

Title:

CLASSIFICATION OF THE
DURABILITY OF REACTION
TO FIRE PERFORMANCE
IN ACCORDANCE WITH
BS EN 16755:2017.

Product Name:

Western Red Cedar

Application:

Exterior

Report No:

WF 430139

Issue No:

2

Prepared for:

Burnblock ApS
Wilders Plads 15C ,
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Date:

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1. Introduction

This classification report defines the classification assigned to the durability of the fire performance of Western Red Cedar (*Tuja Plicata*) when treated with Burnblock fire retardant treatment in line with the procedures given in EN 16755: 2017.

2. Details of classified fire retardant treatment

The treatment product is Burnblock manufactured by Burnblock ApS, the sponsors of this report. Burnblock is a fire retardant chemical treatment which is used to impregnate timber using a high pressure vacuum treatment method. The wood is treated using Burnblock under pressure for a retention rate of 33.7 kg/m³. Full details of the treatment are provided in the table below.

General Description		Burnblock treated Western Red Cedar (<i>Tuja Plicata</i>)
Treatment Trade Name		Burnblock
	Sampling Method	15mm Western Red Cedar was selected randomly from stock, ensuring as wide a density and quality range as possible within given specifications (350-450 kg/m ³)
	Conditioning	The specimens were stored in a conditioning room with an atmosphere of relative humidity of 50 ± 5 % and a temperature of 23 ± 2 °C. The test specimens were kept in this room until the tests were performed.
Flame retardant summary	Trade name	BURNBLOCK®
	Generic Type	BURNBLOCK® JG30
	Treatment Process	Pressure Impregnation
	Solution Strength	12 wt. %
	Net chemical retention level	33.7 Kg/m ³
	Cycle details	Pre vacuum 50 min 0.1 bar, Pressure 30 min 12 bar
Coatings		N/A

3. Reports referenced in this report

The following reports have been used to compile the data needed to produce this report. The reports relate to the hygroscopicity and flammability characteristics of the treated timber assessed in relating to the durability of its fire retardant treatment

Test Report Number	Laboratory Issuing the Report	Subject of the Report
MH202011d/3	Univerza v Ljubljani Biotehniška	Hygroscopic properties
MH20211BB/3	Univerza v Ljubljani Biotehniška	Weathering Conditions
PCA10648A	DBI (Danish Institute of Fire and Security Technology)	Classification to EN 13501
P119353-1000	Building Research Establishment	Cone calorimeter tests to ISO 5660

4. Hygroscopic Properties of the Product

The hygroscopic properties of the Burnblock treated Western Red Cedar were determined by Univerza v Ljubljani Biotehniška in accordance with annex A of EN 16755 and reported in MH202011d/3

All specimens were conditioned at 50%RH and 23°C until constant mass. They were then exposed to humidity conditions of 90 %RH and 27°C again until constant mass is achieved.

The results of the tests were as follows:

Retention level (kg/m ³)	Average Moisture content prior to high humidity exposure (%)	Equilibrium Moisture content after exposure to high humidity (%)	Conclusion (Pass/Fail) (<28%)
C70A - 33.6	7.6	16.2	Pass (EXT)
C1 - / (untreated)	11.5	21.0	

Note: the criteria for DRF Class EXT are:

- i) Moisture content < 28 %
- ii) No exudation of liquid
- iii) Minimum visible salt with no increase at surface

5. Weathering Conditions

Specimens of the Burnblock treated Western Red Cedar timber were then weathered in accordance with EN 16755:2017, using 12 one-week cycles consisting of 96h of water exposure and 72h drying. The method and results are detailed in Univerza v Ljubljani Biotehniška report MH20211BB/3.

6. Fire testing methods

The fire test methods used to compare the performance of the weathered and unweathered product to determine the durability of the treatment can be either EN 13823 (the Single Burning Item (SBI)) or the cone calorimeter (ISO 5660).

For the purpose of the comparison of the behaviour of Burnblock treated Western Red Cedar timber for use in Exterior areas prior to and following weathering of the product, the tests were conducted to ISO 5660 at an imposed heat flux of 50KW/m².

The criteria for the performance of weathered Class B product is:

Heat Release Rate $HRR_{30s\ ave} \leq 150kW/m^2$ 600s after ignition
 Total Heat Release THR_{600s} increase $\leq 20\%$ compared to the unweathered product¹.

Note 1:

The National foreword to BS EN 16755 states:

'The criteria for demonstrating durability of reaction to fire performance of wood used externally (EXT class) as set out in EN 16755 Clause 5.3.4, Table 1, note d, is, in the opinion of the UK committee, unreliable as an indication that performance is maintained in service. For UK purposes, the committee recommends that maintenance of reaction to fire performance should be demonstrated by Heat Release Rate (appropriate to RTF class) alone.'

This statement and the requirement under the British Standard version of this European Standard is because it was recognised that when the timber is at Class B then a 20% increase in the total heat release is a very small number and can be exceeded simply in the variability between the measurement in 3 specimens of timber whether or not it has been weathered and therefore is an unreliable criteria for determining the effects of weathering.

In the UK therefore determination of the effectiveness of the fire retardant treatment for any timber species for exterior use is based solely on the rate of heat release.

7. Test reports & test results in support of durability classification

The initial fire performance of the unweathered product was Class B-s1,d0. The report number for this classification is DBI report PCA10648A.

The results of the ISO 5660-1 testing in support of EN 16755:2017 are detailed in BRE report P119353-1000

Maximum HRR for 600s after ignition/ kW m ² PASS/FAIL	% Increase THR at 600 s after weathering
Pass	(Note 1)

8. Classification and field of application

8.1 Reference of classification

This classification has been carried out in accordance with clause 5.3 of EN 16755:2017.

8.2 Classification

The Burnblock fire retardant treatment when used to upgrade the fire performance of Western Red Cedar meets the requirements for both hygroscopic and reaction to fire performance after weathering exposure and can therefore be classified according to the British Standard, BS EN 16755 taking into account the national forward:

**DRF Class
INT1, INT2 and EXT (Note 1)**

8.3 Field of application

This classification for INT1, INT2 and Exterior useage is valid according to the British Standard for the following applications, as defined in connection with BS EN 16755:2017.

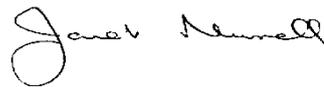
- i) Western Red Cedar (Tuja Plicata)
- ii) Net Chemical Retention of 38 kg/m³
- iii) For Burnblock treatment only

SIGNED



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Katie Williams
Certification Engineer

APPROVED



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Janet Murrell
Technical Manager
Technical Department
on behalf of **Warringtonfire**

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Revised By: K Williams	Approved By: J Murrell
Reason for Revision: This document replaces Issue 1 (dated 16 th February 2021) of the same number which has been withdrawn. Minor amendments were made to the wording in the Classification and Field of Application in this Issue 2 report. The classification has not changed from the Issue 1 report.	