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TM203-01D02 Trafalgar Fyreflex Acoustic Assessment (r0)

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Trafalgar Fyreflex Sealant - Acoustic Assessment

1 Introduction

Renzo Tonin & Associates were engaged by Trafalgar Group to provide an acoustic assessment of the Trafalgar Fyreflex sealant when used in sealing of service penetrations and joints in typical sound-rated partitions. The following typical application of the Fyreflex sealants are assessed:

Application in sealing of joints at

- Deflection head - gap at between top of plasterboard of CSR 1125 wall system and concrete slab soffit
- Butt joints in 140mm masonry walls

Application in sealing of cable service penetrations in

- CSR 1125 single layered stud wall
- CSR 1078 double layered stud wall, and
- 140mm concrete block wall

Fyreflex sealant has a nominal density of 1,600 kg/m^3 and specific gravity of 1.6. Material composition of the sealant is listed in Table 1 below.

Table 1: Fyreflex Sealant Composition

Material	% Composition
Mineral fillers	30-60%
Acrylic polymer	10-30%
Plasticiser	1-10%
Additives	1-10%

Material	% Composition
Water	Balance

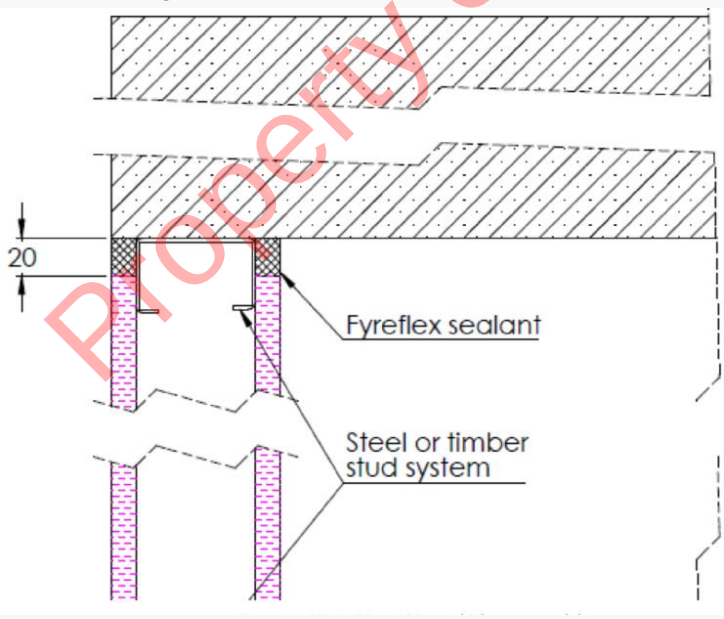
2 Assessment

Table 2 to Table 4 below summaries our assessment of acoustic performance of the Fyreflex sealant in sealing of controls joints, stud wall perimeter gaps and clearances around service penetrations in sound-rated partitions.

The weighted sound reduction index (R_w) and spectrum adaptation term (C_{tr}) of the sound-rated wall systems with application of Fyreflex sealant were predicted using material properties provided and computer modelling software (Marshall Day Insul) in combination with results of laboratory tests of similar constructions.

2.1 Fyreflex Application in Sealing of Gaps at Deflection Heads

Table 2: Gap Between Top of Plasterboard and Slab Soffit

Application / Partition System	Sound Insulation Ratings R_w (R_w+C_{tr})		Degradation on Acoustic Performance
	CSR Acoustic Ratings	Predicted with 20mm gap at deflection head sealed with Fyreflex on both sides	
Partition: CSR 1125 stud wall with a maximum 20mm perimeter gap between top of plasterboard and slab soffit. The wall system consists of 1 layer of Gyprock Fyrechek plasterboards on both sides of a 92mm steel stud frame. Fyreflex Application: Continuous run of Fyreflex sealant to depth of plasterboard at sides on both sides of the deflection head as indicated in Figure 2 below. In this case minimum sealant thickness of 13mm.  Figure 1: Gap between plasterboard and slab soffit at deflection head			
CSR 1125 Partition without cavity insulation	41 (34)	41 (34)	Nil

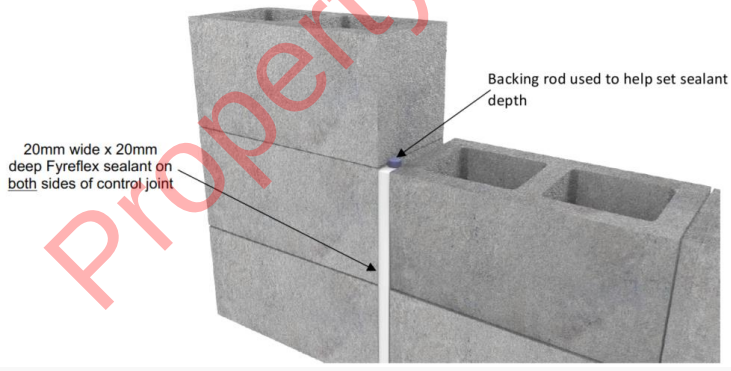
Application / Partition System	Sound Insulation Ratings R_w (R_w+C_{tr})		Degradation on Acoustic Performance
	CSR Acoustic Ratings	Predicted with 20mm gap at deflection head sealed with Fyreflex on both sides	
CSR 1125 Partition with 50mm GW Acoustigard 11kg insulation	48 (39)	48 (39)	Nil
CSR 1125 Partition with 75mm GW Acoustigard 14kg insulation	50 (42)	50 (42)	Nil
CSR 1125 Partition with MSB3 Polyester insulation	47 (39)	47 (39)	Nil
CSR 1125 Partition with Soundscreen 1.7 insulation	49 (40)	49 (40)	Nil

Notes:

1. Predicted acoustic ratings provided are opinions and are not laboratory test results. CSR nominal ratings are from CSR publication.
2. Assuming deflection head detail in typical wall areas of 5 to 20m^2 with no service penetrations and other perimeters acoustically sealed without comprising wall integrity.

2.2 Fyreflex Application in Sealing of Masonry Control Joints

Table 3: Masonry Control Joints

Application	Predicted Sound Insulation Ratings R_w (R_w+C_{tr})		Degradation on Acoustic Performance
	Without Control Joint	With Control Joint - Sealed with 20 x 20mm Fyreflex on both sides	
Partition: Typical 140mm hollow concrete block wall with control joint having a maximum width of 20mm. Fyreflex Application: Continuously run of Fyreflex sealant to a minimum depth of 20mm on both sides of the control joint. Backing rod used to assist in setting sealant depth as indicated in Figure 2 below.  Figure 2: Control Joint in Masonry Partitions	45 (42)	45 (42)	Nil
Partition: Typical 140mm concrete wall with control joint having a maximum width of 20mm. Fyreflex Application: Continuously run of Fyreflex sealant to a minimum depth of 20mm on both sides of control joint. Backing rod used to assist in setting sealant depth as indicated in Figure 2 above.	53 (49)	53 (49)	Nil

Application	Predicted Sound Insulation Ratings R_w (R_w+C_{tr})		Degradation on Acoustic Performance
	Without Control Joint	With Control Joint - Sealed with 20 x 20mm Fyreflex on both sides	

Notes:

1. Acoustic ratings provided are opinions and are not laboratory test results.
2. Assuming control joint in a typical wall/floor areas of 5 to 20m^2 with no service penetrations through the wall, all mortar joints are filled with mortar/grout and perimeter of the wall acoustically sealed without compromising wall integrity.
3. The acoustic rating of the systems is based on both laboratory test results of similar constructions and calculations using predictive models. The expected tolerance of the opinions is ±2dB for R_w and ±3dB for R_w+C_{tr}. This allows for variation in the test method, the difference between laboratories and the accuracy of the estimating techniques.

2.3 Fyreflex Application in Cable Penetrations Through Stud Walls

Table 4: Fyreflex Application in Cable Penetrations through Stud Walls

Application	Predicted Sound Insulation Ratings R_w (R_w+C_{tr})		
	CSR Acoustic Rating (Without Service Penetration)	With Service Penetration - Sealed with Fyreflex to depth of plasterboard on both sides	Degradation on Acoustic Performance

Partition: CSR 1125 stud wall with a maximum 40mm diameter penetration through the stud wall to allow passing of 5 CAT 6 network cables. The wall system consists of 1 layer of Gyprock Fyrechek plasterboards on both sides of a 92mm steel stud frame.

Fyreflex Application: Continuously fill 10-12mm annular gap and residual gaps between cables with Fyreflex sealant to depth of the plasterboard (minimum 13mm for CSR 1125), topped with a 50x50mm fillet on both sides of the service penetration as indicated in Figure 3 and Figure 4 below.

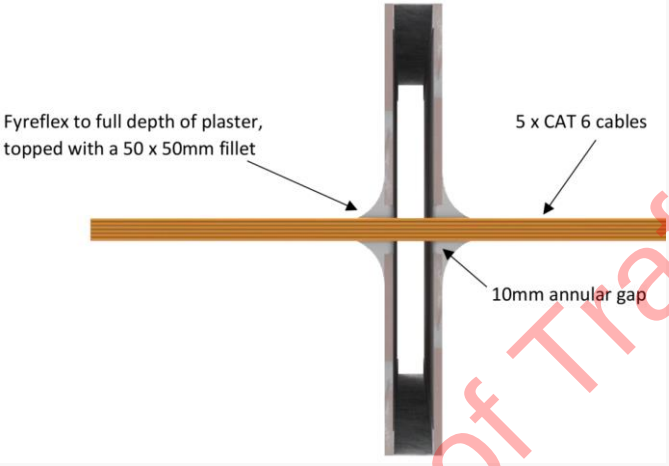


Figure 3: Cable Penetration in CSR 1125 walls – Side Sectional view

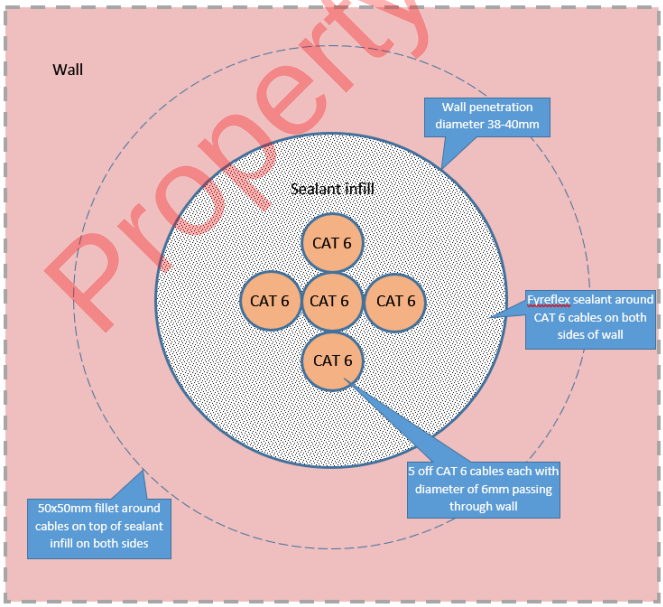


Figure 4: Cable Penetration in stud walls - Front Sectional View

Application	Predicted Sound Insulation Ratings R_w (R_w+C_{tr})		
	CSR Acoustic Rating (Without Service Penetration)	With Service Penetration - Sealed with Fyreflex to depth of plasterboard on both sides	Degradation on Acoustic Performance
CSR 1125 Partition without cavity insulation	41 (34)	41 (34)	Nil
CSR 1125 Partition with 50mm GW Acoustigard 11kg insulation	48 (39)	48 (39)	Nil
CSR 1125 Partition with 75mm GW Acoustigard 14kg insulation	50 (42)	50 (42)	Nil
CSR 1125 Partition with MSB3 Polyester insulation	47 (39)	47 (39)	Nil
CSR 1125 Partition with Soundscreen 1.7 insulation	49 (40)	49 (40)	Nil

Application	Predicted Sound Insulation Ratings R_w (R_w+C_{tr})		
	CSR Acoustic Rating (Without Service Penetration)	With Service Penetration - Sealed with Fyreflex to depth of plasterboard on both sides	Degradation on Acoustic Performance
Partition: CSR 1078 stud wall with a maximum 40mm diameter penetration through the stud wall for 5 x CAT 6 network cables. The wall system consists of 2 layers of Gyprock Fyrechek plasterboards on both sides of a 92mm steel stud frame. Fyreflex Application: Continuously fill 10-12mm annular gap and residual gaps between cables with Fyreflex sealant to a depth of the plasterboard (minimum 26mm for CSR 1078), topped with a 50x50mm fillet on both sides of the service penetration as indicated in Figure 3 and Figure 6 below.			

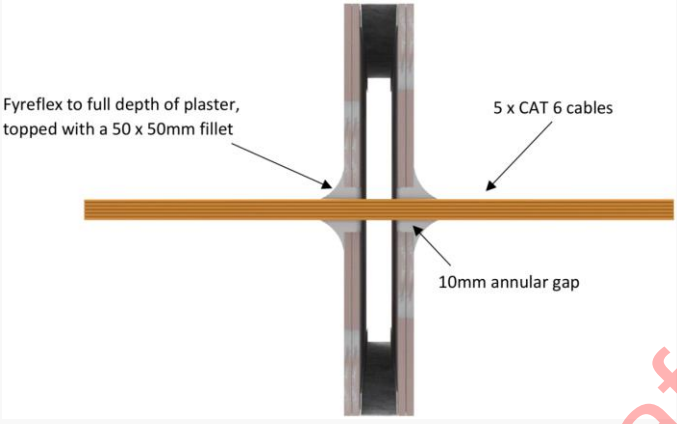


Figure 5: Cable Penetration in CSR 1078 walls – Side Sectional view

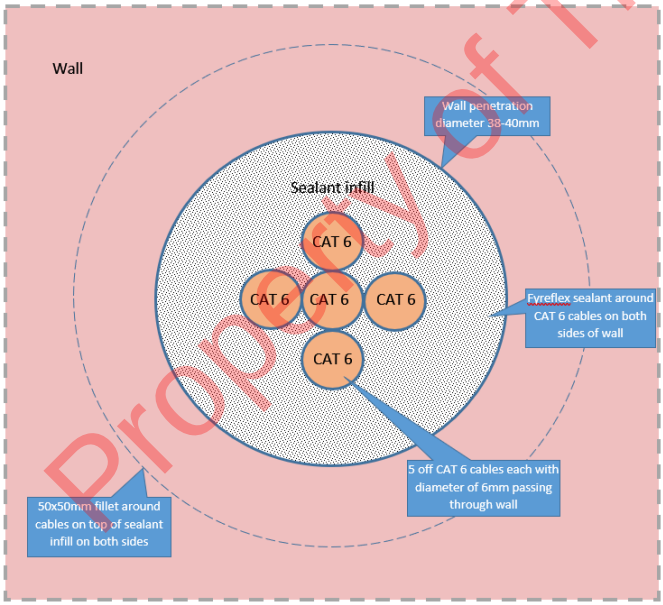


Figure 6: Cable Penetration in stud wall - Front Sectional View

CSR 1078 Partition without cavity insulation	47 (41)	47 (41)	Nil
CSR 1078 Partition with 50mm GW Acoustigard 11kg insulation	53 (45)	53 (45)	Nil
CSR 1078 Partition with 75mm GW Acoustigard 11kg insulation	54 (46)	54 (46)	Nil
CSR 1078 Partition with MSB3 Polyester insulation	51 (44)	51 (44)	Nil

Application	Predicted Sound Insulation Ratings R_w (R_w+C_{tr})		
	CSR Acoustic Rating (Without Service Penetration)	With Service Penetration - Sealed with Fyreflex to depth of plasterboard on both sides	Degradation on Acoustic Performance
CSR 1078 Partition with Soundscreen 1.7 insulation	55 (46)	55 (46)	Nil
Assessment results are same for CSR 1078 Partitions utilising other steel studs other than 92mm.			

Notes:

1. Acoustic ratings provided are opinions and are not laboratory test results. CSR nominal ratings are from CSR publication.
2. Assuming cable penetration in a typical wall/floor areas of 5 to 20m^2 with no other service penetrations through the wall, and perimeter of the wall acoustically sealed without compromising wall integrity.
3. CAT 6 network cables assumptions: 6mm nominal diameter, HDPE insulated copper wires in PVC sheath/jacket.
4. The acoustic rating of the systems is based on both laboratory test results of similar constructions and calculations using predictive models. The expected tolerance of the opinions is ±2dB for R_w and ±3dB for R_w+C_{tr}. This allows for variation in the test method, the difference between laboratories and the accuracy of the estimating techniques.

2.4 Fyreflex Application in Cable Penetrations Through Masonry Partitions

Table 5: Cable Penetrations Through Masonry Partitions

Application	Predicted Sound Insulation Ratings R_w (R_w+C_{tr})		Degradation on Acoustic Performance
	Without Service Penetration	With Service Penetration - Sealed with Fyreflex to depth of 20mm on both sides	
Partition: Typical 140mm hollow concrete block wall with a maximum 40mm diameter penetration through the masonry for 5 x CAT 6 network cables. Fyreflex Application: Continuously fill 10-12mm annular gap and residual gaps between cables with Fyreflex sealant to a minimum depth of 20mm, topped with a 50x50mm fillet on both sides of the service penetration as indicated in Figure 7 and Figure 8 below.	45 (42)	45 (42)	Nil

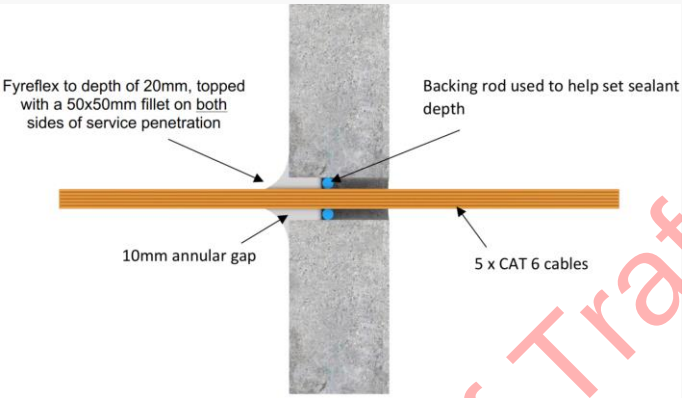


Figure 7: Cable Penetration in Masonry Partitions – Side Sectional View

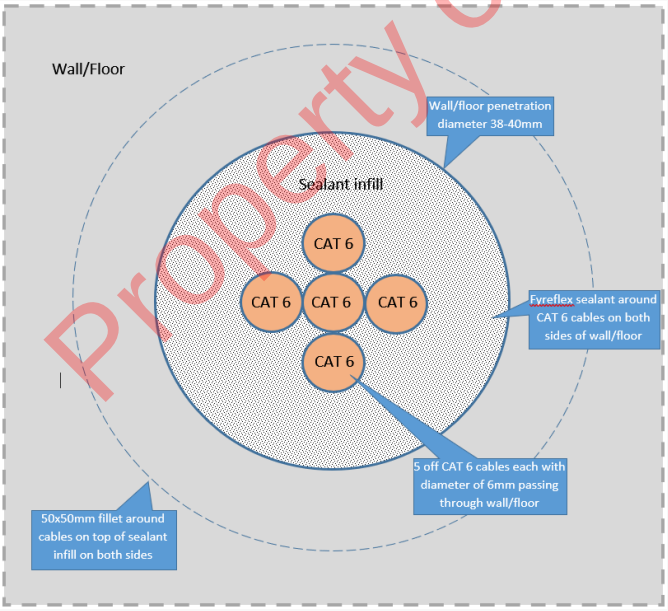


Figure 8: Cable Penetration in Masonry Partitions - Face Sectional View

Application	Predicted Sound Insulation Ratings R_w (R_w+C_{tr})		
	Without Service Penetration	With Service Penetration - Sealed with Fyreflex to depth of 20mm on both sides	Degradation on Acoustic Performance

Notes:

1. Acoustic ratings provided are opinions and are not laboratory test results.
2. Assuming control joint in a typical wall/floor areas of 5 to 20m^2 with no other service penetrations through the wall, all mortar joints are filled with mortar/grout and perimeter of the wall acoustically sealed without compromising wall integrity.
3. CAT 6 network cables assumptions: 6mm nominal diameter, HDPE insulated copper wires in PVC sheath/jacket.
4. The acoustic rating of the systems is based on both laboratory test results of similar constructions and calculations using predictive models. The expected tolerance of the opinions is ±2dB for R_w and ±3dB for R_w+C_{tr}. This allows for variation in the test method, the difference between laboratories and the accuracy of the estimating techniques.

The predicted acoustic ratings stated above assumes partition systems are of good construction, joints and annual gaps around services penetrations are sealed in accordance with manufacturer's specification on both sides of the partition.

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
26.07.2021	Prepare report	0		T. Wong		T. Wong
06.08.2021	Finalise assessment and issue		1	T. Wong		T. Wong

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