Mežs Koks Attīstība

FOREST AND WOOD PRODUCTS
RESEARCH AND DEVELOPMENT INSTITUTE

„MEŽA UN KOKSNES PRODUKTU PĒTNIECĪBAS UN ATTĪSTĪBAS INSTITŪTS" SIA
VAT No. LV 43603022749
Dobeles iela 41, Jelgava, LV-3001, LATVIA
Phone: +371 63010605 * Fax: +371 63010609 * E-mail: meka@e-koks.lv * Web: www.e-koks.lv

LATAK-T-316

Test Report
No.547/2011

Forest and Wood Products Research and Development Institute
Testing Laboratory

Customer: Holz Prof OÜ

Customer's address: Kraavi 45/2,Tallinn, 11215
Reg. No. 11053593
Date of the order: 27/07/2011.

Testing was done according contract No.: 78-10/10 MU

Test samples received: 27.02.2010.

Description of product (According to customer's information):

- Product: Fire retardant treated Scotland Larch wood with "Holz Prof" (HR Prof) – Fire Retardant with Wood Preservative;
- Product nominal thickness: 22 mm;

Sampling:
Product was sampled by Holz Prof OÜ at 11.07.2011 and delivered to laboratory. Testing laboratory has no information regarding representation of specimens.

Application of building product (according to customer's information):
Laboratory has no information regarding product end use application.

Specimen preparation for testing:
Specimens were prepared by Holz Prof OÜ. Scotland Larch boards were treated by brush with "Holz Prof" (HR Prof) total consumption 300 g/m^2. Specimen mounting was done by laboratory. Each wood board was screwed on wood slats with 20 mm thickness.

Substrates used:
No substrates were used.

Conditioning of specimens:
Specimens were conditioned according to standard LVS EN 13238:2010.
Conditioning method: constant mass.
Temperature: t = 23 ± 1 °C.
Relative humidity: RH = 50 ± 5%.
Conditioning period: 27 days.

Test standard: LVS EN 13823:2010.

Tests date: 24.08.2011; 25.08.2011.

Test results:
Test results are given in the annex 1 and test protocols in the annexes 2 to 4.

According to LVS EN 13823:2010 test results relate to the behaviour of 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.

Annexes:
Annex 1 (Test results, 2 pp.)
Annex 2 (SBI test protocol Nr. 547-1, 5 pp.)
Annex 3 (SBI test protocol Nr. 547-2, 5 pp.)
Annex 4 (SBI test protocol Nr. 547-3, 5 pp.)
Annex 5 (test parameter explanation, 1 pp.)

Tests carried out by: Edgars Bukšāns / /

Head of testing laboratory: Kārlis Būmanis / /

Prepared at: 22.09.2011

s.p.

Annex 1 to test report No. 547/2011

TEST RESULTS

Product:

- Test specimens: Fire retardant treated Scotland Larch wood with "Holz Prof" (HR Prof)– Fire Retardant with Wood Preservative;
- Number of test specimens and identification: 3 test specimens (547-1; 547-2; 547-3).
- Measured density: 620 kg/m^3.

Test method:
LVS EN 13823:2010

Mounting:
Wood boards were mounted in horizontal direction by fixing to wood slats by screws.
Specimens were mounted in SBI trolley in accordance with standard LVS EN 13823:2010 paragraph 5.2.2 b. There was 20 mm non ventilated air gap between the specimen and calcium silicate backing board. Calcium silicate backing board complies with standard LVS EN 13238:2010 requirements.

Test result summary
Three tests were performed without technical failure and data statistical analyze done form tests results of three specimens (547-1; 547-2; 547-3). Alternative smoke production calculation procedure according standard LVS EN 13823:2010 paragraph A 6.1.2. were used during tests.

Specimen No.	**547-1**	**547-2**	**547-3**	Average	Standard deviation	Standard error
General information						
Test start, min:s	0:00	0:00	0:00	-	-	-
Auxiliary burner ignited, min:s	2:00	2:00	2:00	-	-	-
Main burner ignited, min:s	5:03	5:03	5:03	-	-	-
Main burner stopped, min:s	26:00	26:00	26:00	-	-	-
Observations						
Ignition of specimen	5:55	5:55	5:50	-	-	-
First flaming droplets, particles, min:s	No	No	No	-	-	-
Burning droplets, particles, >10s	No	No	No	-	-	-
Lateral flame spread, LFS	No	No	No	-	-	-
Falling specimen parts, min:s	No	No	No	-	-	-
Fire performance, see annexes 2 - 4						
$FIGRA_{0,2MJ}$, W/s	52.2	36.6	34.9	**41.2**	9.5	5.5
$FIGRA_{0,4MJ}$, W/s	27.0	28.2	29.1	**28.1**	1.1	0.6
THR_{600s}, MJ	3.5	3.2	3.6	**3.4**	0.2	0.1
SMOGRA, cm^2/s^2	Threshold not reached	1.1	2.1	**1.6**	0.7	0.5
Time of maximal smoke growth rate (SMOGRA), s	-	648	450	**549**	140	99
TSP_{600s}, m^2	28.6	29.4	41.2	**33.1**	7.1	4.1

Observations during the test
There were not flaming droplets observed during all test. There were no lateral flame spread nor specimen collapse during all test, see Fig. 2.

Deviations from standard:
No.
Photos:

Fig. 1 Specimen mounting in SBI (Specimen No. 547-1).

Fig. 2 Specimen after the test.

Annex 2

SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-1.csv
Report identification	547-1
Product identification	Scotland Larch with Holz Prof fire retardant

Test

Standard used	EN 13823:2010
Date of test	24/08/2011
Date of report	25/08/2011
E'	17.2 MJ/m³

Apparatus specifications

kt	0.93
kp	1.08
Duct diameter	0.315 m
O2 calibration delay time	12 s
CO2 calibration delay time	9 s

Pre-test conditions

Baseline duct temperature	298.34 K
Ambient temperature	296.61 K
Ambient pressure	103.485 kPa
Relative humidity	48%

Baseline conditions

Baseline ambient oxygen	20.638%
Baseline oxygen	20.951%
Baseline carbon dioxide	0.0400%
Baseline smoke	100.09%

Specimen conditioning

Method	Constant mass
Time interval	24 hours
Mass 1	11024 g
Mass 2	11018 g
Temperature	23°C
RH	50%

Specimen information

Thickness	22 mm
Density	620 kg/m³
Surface mass/area	
Specimen number	1
Date of arrival	27/07/2011

Mounting method	5.2.2b) in EN 13823:2002
Joints	standard horizontal
Fixed to substrate?	Yes
Fixing method	screw
Substrate	Spruce wood slats
Manufacturer	Holz Prof OU
Sponsor	Holz Prof OU

Test validity criteria

Test drifts

	Initial	Final	Change
Oxygen	20.951%	20.957%	0.006%
CO2	0.040%	0.040%	0.000%
Smoke	100.09%	100.55%	0.005

Exposure time 1254 s

Synchronisation details

Duct temp. dropped by 2.5 K from baseline of 320.78 K at 303 s
Oxygen rose by 0.05% from baseline of 20.673% at 303 s
CO2 dropped by 0.02% from baseline of 0.213% at 303 s

Burner details

Auxiliary Burner HRR	30.330 kW
Auxiliary Burner HRR std. dev.	0.785 kW
Burner CO2/O2 ratio	0.623
Auxiliary Burner SPR	0.025 m²/s
Auxiliary Burner SPR std. dev.	0.004 m²/s
Burner response time (s)	9 s

Other checks

Minimum duct flow	0.548 m³/s
Maximum duct flow	0.645 m³/s

No T/C failure

Classification results

FIGRA(0.2)	52.2 W/s at 378 s
FIGRA(0.4)	27.0 W/s at 432 s
THR(600)	3.5 MJ
SMOGRA	2.9 cm²/s² at 642 s
TSP(600)	51.6 m²

Classification observations

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

Potential classification

Class	A2/B
Smoke production	s2
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

SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-1.csv
Report identification	547-1
Product identification	Scotland Larch with Holz Prof fire retardant

Alternative smoke results

Smoke test filename	C:\SBICALC\SMOKE\11082501.CSV
Main burner SPR	0.065 m²/s
Main burner SPR std. dev.	0.008 m²/s

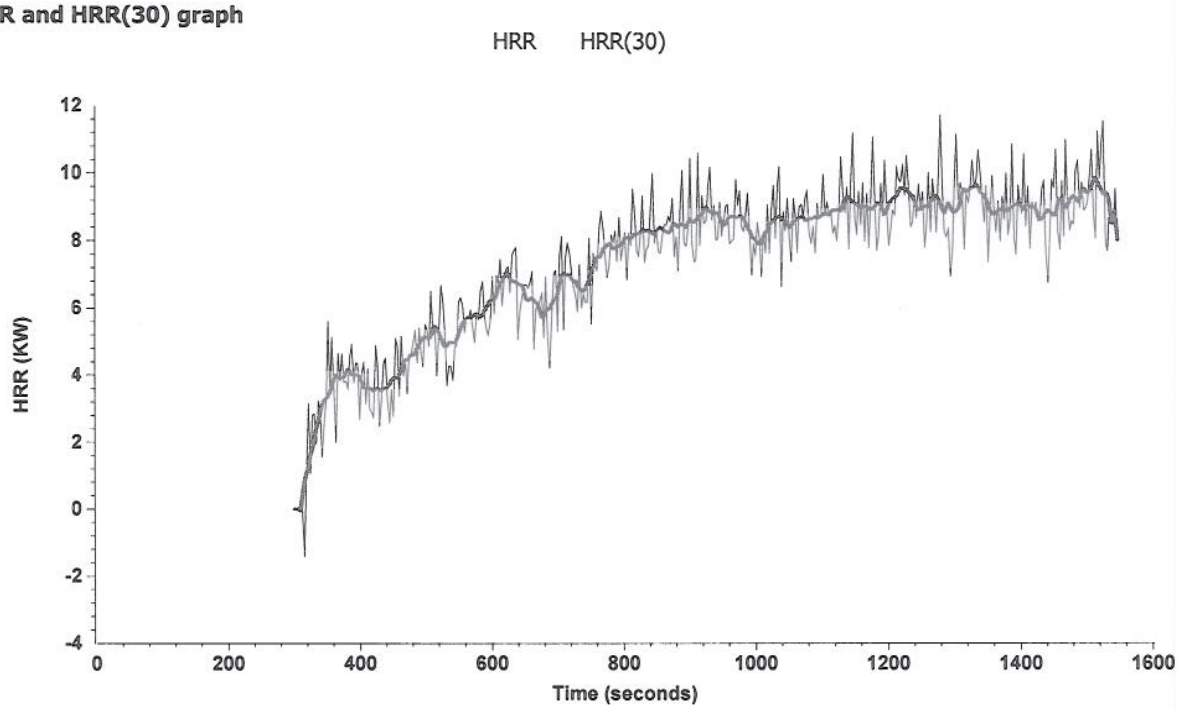
Alternative classification results

SMOGRA	threshold not reached
TSP(600)	28.6 m²
Smoke production class	s1

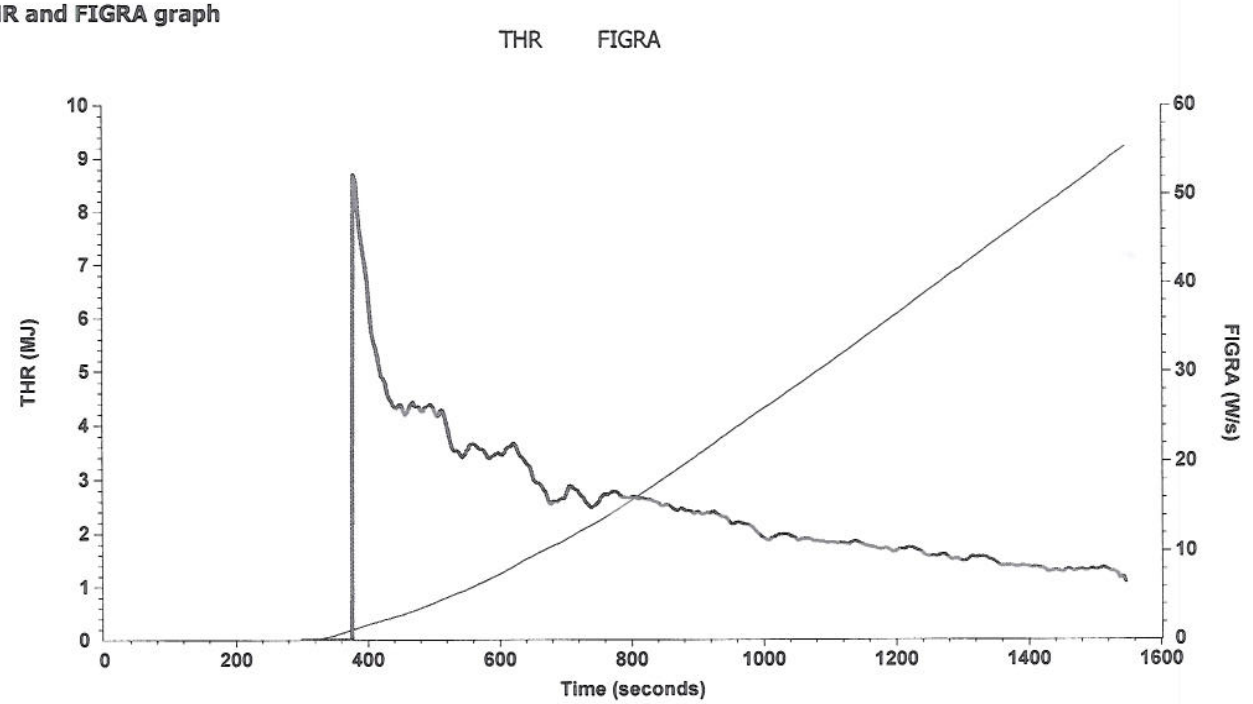
SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-1.csv
Report identification	547-1
Product identification	Scotland Larch with Holz Prof fire retardant

HRR and HRR(30) graph



THR and FIGRA graph

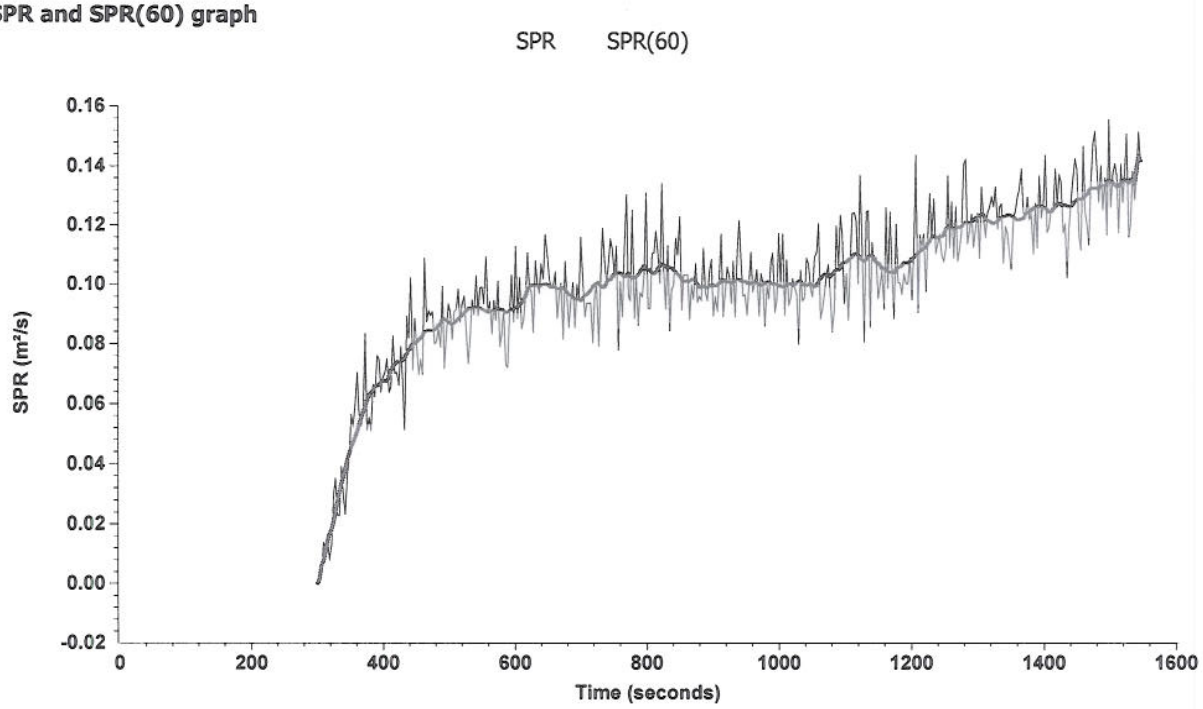


The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

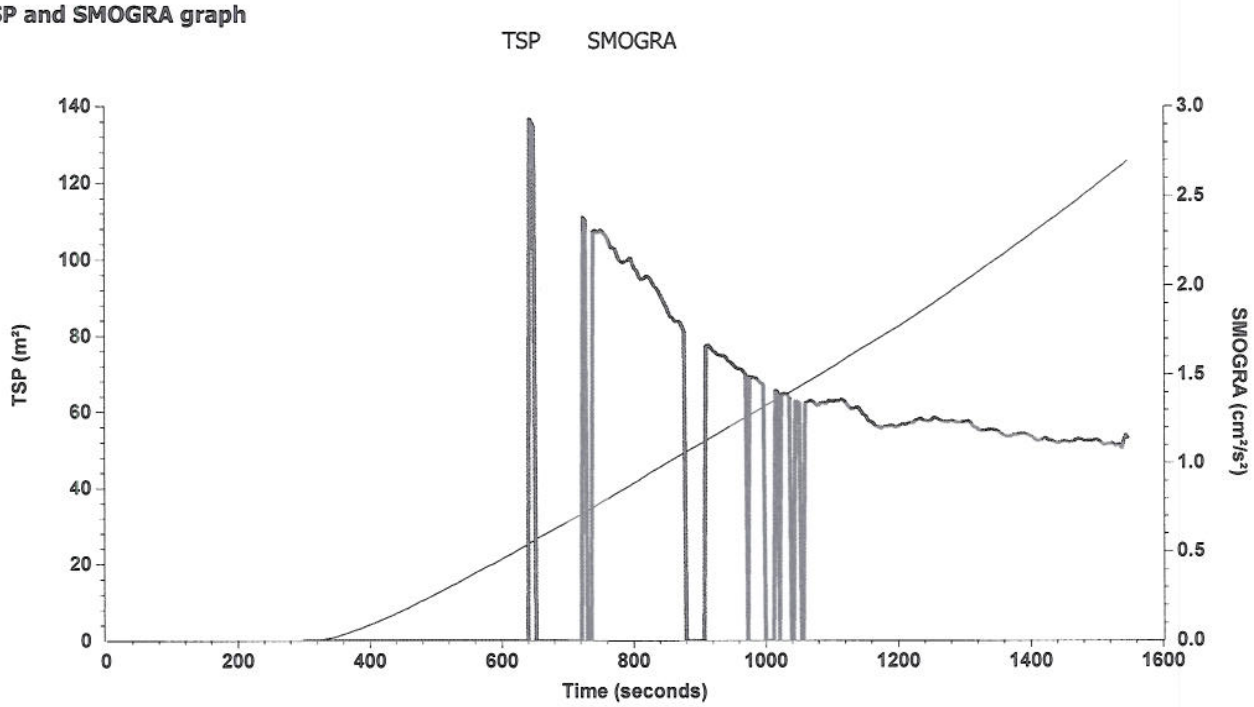
SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-1.csv
Report identification	547-1
Product identification	Scotland Larch with Holz Prof fire retardant

SPR and SPR(60) graph



TSP and SMOGRA graph

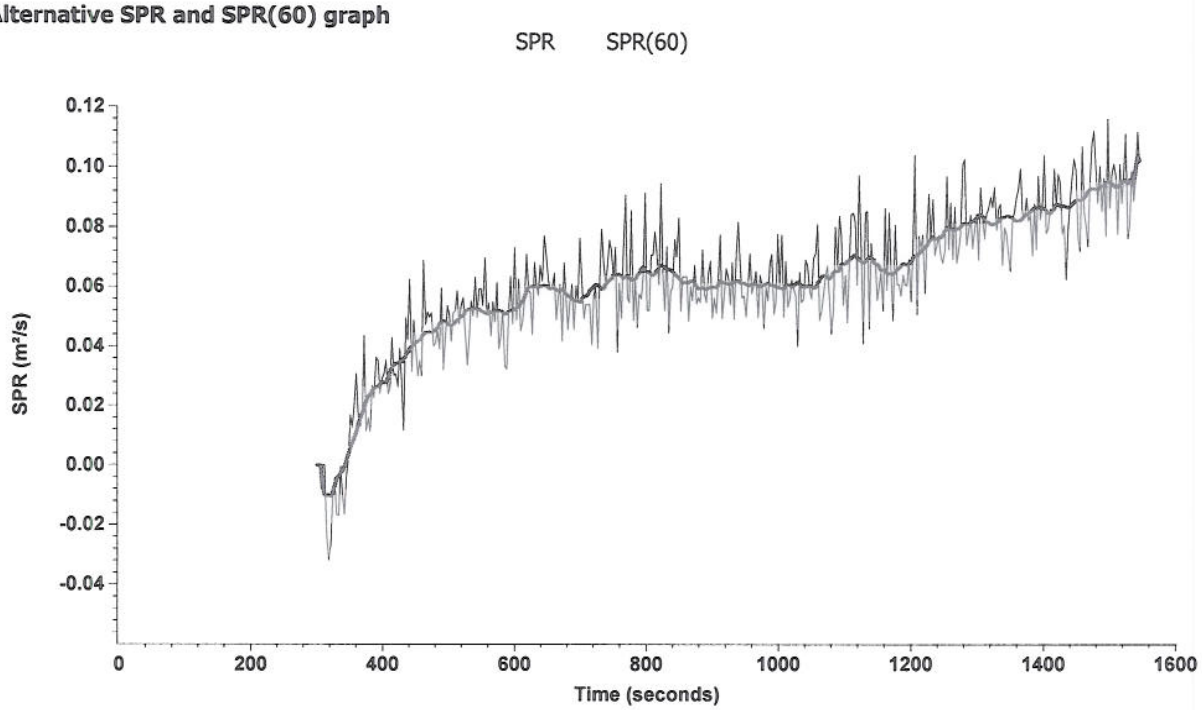


The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

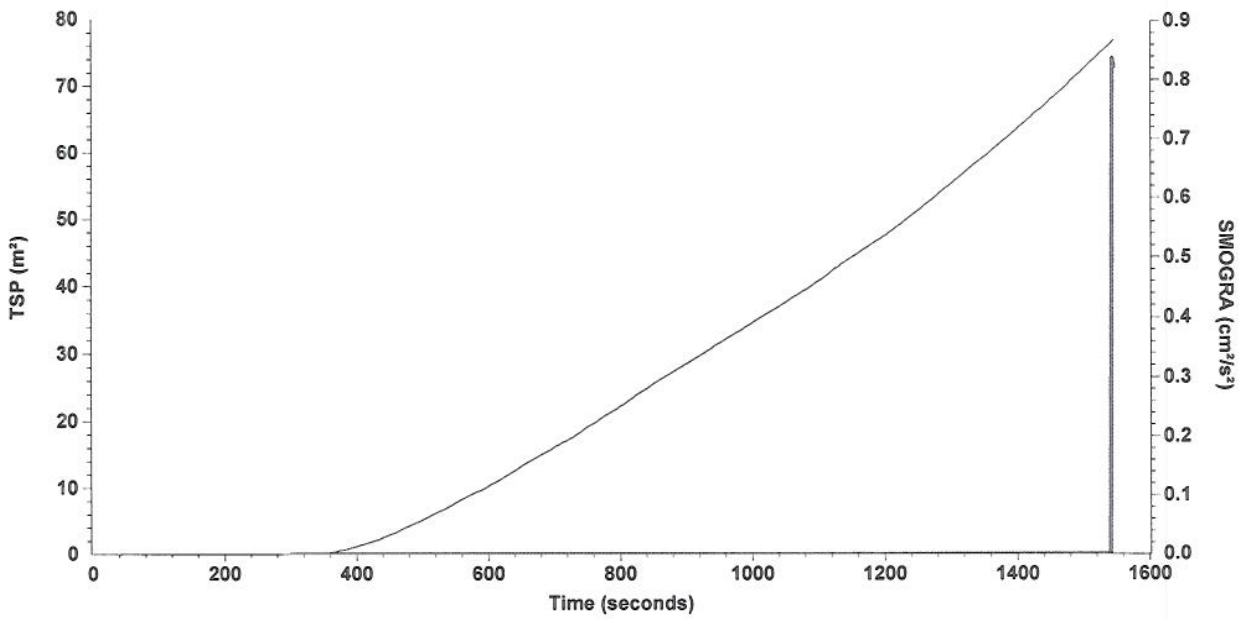
SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-1.csv
Report identification	547-1
Product identification	Scotland Larch with Holz Prof fire retardant

Alternative SPR and SPR(60) graph



Alternative 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.

Annex 3

SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-2.csv
Report identification	547-2
Product identification	Scotland Larch with Holz Prof fire retardant

Test

Standard used	EN 13823:2010
Date of test	25/08/2011
Date of report	25/08/2011
E'	17.2 MJ/m³

Apparatus specifications

kt	0.93
kp	1.08
Duct diameter	0.315 m
O2 calibration delay time	12 s
CO2 calibration delay time	9 s

Pre-test conditions

Baseline duct temperature	299.42 K
Ambient temperature	296.11 K
Ambient pressure	103.329 kPa
Relative humidity	59%

Baseline conditions

Baseline ambient oxygen	20.542%
Baseline oxygen	20.953%
Baseline carbon dioxide	0.0409%
Baseline smoke	100.02%

Specimen conditioning

Method	Constant mass
Time interval	24 hours
Mass 1	11024 g
Mass 2	11018 g
Temperature	23°C
RH	50%

Specimen information

Thickness	22 mm
Density	620 kg/m³
Surface mass/area	
Specimen number	2
Date of arrival	27/07/2011
Mounting method	5.2.2b) in EN 13823:2002
Joints	standard horizontal
Fixed to substrate?	Yes
Fixing method	screw
Substrate	Spruce wood slats
Manufacturer	Holz Prof OU
Sponsor	Holz Prof OU

Test validity criteria

Test drifts

	Initial	Final	Change
Oxygen	20.953%	20.945%	0.008%
CO2	0.041%	0.041%	0.000%
Smoke	100.02%	99.73%	0.003

Exposure time 1254 s

Synchronisation details

Duct temp. dropped by 2.5 K from baseline of 322.45 K at 303 s
Oxygen rose by 0.05% from baseline of 20.669% at 303 s
CO2 dropped by 0.02% from baseline of 0.215% at 303 s

Burner details

Auxiliary Burner HRR	30.785 kW
Auxiliary Burner HRR std. dev.	0.685 kW
Burner CO2/O2 ratio	0.612
Auxiliary Burner SPR	0.026 m²/s
Auxiliary Burner SPR std. dev.	0.003 m²/s
Burner response time (s)	9 s

Other checks

Minimum duct flow	0.553 m³/s
Maximum duct flow	0.651 m³/s

No T/C failure

Classification results

FIGRA(0.2)	36.6 W/s at 408 s
FIGRA(0.4)	28.2 W/s at 507 s
THR(600)	3.2 MJ
SMOGRA	2.9 cm²/s² at 648 s
TSP(600)	52.0 m²

Classification observations

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

Potential classification

Class	A2/B
Smoke production	s2
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

SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-2.csv
Report identification	547-2
Product identification	Scotland Larch with Holz Prof fire retardant

Alternative smoke results

Smoke test filename	C:\SBICALC\SMOKE\11082501.CSV
Main burner SPR	0.065 m^2/s
Main burner SPR std. dev.	0.008 m^2/s

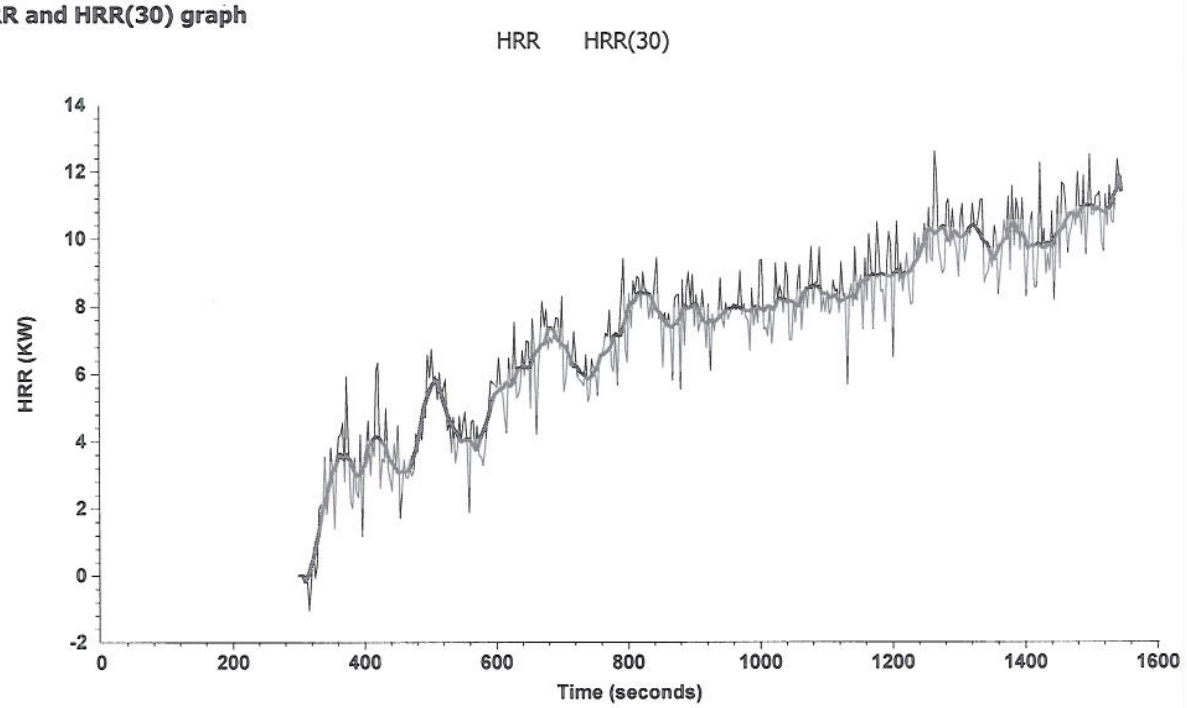
Alternative classification results

SMOGRA	1.1 cm^2/s^2 at 648 s
TSP(600)	29.4 m^2
Smoke production class	s1

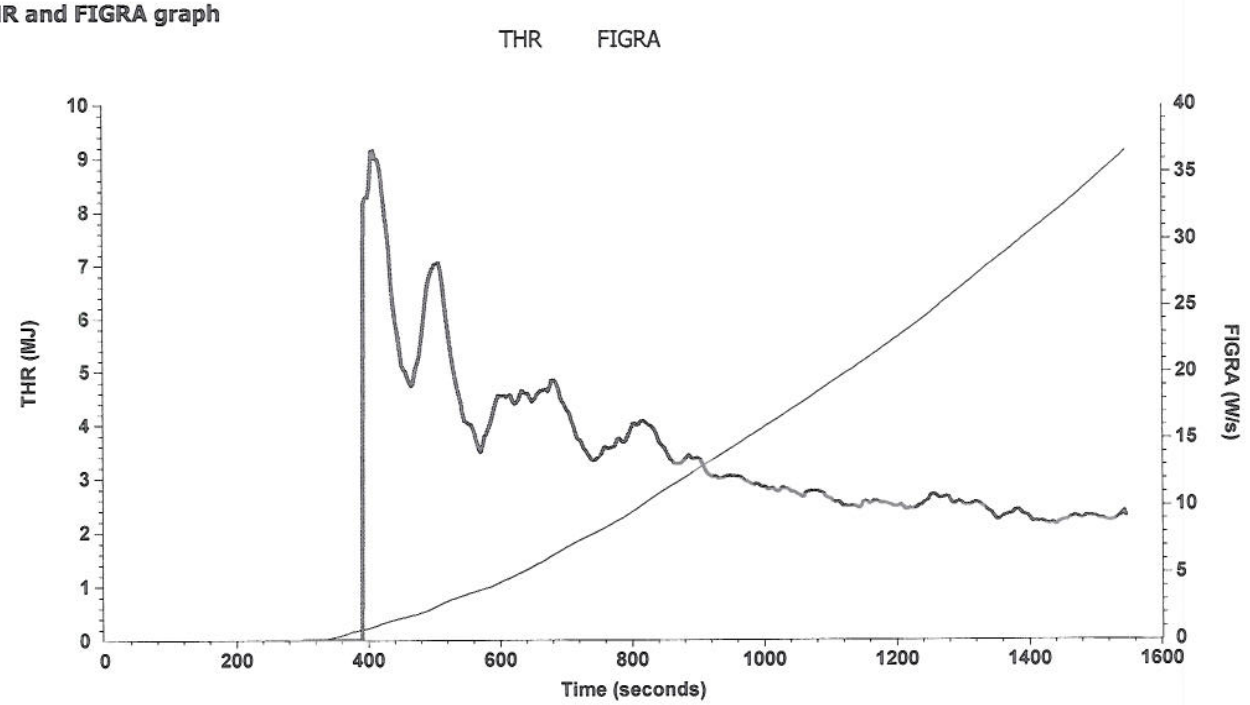
SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-2.csv
Report identification	547-2
Product identification	Scotland Larch with Holz Prof fire retardant

HRR and HRR(30) graph



THR and FIGRA graph

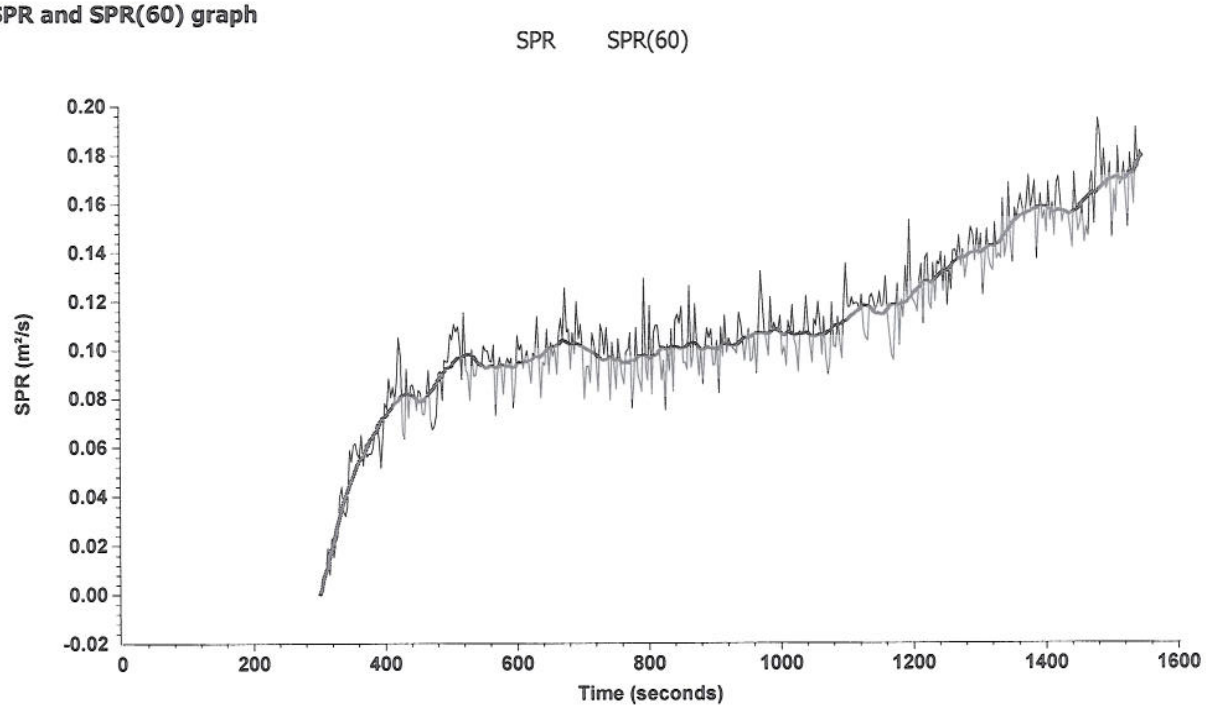


The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

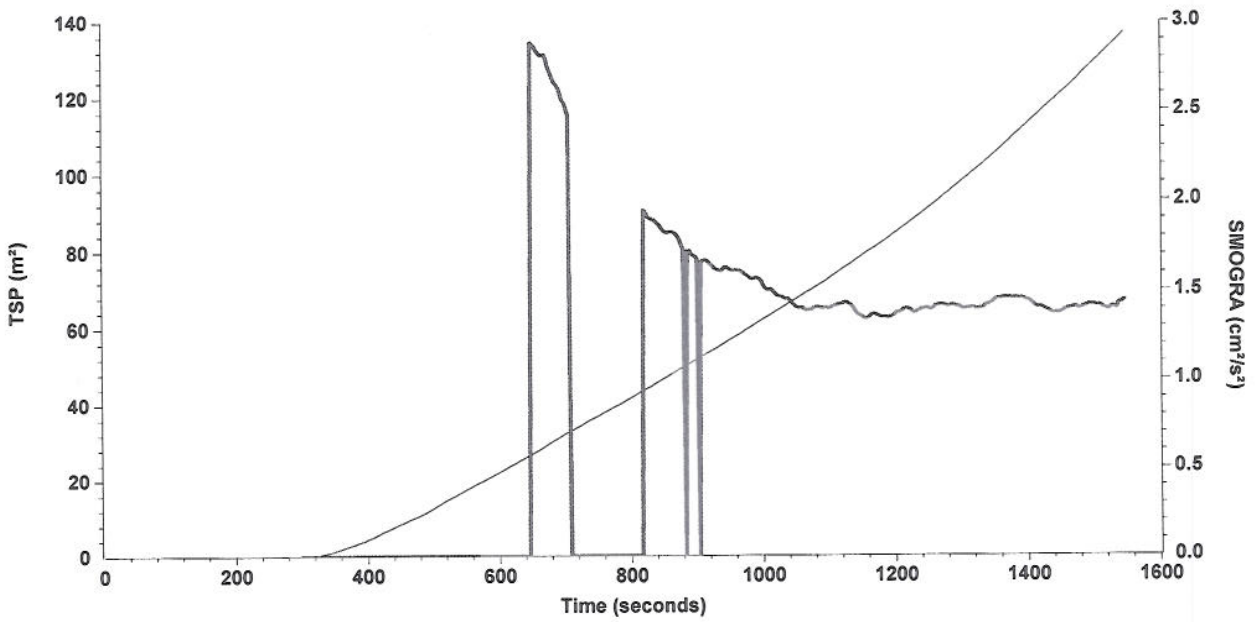
SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-2.csv
Report identification	547-2
Product identification	Scotland Larch with Holz Prof fire retardant

SPR and SPR(60) graph



TSP and SMOGRA graph

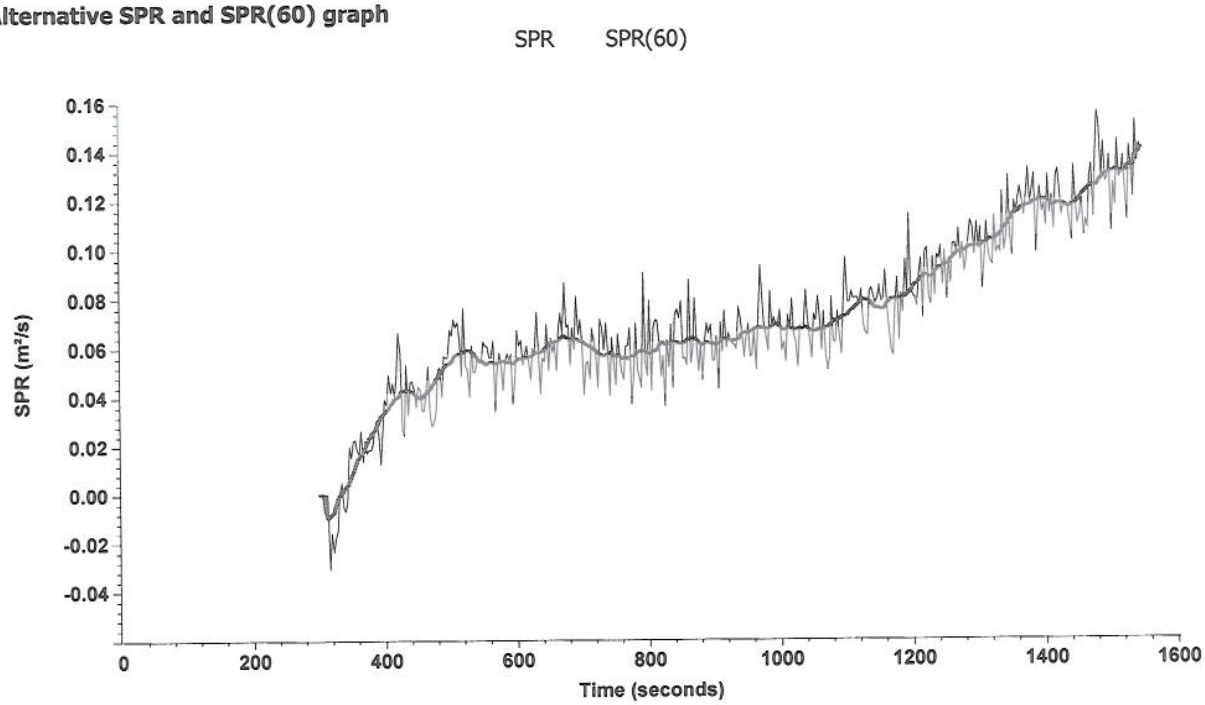


The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

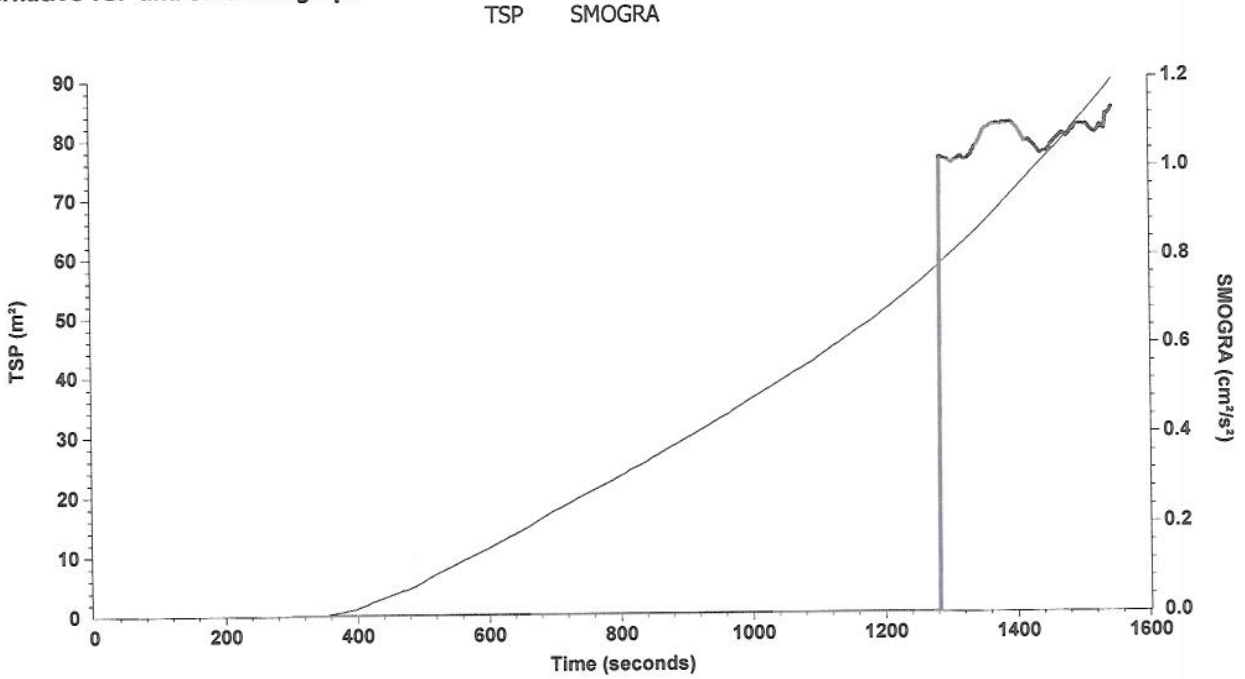
SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-2.csv
Report identification	547-2
Product identification	Scotland Larch with Holz Prof fire retardant

Alternative SPR and SPR(60) graph



Alternative 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.

Annex 4

SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-3.csv
Report identification	547-3
Product identification	Scotland Larch with Holz Prof fire retardant

Test

Standard used	EN 13823:2010
Date of test	25/08/2011
Date of report	25/08/2011
E'	17.2 MJ/m³

Apparatus specifications

kt	0.93
kp	1.08
Duct diameter	0.315 m
O2 calibration delay time	12 s
CO2 calibration delay time	9 s

Pre-test conditions

Baseline duct temperature	299.47 K
Ambient temperature	295.51 K
Ambient pressure	103.373 kPa
Relative humidity	54%

Baseline conditions

Baseline ambient oxygen	20.574%
Baseline oxygen	20.951%
Baseline carbon dioxide	0.0386%
Baseline smoke	100.03%

Specimen conditioning

Method	Constant mass
Time interval	24 hours
Mass 1	11024 g
Mass 2	11018 g
Temperature	23°C
RH	50%

Specimen information

Thickness	22 mm
Density	620 kg/m³
Surface mass/area	
Specimen number	3
Date of arrival	27/07/2011
Mounting method	5.2.2b) in EN 13823:2002
Joints	standard horizontal
Fixed to substrate?	Yes
Fixing method	screw
Substrate	Spruce wood slats
Manufacturer	Holz Prof OU
Sponsor	Holz Prof OU

Test validity criteria

Test drifts

	Initial	Final	Change
Oxygen	20.951%	20.952%	0.001%
CO2	0.039%	0.040%	0.001%
Smoke	100.03%	99.64%	0.004

Exposure time 1254 s

Synchronisation details

Duct temp. dropped by 2.5 K from baseline of 322.71 K at 303 s
Oxygen rose by 0.05% from baseline of 20.665% at 303 s
CO2 dropped by 0.02% from baseline of 0.215% at 306 s

Burner details

Auxiliary Burner HRR	30.735 kW
Auxiliary Burner HRR std. dev.	0.520 kW
Burner CO2/O2 ratio	0.620
Auxiliary Burner SPR	0.028 m²/s
Auxiliary Burner SPR std. dev.	0.003 m²/s
Burner response time (s)	9 s

Other checks

Minimum duct flow	0.541 m³/s
Maximum duct flow	0.641 m³/s

No T/C failure

Classification results

FIGRA(0.2)	34.9 W/s at 390 s
FIGRA(0.4)	29.1 W/s at 444 s
THR(600)	3.6 MJ
SMOGRA	6.7 cm²/s² at 450 s
TSP(600)	62.8 m²

Classification observations

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

Potential classification

Class	A2/B
Smoke production	s2
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

SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-3.csv
Report identification	547-3
Product identification	Scotland Larch with Holz Prof fire retardant

Alternative smoke results

Smoke test filename	C:\SBICALC\SMOKE\11082501.CSV
Main burner SPR	0.065 m^2/s
Main burner SPR std. dev.	0.008 m^2/s

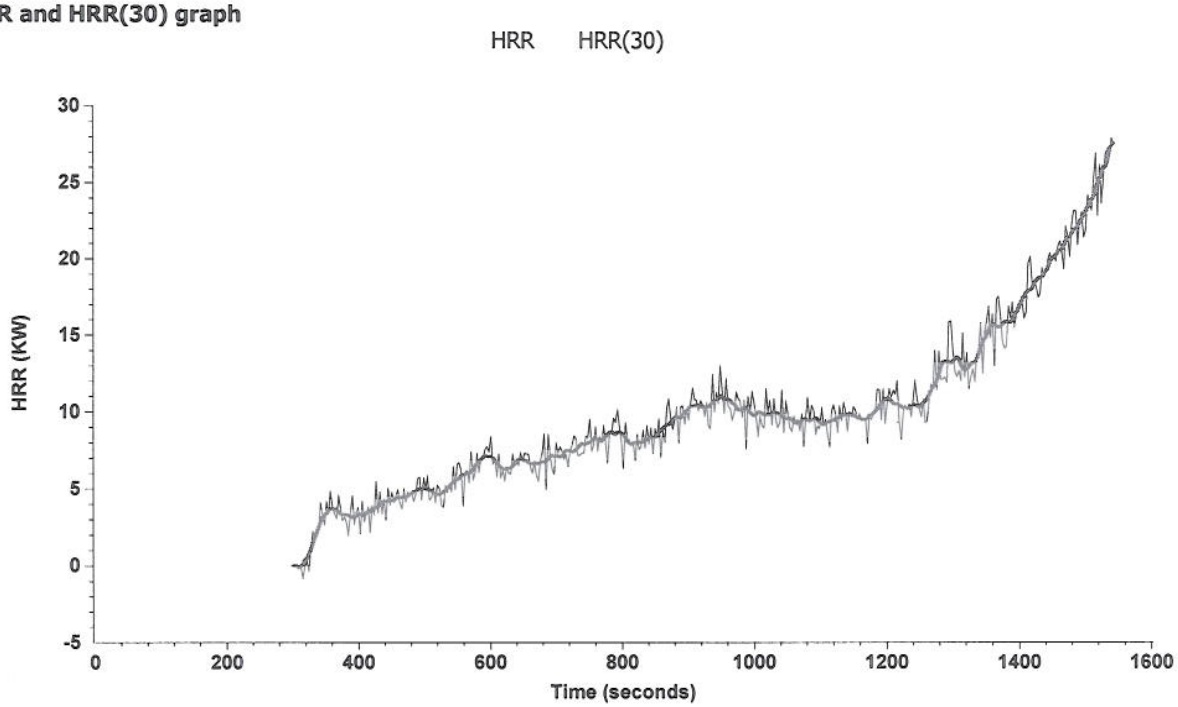
Alternative classification results

SMOGRA	2.1 cm^2/s^2 at 450 s
TSP(600)	41.2 m^2
Smoke production class	s1

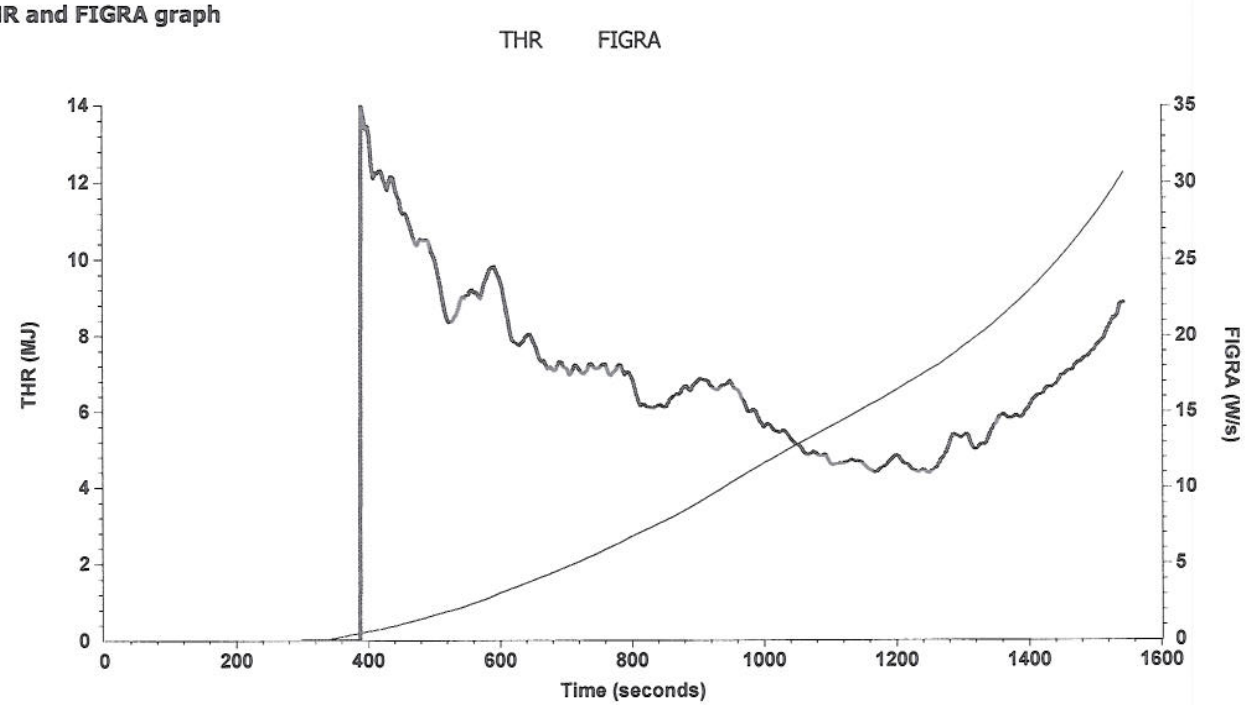
SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-3.csv
Report identification	547-3
Product identification	Scotland Larch with Holz Prof fire retardant

HRR and HRR(30) graph



THR and FIGRA graph

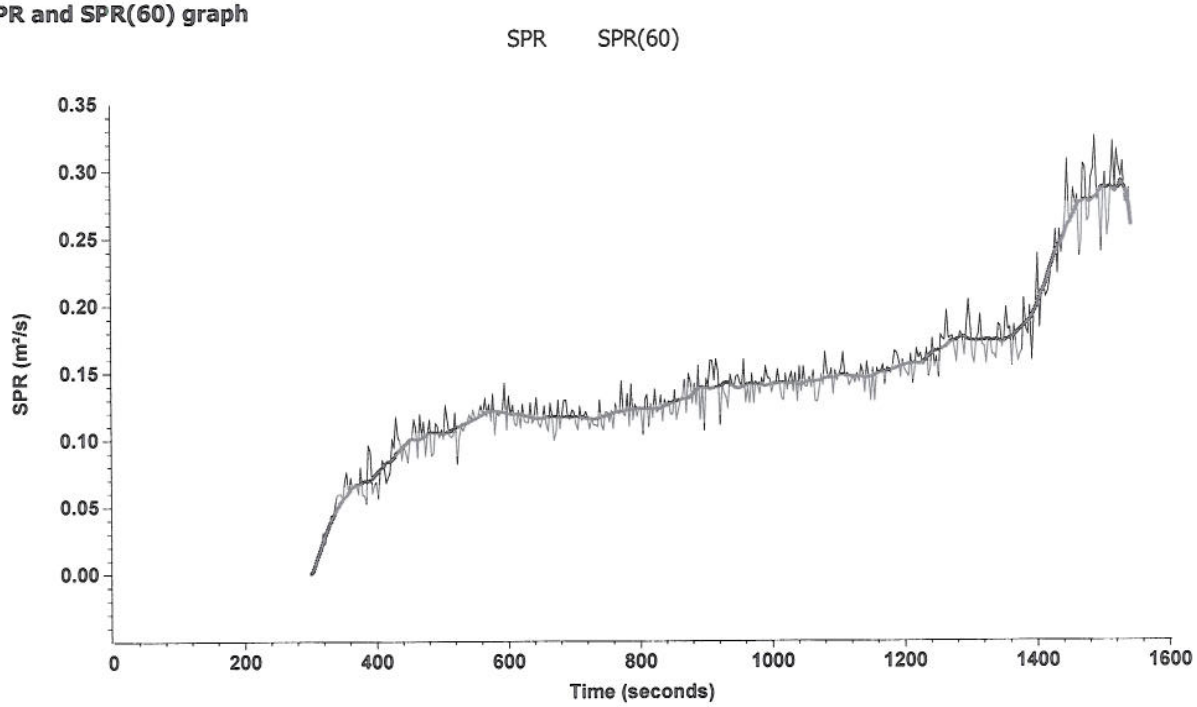


The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

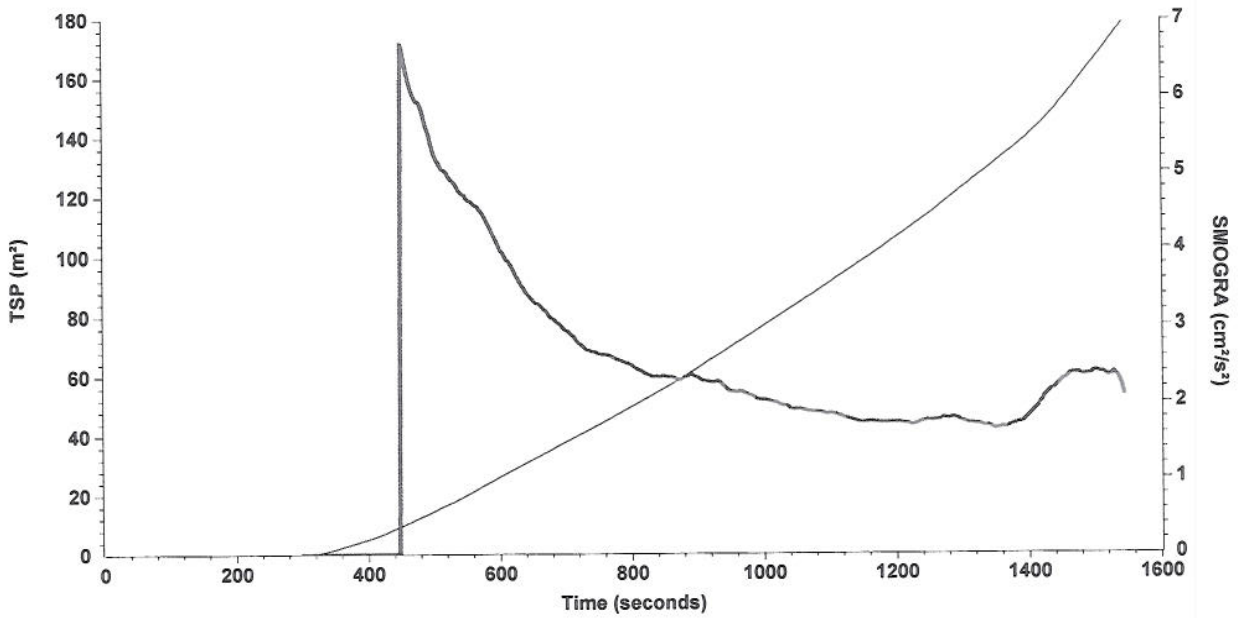
SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-3.csv
Report identification	547-3
Product identification	Scotland Larch with Holz Prof fire retardant

SPR and SPR(60) graph



TSP and SMOGRA graph

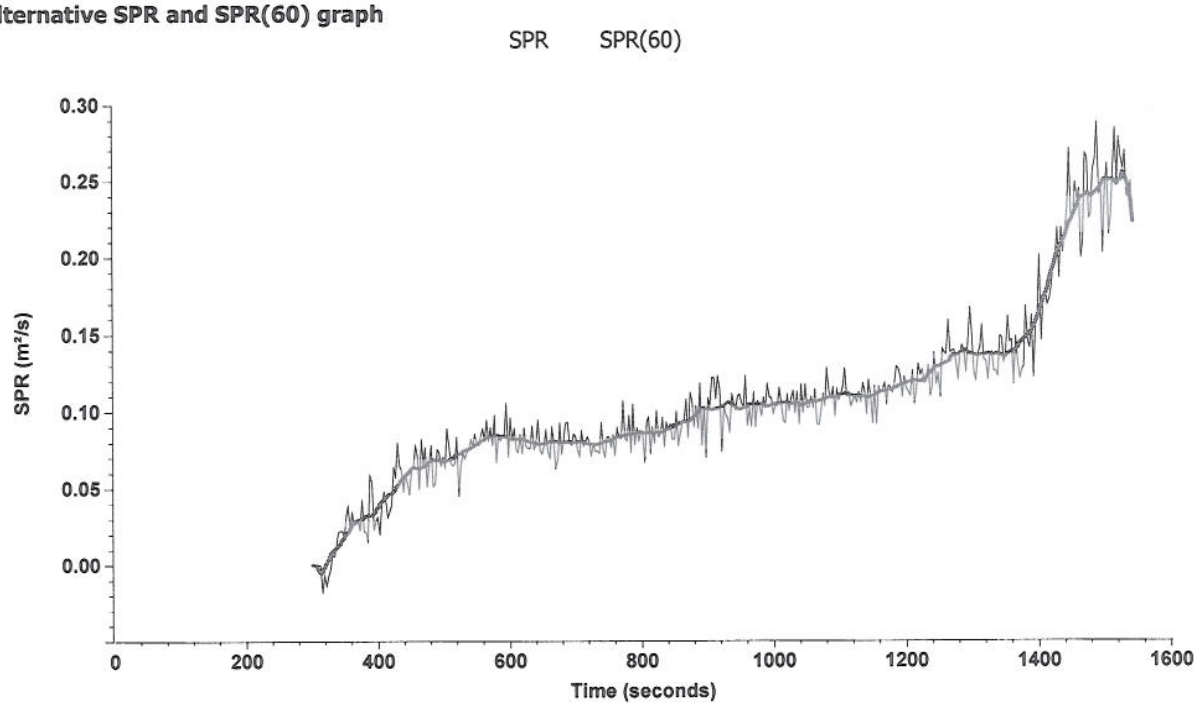


The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

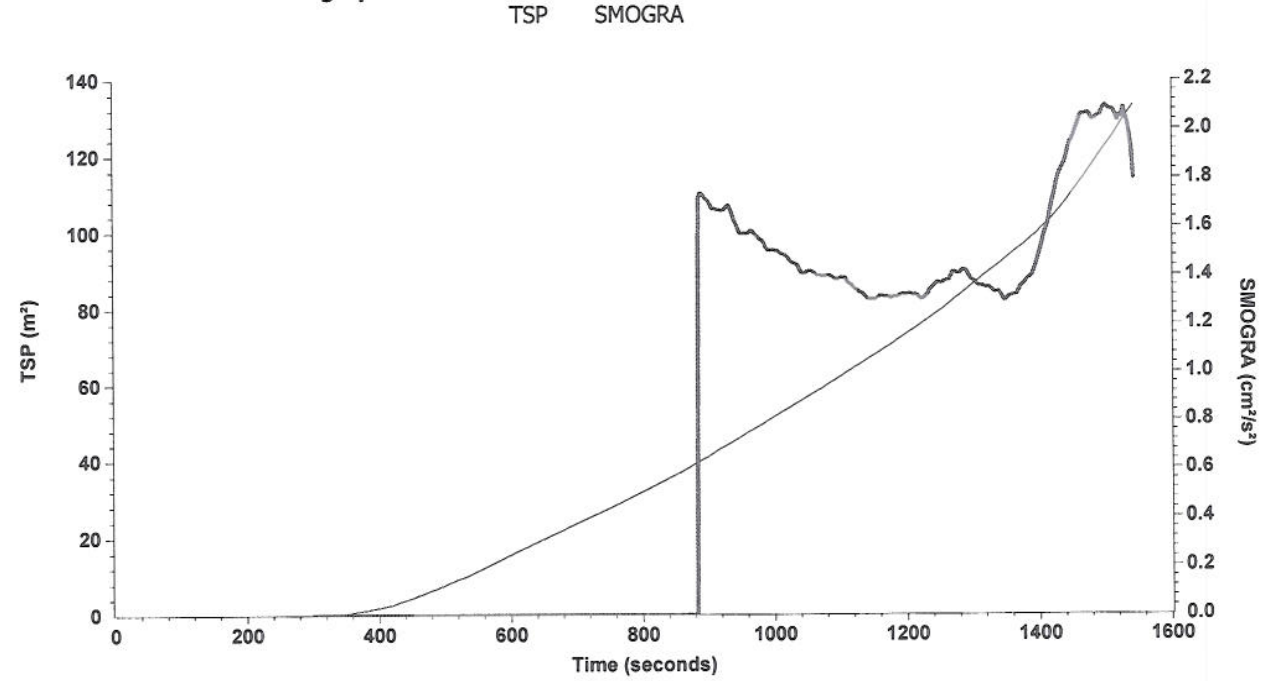
SBI Test Report

Laboratory name	MeKA Testesanas laboratorija
Operator	Edgars Buksans
Filename	C:\SBICALC\Data\547-3.csv
Report identification	547-3
Product identification	Scotland Larch with Holz Prof fire retardant

Alternative SPR and SPR(60) graph



Alternative 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.

Test parameter explanation

Parameter	Explanation
Specimen	Specimen consisting of two wings (short wing - 495 x1500mm and long wing 1000x1500mm) mounted perpendicular each to other.
Test start	Start of data collection
Ignition of the specimen	Ignition of specimen long wing initiated by main burner
Flaming particles and droplets	Specimen particles which have fall down on trolley at distance more than 300 mm distance from specimen corner and continue burning. It should be observed if flaming time is less or more than 10 s.
Lateral flame spread on the long wing LFS 1000 mm	Lateral flame spread is recorded when sustained flames reach's the far edge of specimen at height between 500 to 1000mm.
HRR, kW	Heat release rate of material between ignition of main burner and end of the test, burner heat output excluded, as a 60 s running average value.
SPR, m^2/s^2	Smoke production rate of material between ignition of the main burner and end of test burner smoke production output excluded, as 60 s running average value.
$FIGRA_{0,2MJ}$, W/s	Fire growth rate is maximum of the quotient of heat release rate from the specimen and time of its occurrence using a THR-threshold of 0.2 MJ.
$FIGRA_{0,4MJ}$, W/s	Fire growth rate is maximum of the quotient of heat release rate from the specimen and time of its occurrence using a THR-threshold of 0.4 MJ.
THR_{600s}, MJ	Total heat release of the sample at first 600 s from ignition of main burner.
SMOGRA, cm^2/s^2	Maximum of the quotient of smoke production rate from the specimen and the time of its occurrence.
TSP_{600s}, m^2	Total smoke production from the specimen in the first 600 s of exposure to the main burner flames.