Test Report

WARRES No. 125255

External Fire Exposure Roof Test
BS 476: Part 3: 1958

Sponsored By

ENDUREED UK.I.
8 Thorsby Road
Altrincham
Cheshire
WA15 7QP

Warrington FIRE research

(LJL10195W)

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1 Purpose Of Test

To determine the performance of specimens of a roof construction when they are subjected to the conditions of the test specified in BS 476: Part 3: 1958, "British Standard Specification for Fire Tests on Building Materials and Structures - External Fire Exposure Roof Tests".

NOTE: BS 476: Part 3: 1958 has been withdrawn and has been superseded by BS 476: Part 3: 1975. BS 476: Part 3: 1958 is referred to in various building legislation documents, however, and the test is therefore still conducted.

2 Scope Of Test

The tests described in BS 476: Part 3: 1958 are designed to give information concerning the hazard that exists of fires spreading to the roof of a building from a nearby fire outside the building itself and are not concerned with the behaviour of a roof when it is subjected to the effects of fire on its underside.

The tests are designed to provide an evaluation of the following characteristics of a roof construction when its external surface is exposed to specified conditions of radiated heat and flame:

(a) its ability to resist penetration by fire

(b) its ability to resist spread of flame over its external surface

The test specimens are tested at an angle of 45° to the horizontal (sloping position) unless the roof construction is used at an angle of less than 10° to the horizontal, in which case the specimens are tested horizontally (flat position).

The test specimens are designated according to their performance during the tests.

3 Description Of Test Specimens

The description of the test specimens given below has been prepared from information provided by the sponsor of the test. All values quoted are nominal.

The specimens were representative of a non-insulated roof construction incorporating "ENDUREED® Premium Thatch Shingles" applied to a plywood deck and were constructed as follows:

19mm thick exterior grade plywood, covered on one face with one layer of "Soprema HR/FR", a self-adhesive, granulated colphene membrane (manufactured by Soprema Incorporated) having a thickness of 3.7mm and a weight per unit area of 1.1lbs/ft²

"ENDUREED® Premium Thatch Shingles" (manufactured by C & H Roofing Incorporated), each having the dimensions 10inch long x 36inch wide x 26mm thick and a weight per unit area of 250lbs/m² were cut to the length required to fabricate the test specimens.

The "ENDUREED® Premium Thatch Shingles" were mechanically fastened through the underlay and into the plywood deck utilising 11 gauge stainless steel annular ring shank roofing nails. The sponsor stated that the "ENDUREED® Premium Thatch Shingles" were laid as they would be in practice with an overlap of 5inches.

The sponsor further stated that "ENDUREED® Premium Thatch Shingles" comprise individual "GEON®" high grade PVC reeds bound by a metal binder strip (product referenced "Battenbar™") manufactured from grade 304 stainless steel.

In the case of each specimen tested, joint details in the "ENDUREED® Premium Thatch Shingles" were representative of those that would be used in practice.

Two of the specimens tested during the fire penetration section of the test included examples of joints that could occur in practice in the "Soprema HR/FR" membrane. One specimen included a 6inch wide side lap whilst the other included a 6inch wide end lap.

The specimens were supplied by the sponsor. Warrington Fire Research Centre was not involved in any selection or sampling procedure.

4 Conditioning Of Specimens

The specimens were received on the 7th June 2002.

Prior to testing the specimens were conditioned to equilibrium in an atmosphere having a temperature of 70 ± 5° F and a relative humidity of 55 to 65%.

5 Date Of Test

The test was performed on the 17th June 2002.

6 Test Procedure

The test was performed in accordance with the test procedures specified in BS 476: Part 3: 1958 and this report should be read in conjunction with that British Standard.

Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group has identified a number of such areas and has agreed resolutions which define common agreement of interpretations between fire test laboratories which are members of the Group. Resolution No. 61 applies to BS 476: Part 3: 1958 and specifies a tolerance for the output from the copper disc radiometers used to calibrate the surface combustion heaters, the heating being adjusted so that the relevant copper disc radiometers give an output of 25 ± 1.5 mV prior to the test. This procedure was followed during this test.

7 Orientation Of Specimens

The specimens were tested in the sloping position.

8 Test Results

The test results relate only to the behaviour of the test specimens of the construction under the particular conditions of test, they are not intended to be the sole criterion for assessing the potential fire hazard of the construction in use.

The test results relate only to the specimens of the roof construction which were tested. Small differences in the composition or thickness of the construction may significantly affect the results of the test and may therefore invalidate the test results. Care should be taken to ensure that any construction which is supplied or used is fully represented by the specimens which were tested.

The results of the tests on each of the specimens are given in Table 1.

IN ACCORDANCE WITH THE DESIGNATIONS DEFINED IN BS 476: PART 3: 1958 THE TEST SPECIMENS ARE IN CATEGORY EXT.S.AA.

9 Validity

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over five years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

Responsible Officer

I Moore

I MOORE
Technical Officer -
Reaction to Fire Testing

Approved

C. Jean
C. OEAN

pp **P E LYTHGOE**
Testing Manager, Testing Department
Reaction to Fire Testing
for and on behalf of
WARRINGTON FIRE RESEARCH CENTRE

Date of Issue: 21 June 2002

(LJL10195W)

Table 1

PRELIMINARY IGNITION TEST - Specimen No: 1			
No sustained ignition occurred			
FIRE PENETRATION TEST - Specimen No:	**2**	**3**	**4**
After exposure to radiant heat for one hour	NIL	NIL	NIL
SPREAD OF FLAME TEST - Specimen No:	**5**	**6**	**7**
Spread of flame down the specimen	NIL	NIL	NIL
OTHER OBSERVATIONS:			
There was no dripping from the underside of the specimens. No mechanical failures were observed and no holes developed during the tests.			

Designation Of Specimens

The following is reproduced from clause 7 of BS 476: Part 3: 1958.

The designation of specimens subject to conditions of external fire shall be according to both the time of penetration and the distance of spread of flame along their external surface.

Each category designation shall consist of two letters, e.g. AA, AC, BB these being determined as follows:

A Those specimens which have not been penetrated within 1 hour
B Those specimens which are penetrated in not less than ½ hour
C Those specimens which are penetrated in less than ½ hour
D Those specimens which are penetrated in the preliminary test.

2nd Letter

A Those specimens on which there is no spread of flame
B Those specimens on which there is not more than 21 inches spread of flame
C Those specimens on which there is more than 21 inches spread of flame
D Those specimens which continue to burn for 5 minutes after the withdrawal of the test flame or spread more than 15 inches across the region of burning in the preliminary test.

Attention shall be drawn to dripping from the underside of the specimen, any mechanical failure, and any development of holes, by adding a suffix `X' to the designation to denote that one or more of these took place during the test.