



Determination of surface flammability and smoke and toxic products

PAROC Marine Slab 40 N5



The test methods (IMO FTPC Part 5 and Part 2) referred to in this research report are accredited.

Requested by: Paroc Oy Ab



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P.O. Box 294
FI-01301 Vantaa
Finland

Order 22 March 2007 / Tuomo Hjelt

Contact person at VTT **VTT, Technical Research Centre of Finland**
Building Engineer Jussi Rautiainen
Kivimiehentie 4, Espoo, P.O.BOX 1000, FI-02044 VTT, Finland
Tel. + 358 20 722 4809, Fax + 358 20 722 4815, Email jussi.rautiainen@vtt.fi

Task **Determination of surface flammability and smoke and toxic products**

Product The customer gave following information about the product tested:

Product name: **PAROC Marine Slab 40 N5**
Manufacturer: Paroc Oy Ab, Poikkitie, FI-53500, Finland
Product description: one side faced stone wool slab
Nominal density of stone wool: 40 kg/m³
Binder content of stone wool: 3 %
Facing: white glass fibre non-woven tissue (60 g/m²)

Sample Date of delivery: 23 March 2007
Size of the stone wool slab: 600 mm x 1200 mm x 50 mm
Facing: weight per unit area 58 g/m² (measured by VTT)

The sample was chosen by the customer.

Specimens From the sample three specimens were made with a diameter 155 mm x 800 mm x 50 mm.

The test specimens were conditioned to constant mass at a temperature of 23 ± 2 °C and a relative humidity of 50 ± 10 %.

Date of test 30 March 2007

Test method IMO FTPC Part 5 - Test for Surface Flammability
(IMO Resolution MSC.61(67) Part 5)
Test procedure IMO Resolution A.653(16).

Description of the test method and requirements are given in Appendix 1.

The test results relate only to the sample tested.

Test details

Three specimens were tested. A pilot flame with acetylene gas and air was used.

Test results

The first two specimens were tested with the pilot flame at normal position. The surface of the specimens did not ignite. According to the IMO Resolution A.653(16) one additional test was made with the pilot flame angled to impinge on the upper half of the test specimen. As the surface of the specimens did not ignite, all tests were terminated after 10 min exposure time.

Fire characteristics of the material tested are presented in the following table.

	Q_t MJ	Q_p kW
Test 1	0,01	0,25
Test 2	0,02	0,92
Test 3	0,00	0,02
Mean	0,01	0,40
Criteria for bulkhead, wall and ceiling linings according to IMO FTPC Part 5	$\leq 0,7$	$\leq 4,0$
Classification as a bulkhead, wall and ceiling lining according to IMO FTPC Part 5	pass	pass

Q_t = total heat release

Q_p = peak heat release rate

Rate of heat release in test 1...3 is presented I Appendix 2

The other fire characteristics could not be determined, because the specimens did not ignite and the flame front did not spread at all over the surface of the specimens.

Other observations: No material fell down during the tests.

According to IMO FTPC Annex 2 (IMO Resolution MSC.61(67) Annex 2) surface materials with both the total heat release (Q_t) of not more than 0,2 MJ and the peak heat release rate (Q_p) of not more than 1,0 kW determined in accordance with resolution A.653(16) are considered to comply with the requirements of IMO FTPC Part 2 - *Smoke and toxicity test* - without further testing.

Note

According to the standard: "the results relate only 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."

Classification

The tested product, **PAROC Marine Slab 40 N5** may be regarded as a material with

low flame spread for bulkhead, wall and ceiling linings

according to IMO FTPC Part 5 (IMO Resolution MSC.61(67) Part 5).

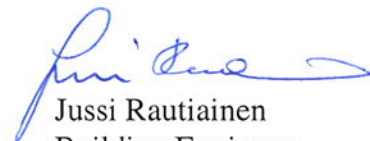
According to test results the tested product, **PAROC Marine Slab 40 N5**, meets the criteria for smoke and toxicity for materials used as the surface of bulkheads, linings or ceilings given by IMO FTPC Part 2 (IMO Resolution MSC.61(67) Part 2) without further testing.

Approval of the product may be obtained only on application to the appropriate Administration.

Espoo 16 April 2007



Tiia Ryyänen
Senior Research Scientist



Jussi Rautiainen
Building Engineer

APPENDICES

Appendix 1, Description of the test method and requirements (IMO FTPC, Part 5)
Appendix 2, Rate of heat release results

DISTRIPUTION

Customer	Original (2)
VTT / Register Office	Original

SPREAD OF FLAME

Description of the method IMO FTPC Part 5 - Test for surface flammability (IMO Resolution MSC.61(67) Part 5, test procedure IMO Resolution A.653(16).

Specimens

Size: 155^{+0}_{-5} mm x 800^{+0}_{-5} mm. Amount: 8 pcs.

Materials and composites of normal thickness 50 mm or less are attached on a substrate. The attaching and substrates used shall be representative to those used in practise.

Before test the specimens should be conditioned to constant moisture content at a temperature of 23 ± 2 °C and a relative humidity of 50 ± 10 %.

Test procedure

The specimen is inserted to the test apparatus in a vertical position so that its longer side is horizontal. The specimen is exposed to an exact defined heat radiation caused by burning the mixture of methane gas and air in a radiation panel. The highest intensity of heat radiation at the nearest end of the specimen is $50,5$ kW/m² and it decreases from this value towards the other end according to a defined curve. During the test the time of ignition, spread of flame, extinguishment of flame and heat for sustained burning are measured.

Criteria

Materials giving average values for all the surface flammability criteria not exceeding those listed below, are considered to meet the requirement for low flame spread.

Bulkhead, wall and ceiling linings:

$$CFE \geq 20,0 \text{ kW/m}^2$$

$$Q_{sb} \geq 1,5 \text{ MJ/m}^2$$

$$Q_t \leq 0,7 \text{ MJ}$$

$$Q_p \leq 4,0 \text{ kW}$$

Floor coverings:

$$CFE \geq 7,0 \text{ kW/m}^2$$

$$Q_{sb} \geq 0,25 \text{ MJ/m}^2$$

$$Q_t \leq 2,0 \text{ MJ}$$

$$Q_p \leq 10,0 \text{ kW}$$

where

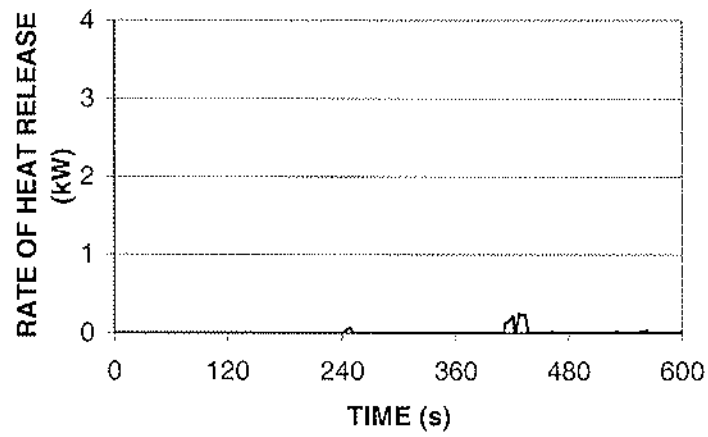
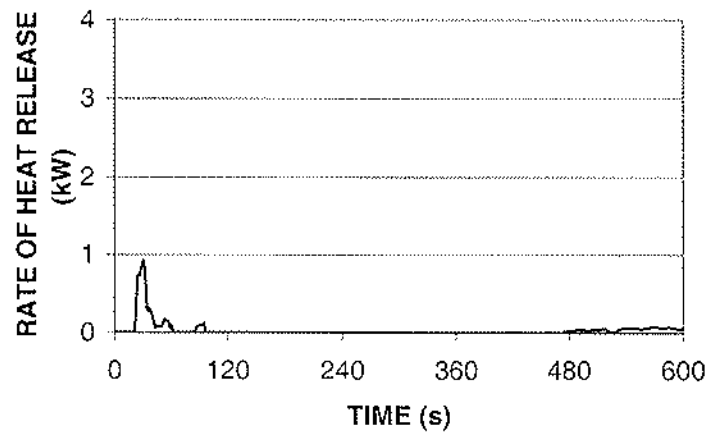
CFE = critical flux at extinguishment

Q_{sb} = heat for sustained burning

Q_t = total heat release

Q_p = peak heat release rate

Appendix 2

TEST 1**TEST 2****TEST 3**