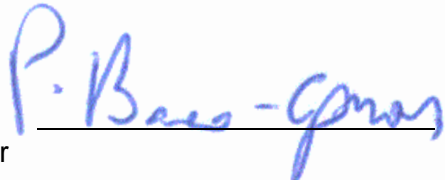


FAR 3847 Issue 2

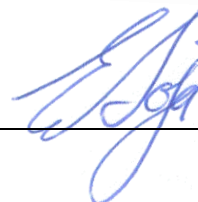
FIRE RESISTANCE OF A SLIDING ACCORDION DOOR ASSEMBLY

This report replaces FAR 3847 issued on the 2 April 2012

Author: P. Bano-Chapman
Senior Fire Testing Engineer



Reviewer: E. Soja
Senior Fire Safety Engineer



Contact: BRANZ Limited
Moonshine Road
Judgeford
Private Bag 50908
Porirua City
New Zealand
Tel: +64 4 237 1170
Fax: +64 4 237 1171
www.branz.co.nz

BRANZ's agreement with its Client in relation to this report contains the following terms and conditions in relation to **Liability and Indemnification**

- a. Limitation and Liability
 - i. BRANZ undertakes to exercise due care and skill in the performance of the Services and accepts liability to the Client only in cases of proven negligence.
 - ii. Nothing in this Agreement shall exclude or limit BRANZ's liability to a Client for death or personal injury or for fraud or any other matter resulting from BRANZ's negligence for which it would be illegal to exclude or limit its liability.
 - iii. BRANZ is neither an insurer nor a guarantor and disclaims all liability in such capacity. Clients seeking a guarantee against loss or damage should obtain appropriate insurance.
 - iv. Neither BRANZ nor any of its officers, employees, agents or subcontractors shall be liable to the Client nor any third party for any actions taken or not taken on the basis of any Output nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to BRANZ.
 - v. BRANZ shall not be liable for any delayed, partial or total non-performance of the Services arising directly or indirectly from any event outside BRANZ's control including failure by the Client to comply with any of its obligations hereunder.
 - vi. The liability of BRANZ in respect of any claim for loss, damage or expense of any nature and howsoever arising shall in no circumstances exceed a total aggregate sum equal to 10 times the amount of the fee paid in respect of the specific service which gives rise to such claim or NZD\$50,000 (or its equivalent in local currency), whichever is the lesser.
 - vii. BRANZ shall have no liability for any indirect or consequential loss (including loss of profits).
 - viii. In the event of any claim the Client must give written notice to BRANZ within 30 days of discovery of the facts alleged to justify such claim and, in any case, BRANZ shall be discharged from all liability for all claims for loss, damage or expense unless legal proceedings are commenced in respect of the claim within one year from:
 - The date of performance by BRANZ of the service which gives rise to the claim;
 - or
 - The date when the service should have been completed in the event of any alleged non-performance.
- b. Indemnification: The Client shall guarantee, hold harmless and indemnify BRANZ and its officers, employees, agents or subcontractors against all claims (actual or threatened) by any third party for loss, damage or expense of whatsoever nature including all legal expenses and related costs and howsoever arising relating to the performance, purported performance or non-performance, of any Services.
- c. Without limiting clause b above, the Client shall guarantee, hold harmless and indemnify BRANZ and its officers, employees, agents or subcontractors against all claims (actual or threatened) by any party for loss, damage or expense of whatsoever nature including all legal expenses and related costs arising out of:
 - i. any failure by the Client to provide accurate and sufficient information to BRANZ to perform the Services;
 - ii. any misstatement or misrepresentation of the Outputs, including Public Outputs;
 - iii. any defects in the Products the subject of the Services; or
 - iv. any changes, modifications or alterations to the Products the subject of the Services.



FIRE RESISTANCE OF A SLIDING ACCORDION DOOR ASSEMBLY

1. CLIENT

WonDoor Corporation
1865 South 3480 West
Salt Lake City
Utah 84104
USA

2. INTRODUCTION

This report gives BRANZ's assessment on the fire resistance of the horizontal folding accordion type curtain tested to UL 10b if it had been tested in accordance with AS 1530.4-2005.

3. RE-ISSUE

This assessment report has been re-issued to include bi-parting doors.

4. BACKGROUND

In Underwriters Laboratories Inc (UL) fire resistance test, file No. R6799-2 Project No. 97NK30045, a folding curtain door assembly was tested in accordance with UL 10B (NFPA 252, CAN 4-S104) for 180 minutes then subjected it to a hose stream test. The folding curtain door maintained the test criteria for the duration of the fire test and subsequent hose stream test. The sliding door consisted of a double skinned interlinked curtain that folded in on itself when open (sliding accordion door). The slats were secured together with a hinge arrangement. The sliding door was mounted within a plasterboard frame which in turn was secured to the brick lined specimen frame. The overall size of the test specimen was 3,962 mm wide x 3,562 mm high. For specific construction details refer to the UL test report File R6799-2 Project 97NK30045 dated 20th November 1997. Revised 4th November 1998.

In Underwriters Laboratories Inc (UL) fire resistance test, file No. R6799-6 Project No. 83NK21332, a bi-parting folding curtain door assembly was tested in accordance with UL 10B (NFPA 252, CAN 4-S104) for 180 minutes then subjected it to a hose stream test. The folding curtain door maintained the test criteria for the duration of the fire test and subsequent hose stream test. The sliding door consisted of a double skinned interlinked curtain that folded in on itself when open (sliding accordion door). The slats were secured together with a hinge arrangement. The sliding door was mounted within a plasterboard frame which in turn was secured to the brick lined specimen frame. The overall opening size of the test specimen was 3,784 mm wide x 3,549 mm high. For specific construction details refer to the UL test report File R6799-6 Project 83NK21332 dated 5th May 1985 revised 18th May 1990.

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5. DISCUSSION

5.1 Test standards UL10b vs AS 1530.4-2005

5.1.1 Furnace conditions

5.1.1.1 Time temperature curve

The two standards follow different time temperature curves which differ in their severity over time. The UL curve has a more rapid rise at the start of the test then falls below the AS 1530.4-2005 curve after approximately 60 minutes. In the UL report there is no mention of what the ambient temperature was, so for purposes of this comparison it has been assumed to be 20°C. Based on the area under the curve, for each time temperature regime the UL10B curve starts off having a higher temperature then after approximately 50 minutes the UL10B curve starts to fall below the AS 1530.4-2005 curve. At 120 minutes the AS 1530.4-2005 curve is approximately 1.7% more severe based on the area under curve than the UL10B curve.

In the UL test report it is stated that the furnace complied with the standard for the 180 minute duration of the test, however it is not indicated what the area under the curve was during the test. UL10B allows for $\pm 7.5\%$ for 120 minute tests where as AS 1530.4-2005 allows $\pm 5\%$ for tests longer than 30 minutes.

An examination of the furnace temperature graph in the UL test report and the comparison of the furnace curves suggests that the furnace conditions would have also complied with AS 1530.4-2005 for at least 120 minutes.

5.1.1.2 Furnace thermocouples

A difference between test standards are the furnace thermocouples used. UL10B define either thermocouples protected by a porcelain tube or a wrought-steel/iron tube whereas AS 1530.4-2005 uses 3 mm mineral insulated metal sheathed thermocouples. The difference between thermocouples means the UL10B thermocouples are less responsive to rapid temperature rise than those defined in AS 1530.4-2005. This is due to having a larger thermal mass to heat up, which in turn means the furnace conditions at the start of the UL test are in fact more severe than indicated by the comparison between curves, as more heat is required to achieve the same temperature rise when compared to the furnace thermocouples used in AS 1530.4-2005.

After approximately 40 minutes the temperature rise defined in the curves is reduced and the temperature indicated by the different thermocouples are likely to be more consistent. This difference in thermocouples indicates the severity of exposure on the test specimen is likely to be closer to the AS 1530.4-2005 curve at 120 minutes than a comparison between curves indicates. Therefore it is further considered the furnace temperature gives similar heating conditions to those in AS 1530.4-2005 for at least 120 minutes.

5.1.1.3 Furnace pressure

The pressure conditions of UL10B define a pressure of 0 Pa ± 2.4 Pa (± 0.01 inches of water) at the top of the specimen where as AS 1530.4-2005 defines a neutral plane at 500 mm from the sill. In this case AS 1530.4-2005 is a more severe exposure condition as furnace gases will be pushed through any holes in the test specimen. If there are any combustible materials in the test specimen this positive pressure could cause ignition to the unexposed face of the combustible products from these materials. There were no observations from the test report indicating flaming of the tested specimen

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which is largely non-combustible. Based on the observations it is considered unlikely that flaming would occur if the specimen was tested in accordance with AS 1530.4-2005 for at least 120 minutes.

The positive pressure on the specimen could also possibly cause greater erosion of the metal components causing structural collapse and Integrity failure, however as the test was continued for 180 minutes without failure it is considered for this specimen that the furnace pressure conditions of AS 1530.4-2005 would not prejudice the fire resistance of the sliding doorset before at least 120 minutes.

5.1.2 Failure criteria

The test specimen is an all metal sliding door and as such is only subject to the Integrity criteria of the test standards. In UL10B the Conditions of Acceptance include allowing small flaming on the unexposed face in certain circumstances, doors on guides must not release from the guides or the guide not loosen such that the passage of flames could occur, and the bottom of the door not separate more than 19.1 mm (3/4 inch) or the meeting edge separate by more than 9.5 mm. In the test report it stated that there was no through openings nor evidence of flaming for the duration of the test.

The Integrity criteria of AS 1530.4-2005 for uninsulated shutters include flaming in excess of 10 seconds and penetration of a 6 mm x 150 mm and 25 mm gap gauge. Based on the information in the UL test report it is considered that the test specimen did not fail any of the Integrity criteria of AS 1530.4-2005 for the duration of the test. Therefore it is considered that the test specimen would maintain the Integrity criteria of the test standard for at least 120 minutes.

5.2 Installation details

In UL fire resistance test file R6799-2 Project 97NK30045 the single sliding doorset was installed into a steel framed plasterboard wall mounted into a block lined specimen frame. It is considered that if the sliding door is installed into a similar 120 minute fire rated plasterboard wall with similar mounting details it would not prejudice the fire resistance of the wall.

In UL fire resistance test file R6799-6 Project No. 83NK21332, a bi-parting folding curtain door assembly was installed into a similar construction as above. It is considered that if the sliding door is installed into a similar 120 minute fire rated plasterboard wall with similar mounting details it would not prejudice the fire resistance of the wall.

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6. CONCLUSION

It is considered that based on the UL test report File R6799-2 Project 97NK30045 and File R6799-6 Project No. 83NK21332, if the single or bi-parting sliding doorset had been tested in accordance with AS1530.4-2005 for an un-insulated specimen it would have achieved at least 120 minutes Integrity.

7. LIMITATIONS

This assessment is subject to the completeness and accuracy of the information supplied.


BRANZ reserves the right to amend or withdraw this assessment should additional information become available regarding the fire performance of the items assessed in this report.

8. TERMS AND CONDITIONS

This report is issued in accordance with the Terms and Conditions as detailed and agreed in the BRANZ Services Agreement for this work.

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	Report Number: FAR 3847 Issue 2	Date of Issue: 13 June 2012	Page 6 of 6 Pages
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