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MEMBER OF **Bodycote** TESTING GROUP

Test Report Nr 13031A

Sponsor / Supplier

RECTICEL N.V.
Damstraat 2
B-9230 WETTEREN
BELGIUM

Material

PU under layer for floor coverings

Trade Name

Recticel IMO 4mm

Name of the manufacturer

RECTICEL N.V. (Composite foams)
Bijsterhuizen 2219
NL- 6604 LC WIJCHEN
THE NETHERLANDS

Nature of the tests

Tests concerning the reaction to fire of this material according to the IMO resolution A.653 (16).

This report consists of 7 pages, including 2 annexes



WFRGENT NV - Ottergemsesteenweg-Zuid 711 - B-9000 Gent - België
t: +32/(0)9 243 77 50 - f: +32/(0)9 243 77 51 - e: info@warringtonfiregent.net
BTW/VAT/TVA BE0870.418.414 - Ondernemingsnummer : RPR 0870.418.414 GENT



1. THE REACTION TO FIRE

The aim of the reaction to fire tests is to determine the behaviour of the material concerning the contribution of this material to the development of a starting fire.

This behaviour is characterised by test results, only of a conventional nature, so that these test results do not have an "absolute value".

2. DESCRIPTION OF THE TEST METHOD

At the request of the sponsor, the test and the classification of the material are carried out in accordance with the prescriptions of : "IMO Resolution A.653 (16) - 1996 - Recommendation on improved fire test procedures for surface flammability of bulkhead, ceiling and deck finish materials."

Description of the test and classification method : annex 1

3. TEST SPECIMEN

The firm RECTICEL N.V., Damstraat 2, B-9230 WETTEREN, BELGIUM provided the laboratory with a series of 6 samples of 0,155 m x 0,800 m of a material, in order to determine the reaction to fire characteristics of the material.

Date of reception : 2007-10-18

Sampling : by the sponsor

Trade name : **Recticel IMO 4mm**

Description of the material :

This description is based on information given by the sponsor. All values are nominal, except for measured values, which are identified as MV. The measured values are mentioned only if they differ more than 10 % from the nominal values.

The tested product consists of an under layer for floor coverings, built up out of three layers:

- the top layer is silver coloured compound of alu / polyester FR. The aluminium film has a thickness of 12 μ and a surface mass of 33 g/m² and the FR-PET film has a thickness of 19 and a surface mass of 28 g/m²

- the second layer consists of bonded PU foam, reference Recfoam U140, with a thickness of 4mm and a density of 140 kg/m³

- the backing is a black PP spunbond non-woven with a thickness of 5 μ m and a surface mass of 28g/m².

The different layers are laminated together by a hot melt film (29g/m²).

The total product has got a thickness of 4mm and a measured surface mass of 560 g/m².

4. CONDITIONING

Before testing, the samples have been conditioned according to the specifications of the standards mentioned above.

Start conditioning : 2007-10-18
End conditioning : 2007-11-14

5. RESULTS

The tests have been carried out on : 2007-11-14

Position of the pilot flame : not impinging.

a) Observations :

Specimen number	1	2	3	1	2	3
	FLAME SPREAD (s)			Heat for sustained burning (MJ/m ²)		
50 mm	1	8	3	0,05	0,38	0,14
100 mm	3	12	16	0,14	0,57	0,76
150 mm	23	16	245	1,01	0,70	10,73
200 mm	24	(1)	462	0,97	(1)	18,59
250 mm	(1)		(1)	(1)		(1)
300 mm						
350 mm						
400 mm						
450 mm						
500 mm						
550 mm						
600 mm						
650 mm						
700 mm						
750 mm						
Maximum flame spread distance (mm)	230	180	210			
Duration of the test (s)	1347	1971	1263			

(1) not reached

Specimen number	1	2	3
DERIVED FIRE CHARACTERISTICS			
Average heat for sustained burning (MJ/m ²)	0,99	0,70	10,73
Heat for ignition (MJ/m ²)	1,01	0,70	10,73
Critical flux at extinguishment (kW/m ²)	37,10	42,15	39,23
Peak heat release rate (kW)	0,53	0,70	0,38
Total heat release (MJ)	0,13	0,62	0,33

b) Derived fire characteristics

	Average
Average Heat for sustained burning (MJ/m ²)	4,14
Heat for ignition (MJ/m ²)	4,15
Critical flux at extinguishment (kW/m ²)	39,49
Peak heat release rate (kW)	0,54
Total heat release (MJ)	0,36

c) Graph of Heat release rate (Kw) in function of time (s) for each specimen :

See annex 2.

6. CONCLUSION

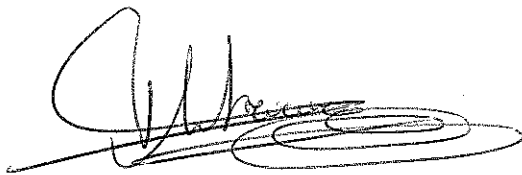
The test results relate only to the behaviour of the product under the particular conditions of the test. These results are not intended to be the sole criterion for assessing the potential fire hazard of the material in use.

The test results are only valid for the specimens of the product as they have been tested. Small differences in the composition or thickness of the specimen may significantly affect the performance during the test and may therefore invalidate the test results.

In order to obtain test results which are representative for the product which is supplied or used, the conformity between the test specimen and the product should be assured. This is the role of the manufacturer and/or the supplier.

The PU under layer for floor coverings 'Recticel IMO 4mm', as described in § 3 and under the conditions of the test, **has not exceeded the surface flammability criteria** mentioned in IMO A.653 (16) - 1991 **for floorcoverings**, therefore it meets the requirements for low flame spread in compliance with regulations II-2/3.8, II-2/34 and II-2/49 of the International Convention for the Safety of Life at Sea, 1974, as amended in 1989 and 1991.

Ghent,



ing. F. DUTRIEUE
Project Manager

30 JAN 2008



Prof. dr. ir. P. VANDELDE
Director

IMO_A653(16)-Off3-WG-2E

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DETERMINATION OF THE FIRE CHARACTERISTICS OF A MATERIAL IN ACCORDANCE WITH "IMO resolution A.653 (16) : Recommendation on improved fire test procedures for surface flammability of bulkhead, ceiling and deck finish materials."

Description :

A sample of 0,155 m x 0,800 m is exposed to the radiation heat of a radiant panel. This sample is fixed onto a support in such a way that the intensity of the radiation, incident on the surface of the sample, varies in a given direction following a prescribed law. At the same time, a gas burner flame is placed near the edge with the highest temperature. A minimum of three tests are carried out.

The times needed by the flame to reach certain distances are measured. They permit to draw a diagram of the flame spread in function of time.

This measurement of flame spread in function of time together with the flux incident on the specimen at different positions allows for the determination of certain fire characteristics :

- Average heat for sustained burning : Q_{sb}
- critical flux at extinguishment : CFE.

During the test the fume stack temperature is registered. This allows the determination of :

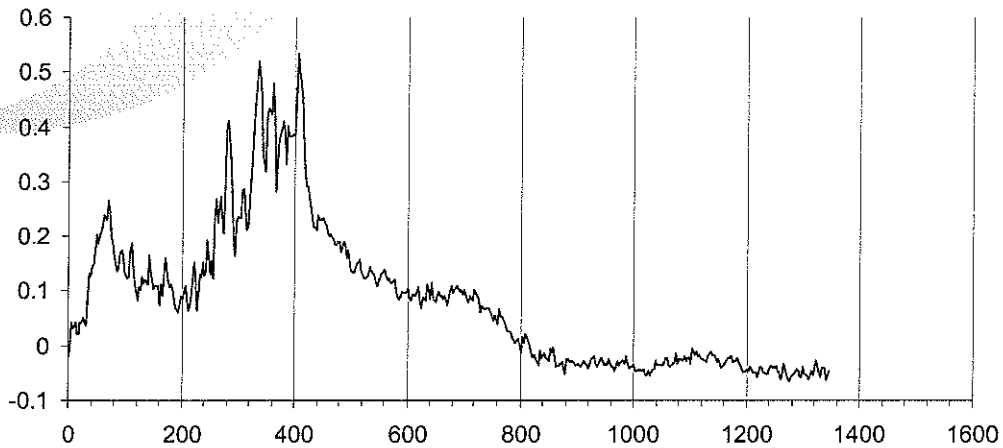
- the peak heat release rate : Q_p
- the total heat release rate : Q_t .

Surface flammability criteria :

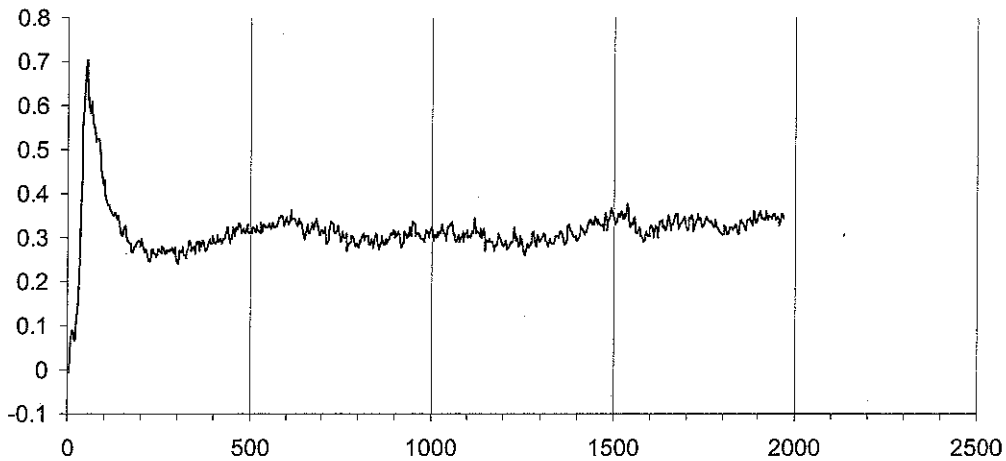
Bulkhead, wall and ceiling linings				Floor coverings			
CFE kW/m ²	Q_{sb} MJ/m ²	Q_t MJ	Q_p kW	CFE kW/m ²	Q_{sb} MJ/m ²	Q_t MJ	Q_p kW
≥ 20,0	≥ 1,5	≤ 0,7	≤ 4,0	≥ 7,0	≥ 0,25	≤ 2,0	≤ 10,0

Graph of Heat release rate (Kw) in function of time (s) for specimen Nr 1

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Graph of Heat release rate (Kw) in function of time (s) for specimen Nr 2



Graph of Heat release rate (Kw) in function of time (s) for specimen Nr 3

