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An assessment of the fire performance of single-leaf access panels with insulated frames, for Hong Kong International Airport

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1 Introduction

A fire resistance test has been carried out on a double-leaf access panel. The tested panel had a fire resistance of 120min with respect to the integrity criterion of BS 476: Part 22: 1987 and 16min with respect to the insulation criterion. This assessment report examines the fire resistance of single-leaf access panels which are designed to provide 120min fire resistance with respect to the integrity criterion and 30min with respect to the insulation criterion, for Hong Kong International Airport.

2 Scope

This assessment report considers the fire resistance of single-leaf access panels, for Hong Kong International Airport. The access panels are designed to provide 120min fire resistance with respect to the integrity criterion of BS 476: Part 22: 1987 and 30min with respect to the insulation criterion, for fire exposure from either side.

3 Supporting Data

This assessment is based on supporting test data which is more than five years old. This supporting data has therefore been reviewed against current test procedures.

3.1 BRE Test Report TE 94530

A double-leaf steel/plasterboard access panel incorporated in a steel-framed plasterboard partition, was subjected to a fire resistance test, in accordance with BS 476: Part 22: 1987 (Method 6) on 12 April 2000.

The access panel, nominally 2m high x 2m wide x 45mm thick, comprised two door leaves consisting of a polyester powder coated 1mm-thick steel skin on the exposed side and 12.5mm-thick Megadeco plasterboard on the unexposed side with 30mm thick mineral wool between the faces. The panel leaves were hung in a steel frame incorporating a smoke seal, both leaves opening towards the furnace.

The access panel was incorporated in a steel-frame partition comprising one layer of 12.5mm-thick Lafarge Firecheck plasterboard followed by one layer of 12.5mm-thick Lafarge Megadeco plasterboard on each face of the partition. The specimen when tested in the orientation described was found to have the following fire resistance:

Insulation:	16min
Integrity:	135min

For full details see BRE test report TE 94530.

4 Description of the Proposed Access Panels

The construction of the proposed single-leaf access panels is the same as that of the tested double-leaf access panel. The only significant differences are that method by which the frame is fixed to the supporting masonry wall and the addition of 15mm-thick Monokote MK6 to the frame on the closing side of the panel.

The frame of the access panel is fixed back to the wall using steel angle section cleats. These cleats, 80mm x 30mm x 100mm long x 4mm thick, are fixed around the opening at 600mm centres using M8 x 65mm-long steel anchor bolts. The cleats are attached by a continuous 4mm fillet weld to a further angle section cleat, 20mm x 30mm x 80mm long x 4mm thick, to which the access panel frame is fixed using M5 nuts and bolts. Details of the fixing method are shown in figures 1 to 3.

The frame is coated on the closing side of the access panel with 15mm-thick Monokote SK6, as shown in figures 1 to 3.

5 Assessment

The tested specimen achieved a fire resistance of 120min with respect to the integrity criterion of the standard and 16min with respect to the insulation criterion. The failure of insulation occurred on the unexposed face of the access panel frame. During the test, the mean and maximum temperature limits were not exceeded on the unexposed face of the access panel leaves.

Although the method of fixing the frame has been changed since the test, we are of the opinion that the alteration will not make any significant difference to the performance. In the test, the frame was fixed directly to the supporting plasterboard partition, whereas in the proposed system angle section cleats are used. The cleats are welded to each other to form a Z-section and these are fixed to both the frame and the supporting construction at the same centres as were used in the test. This method of fixing the frame can be considered equivalent to that tested, particularly as the Z-sections are of a robust construction (being fabricated from two 4mm-thick steel angles).

The tested access panel was of a double-leaf construction, whereas the proposed access panels are single-leaf. Based on our experience, we would expect a single-leaf panel to perform in a similar manner to a double-leaf panel, as long as the leaf size does not exceed that of the tested panel (2m high x 1m wide) and the panel is latched in a similar manner to the active leaf of the tested panel.

The tested access panel opened towards the furnace, whereas the proposed panels may be exposed to a fire from either side. However, we are of the opinion that the performance of the single-leaf access panel would be similar whether it is opening towards or away from the fire, as the hinge edge of the leaf is restrained by a continuous hinge and the latch side by a three-point lock. This should ensure that the perimeter of the leaf does not move away from the frame resulting in a failure of integrity. The fire resistance provided by the panel against the insulation criterion when the side clad with the plasterboard is exposed to the fire may be reduced slightly. However, we would expect the plasterboard to remain in position on the exposed face for at least 30min. Therefore, as the panel leaves in the test maintained their insulation for approximately 40min, any reduction should not be significant.

7 Validity of the Assessment

7.1 Declaration by Applicant

- 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 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 BRE Testing to withdraw the assessment.

Signed: F R.

For and on behalf of: EXITILE LTD.

7.2 BRE Testing Declaration

This assessment is issued on the basis of test data and information to hand at the time of issue. The assessment is invalidated if the assessed construction is subsequently tested since actual test data is deemed to take precedence over an expressed opinion. Any changes in the specification of the product will invalidate this assessment.

This assessment only applies to the assessed construction installed at the specific site referred to in this report and may not be applicable to constructions used on other sites.

This assessment has been carried out in accordance with Fire Test Study Group Resolution No. 82. It relates to the fire performance of the product and does not cover aspects of quality, durability, maintenance nor service requirements. This assessment relates only to the specimen(s) assessed and does not by itself infer that the product is approved under any Loss Prevention Certification Board approval or certification scheme or any other endorsements, approval or certification scheme.

This assessment report is not valid unless it incorporates the declaration duly signed by the applicant.

The tested access panel was fixed to a drywall partition system. This is generally considered to be less onerous than testing in a masonry wall as the partition can bow in sympathy with the access panel reducing the likelihood of gaps opening up between the perimeter of the leaf and the frame. However, the design of the access panel leaf perimeter and the frame mean that even if differential bowing were to occur, it is highly unlikely that any gaps exceeding 150mm x 6mm would open up between the two. In addition, as stated above, the door leaf is latched by a three-point locking system which should restrain both the top and bottom latch-side corners of the leaf.

The tested access panel failed the insulation criterion of the standard at 16min when the maximum temperature limit was exceeded by a thermocouple attached to the frame. By 30min, the temperatures measured on the frame were at approximately 400°C. Based on our experience, we believe that the addition of a 15mm-thick layer of Monokote MK6 to the frame members will ensure that the temperature limit is not exceeded until at least 30min. As both Monokote and plasterboard are gypsum based and, in our experience, behave in a similar manner when used to protect structural steel, the situation can be related to a plasterboard partition comprising a single layer of 12.5mm-thick standard wallboard either side of steel studs. This would be expected to achieve at least 30min fire resistance with respect to the insulation criterion of BS 476: Part 22: 1987. During a test of this type, we would expect the plasterboard on the exposed face to start to crack and detach from the studs at approximately 15min. This would then expose the studs and the boards on the unexposed face to temperatures well in excess of 400°C for approximately 15min. This is can be compared to the situation on the frame of the proposed access panels, except with the access panel frame the temperatures are lower and the thickness of the Monokote is greater. We would not expect stickability to be a problem as the Monokote is being applied to the masonry wall and the material filling the frame, as well as the frame itself.

6 Conclusion

Therefore it is our opinion that the single-leaf access panels with insulated frames, for Hong Kong International Airport, as described in section 4 of this report, will provide up to 120min fire resistance with respect to the integrity criterion of BS 476: Part 22: 1987 and 30min with respect to the insulation criterion, for fire exposure from either side.

8 Figures

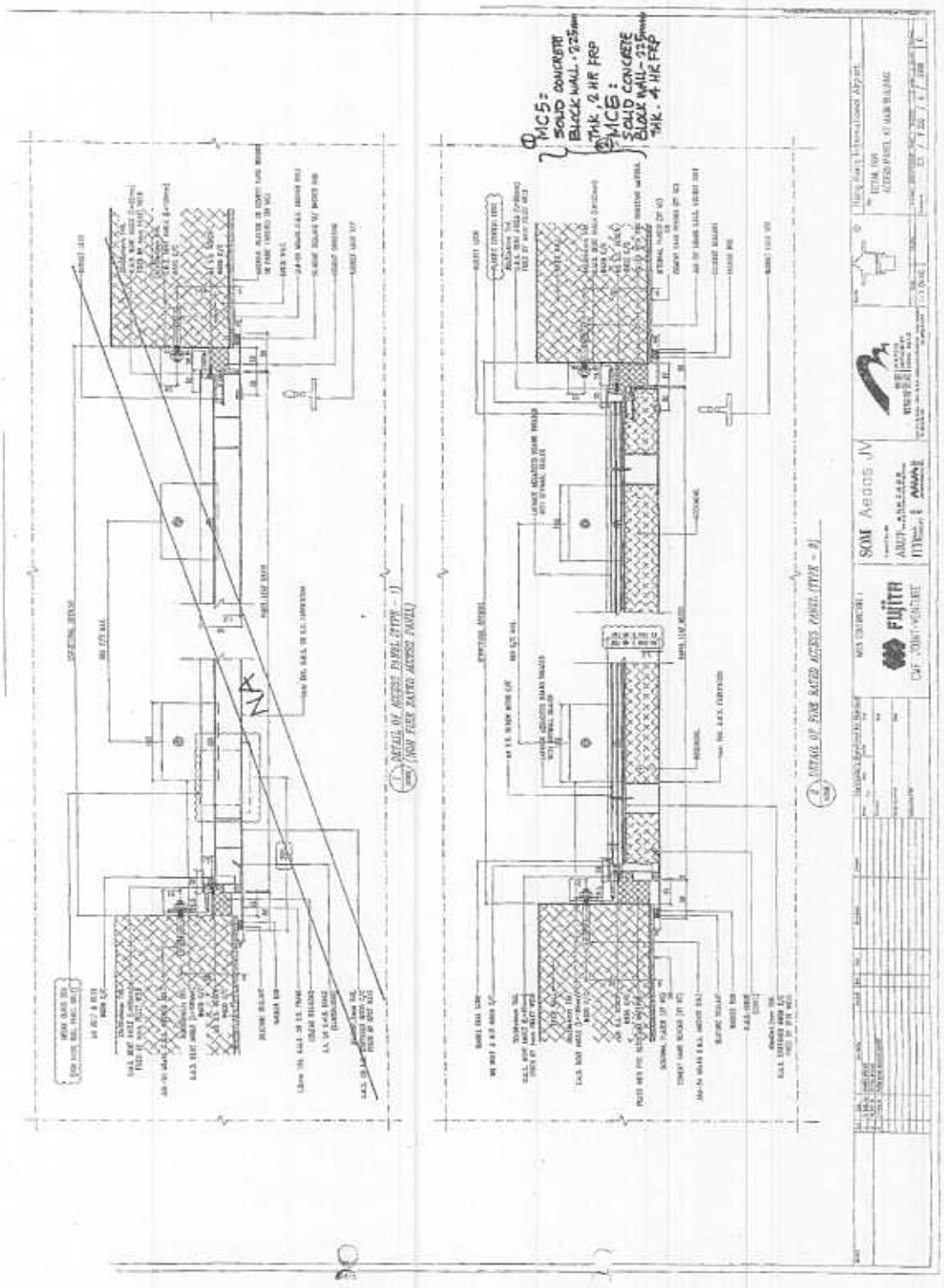

Figure 1 Horizontal section through access panel (lower section only)

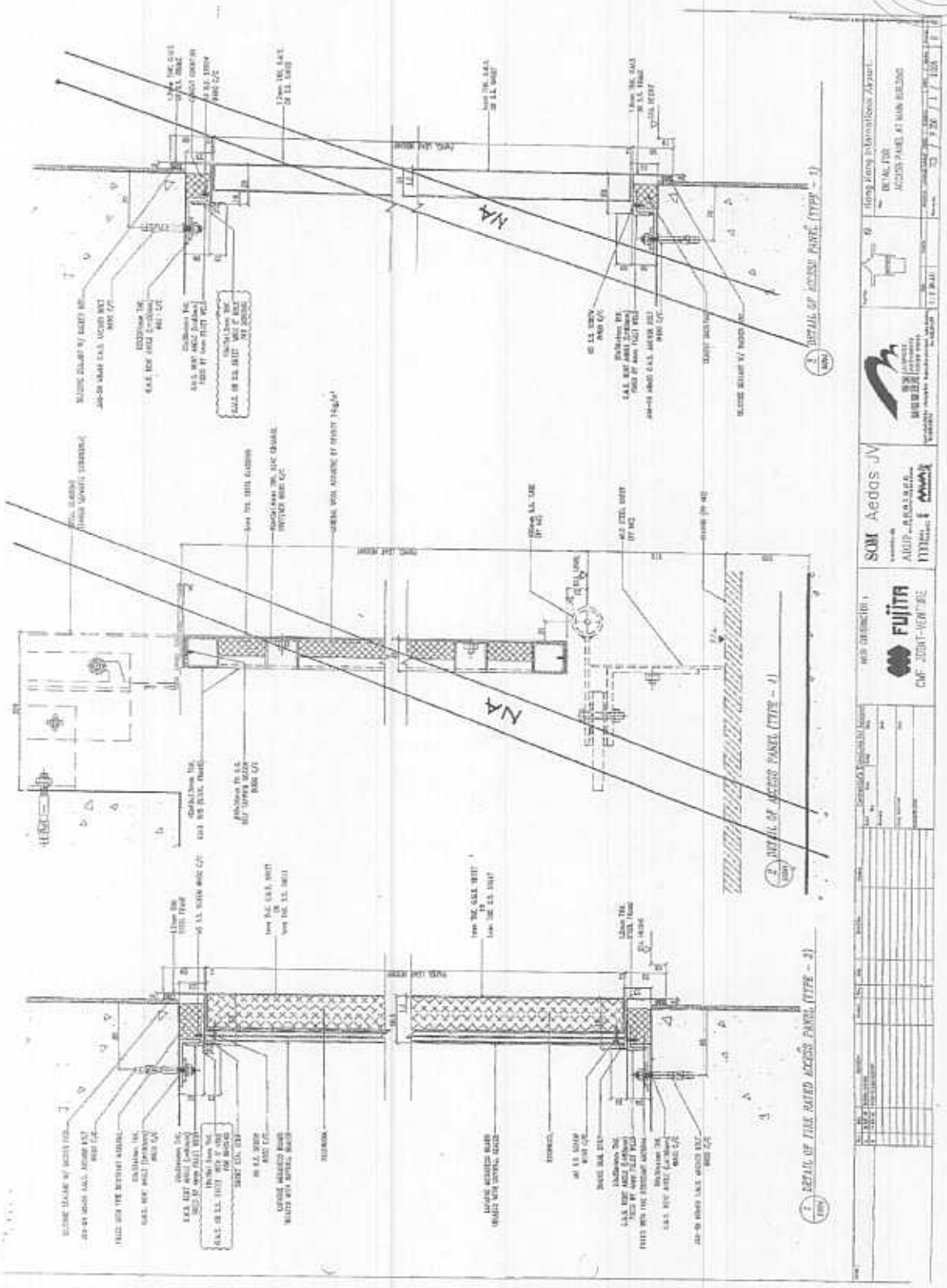

Figure 2 Vertical section through access panel (left-hand section only)

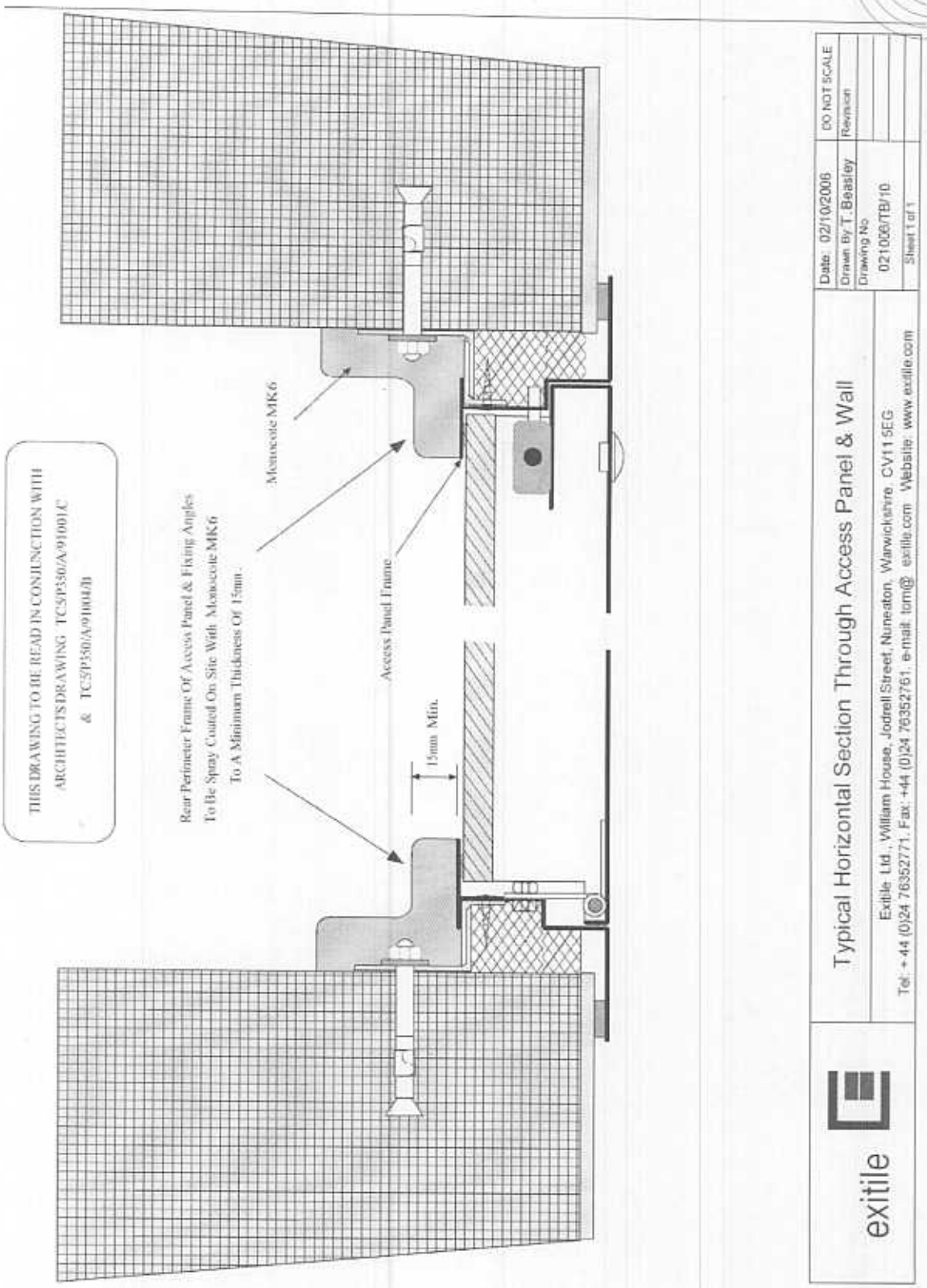

Figure 3 Horizontal section showing Monokote application

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