

Engineering Judgement (Assessment)

Ref: EJ 210708

Client: Firestop Centre Ltd

Project: Hawkins Construction- Wakefield Hospital Stage 1- Wellington

Title: Proposal for firestopping HDPE plastic pipe (180mm diameter/ pipe wall thickness 16.4mm) penetrating a gypsum board wall with oversized Protecta FR Collars (200mm diameter) - Fire resistance - (FRR -/60/60)

Date: 08/07/2021



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About Engineering Judgments

Firestop systems are intended to deter or prevent the passage of fire, toxic gasses and smoke through openings created for the passage of building service supplies, blank seals and joint systems. Penetration Firestop Sealing Systems are required to be Tested, Rated and Certified to the approved AS Standard. Such Penetration Firestop Sealing Systems are required by building regulations and codes to be tested and rated as part of an assembly. All elements of the tested and certified Penetration Firestop Sealing Systems, including proprietary systems into which the Penetration Firestop Sealing Systems is installed, form a specific and inseparable engineered system which must be used as such.

Where construction site constraints, unanticipated hindrances or conditions differing from original design are encountered and such conditions cannot easily or cost effectively be redesigned or reconstructed, design assessments can be made to propose an alternative method that ensures performance of the firestop system is not compromised.

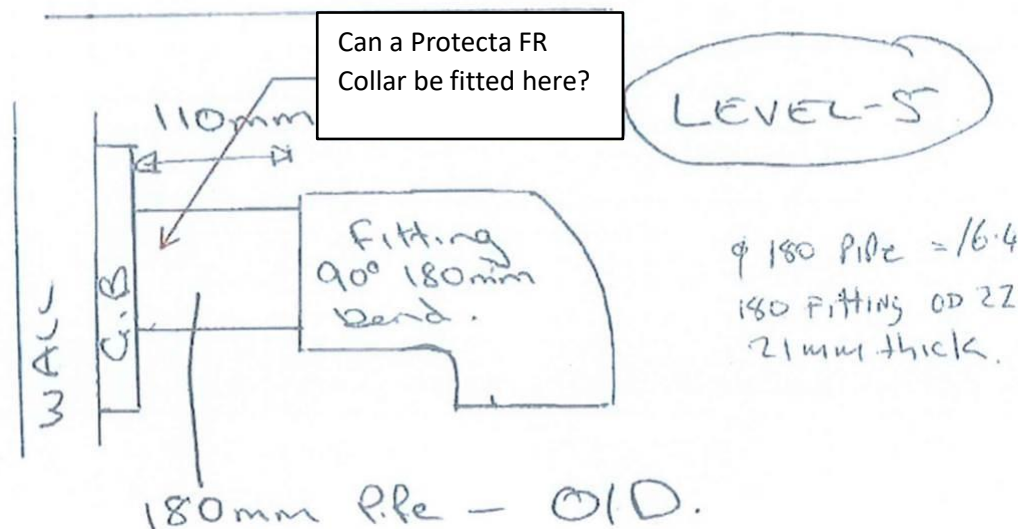
These are referred to as Engineering Judgements.

1. Scope of EJ

Firestop Centre Ltd. have been asked to provide a solution for firestopping HDPE plastic pipes (180 mm diameter/ pipe wall thickness 16.4mm) penetrating a gypsum board wall (128mm depth) comprising of 76mm steel KOROK stud and 2 layers of 13mm thick Fyrelime gypsum board on both faces of the stud.

Wall elements are required to be otherwise tested or assessed by others for the required fire resistance period for -/60/60.

The 180mm diameter HDPE pipe (pipe wall thickness 16.4mm) penetrates the gypsum board wall and there is no specific Protecta FR Pipe Collar to suit this specific outside diameter.



This drawing was supplied to us by Firestop Centre Ltd.

We are proposing that an oversized collar (200mm diameter/60mm depth) can be fitted to the face of the wall leaving an approximate annular space of 10mm wide between the inside of the collar and the pipe.

2. Fire test evidence to support the proposed fire seal

All fire test evidence is drawn from:

Fire assessment report: Warrington Fire Australia Assessment Report - Service Penetrations protected with Protecta FR Collars in accordance with AS1530.4:2014 and AS 4072.1:2005

Sponsor: Polyseam Ltd

Report number: 5147800B

Revision: R3.2

Reference number: FAS190125

Issued date: 21 May 2021

Expiry date: 30 April 2026

Key references:

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Where PE pipes are mentioned, this includes PE-LD, PE-MD, PE-HD, PE-X and similar. The tested PE-HD pipe was confirmed by report sponsor and pipe manufacturer to be similar to HDPE pipes. Therefore, the FRLs shown for PE-HD pipes in section 6 are applicable to HDPE pipes. Therefore, the FRLs shown for PE-HD pipes in section 6 are applicable to HDPE pipes.

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Some of the Protecta FR Collars were tested oversized, i.e. the internal diameter of the collar is larger than the pipe diameter. Protecta FR Collars are oversized to allow for the natural gradient of pipework for flow purposes and inconsistencies of pipe installation.

An oversize collar can therefore be used in situations where the penetration size is greater than the pipe diameter and/or where the pipe is inserted at an angle.

Oversize collars can be used as a method of fire protection in both walls and floors for any type of services as assessed in section 6 including both pipes and cables where the requirement for oversize collars arise due to angling of services or oversized apertures.

However, when used with over-sized collars, the fire resistance performance of any 180 minutes or 240 minutes systems must be reduced to maximum 120 minutes in integrity and insulation.

The minimum angle tested is 45° as shown in the example in clause 6.5.2 and so this allows the use of over-sized collars for pipes at angles from 90° to 45°.

The maximum collar size is 160 mm. The maximum average annular space to be used with over-sized collars is 55 mm.

6.5.2 Oversize penetration seals, in drywalls and concrete/masonry walls or floors

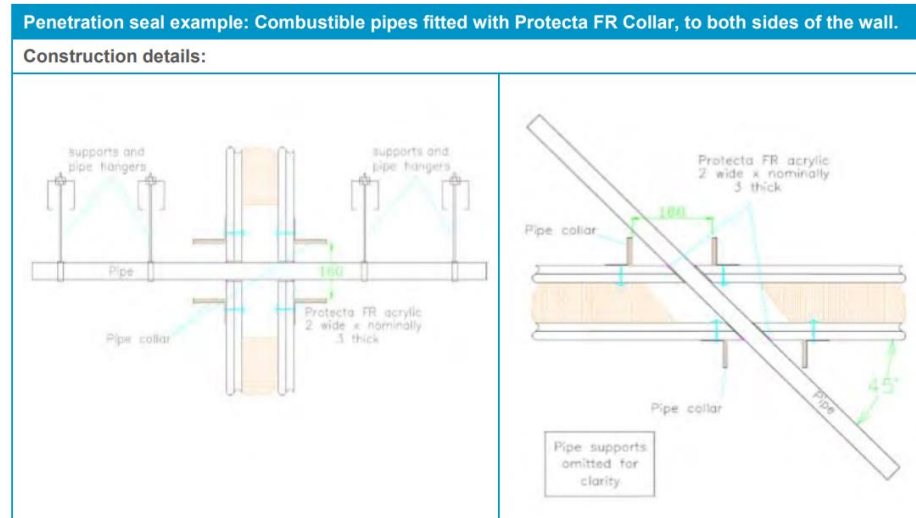


Table 36 PVC-U pipe installed at an angle (45°)

Services	Collar inlay	FRL
PVC-U pipe		
Diameter 50 mm, wall thickness 2.4 mm*	60 x 15.0 mm	-/90/90 C/C
<p>*Pipe fitted at 45° to the face of the partition in a horizontal plane</p> <p>Note: Oversize collars can be used as a method of fire protection in both walls and floors for any type of services as assessed in section 6 including both pipes and cables where the requirement for oversize collars arise due to angling of services or oversized apertures. However, when used with over-sized collars, the fire resistance performance of any 180 minutes or 240 minutes systems must be reduced to maximum 120 minutes in integrity and insulation.</p>		

The annular gap penetrating the wall was filled with FR Acrylic Sealant (minimum depth 25mm) to the depth of the boards on both sides of the wall.

The inside diameter of the 160mm Protecta FR Collar is nominally 170mm diameter.

FR Pipe Collars have been tested with 200mm diameter HDPE (pipe wall thickness 6.2 – 18.2mm).

Table 18 PE pipes (diameter 110 – 160 mm) protected with Protecta FR collar installed at both sides of the wall

Services	Collar Inlay	FRL
PE pipe		
Diameter 110 mm, wall thickness 3.4-10.0 mm*	60 × 6.0 mm	-/90/60 U/U, C/U, U/C, C/C
Diameter 125 mm, wall thickness 4.0-11.5 mm*	60 × 8.8 mm	
Diameter 140 mm, wall thickness 4.4-12.8 mm*	60 × 11.5 mm	
Diameter 160 mm, wall thickness 4.9-14.6 mm*	60 × 15.0 mm	-/90/90 U/U, C/U, U/C, C/C
Diameter 200 mm, wall thickness 6.2-18.2 mm*	60 × 18.0 mm	-/120/90 U/C, C/C
Diameter 400 mm, wall thickness 36.3 mm*	100 × 40.0 mm	-/90/90 C/C
*Typical pipe diameters shown, see below graph for intermediate sizes		

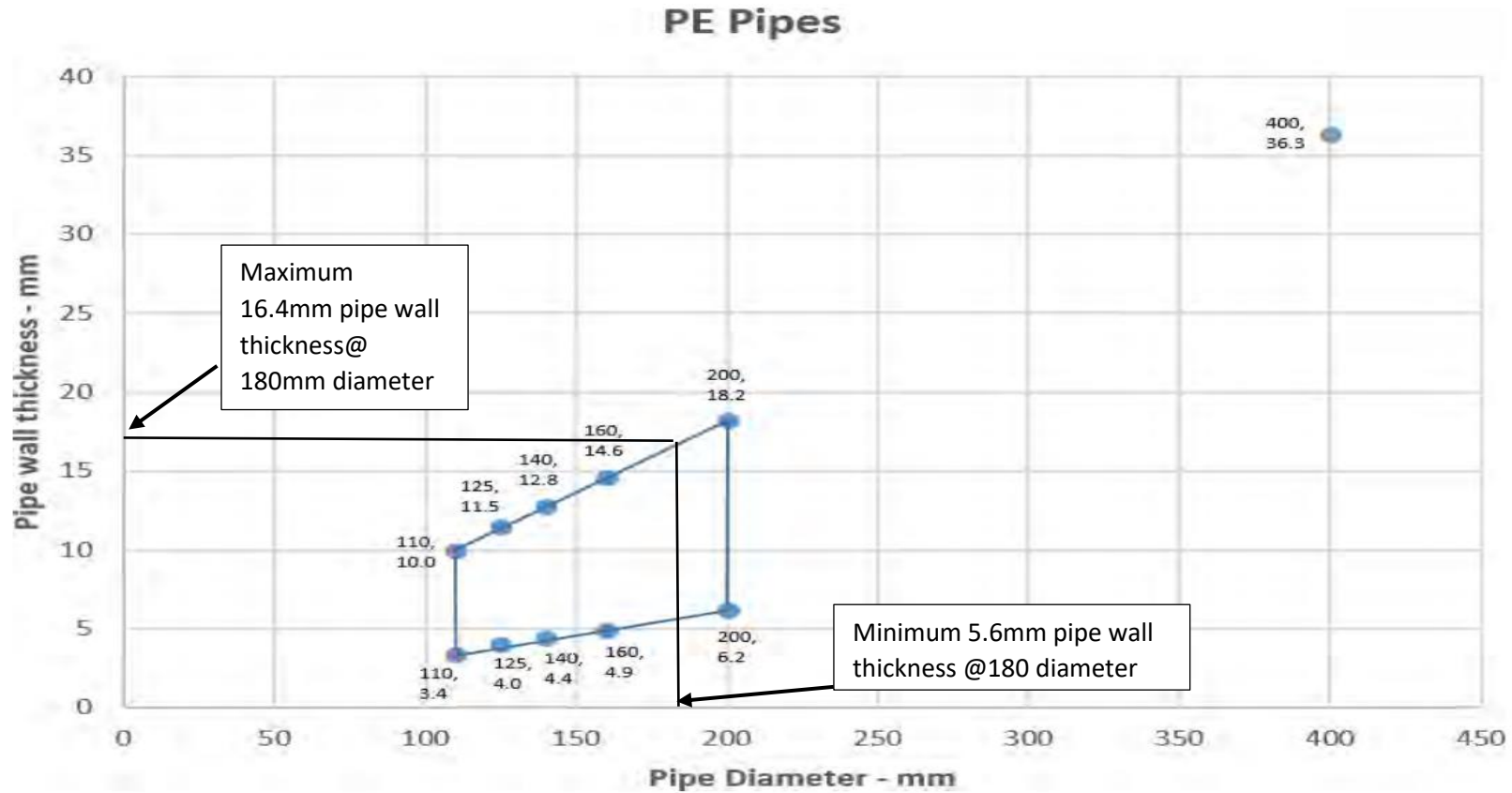


Figure 14 Intermediate pipe wall thicknesses for PE pipe diameters

The particular pipe being subject of this request is 180mm diameter with a pipe wall thickness of 16.4mm. This scope of testing and the oversized collar evidence would support the use of 200mm FR Collars with 180mm diameter HPDE pipe with a wall thickness of 16.4mm for a fire resistance of -/120/90.

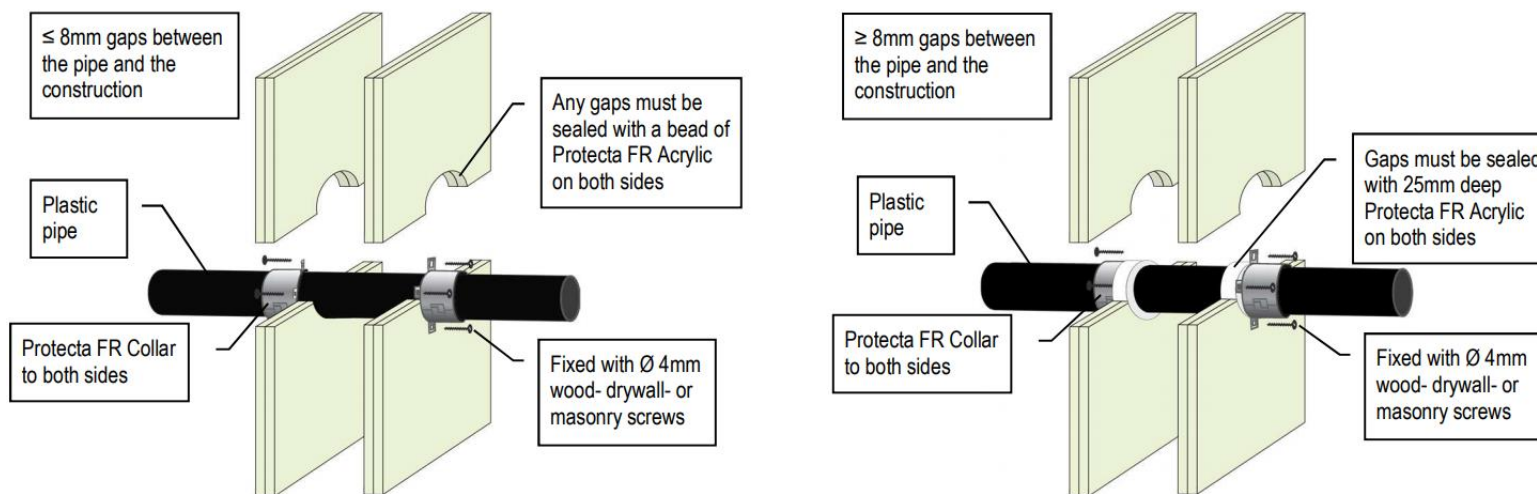
3. Proposals

We believe that the 180mm diameter HDPE pipe (Pipe wall thickness 16.4mm) can be solved by affixing Protecta FR Collars (200mm diameter) on both sides of the plasterboard/KOROK wall.

The annular space between the pipe and plasterboard wall must be filled with Protecta FR Acrylic Sealant to the depth of the plasterboard and the collar affixed to the wall as described within the latest installation instructions.

The annular space between the pipe and inside of the collar must not be filled with any sealant/stone wool as it is crucial for the intumescent within the collar to get hot and expand freely within the confines of the collar shell.

≥ 100MM DRYWALLS, MASONRY OR CONCRETE WALLS



To summarise, based on direct and indirect fire test evidence, in the opinion of Polyseam Ltd, the fitting of Protecta FR Collars (200mm diameter x 60mm depth) to HPDE pipe (180mm diameter/ 16.4mm pipe wall thickness) will provide an FRR of -/60/60 when fitted to a with gypsum board wall (128mm depth) comprising of 76mm steel KOROK stud and 2 layers of 13mm thick Fyrelite gypsum board on both faces of the stud.

7. Disclaimer:

This document is solely to be used for the purpose of and as an Engineering Judgement and as such the following guidelines MUST BE ADHERED TO:

Not be used in lieu of AS systems when available;

Only be issued by a firestop manufacturer's technical personnel or qualified internal engineer or third party certified engineer appointed solely by Polyseam Ltd;

1. Be based upon interpolation of previously Polyseam Ltd. AS Tested and Assessed Firestop Sealing System that are sufficiently similar in nature and clearly state the conditions upon which this Engineering Judgement is made;
2. Be based on full knowledge of the elements of the constructed system. Such information to be supplied by the approved contractor /architect / controlling body and such information will be deemed to be a correctly represent in its entirety of the constructed system as is or as will be. Any deviation from the information found after this Engineering Judgement is produced / implemented will result in the withdrawal of this Engineering Judgement as supporting data;
3. Be based upon full knowledge of the elements of construction to be protected and the understanding of the probable behaviour of that construction and the recommended Polyseam Ltd Protecta Brand Penetration Firestop Sealing Systems as if it were subjected to the appropriate AS Standard Testing Method. Such information to be supplied by the approved contractor / architect / controlling body and such information will be deemed to be a correct representation of the constructed / installed system as is or as will be. Any deviation from the information found after this Engineering Judgement is implemented will result in the withdrawal of this Engineering Judgement as supporting data;
4. Be limited to the specific conditions and configuration upon which the Engineering Judgement is intended, based on reasonable performance expectations for the recommended Polyseam Ltd Firestop Sealing System under EN Testing Methods;
5. Be accepted for a single specific job, site location / project location, this Engineering Judgement is none transferable to any other job, site location / project location.

THE ASSESSMENT HELD WITHIN THIS DOCUMENT IS FOR THE SOLE PURPOSES TO FORM AN ENGINEERING JUDGEMENT, BASED ON THE AFOREMENTIONED GUIDELINES STATED UNDER TITLE – PURPOSES OF THIS DOCUMENT. NO DEVIATION FROM THE PURPOSE AND GUIDELINES WILL BE RECOGNISED AS FORMING ANY OR PART OF THIS ENGINEERING JUDGEMENT. THIS ENGINEERING JUDGEMENT IS MADE SPECIFICALLY FOR THE PURPOSES OF A SINGLE PENETRATION FOR THE SPECIFIC SITE AND LOCATION INDICATED AND SIGNED FOR BELOW. ALL INFORMATION HELD WITHIN THIS ENGINEERING JUDGEMENT IS BASED UPON EVIDENCE GIVEN BY THE APPROPRIATE CONTRACTOR / ARCHITECT RESPONSIBLE / RESPONSIBLE PERSON FOR THIS SPECIFIC PROJECT. ANY INFORMATION GIVEN BY AN UNAUTHORISED PERSON OR PERSONS OR MISREPRESENTATION OR IS SUBSEQUENTLY SHOWN TO BE INCORRECT THEREAFTER WILL BE DEEMED TO FALL OUTSIDE OF THE ENGINEERING JUDGEMENT AND WILL THUS RENDER THIS ENGINEERING JUDGEMENT VOID THE CONSEQUENCES OF WHICH POLYSEAM LTD WILL NOT BE RESPONSIBLE. POLYSEAM LIMITED **Page | 8**
PRODUCING THIS ENGINEERING JUDGEMENT DO SO IN GOOD FAITH OF THE AFOREMENTIONED AND AS SUCH CANNOT BE HELD RESPONSIBLE FOR


Sub-Contractor Section

Company	Requested by Authorised Representative Position and Name:	Site	Location Reference	Date	Signature accepting all information given for the purposes of this Engineering Judgement are correct

Main Contractor / Architect / Designer Section / Company

Company	Requested by Authorised Representative Position and Name:	Site	Location Reference	Date	Signature accepting all information given for the purposes of this Engineering Judgement are correct

Polyseam Limited Section

Company	Requested By Position and Name:	Date	Signature in no way accepts liability for false or inaccurate information
Polyseam Limited	CEO Kjetil Bogstad	08.07.2021	
Company	Authorised By Position and Name:	Date	Signature in no way accepts liability for false or inaccurate information
Polyseam Limited	Technical Manager Duncan Alabaster	08.07.2021	