INSTYTUT TECHNIKI BUDOWLANEJ

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European Technical Assessment

ETA-17/1063 of 08/11/2023

General Part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	Piro Collar PC
Product family to which the construction product belongs	Fire Stopping and Fire Sealing Products. Penetration Seals
Manufacturer	PIROSYSTEM Sp. z o.o. ul. Ogrodnicza 3A PL 83-021 Wiślina, Poland
Manufacturing plant	Manufacturing plant no 3
This European Technical Assessment contains	121 pages including 4 Annexes which form an integral part of this Assessment
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	European Assessment Document (EAD) 350454-00-1104 “Fire Stopping and Fire Sealing Products. Penetration Seals”
This version replaces	ETA-17/1063 issued on 06/04/2023

This European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Specific Part

1 Technical description of the product

Piro Collar PC is a collar pipe closure device used to form penetration seals where cables, combustible pipes and metal pipes penetrate walls and floors.

Piro Collar PC includes one or more layers of an intumescent liner, graphite based, inserted into a uniform or multi-segment stainless steel case.

Intumescent material is graphite intumescent gasket. In collars with diameter above the 160 mm, the intumescent material in the collars is additionally protected by the woven cotton mesh.

Collars are fixed on the both sides of the penetration in wall and on the bottom of the penetration in floor by means of symmetrically placed steel dowels M6x60 or M8x80 in accordance with Table A1.

The dimensions of steel casing of the Piro Collar PC depend of its diameters:

- width 30 mm for a collar with an inside diameter of 25 mm to 160 mm,
- width 60 mm for collar with an inside diameter of 25 mm to 200 mm,
- width 180 mm for collar with an inside diameter of 200 mm to 400 mm.

The steel casing Piro Collars PC for intumescent material thickness of the 30 mm and 60 mm are made in the same way but the width of the steel casing is correspondingly reduced.

The collar is supplied in assembled form or in form to assemble during mounting, without fixing dowels. If necessary, the intumescent liner and steel case may be cut to a required length, equal or greater than external circumference of the pipe (including insulation, if it is required). The collar is fixed to the separating element with the specified type and number of fixing dowels, given in Annex A.

Auxiliary products used with Piro Collar PC to form single penetration seals are:

- synthetic, flexible elastomeric foam (FEF) in accordance with EN 14304 with reaction to fire class B_L-s3, d0 according to EN 13501-1, and with density of 45 – 70 kg/m^3,
- PE acoustic mat type Weberfloor 4955 db of nominal weight of 12 kg / 30 m^2,
- Piro Multitube PM in accordance with ETA-17/1061.

2 Specification of the intended use in accordance with the applicable European Assessment Document (EAD)

2.1 Intended use

The intended use of Piro Collar PC is to reinstate the fire resistance performance of flexible wall, rigid wall or rigid floor constructions, where they are penetrated by combustible pipes (with insulation or not), insulated metal pipes (single or in bundles) or cables.

The specific elements of construction that Piro Collar PC may be used to provide a penetration seal in, are as follows:

Rigid walls:	The wall must have a minimum thickness of 100 or 125 mm (for details see Annex B) and comprise concrete, reinforced concrete, aerated concrete, ceramic brick, cavity brick or checker brick, with a minimum density of 600 kg/m^3.
Flexible walls:	The wall must have a minimum thickness of 125 mm and comprise timber or steel studs lined on both faces with minimum two layers (with overall board layer thickness on one side equal to or greater than 25 mm) of ‘Type F’ or ‘Type DF’ gypsum plasterboards according to EN 520. 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.

Rigid floors: The floor must have a minimum thickness of 150 mm and comprise concrete, reinforced concrete, with a minimum density of 1700 kg/m³.

The supporting construction shall be classified in accordance with EN 13501-2 for the required fire resistance period (equal to or greater than specified in Annex B).

Piro Collar PC may be used to provide a penetration seal with specific combustible pipes, metal pipes and cables (according to Annexes A to D).

Construction details of penetration seals are provided in Annex C. Additional provisions are given in Annex A.

The provisions made in this European Technical Assessment are based on an assumed working life of the product of 10 years, when installed in the works, provided that the penetration seal is subject to appropriate installation, in accordance with the manufacturer's recommendations. The indications given on the working life cannot be interpreted as a guarantee given by the producer or the Technical Assessment Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

2.2 Use category

Type Z_2: intended for use in internal conditions with humidity lower than 85% RH, excluding temperatures below 0°C, without exposure to rain or UV.

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

3.1 Performance of the product

3.1.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	B-s2, d0
Resistance to fire	Annex B

3.1.2 Hygiene, health and the environment (BWR 3)

No performance assessed.

3.1.3 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Mechanical resistance and stability	no performance assessed
Resistance to impact / movement	no performance assessed
Adhesion	no performance assessed
Durability	Use category: Type Z_2

3.1.4 Protection against noise (BWR 5)

No performance assessed.

3.1.5 Energy economy and heat retention (BWR 6)

No performance assessed.

3.2 Methods used for the assessment

The assessment has been made in accordance with EAD 350454-00-1104.

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, as amended by Decision 2001/596/EC of the European Commission, the system 1 of assessment and verification of constancy of performance applies (see Annex V to regulation (EU) No 305/2011).

5 Technical details necessary for the implementation of the AVCP system, as provided in the applicable European Assessment Document (EAD)

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited in Instytut Techniki Budowlanej.

For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

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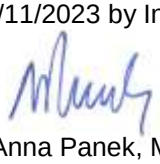

Anna Panek, MSc
Deputy Director of ITB

Additional provisions

- Piro Collar PC shall be fixed to the wall or to the floor by means of symmetrically placed steel dowels (M6x60 or M8x80). Minimal number and type of fixing dowels is given in Table A1.

Table A1.

Pipe diameter or pipe with insulation diameter [mm]	Number of fixing dowels (minimum)	Fixing dowels dimensions
25, 32, 40, 48	2	M6x60
55, 68, 82, 90	3	M6x60
110, 125	4	M8x80
135	5	M8x80
160	6	M8x80
200	7	M8x80
250	8	M8x80
315	10	M8x80
350	11	M8x80
400	13	M8x80

- Classifications given in Annex B are valid for specific pipes made of:
  - PVC-U according to EN 1329-1, EN 1453-1 or EN 1452-1,
  - PVC-C according to EN 1566-1,
  - PE according to EN 12201-2, EN 1519-1 and EN 12666-1,
  - PE-HD according to EN 1519-1 or EN 12666-1,
  - PP according to EN 1451-1,
  - ABS according to EN 1455-1,
  - SAN + PVC according to EN 1565-1,
  - PE-X according to EN ISO 21003-1, EN ISO 21003-2 and EN ISO 21003-3,
  - PE-RT according to EN ISO 23391-2,
  - PP-R according to EN ISO 15874-2,
  - PP-R/AL/PP-R according to EN ISO 23391-2,
  - PP-R STABI AL according to EN ISO 21003-2 and EN ISO 21003-2,
  - PP-R/GF/PP-R according to EN ISO 15874,
  - PP-R/PP-R+GF/PP-R according to EN ISO 15874,
  - PE-RT/AL/PE-RT according to EN ISO 21003,
  - Syncopex C.O. PN6/95 C, C.W. PN10/70C according to PN EN 448,
  - PP - Wavin Wafix of Wavin company,
  - PP - Wavin SiTech+ of Wavin company,
  - PP - Wavin AS+ of Wavin company,

  in accordance with tables in Annex B.

- Classifications given in Annex B6 is valid for cable A1 according to EN 1366-3.

- Classifications given in Annex B for steel and copper pipes are also valid for other metal pipes with:
  - thermal conductivity lower than respectively steel or copper, and
  - melting point at least equal to respectively steel or copper, and greater than:
    - 739 °C for the fire resistance class EI 15 and E 15,
    - 782 °C for the fire resistance class EI 20 and E 20,
    - 843 °C for the fire resistance class EI 30 and E 30,
    - 903 °C for the fire resistance class EI 45 and E 45,
    - 946 °C for the fire resistance class EI 60 and E 60,

- 1006 °C for the fire resistance class EI 90 and E 90,
- 1049 °C for the fire resistance class EI 120 and E 120.

- The minimum distance between the penetration seals (between adjacent collars) in supporting construction shall be:
  - not restricted – in case of plastic pipes (according to Annexes B1 to B7), plastic pipes in bundles (according to Annexes B11, B14 and B15) and metal pipes (according to Annexes B1 and B4, excluding copper pipes of maximum diameter 50 mm with FEF insulation thickness 32 mm),
  - 20 mm – in case of plastic pipe of maximum diameter 110 mm (according to Annexes B8 to B20),
  - 40 mm – in case of plastic pipe of diameter greater than 110 mm (according to Annexes B8 to B20) and copper pipes of maximum diameter 50 mm with FEF insulation thickness 32 mm (according to Annex B4).

- Distance from the surface of separating element to the first place of pipes support is max. 370 mm.

- Classifications given in Annex B for insulated pipes is valid for pipes with sustained and continued insulation made of flexible elastomeric foam (FEF) (for details see clause 1 of ETA) and does not cover locally insulated or non-insulated pipes. The thickness, density and reaction to fire class of insulation shall remain in accordance with ETA provisions.

- Classifications given in Annex B for insulated pipes is valid for pipes with local insulation made of PE acoustic mat (for details see clause 1 of ETA) and does not cover non-insulated pipes. The thickness, density and reaction to fire class of insulation shall remain in accordance with ETA provisions.

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Annex B – Resistance to fire classification:

Annex C – Construction details:

Table B1. Resistance to fire classification of metal and plastic pipes with flexible elastomeric foam (FEF) insulation penetration seals in flexible or rigid wall, made in accordance with Annex A and Annex C1

Pipe material	Pipe diameter [mm]	FEF insulation thickness [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
Copper	D ≤ 22	10	≥ 1,0	60	2,5	**EI 120-C/U EI 120-C/C**
				30	5,0	
	D ≤ 54	35	1,5 – 14,2	60	9,5	
				30	19,0	
	D ≤ 76	40	Fig. D1	60	17,0	
			Fig. D44	30	34,0	
	D ≤ 108	40	Fig. D1	180	18,0	
Steel	D ≤ 57,9	25	5,2 – 14,2	60	6,0	**EI 120-C/U EI 120-C/C**
				30	12,0	
	D ≤ 88,9	32	Fig. D2	60	Fig. D3	
			Fig. D45	30	Fig. D46	
	D ≤ 159	20	7,5 – 14,2	180	18,0	
PVC-U, PVC-C	D ≤ 40	13	1,9	60	6,0	**EI 120-U/C EI 120-C/C**
				30	12,0	
	D ≤ 110	25	3,2	60	17,0	
				30	34,0	
	D ≤ 140	27	4,0	180	18,0	
	D ≤ 200	25	4,9	180	24,5	
Wall thickness ≥ 125 mm						

Table B2. Resistance to fire classification of plastic pipes penetration seals in rigid wall, made in accordance with Annex A and Annex C2

Pipe material	Wall thickness [mm]	Pipe diameter [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
PE-HD, PE, ABS, SAN+PVC	100 – 125	D ≤ 50	1,8 – 2,4	60	4,0	**EI 120-U/C EI 120-C/C**
				30	8,0	
		50 < D ≤ 160	Fig. D4	60	Fig. D5	
			Fig. D47	30	Fig. D48	
	≥ 125	D ≤ 40	1,8 – 2,4	60	4,0	
				30	8,0	
			2,5	60	2,5	
				30	5,0	
		40 < D ≤ 50	1,8 – 2,4	60	4,0	
				30	8,0	
		50 < D ≤ 160	Fig. D6	60	Fig. D7	
			Fig. D49	30	Fig. D50	
		160 < D ≤ 200	Fig. D6	180	18,0	
PP	100 – 125	D ≤ 40	1,8 – 2,6	60	2,5	**EI 120-U/C EI 120-C/C**
				30	5,0	
		40 < D ≤ 160	Fig. D10	60	Fig. D11	
			Fig. D53	30	Fig. D54	
	≥ 125	D ≤ 40	1,8 – 2,6	60	2,5	
				30	5,0	
		40 < D ≤ 160	Fig. D12	60	Fig. D8	
			Fig. D55	30	Fig. D51	
		160 < D ≤ 200	Fig. D12	180	18,0	
PVC-U, PVC-C	100 – 125	D ≤ 50	1,8 – 3,0	60	4,0	**EI 120-U/C EI 120-C/C**
				30	8,0	
		50 < D ≤ 160	Fig. D14	60	Fig. D5	
			Fig. D57	30	Fig. D48	
	≥ 125	D ≤ 40	1,8	60	4,0	
				30	8,0	
			1,9	60	2,5	
				30	5,0	
			2,0 – 3,0	60	4,0	
				30	8,0	

Piro Collar PC	**Annex B2** of European Technical Assessment ETA-17/1063
Penetration seals made with use of Piro Collar PC Plastic pipes penetration seals in rigid wall	

Table B2. Resistance to fire classification of plastic pipes penetration seals in rigid wall, made in accordance with Annex A and Annex C2 (continued)

Pipe material	Wall thickness [mm]	Pipe diameter [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
PVC-U, PVC-C	≥ 125	40 < D ≤ 50	1,8 – 3,0	60	4,0	**EI 120-U/C EI 120-C/C**
				30	8,0	
		50 < D ≤ 160	Fig. D15	60	Fig. D7	
			Fig. D58	30	Fig. D50	
		50 < D ≤ 200	Fig. D15	180	18,0	

Table B3. Resistance to fire classification of plastic pipes penetration seals in flexible wall, made in accordance with Annex A and Annex C3

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
PE-HD, PE, ABS, SAN+PVC	D ≤ 40	2,4	60	2,5	**EI 120-U/C EI 120-C/C**
			30	5,0	
	D ≤ 110	6,6	60	Fig. D8	
			30	Fig. D51	
	D ≤ 140	8,3	60	Fig. D9	**EI 90 / E 120-U/C EI 90 / E 120-C/C**
			30	Fig. D52	
	D ≤ 160	9,5	60	Fig. D8	**EI 120-U/C EI 120-C/C**
			30	Fig. D51	
	D ≤ 200	11,9	180	18,0	
PP	D ≤ 40	1,8	60	2,5	**EI 120-U/C EI 120-C/C**
			30	5,0	
	40 < D ≤ 160	Fig. D13	60	Fig. D8	
		Fig. D56	30	Fig. D51	
		Fig. D13	60	Fig. D9	**EI 90 / E 120-U/C EI 90 / E 120-C/C**
		Fig. D56	30	Fig. D52	
	110 < D ≤ 200	Fig. D13	180	18,0	**EI 120-U/C EI 120-C/C**
PVC-U, PVC-C	D ≤ 40	1,9	60	2,5	**EI 120-U/C EI 120-C/C**
			30	5,0	
	40 < D ≤ 160	Fig. D16	60	Fig. D17	
		Fig. D59	30	Fig. D60	
	40 < D ≤ 200	Fig. D16	180	18,0	
Wall thickness ≥ 125 mm					

Table B4. Resistance to fire classification of metal and plastic pipes with flexible elastomeric foam (FEF) insulation penetration seals in rigid floor, made in accordance with Annex A and Annex C4

Pipe material	Pipe diameter [mm]	FEF insulation thickness [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
Copper	D ≤ 10	10	≥ 0,9	60	2,5	**EI 120-C/U EI 120-C/C**
				30	5,0	
	D ≤ 50 [1)]	32	1,2 – 14,2	60	6,5	**EI 60-C/U EI 60-C/C**
				30	13,0	
	D ≤ 54	40	1,5 – 14,2	60	9,5	**EI 120-C/U EI 120-C/C**
				30	19,0	
	D ≤ 76	40	1,7 – 14,2	60	17,0	**EI 90-C/U EI 90-C/C**
				30	34,0	
		25	2,5 – 14,2	60	9,5	**EI 120-C/U EI 120-C/C**
				30	19,0	
	D ≤ 108	50	1,5 – 14,2	180	18,0	**EI 120-C/U EI 120-C/C**
Steel	D ≤ 17,2	10	Fig. D18	60	2,5	**EI 120-C/U EI 120-C/C**
			Fig. D61	30	5,0	
	D ≤ 57,9	25	3,6 – 14,2	60	9,5	
				30	19,0	
	D ≤ 88,9	32	3,2 – 14,2	60	17,0	
				30	34,0	
	D ≤ 159	19	4,5 – 14,2	180	18,0	
	D ≤ 219,3	50	Fig. D19	180	Fig. D20	
	108 < D ≤ 219,3	50	Fig. D19	180	Fig. D20	**EI 90 / E 120-C/U EI 90 / E 120-C/C**
PVC-U, PVC-C	D ≤ 40	13 – 20	1,6	60	6,0	**EI 120-U/C EI 120-C/C**
				30	12,0	
	D ≤ 110	25	3,25 – 3,4	60	17,0	
				30	34,0	
	D ≤ 140	25	6,0	180	18,0	
	D ≤ 200	25	6,5	180	28,5	
PP	D ≤ 81	13	4,5	60	6,0	**EI 120-U/C EI 120-C/C**
				30	12,0	

[1)] The minimum distance between the penetration seals (between adjacent collars) in supporting construction shall be 40 mm (according to Annex A)

Floor thickness ≥ 150 mm

Table B4. Resistance to fire classification of metal and plastic pipes with flexible elastomeric foam (FEF) insulation penetration seals in rigid floor, made in accordance with Annex A and Annex C4 (continued)

Pipe material	Pipe diameter [mm]	FEF insulation thickness [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
PE-RT	D ≤ 50	12	4,5	60	6,5	**EI 180-U/C EI 180-C/C**
				30	13,0	
		13 – 50	4,5	60	16,0	**EI 90-U/C EI 90-C/C**
				30	32,0	
PP-R STABI AL	D ≤ 42	40	8,5	60	16,0	**EI 180-U/C EI 180-C/C**
				30	32,0	
	D ≤ 110	32	18,3	60	16,0	
				30	32,0	
PP-R/ GF/PP-R	D ≤ 75	32	10,3 – 18,3	60	12,0	**EI 180-U/C EI 180-C/C**
				30	24,0	
	75 < D ≤ 110	32	18,3	60	16,0	
				30	32,0	
Floor thickness ≥ 150 mm						

Table B5. Resistance to fire classification of plastic pipes penetration seals in rigid floor, made in accordance with Annex A and Annex C5

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
PE-HD, PE, ABS, SAN+PVC	D ≤ 40	2,7	60	2,5	**EI 120-U/C EI 120-C/C**
			30	5,0	
	D ≤ 110	7,0	60	Fig. D8	
			30	Fig. D51	
	D ≤ 160	10,0	60	Fig. D8	
			30	Fig. D51	
	D ≤ 200	11,9	180	18,0	
PP	D ≤ 40	6,7	60	2,5	**EI 120-U/C EI 120-C/C**
			30	5,0	
	40 < D ≤ 160	Fig. D21	60	Fig. D17	
		Fig. D62	30	Fig. D30	
	110 < D ≤ 200	Fig. D21	180	18,0	
	40 < D ≤ 355	Fig. D21	180	Fig. D22	**EI 60-U/C EI 60-C/C**
PVC-U, PVC-C	D ≤ 40	1,6	60	2,5	**EI 120-U/C EI 120-C/C**
			30	5,0	
	40 < D ≤ 160	Fig. D23	60	Fig. D24	
		Fig. D63	30	Fig. D67	
	40 < D ≤ 400	Fig. D23	180	Fig. D25	
PP-R STABI AL	D ≤ 110	18,3	60	12,0	**EI 180-U/C EI 180-C/C**
			30	24,0	
PP-R/ GF/PP-R	D ≤ 20	3,2	60	4,0	**EI 180-U/C EI 180-C/C**
			30	8,0	
		3,3 – 18,3	60	4,0	**EI 120 / E 180-U/C EI 120 / E 180-C/C**
			30	8,0	
	20 < D ≤ 110	18,3	60	Fig. D31	
			30	Fig. D70	
PE-X	D ≤ 50	4,5	60	4,0	**EI 120 / E 180-U/C EI 120 / E 180-C/C**
			30	8,0	
Floor thickness ≥ 150 mm					

Table B6. Resistance to fire classification of plastic pipes with cables type A1 inside penetration seals in rigid floor, made in accordance with Annex A and Annex C6

Pipe material	Pipe diameter [mm]	Max number of cables type A1 inside the pipe	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
PVC-U / PVC-C pipes with cables type A1 inside	D ≤ 40	3	1,6	60	2,5	**EI 120-U/C EI 120-C/C**
				30	5,0	
	D ≤ 110	10	3,4	60	Fig. D26	
				30	Fig. D65	
	D ≤ 160	10	6,2	60	Fig. D26	
				30	Fig. D65	
Floor thickness ≥ 150 mm						

Table B7. Resistance to fire classification of plastic pipes with PP inside penetration seals in rigid floor, made in accordance with Annex A and Annex C7

Pipe material	Pipe diameter [mm]	Max number of pipes inside the pipes x max diameter of PP pipes [mm] x PP pipes wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
PVC-U / PVC-C pipes with PP pipes inside	D ≤ 40	3 x 16 x 0,8	60	2,5	**EI 120-U/C EI 120-C/C**
			30	5,0	
	D ≤ 160	70 x 16 x 0,8	60	Fig. D24	
			30	Fig. D64	
Floor thickness ≥ 150 mm					

Table B8. Resistance to fire classification of plastic pipes with PE acoustic mat insulation penetration seals in rigid floor, made in accordance with Annex A and Annex C8

Pipe material	Pipe diameter [mm]	PP insulation thickness [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
PE-HD, PE, ABS, SAN+PVC	D ≤ 110	3	4,5 – 7,8	60	6,5	**EI 180-U/C EI 180-C/C**
				30	13,0	
	110 < D ≤ 200	6	Fig. D27	60	Fig. D30	**EI 90-U/C EI 90-C/C**
			Fig. D66	30	Fig. D69	
PP	D ≤ 110	3	2,7	60	6,5	**EI 120 / E 180-U/C EI 120 / E 180-C/C**
				30	13,0	
		3	2,8 – 5,4	60	6,5	**EI 90 / E 180-U/C EI 90 / E 180-C/C**
				30	13,0	
	110 < D ≤ 200	3	Fig. D28	60	Fig. D30	**EI 45-U/C EI 45-C/C**
			Fig. D67	30	Fig. D69	
PVC-U, PVC-C	D ≤ 110	3	3,2 – 6,4	60	6,5	**EI 180-U/C EI 180-C/C**
				30	13,0	
	110 < D ≤ 200	6	Fig. D29	60	Fig. D30	**EI 120 / E 180-U/C EI 120 / E 180-C/C**
			Fig. D68	30	Fig. D69	
PP-R	D ≤ 32	3	5,0	60	4,0	**EI 180-U/C EI 180-C/C**
				30	8,0	
PP-R STABI AL	D ≤ 42	3	8,5	60	4,0	**EI 180-U/C EI 180-C/C**
				30	8,0	
PP-R/ PP-R+GF/PP-R	D ≤ 63	3	8,6	60	4,0	**EI 180-U/C EI 180-C/C**
				30	8,0	
Floor thickness ≥ 150 mm						

Table B9. Resistance to fire classification of plastic pipes with pipe elbow 87,5° penetration seals in rigid floor, made in accordance with Annex A and Annex C9

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
PP	D ≤ 110 [1)]	3,2	60	6,5	**EI 180-U/C EI 180-C/C**
			30	13,0	
PVC-U, PVC-C	D ≤ 110 [1)]	2,2	60	6,5	**EI 180-U/C EI 180-C/C**
			30	13,0	
PVC-U, PVC-C	D ≤ 110 [2)]	4,2	60	6,5	**EI 180-U/C EI 180-C/C**
			30	13,0	
Floor thickness ≥ 150 mm					

[1)] Diameter of pipe elbow is 130 mm for pipe with diameter of 110 mm and for smaller pipes shall be proportionally reduced, the pipe wall thickness of the pipe elbow is 3,2 mm
[2)] Diameter of pipe elbow is 136 mm for pipe with diameter of 110 mm and for smaller pipes shall be proportionally reduced, the pipe wall thickness of the pipe elbow is 4,2 mm

Table B10. Resistance to fire classification of plastic pipes with pipe elbow 67,5° penetration seals in rigid floor, made in accordance with Annex A and Annex C10

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
PVC-U, PVC-C	D ≤ 110 [1)]	3,2	60	6,5	**EI 180-U/C EI 180-C/C**
			30	13,0	
		3,3 – 4,0	60	6,5	**EI 120-U/C EI 120-C/C**
			30	13,0	
PVC-U, PVC-C	110 < D ≤ 160 [2)]	4,0	60	Fig. D32	**EI 120-U/C EI 120-C/C**
			30	Fig. D71	
Floor thickness ≥ 150 mm					

[1)] Diameter of pipe elbow is 130 mm for pipe with diameter of 110 mm and for smaller pipes shall be proportionally reduced, the pipe wall thickness of the pipe elbow is 3,2 mm

[2)] Diameter of pipe elbow is 187 mm for pipe with diameter of 110 mm and for smaller pipes shall be proportionally reduced, the pipe wall thickness of the pipe elbow is 6,4 mm

Table B11. Resistance to fire classification of plastic pipes bundles (max 3 pipes in bundle) penetration seals in rigid floor, made in accordance with Annex A and Annex C11

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
PP	D ≤ 75	1,8	60	6,5	**EI 180-U/C EI 180-C/C**
			30	13,0	
Floor thickness ≥ 150 mm					

Table B12. Resistance to fire classification of quadruple heating pipes penetration seals in rigid floor, made in accordance with Annex A and Annex C12

a) Quadruple heating pipe type Syncopex C.O. PN6/95 C,C.W. PN10/70C - PE-X pipes with following dimensions: 50 x 3,0 mm, 32 x 2,5 mm, 20 x 2,1 mm and 50 x 5,0 mm (max. diameter x constant pipe wall thickness)
b) PE insulation thickness of 32 mm placed in corrugated pipe made of PE-HD diameter of max. 160 mm and pipe wall thickness of 0,5 mm
c) Piro Multitube PM (according to ETA-17/1061) dimensions of 9,6 x 100 mm (thickness x width)
d) Intumescent material dimensions of 16,0 x 60 mm (thickness x width)

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

Piro Collar PC	**Annex B12** of European Technical Assessment ETA-17/1063
Penetration seals made with use of Piro Collar PC Quadruple heating pipes penetration seals in rigid floor	

Table B13. Resistance to fire classification of double heating pipes penetration seals in rigid floor, made in accordance with Annex A and Annex C13

a) Double heating pipe type Syncopex C.O. PN6/95 C,C.W. PN10/70C - PE-X pipes with following dimensions: 21 x 2,5 mm and 17 x 2,5 mm (max. diameter x constant pipe wall thickness)
b) PE insulation thickness of 32 mm placed in corrugated pipe made of PE-HD diameter of max. 160 mm and pipe wall thickness of 0,5 mm
c) Intumescent material dimensions of 16,0 x 60 mm (thickness x width)

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

Table B14. Resistance to fire classification of plastic pipes bundle with pipe elbow 87,5° penetration seals in rigid floor, made in accordance with Annex A and Annex C14

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
PP	D ≤ 50 [1)]	1,8	60	6,5	**EI 120 / E 180-U/C** **EI 120 / E 180-C/C**
			30	13,0	
Floor thickness ≥ 150 mm					

[1)] Diameter of pipe elbow is 65 mm for pipe with diameter of 110 mm and for smaller pipes shall be proportionally reduced, the pipe wall thickness of the pipe elbow is 1,8 mm

Table B15. Resistance to fire classification of plastic pipes bundle (max 5 pipes in bundle) penetration seals in rigid floor, made in accordance with Annex A and Annex C15

a) Max. 5 following pipes: PVC-U with diameter of $D_1 \leq 40$ mm and pipe wall thickness of 1,8 mm, PE-HD with diameter of $D_2 \leq 40$ mm and pipe wall thickness of 2,8 mm, PE-HD with diameter of $D_3 \leq 40$ mm and pipe wall thickness of 2,8 mm, PP with diameter of $D_4 \leq 50$ mm and pipe wall thickness of 1,8 mm, PP with diameter of $D_5 \leq 50$ mm and pipe wall thickness of 1,8 mm
b) Intumescent material dimensions of 4 x 60 mm (thickness x width)

Fire resistance class: EI 120-U/C
Fire resistance class: EI 120-C/C

Piro Collar PC	**Annex B15** of European Technical Assessment ETA-17/1063
Penetration seals made with use of Piro Collar PC Plastic pipes bundle penetration seals in rigid floor	

Table B16. Resistance to fire classification of Wavin pipes penetration seals in rigid wall, made in accordance with Annex A and Annex C16

Pipe material	Wall thickness [mm]	Pipe diameter [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
Wavin Wafix PP pipes	100 – 125	D ≤ 40	1,8 – 2,5	60	2,5	**EI 120-U/C EI 120-C/C**
		40 < D ≤ 160	Fig. D33	60	Fig. D34	
	≥ 125	D ≤ 40	1,8 – 2,6	60	2,5	
		40 < D ≤ 160	Fig. D35	60	Fig. D36	
		160 < D ≤ 200	Fig. D35	180	18,0	
Wavin SiTech+	100 – 125	32	2,0	60	2,5	**EI 120-U/C EI 120-C/C**
		40	2,0	60	2,5	
		50	2,1	60	4,0	
		75	2,6	60	7,0	
		90	3,1	60	9,0	
		110	3,6	60	11,0	
		125	4,0	60	13,0	
		160	5,0	60	17,0	
	≥ 125	32	2,0	60	2,5	**EI 120-U/C EI 120-C/C**
		40	2,0	60	2,5	
		50	2,1	60	4,0	
		75	2,6	60	5,0	
		90	3,1	60	6,0	
		110	3,6	60	6,0	
		125	4,0	60	10,0	
		160	5,0	60	17,0	
Wavin AS+	100 – 125	50	3,0	60	4,0	**EI 120-U/C EI 120-C/C**
		75	3,5	60	7,0	
		90	4,6	60	9,0	
		110	5,3	60	11,0	
		125	5,3	60	13,0	
		160	5,6	60	17,0	
	≥ 125	50	3,0	60	4,0	**EI 120-U/C EI 120-C/C**
		75	3,5	60	5,0	
		90	4,6	60	6,0	
		110	5,3	60	6,0	
		125	5,3	60	10,0	
		160	5,6	60	17,0	

Table B17. Resistance to fire classification of Wavin pipes penetration seals in flexible wall, made in accordance with Annex A and Annex C17

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
Wavin Wafix PP pipes	D ≤ 40	1,8	60	2,5	**EI 120-U/C EI 120-C/C**
	40 < D ≤ 160	Fig. D37	60	Fig. D36	
		Fig. D37	60	Fig. D38	**EI 120-U/C EI 120-C/C**
	110 < D ≤ 200	Fig. D37	180	18,0	**EI 90 / E 120-U/C EI 90 / E 120-C/C**
Wavin SiTech+	32	2,0	60	5,0	**EI 120-U/C EI 120-C/C**
	40	2,0	60	5,0	
	50	2,1	60	5,0	
	75	2,6	60	5,0	
	90	3,1	60	6,0	
	110	3,6	60	6,0	
	125	4,0	60	10,0	
	160	5,0	60	18,0	
Wavin AS+	50	3,0	60	6,0	**EI 120-U/C EI 120-C/C**
	75	3,5	60	6,0	
	90	4,6	60	13,0	
	110	5,3	60	15,0	
	125	5,3	60	15,0	
	160	5,6	180	18,0	
Wall thickness ≥ 125 mm					

Table B18. Resistance to fire classification of Wavin pipes with flexible elastomeric foam (FEF) insulation penetration seals in rigid floor, made in accordance with Annex A and Annex C18

Pipe material	Pipe diameter [mm]	FEF insulation thickness [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
Wavin Wafix PP pipes	D ≤ 81	13	4,5	60	6,0	**EI 120-U/C EI 120-C/C**
Floor thickness ≥ 150 mm						

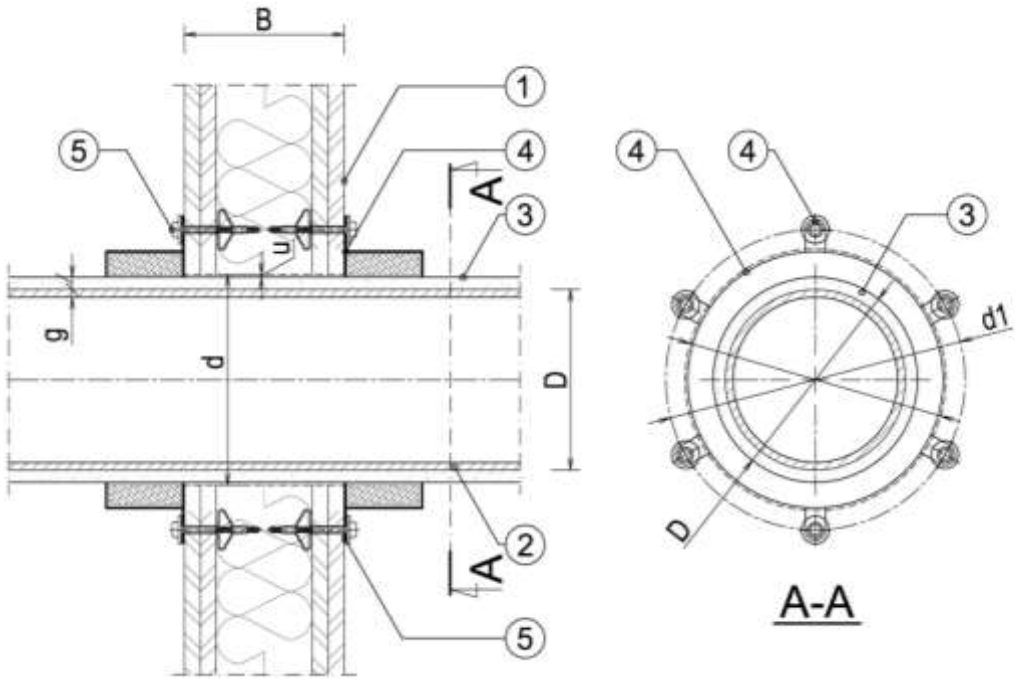
Table B19. Resistance to fire classification of Wavin pipes penetration seals in rigid floor, made in accordance with Annex A and Annex C19

Pipe material	Pipe diameter [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
Wavin Wafix PP pipes	D ≤ 40	6,7	60	2,5	**EI 120-U/C EI 120-C/C**
	40 < D ≤ 160	Fig. D39	60	Fig. D41	
	110 < D ≤ 200	Fig. D39	180	18,0	
	40 < D ≤ 355	Fig. D39	180	Fig. D40	**EI 60-U/C EI 60-C/C**
Wavin SiTech+	75	2,6	60	6,0	**EI 120-U/C EI 120-C/C**
	90	3,1	60	6,0	
	110	3,6	60	6,0	
	125	4,0	60	8,0	
	160	5,0	180	18,0	
Wavin AS+	50	3,0	60	6,0	**EI 120-U/C EI 120-C/C**
	75	3,5	60	6,0	
	90	4,6	60	6,0	
	110	5,3	60	6,0	
	125	5,3	60	8,0	
	160	5,6	180	18,0	
Floor thickness ≥ 150 mm					

Table B20. Resistance to fire classification of Wavin pipes with PE acoustic mat insulation penetration seals in rigid floor, made in accordance with Annex A and Annex C20

Pipe material	Pipe diameter [mm]	FEF insulation thickness [mm]	Pipe wall thickness [mm]	Intumescent material width [mm]	Intumescent material thickness [mm]	Fire resistance class
Wavin Wafix PP pipes	D ≤ 110	3	2,7	60	6,5	**EI 120 / E 180-U/C EI 120 / E 180-C/C**
	110 < D ≤ 200	3	2,8 – 5,4	60	6,5	**EI 90 / E 180-U/C EI 90 / E 180-C/C**
		3	Fig. D42	60	Fig. D43	**EI 45-U/C EI 45-C/C**
Wavin SiTech+	75	3	2,6	60	6,5	**EI 90 / E 180-U/C EI 90 / E 180-C/C**
	90	3	3,1	60	6,5	
	110	3	3,6	60	6,5	
Wavin AS+	50	3	3,0	60	6,5	**EI 90 / E 180-U/C EI 90 / E 180-C/C**
	75	3	3,5	60	6,5	
	90	3	4,6	60	6,5	
	110	3	5,3	60	6,5	
Floor thickness ≥ 150 mm						

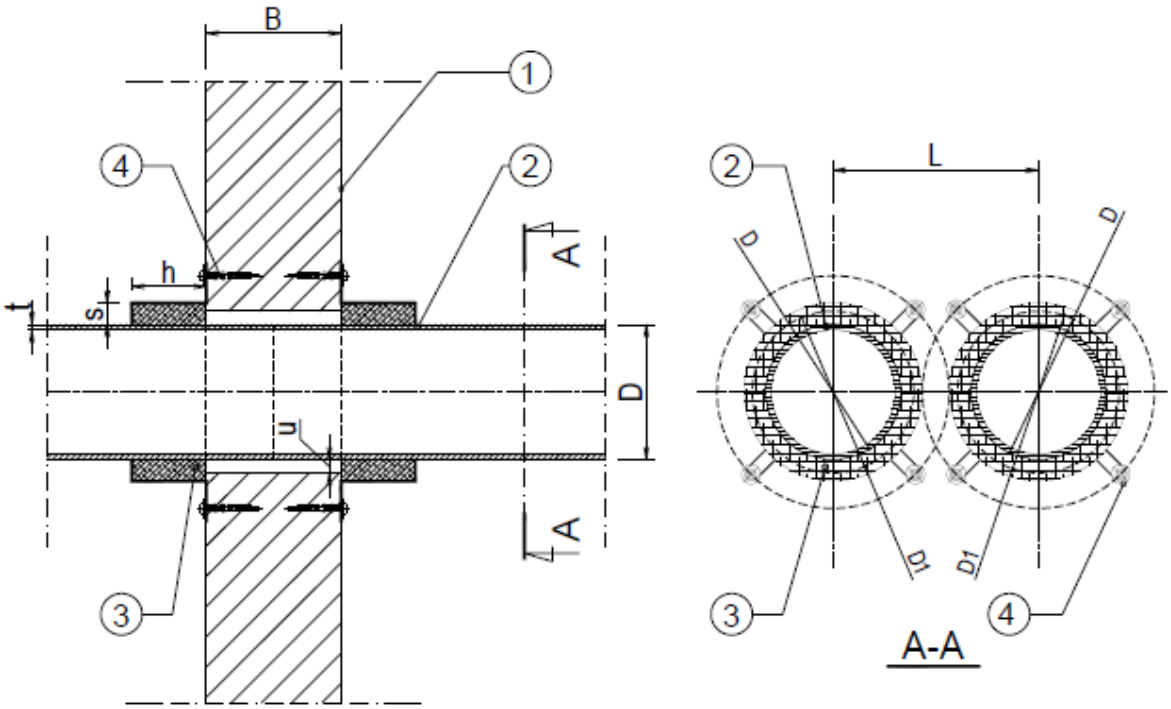
Fig. C1. Metal and plastic pipes with FEF insulation penetration seal in flexible or rigid wall made with use of Piro Collar PC



1 Flexible or rigid wall thickness of B = min. 125 mm
2 Metal or plastic pipe diameter D, pipe wall thickness t; space between the pipe insulation and supporting construction u = max. 15 mm
3 Flexible elastomeric foam (FEF) continuous insulation, thickness of g, nominal density of 45 - 70 kg/m^3 and reaction to fire class B_L-s2, d0 in accordance with EN 13501-1
4 Piro Collar PC collar, fixed both side of the wall, outside the wall
5 Collar fixing – steel fixing dowel M6x60 or M8x80 (see Table A1)

Piro Collar PC	**Annex C1** of European Technical Assessment ETA-17/1063
Construction details Insulated metal or plastic pipes penetration seals in flexible or rigid wall	

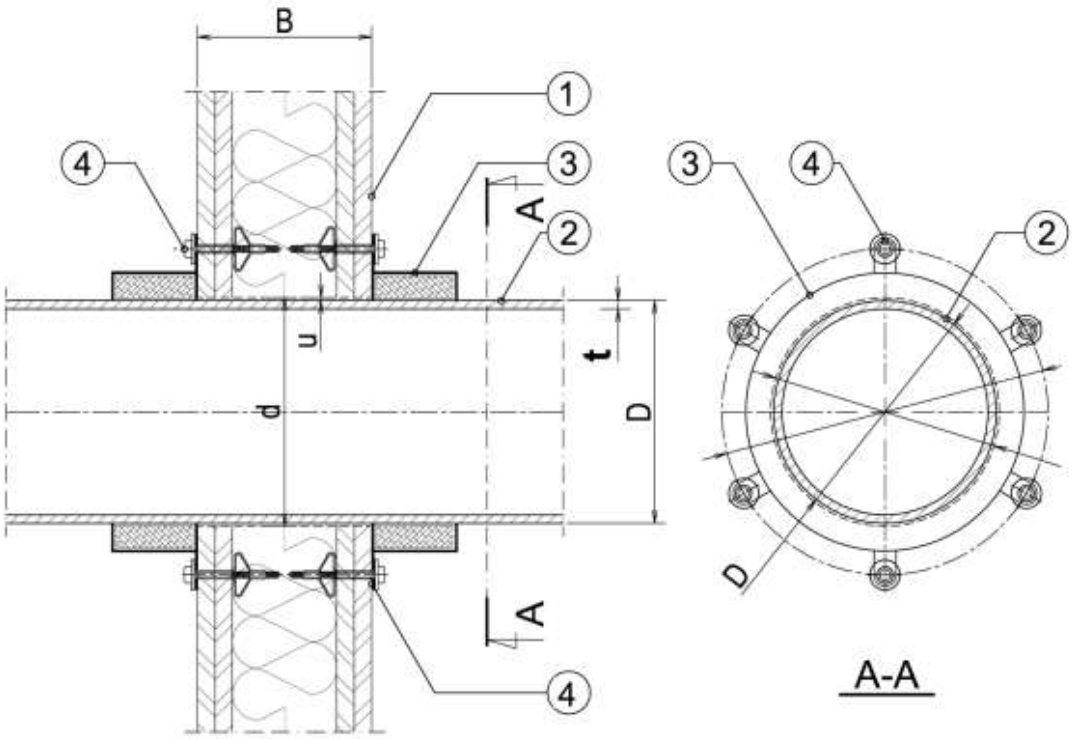
Fig. C2. Plastic pipe penetration seal in rigid wall made with use of Piro Collar PC



1 Rigid wall supporting construction thickness of B = min. 100 mm
2 Plastic pipe, diameter of D and pipe wall thickness of t
3 Gap between the pipe and supporting construction width of u = max. 15 mm, filled with gypsum plaster on the depth of min. 10 mm
4 Piro Collar PC collar, fixed both side of the wall, outside the wall

Piro Collar PC	**Annex C2** of European Technical Assessment ETA-17/1063
Construction details Plastic pipes penetration seals in rigid wall	

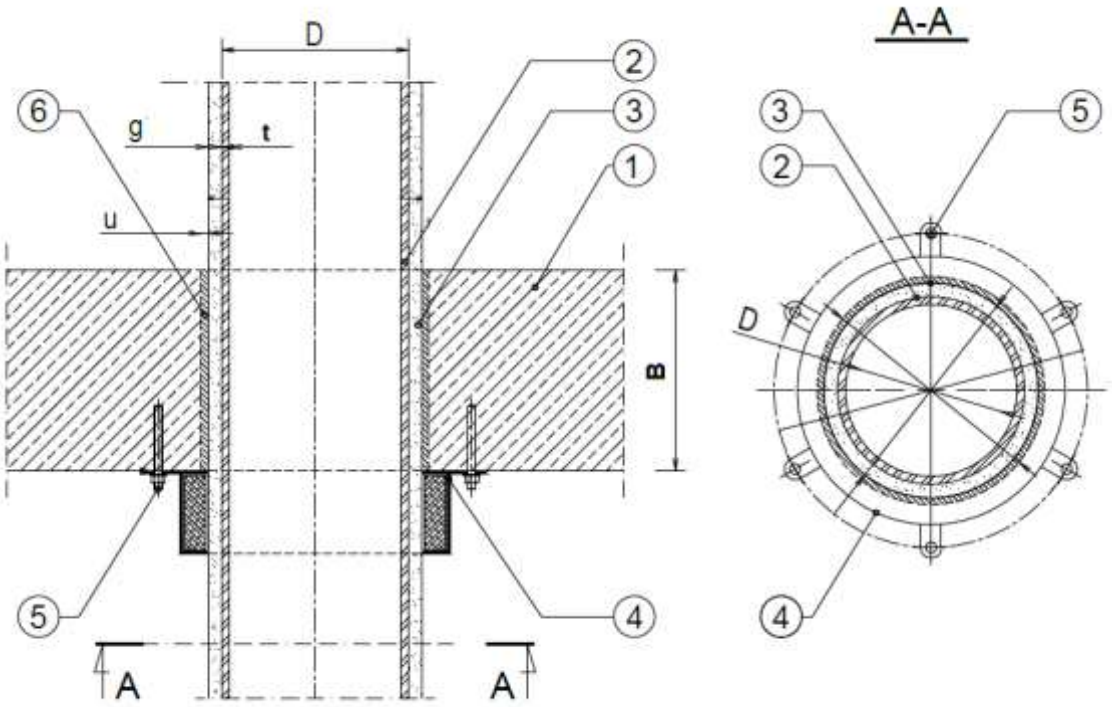
Fig. C3. Plastic pipe penetration seal in flexible wall made with use of Piro Collar PC



1 Flexible wall thickness of B = min. 125 mm
2 Plastic pipe diameter D, pipe wall thickness t; space between the pipe insulation and supporting construction u = max. 15 mm
3 Piro Collar PC collar, fixed both side of the wall, outside the wall
4 Collar fixing – steel fixing dowel M6x60 or M8x80 (see Table A1)

Piro Collar PC	**Annex C3** of European Technical Assessment ETA-17/1063
Construction details Plastic pipes penetration seals in flexible wall	

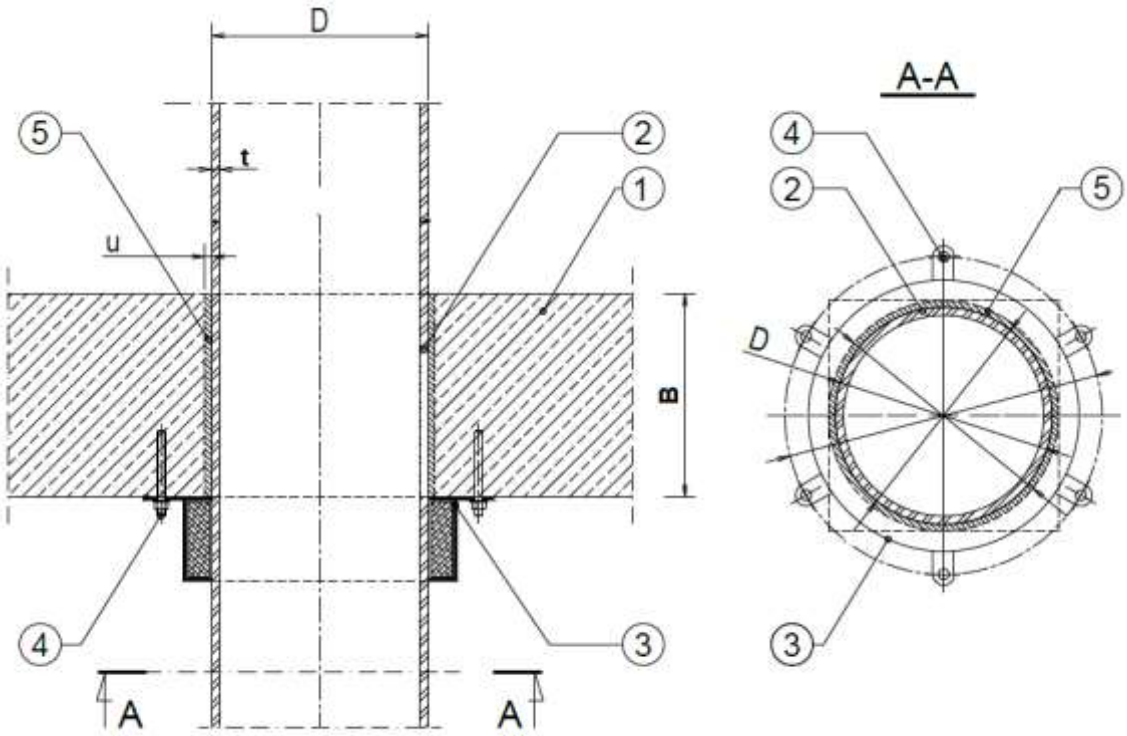
Fig. C4. Metal or plastic pipes with FEF insulation penetration seal in rigid floor made with use of Piro Collar PC



1 Rigid floor thickness of min. 150 mm
2 Plastic or metal pipe diameter D, pipe wall thickness t
3 Flexible elastomeric foam (FEF) continuous insulation, thickness of g, nominal density of 45 - 70 kg/m³ and reaction to fire class B_L-s2, d0 in accordance with EN 13501-1
4 Piro Collar PC collar, fixed on the bottom of the floor
5 Collar fixing – steel fixing dowel M6x60 or M8x80 (see Table A1)
6 Gap between the pipe and supporting construction filled with cement mortar, thickness of u = max. 10 mm.

Piro Collar PC	**Annex C4** of European Technical Assessment ETA-17/1063
Construction details Insulated metal and plastic pipes penetration seals in rigid floor	

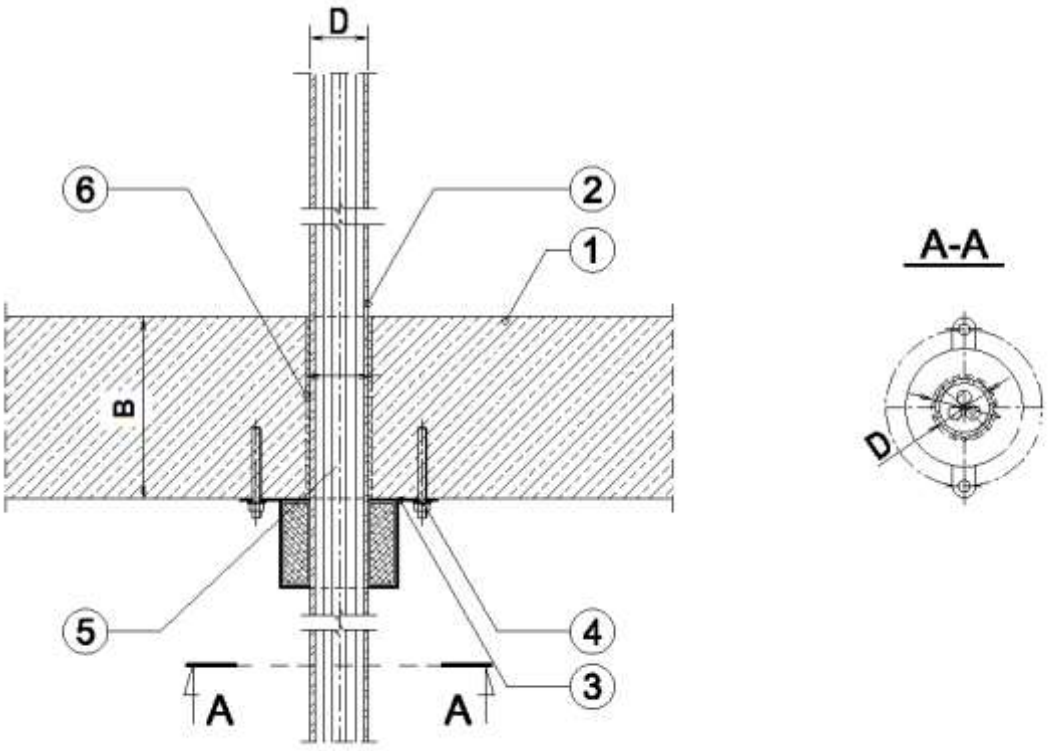
Fig. C5. Plastic pipe penetration seal in rigid floor made with use of Piro Collar PC



1 Rigid floor thickness of B = min. 150 mm
2 Plastic pipe diameter D, pipe wall thickness t
3 Piro Collar PC collar, fixed on the bottom of the floor
4 Collar fixing – steel fixing dowel M6x60 or M8x80 (see Table A1)
5 Gap between the pipe and supporting construction filled with cement mortar, thickness of u = max. 10 mm

Piro Collar PC	**Annex C5** of European Technical Assessment ETA-17/1063
Construction details Plastic pipes penetration seals in rigid floor	

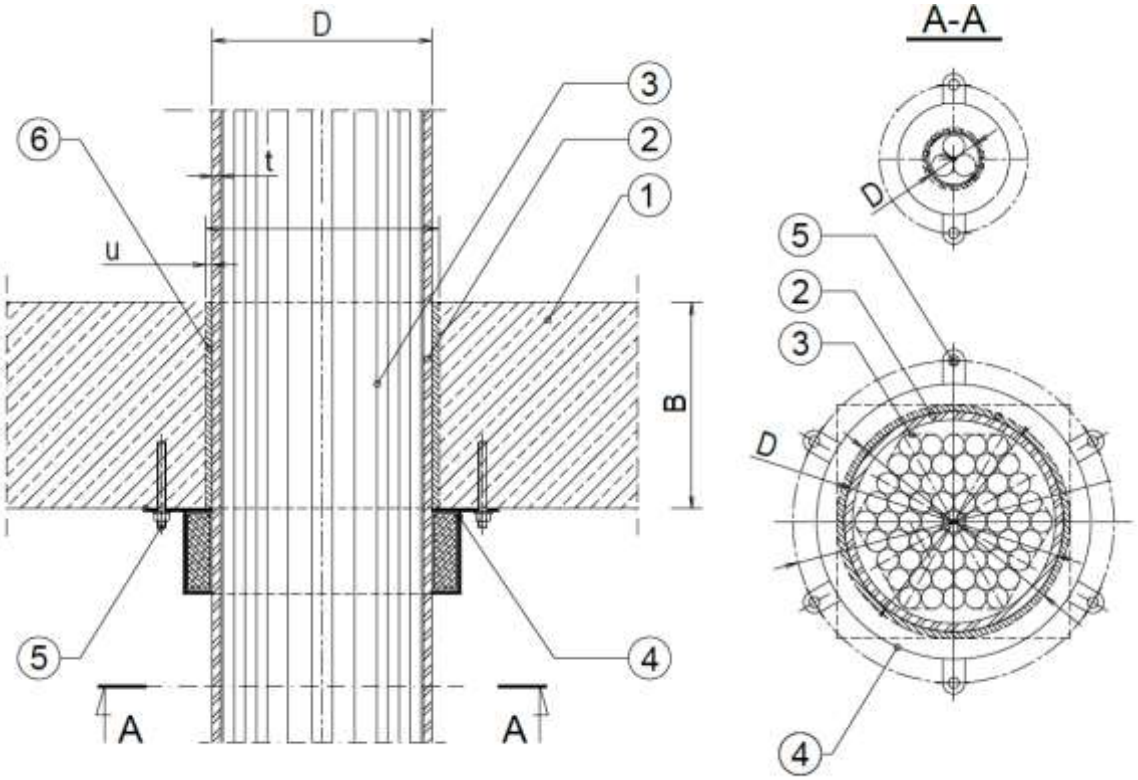
Fig. C6. Plastic pipe with Cables type A1 inside penetration seal in rigid floor made with use of Piro Collar PC



1 Rigid floor thickness of B = min. 150 mm
2 Plastic pipe diameter D, pipe wall thickness t
3 Piro Collar PC collar, fixed on the bottom of the floor;
4 Collar fixing – steel fixing dowel M6x60 or M8x80 (see Table A1)
5 Cables type A1 in accordance with EN 1366-3, max. 10 cables
6 Gap between the pipe and supporting construction filled with cement mortar, thickness of u = max. 10 mm

Piro Collar PC	**Annex C6** of European Technical Assessment ETA-17/1063
Construction details Plastic pipes with cables type A1 inside penetration seals in rigid floor	

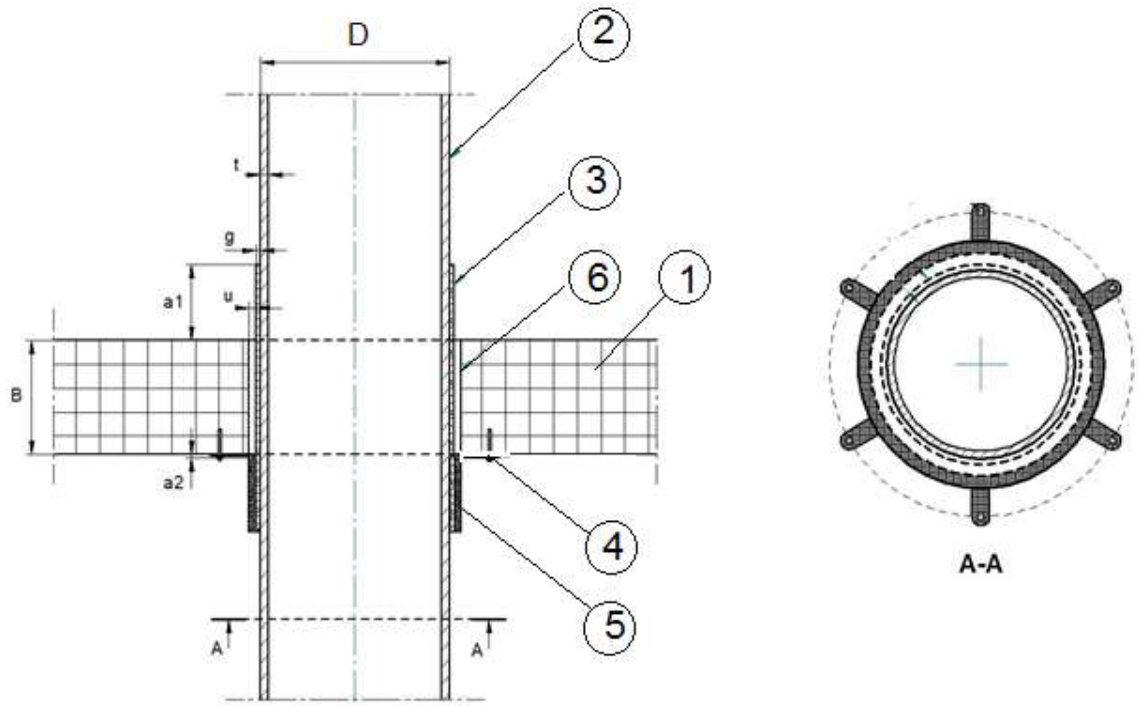
Fig. C7. Plastic pipe with PP pipes inside penetration seal in rigid floor made with use of Piro Collar PC



1 Rigid floor thickness of B = min. 150 mm
2 Plastic pipe diameter D, pipe wall thickness t
3 PP pipes inside the pipe
4 Piro Collar PC collar, fixed on the bottom of the floor
5 Collar fixing – steel fixing dowel M6x60 or M8x80 (see Table A1)
6 Gap between the pipe and supporting construction filled with cement mortar, thickness of u = max. 10 mm

Piro Collar PC	**Annex C7** of European Technical Assessment ETA-17/1063
Construction details Plastic pipes with PP pipes inside penetration seals in rigid floor	

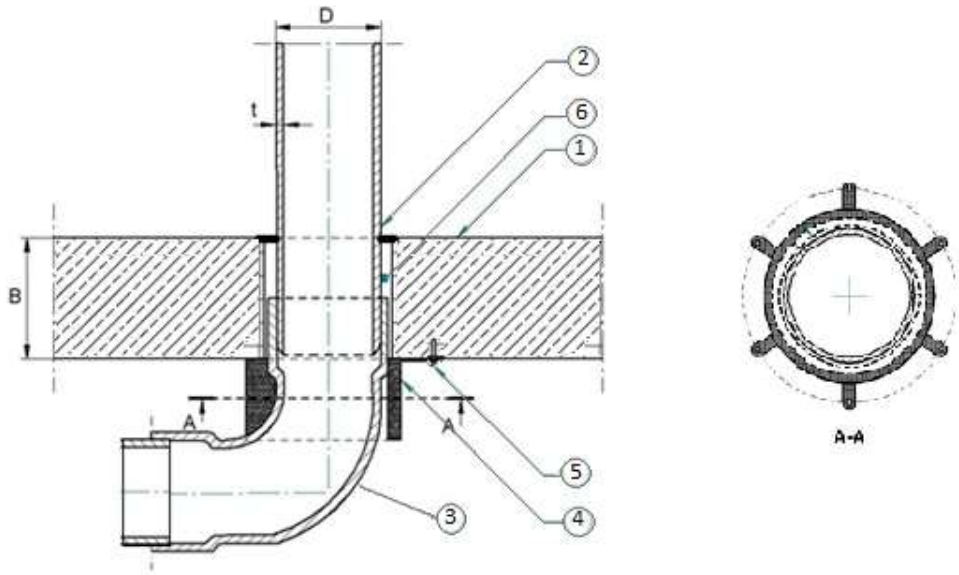
Fig. C8. Plastic pipe with PE insulation penetration seal in rigid floor made with use of Piro Collar PC



1 Reinforced concrete floor thickness of B = min. 150 mm
2 Plastic pipe diameter of D, pipe wall thickness of t
3 Acoustic mat made of PE and thickness of g, length of the mat on the top the floor a1 = 50 mm
4 Collar fixing – steel fixing dowel
5 Piro Collar PC, placed on the bottom of the floor
6 Gap between the floor and the service filled with cement mortar, thickness of u = max. 10 mm

Piro Collar PC	**Annex C8** of European Technical Assessment ETA-17/1063
Construction details Insulated plastic pipes penetration seals in rigid floor	

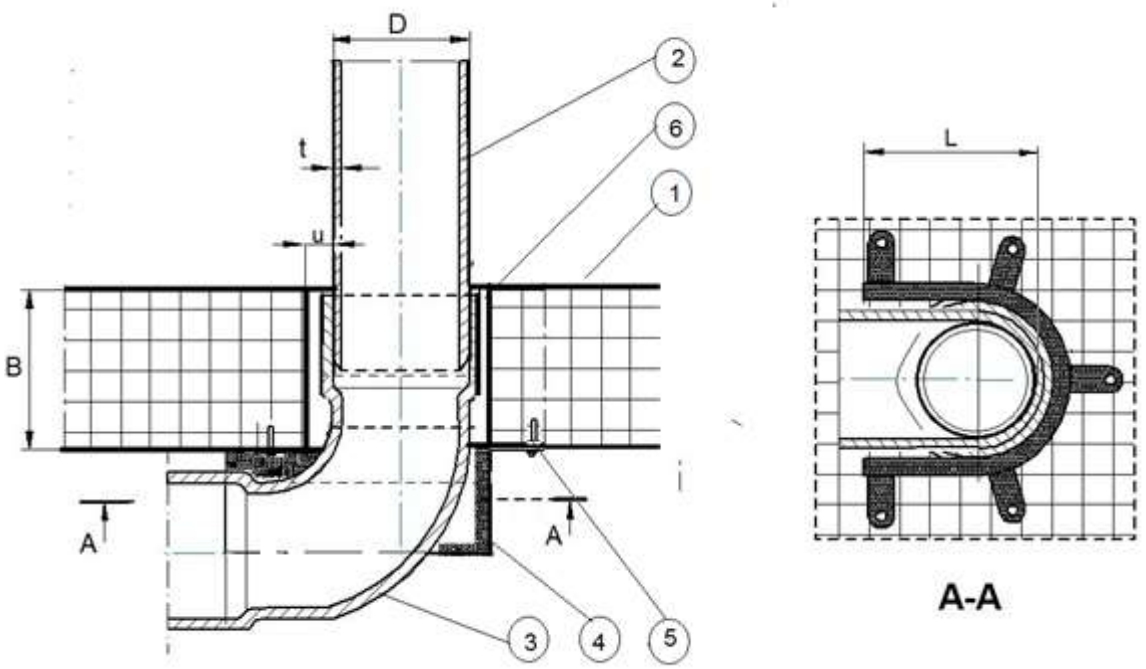
Fig. C9. Plastic pipe with pipe elbow 87,5° penetration seal in rigid floor made with use of Piro Collar PC



1 Reinforced concrete floor thickness of B = min. 150 mm
2 Plastic pipe diameter of D, pipe wall thickness of t
3 Plastic pipe elbow 87,5°, diameter of D1 and pipe wall thickness of t1
4 Piro Collar PC, placed on the bottom of the floor
5 Collar fixing – steel fixing dowel
6 Gap between the floor and the service filled with cement mortar, thickness of u = max. 10 mm

Piro Collar PC	**Annex C9** of European Technical Assessment ETA-17/1063
Construction details Plastic pipes with pipe elbow 87,5° penetration seals in rigid floor	

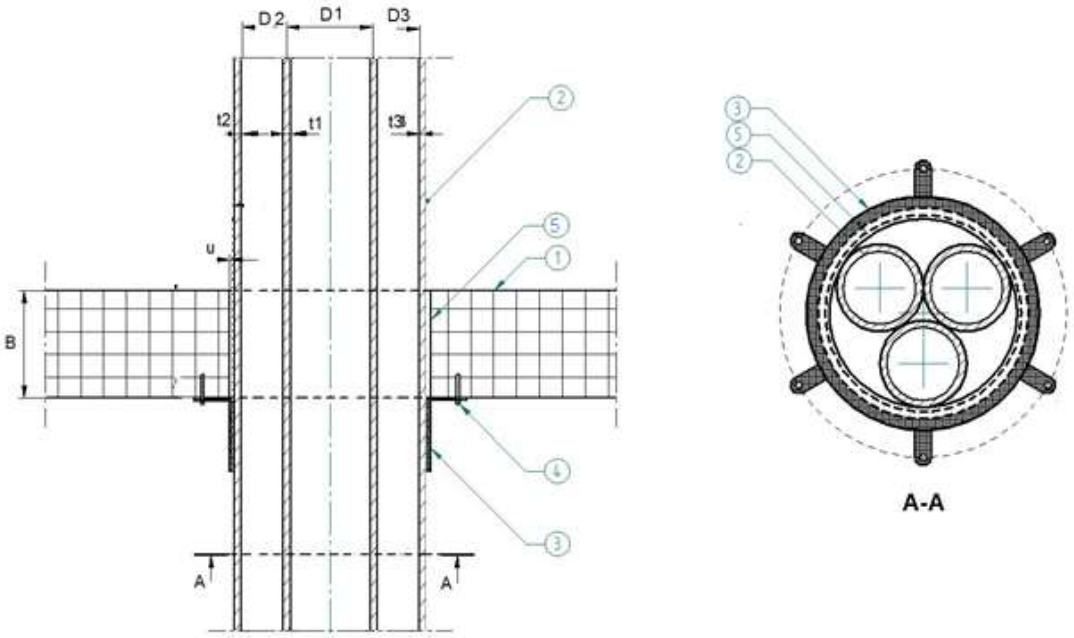
Fig. C10. Plastic pipe with pipe elbow 67,5° penetration seal in rigid floor made with use of Piro Collar PC



1 Reinforced concrete floor thickness of B = min. 150 mm
2 Plastic pipe diameter of D, pipe wall thickness of t
3 Plastic pipe elbow 67,5°, diameter of D1 and pipe wall thickness of t1
4 Piro Collar PC, placed on the bottom of the floor; collar length L = 1,3 x D
5 Collar fixing – steel fixing dowel
6 Gap between the floor and the service filled with cement mortar, thickness of u = max. 10 mm

Piro Collar PC	**Annex C10** of European Technical Assessment ETA-17/1063
Construction details Plastic pipes with pipe elbow 67,5° penetration seals in rigid floor	

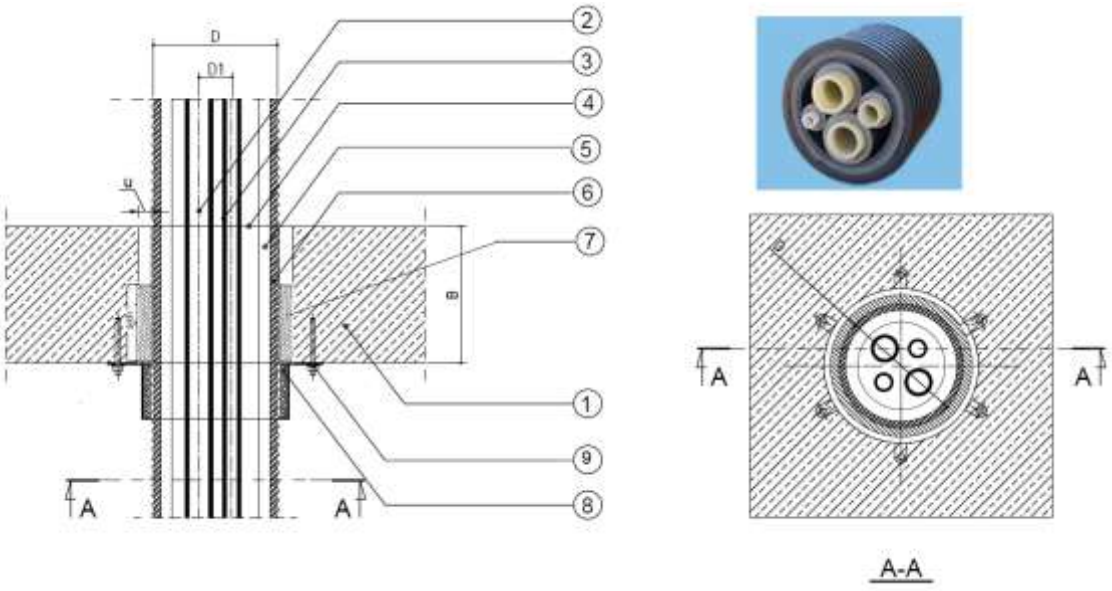
Fig. C11. Plastic pipe bundle penetration seal in rigid floor made with use of Piro Collar PC



1 Reinforced concrete floor thickness of B = min. 150 mm
2 Bundle of PP pipes diameter of max. 75 mm and pipe wall thickness of 1,8 mm
3 Piro Collar PC, placed on the bottom of the floor
4 Collar fixing – steel fixing dowel
5 Gap between the floor and the service filled with cement mortar, thickness of u = max. 10 mm

Piro Collar PC	**Annex C11** of European Technical Assessment ETA-17/1063
Construction details Plastic pipes bundle penetration seals in rigid floor	

Fig. C12. Quadruple heating pipe type Syncopex C.O. PN6/95 C,C.W. PN10/70C with PE insulation penetration seal in rigid floor made with use of Piro Multitube PM and Piro Collar PC



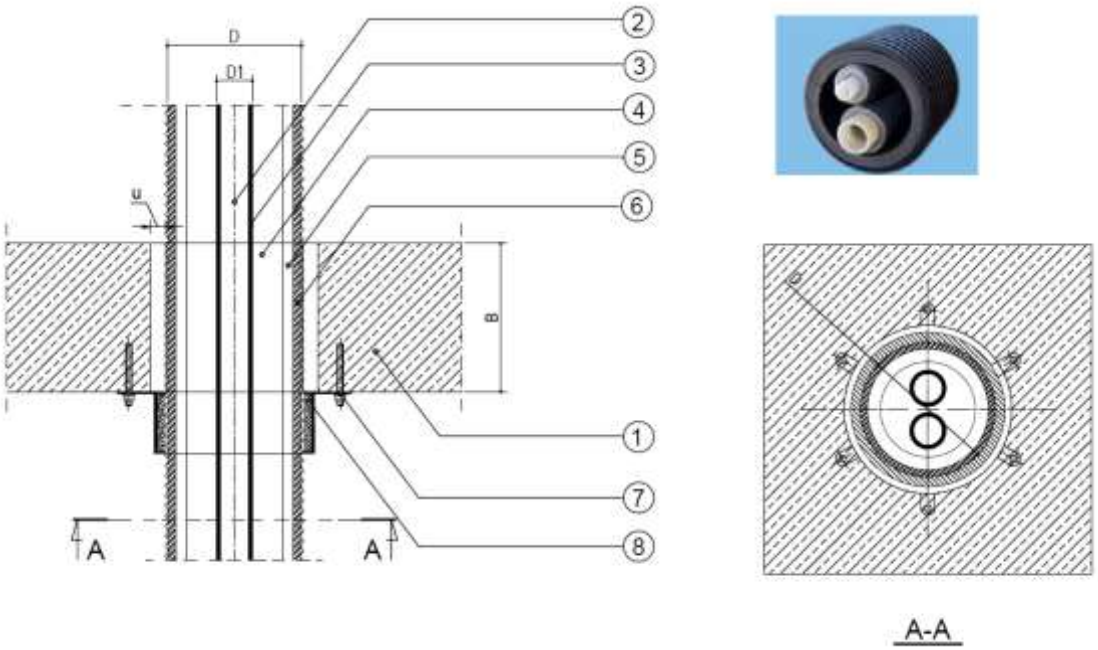
1 Reinforced concrete floor thickness of B = min. 150 mm
2 Quadruple heating pipe type Syncopex C.O. PN6/95 C,C.W. PN10/70C (currogated pipe made of PE-HD, diameter of D ≤ 160 mm and pipe wall thickness of 0,5 mm), with max. 4 following PE-X pipes inside:
- with diameter of D1 ≤ 50 mm and pipe wall thickness of t = 3,0 mm
- with diameter of D1 ≤ 50 mm and pipe wall thickness of t = 5,0 mm
- with diameter of D1 ≤ 32 mm and pipe wall thickness of t = 2,5 mm
- with diameter of D1 ≤ 20 mm and pipe wall thickness of t = 2,1 mm

3, 4 Two layers of PE insulation, overall thickness of 32 mm (2 x 16 mm), continous insulation
5 Area between the insulation of inside pipe and currogated pipe
6 Currogated pipe made of PE-HD, D ≤ 160 mm and pipe wall thickness of 0,5 mm
7 Piro Multitube PM with intumescent material length of 100 mm and thickness of 9,6 mm (2 x 4,8 mm), placed inside the floor, in the distance of 15 ± 5 mm from the floor bottom
8 Piro Collar PC, placed on the bottom of the floor
9 Collar fixing – steel fixing dowel

Gap between the floor and the service filled with cement mortar, thickness of u = max. 25 mm

Piro Collar PC	**Annex C12** of European Technical Assessment ETA-17/1063
Construction details Quadruple heating pipes penetration seals in rigid floor	

Fig. C13. Double heating pipe type Syncopex C.O. PN6/95 C,C.W. PN10/70C with PE insulation penetration seal in rigid floor made with use of Piro Collar PC

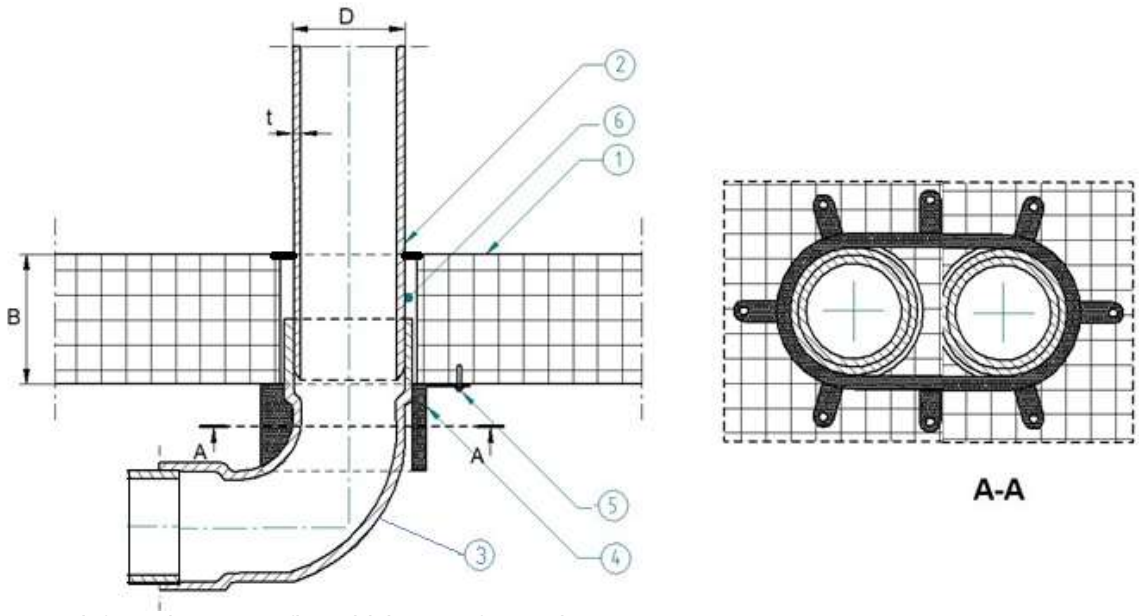


1 Reinforced concrete floor thickness of B = min. 150 mm
2 Double heating pipe type Syncopex C.O. PN6/95 C,C.W. PN10/70C (corrugated pipe made of PE-HD, diameter of D ≤ 110 and pipe wall thickness of 0,5 mm), with max. 2 following PE-X pipes inside:
- with diameter of D1 ≤ 21 mm and pipe wall thickness of t = 2,5 mm
- with diameter of D1 ≤ 17 mm and pipe wall thickness of t = 2,5 mm

3, 4 Two layers of PE insulation, overall thickness of 32 mm (2 x 16 mm), continuous insulation
5 Area between the insulation of inside pipe and corrugated pipe
6 Corrugated pipe made of PE-HD, diameter of D ≤ 110 and pipe wall thickness of 0,5 mm
8 Piro Collar PC, placed on the bottom of the floor
7 Collar fixing – steel fixing dowel
Gap between the floor and the service filled with cement mortar, thickness of u = max. 25 mm

Piro Collar PC	**Annex C13** of European Technical Assessment ETA-17/1063
Construction details Double heating pipes penetration seals in rigid floor	

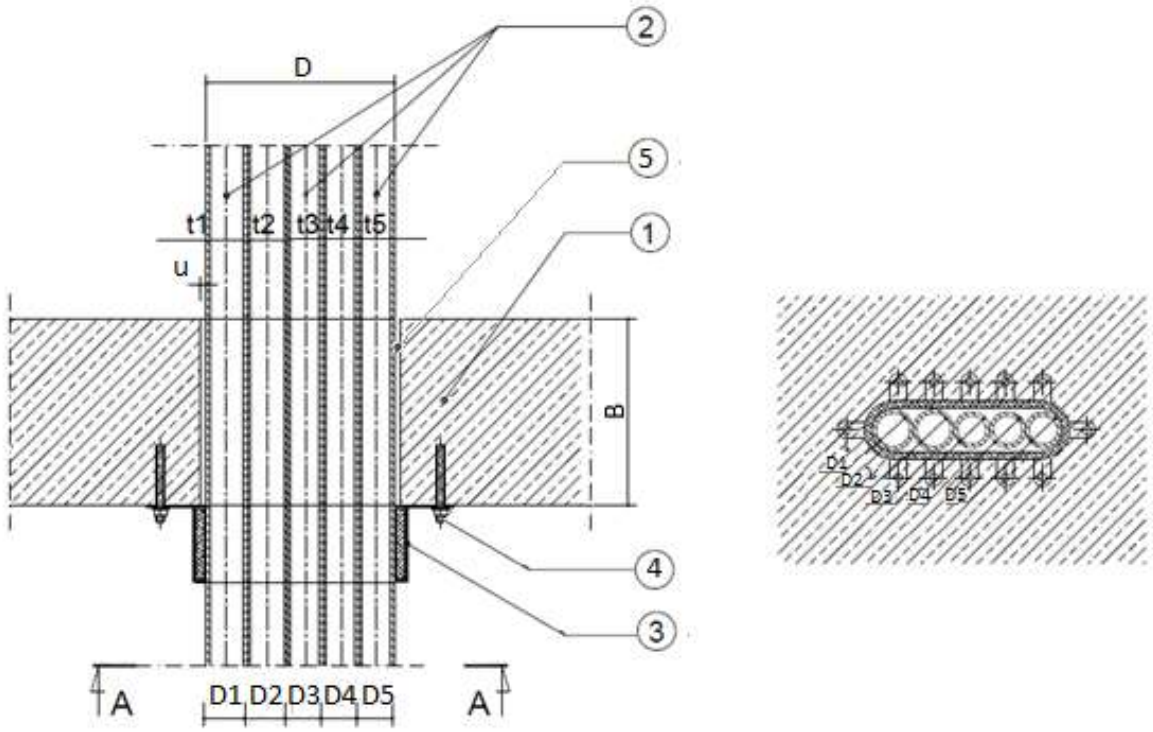
Fig. C14. Bundle of plastic pipe with pipe elbow 87,5° penetration seal in rigid floor made with use of Piro Collar PC



1 Reinforced concrete floor thickness of B = min. 150 mm
2 Bundle of max. 2 x PP pipes diameter of D ≤ 50 mm and pipe wall thickness of 1,8 mm
3 PP pipe elbow 87,5°, diameter of D1 ≤ 65 mm (fitted to the diameter of the pipe)
4 Piro Collar PC, placed on the bottom of the floor
5 Collar fixing – steel fixing dowel
6 Gap between the floor and the service filled with cement mortar, thickness of u = max. 10 mm

Piro Collar PC	**AnnexC14** of European Technical Assessment ETA-17/1063
Construction details Bundle of plastic pipe with pipe elbow 87,5° penetration seals in rigid floor	

Fig. C15. Plastic pipe bundle penetration seal in rigid floor made with use of Piro Collar PC

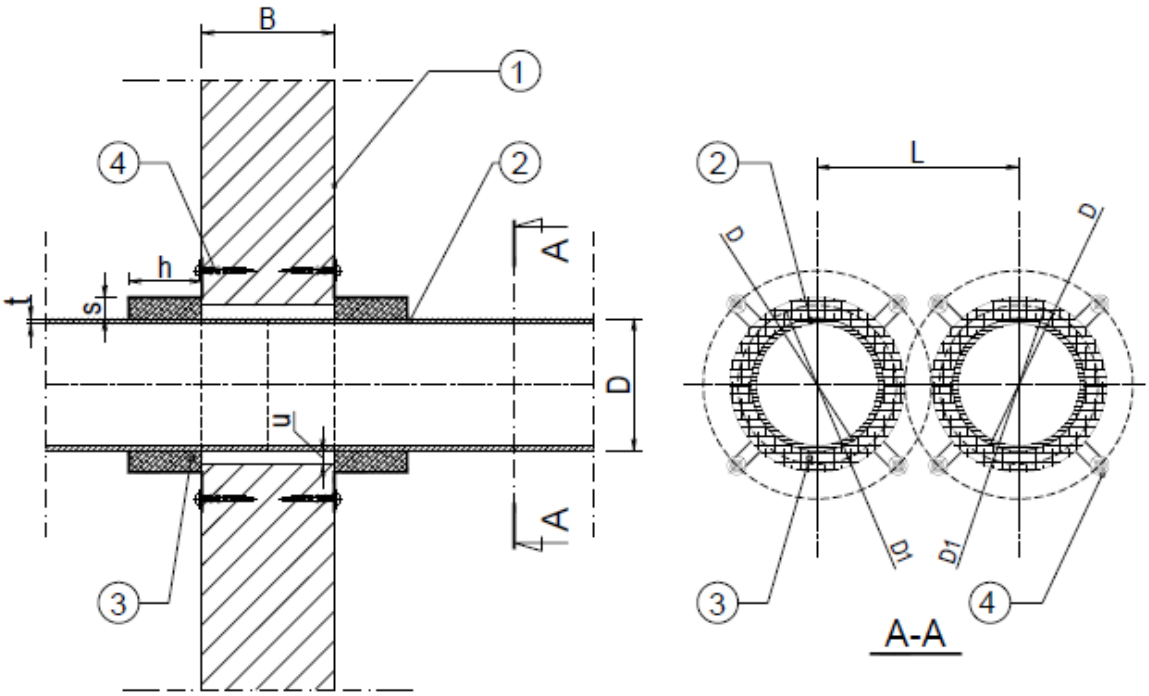


1 Reinforced concrete floor thickness of B = min. 150 mm
2 Plastic pipes bundle with max. 5 following pipes:
- PVC-U with diameter of D1 ≤ 40 mm and pipe wall thickness of 1,8 mm
- PE-HD with diameter of D2 ≤ 40 mm and pipe wall thickness of 2,8 mm
- PE-HD with diameter of D3 ≤ 40 mm and pipe wall thickness of 2,8 mm
- PP with diameter of D4 ≤ 50 mm and pipe wall thickness of 1,8 mm
- PP with diameter of D5 ≤ 50 mm and pipe wall thickness of 1,8 mm

3 Piro Collar PC, placed on the bottom of the floor
4 Collar fixing – steel fixing dowel
5 Space between the floor and the service filled with cement mortar, thickness of u = max. 10 mm

Piro Collar PC	**Annex C15** of European Technical Assessment ETA-17/1063
Construction details Plastic pipes bundle penetration seals in rigid floor	

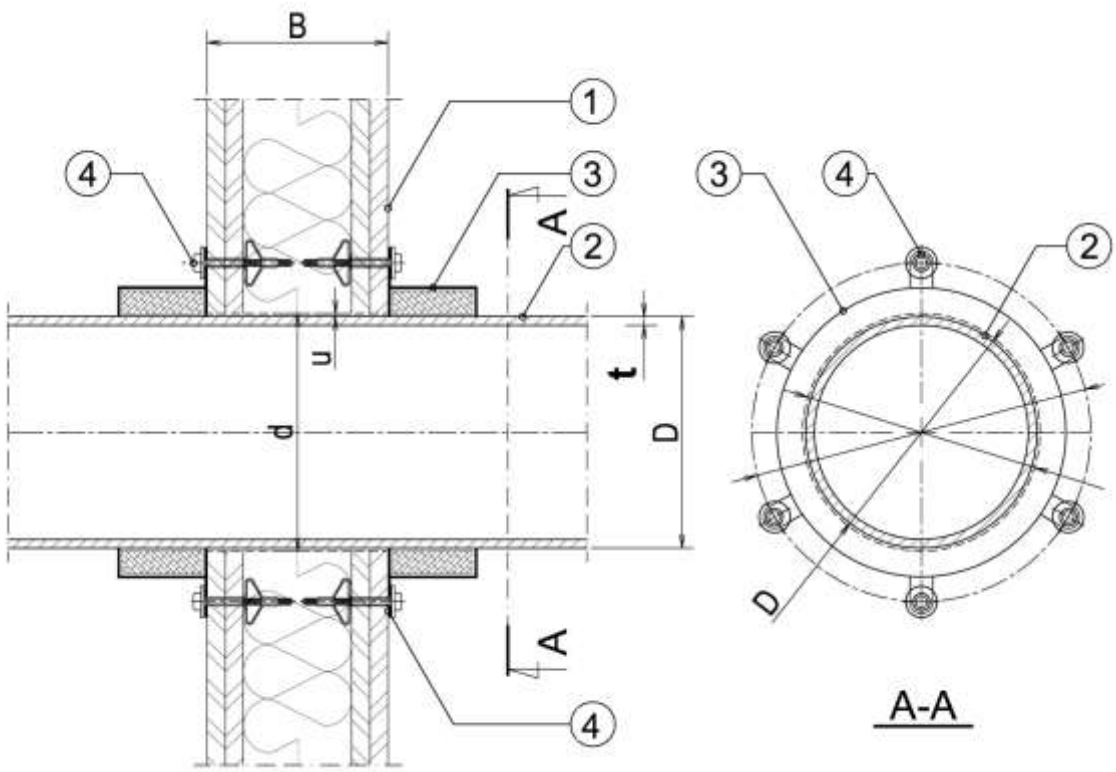
Fig. C16. Wavin pipe penetration seal in rigid wall made with use of Piro Collar PC



1 Rigid wall supporting construction thickness of B = min. 100 mm
2 Plastic pipe Wavin Wafix PP, Wavin SiTech+ or Wavin AS+, diameter of “D” and pipe wall thickness of t
Gap between the pipe and supporting construction width of u = max. 15 mm, filled with gypsum plaster on the depth of min. 10 mm
3 Piro Collar PC, fixed both side of the wall, outside the wall
4 Collar fixing – steel fixing dowel

Piro Collar PC	**Annex C16** of European Technical Assessment ETA-17/1063
Construction details Wavin pipes penetration seals in rigid wall	

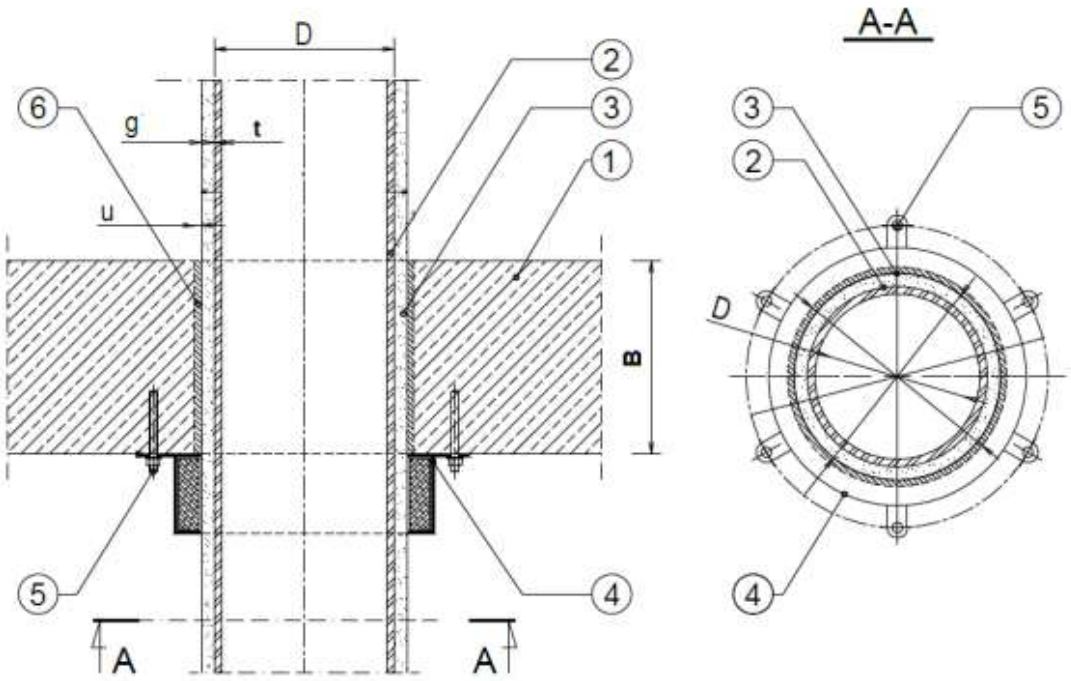
Fig. C17. Wavin pipe penetration seal in flexible wall made with use of Piro Collar PC



1 Flexible wall thickness of B = min. 125 mm
2 Plastic pipe Wavin Wafix PP, Wavin SiTech+ or Wavin AS+ diameter D, pipe wall thickness t; space between the pipe insulation and supporting construction u = max. 15 mm;
3 Piro Collar PC, fixed both side of the wall, outside the wall
4 Collar fixing – steel fixing dowel

Piro Collar PC	**Annex C17** of European Technical Assessment ETA-17/1063
Construction details Wavin pipes penetration seals in flexible wall	

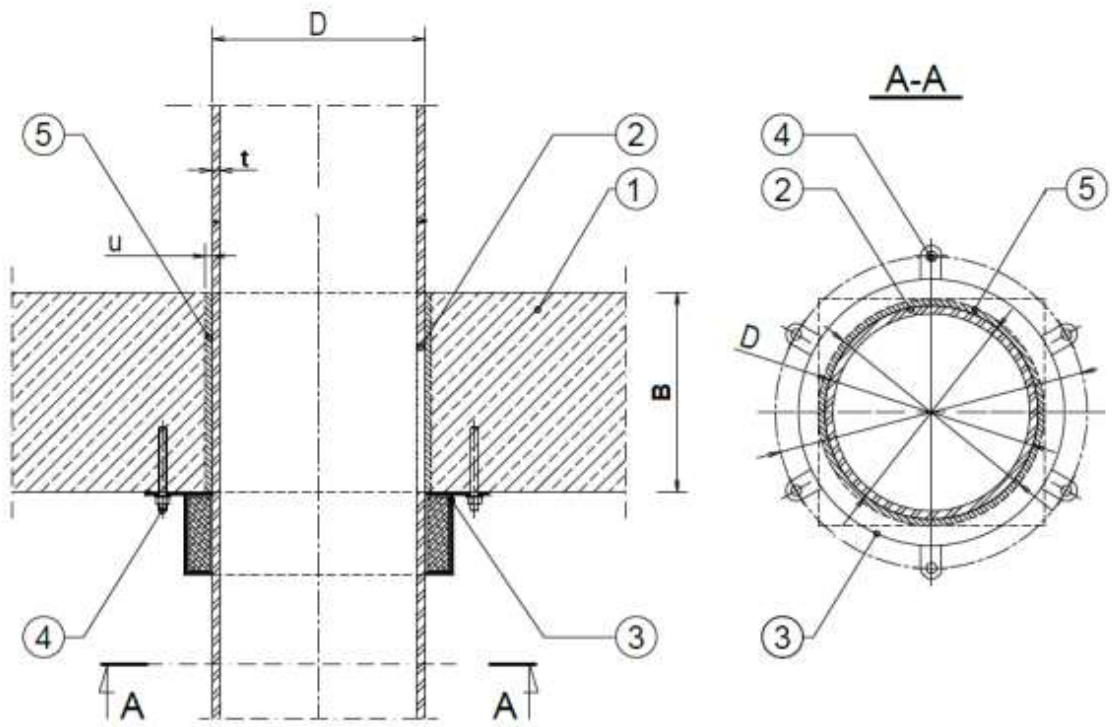
Fig. C18. Wavin pipe with FEF insulation penetration seal in rigid floor made with use of Piro Collar PC



1 Reinforced concrete floor thickness of B = min. 150 mm
2 Plastic pipe Wavin Wafix PP, Wavin SiTech+ or Wavin AS+ diameter D, pipe wall thickness t
3 Flexible elastomeric foam (FEF) continuous insulation, thickness of "g", nominal density of 45 - 70 kg/m^3 and reaction to fire class BL-s2, d0 in accordance with EN 13501-1
4 Piro Collar PC collar, fixed on the bottom of the floor
5 Collar fixing – steel fixing dowel
6 Space between the floor and the service filled with cement mortar, thickness of u = max. 10 mm

Piro Collar PC	**Annex C18** of European Technical Assessment ETA-17/1063
Construction details Insulated Wavin pipes penetration seals in rigid floor	

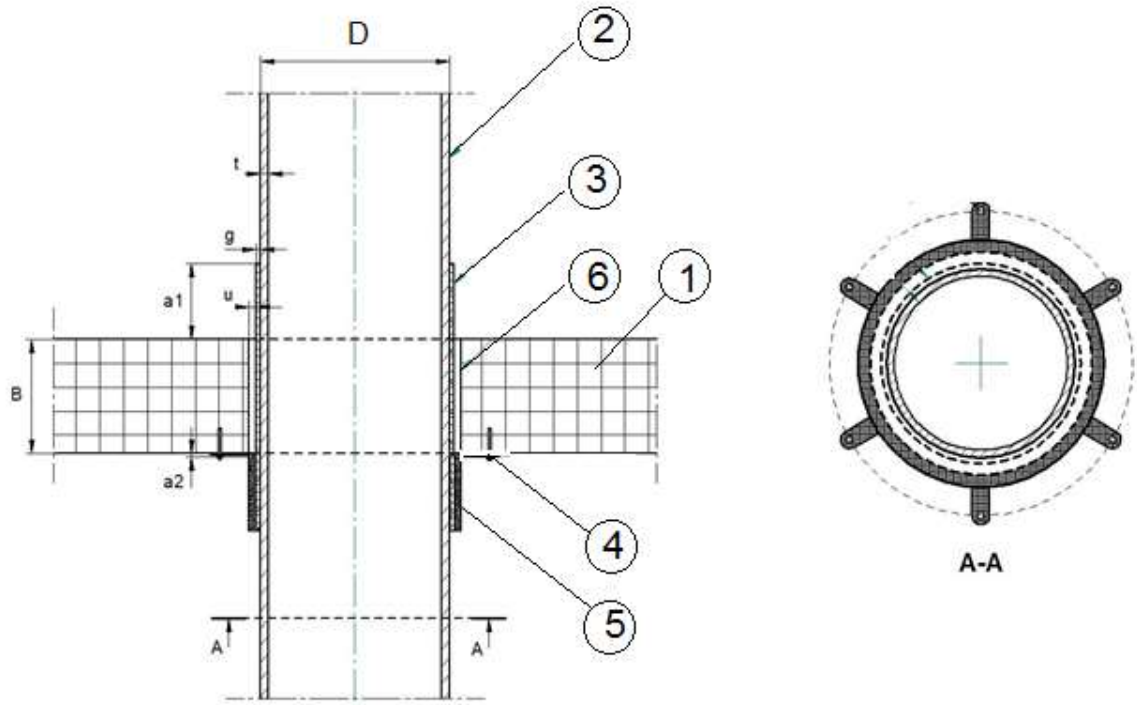
Fig. C19. Wavin pipe penetration seal in rigid floor made with use of Piro Collar PC



1 Reinforced concrete floor thickness of B = min. 150 mm
2 Plastic pipe Wavin Wafix PP, Wavin SiTech+ or Wavin AS+ diameter D, pipe wall thickness t
3 Piro Collar PC, placed on the bottom of the floor
4 Collar fixing – steel fixing dowel
5 Space between the floor and the service filled with cement mortar, thickness of u = max. 10 mm

Piro Collar PC	**Annex C19** of European Technical Assessment ETA-17/1063
Construction details Insulated Wavin pipes penetration seals in rigid floor	

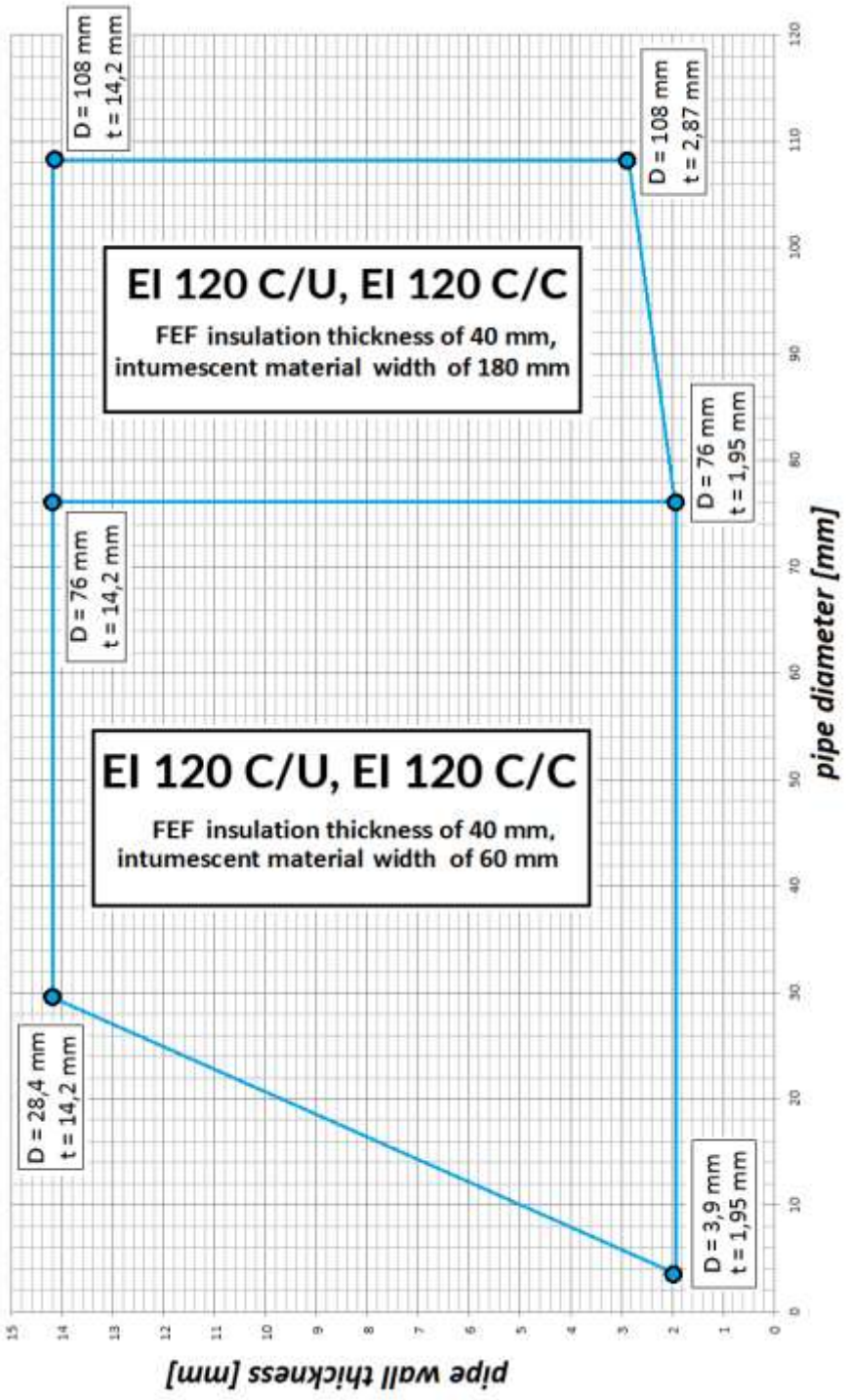
Fig. C20. Wavin pipe penetration with PE insulation seal in rigid floor made with use of Piro Collar PC



1 Reinforced concrete floor thickness of B = min. 150 mm
2 Plastic pipe Wavin Wafix PP, Wavin SiTech+ or Wavin AS+ diameter of D, pipe wall thickness of t
3 Acoustic mat made of PE and thickness of g, length of the mat on the top a1 = 50 mm
4 Collar fixing – steel fixing dowel
5 Piro Collar PC, placed on the bottom of the floor
6 Space between the floor and the service filled with cement mortar, thickness of u = max. 10 mm

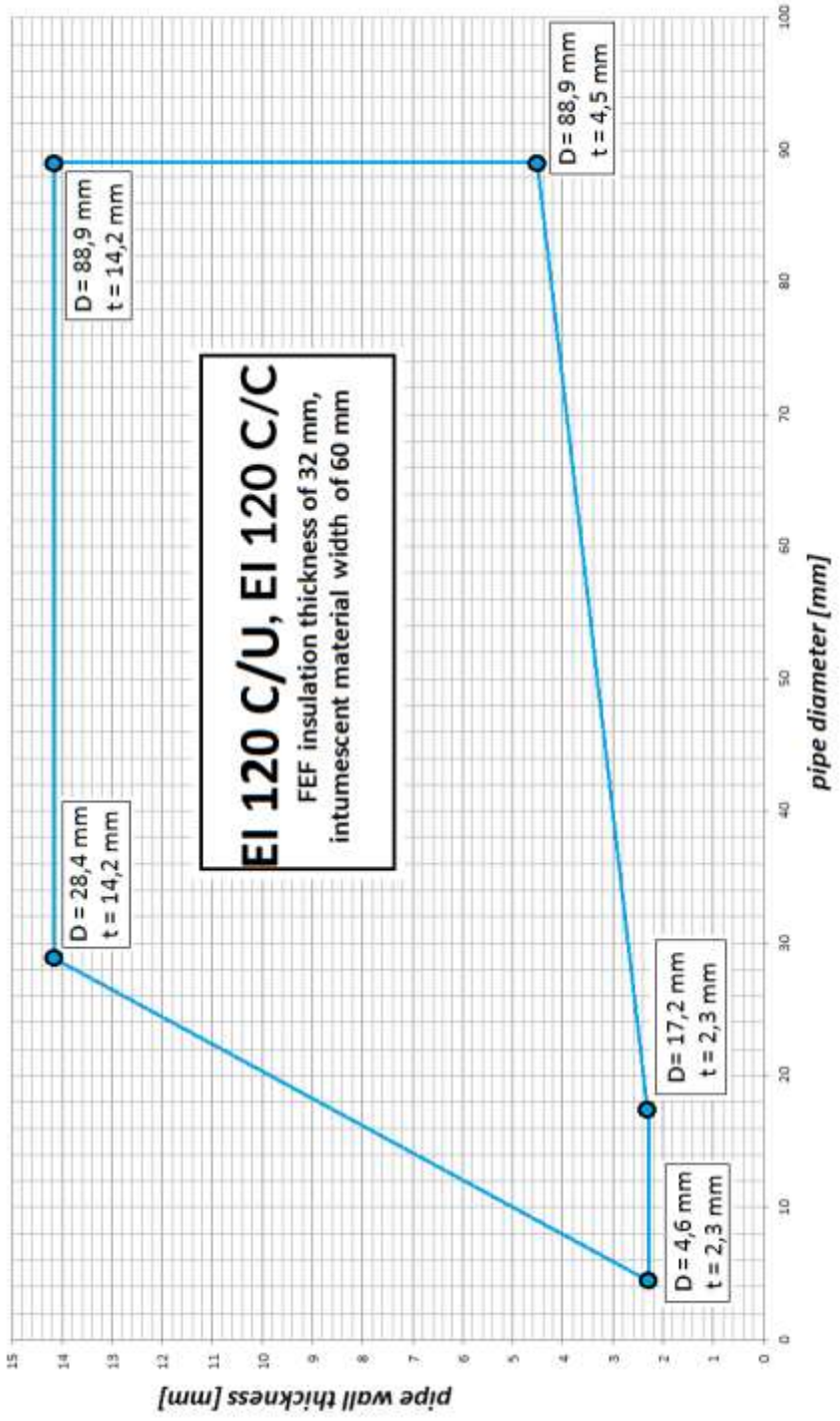
Piro Collar PC	**Annex C20** of European Technical Assessment ETA-17/1063
Construction details Insulated Wavin pipes penetration seals in rigid floor	

Fig. D1. Range of copper pipes with flexible elastomeric foam (FEF) insulation thickness of 40 mm, in flexible or rigid wall, thickness of B ≥ 125 mm penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C1 in Annex C



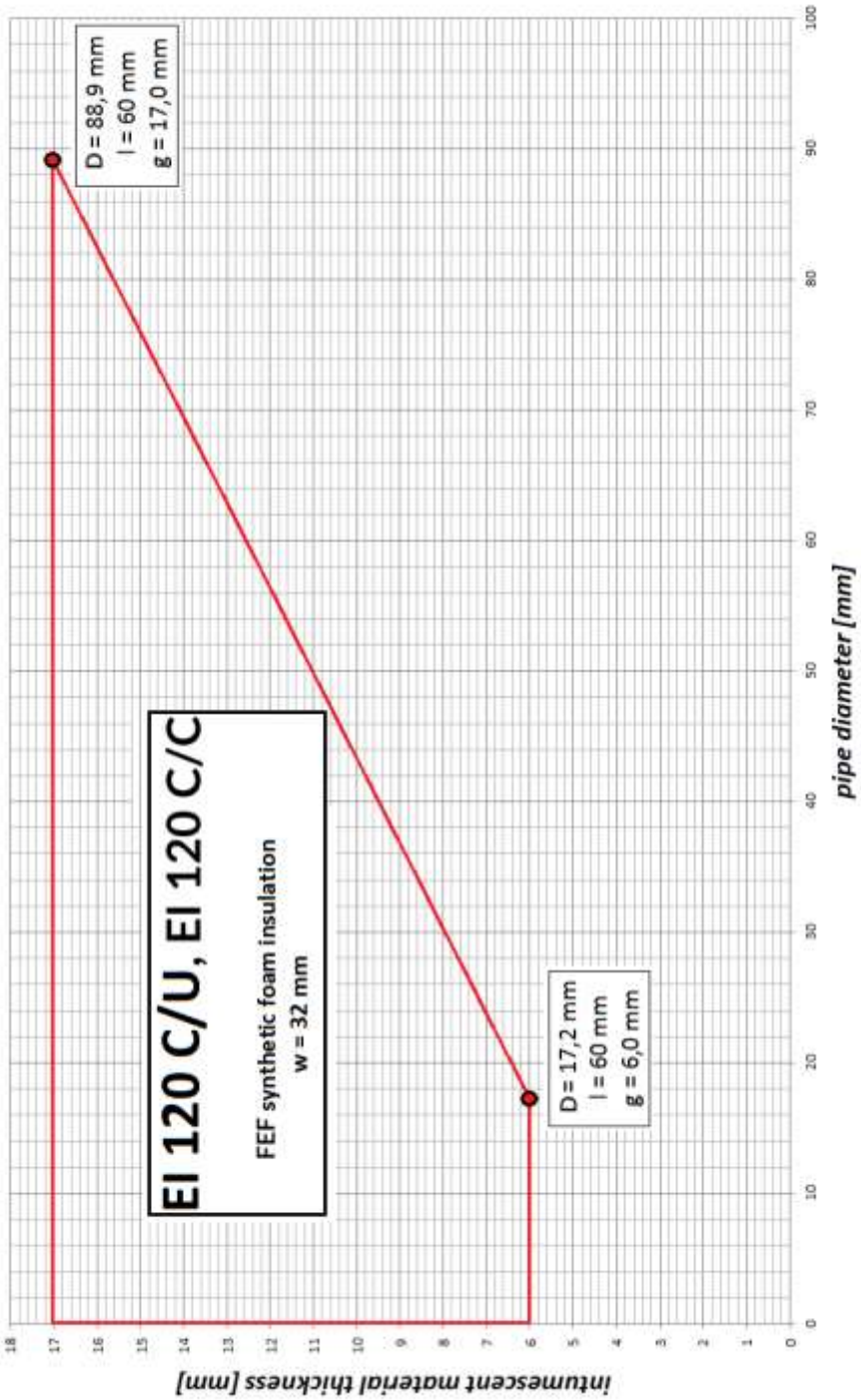
Piro Collar PC	**Annex D1** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D2. Range of steel pipes with flexible elastomeric foam (FEF) insulation thickness of 32 mm in flexible or rigid wall, thickness of B ≥ 125 mm penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C1 in Annex C



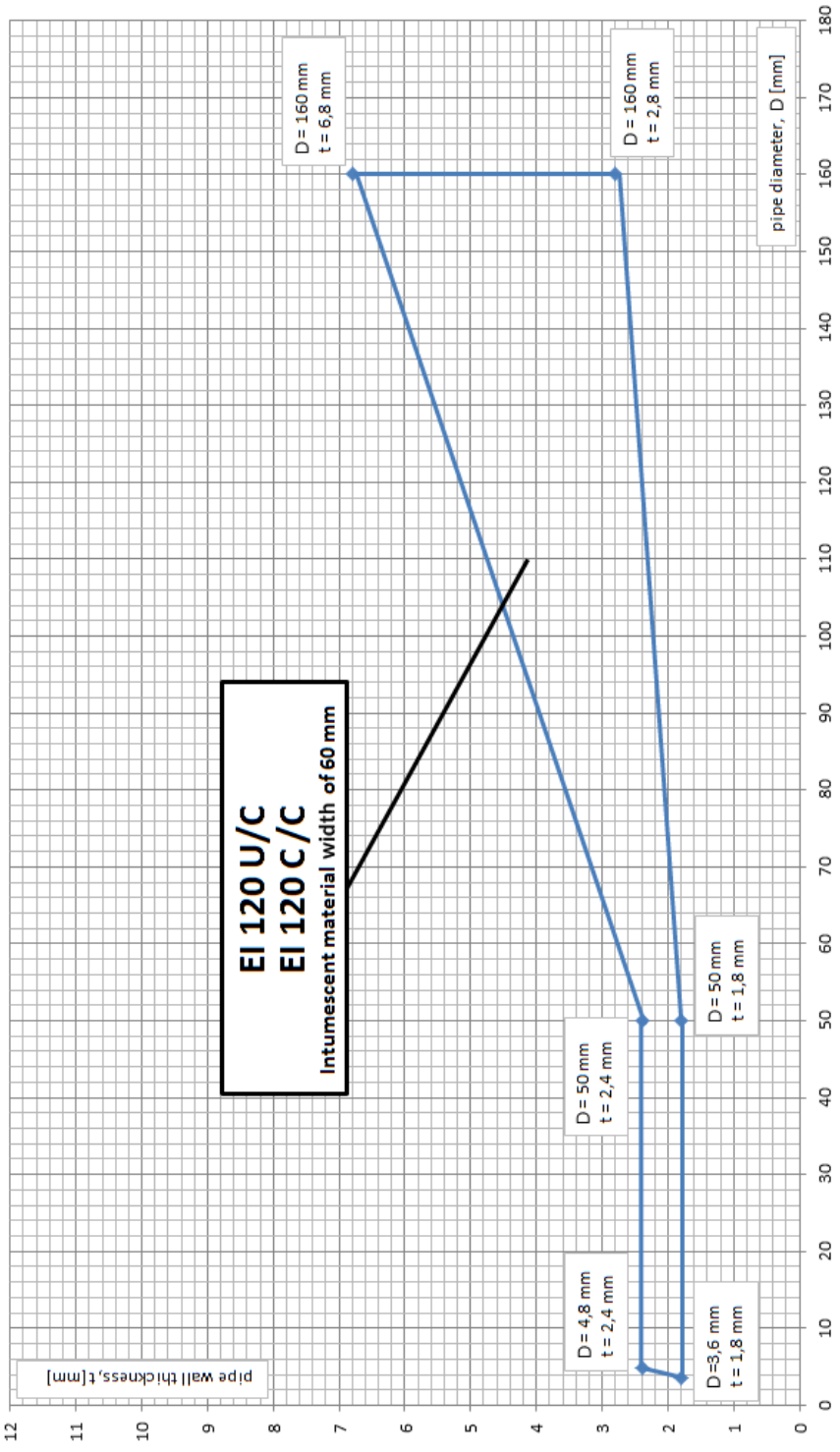
Piro Collar PC	**Annex D2** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D3. Range of intumescent material thickness for steel pipes with flexible elastomeric foam (FEF) insulation thickness of 32 mm (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C1 in Annex C



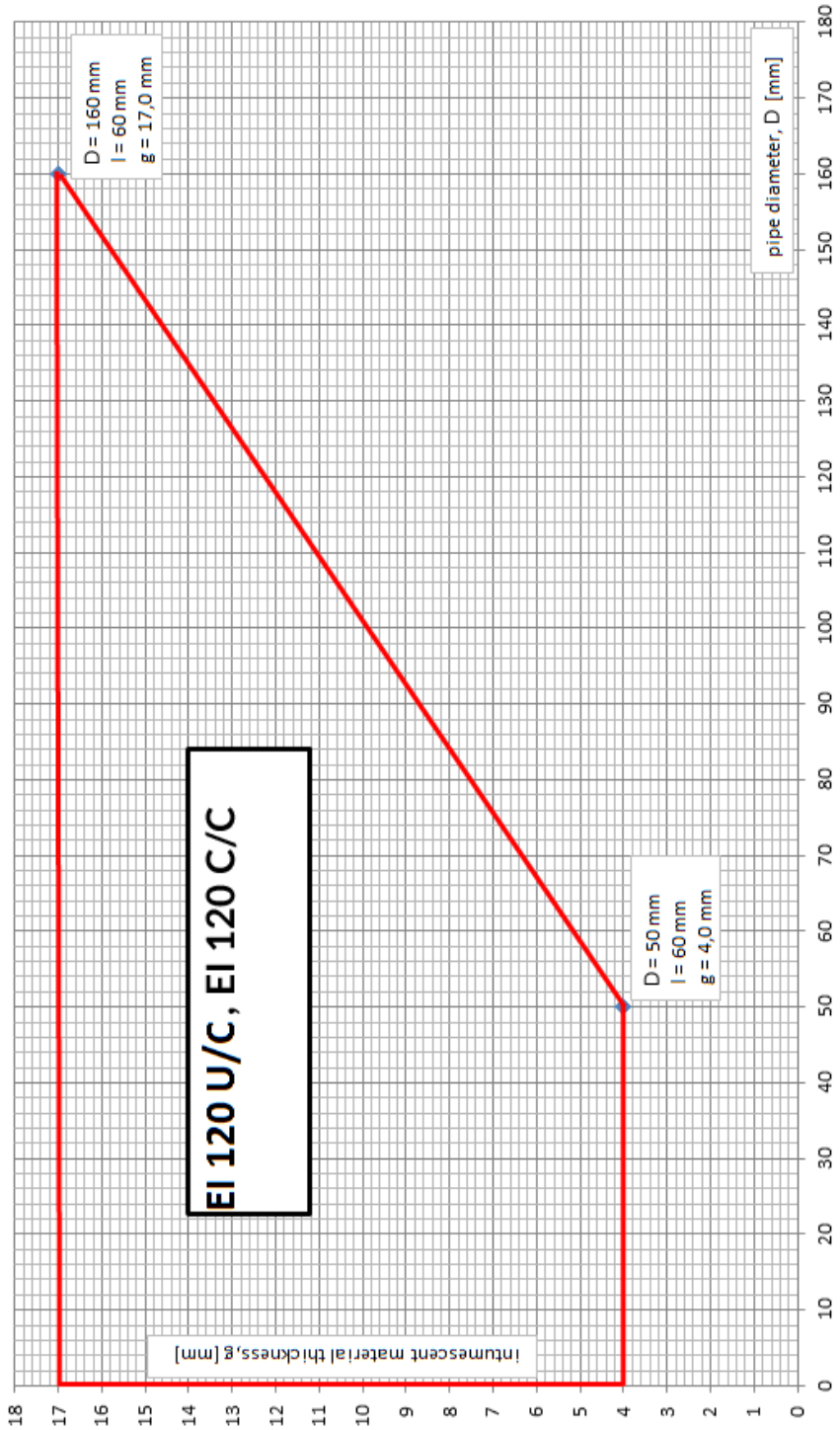
Piro Collar PC	**Annex D3** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D4. Range of PE-HD/PE/ABS/SAN+PVC pipes, penetration sealed with use of Piro Collar PC collars in rigid wall, thickness of 100 mm ≤ B < 125 mm made in accordance with Fig. C2 in Annex C



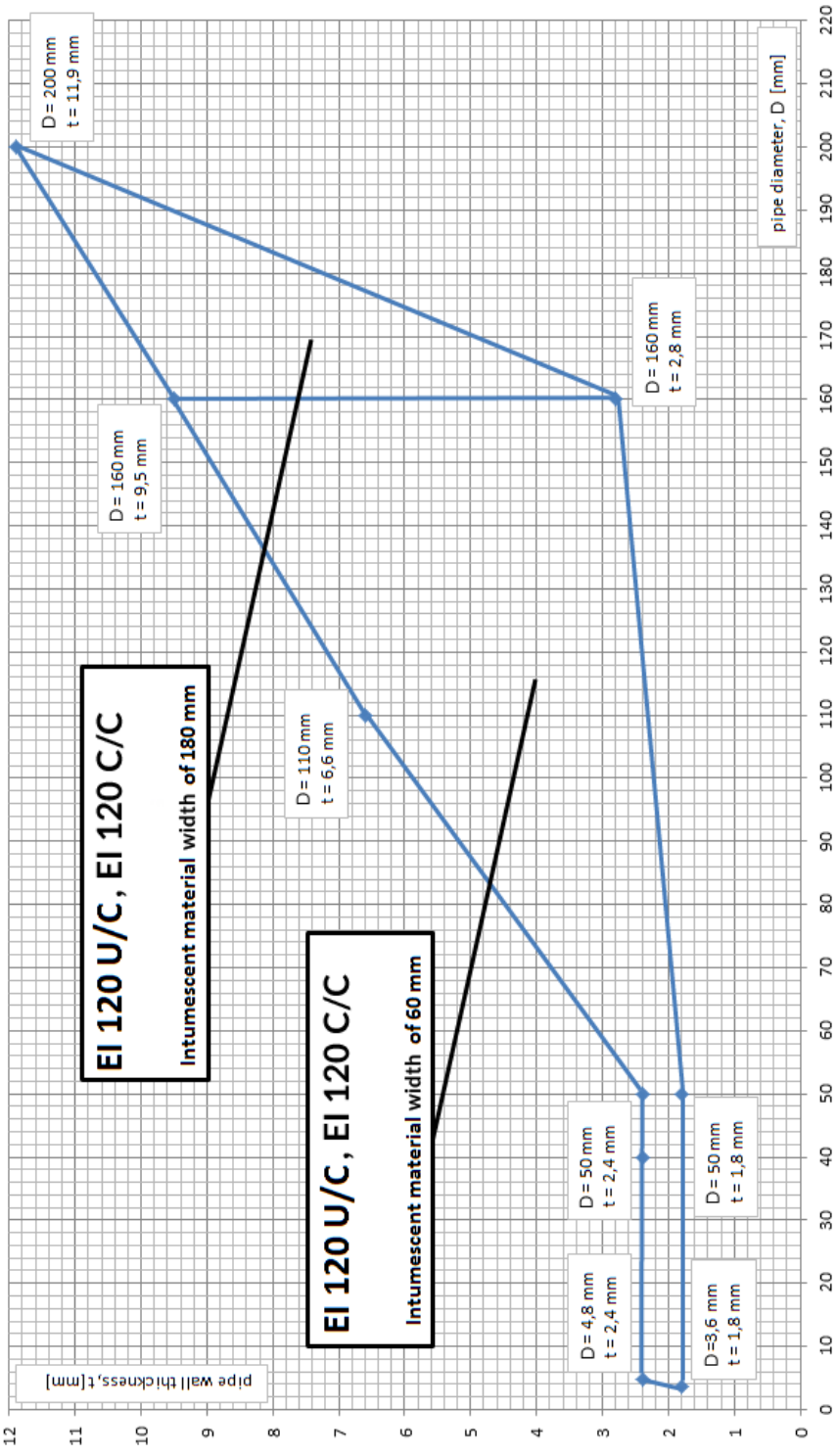
Piro Collar PC	**Annex D4** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D5. Range of intumescent material thickness for PE-HD/PE/ABS/SAN+PVC and PVC-U/PVC-C pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C2 in Annex C



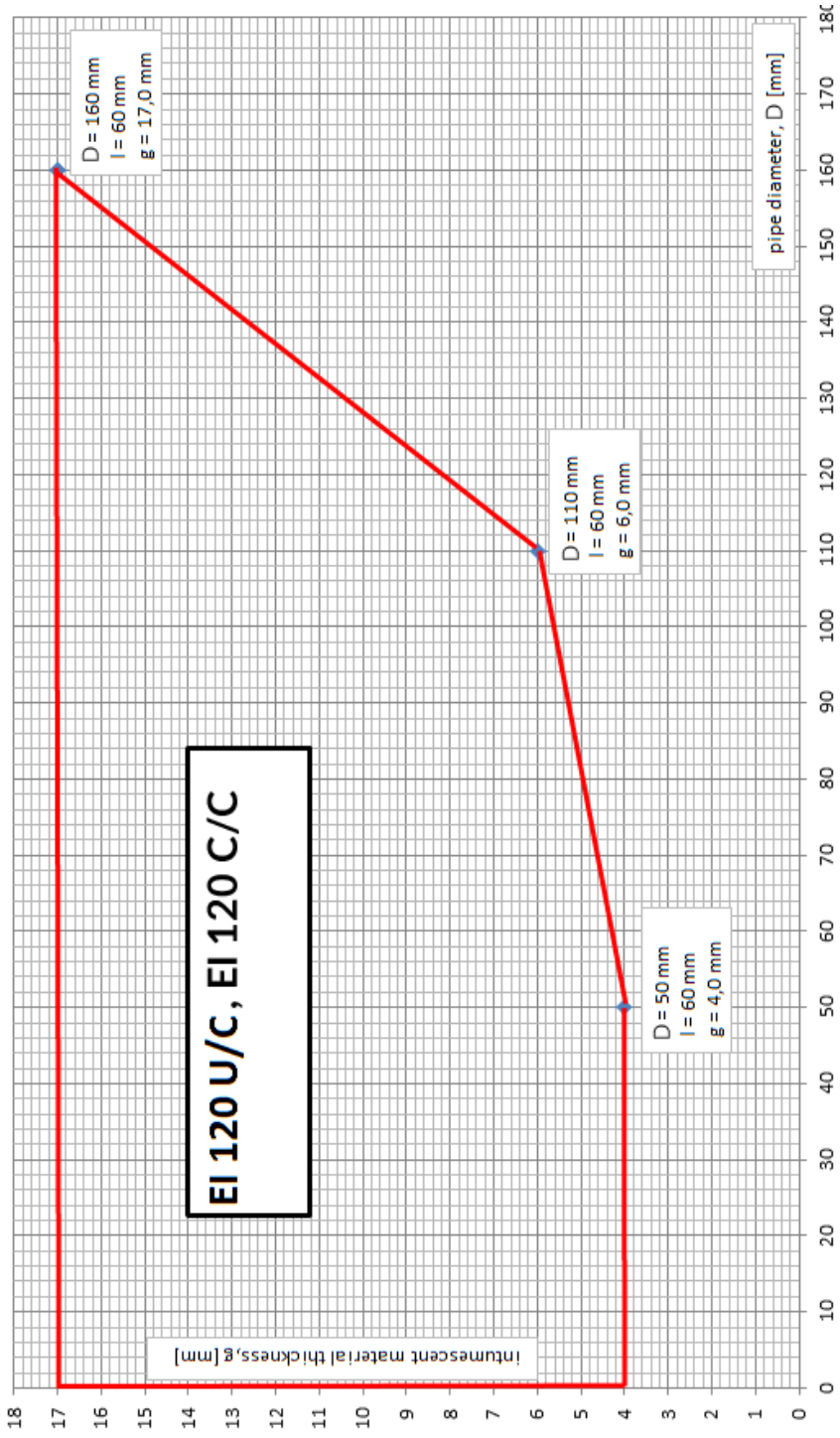
Piro Collar PC	**Annex D5** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D6. Range of PE-HD/PE/ABS/SAN+PVC pipes, penetration sealed with use of Piro Collar PC collars in rigid wall thickness of B ≥ 125 mm, made in accordance with Fig. C2 in Annex C



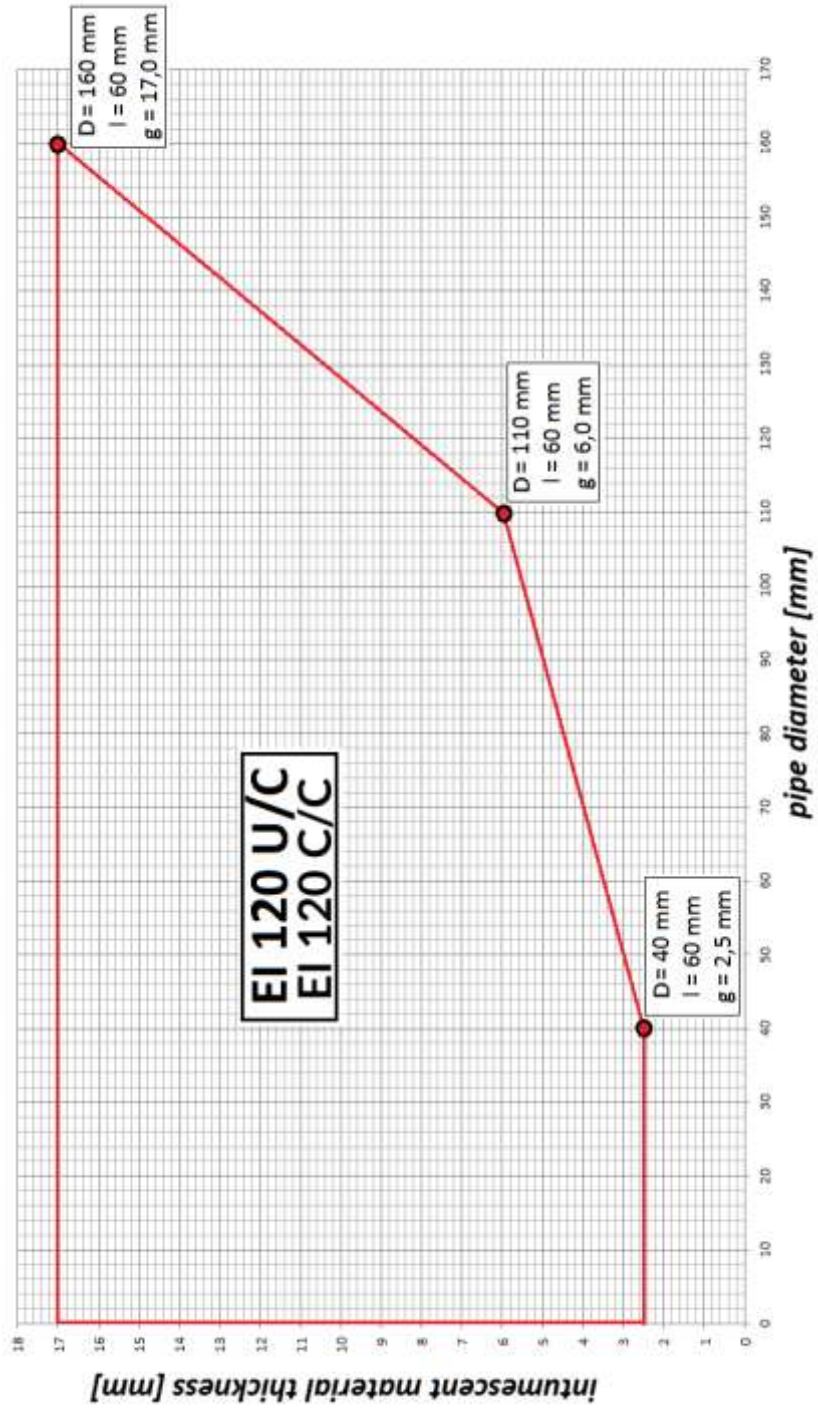
Piro Collar PC	**Annex D6** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D7. Range of intumescent material thickness for PE-HD/PE/ABS/SAN+PVC and PVC-U/PVC-C pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C2, C3 and C5 in Annex C



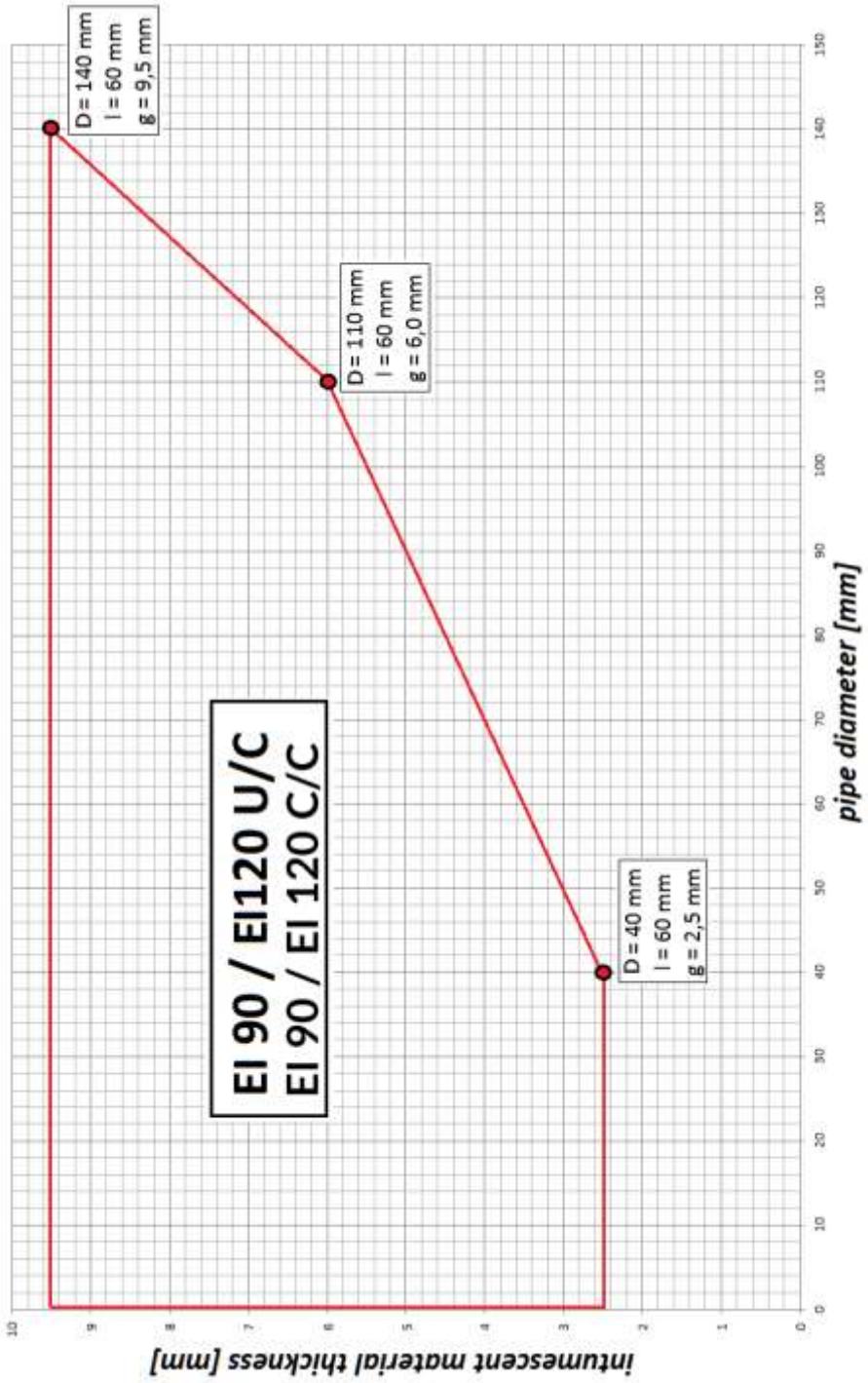
Piro Collar PC	**Annex D7** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D8. Range of intumescent material thickness for PE-HD/PE/ABS/SAN+PVC and PP pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C3 and C5 in Annex C



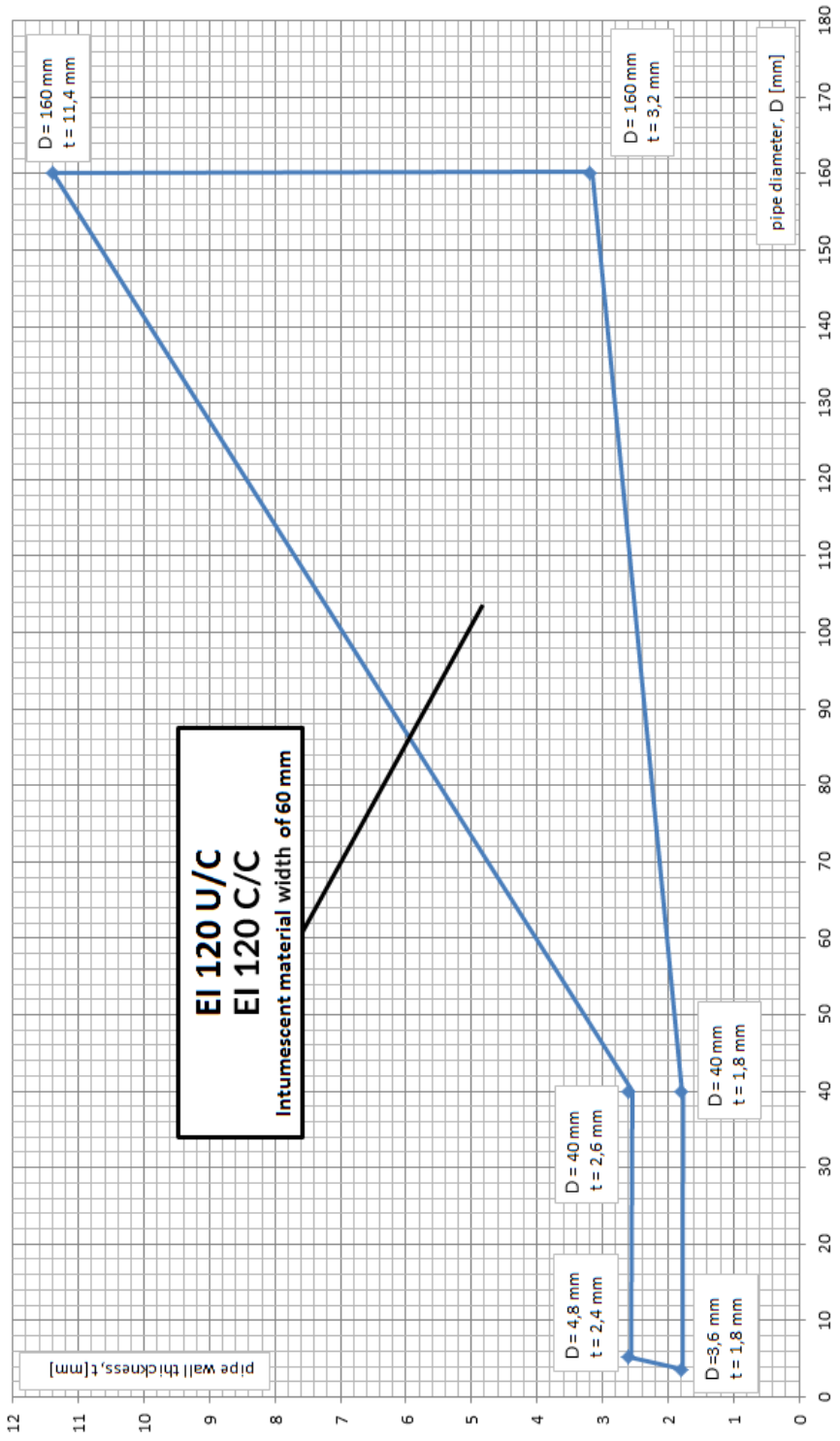
Piro Collar PC	**Annex D8** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D9. Range of intumescent material thickness for PE-HD/PE/ABS/SAN+PVC and PP pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C3 in Annex C



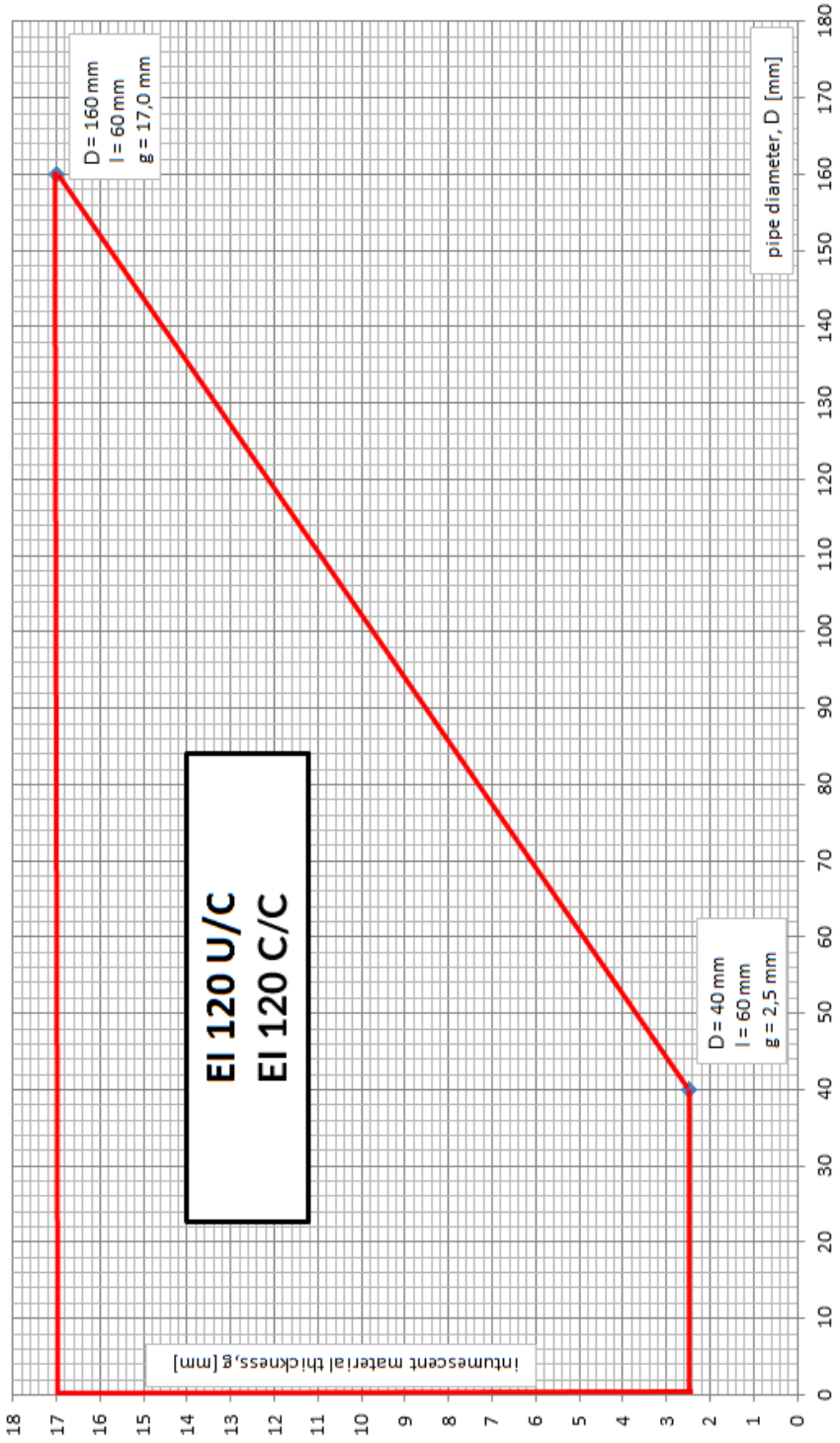
Piro Collar PC	**Annex D9** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D10. Range of PP pipes, penetration sealed with use of Piro Collar PC collars in rigid wall, thickness of 100 mm ≤ B < 125 mm made in accordance with Fig. C2 in Annex C



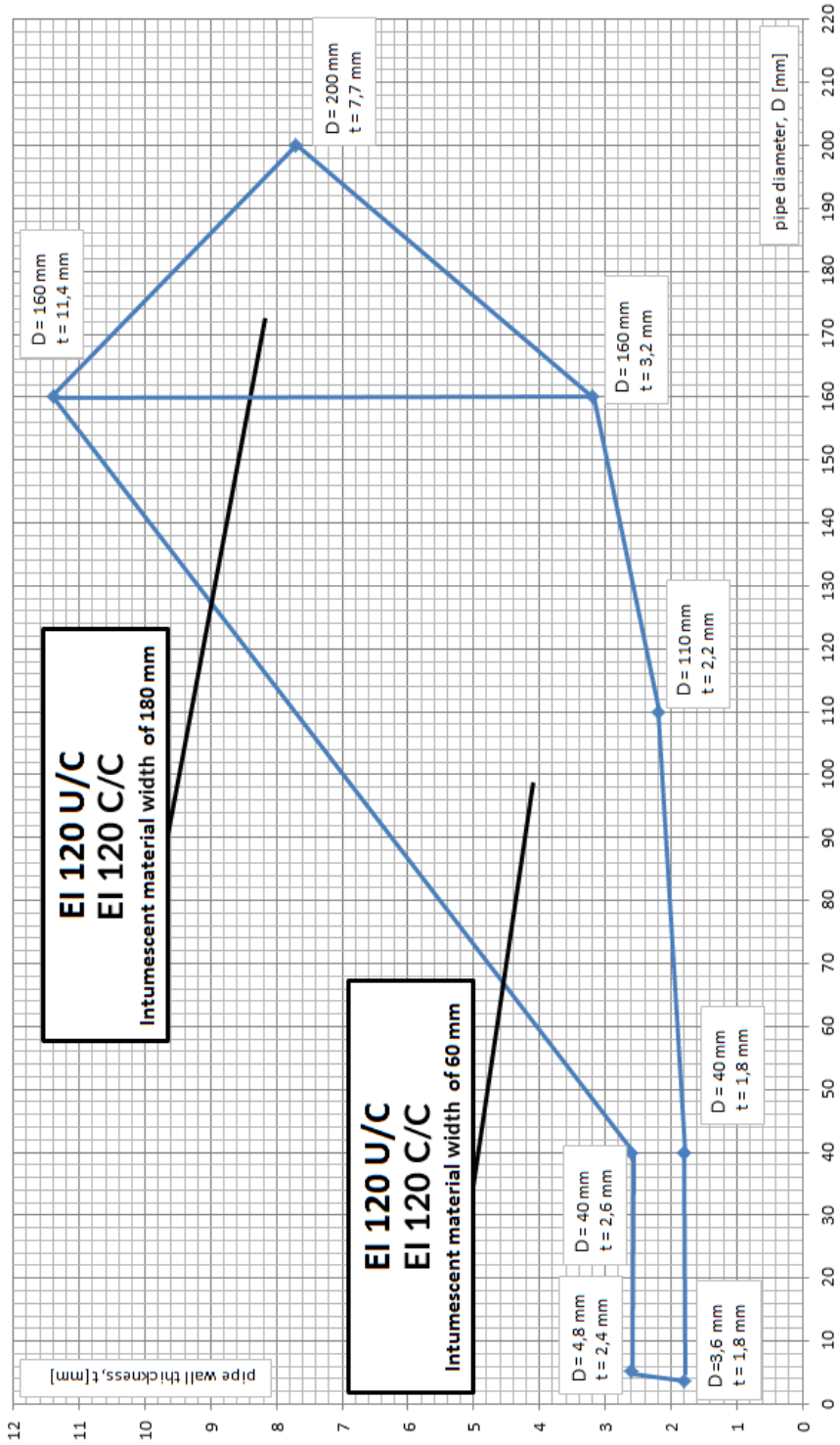
Piro Collar PC	**Annex D10** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D11. Range of intumescent material thickness for PP pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C2 and C5 in Annex C



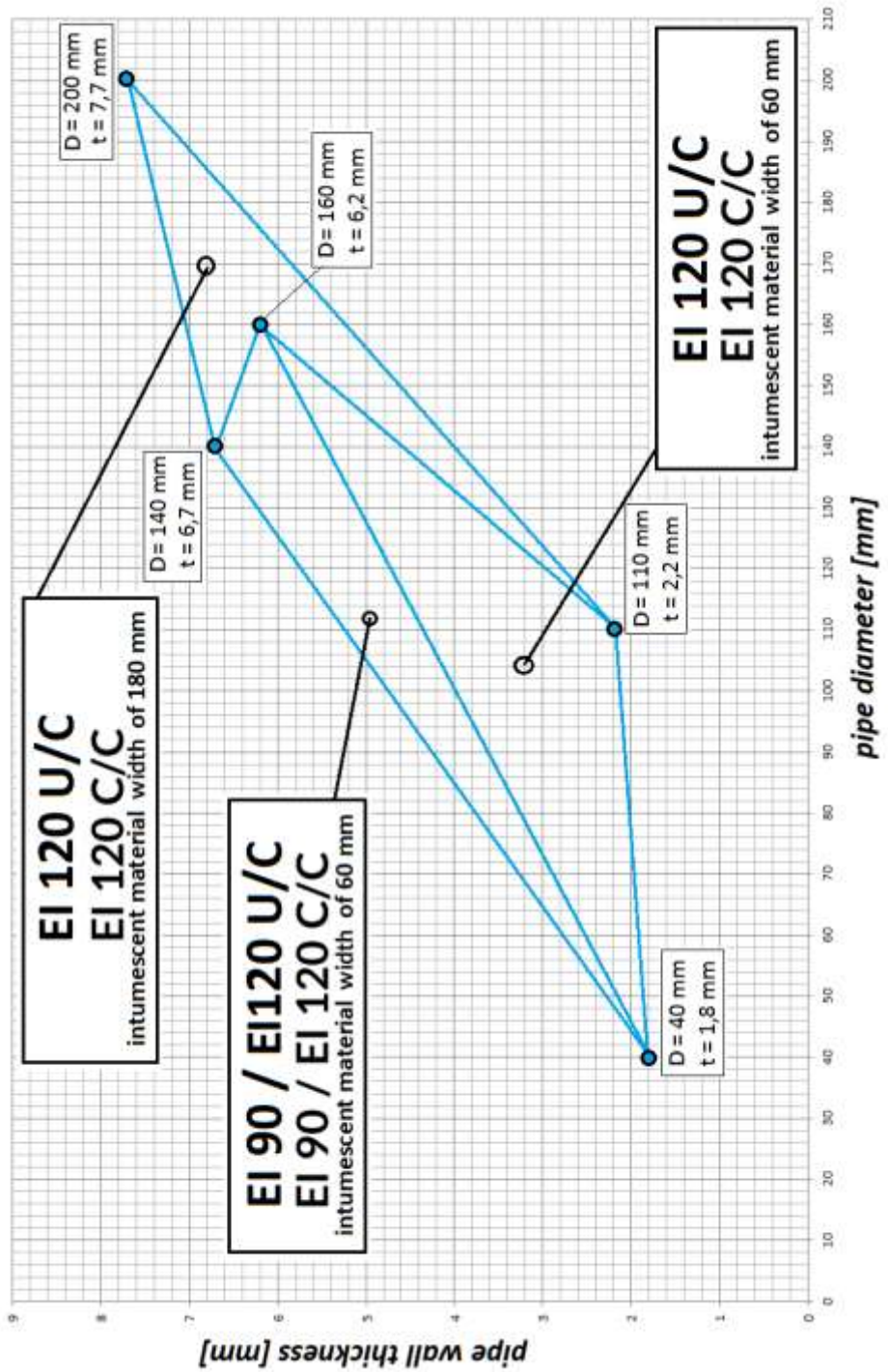
Piro Collar PC	**Annex D11** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D12. Range of PP pipes, penetration sealed with use of Piro Collar PC collars in rigid wall thickness of B ≥ 125 mm, made in accordance with Fig. C2 in Annex C



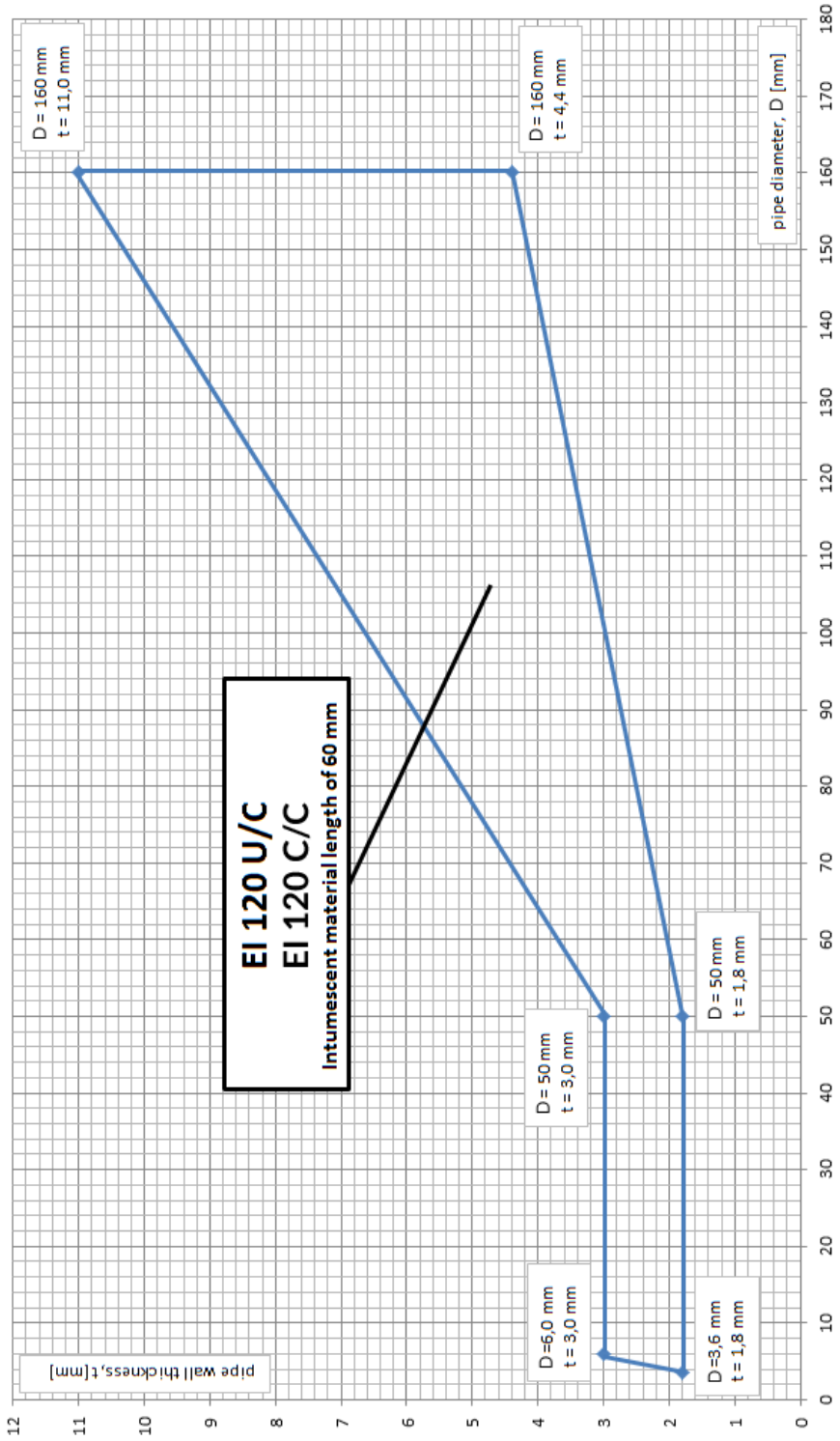
Piro Collar PC	**Annex D12** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D13. Range of PP pipes, penetration sealed with use of Piro Collar PC collars in flexible wall thickness of B ≥ 125 mm, made in accordance with Fig. C3 in Annex C



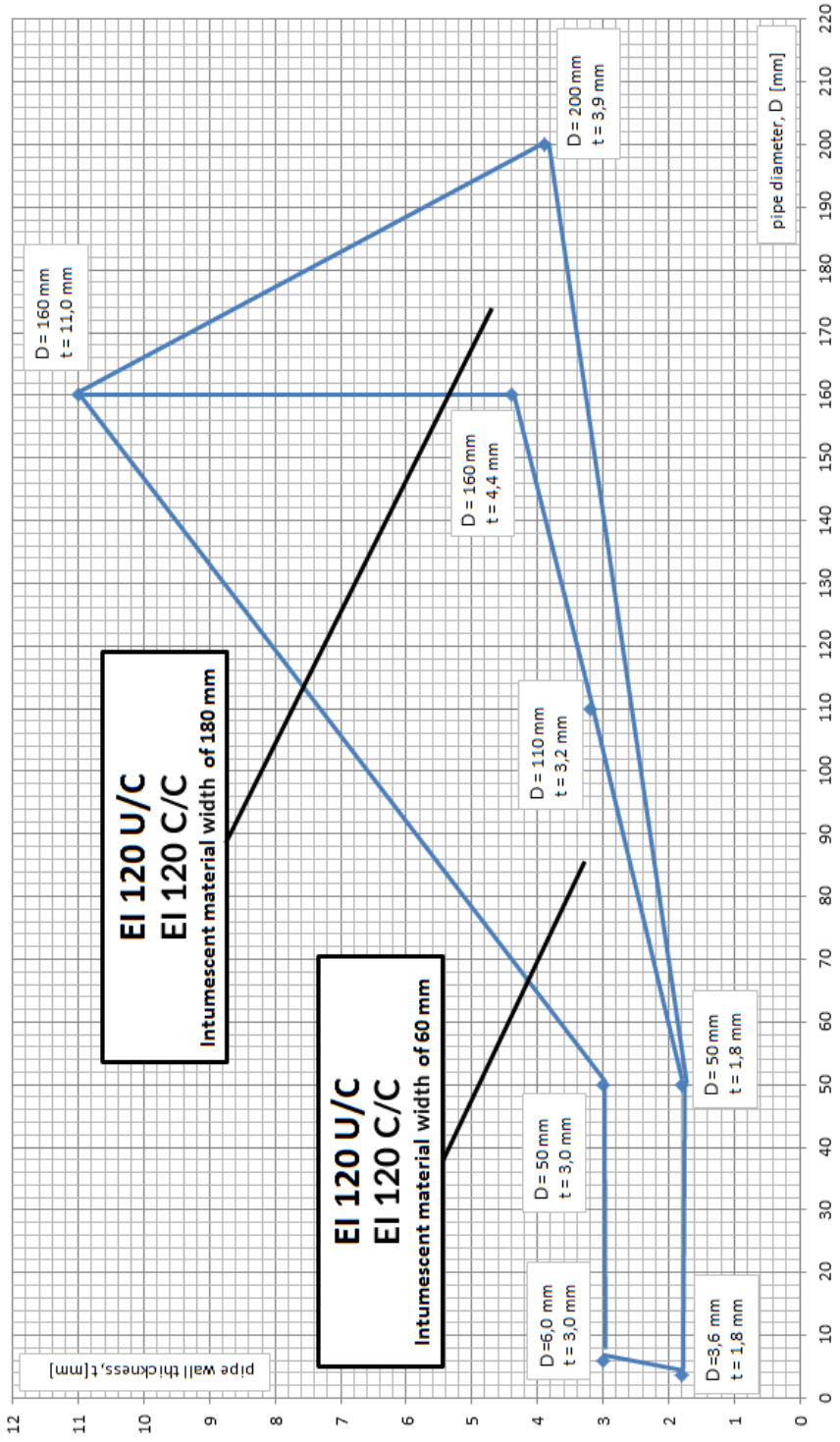
Piro Collar PC	**Annex D13** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D14. Range of PVC-U/PVC-C pipes, penetration sealed with use of Piro Collar PC collars in rigid wall, thickness of 100 mm ≤ B < 125 mm made in accordance with Fig. C2 in Annex C



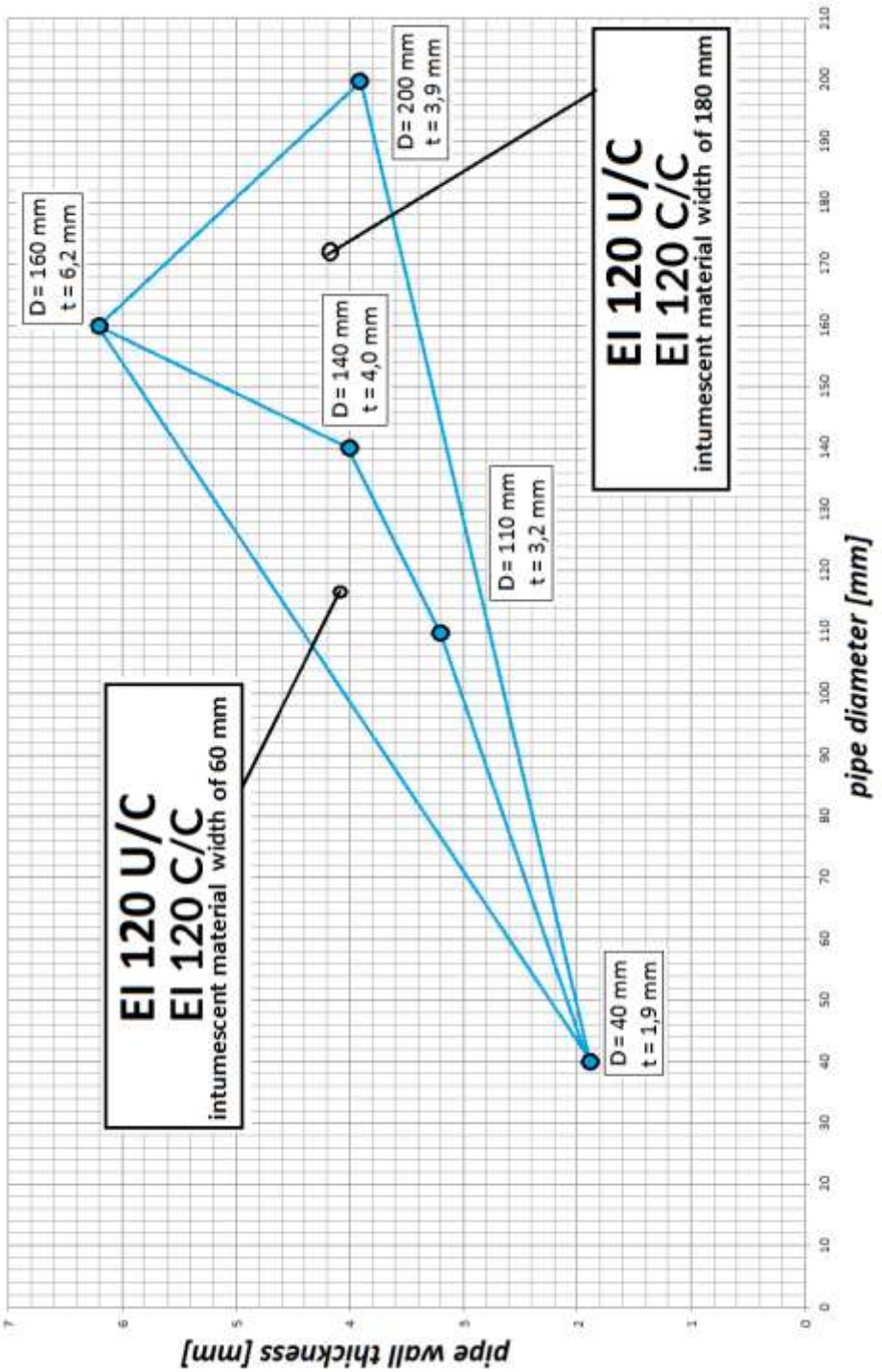
Piro Collar PC	**Annex D14** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D15. Range of PVC-U/PVC-C pipes, penetration sealed with use of Piro Collar PC collars in rigid wall thickness of B ≥ 125 mm, made in accordance with Fig. C2 in Annex C



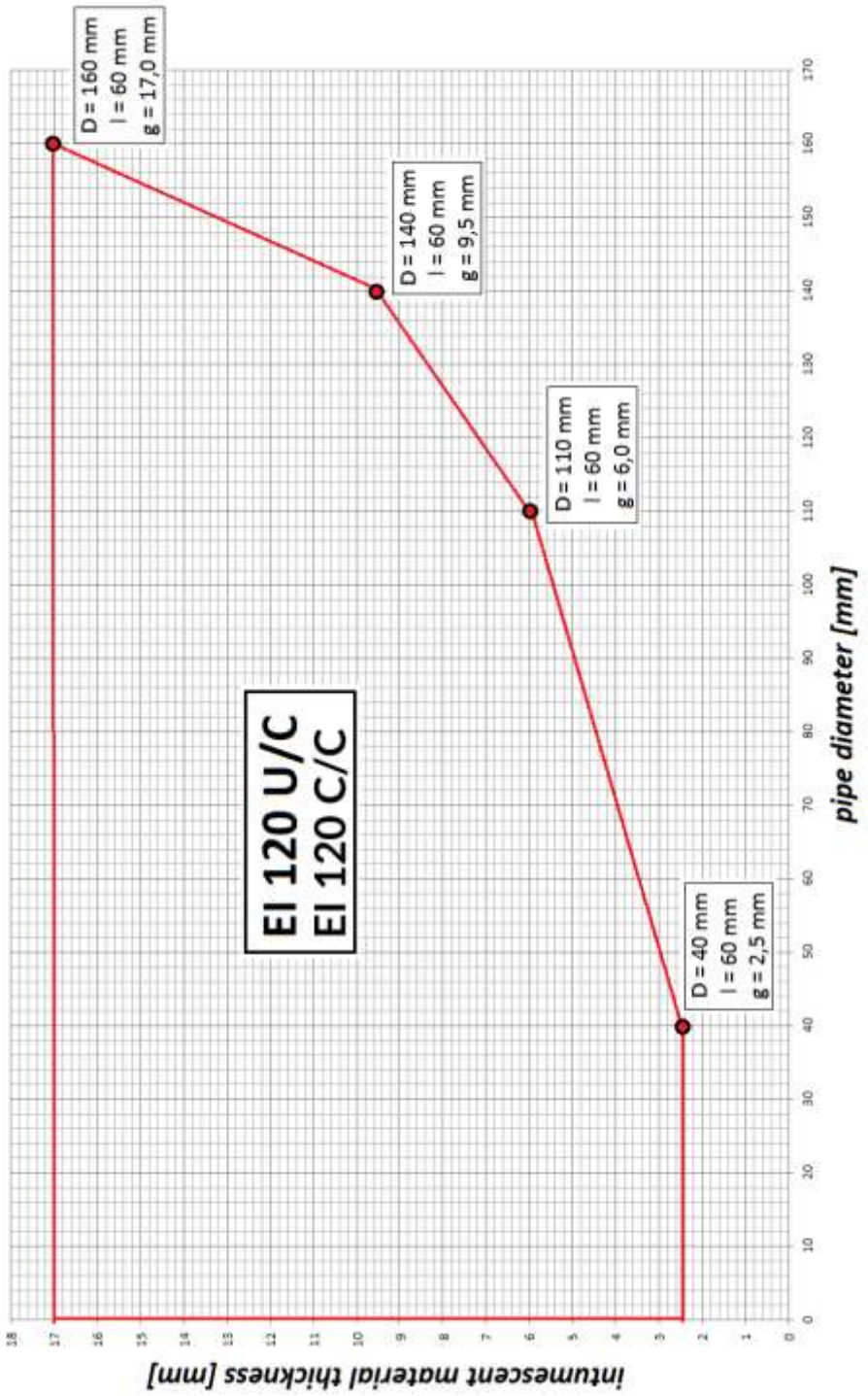
Piro Collar PC	**Annex D15** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D16. Range of PVC-U/PVC-C pipes, penetration sealed with use of Piro Collar PC collars in flexible wall thickness of B ≥ 125 mm made in accordance with Fig. C3 in Annex C



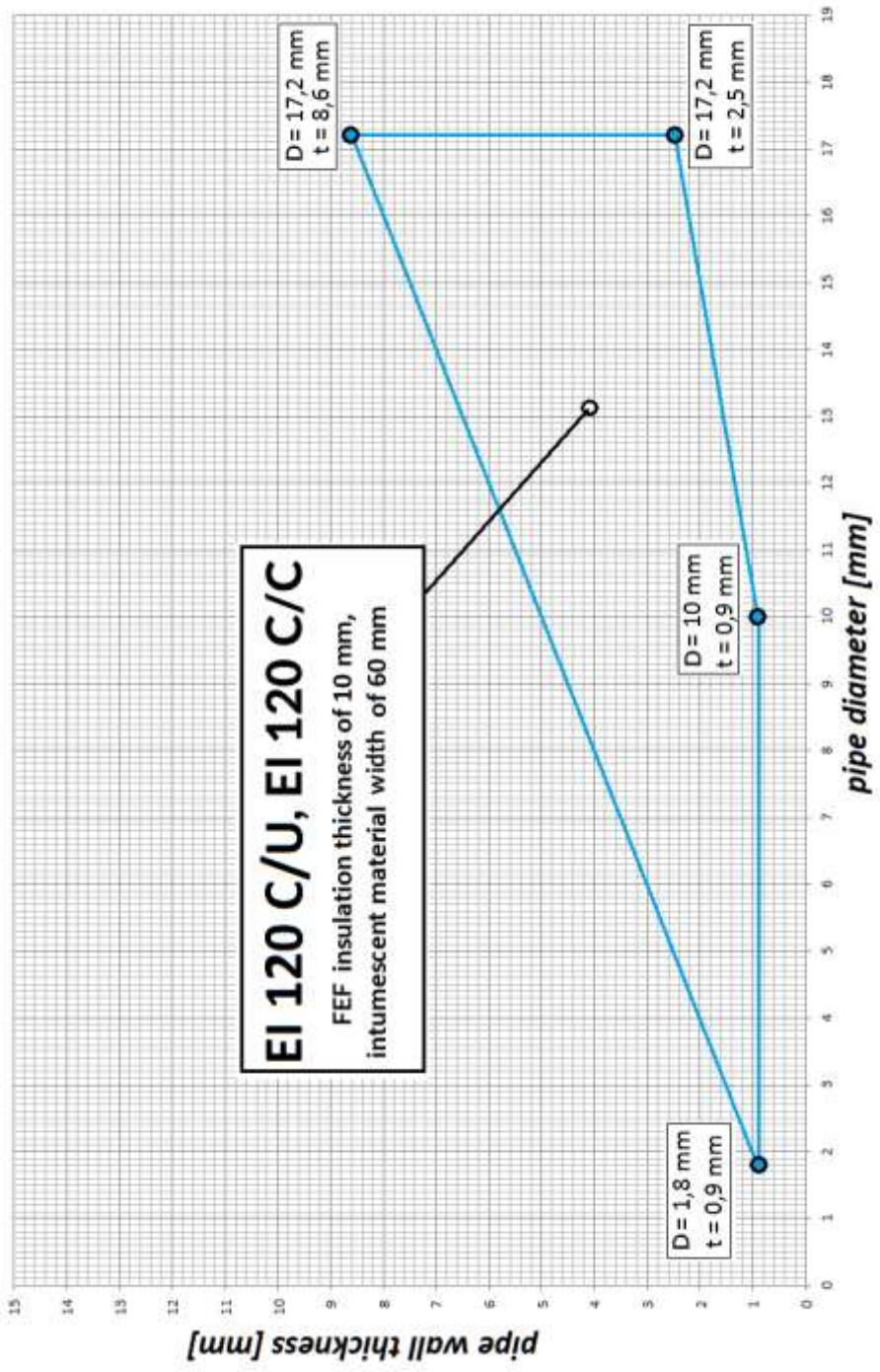
Piro Collar PC	**Annex D16** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D17. Range of intumescent material thickness for PVC-U/PVC-C and PP pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C3 and C5 in Annex C



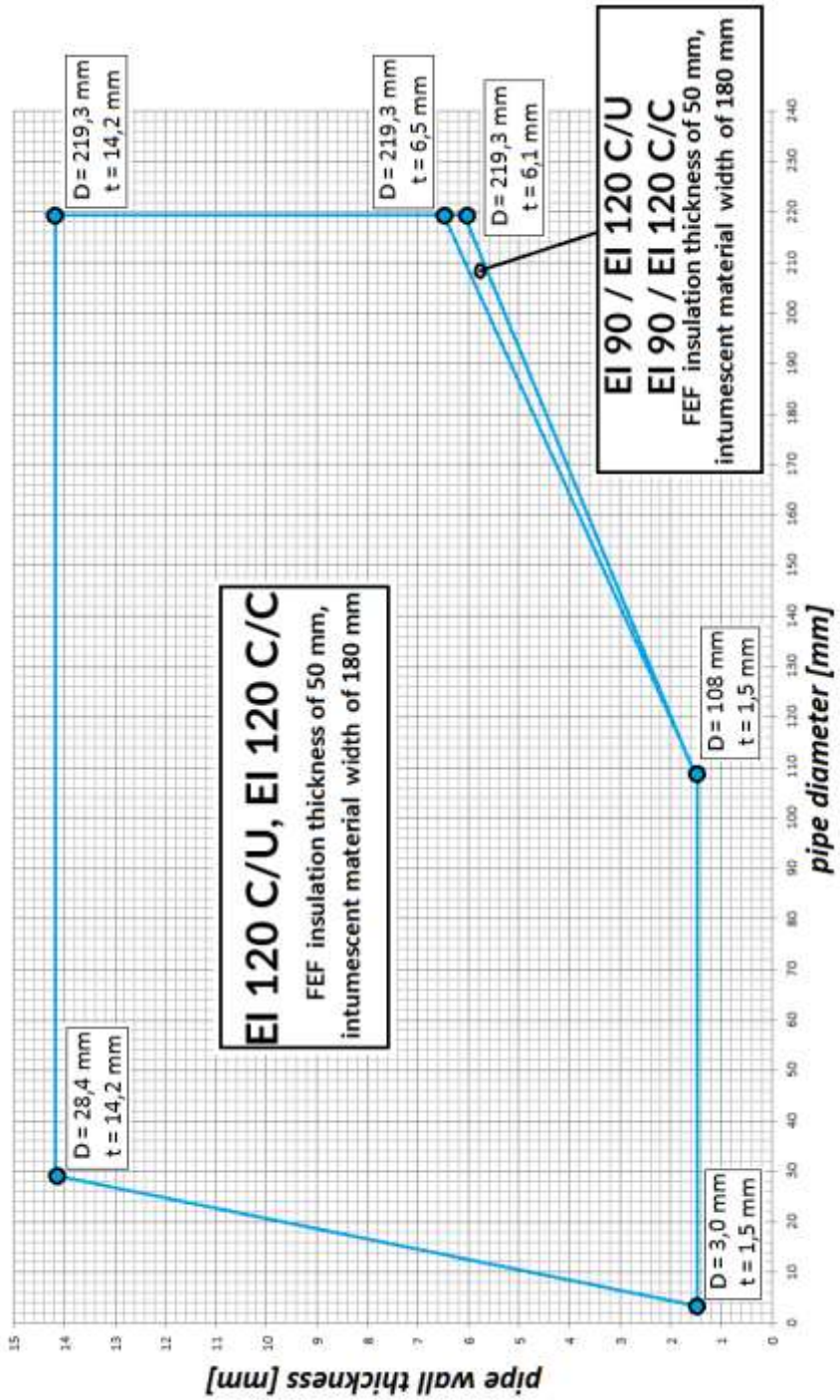
Piro Collar PC	**Annex D17** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D18. Range of steel pipes with flexible elastomeric foam (FEF) insulation thickness of 10 mm in rigid floor thickness of B ≥ 150 mm, penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C4 in Annex C



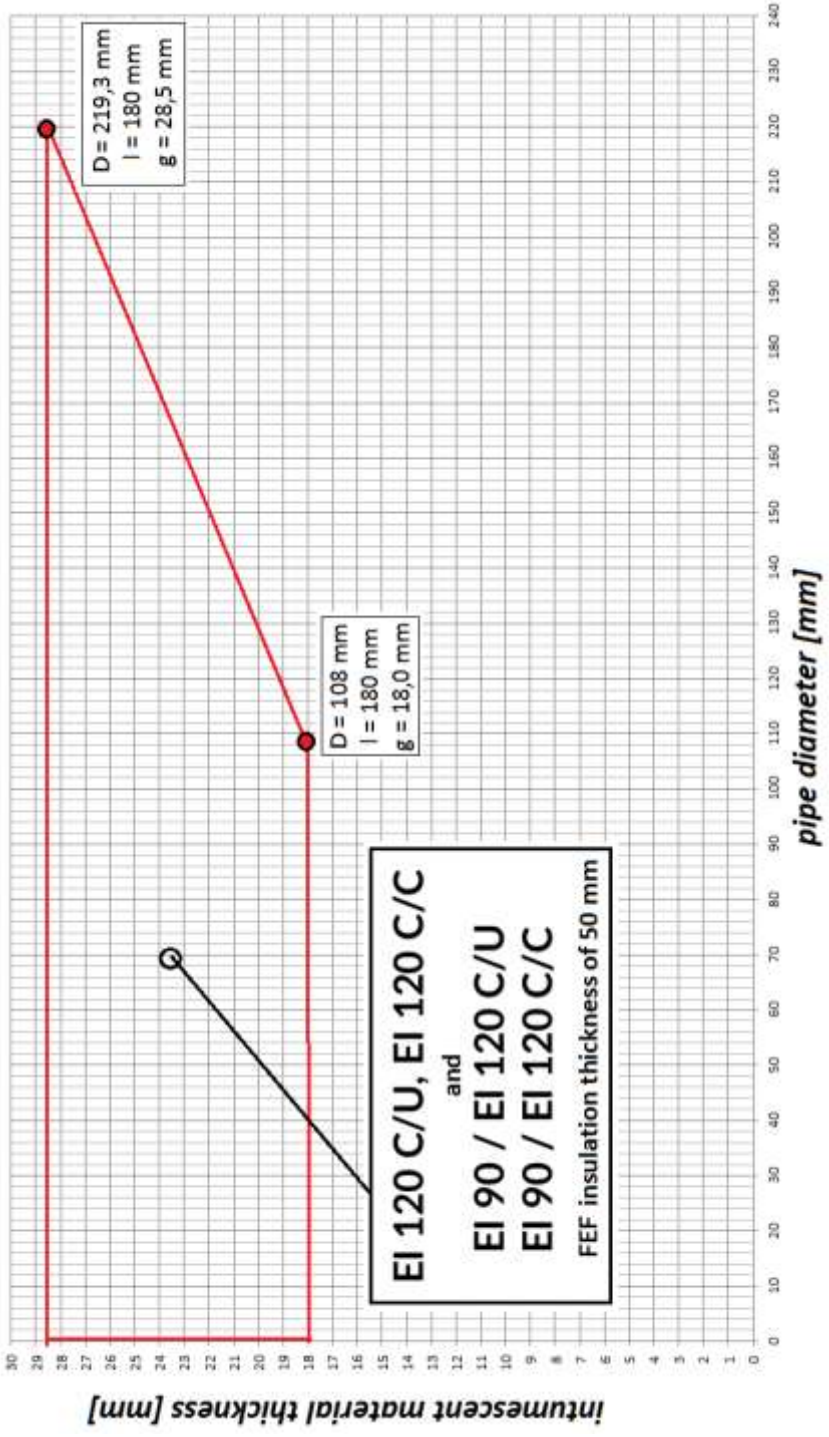
Piro Collar PC	**Annex D18** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D19. Range of steel pipes with flexible elastomeric foam (FEF) insulation thickness of 50 mm in rigid floor thickness of B ≥ 150 mm, penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C4 in Annex C



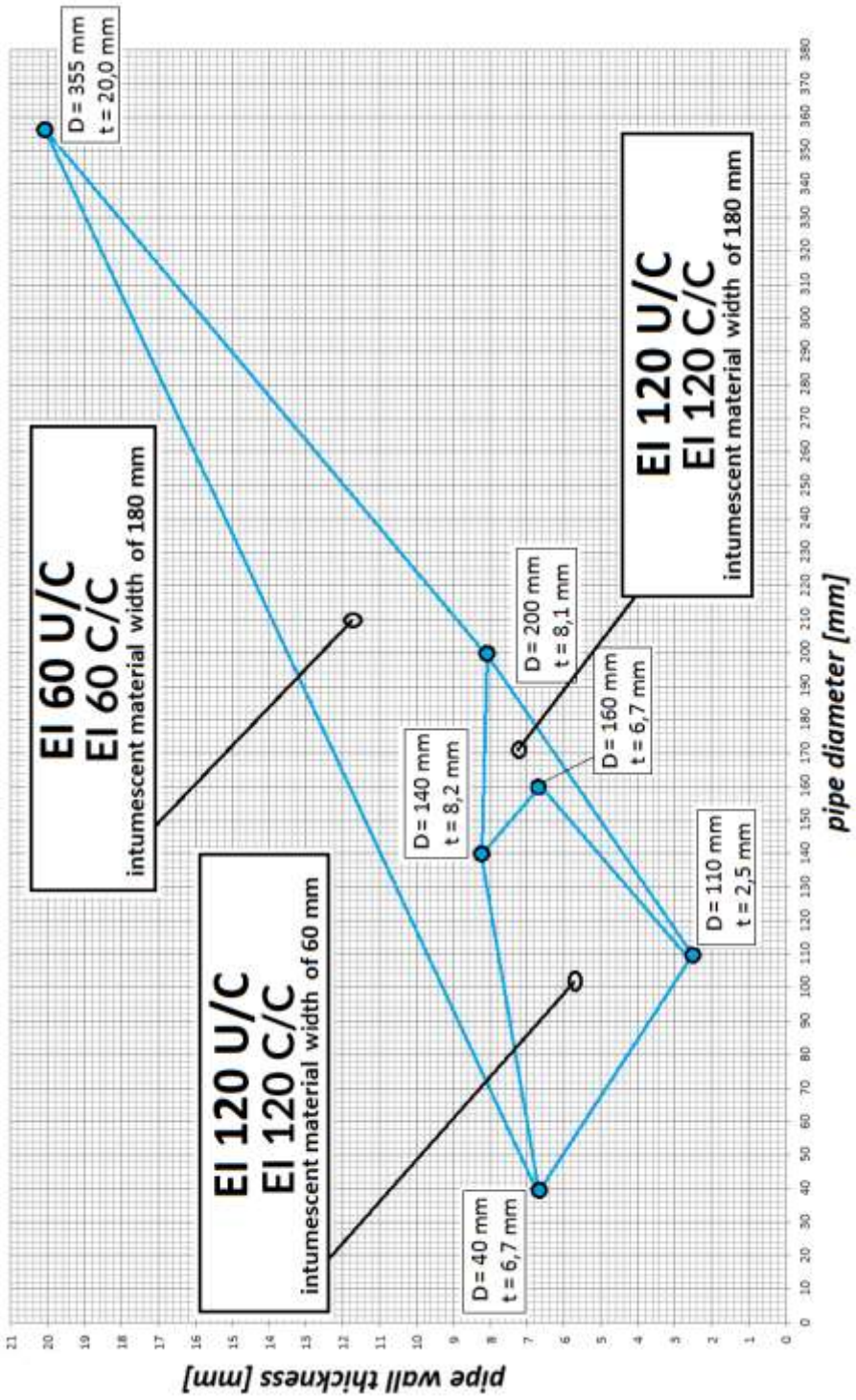
Piro Collar PC	**Annex D19** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D20. Range of intumescent material thickness for steel pipes with flexible elastomeric foam (FEF) insulation thickness of 50 mm (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C4 in Annex C



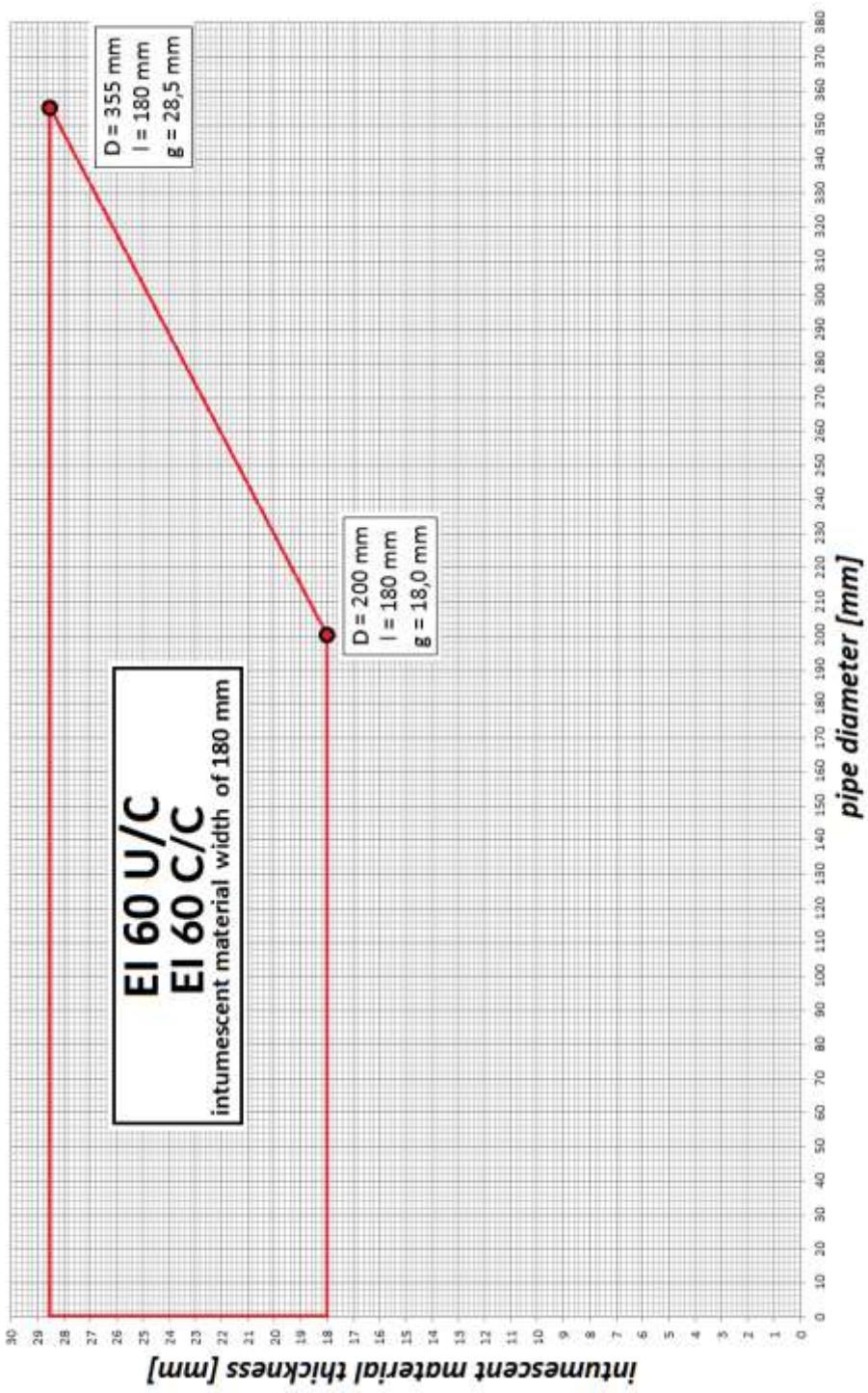
Piro Collar PC	**Annex D20** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D21. Range of PP pipes, penetration sealed with use of Piro Collar PC collars in rigid floor thickness of B ≥ 150 mm, made in accordance with Fig. C5 in Annex C



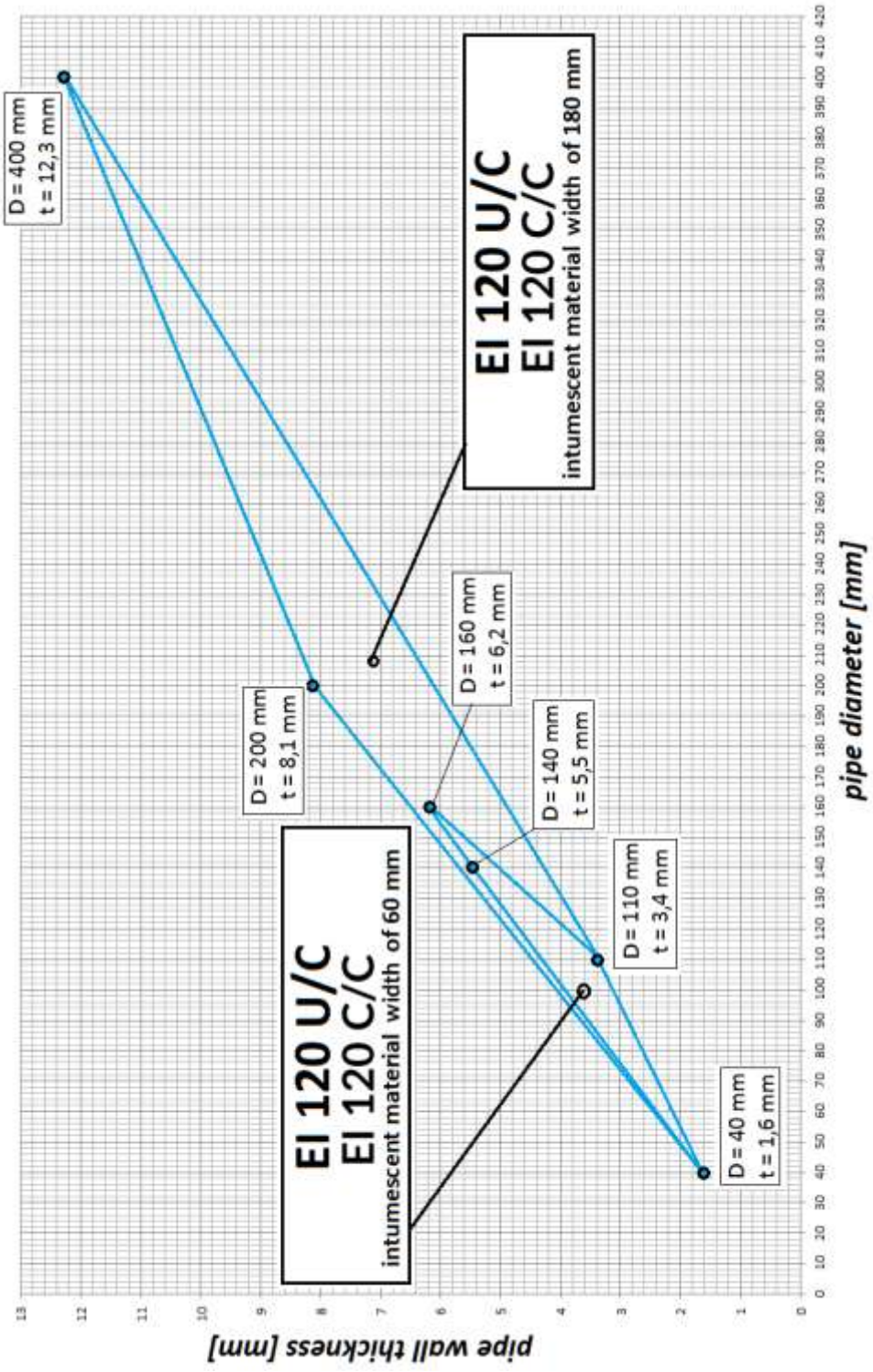
Piro Collar PC	**Annex D21** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D22. Range of intumescent material thickness for PP pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C5 in Annex C



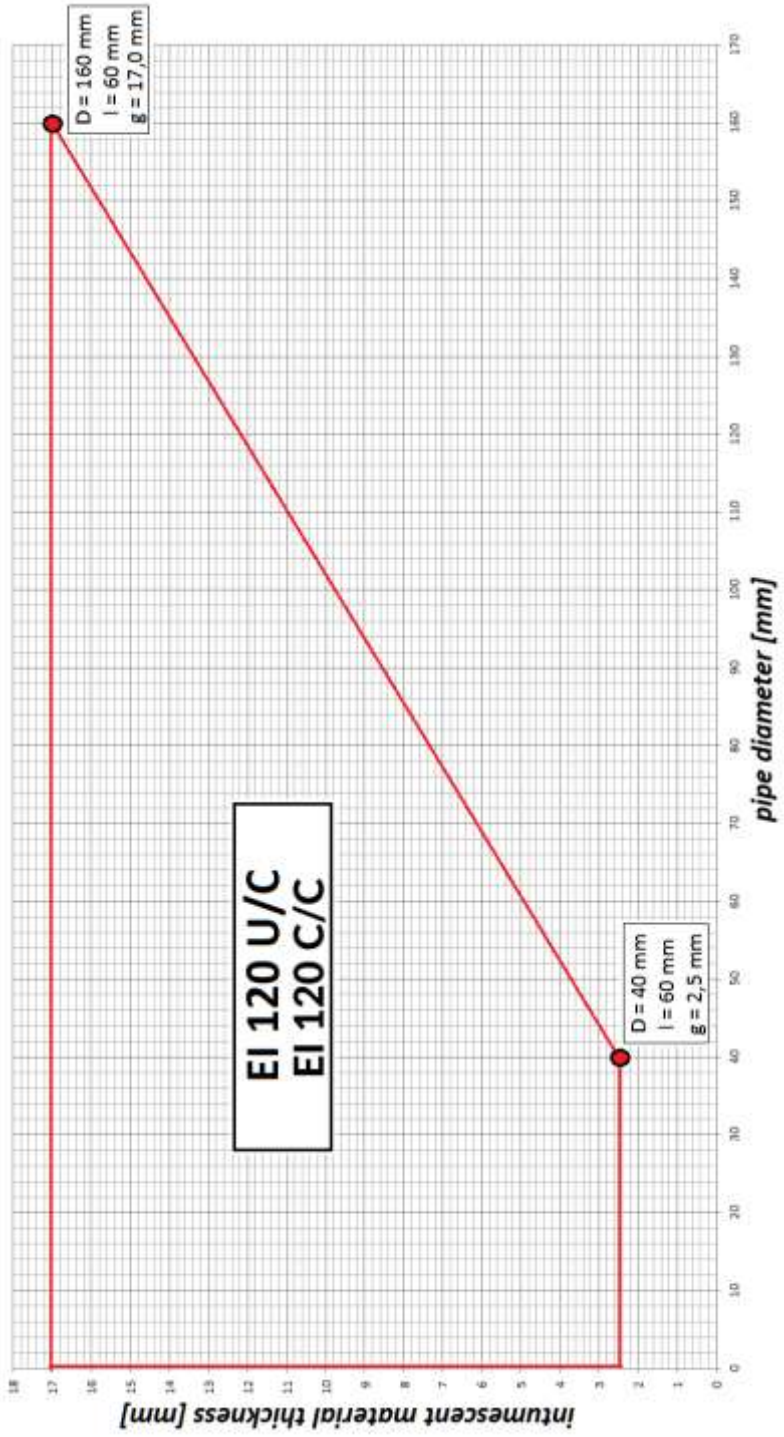
Piro Collar PC	**Annex D22** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D23. Range of PVC-U/PVC-C pipes, penetration sealed with use of Piro Collar PC collars in rigid floor thickness of B ≥ 150 mm, made in accordance with Fig. C5 in Annex C



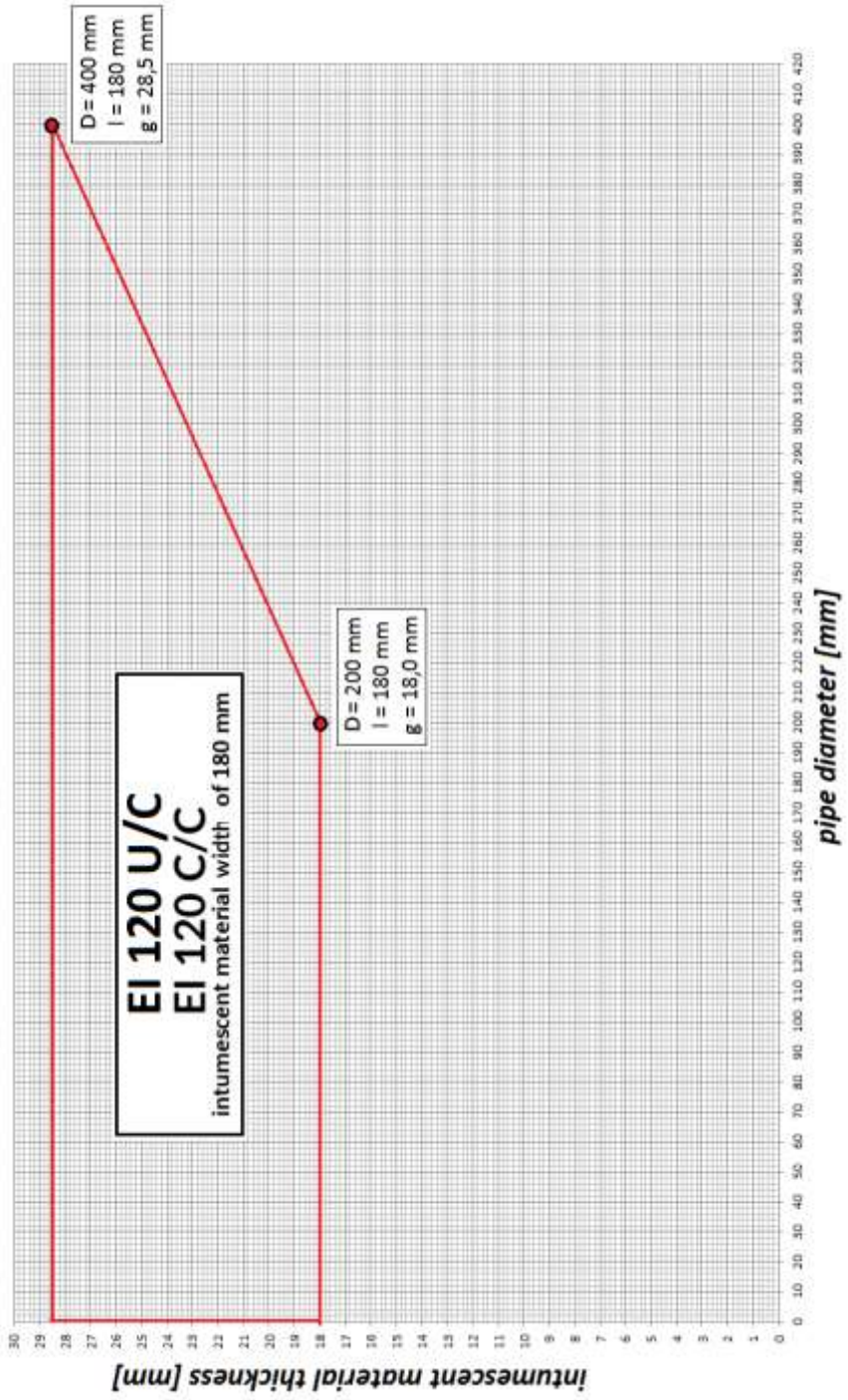
Piro Collar PC	**Annex D23** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D24. Range of intumescent material thickness for PVC-U/PVC-C pipes with PP pipes inside (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C5 and C7 in Annex C



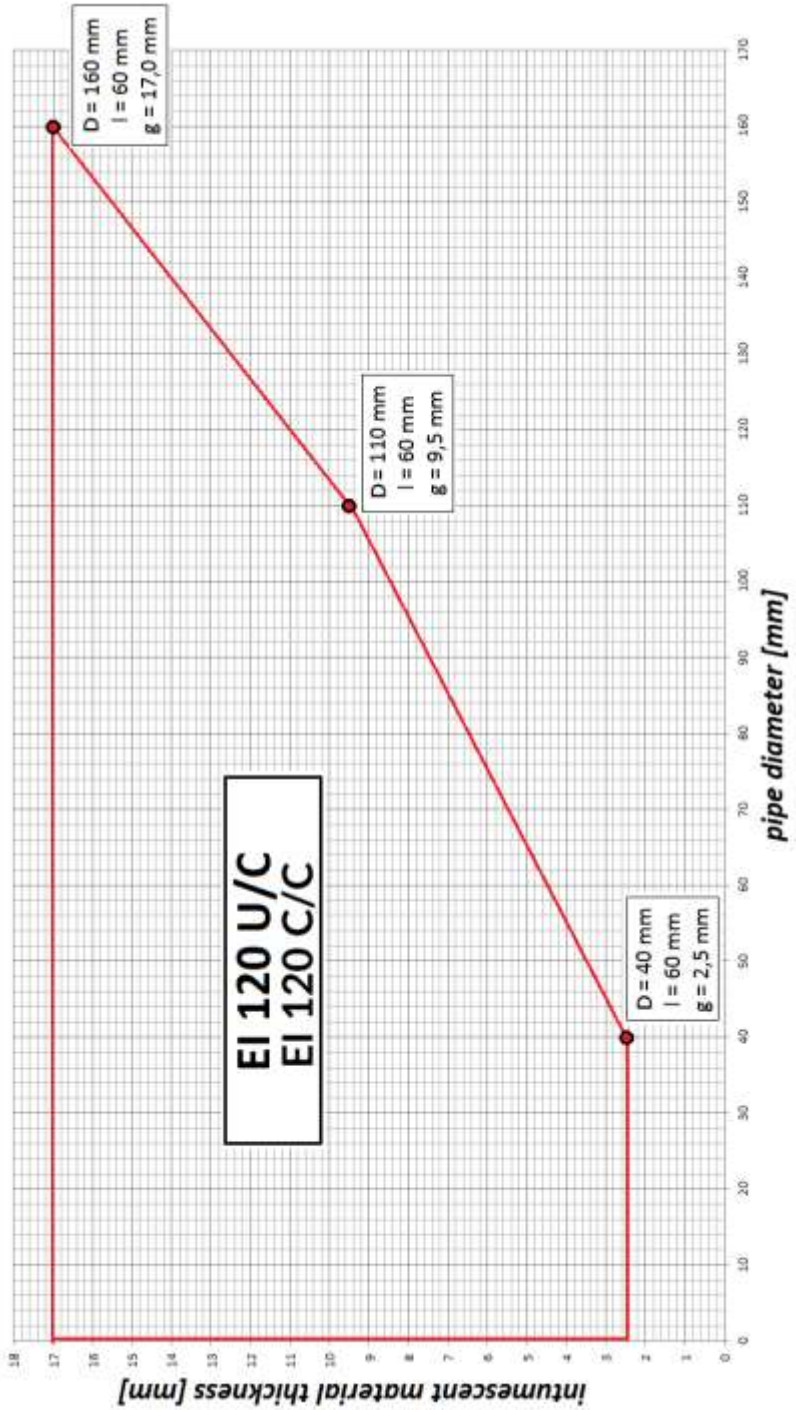
Piro Collar PC	**Annex D24** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D25. Range of intumescent material thickness for PVC-U/PVC-C pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C5 in Annex C



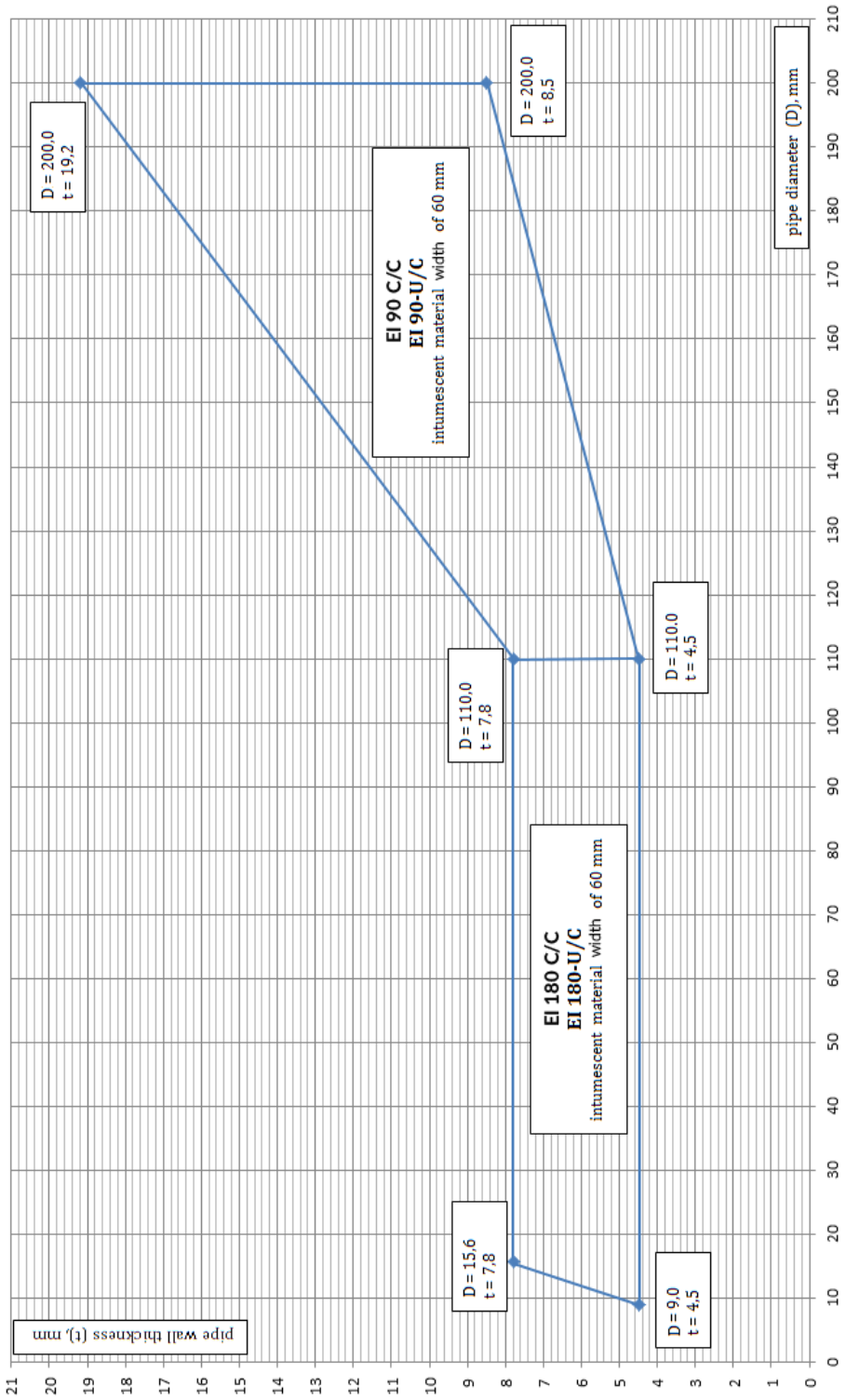
Piro Collar PC	**Annex D25** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D26. Range of intumescent material thickness for PVC-U/PVC-C pipes with cables type A1 inside (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C6 in Annex C



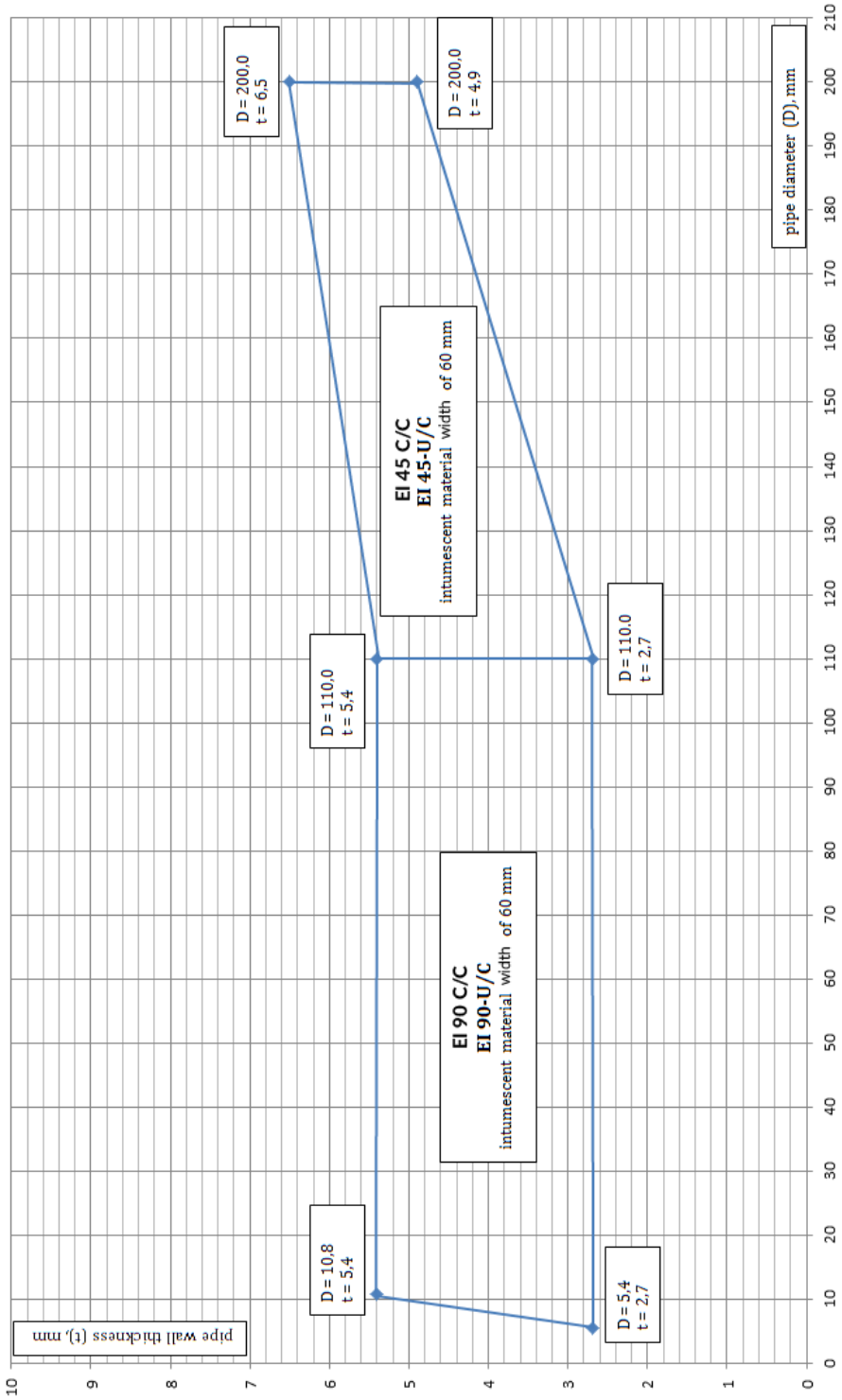
Piro Collar PC	**Annex D26** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D27. Range of PE-HD/PE/ABS/SAN+PVC pipes with PE acoustic mat insulation sealed with use of Piro Collar PC collars in rigid floor, made in accordance with Fig. C8 in Annex C



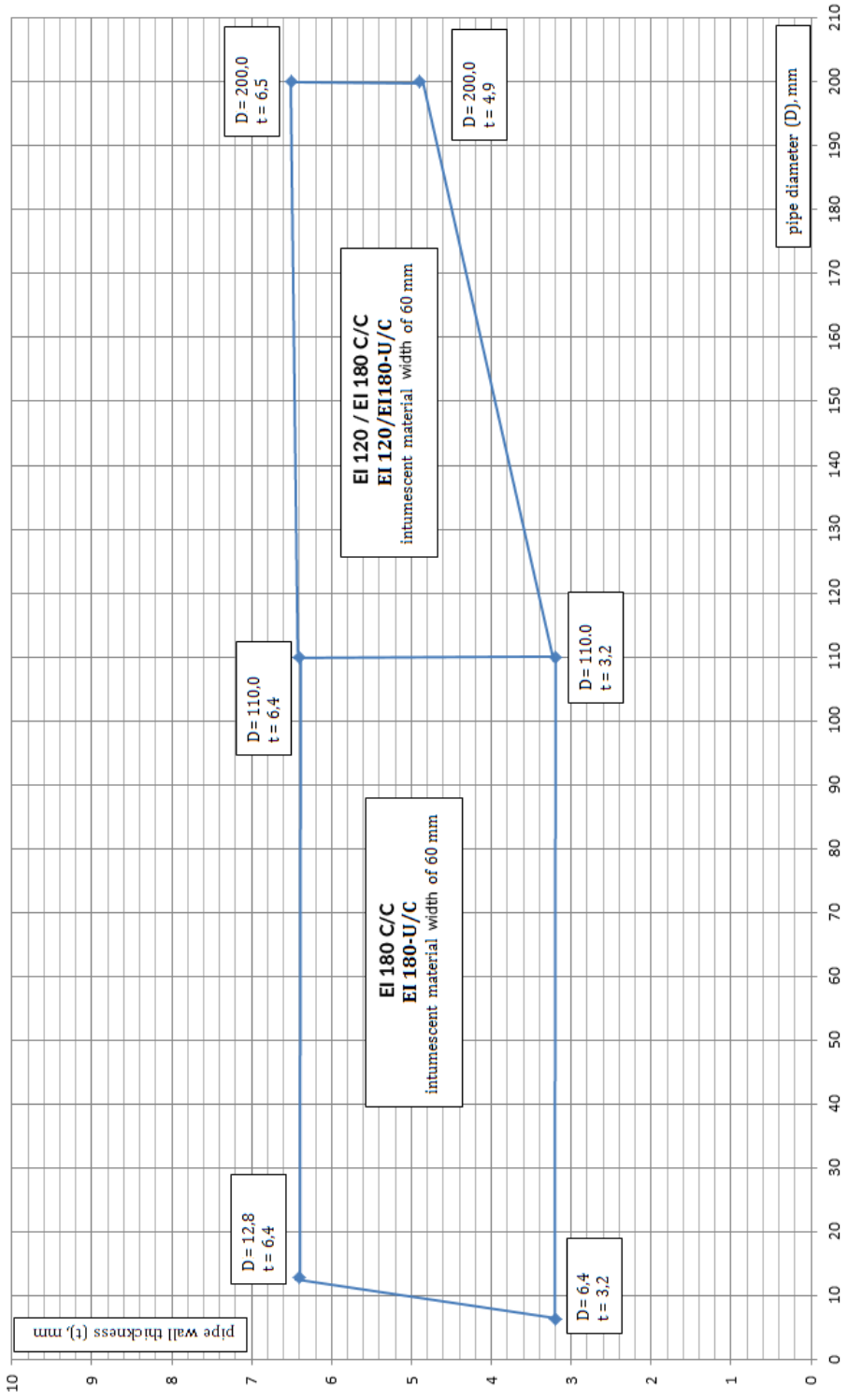
Piro Collar PC	**Annex D27** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D28. Range of PP pipes with PE acoustic mat insulation sealed with use of Piro Collar PC collars in rigid floor, made in accordance with Fig. C8 in Annex C



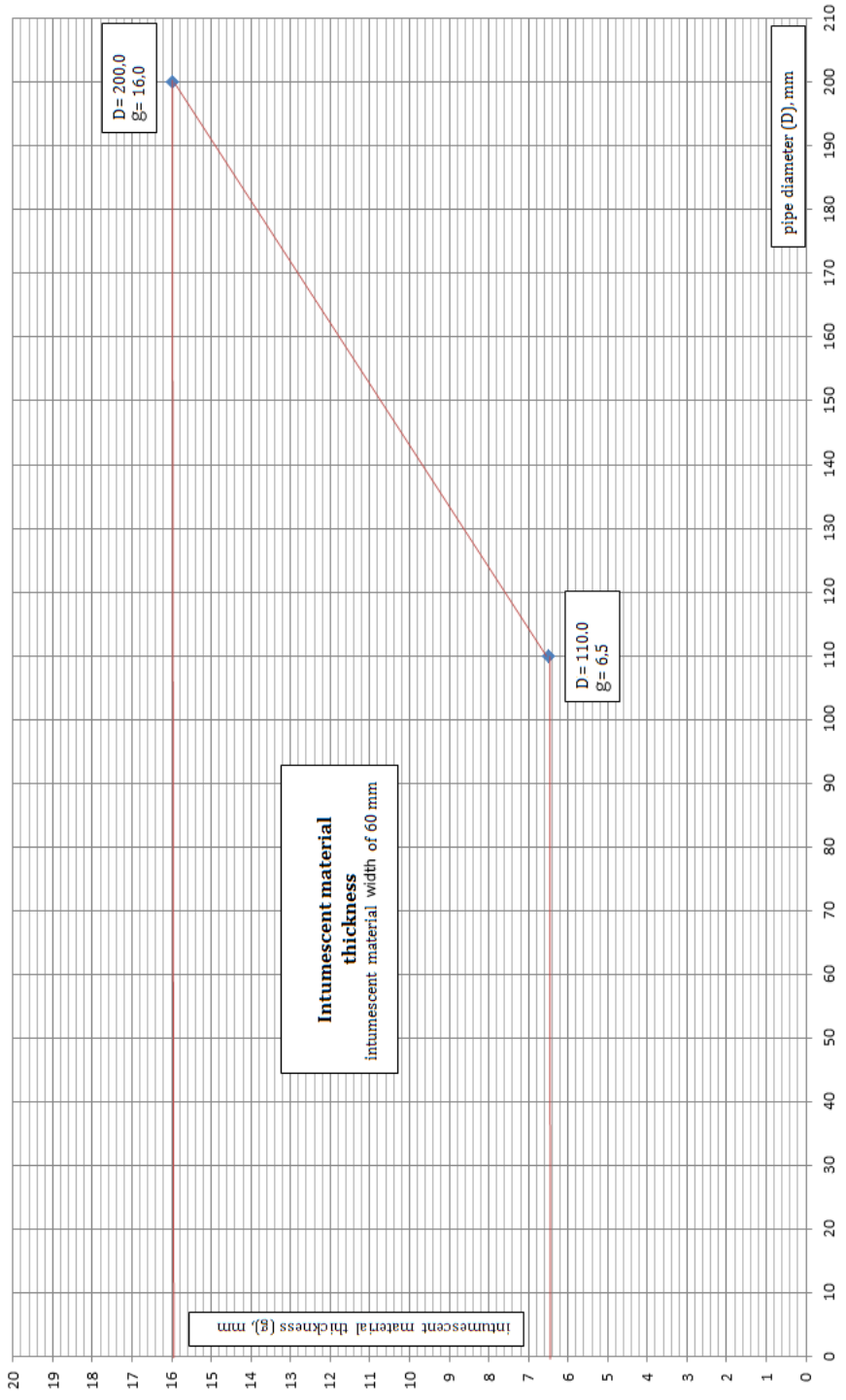
Piro Collar PC	**Annex D28** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D29. Range of PVC-U/PVC-C pipes with PE acoustic mat insulation sealed with use of Piro Collar PC collars in rigid floor, made in accordance with Fig. C8 in Annex C



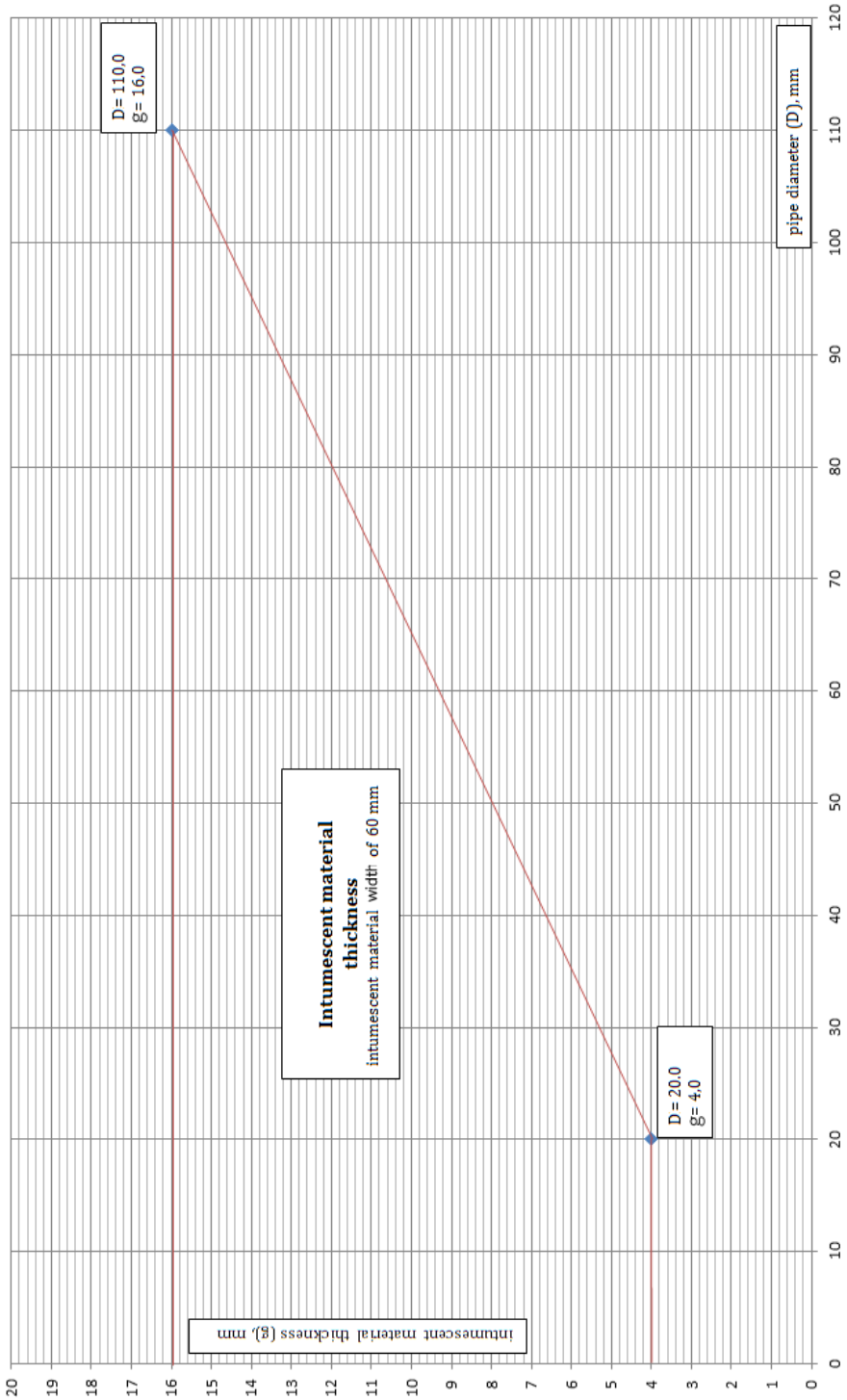
Piro Collar PC	**Annex D29** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D30. Range of intumescent material thickness for PE-HD/PE/ABS/SAN+PVC, PP and PVC-U/PVC-C pipes with PE acoustic mat insulation (g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C8 in Annex C



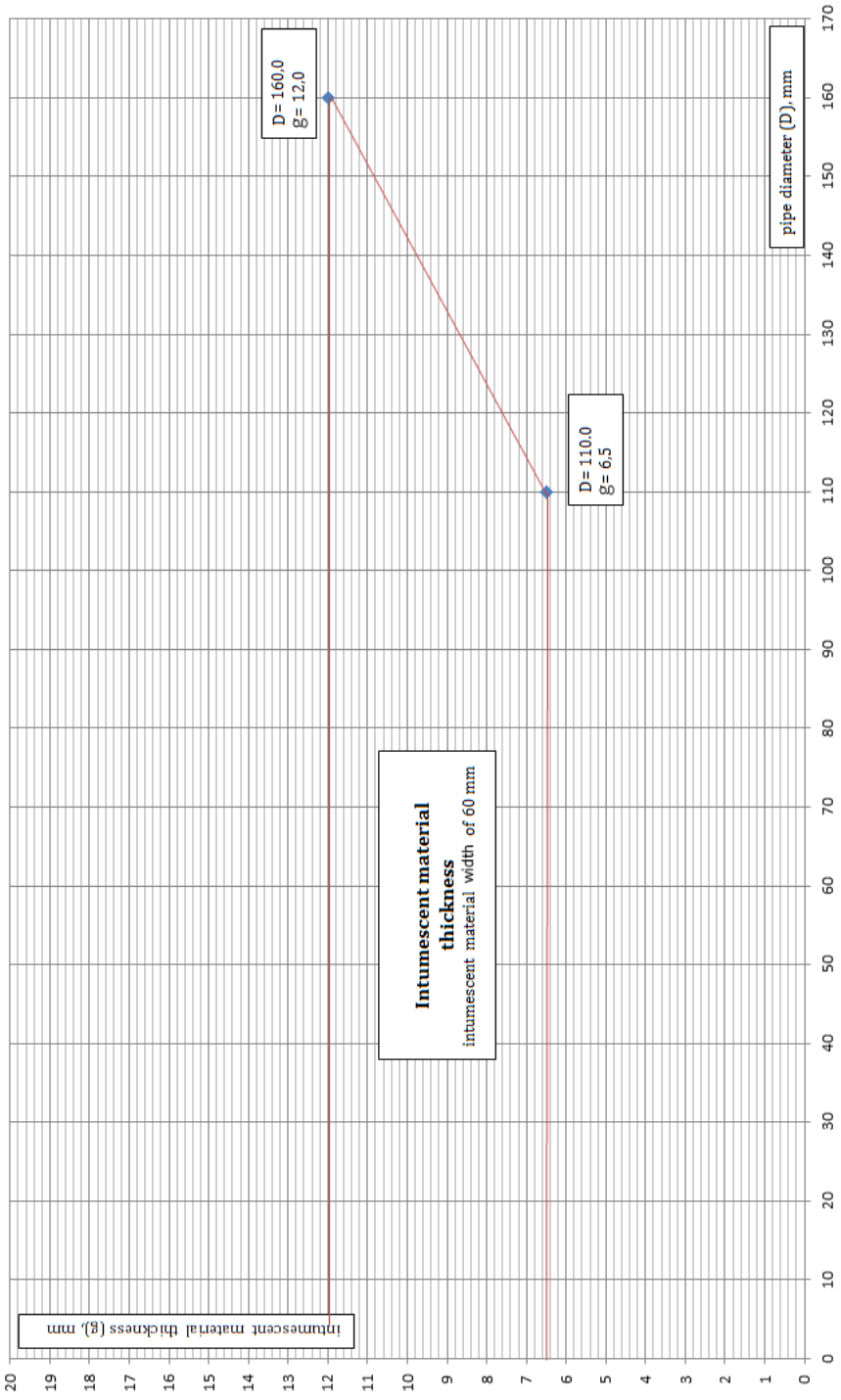
Piro Collar PC	**Annex D30** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D31. Range of intumescent material thickness for PP-R/GF/PP-R pipes (g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C5 in Annex C



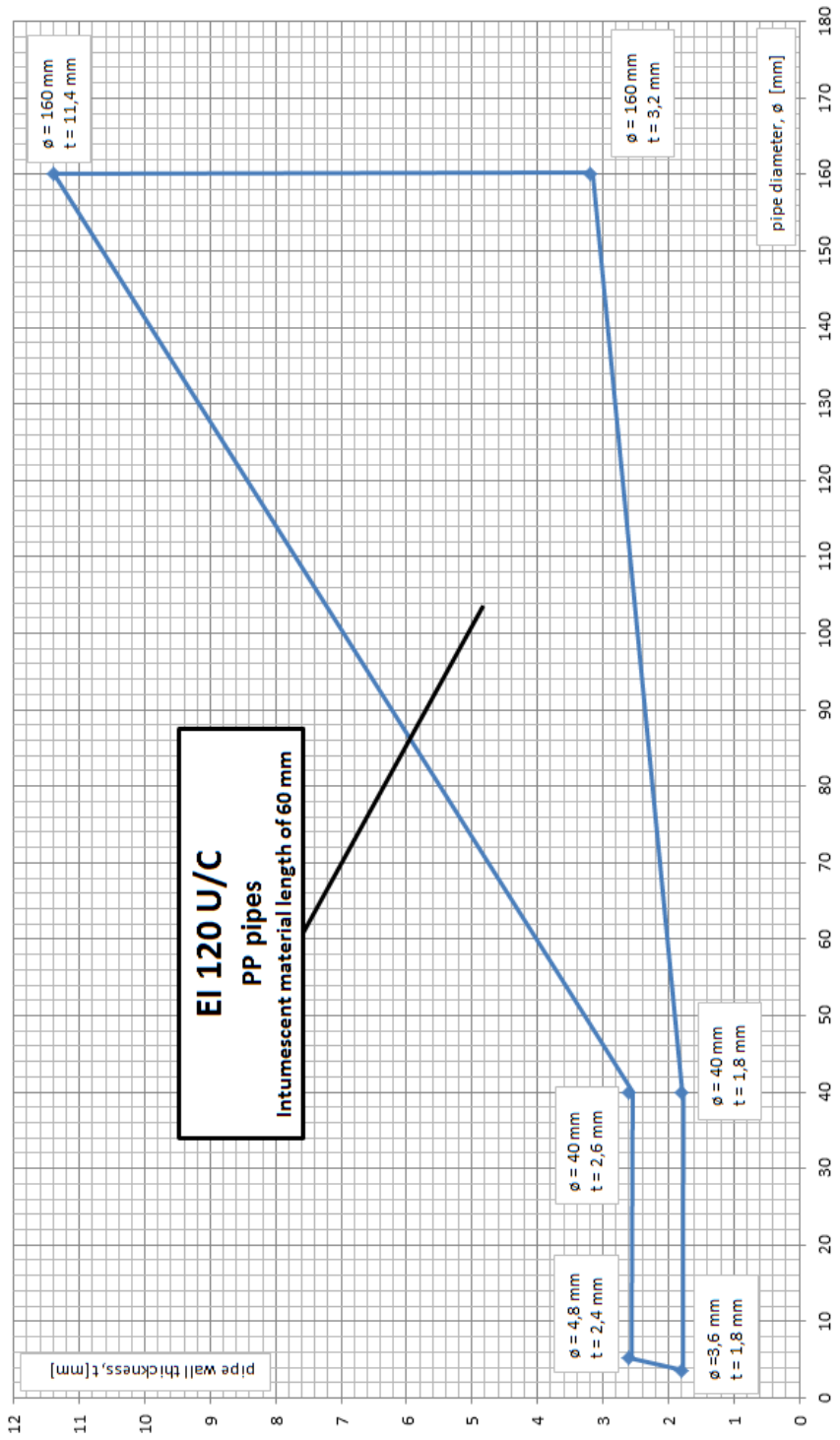
Piro Collar PC	**Annex D31** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D32. Range of intumescent material thickness for PVC-U/PVC-C pipes with pipe elbow 67,5° (g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C10 in Annex C



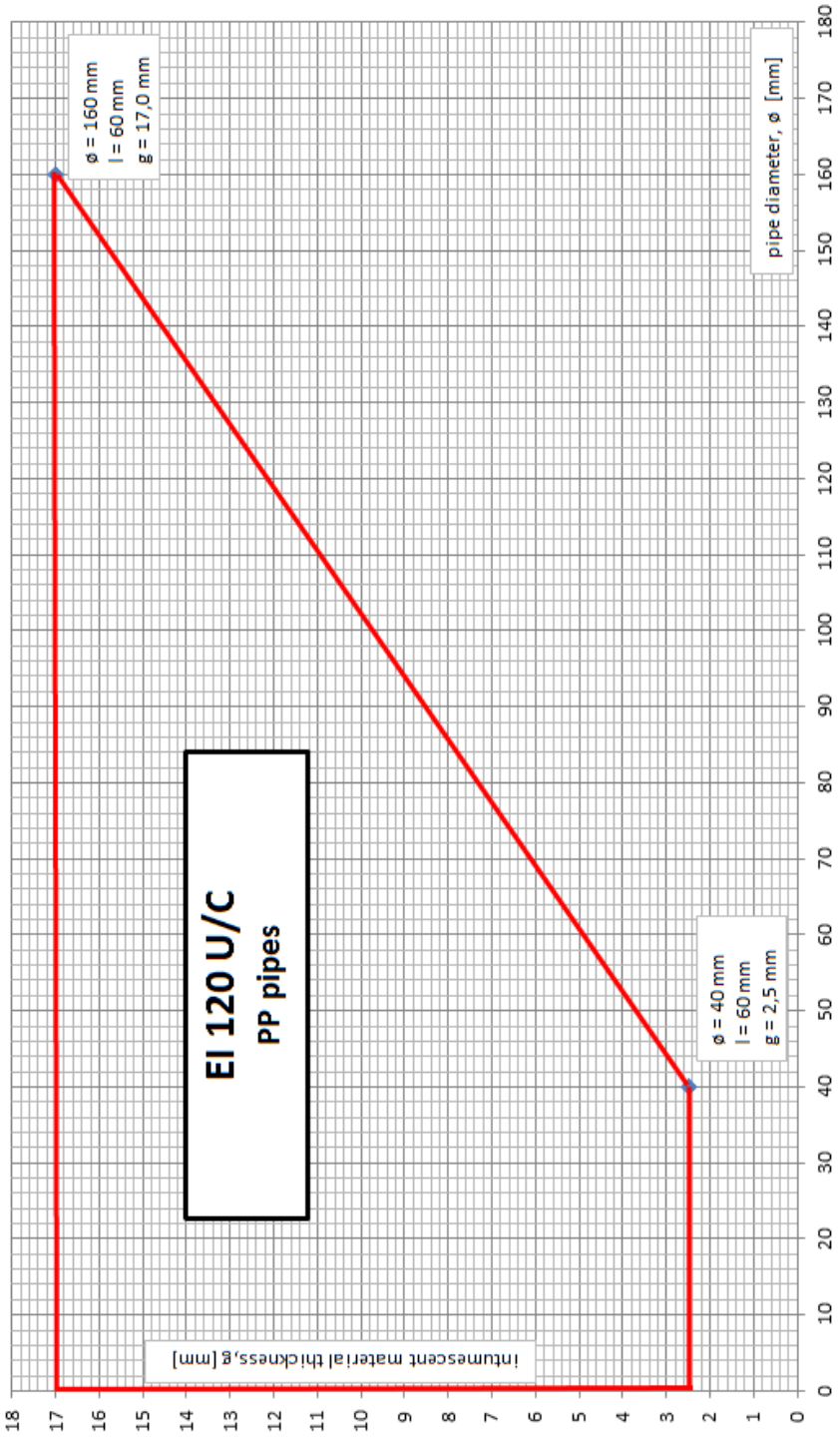
Piro Collar PC	**Annex D32** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D33. Range of Wavin pipes sealed with use of Piro Collar PC collars in rigid floor, made in accordance with Fig. C16 in Annex C



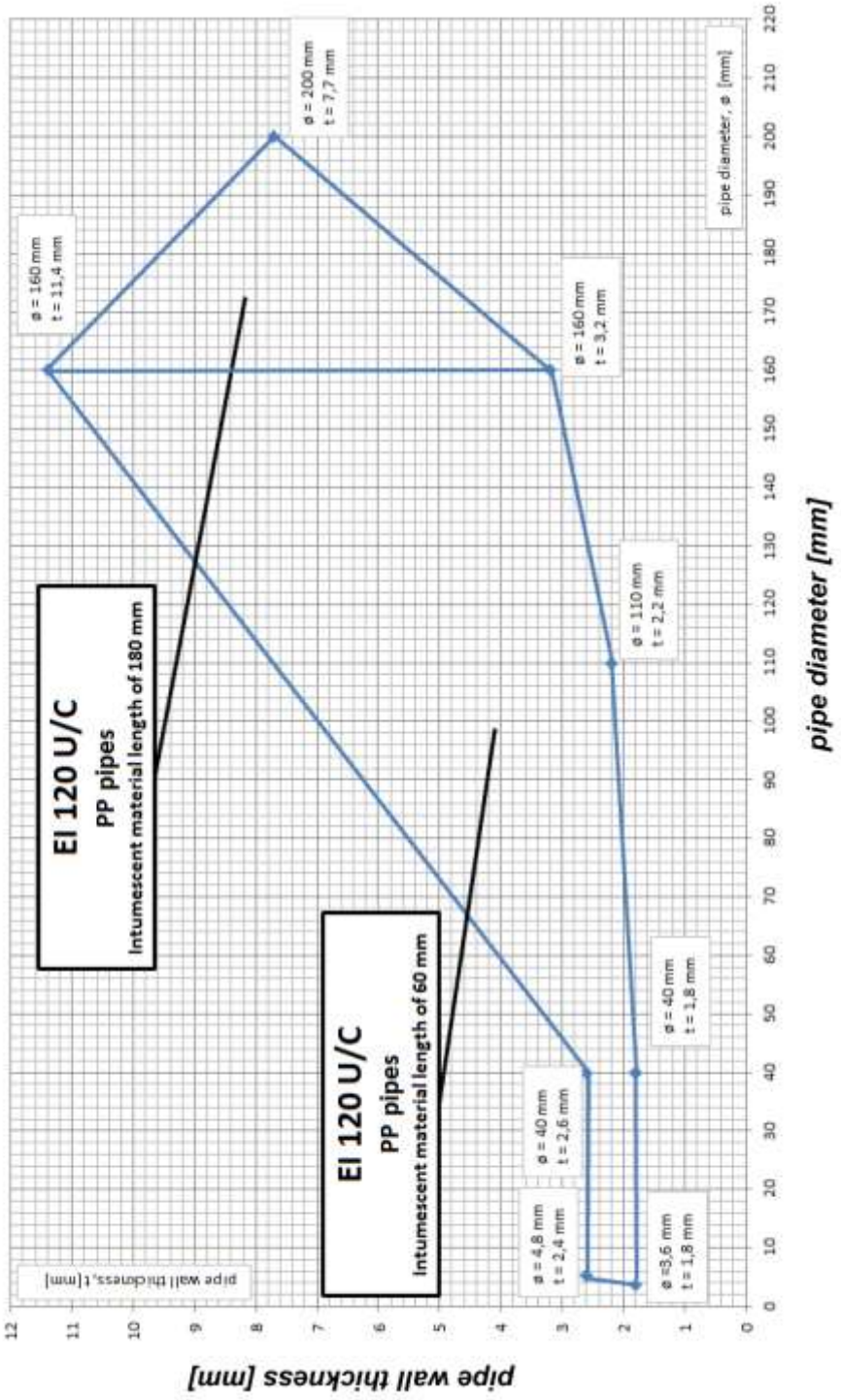
Piro Collar PC	**Annex D33** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D34. Range of intumescent material thickness for Wavin pipes (g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C16 in Annex C



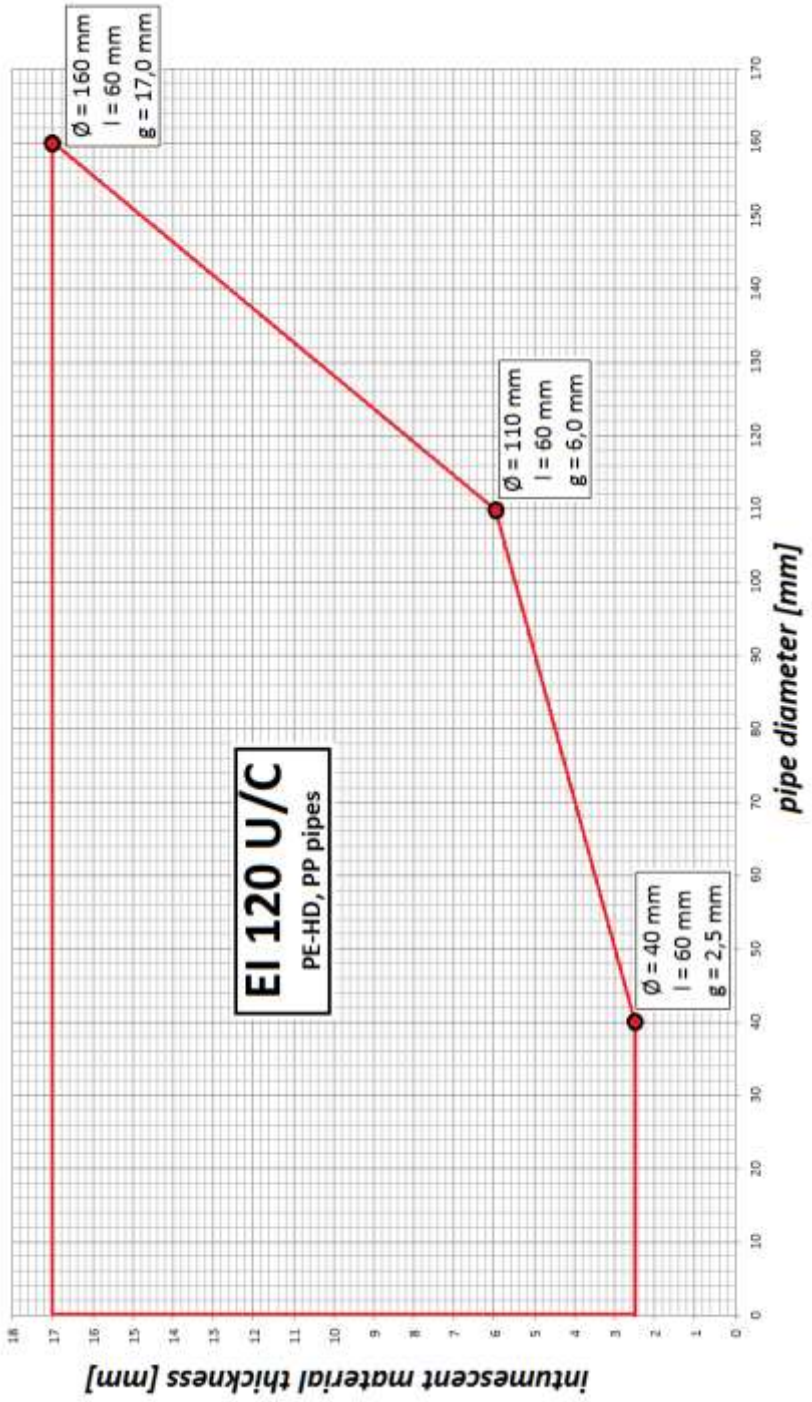
Piro Collar PC	**Annex D34** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D35. Range of Wavin pipes sealed with use of Piro Collar PC collars in rigid floor, made in accordance with Fig. C16 in Annex C



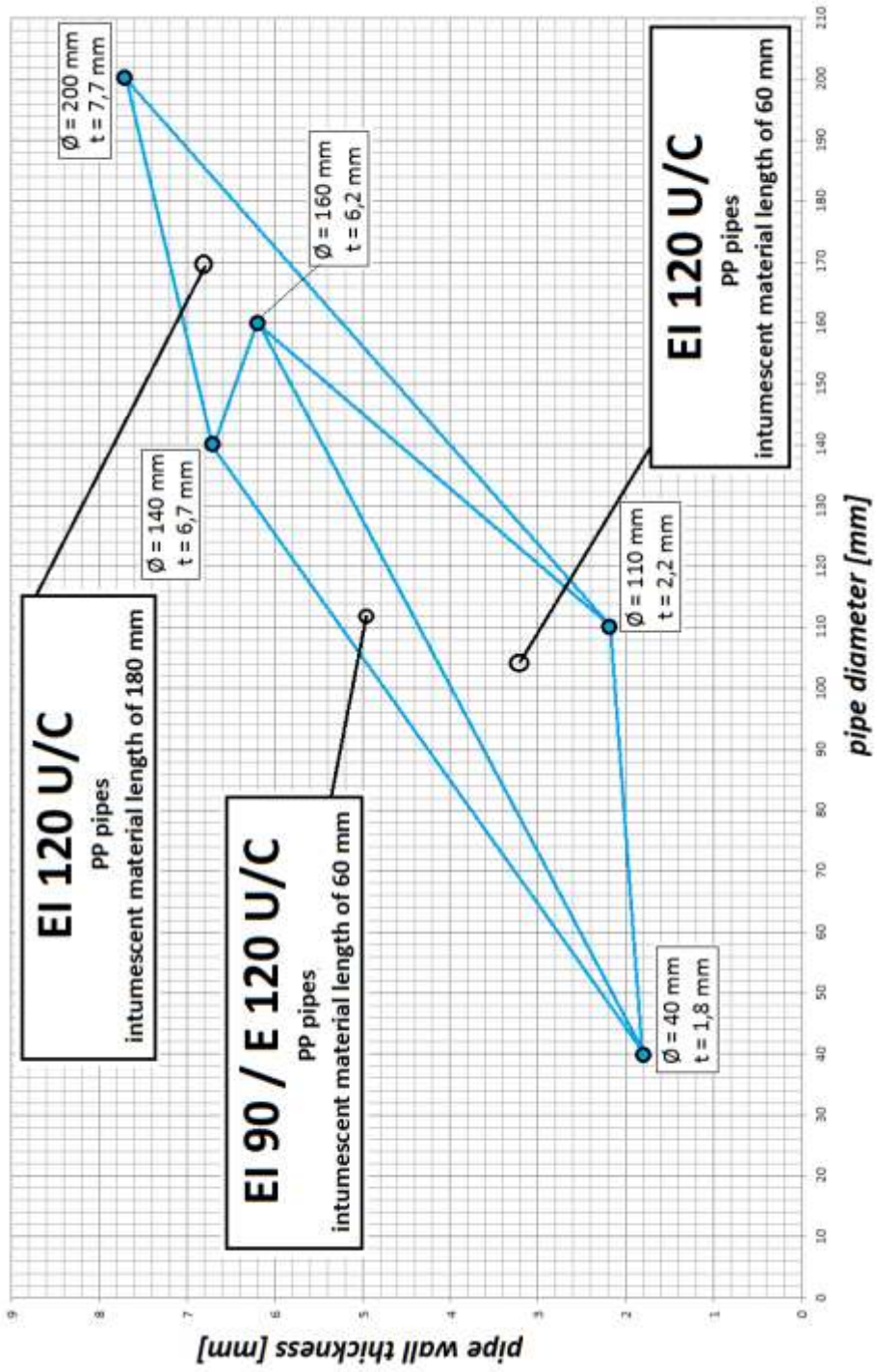
Piro Collar PC	**Annex D35** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D36. Range of intumescent material thickness for Wavin pipes (g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C16 in Annex C



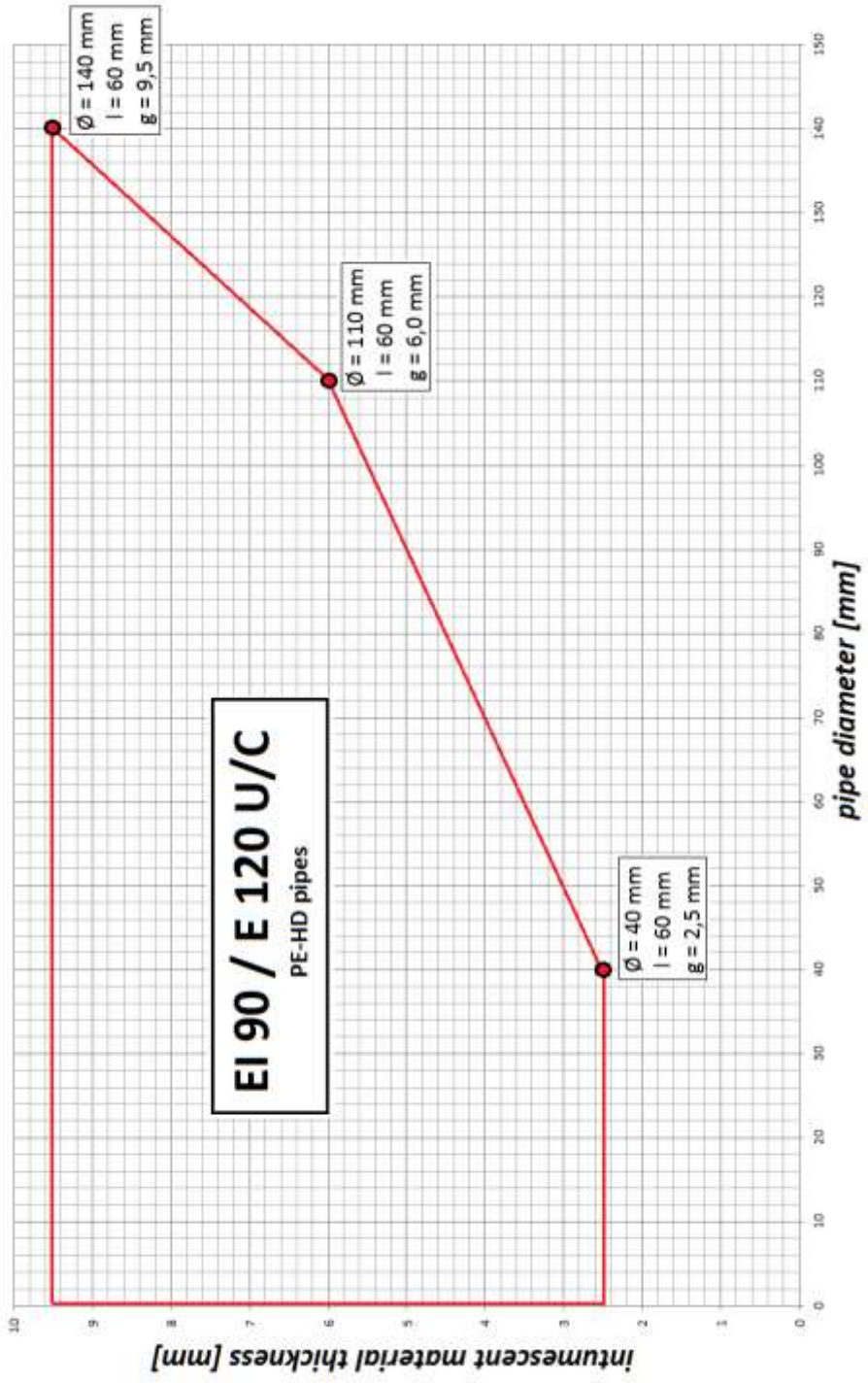
Piro Collar PC	**Annex D36** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D37. Range of Wavin pipes sealed with use of Piro Collar PC collars in rigid floor, made in accordance with Fig. C17 in Annex C



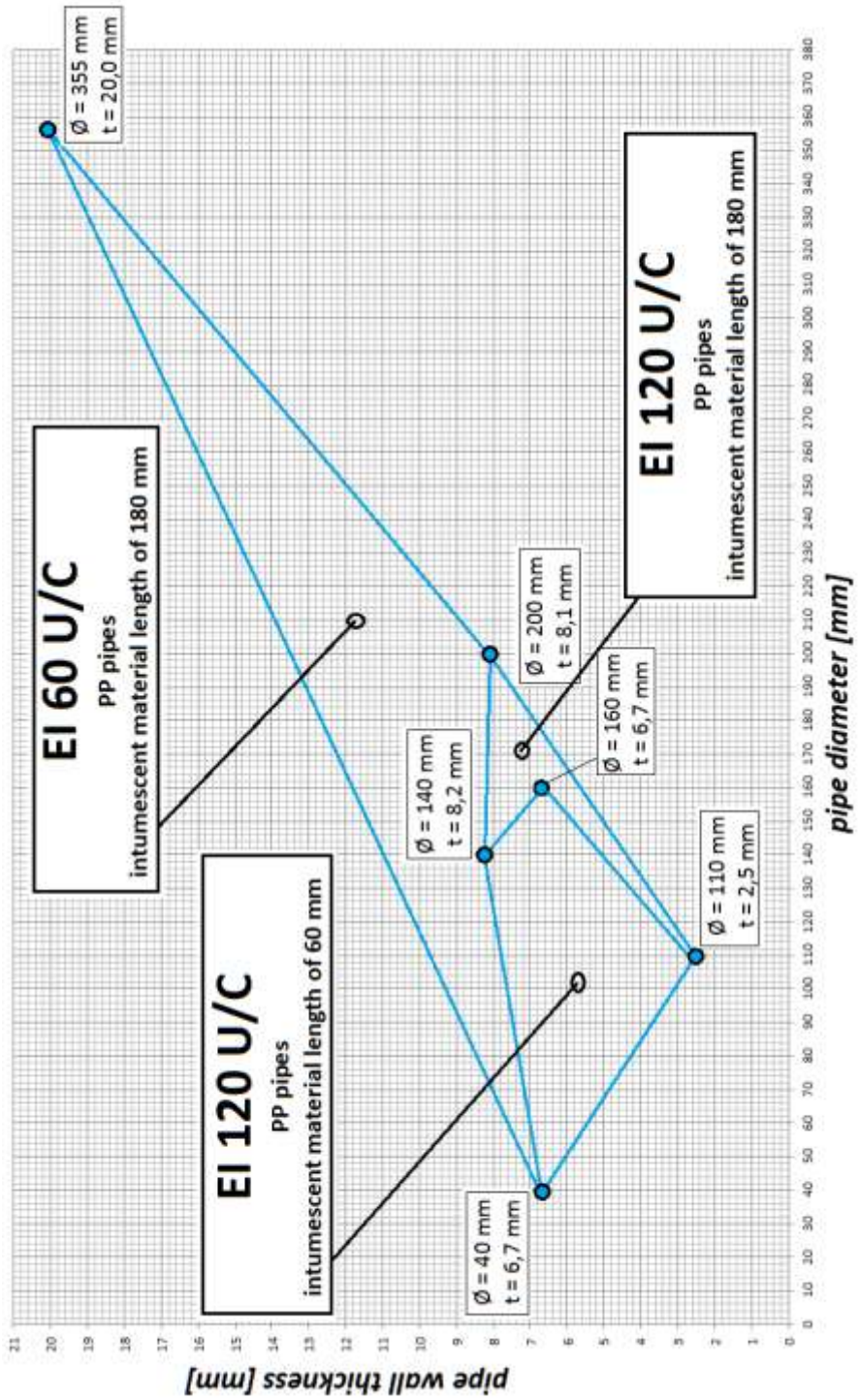
Piro Collar PC	**Annex D37** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D38. Range of intumescent material thickness for Wavin pipes (g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C17 in Annex C



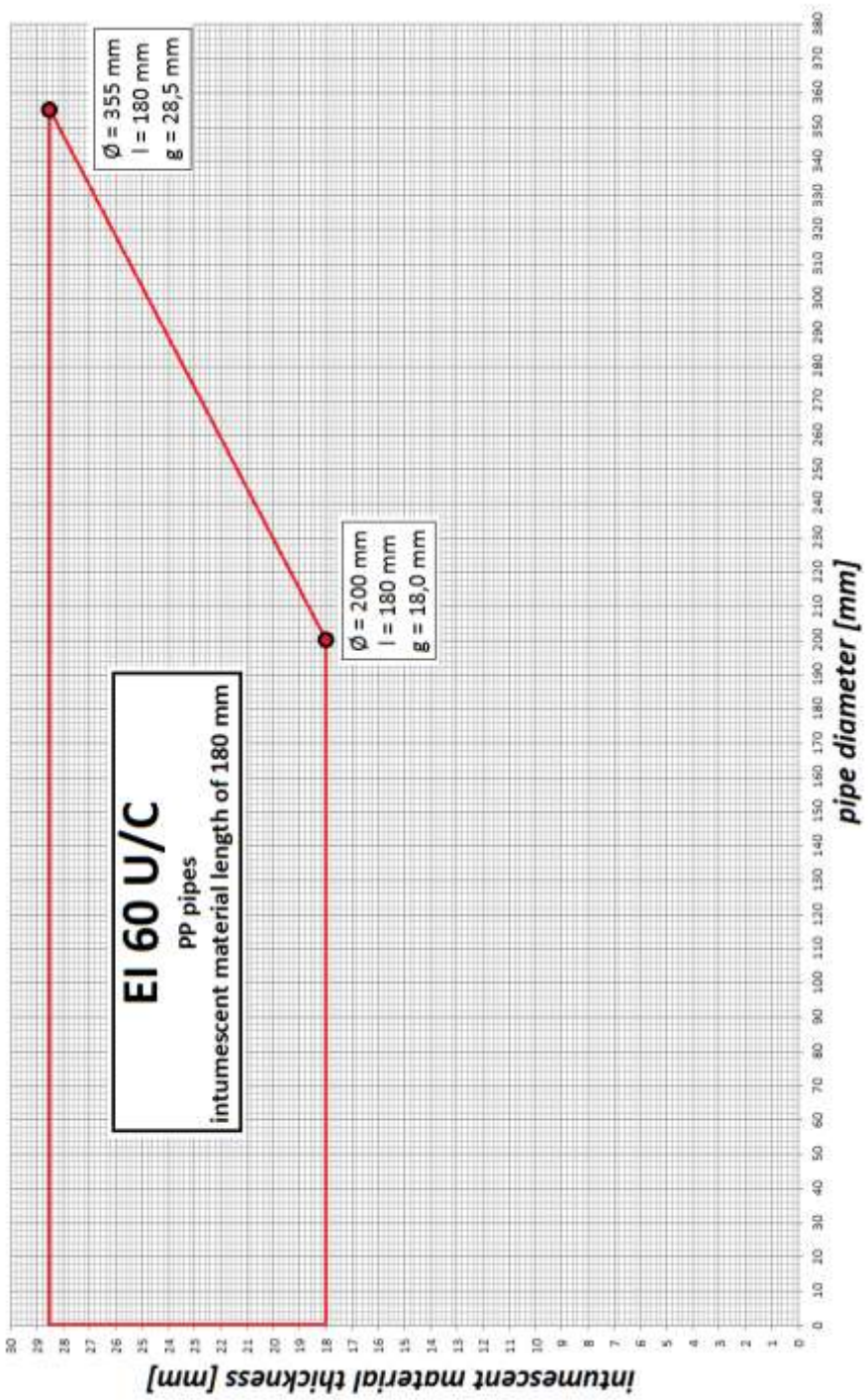
Piro Collar PC	**Annex D38** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D39. Range of Wavin pipes sealed with use of Piro Collar PC collars in rigid floor, made in accordance with Fig. C19 in Annex C



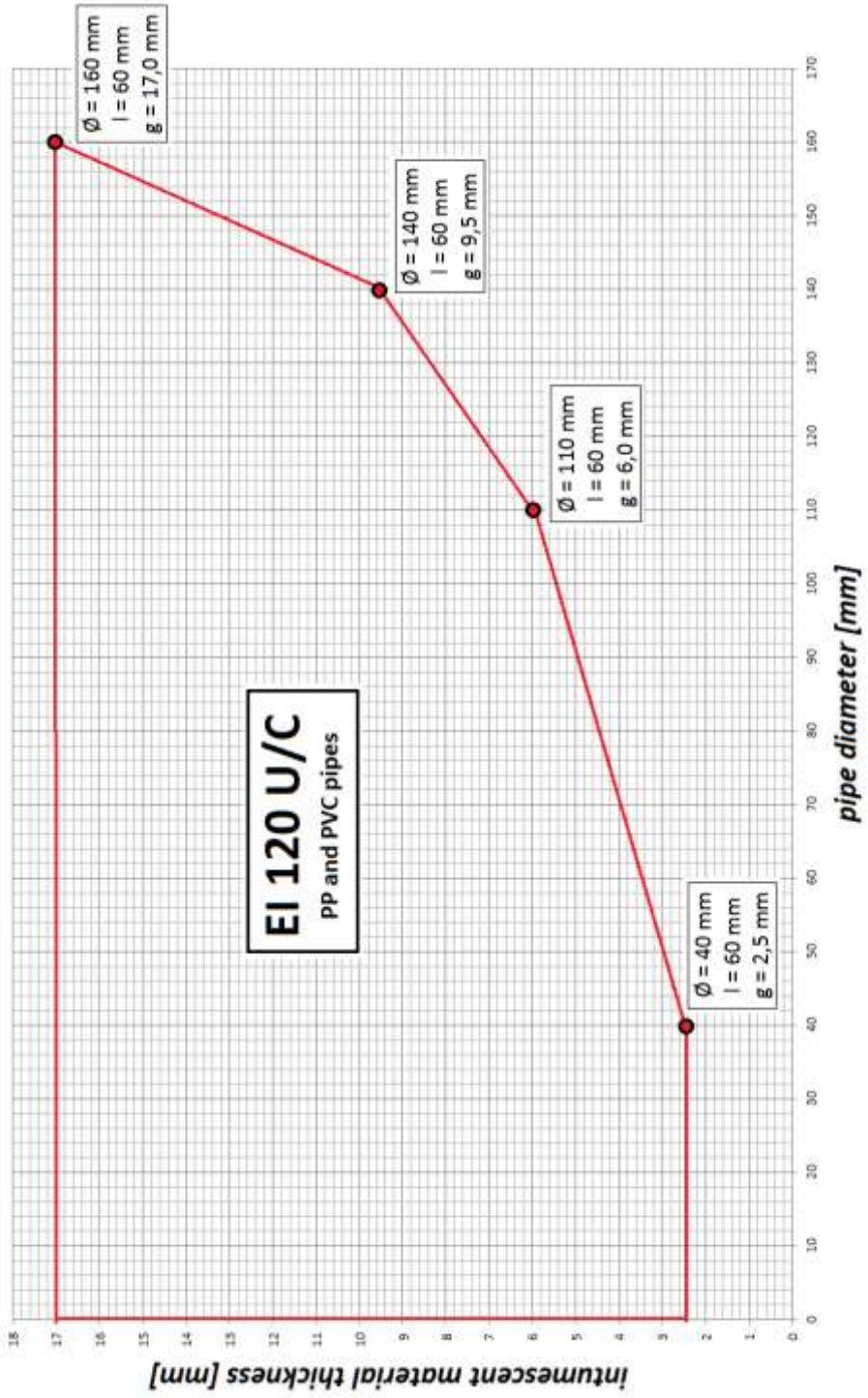
Piro Collar PC	**Annex D39** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D40. Range of intumescent material thickness for Wavin pipes (g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C19 in Annex C



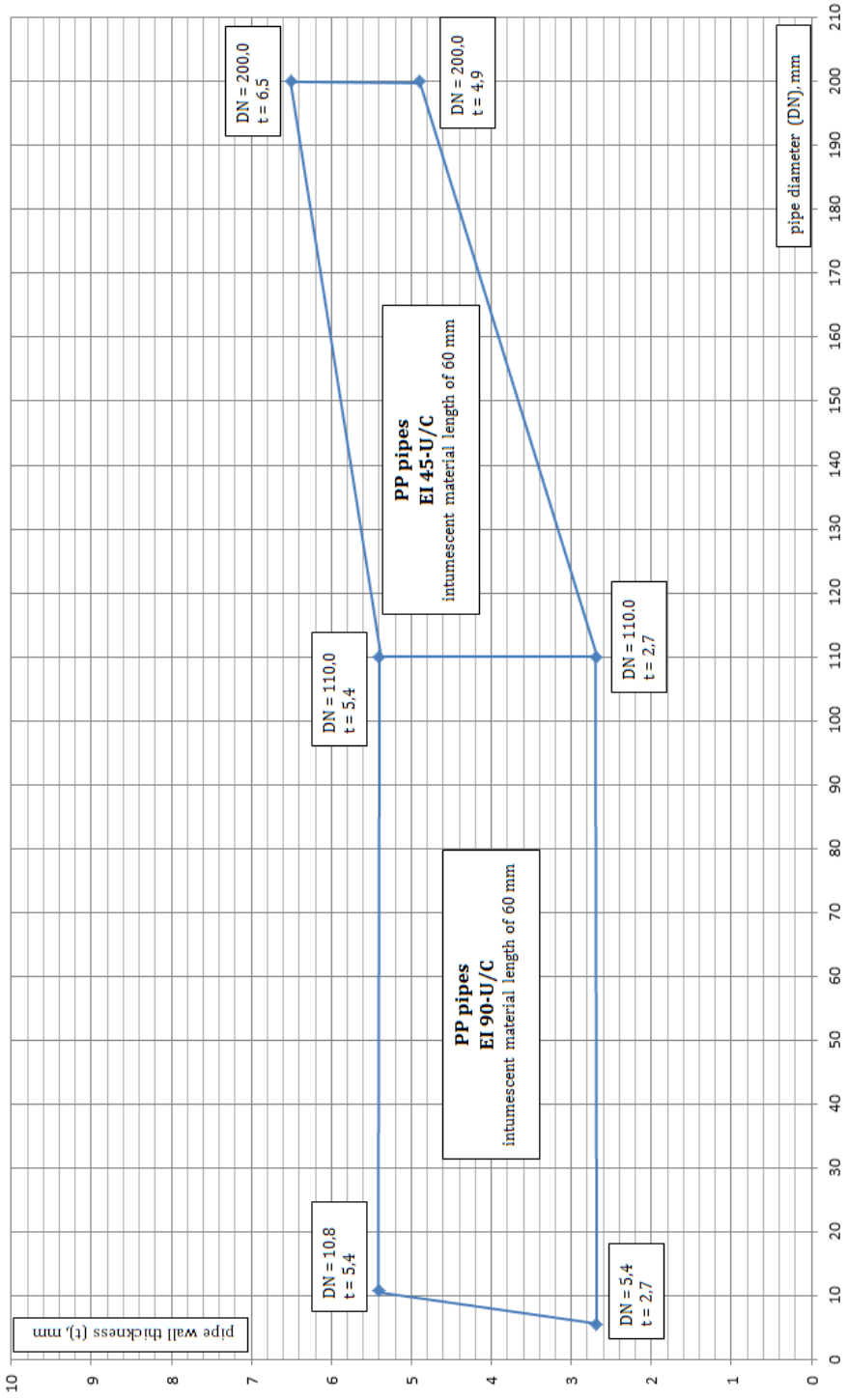
Piro Collar PC	**Annex D40** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D41. Range of intumescent material thickness for Wavin pipes (g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C19 in Annex C



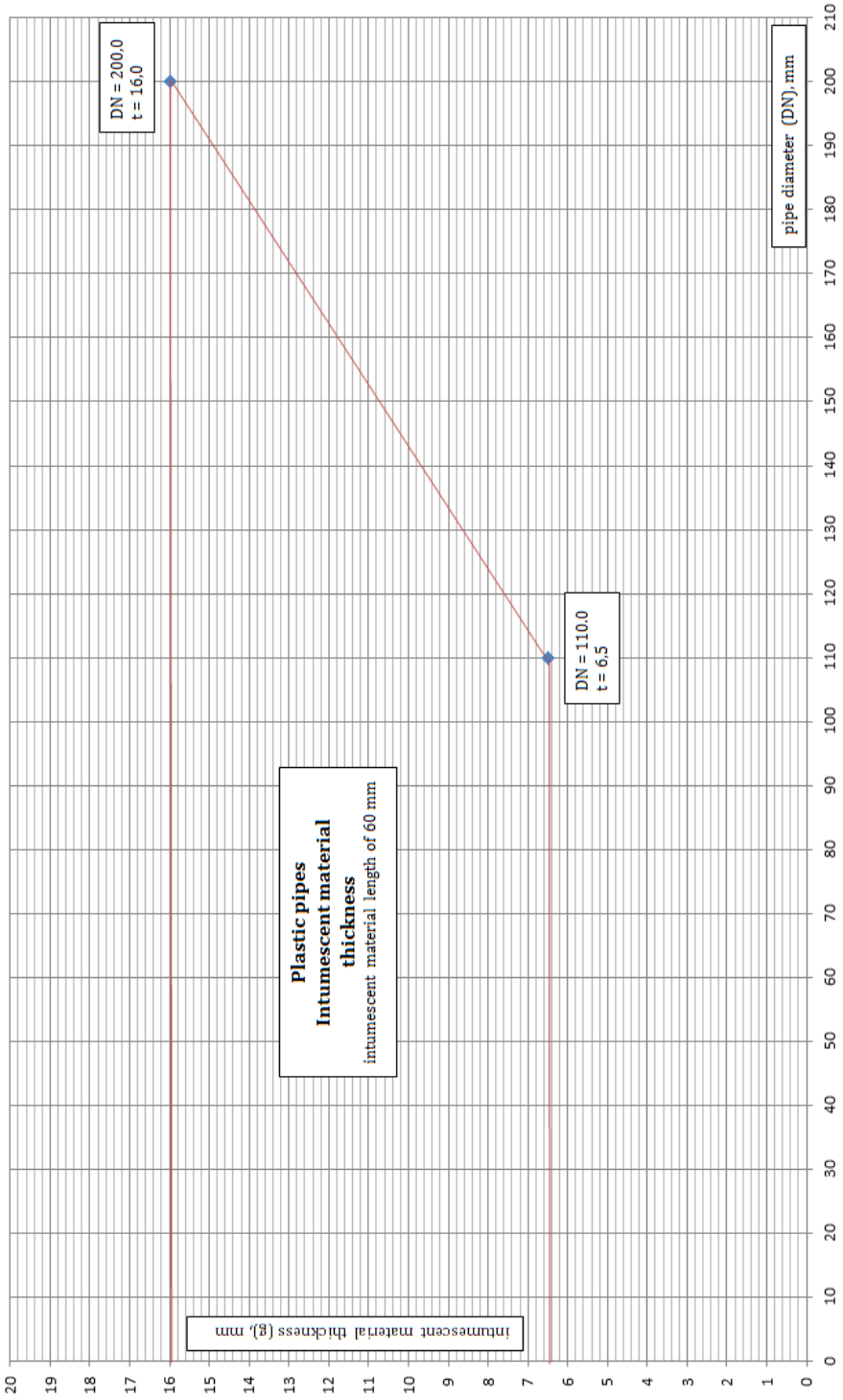
Piro Collar PC	**Annex D41** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D42. Range of Wavin pipes sealed with use of Piro Collar PC collars in rigid floor, made in accordance with fig C20 in Annex C



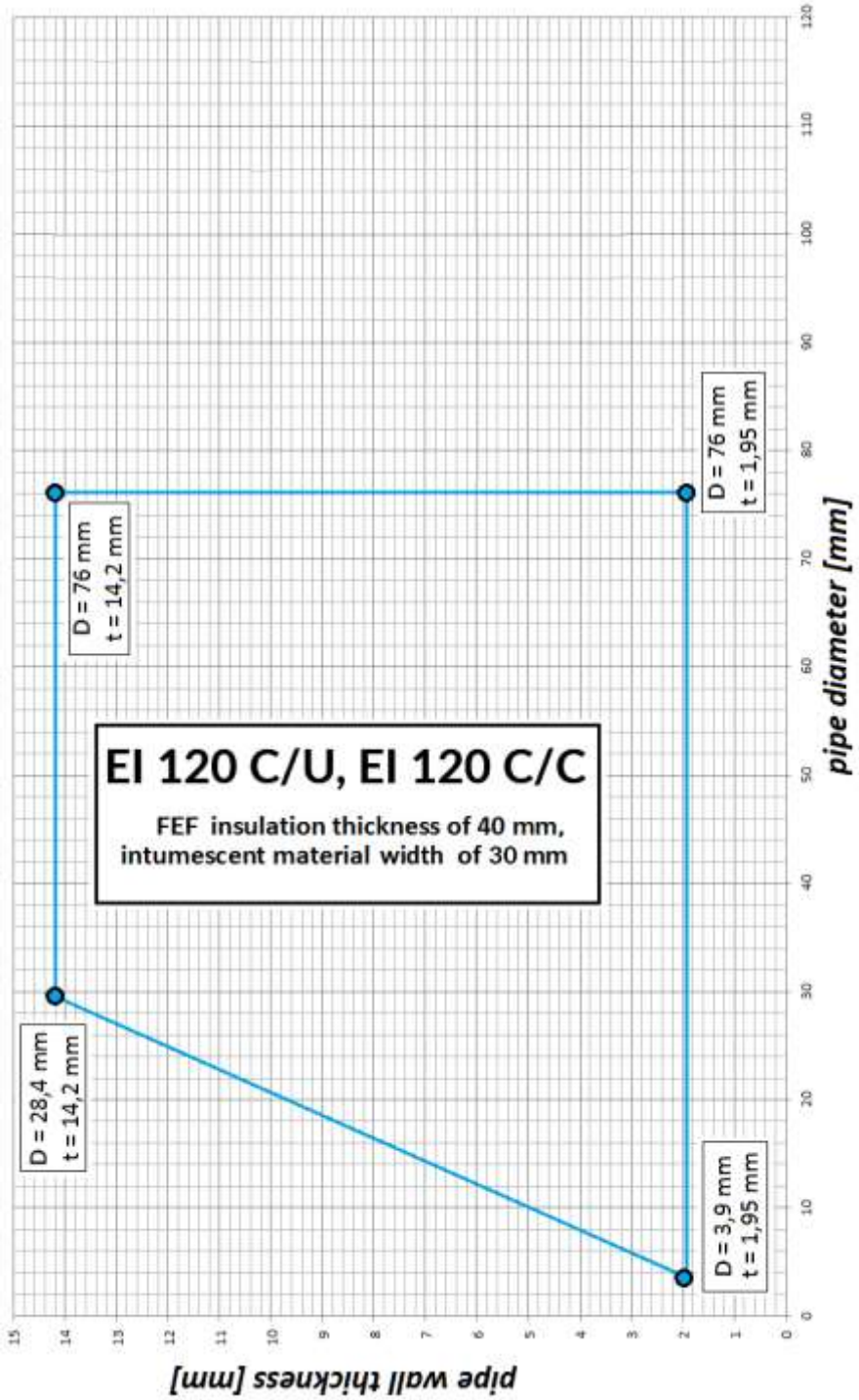
Piro Collar PC	**Annex D42** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D43. Range of intumescent material thickness for Wavin pipes (g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C20 in Annex C



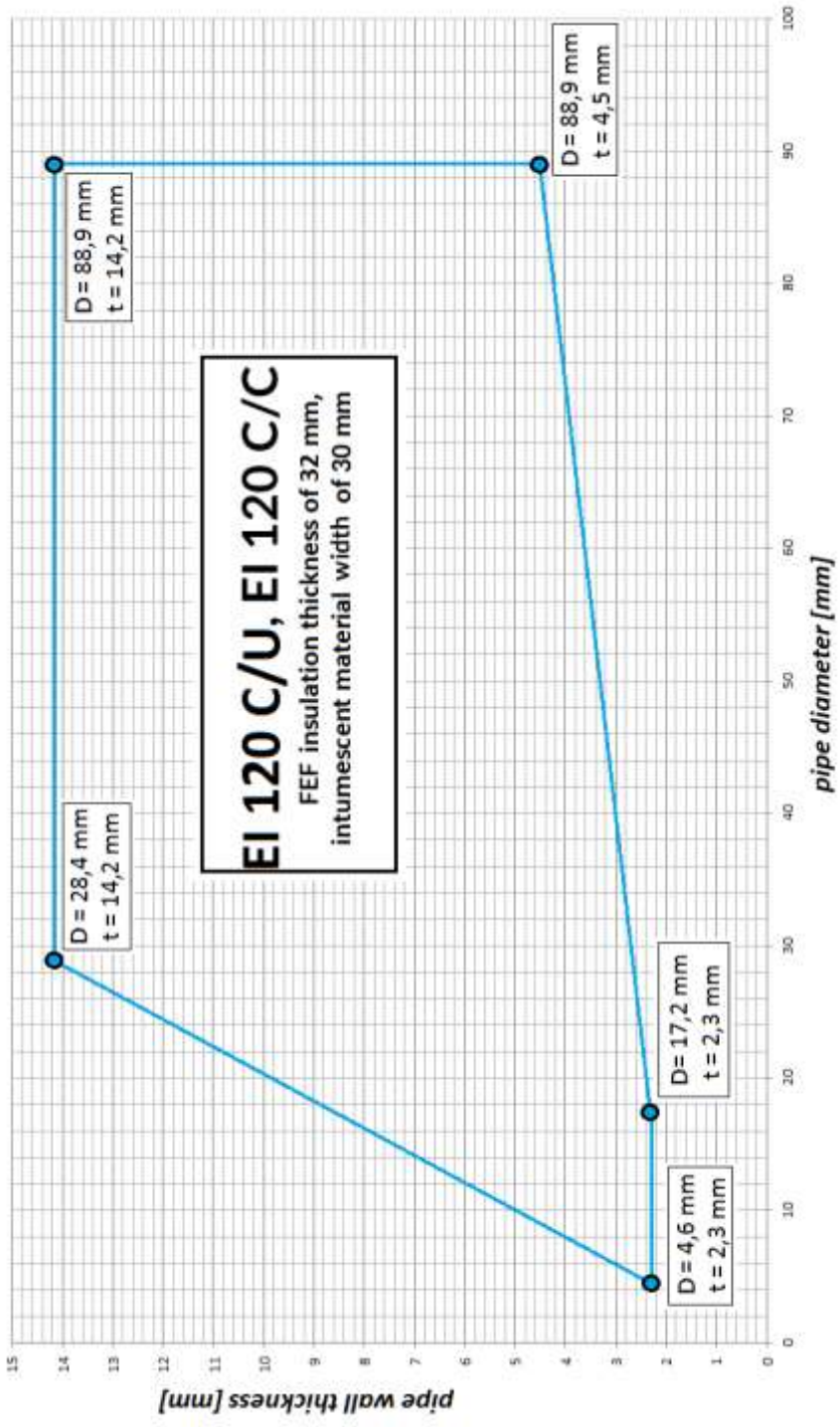
Piro Collar PC	**Annex D43** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D44. Range of copper pipes with flexible elastomeric foam (FEF) insulation thickness of 40 mm, in flexible or rigid wall, thickness of B ≥ 125 mm penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C1 in Annex C



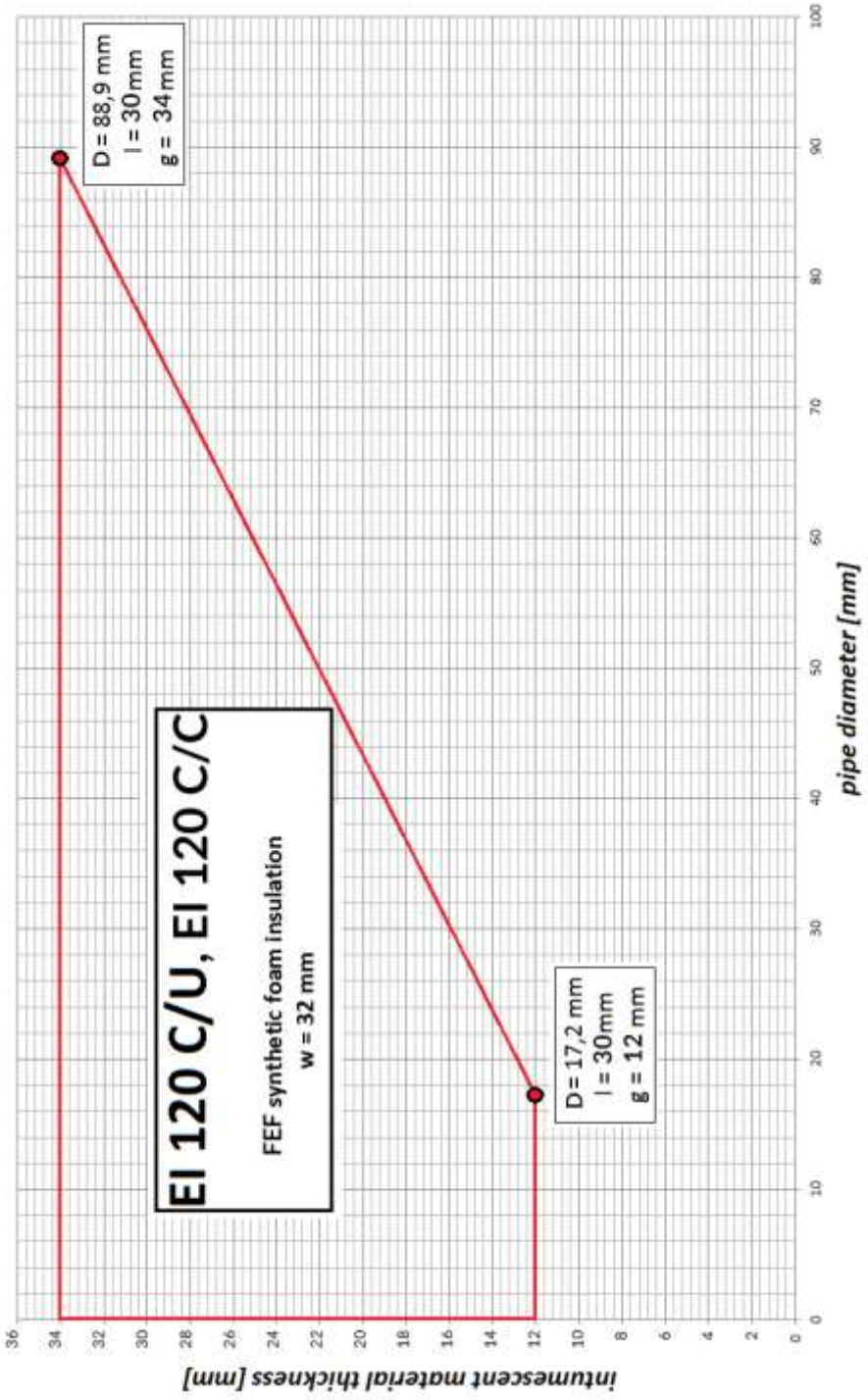
Piro Collar PC	**Annex D44** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D45. Range of steel pipes with flexible elastomeric foam (FEF) insulation thickness of 32 mm in flexible or rigid wall, thickness of B ≥ 125 mm penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C1 in Annex C



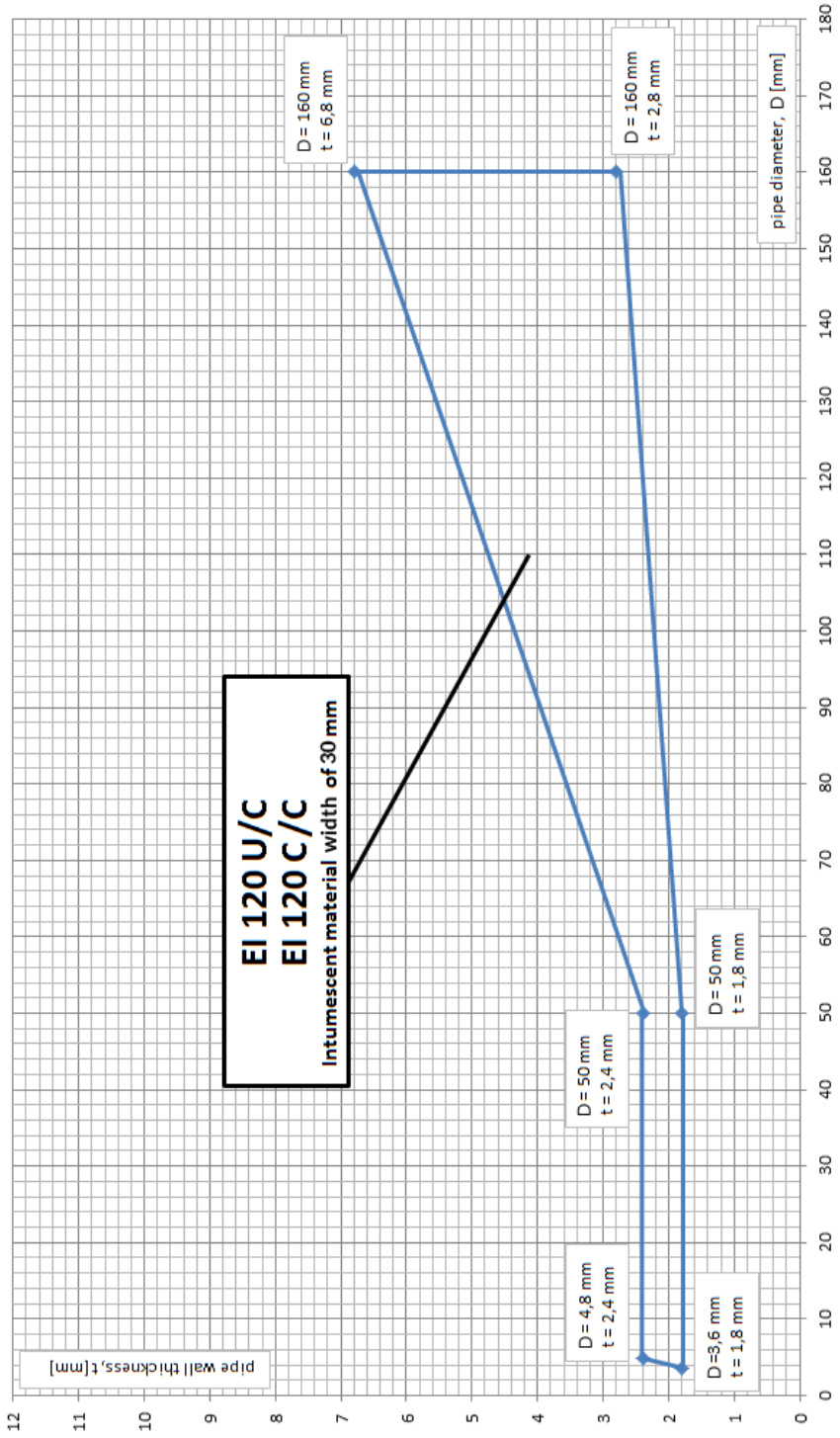
Piro Collar PC	**Annex D45** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D46. Range of intumescent material thickness for steel pipes with flexible elastomeric foam (FEF) insulation thickness of 32 mm (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C1 in Annex C



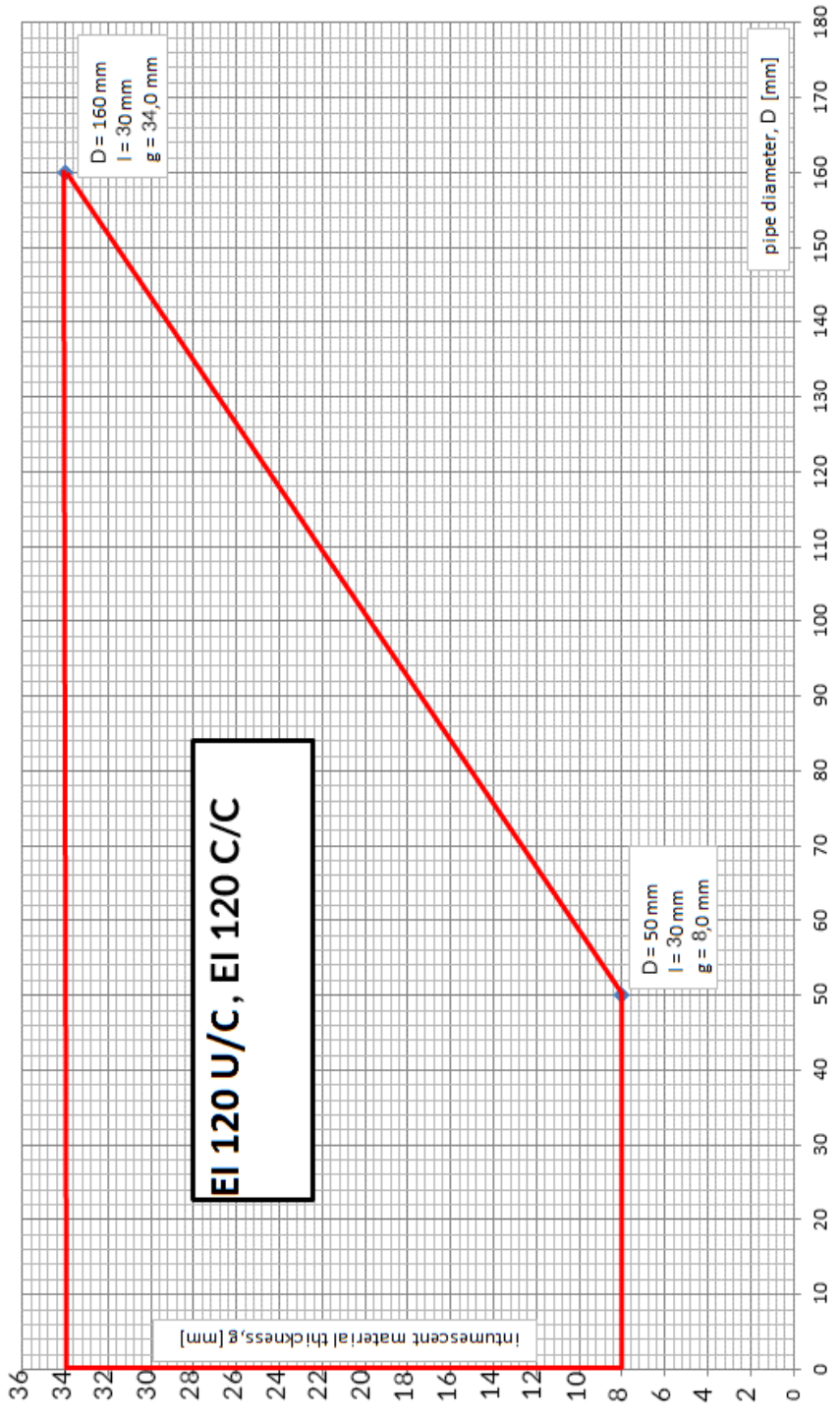
Piro Collar PC	**Annex D46** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D47. Range of PE-HD/PE/ABS/SAN+PVC pipes, penetration sealed with use of Piro Collar PC collars in rigid wall, thickness of 100 mm ≤ B < 125 mm made in accordance with Fig. C2 in Annex C



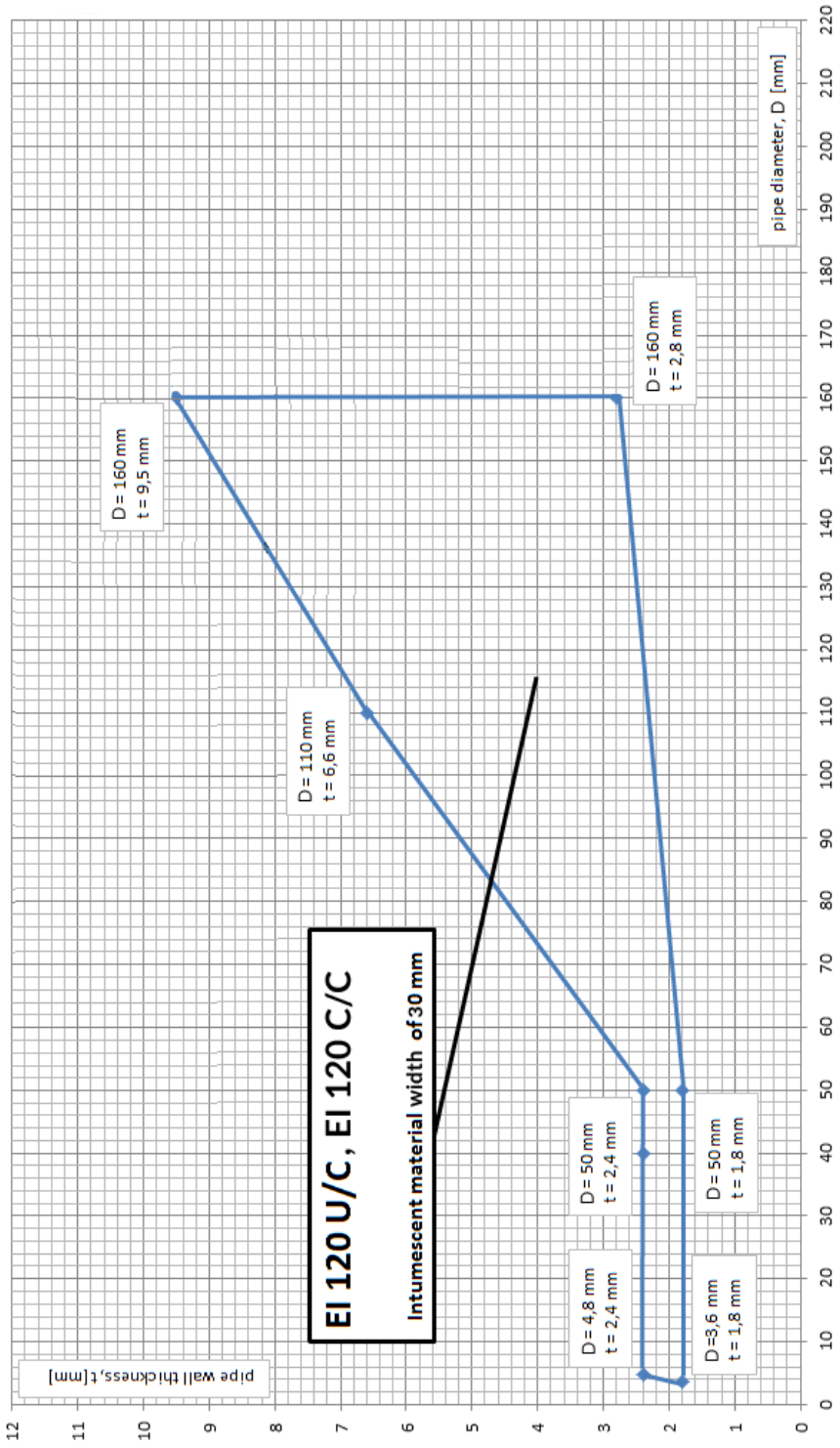
Piro Collar PC	**Annex D47** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D48. Range of intumescent material thickness for PE-HD/PE/ABS/SAN+PVC and PVC-U/PVC-C pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C2 in Annex C



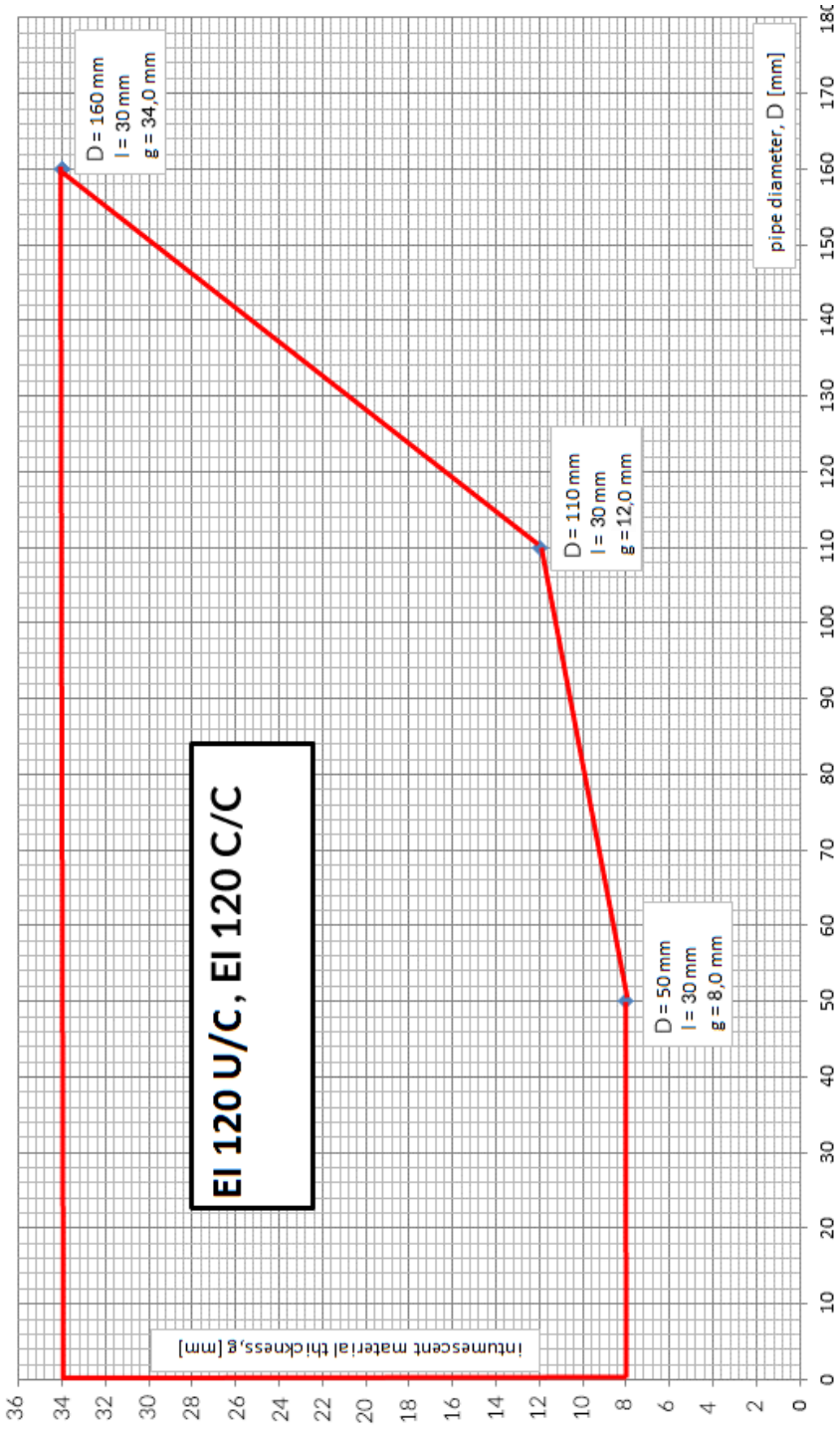
Piro Collar PC	**Annex D48** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D49. Range of PE-HD/PE/ABS/SAN+PVC pipes, penetration sealed with use of Piro Collar PC collars in rigid wall thickness of B ≥ 125 mm, made in accordance with Fig. C2 in Annex C



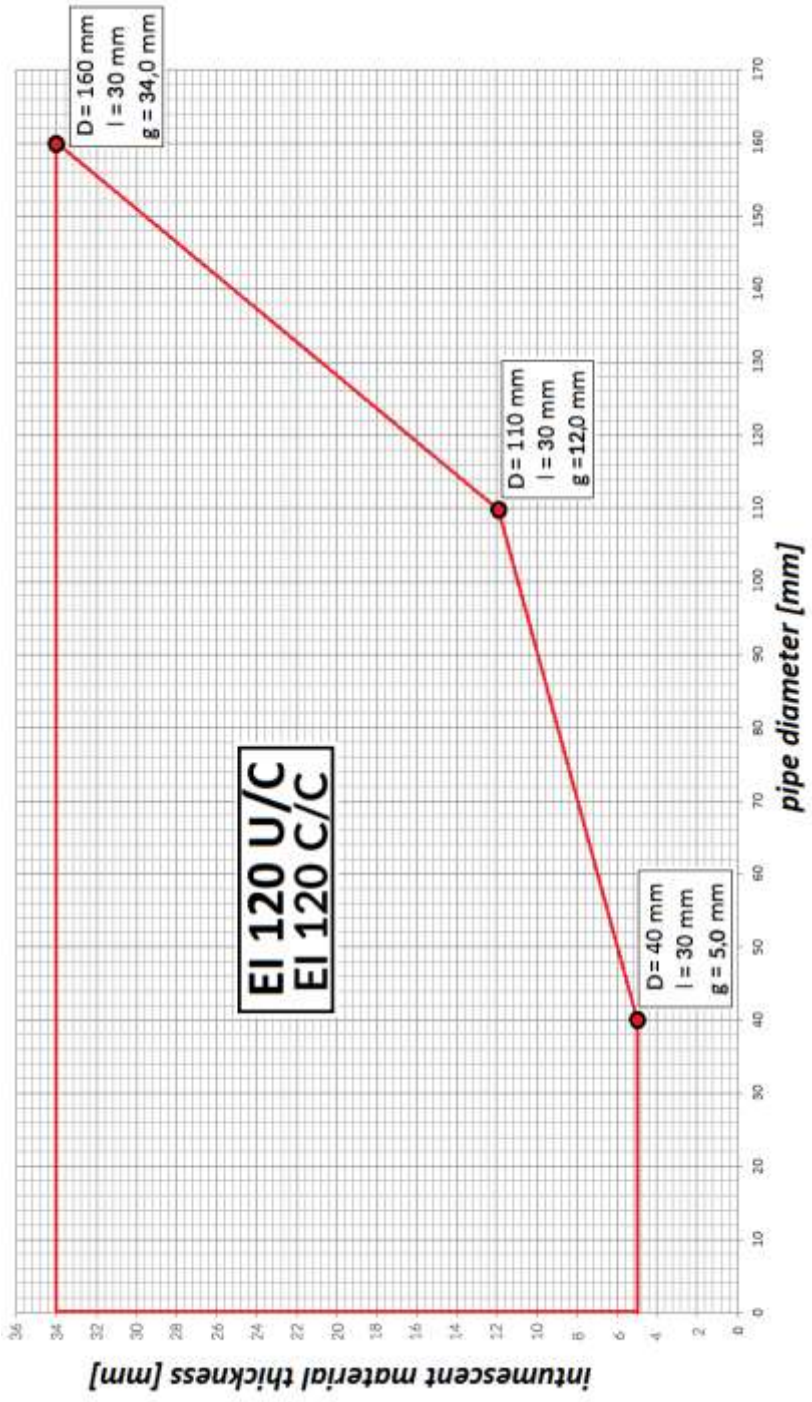
Piro Collar PC	**Annex D49** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D50. Range of intumescent material thickness for PE-HD/PE/ABS/SAN+PVC and PVC-U/PVC-C pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C2 in Annex C



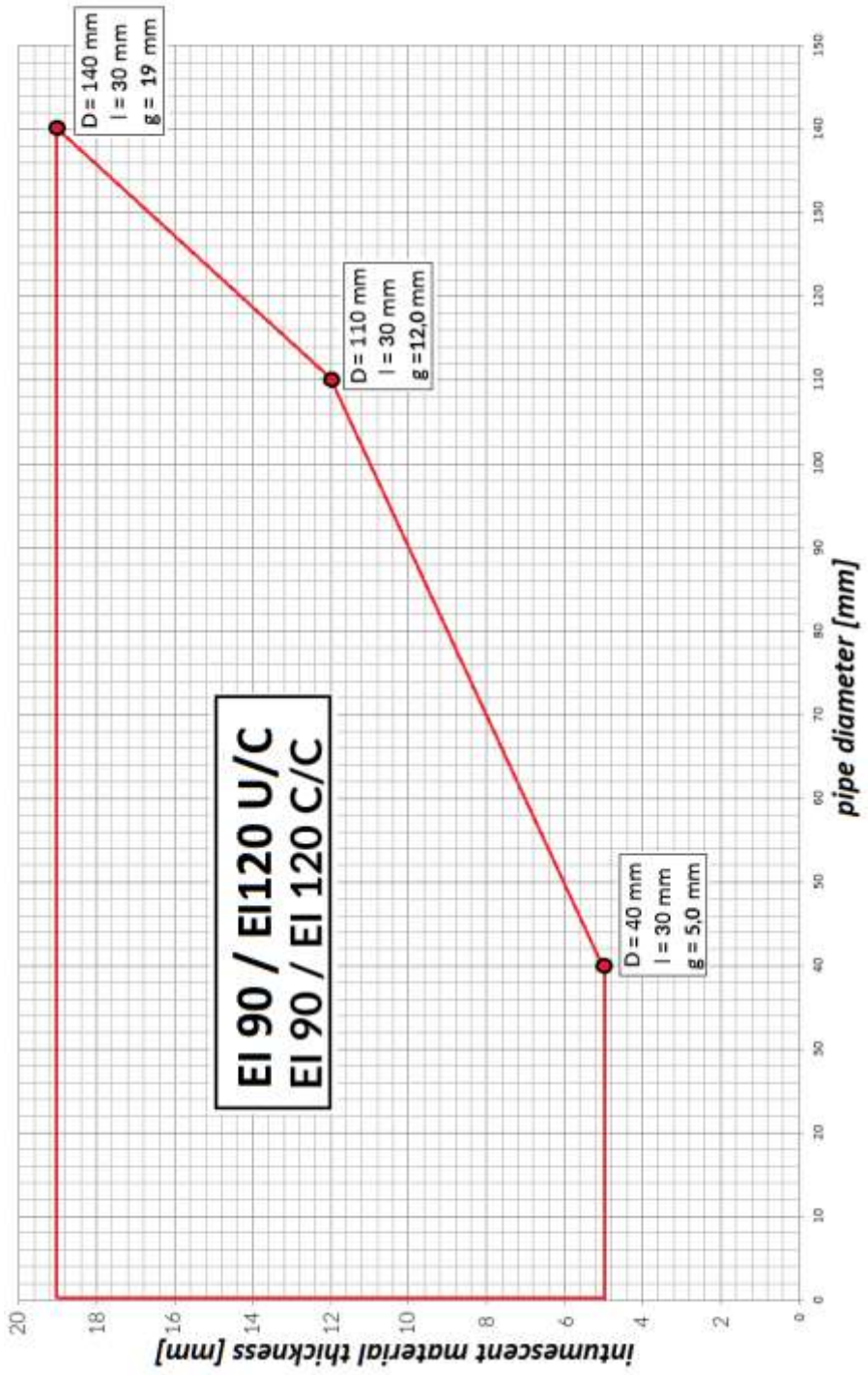
Piro Collar PC	**Annex D50** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D51. Range of intumescent material thickness for PE-HD/PE/ABS/SAN+PVC and PP pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C2, C3 and C5 in Annex C



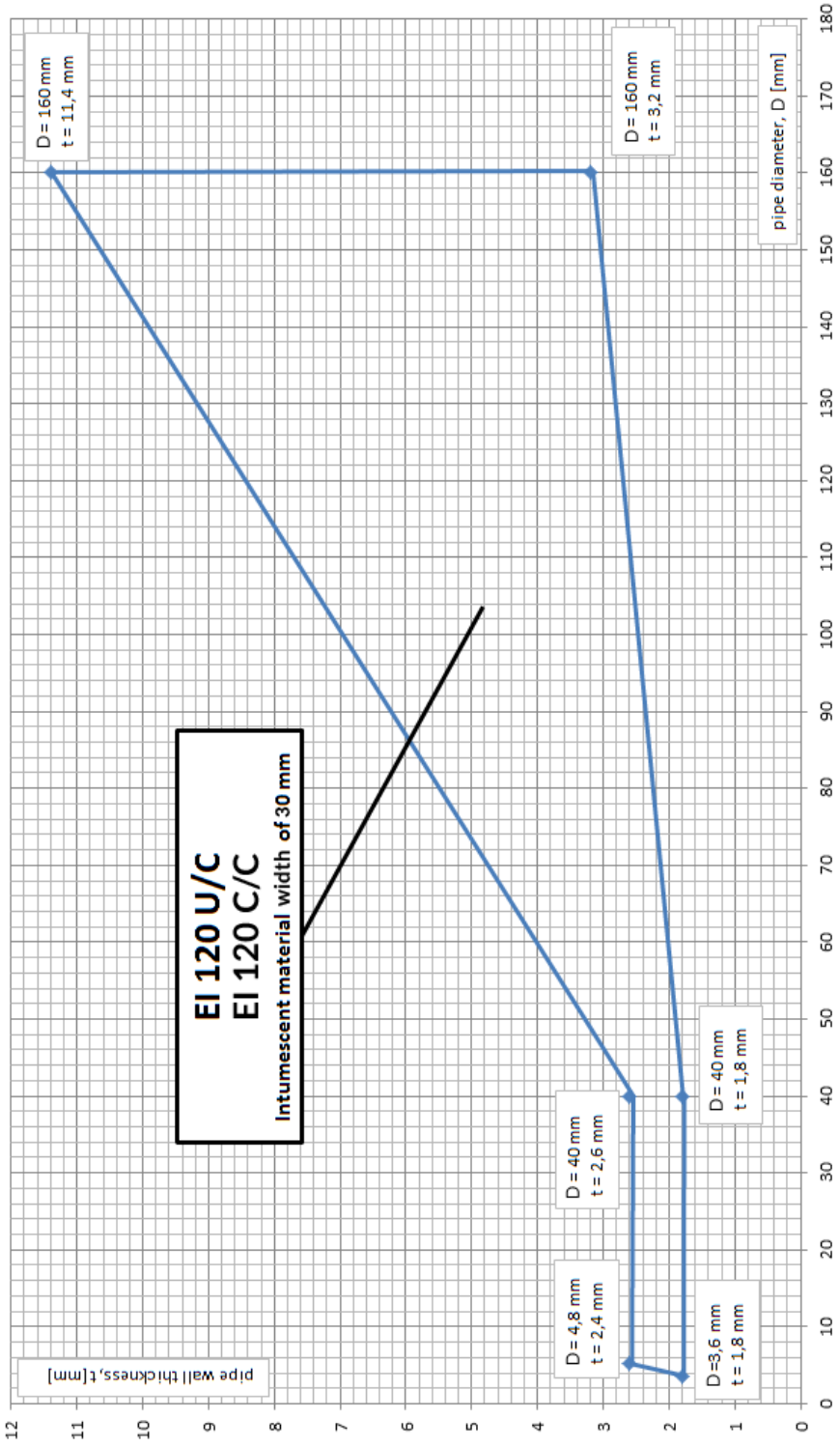
Piro Collar PC	**Annex D51** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D52. Range of intumescent material thickness for PE-HD/PE/ABS/SAN+PVC and PP pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C3 in Annex C



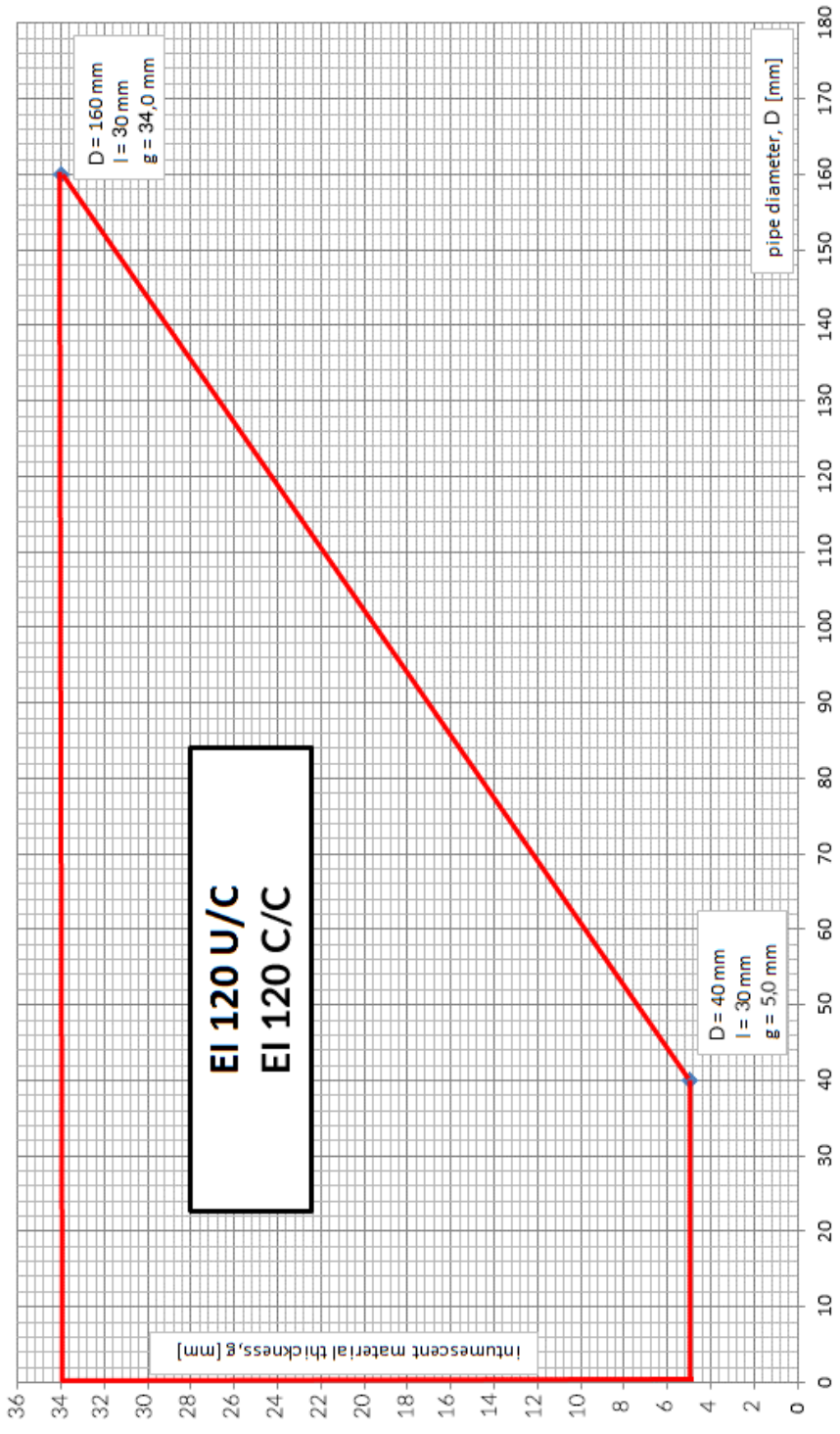
Piro Collar PC	**Annex D52** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D53. Range of PP pipes, penetration sealed with use of Piro Collar PC collars in rigid wall, thickness of 100 mm ≤ B < 125 mm made in accordance with Fig. C2 in Annex C



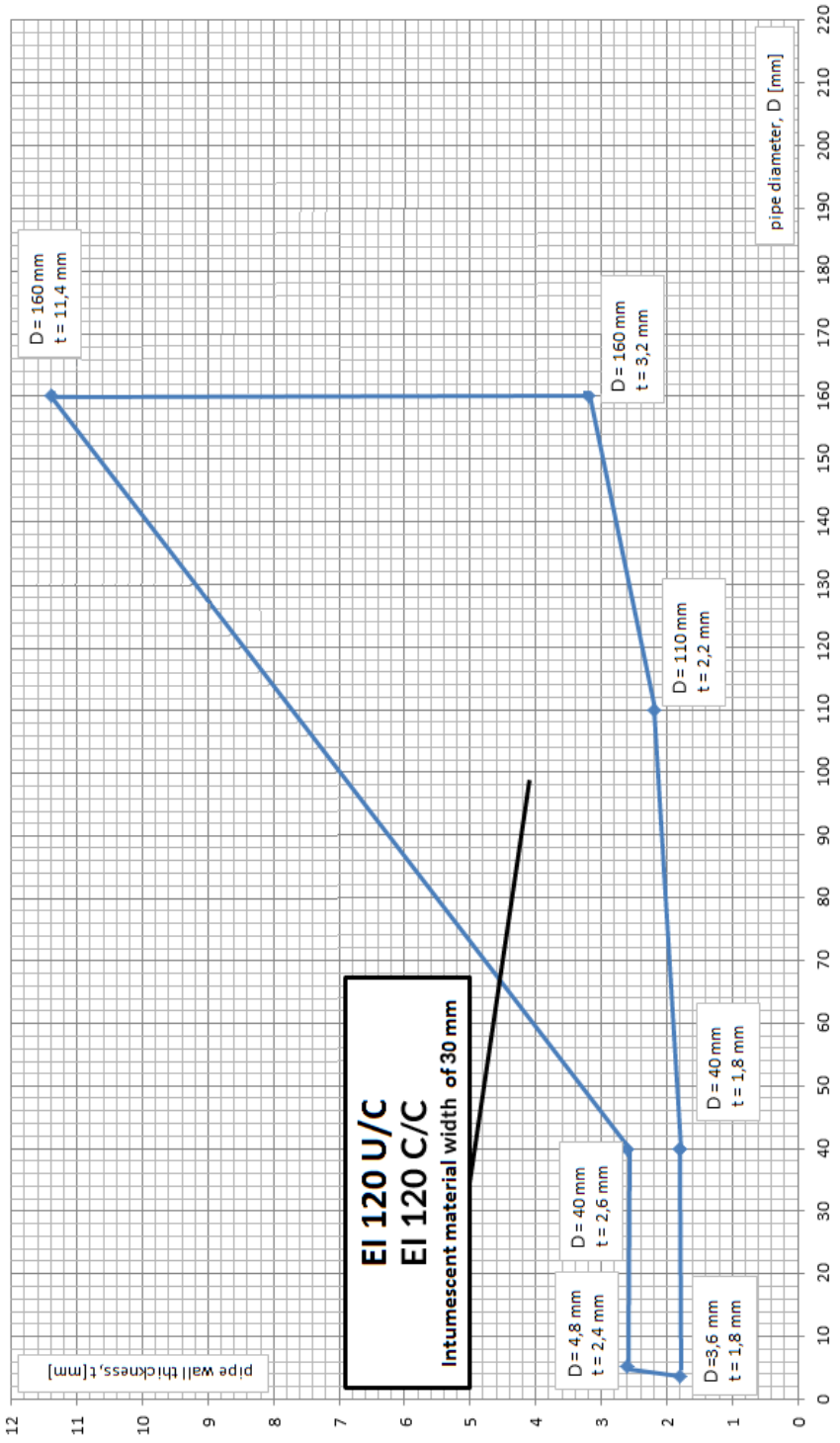
Piro Collar PC	**Annex D53** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D54. Range of intumescent material thickness for PP pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C2 and C5 in Annex C



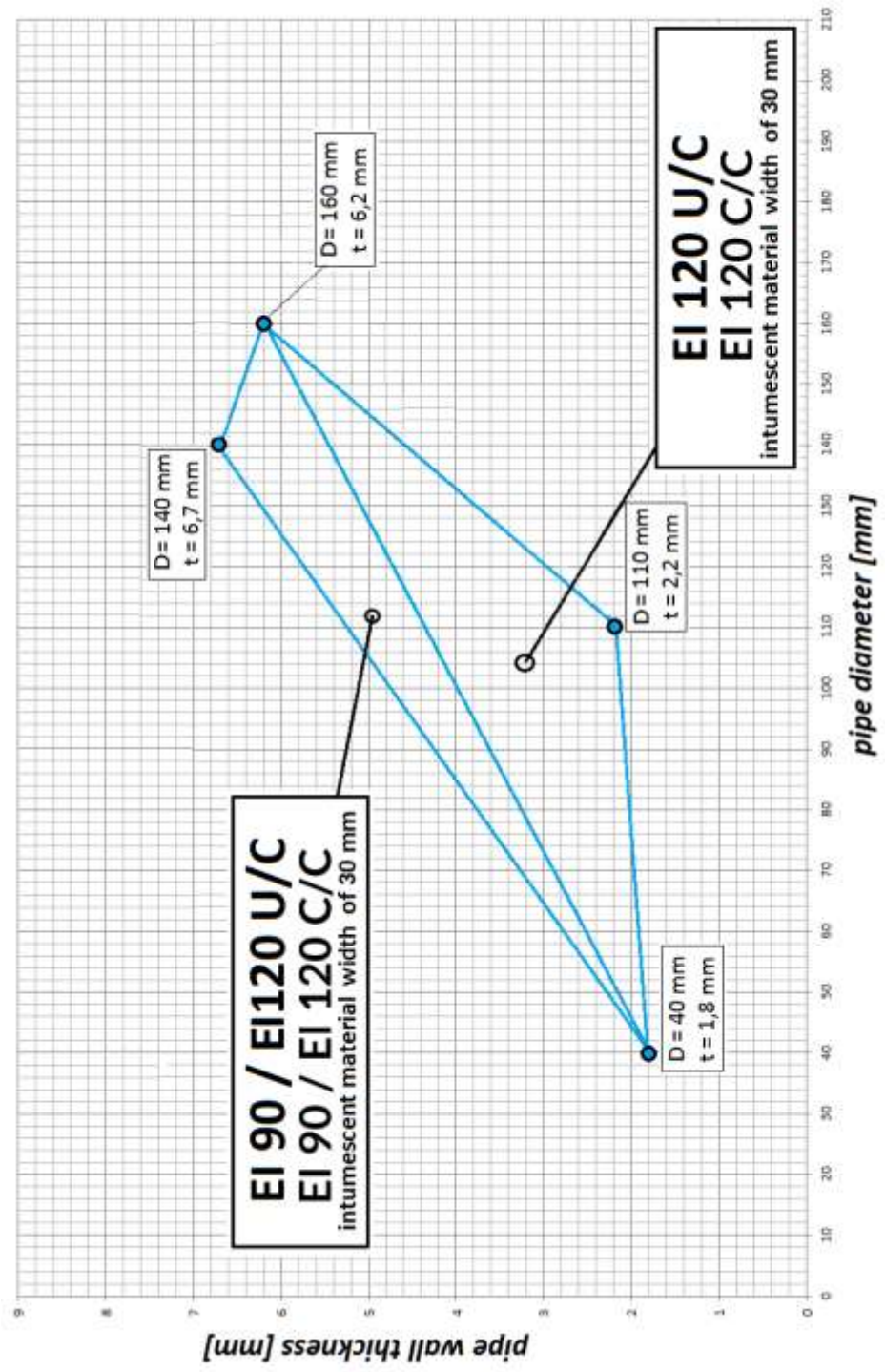
Piro Collar PC	**Annex D54** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D55. Range of PP pipes, penetration sealed with use of Piro Collar PC collars in rigid wall thickness of B ≥ 125 mm, made in accordance with Fig. C2 in Annex C



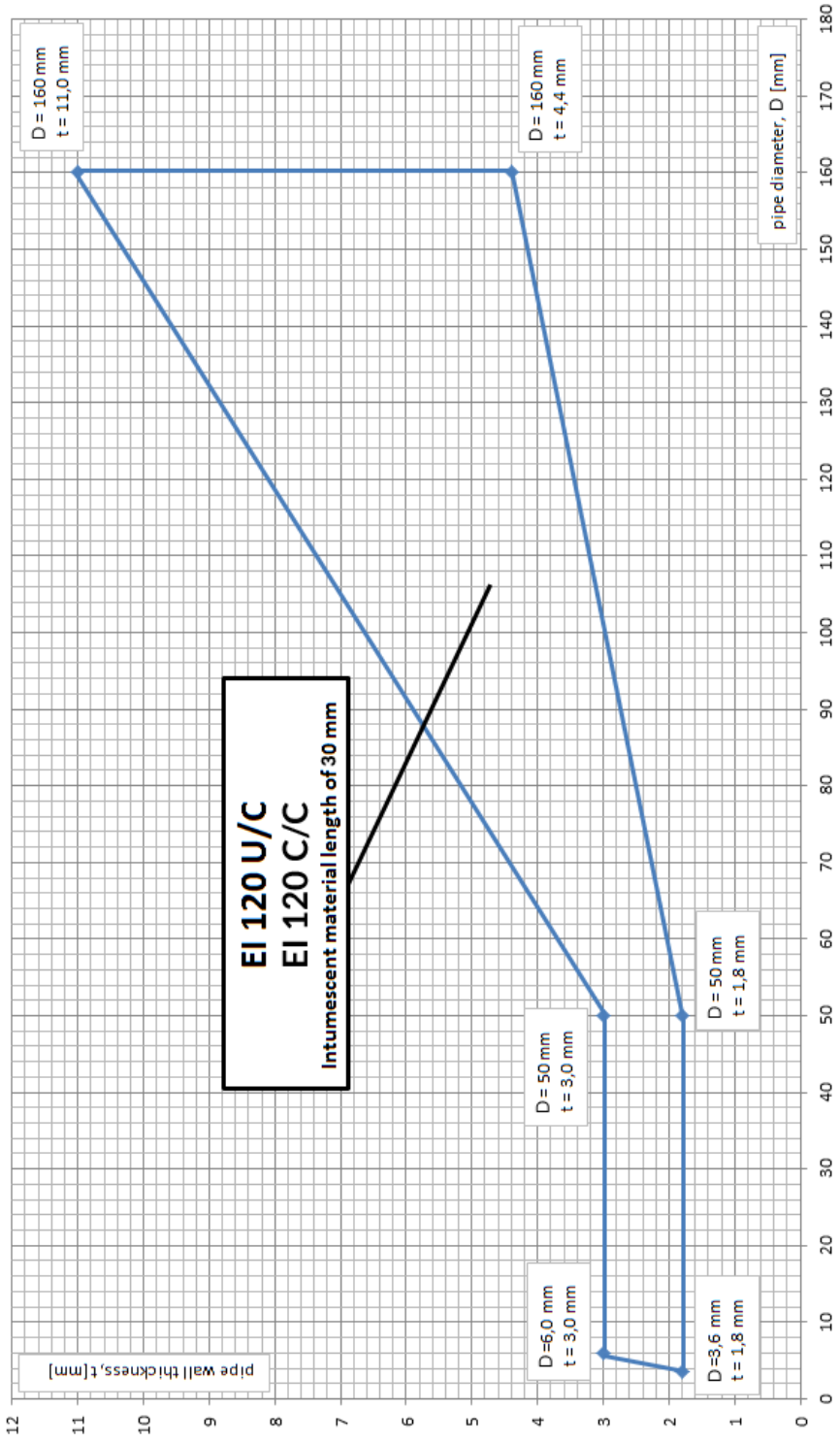
Piro Collar PC	**Annex D55** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D56. Range of PP pipes, penetration sealed with use of Piro Collar PC collars in flexible wall thickness of B ≥ 125 mm, made in accordance with Fig. C3 in Annex C



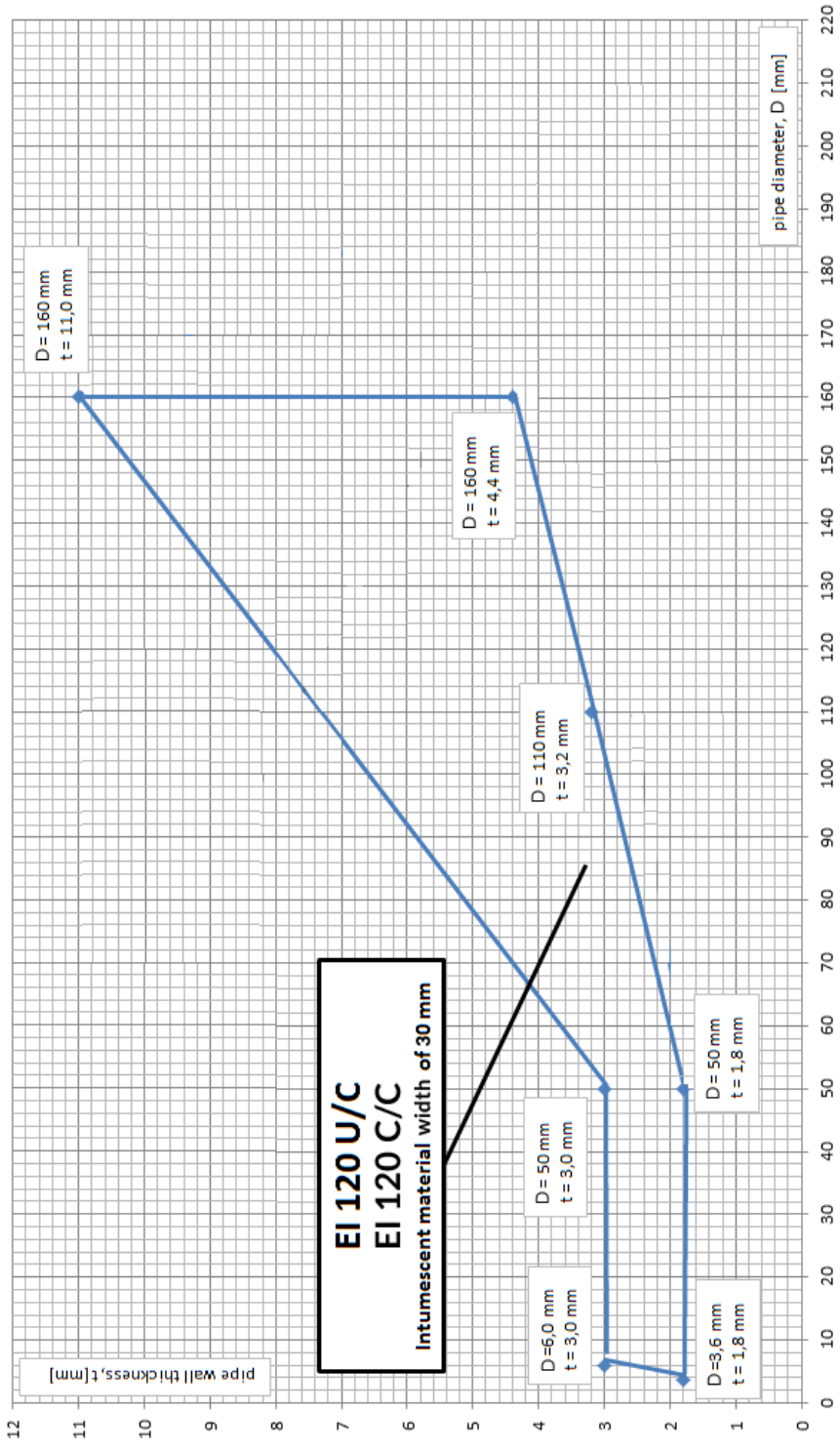
Piro Collar PC	**Annex D56** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D57. Range of PVC-U/PVC-C pipes, penetration sealed with use of Piro Collar PC collars in rigid wall, thickness of 100 mm ≤ B < 125 mm made in accordance with Fig. C2 in Annex C



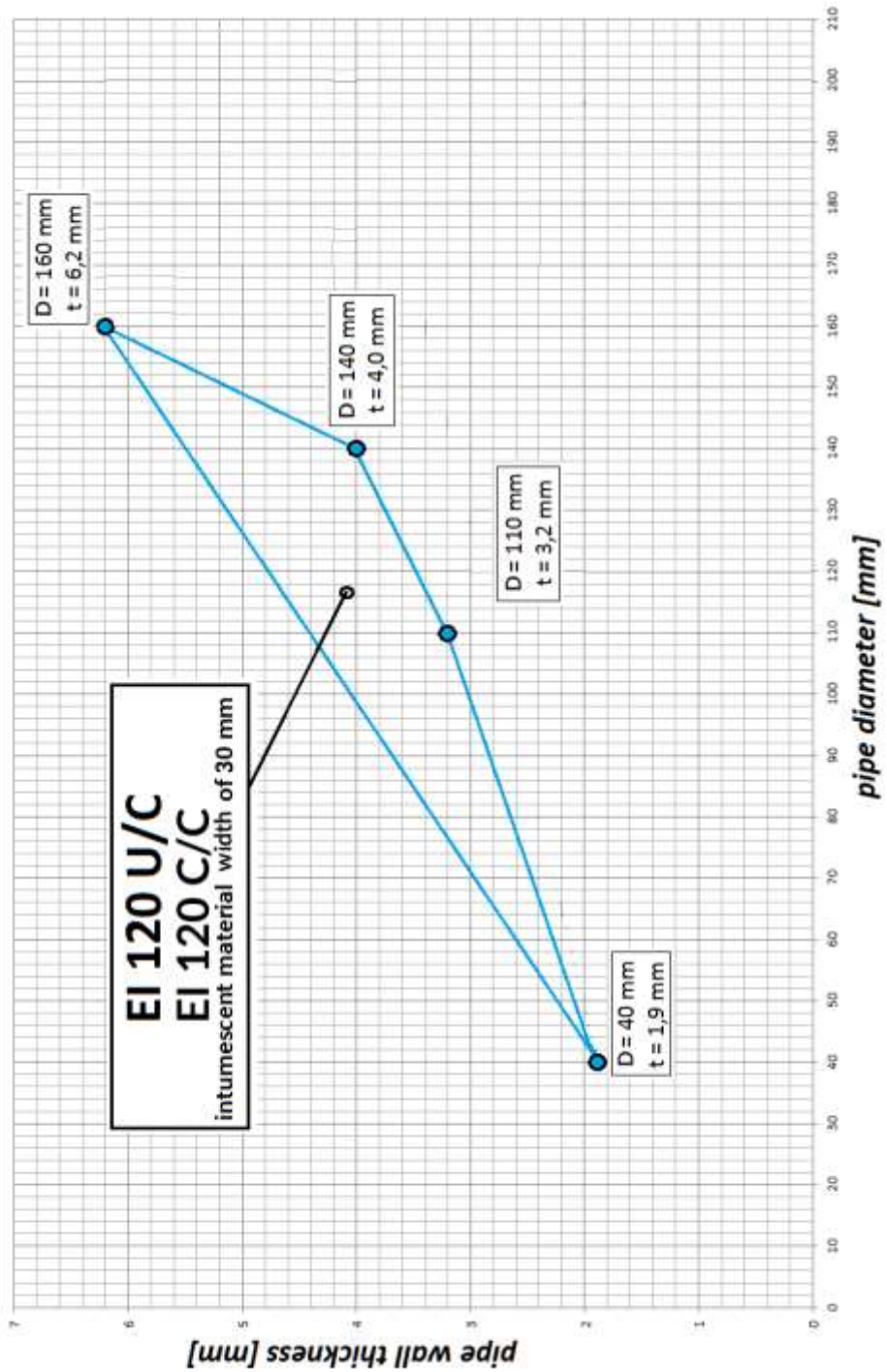
Piro Collar PC	**Annex D57** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D58. Range of PVC-U/PVC-C pipes, penetration sealed with use of Piro Collar PC collars in rigid wall thickness of B ≥ 125 mm, made in accordance with Fig. C2 in Annex C



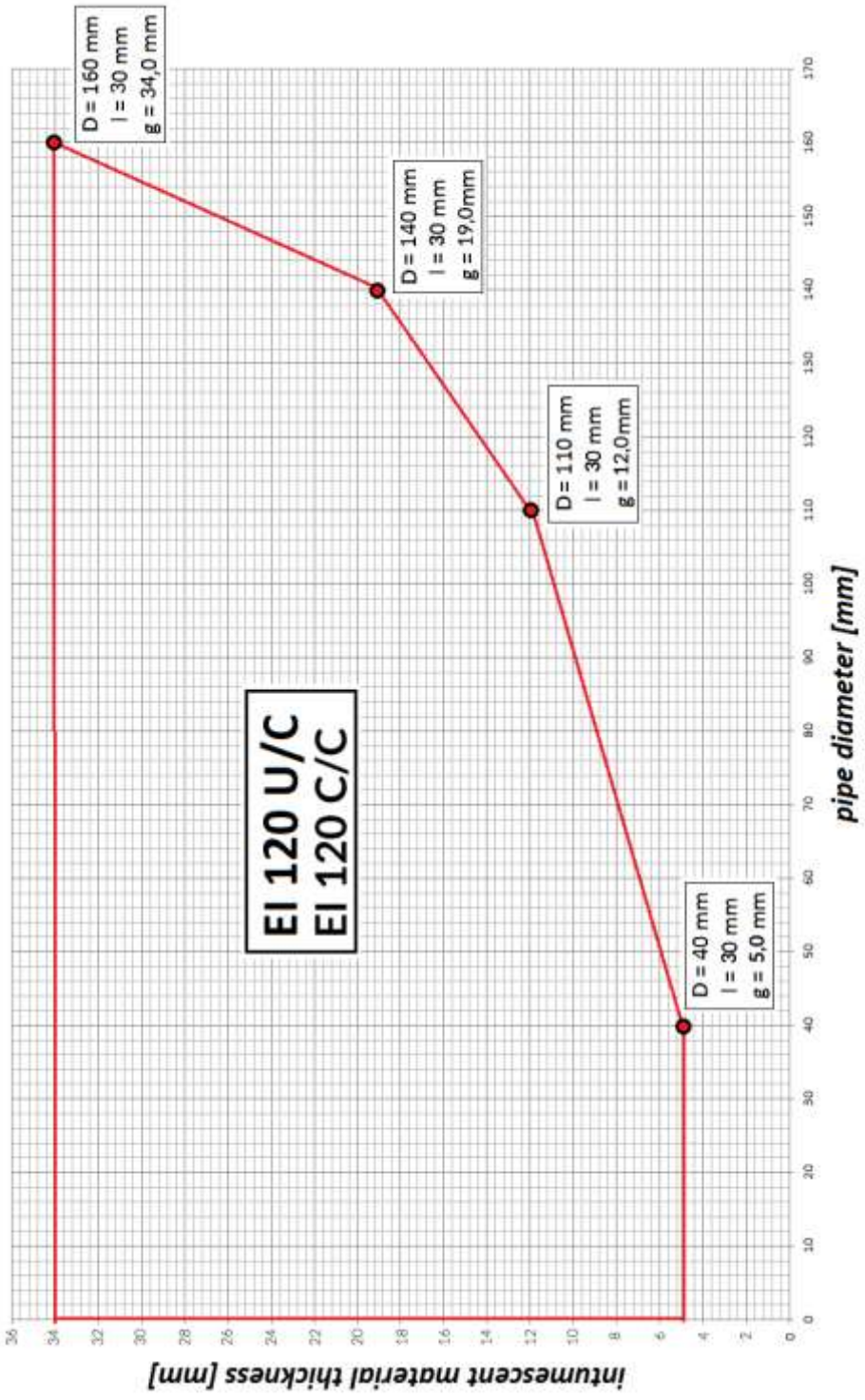
Piro Collar PC	**Annex D58** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D59. Range of PVC-U/PVC-C pipes, penetration sealed with use of Piro Collar PC collars in flexible wall thickness of B ≥ 125 mm made in accordance with Fig. C3 in Annex C



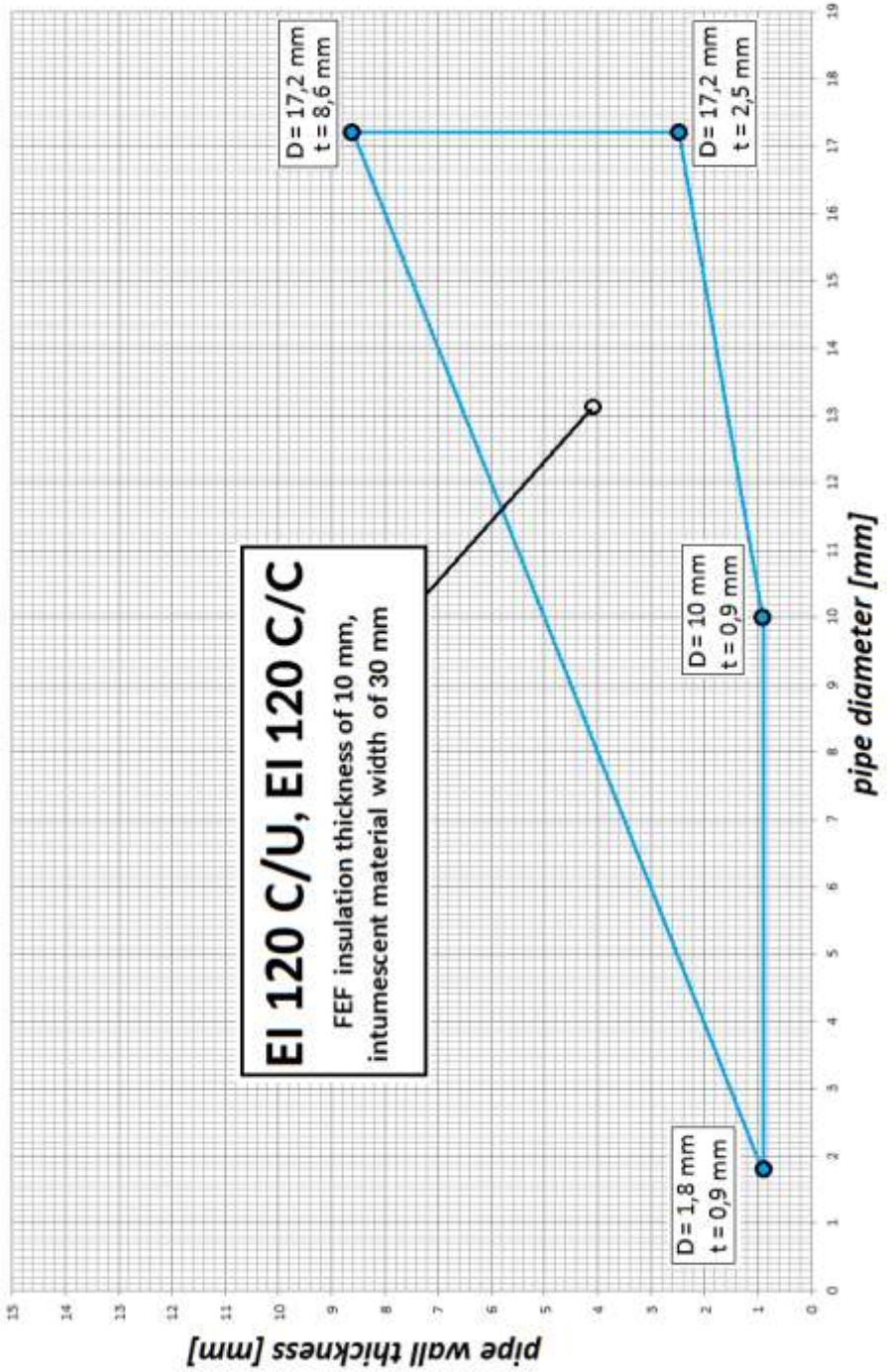
Piro Collar PC	**Annex D59** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D60. Range of intumescent material thickness for PVC-U/PVC-C and PP pipes (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C3 in Annex C



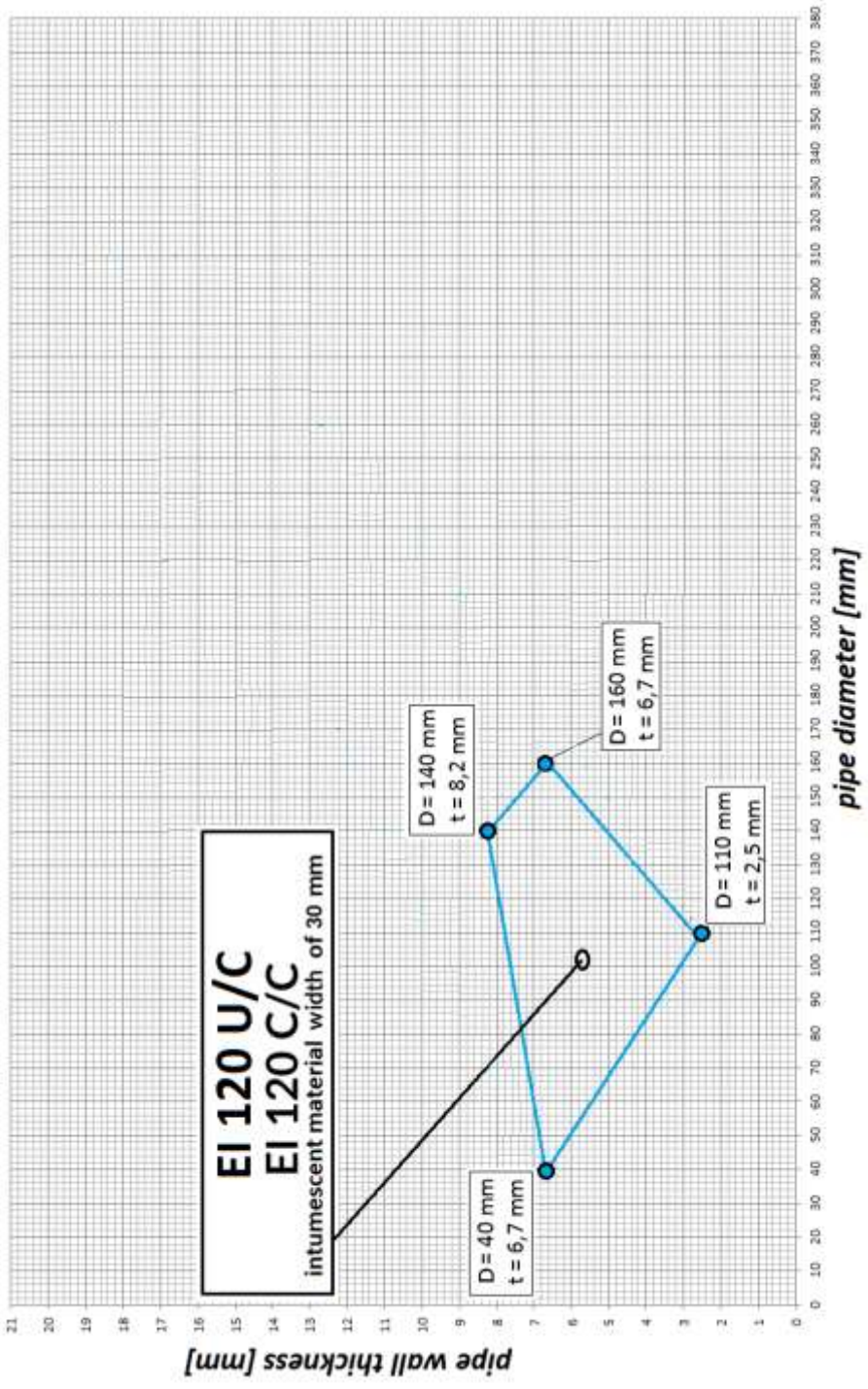
Piro Collar PC	**Annex D60** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D61. Range of steel pipes with flexible elastomeric foam (FEF) insulation thickness of 10 mm in rigid floor thickness of B ≥ 150 mm, penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C4 in Annex C



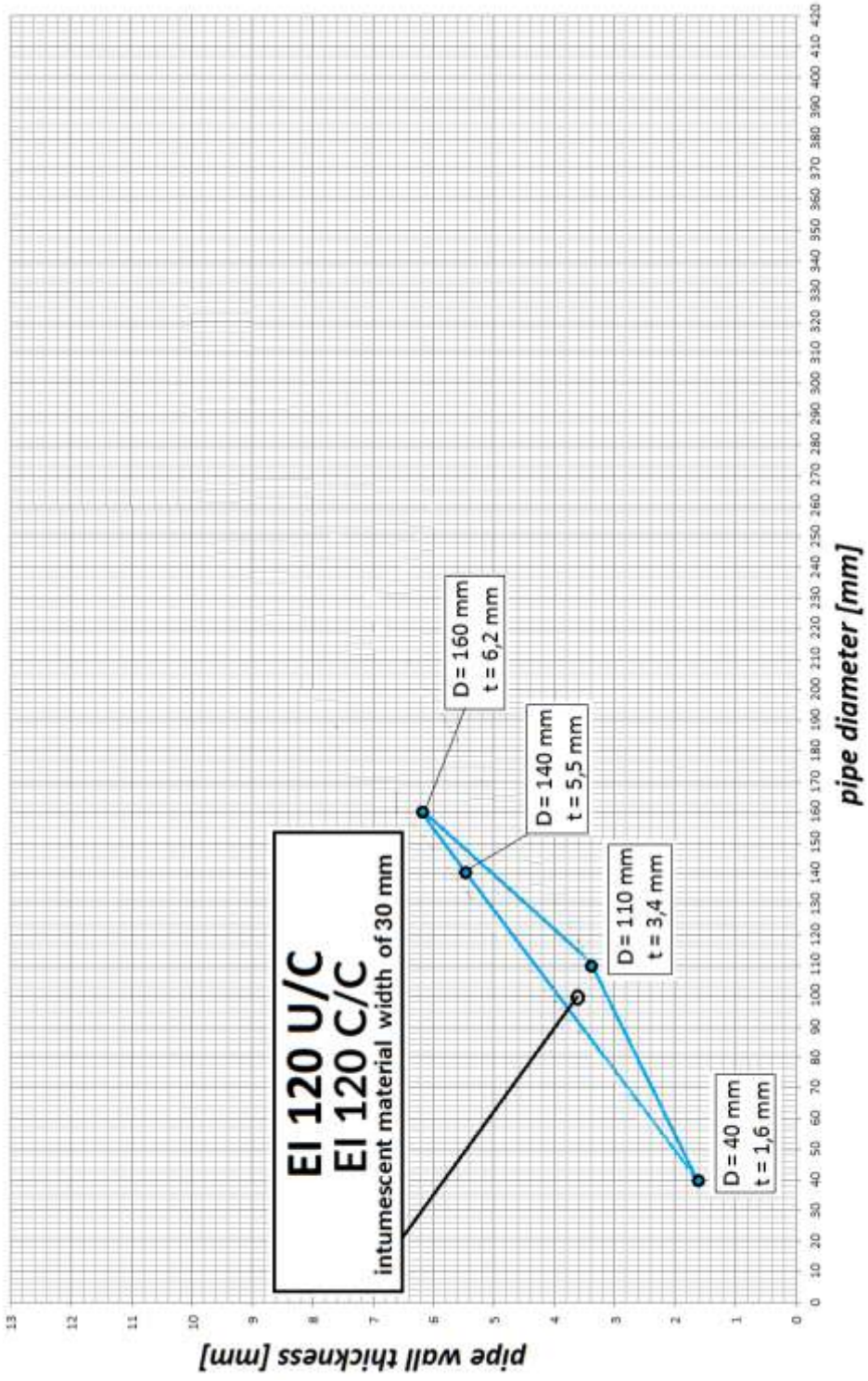
Piro Collar PC	**Annex D61** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D62. Range of PP pipes, penetration sealed with use of Piro Collar PC collars in rigid floor thickness of B ≥ 150 mm, made in accordance with Fig. C5 in Annex C



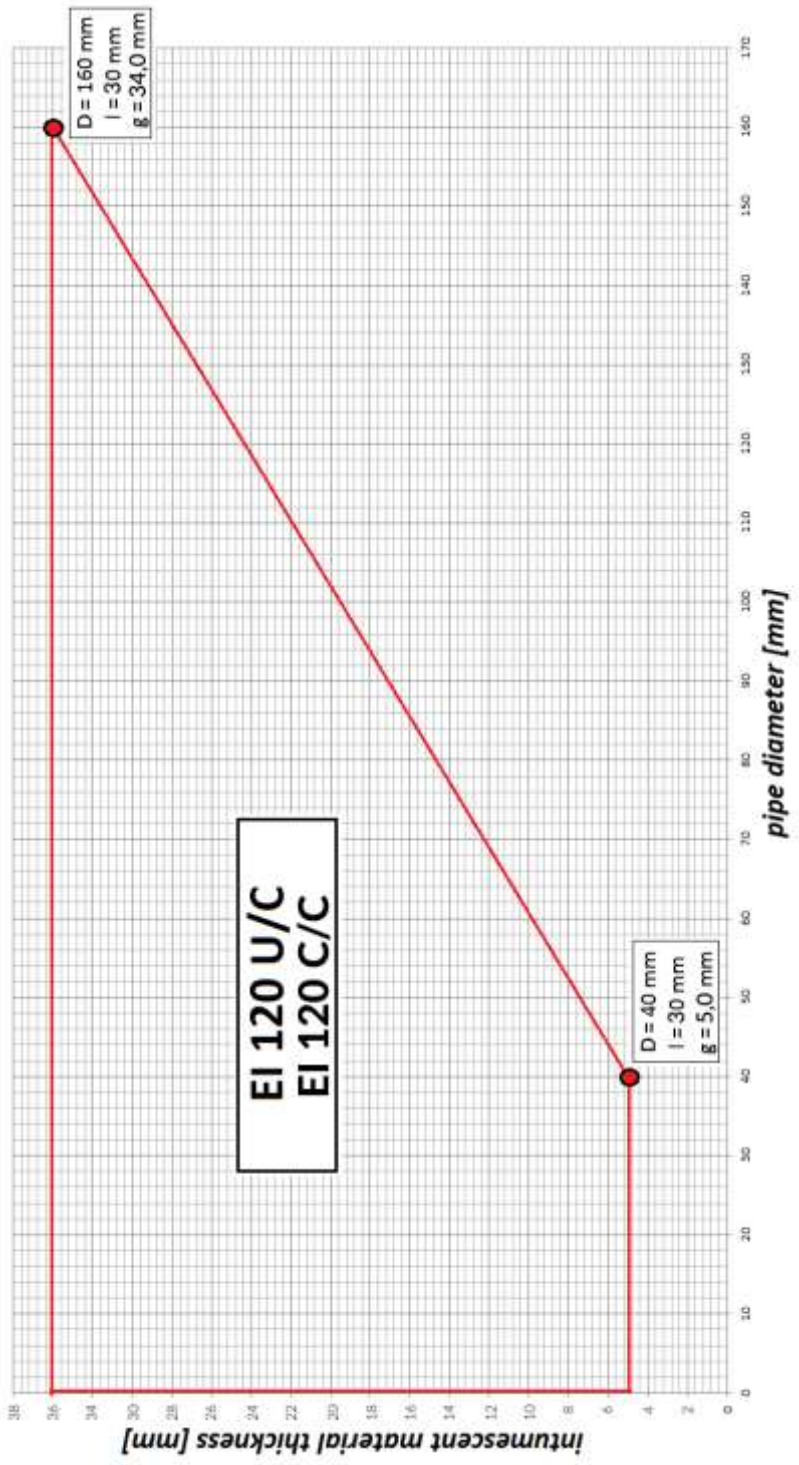
Piro Collar PC	**Annex D62** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D63. Range of PVC-U/PVC-C pipes, penetration sealed with use of Piro Collar PC collars in rigid floor thickness of B ≥ 150 mm, made in accordance with Fig. C5 in Annex C



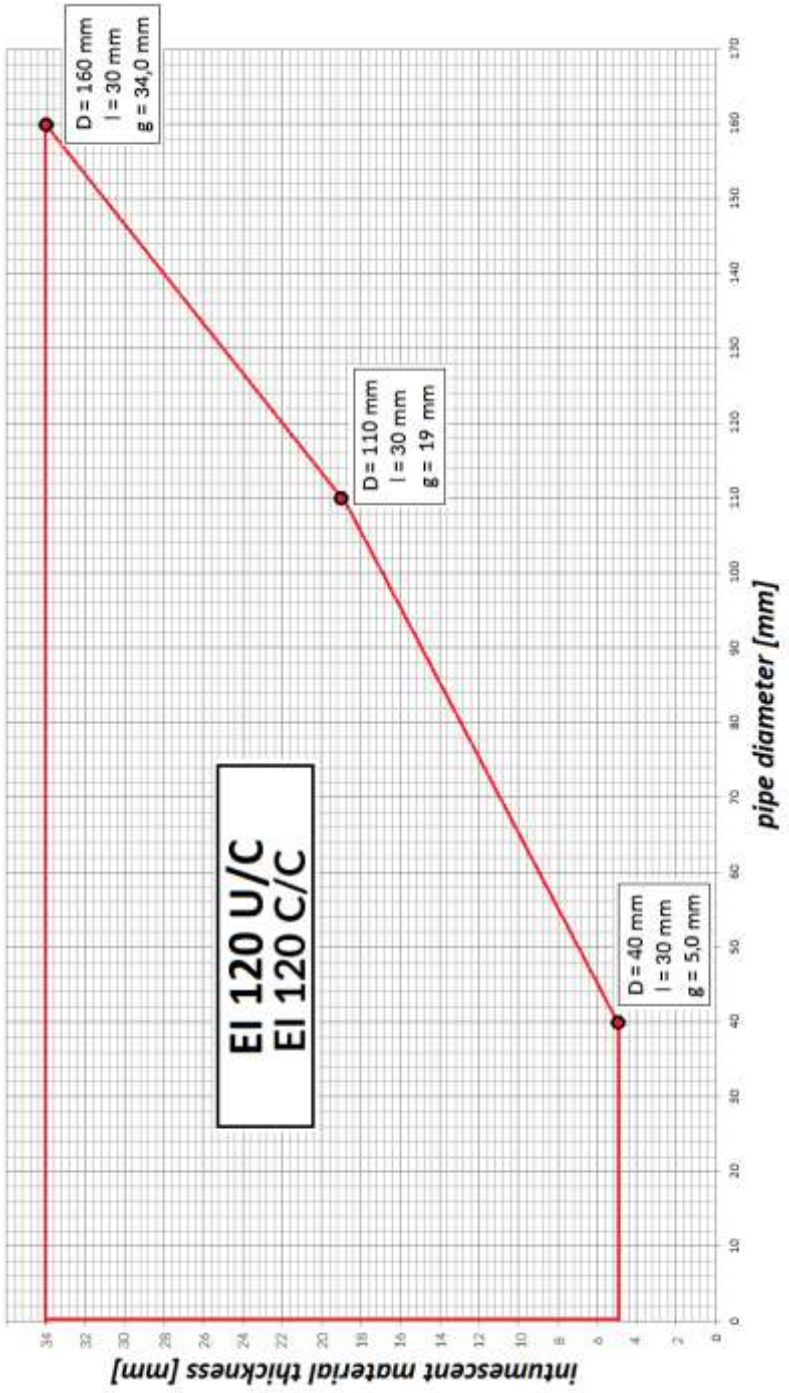
Piro Collar PC	**Annex D63** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D64. Range of intumescent material thickness for PVC-U/PVC-C pipes with PP pipes inside (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C7 in Annex C



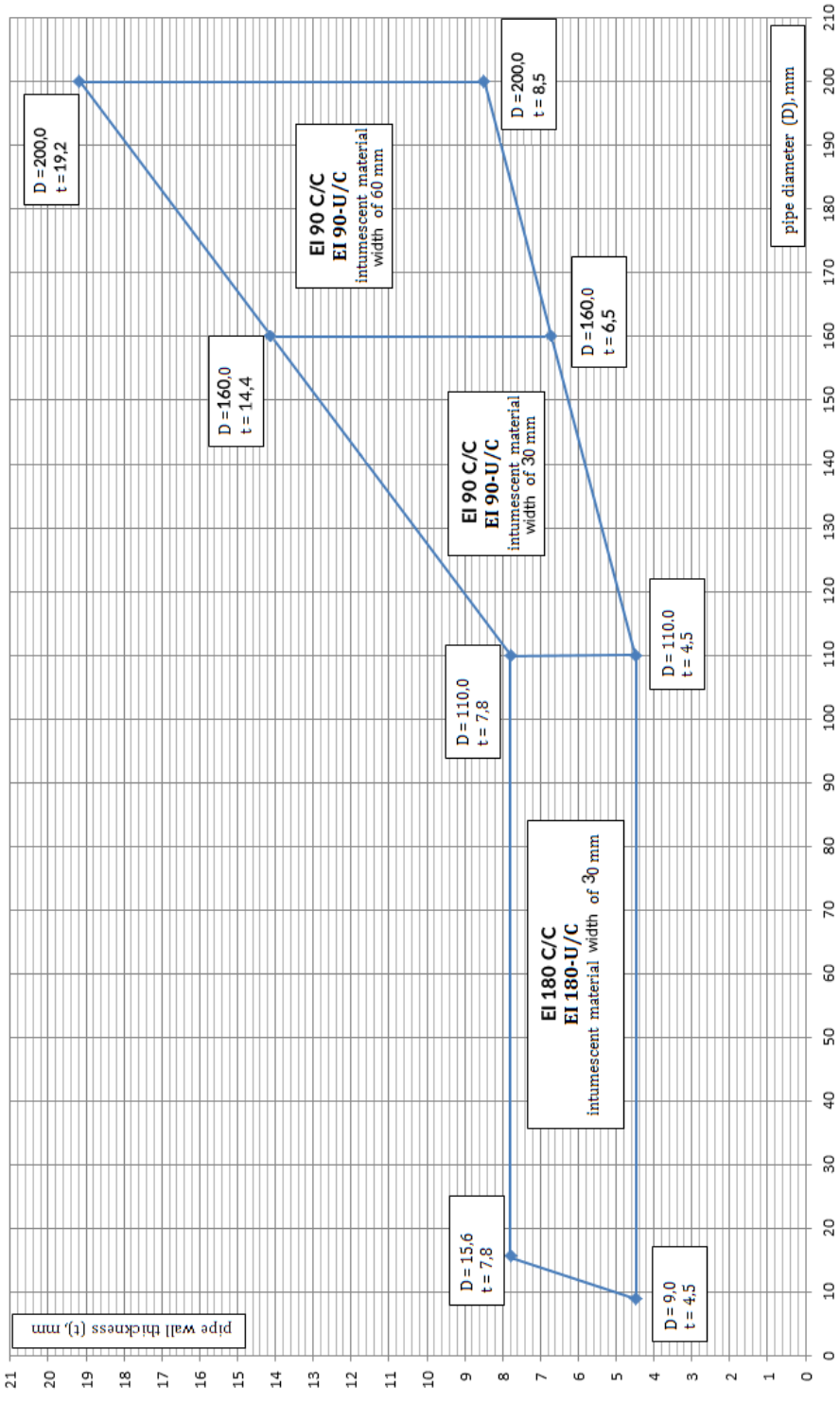
Piro Collar PC	**Annex D64** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D65. Range of intumescent material thickness for PVC-U/PVC-C pipes with cables type A1 inside (l – intumescent material width, g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C6 in Annex C



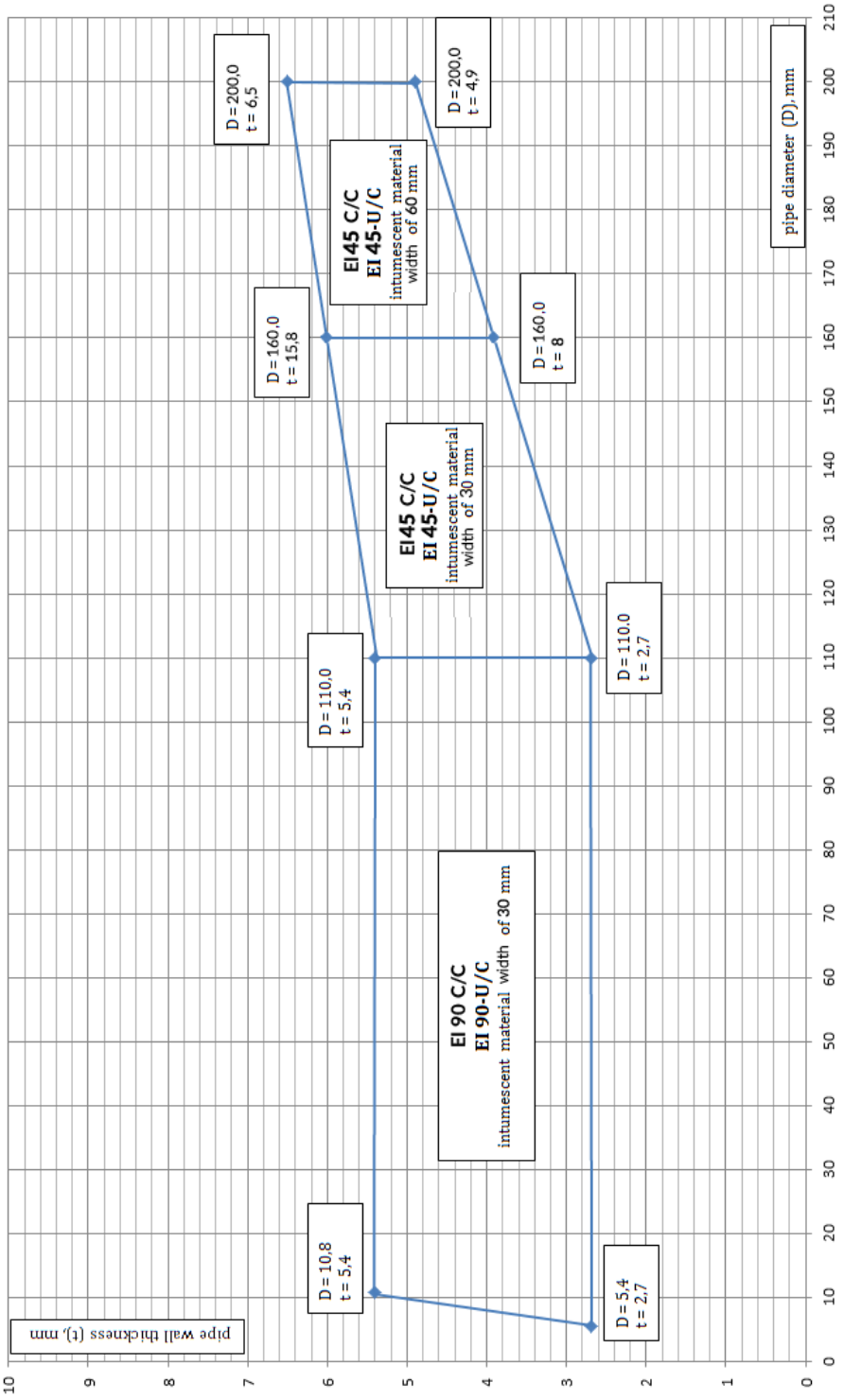
Piro Collar PC	**Annex D65** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D66. Range of PE-HD/PE/ABS/SAN+PVC pipes with PE acoustic mat insulation sealed with use of Piro Collar PC collars in rigid floor, made in accordance with Fig. C8 in Annex C



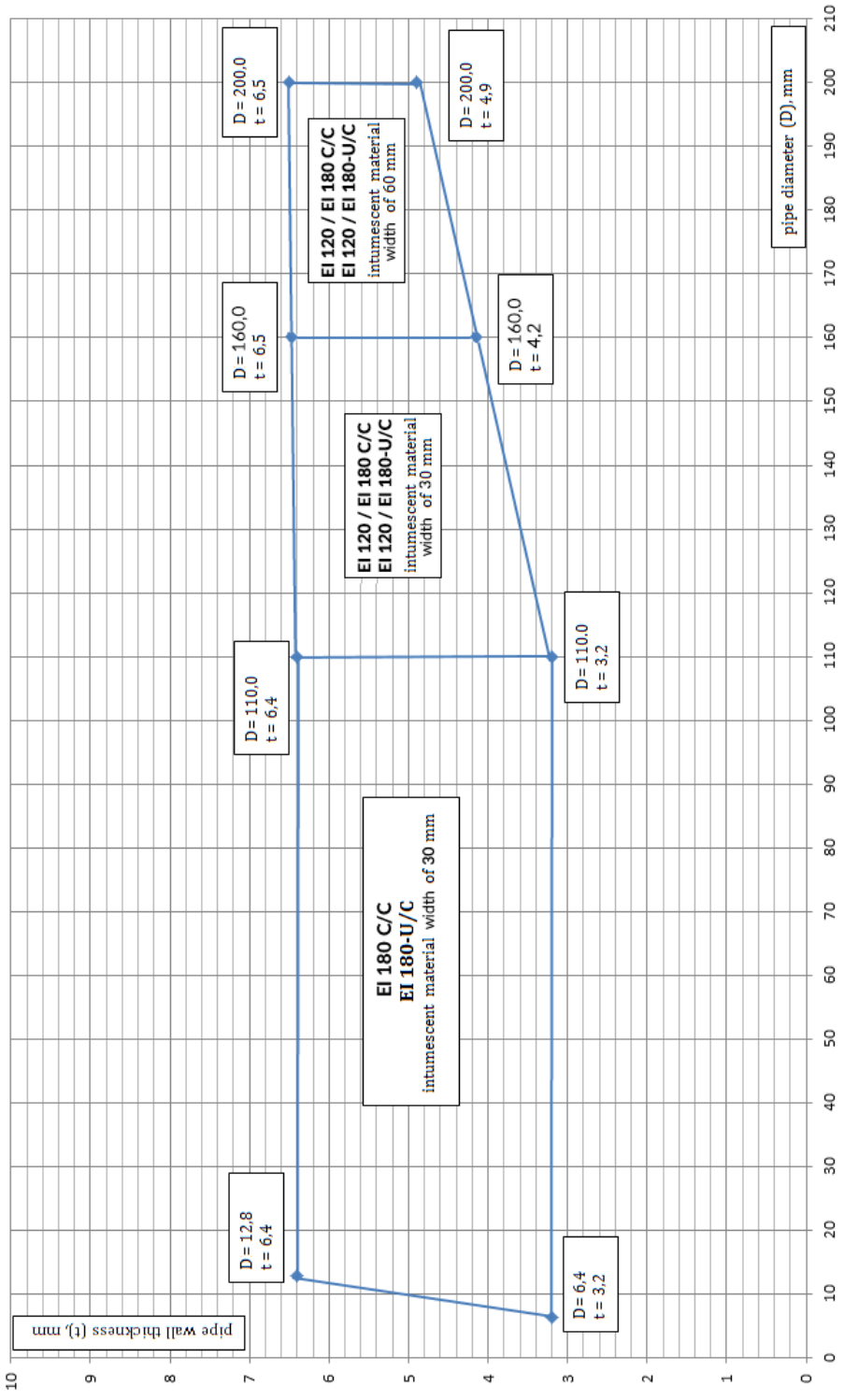
Piro Collar PC	**Annex D66** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D67. Range of PP pipes with PE acoustic mat insulation sealed with use of Piro Collar PC collars in rigid floor, made in accordance with Fig. C8 in Annex C



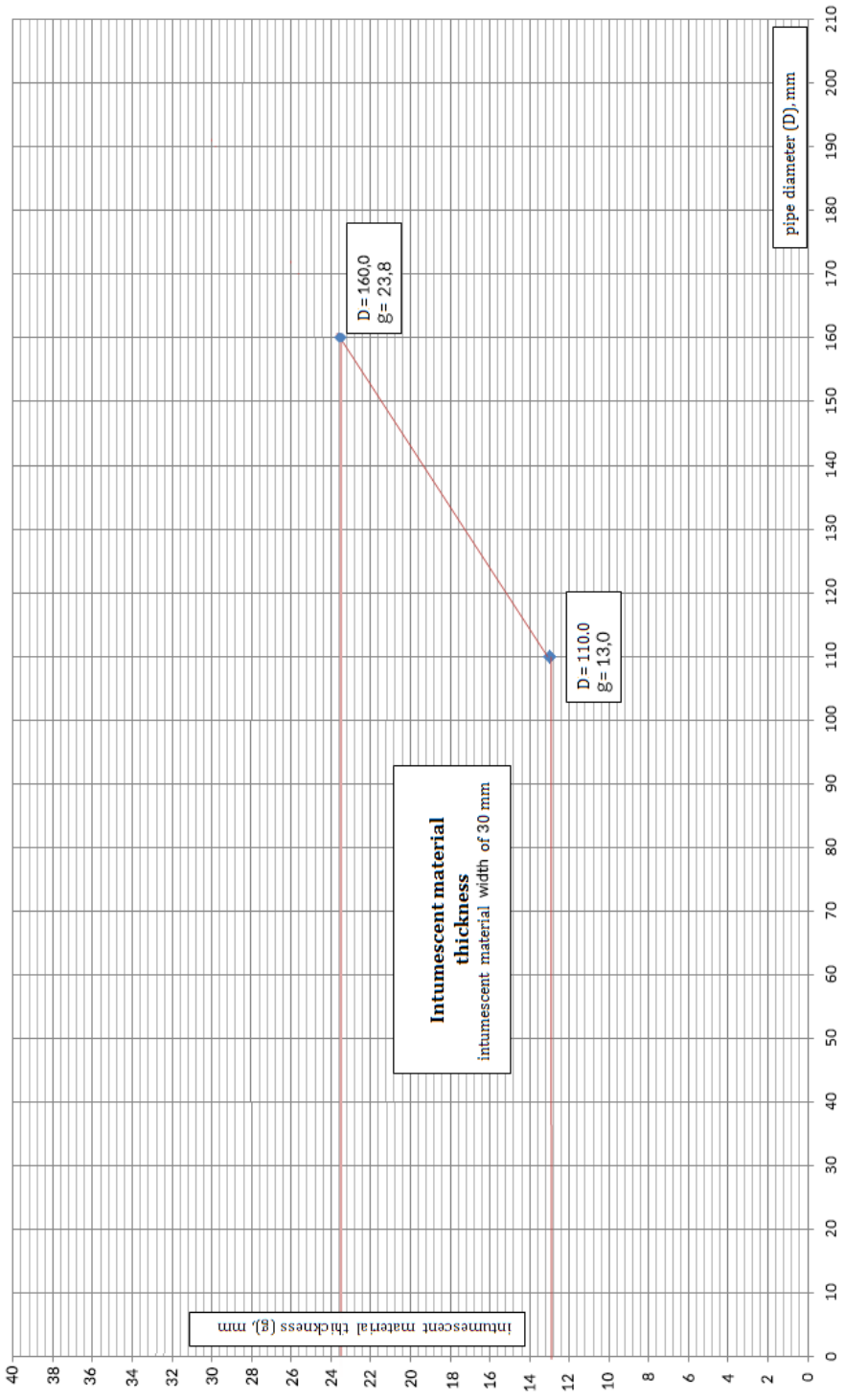
Piro Collar PC	**Annex D67** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D68. Range of PVC-U/PVC-C pipes with PE acoustic mat insulation sealed with use of Piro Collar PC collars in rigid floor, made in accordance with Fig. C8 in Annex C



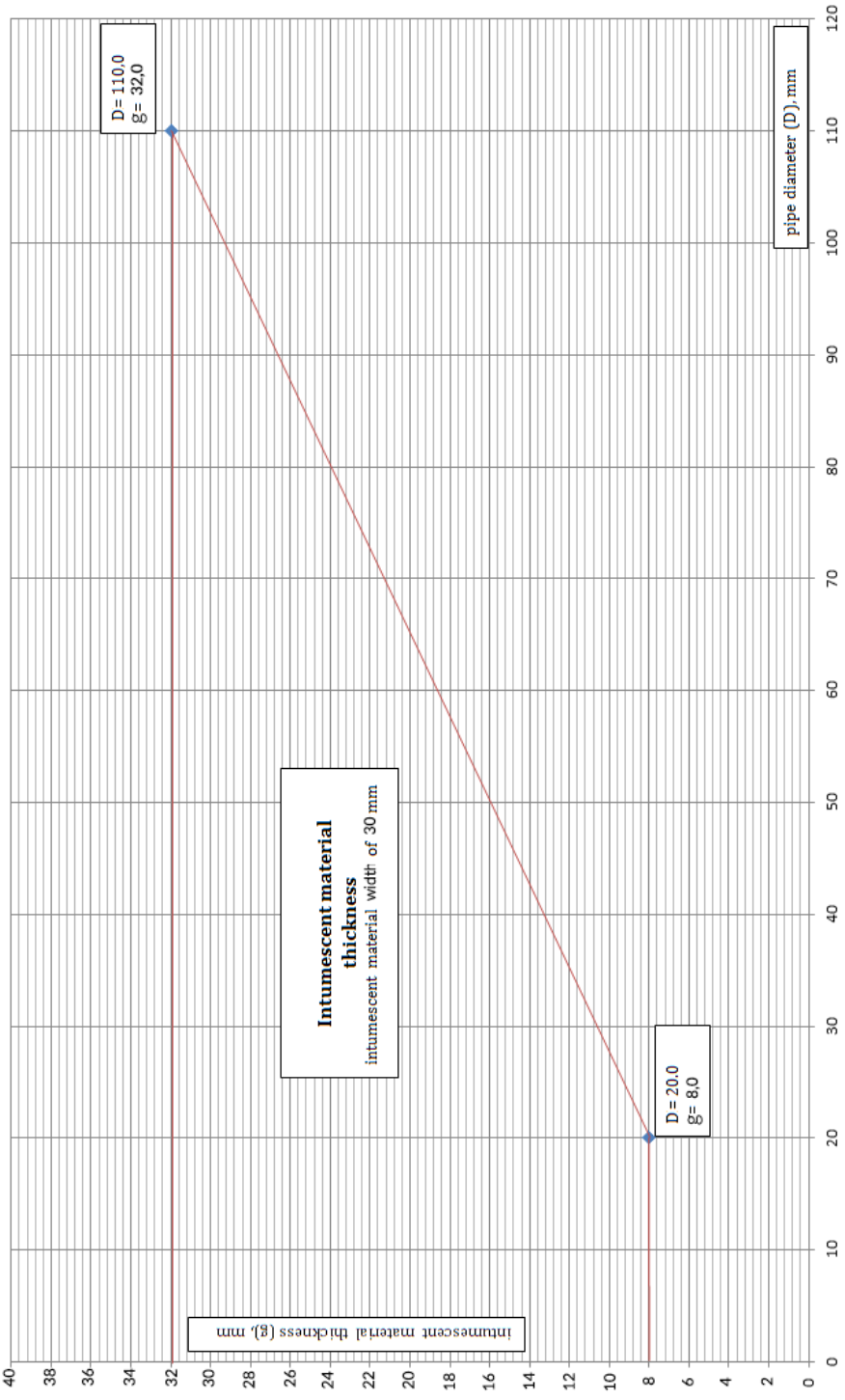
Piro Collar PC	**Annex D68** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D69. Range of intumescent material thickness for PE-HD/PE/ABS/SAN+PVC, PP and PVC-U/PVC-C pipes (g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C8 in Annex C



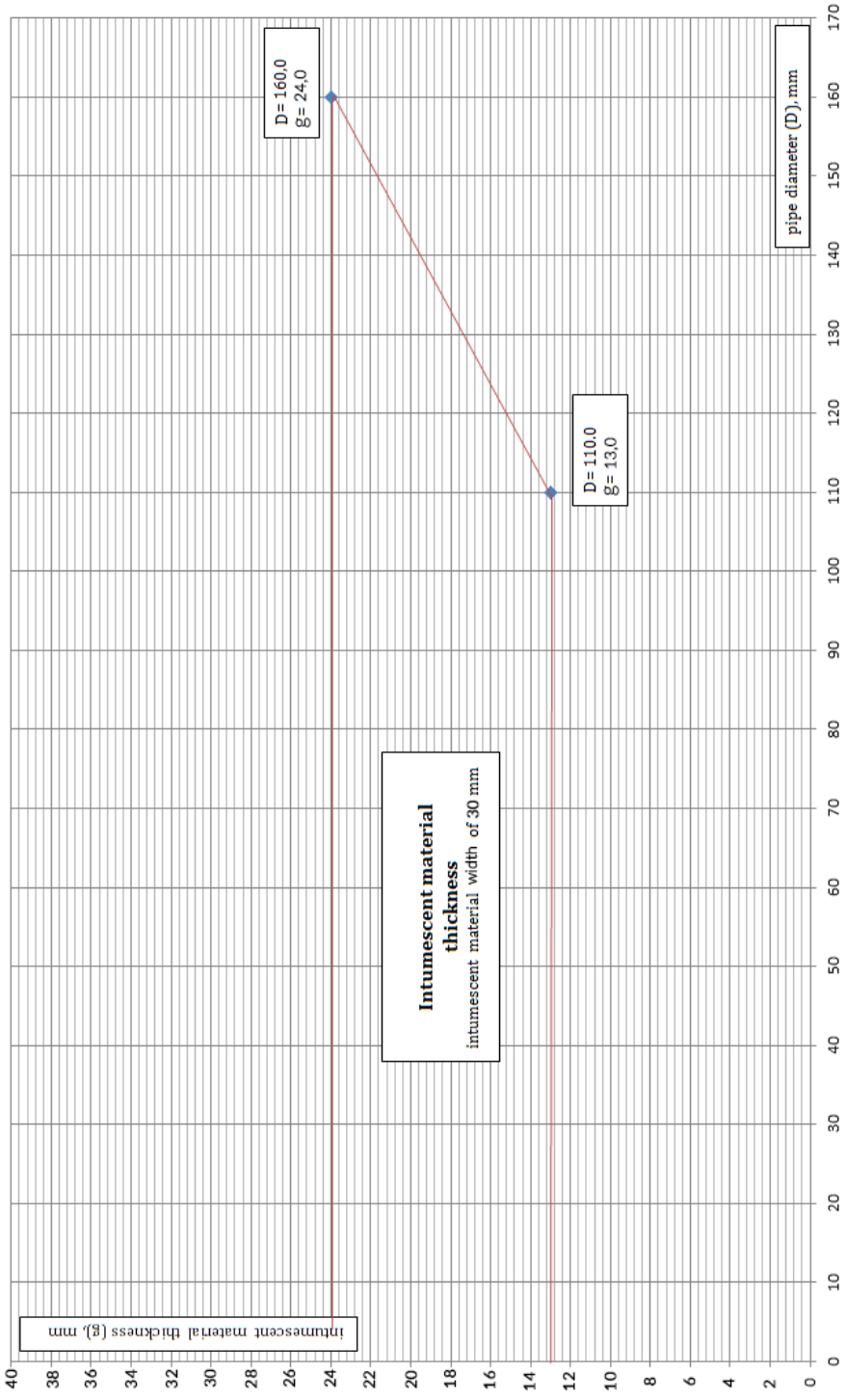
Piro Collar PC	**Annex D69** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D70. Range of intumescent material thickness for PP-R/GF/PP-R pipes (g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C5 in Annex C



Piro Collar PC	**Annex D70** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	

Fig. D71. Range of intumescent material thickness for PVC-U/PVC-C pipes with pipe elbow 67,5° (g – intumescent material thickness), penetration sealed with use of Piro Collar PC collars, made in accordance with Fig. C10 in Annex C



Piro Collar PC	**Annex D71** of European Technical Assessment ETA-17/1063
Resistance to fire classification of penetration seals made with use of Piro Collar PC Ranges of pipes diameter, pipe walls thicknesses and intumescent material thickness	