



T018 (EN ISO/IEC 17025)

I006 (EN 45004, Annex A)

Determination of surface flammability of LTC silicone rubber seal T1038

Test method: IMO FTPC Part 5

Test for surface flammability

(IMO Resolution MSC.61(67) Part 5)

Test procedure IMO Resolution A.653(16)

Requested by: FP FinnProfiles Oy

Requested by FP FinnProfiles Oy
FIN-91100 Ii
Finland

Order 18 November 2003, Henrik Ahlgren

Testing Laboratory **VTT TECHNICAL RESEARCH CENTRE OF FINLAND**
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Task **Determination of surface flammability of a silicone rubber seal**

The product tested LTC silicone rubber seal T1038
Colour: black

The product is described in greater detail in Appendix 3.

Samples of the product will be stored for reference by VTT until 30 November 2004.

Manufacturer FP FinnProfiles Oy, Iilaakso, FIN-91100 Ii.

Date of supply 18 November 2003

Date of test 28 November 2003

Test specimens The test specimens measuring 155 mm x 800 mm were made by attaching one profile (17 mm x 17 mm) mechanically and centrally on a 19 mm thick non-combustible Monolux board (800 mm x 155 mm) with a density of 768 kg/m³.

The measured mass of the profile was about 145 g/m.

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

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 2.

Test details

Three specimens were tested.

A pilot flame with acetylene gas and air was used.

Test results

The following table gives the times to reach different positions and the maximum distance of flame spread on the centreline of the test specimen:

Distance from the hot end of the test specimen	Test 1 Time (s)	Test 2 Time (s)	Test 3 Time (s)
Ignition	no ignition	388	369
100 mm		388	369
150 mm		388	390
200 mm		625	534
250 mm			822
Maximum distance	-	230 mm	260 mm
End of test	at 600 s	at 1085 s	at 1123 s

Other observations: No material fell down during the tests.

The measured heat for ignition and heat for sustained burning (Q_{sb}) values are presented in the following table.

D (mm)	Test 1 Q_{sb} MJ/m ²	Test 2 Q_{sb} MJ/m ²	Test 3 Q_{sb} MJ/m ²	Mean Q_{sb} MJ/m ²
150	**	18,04 *	18,14 *	
200		26,06	22,27	
Average heat for sustained burning when $D \leq 400$ mm	> 30,3	22,05	20,21	> 24,19

D = Distance from the hot end of the test specimen.

* = Heat for ignition values are the values at the 150 mm position.

** = Heat for ignition and heat for sustaining burning (Q_{sb}) could not be determined because the specimen did not ignite and the flame front did not spread at all over the surface of the specimen.

All the fire characteristics of the tested material are presented in the following table:

	CFE kW/m ²	Q _{sb} MJ/m ²	Q _t MJ	Q _p kW
Test 1	> 50,5	> 30,3	0,01	0,23
Test 2	38,8	22,05	0,17	0,48
Test 3	35,6	20,21	0,19	0,63
Mean	> 41,6	> 24,2	0,12	0,4
Criteria for bulkhead, wall and ceiling linings according to IMO FTPC Part 5	≥ 20,0	≥ 1,5	≤ 0,7	≤ 4,0
Classification as a bulkhead, wall and ceiling lining according to IMO FTPC Part 5	pass	pass	pass	pass

Rate of heat release in tests 1...3 is presented in Appendix 1.

CFE = critical flux at extinguishment

Q_{sb} = heat for sustained burning

Q_t = total heat release

Q_p = peak heat release rate

Classification

The tested LTC silicone rubber seal T1038 tested as a stripe (17 mm x 17 mm) may be regarded as a material with

low flame spread for bulkhead, wall and ceiling linings

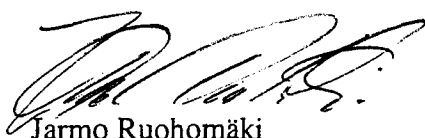
according to IMO FTPC Part 5 (IMO Resolution MSC.61(67) Part 5).

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

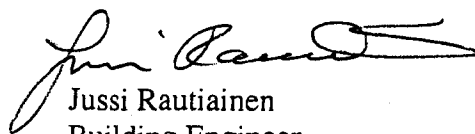
Note

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."

Espoo 8 December 2003



Jarmo Ruohomäki
Senior Research Scientist



Jussi Rautiainen
Building Engineer

Appendices

- 1 Rate of heat release results
- 2 Method description and requirements
- 3 Description of the profile

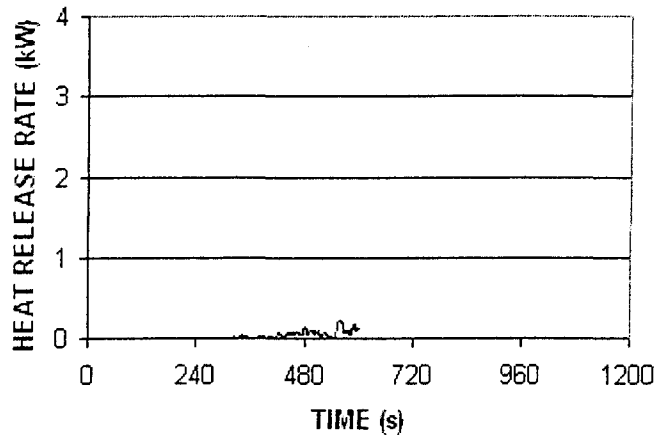
Distribution

Customer	Original
VTT	Original

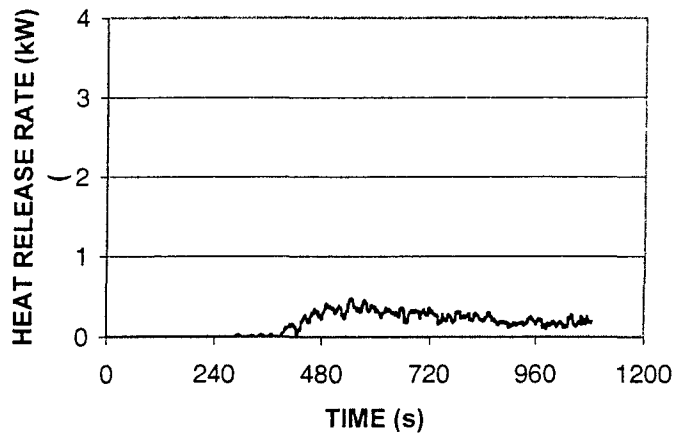
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Appendix 1

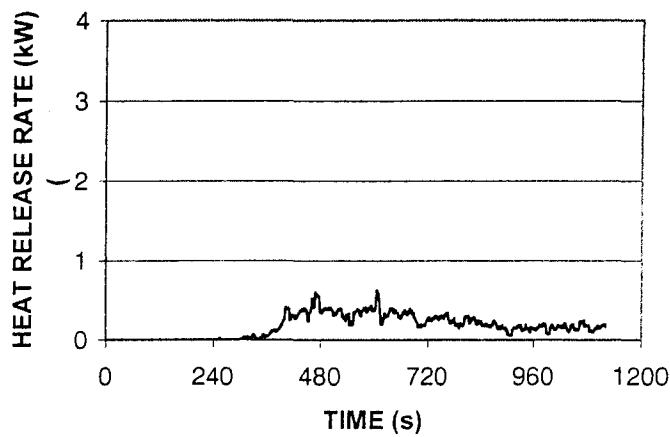
TEST 1



TEST 2



TEST 3



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: 10 pcs.

Materials and composites of normal thickness 50 mm or less are attached, by means of an adhesive if appropriate, to the substrate to which they will be attached in practice. Over 50 mm thick specimens shall be reduced to the thickness of 50^{+3}_{-0} mm by cutting away the unexposed face.

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:

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

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

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

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

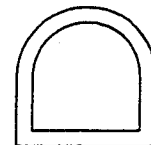
where

CFE = critical flux at extinguishment

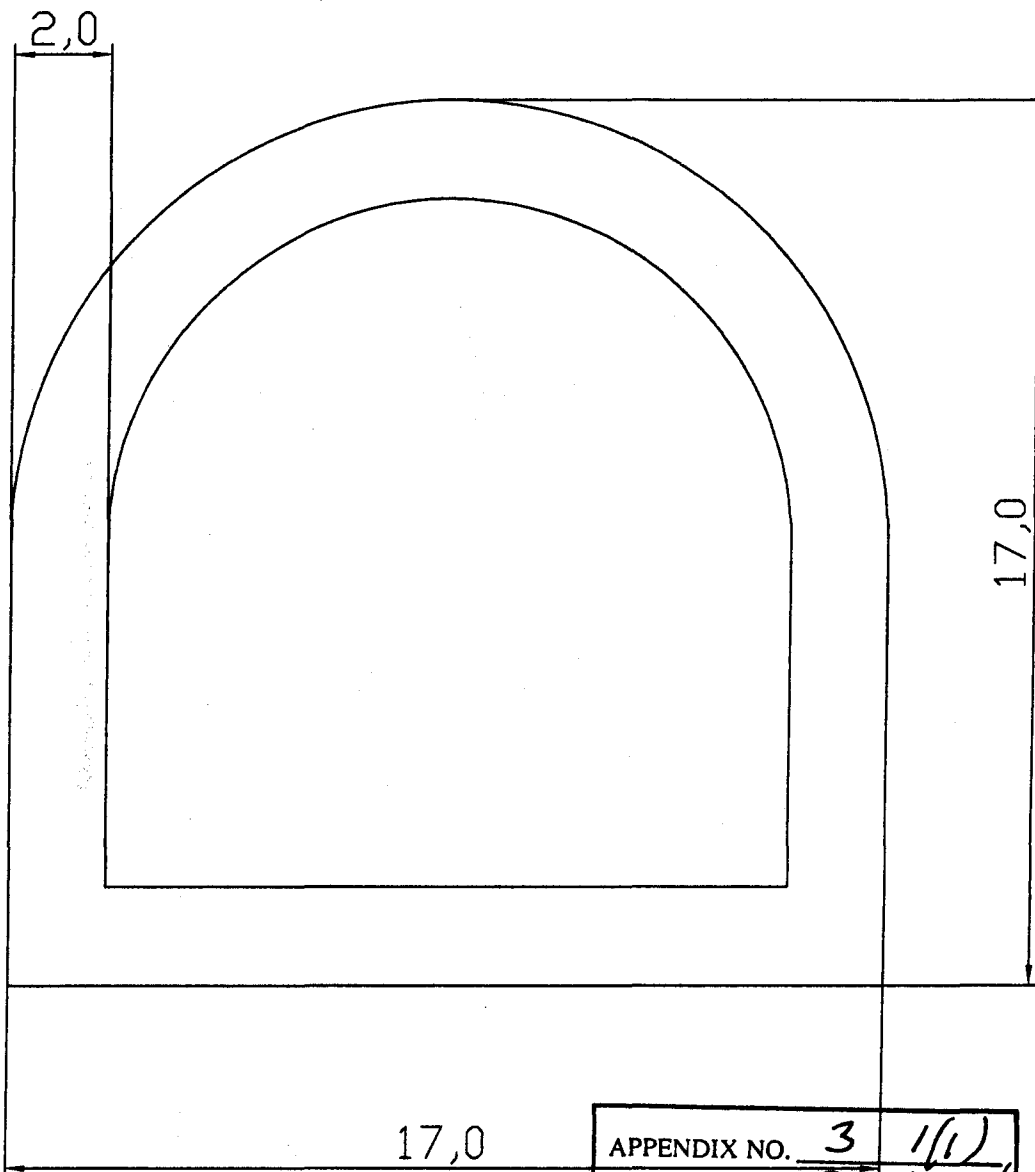
Q_{sb} = heat for sustained burning

Q_t = total heat release

Q_p = peak heat release rate



1:1



APPENDIX NO.	3	1(1)
REPORT NO.	RTE 4268/03	
SIGNATURE	<i>[Handwritten Signature]</i>	
VTT BUILDING AND TRANSPORT		

This drawing is the property of:
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Itemref	Quantity	Material LTC - Silicone rubber			Article No. 1	
Designed by J.JUUTINEN	Checked by H.AHLGREN	Approved by - date	File name T1038	Date 1.12.2003	Scale SCALE	
			SILICONE-PROFILE			
			Edition EDITION	Sheet A4		