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**European Technical
 Assessment**

**ETA 15/0696
 of 12/11/15**

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011:

Trade name of the construction product	FISCHER FFC FireStop Collar
Product family to which the construction product belongs	Fire Stopping and Sealing Product Penetration Seals
Manufacturer	Fischerwerke GmbH & Co.KG Klaus-Fischer-Strasse 1 72178 Waldachtal Germany
Manufacturing plant(s)	E/091
This European Technical Assessment contains	19 pages including 1 Annex(es) which form an integral part of this assessment.
	Annex(es) A - C Contain(s) confidential information and is/are not included in the European Technical Assessment when that assessment is publicly available.
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	ETAG 026, edition 2011, used as European Assessment Document (EAD)

General Comments

1. This European Technical Assessment is issued by Warrington Certification Limited on the basis of ETAG 026 Fire Protective Products Part 1: General June 2013, and Part 2: Fire Stopping and Fire Sealing Products Aug 2011, Used as European Assessment Document.
2. This European Technical Assessment is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1.



1 SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical Description of the Product

(Detailed information and data are given in Annexes)

- 1) FISCHER FFC FireStop Collar is installed round combustible pipes to form a penetration seal used to reinstate the fire resistance performance of wall and floor constructions, where they have been provided with apertures for the penetration of combustible pipe services.
- 2) FISCHER FFC FireStop Collar include an intumescent component incorporated into a mild steel case to close any gaps and joints and provide a closure of combustible pipes when heated and to prevent the passage of fire.
- 3) FISCHER FFC FireStop Collar are supplied in assembled form, without fixings. The collar is wrapped around the pipe at the soffit or both faces of walls, depending on application. Fixing specifications are detailed in Annex A.
- 4) FISCHER FFC FireStop Collar can be used with FISCHER FiAM Intumescent Acoustic Mastic to seal the space between the combustible pipe and the aperture to close gap sizes as specified in Annex A.
- 5) The applicant has submitted a written declaration that the product and/or constituents of the product contains no substances which have been classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No. 1272/2008 and listed in the 'indicative list on dangerous substances' of the EGDS – taking into account the installation conditions of the construction product and the release scenarios resulting from there.

In addition to the specific clauses relating to dangerous substances contained in this European Technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

The use category of FISCHER FFC FireStop Collar in relation to BWR 3 (Hygiene, health and environment) is IA1, S/W3.

- 6) External use- ETAG 026-2 (used as European Assessment Document EAD) Type X.



2 Specification Of The Intended Use In Accordance With The Relevant EAD

2.1 Intended Use

- 1) The intended use of FISCHER FFC FireStop Collar is to reinstate the fire resistance performance of wall and floor constructions, where they are penetrated by various combustible pipe services.

The specific elements of construction that the system FISCHER FFC FireStop Collar may be used is as follows:

Flexible walls: The wall must have a minimum thickness of 100 mm and comprise timber or steel studs line on both faces with minimum 2 layers of 12.5 mm thick, 'Type F' Gypsum boards according to EN 520. In timber stud walls, no part of the penetration seal shall be closer than 100mm to a stud, and minimum 100 mm of insulation of class A1 or A2 according to EN 13501-1, is provided within the cavity between the penetration seal and the stud.

Rigid walls: The wall must have a minimum thickness of 100 mm and comprise of concrete, aerated concrete or masonry, with a minimum density of 650 km/m³.

Rigid floor: The floor must have a minimum thickness of 150 mm and comprise of concrete, aerated concrete or masonry, with a minimum density of 650 km/m³.

- 2) The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period.
- 3) The system FISCHER FFC FireStop Collar may be used to provide a penetration seal with specific combustible pipes, single only (for details see Annex A).
- 4) Apertures in the separating element shall be maximum 10 mm diameter oversize with respect to the pipe diameter. The remaining annular space/gap shall be infilled with FISCHER FiAM Intumescent Acoustic Mastic. Apertures for the penetration of pipes shall be separated by a minimum of 200 mm.
- 5) The provisions made in this European Technical Assessment are based on an assumed working life of the system FISCHER FFC FireStop Collar of 10 years, The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.
- 6) Services in walls shall be supported at maximum 400mm from the face of the separating element for walls, and 400mm above the surface of the floor.



Use Category

Type X: Intended for use in conditions exposed to weathering.



Performance Of The Product And References To The Methods Used For Its Assessment

Product Type: Collar		Intended use: Pipe Closure Device
Basic requirement for construction work	Basic Requirement	Performance
BWR 1 Mechanical resistance and stability		
	None	Not relevant
BWR 2 Safety in case of fire		
EN 13501-1	Reaction to fire	Class E
EN 13501-2	Resistance to fire	Annex A
BWR 3 Hygiene, Health and the Environment		
EN 1026:2000	Air permeability	No performance determined
ETAG 026-3 Annex C	Water permeability	No performance determined
Declaration by manufacturer	Release of dangerous substances	Use category IA1, S/W3 Declaration of manufacturer
BWR 4 Safety in use		
EOTA TR 001:2003	Mechanical resistance and stability	No performance determined
EOTA TR 001:2003	Resistance to impact/movement	No performance determined
EOTA TR 001:2003	Adhesion	No performance determined
BWR 5 Protection against noise		
EN 10140-2/ EN ISO 717-1	Airborne sound insulation	No performance determined
BWR 6 Energy, Economy and Heat Retention		
EN 12664, EN 12667 or EN 12939	Thermal properties	No performance determined
EN ISO 12572 EN12086	Water vapour permeability	No performance determined
General aspects relating to fitness for use		
EOTA TR 024:2009	Durability and serviceability	X
BWR 7 Sustainable use of natural resources		
		No performance determined



3 Assessment And Verification Of Constancy Of Performance (Hereinafter AVCP) System Applied, With References To Its Legal base

According to the decision 1999/454/EC of the European Commission the system of assessment and verification of constancy of performance (see Annex V to the Regulation (EU) No 305/2011) given in the following table apply:

Products	Intended uses	Level or Class	System
Fire stopping and fire sealing products	For fire compartmentation and / or fire protection or fire performance	Any	System 1

4 Technical Details Necessary For The Implementation Of The AVCP System, As Provided For In The Applicable EAD.

Tasks for the Manufacturer

Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall ensure that the product is in conformity with this European technical assessment.

The manufacturer may only use constituent materials stated in the technical documentation of this European technical assessment.

The factory production control shall be in accordance with the Control Plan of 03.06.15 relating to the European Technical Assessment ETA– 15/0696 “Control Plan” is laid down in the context of the factory production control system operated by the manufacturer and deposited at Warrington Certification Limited.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the Control Plan.

Other tasks of manufacturer

Additional information

The manufacturer shall provide a technical data sheet and an installation instruction with the following minimum information:

(a) Technical data sheet:

- Field of application:



- Building elements for which the penetration seal is suitable, type and properties of the building elements like minimum thickness, density, and - in case of lightweight constructions – the construction requirements.
- Services for which the penetration seal is suitable, type and properties of the services like material, diameter, thickness etc. in case of pipes including insulation materials; necessary/allowed supports/fixings (e.g. cable trays)
- Limits in size, minimum thickness etc. of the penetration seal

Construction of the penetration seal including the necessary components and additional products (e.g. backfilling material) with clear indication whether they are generic or specific (b) Installation instruction:

- Steps to be followed
- Procedure in case of retrofitting.

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of linear joint seals seals in order to undertake the actions laid down in section 3.3. For this purpose, the "control plan" referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body or bodies involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of the European technical assessment ETA 15/0696.

Tasks of approved bodies

The approved body shall perform the

- initial type-testing of the product,
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control,

In accordance with the provisions laid down in the "Control Plan" of 03.06.15 relating to the European Technical Assessment 15/0696.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the product stating the conformity with the provisions of this European technical assessment.

In cases where the provisions of the European technical assessment and its "Control Plan" are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform the Warrington Certification Limited without delay.



Signatories



Responsible Officer

N. Stoyanov* - Certification Engineer



Approved

C. Abbott* - Principal Certification Engineer

* For and on behalf of Warrington Certification Limited.



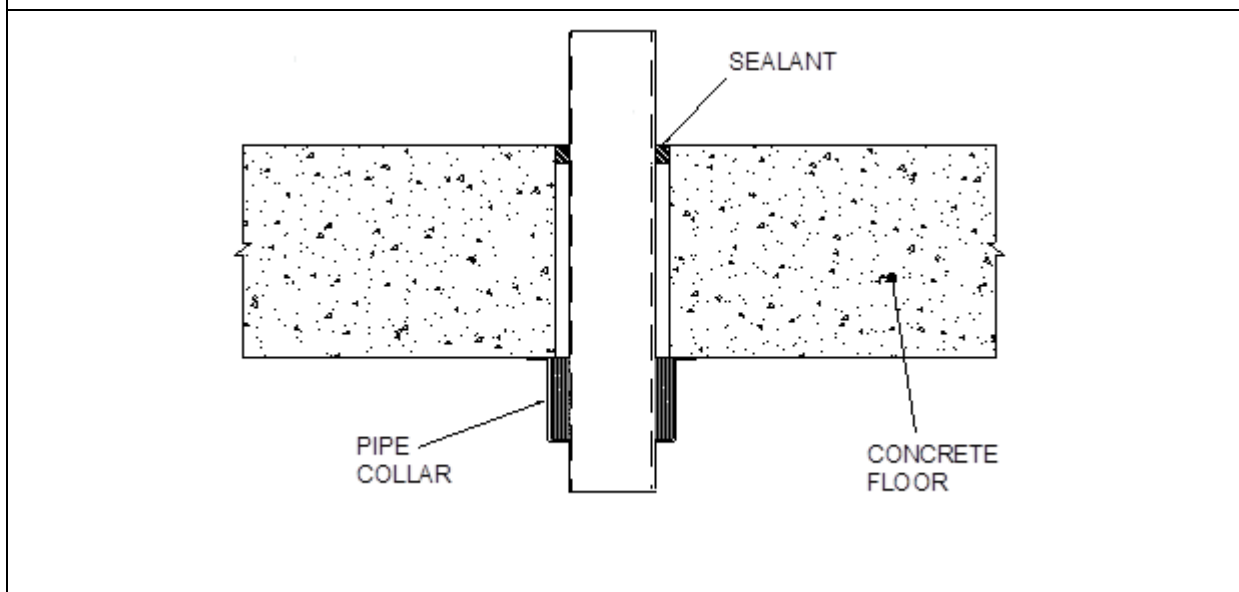
Annex A

Resistance to Fire Classification of FISCHER FFC FireStop Collar

A.1 Floor construction with thickness of minimum 150 mm

A.1.1 Penetration seal with FISCHER FFC FireStop Collar installed on the underside of rigid floor

Construction details: Combustible pipes installed with a single FISCHER FFC FireStop Collar to the underside. Maximum 10 mm annular space filled with FISCHER FiAM Intumescent Acoustic Mastic.



A.1.1.1 PVC-U pipes with FISCHER FFC FireStop Collar installed on the underside of rigid floor

PVC-U pipes according to EN 1452 with FISCHER FFC FireStop Collar.

FISCHER FFC FireStop Collar, Face Fixed on the Underside of Rigid Floor (min 150 mm thick) PVC-U Pipes					
Penetration Specification	Collar Reference	Intumescent Material	Annulus Space (mm)	Collar Fixing	Classification
PVC Pipe 32 mm ϕ 1.8 mm wall thickness	32 mm	30 mm (W) x 4 mm (T)	10	Face fixed on the underside of rigid floor with 3No. Fischer FSA ϕ 8 x 60mm long, with M6 hexagon head bolts	EI 240 U/C
PVC Pipe 40 mm ϕ 1.8 mm wall thickness	40 mm				
PVC Pipe 50 mm ϕ 1.8 mm wall thickness	50 mm				
PVC Pipe 55 mm ϕ 2.3-3.0 mm wall thickness	55 mm	30 mm (W) x 6 mm (T)			
PVC Pipe 63 mm ϕ 2.3-3.0 mm wall thickness	63 mm				
PVC Pipe 75 mm ϕ 3.1-4.8 mm wall thickness	75 mm	30 mm (W) x 8 mm (T)			
PVC Pipe 82 mm ϕ 3.1-4.8 mm wall thickness	82 mm				
PVC Pipe 90 mm ϕ 4.2-7.4 mm wall thickness	90 mm	30 mm (W) x 10 mm (T)			
PVC Pipe 100 mm ϕ 4.2-7.4 mm wall thickness	100 mm				
PVC Pipe 110 mm ϕ 4.2-7.4 mm wall thickness	110 mm				
PVC Pipe 125 mm ϕ 6.0 mm wall thickness	125 mm	40 mm (W) x 12 mm (T)			
PVC Pipe 140 mm ϕ 6.1-7.5 mm wall thickness	140 mm	40 mm (W) x 16 mm (T)			
PVC Pipe 160 mm ϕ 6.2-9.5 mm wall thickness	160 mm	40 mm (W) x 18 mm (T)			



A.1.1.2 PP pipes with FISCHER FFC FireStop Collar installed on the underside of rigid floor

PP pipes according to EN 1451 with FISCHER FFC FireStop Collar.

FISCHER FFC FireStop Collar, Face Fixed on the Underside of Rigid Floor (min 150 mm thick) PP Pipes					
Penetration Specification	Collar Reference	Intumescent Material	Annulus Space (mm)	Collar Fixing	Classification
PP Pipe 32 mm \varnothing 2.9 mm wall thickness	32 mm	30 mm (W) x 4 mm (T)	10	Face fixed on the underside of rigid floor with 3No. Fischer FSA \varnothing 8 x 60mm long, with M6 hexagon head bolts	EI 240 U/C
PP Pipe 40 mm \varnothing 2.9 mm wall thickness	40 mm				
PP Pipe 50 mm \varnothing 2.9 mm wall thickness	50 mm				
PP Pipe 55 mm \varnothing 2.9-4.4 mm wall thickness	55 mm	30 mm (W) x 6 mm (T)			
PP Pipe 63 mm \varnothing 2.9-4.4 mm wall thickness	63 mm				
PP Pipe 75 mm \varnothing 2.8-6.7 mm wall thickness	75 mm	30 mm (W) x 8 mm (T)			
PP Pipe 82 mm \varnothing 2.8-6.7 mm wall thickness	82 mm				
PP Pipe 90 mm \varnothing 2.7-10.0 mm wall thickness	90 mm	30 mm (W) x 10 mm (T)			
PP Pipe 100 mm \varnothing 2.7-10.0 mm wall thickness	100 mm				
PP Pipe 110 mm \varnothing 2.7-10.0 mm wall thickness	110 mm				
PP Pipe 125 mm \varnothing 3.1 mm wall thickness	125 mm	40 mm (W) x 12 mm (T)			
PP Pipe 140 mm \varnothing 3.5-8.0 mm wall thickness	140 mm	40 mm (W) x 16 mm (T)			
PP Pipe 160 mm \varnothing 4.0-14.6 mm wall thickness	160 mm	40 mm (W) x 18 mm (T)			



A1.1.3 PE pipes with FISCHER FFC FireStop Collar installed on the underside of rigid floor

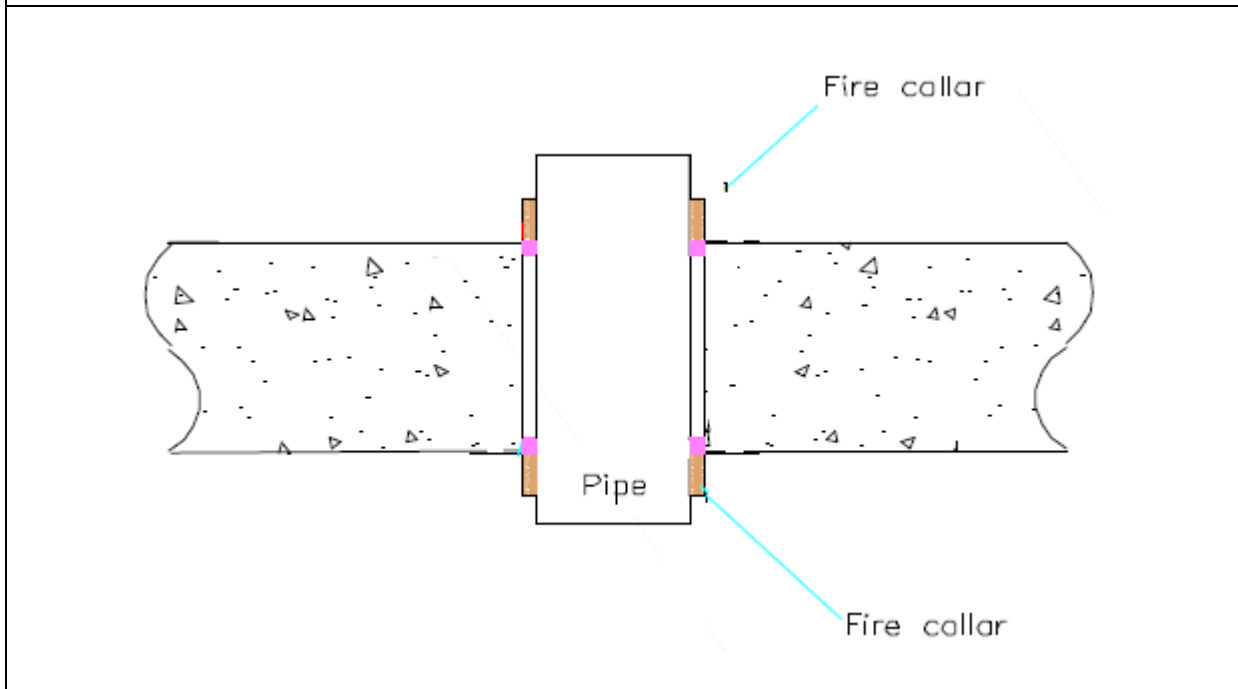
PE pipes according to EN ISO 15494 with FISCHER FFC FireStop Collar.

FISCHER FFC FireStop Collar, Face Fixed on the Underside of Rigid Floor (min 150 mm thick) PE Pipes					
Penetration Specification	Collar Reference	Intumescent Material	Annulus Space (mm)	Collar Fixing	Classification
PE Pipe 32 mm \varnothing 2.9 mm wall thickness	32 mm	30 mm (W) x 4 mm (T)	10	Face fixed on the underside of rigid floor with 3No. Fischer FSA \varnothing 8 x 60mm long, with M6 hexagon head bolts	EI 240 U/C
PE Pipe 40 mm \varnothing 2.9 mm wall thickness	40 mm				
PE Pipe 50 mm \varnothing 2.9 mm wall thickness	50 mm				
PE Pipe 55 mm \varnothing 2.9-4.4 mm wall thickness	55 mm	30 mm (W) x 6 mm (T)			
PE Pipe 63 mm \varnothing 2.9-4.4 mm wall thickness	63 mm				
PE Pipe 75 mm \varnothing 2.8-6.7 mm wall thickness	75 mm	30 mm (W) x 8 mm (T)			
PE Pipe 82 mm \varnothing 2.8-6.7 mm wall thickness	82 mm				
PE Pipe 90 mm \varnothing 2.7-10.0 mm wall thickness	90 mm	30 mm (W) x 10 mm (T)			
PE Pipe 100 mm \varnothing 2.7-10.0 mm wall thickness	100 mm				
PE Pipe 110 mm \varnothing 2.7-10.0 mm wall thickness	110 mm				
PE Pipe 125 mm \varnothing 3.1 mm wall thickness	125 mm	40 mm (W) x 12 mm (T)			
PE Pipe 140 mm \varnothing 3.9-5.8 mm wall thickness	140 mm	40 mm (W) x 16 mm (T)			
PE Pipe 160 mm \varnothing 4.9-9.5 mm wall thickness	160 mm	40 mm (W) x 18 mm (T)			



A.1.2 Penetration seal with FISCHER FFC FireStop Collar installed on both sides of rigid floor

Construction details: Combustible pipes installed with a single FISCHER FFC FireStop Collar to both sides. Maximum 10 mm annular space filled with FISCHER FiAM Intumescent Acoustic Mastic.



A.1.2.1 Penetration seal with FISCHER FFC FireStop Collar installed on both sides of rigid floor

PP pipes according to EN 1451 with FISCHER FFC FireStop Collar.

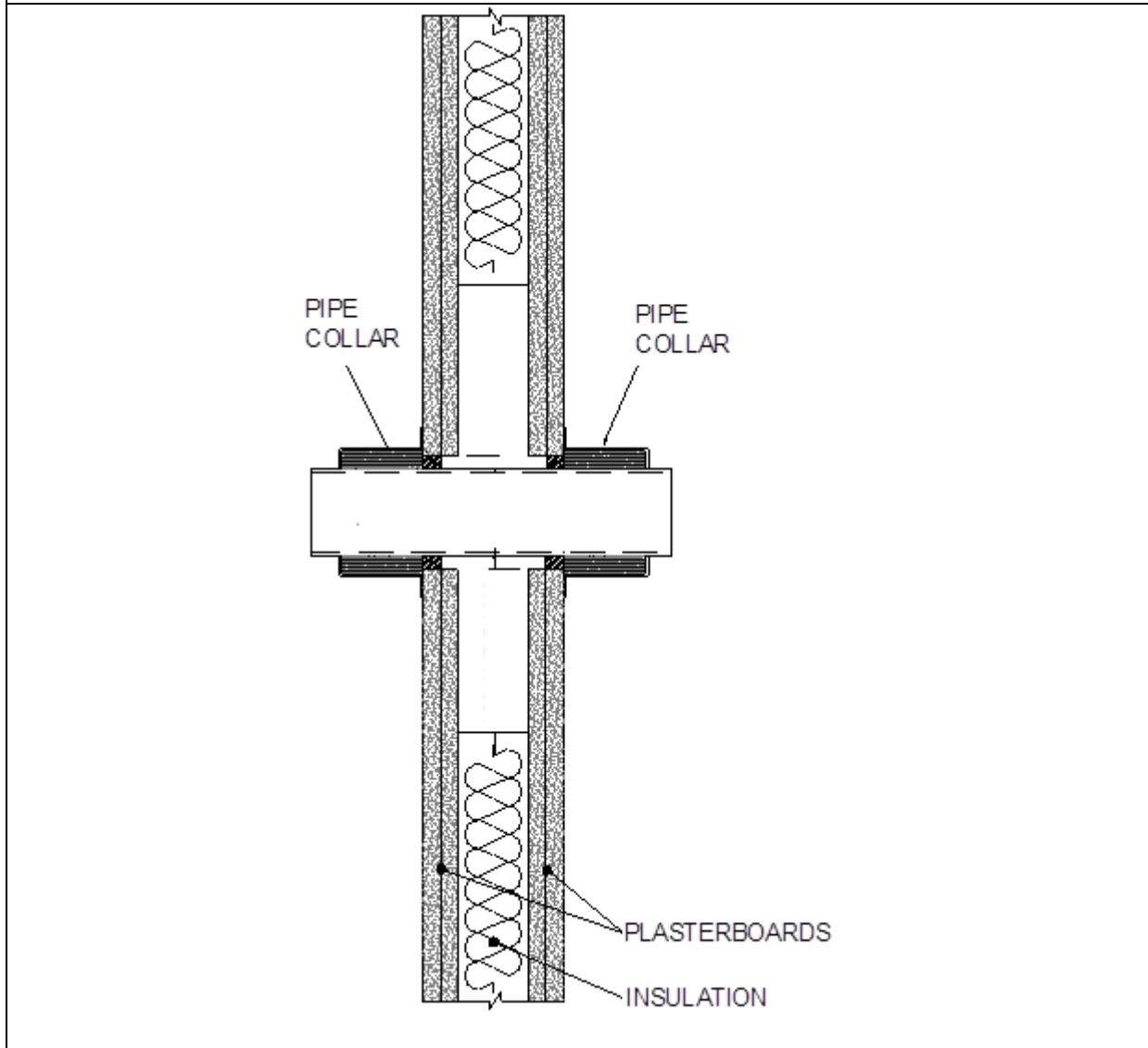
FISCHER FFC FireStop Collar, Face Fixed on Both Sides of Rigid Floor (min 150 mm thick) PP Pipes					
Penetration Specification	Collar Reference	Intumescent Material	Annulus Space (mm)	Collar Fixing	Classification
PP Pipe 110 mm ϕ 2.7 mm wall thickness	110 mm	30 mm (W) x 10 mm (T)	10	Fixed on both faces of rigid floor with 3No. Fischer FSA ϕ 8 x 60mm long, with M6 hexagon head bolts	EI 120 U/U
PP Pipe 160 mm ϕ 4.0 mm wall thickness	160 mm	40 mm (W) x 16 mm (T)			EI 120 C/U



A.2 Wall construction with thickness of minimum 100 mm

A.2.1 Penetration seal with FISCHER FFC FireStop Collar installed on both sides of flexible or rigid wall

Construction details: Combustible pipes installed with a single FISCHER FFC FireStop Collar to both sides. Maximum 10 mm annular space filled with FISCHER FIAM Intumescent Acoustic Mastic.



A.2.1.1 PVC-U pipes with FISCHER FFC FireStop Collar installed on both sides of flexible or rigid wall

PVC-U pipes according to EN 1452 with FISCHER FFC FireStop Collar.

FISCHER FFC FireStop Collar, Face Fixed on Both Sides of Flexible or Rigid Wall (min 100 mm thick) PVC-U Pipes					
Penetration Specification	Collar Reference	Intumescent Material	Annulus Space (mm)	Collar Fixing	Classification
PVC Pipe 32 mm ø 1.8 mm wall thickness	32 mm	30 mm (W) x 4 mm (T)	10	Fixed on both sides of the wall with a 6mm x 65mm long Fisher HM 6x65 S, steel toggle anchor	EI 120 U/C
PVC Pipe 40 mm ø 1.8 mm wall thickness	40 mm				
PVC Pipe 50 mm ø 1.8 mm wall thickness	50 mm				
PVC Pipe 55 mm ø 2.3-3.0 mm wall thickness	55 mm	30 mm (W) x 6 mm (T)			
PVC Pipe 63 mm ø 2.3-3.0 mm wall thickness	63 mm				
PVC Pipe 75 mm ø 3.1-4.8 mm wall thickness	75 mm	30 mm (W) x 8 mm (T)			
PVC Pipe 82 mm ø 3.1-4.8 mm wall thickness	82 mm				
PVC Pipe 90 mm ø 4.2-7.4 mm wall thickness	90 mm	30 mm (W) x 10 mm (T)			
PVC Pipe 100 mm ø 4.2-7.4 mm wall thickness	100 mm				
PVC Pipe 110 mm ø 4.2-7.4 mm wall thickness	110 mm				
PVC Pipe 125 mm ø 6.0 mm wall thickness	125 mm	40 mm (W) x 12 mm (T)			
PVC Pipe 140 mm ø 6.1-7.5 mm wall thickness	140 mm	40 mm (W) x 16 mm (T)			
PVC Pipe 160 mm ø 6.2-9.5 mm wall thickness	160 mm	40 mm (W) x 18 mm (T)			



A.2.1.2 PP pipes with FISCHER FFC FireStop Collar installed on both sides of flexible or rigid wall

PP pipes according to EN 1451 with FISCHER FFC FireStop Collar.

FISCHER FFC FireStop Collar, Face Fixed on Both Sides of Flexible or Rigid Wall (min 100 mm thick) PP Pipes					
Penetration Specification	Collar Reference	Intumescent Material	Annulus Space (mm)	Collar Fixing	Classification
PP Pipe 32 mm ϕ 2.9 mm wall thickness	32 mm	30 mm (W) x 4 mm (T)	10	Fixed on both sides of the wall with a 6mm x 65mm long Fisher HM 6x65 S, steel toggle anchor	EI 120 U/C
PP Pipe 40 mm ϕ 2.9 mm wall thickness	40 mm				
PP Pipe 50 mm ϕ 2.9 mm wall thickness	50 mm				
PP Pipe 55 mm ϕ 2.9-4.4 mm wall thickness	55 mm	30 mm (W) x 6 mm (T)			
PP Pipe 63 mm ϕ 2.9-4.4 mm wall thickness	63 mm				
PP Pipe 75 mm ϕ 2.8-6.7 mm wall thickness	75 mm	30 mm (W) x 8 mm (T)			
PP Pipe 82 mm ϕ 2.8-6.7 mm wall thickness	82 mm				
PP Pipe 90 mm ϕ 2.7-10.0 mm wall thickness	90 mm	30 mm (W) x 10 mm (T)			
PP Pipe 100 mm ϕ 2.7-10.0 mm wall thickness	100 mm				
PP Pipe 110 mm ϕ 2.7-10.0 mm wall thickness	110 mm				
PP Pipe 125 mm ϕ 3.1 mm wall thickness	125 mm	40 mm (W) x 12 mm (T)			
PP Pipe 140 mm ϕ 3.5-8.0 mm wall thickness	140 mm	40 mm (W) x 16 mm (T)			
PP Pipe 160 mm ϕ 4.0-14.6 mm wall thickness	160 mm	40 mm (W) x 18 mm (T)			



A.2.1.3 PE pipes with FISCHER FFC FireStop Collar installed on both sides of flexible or rigid wall

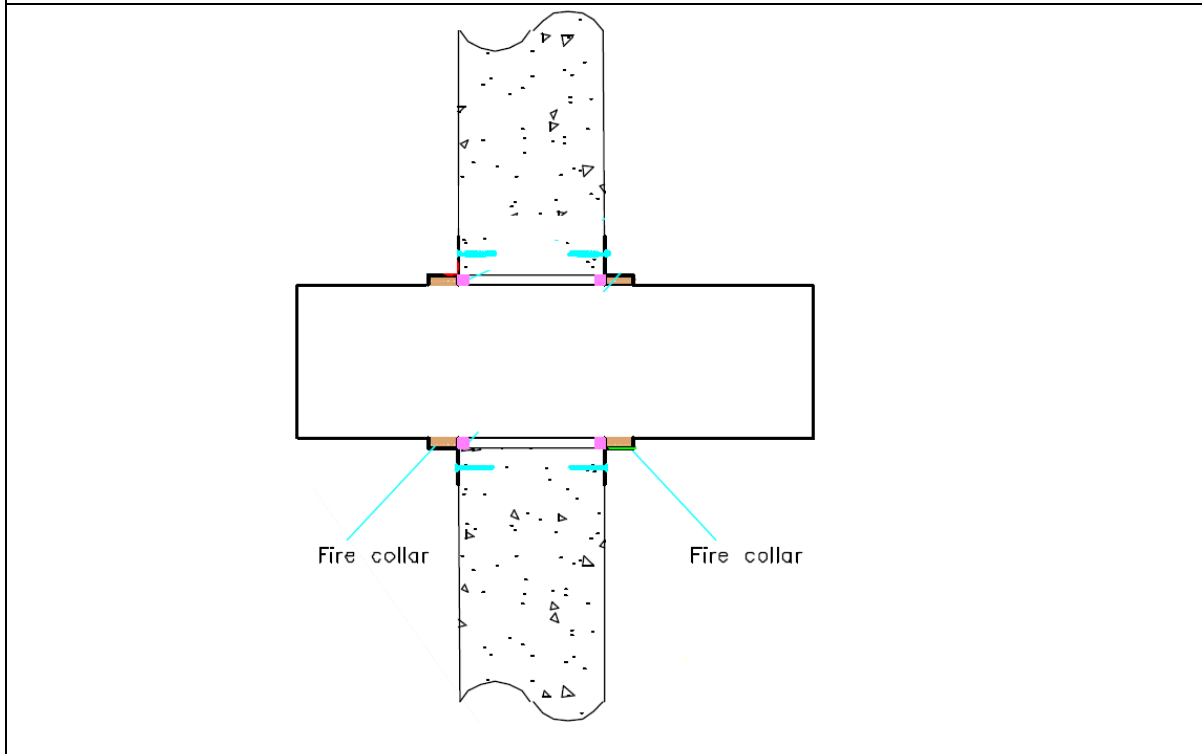
PE pipes according to EN ISO 15494 with FISCHER FFC FireStop Collar.

FISCHER FFC FireStop Collar, Face Fixed on Both Sides of Flexible or Rigid Wall (min 100 mm thick) PE Pipes					
Penetration Specification	Collar Reference	Intumescent Material	Annulus Space (mm)	Collar Fixing	Classification
PE Pipe 32 mm ø 2.9 mm wall thickness	32 mm	30 mm (W) x 4 mm (T)	10	Fixed on both sides of the wall with a 6mm x 65mm long Fisher HM 6x65 S, steel toggle anchor	EI 120 U/C
PE Pipe 40 mm ø 2.9 mm wall thickness	40 mm				
PE Pipe 50 mm ø 2.9 mm wall thickness	50 mm				
PE Pipe 55 mm ø 2.9-4.4 mm wall thickness	55 mm	30 mm (W) x 6 mm (T)			
PE Pipe 63 mm ø 2.9-4.4 mm wall thickness	63 mm				
PE Pipe 75 mm ø 2.8-6.7 mm wall thickness	75 mm	30 mm (W) x 8 mm (T)			
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PE Pipe 100 mm ø 2.7-10.0 mm wall thickness	100 mm				
PE Pipe 110 mm ø 2.7-10.0 mm wall thickness	110 mm				
PE Pipe 125 mm ø 3.1 mm wall thickness	125 mm	40 mm (W) x 12 mm (T)			
PE Pipe 140 mm ø 3.9-5.8 mm wall thickness	140 mm	40 mm (W) x 16 mm (T)			
PE Pipe 160 mm ø 4.9-9.5 mm wall thickness	160 mm	40 mm (W) x 18 mm (T)			



A.2.2 Penetration seal with FISCHER FFC FireStop Collar installed on both sides of rigid wall

Construction details: Combustible pipes installed with a single FISCHER FFC FireStop Collar to both sides. Maximum 10 mm annular space filled with FISCHER FIAM Intumescent Acoustic Mastic.



A.2.2.1 PP pipes with FISCHER FFC FireStop Collar installed on both sides of rigid wall

PP pipes according to EN 1451 with FISCHER FFC FireStop Collar.

FISCHER FFC FireStop Collar, Face Fixed on Both Sides of Rigid Wall (min 100 mm thick) PP Pipes					
Penetration Specification	Collar Reference	Intumescent Material	Annulus Space (mm)	Collar Fixing	Classification
PP Pipe 110 mm ϕ 2.7 mm wall thickness	110 mm	30 mm (W) x 10 mm (T)	10	Fixed on both faces of the wall with 3No. 40mm Fischer pins	EI 120 U/U
PP Pipe 160 mm ϕ 4.0 mm wall thickness	160 mm	40 mm (W) x 18 mm (T)		Fixed on both faces of the wall with 3No. ϕ 4 x 70mm wood screws and penny washers	EI 120 U/U
PP Pipe 250 mm ϕ 6.2 mm wall thickness	250 mm	40 mm (W) x 24 mm (T)			EI 120 U/C