REPORT

Reaction to fire testing of ES/VFR/C with Excel clear top coat applied to plywood, thickness 9 mm
Single Burning Item test according to EN 13823:2014

Report no.	2019-Efectis-R001171
Sponsor	Intumescent Systems Ltd Envirograf House Barfrestone CT15 7JG DOVER UNITED KINGDOM
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TESTING
RvA L 470

1.   PRODUCT IDENTIFICATION

ES/VFR/C with Excel clear top coat applied to plywood, thickness 9 mm, further referred to as 'the product'.

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 ceiling- wall- and façade finish.

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:
-   Layer of ES/VFR clear primer;
-   2 layers of ES/VFR/C;
-   2 layers of Excel clear top coat.

Applied to plywood, thickness 9 mm.

The product has a total thickness of 9 mm and a mass per unit area of approx. 4.4 kg/m^2.

4.   DETAILS OF THE EXAMINATION

4.1   SAMPLES

Sampling procedure	The specimens were prepared and submitted by the sponsor. The preparation is described in report 2019-Efectis-R001227.
Age	At the time of receipt: no information received.
Date of receipt	June 12, 2019

4.2 SPECIMENS

Substrate used	Plywood, not fire retardant treated (EN 636), 450±50 kg/m^3, thickness 9±1mm (class D-s2,d0) according to EN 13238:2010.
Method of applying	Painting
Specimen preparation	The plywood long specimen wing was provided with a vertical joint at a distance of 200 mm from the inner corner and a horizontal joint at a distance of 500 mm from the bottom before painting. See photographs of the SBI test at the end of the report.

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 a non-ventilated air gap of 32 mm to the backing board.
Deviations from the test method	None
Guideline for European Technical Approval of Fire retardant products	ETAG 028:2012
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.
Assessment	The panels were positioned with a non-ventilated air gap of 32 mm to the backing board which is not a standard mounting according 5.2.2 of the standard. It is expected that the insulation of the smaller airgap is similar with a standard airgap of 40 mm which results in the same fire- and smoke class.
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:	June 26, 2019

The results are given in Table 1.

Table 1: Single Burning Item classification parameter results

Test parameter		Test number 1	2	3	Classification parameter
FIGRA$_{0.2\ MJ}$	[W/s]	30	50	18	**33**
FIGRA$_{0.4\ MJ}$	[W/s]	30	40	18	**29**
THR$_{600s}$	[MJ]	3.1	3.8	1.5	**2.8**
LFS	{Yes, No}	No	No	No	**No**
SMOGRA	[m^2/s^2]	7.3	4.0	10.0	**7.1**
TSP$_{600s}$	[m^2]	57	60	44	**54 - 24 = 30**
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.

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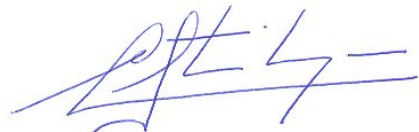
Regarding the estimated precision of the test method, the following information is given in Annex B of EN 13823.

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]

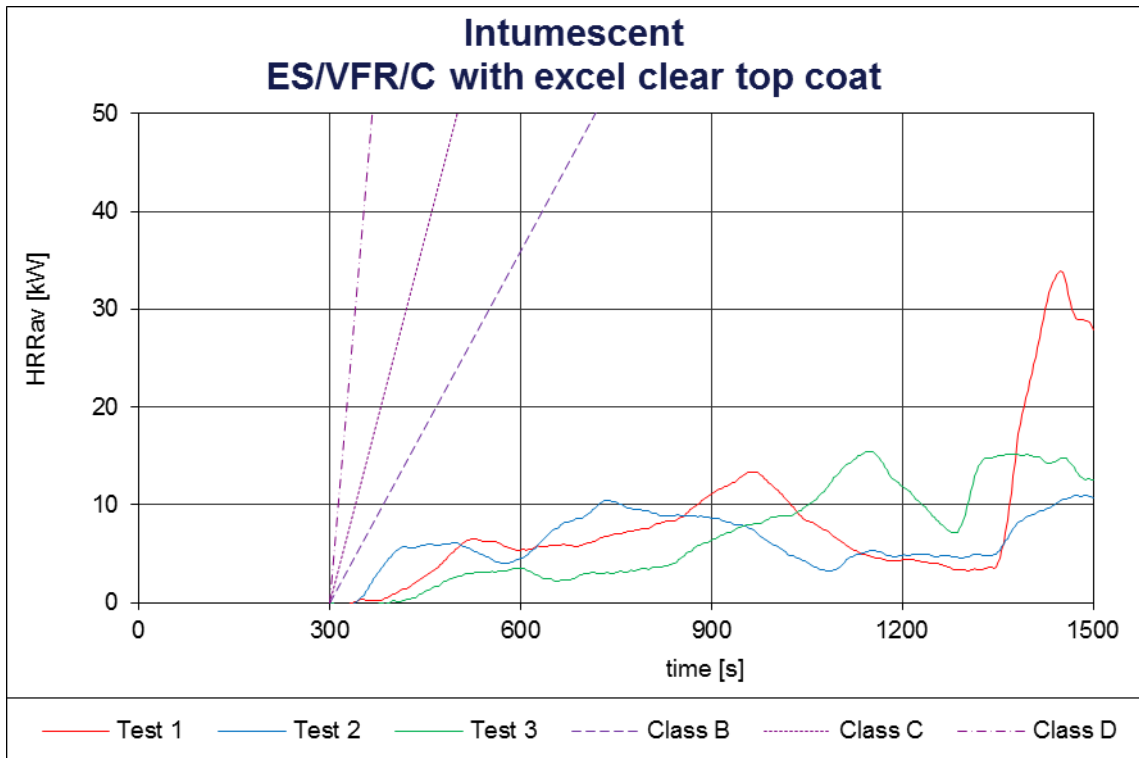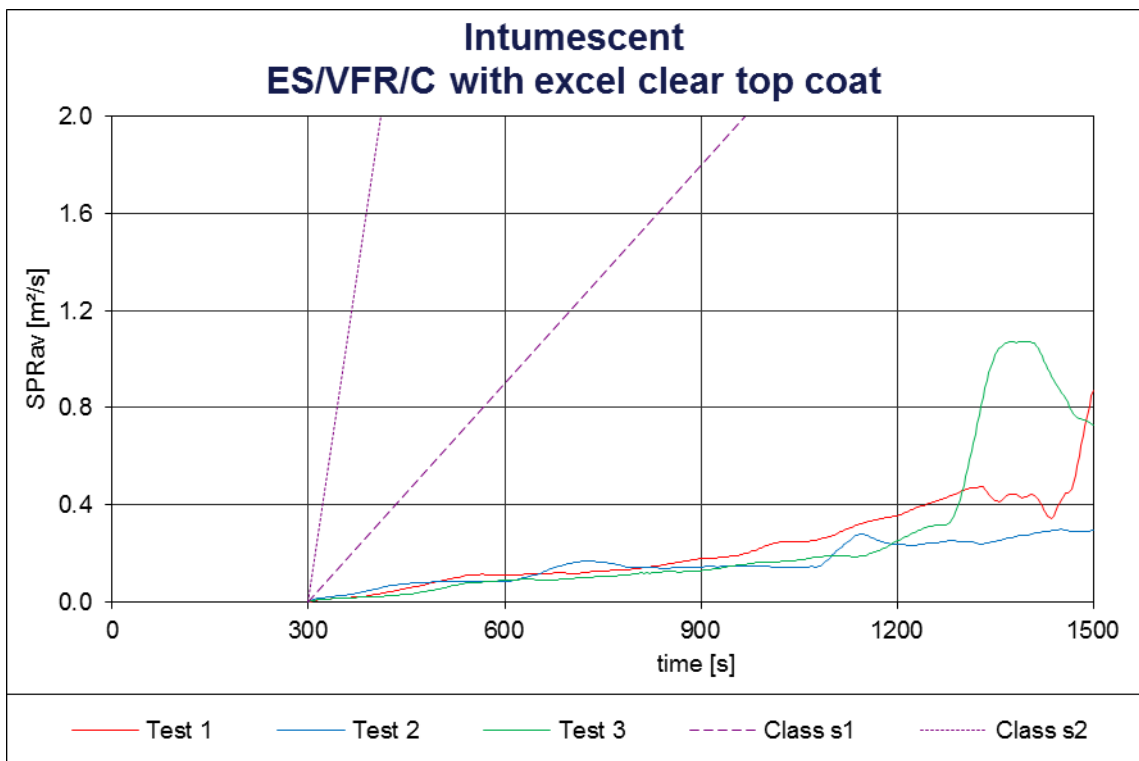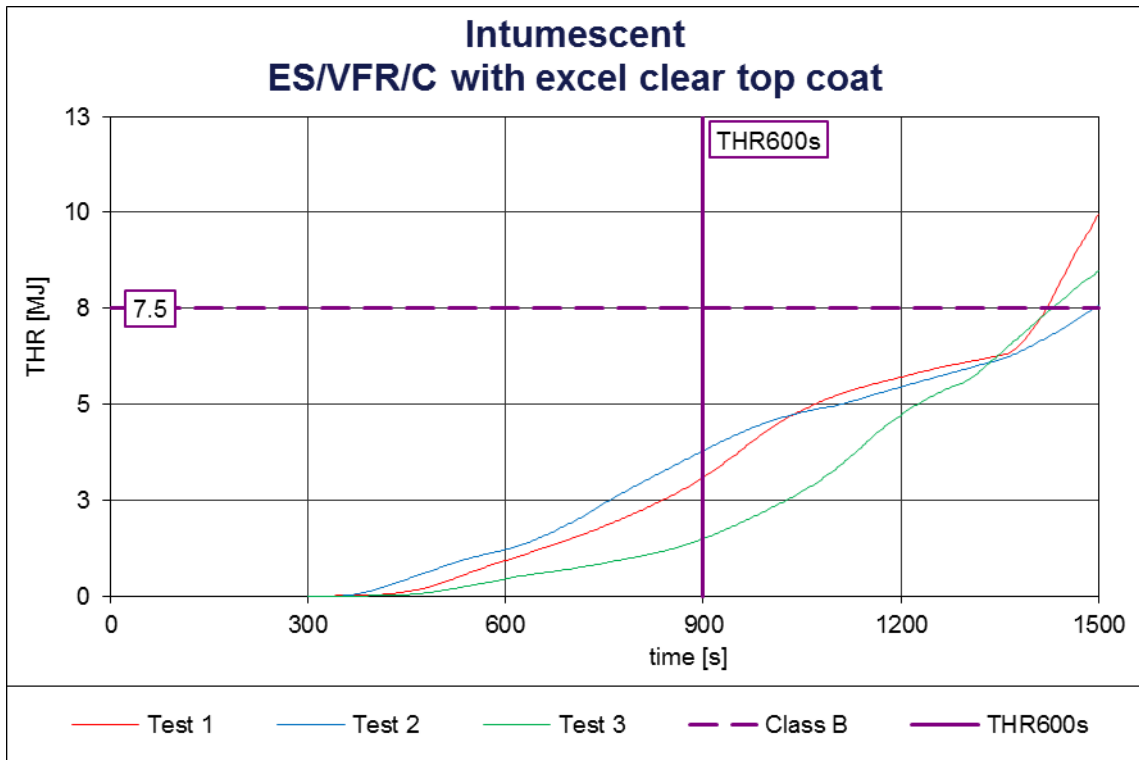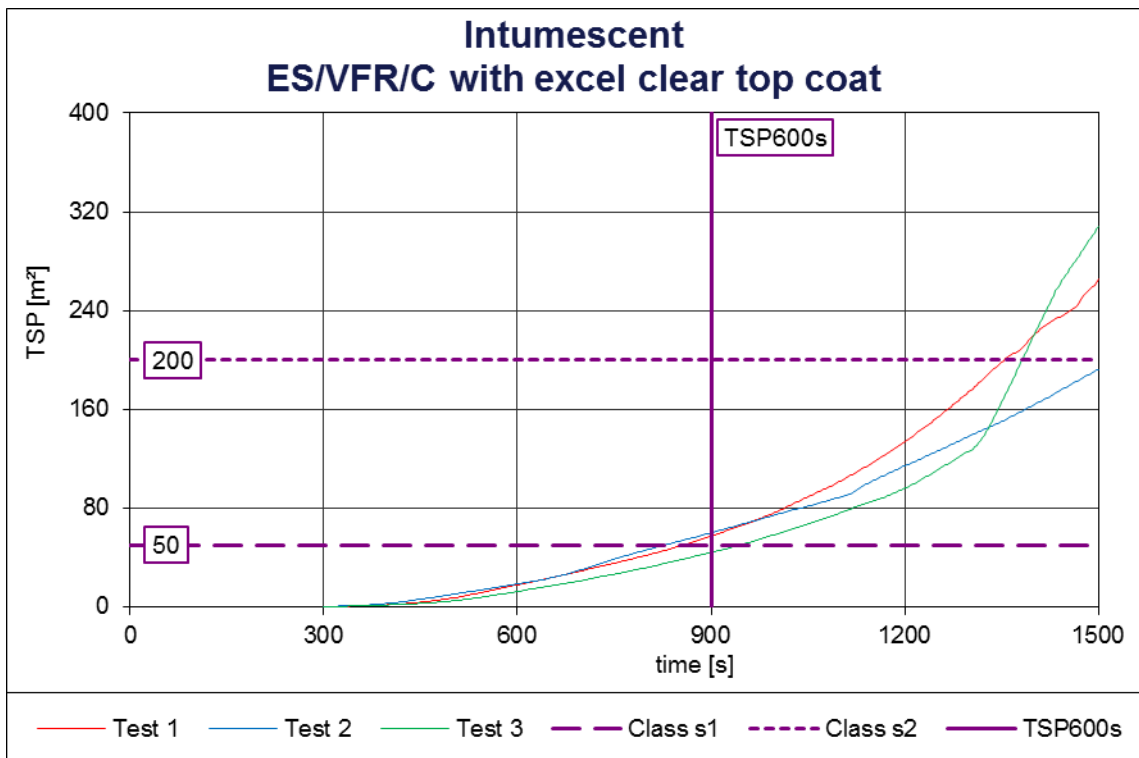Chart 7   SMOGRA [m^2/s^2]

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]
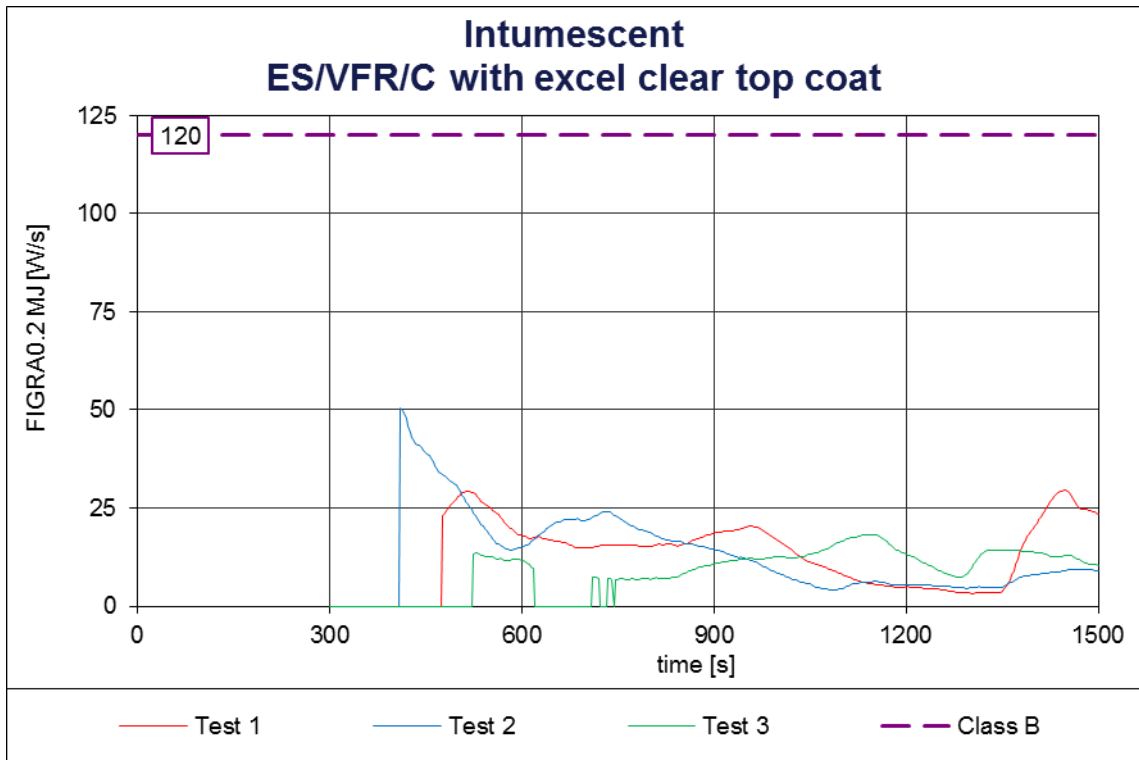

Chart 4: Total Smoke Production (TSP(t)) [m^2]

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

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

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

Chart 8: Smoke correction

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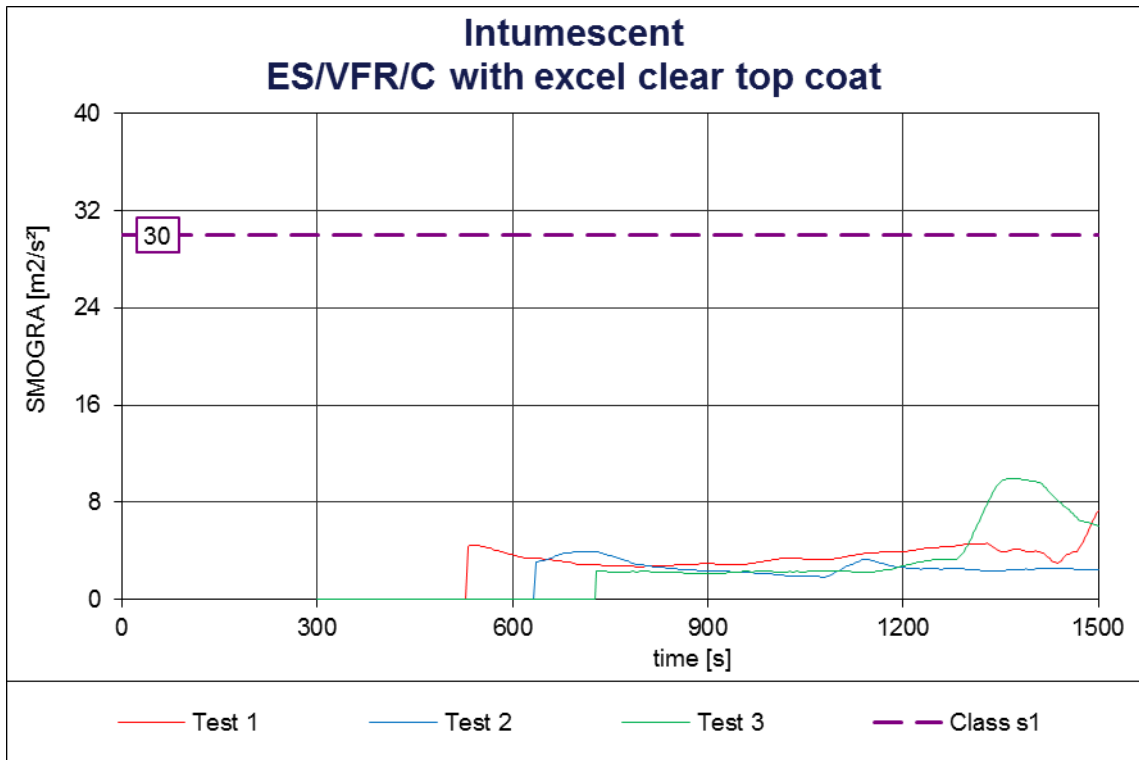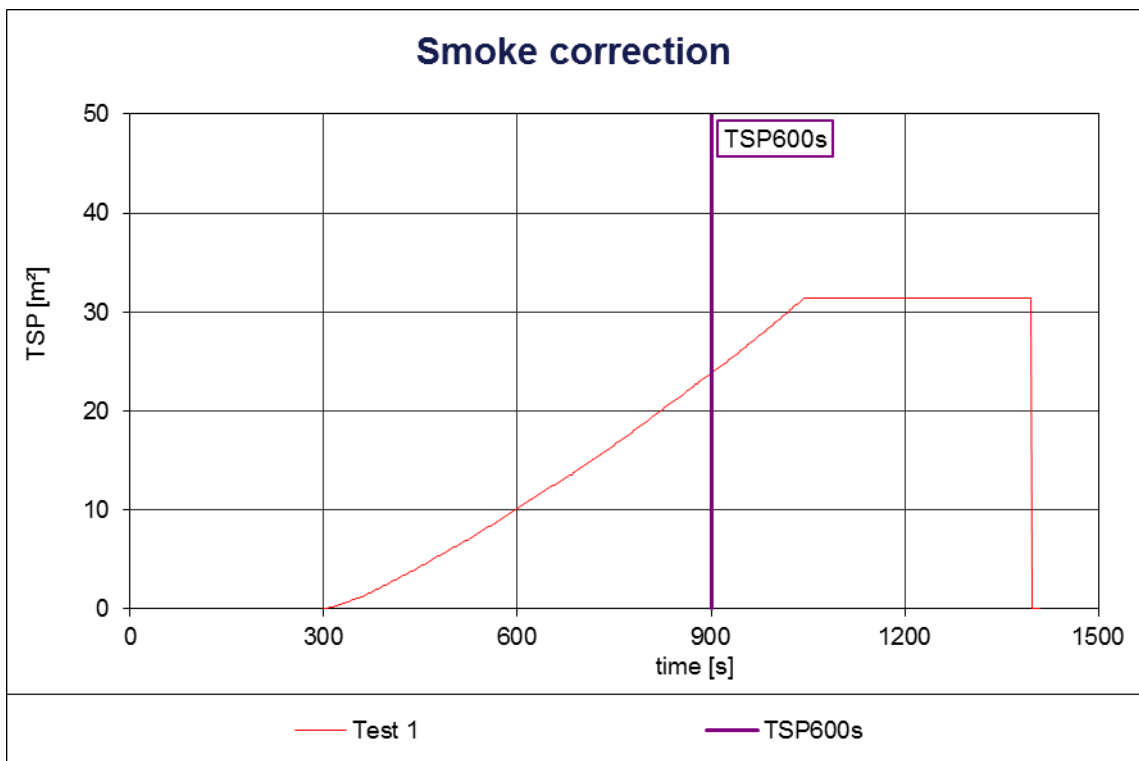
APPENDIX: PHOTOGRAPHS

Photographs 1 and 2: Specimen 2 prior to testing

Photographs 3 and 4: Specimen 2 after testing

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