Laboratory for Fire Safety

Reaction to fire testing in accordance with EN_13823:2020 of RoofSupport FireWrap

Test report

Report number Y 2586-3E-RA-001 dated 9 May 2022

Laboratory for Fire Safety

Reaction to fire testing in accordance with EN_13823:2020 of RoofSupport FireWrap

Test report

Client	Conduct Technical Solutions bv Aalborg 4 2993 LP Barendrecht The Netherlands
Issued by	Peutz bv Lindenlaan 41 6584 AC Molenhoek PO Box 66 6585 ZH Mook The Netherlands
Notified body no.	NB 2264
Product	**RoofSupport FireWrap**
Report number	Y 2586-3E-RA-001
Date	9 May 2022
Reference	HL/MvD//Y 2586-3E-RA-001
Representative	ing. H.H.A. Leenders
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Table of contents

1 Introduction

On behalf of Conduct Technical Solutions bv an investigation was performed with respect to the reaction to fire properties of RoofSupport FireWrap.
The investigation was performed in the Peutz Laboratory for Fire safety in accordance with EN 13823:2020 ('Single Burning Item-test'), further referenced as EN 13823.

This report provides a description of the construction tested, the method of mounting in the test apparatus, the method used and the test results.

TESTEN
RvA L 505

For this type of measurements the Laboratory for Fire safety has been accredited by the Dutch "Raad voor Accreditatie" (RvA).

The RvA is member of EA MLA (**EA MLA**: **E**uropean **A**ccreditation Organisation **M**ulti**L**ateral **A**greement: http://www.european-accreditation.org).

EA: "Certificates and reports issued by bodies accredited by MLA and MRA members are considered to have the same degree of credibility, and are accepted in MLA and MRA countries."

2 Product description

2.1 General

The information in this chapter is based on information provided by the client.

The product investigated is the RoofSupport FireWrap, hereinafter also called 'the product'. The intended application is to protect solar cables against fire and to delay the fire spread between compartments. The FireWrap bag is based on an E-glass fibre silicone coated textile layer filled with an insulation material. The bag is sealed with high temperature resistant threads and provided with stainless steel tensioners.

The materials to be tested were delivered on the date specified in table 2.1. On arrival the material was verified and marked by Peutz.

2.2 Harmonised product standard

According to the client there was no harmonised European product standard published at the time the tests were conducted and this report was drawn up.

2.3 Product identification

The most important parameters for identifying the product are summarized in Tables 2.1 and 2.2 below.

t2.1 General information of product to be tested

Product	
Date of delivery	14th of January 2022
Commercial name	RoofSupport FireWrap
Manufacturer	Forfyre bv
	Koopvaardijweg 3A
	4906 CV Oosterhout
	The Netherlands
Client	Conduct Technical Solutions bv
	Aalborg 4
	2993 LP Barendrecht
	The Netherlands
Identification	N/A
Sampling	N/A

Peutz was not involved in the selection of the test specimen (or of its materials). The laboratory cannot make any declaration about the representativeness of the provided specimen and the samples made available. The results apply to the sample as received.

t2.2 Additional information of product to be tested

Product	**Nominal value**	**Measured value [MV]**
Description	The FireWrap bag is based on an E-glass fibre silicone coated textile layer (1) filled with an insulation material (2). The bag is sealed with high temperature resistant threads (3) and provided with stainless steel tensioners (not part of the specimen). Due to the dimensions of the sample to be tested, the bags are sewn together to create a full test specimen.	
Intended use	Protect solar cables against fire and to delay the fire propagation between compartments.	
Dimensions [mm]	750 x 500	
Total thickness [mm]	19	20.2
Density [kg/m^3]	-	203
Surface weight [kg/m^2]	-	4.1
Colour	white	
Layer (1)		
Type product	E-glass fibre based textile, silicon coated on both sides	
Commercial name	Fyretex 550 HT SIL	
Manufacturer	Forfyre bv, Koopvaardijweg 3A, 4906 CV Oosterhout, NL	
Thickness [mm]	-	0.417
Density [kg/m^3]	0.512	*
Surface weight [kg/m^2]	0.64	0.65
Colour	White	White
Layer (2)		
Type product	High temperature insulation wool blanket based on alkaline earth silicate fibres	
Commercial name	FyreBlanket 1200	
Manufacturer	Forfyre bv, Koopvaardijweg 3A, 4906 CV Oosterhout, NL	
Thickness [mm]	25	25.0
Density [kg/m^3]	128	138.4
Surface weight [kg/m^2]	3.2	3.46
Binder	None	**
Layer (3)		
Type product	Kevlar covered steel threads	
Commercial name	FyreYarn 1000	
Manufacturer	Forfyre bv, Koopvaardijweg 3A, 4906 CV Oosterhout, NL	
Thickness [mm]	0.15	**
Density [kg/m^3]	N/A	**
Surface weight [kg/m^2]	N/A	**
Colour	White/yellow	

* Not verified by the laboratory

** Unverifiable by the laboratory

The values mentioned are the nominal values as given by the client, unless otherwise stated (MV, measured value).

2.4 Conditioning of test specimen

Prior to the tests, the specimens were stored for at least four weeks in a climate room with the environmental conditions as specified in EN 13238:2010.

Conditioning took place from 14th of January 2022 until the test date 1st of March 2022.

2.5 Test specimen

According to the client there was no harmonised European product standard published at the time the tests were conducted and this report was drawn. The construction of the test specimens and the mounting in the test apparatus are therefore based entirely on EN 13823.

The test specimen were supplied as a whole and buillt in by the laboratory on the day of testing. See Table 2.3 for a description of the test specimen.

t2.3 Description of test specimen

Product	
Substrate	No substrate was used.
Mounting	Free standing on a metal test rig with pins at a distance of at least 80 mm from the backing board according to standard mounting as described in EN 13823, chapter 5.2.2.
Joints	In the long wing and short wing a horizontal seam at 750 mm and vertical seams every 500 mm were present.
Cavity	Behind the test specimen a ventilated cavity was present, depth 80 mm.
Product standard	At the time of testing the client was not aware of the existence of a harmonised product standard.

3 Test results

3.1 Results of measurements

In total three tests were performed.
The environmental conditions and test results are summarised in the tables 3.1 and 3.2 below. For additional visual observations on the behaviour of the test specimen please refer to chapter 3.2. For any comments and/or deviations from the standard, please refer to Chapter 3.3. Photographs of the samples are presented in Appendix 1.
Detailed information regarding the testing and the results of the tests are given in Appendix 2.

t3.1 Environmental conditions immediately prior to the test

		Test 1	Test 2	Test 3
Test date		01/03/22	01/03/22	01/03/22
Temperature	[°C]	14	14	14
Relative humidity	[%]	37	39	40
Air pressure	[Pa]	102421	102392	102367

t3.2 Test results EN 13823

Parameter		Test 1	Test 2	Test 3	Classification parameter
$FIGRA_{0,2MJ}$	[W/s]	0	0	0	0
$FIGRA_{0,4MJ}$	[W/s]	0	0	0	0
THR_{600s}	[MJ]	0.4	0.5	0.6	0.5
SMOGRA	$[m^2/s^2]$	0	0	0	0
TSP_{600s}	$[m^2]$	1	2	1	1
LFS reaching egde	[Y/N]	N	N	N	N
FDP ≤ 10 s	[Y/N]	N	N	N	N
FDP > 10 s	[Y/N]	N	N	N	N

(value) not used to determine classification parameter
FIGRA maximum value of the quotient of heat release specimen and time, with a threshold of 0.2 MJ respectively 0.4 MJ
THR_{600s} total heat release from the specimen during the first 600 s of exposure to the flames of the main burner
SMOGRA maximum of the quotient of smoke production rate from the specimen and the time of its occurrence
TSP_{600s} total smoke production from the specimen during the first 600 s of exposure to the flame of the main burner
LFS lateral flame spread over the long wing
FDP burning droplets or particles outside the burner area that remain burning

3.2 Observations of the behaviour of the test specimen

There were no additional events as mentioned in EN 13823, clause 8.3.6.

3.3 Remarks

Due to the relative limited size of the product in practice, the specimens were provided with seams at 750 mm horizontal and every 500 mm vertically to create full dimensions of test specimens.
In view of the results obtained, we do not anticipate this to be of any influence on a potential classification.

4 Finally

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.

Information regarding the accuracy of the method can be found in EN 13823, Annex B.

Mook,

H.H.A. Leenders, BSc.
Head of Laboratory for Fire Safety

D.J. den Boer, BSc.
Management

This report contains 10 pages and 2 appendices:

Appendix 1 Photographs	(3 pages)
Appendix 2 Test results	(12 pages)

Appendix 1
Photographs

Test specimen 1
View of the exposed surface of the long wing

Test specimen 1
Vertical outer edge of the long wing

Test specimen 1
View of the exposed surface during testing

Test specimen 1
View of the exposed surface after testing

Appendix 1
Photographs

Test specimen 2
View of the exposed surface of the long wing

Test specimen 2
Vertical outer edge of the long wing

Test specimen 2
View of the exposed surface during testing

Test specimen 2
View of the exposed surface after testing

Appendix 1
Photographs

Test specimen 3
View of the exposed surface of the long wing

Test specimen 3
Vertical outer edge of the long wing

Test specimen 3
View of the exposed surface during testing

Test specimen 3
View of the exposed surface after testing

Laboratory for Fire Safety
EN 13823 - SBI - Test results

program version v3.22b 24-01-22 JM

Project data

Project no:	Y2586_20220301#01
Print date:	22-4-2022 09:57:36
Test date:	01-03-2022
Technician:	MvD

Measured data read from file(s):
Y2586_20220301#01.txt
20220301.spr

Description of product and mounting

Identification sample:	Firewrap
Test specimen no.:	#01
Substrate:	No substrate, CaSi-board as backing
Mounting:	Free standing on steel rig ventilated cavity 80 mm
Seams/joints:	Horizontal on 750 mm; vertically on 500 mm

Description of specimen tested

Firewrap 20 mm thick

E-glass fibre based textile - Fyretex 550HT
Fyreblacket 1200

Recorded events during the test

Surface flash:	N
Falling of parts of the specimen:	N
Smoke not entering the hood:	N
Mutual fixing of backing boards fails:	N
Conditions justify early termination:	N
Distortion or collapse of the specimen:	N
Any other additional events:	N

Visual observations during the test

Lateral flame spread till edge of specimen:	N
Flaming droplets/particles <= 10 s:	N
Flaming droplets/particles > 10 s:	N

Other events

Early termination of test:	N
Closing gas supply at time:	1557 s
Heat release too high:	N
i.e. HRR > 350 kW or HRR_30 > 280 kW	
Temperature too high:	N
i.e. Tms > 400 'C or Tms_30 > 300 'C	
Burner heavily disturbed:	N
Failure of test apparatus:	N

Results

Figra 02:	0,00 W/s	at:	0 s
Figra 04:	0,00 W/s	at:	0 s
THR600:	0,44 MJ		
Smogra:	0,00 m2/s2	at:	0 s
TSP600:	0,80 m2		

Laboratory for Fire Safety
EN 13823 - SBI - Heat release

program version v3.22b 24-01-22 JM

Project data

Project no: Y2586_20220301#01
Print date: 22-4-2022 09:57:36
Test date: 01-03-2022
Technician: MvD

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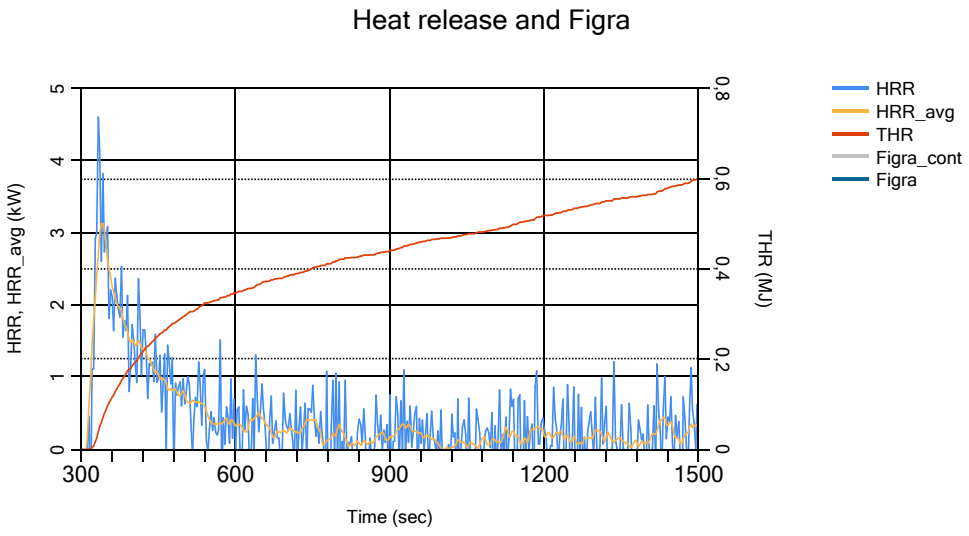
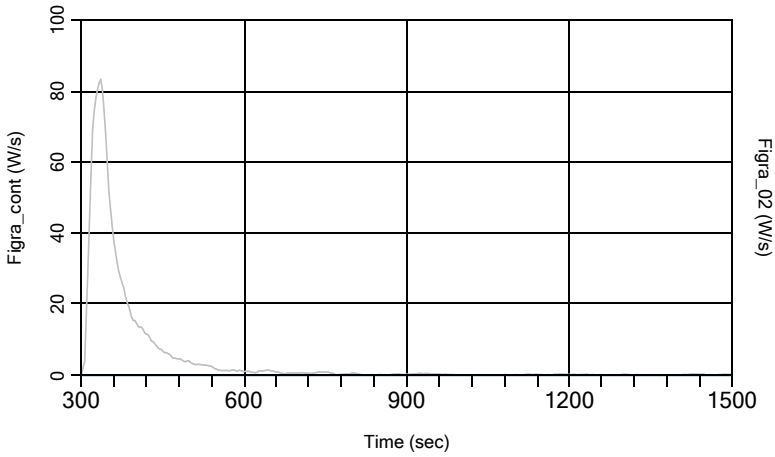
20220301.spr





Laboratory for Fire Safety
EN 13823 - SBI - Smoke production

program version v3.22b 24-01-22 JM

Project data

Project no: Y2586_20220301#01
Print date: 22-4-2022 09:57:36
Test date: 01-03-2022
Technician: MvD

Measured data read from file(s):
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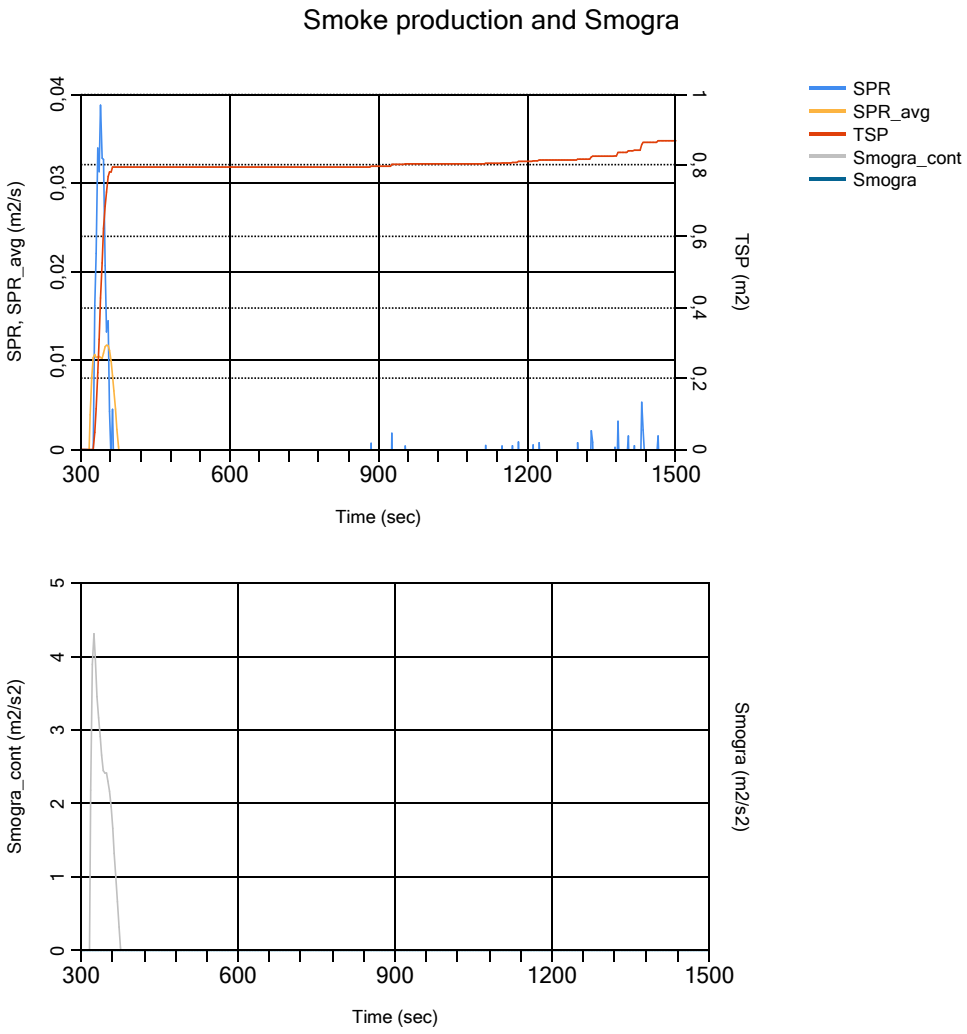


Laboratory for Fire Safety
EN 13823 - SBI - Calculations

program version v3.22b 24-01-22 JM

Project data

Project no:	Y2586_20220301#01
Print date:	22-4-2022 09:57:36
Test date:	01-03-2022
Technician:	MvD

Measured data read from file(s):
Y2586_20220301#01.txt
20220301.spr

Pre-test conditions

Ambient temperature:	13,5	°C
Ambient pressure:	102421	Pa
Ambient relative humidity:	37,4	%

Calculations in accordance with EN 13823

Figra 02:	0,000	W/s	at time:	0 s
Figra 04:	0,000	W/s	at time:	0 s
THR600:	0,441	MJ		
THRend:	0,599	MJ	exposure:	1200 s
Smogra:	0,000	m2/s2	at time:	0 s
TSP600:	0,797	m2		
TSPeind:	0,869	m2	exposure:	1200 s

Averaged Tms based on thermocouples: T1, T2, T3

Laboratory for Fire Safety
EN 13823 - SBI - Test results

program version v3.22b 24-01-22 JM

Project data

Project no:	Y2586_20220301#02
Print date:	22-4-2022 09:55:00
Test date:	01-03-2022
Technician:	MvD

Measured data read from file(s):
Y2586_20220301#02.txt
20220301.spr

Description of product and mounting

Identification sample:	Firewrap
Test specimen no.:	#02
Substrate:	No substrate, CaSi-board as backing
Mounting:	Free standing on steel rig ventilated cavity 80 mm
Seams/joints:	Horizontal on 750 mm; vertically on 500 mm

Description of specimen tested

Firewrap 20 mm thick

E-glass fibre based textile - Fyretex 550HT
Fyreblacket 1200

Recorded events during the test

Surface flash:	N
Falling of parts of the specimen:	N
Smoke not entering the hood:	N
Mutual fixing of backing boards fails:	N
Conditions justify early termination:	N
Distortion or collapse of the specimen:	N
Any other additional events:	N

Visual observations during the test

Lateral flame spread till edge of specimen:	N
Flaming droplets/particles <= 10 s:	N
Flaming droplets/particles > 10 s:	N

Other events

Early termination of test:	N
Closing gas supply at time:	1557 s
Heat release too high:	N
i.e. HRR > 350 kW or HRR_30 > 280 kW	
Temperature too high:	N
i.e. Tms > 400 'C or Tms_30 > 300 'C	
Burner heavily disturbed:	N
Failure of test apparatus:	N

Results

Figra 02:	0,00 W/s	at:	0 s
Figra 04:	0,00 W/s	at:	0 s
THR600:	0,50 MJ		
Smogra:	0,00 m2/s2	at:	0 s
TSP600:	2,10 m2		

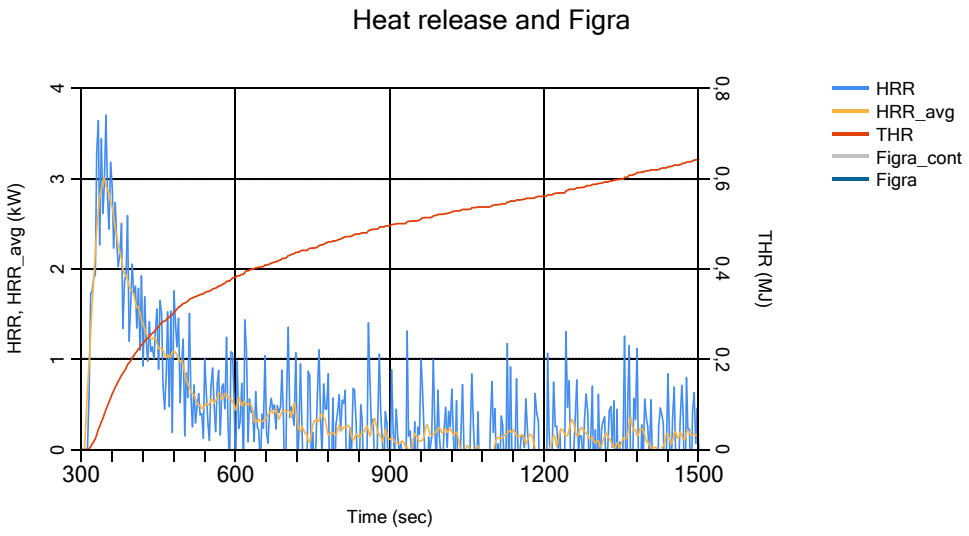
Laboratory for Fire Safety
EN 13823 - SBI - Heat release

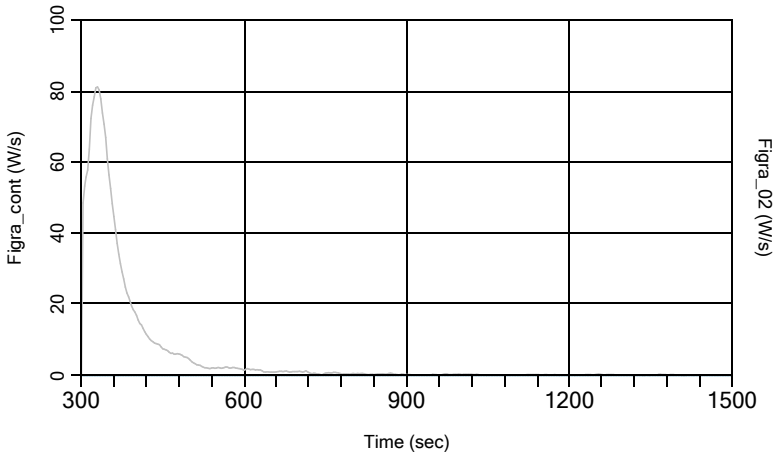
program version v3.22b 24-01-22 JM

Project data

Project no: Y2586_20220301#02
Print date: 22-4-2022 09:55:00
Test date: 01-03-2022
Technician: MvD

Measured data read from file(s):
Y2586_20220301#02.txt
20220301.spr





Laboratory for Fire Safety
EN 13823 - SBI - Smoke production

program version v3.22b 24-01-22 JM

Project data

Project no: Y2586_20220301#02
Print date: 22-4-2022 09:55:00
Test date: 01-03-2022
Technician: MvD

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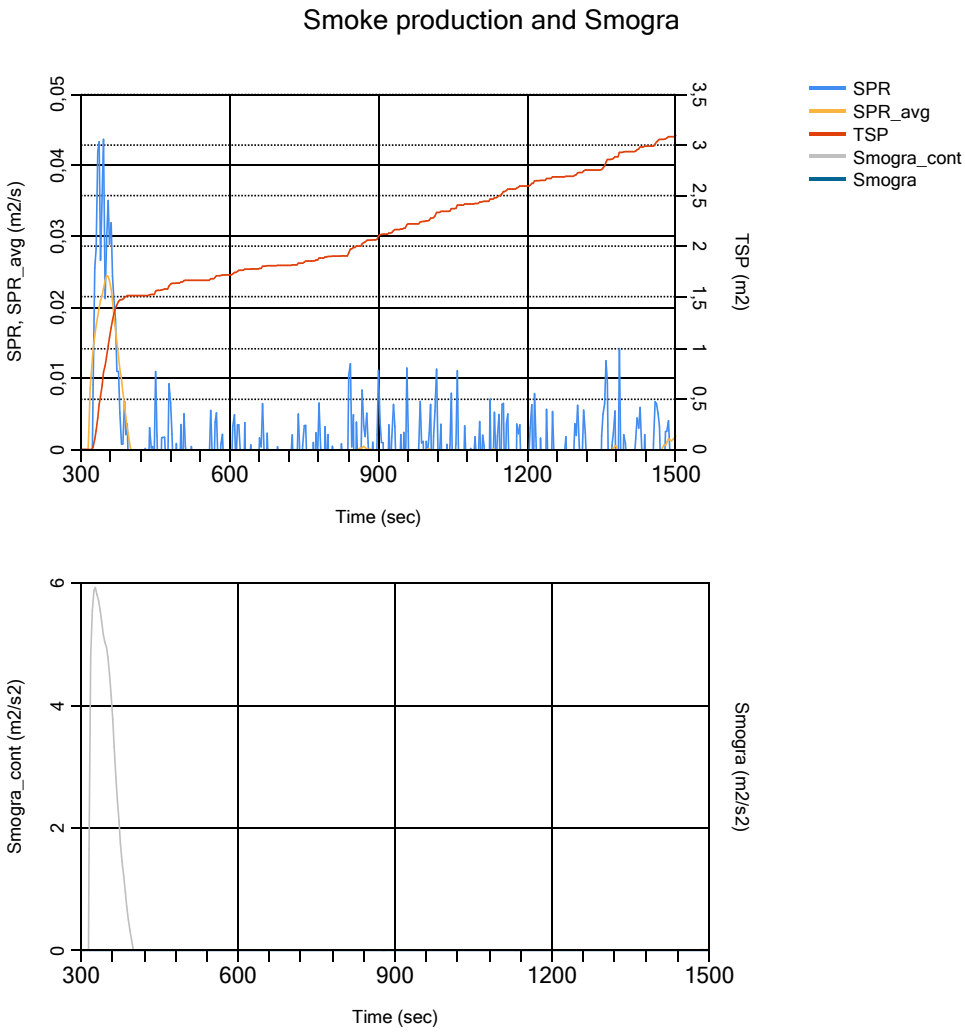
20220301.spr



Laboratory for Fire Safety
EN 13823 - SBI - Calculations

program version v3.22b 24-01-22 JM

Project data

Project no:	Y2586_20220301#02
Print date:	22-4-2022 09:55:00
Test date:	01-03-2022
Technician:	MvD

Measured data read from file(s):
Y2586_20220301#02.txt
20220301.spr

Pre-test conditions

Ambient temperature:	13,9	°C
Ambient pressure:	102392	Pa
Ambient relative humidity:	39,0	%

Calculations in accordance with EN 13823

Figra 02:	0,000	W/s	at time:	0 s
Figra 04:	0,000	W/s	at time:	0 s
THR600:	0,496	MJ		
THRend:	0,643	MJ	exposure:	1200 s
Smogra:	0,000	m2/s2	at time:	0 s
TSP600:	2,105	m2		
TSPeind:	3,093	m2	exposure:	1200 s

Averaged Tms based on thermocouples: T1, T2, T3

Laboratory for Fire Safety
EN 13823 - SBI - Test results

program version v3.22b 24-01-22 JM

Project data

Project no:	Y2586_20220301#03
Print date:	22-4-2022 09:32:49
Test date:	01-03-2022
Technician:	MvD

Measured data read from file(s):
Y2586_20220301#03.txt
20220301.spr

Description of product and mounting

Identification sample:	Firewrap
Test specimen no.:	#03
Substrate:	No substrate, CaSi-board as backing
Mounting:	Free standing on steel rig ventilated cavity 80 mm
Seams/joints:	Horizontal on 750 mm; vertically on 500 mm

Description of specimen tested

Firewrap 20 mm thick

E-glass fibre based textile - Fyretex 550HT
Fyreblacket 1200

Recorded events during the test

Surface flash:	N
Falling of parts of the specimen:	N
Smoke not entering the hood:	N
Mutual fixing of backing boards fails:	N
Conditions justify early termination:	N
Distortion or collapse of the specimen:	N
Any other additional events:	N

Visual observations during the test

Lateral flame spread till edge of specimen:	N
Flaming droplets/particles <= 10 s:	N
Flaming droplets/particles > 10 s:	N

Other events

Early termination of test:	N
Closing gas supply at time:	1557 s
Heat release too high:	N
i.e. HRR > 350 kW or HRR_30 > 280 kW	
Temperature too high:	N
i.e. Tms > 400 'C or Tms_30 > 300 'C	
Burner heavily disturbed:	N
Failure of test apparatus:	N

Results

Figra 02:	0,00 W/s	at:	0 s
Figra 04:	0,00 W/s	at:	0 s
THR600:	0,57 MJ		
Smogra:	0,00 m2/s2	at:	0 s
TSP600:	0,95 m2		

Laboratory for Fire Safety
EN 13823 - SBI - Heat release

program version v3.22b 24-01-22 JM

Project data

Project no: Y2586_20220301#03
Print date: 22-4-2022 09:32:49
Test date: 01-03-2022
Technician: MvD

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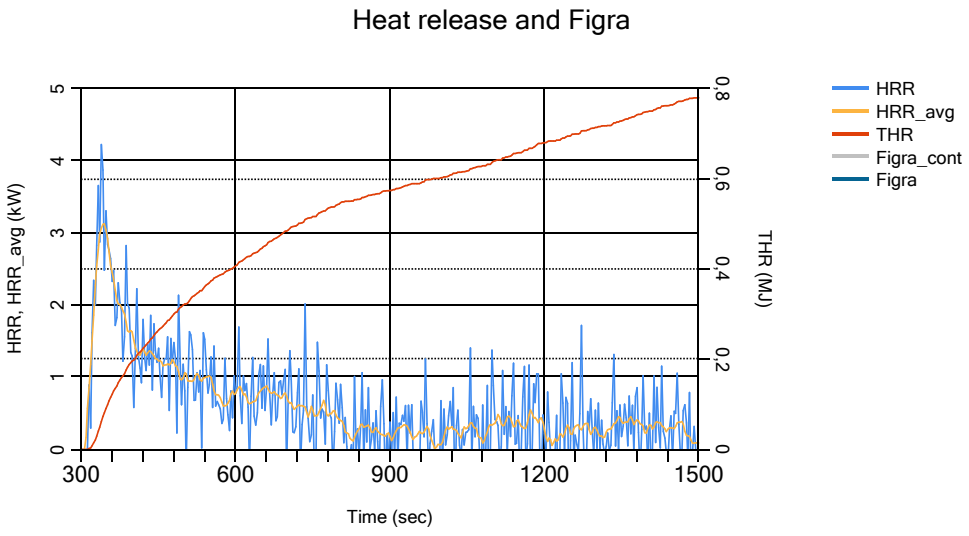
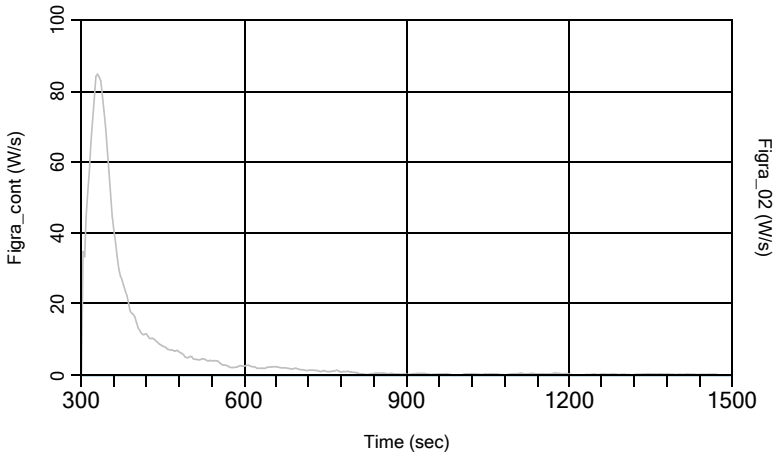




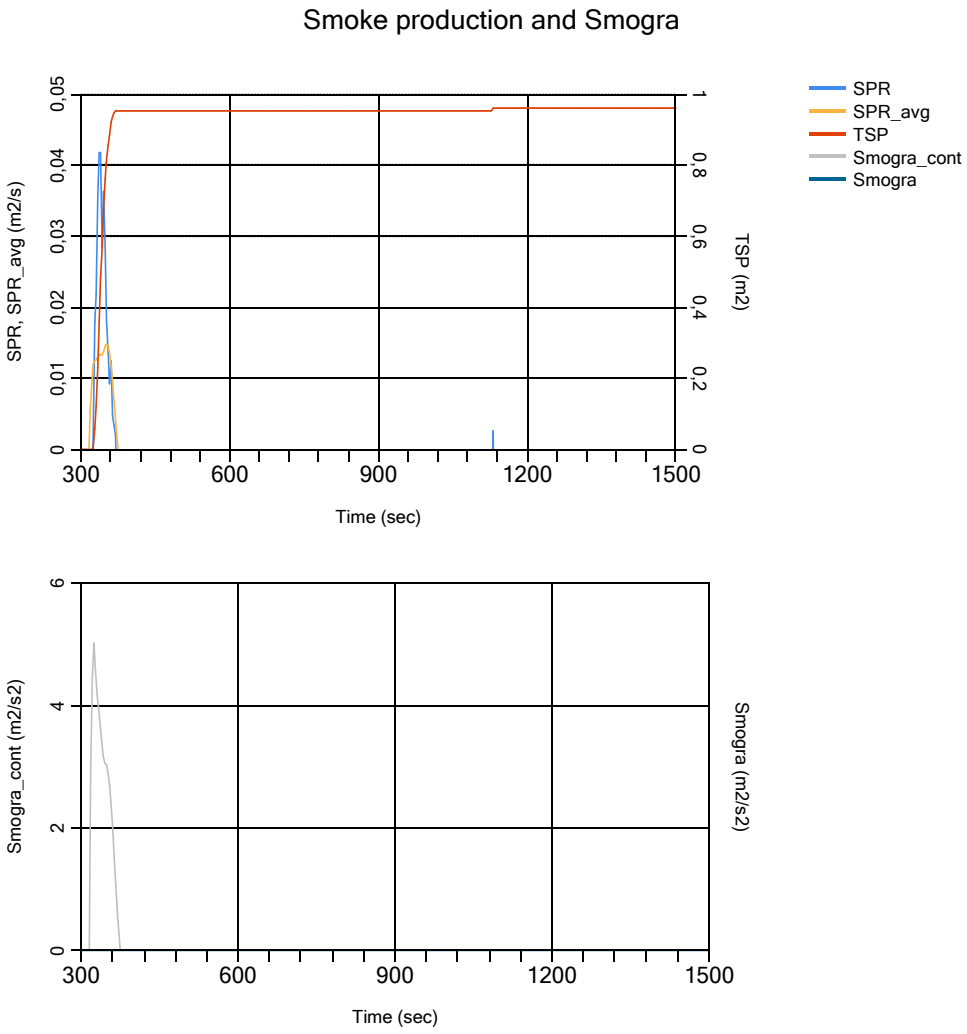
Laboratory for Fire Safety
EN 13823 - SBI - Smoke production

program version v3.22b 24-01-22 JM

Project data

Project no: Y2586_20220301#03
Print date: 22-4-2022 09:32:49
Test date: 01-03-2022
Technician: MvD

Measured data read from file(s):
Y2586_20220301#03.txt
20220301.spr



Laboratory for Fire Safety
EN 13823 - SBI - Calculations

program version v3.22b 24-01-22 JM

Project data

Project no:	Y2586_20220301#03
Print date:	22-4-2022 09:32:49
Test date:	01-03-2022
Technician:	MvD

Measured data read from file(s):
Y2586_20220301#03.txt
20220301.spr

Pre-test conditions

Ambient temperature:	13,6	°C
Ambient pressure:	102367	Pa
Ambient relative humidity:	40,0	%

Calculations in accordance with EN 13823

Figra 02:	0,000	W/s	at time:	0 s
Figra 04:	0,000	W/s	at time:	0 s
THR600:	0,574	MJ		
THRend:	0,779	MJ	exposure:	1200 s
Smogra:	0,000	m2/s2	at time:	0 s
TSP600:	0,953	m2		
TSPeind:	0,961	m2	exposure:	1200 s

Averaged Tms based on thermocouples: T1, T2, T3