

TABLE OF CONTENTS

Page No.

**The Fire Resistance Performance of
Linear Gap Sealing Systems with
Respect to BS 476: Part 20: 1987**

Report for

Soudal N.V.
Everdongenlaan 18-20
B-2300 Turnhout
Belgium



The Professionals in Fire Safety

Warrington Fire Research Centre Limited., Holmesfield Road, Warrington, UK WA1 2DS
Tel: int + 44 (0)1925 655116 • Fax: int + 44 (0)1925 244838 • Reg No 1247124

TABLE OF CONTENTS

SECTION	PAGE
1 INTRODUCTION	3
2 ASSUMPTIONS	3
3 PROPOSAL	3
4 DISCUSSION	3
4.1 PREVIOUS TEST EVIDENCE	3
4.2 COMPARISON BETWEEN PREVIOUS TEST CONDITIONS AND BS 476: PART 20: 1987	4
4.2.1 HEATING CONDITIONS	4
4.2.2 FURNACE PRESSURE	4
4.2.3 PERFORMANCE CRITERIA	4
5 CONCLUSIONS	5
6 VALIDITY	5
7 SUMMARY OF SUPPORTING DATA	5
8 DECLARATION BY SOUDAL N.V.	6
9 SIGNATORIES	6
ANNEX A	7
TABLE 1	7

1 Introduction

This report provides a considered opinion regarding the expected fire resistance performance of wall mounted linear gap sealing systems, if tested utilising the heating conditions and general principles of BS 476: Part 20: 1987.

The gap seals have been previously subjected to an ad-hoc test at The University of Gent, Belgium to provide information for the assessment of the sealing systems to prEN 1366-4, NBN 713.020 and BS 476: Part 20: 1987.

The data referred to in Section 7 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 proposed gap seals will be fitted within vertical separating elements of similar construction to those tested, using a similar method of installation.

It is also assumed that all materials used will be identical to those of the previously tested specimens, other than where specified in this report.

3 Proposal

It is proposed that the linear gap sealing systems, which were previously subjected to an ad-hoc fire resistance test under the reference Beproeivingsverslag Nr. 9297 to provide information for assessment purposes, shall satisfy the integrity and insulation performance requirements of BS 476: Part 20: 1987 for the same durations as previously tested.

A description of the previously tested seals and a summary of the results achieved is contained in Table 1 of Annex A, of this report.

4 Discussion

4.1 Previous Test Evidence

The previous test was conducted on eleven specimens of linear gap sealing systems which each incorporated either Soudafoam FR, Soudal Firecyl 4H or Soudal Fire Silicone B1.

The specimens were subjected from one direction to the heating conditions specified in EN 1363-1: 1999 utilising the plate thermometers referred to in this Standard. The unexposed surface thermocouples were positioned in accordance with the requirements of prEN 1366-4. Throughout the test the specimens were subjected to a maximum pressure on their exposed face of 20 (\pm 5) Pa, relative to the laboratory atmosphere.

The specimens were evaluated against the performance requirements for integrity and insulation as specified in prEN 1366-4 and the results are as specified in Table 1 of Annex A.

4.2 Comparison Between Previous Test Conditions and BS 476: Part 20: 1987

There is currently no specific British Standard test method for linear gap sealing systems used to reinstate the fire resistance performance of wall and floor constructions at positions where they are provided with joints. For this reason, such sealing systems are usually fire tested utilising the heating conditions and general principles of BS 476: Part 20: 1987, which provides the basis for all British Standard fire resistance tests within the BS 476 series. The differences between the requirements of BS 476 and the conditions utilised for the previous fire test shall each be considered separately.

4.2.1 Heating Conditions

The test was conducted utilising the heating conditions specified in EN 1363-1: 1999 utilising the plate thermometers. The specified furnace temperature according to BS 476: Part 20: 1987 after any particular duration of the test is identical to that specified in the European Standard. However, the furnace temperature during a British Standard fire test would be measured by means of 1.5 mm diameter, mineral insulated thermocouples.

Recent research and development work conducted by WFRC has demonstrated that the plate thermometer is less responsive in recording fluctuations in the furnace temperature than the 1.5 mm diameter, mineral insulated thermocouples. For this reason it is necessary to increase the input of fuel into the furnace chamber during a test to EN, to compensate, particularly during the early stages.

For this reason it is considered that the heating conditions used for the previous test, which were controlled using the plate thermometers, represent a more onerous testing condition than those specified for a test to BS 476: Part 20: 1987.

4.2.2 Furnace Pressure

The tested specimens were subjected to a maximum positive furnace pressure of 20 (\pm 5) Pa during the test. If the test had been conducted to BS 476 the pressure would have been controlled such that the furnace pressure did not exceed 20 Pa at the top of the sealing systems during the test.

It is therefore considered that the furnace pressure conditions adopted for the test are essentially similar to the conditions required by BS 476: Part 20: 1987.

4.2.3 Performance Criteria

The tested specimens were evaluated against the integrity and insulation performance criteria of prEN 1366-4. This integrity and insulation criteria is essentially the same as the integrity and insulation criteria which would be adopted for a test utilising the principles of BS 476: Part 20: 1987.

The main difference between the integrity criteria for each of the aforementioned Standards is that the EN test method requires the cotton pad to be applied for a period of thirty seconds, as opposed to the ten seconds required by BS. It is considered that the application of the cotton pad for a longer duration represents a more onerous testing condition, since there is a greater risk of the pad glowing or igniting during this extended period.

The gap gauge and sustained flaming criteria used to determine the integrity performance are identical for both Standards and the maximum allowable unexposed surface temperature rise of 180 °C would also be used to evaluate the insulation criteria for both test methods.

It is therefore considered that the performance criteria for both Standards are very similar, although the requirements for the EN test method may be slightly more onerous.

5 Conclusions

It is considered that the linear gap sealing systems listed in Table 1 of Annex A, which were previously subjected to an ad-hoc test under the reference Beproeivingsverslag Nr. 9297, would achieve a similar integrity and insulation performance if subjected to a test utilising the heating conditions and general principles of BS 476: Part 20: 1987.

6 Validity

This assessment is issued on the basis of the test data and information available at the time of issue. If contradictory evidence becomes available to WFRC the assessment will be unconditionally withdrawn and Soudal N.V. 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 June 2002, at which time it is recommended that it be returned for re-appraisal.

The appraisal is only valid provided that no other modifications are made to the tested or assessed construction other than those described in this report.

7 Summary of Supporting Data

Beproeivingsverslag Nr. 9297

An ad-hoc fire resistance test conducted using the general principles of prEN1366-4.

Each of the sealing systems incorporated either Soudafoam FR, Soudal Firecryl 4H or Soudal Fire Silicone B1.

The test results and further details of each of the tested specimens is provided in Table 1 of Annex A, of this report.

Test Date : 7th December 1999
Test Sponsor : Soudal N.V.

8 Declaration by Soudal N.V.

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:

9 Signatories

Prepared by: *D. Hankinson* * **D. Hankinson**

Reviewed by: *D. Williams* * **D. Williams**

* 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 8 to this report.

Report Issued: 11th May 2000

This report may only be reproduced in full. Extracts or abridgements of reports shall not be published without permission of Warrington Fire Research Centre.



Annex A

Table 1

Specimen Ref.	Wall Depth (mm)	Sealant Ref*	Gap Width (mm)	Sealant Depth (mm)	Backing Rod	Integrity (minutes)	Insulation (minutes)
1	200	Soudafoam FR	11	200	None	229	229
2	200	Soudafoam FR	41	200	None	110	110
3	200	Soudal Firecryl 4H	20	20	25 mm diameter Polyethylene	240	240
4	200	Soudal Fire Silicone B1	11	10	15 mm diameter Polyethylene	240	240
5	200	Soudal Fire Silicone B1	31	20	40 mm diameter Polyethylene	225	240
6	100	Soudal Fire Silicone B1	33	20	40 mm diameter Polyethylene	116	187
7	100	Soudal Fire Silicone B1	11	10	15 mm diameter Polyethylene	146	202
8	100	Soudal Firecryl 4H	21	20	25 mm diameter Polyethylene	210	240
9	100	Soudal Firecryl 4H	11	10	15 mm diameter Polyethylene	187	240
10	100	Soudafoam FR	31	100	None	50	50
11	100	Soudafoam FR	11	100	None	103	104

*Soudafoam FR applied through full thickness of the wall.

Fire Silicone B1 and Firecryl 4H seals applied flush with both faces of the wall using two separate backing rods.

Mr G Stamberger
Soudal NV
Everdongenlaan 18-20
B-2300
Turnhout
Belgium

Review of Assessment Report Referenced WFRC No. C113610

1 Introduction

The assessment referenced WFRC No. C113610 provides an opinion regarding the expected fire resistance performance of linear gap sealing systems if tested utilising the principles of BS 476: Part 20: 1987.

The expected fire performance of each seal under consideration is tabulated in Annex A of the assessment.

2 Confirmation of Specification

It has been confirmed by Soudal NV that there have been no changes to the specification of the construction considered in the original appraisal referenced WFRC No. C113610.

3 Conclusions

The data used for the original appraisal has been re-examined and found to be satisfactory.

The procedures adopted for the original assessment have also been re-examined and are similar to those currently in use.

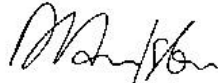
Therefore, with respect to the assessment of performance given in WFRC No. C113610, the contents should remain valid until the 1st March 2004.

4 Validity

This review is based on information used to formulate the original assessment. No other information or data has been provided by Soudal NV which could affect this review.

The original appraisal report was performed in accordance with the principles of the UK Fire Test Study Group Resolution 64A: 1993, which has since been superseded by Resolution 82: 2001. This review has therefore also been conducted using the principles of Resolution 82: 2001.

Performed by:



D. Hankinson
Technical Officer
Technical Department
Warrington Fire Research Centre

Reviewed By:



A. Kearns
Technical Officer
Technical Department
Warrington Fire Research Centre