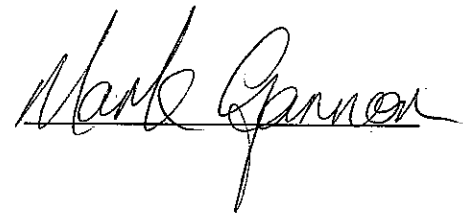


FAR 3576

FIRE RESISTANCE OF A WONDOOR FIRE RATED CURTAIN WITH VARIATIONS TO CONSTRUCTION

Author: Mark Gannon
Fire Testing Engineer



Reviewer: P. Bano-Chapman
Senior Fire Testing 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 WONDOOR FIRE RATED CURTAIN WITH VARIATIONS TO CONSTRUCTION

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 curtain with an increase in panel size up to 8.4 m high x unlimited width but otherwise as tested and assessed in BRANZ assessment report FAR 3571 in accordance with BS 476:Part 22: 1987.

3. BACKGROUND

In BRANZ assessment report FAR 3571 a WonDoor that was tested in accordance with UL 10B was assessed to BS 476:Part 22: 1987 to achieve a fire resistance of at least 120 minutes Integrity. The assessment is based on UL reports No. R6799-2 Project No. 97NK30045, UL File R6799 Project 07NK04154 and UL letter dated 28th August 1998 regarding R6799.

In Underwriters Laboratories Inc (UL) fire resistance test file No. R6799-2 Project No. 97NK30045 tested a folding curtain door assembly 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 (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 3962 mm wide x 3562 mm high. For specific construction details refer to the UL test report File R6799-2 Project 97NK30045 dated 20th November 1997.

In UL File R6799 Project 07NK04154 it was considered that increasing the height to an oversized sliding curtain tested in UL file No. R6799-2 Project No. 97NK30045, would not prejudice its established fire resistance. This is based on drawings supplied to UL with new track details.

UL letter dated 28th August 1998 regarding R6799 – Special purpose type fire door assemblies. This letter discusses the labelling of oversize special purpose fire door assemblies including no maximum width limitation to the Won-Door folding curtain design.


M.J.C.


PBC



4. BASIS OF ASSESSMENT

- The assessment does not specifically consider maintenance, durability or serviceability requirements.
- The curtain is assessed in the fully closed position.

5. DISCUSSION

5.1 General

In BRANZ assessment report FAR 3571 a fire rated curtain by WonDoor was assessed to BS 476:Part 22: 1987 for Integrity of 120 minutes. It is proposed that the WonDoor be increased in size up to a maximum height of 8.4m with an infinite width.

5.2 Increase in width

The curtain system consists of modular vertical interlocking slats. It is considered based the fact that the construction details are the same at the leading and trailing edges of the curtain that the WonDoor can be increased in width without prejudice to the fire resistance performance of the doorset.

5.3 Increase in height

For the increase in height a number of factors need to be considered. First what is the effect of the expansion of the curtain with increasing height and will the support structure be sufficient to support the weight of the curtain.

In the test report on the WonDoor referenced in FAR 3571 the deflection of the curtain at 90 minutes was measured as 38 mm at the centre. The deflection of the curtain was stable from 45 minutes to 90 minutes after which no further deflection measurements were reported. Based on the type of specimen and information in the report it is expected that if the curtain was measured at 120 minutes the deflection is likely to be similar.


Using the information from the test it is determined that for an increase in height of up to 8,400 mm the deflection of the curtain when taking into account the curvature of the curtain would be 212 mm at the centre and 70 mm at the leading edge. It has been previously stated by the client that the clearance at the sill of the curtain is at least 15 mm. This indicates that the curtain will become jammed at the sill shortly after the start of the fire test preventing any deflection of the bottom of the leading edge away from the strike. This also means that the curtain resting on the sill will remove a significant amount of weight off the suspension system.

It has previously been stated by WonDoor that the rollers and support system are designed to carry three times the actual weight of the curtain system. Based on this information and the fact that a significant proportion of the weight of the curtain will be supported by the floor it is considered that the WonDoor curtain would not be prejudiced the fire resistance of the doorset before at least 120 minutes if increased in size up to 8.4m.

The client has previously stated that the top of the curtain is effectively locked at the track. During fire exposure the curtain will expand jam at the sill, therefore effectively become fixed at the top and bottom. With no latching mechanism at mid height it is possible that the leading edge could deflect out of the strike at mid height. To prevent


MJS


PBC

	Report Number: FAR 3576	Date of Issue: 10 December 2010	Page 4 of 6 Pages
---	-------------------------	---------------------------------	-------------------

this the depth of the strike must be increased to a minimum of 106 mm. Where the leading edge is engaged in the strike by at least 106 mm.

5.4 Bi-parting doors

In UL fire resistance test report File R6799-6 Project 83NK21332 and project 85NK5664 a bi-parting fire door was tested in accordance with UL 10B for up to 3 hours and at the conclusion of the fire test subject to a hose stream test at 45 PSI for 7 minutes and 24 seconds. The tested doorsets were deemed to meet the requirements of the test standard for 3 hours fire endurance.

The test report covered a number of fire tests with variations to construction. The main test covered in the report included a fusible link latching mechanism at the meeting edge which locked the meeting edge together when exposed to fire conditions. One of the subsequent tests covered in the test report included reinforcing of the leading posts to replace the fusible link latching mechanism.

Based on the test report R6799-6 it is considered that the WonDoor can also be installed with a bi-parting meeting edge as tested and reported in UL report R6799-6 and would achieve at least 120 minutes Integrity if tested in accordance with BS 476:Part 22: 1987 for un-insulated specimen.

5.5 Additional information

The test specimen assessed in FAR 3571 was subjected to a fire resistance test in accordance with UL10B for 180 minutes then subjected to the impact and cooling effects of a hose stream at 30 psi for over 7 minutes. The test specimen passed the requirements for both the fire resistance and hose stream tests. The result from the hose stream test indicates that there is a considerable amount of strength left in the test specimen and support structure after 3 hours fire exposure. It also demonstrates that the support structure, leading and trailing edges did not detach under the impact of the hose stream.

The test specimen is assessed to BS 476:Part 22: 1987 for 120 minutes which does not require the application of a hose stream. It is considered based on the additional fire exposure from the UL test and passing the hose stream test the support structure is sufficiently strong to support the increase in curtain height for up to at least 120 minutes.

6. CONCLUSION

It is considered that the WonDoor fire curtain assessed in BRANZ assessment report FAR 3571 based on the UL test report File R6799-2 Project 97NK30045 and Project 07NK04154, would not be prejudiced if increased in height up to a maximum height of 8.4m and an infinite increase in width if tested in accordance with BS 476:Part 22: 1987 for an un-insulated specimen and would achieve at least 120 minutes Integrity.

It is also considered that the bi-parting meeting edges tested and reported in File R6799-6 Project 83NK21332 and project 85NK5664 can also be included in the above WonDoor fire curtain without prejudice to the Integrity of the doorset before at least 120 minutes.


M.J.G.


PBC



7. LIMITATIONS


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

Note: this assessment does not cover maintenance or durability but only the fire resistance of the curtain assuming it is closed at the beginning of fire exposure.

BRANZ reserves the right to amend or withdraw this assessment if information becomes available which indicates the stated fire performance may not be achieved.


MJG


PBC

	Report Number: FAR 3576	Date of Issue: 10 December 2010	Page 6 of 6 Pages
---	-------------------------	---------------------------------	-------------------