



Centre for Fire Research
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TNO report

EN 13823:2002 "Single Burning Item" and EN 11925-
2:2002 "Ignitability" test report of examination on the
reaction to fire performance of ENVIROGRAF PRODUCT
42: Intumescent paint and Varnish on PU foam substrate
manufactured by ORAC Belgium

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Sponsor	Environmental Seals Ltd Envirograf House, Barfrestone DOVER, Kent CT15 7JG United Kingdom
Project name	Reaction to Fire
Project number	006.55494/01.01

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Products: Product 042-01 intumescent coating

Purpose of test:

Examination of Product 042-01 intumescent coating on a rigid polyurethane foam substrate on reaction to fire performance and smoke production in accordance with EN 13823: 2002 – Single Burning Item (SBI).

Contractor, manufacturer and production site:

Environmental Seals Ltd
Envirograf House, Barfreestone
DOVER, Kent
CT15 7JG United Kingdom

Dates of examination: January 10 and 11, 2006

Period of report issue and report number:

2006; **2006-CVB-R0????**.

Product description:

The product 042-01 is an intumescent coating system, to be applied to a substrate. The test specimen were constructed as follows:

- 9.0mm WBP plywood, density between 600 to 650 kg/m³.
- 12.5mm S/E gypsum plasterboard.
- Polyurethane K240 material, approximately 9.0mm thick, non Fire rated, density 400 kg/m³.
- Paint system is one coat of HW01 White or Coloured intumescent water based coating applied at 8-10m² per litre per coat.

Mounting configuration:

The mounting of the panels was in accordance with the prescriptions in the SBI standard EN 13823:2002. The panels were mounted directly onto a CaSi backing board. In the long wing of the specimens a vertical joint was positioned at 200 mm distance, and a horizontal joint at 500 mm.

Samples:

Sampling procedure: by contractor

Age: At time of examination: PU foam substrate four/six months, Envirograf product 42 coating applied eight weeks prior to test date.

Date of receipt: 23 November 2005

Examination:

A total of three SBI test were carried out.

Table 1: SBI classification parameter results.

Product ref. and test no.	Heat production / flame spread				Smoke production		Flaming debris	
	FIGRA _{0,2MJ} [W/s]	FIGRA _{0,4MJ} [W/s]	THR _{600s} [MJ]	LFS _{edge} {Y/N}	SMOGRA [m ² /s ²]	TSP _{600s} [m ²]	FDP _{f≤10s} {Y/N}	FDP _{f>10s} {Y/N}
	208	128	8.6	N	75	151	N	N
	276	157	8.4	N	86	169	N	N
	210	126	7.7	N	90	150	N	N
Values used for Classification	231	137	8.2	N	84	157	N	N

Observations during the tests: In the second test, not all checks were OK due to a too high difference between duct and ambient temperature, 4.1 K where 4 K is allowed. In the third test, not all checks were Ok due to a (marginally) too high volume flow in the first part of the test sequence (first 2 minutes). In the opinion of TNO Centre for Fire Research this will not have influenced the classification parameter results significantly.

Ignitability following EN 11925-2:2002

The results are given in Table 2.

Table 2: Ignitability classification parameter results, ignition time 30 s

sample	Ignition of sample	Maximum flame height	t ₁₅₀	After- burning time	Ignition of filter paper
	[Y/N]	[mm]	[s]	[s]	Y/N
Edge ignition					
1	N	48	∞ not reached	0	N
2	N	49		0	N
3	N	53		0	N
4	N	52		0	N
5	N	52		0	N
6	N	41		0	N
Value used for classification		49			N
surface ignition					
1	N	60	∞ not reached	0	N
2	N	51		0	N
3	N	52		0	N
4	N	51		0	N
5	N	65		0	N
6	N	64		0	N
Value used for classification		57			N

Observations of physical behaviour of the test specimen: the material did not shrink and melt away from the flame without ignition. Applying the testing protocol as specified in Annex A of the standard was therefore deemed not necessary.

Conclusions/Remarks:

1. A formal classification is to be assessed in accordance with the EN 13501-1, “Classification using fire reaction tests”.
2. The field of application of the test results is limited to the end use applications in accordance with the mounting and fixing used in the test.
3. Graphs of rate of heat release $HRR_{av}(t)$, total heat release $THR(t)$, $1000 \cdot HRR_{av}(t)/(t-300)$, rate of smoke production $SPR_{av}(t)$, total smoke production $TSP(t)$ and $10000 \cdot SPR_{av}(t)/(t-300)$, are presented hereafter.
4. The test results relate to the behaviour of the test specimens of a material under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the material in use.
5. Regarding the precision of the test method, the following information is given in the Annex B of the EN 13823:

Table B.2 — Average relative standard deviations

	FIGRA _{0,2MJ}	FIGRA _{0,4MJ}	THR _{600s}	SMOGRA	TSP _{600s}
Average (s _r /m)	14 %	15 %	11 %	15 %	18 %

Following Annex B of EN 11925-2 the absolute repeatability/reproducibility for this test method is within 3 s to 5 s.

W. Langstraat

F. Paap Ph.D.

EN 13823 (SBI test)

TNO
 data processing

Productname: **Envirograf Orac 40mm**

Testdate: 11 January 2006

Specimen no: 1 of 3

Preliminary SBI classification: **C / s2 / d0**

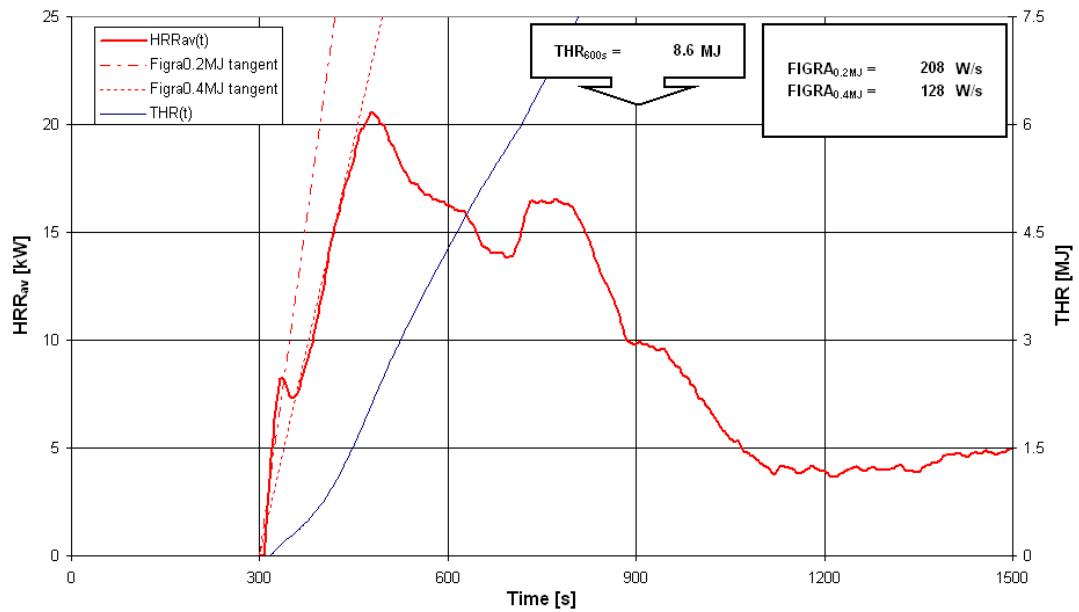
(Final classification assessment is based on repetitive SBI tests and other tests)

Classification parameter results:

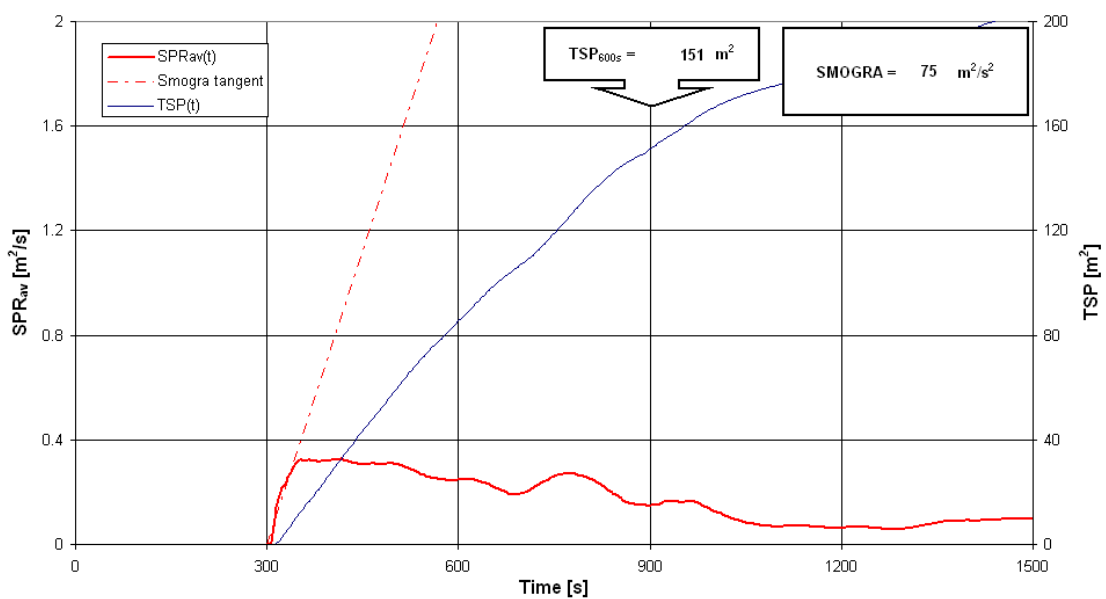
FIGRA _{0.2MJ} [W/s]:	208	LFS till edge {Y/N}: N
FIGRA _{0.4MJ} [W/s]:	128	FDP($f < 10s$) {Y/N}: N
THR _{600s} [MJ]:	8.6	FDP($f > 10s$) {Y/N}: N
SMOGRA [m ² /s ²):	75	
TSP _{600s} [m ²):	151	

Checks OK {Y/N}: Y

HRR_{av}(t) and THR(t)



SPR_{av}(t) and TSP(t)



EN 13823 (SBI test)

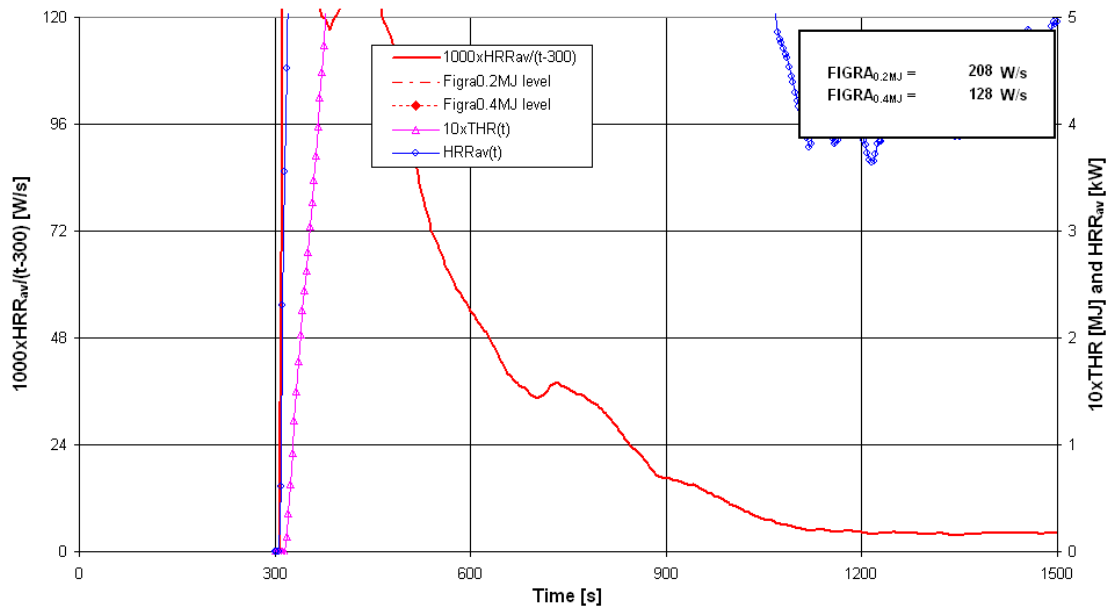
TNO
data processing

Productname: **Envirograf Orac 40mm**

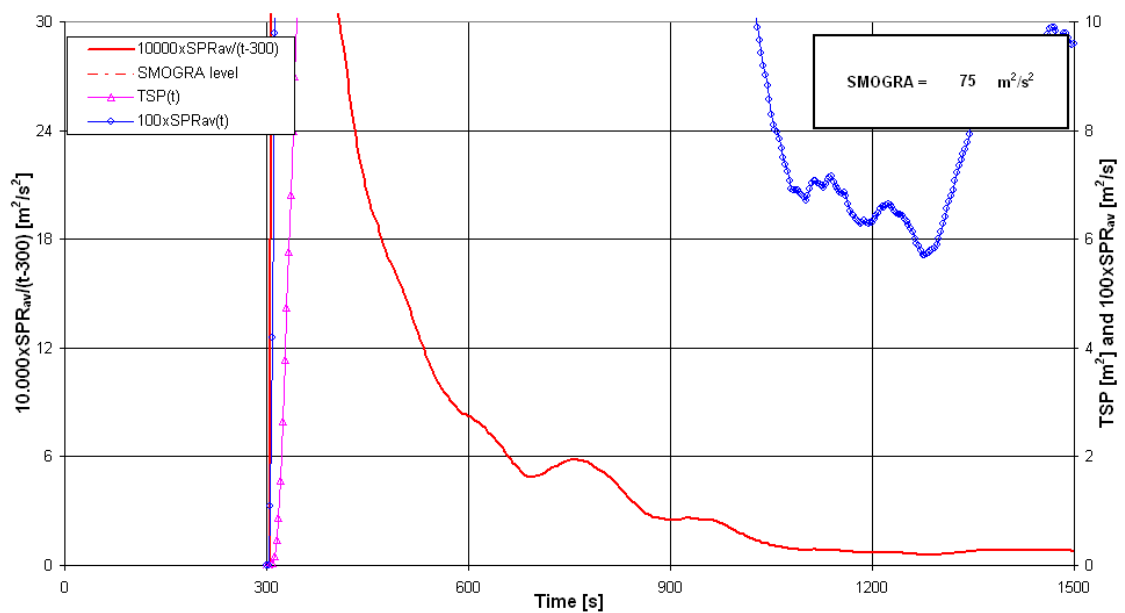
Testdate: 11 January 2006

Specimen no: 1 of 3

FIGRA with thresholds



SMOGRA with thresholds



EN 13823 (SBI test)

TNO
 data processing

Productname: **Envirograf Orac 40mm**

Testdate: 11 January 2006

Specimen no: 2 of 3

Preliminary SBI classification: **C / s2 / d0**

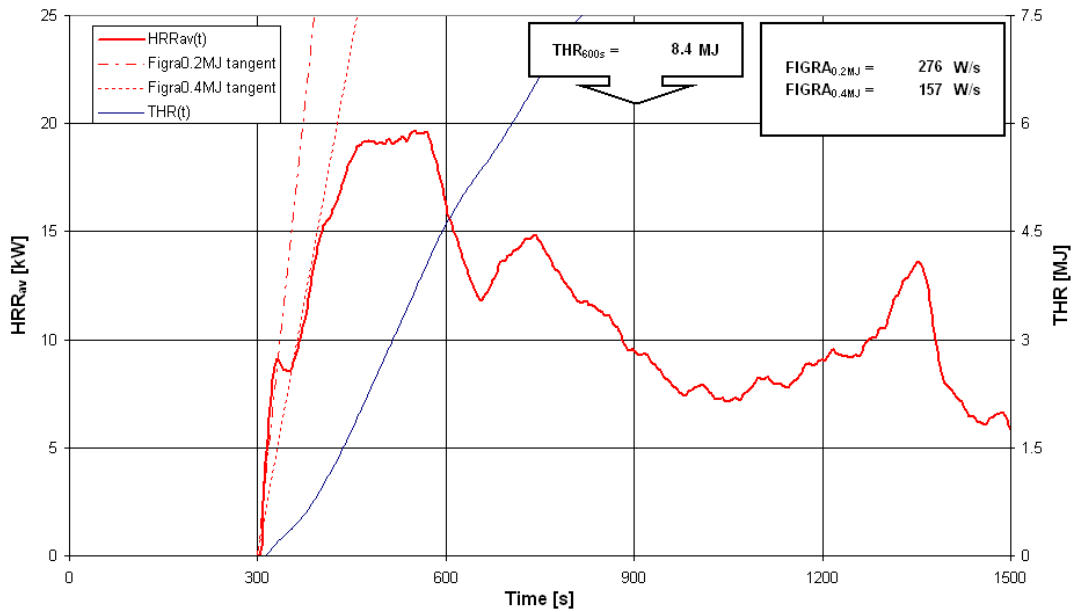
(Final classification assessment is based on repetitive SBI tests and other tests)

Classification parameter results:

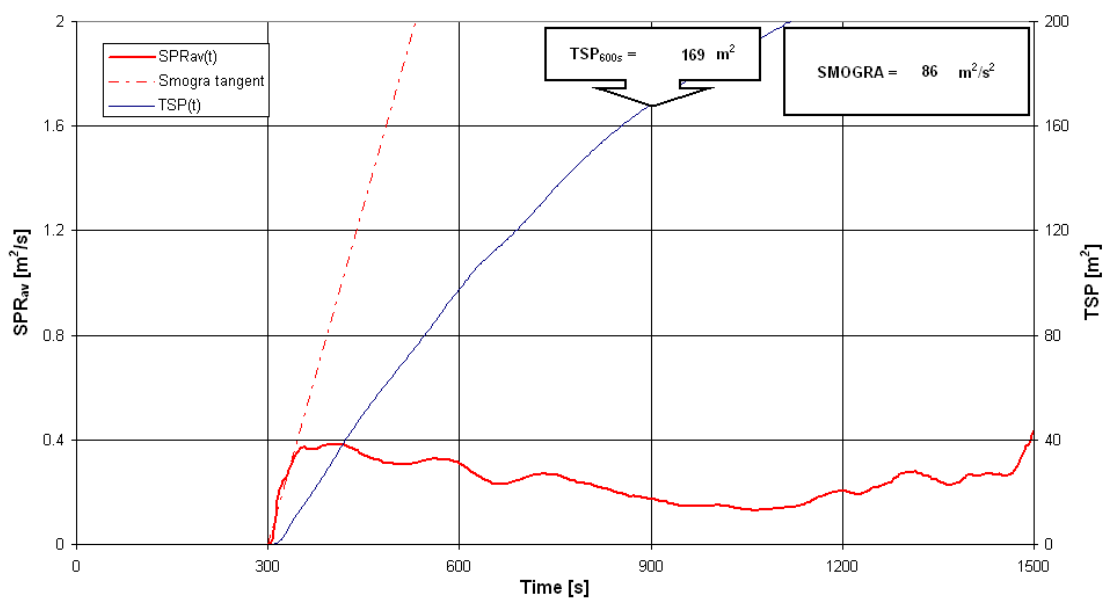
FIGRA _{0,2MJ} [W/s]:	276	LFS till edge {Y/N}:	N
FIGRA _{0,4MJ} [W/s]:	157	FDP (f<10s) {Y/N}:	N
THR _{600s} [MJ]:	8.4	FDP (f>10s) {Y/N}:	N
SMOGRA [m ² /s ²]:	86		
TSP _{600s} [m ²]:	169		

Checks OK {Y/N}: N

HRR_{av}(t) and THR(t)



SPR_{av}(t) and TSP(t)



EN 13823 (SBI test)

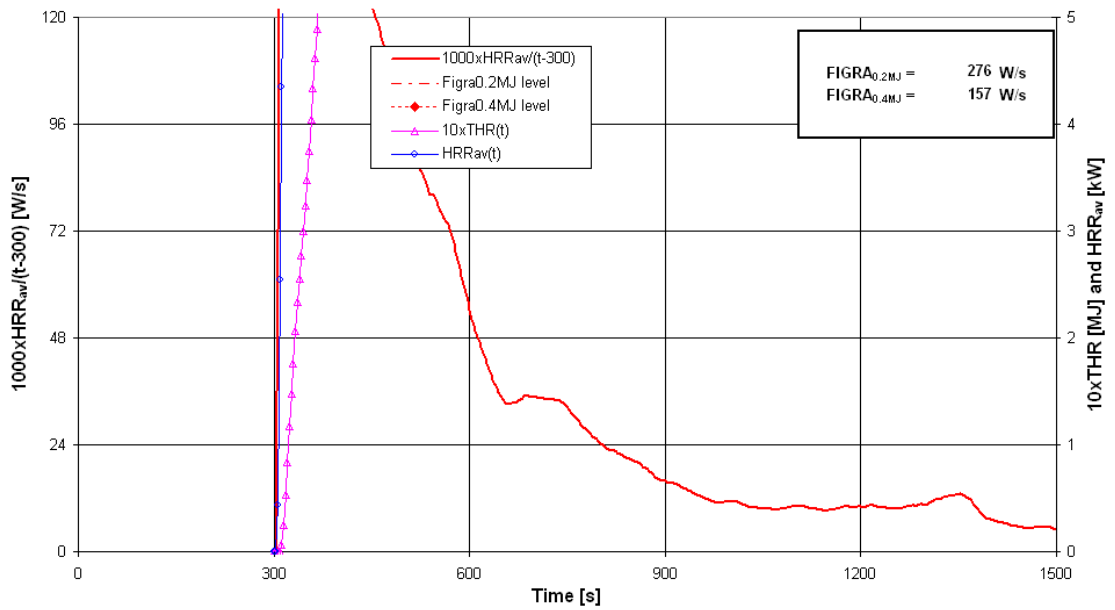
TNO
 data processing

Productname: **Envirograf Orac 40mm**

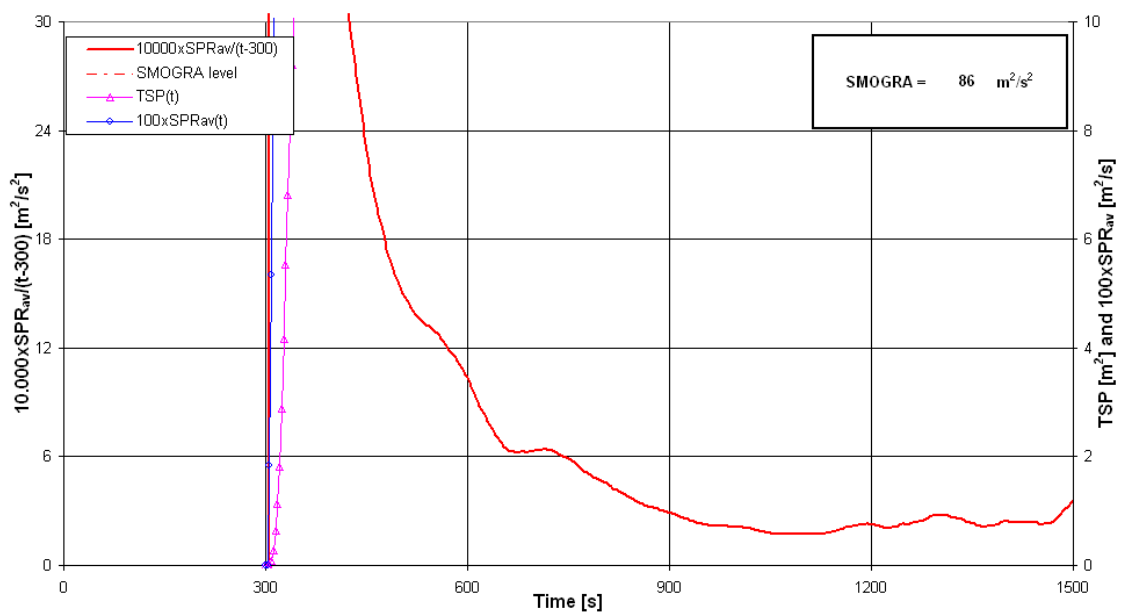
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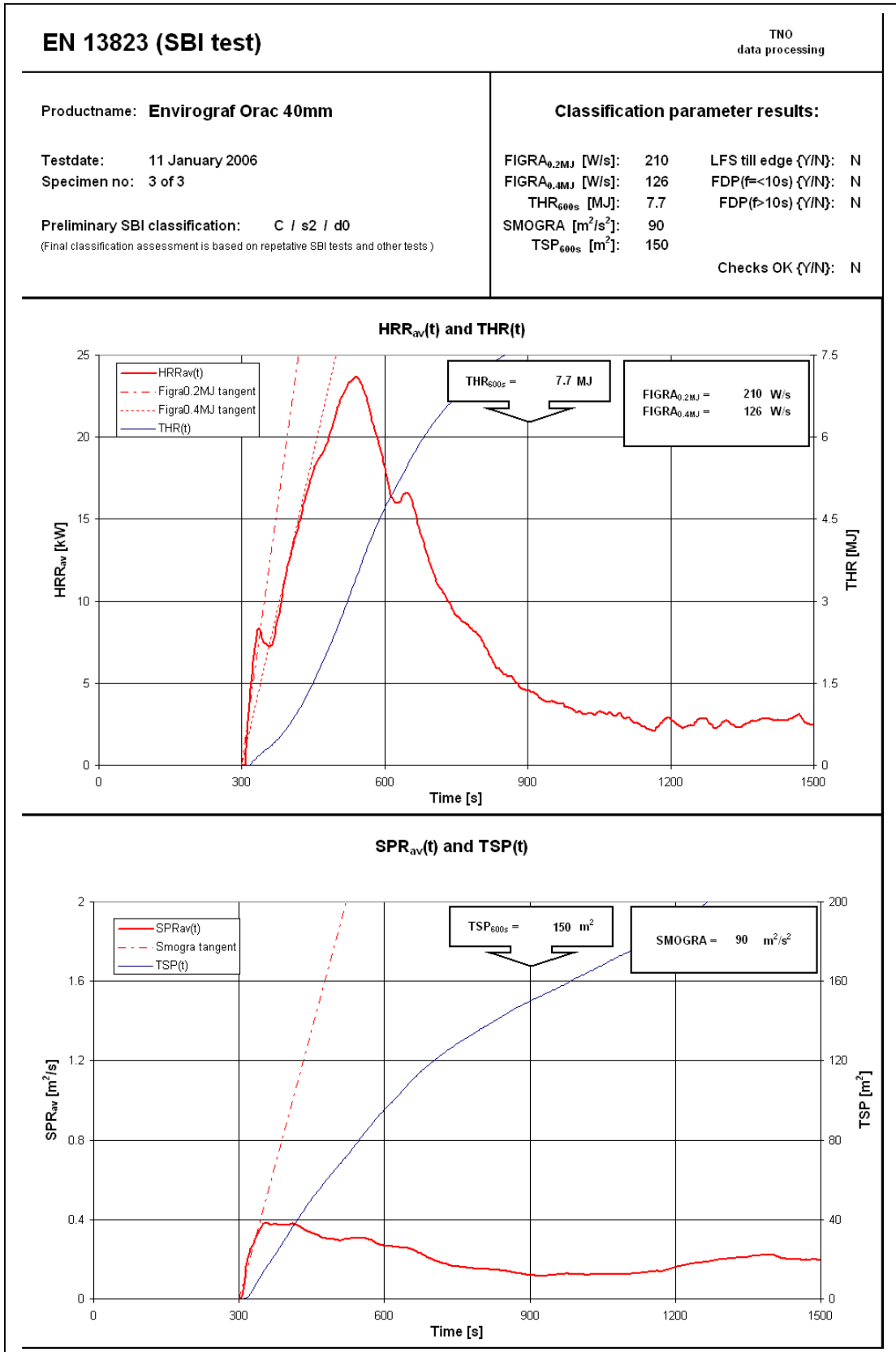
Specimen no: 2 of 3

FIGRA with thresholds



SMOGRA with thresholds





EN 13823 (SBI test)

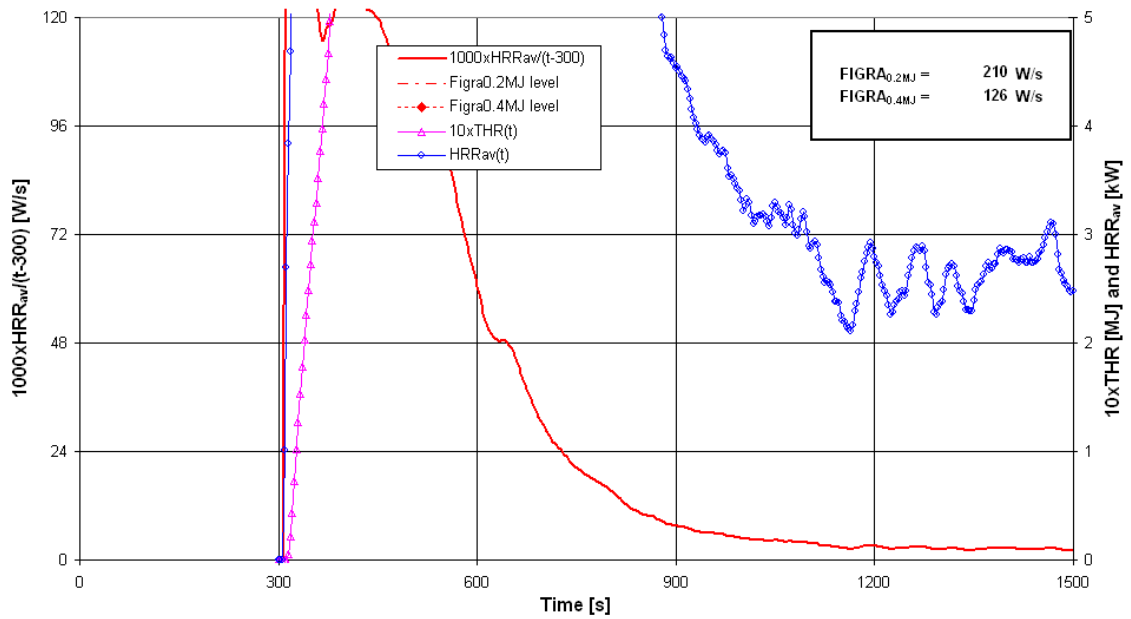
TNO
 data processing

Productname: **Envirograf Orac 40mm**

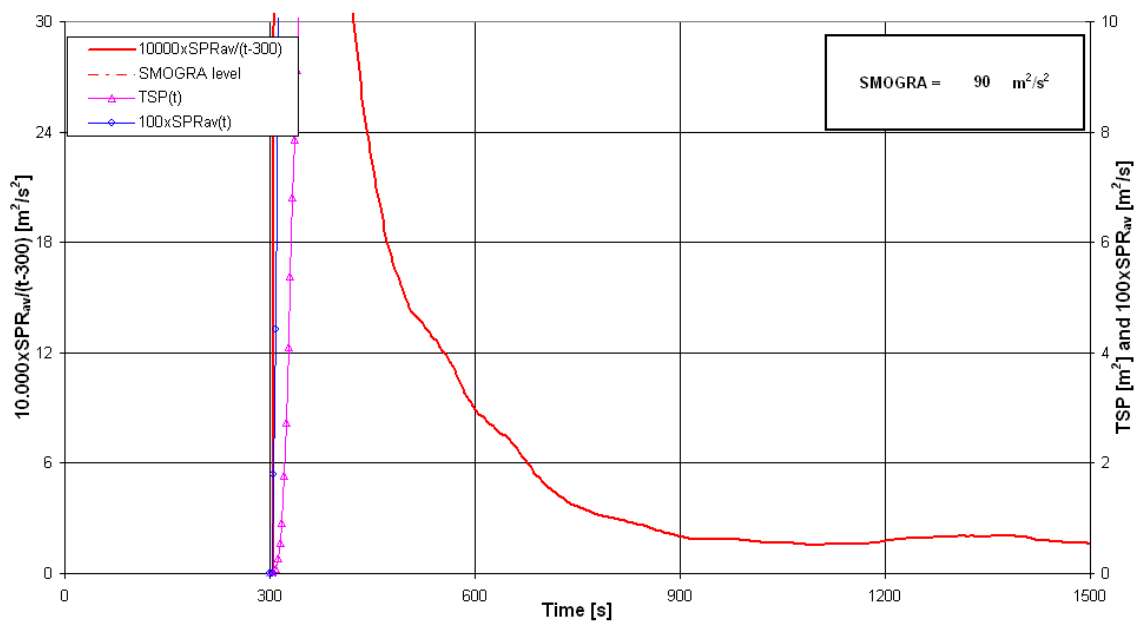
Testdate: 11 January 2006

Specimen no: 3 of 3

FIGRA with thresholds



SMOGRA with thresholds



Pictures of test specimen before and after the test.

