

The Fire Resistance Performance of
a Modified Timber Doorset

Report For

Sauerlander Spanplatten GmbH





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a Modified Timber Doorset

Report For

Sauerlander Spanplatten GmbH
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*For and on behalf of Warrington Fire Research Centre.

The assessment report is not valid unless it incorporates the declaration duly signed by the applicant.
This is included in Appendix 2 to this report.

Report Issued : 27th November 1997

The Fire Resistance Performance of a Modified Timber Doorset

1 Introduction

- 1.1 This report presents an appraisal of a timber based doorset design, similar to the basic design of a doorset previously fire tested and reported under the reference WARRES No. 60270/B, but modified as described in Section 3 of this report to allow for an increase in leaf size.
- 1.2 The doorset design is required to be capable of providing a performance of 30 minutes integrity and 30 minutes insulation with respect to BS476: Part 22: 1987, Clause 6.
- 1.3 The data referred to in Appendix 1 has been considered for the purpose of this appraisal which has been prepared in accordance with the Fire Test Study Group Resolution No. 64A: 1993.

2 Assumptions

- 2.1 Door leaf to frame clearance gaps can have a significant effect on the overall fire performance of a timber doorset. It is therefore assumed that the leaf to frame clearance gaps will not exceed those measured for the relevant fire test, referred to in Appendix 1 under the reference WARRES No. 60270/B and in any case will not exceed 2.7 mm
- 2.2 In the preparation of this appraisal it is also assumed that the door leaf is in the fully closed position and the latch bolt is fully engaged in the latch keep plate.
- 2.3 It is further assumed that any supporting masonry/concrete wall structure is capable of providing the required level of fire performance to effectively support the construction for the required period of fire resistance.

3 Proposal

- 3.1 It is proposed that a timber based doorset, previously tested and reported under the reference WARRES No. 60270/B, can be modified by increasing the size of the leaf up to a maximum size of 2040mm high by 926mm wide with no detrimental effect in the required fire resistance performance of 30 minutes integrity and 30 minutes insulation should it be tested in accordance with BS 476: Part 22: 1987, Clause 6.
- 3.2 The proposed doorset design will include no other modifications from that tested.

4 Discussion

Basic Test Evidence

- 4.1 The doorset tested and reported under the reference WARRES No. 60270/B comprised door leaves consisting of a softwood timber internal frame with a moulded, extruded chipboard core and moulded hardboard facings. The door leaves were hung within 1½ pairs of steel butt hinges into a softwood timber door frame which contained a single 10 mm wide by 4 mm thick 'Palusol' intumescent strip within its reveal. The doorset that was installed such that its leaf opened towards the furnace achieved a fire resistance performance of 34 minutes integrity and 34 minutes insulation when tested in accordance with BS 476: Part 22: 1987, Clause 6.

- 4.2 The tested door leaf was of overall dimensions 1980mm high by 820mm wide by 44mm thick.
- 4.3 Failure of the doorset was due to occurrence of sustained flaming at the head of door, between the leaf head and the door frame.

Assessed Performance

- 4.4 The proposal involves increasing the height of the tested door leaf by approximately 3%, and also increasing the width of the door leaf by approximately 13%. This results in a proposed increase in door leaf area of approximately 16%.
- 4.5 The maximum deflection of the door leaf after a period of 30 minutes was 15mm, with the leaf deflecting away from the doorstep towards the furnace. This deflection is considered to indicate a door leaf construction with a reasonable degree of stability, and at this level of deflection a substantial thickness of door leaf would be remaining within the reveal of the door frame.
- 4.6 The exhibition of a reasonable degree of stability would tend to suggest that the mode of failure was not attributable to door leaf height or width, but more as a result of burn through of the leaf to frame junction. It is considered that this type of failure would not have occurred at an earlier point in the test should the door leaf have been tested at the proposed larger size.
- 4.7 The doorset that was tested and reported under the reference WARRES No. 60270/B satisfied the integrity and insulation performance criteria of the Standard for a period of 34 minutes 23 seconds. This represents an increase over the required performance of almost 15%.
- 4.8 It is considered reasonable that this increase of 15% over the required fire resistance period required may be traded against the proposed 16% increase in the leaf area.
- 4.9 It is therefore considered that due to the degree of stability exhibited by the tested leaf and also due to its increased performance over that required, the proposal to increase the size of the leaf up to a maximum of 2040mm high by 926mm wide would be acceptable.

5 Conclusions

- 5.1 The doorset as tested and described in the report, referenced WARRES No.60270/B and summarised in Appendix 1, when incorporating a leaf increased in size up to a maximum of 2040mm high by 926mm wide, is expected to be capable of a performance of 30 minutes integrity and insulation if tested in accordance with BS476: Part 22: 1987, Clause 6.

6 Validity

- 6.1 This assessment is issued on the basis of test data and information available at the time of issue. If contradictory evidence becomes available to WFRC the assessment will be unconditionally withdrawn and Sauerlander Spanplatten GmbH will be notified in writing. Similarly the assessment is invalidated if the assessed construction is subsequently tested because actual test data is deemed to take precedence over an expressed opinion. The assessment is valid initially for a period of two years, i.e. until 1st December 1999, at which time it is recommended that it be returned for re-appraisal.
- 6.2 The appraisal is only valid provided that no other modifications are made to the tested construction other than those described in this report.

27th November 1997

JMP(1955)

Appendix 1

Summary of Supporting Data

A1.1 Warrington Fire Research Centre WARRES No. 60270/B

A report on a fire resistance test performed in accordance with BS 476: Part 22: 1987, Clause 6 on a specimen of a single-acting, single-leaf doorset. The door leaf was of overall size 1980mm high by 820mm wide by 44mm thick and incorporated a moulded, extruded chipboard core nominally 38mm thick, a 38mm by 38mm whitewood internal frame and was faced on each side with a 3mm thick moulded hardboard skin.

The door leaf was hung within a softwood door frame on 1 ½ pairs of steel butt hinges and was latched at mid-height. The door frame was fitted with 10mm by 4mm thick intumescent strips, referenced Lorient LP1004. The door set was mounted within a masonry wall such that it opened towards the heating conditions of the test.

The specimen satisfied the performance requirements specified in Clause 6 of BS 476: Part 22: 1987, for fully insulated doorsets for the following periods:

Integrity : 34 minutes
Insulation : 34 minutes

The test was discontinued after a period of 35 minutes.

Test date : 7th December 1993
Test sponsor : Sauerlander Spanplatten GmbH

Appendix 2

Declaration by Sauerlander Spanplatten GmbH

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. 64A: 1993.

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 the assessment is being made.

We agree to withdraw this assessment from circulation should the component or element of structure be the subject of 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 Warrington Fire Research Centre to withdraw the assessment.

Signed:

For and on behalf of:

**The Fire Resistance Performance
of Modified FD30 Timber Doorsets**

Report for

Sauerlander Spanplatten GmbH & Co. KG
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59805 Arnsberg
Germany

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1 Introduction

This report presents an appraisal of the expected fire resistance performance of modified timber doorsets, similar in construction to previously fire tested doorsets, but modified as detailed within Section 5 of this report.

The modified doorsets are required to satisfy the integrity and insulation performance requirements of BS 476: Part 22: 1987, for a period of 30 minutes.

The data referred to in Section 8 of this report has been considered for the purpose of this appraisal which has been prepared in accordance with the Fire Test Study Group Resolution No. 64A: 1993.

2 Assumptions

It is assumed that the supporting structure is capable of effectively supporting the proposed construction and has been found by separate fire test to be capable of providing the required period of fire resistance.

In addition, it is assumed that the door leaf will be in the fully closed position and the door closer, if fitted, will have the required power rating to fully close the door leaf, overcoming the latch mechanism, when the door leaf is operated from the open position.

The maximum measured door gaps recorded during the tests referenced WARRES Nos. 67040/B and 60270/B were 2.5 mm (doors with intumescent seals in head only) and 3.5 mm (doors with intumescent seals in head and jambs). It is therefore a condition of this assessment that these maximum door leaf to frame gaps be adhered to.

3 Proposals

It is proposed to provide doorsets, similar in construction to those tested under references WARRES No. 67040/B and WARRES No. 60270/B incorporating door leaves of increased dimensions as detailed within Section 5.

4 Discussion

4.1 Basic Test Evidence

Test report reference WARRES No. 67040/B included a single-acting, single-leaf doorset. The doorset included a door leaf of dimensions 1985 mm high by 824 mm wide by 44 mm thick and incorporated a 10 mm wide by Palusol based intumescent seal within the head of the door leaf. The door leaf was latched at mid-height.

The doorset satisfied the integrity performance criterion of the Standard for a period of 33 minutes. Integrity failure was due to sustained flames co-incident with the lower trailing edge area.

Test report reference WARRES No. 60270/B included a single-acting, single-leaf doorset. The doorset included a door leaf of dimensions 1980 mm high by 820 mm wide by 44 mm thick which was latched at mid-height. The head and jambs of the door frame included a single 10 mm wide Palusol based intumescent seal.

The doorset satisfied the integrity performance criterion of the Standard for a period of 34 minutes. Integrity failure was due to sustained flames co-incident with the head of the door leaf.

The door leaves within each of the above tests comprised a 38 mm thick routed chipboard core of nominal density 520 kg/m³ within a softwood stile and rail arrangement (38 mm by 38 mm of nominal density 510 kg/m³) faced with 3 mm thick hardboard. Each door leaf was hung on three steel butt hinges within a softwood door frame of nominal density 440 kg/m³.

5 Assessed Performance

5.1 FD30 Doorsets (Intumescent in head only)

The proposed door leaves are to be specified as per that tested under reference WARRES No. 67040/B, i.e including an intumescent seal within the head of the doorset only.

Whilst the tested door leaf was of overall dimensions 1985 mm high by 824 mm wide, it is proposed that the door leaves be of increased dimensions up to those detailed within Figure 1 below.

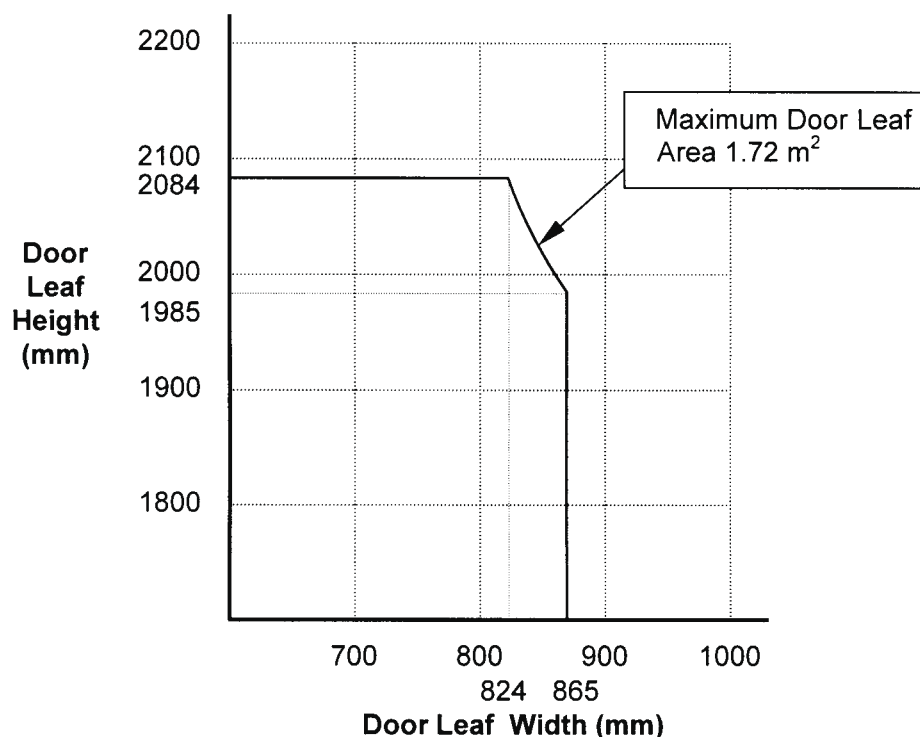


Figure 1. Proposed Door Leaf Dimensions (Intumescent in head only)

Maximum Door Leaf Height	Maximum Door Leaf Width	Maximum Door Leaf Area
2084 mm high (at 824 mm wide)	865 mm wide (at 1985 mm high)	1.72 m ²

Table 1. Proposed Door Leaf Dimensions (Intumescent in head only)

The observations to the test report state that after a test duration of 20 minutes the maximum perimeter door leaf distortion was recorded as being 6 mm and there are no further details of any significant visible deflections of the door leaf.

Furthermore, the mode of integrity failure was due to sustained flames co-incident with the lower trailing edge area, which is not considered to be related to door leaf dimensions.

The increase in the doorset dimensions of nominally 5 % in height, width or area are not considered to be excessive when considered against the achieved overrun of 10 % compared to the required 30 minutes integrity.

5.2 FD30 Doorsets (Intumescent head and jambs)

The proposed door leaves are to be specified as per that tested under reference WARRES No. 60270/B, i.e including an intumescent seal within the head and jambs of the doorset.

Whilst the tested door leaf was of overall dimensions 1980 mm high by 820 mm wide, it is proposed that the door leaves be of increased dimensions up to those detailed within Figure 1 below.

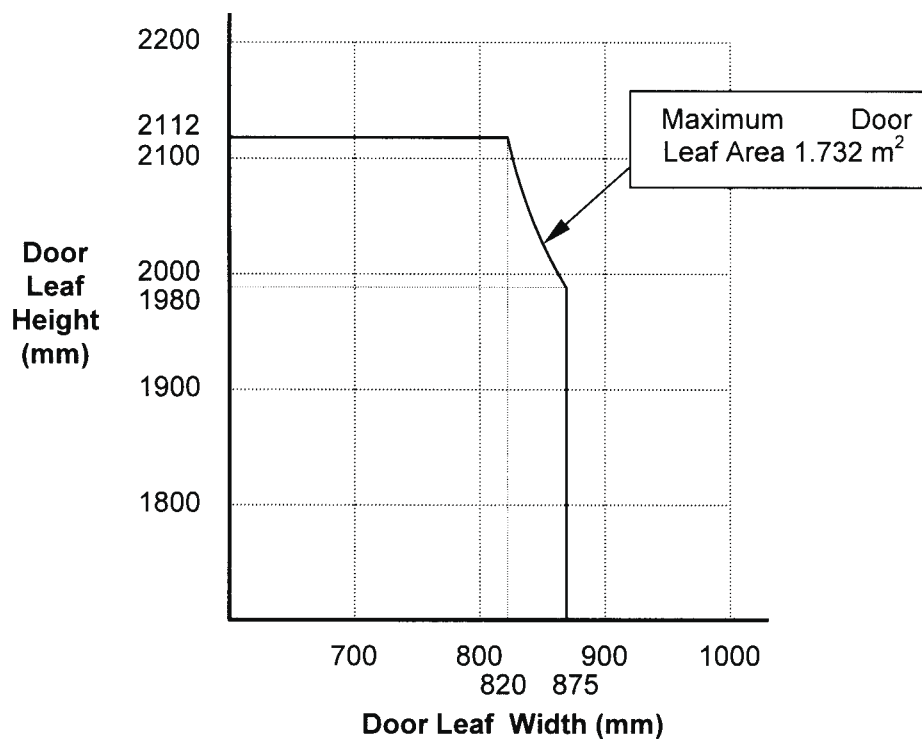


Figure 2. Proposed Door Leaf Dimensions (Intumescent in head and jambs)

Maximum Door Leaf Height	Maximum Door Leaf Width	Maximum Door Leaf Area
2112 mm high (at 820 mm wide)	875 mm wide (at 1980 mm high)	1.732 m ²

Table 2. Proposed Door Leaf Dimensions (Intumescent in head and jambs)

The observations to the test report state that after a test duration of 30 minutes the maximum perimeter door leaf distortion was recorded as being 15 mm.

The increase in the doorset dimensions of nominally 6 % in height, width or area are not considered to be excessive when considered against the achieved overrun of 13 % compared to the required 30 minutes integrity.

6 Conclusions

The doorset assemblies as tested under references WARRES No. 67040/B and WARRES No. 60270/B, when modified as discussed in Section 5 of this assessment, are expected to be capable of achieving an integrity and insulation (where applicable) performance in excess of 30 minutes, if tested in accordance with BS 476: Part 22: 1987.

7 Validity

This assessment is issued on the basis of test data and information available at the time of issue. If contradictory evidence becomes available to WFRC the assessment will be unconditionally withdrawn and Sauerlander Spanplatten will be notified in writing. Similarly the assessment is invalidated if the assessed construction is subsequently tested because actual test data is deemed to take precedence over an expressed opinion.

The assessment is valid initially for a period of two years, i.e. until 1st May 2003, at which time it is recommended that it be returned for re-appraisal.

8 Summary of Supporting Data

WARRES No. 67040/B

Fire resistance test conducted in accordance with BS 476: Part 22: 1987, on a single specimen of a single-acting, single-leaf timber based doorset.

The doorset included a door leaf of dimensions 1985 mm high by 824 mm wide by 44 mm thick.

Test results:

Integrity : 33 minutes
Insulation : 33 minutes

Test date : 12th April 1996
Test sponsor : Sauerlander Spanplatten GmbH

WARRES No. 60270/B

Fire resistance test conducted in accordance with BS 476: Part 22: 1987, on a single specimen of a single-acting, single-leaf timber based doorset.

The doorset included a door leaf of dimensions 1980 mm high by 820 mm wide by 44 mm thick.

Test results:

Integrity : 34 minutes
Insulation : 34 minutes
Test date : 16th November 1992
Test sponsor : Sauerlander Spanplatten GmbH

9 Declaration by Sauerlander Spanplatten GmbH

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. 64A: 1993.

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 the assessment is being made.

We agree to withdraw this assessment from circulation should the component or element of structure be the subject of 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 Warrington Fire Research Centre to withdraw the assessment.

Signed:

For and on behalf of:

10 Signatories

Prepared by: S. Hankey * **S. Hankey**

Reviewed by: D. Hankinson * **D. Hankinson**

* For and on behalf of Warrington Fire Research Centre.

The assessment report is not valid unless it incorporates the declaration duly signed by the applicant. This is included in Section 9 to this report.

Report Issued: 10th April 2001

