

Climate Recovery AB
Skeppsbron 9
392 31 Kalmar

Fire test according to EN 13823 (SBI Method)

(3 appendices)

Introduction

SP has by request of Climate Recovery AB performed a fire test according to EN 13823:2010+A1:2014 (SBI method). The purpose of the test is to form a basis for technical fire classification.

Product

According to the client:

Product called "CR-DUCT", consisting of a core of mineral wool with a nominal area weight of 2.0 kg/m². The facing and backing of the mineral wool consists of a lacquered aluminium foil, nominal area weight 34 g/m² and nominal lacquer area weight of 0.08 g/m². The aluminium foil on each side is attached to the mineral wool with layers of PE, nominal area weight 12 g/m², PET nominal area weight 17 g/m², glass scrim nominal area weight 6 g/m² and a layer of PE nominal area weight 15 g/m² on the facing, while the PE layer is 25 g/m² on the backing. The product as a whole has a nominal thickness of 30 mm.

Manufacturer

Climate Recovery AB, Kalmar, 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 January 15, 2015 at SP Fire Research.

Test results

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

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.

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Note

The accreditation referred to is valid for EN 13823.

**SP Technical Research Institute of Sweden
Fire Research - Fire Dynamics**

Performed by



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Examined by



Per Thureson

Appendices

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

Appendix 1

Test results, EN 13823:2010+A1:2014

Product

Product called “CR-DUCT”, consisting of a core of mineral wool with a nominal area weight of 2.0 kg/m². The facing and backing of the mineral wool consists of a lacquered aluminium foil, nominal area weight 34 g /m² and nominal lacquer area weight of 0.08 g/m². The aluminium foil on each side is attached to the mineral wool with layers of PE, nominal area weight 12 g/m², PET nominal area weight 17 g/m², glass scrim nominal area weight 6 g/m² and a layer of PE nominal area weight 15 g/m² on the facing, while the PE layer is 25 g/m² on the backing. The product as a whole has a nominal thickness of 30 mm.

Mounting

See photo 1 – 2, appendix 2.

The product was mounted according to EN 13823:2010+A1:2014, 5.2.2 a and e. It was fixed mechanically with steel wires on to a steel frame. The fixing was used only in order to keep the panel in place during testing. A distance of approximately 80 mm was used between backing board and product. The panels in accordance with EN 13823:2010+A1:2014, 4.4.11 were removed. A vertical joint on the long specimen wing was used. The side with facing was exposed.

Test results

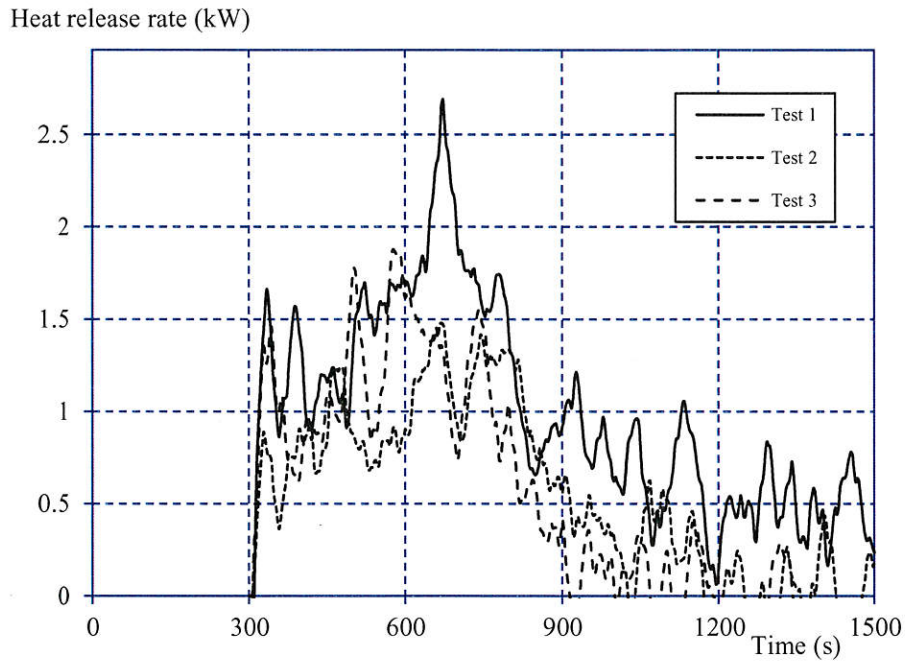
Test no	Test 1	Test 2	Test 3	Average
General information				
Test start, min:s	0:00	0:00	0:00	
Auxiliary burner ignited and adjusted, min:s	2:00	2:00	2:00	
Main burner ignited, min:s	5:00	5:00	5:00	
Main burner stopped, min:s	26:00	26:00	26:00	
Observations				
Flaming droplets or particles	No	No	No	
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	0	0	0	<u>0</u>
FIGRA _{0,4MJ} , W/s	0	0	0	<u>0</u>
SMOGRA, m ² /s ²	0	0	0	<u>0</u>
THR _{600s} , MJ	0.8	0.6	0.6	<u>0.7</u>
TSP _{600s} , m ²	21	16	18	<u>18</u>

Method of smoke calculation

The smoke production rate, SPR, of the burner was calculated using data from the auxiliary (secondary) burner.

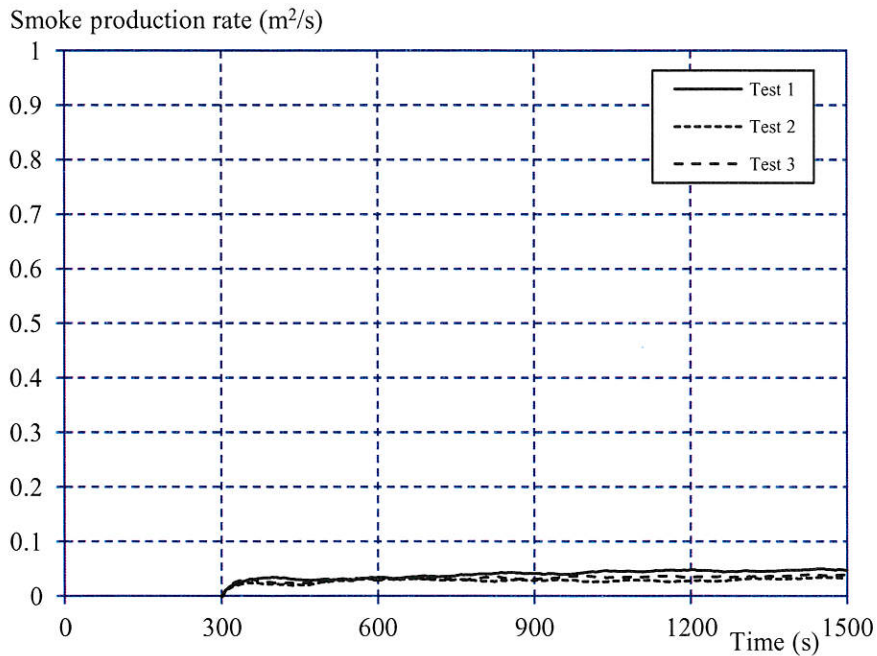
Appendix 1

Graph of heat release rate (HRR_{av})



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

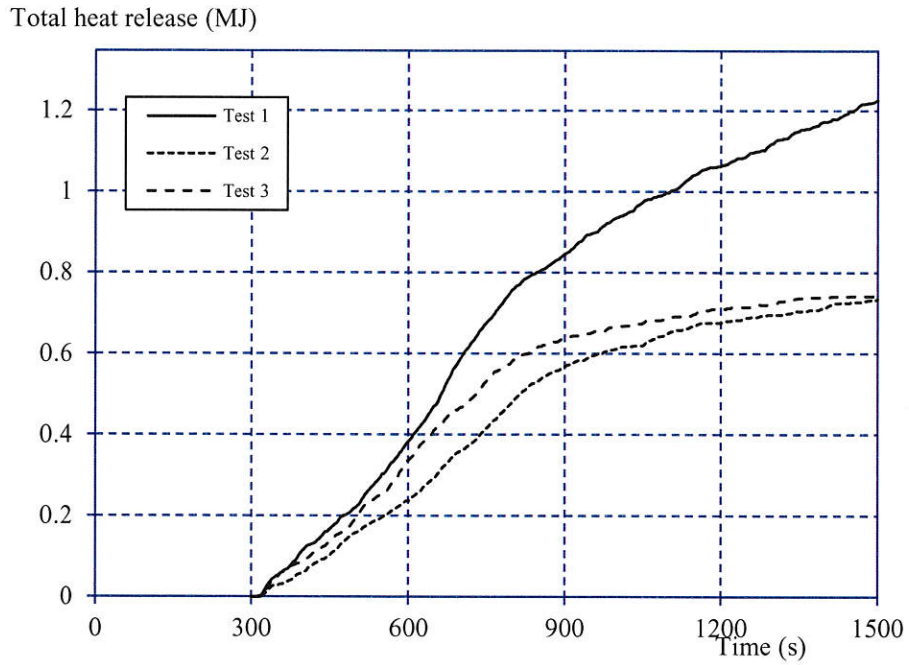
Graph of smoke production rate (SPR_{av})



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

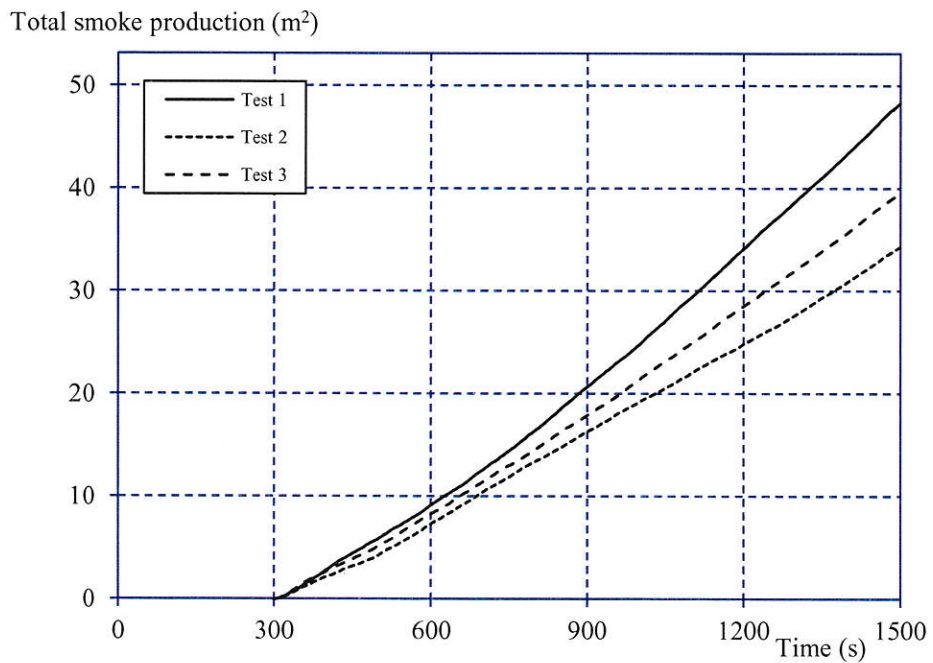
Appendix 1

Graph of total heat release (THR)



Graph 3 Total heat release (burner excluded).

Graph of total smoke production (TSP)

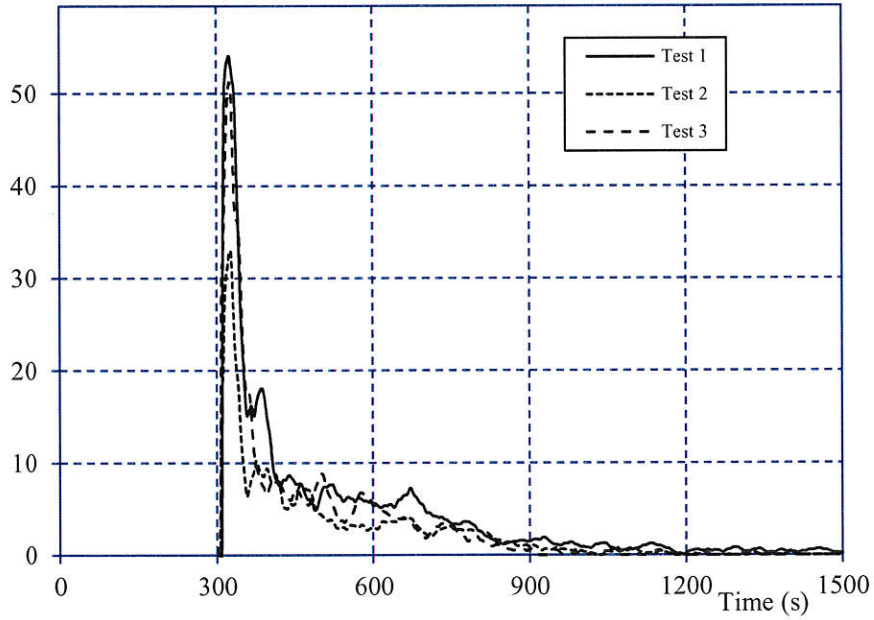


Graph 4 Total smoke production (burner excluded).

Appendix 1

Graph of Fire Growth RATE index (FIGRA)

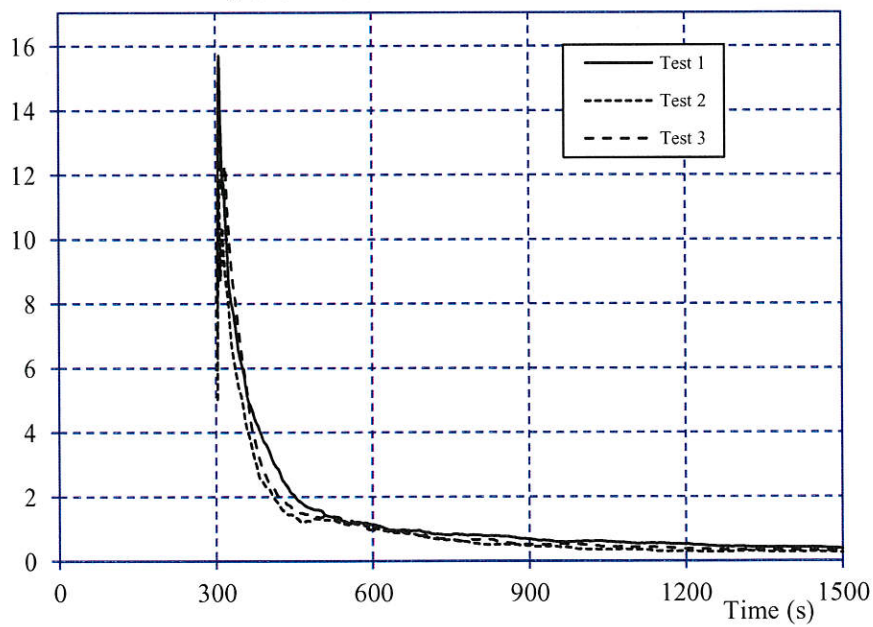
FIGRA, $1000 \times \text{HRR}_{\text{av}}(t)/(t-300)$, (W/s)



Graph 5 Fire growth rate index.

Graph of SMOke Growth RATE index (SMOGRA)

SMOGRA, $10000 \times \text{SPR}_{\text{av}}(t)/(t-300)$, (m^2/s^2)



Graph 6 Smoke growth rate index.

Appendix 1

Note

Graphs 5 and 6 show the time relationships of *FIGRA* and *SMOGRA* 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 *SMOGRA* may be smaller than shown in the graphs as the threshold values are applied in this case.

Measured data

Thickness 28.1 – 29.5 mm.

Density 70 – 75 kg/m³.

Conditioning

According to EN 13238 and EN 13823:2010.

Temperature (23 ± 2) °C.

Relative humidity (50 ± 5) %.

Constant mass:

Mass 1: 1622 g

Mass 2: 1623 g

Time : 24 h

Date of test

January 27 and 30, 2015.

Appendix 2

Photographs



Photo no 1 Prior to test "CR-DUCT"

The exposed surface of the long wing.

Appendix 2



Photo no 2 Prior to test “CR-DUCT”

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

Appendix 2



Photo no 3 After test “CR-DUCT”

Impact of flames in the burner corner.

Appendix 3

Test parameter explanation – EN 13823:2010+A1:2014 (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 $300 s \leq t \leq 900 s$.