

Thore Berntssons Båtbyggeri AB
Mellan-Restad 460
SE-442 95 KUNGÄLV

Fire test according to EN 13823 (SBI Method) and EN ISO 11925-2 (4 appendices)

Introduction

SP has by request of Thore Berntssons Båtbyggeri AB performed fire tests according to EN 13823:2010 (SBI method) and EN ISO 11925-2. The purpose of the tests are to form a basis for technical fire classification.

Product

According to the client:

Composite panel called "Moln", with a foam core and GRP surface layer on both sides. The panel has an intumescent paint coating.

Material:	Amount:
Top clear coat	120 µm
FR-treated paint	Contego, High Solids, 600 µm
Glas fibre	3000 gram/m ²
Hartz	
Core material P60	27 mm
Hartz	
Glas fibre	3000 gram/m ²
FR-treated paint	Contego, High Solids, 600 µm
Top clear coat	120 µm

The panel has sealed edges and is manufactured with vacuum infusion technology.

More information regarding the product is held on file by SP Fire Research.

Manufacturer

Thore Berntssons Båtbyggeri AB, Kungälv, Sweden.

Sampling

The sample was delivered by the client. It is not known to SP Fire Research if the product received is representative of the mean production characteristics.

The sample was received October 1, 2014 at SP Fire Research.

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Test results

The test results are given in appendix 1 – 2 . Photographs are shown in appendix 3. An explanation of the SBI-test parameters is given in appendix 4.

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.

Deviation from standard

For calculation of alternative smoke procedure, TSP_{600s} , data from a former test day were used.

Note

The accreditation referred to is valid for EN 13823 and EN ISO 11925-2.

SP Technical Research Institute of Sweden Fire Research - Fire Dynamics

Performed by



Johan Post

Examined by



Per Thureson

Appendices

- 1 Test results, EN 13823
- 2 Test results, EN ISO 11925-2
- 3 Photographs
- 4 Test parameter explanation, EN 13823

Appendix 1

Test results, EN 13823:2010

Product

According to the client:

Composite panel called “Moln”, with a foam core and GRP surface layer on both sides. The panel has an intumescent paint coating.

Material:	Amount:
Top clear coat	120 µm
FR-treated paint	Contego, High Solids, 600 µm
Glas fibre	3000 gram/m ²
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Core material P60	27 mm
Hartz	
Glas fibre	3000 gram/m ²
FR-treated paint	Contego, High Solids, 600 µm
Top clear coat	120 µm

The panels has sealed edges and are manufactured with vacuum infusion technology.

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Mounting

See photo 1 – 2, appendix 3.

The product was mounted according to EN 13823:2010, 5.2.2 a. A distance of approximately 80 mm was used between backing board and product. The specimens were formed as one piece, there were no exposed joint in burner corner. The panels in accordance with EN 13823:2010, 4.4.11 were removed. No joints were used.

Test results

Test no	Test 1	Test 2	Test 3	Average
General information				
Test start, min:s	0:00	0:00	0:00	
Auxiliary burner ignited and adjusted, min:s	2:00	2:00	2:00	
Main burner ignited, min:s	5:00	5:00	5:00	
Main burner stopped, min:s	26:00	26:00	26:00	
Observations				
Flaming droplets or particles	No	No	No	
Burning droplets or particles, > 10 s	No	No	No	
Lateral flame spread until the edge, LFS	No	No	No	
Fire performance, see graph no 3 to 6				
FIGRA _{0,2MJ} , W/s	92	81	108	<u>93</u>
FIGRA _{0,4MJ} , W/s	40	51	64	<u>52</u>
SMOGRA, m ² /s ²	0.0	3.6	4.2	<u>2.6</u>
THR _{600s} , MJ	1.6	1.4	1.6	<u>5.1</u>
TSP _{600s} , m ²	30	34	37	<u>34</u>

Appendix 1

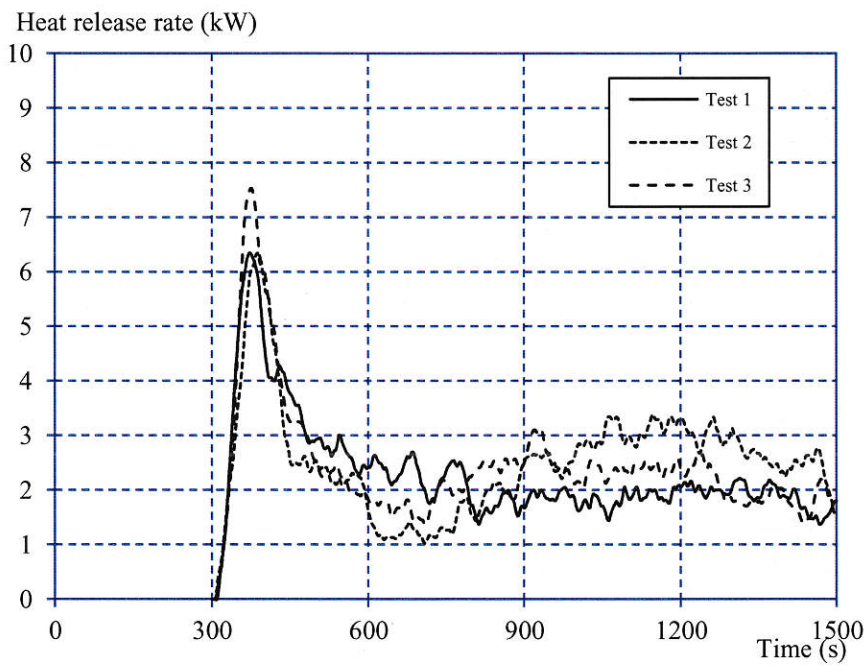
Observations made during the tests

None.

Method of smoke calculation

The smoke production rate, SPR, of the burner was calculated using data from the main (primary) burner according to EN 13823:2010, A.6.1.2.

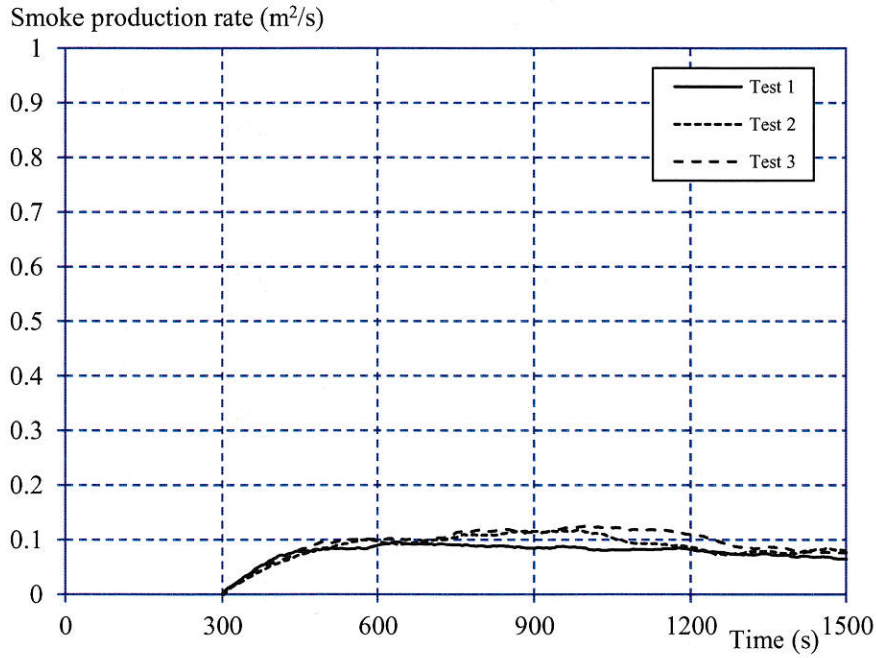
Graph of heat release rate (HRR_{av})



Graph 1 Heat release rate (burner excluded), 30 seconds running average value.

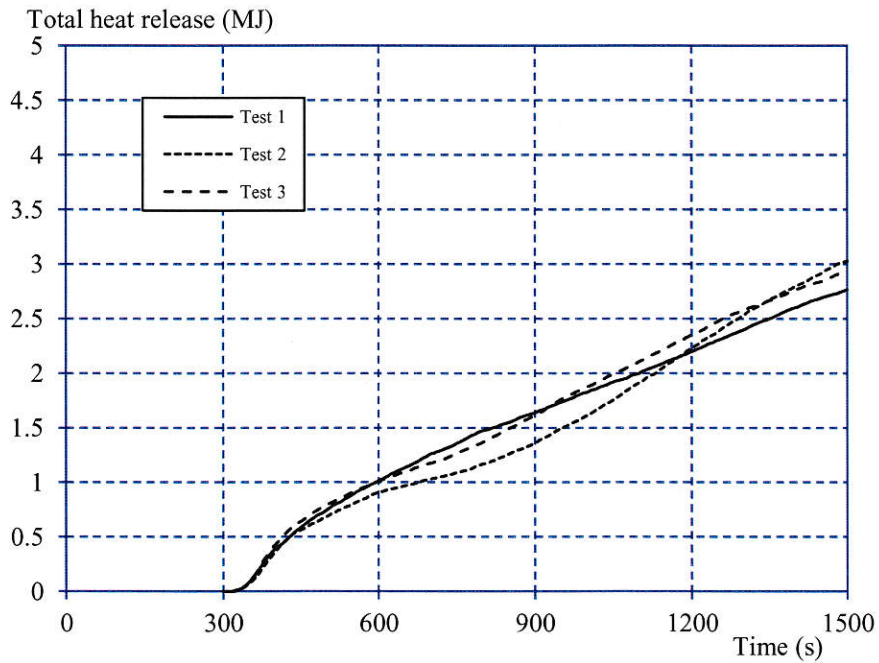
Appendix 1

Graph of smoke production rate (SPR_{av})



Graph 2 Smoke production rate (burner excluded), 60 seconds running average value.

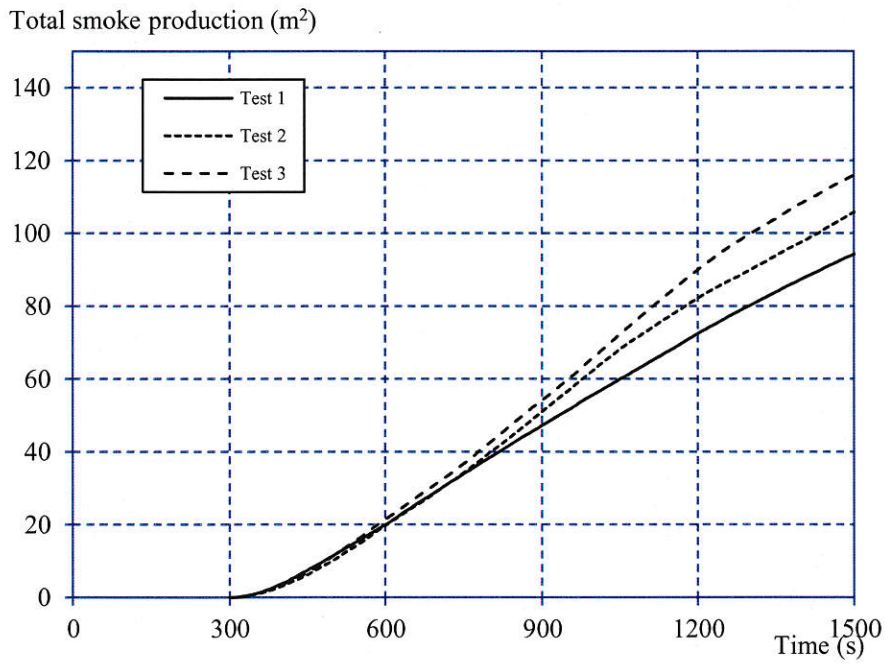
Graph of total heat release (THR)



Graph 3 Total heat release (burner excluded).

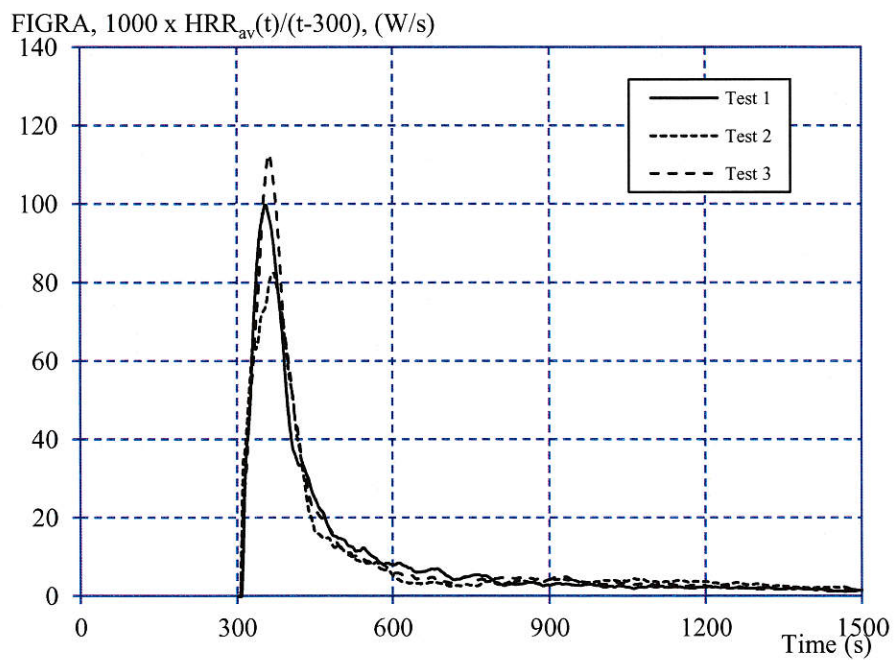
Appendix 1

Graph of total smoke production (TSP)



Graph 4 Total smoke production (burner excluded). The graphs are based on SPR calculation using data from the auxiliary burner.

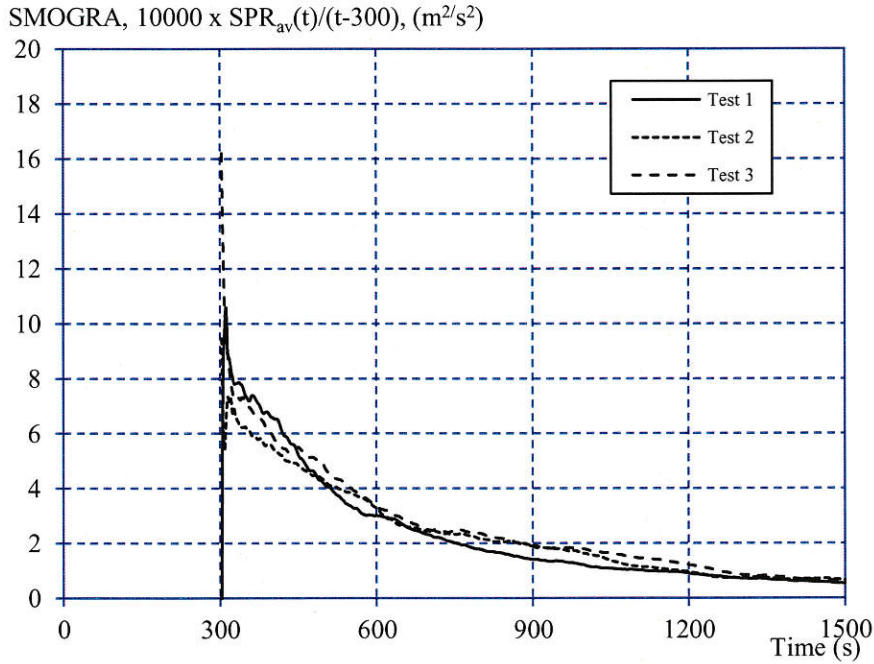
Graph of Fire Growth Rate index (FIGRA)



Graph 5 Fire growth rate index.

Appendix 1

Graph of SMOke Growth RATE index (SMOGR_A)



Graph 6 Smoke growth rate index.

Note

Graphs 5 and 6 show the time relationships of *FIGRA* and *SMOGR_A* respectively without applying the threshold values, see EN 13823, paragraph A.5.3 and A.6.3. Therefore the reported single maximum values of *FIGRA*_{0,2MJ}, *FIGRA*_{0,4MJ} and *SMOGR_A* may be smaller than shown in the graphs as the threshold values are applied in this case.

Measured data

- Thickness 32.5 – 33.5 mm.
- Area weight 14.5 – 15.1 kg/m².
- Density 440 - 460 kg/m³.

Conditioning

According to EN 13238 and EN 13823:2010.

- Temperature (23 ± 2) °C.
- Relative humidity (50 ± 5) %.

- Constant mass:
- Mass 1: 34742 g
- Mass 2: 34734 g
- Time : 72 h

Date of test

October 6, 2014.

Appendix 2

Test results – EN ISO 11925-2:2010

Product

According to the client:

Composite panel called “Moln”, with a foam core and GRP surface layer on both sides. The panel has an intumescent paint coating.

Material:	Amount:
Top clear coat	120 µm
FR-treated paint	Contego, High Solids, 600 µm
Glas fibre	3000 gram/m ²
Hartz	
Core material P60	27 mm
Hartz	
Glas fibre	3000 gram/m ²
FR-treated paint	Contego, High Solids, 600 µm
Top clear coat	120 µm

The panels has sealed edges and are manufactured with vacuum infusion technology.

More information regarding the product is held on file by SP Fire Research.

Application

Surface exposure. Flame exposure time was 30 seconds.

Test results

Test no	1	2	3	4	5	6
Direction	None	None	None	None	None	None
The sample ignited, s	NI	NI	NI	NI	NI	NI
The flames reach 150 mm, s	-	-	-	-	-	-
Burning droplets	No	No	No	No	No	No
Time when filter paper ignited, s	-	-	-	-	-	-

NI = No ignition.

Measured data

Thickness 32.5 – 33.5 mm.

Area weight 14.5 – 15.1 kg/m².

Density 440 - 460 kg/m³.

Appendix 2

Conditioning

According to EN 13238:2010.

Temperature (23 ± 2) °C.

Relative humidity (50 ± 5) %.

Date of test

October 7, 2014.

Appendix 3

Photographs



Photo no 1 Prior to test "Moln"

The exposed surface of the long wing.

Appendix 3

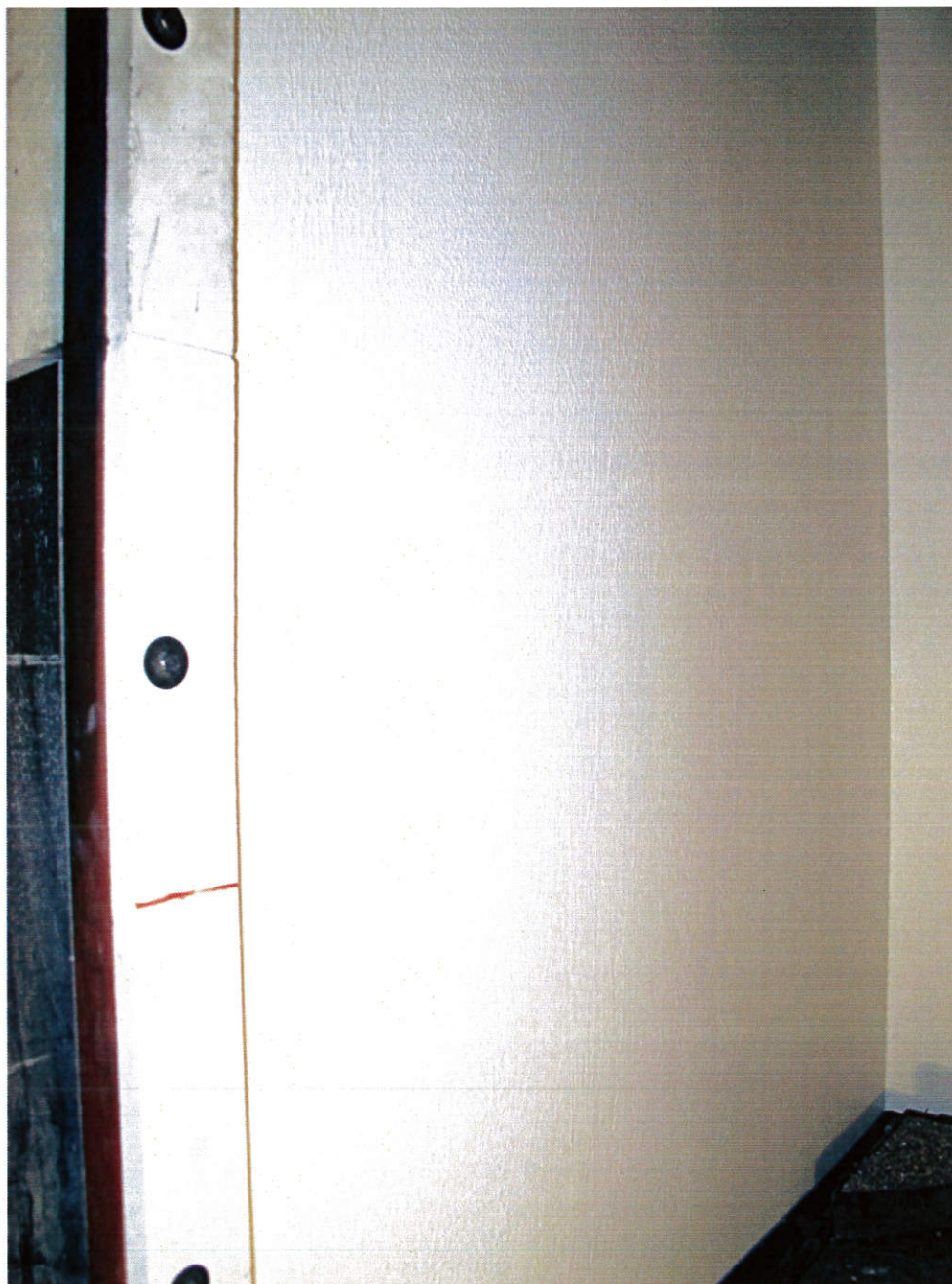


Photo no 2 Prior to test "Moln"

The vertical outer edge of the long wing at a height of 500 mm above the floor of the trolley.

Appendix 3



Photo no 3 After test “Moln”

Impact of flames in the burner corner.

Appendix 4

Test parameter explanation – EN 13823:2010 (SBI method)

Parameter	Explanation
Test start	Start of data collection.
End of test	26:00 (min:s) after test start.
HRR_{av} , maximum, kW	Peak Heat Release Rate of material between ignition of the main burner and end of test (burner heat output excluded), as a 30 seconds running average value.
SPR_{av} , maximum, m^2/s	Peak Smoke Production Rate of material between ignition of the main burner and end of test (burner heat output excluded), as a 60 seconds running average value.
$FIGRA_{0,2MJ}$, W/s	Fire Growth RATE index is defined as the maximum of the quotient $HRR_{av}(t)/(t-300s)$, multiplied by 1000. During $300 s \leq t \leq 1500 s$, threshold value 3 kW and 0.2 MJ.
$FIGRA_{0,4MJ}$, W/s	Fire Growth RATE index is defined as the maximum of the quotient $HRR_{av}(t)/(t-300s)$, multiplied by 1000. During $300 s \leq t \leq 1500 s$, threshold value 3 kW and 0.4 MJ.
$SMOGRA$, m^2/s^2	SMOke Growth RATE index is defined as the maximum of the quotient $SPR_{av}(t)/(t-300s)$, multiplied by 10 000. During $300 s \leq t \leq 1500 s$, threshold value $0.1 m^2/s$ and $6 m^2$.
THR_{600s} , MJ	Total heat release of the sample during $300 s \leq t \leq 900 s$.
TSP_{600s} , m^2	Total smoke production of the sample during $300 s \leq t \leq 900 s$.