



Project number: 4788528710 – Issue 3

15<sup>th</sup> June 2018

## **ASSESSMENT REPORT**

The Performance of  
Pattress Fixed Protecta FR Board  
In Accordance with BS EN 1366-3: 2009

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**TABLE OF CONTENTS**

<b>Section</b>	<b>Page</b>
1. Introduction	3
2. Assumptions	3
3. Assessment – BS EN 1366-3: 2009	3
4. Limits of Applicability	14
5. Conclusions	14
6. Validity	14
7. Declaration by POLYSEAM AS	15
8. Signatories	16
Appendix 1: Summary of Primary Supporting Evidence	17
Appendix 2: Summary of Assessed Scope	18



## 1. Introduction

This report considers the expected fire resistance performance of Protecta FR Board penetration seals, as detailed in ETA 13/0673 & ETA 14/0247, to be installed in drywalls, pattress fixed, as detailed in Appendix 2.

The data which forms the basis of this assessment was obtained from tests in accordance with BS EN 1366-3: 2009.

The penetration seals discussed are required to provide up to 120 minutes integrity and insulation performance, depending on size and configuration, with respect to BS EN 1366-3: 2009.

## 2. Assumptions

It is assumed that the walls into which the penetration seals are installed have been classified to EN 13501-2 to at least the same performance as that required of the seal and will be at least 100 mm thick including minimum 2 layers of gypsum plasterboard to both faces. The walls shall have been demonstrated to be suitable for the required aperture design and size.

It is assumed that the proposed penetration seals will be installed by competent installers and will be of the configurations described in BS EN 1366-3: 2009 with the exception of the pattress fixing described in Section 3 of this report.

The maximum permitted opening size in the wall is 1100 mm high x 500 mm wide or 500 mm high x 1100 mm wide.

## 3. Assessment – Performance to BS EN 1366-3: 2009

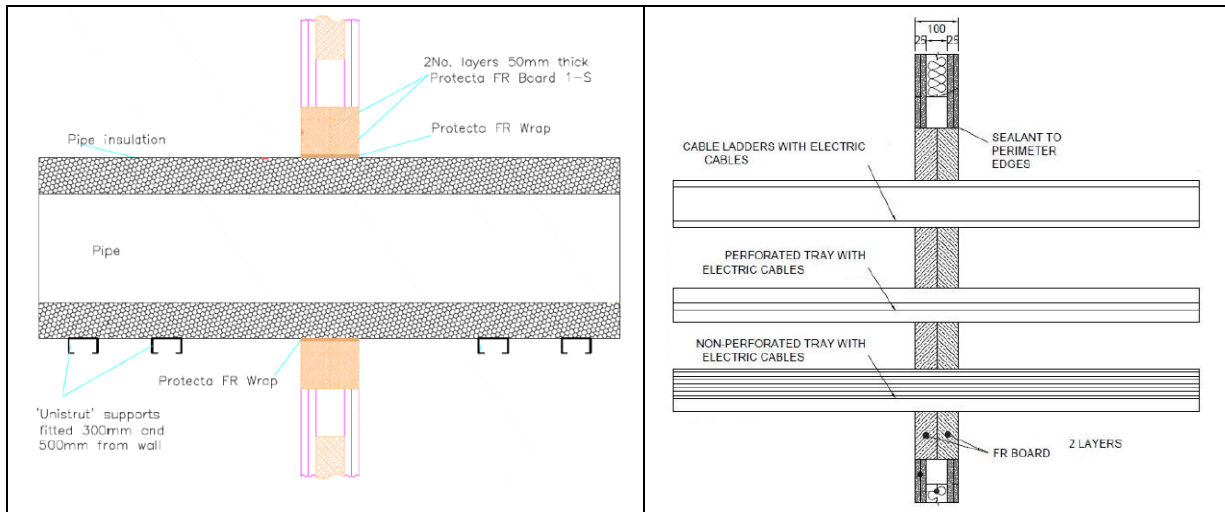
The proposed Protecta FR Board penetration seals are the subject AVCP under the construction products regulation by UL International (UK) Ltd (NB 0843). The basic requirements for this are as follows:

- Verification of the manufacture of test samples
- Testing in accordance with EN 1366-3
- Evaluation against ETAG 026-2 (EAD 350454-00-1104)
- Continuous factory surveillance and verification
- Eligibility to bear the 'CE Mark' via compliance with Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC - OJ L 88 of 4 April 2011 (The Construction Products Regulation)

The requirements met by these products therefore go far beyond those of simple type testing and the testing used to support ETA 13/0673 & ETA 14/0247 is accordance with EN 1366-3: 2009.

It is however proposed that an alternative installation detail may be used for 50 mm Protecta FR Board 1S (coated on outside face) in drywalls, minimum 100 mm thick, while maintaining the classifications cited within ETA 13/0673 in pages 33-44 and ETA 14/0247 in pages 36-45 (and detailed in Appendix 2 of this report).

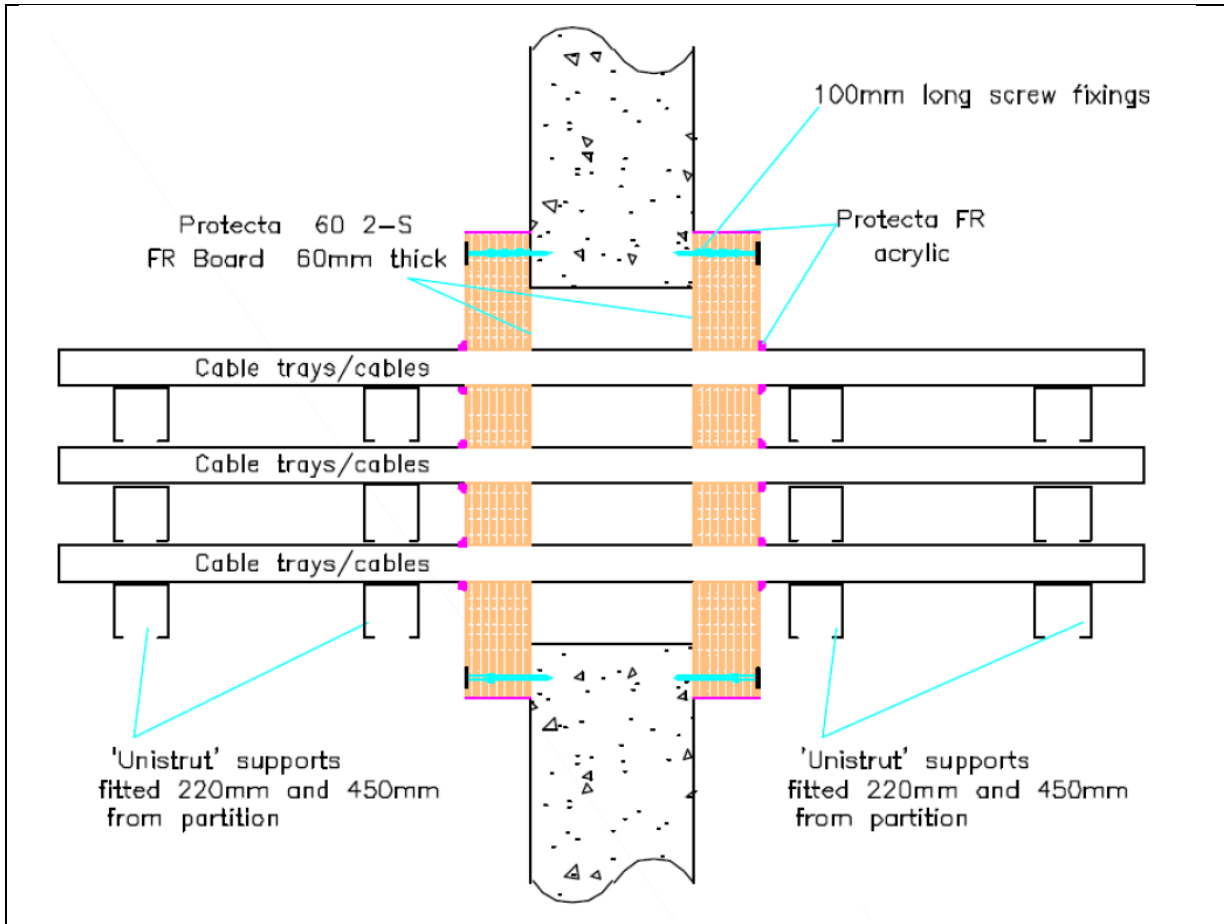
All of the classified configurations detailed in the relevant pages of the ETAs are installed with Protecta FR Board 1S back to back, inside the opening in the wall, as shown in the examples below:



There is therefore no doubt of the capability of the Protecta FR Board to provide a penetration seal when installed in this manner, however the proposal requires that the boards be face fixed to the wall, over the aperture.

Typically patrix installations of coated board seals will provide equal or improved performance relative to seals fixed within the aperture due to the increased overall seal depth, provided the installation detail is adequate, since the interface between coated board and the wall is a potential weakness.

Such a detail has already been tested and included within ETA 13/0673, albeit only when installed into rigid (masonry/concrete walls), utilising a 50 mm overlap all around and fixing with steel screws, 100 mm long and penny washers, at 350 mm centres, as illustrated below:



As anticipated, when the classifications for this detail are compared with the same detail installed within the wall (both rigid wall), the results are favorable, as demonstrated below:

Services	Regular Classification	Pattress Classification	Equal or positive comparison
None (blank)	E 240, EI 180	E 240, EI 180	✓
Single or bundled electrical cables up to 50 mm Ø, with or without trays	E 180, EI 60	E 240, EI 90	✓
Single or bundled electrical cables up to 80 mm Ø (single, bundled and on trays)	E 180, EI 60	E 240, EI 60	✓
Cables up to 21mm Ø in tied bundles up to 100mm Ø	E 180, EI 120	EI 240	✓
Steel cable trays & ladders	E 180, EI 60	E 240, EI 180	✓
Non-Sheathed wires up to 24 mm Ø	N/A	E 240, EI 120	N/A

This provides adequate confidence that the Protecta FR Board can be expected to perform similarly or better when installed in drywalls in pattress configuration, rather than the currently classified internal installations in ETA 13/0673 and ETA 14/0247, subject to the following, conservative, installation details:



- Minimum 50 mm overlap to all sides of the opening bedded onto a bead of Protecta FR Coating
- Maximum 1100 mm high by 500 mm opening size – in combination with the above overlap and the board size of 1200 x 600 mm, this will minimize the necessary jointing
- Expanding steel drywall bolts/fixings and penny washers at no greater than 300 mm centres
- Ends of the boards coated/capped with Protecta FR Acrylic Sealant
- Where Protecta FR Wrap is required, this will be fitted into the boards to both faces - this will maintain or increase the depth of the pipe closure and replicates the well proven detail of Protecta FR wrap in single boards.

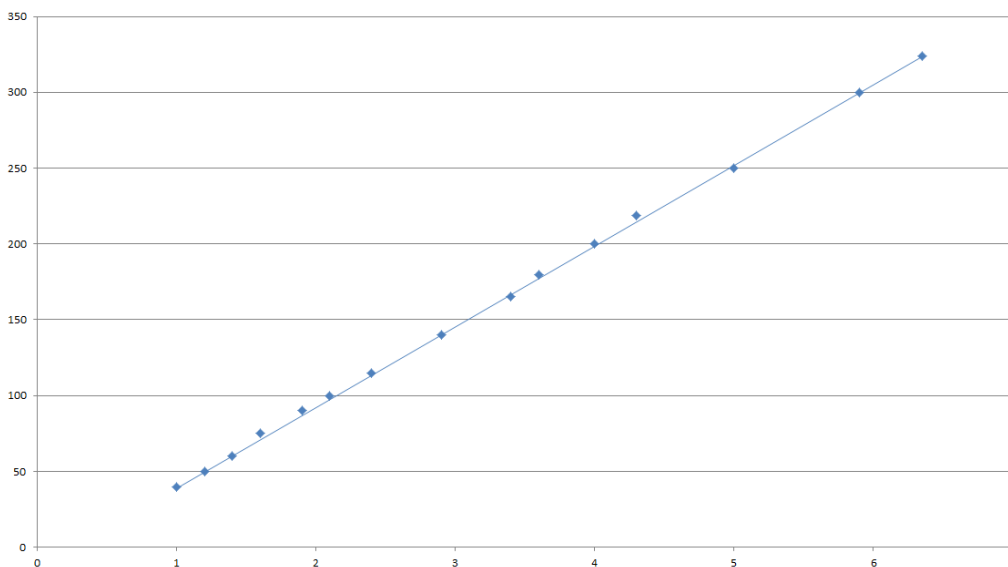
The following classifications given in ETA 13/0673 and ETA 14/0247 may therefore be positively appraised for discussed pattrass installation of Protecta FR Board 1S in drywalls:

Services	Maximum aperture	Classification
None (blank)	2400 mm wide x 1200 mm high	EI 120
Single electrical cables up to 21 mm Ø		E 120, EI 60
Electrical cables up to 80 mm Ø (single, bundled and on trays)		EI 60
Cables up to 21mm Ø in tied bundles up to 100mm Ø		
Steel cable trays & ladders		EI 60 C/U
Steel conduit up to 16 mm Ø		E 60 C/U, EI 45 C/U
copper conduit up to 16 mm Ø		E 60, EI 30
Unsheathed wires up to 24 mm Ø		EI 60 C/U, EI 60 C/C
PVC conduit up to 16 mm Ø		



Mild or stainless steel pipe	Insulation CS (Continuous Sustained)	Classification
40 mm diameter/1-14.2 mm wall	20 mm thick stone, mineral wool 80 kg/m <sup>3</sup>	<b>EI 120 C/U</b>
40 mm diameter/1-14.2 mm wall*	30-80 mm thick stone, mineral wool min. 80 kg/m <sup>3</sup>	
50 mm diameter/1.2-14.2 mm wall*		
60 mm diameter/1.4-14.2 mm wall*		
75 mm diameter/1.6-14.2 mm wall*		
90 mm diameter/1.9-14.2 mm wall*		
100 mm diameter/2.1-14.2 mm wall*		
115 mm diameter/2.4-14.2 mm wall*		
140 mm diameter/2.9-14.2 mm wall*		
165 mm diameter/ 3.4-14.2 mm wall*		
180 mm diameter/ 3.6-14.2 mm wall*		
200 mm diameter/ 4.0-14.2 mm wall*		
219 mm diameter/ 4.3-14.2 mm wall*		
250 mm diameter/ 5.0-14.2 mm wall*		
300 mm diameter/ 5.9-14.2 mm wall*		
324 mm diameter/ 6.35-14.2 mm wall*		
PEX pipe in pipe system	Insulation	Classification
15 mm diameter x 2.5 mm wall inner /25mm diameter outer	None	<b>EI 90 C/C</b>

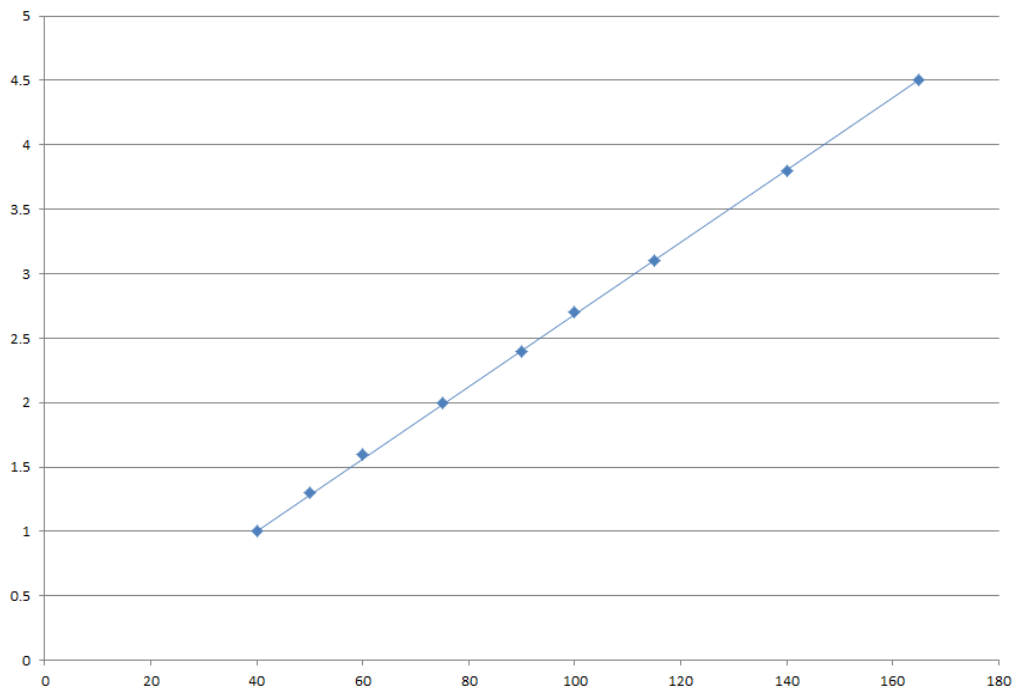
Pipe Diameter vs wall thickness





Mild or stainless steel pipe	Insulation CS (Continuous Sustained)	Protecta FR Wrap	Classification
40 mm diameter/1-14.2 mm wall	32 mm thick K-flex Elastomeric insulation	3 layers 50 x 1.8 mm	EI 90 C/U
40 mm diameter/1-14.2 mm wall*	32-50 mm thick K-flex Elastomeric insulation		
50 mm diameter/1.2-14.2 mm wall*			
60 mm diameter/1.4-14.2 mm wall*			
75 mm diameter/1.6-14.2 mm wall*			
90 mm diameter/1.9-14.2 mm wall*			
100 mm diameter/2.1-14.2 mm wall*			
115 mm diameter/2.4-14.2 mm wall*			
140 mm diameter/2.9-14.2 mm wall*			
165 mm diameter/ 3.4-14.2 mm wall*			
180 mm diameter/ 3.6-14.2 mm wall*			
200 mm diameter/ 4.0-14.2 mm wall*			
219 mm diameter/ 4.3-14.2 mm wall*			
250 mm diameter/ 5.0-14.2 mm wall*			
300 mm diameter/ 5.9-14.2 mm wall*			
324 mm diameter/ 6.35-14.2 mm wall*			

Pipe diameter vs Wall thickness







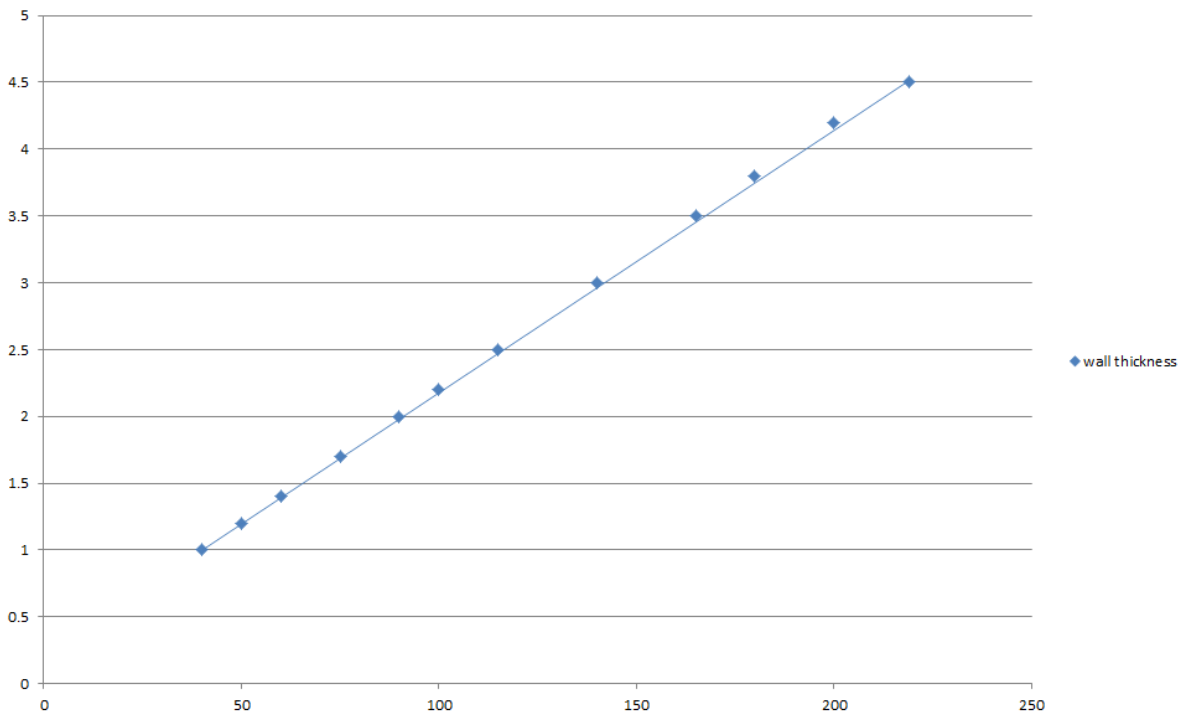
Services	Wrap	Insulation CS (Continuous Sustained)	Classification
Mild or stainless steel pipe			
40 mm diameter/1-14.2 mm wall	50 x 1.8 mm Protecta FR Pipe Wrap, one fitted flush to each face of seal	13 mm Kaiflex ST insulation	EI 120 U/C, EI 120 U/U, EI 120 C/U, EI 120 C/C
40 mm diameter/1-14.2 mm wall*	2 off 50 x 3.6 mm Protecta FR Pipe Wrap, one fitted flush to each face of seal	13 - 32mm Kaiflex ST insulation	E 120 U/C, E 120 U/U, E 120 C/U, E 120 C/C, EI 60 U/C, EI 60 U/U, EI 60 C/U, EI 60 C/C
50 mm diameter/1.3-14.2 mm wall*			
60 mm diameter/1.6-14.2 mm wall*			
75 mm diameter/2-14.2 mm wall*			
90 mm diameter/2.4-14.2 mm wall*			
100 mm diameter/2.7-14.2 mm wall*			
115 mm diameter/3.1-14.2 mm wall*			
140 mm diameter/3.8-14.2 mm wall*			
165 mm diameter/ 4.5-14.2 mm wall*			

Services	Insulation LI (Local Interrupted min. 600 mm)	Classification
Copper pipe up to 54 mm diameter/1-14.2 mm wall	20 mm stone wool 80 kg/m <sup>3</sup>	EI 120 C/C
Alupex composite pipe 75 mm diameter/7.5 mm wall	600 mm length of 25 mm Protecta Mineral Fibre BIO	EI 60 C/U
Mild or stainless steel pipe 114 mm diameter/11 mm wall	None	E 90 C/U, EI 20 C/U



Services	Insulation LI (Local Interrupted min. 600 mm)	Classification
Mild or stainless steel pipe		
40 mm diameter/1-14.2 mm wall	20 mm stone wool 80 kg/m <sup>3</sup>	EI 120 C/U
40 mm diameter/1-14.2 mm wall*	30 mm stone wool 80 kg/m <sup>3</sup>	E 120 C/U, EI 90 C/U
50 mm diameter/1.2-14.2 mm wall*		
60 mm diameter/1.4-14.2 mm wall*		
75 mm diameter/1.7-14.2 mm wall*		
90 mm diameter/2-14.2 mm wall*		
100 mm diameter/2.2-14.2 mm wall*		
115 mm diameter/2.5-14.2 mm wall*		
140 mm diameter/3-14.2 mm wall*		
165 mm diameter/3.5-14.2 mm wall*		
180 mm diameter/3.8-14.2 mm wall*		
200 mm diameter/4.2-14.2 mm wall*		
219 mm diameter/4.5-14.2 mm wall*		

Pipe diameter vs Wall thickness



Services	Insulation LI (Local Interrupted min. 600 mm)	Classification
Geberit Mepla MLC (PE-Xb/Aluminium/PE-HD) pipe*	20 mm stone wool 80 kg/m <sup>3</sup>	EI 120 C/C
16 mm diameter/2.25 mm wall		EI 60 C/C
20 mm diameter/2.5 mm wall		
26 mm diameter/3 mm wall		
32 mm diameter/3 mm wall		
40 mm diameter/3.5 mm wall		
50 mm diameter/4 mm wall		
63 mm diameter/4.5 mm wall		
75 mm diameter/4.7 mm wall		

Services	Wrap	Insulation CS/LS (Continuous Sustained or Local Sustained min. 800 mm)	Classification
Copper pipe	50 x 3.6 mm Protecta FR Pipe Wrap fitted to both sides of the seal	9 mm Kaiflex ST insulation	EI 120 C/C
12 mm diameter/1 mm wall		9-13 mm Kaiflex ST insulation	E 120 C/C, EI 90 C/C
12-54 mm diameter/1-1.2 mm wall		13-25 mm Kaiflex ST insulation	E 120 C/C, EI 60 C/C
12-54 mm diameter/1-1.2 mm wall			
Geberit Mepla MLC (PE-Xb/Aluminium/PE-HD pipe)*			
16 mm diameter/2.25 mm wall	50 x 3.6 mm Protecta FR Pipe Wrap fitted to both sides of the seal	9-25 mm Kaiflex ST insulation	EI 120 C/C
20 mm diameter/2.5 mm wall			
26 mm diameter/3 mm wall			
32 mm diameter/3 mm wall			
40 mm diameter/3.5 mm wall			
50 mm diameter/4 mm wall			
63 mm diameter/4.5 mm wall			
75 mm diameter/4.7 mm wall			

Services	Wraps (both sides)	Permitted configuration for seal separation	Classification
PVC-U pipe according to EN 1329-1, EN 1452-2 and EN 1453-1^ and PVC-C according to EN 1566-1			
Diameter up to 40 mm, wall thickness 1.9 – 3.0 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	EI 120 U/U, EI 120 C/U, EI 120 U/C, EI 120 C/C
Diameter up to 110 mm, wall thickness 2.7 - 6.6 mm	50 x 3.6 mm (2 x 1.8 layer)		E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C
Diameter up to 125 mm, wall thickness 3.7 – 7.4 mm	50 x 5.4 mm (3 x 1.8 layer)		
Diameter up to 160 mm, wall thickness 9.5 mm	50 x 7.2 mm (4 x 1.8 layer)		
PE pipe according to EN 1519-1, EN 12201-2 and EN 12006-1 <sup>§</sup> , ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Diameter up to 40 mm, wall thickness 2.4 – 3.7 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	EI 120 U/U, EI 120 C/U, EI 120 U/C, EI 120 C/C
Diameter up to 110 mm, wall thickness 4.2 - 10 mm	50 x 3.6 mm (2 x 1.8 layer)		E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C
Diameter up to 125 mm, wall thickness 4.8 – 12 mm	50 x 5.4 mm (3 x 1.8 layer)		
Diameter up to 160 mm, wall thickness 14.6 mm	50 x 7.2 mm (4 x 1.8 layer)		
PP pipe according to EN 1852-1: 2009			
Diameter up to 40 mm, wall thickness 1.8 – 5.5 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	EI 120 U/U, EI 120 C/U, EI 120 U/C, EI 120 C/C
Diameter up to 110 mm, wall thickness 2.7 - 15.1 mm	50 x 3.6 mm (2 x 1.8 layer)		EI 90 U/U, EI 90 C/U, EI 90 U/C, EI 90 C/C
Diameter up to 125 mm, wall thickness 3.1 – 17.1 mm	50 x 5.4 mm (3 x 1.8 layer)		
Diameter up to 160 mm, wall thickness 21.9 mm	50 x 7.2 mm (4 x 1.8 layer)		

Services	Wraps (both sides)	Permitted configuration for seal separation	Classification
PVC-U pipe according to EN 1329-1, EN 1452-2 and EN 1453-1^ and PVC-C according to EN 1566-1			
Diameter up to 40 mm, wall thickness 3.0 – 4.3 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	E 120 U/C, E 120 C/U, EI 60 U/C, EI 60 C/C
Diameter up to 110 mm, wall thickness 2.7 - 6.6 mm	50 x 3.6 mm (2 x 1.8 layer)		E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C
Diameter up to 125 mm, wall thickness 3.7 – 7.4 mm	50 x 5.4 mm (3 x 1.8 layer)		EI 120 U/C, EI 120 C/C
Diameter up to 160 mm, wall thickness 3.2 - 9.5 mm	50 x 7.2 mm (4 x 1.8 layer)		EI 60 U/C, EI 60 C/C
PE pipe according to EN 1519-1, EN 12201-2 and EN 12006-1 <sup>§</sup> , ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Diameter up to 40 mm, wall thickness 3.2 – 3.7 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	EI 120 U/C, EI 120 C/C
Diameter up to 110 mm, wall thickness 4.2 - 10 mm	50 x 3.6 mm (2 x 1.8 layer)		EI 60 U/C, EI 60 C/C
Diameter up to 125 mm, wall thickness 12 mm	50 x 5.4 mm (3 x 1.8 layer)		EI 120 U/C, EI 120 C/C
Diameter up to 160 mm, wall thickness 4.9 – 12.0 mm	50 x 7.2 mm (4 x 1.8 layer)		E 120 U/C, E 120 C/C
Diameter up to 160 mm, wall thickness 12.0 mm			EI 90 U/C, EI 90 C/C
PP pipe according to EN 1852-1: 2009			
Diameter up to 40 mm, wall thickness 4.0 – 5.5 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	EI 120 U/C, EI 120 C/C
Diameter up to 110 mm, wall thickness 6.6 mm	50 x 3.6 mm (2 x 1.8 layer)		E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C
Diameter up to 125 mm, wall thickness 17.1 mm	50 x 5.4 mm (3 x 1.8 layer)		E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C
Diameter up to 160 mm, wall thickness 4.0 - 21.9 mm	50 x 7.2 mm (4 x 1.8 layer)		E 120 U/C, E 120 C/C
Diameter up to 160 mm, wall thickness 21.9 mm			EI 60 U/C, EI 60 C/C

#### **4. Limits of Applicability**

The conclusions of this report only apply to Protecta FR Board 1S penetration seals as detailed in Appendix 2 of this report.

ETA 13/0673 & ETA 14/0247 should be consulted for additional detail where appropriate.

#### **5. Conclusions**

It can be concluded that Protecta FR Board 1S penetration seals, used as penetration seals installed in patters configuration, as described in this report, would be expected to provide the performances given in Appendix 2 of this report, if subjected to a test in accordance with BS EN 1366-3: 2009.

#### **6. Validity**

This assessment is issued on the basis of test data and information available at the time of issue.

If contradictory evidence becomes available to UL International (UK) Ltd the assessment will be unconditionally withdrawn and POLYSEAM LTD will be notified in writing. Similarly the assessment is invalidated if the assessed construction is subsequently tested because actual test data is deemed to take precedence over an expressed opinion.

The assessment is valid initially for a period of five years i.e. until 1st June 2023, after which time it is recommended that it be returned for re-appraisal.

The appraisal is only valid provided that no other modifications are made to the tested construction other than those described in this report.



**7. Declaration by POLYSEAM LTD**

We the undersigned confirm that we have read and complied with the obligations placed on us by the UK Fire Test Study Group Resolution No. 82: 2001.

We confirm that the component or element of structure, which is the subject of this assessment, has not to our knowledge been subjected to a fire test to the Standard against which the assessment is being made.

We agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test to the Standard against which this assessment is being made.

We are not aware of any information that could adversely affect the conclusions of this assessment.

If we subsequently become aware of any such information we agree to cease using the assessment and ask UL International (UK) Ltd to withdraw the assessment.

Signed:

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For and on behalf of:

-----

## 8. Signatories

Report by:

Reviewed by:

A handwritten signature in blue ink, appearing to read 'Chris Johnson'.A handwritten signature in blue ink, appearing to read 'Steven Harms'.

Chris Johnson\*  
Staff Engineer  
Building and Life Safety Technologies

Steven Harms\*  
Engineering Leader  
Building and Life Safety Technologies

\*For and on behalf of Underwriters Laboratories International (UK) Ltd

The assessment report is not valid unless it incorporates the declaration duly signed by the applicant. This is included in Section 7 to this report.

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**Appendix 1: Summary of Primary Supporting Evidence**

**ETA 13/0673**

A European Technical Assessment of Protecta FR Board penetrations seals in accordance with ETAG 026-2, edition 2011, used as European Assessment Document (EAD).

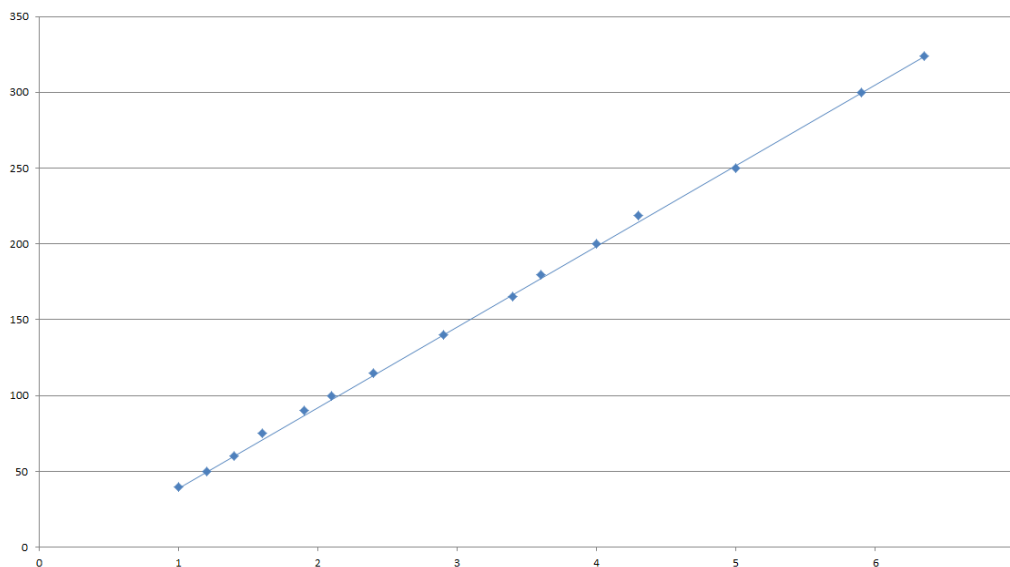
**Appendix 2: Summary of Assessed Scope**

Services	Maximum aperture	Classification
None (blank)	2400 mm wide x 1200 mm high	EI 120
Single electrical cables up to 21 mm $\varnothing$		E 120, EI 60
Electrical cables up to 80 mm $\varnothing$ (single, bundled and on trays)		EI 60
Cables up to 21mm $\varnothing$ in tied bundles up to 100mm $\varnothing$		
Steel cable trays & ladders		EI 60 C/U
Steel conduit up to 16 mm $\varnothing$		E 60 C/U, EI 45 C/U
copper conduit up to 16 mm $\varnothing$		E 60, EI 30
Unsheathed wires up to 24 mm $\varnothing$		EI 60 C/U, EI 60 C/C
PVC conduit up to 16 mm $\varnothing$		



Mild or stainless steel pipe	Insulation CS (Continuous Sustained)	Classification
40 mm diameter/1-14.2 mm wall	20 mm thick stone, mineral wool 80 kg/m <sup>3</sup>	<b>EI 120 C/U</b>
40 mm diameter/1-14.2 mm wall*	30-80 mm thick stone, mineral wool min. 80 kg/m <sup>3</sup>	
50 mm diameter/1.2-14.2 mm wall*		
60 mm diameter/1.4-14.2 mm wall*		
75 mm diameter/1.6-14.2 mm wall*		
90 mm diameter/1.9-14.2 mm wall*		
100 mm diameter/2.1-14.2 mm wall*		
115 mm diameter/2.4-14.2 mm wall*		
140 mm diameter/2.9-14.2 mm wall*		
165 mm diameter/ 3.4-14.2 mm wall*		
180 mm diameter/ 3.6-14.2 mm wall*		
200 mm diameter/ 4.0-14.2 mm wall*		
219 mm diameter/ 4.3-14.2 mm wall*		
250 mm diameter/ 5.0-14.2 mm wall*		
300 mm diameter/ 5.9-14.2 mm wall*		
324 mm diameter/ 6.35-14.2 mm wall*		
PEX pipe in pipe system	Insulation	Classification
15 mm diameter x 2.5 mm wall inner /25mm diameter outer	None	<b>EI 90 C/C</b>

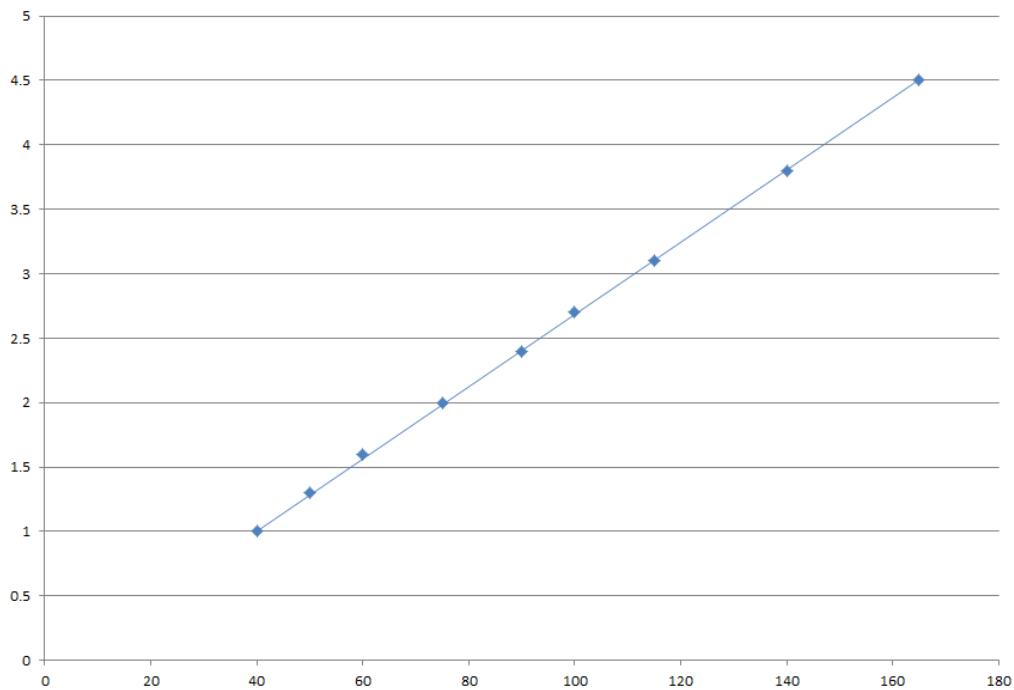
Pipe Diameter vs wall thickness





Mild or stainless steel pipe	Insulation CS (Continuous Sustained)	Protecta FR Wrap	Classification
40 mm diameter/1-14.2 mm wall	32 mm thick K-flex Elastomeric insulation	3 layers 50 x 1.8 mm	EI 90 C/U
40 mm diameter/1-14.2 mm wall*	32-50 mm thick K-flex Elastomeric insulation		
50 mm diameter/1.2-14.2 mm wall*			
60 mm diameter/1.4-14.2 mm wall*			
75 mm diameter/1.6-14.2 mm wall*			
90 mm diameter/1.9-14.2 mm wall*			
100 mm diameter/2.1-14.2 mm wall*			
115 mm diameter/2.4-14.2 mm wall*			
140 mm diameter/2.9-14.2 mm wall*			
165 mm diameter/ 3.4-14.2 mm wall*			
180 mm diameter/ 3.6-14.2 mm wall*			
200 mm diameter/ 4.0-14.2 mm wall*			
219 mm diameter/ 4.3-14.2 mm wall*			
250 mm diameter/ 5.0-14.2 mm wall*			
300 mm diameter/ 5.9-14.2 mm wall*			
324 mm diameter/ 6.35-14.2 mm wall*			

Pipe diameter vs Wall thickness





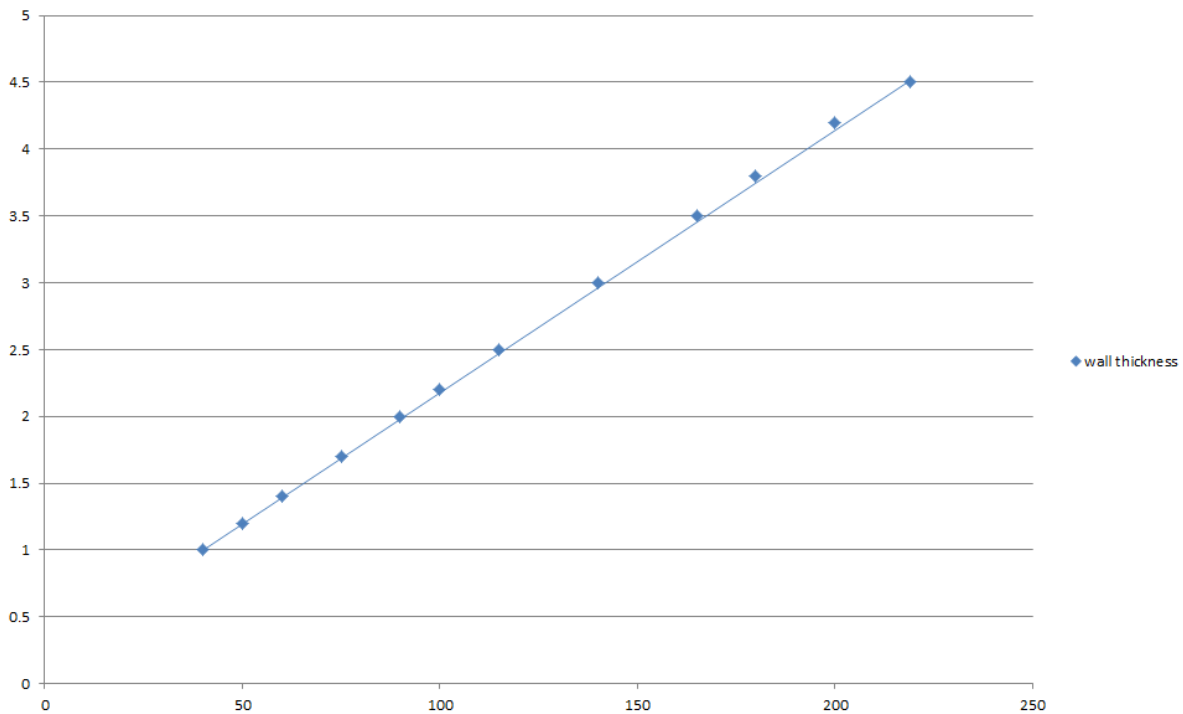
Services	Wrap	Insulation CS (Continuous Sustained)	Classification
Mild or stainless steel pipe			
40 mm diameter/1-14.2 mm wall	50 x 1.8 mm Protecta FR Pipe Wrap, one fitted flush to each face of seal	13 mm Kaiflex ST insulation	EI 120 U/C, EI 120 U/U, EI 120 C/U, EI 120 C/C
40 mm diameter/1-14.2 mm wall*	2 off 50 x 3.6 mm Protecta FR Pipe Wrap, one fitted flush to each face of seal	13 - 32mm Kaiflex ST insulation	E 120 U/C, E 120 U/U, E 120 C/U, E 120 C/C, EI 60 U/C, EI 60 U/U, EI 60 C/U, EI 60 C/C
50 mm diameter/1.3-14.2 mm wall*			
60 mm diameter/1.6-14.2 mm wall*			
75 mm diameter/2-14.2 mm wall*			
90 mm diameter/2.4-14.2 mm wall*			
100 mm diameter/2.7-14.2 mm wall*			
115 mm diameter/3.1-14.2 mm wall*			
140 mm diameter/3.8-14.2 mm wall*			
165 mm diameter/ 4.5-14.2 mm wall*			

Services	Insulation LI (Local Interrupted min. 600 mm)	Classification
Copper pipe up to 54 mm diameter/1-14.2 mm wall	20 mm stone wool 80 kg/m <sup>3</sup>	EI 120 C/C
Alupex composite pipe 75 mm diameter/7.5 mm wall	600 mm length of 25 mm Protecta Mineral Fibre BIO	EI 60 C/U
Mild or stainless steel pipe 114 mm diameter/11 mm wall	None	E 90 C/U, EI 20 C/U



Services	Insulation LI (Local Interrupted min. 600 mm)	Classification
Mild or stainless steel pipe		
40 mm diameter/1-14.2 mm wall	20 mm stone wool 80 kg/m <sup>3</sup>	EI 120 C/U
40 mm diameter/1-14.2 mm wall*	30 mm stone wool 80 kg/m <sup>3</sup>	E 120 C/U, EI 90 C/U
50 mm diameter/1.2-14.2 mm wall*		
60 mm diameter/1.4-14.2 mm wall*		
75 mm diameter/1.7-14.2 mm wall*		
90 mm diameter/2-14.2 mm wall*		
100 mm diameter/2.2-14.2 mm wall*		
115 mm diameter/2.5-14.2 mm wall*		
140 mm diameter/3-14.2 mm wall*		
165 mm diameter/3.5-14.2 mm wall*		
180 mm diameter/3.8-14.2 mm wall*		
200 mm diameter/4.2-14.2 mm wall*		
219 mm diameter/4.5-14.2 mm wall*		

Pipe diameter vs Wall thickness



Services	Insulation LI (Local Interrupted min. 600 mm)	Classification
Geberit Mepla MLC (PE-Xb/Aluminium/PE-HD) pipe*	20 mm stone wool 80 kg/m <sup>3</sup>	EI 120 C/C
16 mm diameter/2.25 mm wall		EI 60 C/C
20 mm diameter/2.5 mm wall		
26 mm diameter/3 mm wall		
32 mm diameter/3 mm wall		
40 mm diameter/3.5 mm wall		
50 mm diameter/4 mm wall		
63 mm diameter/4.5 mm wall		
75 mm diameter/4.7 mm wall		

Services	Wrap	Insulation CS/LS (Continuous Sustained or Local Sustained min. 800 mm)	Classification
Copper pipe	50 x 3.6 mm Protecta FR Pipe Wrap fitted to both sides of the seal	9 mm Kaiflex ST insulation	EI 120 C/C
12 mm diameter/1 mm wall		9-13 mm Kaiflex ST insulation	E 120 C/C, EI 90 C/C
12-54 mm diameter/1-1.2 mm wall		13-25 mm Kaiflex ST insulation	E 120 C/C, EI 60 C/C
12-54 mm diameter/1-1.2 mm wall			
Geberit Mepla MLC (PE-Xb/Aluminium/PE-HD pipe)*			
16 mm diameter/2.25 mm wall	50 x 3.6 mm Protecta FR Pipe Wrap fitted to both sides of the seal	9-25 mm Kaiflex ST insulation	EI 120 C/C
20 mm diameter/2.5 mm wall			
26 mm diameter/3 mm wall			
32 mm diameter/3 mm wall			
40 mm diameter/3.5 mm wall			
50 mm diameter/4 mm wall			
63 mm diameter/4.5 mm wall			
75 mm diameter/4.7 mm wall			

Services	Wraps (both sides)	Permitted configuration for seal separation	Classification
PVC-U pipe according to EN 1329-1, EN 1452-2 and EN 1453-1^ and PVC-C according to EN 1566-1			
Diameter up to 40 mm, wall thickness 1.9 – 3.0 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	EI 120 U/U, EI 120 C/U, EI 120 U/C, EI 120 C/C
Diameter up to 110 mm, wall thickness 2.7 - 6.6 mm	50 x 3.6 mm (2 x 1.8 layer)		E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C
Diameter up to 125 mm, wall thickness 3.7 – 7.4 mm	50 x 5.4 mm (3 x 1.8 layer)		
Diameter up to 160 mm, wall thickness 9.5 mm	50 x 7.2 mm (4 x 1.8 layer)		
PE pipe according to EN 1519-1, EN 12201-2 and EN 12006-1 <sup>§</sup> , ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Diameter up to 40 mm, wall thickness 2.4 – 3.7 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	EI 120 U/U, EI 120 C/U, EI 120 U/C, EI 120 C/C
Diameter up to 110 mm, wall thickness 4.2 - 10 mm	50 x 3.6 mm (2 x 1.8 layer)		E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C
Diameter up to 125 mm, wall thickness 4.8 – 12 mm	50 x 5.4 mm (3 x 1.8 layer)		
Diameter up to 160 mm, wall thickness 14.6 mm	50 x 7.2 mm (4 x 1.8 layer)		
PP pipe according to EN 1852-1: 2009			
Diameter up to 40 mm, wall thickness 1.8 – 5.5 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	EI 120 U/U, EI 120 C/U, EI 120 U/C, EI 120 C/C
Diameter up to 110 mm, wall thickness 2.7 - 15.1 mm	50 x 3.6 mm (2 x 1.8 layer)		EI 90 U/U, EI 90 C/U, EI 90 U/C, EI 90 C/C
Diameter up to 125 mm, wall thickness 3.1 – 17.1 mm	50 x 5.4 mm (3 x 1.8 layer)		
Diameter up to 160 mm, wall thickness 21.9 mm	50 x 7.2 mm (4 x 1.8 layer)		



Services	Wraps (both sides)	Permitted configuration for seal separation	Classification
PVC-U pipe according to EN 1329-1, EN 1452-2 and EN 1453-1^ and PVC-C according to EN 1566-1			
Diameter up to 40 mm, wall thickness 3.0 – 4.3 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	E 120 U/C, E 120 C/U, EI 60 U/C, EI 60 C/C
Diameter up to 110 mm, wall thickness 2.7 - 6.6 mm	50 x 3.6 mm (2 x 1.8 layer)		E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C
Diameter up to 125 mm, wall thickness 3.7 – 7.4 mm	50 x 5.4 mm (3 x 1.8 layer)		EI 120 U/C, EI 120 C/C
Diameter up to 160 mm, wall thickness 3.2 - 9.5 mm	50 x 7.2 mm (4 x 1.8 layer)		EI 60 U/C, EI 60 C/C
PE pipe according to EN 1519-1, EN 12201-2 and EN 12006-1 <sup>§</sup> , ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Diameter up to 40 mm, wall thickness 3.2 – 3.7 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	EI 120 U/C, EI 120 C/C
Diameter up to 110 mm, wall thickness 4.2 - 10 mm	50 x 3.6 mm (2 x 1.8 layer)		EI 60 U/C, EI 60 C/C
Diameter up to 125 mm, wall thickness 12 mm	50 x 5.4 mm (3 x 1.8 layer)		EI 120 U/C, EI 120 C/C
Diameter up to 160 mm, wall thickness 4.9 – 12.0 mm	50 x 7.2 mm (4 x 1.8 layer)		E 120 U/C, E 120 C/C
Diameter up to 160 mm, wall thickness 12.0 mm			EI 90 U/C, EI 90 C/C
PP pipe according to EN 1852-1: 2009			
Diameter up to 40 mm, wall thickness 4.0 – 5.5 mm	50 x 1.8 mm (1 layer)	1 & 2 between PVC-U/PVC-C, PE/ABS/SAN+PVC and PP pipes in any combination	EI 120 U/C, EI 120 C/C
Diameter up to 110 mm, wall thickness 6.6 mm	50 x 3.6 mm (2 x 1.8 layer)		E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C
Diameter up to 125 mm, wall thickness 17.1 mm	50 x 5.4 mm (3 x 1.8 layer)		E 120 U/C, E 120 C/C EI 90 U/C, EI 90 C/C
Diameter up to 160 mm, wall thickness 4.0 - 21.9 mm	50 x 7.2 mm (4 x 1.8 layer)		E 120 U/C, E 120 C/C
Diameter up to 160 mm, wall thickness 21.9 mm			EI 60 U/C, EI 60 C/C