



Our ref: FCO-2310/CO4050

Machdev Pty Ltd  
U2/ 423 Bradman Street  
ACACIA RIDGE QLD 4110

Attention: Mr Wayne Borg

LIKELY FIRE PERFORMANCE OF EXTENDED HEIGHT WALL SYSTEM  
Assessment Number FCO-2310  
E-mail dated 31 August 2011 from Ian Ritchie.

INTRODUCTION

We have re-examined the information referenced by you. The information included

- CSIRO Sponsored Investigation test report numbered FSV 0977 on the fire-resistance test numbered FS 3560/2462 on a lined prefabricated wall system tested on 12 March 2003;
- test data from our pilot-scale test numbered FS 3442/2256 on a single skinned Quick'n Tuff wall system rendered on the exposed face;
- your drawings numbered QTES-001 Rev B detail 7.1.3.4 dated 15 April 2003, QTES-001 Rev A detail AS-11.1.1 dated 7 January 2004, QTES-001 Rev A detail AS-11.1.2 dated 7 January 2004; QTES-001 Rev A detail AS-11.2.1 dated 8 January 2004; QTES-001 Rev A detail AS-11.2.2 dated 8 January 2004; and
- the e-mail from Mr Doug Kedacic detailing the proposed system dated 9 January 2004.

We have retained this information

ANALYSIS

On 12 March 2003 this Division conducted a full-scale fire-resistance test on a plasterboard-lined prefabricated wall system comprising a double steel-stud wall system separated by a 90-mm wide cavity and lined on both sides with plasterboard. Both steel stud frames were insulated with rebated QT panels made from a blend of polystyrene bead materials and modified concrete, and stacked on top of each other in between the metal stud sections.

The wall incorporated a perimeter frame made from two 35-mm x 35-mm x 0.75 mm L-sections made from galvanised steel that were put together to form a track and channel. This was used for the top and bottom of the wall frame. The frame included J-section studs formed from 51-mm x 30-mm x 0.55-mm C-Section backed with a 35-mm x 35-mm x 0.75-mm L-section. The studs were spaced at 450-mm centres. Parallel walls fabricated from two of these steel frames separated by a 90-mm wide cavity formed the wall system.

THIS ASSESSMENT SUPERSEDES ASSESSMENT NUMBERED FCO-2310 DATED 15 JUNE 2004.

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During the construction of the metal frames, rebated QT insulation panels, made from a blend of polystyrene bead materials and modified concrete were stacked on top of each other between the metal studs.

The panels were 450-mm long x 900-mm high x 50-mm thick and included two imbedded metal noggings. Each panel was then screw-fixed to the metal studs through each of its metal noggings. Both of the wall frames were insulated with the QT panels in the same manner, and were separated from each other by a 90-mm wide cavity. The external faces of the wall cavity wall system were lined with 13-mm Fyrchek Plasterboard, screw fixed to the studs at approximately 400-mm centres with the sheets lined horizontally. All the plasterboard joints formed in both external faces of the wall were then set using perforated paper tape and plaster. Any gaps along the perimeter were sealed using fire-caulk sealant and finished flush with the face. The wall system, as tested achieved a performance that equated to a fire-resistance level of -/120/120.

The proposed systems are

- (i) is a framed wall comprising two layers of 13-mm thick approved fire-grade plasterboard affixed to the timber-stud frame internally and one layer of fire resistant building foil (building wrap), one layer of 51mm QT WallPanel (without imbedded channels) with a 5-8mm render applied with finish, affixed directly to the exterior frame face or of a 30-50mm battened out cavity; and
- (ii) is a framed wall comprising one layer of 16-mm thick approved fire-grade plasterboard affixed to the timber-stud frame internally and one layer of fire resistant building foil (building wrap), one layer of 37mm QT WallPanel (without imbedded channels) with a 5-8mm render applied with finish, affixed directly to the exterior frame face or of a 30-50mm battened out cavity

Based on previous experience with multilayered wall systems it has been observed that by doubling a system the FRL is increased by at least 1.5 times the single value. Thus it can be assumed from this result that half the wall system, i.e. one layer of 13-mm thick Fyrchek and one layer of the QT WallPanel system would be capable of achieving approximately 80 minutes for integrity and insulation. Applying the necessary conservatism required for an assessment than an additional layer of 13-mm thick Fyrchek would provide a performance at least equivalent to 90 minutes for both integrity and insulation and the utilisation of a single layer of 16-mm thick Fyrchek would provide a performance at least equivalent to 60 minutes, subject to the reduction in the QT WallPanel thickness, for both integrity and insulation.

Additionally the wall systems were originally tested at a height of 3000 mm. This dimension, as well as being the maximum height of our test facilities, is the internationally accepted test height for vertical specimens. Thus all wall systems in excess of 3000 mm are constructed on the basis of established structural design codes, extrapolation and modular construction. The proposed system must comply with these requirements in order to maintain the established fire-resistance levels. The attached drawing references AS 1684 - Residential timber-framed construction – design criteria. This standard will not be relevant under all situations and this assessment is based on the requirement that the appropriate design code is used.

OPINION/CONCLUSION

Based on the factors detailed above it is the opinion of the Division that

- (a) the proposed timber-frame systems detailed in the attached drawings comprising two layers of 13-mm thick Fyrchek plasterboard affixed to the timber-stud frame internally and one layer of fire resistant building foil (building wrap), one layer of 51mm QT WallPanel with a 5-8mm render applied with finish, affixed directly to the exterior frame face or of a 30-50mm battened out cavity would be capable of achieving fire-resistance levels (FRL) of

- (i) -/90/90 for non-loadbearing walls; and
- (ii) 90/90/90 for loadbearing walls designed in accordance with AS 1684 or NZ 3604

for fire exposure from either direction if tested in accordance with AS 1530.4-1997.

- (b) the proposed timber-frame systems detailed in the attached drawings comprising one layers of 16-mm thick Fyrchek plasterboard affixed to the timber-stud frame internally and one layer of fire resistant building foil (building wrap), one layer of 37 mm QT WallPanel with a 5-8mm render applied with finish, affixed directly to the exterior frame face or of a 30-50mm battened out cavity would be capable of achieving fire-resistance levels (FRL) of

- (i) -/60/60 for non-loadbearing walls; and
- (ii) 60/60/60 for loadbearing walls designed in accordance with AS 1684 or NZ 3604

for fire exposure from either direction if tested in accordance with AS 1530.4-1997.

- (c) the proposed steel-frame systems detailed in the attached drawings comprising two layers of 13-mm thick Fyrchek plasterboard affixed to the steel-stud frame internally and one layer of fire resistant building foil (building wrap), one layer of 51mm QT WallPanel with a 5-8mm render applied with finish, affixed directly to the exterior frame face or of a 30-50mm battened out cavity would be capable of achieving fire-resistance levels (FRL) of

- (iii) -/90/90 for non-loadbearing walls; and
- (iv) 90/90/90 for loadbearing walls designed in accordance with AS 3623 or AS/NZS 4600

for fire exposure from either direction if tested in accordance with AS 1530.4-1997.

- (d) the proposed steel-frame systems detailed in the attached drawings comprising one layers of 16-mm thick Fyrchek plasterboard affixed to the steel-stud frame internally and one layer of fire resistant building foil (building wrap), one layer of 37 mm QT WallPanel with a 5-8mm render applied with finish, affixed directly to the exterior frame face or of a 30-50mm battened out cavity would be capable of achieving fire-resistance levels (FRL) of

- (i) -/60/60 for non-loadbearing walls; and
- (ii) 60/60/60 for loadbearing walls designed in accordance with AS 3623 or AS/NZS 4600

for fire exposure from either direction if tested in accordance with AS 1530.4-1997.

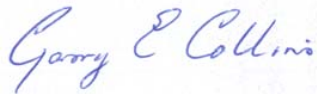
These designated FRL's would still apply to the same systems extended in height in modular form provided that the structural members are design in accordance with the relevant structural design code for the height and load of the actual installation and an approved joint system appropriate to the FRL and the width of the gap is used for the horizontal and vertical joints in a manner as detailed in the attached drawings.

These designated FRL's also apply if the battens are either timber or steel construction.

TERM OF VALIDITY

This opinion will lapse on 31 August 2016. Should you wish us to re-examine this opinion with a view to the possible extension of its term of validity, would you please apply to us three to four months before the date of expiry. This Division reserves the right at any time to amend or withdraw this opinion in the light of new knowledge.

Yours faithfully,

A handwritten signature in blue ink that reads "Garry E Collins". The signature is written in a cursive style.

Garry E Collins  
Manager, Fire Testing and Assessment

31 August 2011