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REPORT

Reaction to fire testing of coated Cross Laminated Timber (CLT)
Single Burning Item test according to EN 13823:2010 + A1:2014

Report no.	2020-Efectis-R000826
Sponsor	Intumescent Systems Ltd Envirograf House Barfrestone CT15 7JG DOVER UNITED KINGDOM
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Notified body no.	1234
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1. PRODUCT IDENTIFICATION

Coated Cross Laminated Timber (CLT), further referred to as 'the product'.

1.1 ASSESSMENT INFORMATION

2. ABSTRACT

Determination of the reaction to fire properties of the product, when exposed to the thermal attack by a **Single Burning Item** according to EN 13823:2010 + A1:2014, with the objective to obtain the reaction to fire classification according to EN 13501-1:2018.

3. DETAILS OF THE PRODUCT TESTED

3.1 INTENDED APPLICATION

The product will be used as a wall covering.

3.2 MANUFACTURER/IMPORTER

Intumescent Systems Ltd
Envirograf House
Barfrestone
CT15 7JG DOVER
UNITED KINGDOM

3.3 PRODUCT DESCRIPTION

According to the sponsor the product is from inside out composed of:

- Cross Laminated Timber coated with:
  - One coat of HWAP primer at 12 m^2 per litre;
  - Two coats of HW02/N Clear Intumescent coating at 8 m^2 per litre per coat;
  - One coat of Enviro Clear top coat in satin at 8 m^2 per litre.

The product has a total thickness of 45 mm and a density of approx. 500 kg/m^3.

4. DETAILS OF THE EXAMINATION

4.1 SAMPLES

Sampling procedure	The specimens were prepared and submitted by the sponsor.
Age	At the time of receipt: no information received.
Date of receipt	March 20, 2020

4.2 SPECIMENS

Substrate used	Cross Laminated Timber (CLT)
Specimen preparation	The long specimen wing was onlt provided with vertical joints.

4.3 CONDITIONING

Prior to the examinations, the specimens were conditioned over a period of 2 weeks minimum at a temperature of (23 ± 2) ºC and a relative humidity of (50 ± 5) % according to § 4.1 of EN 13238.

4.4 EXAMINATION

Method of mounting and fixing	The panels were positioned with an air gap of 40 mm to the backing board.
Exposed surface	The inside of the product was exposed by flames during testing.
Deviations from the test method	None
Harmonised Product Standard	At the time of examination of the product, the sponsor was not aware of a related existing Harmonised Product Standard.
Assessment	In accordance with the Note in §A.6.1.2 of EN 13823 a smoke correction of the measured Total Smoke Production (TSP) of the product is conducted. An additional SBI test was performed to measure the TSP of the SBI system itself. The result is used to correct the average TSP of the SBI tests performed on the product by deducting the smoke production of the system. The corrected value will be used as the classification parameter for the TSP.
Number of tests	A total of four Single Burning Item tests, including an additional test to determine the amount of smoke correction, were carried out, all in accordance with EN 13823.
Date of examination:	April 7, 2020
Location of examination	Efectis Nederland BV, Bleiswijk, The Netherlands

The results are given in Table 1.

Table 1: Single Burning Item classification parameter results

Test number / Test parameter		1	2	3	**Classification parameter**	Smoke correction
Sample variant		45 mm				
$FIGRA_{0.2\ MJ}$	[W/s]	91	143	55	**96**	
$FIGRA_{0.4\ MJ}$	[W/s]	83	114	55	**84**	
THR_{600s}	[MJ]	4.4	4.5	3.6	**4.2**	
LFS	{Yes, No}	No	No	No	**No**	
SMOGRA	[m^2/s^2]	5.4	8.6	6.1	**6.7**	
TSP_{600s}	[m^2]	49	59	54	**54 - 22 = 32**	22
Flaming droplets/particles						
Flaming ≤ 10 s	{Yes, No}	No	No	No	**No**	
Flaming > 10 s	{Yes, No}	No	No	No	**No**	

FIGRA	Fire growth rate: The maximum of the quotient of heat release rate from the burning specimen and the time of its occurrence, determined during the full test period, using a THR-threshold of 0.2 MJ or 0.4 MJ and a HRR_{av}-threshold of 3 kW.
THR_{600s}	Total heat release from the burning specimen during the first 600s of exposure to the main burner flames.
LFS	Lateral flame spread over the long specimen wing.
SMOGRA	Smoke growth rate: The maximum of the quotient of smoke production rate from the burning specimen and the time of its occurrence (multiplied by 10.000), determined during the full test period, using the TSP-threshold of 6 m^2 and the SPR_{av}-threshold of 0.1 m^2/s.
TSP_{600s}	Total smoke production from the burning specimen during the first 600s of exposure to the main burner flames.

Observations of physical behaviour of the test specimen: None

5. CONCLUSIONS

A formal classification is to be assessed in accordance with EN 13501-1, “Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests”.

Graphs of Rate of Heat Release ($HRR_{av}(t)$), Rate of Smoke Production ($SPR_{av}(t)$), Total Heat release (THR(t)), Total Smoke Production (TSP(t)), $FIGRA_{0.2\ MJ}$, $FIGRA_{0.4\ MJ}$ and SMOGRA, are presented hereafter followed by some photographs of the test setup and test results.

Remarks:
The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

Regarding the estimated precision of the test method, the following information is given in Annex B of EN 13823.

Table B.2 — Average relative standard deviations

	$FIGRA_{0.2\ MJ}$	$FIGRA_{0.4\ MJ}$	$THR_{600\ s}$	SMOGRA	$TSP_{600\ s}$
Average (s_r /m)	14 %	15 %	11 %	15 %	18 %
Average (s_R /m)	23 %	25 %	21 %	40 %	44 %

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APPENDIX: CHARTS

Chart 1	Rate of Heat Release ($HRR_{av}(t)$) [kW]
Chart 2	Rate of Smoke Production ($SPR_{av}(t)$) [m^2/s]
Chart 3	Total Heat release (THR(t)) [MJ]
Chart 4	Total Smoke Production (TSP(t)) [m^2]
Chart 5	$FIGRA_{0.2\ MJ}$ [W/s]
Chart 6	$FIGRA_{0.4\ MJ}$ [W/s]
Chart 7	SMOGRA [m^2/s^2]
Chart 8	Smoke correction

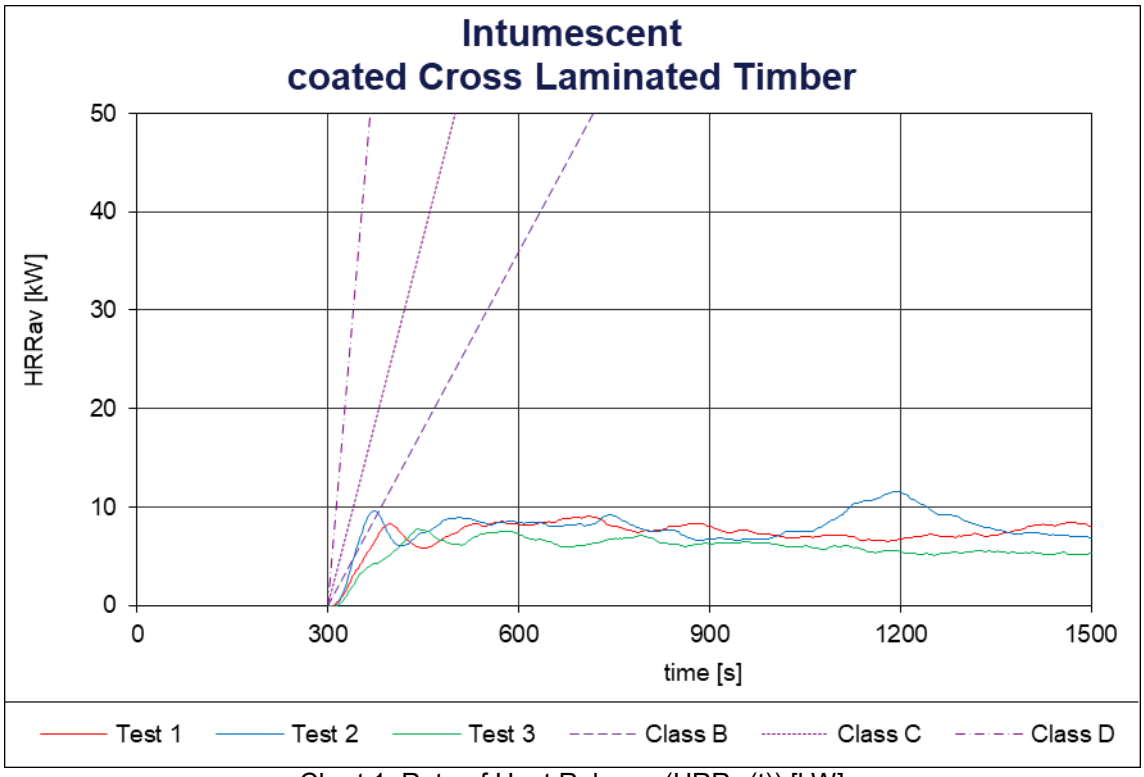

Chart 1: Rate of Heat Release ($HRR_{av}(t)$) [kW]

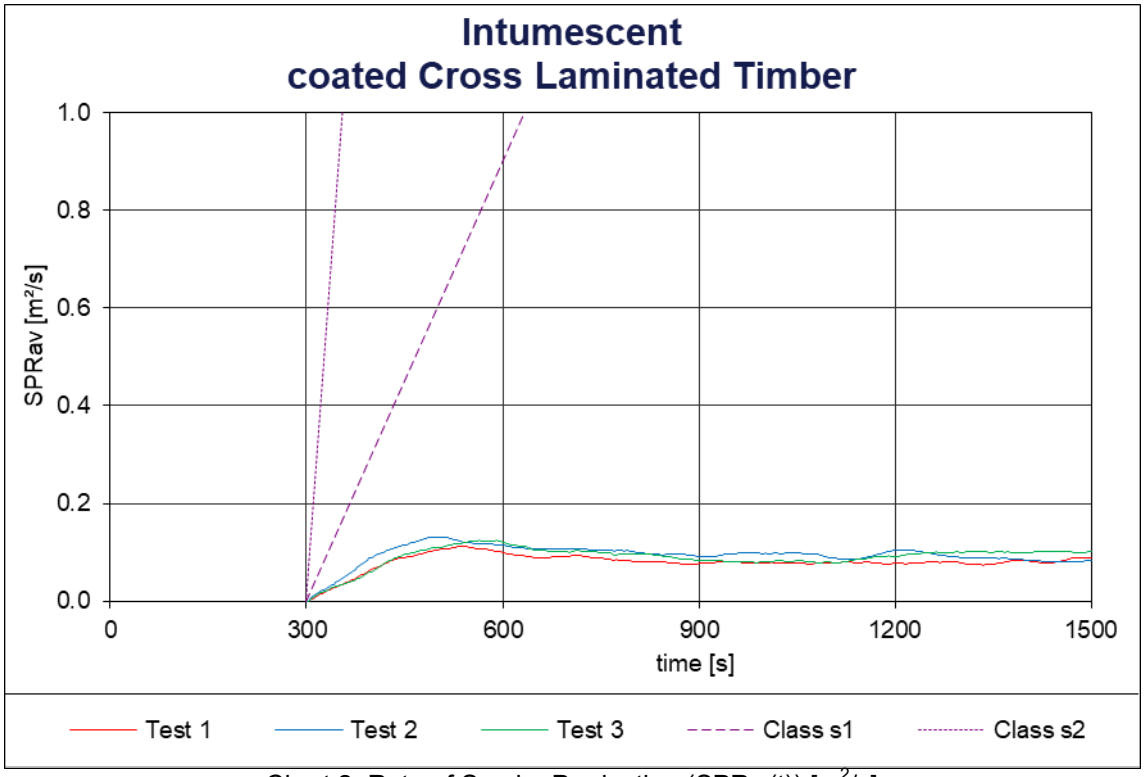

Chart 2: Rate of Smoke Production ($SPR_{av}(t)$) [m^2/s]

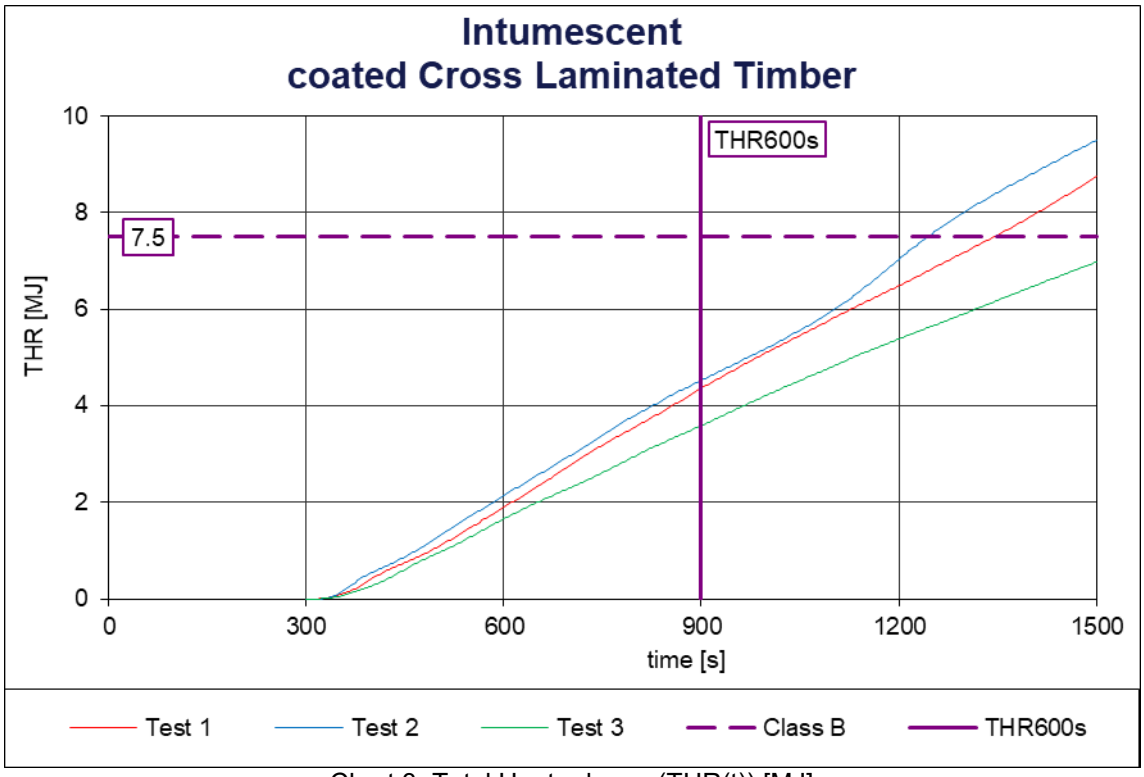

Chart 3: Total Heat release (THR(t)) [MJ]

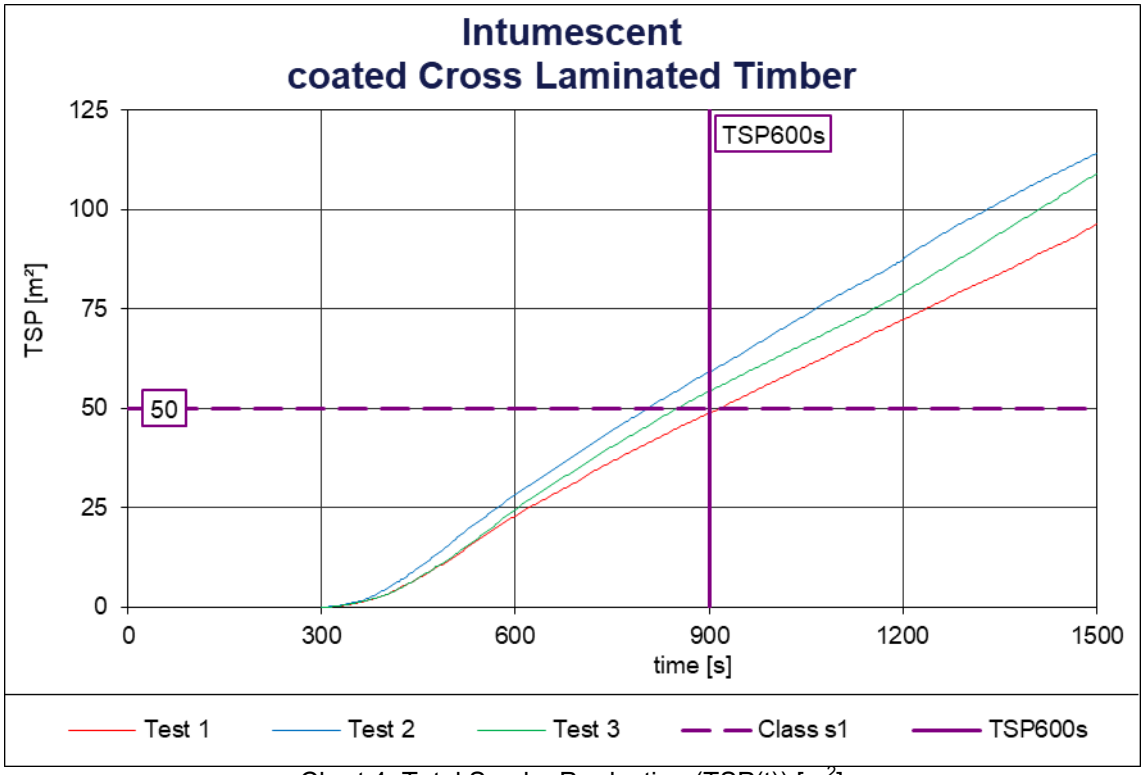

Chart 4: Total Smoke Production (TSP(t)) [m^2]

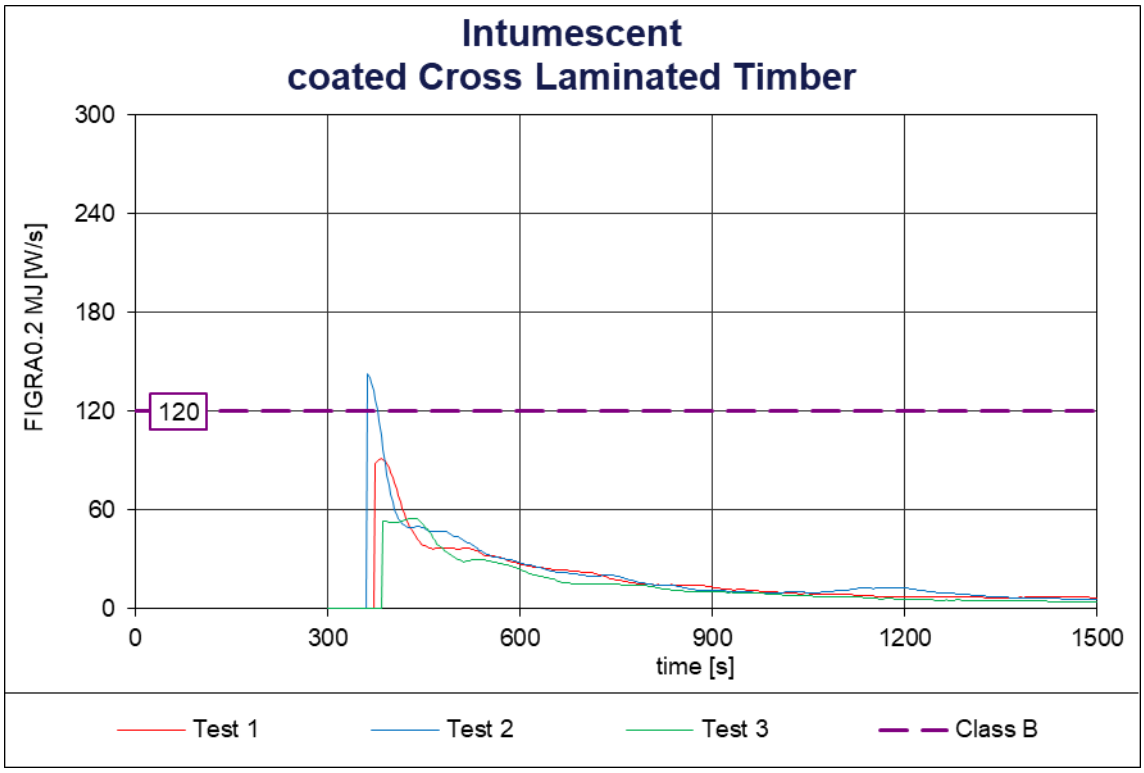

Chart 5: $FIGRA_{0.2\ MJ}$ [W/s]

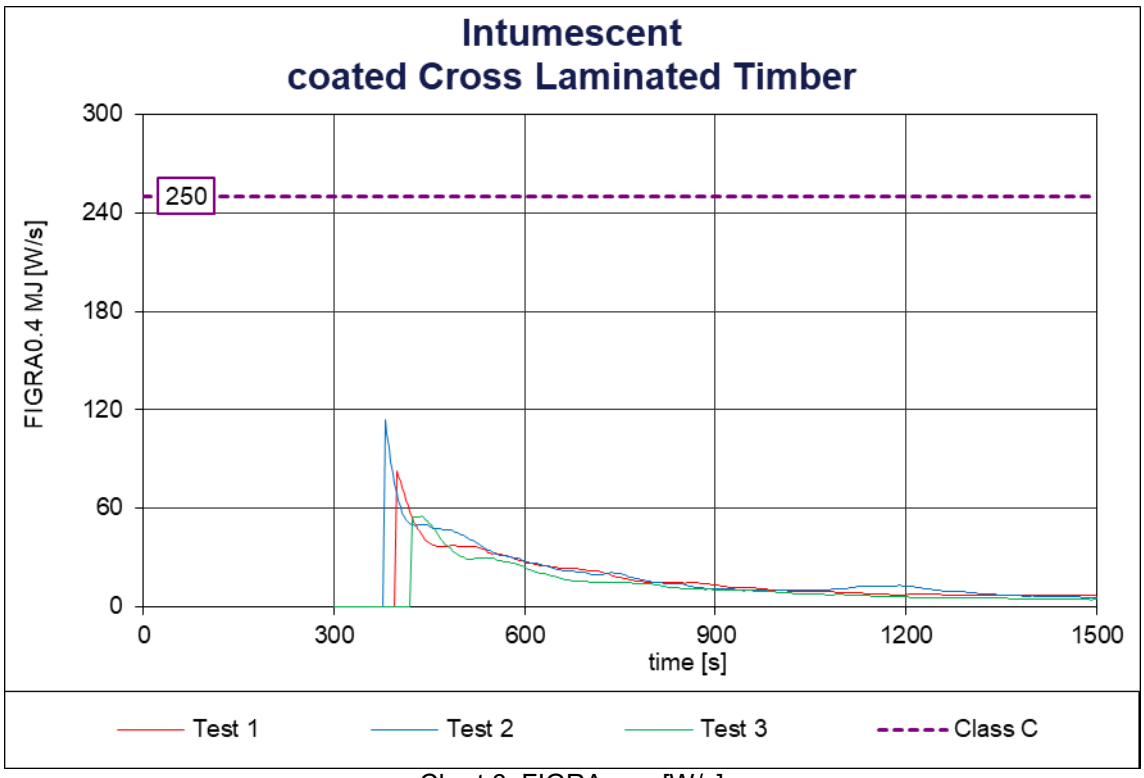

Chart 6: $FIGRA_{0.4\ MJ}$ [W/s]

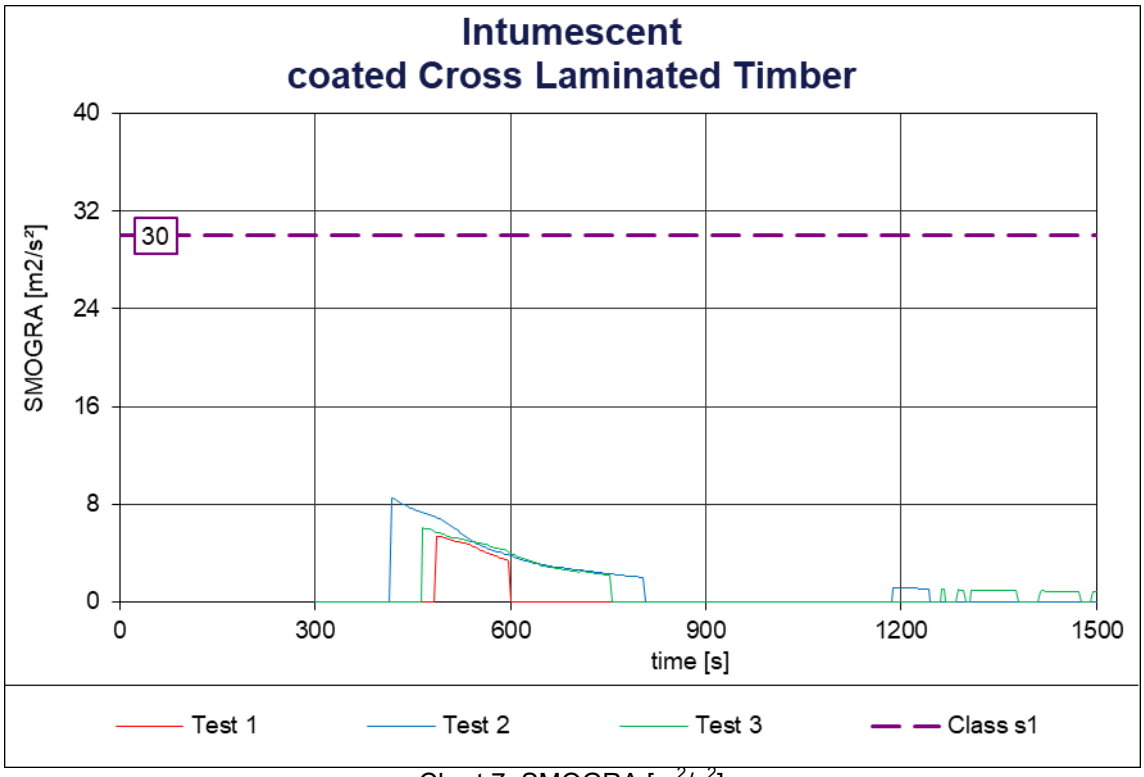

Chart 7: SMOGRA [m^2/s^2]

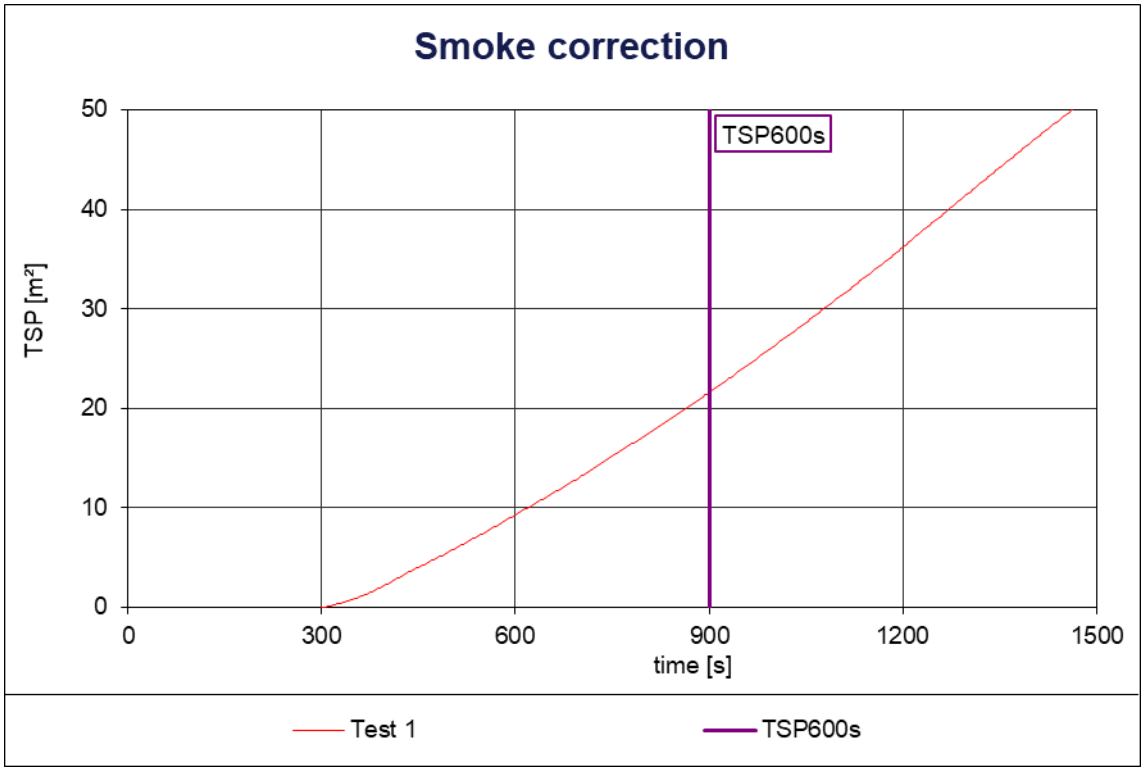

Chart 8: Smoke correction

APPENDIX: PHOTOGRAPHS

Photographs 1 and 2: Specimen 1 prior to testing

Photographs 3 and 4: Specimen 1 after testing