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Designated according to Article 29 of Regulation (EU) No 305/2011

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European Technical Assessment ETA-17/1040 of 19/06/2019

General Part

Technical Assessment Body issuing the European Technical Assessment: FIRES, s.r.o.	
Trade name of the construction product	Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar
Product family to which the construction product belongs	Fire stopping and fire sealing products. Penetration seals. The Product Area Code (PAC): 35
Manufacturer	Mercor Dunamenti Zrt. Nemeskéri Kiss Miklós u. 39. H-2131 Göd Hungary
Manufacturing plant(s)	Mercor Dunamenti Zrt. Nemeskéri Kiss Miklós u. 39. H-2131 Göd Hungary
This European Technical Assessment contains	67 pages including 4 Annexes which form an integral part of this assessment
	2 Annexes contain confidential information and is/are not included in the European Technical Assessment when that assessment is publicly disseminated
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.

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (excepted the confidential Annex(es) referred to above). However, partial reproduction may be made, with the written consent of the issuing Technical Assessment Body. Any partial reproduction has to be identified as such.

Specific parts

1. Technical description of the product

The product, Mixed penetration seal Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar is defined as system used to maintain the fire resistance of a separating wall/floor at the position where services pass through or where there is provision for services to pass through a separating wall/floor.

Mixed penetration seal is combination of mineral wool, paint Polylack F, putty Polylack K, Polylack KG, PS Bandage or PS Collar.

The characteristics of sealing materials

Polylack F, Polylack K
Fire protection of penetration seal of cables, metal pipes and air-technical cables. Water-based, intumescent fire protection coating.

Polylack F
- Paint
- Density 1,33 ± 0,07 g.m^{-3}
- Swelling capacity: approx. 1:25
- Solvent: water

Polylack K
- Putty
- Density 1,33 ± 0,07 g.m^{-3}
- Swelling capacity: approx. 1:10
- Solvent: water

Polylack KG
Fire protection of penetration seals of cables, metal pipes and air-technical cables. Water-based, intumescent fire protection mastic used as filler (for adhesion or filling gaps).

- Putty
- Density: approx. 1,35 ± 0,07 g.m^{-3}
- Expanding capacity: approx. 1:5
- Solvent: water

PS Bandage
Consists of fire-resistant filling materials, special graphite and additives mixed into thermoplastic materials.

- Plastic based strip on fiberglass substrate
- Density: 1,25 - 1,35 g/cm^3
- Size of bandage: width: 150 mm, thickness: 2,0 mm

PS Collar
Fire protection of penetration seals of combustible pipes passing through a separating wall/floor. PS Collar includes one or more layers of an intumescent, graphite based liner with a nominal thickness of 2,5 mm and width of 30 mm or 60 mm, inserted into a steel case. The housing of the collar is made of galvanized steel sheet with a thickness of 0,7 mm or stainless steel sheet with a thickness of 0,5 mm.

- Expansion ratio: up to approx. 7-fold
- Expansion temperature: 180°C to 200°C
- Expansion pressure: 1,6 N/mm^2
- Density: 1,20 ± 0,25 g/cm^3
- Dimensions: width: 30 mm and 60 mm, thickness: 2,5 mm

Auxiliary products, used with Polylack F, Polylack K, Polylack KG, PS Bandage and PS Collar to from mixed penetration seals, are:

- K-Flex ST: Flexible Elastomeric Foam, in accordance with EN 14303, intended to be used as Thermal insulation for building equipment and industrial installations.
  - Width: 1000 mm and 1500 mm
  - Thickness: 6 mm - 50 mm
  - Bulk density: 49 kg.m^{-3}
  - Temperature range: -200° C to + 116° C
  - Coefficient of resistance to water vapour diffusion: μ > 7000
  - Reaction to fire: B – s3, d0, EN 13501-1
  - Manufacturer: L'ISOLANTE K-FLEX S.p.A.
- NH/Armaflex: Foamed Synthetic Elastomer, in accordance with EN 14303, without chloride or bromide ions.
  - Manufacturer: Armacell UK Limited
  - Thermal insulation material with closed cell structure and high flexibility
  - Insulation for pipework, tanks and air ducts, for prevention of stress corrosion in stainless steel pipes
  - Temperature range: -200° C to + 105° C
  - Bulk density: 49 kg.m^{-3}
  - Fire performance: Behaviour in fire – self-extinguishing, does not spread flame, does not drip
  - Reaction to fire: E, D_L – s2, d0, EN 13501-1
- stone mineral wool insulation boards, in accordance with EN 14303 or EN 13162, with reaction to fire class A1, according to EN 13501-1, used as backing material with thickness of 50 mm and bulk density of 150 kg.m^{-3}.

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

2.1 Intended use

Mixed penetration seal Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar is installed either in wall or in floor.

Mixed penetration seal installed in wall

Mixed penetration seal is built in flexible wall construction, 100 mm thick (steel construction with 50 mm width, both sides sheeted by double layers of gypsum boards type F with thickness 12,5 mm and mineral wool with a thickness of 50 mm and with a bulk density of 100 kg/m^3).

In the wall, there is an opening with dimensions (1200 x 1800) mm with aperture framing and aperture lining. The opening is filled by one layer of mineral wool with thickness of 50 mm and bulk density of 150 kg/m^3. The surface of mineral wool is covered from both sides by layer of Polylack F coating with dry thickness of 0,5 mm. The surface of the cables and perforated cable trays in length of 150 mm is protected by a layer of Polylack F coating with dry thickness of 0,5 mm. The supporting construction is protected by a layer of Polylack F coating with dry thickness of 0,5 mm and with width of 50 mm.

Detailed information about usage of sealing materials (Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar) is given in Annex A of this ETA.

Mixed penetration seal installed in floor

Mixed penetration seal is built in rigid aerated concrete floor construction with a thickness of 150 mm and with a bulk density of 620 kg/m^3.

In the floor, there is an opening with dimensions (1800 x 1200) mm. The opening is filled by one layer of mineral wool with thickness of 50 mm and bulk density of 150 kg/m^3. The surface of mineral wool is covered from both sides by layer of Polylack F coating with dry thickness of 0,5 mm. The surface of the cables and perforated cable trays in length of 150 mm is protected by a layer of Polylack F coating with dry thickness of 0,5 mm.

Detailed information about usage of other sealing materials (Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar) are given in Annex B of this ETA.

2.2 Use condition

Mixed penetration seal Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar is intended for use in internal conditions with humidity lower than 85 % RH excluding temperatures below 0°C, without exposure to rain or UV – use condition Type Z_2 according to EAD 350454-00-1104.

Although a penetration seal is intended for indoor applications only, the construction process may result in it being subjected to more exposed conditions for a period before the building envelope is closed. For this case provisions shall be made to protect temporarily exposed penetration seals according to the ETA-holder's installation instructions.

2.3 Working life

The performances given in this European Technical Assessment are based on an assumed working life of the Mixed penetration seal Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar of 10 years, provided the conditions laid down in the technical literature of the manufacturer relating to packaging, transport, storage, installation, use and repair are met.

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by the Technical Assessment Body, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

2.4 General aspects

It is assumed that:

- damages to the penetration seal are repaired accordingly,
- the installation of the penetration seal does not affect the stability of the adjacent building element – even in case of fire,
- the installations are fixed to the adjacent building element in accordance with the relevant regulations in such a way that, in case of fire, no additional mechanical load is imposed to the penetration seal,
- the support of the installations is maintained for the required period of fire resistance and
- pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire.

This European Technical Assessment does not address any risks associated with the emission of dangerous liquids or gases caused by failure of the pipe(s) in case of fire nor

does it prove the prevention of the transmission of fire through heat transfer via the medium in the pipes.

The risk of downward spread of fire caused by burning material which drips through a pipe to floors below, is not considered in this European Technical Assessment (see EN 1366-3: 2009, clause 1).

The durability assessment does not take account of the possible effect on the penetration seal of substances permeating through the pipe walls.

The assessment does not cover the avoidance of destruction of the penetration seal or of the adjacent building element(s) by forces caused by temperature changes in case of fire. This has to be considered when designing the piping system.

The European Technical Assessment is issued for the product on the basis of agreed data/information, deposited with the FIRES, s.r.o. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to the FIRES, s.r.o. before the changes are introduced. The FIRES, s.r.o. will decide whether or not such changes affect the European Technical Assessment and consequently the validity of the CE marking on the basis of the European Technical Assessment and if so whether further assessment or alterations to the European Technical Assessment, shall be necessary.

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

Product: Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar		**Intended use:** Penetration seal
Basic requirement for construction work	**Essential characteristic**	**Performance**
BWR 2: Safety in case of fire	Reaction to fire	Clause 3.1.1 of this ETA
	Resistance to fire	Clause 3.1.2 of this ETA
BWR 3: Hygiene, health and the environment	Air permeability	No performance assessed
	Water permeability	No performance assessed
	Content, emmision and/or release of dangerous substances	Use category: IA1, S/W3 Declaration of the manufacturer: The product does not contain/release dangerous substances specified in EOTA TR 034, October 2015
BWR 4: Safety and accessibility in use	Mechanical resistance and stability	No performance assessed
	Resistance to impact/movement	No performance assessed
	Adhesion	No performance assessed
	Durability	Clause 3.3.4 of this ETA
BWR 5: Protection against noise	Airborne sound insulation	No performance assessed

BWR 6: Energy economy and heat retention	Thermal properties	No performance assessed
	Water vapour permeability	No performance assessed

Characterisation of all components of the of the Mixed penetration seal Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar has been done according to cl. 2.2 of EAD 350454-00-1104. Received data are confidential and are deposited by FIRES, s.r.o.

3.1 Safety in case of fire (BWR 2)

3.1.1 Reaction to fire

Mixed penetration seal Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar was assessed according to EAD 350454-00-1104 clause 2.2.1 and classified according to EN 13501-1: 2007 + A1: 2009.

Individual reaction to fire classes and field of application of sealing materials (Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar) are given in Annex C of this ETA.

3.1.2 Resistance to fire

Mixed penetration seal Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar was tested according to EN 1363-1: 2012, EN 1366-3: 2009 and EAD 350454-00-1104 clause 2.2.2 and was classified according to EN 13501-2: 2016.

Individual resistance to fire classes and field of application of sealing materials (Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar) are given in Annex D of this ETA.

3.2 Hygiene, health and the environment (BWR 3)

3.2.1 Air permeability

No performance assessed

3.2.2 Water permeability

No performance assessed

3.2.3 Content, emmision and/or release of dangerous substances

According to declaration of the manufacturer, the Mixed penetration seal Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar does not contain/release dangerous substances specified in EOTA TR 034, October 2015.

Regarding the dangerous substances, there may be requirements applicable to the product falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

3.3 Safety and accessibility in use (BWR 4)

3.3.1 Mechanical resistance and stability

No performance assessed

3.3.2 Resistance to impact/movement

No performance assessed

3.3.3 Adhesion

No performance assessed

3.3.4 Durability

Basic durability assessment of all components of the of the Mixed penetration seal Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar has been done according to cl. 2.2.9 of EAD 350454-00-1104. Received data are confidential and are deposited by FIRES, s.r.o.

Components and materials compatibility – effects in contact with metal or plastics has been tested and assessed.

Expression of basic durability assessment: Mixed penetration seal Polylack F, Polylack K, Polylack KG, PS Bandage is appropriate for use in internal conditions with humidity lower than 85 % RH excluding temperatures below 0°C, without exposure to rain or UV – use condition Type Z_2 according to EAD 350454-00-1104.

Mixed penetration seal Polylack F, Polylack K, Polylack KG, PS Bandage, PS Collar is appropriate for intended use in regard to compatibility of components and materials concerning effects in contact with metal or plastics.

3.4 Protection against noise (BWR 5)

3.4.1 Airborne sound insulation

No performance assessed

3.5 Energy economy and heat retention (BWR 6)

3.5.1 Thermal properties

No performance assessed

3.5.2 Water vapour permeability

No performance assessed

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

According to the Decision 1999/454/EC[1], amended by Decision 2001/596/EC[2] of the European Commission the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No. 305/2011) given in the following tables apply:

Product(s)	Intended use(s)	Level(s) or class(es) (resistance to fire)	System(s)
Fire Stopping and Fire Sealing Products	For fire compartmentation and/or fire protection or fire performance	any	1

According to the Decision 1999/454/EC, amended by Decision 2001/596/EC of the European Commission the system(s) of assessment and verification of constancy of performance, with regard to reaction to fire, is 3.

Product(s)	Intended use(s)	Level(s) or class(es) (resistance to fire)	System(s)
Fire Stopping and Fire Sealing Products	For uses subject to regulations on reaction to fire	A1*, A2*, B*, C*	1
		A1**, A2**, B**, C**, D, E	3
		(A1 to E)***, F	4

* Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material)
** Products/materials not covered by footnote (*)
*** Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of class A1 according to Commision Decision 96/603/EC, as amended)

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited by the Technical Assessment Body FIRES, s.r.o.

The notified product certification body shall carry out the continuous surveillance, assessment and evaluation of factory production control at least twice a year.

Issued in Batizovce on 19. 06. 2019 by FIRES, s.r.o.

Approved by:

Ing. Michal Gašper
Head of the Technical Assessment Body

Prepared by:

Ing. Samuel Skokan
Assessor of the Technical Assessment Body

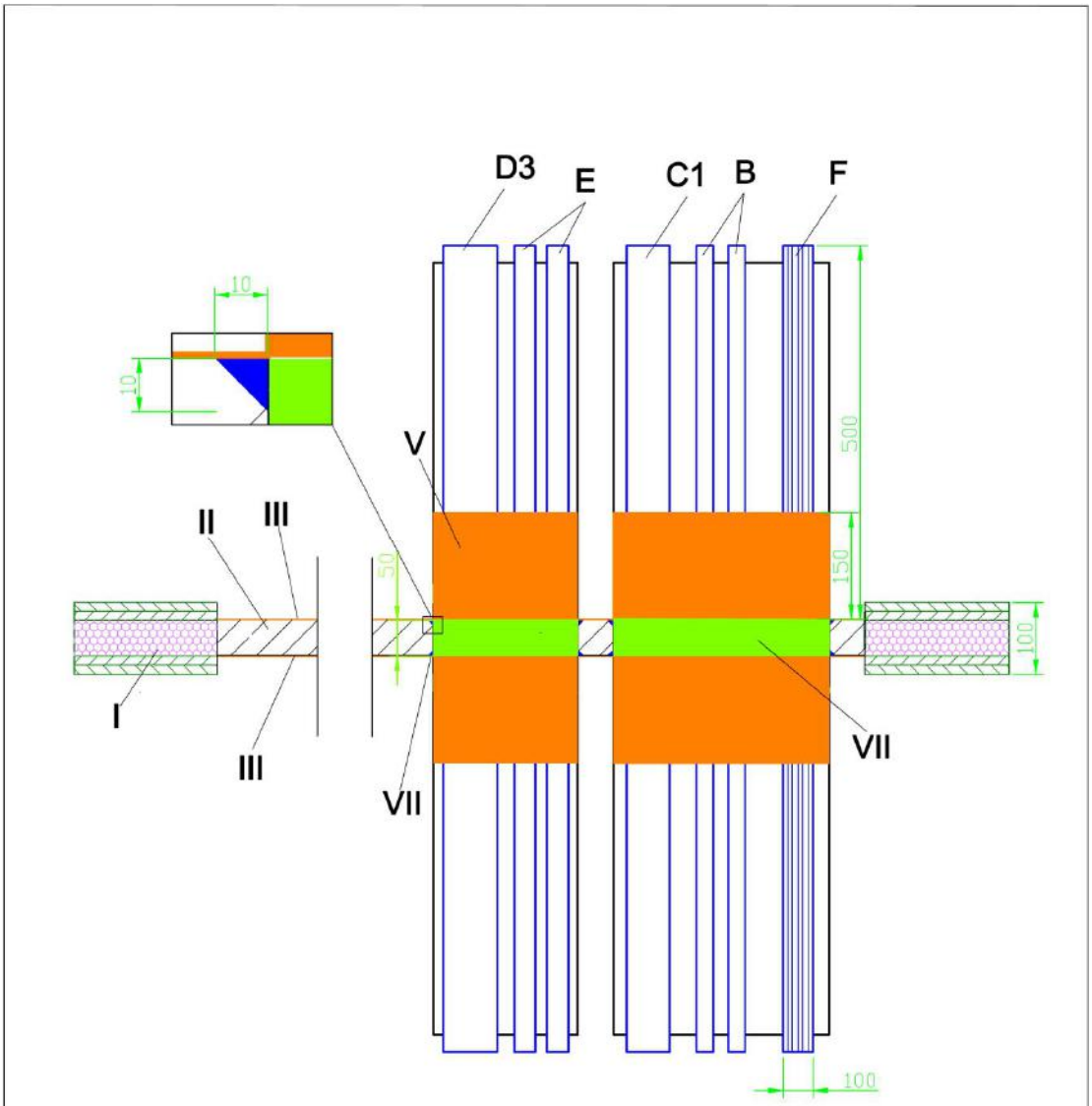
[1] Official Journal of the European Communities no. L 178, 14. 07. 1999
[2] Official Journal of the European Communities no. L 209, 02. 08. 2001

Annex A

Use: in flexible or rigid wall supporting construction

Maximum dimensions of penetration seal: (1200 x 1800) mm (width x height)

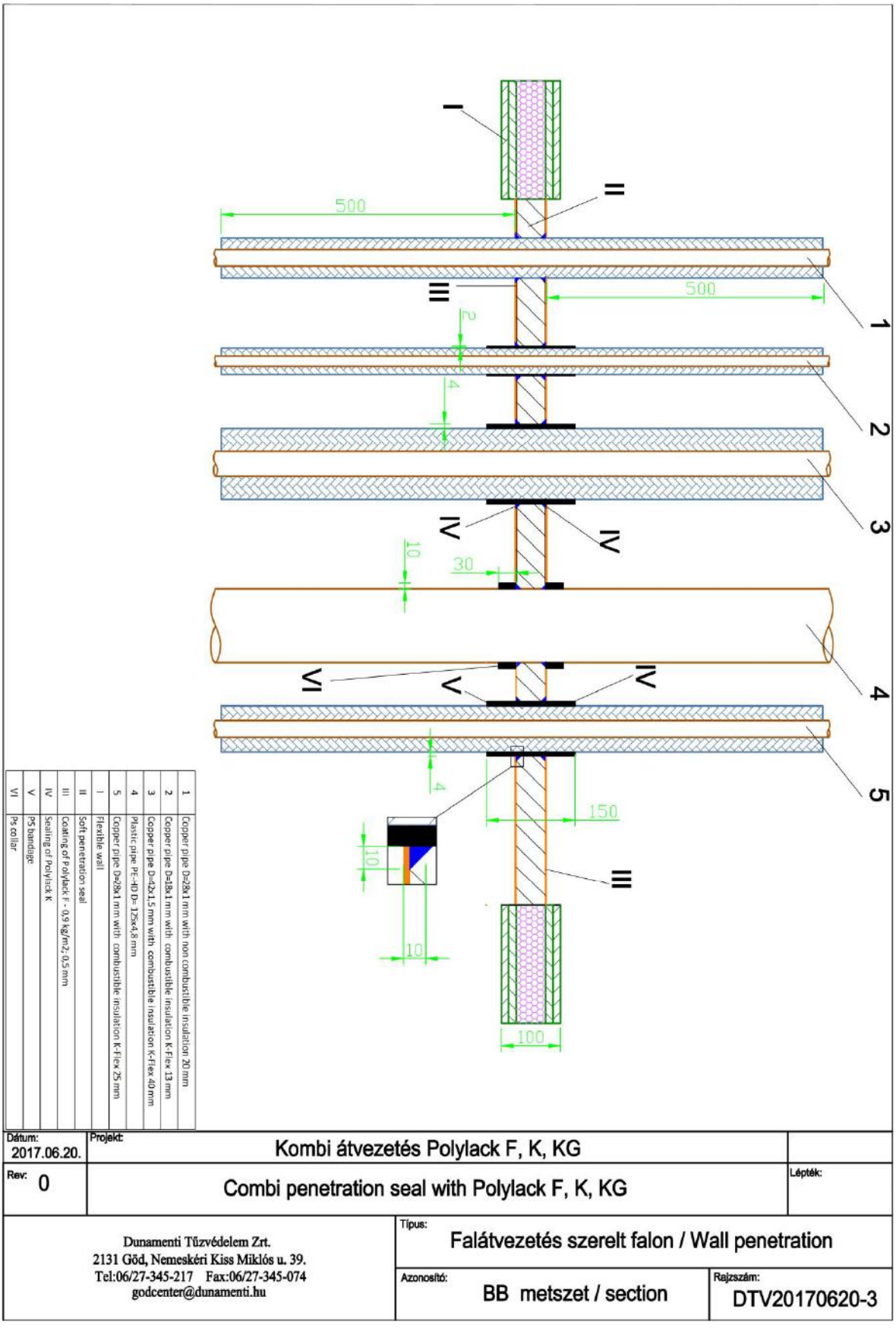
No. D3, 2 x E, C1, 2 x B, F - services



D3	Cable N2XH-J 4x185 SM
E	Cables N-YY-O 1x185 RM
C1	Cable NYCWY 4x95 SM/50
B	Cables NYY-O 1x95 RM
F	Bundle of telekommunication cable, J-Y(St)Y 20X2X0,6 mm
I	Flexible wall
II	Stone wool 50 mm of thickness, density 150 kg/m^3
III	Coating of Polylack F - 0,9 kg/m2; 0,5 mm
V	Coating of Polylack F - 0,5 mm
VII	Sealing of Polylack KG

Dátum: 2017.06.20.	Projekt: Kombi átvezetés Polylack F, K, KG - EI60	
Rev: 0	Combi penetration seal with Polylack F, K, KG - EI60	Léptók:
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: Falátvezetés szerelt falon / Wall penetration	
	Azonosító: AA metszet / section	Rajzszám: DTV20170620-2

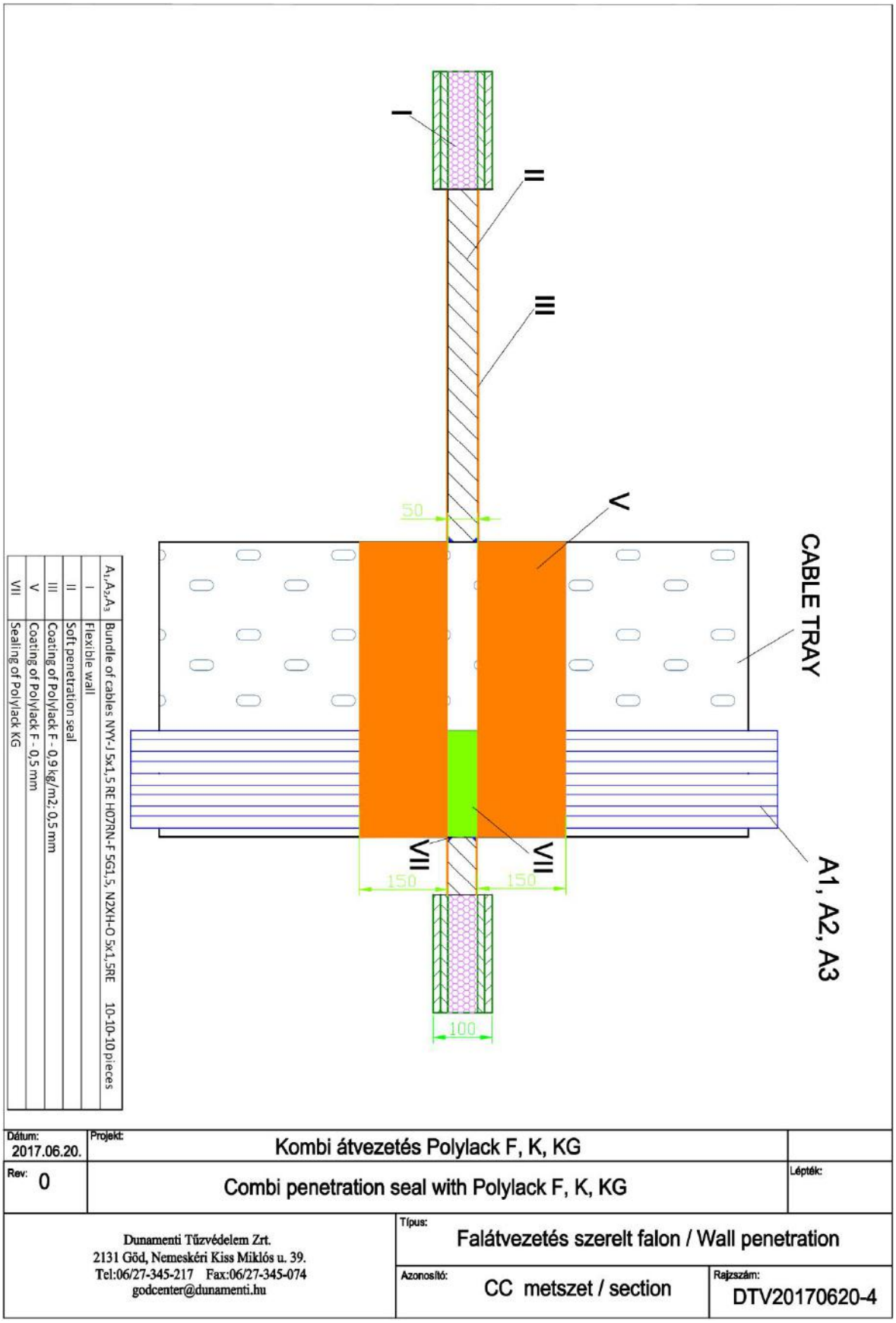
No. 1, 2, 3, 4, 5 - services



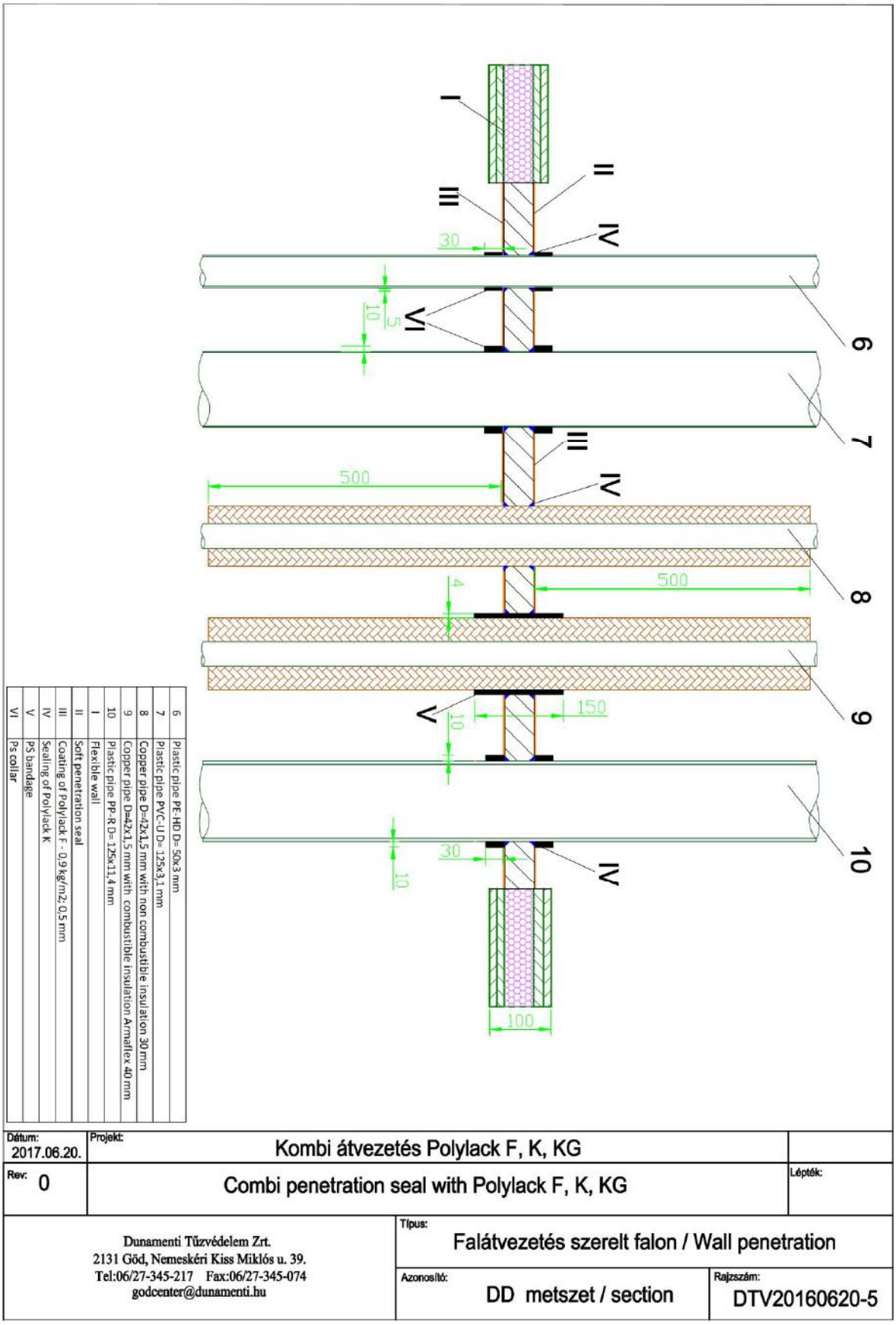
VI	Ps collar
V	PS bandage
IV	Sealing of Polylack K
III	Coating of Polylack F - 0,9 kg/m2, 0,5 mm
II	Soft penetration seal
I	Flexible wall
5	Copper pipe D=28x1 mm with combustible insulation K-Flex 25 mm
4	Plastic pipe PE-HD D= 125x4,8 mm
3	Copper pipe D=42x1,5 mm with combustible insulation K-Flex 40 mm
2	Copper pipe D=18x1 mm with combustible insulation K-Flex 13 mm
1	Copper pipe D=28x1 mm with non combustible insulation 20 mm

Dátum: 2017.06.20.	Projekt: Kombi átvezetés Polylack F, K, KG	
Rev: 0	Combi penetration seal with Polylack F, K, KG	Lépték:
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: Falátvezetés szerelt falon / Wall penetration	
	Azonosító: BB metszet / section	Rajzszám: DTV20170620-3

No. A1, A2, A3 - services



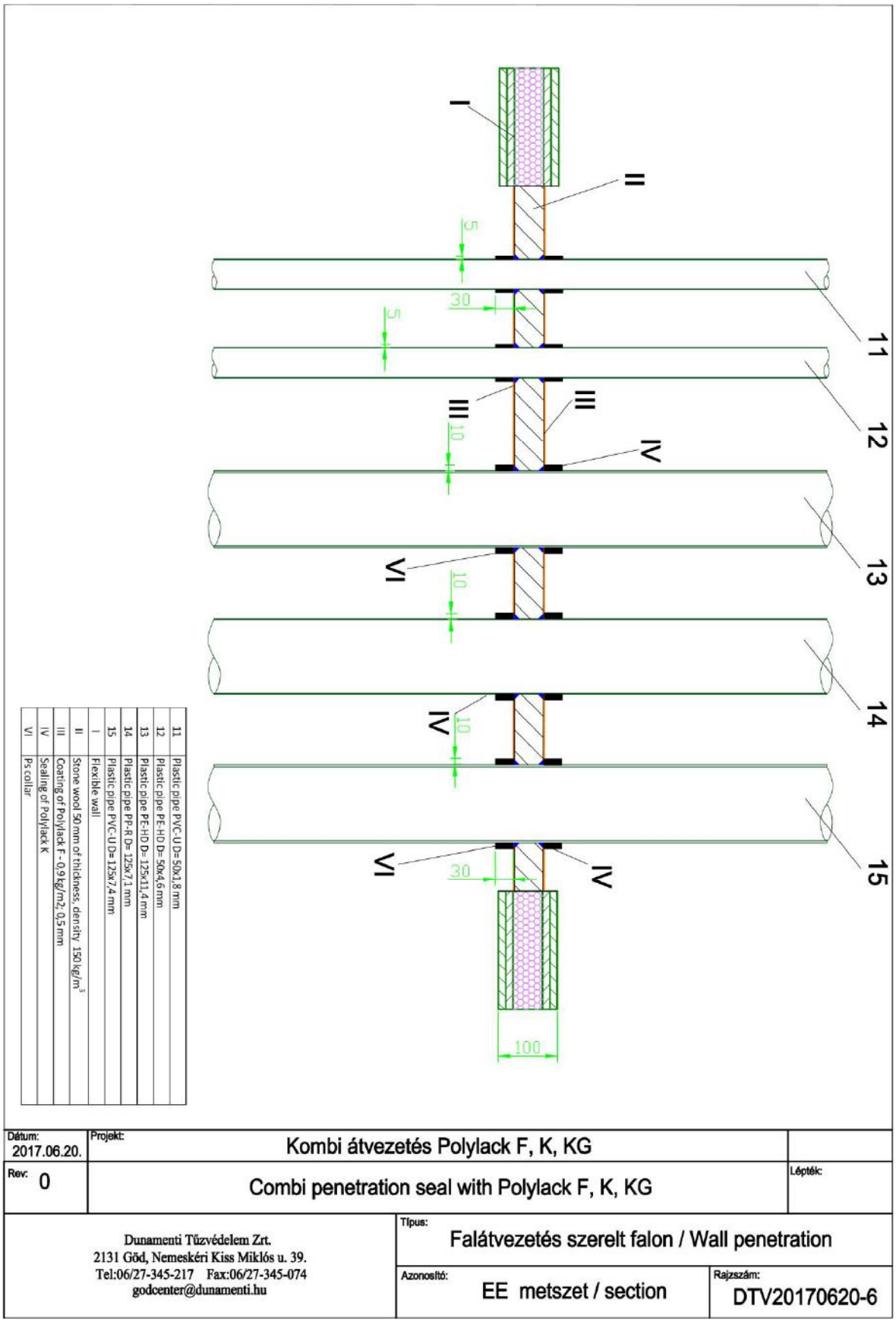
No. 6, 7, 8, 9, 10 - services



VI	Ps collar
V	PS bandage
IV	Sealing of Polylack K
III	Coating of Polylack F - 0,9 kg/m2; 0,5 mm
II	Soft penetration seal
I	Flexible wall
10	Plastic pipe PP-R D= 125x11,4 mm
9	Copper pipe D=42x1,5 mm with combustible insulation Armaflex 40 mm
8	Copper pipe D=42x1,5 mm with non combustible insulation 30 mm
7	Plastic pipe PVC-U D= 125x3,1 mm
6	Plastic pipe PE-HD D= 50x3 mm

Dátum: 2017.06.20.	Projekt: Kombi átvezetés Polylack F, K, KG	
Rev: 0	Combi penetration seal with Polylack F, K, KG	Lépték:
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: Falátvezetés szerelt falon / Wall penetration	
	Azonosító: DD metszet / section	Rajzszám: DTV20160620-5

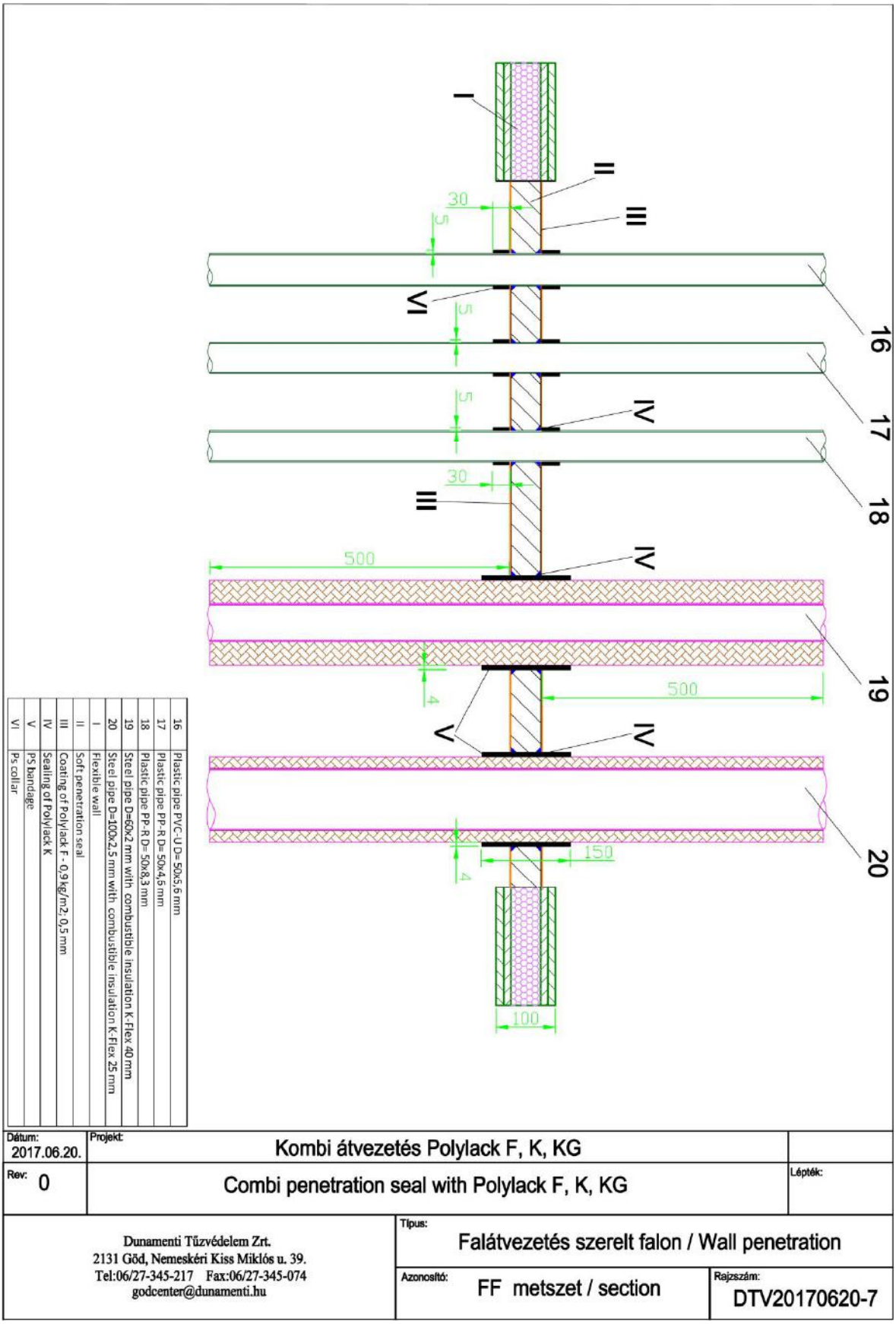
No. 11, 12, 13, 14, 15 - services



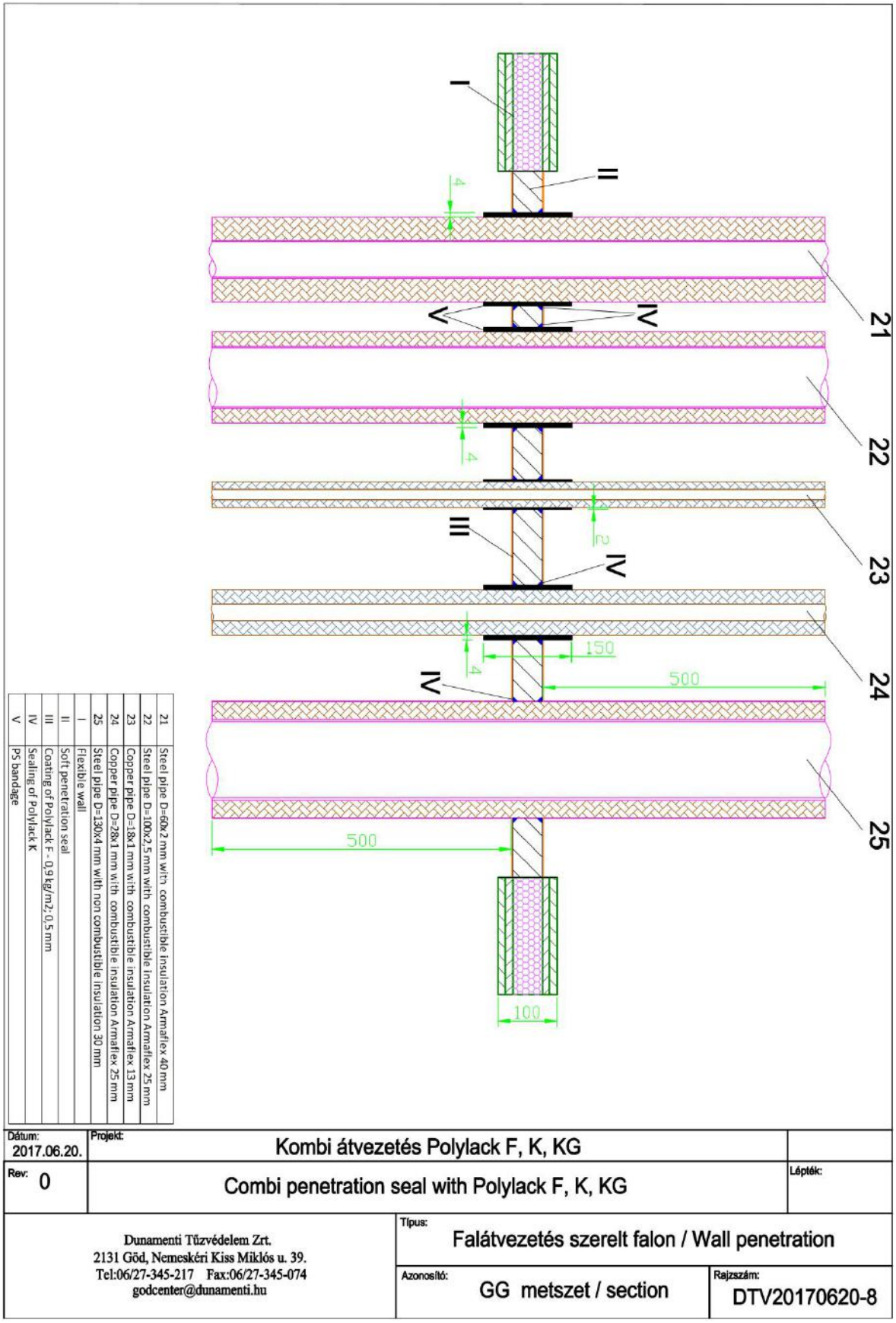
11	Plastic pipe PVC-U D=50x1.8 mm
12	Plastic pipe PE-HD D= 50x4.6 mm
13	Plastic pipe PE-HD D= 125x11.4 mm
14	Plastic pipe PP-R D= 125x7,1 mm
15	Plastic pipe PVC-U D=125x7,4 mm
I	Flexible wall
II	Stone wool 50 mm of thickness, density 150 kg/m^3
III	Coating of Polylack F - 0,9 kg/m2; 0,5 mm
IV	Sealing of Polylack K
VI	Ps collar

Dátum: 2017.06.20.	Projekt: Kombi átvezetés Polylack F, K, KG	
Rev: 0	Combi penetration seal with Polylack F, K, KG	Léptékː
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: Falátvezetés szerelt falon / Wall penetration	
	Azonosító: EE metszet / section	Rajzszám: DTV20170620-6

No. 16, 17, 18, 19, 20 - services



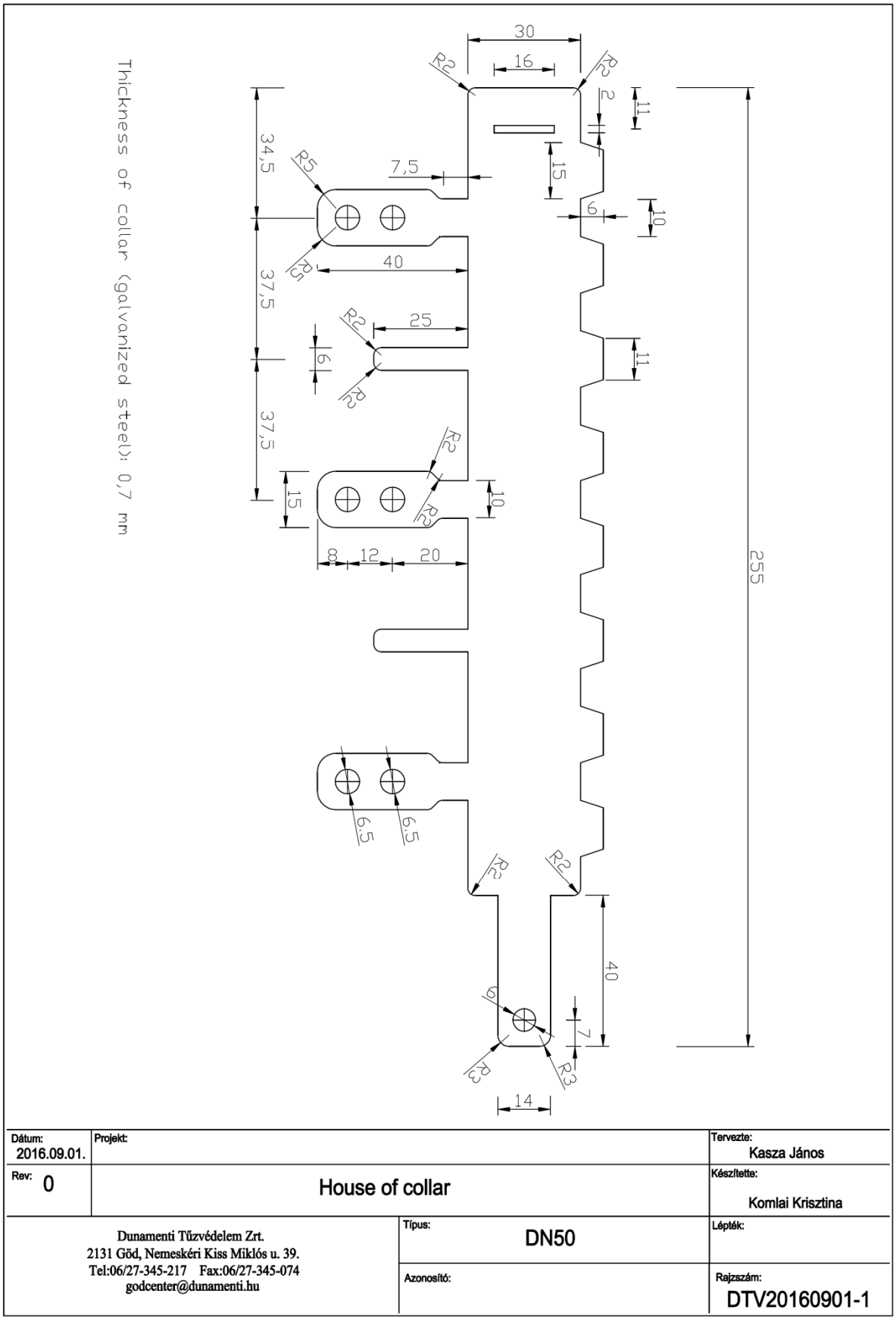
No. 21, 22, 23, 24, 25 - services



V	PS bandage
IV	Sealing of Polylack K
III	Coating of Polylack F - 0,9 kg/m2; 0,5 mm
II	Soft penetration seal
I	Flexible wall
25	Steel pipe D=130x4 mm with non combustible insulation 30 mm
24	Copper pipe D=28x1 mm with combustible insulation Armaflex 25 mm
23	Copper pipe D=18x1 mm with combustible insulation Armaflex 13 mm
22	Steel pipe D=100x2,5 mm with combustible insulation Armaflex 25 mm
21	Steel pipe D=60x2 mm with combustible insulation Armaflex 40 mm

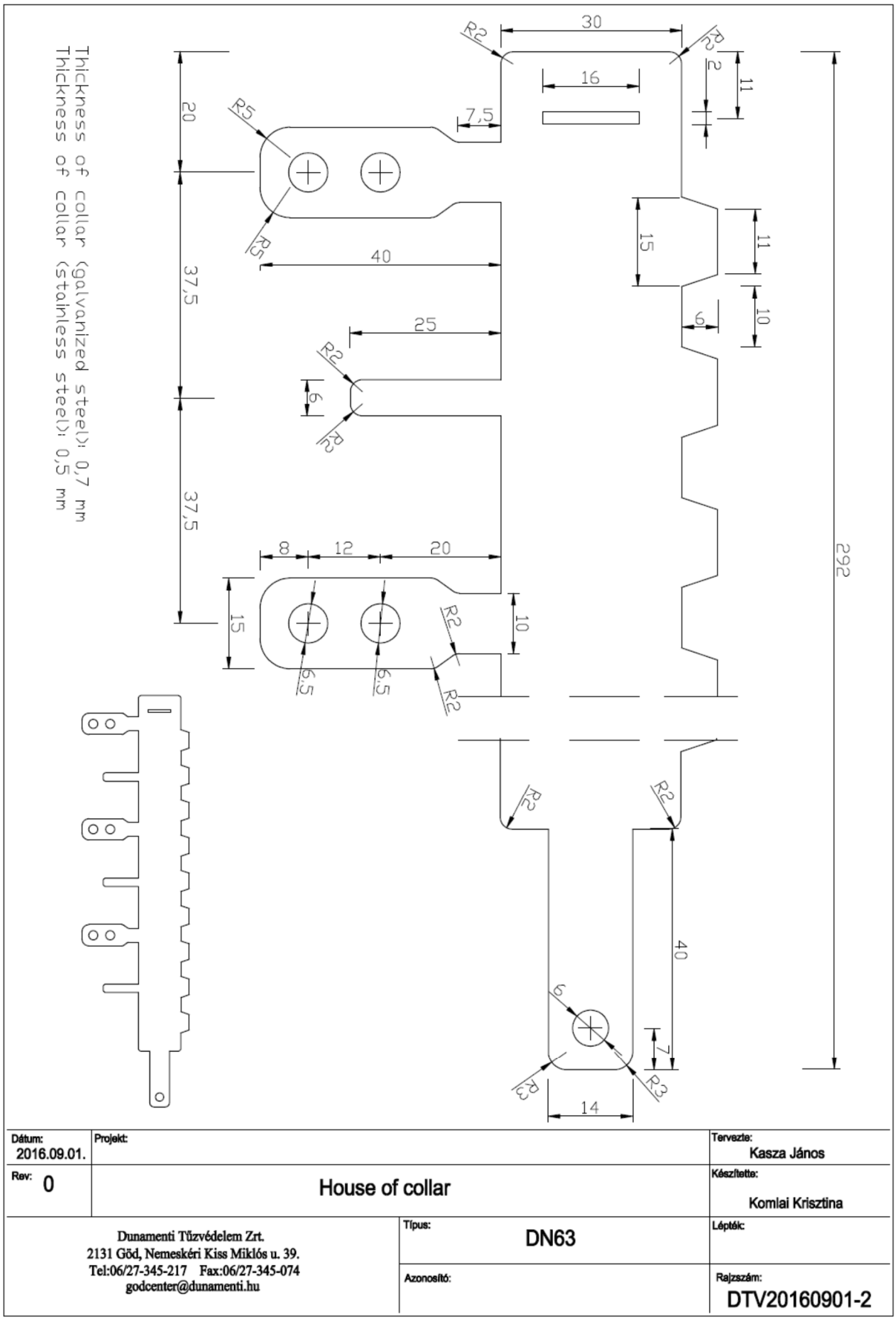
Dátum: 2017.06.20.	Projekt: Kombi átvezetés Polylack F, K, KG	
Rev: 0	Combi penetration seal with Polylack F, K, KG	Lépték:
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: Falátvezetés szerelt falon / Wall penetration	
	Azonosító: GG metszet / section	Rajzszám: DTV20170620-8

Drawing of house of collar DN50



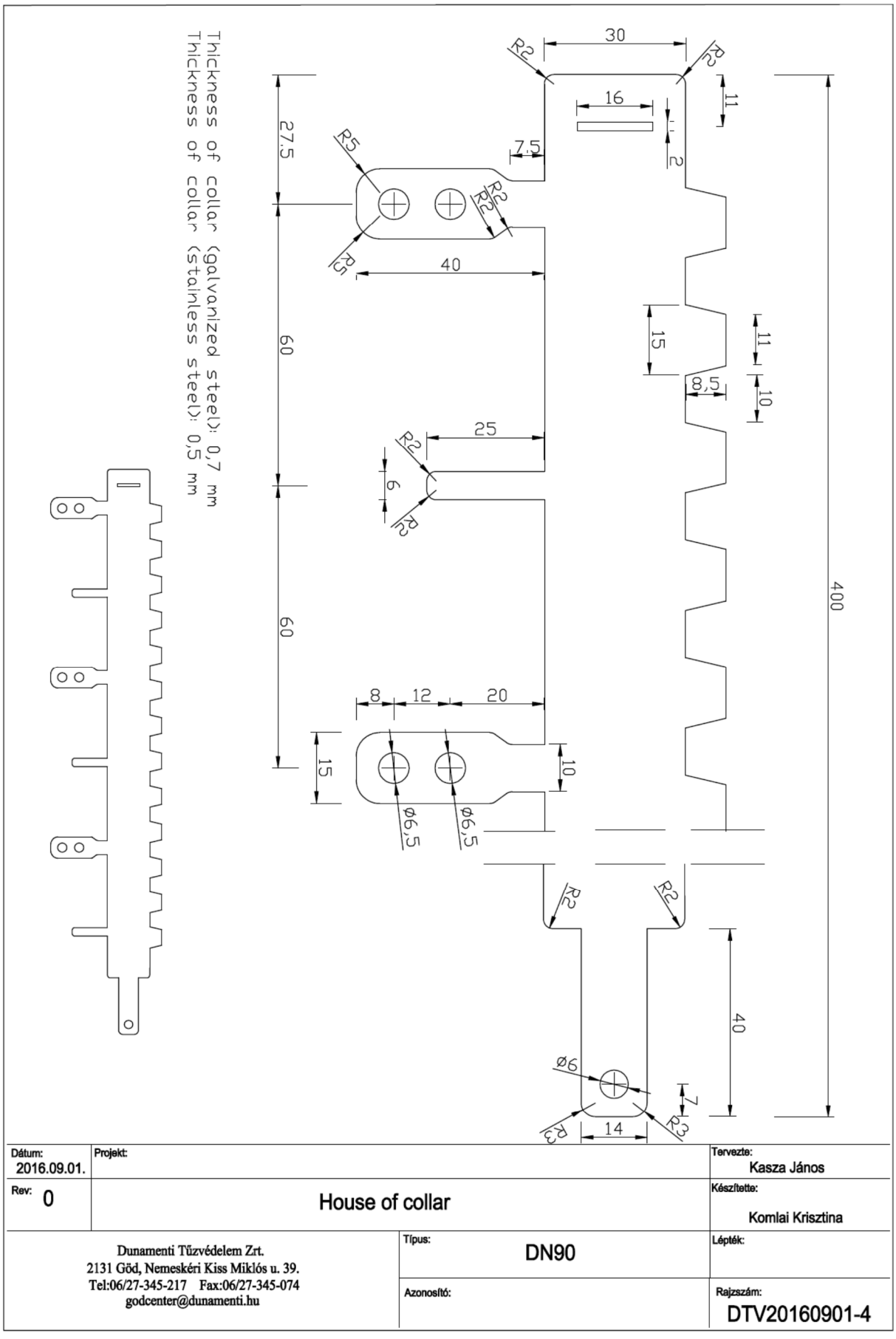
Dátum: 2016.09.01.	Projekt:	Tervezte: Kasza János
Rev: 0	House of collar	Készítette: Komlai Krisztina
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: DN50 Azonosító:	Lépték: Rajzszám: DTV20160901-1

Drawing of house of collar DN63

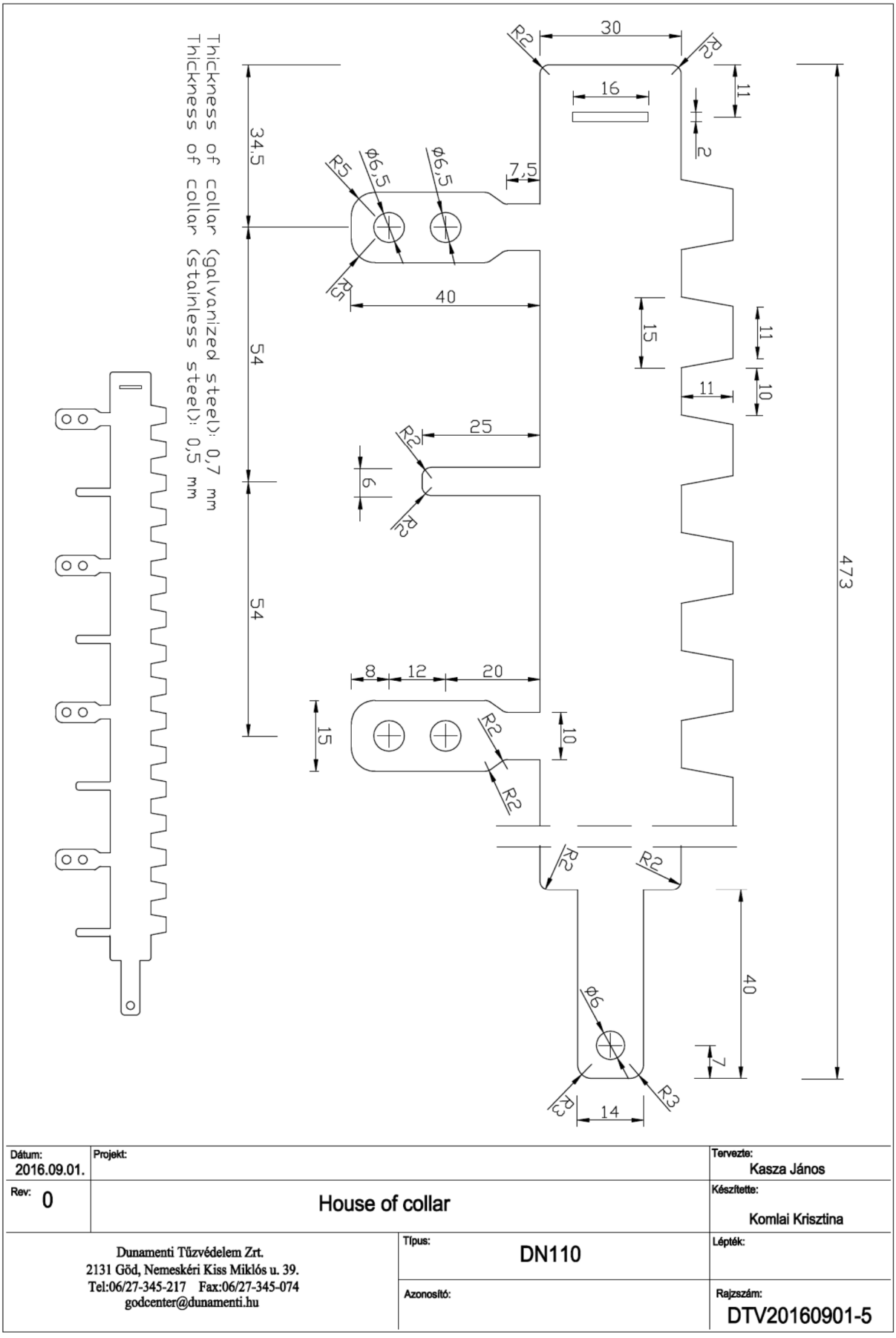


Dátum: 2016.09.01.	Projekt:	Tervezte: Kasza János
Rev: 0	House of collar	Készítette: Komlai Krisztina
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: DN63	Léptók:
	Azonosító:	Rajzszám: DTV20160901-2

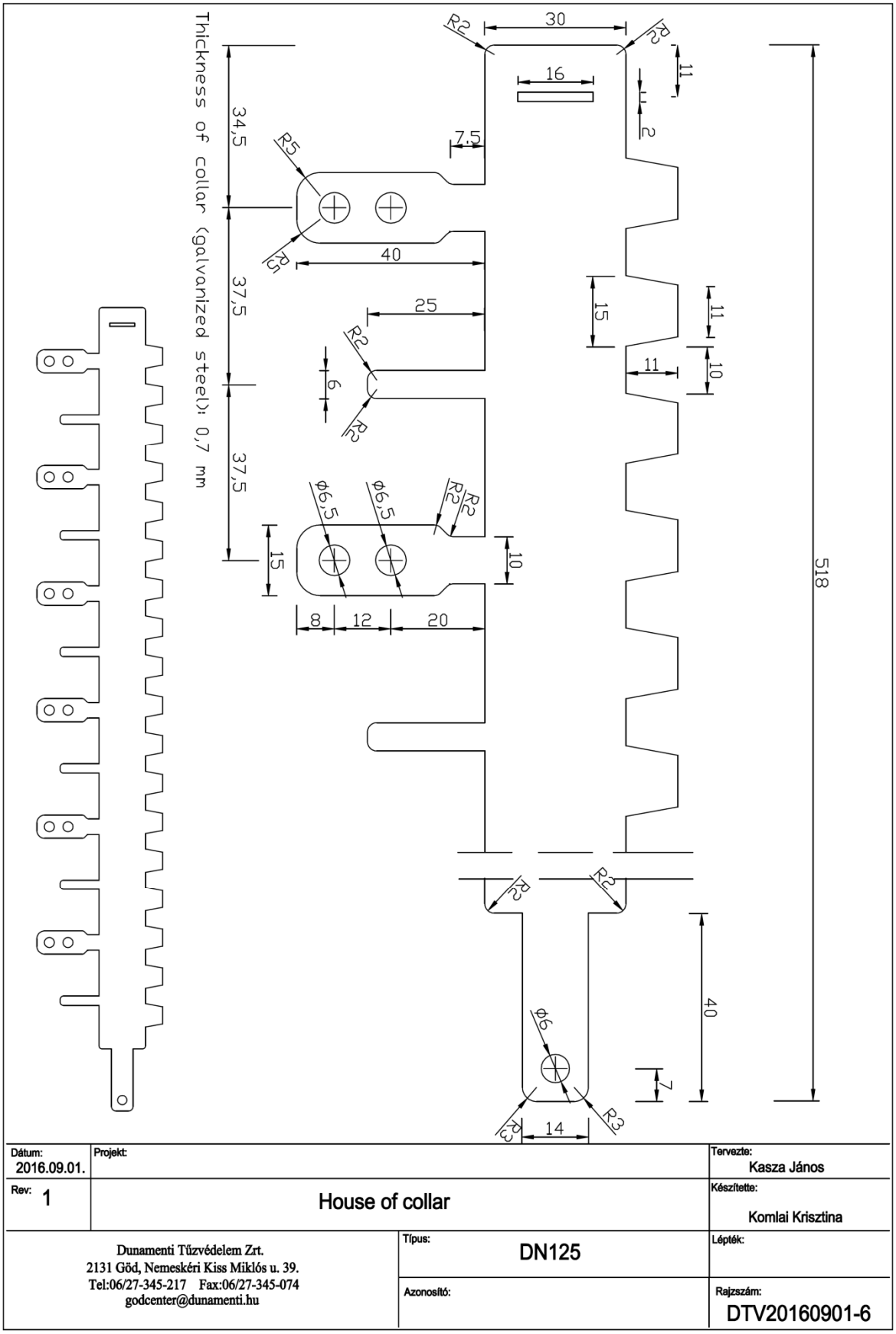
Drawing of house of collar DN90



Drawing of house of collar DN110



Drawing of house of collar DN125



Dátum: 2016.09.01.	Projekt:	Tervezte: Kasza János
Rev: 1	House of collar	Készítette: Komlai Krisztina
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: DN125	Lépték:
	Azonosító:	Rajzszám: DTV20160901-6

Table 1 Services

Service	Type of service	Opening	Penetration sealing	Pipe end confi-guration
D3 Tray 200 mm	Cable N2XH-J 4 x 185 SM	-	The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
2xE Tray 200 mm	2xCables N-YY-O 1 x 185 RM	-	The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
C1 Tray 300 mm	Cable NYCWY 4 x 95 SM/50	-	The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
2xB Tray 300 mm	2 x Cables NYY-O 1 x 95 RM	-	The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
F Tray 300 mm	Bundle of telecommunication cables, J-Y(St)Y 20 x 2 x 0,6 mm D=100 mm	-	The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
A1 Tray 500 mm	Bund of cables NYY-J 5 x 1,5 RE, 10 pieces of cables in the bundle	-	The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
A2 Tray 500 mm	Bund of cables H07RN-F 5G1,5 , 10 pieces of cables in the bundle		The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
A3 Tray 500 mm	Bund of cables N2XH-O 5 x 1,5 RE, 10 pieces of cables in the bundle		The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-

Service	Type of service	Opening	Penetration sealing	Pipe end confi-guration
1	Copper pipe D=28 x 1 mm with non-combustible stone wool insulation 20 mm, PAROC Hvac Section AluCoat, with bulk density 80 kg/m^3 with reinforced aluminium foil facing. The length of the insulation on both sides is 500 mm from the penetration seal surface to the end of the service. Pipe insulation CS	70 mm	The gap around the wall and service sealed by Polylack K in the corners from both sides	C/U
2	Copper pipe D=18 x 1 mm with combustible insulation K-Flex ST 13 mm, pipe insulation CS	49 mm	PS bandage (2,0 x 150) mm in the middle of penetration – one layer and Polylack K in the corners from both sides	C/U
3	Copper pipe D=42 x 1,5 mm with combustible insulation K-Flex ST 40 mm, pipe insulation CS	137 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
4	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 125 x 4,8 mm sealed in the flexible wall construction	125 mm	PS collar type DN125 from both sides 4 layers of 2.5 mm intumescent strips (10x30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 6 pcs of steel screw Ø 6 x 50 mm.	U/C
5	Copper pipe D=28 x 1 mm with combustible insulation K-Flex ST 25 mm, pipe insulation CS	93 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
6	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 50 x 3mm sealed in the flexible wall construction	50 mm	PS collar type DN50 from both sides 2 layers of 2.5 mm intumescent strips (5 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 3 pcs of steel screw Ø 6 x 50 mm.	U/C
7	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 125 x 3,1 mm sealed in the flexible wall construction	125 mm	PS collar type DN125 from both sides 4 layers of 2.5 mm intumescent strips (10 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 6 pcs of steel screw Ø 6 x 50 mm.	U/C

Service	Type of service	Opening	Penetration sealing	Pipe end confi-guration
8	Copper pipe D=42 x 1,5 mm with non-combustible insulation stone wool insulation 30 mm, PAROC Hvac Section AluCoat, with bulk density 80 kg/m^3 with reinforced aluminium foil facing. The length of the insulation on both sides is 500 mm from the penetration seal surface to the end of the service. Pipe insulation CS	102 mm	The gap around the wall and service sealed by Polylack K in the corners from both sides	C/U
9	Copper pipe D=42 x 1,5 mm with combustible insulation NH/Armaflex 40 mm, pipe insulation CS	137 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
10	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 125 x 11,4 mm sealed in the flexible wall construction	125 mm	PS collar type DN125 from both sides 4 layers of 2.5 mm intumescent strips (10 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 6 pcs of steel screw Ø 6 x 50 mm.	U/C
11	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 50 x 1,8 mm sealed in the flexible wall construction	50 mm	PS collar type DN50 from both sides 2 layers of 2.5 mm intumescent strips (5 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 3 pcs of steel screw Ø 6 x 50 mm.	U/C
12	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 50 x 4,6mm sealed in the flexible wall construction	50 mm	PS collar type DN50 from both sides 2 layers of 2.5 mm intumescent strips (5 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 3 pcs of steel screw Ø 6 x 50 mm.	U/C
13	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 125 x 11,4 mm sealed in the flexible wall construction	125 mm	PS collar type DN125 from both sides 4 layers of 2.5 mm intumescent strips (10 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 6 pcs of steel screw Ø 6 x 50 mm.	U/C
14	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 125 x 7,1 mm sealed in the flexible wall construction	125 mm	PS collar type DN125 from both sides 4 layers of 2.5 mm intumescent strips (10 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 6 pcs of steel screw Ø 6 x 50 mm.	U/C

Service	Type of service	Opening	Penetration sealing	Pipe end confi-guration
15	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 125 x 7,4 mm sealed in the flexible wall construction	125 mm	PS collar type DN125 from both sides 4 layers of 2.5 mm intumescent strips (10 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 6 pcs of steel screw Ø 6 x 50 mm.	U/C
16	Plastic pipe PVC-U in accordance with EN 1452-1: 209 D= 50 x 5,6 mm sealed in the flexible wall construction	50 mm	PS collar type DN50 from both sides 2 layers of 2.5 mm intumescent strips (5 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 3 pcs of steel screw Ø 6 x 50 mm.	U/C
17	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 50 x 4,6 mm sealed in the flexible wall construction	50 mm	PS collar type DN50 from both sides 2 layers of 2.5 mm intumescent strips (5 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 3 pcs of steel screw Ø 6 x 50 mm.	U/C
18	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 50 x 8,3 mm sealed in the flexible wall construction	50 mm	PS collar type DN50 from both sides 2 layers of 2.5 mm intumescent strips (5 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 3 pcs of steel screw Ø 6 x 50 mm.	U/C
19	Steel pipe D=60 x 2 mm with combustible insulation K-Flex ST 40 mm, pipe insulation CS	155 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
20	Steel pipe D=100 x 2,5 mm with combustible insulation K-Flex ST 25 mm, pipe insulation CS	165 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
21	Steel pipe D=60 x 2 mm with combustible insulation NH/Armaflex 40 mm, pipe insulation CS	155 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
22	Steel pipe D=100 x 2,5 mm with combustible insulation NH/Armaflex 25 mm, pipe insulation CS	165 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
23	Copper pipe D=18 x 1 mm with combustible insulation NH/Armaflex 13 mm, pipe insulation CS	49 mm	PS bandage (2,0 x 150) mm in the middle of penetration – one layer and Polylack K in the corners from both sides	C/U

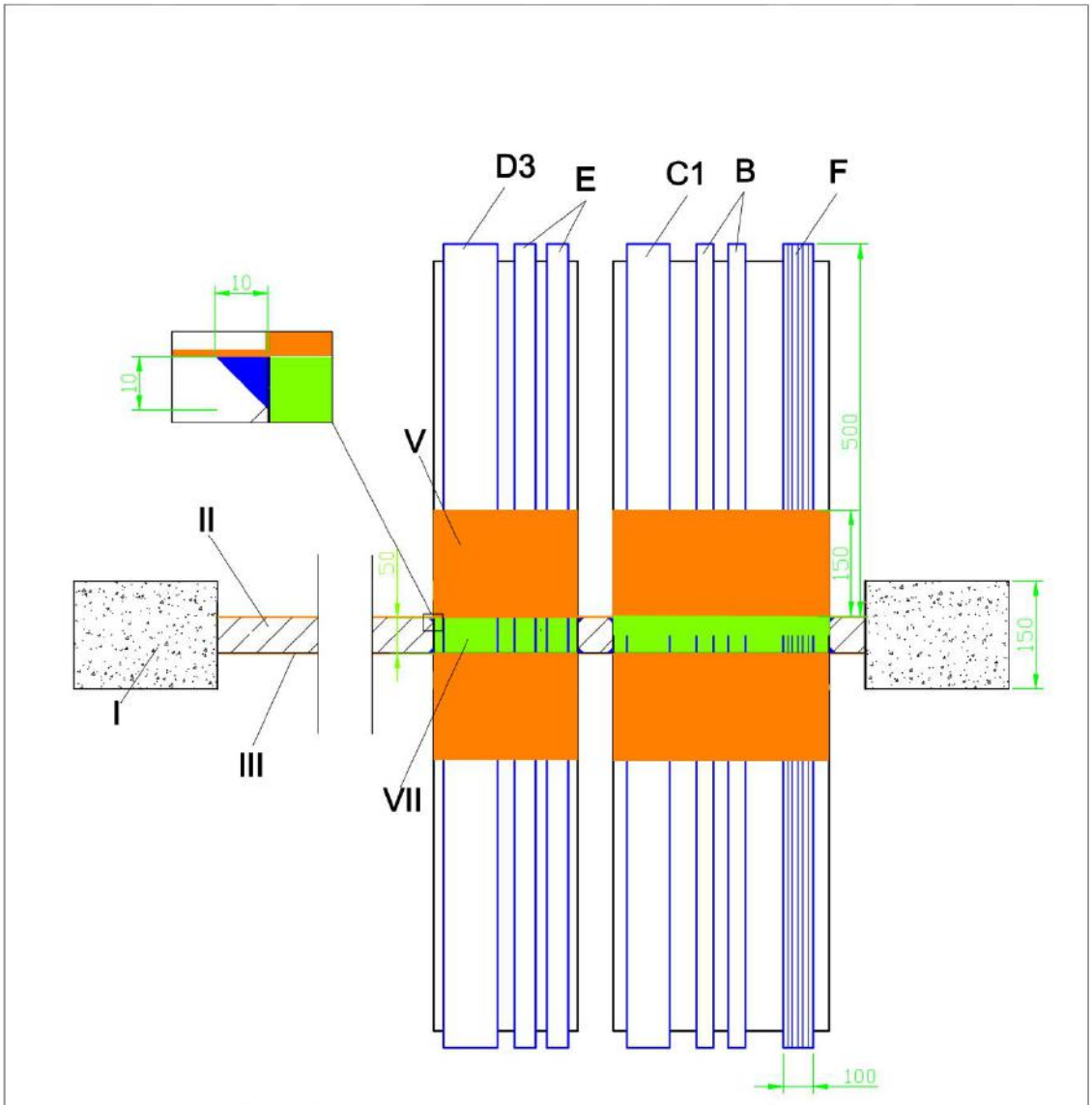
Service	Type of service	Opening	Penetration sealing	Pipe end confi-guration
24	Copper pipe D=28 x 1 mm with combustible insulation NH/Armaflex 25 mm, pipe insulation CS	88 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
25	Steel pipe D=130 x 4 mm with non-combustible stone wool insulation 30 mm, PAROC Hvac Section AluCoat, with bulk density 80 kg/m^3 with reinforced aluminium foil facing. The length of the insulation on both sides is 500 mm from the penetration seal surface to the end of the service. Pipe insulation CS	198 mm	The gap around the wall and service sealed by Polylack K in the corners from both sides	C/U

Annex B

Use: in rigid floor construction

Maximum dimensions of penetration seal: (1200 x 1800) mm (width x height)

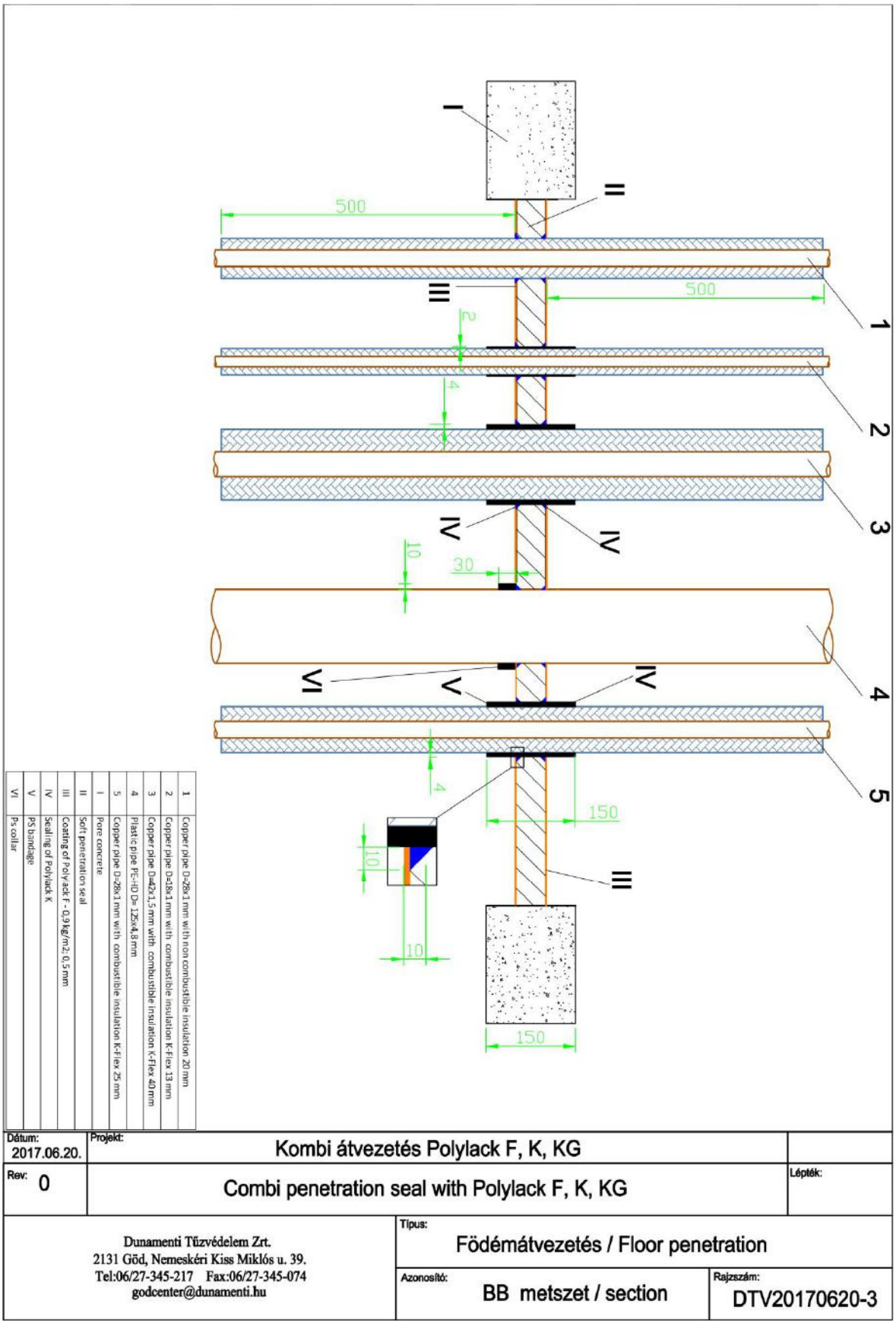
No. D3, 2 x E, C1, 2 x B, F - services



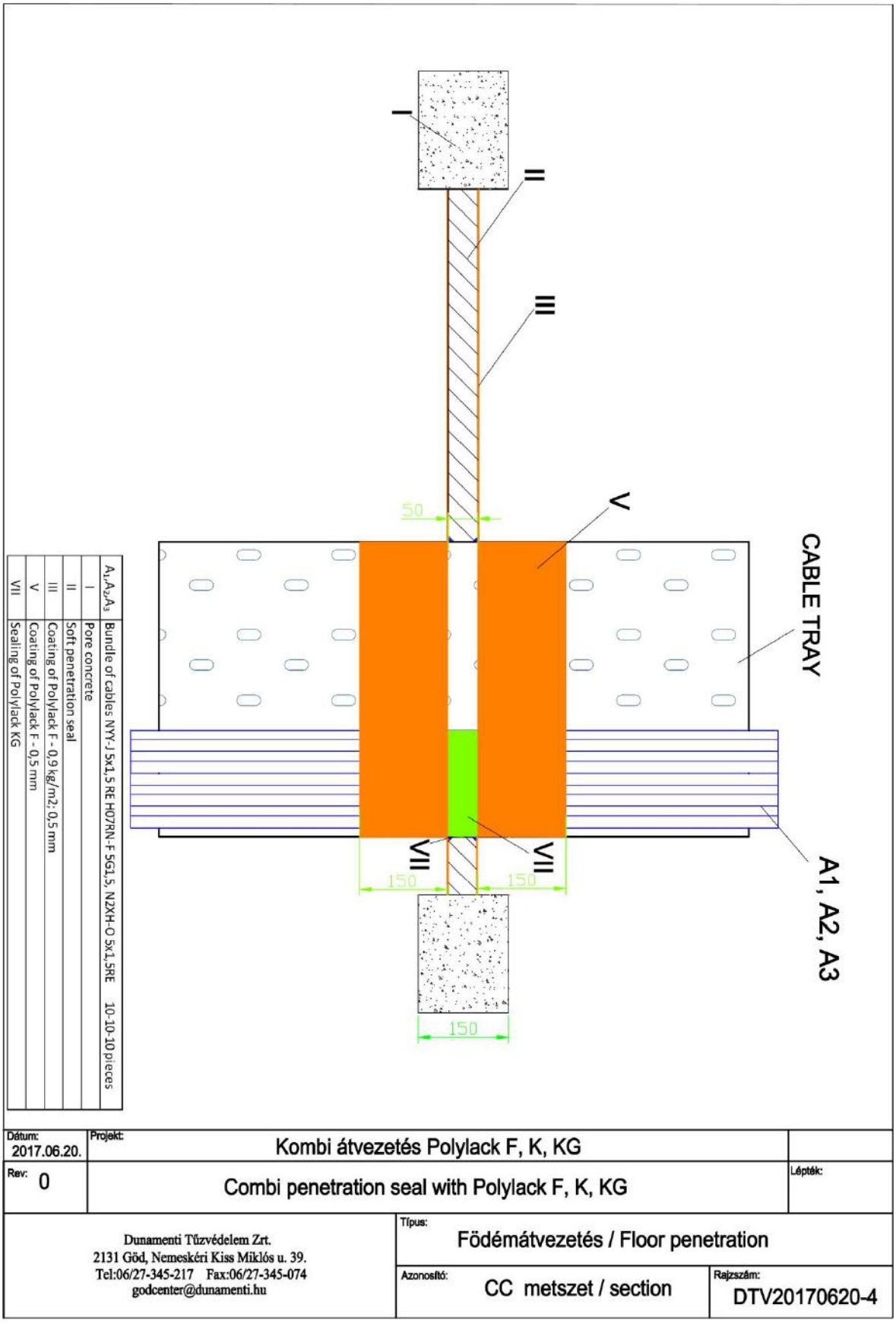
D3	Cable N2XH-J 4x185 SM
E	Cables N-YY-O 1x185 RM
C1	Cable NYCWY 4x95 SM/50
B	Cables NYY-O 1x95 RM
F	Bundle of telekommunication cable, J-Y(St)Y 20X2X0,6 mm
I	Pore concrete
II	Stone wool 50 mm of thickness, density 150 kg/m^3
III	Coating of Polylack F - 0,9 kg/m2; 0,5 mm
V	Coating of Polylack F - 0,5 mm
VII	Sealing of Polylack KG

Dátum: 2017.06.20.	Projekt: Kombi átvezetés Polylack F, K, KG - EI60	
Rev: 0	Combi penetration seal with Polylack F, K, KG - EI60	Léptek:
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: Födémátvezetés / Floor penetration	
	Azonosító: AA metszet / section	Rajzszám: DTV20170620-2

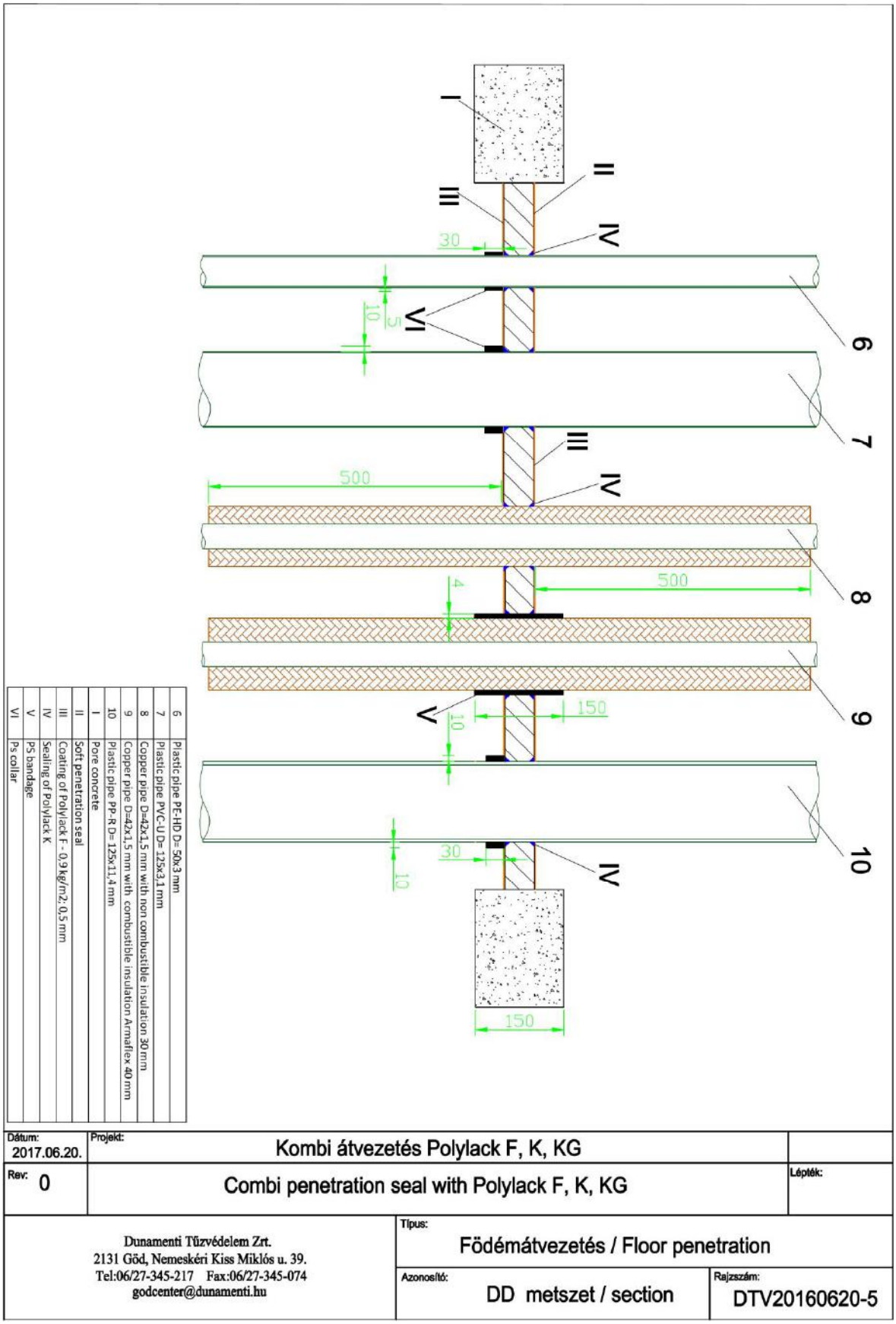
No. 1, 2, 3, 4, 5 - services



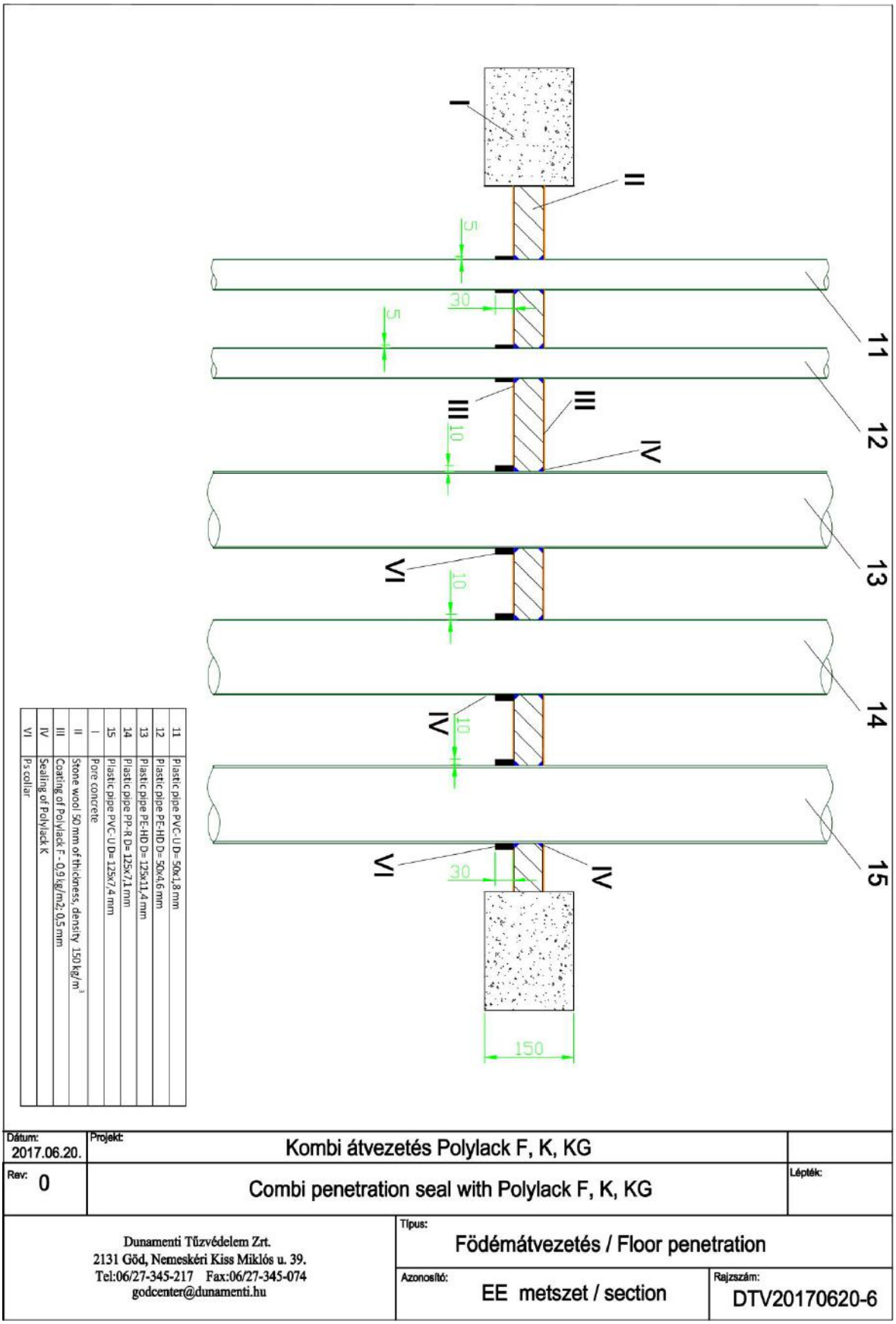
No. A1, A2, A3 - services



No. 6, 7, 8, 9, 10 - services



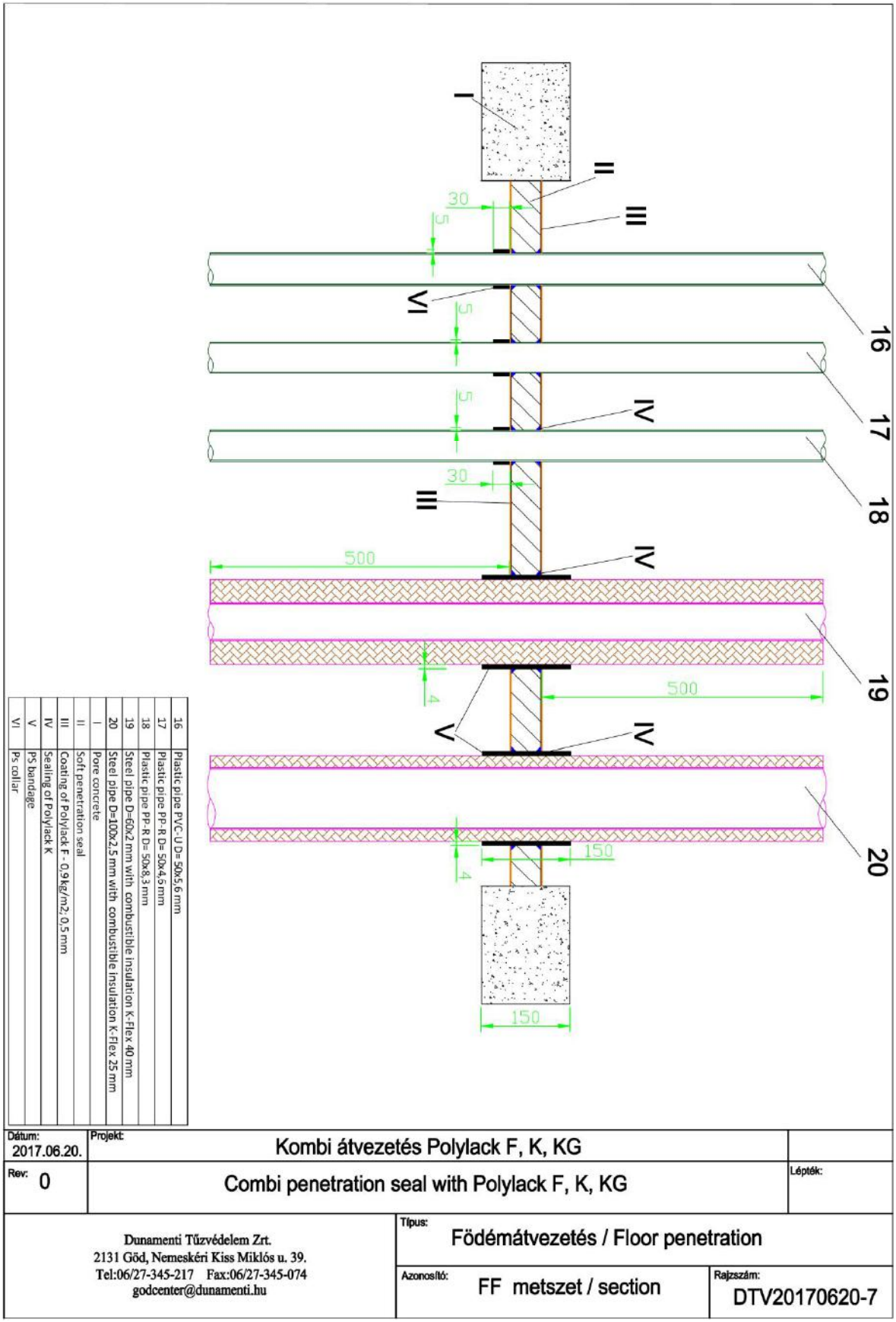
No. 11, 12, 13, 14, 15 - services



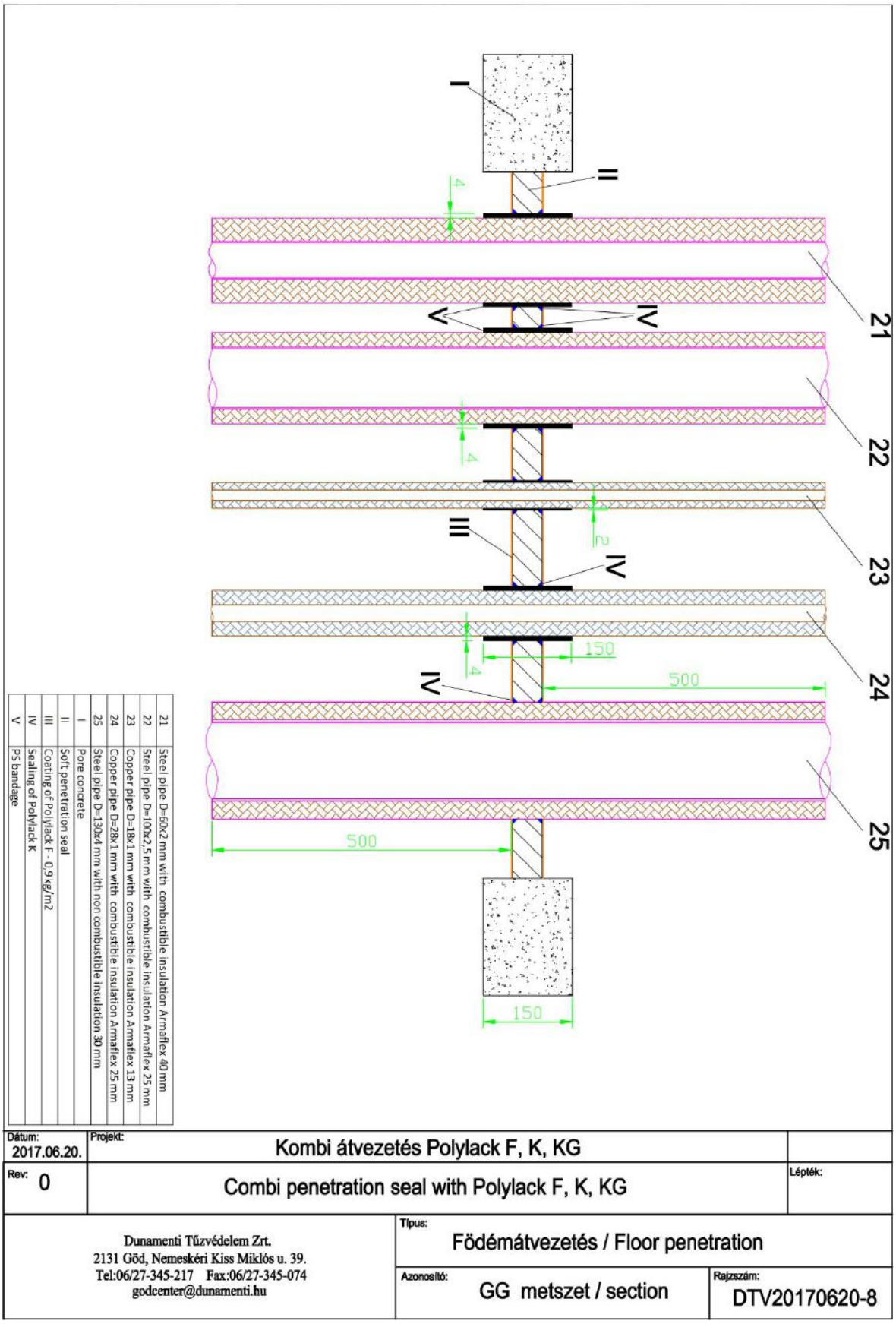
VI	Ps collar
IV	Sealing of Polylack K
III	Coating of Polylack F - 0,9 kg/m2; 0,5 mm
II	Stone wool 30 mm of thickness, density 150 kg/m^3
I	Pore concrete
15	Plastic pipe PVC-U D= 125x7,4 mm
14	Plastic pipe PP-R D= 125x7,1 mm
13	Plastic pipe PE-HD D= 125x11,4 mm
12	Plastic pipe PE-HD D= 50x4,6 mm
11	Plastic pipe PVC-U D= 50x1,8 mm

Dátum: 2017.06.20.	Projekt: Kombi átvezetés Polylack F, K, KG	
Rev: 0	Combi penetration seal with Polylack F, K, KG	Lépték:
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: Födémátvezetés / Floor penetration	
	Azonosító: EE metszet / section	Rajzszám: DTV20170620-6

No. 16, 17, 18, 19, 20 - services



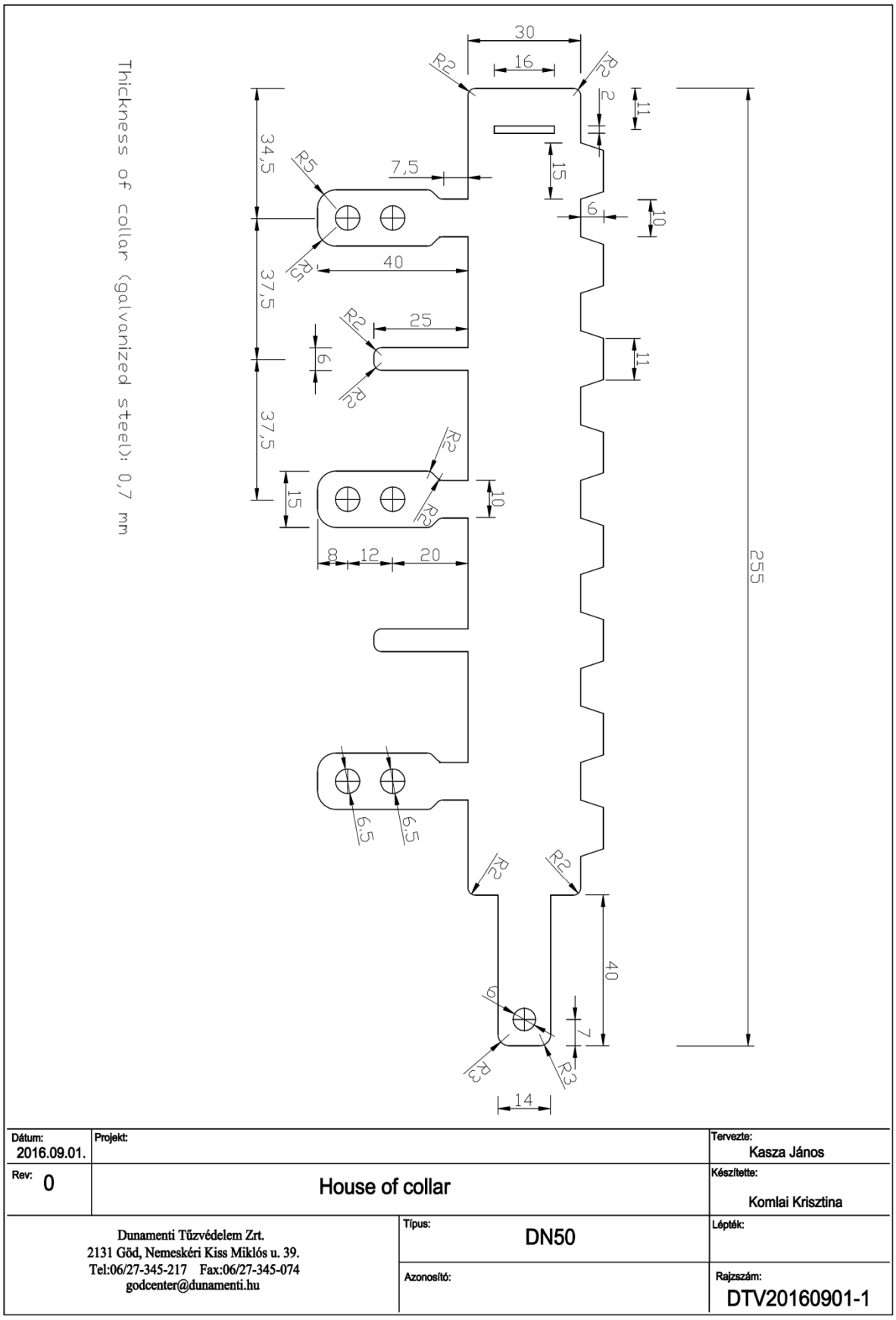
No. 21, 22, 23, 24, 25 - services



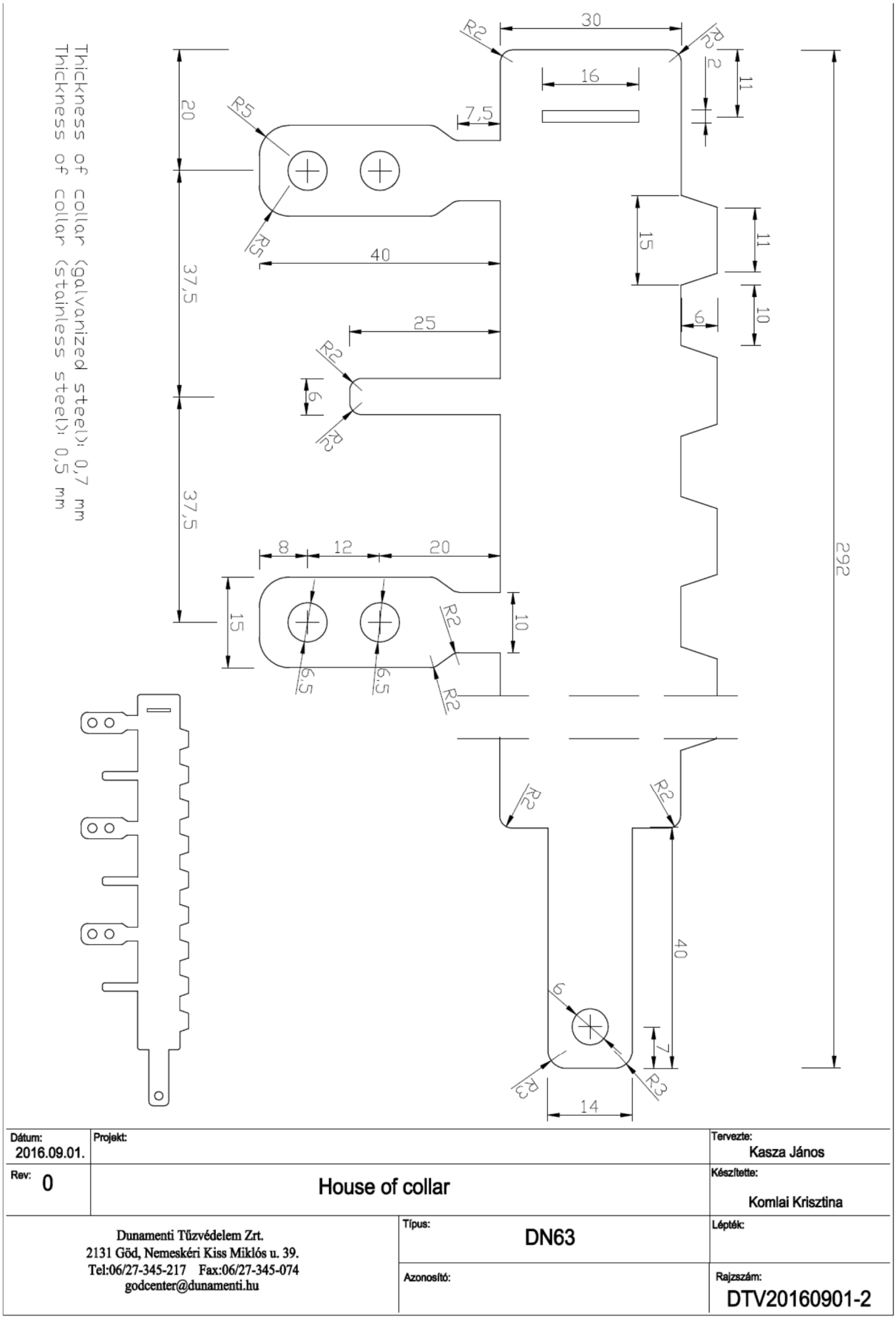
V	PS bandage
IV	Sealing of Polylack K
III	Coating of Polylack F - 0,9 kg/m2
II	Soft penetration seal
I	Pore concrete
25	Steel pipe D=130x4 mm with non combustible insulation 30 mm
24	Copper pipe D=28x1 mm with combustible insulation Armaflex 25 mm
23	Copper pipe D=18x1 mm with combustible insulation Armaflex 13 mm
22	Steel pipe D=100x2,5 mm with combustible insulation Armaflex 25 mm
21	Steel pipe D=60x2 mm with combustible insulation Armaflex 40 mm

Dátum: 2017.06.20.	Projekt: Kombi átvezetés Polylack F, K, KG	
Rev: 0	Combi penetration seal with Polylack F, K, KG	Lépték:
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: Födémátvezetés / Floor penetration	
	Azonosító: GG metszet / section	Rajzszám: DTV20170620-8

Drawing of house of collar DN50

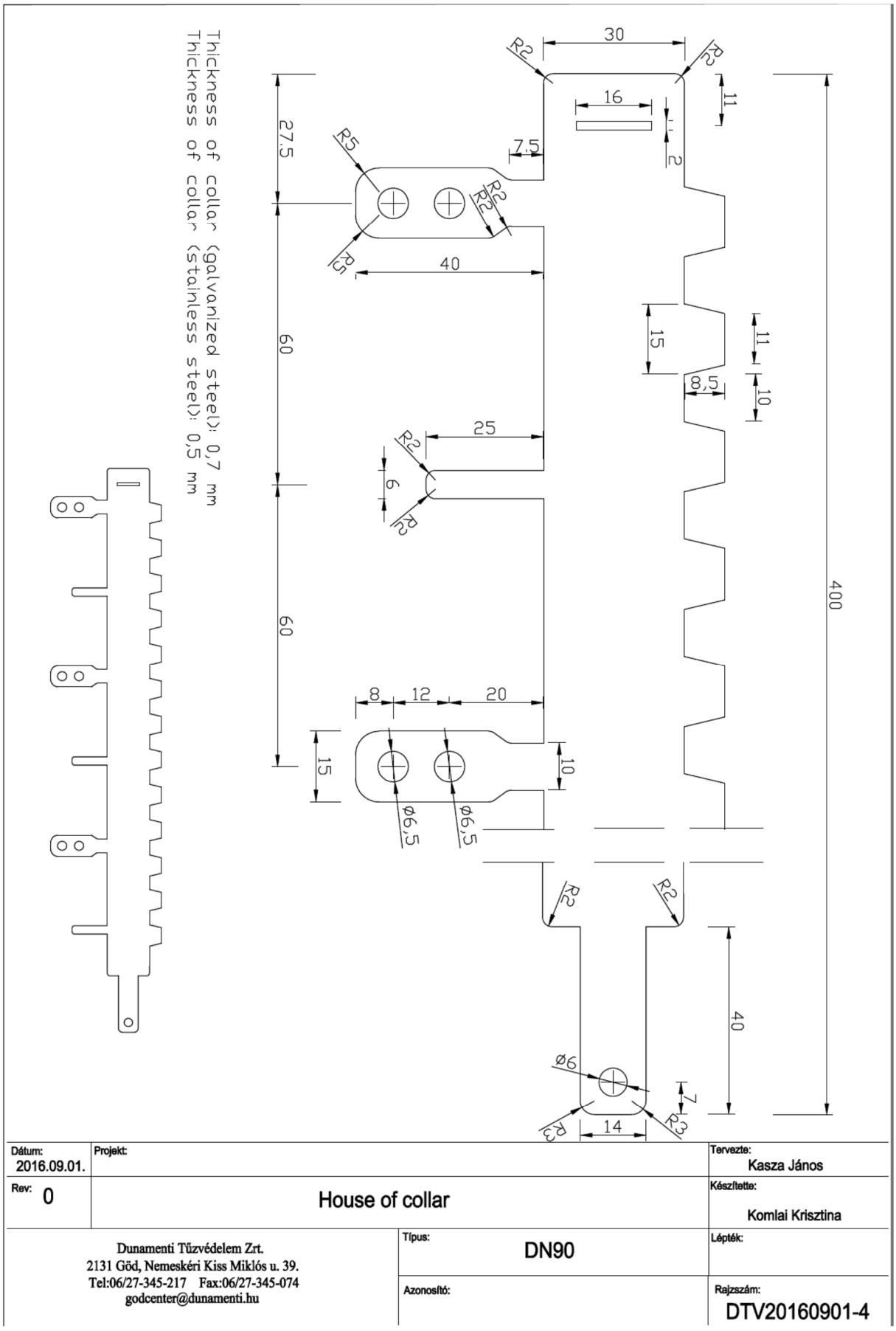


Drawing of house of collar DN63

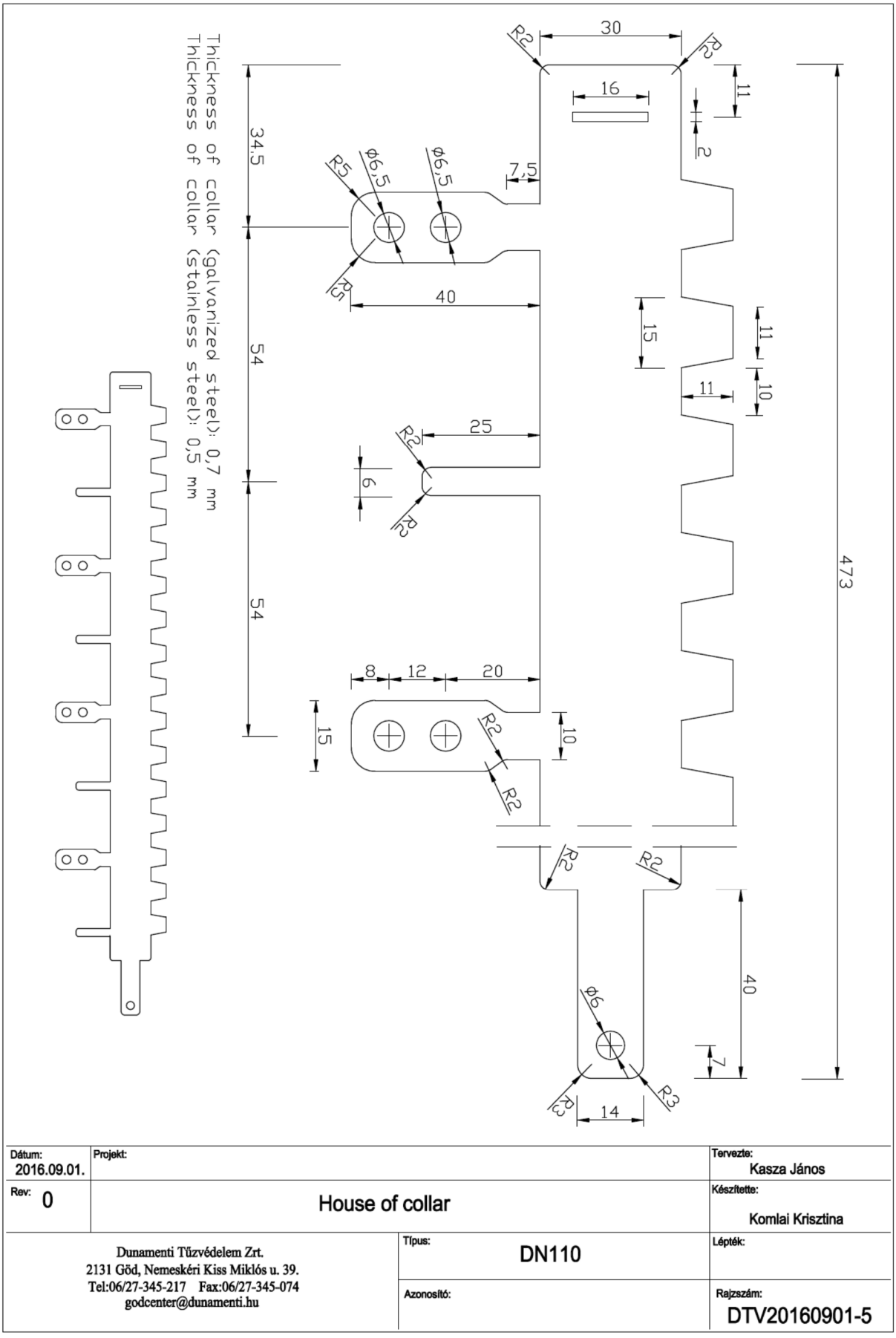


Dátum: 2016.09.01.	Projekt:	Tervezte: Kasza János
Rev: 0	House of collar	Készítette: Komlai Krisztina
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: DN63	Lépték:
	Azonosító:	Rajzszám: DTV20160901-2

Drawing of house of collar DN90

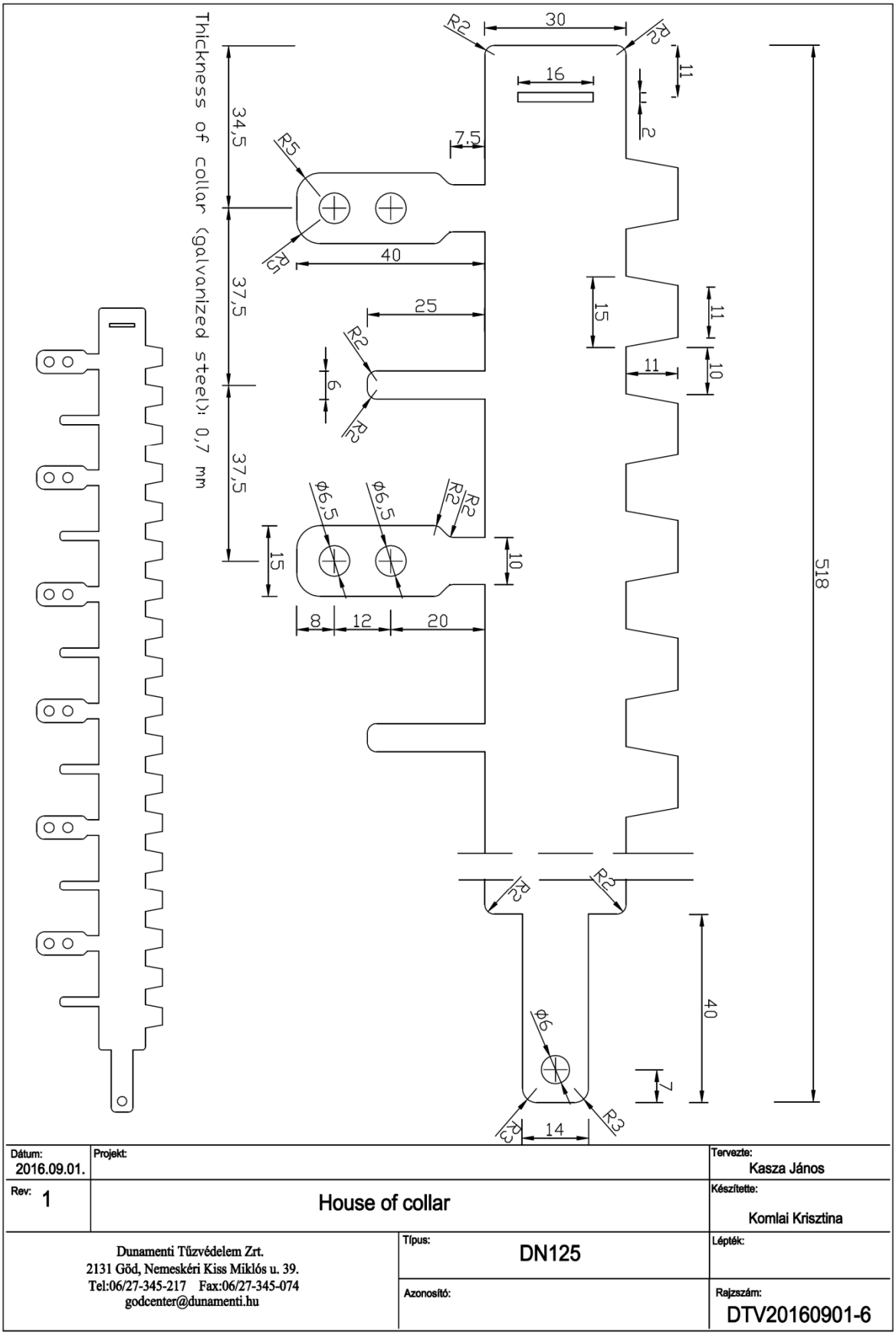


Drawing of house of collar DN110



Dátum: 2016.09.01.	Projekt:	Tervezte: Kasza János
Rev: 0	House of collar	Készítette: Komlai Krisztina
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: DN110	Lépték:
	Azonosító:	Rajzszám: DTV20160901-5

Drawing of house of collar DN125



Dátum: 2016.09.01.	Projekt:	Tervezte: Kasza János
Rev: 1	House of collar	Készítette: Komlai Krisztina
Dunamenti Tűzvédelem Zrt. 2131 Göd, Nemeskéri Kiss Miklós u. 39. Tel:06/27-345-217 Fax:06/27-345-074 godcenter@dunamenti.hu	Típus: DN125	Lépték:
	Azonosító:	Rajzszám: DTV20160901-6

Table 1 Services

Service	Type of service	Opening	Penetration sealing	Pipe end confi-guration
D3 Tray 200 mm	Cable N2XH-J 4 x 185 SM	-	The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
2xE Tray 200 mm	2xCables N-YY-O 1 x 185 RM	-	The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
C1 Tray 300 mm	Cable NYCWY 4 x 95 SM/50	-	The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
2xB Tray 300 mm	2 x Cables NYY-O 1 x 95 RM	-	The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
F Tray 300 mm	Bundle of telecommunication cables, J-Y(St)Y 20 x 2 x 0,6 mm D=100 mm	-	The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
A1 Tray 500 mm	Bund of cables NYY-J 5 x 1,5 RE, 10 pieces of cables in the bundle	-	The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
A2 Tray 500 mm	Bund of cables H07RN-F 5G1,5 , 10 pieces of cables in the bundle		The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-
A3 Tray 500 mm	Bund of cables N2XH-O 5 x 1,5 RE, 10 pieces of cables in the bundle		The surface of the cable, perforated cable tray in length 150 mm are protected by layer of Polylack F 0,5 mm, gap between wall and cable sealed by Polylack KG 10 x 25 mm (width x depth)	-

Service	Type of service	Opening	Penetration sealing	Pipe end confi-guration
1	Copper pipe D=28 x 1 mm with non-combustible stone wool insulation 20 mm, PAROC Hvac Section AluCoat, with bulk density 80 kg/m^3 with reinforced aluminium foil facing. The length of the insulation on both sides is 500 mm from the penetration seal surface to the end of the service. Pipe insulation CS	70 mm	The gap around the wall and service sealed by Polylack K in the corners from both sides	C/U
2	Copper pipe D=18 x 1 mm with combustible insulation K-Flex ST 13 mm, pipe insulation CS	49 mm	PS bandage (2,0 x 150) mm in the middle of penetration – one layer and Polylack K in the corners from both sides	C/U
3	Copper pipe D=42 x 1,5 mm with combustible insulation K-Flex ST 40 mm, pipe insulation CS	137 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
4	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 125 x 4,8 mm sealed in the aerated concrete floor construction	125 mm	PS collar type DN125 from exposed sides 4 layers of 2.5 mm intumescent strips (10 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 6 pcs of steel screw Ø 6 x 50 mm.	U/C
5	Copper pipe D=28 x 1 mm with combustible insulation K-Flex ST 25 mm, pipe insulation CS	93 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
6	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 50 x 3mm sealed in the aerated concrete floor construction	50 mm	PS collar type DN50 from exposed sides 2 layers of 2.5 mm intumescent strips (5 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 3 pcs of steel screw Ø 6 x 50 mm.	U/C
7	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 125 x 3,1 mm sealed in the aerated concrete floor construction	125 mm	PS collar type DN125 from exposed sides 4 layers of 2.5 mm intumescent strips (10 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 6 pcs of steel screw Ø 6 x 50 mm.	U/C

Service	Type of service	Opening	Penetration sealing	Pipe end confi-guration
8	Copper pipe D=42 x 1,5 mm with non-combustible insulation stone wool 30 mm, PAROC Hvac Section AluCoat, with bulk density 80 kg/m^3 with reinforced aluminium foil facing. The length of the insulation on both sides is 500 mm from the penetration seal surface to the end of the service. Pipe insulation CS	102 mm	The gap around the wall and service sealed by Polylack K in the corners from both sides	C/U
9	Copper pipe D=42 x 1,5 mm with combustible insulation NH/Armaflex 40 mm, pipe insulation CS	137 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
10	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 125 x 11,4 mm sealed in the aerated concrete floor construction	125 mm	PS collar type DN125 from exposed sides 4 layers of 2.5 mm intumescent strips (10 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 6 pcs of steel screw Ø 6 x 50 mm.	U/C
11	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 50 x 1,8 mm sealed in the aerated concrete floor construction	50 mm	PS collar type DN50 from exposed sides 2 layers of 2.5 mm intumescent strips (5 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 3 pcs of steel screw Ø 6 x 50 mm.	U/C
12	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 50 x 4,6 mm sealed in the aerated concrete floor construction	50 mm	PS collar type DN50 from exposed sides 2 layers of 2.5 mm intumescent strips (5 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 3 pcs of steel screw Ø 6 x 50 mm.	U/C
13	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 125 x 11,4 mm sealed in the aerated concrete floor construction	125 mm	PS collar type DN 125 from exposed sides 4 layers of 2.5 mm intumescent strips (10 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 6 pcs of steel screw Ø 6 x 50 mm.	U/C

Service	Type of service	Opening	Penetration sealing	Pipe end confi-guration
14	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 125 x 7,1 mm sealed in the aerated concrete floor construction	125 mm	PS collar type DN125 from exposed sides 4 layers of 2.5 mm intumescent strips (10 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 6 pcs of steel screw Ø 6 x 50 mm.	U/C
15	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 125 x 7,4 mm sealed in the aerated concrete floor construction	125 mm	PS collar type DN125 from exposed sides 4 layers of 2.5 mm intumescent strips (10 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 6 pcs of steel screw Ø 6 x 50 mm.	U/C
16	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 50 x 5,6 mm sealed in the aerated concrete floor construction	50 mm	PS collar type DN50 from exposed sides 2 layers of 2.5 mm intumescent strips (5 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 3 pcs of steel screw Ø 6 x 50 mm.	U/C
17	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 50 x 4,6 mm sealed in the aerated concrete floor construction	50 mm	PS collar type DN50 from exposed sides 2 layers of 2.5 mm intumescent strips (5 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 3 pcs of steel screw Ø 6 x 50 mm.	U/C
18	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 50 x 8,3 mm sealed in the aerated concrete floor construction	50 mm	PS collar type DN50 from exposed sides 2 layers of 2.5 mm intumescent strips (5 x 30) mm and Polylack K in the corners from both sides. Collar fixed to the wall by 3 pcs of steel screw Ø 6 x 50 mm.	U/C
19	Steel pipe D=60 x 2 mm with combustible insulation K-Flex ST 40 mm, pipe insulation CS	155 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
20	Steel pipe D=100 x 2,5 mm with combustible insulation K-Flex ST 25 mm, pipe insulation CS	165 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
21	Steel pipe D=60 x 2 mm with combustible insulation NH/Armaflex 40 mm, pipe insulation CS	155 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U

Service	Type of service	Opening	Penetration sealing	Pipe end confi-guration
22	Steel pipe D=100 x 2,5 mm with combustible insulation NH/Armaflex 25 mm, pipe insulation CS	165 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
23	Copper pipe D=18 x 1 mm with combustible insulation NH/Armaflex 13 mm, pipe insulation CS	49 mm	PS bandage (2,0 x 150) mm in the middle of penetration – one layer and Polylack K in the corners from both sides	C/U
24	Copper pipe D=28 x 1 mm with combustible insulation NH/Armaflex 25 mm, pipe insulation CS	88 mm	PS bandage (2,0 x 150) mm in the middle of penetration – two layers and Polylack K in the corners from both sides	C/U
25	Steel pipe D=130 x 4 mm with non-combustible stone wool insulation 30 mm, PAROC Hvac Section AluCoat, with bulk density 80 kg/m^3 with reinforced aluminium foil facing. The length of the insulation on both sides is 500 mm from the penetration seal surface to the end of the service. Pipe insulation CS	198 mm	The gap around the wall and service sealed by Polylack K in the corners from both sides	C/U

Annex C
Reaction to fire classification in accordance with EN 13501-1: 2007 + A1: 2009 and field of application

Sealing material: Polylack F	**Reaction to fire classification:** E

Field of application:

This classification is valid for the following final use applications:

i) mineral wool substrates with minimal bulk density 125 kg.m^{-3} with reaction to fire class A1
or A2-s1,d0
ii) product used in vertical or horizontal position excluding floorings

This classification is also valid for the following product parameters:

Composition	product composition cannot be changed
Applied quantity	Applied quantity can be increased only minimal quantity = 0,9 g.m^{-2}
Thickness	Thickness can be increased only Minimal thickness = 1 mm

Sealing material: Polylack K	**Reaction to fire classification:** E

Field of application:

This classification is valid for the following final use applications:

i) product used in vertical or horizontal position excluding floorings

This classification is also valid for the following product parameters:

Composition	product composition cannot be changed
Applied quantity	Applied quantity can be increased only minimal quantity for cable = 5 – 6 kg.m^{-2} minimal quantity for steel tube = 5 – 6 kg.m^{-2} minimal quantity for air duct = 5 – 6 kg.m^{-2}
Thickness	Thickness can be increased only Minimal thickness of the passage = 120 mm

Sealing material: Polylack KG	**Reaction to fire classification:** E

Field of application:

This classification is valid for the following final use applications:

i) product used in vertical or horizontal position excluding floorings

This classification is also valid for the following product parameters:

Composition	product composition cannot be changed
Applied quantity	Applied quantity can be increased only minimal filed material thickness in the penetration = 50 kg.m^{-2} size of filing = 2 x pipe diameter

Sealing material: PS Bandage	**Reaction to fire classification:** E

Field of application:

This classification is valid for the following final use applications:

i) product used in vertical or horizontal position excluding floorings

This classification is also valid for the following product parameters:

Composition	product composition cannot be changed
Applied quantity	Applied quantity can be increased only minimal mas per surface area 2,2 kg.m^{-2}
Thickness	Thickness can be increased only Minimal thickness = 5 mm PS Bandage can be used multi-layered

Sealing material: intumescent material from: - PS collar	**Reaction to fire classification: E**

Field of application:

This classification is valid for the following final use applications:

i) product used in vertical or horizontal position excluding floorings

This classification is also valid for the following product parameters:

Composition	product composition cannot be changed
Density	Density can be in range (1,20 ± 0,25) g.cm^{-3}
Thickness	Thickness can be increased only Minimal thickness = 2,5 mm can be used multi-layered

Annex D
Resistance to fire classification in accordance with EN 13501-2: 2016 and field of application

Mixed penetration seal installed in wall

Fire resistance classification for Mixed penetration seal

Fire resistance classification:
E 60 / EI 60

Fire resistance classification for separated services

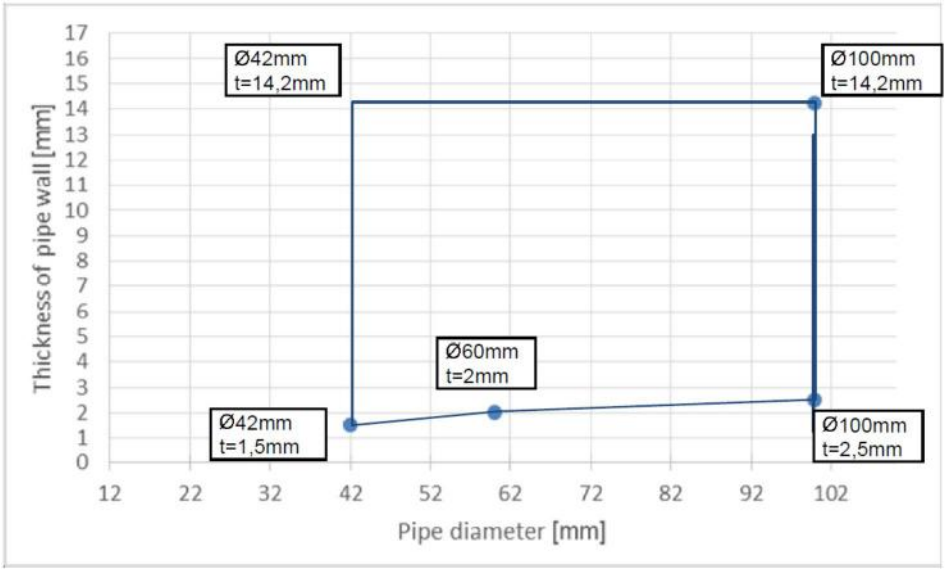
Service	Type of service	Fire resistance classification
D3 Tray 200 mm	Cable N2XH-J 4 x 185 SM	**E 60 / EI 60**
2xE Tray 200 mm	2xCables N-YY-O 1 x 185 RM	**E 60 / EI 60**
C1 Tray 300 mm	Cable NYCWY 4 x 95 SM/50	**E 60 / EI 60**
2xB Tray 300 mm	2 x Cables NYY-O 1 x 95 RM	**E 60 / EI 60**
F Tray 300 mm	Bundle of telecommunication cables, J-Y(St)Y 20 x 2 x 0,6 mm D=100 mm	**E 60 / EI 60**
A1 Tray 500 mm	Bund of cables NYY-J 5 x 1,5 RE, 10 pieces of cables in the bundle	**E 60 / EI 60**
A2 Tray 500 mm	Bund of cables H07RN-F 5G1,5 , 10 pieces of cables in the bundle	**E 60 / EI 60**
A3 Tray 500 mm	Bund of cables N2XH-O 5 x 1,5 RE, 10 pieces of cables in the bundle	**E 60 / EI 60**
1	Copper pipe D=28 x 1 mm with non-combustible stone wool insulation 20 mm, PAROC Hvac Section AluCoat, with bulk density 80 kg/m^3 with reinforced aluminium foil facing. The length of the insulation on both sides is 500 mm from the penetration seal surface to the end of the service. Pipe insulation CS	**E 60-C/U, EI 60-C/U**
2	Copper pipe D=18 x 1 mm with combustible insulation K-Flex ST 13 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
3	Copper pipe D=42 x 1,5 mm with combustible insulation K-Flex ST 40 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
4	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 125 x 4,8 mm sealed in the flexible wall construction	**E 60-U/C, EI 60-U/C**
5	Copper pipe D=28 x 1 mm with combustible insulation K-Flex ST 25 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
6	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 50 x 3mm sealed in the flexible wall construction	**E 60-U/C, EI 60-U/C**

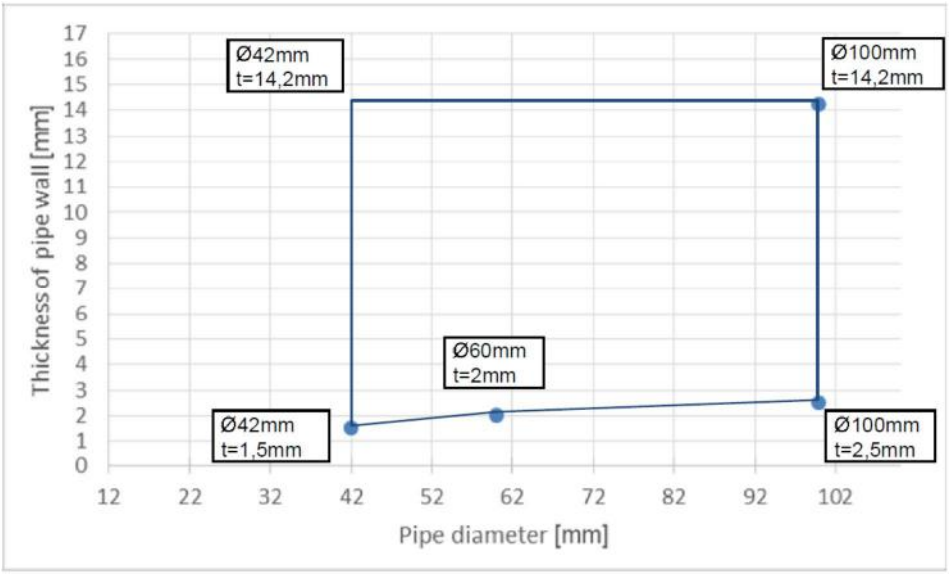
Service	Type of service	Fire resistance classification
7	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 125 x 3,1 mm sealed in the flexible wall construction	**E 60-U/C, EI 60-U/C**
8	Copper pipe D=42 x 1,5 mm with non-combustible insulation stone wool insulation 30 mm, PAROC Hvac Section AluCoat, with bulk density 80 kg/m^3 with reinforced aluminium foil facing. The length of the insulation on both sides is 500 mm from the penetration seal surface to the end of the service. Pipe insulation CS	**E 60-C/U, EI 60-C/U**
9	Copper pipe D=42 x 1,5 mm with combustible insulation NH/Armaflex 40 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
10	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 125 x 11,4 mm sealed in the flexible wall construction	**E 60-U/C, EI 60-U/C**
11	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 50 x 1,8 mm sealed in the flexible wall construction	**E 60-U/C, EI 60-U/C**
12	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 50 x 4,6mm sealed in the flexible wall construction	**E 60-U/C, EI 60-U/C**
13	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 125 x 11,4 mm sealed in the flexible wall construction	**E 60-U/C, EI 60-U/C**
14	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 125 x 7,1 mm sealed in the flexible wall construction	**E 60-U/C, EI 60-U/C**
15	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 125 x 7,4 mm sealed in the flexible wall construction	**E 60-U/C, EI 60-U/C**
16	Plastic pipe PVC-U in accordance with EN 1452-1: 209 D= 50 x 5,6 mm sealed in the flexible wall construction	**E 60-U/C, EI 60-U/C**
17	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 50 x 4,6 mm sealed in the flexible wall construction	**E 60-U/C, EI 60-U/C**
18	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 50 x 8,3 mm sealed in the flexible wall construction	**E 60-U/C, EI 60-U/C**
19	Steel pipe D=60 x 2 mm with combustible insulation K-Flex ST 40 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
20	Steel pipe D=100 x 2,5 mm with combustible insulation K-Flex ST 25 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
21	Steel pipe D=60 x 2 mm with combustible insulation NH/Armaflex 40 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
22	Steel pipe D=100 x 2,5 mm with combustible insulation NH/Armaflex 25 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**

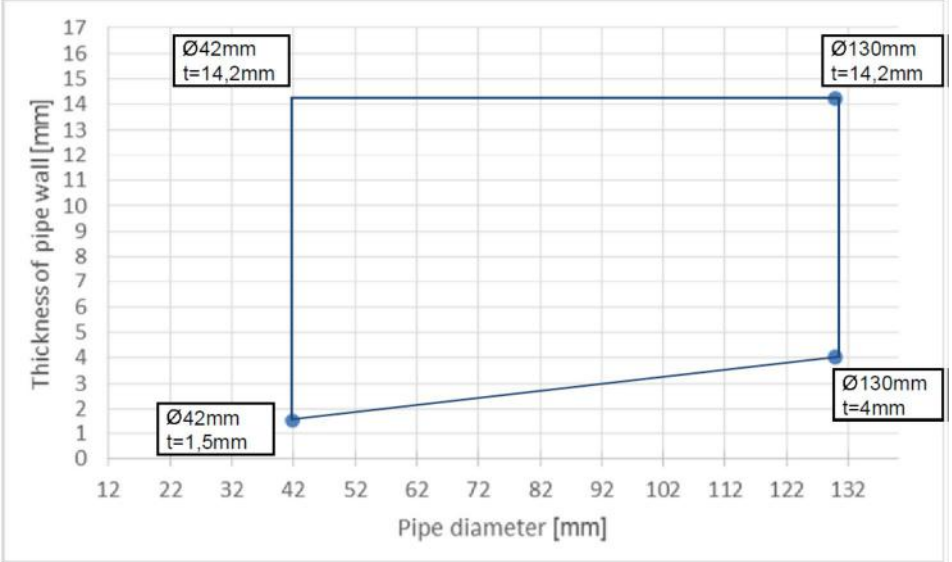
Service	Type of service	Fire resistance classification
23	Copper pipe D=18 x 1 mm with combustible insulation NH/Armaflex 13 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
24	Copper pipe D=28 x 1 mm with combustible insulation NH/Armaflex 25 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
25	Steel pipe D=130 x 4 mm with non-combustible stone wool insulation 30 mm, PAROC Hvac Section AluCoat, with bulk density 80 kg/m^3 with reinforced aluminium foil facing. The length of the insulation on both sides is 500 mm from the penetration seal surface to the end of the service. Pipe insulation CS	**E 60-C/U, EI 60-C/U**

This classification is valid according to EN 1366-3: 2009 for the following end use applications:

Supporting construction	Penetration seal, may be installed in: all flexible wall constructions of the same fire resistance classification as fire resistance of tested flexible support construction described on paragraph 3.2 provided conditions of EN 1366-3, paragraph 13.2.2.1 are met; The standard flexible wall construction does not cover sandwich panel constructions and flexible walls where the lining does not cover the studs on both sides. Penetrations in such constructions shall be tested on a case by case basis. Test results obtained with flexible supporting walls may be applied to concrete or masonry elements of an overall thickness equal to or greater than that of the element used in the tests.
Copper pipes: Pipe diameter and pipe wall thickness	Penetration sealing: **Polylack K** – in case of tested copper pipe Ø 42 x 1,5 mm with continued **non-combustible insulation** 30 mm, wall thickness of the copper pipe can be increased up to 14,2 mm. Penetration sealing: **PS bandage** – in case of tested copper pipe Ø 42 x 1,5 mm two layers of (2 x 150) mm PS bandage with continued **K-Flex combustible insulation** 40 mm and Polylack K in the corners. Wall thickness of the copper pipe can be increased up to 14,2 mm. Penetration sealing: **PS bandage** – in case of tested copper pipe Ø 42 x 1,5 mm two layers of (2 x 150) mm PS bandage with continued **Armaflex combustible insulation** 40 mm and Polylack K in the corners. Wall thickness of the copper pipe can be increased up to 14,2 mm.

Steel pipes: Pipe diameter and pipe wall thickness	Penetration sealing: **PS bandage** - two layers of (2 x 150) mm PS bandage and continued K-Flex combustible insulation 40 mm except pipe Ø 100, where can be used continued K-Flex combustible insulation 25 mm. On the base of test result of copper pipe Ø 42 x 1,5 mm* and steel pipes Ø 60 x 2 mm, Ø 100 x 2,5 mm, the following combination of pipes wall diameter and pipes wall thickness is valid for steel pipes fitted with continued **K-Flex combustible insulation** and Polylack K in the corners. Graph No. 1  **Copper pipe:** Ø 42 x 1,5 mm – two layers of PS bandage (2 x 150) mm - K-Flex combustible insulation 40 mm and Polylack K in the corners. **Steep pipes:** Ø 60 x 2 mm – two layers of PS bandage (2 x 150) mm - K-Flex combustible insulation 40 mm and Polylack K in the corners. Ø 100 x 2,5 mm – two layers of PS bandage (2 x 150) mm - K-Flex combustible insulation 25 mm and Polylack K in the corners. *Field of application of Fire resistance classification* **E 60-C/U, EI 60-C/U** *valid for* copper pipe and steel pipes *and range of pipe diameter from* Ø 42 mm to Ø 100 mm *wall thickness from 1,5 mm to 2,5 mm.* Steel pipe wall thickness can be increased up to 14,2 mm. ** Note: On the base of EN 1366-3, paragraph E.1.5.2, test results of copper pipe* Ø 42 x 1,5 mm is *valid for steel pipes* Ø 60 x 2 mm and Ø 100 x 2,5 mm.

Steel pipes: Pipe diameter and pipe wall thickness	Penetration sealing: **PS bandage** - two layers of (2 x 150) mm PS bandage and continued Armaflex combustible insulation 40 mm except pipe Ø 100, where can be used continued Armaflex combustible insulation 25 mm. On the base of test result of copper pipe Ø 42 x 1,5 mm* and steel pipes Ø 60 x 2 mm, Ø 100 x 2,5 mm, the following combination of pipes wall diameter and pipes wall thickness is valid for steel pipes fitted with continued **Armaflex combustible insulation** and Polylack K in the corners. Graph No. 2  **Copper pipe:** Ø 42 x 1,5 mm – two layers of PS bandage (2 x 150) mm - Armaflex combustible insulation 40 mm and Polylack K in the corners. **Steep pipes:** Ø 60 x 2 mm – two layers of PS bandage (2 x 150) mm - Armaflex combustible insulation 40 mm and Polylack K in the corners. Ø 100 x 2,5 mm – two layers of PS bandage (2 x 150) mm - Armaflex combustible insulation 25 mm and Polylack K in the corners. *Field of application of Fire resistance classification* **E 60-C/U, EI 60-C/U** *valid for* copper pipe and steel pipes *and range of pipe diameter from* Ø 42 mm to Ø 100 mm *wall thickness from 1,5 mm to 2,5 mm.* Steel pipe wall thickness can be increased up to 14,2 mm. ** Note: On the base of EN 1366-3, paragraph E.1.5.2, test results of copper pipe* Ø 42 x 1,5 mm is *valid for steel pipes* Ø 60 x 2 mm and Ø 100 x 2,5 mm.

Steel pipes: Pipe diameter and pipe wall thickness	Penetration sealing: **<u>Polylack K</u>** and continued non-combustible insulation 30 mm. On the base of test result of copper pipe Ø 42 x 1,5 mm* and steel pipe Ø 130 x 4 mm, the following combination of pipes wall diameter and pipes wall thickness is valid for steel pipes fitted with continued **Non-combustible insulation:** Graph No. 3  **Copper pipe:** Ø 42 x 1,5 mm – Polylack K and non-combustible insulation 30 mm **Steel pipe:** Ø 130 x 4 mm – Polylack K and non-combustible insulation 30 mm *Field of application of Fire resistance classification* **E 60-C/U, EI 60-C/U** *valid for* copper pipe and steel pipe *and range of pipe diameter from* Ø 42 mm to Ø 130 mm *wall thickness from 1,5 mm to 4 mm.* Steel pipe wall thickness can be increased up to 14,2 mm. ** Note: On the base of EN 1366-3, paragraph E.1.5.2, test results of <u>copper pipe</u>* Ø 42 x 1,5 mm is *valid for <u>steel pipe</u>* Ø 130 x 4 mm.

Plastic pipes: PE-HD
Pipe diameter and pipe wall thickness

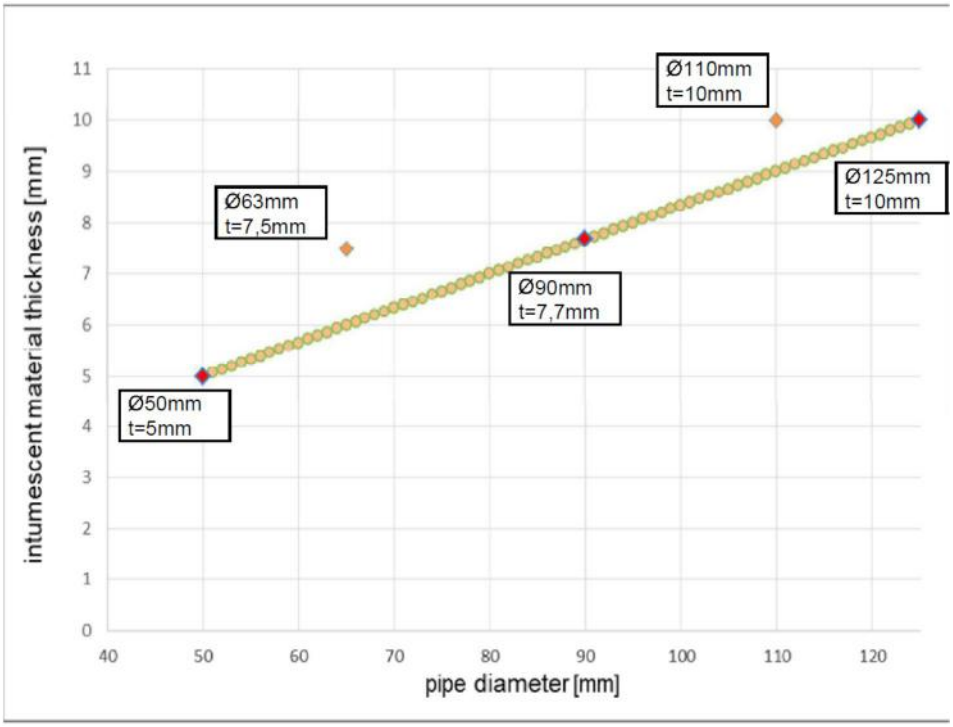
Penetration sealing: **PS collar**

Fire resistance class of PE-HD pipes penetration seal made of PS collar and Polylack K in the corners. For the test was selected (from sponsor intended application to pipes Ø 50, Ø 63, Ø 90, Ø 110, Ø 125) following pipes Ø 50 x 3 mm, Ø 50 x 4,6 mm, Ø 125 x 4,8 mm and Ø 125 x 11,4 mm.

Service		PS collar		Fire resistance class
Pipe diameter (mm)	**Pipe wall Thickness (mm)**	**Intumescent material width (mm) / collar diameter (mm)**	**Intumescent material thickness (mm)**	
0 - 50	3 – 4,8	30 / 50	5	**EI 60-U/C**
50 - 63	3,2 – 5,9	30/ 63	7,5	
63 - 90	3,8 – 8,3	30 / 90	7,7	
90 - 110	4,2 - 10	30 / 110	10	
110 - 125	4,6 – 11,4	30 / 125	10	

Selection of sizes of pipe closure devices:

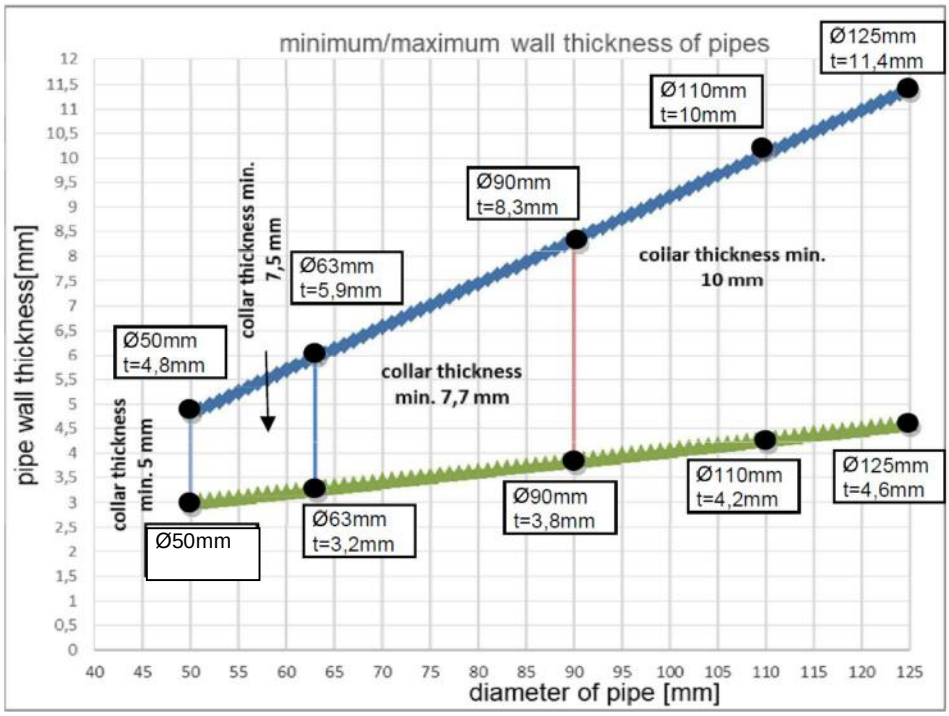
Graph No. 4



Plastic pipes: PE-HD
Pipe diameter and pipe wall thickenss

Range of pipe diameters and pipe wall thickness – selection of pipe wall thickness for appropriate pipe diameter:

Graph No. 5

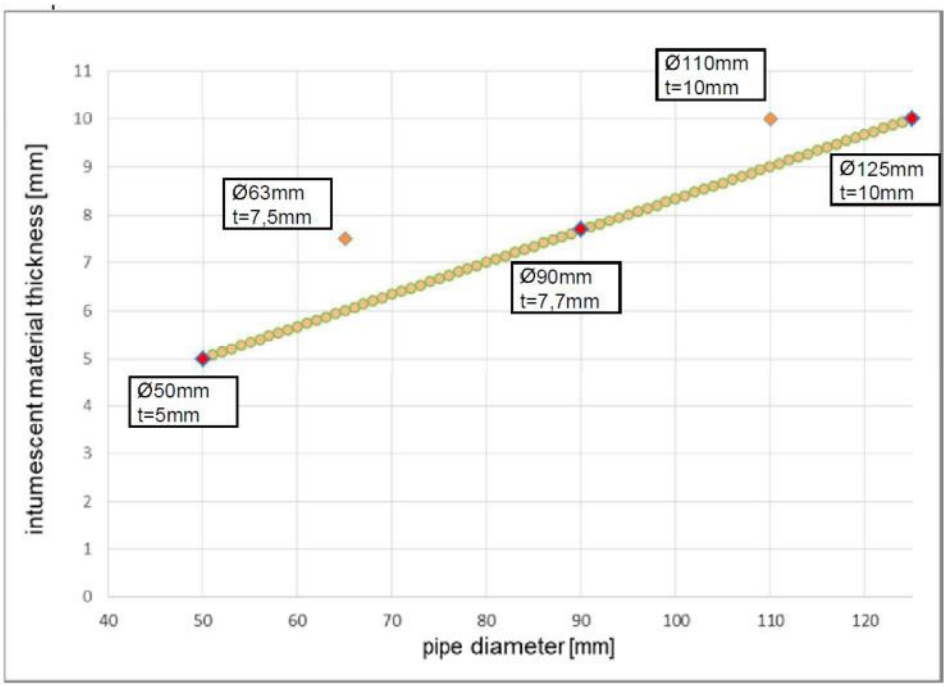
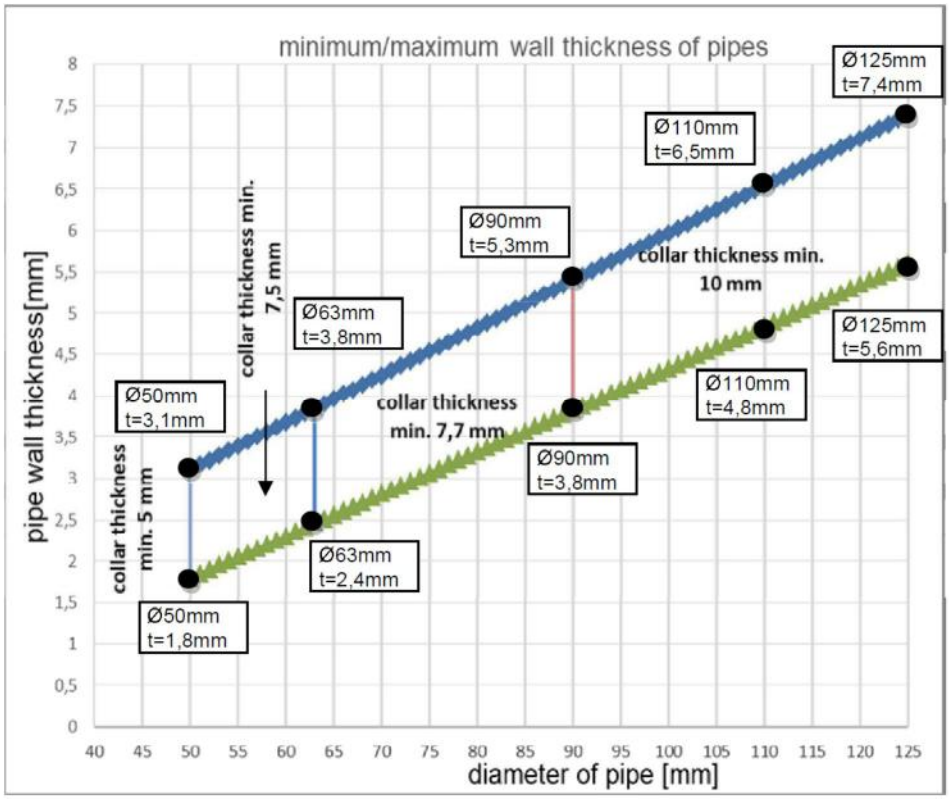


Plastic pipes: PVC-U
Pipe diameter and pipe wall thickness

Penetration sealing: **PS collar**

Fire resistance class of PVC-U pipes penetration seal made of PS collar and Polylack K in the corners. For the test was selected (from sponsor intended application to pipes Ø 50, Ø 63, Ø Ø 90, Ø 110, Ø 125) following pipes Ø 50 x 1,8 mm, Ø 50 x 5,6 mm, Ø 125 x 3,1 mm and Ø 125 x 7,4 mm.

Service		PS collar		Fire resistance class
Pipe diameter (mm)	**Pipe wall Thickness (mm)**	**Intumescent material width (mm) / collar diameter (mm)**	**Intumescent material thickness (mm)**	
0 - 50	1,8 – 3,1	30 / 50	5	**EI 60-U/C**
50 - 63	2,4 – 3,8	30/ 63	7,5	
63 - 90	3,8 – 5,3	30 / 90	7,7	
90 - 110	4,8 – 6,5	30 / 110	10	
110 - 125	5,6 – 7,4	30 / 125	10	

Plastic pipes: PVC-U Pipe diameter and pipe wall thickness	<u>Selection of sizes of pipe closure devices:</u> Graph No. 6  <u>Range of pipe diameters and pipe wall thickness – selection of pipe wall thickness for appropriate pipe diameter:</u> Graph No. 7 

Plastic pipes: PP-R
Pipe diameter and pipe wall thickness

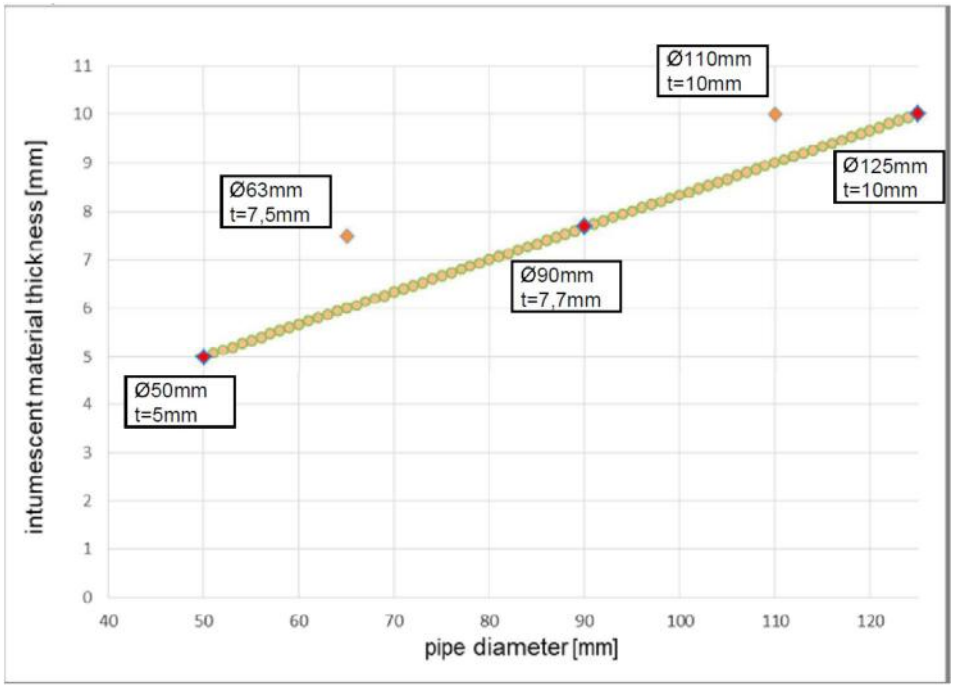
Penetration sealing: **PS collar**

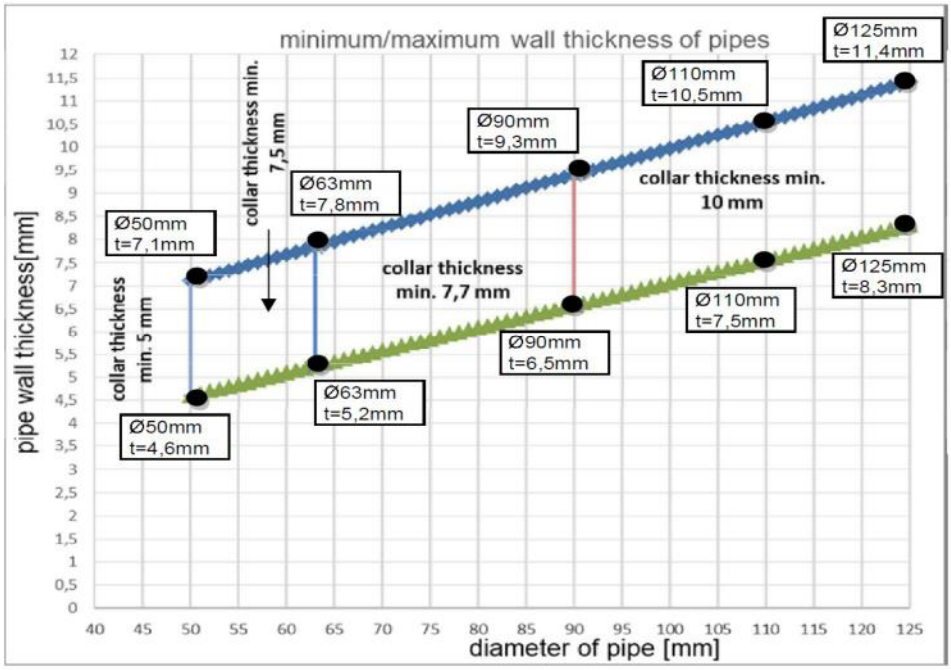
Fire resistance class of PP-R pipes penetration seal made of PS collar and Polylack K in the corners. For the test was selected (from sponsor intended application to pipes Ø 50, Ø 63, Ø Ø 90, Ø 110, Ø 125) following pipes Ø 50 x 4,6 mm, Ø 50 x 8,3 mm, Ø 125 x 7,1 mm and Ø 125 x 11,4 mm.

Service		PS collar		Fire resistance class
Pipe diameter (mm)	**Pipe wall Thickness (mm)**	**Intumescent material width (mm) / collar diameter (mm)**	**Intumescent material thickness (mm)**	
0 - 50	4,6 – 7,1	30 / 50	5	**EI 60-U/C**
50 - 63	5,2 – 7,8	30/ 63	7,5	
63 - 90	6,5 – 9,3	30 / 90	7,7	
90 - 110	7,5 – 10,5	30 / 110	10	
110 - 125	8,3 – 11,4	30 / 125	10	

Selection of sizes of pipe closure devices:

Graph No. 8



Plastic pipes: PP-R Pipe diameter and pipe wall thickness	<u>Range of pipe diameters and pipe wall thickness – selection of pipe wall thickness for appropriate pipe diameter:</u> Graph No. 9 
Seal size and distances	The test results are valid for any penetration seal size (in linear dimensions) equal to or smaller than that tested (1200 x 1800) mm, provided the total amount of cross sections of the services does not exceed 60% of the penetration area, the working clearances are not smaller than minimum working clearances used in the test. The minimum working clearances between the different service types (a_1 to a_6) and the services and the seal edge (b_1 to b_5) used in the test are given in accordance with clause F.5.2.3 of EN 1366-3 The minimum working clearances between the different service: **Type of service** / **Minimum working clearance [mm]** a_1 – 80 a_2 – 50 a_3 – 59 a_4 – 88 a_5 – 50 a_6 – 90 The minimum working clearances between the services and the seal edge: **Type of service** / **Minimum working clearance [mm]** b_1 – 50 b_2 – 100 b_3 – * b_4 – 65 b_5 – 64 Note: * the cable tray was not installed in the mixed penetration seal.
Service	Acc. paragraph 2.2. No changes are allowed.
Pipe end configuration U/C	Metal pipes end configuration C/U, U/C, C/C. Plastic pipes end configuration U/C; C/C.

Mixed penetration seal installed in floor

Fire resistance classification for Mixed penetration seal

Fire resistance classification:
E 60 / EI 60

Fire resistance classification for separated services

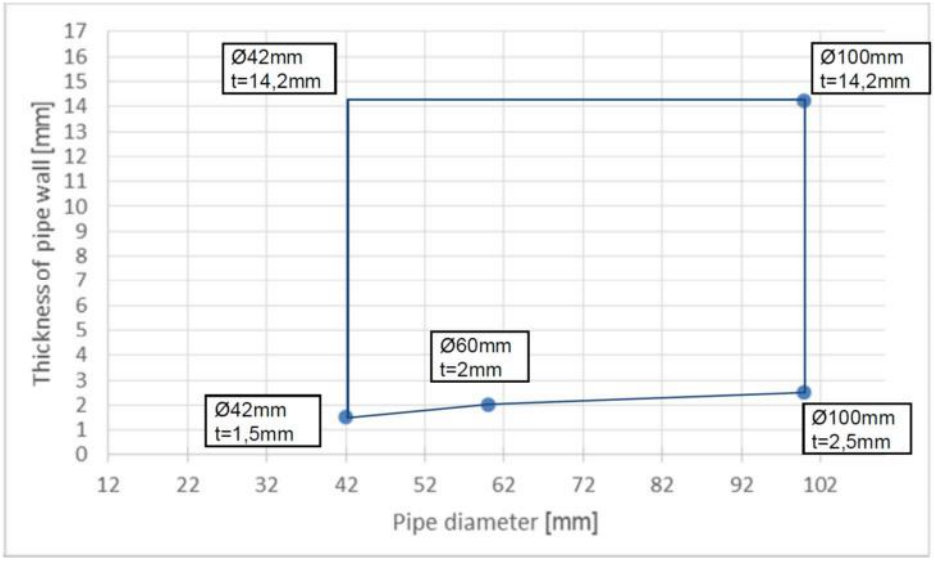
Service	Type of service	Fire resistance classification
D3 Tray 200 mm	Cable N2XH-J 4 x 185 SM	**E 60 / EI 60**
2xE Tray 200 mm	2xCables N-YY-O 1 x 185 RM	**E 60 / EI 60**
C1 Tray 300 mm	Cable NYCWY 4 x 95 SM/50	**E 60 / EI 60**
2xB Tray 300 mm	2 x Cables NYY-O 1 x 95 RM	**E 60 / EI 60**
F Tray 300 mm	Bundle of telecommunication cables, J-Y(St)Y 20 x 2 x 0,6 mm D=100 mm	**E 60 / EI 60**
A1 Tray 500 mm	Bund of cables NYY-J 5 x 1,5 RE, 10 pieces of cables in the bundle	**E 60 / EI 60**
A2 Tray 500 mm	Bund of cables H07RN-F 5G1,5, 10 pieces of cables in the bundle	**E 60 / EI 60**
A3 Tray 500 mm	Bund of cables N2XH-O 5 x 1,5 RE, 10 pieces of cables in the bundle	**E 60 / EI 60**
1	Copper pipe D=28 x 1 mm with non-combustible stone wool insulation 20 mm, PAROC Hvac Section AluCoat, with bulk density 80 kg/m^3 with reinforced aluminium foil facing. The length of the insulation on both sides is 500 mm from the penetration seal surface to the end of the service. Pipe insulation CS	**E 60-C/U, EI 60-C/U**
2	Copper pipe D=18 x 1 mm with combustible insulation K-Flex ST 13 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
3	Copper pipe D=42 x 1,5 mm with combustible insulation K-Flex ST 40 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
4	Plastic pipe PE-HD in accordance with EN 12201-2: 2011D= 125 x 4,8 mm sealed in the aerated concrete floor construction	**E 60-U/C, EI 60-U/C**
5	Copper pipe D=28 x 1 mm with combustible insulation K-Flex ST 25 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
6	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 50 x 3mm sealed in the aerated concrete floor construction	**E 60-U/C, EI 60-U/C**
7	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 125 x 3,1 mm sealed in the aerated concrete floor construction	**E 60-U/C, EI 60-U/C**

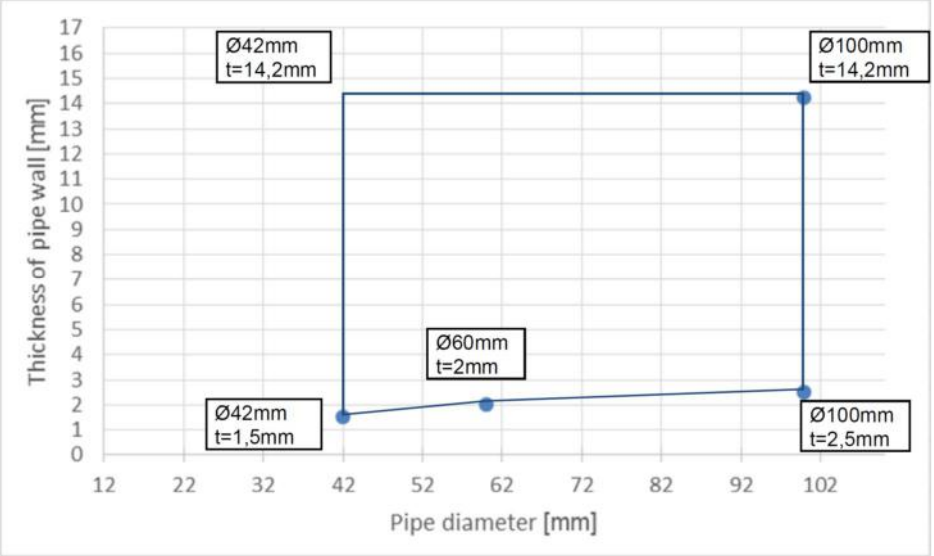
Service	Type of service	Fire resistance classification
8	Copper pipe D=42 x 1,5 mm with non-combustible insulation stone wool 30 mm, PAROC Hvac Section AluCoat, with bulk density 80 kg/m^3 with reinforced aluminium foil facing. The length of the insulation on both sides is 500 mm from the penetration seal surface to the end of the service. Pipe insulation CS	**E 60-C/U, EI 60-C/U**
9	Copper pipe D=42 x 1,5 mm with combustible insulation NH/Armaflex 40 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
10	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 125 x 11,4 mm sealed in the aerated concrete floor construction	**E 60-U/C, EI 60-U/C**
11	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 50 x 1,8 mm sealed in the aerated concrete floor construction	**E 60-U/C, EI 60-U/C**
12	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 50 x 4,6 mm sealed in the aerated concrete floor construction	**E 60-U/C, EI 60-U/C**
13	Plastic pipe PE-HD in accordance with EN 12201-2: 2011 D= 125 x 11,4 mm sealed in the aerated concrete floor construction	**E 60-U/C, EI 60-U/C**
14	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 125 x 7,1 mm sealed in the aerated concrete floor construction	**E 60-U/C, EI 60-U/C**
15	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 125 x 7,4 mm sealed in the aerated concrete floor construction	**E 60-U/C, EI 60-U/C**
16	Plastic pipe PVC-U in accordance with EN 1452-1: 2009 D= 50 x 5,6 mm sealed in the aerated concrete floor construction	**E 60-U/C, EI 60-U/C**
17	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 50 x 4,6 mm sealed in the aerated concrete floor construction	**E 60-U/C, EI 60-U/C**
18	Plastic pipe PP-R in accordance with EN ISO 15874: 2013 D= 50 x 8,3 mm sealed in the aerated concrete floor construction	**E 60-U/C, EI 60-U/C**
19	Steel pipe D=60 x 2 mm with combustible insulation K-Flex ST 40 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
20	Steel pipe D=100 x 2,5 mm with combustible insulation K-Flex ST 25 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
21	Steel pipe D=60 x 2 mm with combustible insulation NH/Armaflex 40 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
22	Steel pipe D=100 x 2,5 mm with combustible insulation NH/Armaflex 25 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
23	Copper pipe D=18 x 1 mm with combustible insulation NH/Armaflex 13 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**
24	Copper pipe D=28 x 1 mm with combustible insulation NH/Armaflex 25 mm, pipe insulation CS	**E 60-C/U, EI 60-C/U**

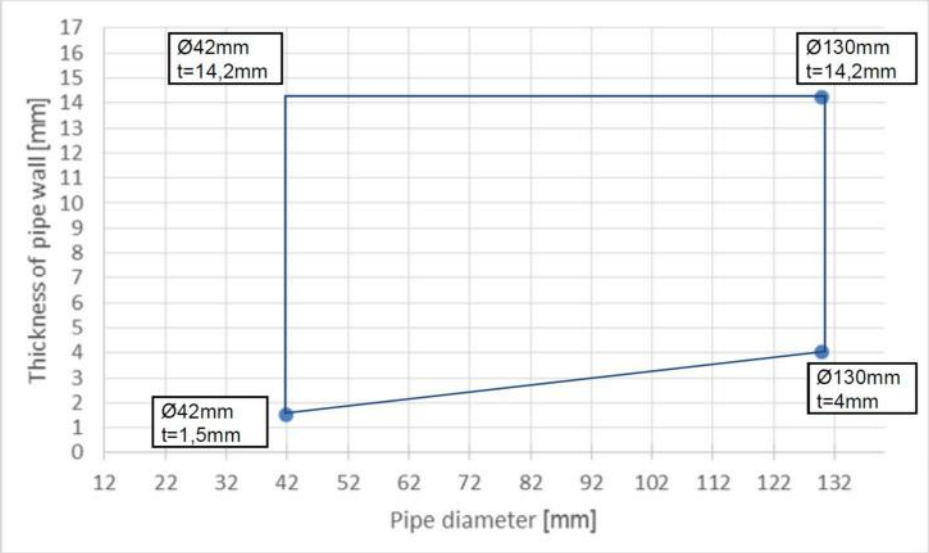
Service	Type of service	Fire resistance classification
25	Steel pipe D=130 x 4 mm with non-combustible stone wool insulation 30 mm, PAROC Hvac Section AluCoat, with bulk density 80 kg/m^3 with reinforced aluminium foil facing. The length of the insulation on both sides is 500 mm from the penetration seal surface to the end of the service. Pipe insulation CS	**E 60-C/U, EI 60-C/U**

This classification is valid according to EN 1366-3: 2009 for the following end use applications:

Supporting construction	Test results obtained with rigid aerated concrete floor constructions, thickness 150 mm and bulk density 620 kg/m^3 may be applied to concrete or masonry separating elements of a thickness and density equal to or greater than that of the supporting construction used in the test. This rule does not apply to pipe closure devices positioned within the supporting construction in case of higher thickness of the supporting construction unless the length of the seal is increased by an equal amount and the distance from the surface of the supporting construction remains the same on both sides.
Copper pipes: Pipe diameter and pipe wall thickness	Penetration sealing: **Polylack K** – in case of tested copper pipe Ø 42 x 1,5 mm with continued **non-combustible insulation** 30 mm, wall thickness of the copper pipe can be increased up to 14,2 mm. Penetration sealing: **PS bandage** – in case of tested copper pipe Ø 42 x 1,5 mm two layers of (2 x 150) mm PS bandage with continued **K-Flex combustible insulation** 40 mm and Polylack K in the corners. Wall thickness of the copper pipe can be increased up to 14,2 mm. Penetration sealing: **PS bandage** – in case of tested copper pipe Ø 42 x 1,5 mm two layers of (2 x 150) mm PS bandage with continued **Armaflex combustible insulation** 40 mm and Polylack K in the corners. Wall thickness of the copper pipe can be increased up to 14,2 mm.

Steel pipes: Pipe diameter and pipe wall thickness	Penetration sealing: **PS bandage** - two layers of (2 x 150) mm PS bandage and continued K-Flex combustible insulation 40 mm except pipe Ø 100, where can be used continued K-Flex combustible insulation 25 mm. On the base of test result of copper pipe Ø 42 x 1,5 mm* and steel pipes Ø 60 x 2 mm, Ø 100 x 2,5 mm, the following combination of pipes wall diameter and pipes wall thickness is valid for steel pipes fitted with continued **K-Flex combustible insulation** and Polylack K in the corners. Graph No. 1  **Copper pipe:** Ø 42 x 1,5 mm – two layers of PS bandage (2 x 150) mm - K-Flex combustible insulation 40 mm and Polylack K in the corners. **Steep pipes:** Ø 60 x 2 mm – two layers of PS bandage (2 x 150) mm - K-Flex combustible insulation 40 mm and Polylack K in the corners. Ø 100 x 2,5 mm – two layers of PS bandage (2 x 150) mm - K-Flex combustible insulation 25 mm and Polylack K in the corners. *Field of application of Fire resistance classification* **E 60-C/U, EI 60-C/U** *valid for* copper pipe and steel pipes *and range of pipe diameter from* Ø 42 mm to Ø 100 mm *wall thickness from 1,5 mm to 2,5 mm.* Steel pipe wall thickness can be increased up to 14,2 mm. ** Note: On the base of EN 1366-3, paragraph E.1.5.2, test results of copper pipe* Ø 42 x 1,5 mm is *valid for steel pipes* Ø 60 x 2 mm and Ø 100 x 2,5 mm.

Steel pipes: Pipe diameter and pipe wall thickness	Penetration sealing: **PS bandage** - two layers of (2 x 150) mm PS bandage and continued Armaflex combustible insulation 40 mm except pipe Ø 100, where can be used continued Armaflex combustible insulation 25 mm. On the base of test result of copper pipe Ø 42 x 1,5 mm* and steel pipes Ø 60 x 2 mm, Ø 100 x 2,5 mm, the following combination of pipes wall diameter and pipes wall thickness is valid for steel pipes fitted with continued **Armaflex combustible insulation** and Polylack K in the corners. Graph No. 2  **Copper pipe:** Ø 42 x 1,5 mm – two layers of PS bandage (2 x 150) mm - Armaflex combustible insulation 40 mm and Polylack K in the corners. **Steep pipes:** Ø 60 x 2 mm – two layers of PS bandage (2 x 150) mm - Armaflex combustible insulation 40 mm and Polylack K in the corners. Ø 100 x 2,5 mm – two layers of PS bandage (2 x 150) mm - Armaflex combustible insulation 25 mm and Polylack K in the corners. *Field of application of Fire resistance classification* **E 60-C/U, EI 60-C/U** *valid for* copper pipe and steel pipes *and range of pipe diameter from* Ø 42 mm to Ø 100 mm *wall thickness from 1,5 mm to 2,5 mm.* Steel pipe wall thickness can be increased up to 14,2 mm. ** Note: On the base of EN 1366-3, paragraph E.1.5.2, test results of copper pipe* Ø 42 x 1,5 mm is *valid for steel pipes* Ø 60 x 2 mm and Ø 100 x 2,5 mm.

Steel pipes: Pipe diameter and pipe wall thickness	Penetration sealing: **Polylack K** and continued non-combustible insulation 30 mm. On the base of test result of copper pipe Ø 42 x 1,5 mm* and steel pipe Ø 130 x 4 mm, the following combination of pipes wall diameter and pipes wall thickness is valid for steel pipes fitted with continued **Non-combustible insulation:** Graph No. 3  **Copper pipe:** Ø 42 x 1,5 mm – Polylack K and non-combustible insulation 30 mm **Steel pipe:** Ø 130 x 4 mm – Polylack K and non-combustible insulation 30 mm *Field of application of Fire resistance classification* **E 60-C/U, EI 60-C/U** *valid for* copper pipe and steel pipe *and range of pipe diameter from* Ø 42 mm to Ø 130 mm *wall thickness from 1,5 mm to 4 mm.* Steel pipe wall thickness can be increased up to 14,2 mm. ** Note: On the base of EN 1366-3, paragraph E.1.5.2, test results of copper pipe* Ø 42 x 1,5 mm is *valid for steel pipe* Ø 130 x 4 mm.

Plastic pipes:

PE-HD

Pipe diameter and pipe wall thickness

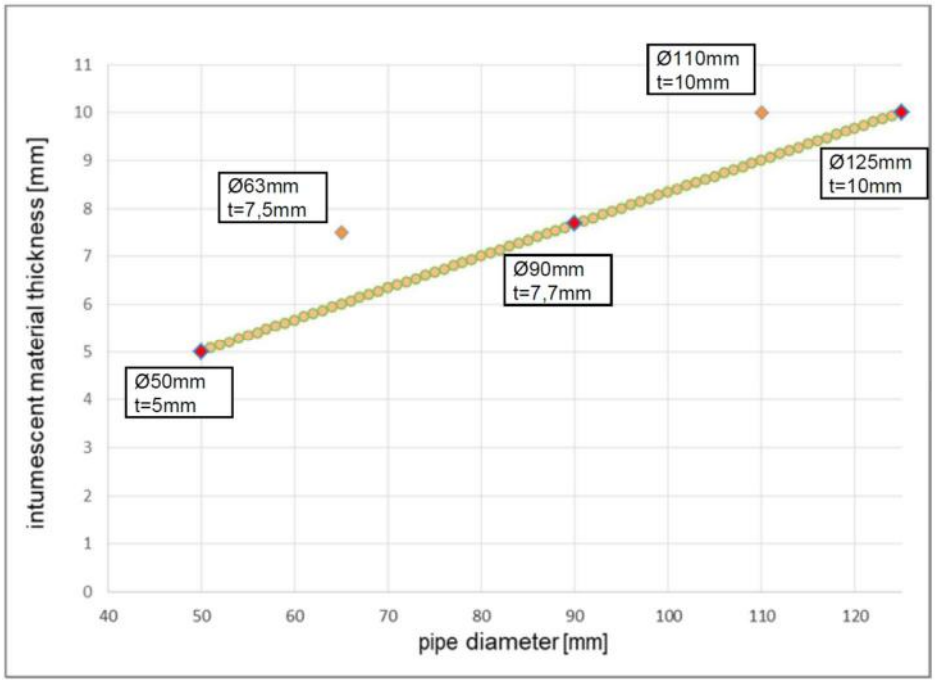
Penetration sealing: **PS collar**

Fire resistance class of PE-HD pipes penetration seal made of PS collar and Polylack K in the corners. For the test was selected (from sponsor intended application to pipes Ø 50, Ø 63, Ø 90, Ø 110, Ø 125) following pipes Ø 50 x 3 mm, Ø 50 x 4,6 mm, Ø 125 x 4,8 mm and Ø 125 x 11,4 mm.

Service		PS collar		Fire resistance class
Pipe diameter (mm)	**Pipe wall Thickness (mm)**	**Intumescent material width (mm) / collar diameter (mm)**	**Intumescent material thickness (mm)**	
0 - 50	3 – 4,8	30 / 50	5	**EI 60-U/C**
50 - 63	3,2 – 5,9	30/ 63	7,5	
63 - 90	3,8 – 8,3	30 / 90	7,7	
90 - 110	4,2 - 10	30 / 110	10	
110 - 125	4,6 – 11,4	30 / 125	10	

Selection of sizes of pipe closure devices:

Graph No. 4



Plastic pipes:

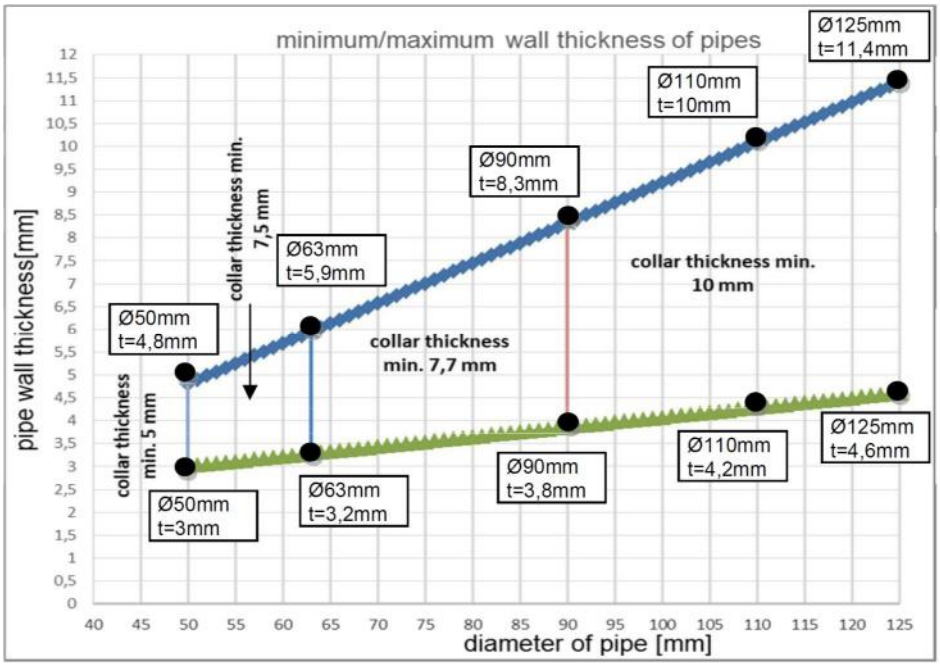
PE-HD

Pipe diameter and pipe wall thicken

ss

Range of pipe diameters and pipe wall thickness – selection of pipe wall thickness for appropriate pipe diameter:

Graph No. 5



Plastic pipes:

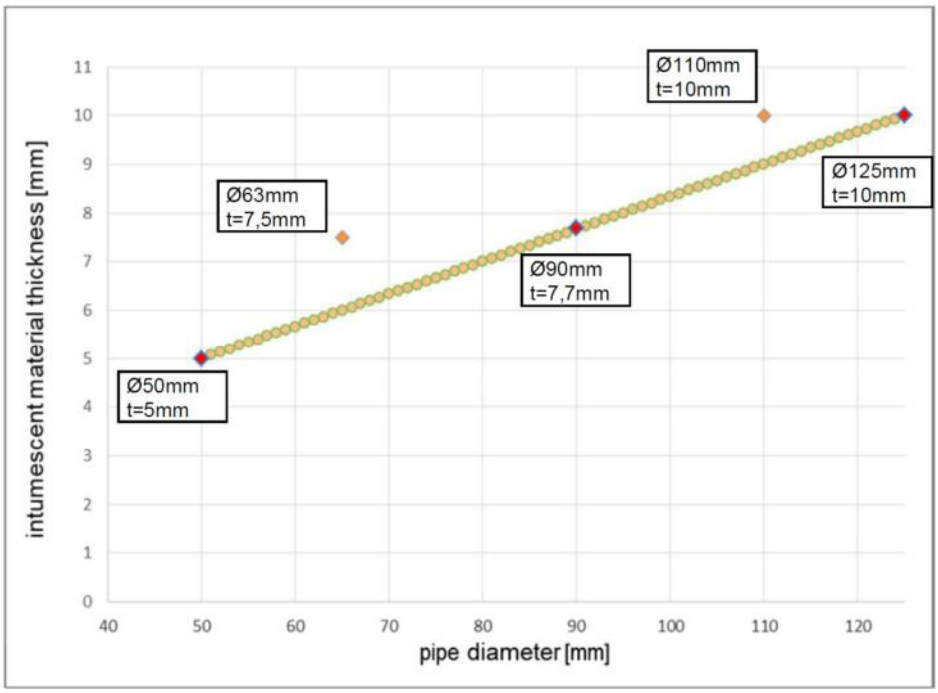
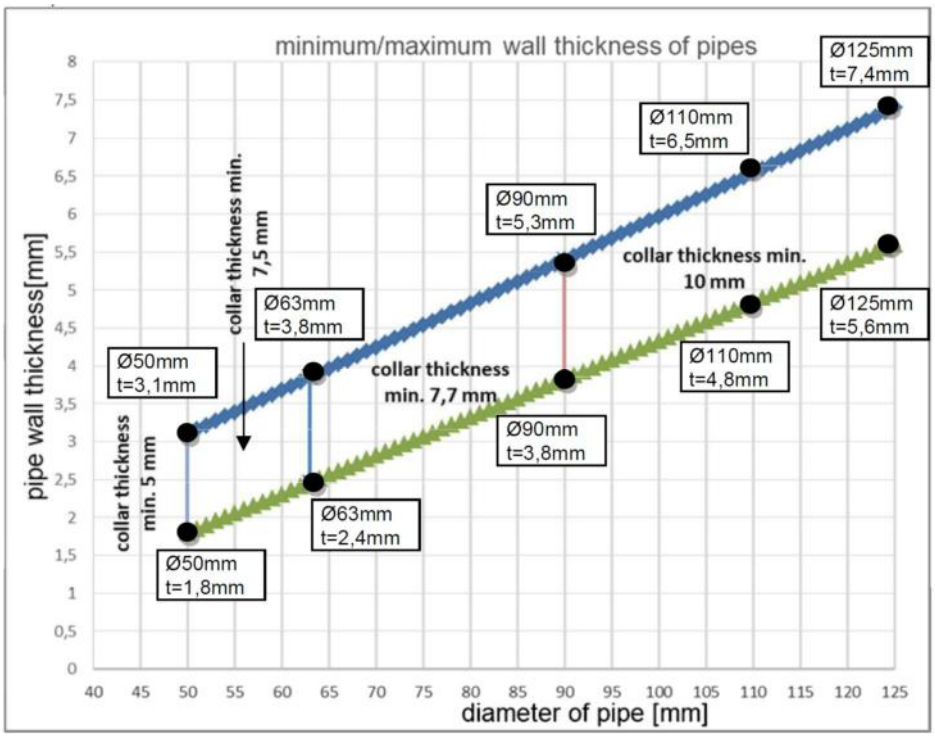
PVC-U

Pipe diameter and pipe wall thickness

Penetration sealing: **PS collar**

Fire resistance class of PVC-U pipes penetration seal made of PS collar and Polylack K in the corners. For the test was selected (from sponsor intended application to pipes Ø 50, Ø 63, Ø 90, Ø 110, Ø 125) following pipes Ø 50 x 1,8 mm, Ø 50 x 5,6 mm, Ø 125 x 3,1 mm and Ø 125 x 7,4 mm.

Service		PS collar		Fire resistance class
Pipe diameter (mm)	**Pipe wall Thickness (mm)**	**Intumescent material width (mm) / collar diameter (mm)**	**Intumescent material thickness (mm)**	
0 - 50	1,8 – 3,1	30 / 50	5	**EI 60-U/C**
50 - 63	2,4 – 3,8	30/ 63	7,5	
63 - 90	3,8 – 5,3	30 / 90	7,7	
90 - 110	4,8 – 6,5	30 / 110	10	
110 - 125	5,6 – 7,4	30 / 125	10	

Plastic pipes: **PVC-U** Pipe diameter and pipe wall thickness	<u>Selection of sizes of pipe closure devices:</u> Graph No. 6  <u>Range of pipe diameters and pipe wall thickness – selection of pipe wall thickness for appropriate pipe diameter:</u> Graph No. 7 

Plastic pipes:

PP-R

Pipe diameter and pipe wall thickness

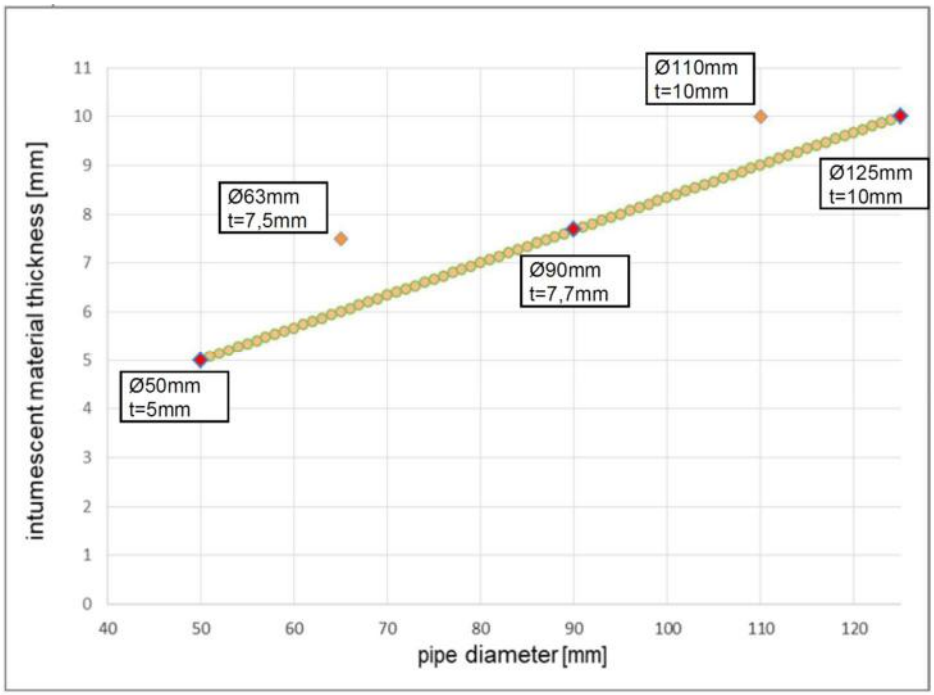
Penetration sealing: **PS collar**

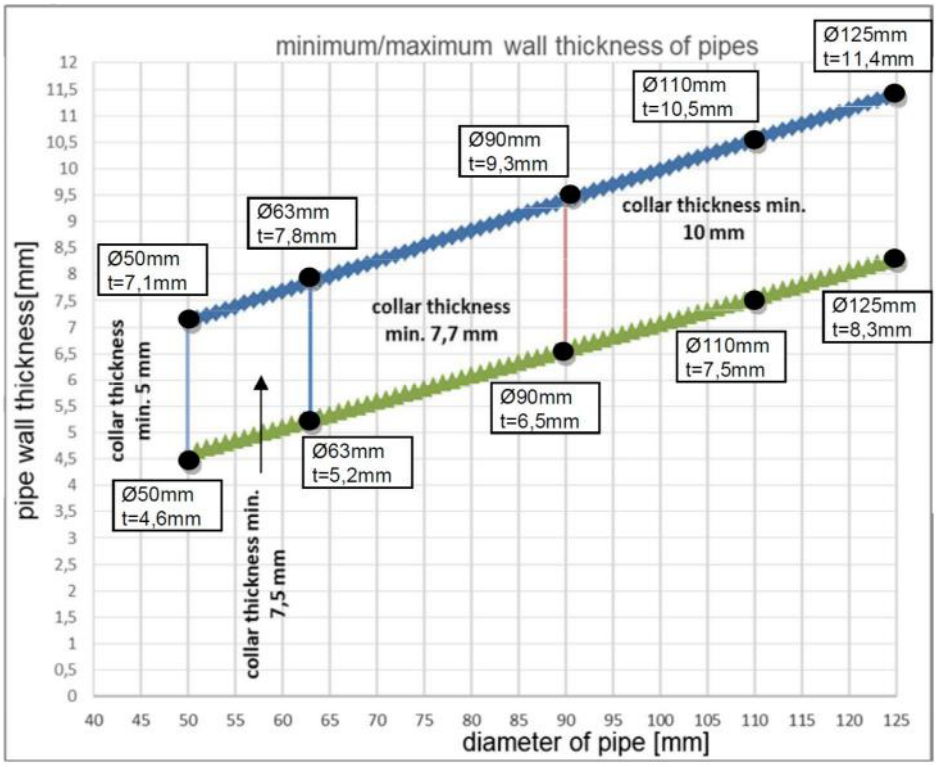
Fire resistance class of PP-R pipes penetration seal made of PS collar and Polylack K in the corners. For the test was selected (from sponsor intended application to pipes Ø 50, Ø 63, Ø 90, Ø 110, Ø 125) following pipes Ø 50 x 4,6 mm, Ø 50 x 8,3 mm, Ø 125 x 7,1 mm and Ø 125 x 11,4 mm.

Service		PS collar		Fire resistance class
Pipe diameter (mm)	**Pipe wall Thickness (mm)**	**Intumescent material width (mm) / collar diameter (mm)**	**Intumescent material thickness (mm)**	
0 - 50	4,6 – 7,1	30 / 50	5	**EI 60-U/C**
50 - 63	5,2 – 7,8	30/ 63	7,5	
63 - 90	6,5 – 9,3	30 / 90	7,7	
90 - 110	7,5 – 10,5	30 / 110	10	
110 - 125	8,3 – 11,4	30 / 125	10	

Selection of sizes of pipe closure devices:

Graph No. 8



Plastic pipes: **PP-R** Pipe diameter and pipe wall thickness	<u>Range of pipe diameters and pipe wall thickness – selection of pipe wall thickness for appropriate pipe diameter:</u> Graph No. 9 
Seal size and distances	The test results are valid for any penetration seal size (in linear dimensions) equal to or smaller than that tested (1200 x 1800) mm, provided the total amount of cross sections of the services does not exceed 60% of the penetration area, the working clearances are not smaller than minimum working clearances used in the test. The minimum working clearances between the different service types (a_1 to a_6) and the services and the seal edge (b_1 to b_5) used in the test are given in accordance with clause F.5.2.3 of EN 1366-3. The minimum working clearances between the different service: **Type of service** / **Minimum working clearance [mm]** a_1 – 80 a_2 – 60 a_3 – 70 a_4 – 100 a_5 – 50 a_6 – 90

<table>
<tr><td>Seal size and distances</td><td>The minimum working clearances between the services and the seal edge:

<table><tr><th>Type of service</th><th>Minimum working clearance [mm]</th></tr><tr><td>b_1</td><td>50</td></tr><tr><td>b_2</td><td>100</td></tr><tr><td>b_3</td><td>*</td></tr><tr><td>b_4</td><td>65</td></tr><tr><td>b_5</td><td>75</td></tr></table>
Note: * the cable tray was not installed in the mixed penetration seal.</td></tr>
<tr><td>Service</td><td>Acc. paragraph 2.2. No changes are allowed</td></tr>
<tr><td>Pipe end configuration U/C</td><td>Metal pipes end configuration C/U, U/C, C/C.
Plastic pipes end configuration U/C; C/C.</td></tr>
</table>