

European Technical Assessment

ETA 17/0614
of 27.11.2020



General part

Technical Assessment Body issuing the ETA: ITeC

ITeC has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment).

Trade name of the construction product

KF-Collar C

Product family to which the construction product belongs

Fire stopping and fire sealing products.
Penetration seals.

Manufacturer

KNAUF di Knauf Srl sas
Via Livornese 20
Castellina Marittima
IT-56040
Italy

Manufacturing plant(s)

According to Annex N kept by ITeC.

This European Technical Assessment contains

13 pages including 2 annexes which form an integral part of this assessment
and

Annex N, which contains confidential information and is not included in the European Technical Assessment when that assessment is publicly available.

This European Technical Assessment is issued in accordance with Regulation (EU) 305/2011, on the basis of

European Assessment Document EAD 350454-00-1104.

This version replaces

ETA 17/0614, issued on 13.09.2017.

General comments

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

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

Specific parts of the European Technical Assessment

1 Technical description of the product

KF-Collar C is a services closure device used as fire pipe penetration seal, consisting of a fire protective inlay made of intumescent material contained in a U-shaped housing of stainless steel with flanges for fixing to the constructive element.

KF-Collar C is supplied in different sizes depending on the pipe diameter to be protected. The detailed technical specification of KF-Collar C and the description of the installation procedure are given in Annex A.

Assembled penetration seals require additional components as described in Annex B. These components cannot be CE marked based on this ETA.

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

KF-Collar C is used to reinstate the resistance to fire performance of flexible or rigid wall and rigid floor constructions where they are penetrated by services (combustible pipes). The detailed specification of the services that may be protected with KF-Collar C are given in Annex B.

The specific elements of construction where the KF-Collar C may be used to provide a penetration seal in, are as follows:

- Flexible walls: Walls with a minimum thickness of 120 mm, which comprise timber or steel studs lined on both faces with minimum two layers of 12,5 mm thick 'Type F' or 'Type DF' gypsum plasterboards according to EN 520¹. 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 walls: Concrete or masonry walls with a minimum thickness of 120 mm and a minimum density of 500 kg/m³.
- Rigid floors: Aerated concrete or other type of rigid floors with a minimum thickness of 150 mm and a minimum density of 550 kg/m³.

The constructive element where the collars are installed must be classified in accordance with EN 13501-2² for the required fire resistance period.

¹ EN 520 Gypsum plasterboards. Definitions, requirements and test methods.

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

KF-Collar C is intended for environmental conditions as defined for use category Type Y_{2,(-20/70)°C} according to EAD 350454-00-1104: intended for semi-exposed use at temperatures below 0°C, but with no exposure to rain nor UV. Type Y_{2,(-20/70)°C} includes lower use categories (i.e. Type Z₁ and Type Z₂).

The provisions made in this ETA are based on a working life of KF-Collar C of at least 10 years, provided that the conditions laid down in the manufacturer's instructions for the installation, use and maintenance are met. These provisions are based upon the current state of the art and the available knowledge and experience.

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

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

3.1 Performance of the product

The assessment of KF-Collar C has been performed in accordance with EAD 350454-00-1104 for *Penetration Seals (September 2017)*.

Table 1: Performance of the product.

Product: KF-Collar C		Intended use: Fire penetration seal	
Basic requirement	Essential characteristic		Performance
BWR 2 Safety in case of fire	Reaction to fire	Inlay material	E
		Steel housing	A1
	Resistance to fire	See Annex B	
BWR 4 Safety and accessibility in use	Durability		Type Y _{2,(-20/70)°C}

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

3.2 Methods used for the assessment

3.2.1 Reaction to fire

The performance of the inlay material of KF-Collar C has been tested according to EN ISO 11925-2³ and determined according to EN 13501-1⁴ and Regulation (EU) 2016/364.

The U-shaped housing made of stainless steel has a class A1 according to Decision 96/603/EC and Decision 2000/605/EC.

3.2.2 Fire resistance

Tested and assessed according to EN 1366-3⁵, the fire resistance classification has been defined according to EN 13501-2 and is given in Annex B.

3.2.3 Durability

KF-Collar C has been tested and assessed for the environmental use category Type Y₂, (-20/70)°C in accordance with section 2.2.9 of EAD 350454-00-1104 and the EOTA Technical Report 024⁶, section 4.2.5, table 4.1.

Stainless steel in accordance with EN 10088-1⁷ is intended for use category Type Y₂, (-20/70)°C.

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

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

Table 2: AVCP System.

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

³ EN ISO 11925-2 Reaction to fire tests. Ignitability of products subjected to direct impingement of flame. Part 2: Single-flame source test.

⁴ EN 13501-1 Fire classification of construction products and building elements. Part 1: Classification using data from reaction to fire tests.

⁵ EN 1366-3 Fire resistance tests for service installations. Part 3: Penetration seals (2009).

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

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

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

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

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

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

Issued in Barcelona on 27 November 2020
by the Catalonia Institute of Construction Technology.



Ferran Bermejo Nualart
Technical Director, ITeC

ANNEX A. Description of the product and installation process

A.1. KF-Collar C components

KF-Collar C is made of the components described in table A.1 and sizes in accordance with table A.2. The housing is manufactured using a 1,5 mm thick steel sheet. The intumescent strip is manufactured at a nominal thickness of 4 mm and the total intumescent thickness of every collar size (b in table A.2) is achieved by adding the required number of intumescent strip layers. The intumescent strip is manufactured at different widths according to the specified collar length (H in table A.2).

Table A.1: Components of KF-Collar C.

Part	Material	Dimensions	
Housing	Stainless steel AISI 430 (1.4016) According to EN 10088-1	Sheet thickness	1,5 mm (all sizes of KF-Collar C)
		Other dimensions according to table A.2 and figures A.1 to A.3	
Inlay strip	Intumescent material	Thickness	4 mm (all sizes of KF-Collar C)
		Width	50 mm (KF-Collar C 110)
			70 mm (KF-Collar C 160)
			100 mm (KF-Collar C 250)

A.2. KF-Collar C dimensions

KF-Collar C is manufactured in different sizes depending on the service to be protected. The corresponding resistance to fire performance is given in Annex B, depending on the construction elements penetrated by the service and the penetration characteristics.

The KF-Collar C types covered by this ETA are given in table A.2.

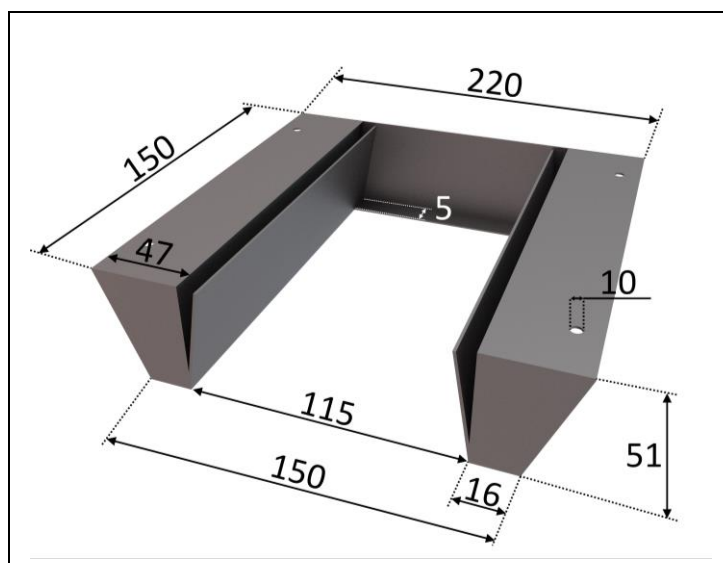


Figure A.1: KF-Collar C 110.

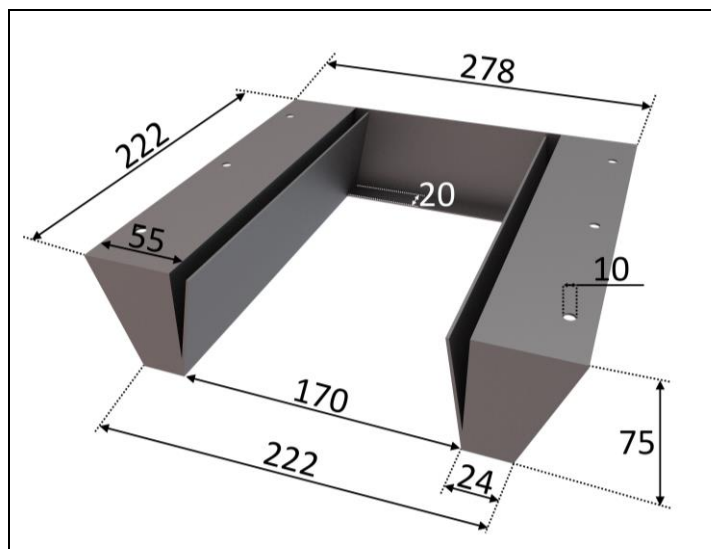


Figure A.2: KF-Collar C 160.

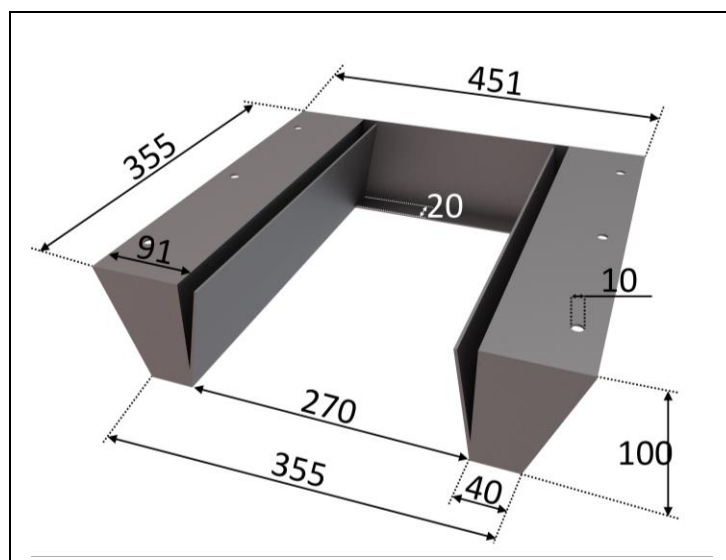


Figure A.3: KF-Collar C 250.

The intumescent strip is cut to size and lodged inside the two parallel boxes of the U-shaped housing. The number of layers and dimensions of the strips depend on the collar size as detailed in table A.2 (information given for each of the two boxes).

Table A.2: Dimensions of KF-Collar C.

Type	d (mm)	D (mm)	H (mm)	b (mm)	Nº of strip layers	Nº of fixings
KF-Collar C 110	115	150	150	16	4	4
KF-Collar C 160	170	222	222	24	6	6
KF-Collar C 250	270	355	355	40	10	6

A.3. KF-Collar C installation

KF-Collar C will be installed in accordance with the manufacturer instructions and the provisions established in this section and in the relevant sections of Annex B.

KF-Collar C shall be fixed depending on the intended use as follows:

- In flexible walls, by means of Ø8 mm x 120 mm galvanised steel screws.
- In rigid walls, by means of Ø8 mm x 60 mm galvanised steel class 8.8 expansion anchors.
- In floors, by means of Ø8 mm x 60 mm galvanised steel class 8.8 expansion anchors.

The number of fixings will be in accordance with table A.2 depending on collar size.

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

The minimum distance between services penetrating the wall/floor, as well as the minimum distance between services and the constructive element edge, is 200 mm.

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

The following installation provisions will be noted:

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

ANNEX B. Resistance to fire performance

B.1. General

The following intended uses of penetration seal are included in this Annex:

- B.2. Plastic pipes.
- B.2.1. Plastic pipes passing through a flexible or rigid wall.
- B.2.2. Plastic pipes passing through a rigid floor.

B.2. Plastic pipes

Regarding the material specification of those services included in this Annex B, pipes will be made from:

- PVC-U according to EN 1329-1⁸, EN 1453-1⁹ and EN ISO 1452-1¹⁰.
- PVC-C according to EN 1566-1¹¹.
- PP according to EN 1451-1¹².
- HDPE according to EN 1519-1¹³ or EN 12666-1¹⁴.
- PE according to EN 12201-2¹⁵, EN 1519-1 and EN 12666-1.
- ABS according to EN 1455-1¹⁶.
- SAN+PVC according EN 1565-1¹⁷.

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- ⁸ EN 1329-1 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Unplasticized poly(vinyl chloride) (PVC-U). Part 1: Specifications for pipes, fittings and the system.
- ⁹ EN 1453-1 Plastics piping systems with structured wall-pipes for soil and waste discharge (low and high temperature) inside buildings. Unplasticized poly(vinyl chloride) (PVC-U). Part 1: Specifications for pipes and the system.
- ¹⁰ EN ISO 1452-1 Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure. Unplasticized poly(vinyl chloride) (PVC-U). Part 1: General (ISO 1452-1:2009).
- ¹¹ EN 1566-1 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Chlorinated poly(vinyl chloride) (PVC-C). Part 1: Specifications for pipes, fittings and the system.
- ¹² EN 1451-1 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Polypropylene (PP). Part 1: Specifications for pipes, fittings and the system.
- ¹³ EN 1519-1 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Polyethylene (PE). Part 1: Specifications for pipes, fittings and the system.
- ¹⁴ EN 12666-1 Plastics piping systems for non-pressure underground drainage and sewerage. Polyethylene (PE). Part 1: Specifications for pipes, fittings and the system.
- ¹⁵ EN 12201-2 Plastics piping systems for water supply, and for drainage and sewerage under pressure. Polyethylene (PE). Part 2: Pipes.
- ¹⁶ EN 1455-1 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Acrylonitrile-butadiene-styrene (ABS). Part 1: Requirements for pipes, fittings and the system.
- ¹⁷ EN 1565-1 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Styrene copolymer blends (SAN+PVC). Part 1: Specifications for pipes, fittings and the system.

Regarding the pipe end configuration, according to section 2.2.2 of EAD 350454-00-1104, the following field of application applies:

- a classification given for a configuration U/U is also valid for any other pipe end configuration: C/U, U/C and C/C.
- a classification given for a configuration U/C is also valid for a pipe end configuration C/U and C/C.
- a classification given for a configuration C/U is also valid for a pipe end configuration C/C.
- a classification given for a configuration C/C is only valid for a pipe end configuration C/C.

Definition of the pipe end configuration is given in section 6.3.4 of EN 1366-3.

Regarding the pipe wall thickness, the rules for the field of direct application of the test results given in EN 1366-3 can be applied, i.e. resistance to fire classification given in this section B.2 is valid between the pipe wall thicknesses as given in the tables.

B.2.1. Plastic pipes passing through a flexible or rigid wall

The flexible or rigid wall shall meet the specification given in section 2 of this ETA.

The relevant size of KF-Collar C will be installed, in accordance with Annex A and the pipe diameter specified in tables B.2.1.1 to B.2.1.3, at the fire exposed side of the wall as shown in figure B.2.1.1.

The resistance to fire of the sealed combustible pipes is given in tables B.2.1.1 to B.2.1.3.

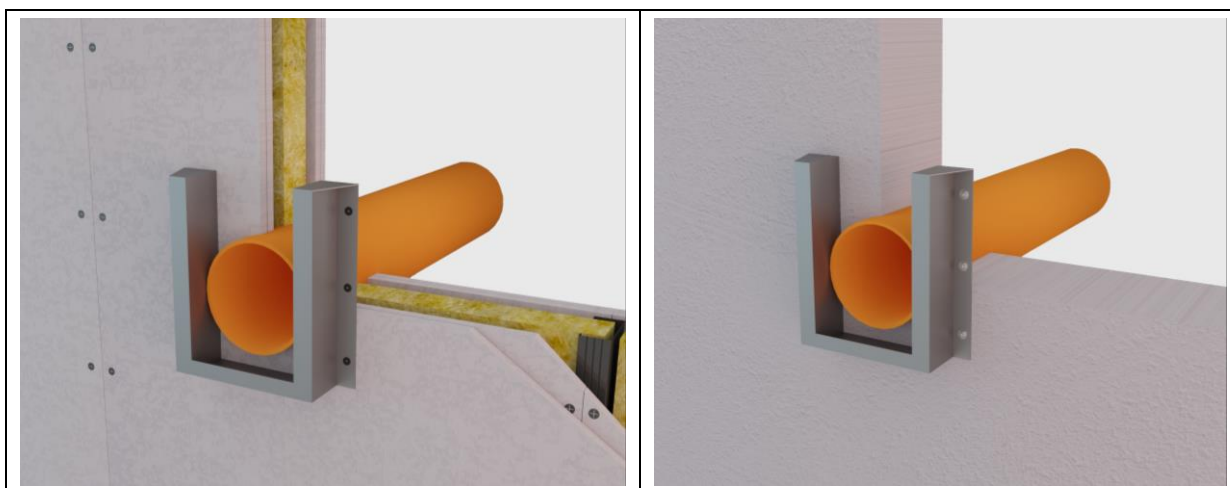


Figure B.2.1.1: Example of plastic pipe penetration seal in a flexible or rigid wall.

Table B.2.1.1: PVC pipes.

External pipe diameter \varnothing (mm)	Pipe wall thickness [t]		Resistance to fire class
	t_{\min} (mm)	t_{\max} (mm)	
110	5,0	8,1	EI 120 U/U
160	3,2	11,8	EI 120 U/U
250	6,2	18,4	EI 120 U/C

Table B.2.1.2: PP pipes.

External pipe diameter \varnothing (mm)	Pipe wall thickness [t]		Resistance to fire class
	t_{\min} (mm)	t_{\max} (mm)	
110	2,7	15,1	EI 120 U/U
160	3,9	14,6	EI 120 U/U
250	7,7	10,0	EI 120 U/C

Table B.2.1.3: HDPE, PE, ABS and SAN+PVC pipes.

External pipe diameter \varnothing (mm)	Pipe wall thickness [t]		Resistance to fire class
	t_{\min} (mm)	t_{\max} (mm)	
110	4,2	7,0	EI 120 U/U
160	6,2	14,6	EI 120 U/U
250	7,7	22,7	EI 120 U/C

B.2.2. Plastic pipes passing through a rigid floor

The rigid floor shall meet the specification given in section 2 of this ETA.

The relevant size of KF-Collar C will be installed, in accordance with Annex A and the pipe diameter specified in tables B.2.2.1 to B.2.2.3, at the bottom side of the floor as shown in figure B.2.2.1.

The resistance to fire of the sealed combustible pipes is given in tables B.2.2.1 to B.2.2.3.

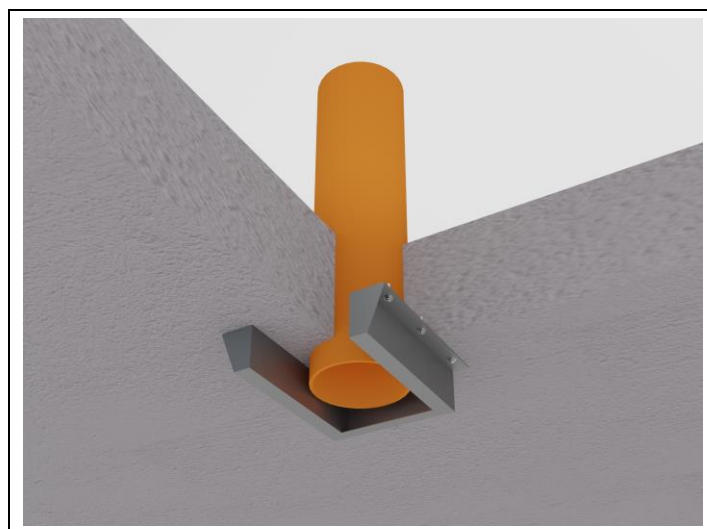


Figure B.2.2.1: Example of plastic pipe penetration seal in a rigid floor.

Table B.2.2.1: PVC pipes.

External pipe diameter Ø (mm)	Pipe wall thickness [t]		Resistance to fire class
	t _{min} (mm)	t _{max} (mm)	
110	3,2	8,1	EI 180 U/U
160	3,2	11,8	EI 180 U/U
250	8,0	18,4	EI 180 U/C

Table B.2.2.2: PP pipes.

External pipe diameter Ø (mm)	Pipe wall thickness [t]		Resistance to fire class
	t _{min} (mm)	t _{max} (mm)	
110	2,7	15,1	EI 180 U/U
160	3,9	14,6	EI 180 U/C ¹⁸
250	16,0	22,7	EI 120 U/C ¹⁹

Table B.2.2.3: HDPE, PE, ABS and SAN+PVC pipes.

External pipe diameter Ø (mm)	Pipe wall thickness [t]		Resistance to fire class
	t _{min} (mm)	t _{max} (mm)	
110	4,2	15,1	EI 180 U/U
160	6,2	21,9	EI 180 U/C ²⁰
250	7,7	22,7	EI 180 U/C

¹⁸ For a pipe with external diameter of 160 mm and wall thickness of 3,9 mm, the resistance to fire class is EI 180 U/U regarding the pipe end configuration.

¹⁹ For a pipe with external diameter of 250 mm and wall thickness of 22,7 mm, the resistance to fire class is EI 180 U/C.

²⁰ For a pipe with external diameter of 160 mm and wall thickness of 6,2 mm, the resistance to fire class is EI 180 U/U regarding the pipe end configuration.