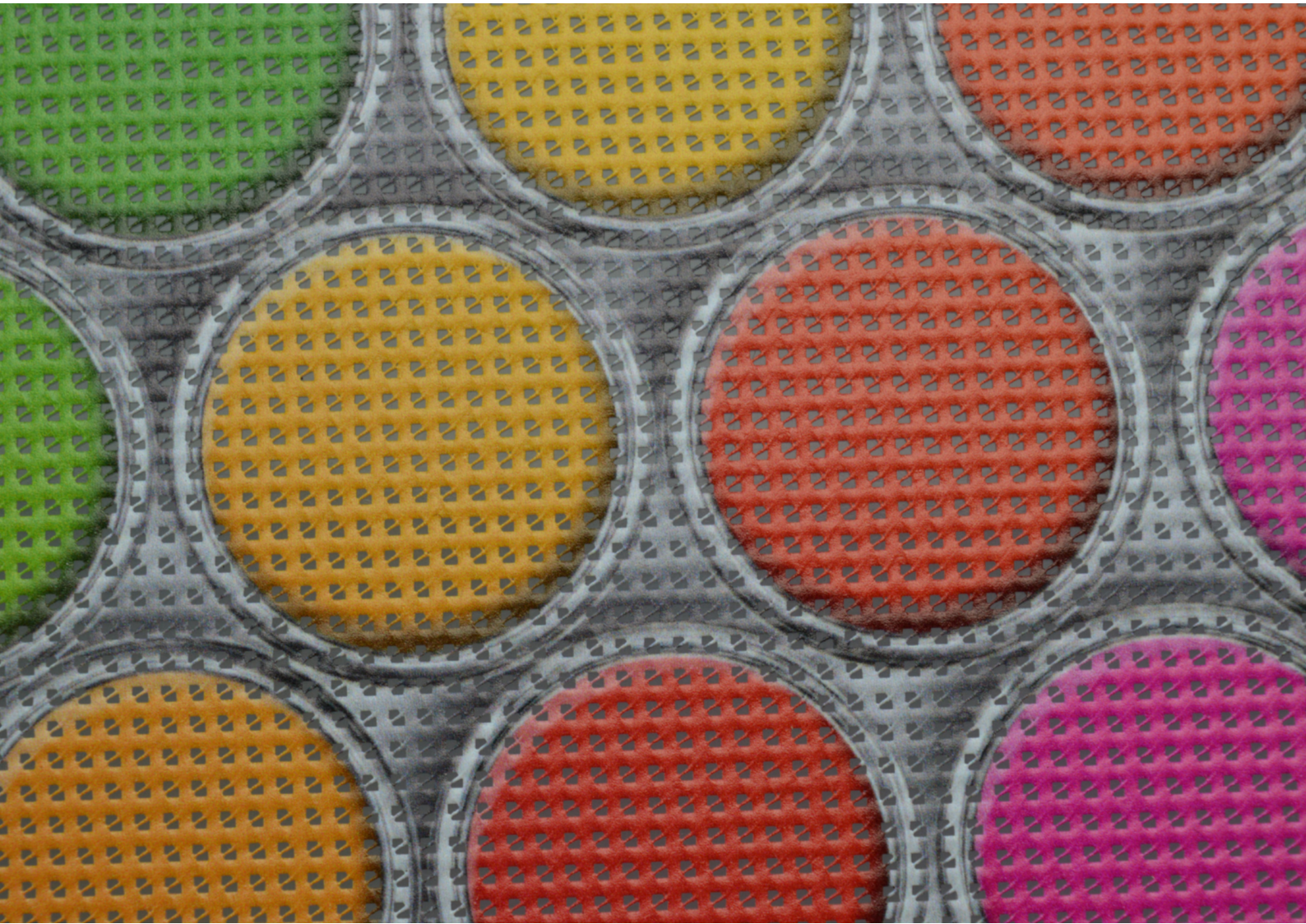


PVC Mesh (Digital Print)



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Fire Certificate

EN13501-1 3

TECHNICAL



NDFR
Non Durably Flame Retardant
chemically treated with a water solution and if wetted in any way should be retreated



DFR
Durably Flame Retardant
chemically treated to withstand a number of cleanings



IFR
Inherently Flame Retardant
woven from fibres with a high flame retardancy



FR
Flame Retardant
chemically treated to an individual specification



NOT FR
Not Flame Retardant no flame retardant treatment



Confirmation that the fabric meets one or more flame retardant standards

BS5867 BS5867 Pt2 B is the British Standard for flame retardant fabrics used for curtains and drapes

BS5852 BS5852 Pt1 is the British Standard for flammability of upholstered composites for seating

BS4790 BS4790: 1987 Determination of the effects of a small source of ignition on textile floor coverings hot metal nut method (method 1, loose laid)

EN13773: 2003 Meets European fire safety standards for vertically hung fabrics. Burning behavior, ignitability testing of curtain fabric for use in the contract market.

TL 1080-0002/8 German Military Specification for horizontally tested materials

EN14041 Details the requirement for CE Marking of textiles, laminate and resilient floor coverings

BS7905-1:2001 Lifting equipment for performance, broadcast and similar applications.

ATTRIBUTES



Approx roll length of material in linear metres (m) & feet (ft)



Approx width of material in centimetres (cm) & inches (")



Approx weight in grams per metre squared (g/m²)



Approx thickness in (mm)

M1, M2, M4 Conforms to French Fire Regulations

B1, B2 Conforms to German Fire Regulations DIN 4102

IMO Conforms to International Maritime Organisation regulations

Classe Uno Meets Italian Fire Regulations

BS EN13501-1 Fire Classification of construction, products and building elements. Classification using test data from reaction to fire tests

CFC EN ISO 9239-1 Reaction to fire test. Horizontal surface spread of flame on floor covering system. Determination of the burning behaviour using a retardant heat source

NFPA 701 NFPA 701: (USA) Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

EN9239-1 Reaction to fire tests – horizontal surface spread of flame on floor covering systems

DIN EN1021 Meets European fire safety standards for exposure to different ignition sources, namely a lit cigarette and butane flame. Assessment of the ignitability of upholstered furniture

Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

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LFF - Laboratório de Fumo e Fogo
Test Report N. 31/LFF/17

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TEST REPORT

Request: Tests according standard NP EN 13501-1: 2007+A1: 2013

Material Reference: Print MS 40 FR

Request Reference: Proposal PE2617029

Request Date: 2017-11-14

Reception Date: 2017-11-21

Test Date: 2017-12-15 to 2017-12-20

Report N. 31/LFF/17

Determination of Fire Reaction Classification

1 - Scope

The reported tests concern the determination of the fire reaction of a mesh coated fabric, made by Endutex, with reference Print MS 40 FR and 628 kg/m² density, to be used in indoors.

2 - Methodology

The tests were performed as indicated in the standard EN ISO 11925-2 issued of 2010 and standard EN 13823:2010+A1 issued of 2014. The classification method was applied according the standard NP EN 13051-1:2007+A1 issued of 2013.

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Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

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Test Report N. 31/LFF/17

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3 – Specimens

3.1 – Dimension and conditioning

The specimens were prepared by the client and had the following dimensions:

Specimens	Length (mm)	Width (mm)	Thickness (mm)	Mass (g)
31/LFF/17/01	250	91	0.5	7.1
31/LFF/17/02	252	92	0.5	7.2
31/LFF/17/03	252	92	0.5	7.2
31/LFF/17/04	249	90	0.5	7.0
31/LFF/17/05	251	92	0.5	7.2
31/LFF/17/06	251	92	0.5	7.2
31/LFF/17/07	251	92	0.5	7.1
31/LFF/17/08	249	91	0.5	7.0
31/LFF/17/09	250	91	0.5	7.0
31/LFF/17/10	251	91	0.5	7.2
31/LFF/17/11	252	92	0.5	7.2
31/LFF/17/12	252	92	0.5	7.2
31/LFF/17/13	1501	1001	0.5	466
31/LFF/17/13	1502	502	0.5	240
31/LFF/17/14	1500	1001	0.5	449
31/LFF/17/14	1501	502	0.5	231
31/LFF/17/15	1501	1002	0.5	483
31/LFF/17/15	1503	503	0.5	256

Before being tested the specimens were conditioned for a minimum period of 600 hours at 23 ± 2 °C and 50 ± 5 % relative humidity

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Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

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Test Report N. 31/LFF/17

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3.2 – Mounting of specimen

Specimens were tested free standing (paragraph 5.2.2.a. of EN 13823).

4 - Results

4.1 – Ignitability test (EN ISO 11925-2)

	Position of flame application			Edge		
Specimens	31/LFF/17/01	31/LFF/17/02	31/LFF/17/03	31/LFF/17/04	31/LFF/17/05	31/LFF/17/06
Flame application time (s)	30	30	30	30	30	30
Ignition (s)	1	1	1	1	1	1
F _s (mm)	Not reached	Not reached	Not reached	Not reached	Not reached	Not reached
Flame extinction (s)	8	9	10	8	8	10
Droplets/Particles	No	No	No	No	No	No
Ignition of the filter paper	No	No	No	No	No	No

F_v: Vertical Flame Spread

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Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1



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 Test Report N. 31/LFF/17

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Position of flame application	Surface
-------------------------------	---------

Specimens	31/LFF/17/07	31/LFF/17/08	31/LFF/17/09	31/LFF/17/10	31/LFF/17/11	31/LFF/17/12
Flame application time (s)	30	30	30	30	30	30
Ignition (s)	2	2	2	2	2	2
F _s (mm)	Not reached	Not reached	Not reached	Not reached	Not reached	Not reached
Flame extinction (s)	16	16	18	17	16	17
Droplets/Particles	No	No	No	No	No	No
Ignition of the filter paper	No	No	No	No	No	No

Fig. Vertical Flame Spread 17

4.2 – Single burning item test (EN 13823)

Specimens	31/LFF/17/13	31/LFF/17/14	31/LFF/17/15	AVERAGE
FIGRA _{0.2 MJ} (W/s)	38.4	TNR	TNR	12.8
THR _{400 s} (MJ)	1.0	0.6	0.4	0.7
LFS (m)	No	No	No	No
FIRE BEHAVIOUR	A2/B	A2/B	A2/B	B
SMOGRA (m ² /s ²) (*)	273.3	370.8	247.5	297.2
TSP _{400 s} (m ²) (*)	196.6	184.0	158.7	179.8
SMOKE PRODUCTION	≤3	≤3	≤3	≤3
FLAMING DROPLETS/PARTICLES	No	No	No	No
FLAMING DROPLETS	d0	d0	d0	d0

FIGRA: Fire growth rate THR: Total heat release LFS: Lateral flame spread (*) : With smoke correction
 SMOGRA: Smoke growth rate TSP: Total smoke production TNR – Threshold not reached

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Fabric: PVC Mesh (Digital Print)
Type: EN13501-1



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Test Report N. 31/LFF/17

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5 – Conclusion

Considering all the results and according the EN 13501-1 standard, it can be concluded that the material should be included in the following classification:

Fire behaviour		Smoke Production			Flaming droplets	
B	-	s	3	,	d	0

This classification is valid if specimens are free standing (paragraph 5.2.2.a. of EN 13823)

Porto, January 02, 2018



João Rodrigues

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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Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1



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Test Report N. 31/LFF/17

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SPECIMEN

ANNEX 1
Photographs of the mounting specimens

Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1



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Figure 1 – View of mounting.



Figure 2 – The SBI test.

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Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

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Figure 3 – The SBI test.



Figure 4 – Specimens following testing in the SBI.

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Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1



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SPECIMEN
ANNEX 2
SBI Test Reports

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Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

SBI Test Report

Laboratory name LFF
 Operator João Rodrigues
 Filename C:\SBICALC\DATA\17120002.RW1
 Report identification 31/LFF/17/13
 Product identification Print MS 40 FR

Test		Pre-test conditions		Specimen conditioning	
Standard used	EN 13823:2010	Baseline duct temperature	295.91 K	Method	Constant mass
Date of test	19/12/2017	Ambient temperature	295.50 K	Time interval	670 hours
Date of report	19/12/2017	Ambient pressure	102.008 kPa	Mass 1	466 g
E'	17.2 MJ/m ³	Relative humidity	47%	Mass 2	240 g
Apparatus specifications		Baseline conditions		Temperature	23°C
kt	0.893	Baseline ambient oxygen	20.680%	RH	50%
kp	1.08	Baseline oxygen	20.948%		
Duct diameter	0.315 m	Baseline carbon dioxide	0.0847%		
O2 calibration delay time	6 s	Baseline smoke	99.97%		
CO2 calibration delay time	9 s				

Specimen Information

Thickness	0.5 mm	Mounting method	5.2.2a) in EN 13823:2002
Density	628 kg/m ³	Joints	none
Surface mass/area	0.314 kg/m ²	Fixed to substrate?	No
Specimen number		Fixing method	N/A
Date of arrival	21/11/2017	Substrate	none
		Manufacturer	Endutex
		Sponsor	

Test validity criteria

Test drifts

	Initial	Final	Change
Oxygen	20.948%	20.952%	0.004%
CO2	0.085%	0.089%	0.004%
Smoke	99.97%	99.32%	0.007

Exposure time 1254 s

Synchronisation details

Duct temp. dropped by 2.5 K from baseline of 322.18 K at 303 s
 Oxygen rose by 0.05% from baseline of 20.624% at 309 s
 CO2 dropped by 0.02% from baseline of 0.343% at 303 s

Burner details

Auxiliary Burner HRR	30.537 kW
Auxiliary Burner HRR std. dev.	0.765 kW
Burner CO2/O2 ratio	0.797
Auxiliary Burner SPR	0.026 m ² /s
Auxiliary Burner SPR std. dev.	0.005 m ² /s
Burner response time (s)	12 s

Other checks

Minimum duct flow	0.494 m ³ /s
Maximum duct flow	0.595 m ³ /s
No T/C failure	

Classification results

FIGRA(0.2)	38.4 W/s at 408 s
FIGRA(0.4)	23.2 W/s at 456 s
THR(600)	1.0 MJ
SMOGRA	273.3 cm ² /s ² at 318 s
TSP(600)	196.6 m ²

Classification observations

LFS to edge?	No
FDP flaming <= 10s?	No
FDP flaming > 10s?	No

Potential classification

Class	A2/B
Smoke production	s3
Flaming droplets/particles	d0

Recorded events

Surface flashes? No; Falling specimen parts? No; Smoke not entering hood? No
 Mutual fixing of backing board failed? No; Distortion/collapse of specimen? No

Pre-test comments

After-test comments

Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1



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page 2

SBI Test Report

Laboratory name LFF
Operator João Rodrigues
Filename C:\SBICALC\DATA\17120002.RW1
Report identification 31/LFF/17/13
Product identification Print MS 40 FR

Alternative smoke results

Smoke test filename C:\SBICALC\SMOKE\17121901.RW1
Main burner SPR 0.051 m²/s
Main burner SPR std. dev. 0.007 m²/s

Alternative classification results

SMOGRA 241.0 cm²/s² at 318 s
TSP(600) 181.4 m²
Smoke production class s3

SPECIMEN

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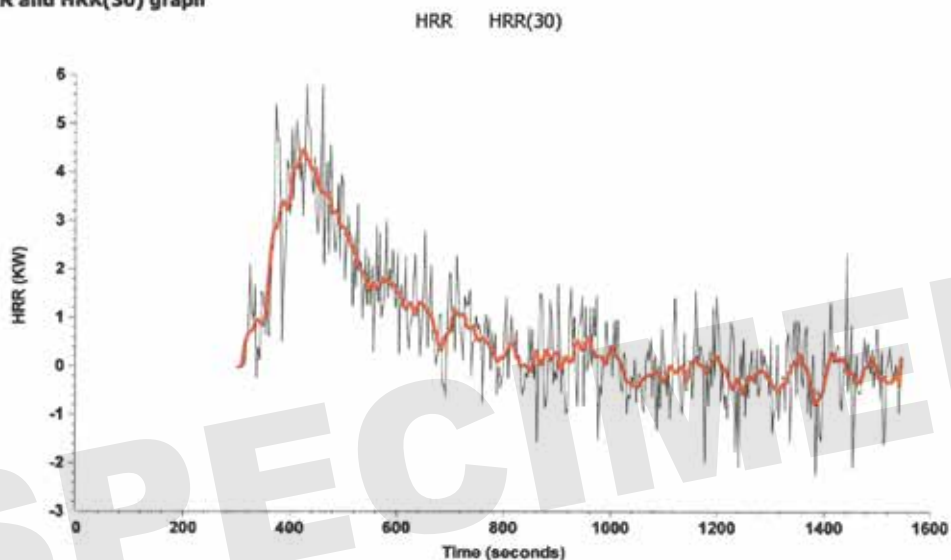
Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

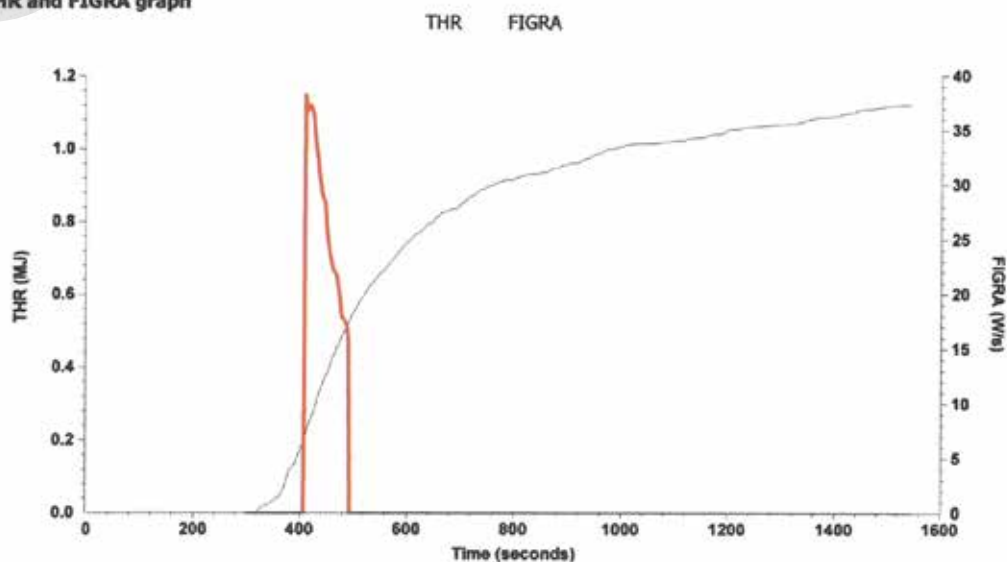
SBI Test Report

Laboratory name LFF
Operator João Rodrigues
Filename C:\SBICALC\DATA\17120002.RW1
Report identification 31/LFF/17/13
Product identification Print MS 40 FR

HRR and HRR(30) graph



THR and FIGRA graph



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.

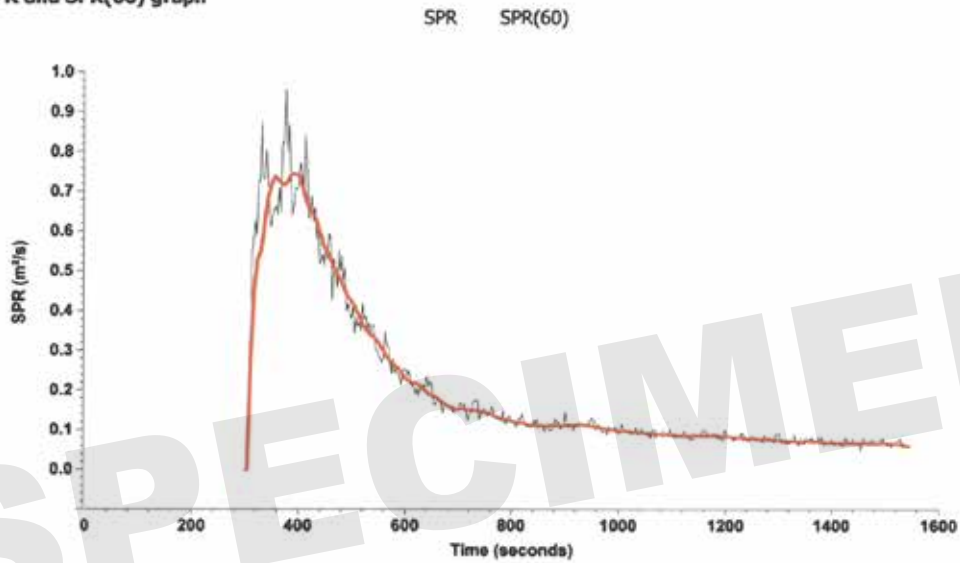
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Type: EN13501-1

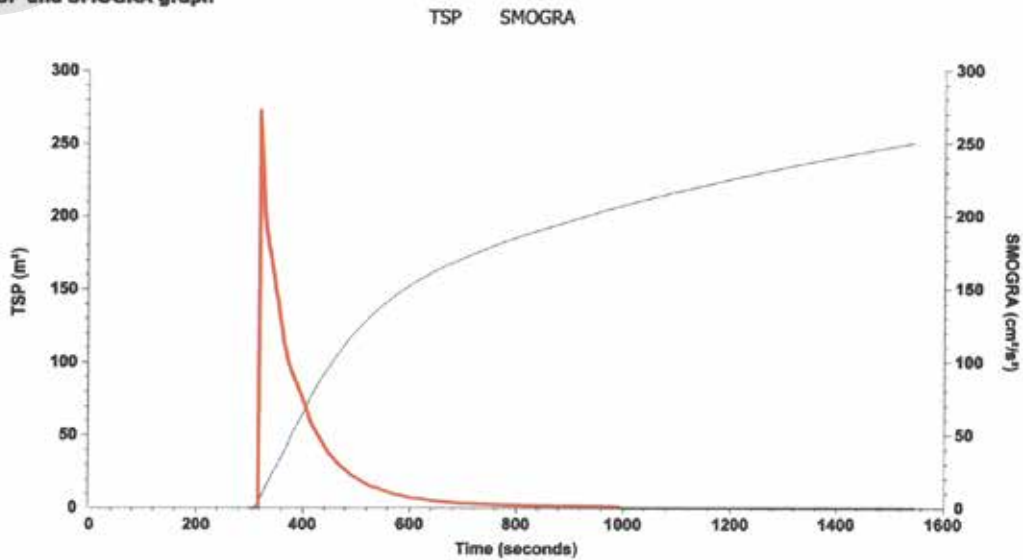
SBI Test Report

Laboratory name LFF
Operator João Rodrigues
Filename C:\SBICALC\DATA\17120002.RW1
Report identification 31/LFF/17/13
Product identification Print MS 40 FR

SPR and SPR(60) graph



TSP and SMOGRA graph



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.

Fire Test Certificate – Specimen

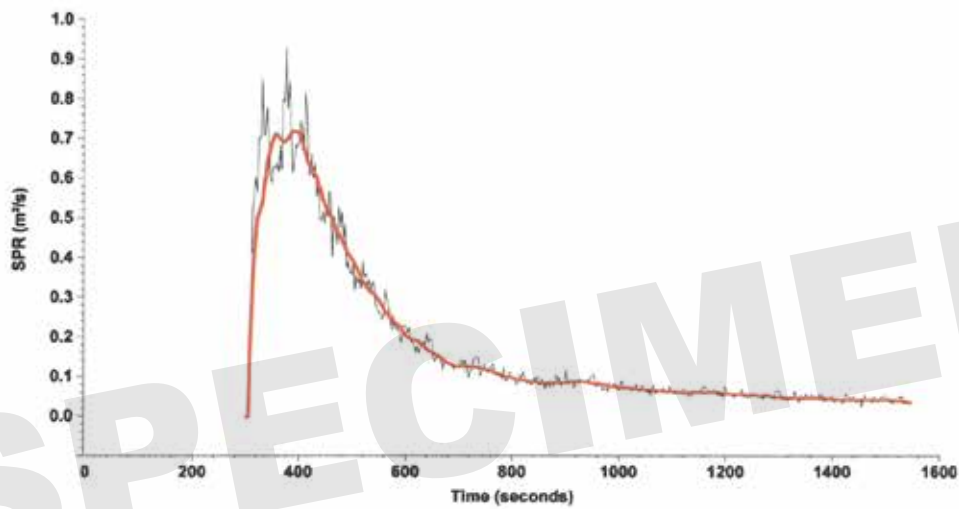
Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

SBI Test Report

Laboratory name LFF
Operator João Rodrigues
Filename C:\SBICALC\DATA\17120002.RW1
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Product identification Print MS 40 FR

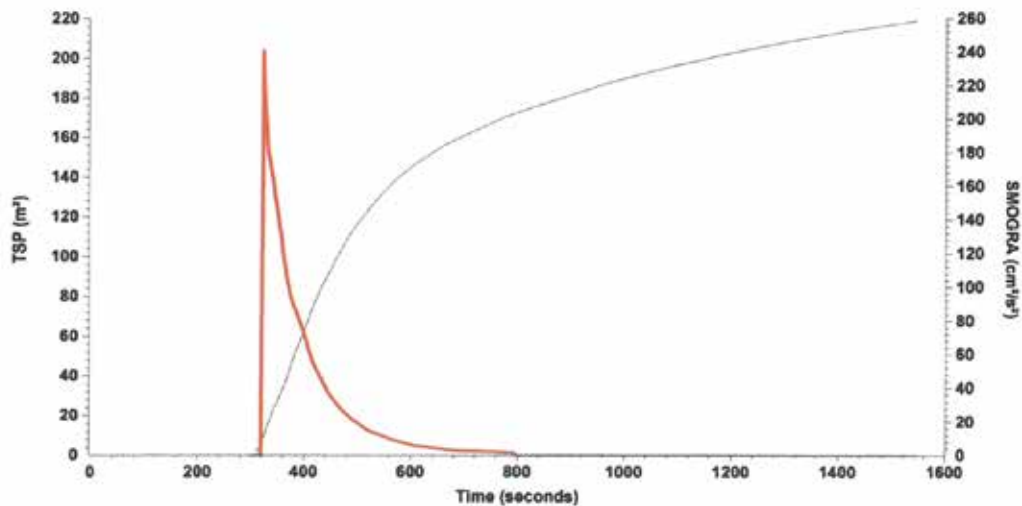
Alternative SPR and SPR(60) graph

SPR SPR(60)



Alternative TSP and SMOGRA graph

TSP SMOGRA



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.

Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

SBI Test Report

Laboratory name LFF
Operator João Rodrigues
Filename C:\SBICALC\DATA\17120003.RW1
Report identification 31/LFF/17/14
Product identification Print MS 40 FR

Test		Pre-test conditions		Specimen conditioning	
Standard used	EN 13823:2010	Baseline duct temperature	295.97 K	Method	Constant mass
Date of test	19/12/2017	Ambient temperature	296.10 K	Time interval	674 hours
Date of report	19/12/2017	Ambient pressure	101.894 kPa	Mass 1	449 g
E'	17.2 MJ/m ³	Relative humidity	46%	Mass 2	231 g
Apparatus specifications		Baseline conditions		Temperature	23°C
kt	0.893	Baseline ambient oxygen	20.687%	RH	50%
kp	1.08	Baseline oxygen	20.951%		
Duct diameter	0.315 m	Baseline carbon dioxide	0.0918%		
O2 calibration delay time	6 s	Baseline smoke	99.98%		
CO2 calibration delay time	9 s				

Specimen information

Thickness	0.5 mm	Mounting method	5.2.2a) in EN 13823:2002
Density	628 kg/m ³	Joints	none
Surface mass/area	0.314 kg/m ²	Fixed to substrate?	No
Specimen number		Fixing method	N/A
Date of arrival	21/11/2017	Substrate	none
		Manufacturer	Endutex
		Sponsor	

Test validity criteria

Test drifts

	Initial	Final	Change
Oxygen	20.951%	20.950%	0.001%
CO2	0.092%	0.096%	0.004%
Smoke	99.98%	99.49%	0.005

Exposure time 1254 s

Synchronisation details

Duct temp. dropped by 2.5 K from baseline of 322.17 K at 303 s
Oxygen rose by 0.05% from baseline of 20.625% at 309 s
CO2 dropped by 0.02% from baseline of 0.349% at 303 s

Burner details

Auxiliary Burner HRR	30.647 kW
Auxiliary Burner HRR std. dev.	0.672 kW
Burner CO2/O2 ratio	0.789
Auxiliary Burner SPR	0.026 m ³ /s
Auxiliary Burner SPR std. dev.	0.005 m ³ /s
Burner response time (s)	12 s

Other checks

Minimum duct flow	0.495 m ³ /s
Maximum duct flow	0.592 m ³ /s
No T/C failure	

Classification results

FIGRA(0.2)	threshold not reached
FIGRA(0.4)	threshold not reached
THR(600)	0.6 MJ
SMOGRA	370.8 cm ² /s ² at 318 s
TSP(600)	184.0 m ²

Classification observations

LFS to edge?	No
FDP flaming <= 10s?	No
FDP flaming > 10s?	No

Potential classification

Class	A2/B
Smoke production	s3
Flaming droplets/particles	d0

Recorded events

Surface flashes? No; Falling specimen parts? No; Smoke not entering hood? No
Mutual fixing of backing board failed? No; Distortion/collapse of specimen? No

Pre-test comments

After-test comments

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.

Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

SBI Test Report

Laboratory name LFF
Operator João Rodrigues
Filename C:\SBICALC\DATA\17120003.RW1
Report identification 31/LFF/17/14
Product identification Print MS 40 FR

Alternative smoke results

Smoke test filename C:\SBICALC\SMOKE\17121901.RW1
Main burner SPR 0.051 m²/s
Main burner SPR std. dev. 0.007 m²/s

Alternative classification results

SMOGRA 359.0 cm²/s² at 318 s
TSP(600) 169.0 m²
Smoke production class s3

SPECIMEN

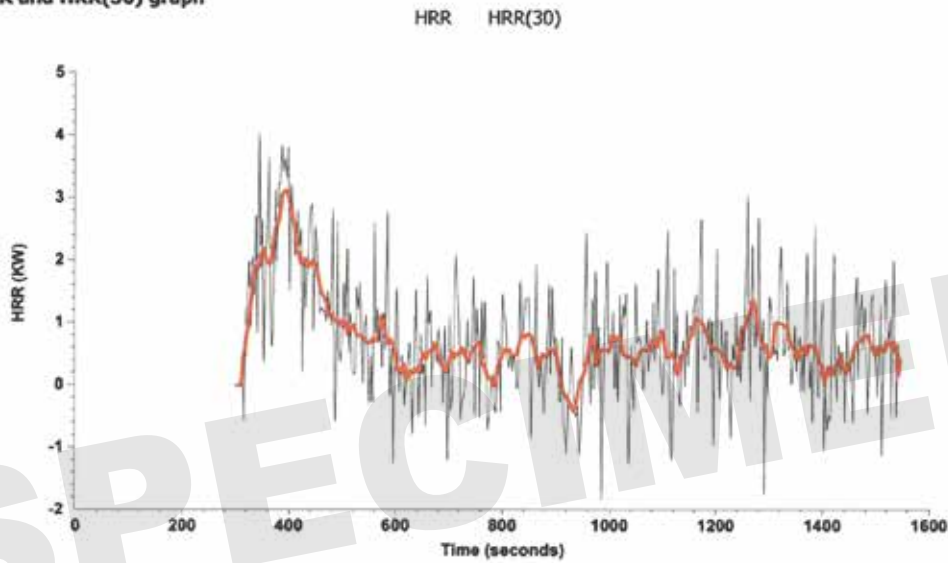
Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

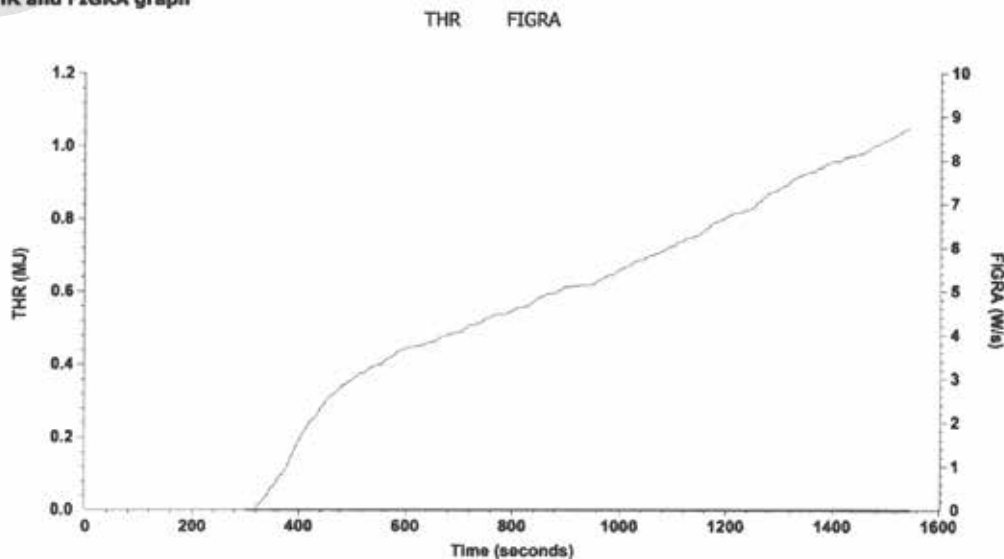
SBI Test Report

Laboratory name LFF
Operator João Rodrigues
Filename C:\SBICALC\DATA\17120003.RW1
Report identification 31/LFF/17/14
Product identification Print MS 40 FR

HRR and HRR(30) graph



THR and FIGRA graph



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Fire Test Certificate – Specimen

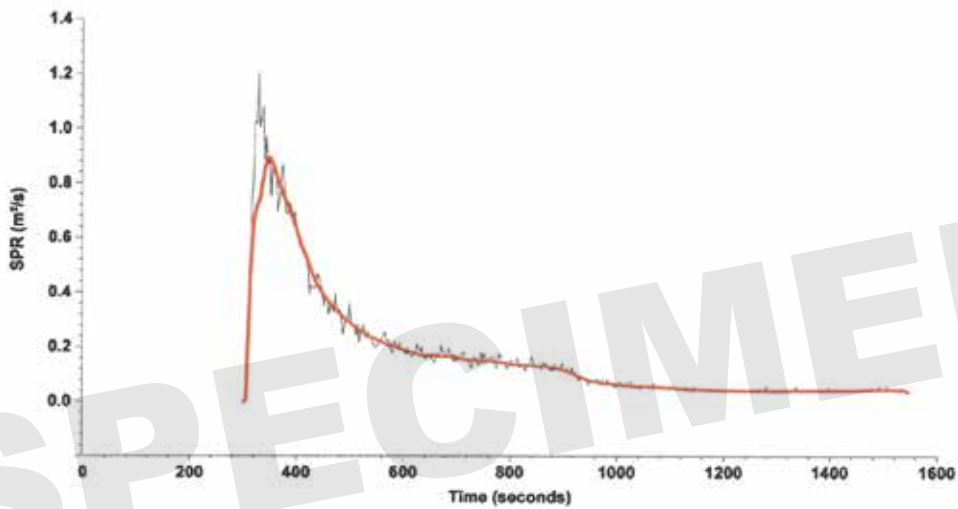
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Type: EN13501-1

SBI Test Report

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Filename: C:\SBICALC\DATA\17120003.RW1
Report identification: 31/LFF/17/14
Product identification: Print MS 40 FR

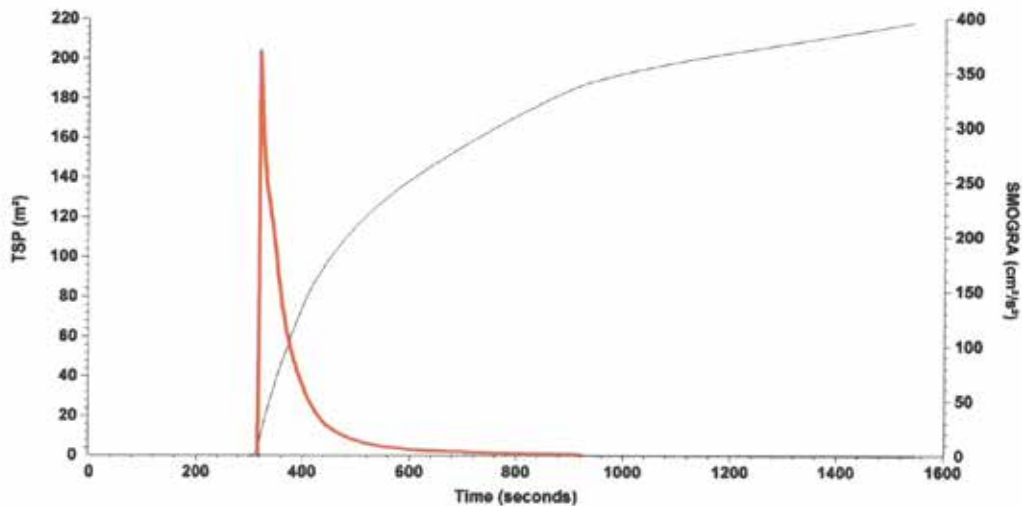
SPR and SPR(60) graph

SPR SPR(60)



TSP and SMOGRA graph

TSP SMOGRA



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.

Fire Test Certificate – Specimen

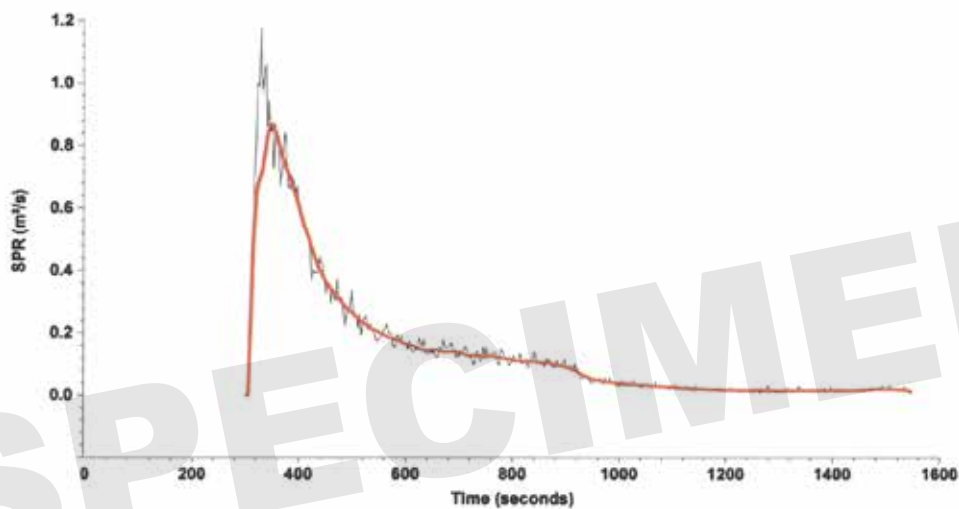
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SBI Test Report

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Report identification: 31/LFF/17/14
Product identification: Print MS 40 FR

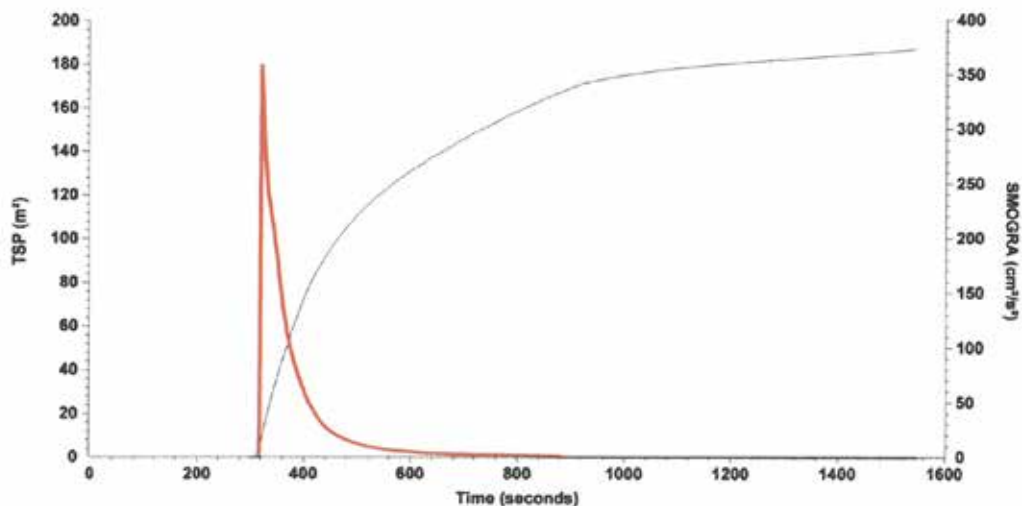
Alternative SPR and SPR(60) graph

SPR SPR(60)



Alternative TSP and SMOGRA graph

TSP SMOGRA



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.

Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

Report produced with the Fire Testing Technology SBICalc software

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SBI Test Report

Laboratory name LFF
Operator João Rodrigues
Filename C:\SBICALC\DATA\17120004.RW1
Report identification 31/LFF/17/15
Product identification Print MS 40 FR

Test		Pre-test conditions		Specimen conditioning	
Standard used	EN 13823:2010	Baseline duct temperature	295.38 K	Method	Constant mass
Date of test	20/12/2017	Ambient temperature	295.26 K	Time interval	698 hours
Date of report	20/12/2017	Ambient pressure	102.195 kPa	Mass 1	483 g
E'	17.2 MJ/m ³	Relative humidity	45%	Mass 2	256 g
Apparatus specifications		Baseline conditions		Temperature	23°C
kt	0.893	Baseline ambient oxygen	20.705%	RH	50%
kp	1.08	Baseline oxygen	20.954%		
Duct diameter	0.315 m	Baseline carbon dioxide	0.0943%		
O ₂ calibration delay time	6 s	Baseline smoke	100.01%		
CO ₂ calibration delay time	9 s				

Specimen Information

Thickness	0.5 mm	Mounting method	5.2.2a) in EN 13823:2002
Density	628 kg/m ³	Joints	none
Surface mass/area	0.314 kg/m ²	Fixed to substrate?	No
Specimen number		Fixing method	N/A
Date of arrival	21/11/2017	Substrate	none
		Manufacturer	Endutex
		Sponsor	

Test validity criteria

Test drifts

	Initial	Final	Change
Oxygen	20.954%	20.956%	0.003%
CO ₂	0.094%	0.098%	0.004%
Smoke	100.01%	99.30%	0.007

Exposure time 1254 s

Synchronisation details

Duct temp. dropped by 2.5 K from baseline of 321.25 K at 303 s
Oxygen rose by 0.05% from baseline of 20.630% at 309 s
CO₂ dropped by 0.02% from baseline of 0.347% at 303 s

Burner details

Auxiliary Burner HRR	30.740 kW
Auxiliary Burner HRR std. dev.	0.892 kW
Burner CO ₂ /O ₂ ratio	0.783
Auxiliary Burner SPR	0.031 m ² /s
Auxiliary Burner SPR std. dev.	0.006 m ² /s
Burner response time (s)	15 s

Other checks

Minimum duct flow	0.502 m ³ /s
Maximum duct flow	0.584 m ³ /s
No T/C failure	

Classification results

FIGRA(0.2)	threshold not reached
FIGRA(0.4)	threshold not reached
THR(600)	0.4 MJ
SMOGRA	247.5 cm ² /s ² at 321 s
TSP(600)	158.7 m ²

Classification observations

LFS to edge?	No
FDP flaming <= 10s?	No
FDP flaming > 10s?	No

Potential classification

Class	A2/B
Smoke production	s3
Flaming droplets/particles	d0

Recorded events Surface flashes? No; Falling specimen parts? No; Smoke not entering hood? No
Mutual fixing of backing board failed? No; Distortion/collapse of specimen? No

Pre-test comments

After-test comments

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.

Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1



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Report produced with the Fire Testing Technology SBICalc software

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SBI Test Report

Laboratory name LFF
Operator João Rodrigues
Filename C:\SBICALC\DATA\17120004.RW1
Report identification 31/LFF/17/15
Product identification Print MS 40 FR

Alternative smoke results

Smoke test filename C:\SBICALC\SMOKE\17122002.RW1
Main burner SPR 0.047 m²/s
Main burner SPR std. dev. 0.004 m²/s

Alternative classification results

SMOGRA 241.4 cm²/s² at 321 s
TSP(600) 149.4 m²
Smoke production class s3

SPECIMEN

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.

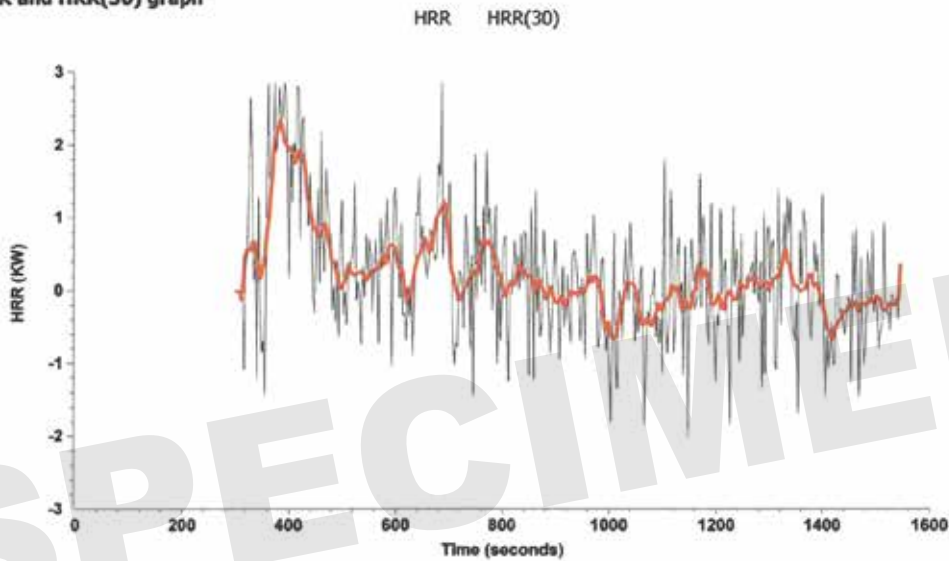
Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

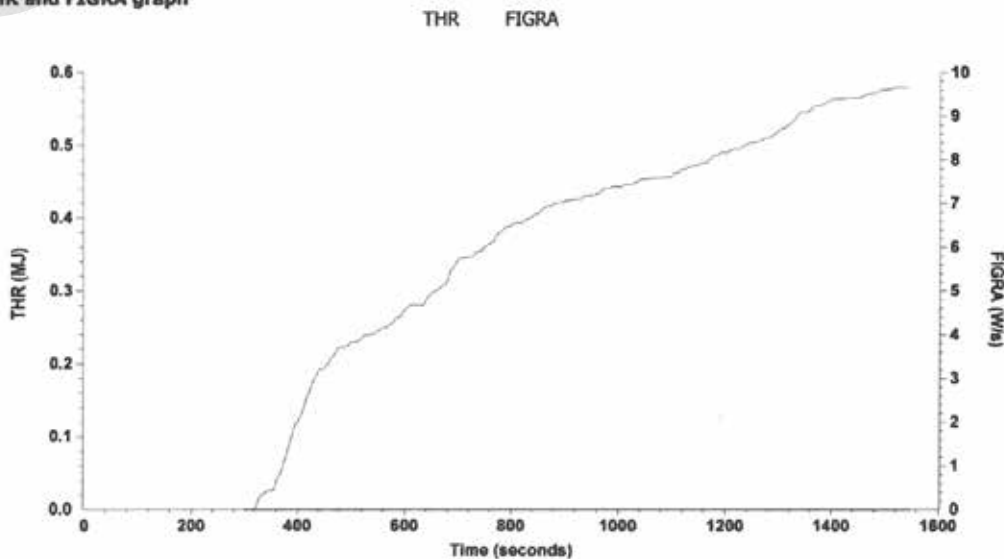
SBI Test Report

Laboratory name LFF
Operator João Rodrigues
Filename C:\SBICALC\DATA\17120004.RW1
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Product identification Print MS 40 FR

HRR and HRR(30) graph



THR and FIGRA graph



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Fire Test Certificate – Specimen

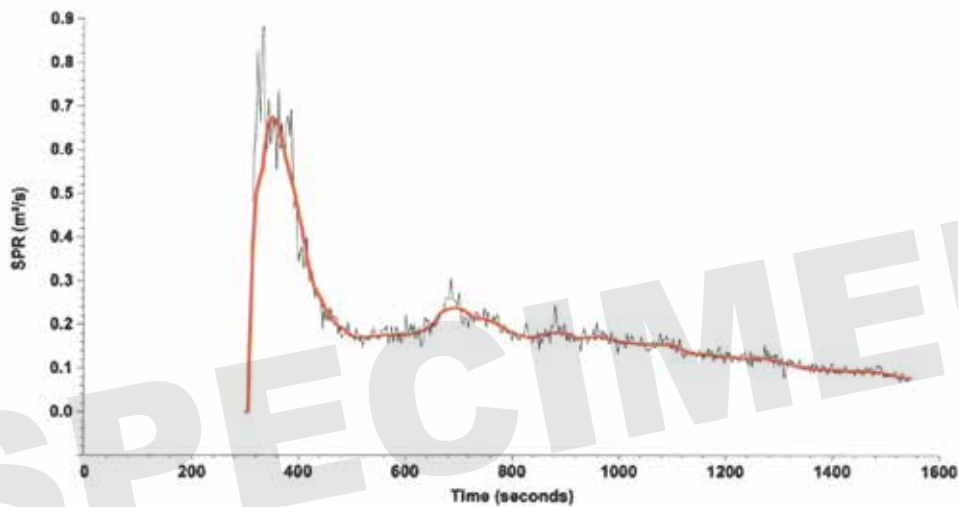
Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

SBI Test Report

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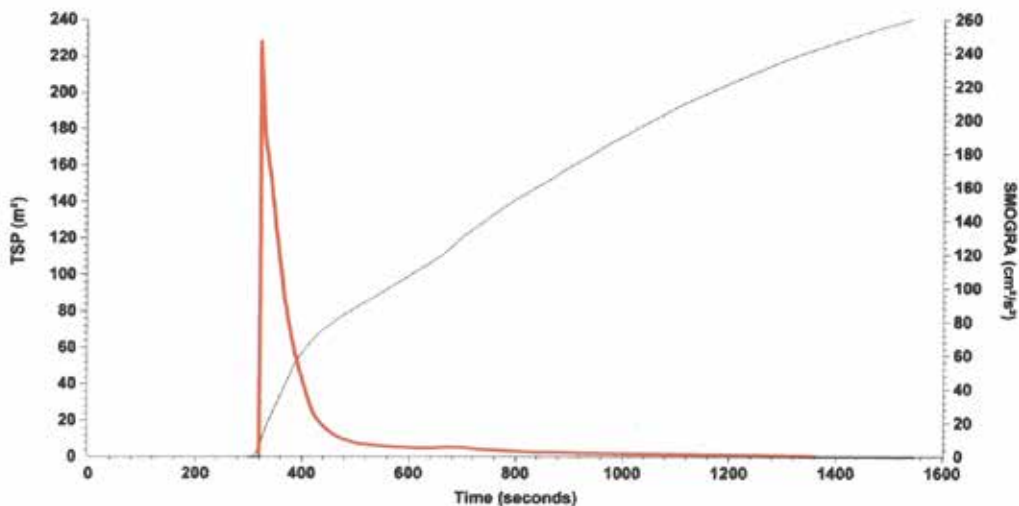
SPR and SPR(60) graph

SPR SPR(60)



TSP and SMOGRA graph

TSP SMOGRA



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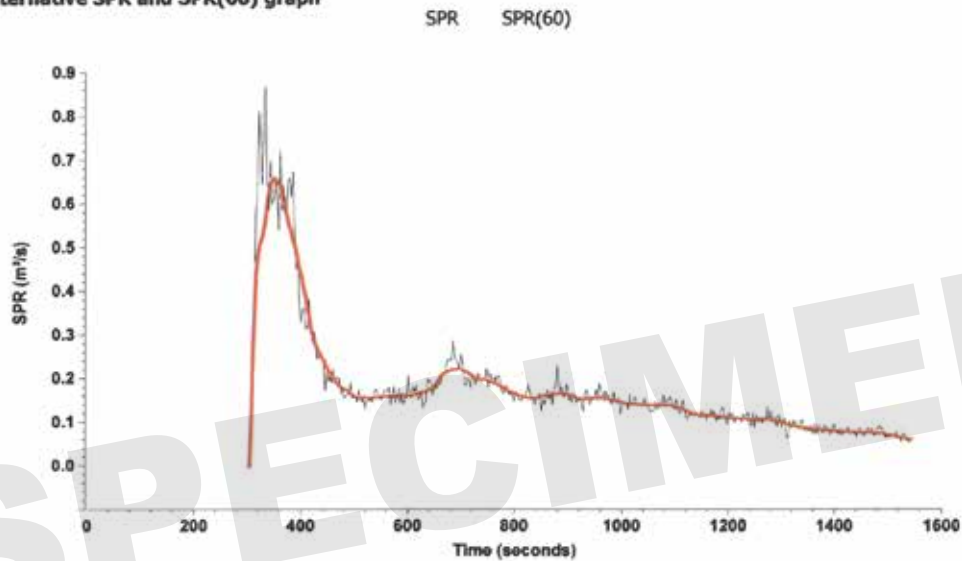
Fire Test Certificate – Specimen

Fabric: PVC Mesh (Digital Print)
Type: EN13501-1

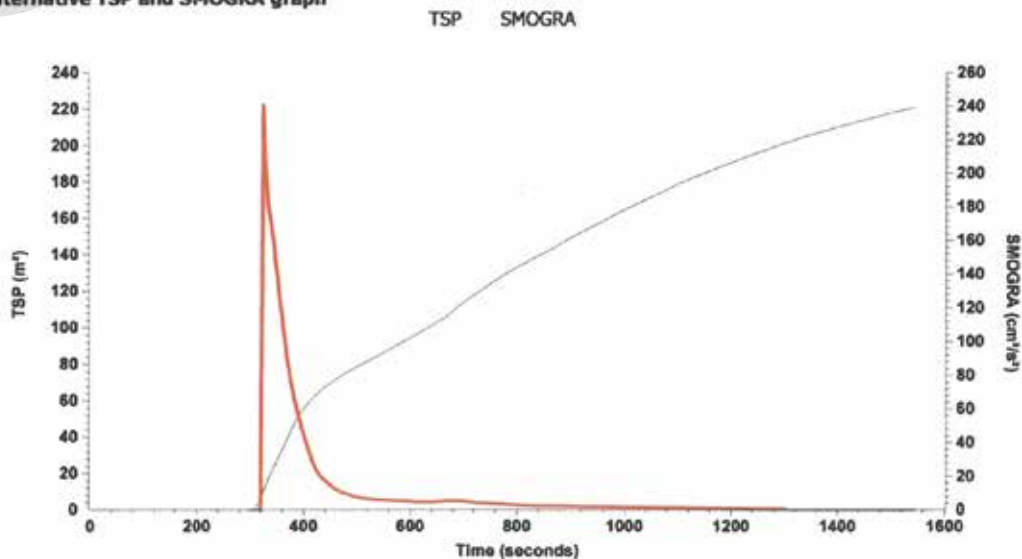
SBI Test Report

Laboratory name: LFF
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Alternative SPR and SPR(60) graph



Alternative TSP and SMOGRA graph



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