,0	EI 120 C/U
≤ 200	≥ 1,2	19,0 – 60,0	EI 120 C/C

Installation notes:

The selected size of COLLUM will always provide with an intumescent strip thickness (b) of at least 8 mm (2 layers) for insulation thicknesses ≤ 40 mm and 12 mm (3 layers) for insulation thicknesses between 40 mm and 60 mm.

A.2.1.2 Lining wall

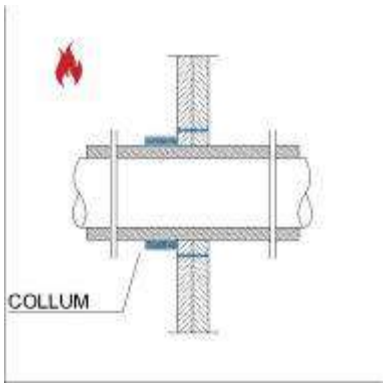
A.2.1.2.1 30 mm thick lining wall



Collar at the fire exposed side only

Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 108	≥ 1,0	40,0	EI 60 U/C

A.2.1.2.2 50 mm thick lining wall



Collar at the fire exposed side only

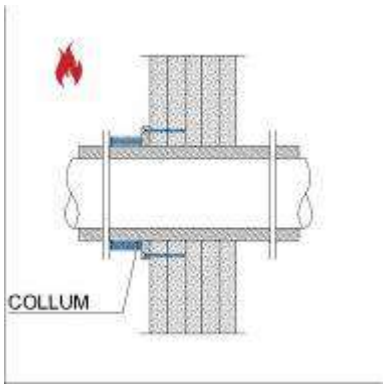
Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 108	≥ 1,0	40,0	EI 60 U/C
≤ 200	≥ 4,0	40,0	EI 120 C/C (i)

Installation notes:

(i) A plate of dimensions 400 mm x 400 mm, made of 'Type GM-F' gypsum and vermiculite plasterboards, coated with fiberglass according to EN 520, is installed with the service axis in the plate centre as a support for COLLUM fixing. The plate has a minimum thickness of 50 mm (e.g.: two boards of thickness 25 mm) and is fixed to the wall plasterboards with self-tapping steel screws Ø 4 mm every 200 mm.

A.2.1.3 Cross laminated timber (CLT) wall

A.2.1.3.1 137 mm thick CLT wall

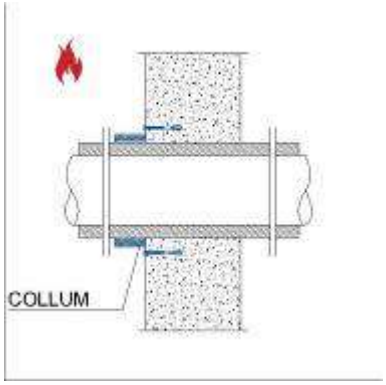


Collar at the fire exposed side only

Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 50	≥ 1,5	21,0	EI 120 C/U

A.2.1.4 Rigid wall

A.2.1.4.1 150 mm thick rigid wall



Collar at the fire exposed side only

Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 50	≥ 2,5	40,0 [25]	EI 120 C/U
≤ 100	≥ 4,0	20,0 [26] – 60,0	EI 180 C/C

Installation notes:

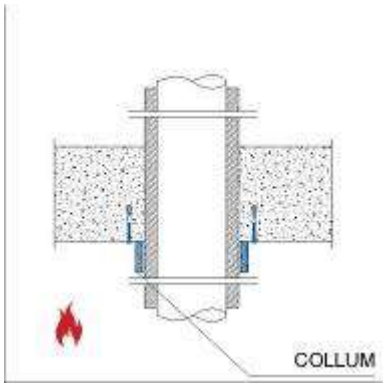
The selected size of COLLUM will always provide with an intumescent strip thickness (b) of at least 8 mm (2 layers) for insulation thicknesses ≤ 40 mm and 12 mm (3 layers) for insulation thicknesses between 40 mm and 60 mm.

[25] The insulation can be covered with an aluminium foil 0,6 mm thick.

[26] The insulation can be covered with an aluminium foil 0,4 mm thick.

A.2.1.5 Rigid floor

A.2.1.5.1 150 mm thick rigid floor

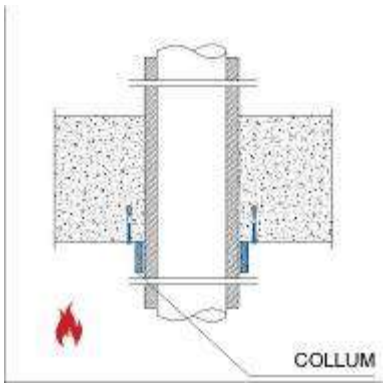


Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 20	≥ 1,0	9,0 – 60,0	EI 180 C/C
≤ 20	≥ 3,0	9,0	EI 180 U/C
≤ 108	≥ 1,0	60,0	EI 180 C/U
≤ 200	≥ 1,0	19,0	EI 60 U/U
≤ 200	≥ 1,0	19,0	EI 120 U/C
≤ 200	≥ 1,2	19,0 – 60,0	EI 180 C/C
≤ 200	≥ 6,0	60,0	EI 180 U/C

Installation notes:

The selected size of COLLUM will always provide with an intumescent strip thickness (b) of at least 8 mm (2 layers) for insulation thicknesses ≤ 40 mm and 12 mm (3 layers) for insulation thicknesses between 40 mm and 60 mm.

A.2.1.5.2 200 mm thick rigid floor



Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 20	≥ 1,0	9,0 – 60,0	EI 180 C/C
≤ 20	≥ 3,0	9,0	EI 180 U/C
≤ 80	≥ 3,5	40,0 [27]	EI 180 C/C
≤ 200	≥ 1,0	19,0	EI 60 U/U
≤ 200	≥ 1,0	19,0	EI 120 U/C
≤ 200	≥ 1,2	19,0 – 60,0	EI 180 C/C
≤ 200	≥ 6,0	60,0	EI 180 U/C

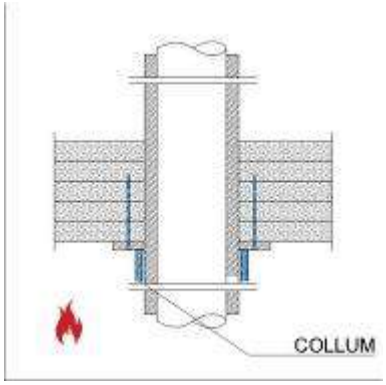
Installation notes:

The selected size of COLLUM will always provide with an intumescent strip thickness (b) of at least 8 mm (2 layers) for insulation thicknesses ≤ 40 mm and 12 mm (3 layers) for insulation thicknesses between 40 mm and 60 mm.

[27] The insulation can be covered with an aluminium foil 0,4 mm thick.

A.2.1.6 Cross laminated timber (CLT) floor

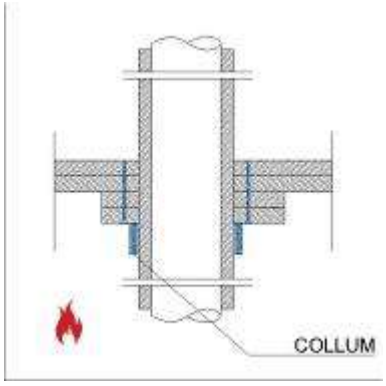
A.2.1.6.1 150 mm thick CLT floor



Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 50	≥ 1,25	16,5	EI 120 U/C

A.2.1.7 False ceiling

A.2.1.7.1 50 mm thick false ceiling

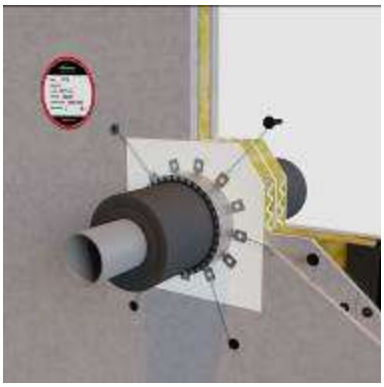


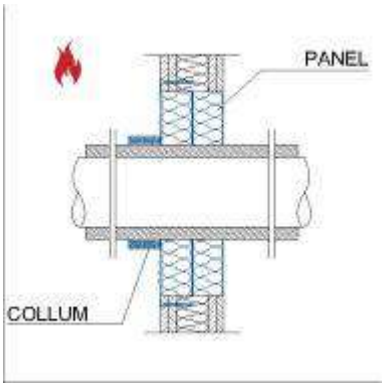
Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 108	≥ 4,0	20,0 – 40,0	EI 120 C/C

A.2.2 Insulated steel pipes through PANEL

A.2.2.1 Flexible wall

A.2.2.1.1 100 mm thick flexible wall





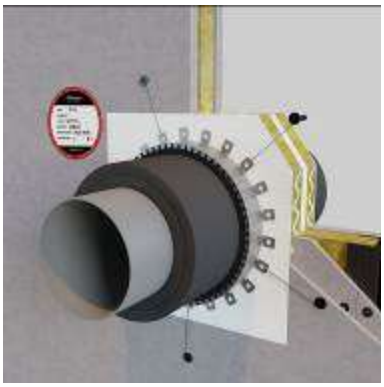
Collar at the fire exposed side only

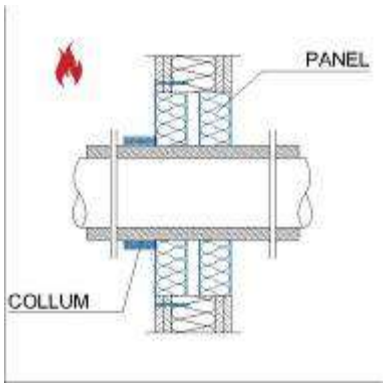
Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 160	≥ 1,2	19,0 – 40,0	EI 120 C/C
≤ 180	≥ 9,0	40,0	EI 120 C/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.2.2.1.2 120 mm thick flexible wall





Collar at the fire exposed side only

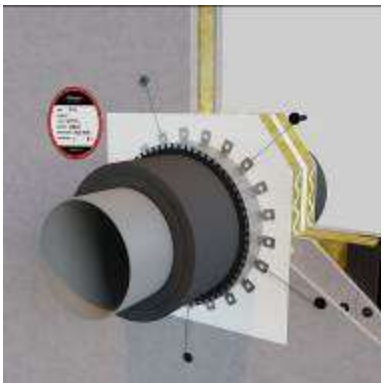
Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 20	≥ 1,0	9,0 – 60,0	EI 120 C/C
≤ 200	≥ 1,2	19,0 – 60,0	EI 120 C/C

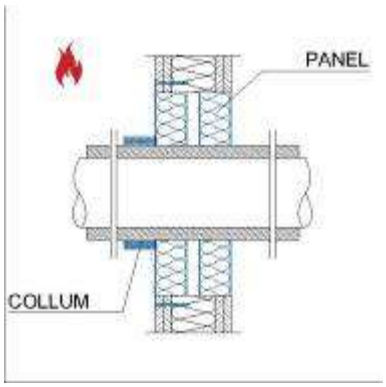
Installation notes:

The selected size of COLLUM will always provide with an intumescent strip thickness (b) of at least 8 mm (2 layers) for insulation thicknesses ≤ 40 mm and 12 mm (3 layers) for insulation thicknesses between 40 mm and 60 mm.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.2.2.1.3 125 mm thick flexible wall





Collar at the fire exposed side only

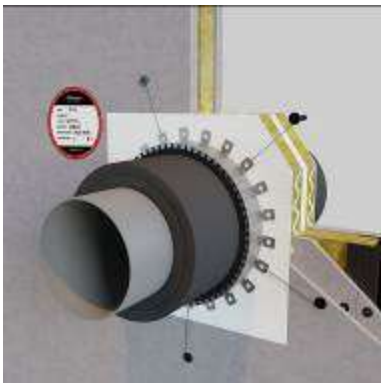
Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 20	≥ 1,0	9,0 – 60,0	EI 120 C/C
≤ 200	≥ 1,2	19,0 – 60,0	EI 120 C/C

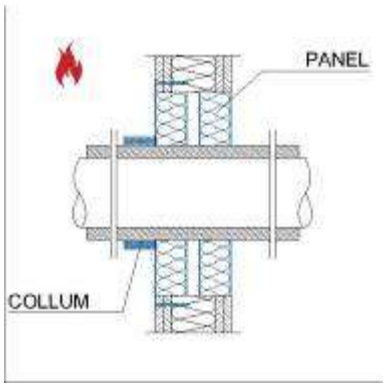
Installation notes:

The selected size of COLLUM will always provide with an intumescent strip thickness (b) of at least 8 mm (2 layers) for insulation thicknesses ≤ 40 mm and 12 mm (3 layers) for insulation thicknesses between 40 mm and 60 mm.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.2.2.1.4 135 mm thick flexible wall





Collar at the fire exposed side only

Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 20	≥ 1,0	9,0 – 60,0	EI 120 C/C
≤ 50	≥ 2,5	40,0	EI 120 U/C
≤ 160	≥ 4,0	40,0	EI 120 C/U
≤ 200	≥ 1,2	19,0 – 60,0	EI 120 C/C

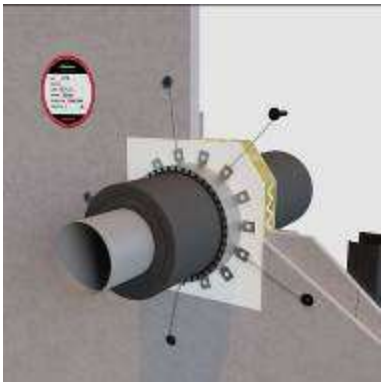
Installation notes:

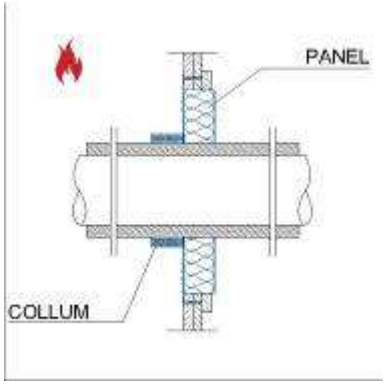
The selected size of COLLUM will always provide with an intumescent strip thickness (b) of at least 8 mm (2 layers) for insulation thicknesses ≤ 40 mm and 12 mm (3 layers) for insulation thicknesses between 40 mm and 60 mm.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.2.2.2 Lining wall

A.2.2.2.1 30 mm thick lining wall





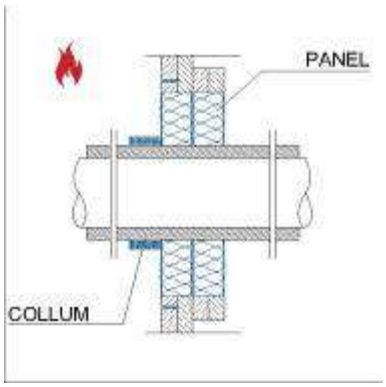
Collar at the fire exposed side only

Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 108	≥ 1,0	40,0	EI 60 U/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.2.2.2.2 50 mm thick lining wall



Collar at the fire exposed side only

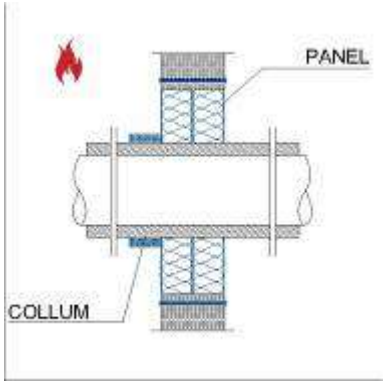
Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 108	≥ 1,0	40,0	EI 60 U/C
≤ 200	≥ 4,0	40,0	EI 120 C/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.2.2.3 Sandwich panel wall

A.2.2.3.1 100 mm thick sandwich panel wall



Collar at the fire exposed side only

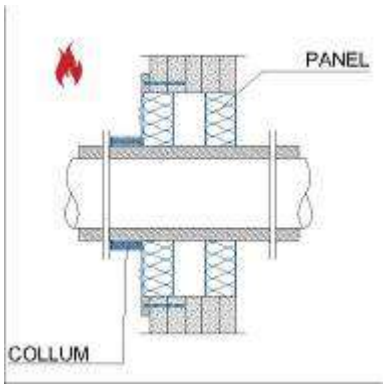
Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 200	≥ 4,0	40,0	EI 120 C/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.2.2.4 Cross laminated timber (CLT) wall

A.2.2.4.1 137 mm thick CLT wall



Collar at the fire exposed side only

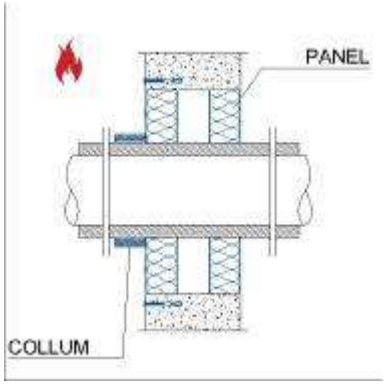
Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 50	≥ 1,5	21,0	EI 120 C/U

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.2.2.5 Rigid wall

A.2.2.5.1 150 mm thick rigid wall



Collar at the fire exposed side only

Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 50	≥ 2,5	40,0 [28]	EI 120 C/U

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

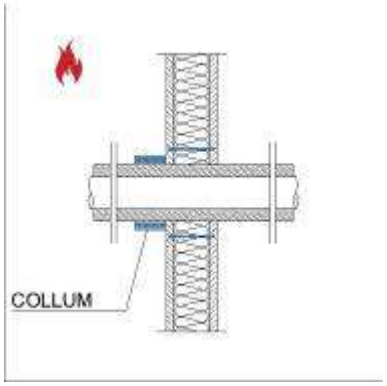
[28] The insulation can be covered with an aluminium foil 0,6 mm thick.

A.3 Multilayer composite pipes

A.3.1 Multilayer composite pipes through the constructive element

A.3.1.1 Flexible wall

A.3.1.1.1 80 mm thick flexible wall



Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/HDPE [29]	≤ 16	2,0	≤ 9 mm	EI 60 U/C

[29] PE-X refers to PE-Xa, PE-Xb or PE-Xc.

A.3.1.1.2 100 mm thick flexible wall

Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/PE	≤ 25	2,5	≤ 9,0 (PE insulation)	EI 120 U/C
	≤ 26	3,0	≤ 9,0 (PE insulation)	EI 120 U/C
	≤ 63	8,6	--	EI 120 U/C
			≤ 20,0	EI 120 U/C
PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0	EI 120 U/C
	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 U/C
	≤ 26	3,0	≤ 9,0	EI 120 U/C
PE-X/Al/PE-RT	≤ 26	3,0	≤ 9,0 (PE insulation)	EI 120 U/C

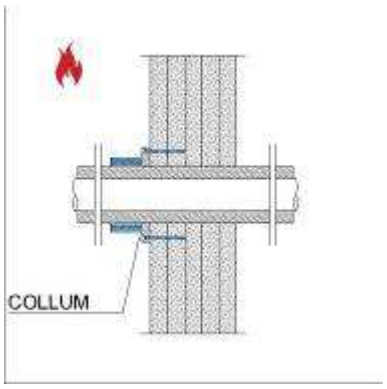
A.3.1.1.3 125 mm thick flexible wall

Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/HDPE	≤ 50	4,5	≤ 20,0	EI 120 U/C

A.3.1.2 Cross laminated timber (CLT) wall

A.3.1.2.1 137 mm thick CLT wall

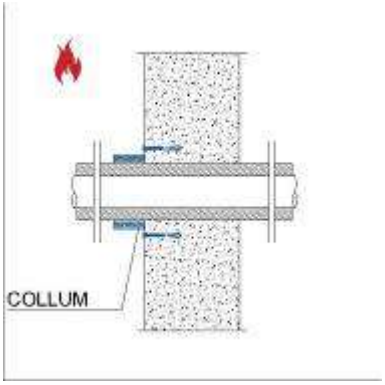


Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/PE-X	≤ 26	3,0	8,5	EI 120 U/C

A.3.1.3 Rigid wall

A.3.1.3.1 150 mm thick rigid wall

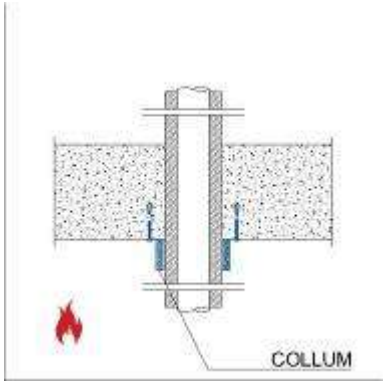


Collar at the fire exposed side only

Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/PE	≤ 25	2,5	≤ 9,0 (PE insulation)	EI 120 U/C
	≤ 26	3,0	≤ 9,0 (PE insulation)	EI 120 U/C
	≤ 63	8,6	--	EI 120 U/C
			≤ 20,0	EI 120 U/C
PE-X/Al/HDPE	≤ 16	2,0	≤ 7,0 (PE insulation)	EI 180 U/C
	≤ 20	3,0	≤ 7,0 (PE insulation)	EI 180 U/C
	≤ 26	3,0	≤ 9,0	EI 120 U/C
PE-X/Al/PE-RT	≤ 26	3,0	≤ 9,0 (PE insulation)	EI 120 U/C

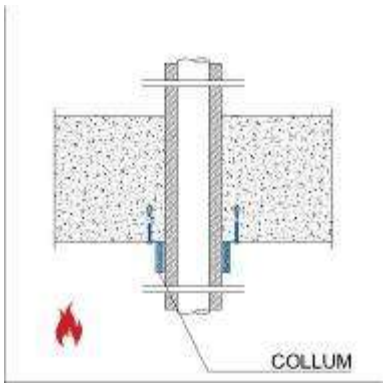
A.3.1.4 Rigid floor

A.3.1.4.1 150 mm thick rigid floor



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/PE	≤ 63	8,7	19,0	EI 180 U/C
PE-X/Al/HDPE	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 180 U/C

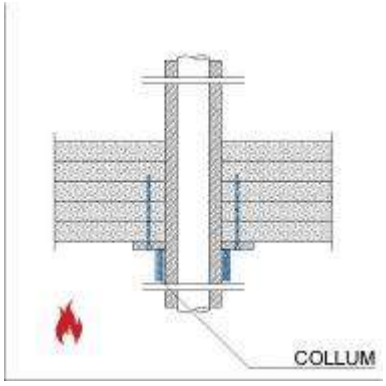
A.3.1.4.2 200 mm thick rigid floor



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/PE	≤ 63	6,0	≤ 20,0	EI 120 U/C

A.3.1.5 Cross laminated timber (CLT) floor

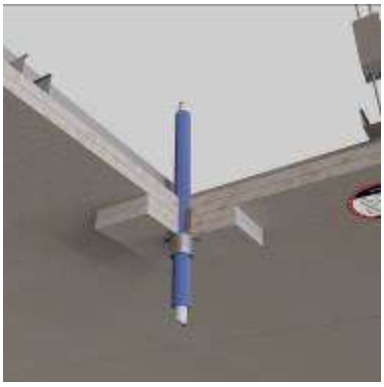
A.3.1.5.1 158 mm thick CLT floor

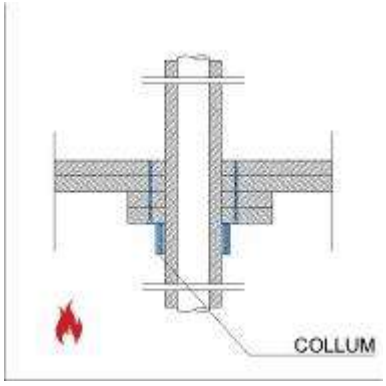


Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/HDPE	≤ 63	6,0	17,0	EI 120 U/C

A.3.1.6 False ceiling

A.3.1.6.1 50 mm thick false ceiling



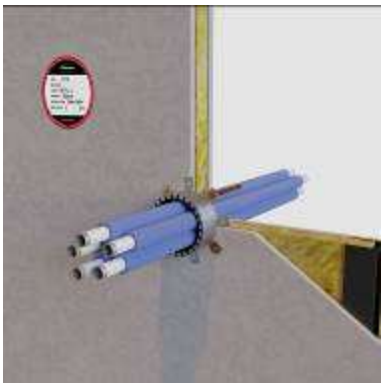


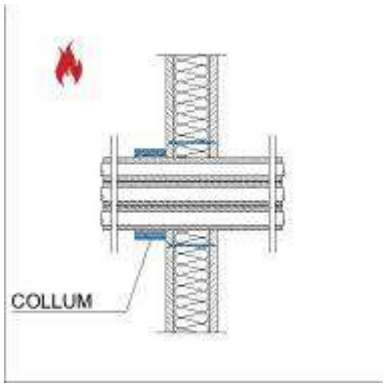
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/PE-RT	≤ 26	3,0	≤ 9,0 (PE insulation)	EI 120 U/C

A.3.2 Multilayer composite pipes in bundles through the constructive element

A.3.2.1 Flexible wall

A.3.2.1.1 80 mm thick flexible wall





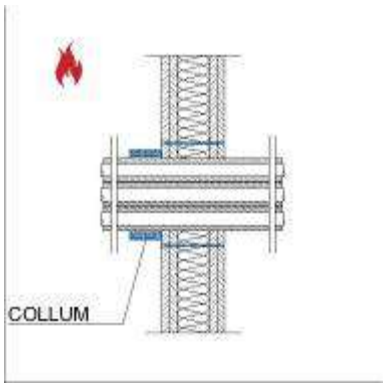
Collar at the fire exposed side only

Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	4 PE-X/Al/HDPE	≤ 16	2,0	--	EI 60 U/C
	3 PE-X/Al/HDPE	≤ 26	3,0	--	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	9,0	EI 60 U/C
	10 corrugated PVC pipes with cable type A1	≤ 20	2,0	--	

Installation notes:

The number of pipes (as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

A.3.2.1.2 100 mm thick flexible wall



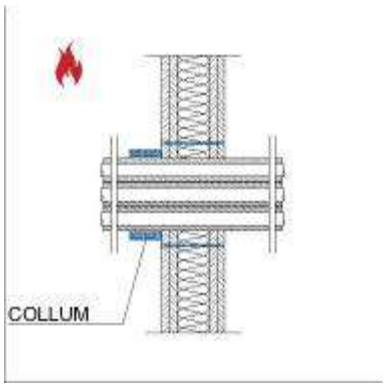
Collar at the fire exposed side only

Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 80	3 PE-X/Al/HDPE	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 C/C
	3 corrugated PVC pipes with cable type A1	≤ 26	3,0	--	
≤ 110	4 PE-X/Al/HDPE	≤ 16	2,0	--	EI 60 U/C
	3 PE-X/Al/HDPE	≤ 26	3,0	--	
≤ 110	9 PE-X/Al/HDPE	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 U/C
≤ 110	2 PE-X/Al/PE	≤ 16	2,0	--	EI 120 U/C
	2 PE-X/Al/PE			≤ 6,0 (PE insulation)	
	2 PE-X/Al/PE	≤ 25	2,5	-	
	2 PE-X/Al/PE			≤ 9,0 (PE insulation)	
≤ 110	2 PE-X/Al/PE-RT	≤ 16	2,0	--	EI 120 U/C
	2 PE-X/Al/PE			≤ 6,0 (PE insulation)	
	2 PE-X/Al/PE	≤ 25	2,5	-	
	2 PE-X/Al/PE			≤ 9,0 (PE insulation)	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	9,0	EI 60 U/C
	10 corrugated PVC pipes with cable type A1	≤ 20	2,0	--	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0 (PE insulation)	EI 120 U/C
	2 PE-X/Al/PE	≤ 26	3,0	≤ 9,0 (PE insulation)	
	3 corrugated PA pipes with cable type A1	≤ 26	0,5	--	

Installation notes:

The number of pipes (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

A.3.2.1.3 125 mm thick flexible wall



Collar at the fire exposed side only

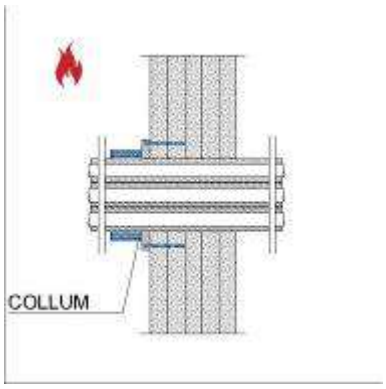
Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
110 < Ø ≤ 125	3 PE-X/Al/HDPE	≤ 32	3,0	--	EI 120 U/C
		≤ 32	3,0	≤ 20,0	
		≤ 20	2,25	≤ 10,0	

Installation notes:

The number of pipes (maximum 3 pipes as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

A.3.2.2 Cross laminated timber (CLT) wall

A.3.2.2.1 137 mm thick CLT wall



Collar at the fire exposed side only

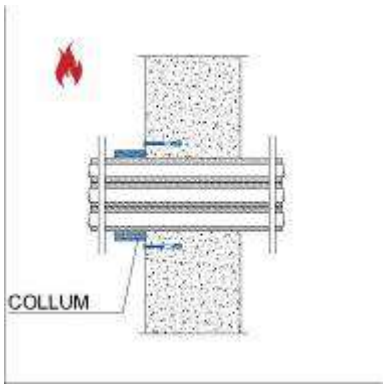
Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 65	1 PE-X/Al/PE-X	≤ 26	3,0	8,5	EI 120 U/C
	2 corrugated PVC pipes with cable type A2	≤ 24	2,0	--	

Installation notes:

The number of pipes (maximum 3 pipes as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

A.3.2.3 Rigid wall

A.3.2.3.1 150 mm thick rigid wall



Collar at the fire exposed side only

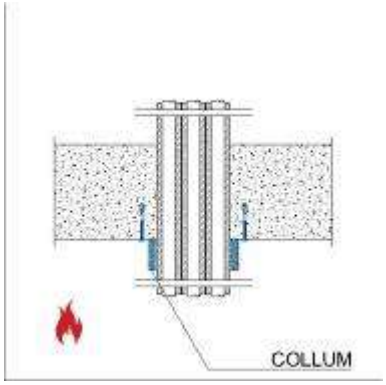
Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	8 PE-X/Al/HDPE	≤ 16	2,0	≤ 7,0 (PE insulation)	EI 180 U/C
	2 PE-X/Al/HDPE	≤ 20	3,0	≤ 7,0 (PE insulation)	
≤ 110	4 PE-X/Al/HDPE	≤ 16	2,0	--	EI 60 U/C
	3 PE-X/Al/HDPE	≤ 26	3,0	--	
≤ 110	9 PE-X/Al/HDPE	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 U/C
≤ 110	2 PE-X/Al/PE	≤ 16	2,0	--	EI 120 U/C
	2 PE-X/Al/PE			≤ 6,0 (PE insulation)	
	2 PE-X/Al/PE	≤ 25	2,5	-	
	2 PE-X/Al/PE			≤ 9,0 (PE insulation)	
≤ 110	2 PE-X/Al/PE-RT	≤ 16	2,0	--	EI 120 U/C
	2 PE-X/Al/PE			≤ 6,0 (PE insulation)	
	2 PE-X/Al/PE	≤ 25	2,5	-	
	2 PE-X/Al/PE			≤ 9,0 (PE insulation)	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0 (PE insulation)	EI 120 U/C
	2 PE-X/Al/PE	≤ 26	3,0	≤ 9,0 (PE insulation)	
	3 corrugated PA pipes with cable type A1	≤ 26	0,5	--	

Installation notes:

The number of pipes (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

A.3.2.4 Rigid floor

A.3.2.4.1 150 mm thick rigid floor



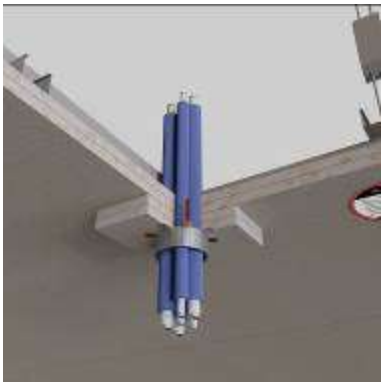
Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	9 PE-X/Al/HDPE	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 180 U/C

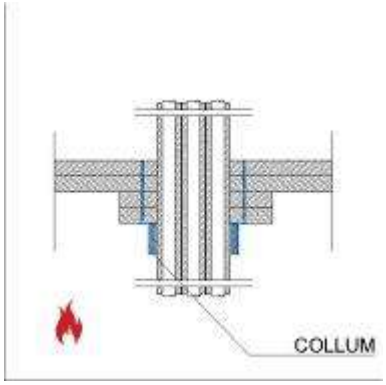
Installation notes:

The number of pipes (maximum 9 pipes as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

A.3.2.5 False ceiling

A.3.2.5.1 50 mm thick false ceiling





Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	2 PE-X/Al/PE-RT	≤ 16	2,0	≤ 6,0 (PE insulation)	EI 120 U/C
	2 PE-X/Al/PE-RT	≤ 26	3,0	≤ 9,0 (PE insulation)	
	2 corrugated PVC pipes with cable type A1	≤ 21	2,0	--	

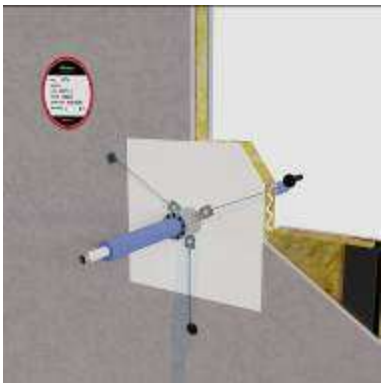
Installation notes:

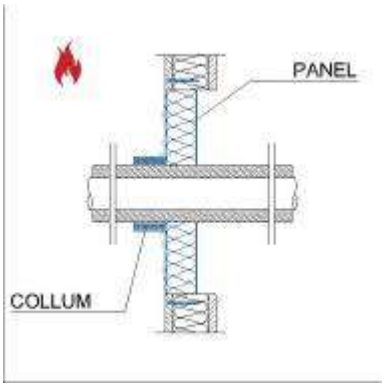
The number of pipes (maximum 6 pipes as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

A.3.3 Multilayer composite pipes through PANEL

A.3.3.1 Flexible wall

A.3.3.1.1 80 mm thick flexible wall





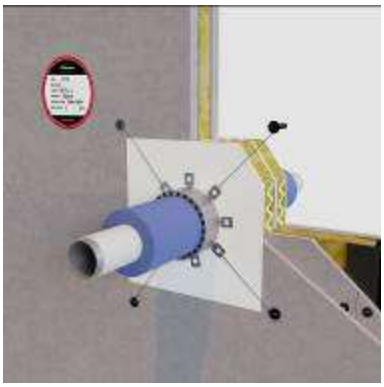
Collar at the fire exposed side only

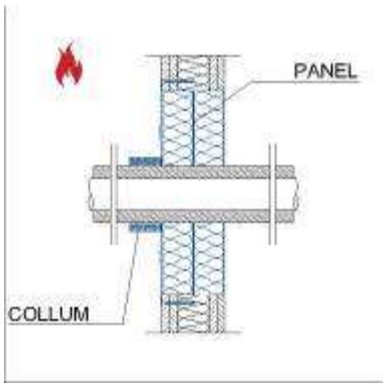
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/HDPE	≤ 16	2,0	9,0	EI 60 U/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.3.3.1.2 100 mm thick flexible wall





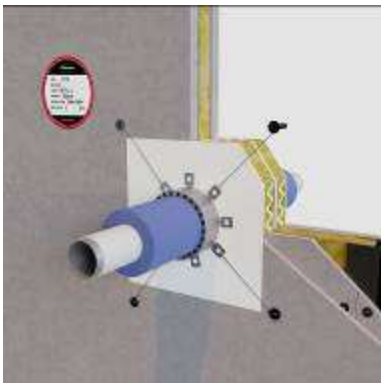
Collar at the fire exposed side only

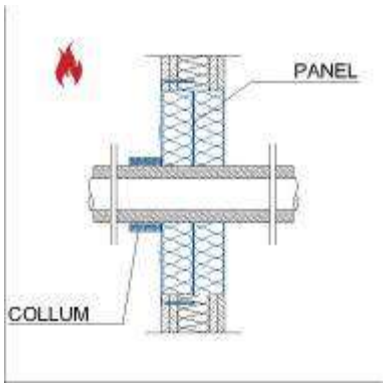
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/PE	≤ 25	2,5	≤ 9,0 (PE insulation)	EI 120 C/C
	≤ 26	3,0	≤ 9,0 (PE insulation)	EI 120 C/C
	≤ 63	8,6	≤ 20,0	EI 120 C/C
PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0	EI 120 C/C
	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 C/C
	≤ 26	3,0	≤ 9,0	EI 120 C/C
PE-X/Al/PE-RT	≤ 26	3,0	≤ 9,0 (PE insulation)	EI 120 C/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.3.3.1.3 125 mm thick flexible wall





Collar at the fire exposed side only

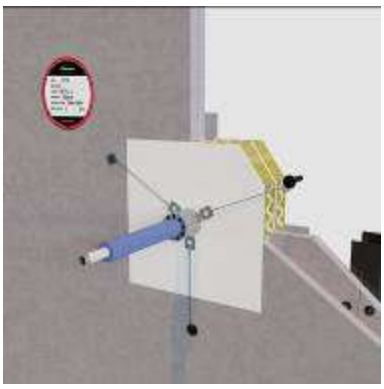
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/HDPE	≤ 32	3,0	≤ 10,0	EI 120 U/C

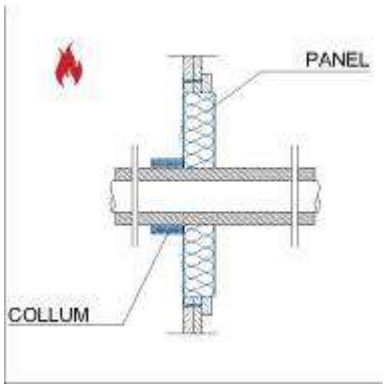
Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.3.3.2 Lining wall

A.3.3.2.1 30 mm thick lining wall





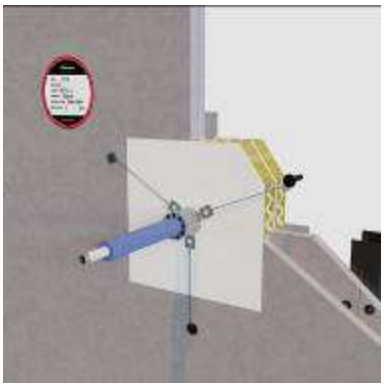
Collar at the fire exposed side only

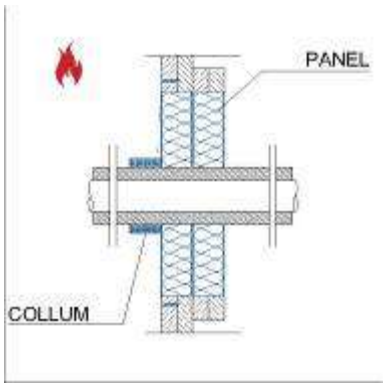
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/HDPE	≤ 16	2,0	9,0	EI 60 U/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.3.3.2.2 50 mm thick lining wall





Collar at the fire exposed side only

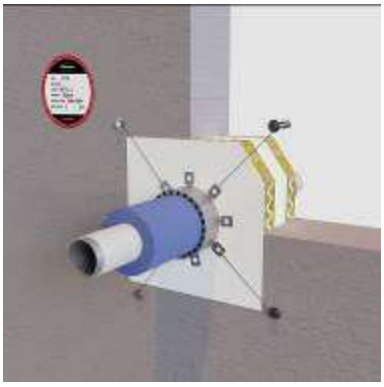
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/HDPE	≤ 16	2,0	9,0	EI 60 U/C
	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 C/C

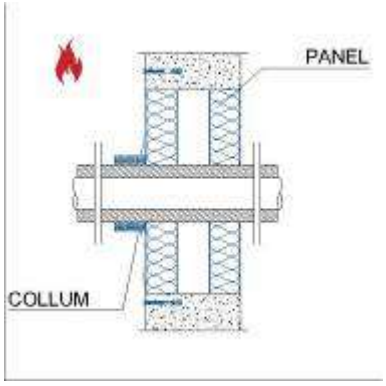
Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.3.3.3 Rigid wall

A.3.3.3.1 150 mm thick rigid wall





Collar at the fire exposed side only

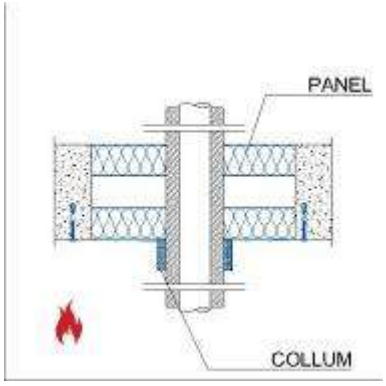
Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/PE	≤ 25	2,5	≤ 9,0 (PE insulation)	EI 120 C/C
	≤ 26	3,0	≤ 9,0 (PE insulation)	EI 120 C/C
	≤ 63	8,6	--	EI 120 C/C
			≤ 20,0	EI 120 C/C
PE-X/Al/HDPE	16	2,0	7,0 (PE insulation)	EI 120 C/C
	≤ 20	3,0	≤ 7,0 (PE insulation)	EI 120 C/C
	≤ 26	3,0	≤ 9,0	EI 120 C/C
PE-X/Al/PE-RT	≤ 26	3,0	≤ 9,0 (PE insulation)	EI 120 C/C

Installation notes:

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.3.3.4 Rigid floor

A.3.3.4.1 150 mm thick rigid floor



Pipe material	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
PE-X/Al/PE	≤ 63	8,7	19,0	EI 120 C/C
PE-X/Al/HDPE	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 C/C

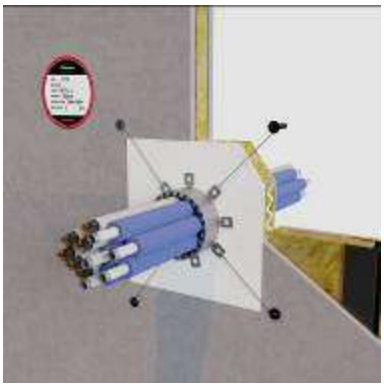
Installation notes:

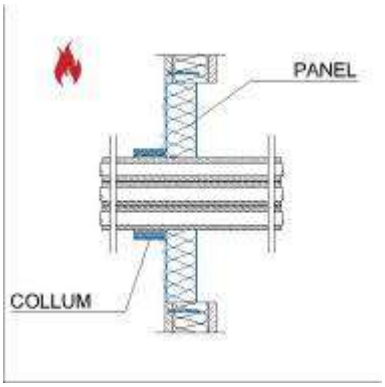
See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.3.4 Multilayer composite pipes in bundles through PANEL

A.3.4.1 Flexible wall

A.3.4.1.1 80 mm thick flexible wall





Collar at the fire exposed side only

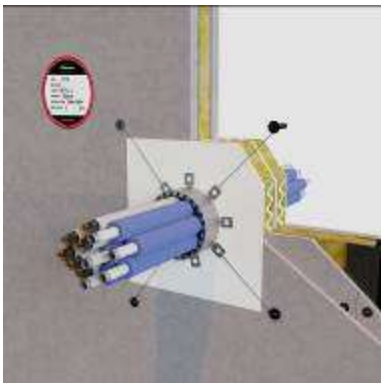
Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	9,0	EI 60 U/C
	10 corrugated PVC pipes with cable type A1	≤ 20	2,0	--	

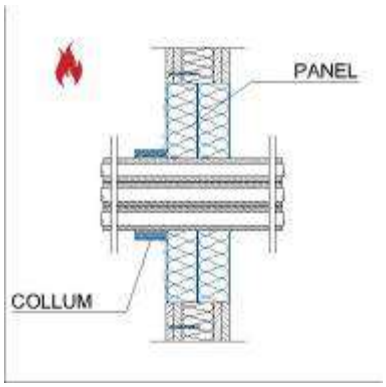
Installation notes:

The number of pipes (maximum 15 as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.3.4.1.2 100 mm thick flexible wall





Collar at the fire exposed side only

Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 80	3 PE-X/Al/HDPE	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 C/C
	3 corrugated PVC pipes with cable type A1	≤ 26	3,0	--	
≤ 110	4 PE-X/Al/HDPE	≤ 16	2,0	--	EI 60 U/C
	3 PE-X/Al/HDPE	≤ 26	3,0	--	
≤ 110	9 PE-X/Al/HDPE	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 C/C
≤ 110	2 PE-X/Al/PE	≤ 16	2,0	--	EI 120 C/C
	2 PE-X/Al/PE			≤ 6,0 (PE insulation)	
	2 PE-X/Al/PE	≤ 25	2,5	-	
	2 PE-X/Al/PE			≤ 9,0 (PE insulation)	
≤ 110	2 PE-X/Al/PE-RT	≤ 16	2,0	--	EI 120 C/C
	2 PE-X/Al/PE			≤ 6,0 (PE insulation)	
	2 PE-X/Al/PE	≤ 25	2,5	-	
	2 PE-X/Al/PE			≤ 9,0 (PE insulation)	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	9,0	EI 60 U/C
	10 corrugated PVC pipes with cable type A1	≤ 20	2,0	--	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0 (PE insulation)	EI 120 C/C
	2 PE-X/Al/PE	≤ 26	3,0	≤ 9,0 (PE insulation)	
	3 corrugated PA pipes with cable type A1	≤ 26	0,5	--	

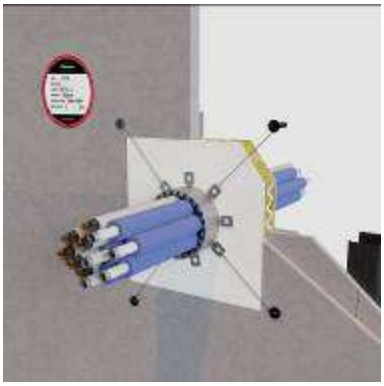
Installation notes:

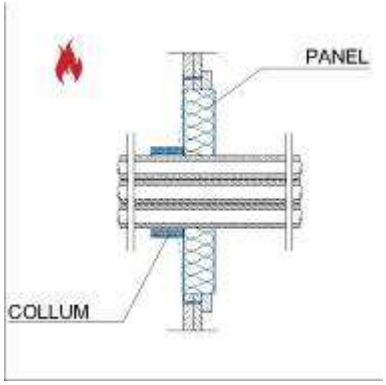
The number of pipes (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.3.4.2 Lining wall

A.3.4.2.1 30 mm thick lining wall





Collar at the fire exposed side only

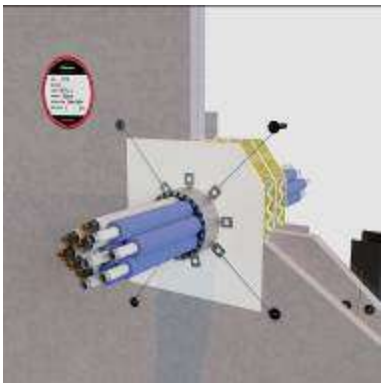
Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	9,0	EI 60 U/C
	10 corrugated PVC pipes with cable type A1	≤ 20	2,0	--	

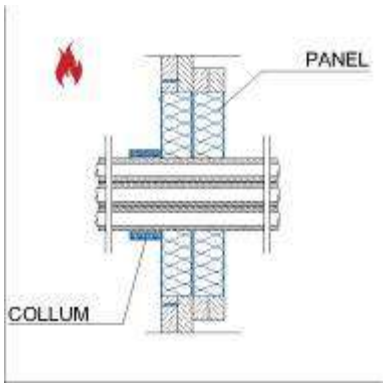
Installation notes:

The number of pipes (maximum 15 pipes as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.3.4.2.2 50 mm thick lining wall





Collar at the fire exposed side only

Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 80	3 PE-X/Al/HDPE	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 C/C
	3 corrugated PVC pipes with cable type A1	≤ 26	3,0	--	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	9,0	EI 60 U/C
	10 corrugated PVC pipes with cable type A1	≤ 20	2,0	--	

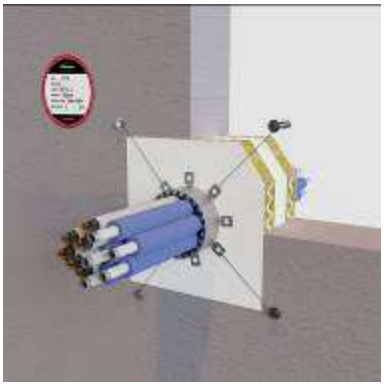
Installation notes:

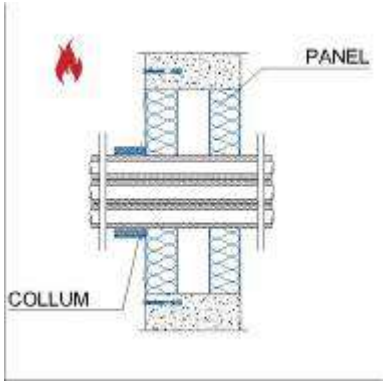
The number of pipes (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.3.4.3 Rigid wall

A.3.4.3.1 150 mm thick rigid wall





Collar at the fire exposed side only

Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	8 PE-X/Al/HDPE	≤ 16	2,0	≤ 7,0 (PE insulation)	EI 120 C/C
	2 PE-X/Al/HDPE	≤ 20	3,0	≤ 7,0 (PE insulation)	
≤ 110	4 PE-X/Al/HDPE	≤ 16	2,0	--	EI 60 U/C
	3 PE-X/Al/HDPE	≤ 26	3,0	--	
≤ 110	9 PE-X/Al/HDPE	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 C/C
≤ 110	2 PE-X/Al/PE	≤ 16	2,0	--	EI 120 C/C
	2 PE-X/Al/PE			≤ 6,0 (PE insulation)	
	2 PE-X/Al/PE	≤ 25	2,5	-	
	2 PE-X/Al/PE			≤ 9,0 (PE insulation)	
≤ 110	2 PE-X/Al/PE-RT	≤ 16	2,0	--	EI 120 C/C
	2 PE-X/Al/PE			≤ 6,0 (PE insulation)	
	2 PE-X/Al/PE	≤ 25	2,5	-	
	2 PE-X/Al/PE			≤ 9,0 (PE insulation)	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0 (PE insulation)	EI 120 C/C
	2 PE-X/Al/PE	≤ 26	3,0	≤ 9,0 (PE insulation)	
	3 corrugated PA pipes with cable type A1	≤ 26	0,5	--	

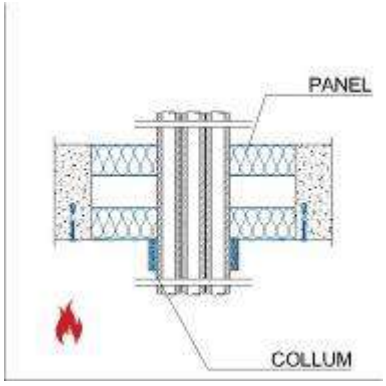
Installation notes:

The number of pipes (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.3.4.4 Rigid floor

A.3.4.4.1 150 mm thick rigid floor



Overall diameter (mm)	Pipe material and number	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	9 PE-X/Al/HDPE	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 C/C

Installation notes:

The number of pipes (maximum 9 pipes as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

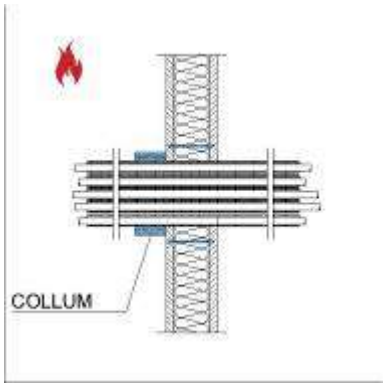
See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.4 Cables

A.4.1 Cable bundles through the constructive element

A.4.1.1 Flexible wall

A.4.1.1.1 80 mm thick flexible wall



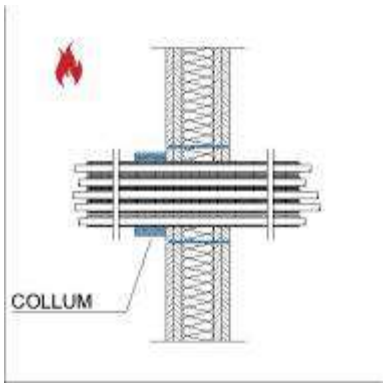
Collar at the fire exposed side only

Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	5 corrugated PVC pipes with cable type A1	≤ 32	2,0	--	EI 60 U/C
	4 corrugated PA pipes with cable type A1	≤ 24	0,5	--	

Installation notes:

The number of pipes and cables (maximum 9 pipes as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

A.4.1.1.2 100 mm thick flexible wall



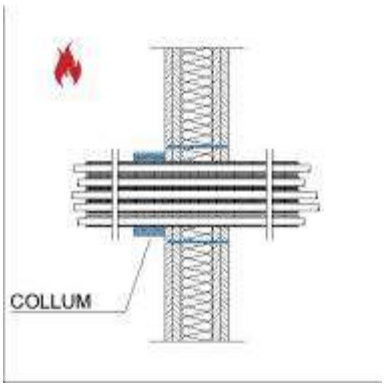
Collar at the fire exposed side only

Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	5 corrugated PVC pipes with cable type A1	≤ 32	2,0	--	EI 60 U/C
	4 corrugated PA pipes with cable type A1	≤ 24	0,5	--	
≤ 110	10 cables type A1	--	--	--	EI 120
	10 cables type A2	--	--	--	
	10 cables type A3	--	--	--	
	2 cables type B	--	--	--	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0 (PE insulation)	EI 120 U/C
	2 PE-X/Al/PE	≤ 26	3,0	≤ 9,0 (PE insulation)	
	3 corrugated PA pipes with cable type A1	≤ 26	0,5	--	
≤ 110	8 corrugated PVC pipes with cable type A1, A2 or A3	≤ 32	2,0	--	EI 120 U/C

Installation notes:

The number of pipes and cables (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

A.4.1.1.3 125 mm thick flexible wall



Collar at the fire exposed side only

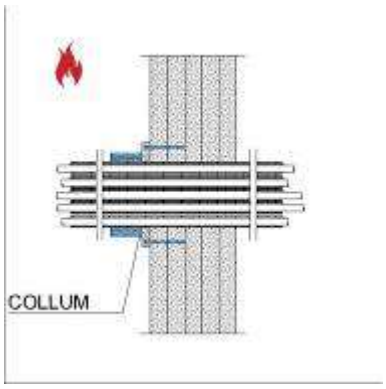
Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	5 corrugated PVC pipes with cable type A1	≤ 32	2,0	--	EI 60 U/C
	4 corrugated PA pipes with cable type A1	≤ 24	0,5	--	
≤ 110	10 cables type A1	--	--	--	EI 120
	10 cables type A2	--	--	--	
	10 cables type A3	--	--	--	
	2 cables type B	--	--	--	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0 (PE insulation)	EI 120 U/C
	2 PE-X/Al/PE	≤ 26	3,0	≤ 9,0 (PE insulation)	
	3 corrugated PA pipes with cable type A1	≤ 26	0,5	--	
≤ 110	1 PVC pipe	≤ 50	2,0	--	EI 120 U/C
	18 corrugated PVC pipes with cable type A1	≤ 20	2,0	--	

Installation notes:

The number of pipes and cables (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

A.4.1.2 Cross laminated timber (CLT) wall

A.4.1.2.1 137 mm thick CLT wall



Collar at the fire exposed side only

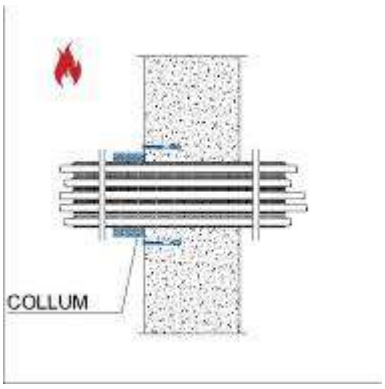
Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 65	1 PE-X/Al/ PE-X	≤ 26	3,0	8,5	EI 120 U/C
	2 corrugated PVC pipes with cable type A2	≤ 24	2,0	--	
≤ 82	7 corrugated PVC pipes with cable type A2	≤ 24	2,0	--	EI 120 U/C

Installation notes:

The number of pipes and cables (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

A.4.1.3 Rigid wall

A.4.1.3.1 150 mm thick rigid wall



Collar at the fire exposed side only

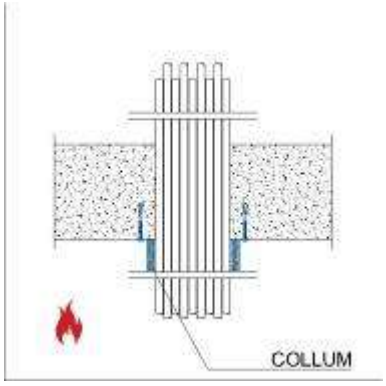
Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	5 corrugated PVC pipes with cable type A1	≤ 32	2,0	--	EI 60 U/C
	4 corrugated PA pipes with cable type A1	≤ 24	0,5	--	
≤ 110	10 cables type A1	--	--	--	EI 180
	10 cables type A2	--	--	--	
	10 cables type A3	--	--	--	
	2 cables type B	--	--	--	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0 (PE insulation)	EI 120 U/C
	2 PE-X/Al/PE	≤ 26	3,0	≤ 9,0 (PE insulation)	
	3 corrugated PA pipes with cable type A1	≤ 26	0,5	--	
≤ 110	1 PVC pipe	≤ 50	2,0	--	EI 120 U/C
	18 corrugated PVC pipes with cable type A1	≤ 20	2,0	--	

Installation notes:

The number of pipes and cables (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

A.4.1.4 Rigid floor

A.4.1.4.1 150 mm thick rigid floor



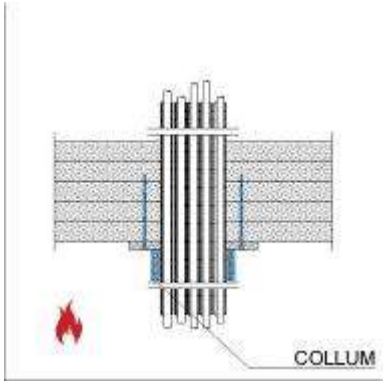
Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 100	10 cables type A1	--	--	--	EI 180
	10 cables type A3	--	--	--	
≤ 110	2 copper pipes	≤ 20	2,0	20	EI 180
	1 PVC pipe	≤ 40	3,7	--	
	1 corrugated PVC pipe with cable type A1	≤ 21,2	2,0	--	

Installation notes:

The number of pipes and cables (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

A.4.1.5 Cross laminated timber (CLT) floor

A.4.1.5.1 158 mm thick CLT floor



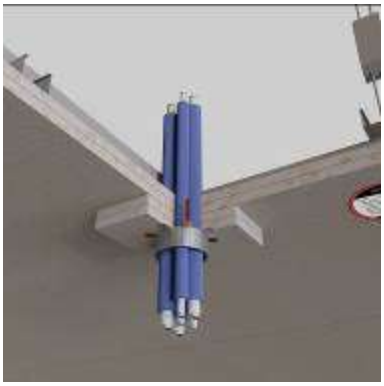
Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	20 corrugated PVC with cable type A3	≤ 20	2,0	--	EI 120

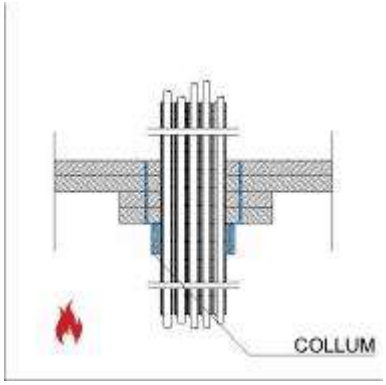
Installation notes:

The number of pipes and cables (maximum 20 pipes as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

A.4.1.6 False ceiling

A.4.1.6.1 50 mm thick false ceiling





Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	2 PE-X/Al/PE-RT	≤ 26	3,0	≤ 9,0 (PE insulation)	EI 120 U/C
	2 PE-X/Al/PE-RT	≤ 16	2,0	≤ 6,0 (PE insulation)	
	2 corrugated PVC pipes with cable type A1	≤ 21	2,0	--	

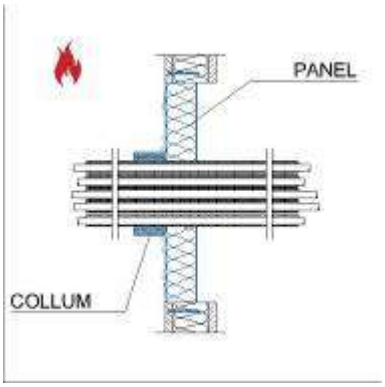
Installation notes:

The number of pipes and cables (maximum 6 pipes as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

A.4.2 Cable bundles through PANEL

A.4.2.1 Flexible wall

A.4.2.1.1 80 mm thick flexible wall



Collar at the fire exposed side only

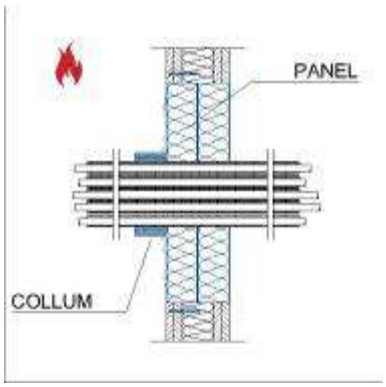
Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	5 corrugated PVC pipes with cable type A1	≤ 32	2,0	--	EI 60 U/C
	4 corrugated PA pipes with cable type A1	≤ 24	0,5	--	

Installation notes:

The number of pipes and cables (maximum 9 pipes as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.4.2.1.2 100 mm thick flexible wall



Collar at the fire exposed side only

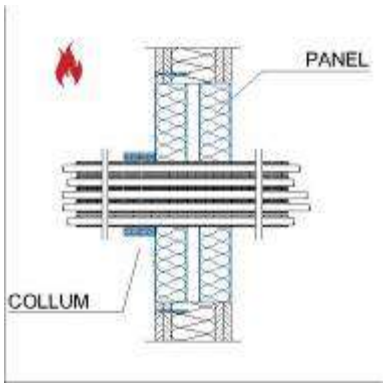
Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	5 corrugated PVC pipes with cable type A1	≤ 32	2,0	--	EI 60 U/C
	4 corrugated PA pipes with cable type A1	≤ 24	0,5	--	
≤ 110	10 cables type A1	--	--	--	EI 120
	10 cables type A2	--	--	--	
	10 cables type A3	--	--	--	
	2 cables type B	--	--	--	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0 (PE insulation)	EI 120 U/C
	2 PE-X/Al/PE	≤ 26	3,0	≤ 9,0 (PE insulation)	
	3 corrugated PA pipes with cable type A1	≤ 26	0,5	--	
≤ 110	8 corrugated PVC pipes with cable type A1, A2 or A3	≤ 32	2,0	--	EI 120 U/C

Installation notes:

The number of pipes and cables (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.4.2.1.3 120 mm thick flexible wall



Collar at the fire exposed side only

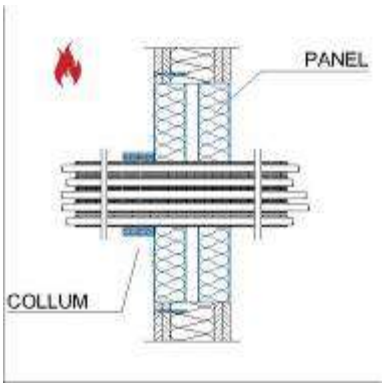
Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	5 corrugated PVC pipes with cable type A1	≤ 32	2,0	--	EI 60 U/C
	4 corrugated PA pipes with cable type A1	≤ 24	0,5	--	
≤ 110	10 cables type A1	--	--	--	EI 120
	10 cables type A2	--	--	--	
	10 cables type A3	--	--	--	
	2 cables type B	--	--	--	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0 (PE insulation)	EI 120 U/C
	2 PE-X/Al/PE	≤ 26	3,0	≤ 9,0 (PE insulation)	
	3 corrugated PA pipes with cable type A1	≤ 26	0,5	--	
≤ 110	8 corrugated PVC pipes with cable type A1, A2 or A3	≤ 32	2,0	--	EI 120 U/C
110 < Ø ≤ 125	1 PP pipe with 15 cables type A1	110 < Ø ≤ 125	3,2	--	EI 120 U/C
110 < Ø ≤ 125	1 corrugated PVC pipe with 15 cables type A1	110 < Ø ≤ 125	9,0	--	EI 120 U/C

Installation notes:

The number of pipes and cables (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.4.2.1.4 125 mm thick flexible wall



Collar at the fire exposed side only

Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	5 corrugated PVC pipes with cable type A1	≤ 32	2,0	--	EI 60 U/C
	4 corrugated PA pipes with cable type A1	≤ 24	0,5	--	
≤ 110	10 cables type A1	--	--	--	EI 120
	10 cables type A2	--	--	--	
	10 cables type A3	--	--	--	
	2 cables type B	--	--	--	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0 (PE insulation)	EI 120 U/C
	2 PE-X/Al/PE	≤ 26	3,0	≤ 9,0 (PE insulation)	
	3 corrugated PA pipes with cable type A1	≤ 26	0,5	--	
≤ 110	1 PVC pipe	≤ 50	2,0	--	EI 120 U/C
	18 corrugated PVC pipes with cable type A1	≤ 20	2,0	--	
110 < Ø ≤ 125	1 PP pipe with 15 cables type A1	110 < Ø ≤ 125	3,2	--	EI 120 U/C
110 < Ø ≤ 125	1 corrugated PVC pipe with 15 cables type A1	110 < Ø ≤ 125	9,0	--	EI 120 U/C

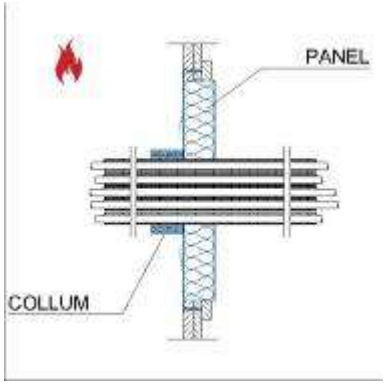
Installation notes:

The number of pipes and cables (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.4.2.2 Lining wall

A.4.2.2.1 30 mm thick lining wall



Collar at the fire exposed side only

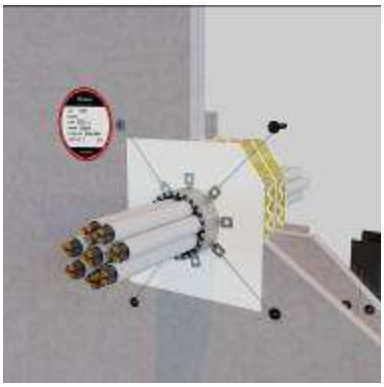
Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	9,0	EI 60 U/C
	10 corrugated PVC pipes with cable type A1	≤ 20	2,0	--	

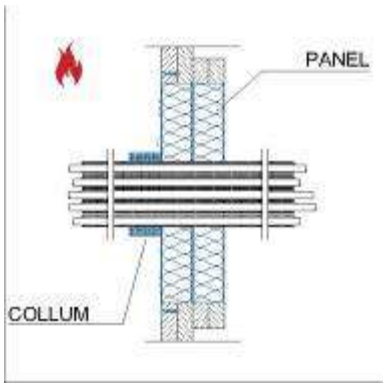
Installation notes:

The number of pipes and cables (maximum 15 pipes as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.4.2.2.2 50 mm thick lining wall





Collar at the fire exposed side only

Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 80	3 PE-X/Al/HDPE	≤ 20	3,0	≤ 6,0 (PE insulation)	EI 120 C/C
	3 corrugated PVC pipes with cable type A1	≤ 26	3,0	--	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	9,0	EI 60 U/C
	10 corrugated PVC pipes with cable type A1	≤ 20	2,0	--	

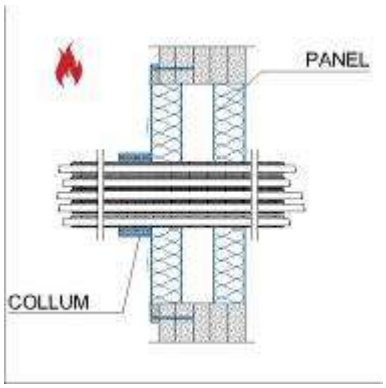
Installation notes:

The number of pipes and cables (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.4.2.3 Cross laminated timber (CLT) wall

A.4.2.3.1 137 mm thick CLT wall



Collar at the fire exposed side only

Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 65	1 PE-X/Al/ PE-X	≤ 26	3,0	8,5	EI 120 U/C
	2 corrugated PVC pipes with cable type A2	≤ 24	2,0	--	
≤ 82	7 corrugated PVC pipes with cable type A2	≤ 24	2,0	--	EI 120 U/C

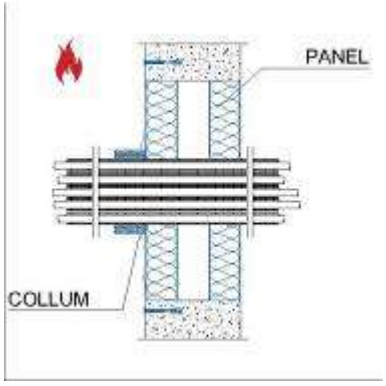
Installation notes:

The number of pipes and cables (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.4.2.4 Rigid wall

A.4.2.4.1 150 mm thick rigid wall



Collar at the fire exposed side only

Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	5 corrugated PVC pipes with cable type A1	≤ 32	2,0	--	EI 60 U/C
	4 corrugated PA pipes with cable type A1	≤ 24	0,5	--	
≤ 110	10 cables type A1	--	--	--	EI 180
	10 cables type A2	--	--	--	
	10 cables type A3	--	--	--	
	2 cables type B	--	--	--	
≤ 110	5 PE-X/Al/HDPE	≤ 16	2,0	≤ 9,0 (PE insulation)	EI 120 U/C
	2 PE-X/Al/PE	≤ 26	3,0	≤ 9,0 (PE insulation)	
	3 corrugated PA pipes with cable type A1	≤ 26	0,5	--	
≤ 110	1 PVC pipe	≤ 50	2,0	--	EI 120 U/C
	18 corrugated PVC pipes with cable type	≤ 20	2,0	--	
110 < Ø ≤ 125	7 corrugated PVC pipes with cable type A1	≤ 32	2,0	--	EI 180 C/U

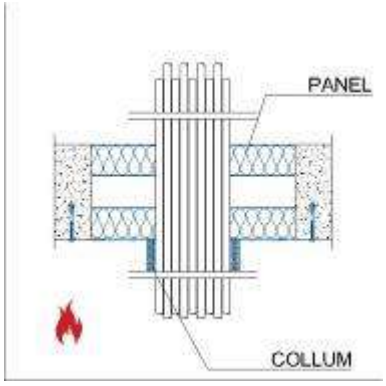
Installation notes:

The number of pipes and cables (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.4.2.5 Rigid floor

A.4.2.5.1 150 mm thick rigid floor



Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 100	10 cables type A1	--	--	--	EI 180
	10 cables type A3	--	--	--	
≤ 110	2 copper pipes	≤ 20	2,0	20	EI 180
	1 PVC pipe	≤ 40	3,7	--	
	1 corrugated PVC pipe with cable type A1	≤ 21,2	2,0	--	
110 < Ø ≤ 125	1 PP pipe with 11 cables type A1	110 < Ø ≤ 125	3,2	--	EI 180 U/C
110 < Ø ≤ 125	1 corrugated PVC pipe with 10 cables type A1	110 < Ø ≤ 125	9,0	--	EI 180 U/C

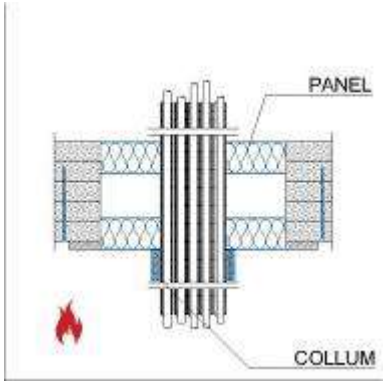
Installation notes:

The number of pipes and cables (maximum as given in the above table for every bundle) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

A.4.2.6 Cross laminated timber (CLT) floor

A.4.2.6.1 158 mm thick CLT floor



Overall diameter (mm)	Service description	Pipe diameter (mm)	Pipe wall thickness (mm)	Insulation thickness (mm)	Classification
≤ 110	20 corrugated PVC pipes with cable type A3	≤ 20	2,0	--	EI 120

Installation notes:

The number of pipes and cables (maximum 20 pipes as given in the above table) can be reduced provided that the collar is closely fitted around the pipes.

See Annex B and section C.2.2 for the installation provisions of COLLUM on PANEL closing solution.

ANNEX B. Supporting constructive elements

B.1. General

The constructive elements where COLLUM may be installed are specified in this annex, as follows:

- Flexible walls: section B.2.1.
- Lining walls: section B.2.2.
- Sandwich panels walls: section B.2.3.
- Timber walls: section B.2.4.
- Rigid walls: section B.2.5.
- Rigid floors: section B.3.1.
- Timber floors: section B.3.2.
- False ceilings: section B.3.3.

The constructive element where the penetration seal is installed must be classified in accordance with EN 13501-2 for the required fire resistance period. The rules given in section 13.3 of EN 1366-3 for supporting constructions can be applied regarding the field of direct application of test results.

B.2. Specification of the supporting walls

B.2.1. Flexible walls [30]

B.2.1.1 Flexible wall of thickness 80 mm

Walls with a minimum thickness of 80 mm and resistance to fire EI 60.

When an opening in the wall is closed with PANEL, one layer is installed levelled to the surface at the fire exposed side of the wall. The maximum size of the opening is 550 mm x 600 mm.

B.2.1.2 Flexible wall of thickness 100 mm

Walls with a minimum thickness of 100 mm and resistance to fire EI 120.

When an opening in the wall is closed with PANEL, two layers are installed levelled to the surface at both sides of the wall. The maximum size of the opening is 550 mm x 600 mm.

[30] The flexible walls comprise timber or steel studs lined on both faces with minimum two layers of 12,5 mm thick 'Type F' or 'Type DF' gypsum plasterboards according to EN 520 (or minimum 1 layer of 15 mm in the case of the 80 mm thick flexible wall). In timber stud walls, no part of the penetration shall be closer than 100 mm to a stud, the cavity must be closed between the penetration seal and the stud and minimum 100 mm of insulation of reaction to fire class A1 or A2 according to EN 13501-1 is provided within the cavity between the penetration seal and the stud.

The resistance to fire performance given in Annex A for flexible walls may be applied to rigid constructions of an overall thickness equal to or greater and a minimum density of 350 kg/m^3.

B.2.1.3 Flexible wall of thickness 120 mm

Walls with a minimum thickness of 120 mm and resistance to fire EI 120.

When an opening in the wall is closed with PANEL, two layers are installed levelled to the surface at both sides of the wall. The maximum size of the opening is 1750 mm x 1000 mm.

B.2.1.4 Flexible wall of thickness 125 mm

Walls with a minimum thickness of 125 mm and resistance to fire EI 120.

When an opening in the wall is closed with PANEL, two layers are installed levelled to the surface at both sides of the wall. The maximum size of the opening is 1750 mm x 1000 mm.

B.2.1.5 Flexible wall of thickness 135 mm

Walls with a minimum thickness of 135 mm and resistance to fire EI 120.

When an opening in the wall is closed with PANEL, two layers are installed levelled to the surface at both sides of the wall. The maximum size of the opening is 1750 mm x 1000 mm.

B.2.2. Lining walls

B.2.2.1 Lining wall of thickness 30 mm

One-sided flexible walls with a minimum thickness of 30 mm (boards only) and resistance to fire EI 60, which comprise a steel frame of a minimum thickness 50 mm (studs of 50 mm x 49 mm x 0,6 mm), lined at one side only with minimum two layers of 15 mm thick ‘Type F’ gypsum plasterboards according to EN 520.

When an opening in the wall is closed with PANEL, one layer is installed. A frame is installed around the opening, fixed to the wall plasterboards with self-tapping steel screws Ø 3,5 mm every 200 mm, made of strips (50 mm width and 15 mm thick) of ‘Type F’ gypsum plasterboards according to EN 520. The maximum size of the opening is 500 mm x 1060 mm.

B.2.2.2 Lining wall of thickness 50 mm

One-sided flexible walls with a minimum thickness of 50 mm (boards only) and resistance to fire EI 120, which comprise a steel frame of a minimum thickness 75 mm (studs of 75 mm x 50 mm x 0,6 mm), lined at one side only with minimum two layers of 25 mm thick ‘Type GM-F’ gypsum and vermiculite plasterboards, coated with fiberglass, according to EN 520.

When an opening in the wall is closed with PANEL, two layers are installed. A frame is installed around the opening, fixed to the wall plasterboards with self-tapping steel screws Ø 4 mm every 200 mm, made of strips (50 mm width and 25 mm thick, two layers for a total thickness of 50 mm) of ‘Type GM-F’ gypsum and vermiculite plasterboards, coated with fiberglass, according to EN 520. The maximum size of the opening is 550 mm x 1050 mm.

B.2.3. Self-supporting sandwich panels wall

Walls with a minimum thickness of 100 mm and resistance to fire EI 120, made of self-supporting sandwich panels with rock wool insulation core of density 100 kg/m^3 faced at both sides with two corrugated galvanised steel sheets of thickness 0,5 mm. The sandwich panels have tongue and groove

joint and are fixed to each other with steel rivets Ø3,5 mm x 14 mm, and to the rigid floors with steel L-profiles and steel anchors.

The opening in the sandwich panels wall is closed with two layers of PANEL. The maximum size of the opening is 600 mm x 1000 mm.

B.2.4. Timber wall

Walls with a minimum thickness of 137 mm and resistance to fire EI 120, made of cross laminated timber boards (X-LAM panels according to ETA 12/0347 or equivalent in accordance with EN 1366-3).

A plate of dimensions 300 mm x 300 mm, made of 12,5 mm thick 'Type F' gypsum plasterboards according to EN 520, is installed with the service axis in the centre as a support for COLLUM fixing.

When an opening in the wall is closed with PANEL, two layers are installed levelled to the surface at both sides of the wall. A frame is installed around the opening, fixed to the wall timber boards with self-tapping steel screws Ø6 mm every 200 mm, made of strips (100 mm width and 12,5 mm thick) of 'Type F' gypsum plasterboards according to EN 520. The maximum size of the opening is 600 mm x 600 mm.

B.2.5. Rigid walls

B.2.5.1 Rigid wall of thickness 150 mm

Concrete or masonry walls with a minimum thickness of 150 mm, minimum density of 550 kg/m^3 and resistance to fire EI 180.

When an opening in the wall is closed with PANEL, two layers are installed levelled to the surface at both sides of the wall. The maximum size of the opening is 1800 mm x 650 mm.

B.2.5.2 Rigid wall of thickness 200 mm

Concrete or masonry walls with a minimum thickness of 200 mm, minimum density of 550 kg/m^3 and resistance to fire EI 240.

When an opening in the wall is closed with PANEL, three layers are installed with the external panels levelled to the surface at both sides of the wall. The maximum size of the opening is 600 mm x 250 mm.

B.3. Specification of the supporting floors

B.3.1. Rigid floors

B.3.1.1 Rigid floor of thickness 150 mm

Concrete or other type of rigid floors with a minimum thickness of 150 mm, minimum density of 1600 kg/m^3 and resistance to fire EI 180.

When an opening in the floor is closed with PANEL, two layers are installed levelled to the surface at both sides of the floor. The maximum size of the opening is 1000 mm x 500 mm. The maximum size can be enlarged up to 2000 mm x 1000 mm when supporting profiles are installed beneath the panels. Steel slotted profiles (30 mm width and 1 mm thick) placed under the panel's splices at maximum 500 mm, fixed to the floor at both profile's ends with expansion anchors Ø60 mm x 8 mm.

B.3.1.2 Rigid floor of thickness 200 mm

Concrete or other type of rigid floors (such as reinforced aerated concrete) with a minimum thickness of 200 mm, minimum density of 650 kg/m^3 and resistance to fire EI 240.

When an opening in the floor is closed with PANEL, three layers are installed with the external panels levelled to the surface at both sides of the floor. The maximum size of the opening is 1360 mm x 200 mm.

B.3.2. Timber floor

Floors with a minimum thickness of 158 mm and resistance to fire EI 120, made of cross laminated timber boards (X-LAM panels according to ETA 12/0347 or equivalent in accordance with EN 1366-3).

A plate of dimensions 300 mm x 300 mm, made of 12,5 mm thick 'Type F' gypsum plasterboards according to EN 520, is installed with the service axis in the centre as a support for COLLUM fixing.

When an opening in the floor is closed with PANEL, two layers of PANEL are installed levelled to the surface at both sides of the floor. A frame is installed around the opening, fixed to the floor timber boards with self-tapping steel screws Ø 5 mm approximately every 175 mm, made of strips (110 mm width and 12,5 mm thick) of 'Type F' gypsum plasterboards according to EN 520. The maximum size of the opening is 700 mm x 500 mm.

B.3.3. False ceiling

False ceiling with a minimum thickness of 50 mm (boards only) and resistance to fire EI 120 (a ← b), which comprise a steel frame lined at the bottom side with minimum two layers of 25 mm thick 'Type F' gypsum plasterboards according to EN 520.

For passing services with a diameter up to 200 mm, a plate made of 2 layers of 25 mm thick 'Type F' gypsum plasterboards according to EN 520 is installed with the service axis in the centre as a support for COLLUM fixing (Ø8 mm x 100 mm self-tapping steel screws). For passing services with a higher diameter, the plate is made of 3 layers of 25 mm thick 'Type F' gypsum plasterboards and COLLUM is fixed with Ø8 mm x 125 mm self-tapping steel screws.

When an opening in the false ceiling is closed with PANEL, a frame made of strips (50 mm width and 25 mm thick, two layers for a total thickness of 50 mm) of 'Type GM-F' gypsum plasterboards coated with fiberglass, according to EN 15283-1, is installed around the opening in the false ceiling, fixed to the gypsum plasterboards with self-tapping steel screws approximately every 100 mm. The opening is closed with two layers of PANEL. The maximum size of the opening is 400 mm x 250 mm.

ANNEX C. Product description and installation criteria

C.1. COLLUM description and components

COLLUM is available in different sizes and designs according to figures C.1 and C.2 and table C.1.

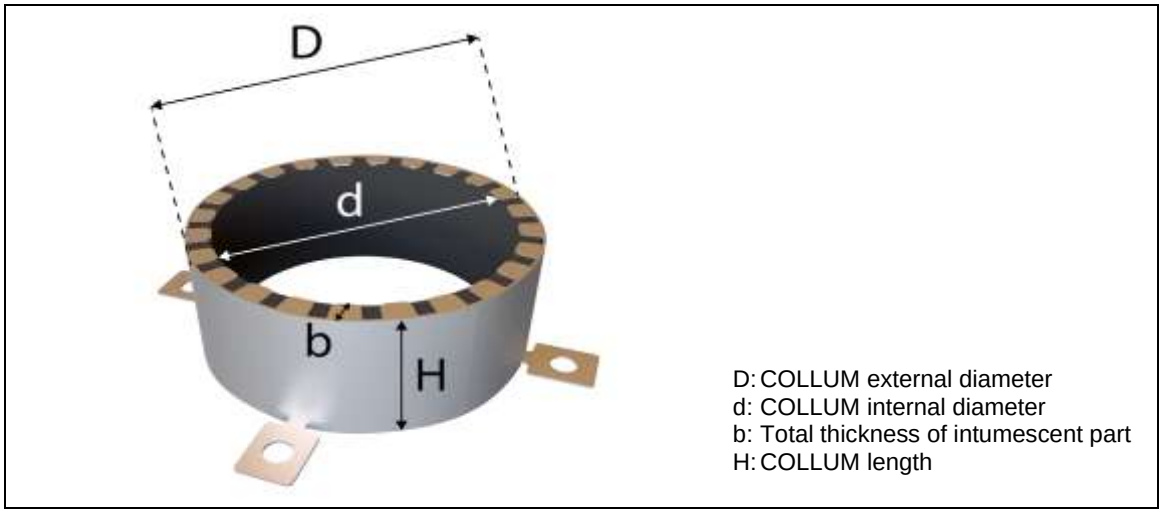


Figure C.1: Dimensions of COLLUM and COLLUM 3.

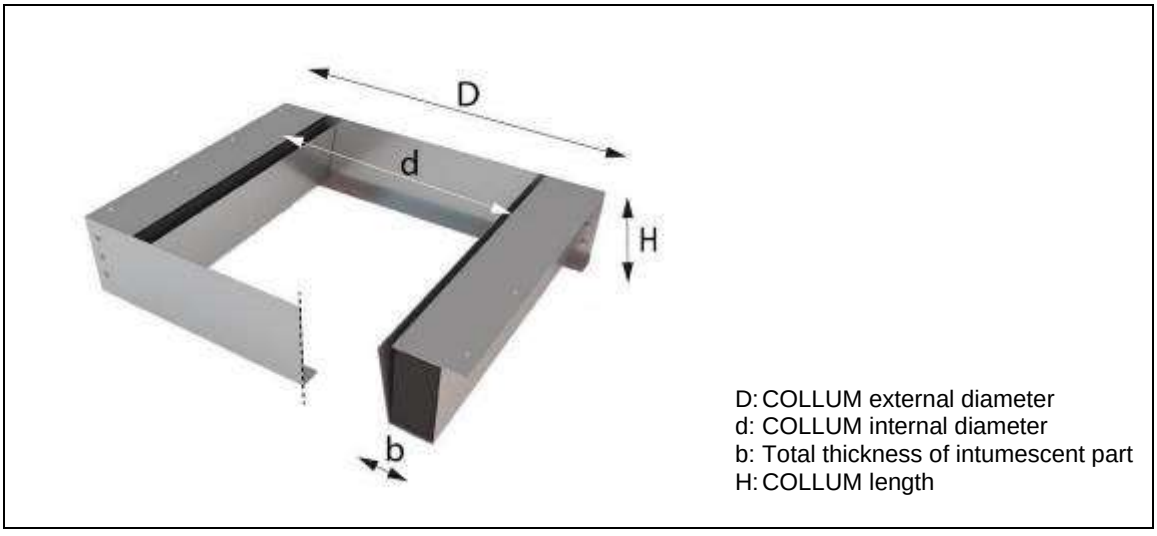


Figure C.2: COLLUM 400 to COLLUM 600.

Table C.1: Dimensions of COLLUM.

Type	d (mm)	D (mm)	H (mm)	b (mm)	Nº of strip layers	Nº of fixing flanges
COLLUM 30	35	52	50	8	2	4
COLLUM 3 30	35	52	30	8	2	4
COLLUM 40	45	62	50	8	2	4
COLLUM 3 40	45	62	30	8	2	4
COLLUM 50	55	72	50	8	2	4
COLLUM 3 50	55	72	30	8	2	4
COLLUM 63	68	85	50	8	2	4
COLLUM 3 63	68	85	30	8	2	4
COLLUM 80	85	102	50	8	2	4
COLLUM 3 80	85	118	30	16	4	4
COLLUM 90	95	112	50	8	2	4
COLLUM 3 90	95	128	30	16	4	4
COLLUM 100	105	122	50	8	2	4
COLLUM 3 100	105	138	30	16	4	4
COLLUM 110	115	132	50	8	2	4
COLLUM 3 110	115	148	30	16	4	4
COLLUM 125	130	155	50	12	3	5
COLLUM 140	145	170	50	12	3	5
COLLUM 160	165	190	50	12	3	5
COLLUM 180	185	227	100	20	5	5
COLLUM 200	210	252	100	20	5	5
COLLUM 250	260	302	100	20	5	5
COLLUM 315	325	375	100 / 200 [31]	24	6	5
COLLUM 400	420	536	157	56	14	8
COLLUM 500	510	764	157	72	18	8
COLLUM 600	650	946	207	96	24	8

For COLLUM 30 to COLLUM 315, as well as for COLLUM 3 30 to COLLUM 3 110, the steel housing which contains the intumescent part is provided with a hinge and toggle latch for collar closing, as well as flanges for fixing to the constructive element.

COLLUM 400 to COLLUM 600 have a boxed shape with the intumescent part contained in two lateral boxes, including flanges for fixing to the constructive element. The other two lateral parts to close the collar are composed by steel sheet (the four pieces are fixed together using M8 bolts and nuts).

[31] Applications with COLLUM 315 with H = 100 mm are specified in Annex A.

COLLUM is made of the components described in table C.2. Three different thicknesses of the steel sheet housing are used depending on the collar size. The intumescent strip is manufactured at a nominal thickness of 4 mm and the total intumescent thickness of every collar size (b in table C.1) is achieved by adding the required number of intumescent strip layers. The intumescent strip is manufactured at different widths according to the specified collar length (H in table C.1).

Table C.2: Components of COLLUM.

Part	Material	Dimensions		
Housing	Stainless steel AISI 430 (1.4016) According to EN 10088-1	Sheet thickness	COLLUM 30 to COLLUM 160 COLLUM 3 30 to COLLUM 3 110	0,6 mm
			COLLUM 200 to COLLUM 315	0,8 mm
			COLLUM 400 to COLLUM 600	2,0 mm
		Other dimensions according to table C.1		
Inlay strip	Intumescent material	Thickness	All sizes of COLLUM and COLLUM 3	4 mm
		Width (H in table C.1)	COLLUM 3	30 mm
			COLLUM 30 to COLLUM 160	50 mm
			COLLUM 180 to COLLUM 250	100 mm
			COLLUM 315	100 mm 200 mm
			COLLUM 400 and COLLUM 500	150 mm
			COLLUM 600	200 mm

C.2. Installation of COLLUM

C.2.1. General

COLLUM will be installed in accordance with the manufacturer instructions, which shall conform to the assessment carried out, and the provisions established in this section and in Annex A.

COLLUM size will be selected from table C.1 to closely fit around the service external diameter (including the insulation, when appropriate), with a maximum annular gap of 5 mm.

In walls, COLLUM can be installed at both sides of the constructive element or only at the fire exposed side, as specified in Annex A. In floors, COLLUM is installed at the bottom side.

COLLUM (except COLLUM 400 to COLLUM 600, see below) shall be fixed to the constructive element as follows:

- In flexible walls, lining walls, timber walls and timber floors, by means of self-tapping galvanised steel screws of Ø8 mm and length depending on the wall thickness and collar size, according to the manufacturer's instructions.
- In sandwich panels walls, COLLUM is only assessed when installed on PANEL closing solution, fixed with Ø6 mm passing threaded steel bars, closed with nuts and washers.

- In rigid walls and rigid floors, by means of Ø8 mm x 60 mm galvanised steel class 8.8 expansion anchors.

COLLUM 400 to COLLUM 600 shall be fixed to the constructive element as follows:

- In flexible and rigid walls, by means of Ø8 mm steel threated bars passing the constructive element and held with nuts, with a perforated steel plate of minimum 1 mm thickness placed at the non-exposed side to distribute the load of the nuts.
- In floors, at the bottom side by means of Ø8 mm x 60 mm galvanised steel class 8.8 expansion anchors.

The number of fixings will be in accordance with table C.1.

All gaps between penetrations and constructive elements will not be greater than 5 mm and shall be filled in with mortar (floors and rigid walls) or gypsum paste (flexible walls), also spread over the constructive element surface around the collar base.

The minimum distance between services is generally 100 mm, except if otherwise specified in the manufacturer's instructions based on specific test results.

The maximum distance from the constructive element to the adequate service support is 500 mm in case of walls (cold side) and floors (upper side).

The following installation provisions will be noted:

- The installation of the penetration seal will not have an effect on the stability of the adjacent building element, even in the event of fire.
- The structural elements related to the wall/floor in which the penetration seal is incorporated will be designed and fire protected in such a way that no additional mechanical load is imposed on the penetration seal.
- The thermal movements of the pipework will be accommodated in such a way that no resulting load is imposed on the penetration seal.
- The services are fixed to the building element in such a way that no additional mechanical load is imposed on the penetration seal in the event of fire.
- The support of the services is maintained during the required period of resistance to fire.
- Pneumatic dispatch systems, compressed air systems, etc. are switched off in the event of fire.

C.2.2. COLLUM installation on PANEL

PANEL closing solution will be installed in the constructive element in accordance with the provisions given in ETA 24/1206, section A.2, and the manufacturer's instructions.

The maximum size of the opening shut with PANEL is given in sections B.2 and B.3 of this ETA in relation to the supporting construction. In the case of walls, the given maximum size can be increased up to either 25 % in height or 25 % in width or 25 % in area according to table A.3 in EN 15882-3 [32]. If a blank seal (opening shut with PANEL without passing services) is installed, splices within the seal area have not been assessed.

The minimum distance from services to the edge of PANEL closure area, as well as the minimum distance between passing services, is generally 100 mm, except if otherwise specified in the manufacturer's instructions based on specific test results.

When COLLUM is installed on PANEL closing solution in walls, it is fixed with steel wires of minimum diameter 1 mm from the collar flanges to the wall, where the wires are fixed by the means described in section C.2.1 depending on the type of constructive element. The minimum number of wires to fix the collar shall be in accordance with the number of fixings given in table C.1. In the case of PANEL closing solution in a sandwich panels wall, COLLUM is fixed at the flanges with Ø6 mm passing threaded steel bars, closed with nuts and washers. See figure C.3.

When COLLUM is installed on PANEL closing solution in floors, it is held at the bottom side with steel wires of minimum diameter 1 mm from the collar flanges, passing through PANEL and fixed to a protected supporting structure at the upper side of the floor. Alternatively, COLLUM can be fixed to PANEL with steel spiral pigtail screws of diameter 8 mm and length 160 mm, in those cases specified in Annex A. See figure C.3.

SEAL W [33] acrylic sealant is applied at an approximate dry thickness of 2 mm over the fire exposed surface of PANEL, completely covering the steel wires and their fixing to the constructive element.

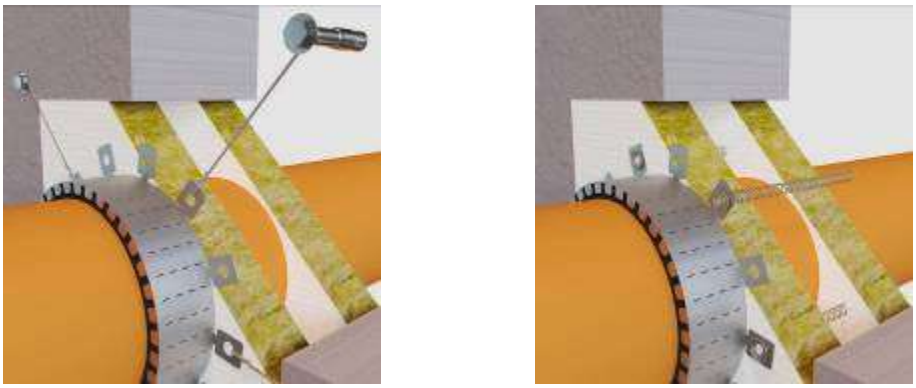


Figure C.3: Fixing methods on PANEL – steel wires (left) and pigtail screws (right).

[32] EN 15882-3 Extended applications of results from fire resistance tests for service installations. Part 3: Penetration seals.

[33] See specification of SEAL W in Annex C, table C3.

C.2.3. COLLUM installation on MASS

MASS closing solution will be installed in the constructive element in accordance with the provisions given in ETA 24/1205, section A.2, and the manufacturer's instructions.

MASS is placed inside the opening in the constructive element, orienting the brick side of 150 mm parallel to the thickness of the support, up to the complete obstruction of the opening. Small gaps between services and MASS can be filled with GRAPHIT FOAM, particularly if they are greater than 5 mm.

The maximum seal size of the MASS closing solution will be 0,6 m^2. If a blank seal (opening shut with MASS without passing services) is installed, a reinforcement net made of 1 mm diameter steel cable is installed at the fire exposed side of the constructive element, supporting the MASS blank seal (see ETA 24/1205, section A.2.2 for rigid and flexible walls and section A.2.3 for rigid floors). In the case of floors, a reinforcement net of 1 mm diameter steel cable is always installed below the seal in openings bigger than 0,4 m^2, also when services pass through (see ETA 24/1205, section A.2.3).

The minimum distance from services to the edge of MASS closure area, as well as the minimum distance between passing services, is generally 100 mm, except if otherwise specified in the manufacturer's instructions based on specific test results.

When COLLUM is installed on MASS closing solution in walls, it is fixed with steel wires of minimum diameter 1 mm from the collar flanges to the wall, where the wires are fixed by the means described in section C.2.1 depending on the type of constructive element. The minimum number of wires to fix the collar shall be in accordance with the number of fixings given in table C.1.

When COLLUM is installed on MASS closing solution in floors, it is held at the bottom side with steel wires of minimum diameter 1 mm from the collar flanges to the floor, where the wires are fixed by means of Ø8 mm x 60 mm galvanised steel expansion anchors.

C.3. Additional components of the fire penetration seal

The additional components, generically referred to in Annex A, shall meet the following specification.

Table C.3: Specification of the fire penetration seal additional components.

Component	Specification
Steel pipes	The steel pipes will be made of steel with a minimum melting point of 1450 ºC and a maximum thermal conductivity of 52 W/(m·K).
Insulation material for pipes (unless otherwise specified in Annex A)	Foamed elastomeric insulation material: • Continuous insulation. • Reaction to fire: from B_L-s1,d0 to D_L-s3,d0. • Maximum thermal conductivity (23 ºC): λ ≤ 0,043 W/(m·K). • Fixed around the pipe with a steel wire of diameter 1 mm.
Small-sheathed cables	Cables type group 1 according to Annex A of EN 1366-3: • Cables type A1 model "5×1,5 mm^2 Cl 1 PVC/PVC 600/1000V NYYJ". • Cables type A2 model "5×1,5 mm^2 Cl 5 Cu EPR/PCP 450/750V H07RN-F". • Cables type A3 model "5×1,5 mm^2 Cl 1 Cu XLPE/LSZH 600/1000V N2XH-J". • Cables type B model "1×95 mm^2 Cl 2 PVC/PVC 600/1000V NYY0".

Table C.3: Specification of the fire penetration seal additional components.

Component	Specification
Pigtail screws	PAROC XFS 001 spring screws made of galvanised steel. Length: 160 mm / Diameter: 8 mm.
PANEL	PANEL is CE marked based on ETA 24/1206, with which the product and installation conditions of PANEL shall conform.
MASS	MASS is CE marked based on ETA 24/1205, with which the product and installation conditions of MASS shall conform.
SEAL W	SEAL W is CE marked based on ETA 24/1207, with which the product and installation conditions of SEAL W shall conform.