SWISSI Process Safety GmbH
WRO-1055-5-24 , Schwarzwaldallee 215 , CH-4002 Basel

CLASSIFICATION OF REACTION TO FIRE IN ACCORDANCE WITH EN 13501-1:2009

Report no. : 905559-11-0279-30-Z

1. **Introduction:** This classification report defines the classification assigned THERMODULAR RF (as described by the sponsor) in accordance with the procedures given in EN 13501-1:2009.

Sponsor:	**PANNELLI TERMICI Srl** Via dell'Alpo, 27 I – 37136 VERONA (VR)
Prepared by:	SWISSI Process Safety GmbH WRO-1055-5-24 Schwarzwaldallee 215 CH - 4058 Basel
Notified Body No:	NB 2139
Product name:	THERMODULAR RF
Classification report No.:	905559-11-0279-29-Z
Issue number:	01
Date of issue:	13. December 2011

This document is composed by n°4 pages and it can b e reproduced only on the whole.
Enclosure: documents supplied by Requesting Company.

2. Details of classified product:

2.1 General

The product THERMODULAR RF is defined as "Self-supporting double skin metal faced insulating panels - Factory made products" according to EN 14509:2006-AC:2008.

2.2 Product description:

Nature: self-supporting double skin metal faced insulating panel (Annex A).

Dimensions:

- Length: on demand
- Width: 1200 mm
- Thickness: 100 mm
- Weight: 11 kg/m^2

Components :

- Internal and external metal facing (galvanised pre-painted cortical plate):
  - Metal: lamina FeZn - thickness: 0.5 mm
  - Coatings of both side: polyester paint (thickness: 25 µm)
  - Type of profile for both facings: Annex C1
- Insulating XPS core: polystyrene, CO_2 - density: 30-35 kg/m^3
- Adhesive: two-part polyurethanic glue - quantity: 220 g/m^2

Production process: The panels are realised by a automatic process consisting in:

- the insulating plates are coupled with two plates
- the glue is applied to the plates
- the formed panels are pressed, then cut, packed and labelled.

Product use: External and internal wall panels

Laying:

The panels installation is effected by overlapping 2 panels on width and fixing with screws.
The panels are installed with the insulating core protected where cut. The flashing are made of pre-painted galvanised sheet (thickness: 0.6 mm).
The flashings realised with the same pre-painted galvanised sheet (thickness: 0.5 mm) are also used as internal and external protection of corners.
The flashings are fixed by screws or rivets placed with a distance not bigger than 200 mm.

3. Reports and results in support of this classification:

3.1 Reports

Name of Laboratory	Name of sponsor	Report ref. no.	Test method
LSFIRE	PANNELLI TERMICI Srl	LSFire / 01885 / E00042 / 07	EN ISO 11925-2
LSFIRE	PANNELLI TERMICI Srl	LSFire / 01885 / E00042 / 08	EN 13823

3.2 Results:

Test method	Tests number	Parameter	Results	
			Continuous parameter - mean (m)	Compliance with parameters
EN ISO 11925-2 Face exposure Application time: 30s	6	Fs ≤ 150 mm		yes
	6	Ignition of the filter paper		no ignition
EN ISO 11925-2 Edge exposure Application time: 30s	6	Fs ≤ 150 mm		yes
	6	Ignition of the filter paper		no ignition
EN ISO 9239-1	3	FIGRA0,2MJ (W/s)	13	
	3	FIGRA0,4MJ (W/s)	13	
	3	LFS < edge		yes
	3	THR600s (MJ)	1.6	
	3	SMOGRA (m^2/s^2)	9	
	3	TSP600s (m^2)	81	
	3	Flaming droplets/particles		no dripping

4 Classification and field of application

4.1 Reference of classification

This classification was conducted in accordance to paragraph 11 of the test method EN 13501-1:2009

4.2 Classification

The product, THERMODULAR RF (as described by the sponsor), in relation to its reaction to fire behaviour is classified:

General Classification	**B**
Additional classification in relation to smoke production	**s2**
Additional classification in relation to flaming droplets / particles	**d0**

Reaction to fire classification: B – s2, d0

4.3 Field of application

This classification is valid for the following end use applications:

- only for the configuration system described.
- only with the cut edges protected.
- for all end use vertical and horizontal, not suspended.
- for a minimum air gap of 40 mm

Remark : This document is not a type approval or a product certification.

SIGNED	**APPROVED**
Date : 13. December 2011	Date : 13. December 2011
Christian Kubainsky	Dr. Georg Suter
Head NB	Head SWISSI PS GmbH

L.S.FIRE TESTING INSTITUTE S.R.L.- Via Olgiate, 15 – 22070 OLTRONA di S. MAMETTE (CO) ITALY

TEST REPORT

Code: 01885 / E00042 / 07

Test date: 23 . 11 . 2011

Test Method **EN ISO 11925-2**

REQUESTING COMPANY

PANNELLI TERMICI Srl
Via dell'Alpo, 27
I – 37136 VERONA (VR)

DENOMINATION OF THE MATERIAL :

THERMODULAR RF
Sampling identification: 20111026 Date of sampling: 26-10-2011

Test configuration: without additional substrate
Surface exposed: identical opposite surface

Conditioning to constant mass: T: (23 ± 2)°C; R.H.: (50 ± 5)% (EN 13238:2010)

RESULTS :

Flame application time: 30 s

	Surface exposure				Edge exposure			
Test n°	Ignition	The flame tip reaches 150 mm	Time to reach 150 mm	Ignition of filter paper	Ignition	The flame tip reaches 150 mm	Time to reach 150 mm	Ignition of filter paper
	(y/n)	(y/n)	(sec)	(y/n)	(y/n)	(y/n)	(sec)	(y/n)
1C	n	n	-	n	n	n	-	n
2C	n	n	-	n	n	n	-	n
3C	n	n	-	n	n	n	-	n
4L	n	n	-	n	n	n	-	n
5L	n	n	-	n	n	n	-	n
6L	n	n	-	n	n	n	-	n

Flame spread: Fs ≤ 150 mm within 60 s **PASS**

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.

OLTRONA di S. MAMETTE, 28-11-2011

LABORATORY DIRECTOR
Maddalena Pezzani

TEST OPERATOR
Silvana Carnevale

Surface exposure

Edge exposure

TEST REPORT

Code: 01885 / E00042 / 08

Tests date, 23 . 11 . 2011

Test Method **SBI – EN 13823**

REQUESTING COMPANY

PANNELLI TERMICI Srl
Via dell'Alpo, 27
I – 37136 VERONA (VR)

DENOMINATION OF THE MATERIAL :

THERMODULAR RF

Sampling identification: 20111026 Date of sampling: 26-10-2011

Test configuration: **According to EN 14509:2006 / AC:2008** (Annex A), except for the outside section of sample where the insulation is protected by flashing made of pre-painted sheet as in real condition installation of the product and the flashing is fixed by rivets disposed every 200 mm
A panel of thickness 100 mm with identical opposing surface is tested.
The long wing has a vertical joint placed at 200 mm from the corner (Annex B). The joint is fixed by rivets placed at 40 mm from the bottom edge and at 40 mm from the upper edge. The rivets are placed both on the exposed surface and on the opposite surface.
The corner is protected by L-shaped flashings made of pre-varnished galvanised sheet FeZn (thickness 0.5 mm - internal size 50 × 50 mm - external size 50 × 150 mm, see Annex C1).
U-shaped flashings made of pre-varnished galvanised sheet FeZn (thickness 0.6 mm - size 50 × 100 × 50 mm, see Annex C1) are used on outside edge of the specimen.
The test specimen is installed on the trolley with a gap of 40 mm from the backing board.

Conditioning to constant mass: T: (23 ± 2)°C; R.H.: (50 ± 5)% (EN 13238:2010)

RESULTS :

	1 ST SPECIMEN	2 ND SPECIMEN	3 RD SPECIMEN	AVERAGE
Ignition time (visual) [s]	70	59	35	55
Ignition time (dRHR=3kW) [s]	177	105	225	169
Ignition time (dT=2.5K) [s]	24	18	27	23
RHR30s maximum [kW]	5	6	5	5
THR600s (=RHR integral) [MJ]	**1.4**	**2.0**	**1.4**	**1.6**
FIGRA [W/s] 0,2 MJ	**11**	**17**	**11**	**13**
FIGRA [W/s] 0,4 MJ	11	17	11	13
dT_{30s} maximum [K]	27	27	27	27
dT integral [K·s]	34232	33713	34110	34018
RSP60s maximum [m^2/s]	0	0	0	0
TSP600s (=SPR integral) [m^2]	**84**	**79**	**79**	**81**
SMOGRA [m^2/s^2]	**9**	**10**	**9**	**9**
Lateral Flame Spread $_{edge}$	**no**	**no**	**no**	**no**
Flaming Droplets Particles $_{f=<10s}$	**no**	**no**	**no**	**no**
Flaming Droplets Particles $_{f>10s}$	**no**	**no**	**no**	**no**

This document is composed by n°3 pages + 4 enclosures + the single test reports and it can be reproduced only on the whole.

	1 ST SPECIMEN	2 ND SPECIMEN	3 RD SPECIMEN	AVERAGE
CLASS (general)	A2 - B	A2 - B	A2 - B	A2 - B
CLASS (smoke)	s2	s2	s2	s2
CLASS (dripping)	d0	d0	d0	d0

To this material, class A2 or B shall be attributed, according to the EN ISO 1716 or EN ISO 11925-2 tests, respectively.

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.

OLTRONA di S. MAMETTE, 28-11-2011

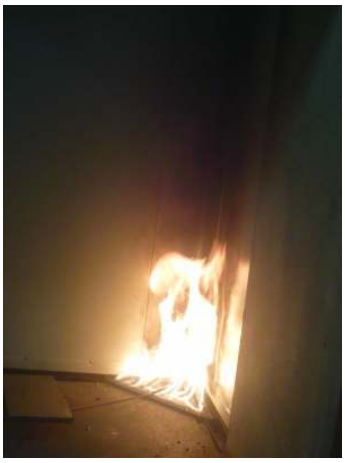
LABORATORY DIRECTOR
Maddalena Pezzani

TEST OPERATOR
Matteo Cappelletti

Test 1



Test 2


Test 3



S.B.I.

- Single test presentation -

Description

Laboratory	:	**LSFire Testing Institute**
Product	:	**Thermodular RF**
Test number	:	**1**
Test date	:	**23/11/2011**

Conditions

Roomtemperature (dgr C)	:	**15**
Ambient pressure (Pa)	:	**101400**
Humidity (%)	:	**62**

Results

Ignition time (visual) [s]	=	**70**
Ignition time (dRHR=3kW) [s]	=	**177**
Ignition time (dT=2.5K) [s]	=	**24**
RHR$_{30s}$ maximum [kW]	=	**4.8**
THR600s (=RHR integral) [MJ]	=	**1.4**
THR1200s (=RHR integral) [MJ]	=	**3.5**
FIGRA [W/s] 0,2 MJ	=	**10.8**
FIGRA [W/s] 0,4 MJ	=	**10.8**
dT $_{30s}$ maximum [K]	=	**27.3**
dT integral [K·s]	=	**34232**
Transmittance minimum [%]	=	**88.7**
RSP$_{60s}$ maximum [m^2/s]	=	**0.18**
TSP600s (=SPR integral) [m^2]	=	**84.2**
TSP1200s (=SPR integral) [m^2]	=	**166.2**
SMOGRA [m^2/s^2]	=	**9.1**
Lateral Flame Spread $_{edge}$	=	**no**
Flaming Droplets Particles $_{f=<10s}$	=	**no**
Flaming Droplets Particles $_{f>10s}$	=	**no**

t* (barycentric time) at t=1200s [s]	=	**717**
FIGRA t* 1200s [1000·MJ/s]	=	**3.5**
MAHRE [kW]	=	**2.9**
FIGRA new [W/s]	=	**19.3**

Data processing

k $_{t}$	:	**0.995**
k $_{rho}$	:	**1.08**
E $_{1}$ (kJ/m^3 O_2)	:	**17200**
Radius of tube (m)	:	**0.125**

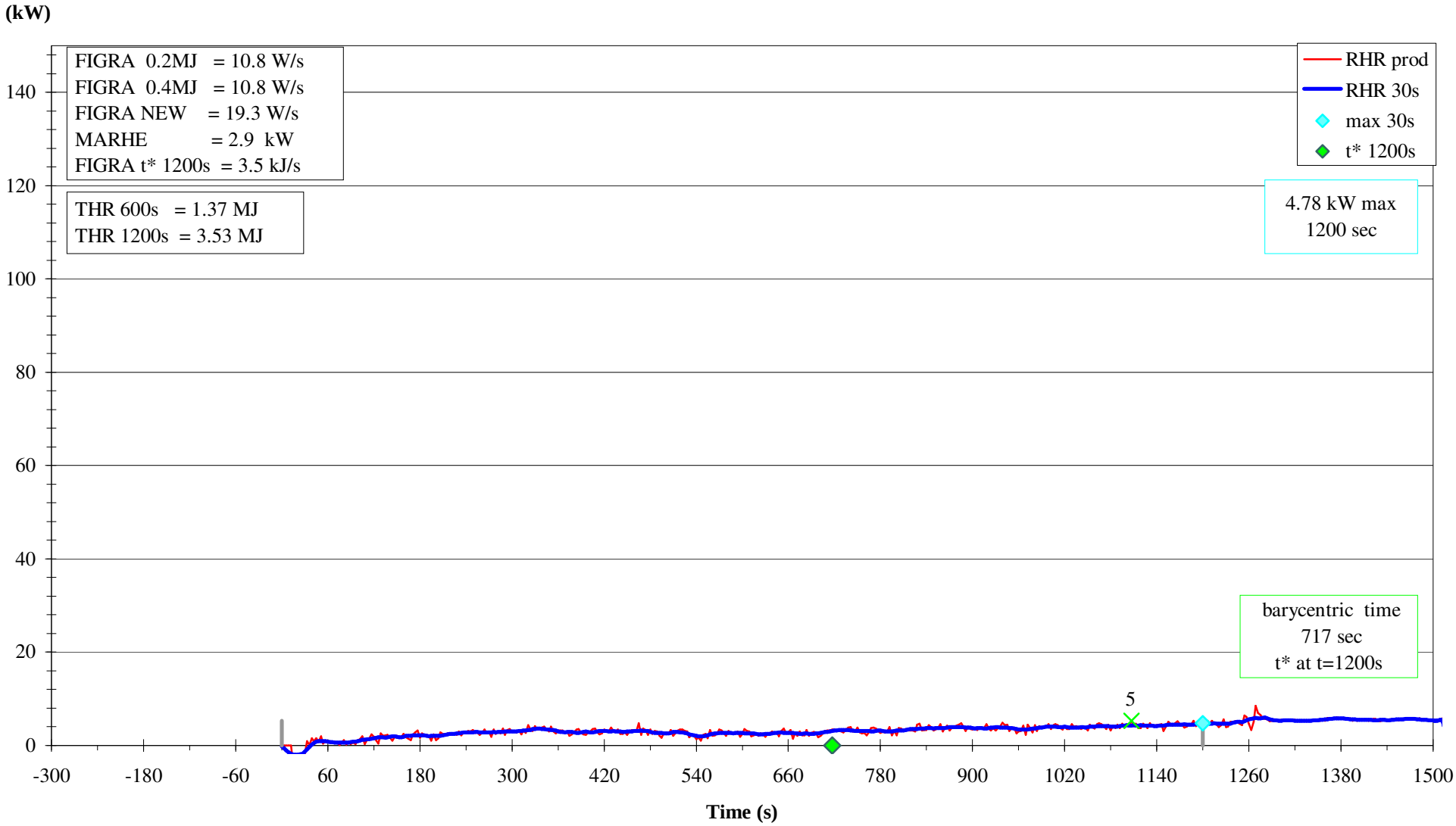
General

Program	:	**SBI**
Software Version (xls-workbook)	:	**mar-10**
Date of processing	:	23-nov-11

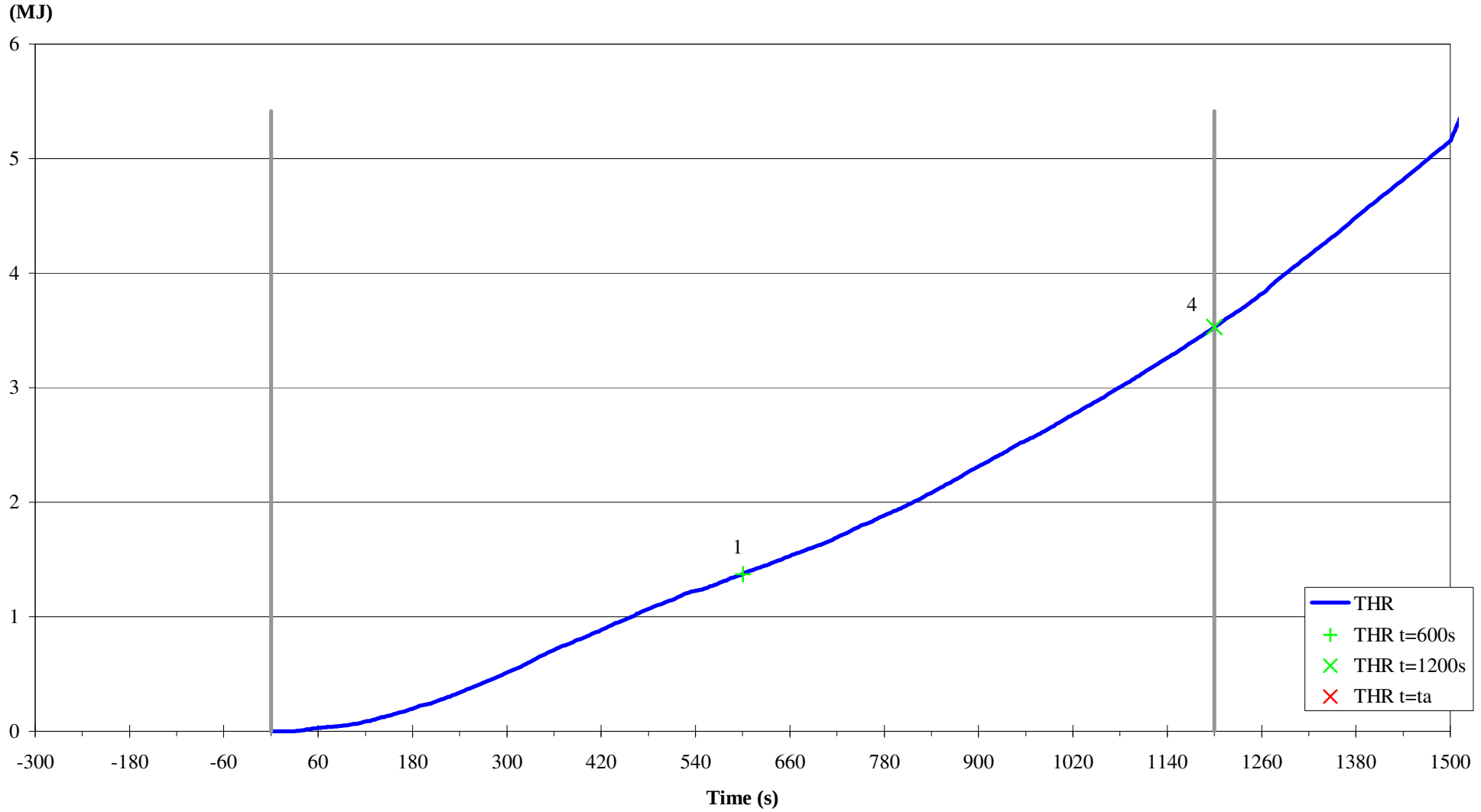
LABORATORY DIRECTOR
- Maddalena Pezzani -

TEST OPERATOR
- Matteo Cappelletti -

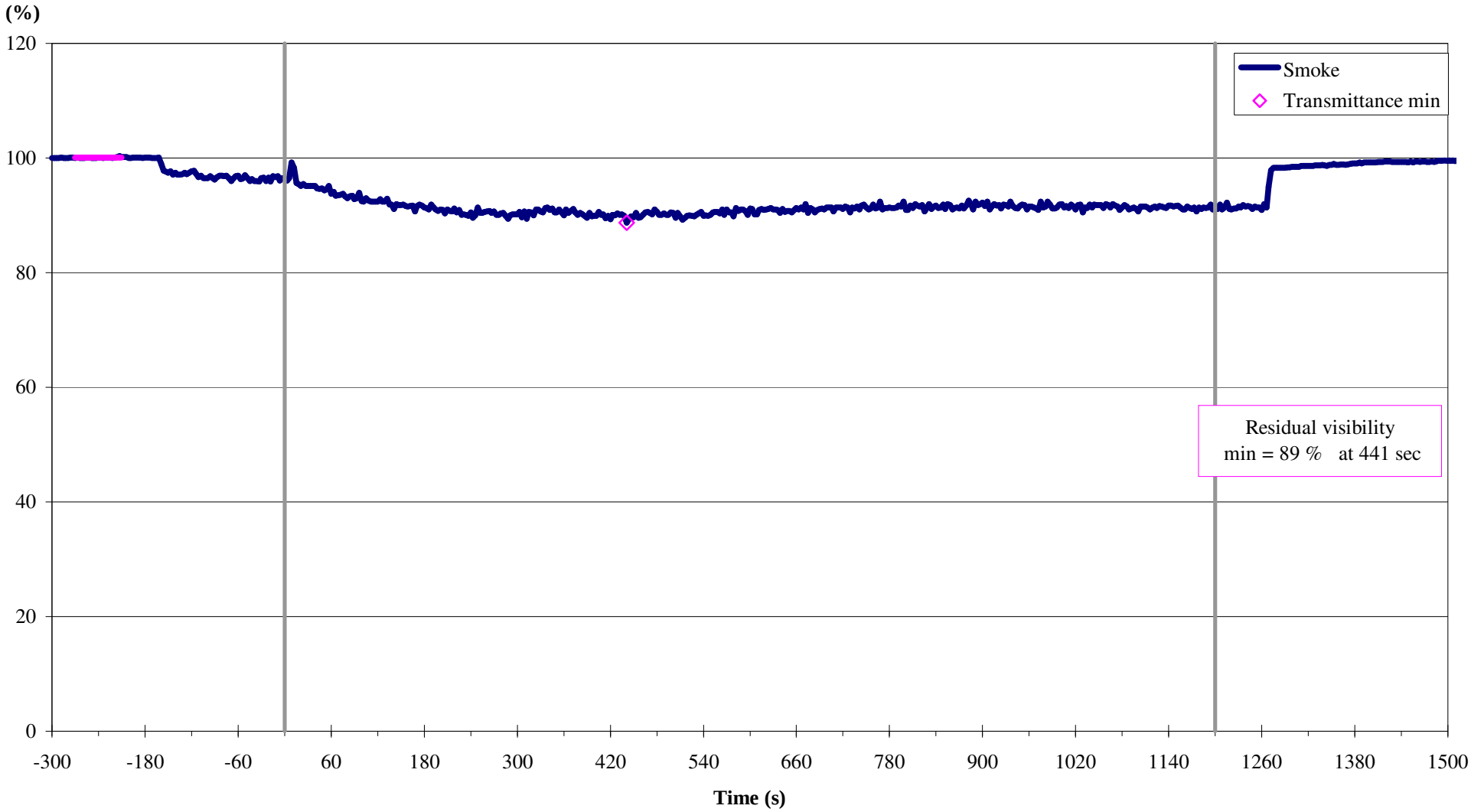
RHR: Rate of Heat Release net (kW)



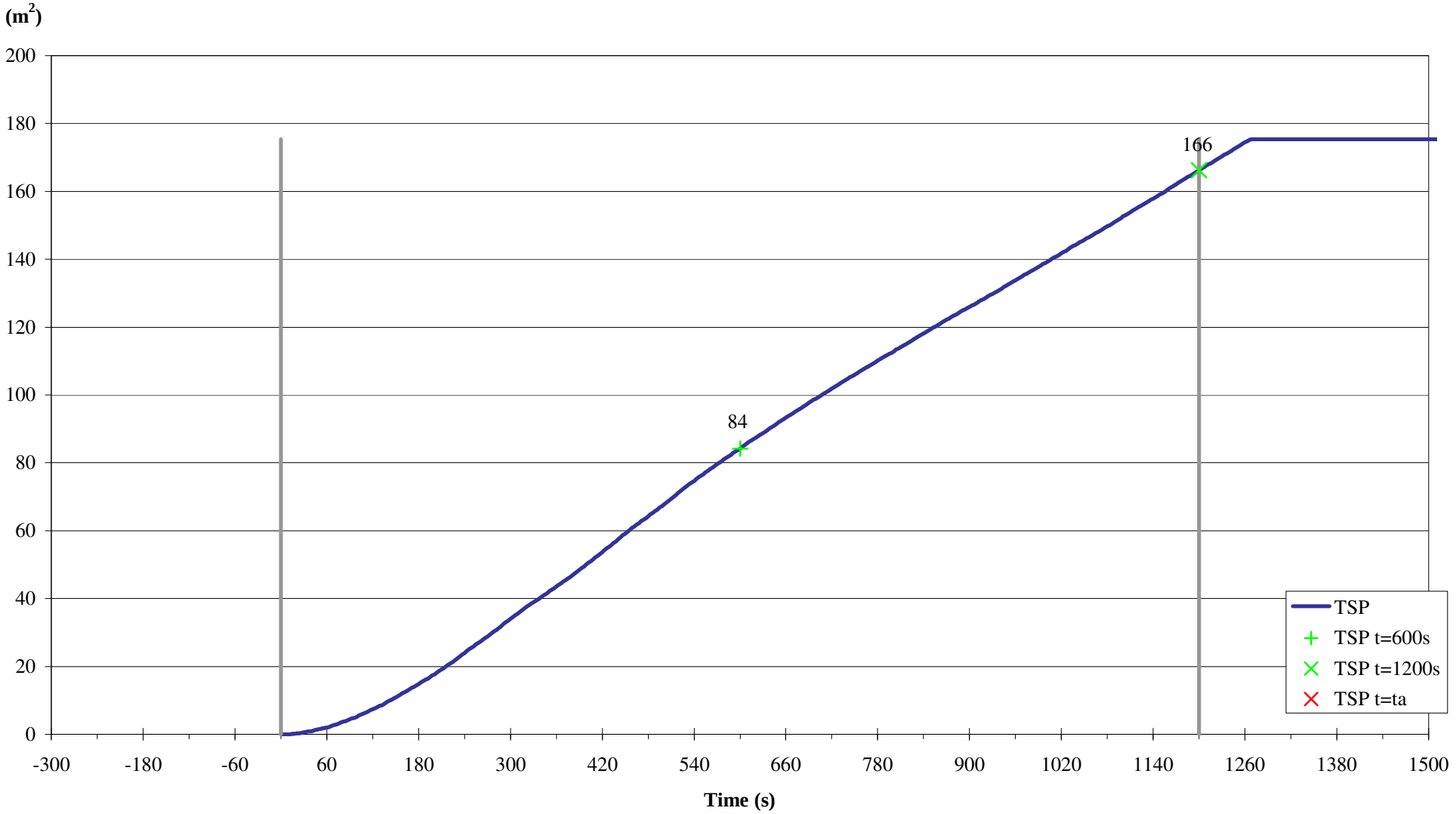
THR: Total Heat Relase (MJ)



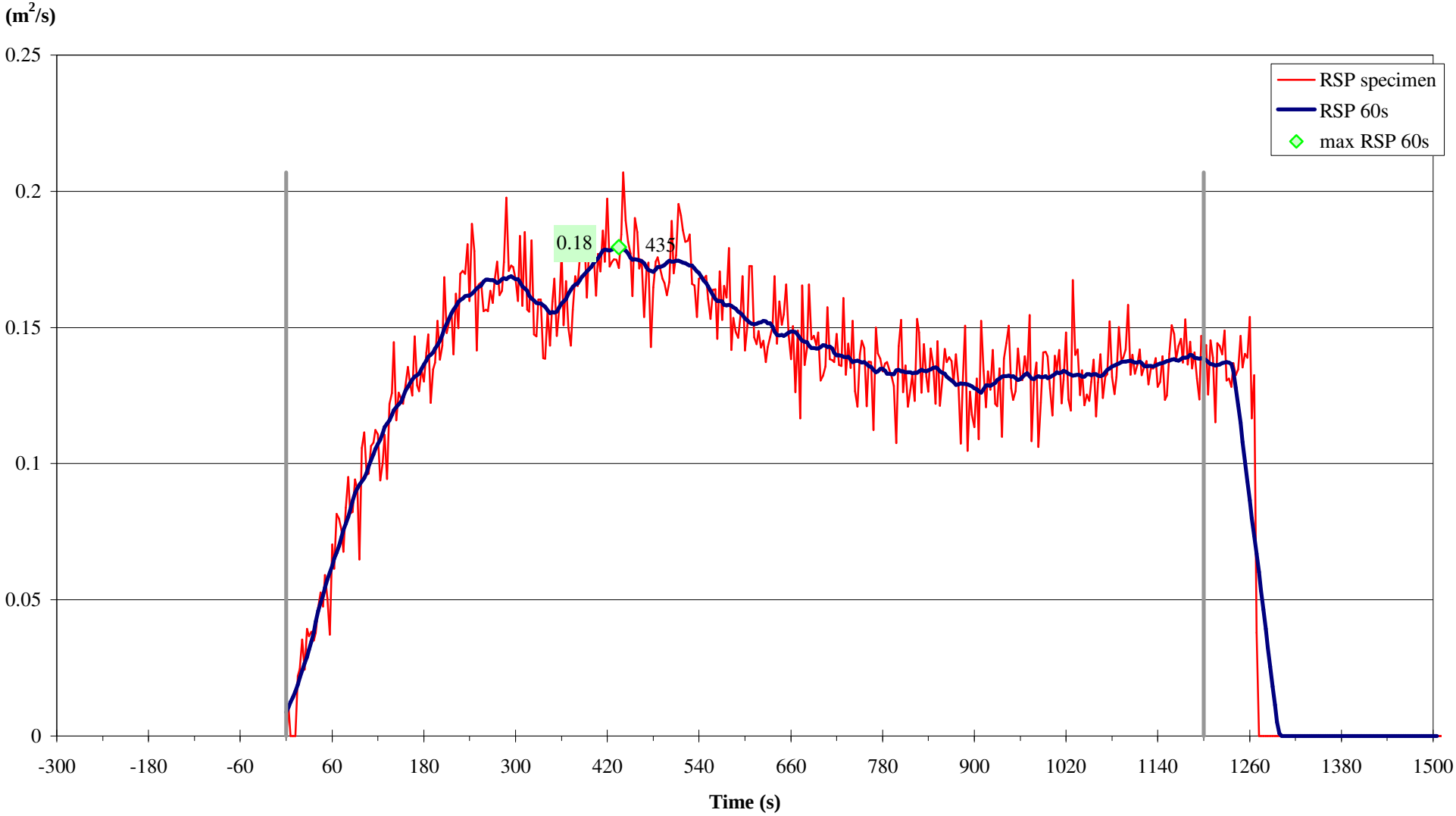
Transmittance (%)



TSP: Total Smoke Production of the specimen (m^2)



RSP: Rate of Smoke Production (m^2/s)



S.B.I.

- Single test presentation -

Description

Laboratory	:	**LSFire Testing Institute**
Product	:	**Thermodular RF**
Test number	:	**2**
Test date	:	**23/11/2011**

Conditions

Roomtemperature (dgr C)	:	**16**
Ambient pressure (Pa)	:	**101350**
Humidity (%)	:	**60**

Results

Ignition time (visual) [s]	=	**59**
Ignition time (dRHR=3kW) [s]	=	**105**
Ignition time (dT=2.5K) [s]	=	**18**
RHR$_{30s}$ maximum [kW]	=	**5.7**
THR600s (=RHR integral) [MJ]	=	**2.0**
THR1200s (=RHR integral) [MJ]	=	**4.2**
FIGRA [W/s] 0,2 MJ	=	**16.6**
FIGRA [W/s] 0,4 MJ	=	**16.6**
dT $_{30s}$ maximum [K]	=	**27.3**
dT integral [K·s]	=	**33713**
Transmittance minimum [%]	=	**89.3**
RSP$_{60s}$ maximum [m^2/s]	=	**0.17**
TSP600s (=SPR integral) [m^2]	=	**79.2**
TSP1200s (=SPR integral) [m^2]	=	**163.0**
SMOGRA [m^2/s^2]	=	**9.7**
Lateral Flame Spread $_{edge}$	=	**no**
Flaming Droplets Particles $_{f=<10s}$	=	**no**
Flaming Droplets Particles $_{f>10s}$	=	**no**

Data processing

k $_{t}$	:	**0.995**
k $_{rho}$	:	**1.08**
E $_{1}$ (kJ/m^3 O_2)	:	**17200**
Radius of tube (m)	:	**0.125**

General

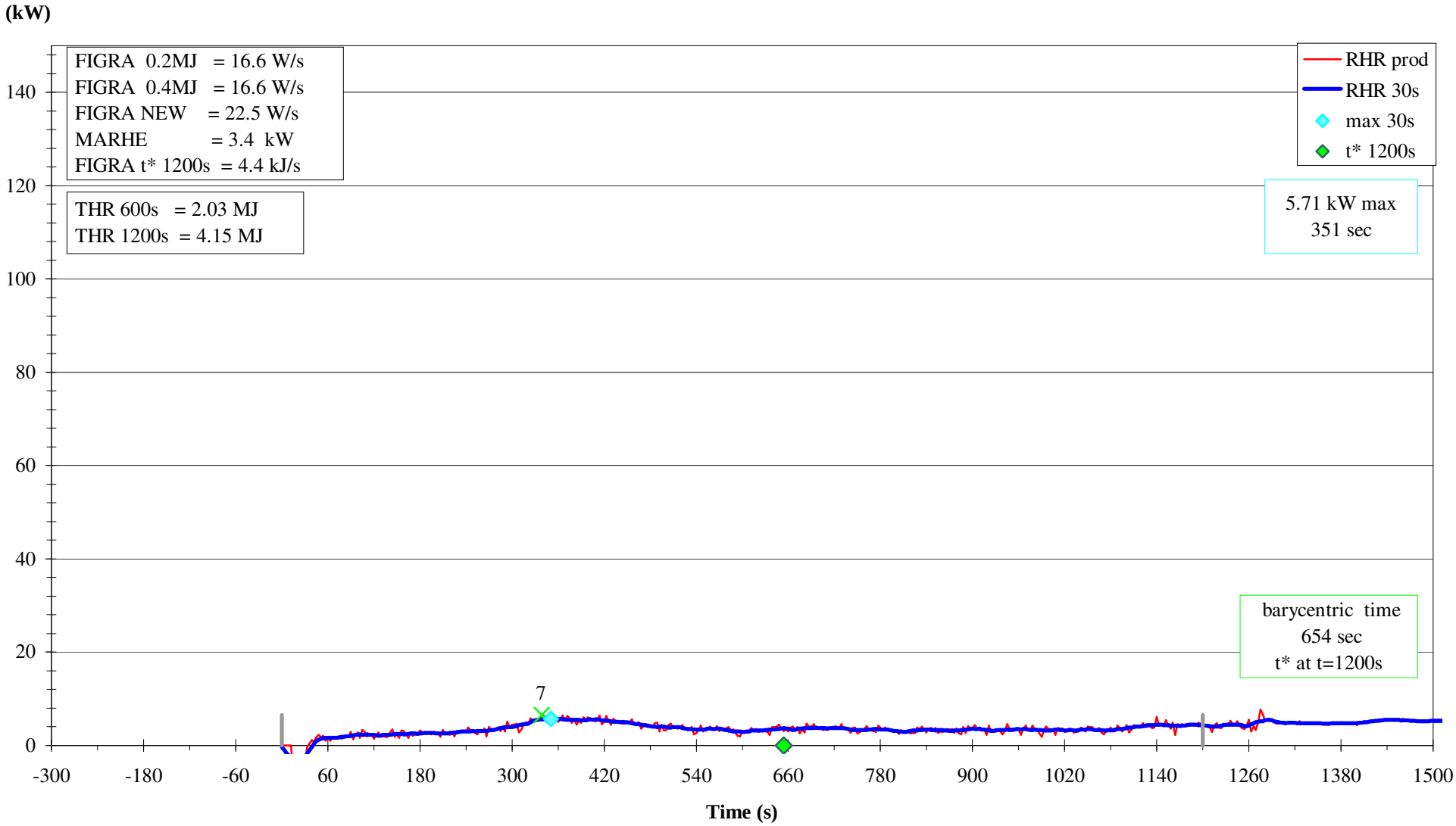
Program	:	**SBI**
Software Version (xls-workbook)	:	**mar-10**
Date of processing	:	23-nov-11

t* (barycentric time) at t=1200s [s]	=	**654**
FIGRA t* 1200s [1000·MJ/s]	=	**4.4**
MAHRE [kW]	=	**3.4**
FIGRA new [W/s]	=	**22.5**

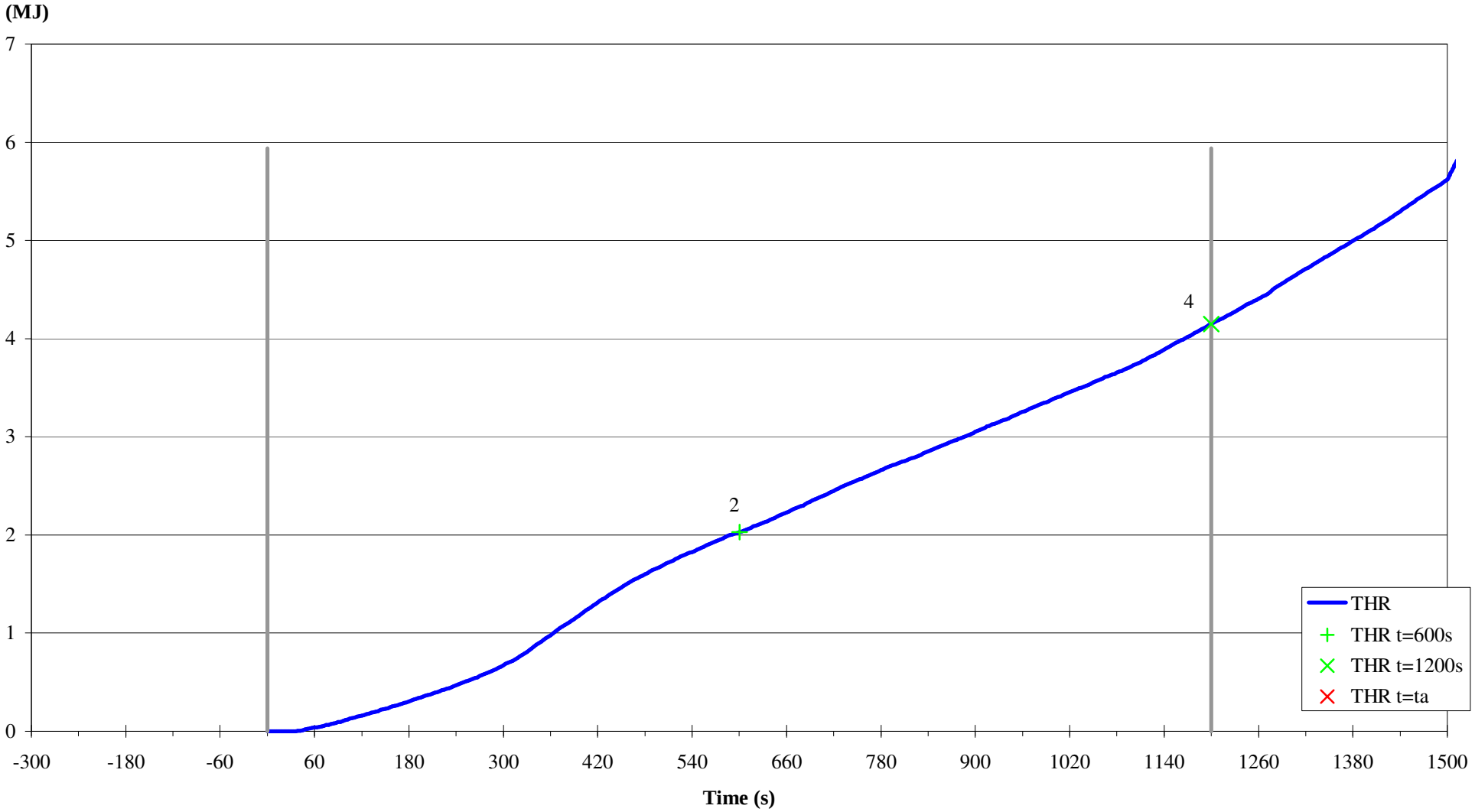
LABORATORY DIRECTOR
- Maddalena Pezzani -

TEST OPERATOR
- Matteo Cappelletti -

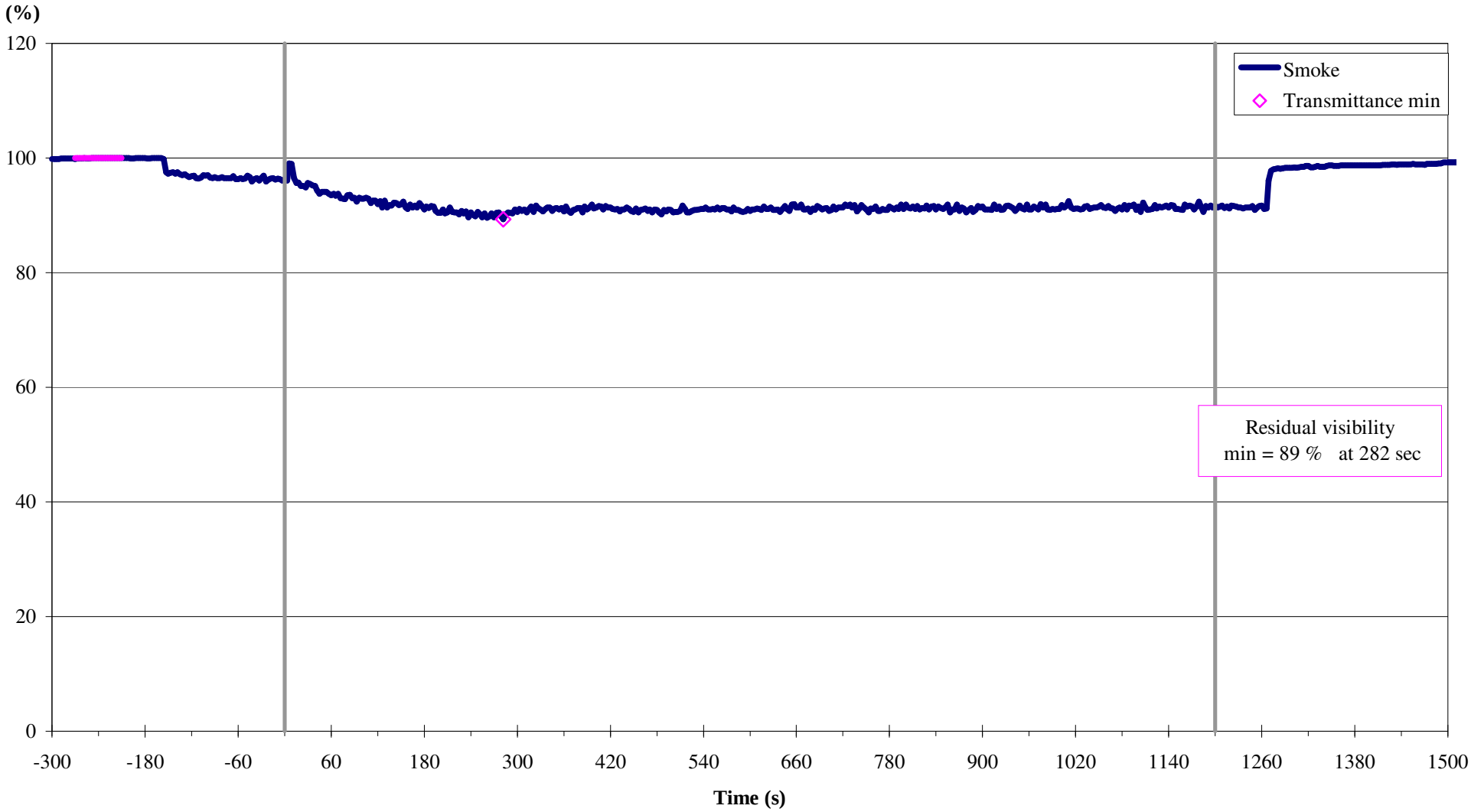
RHR: Rate of Heat Release net (kW)



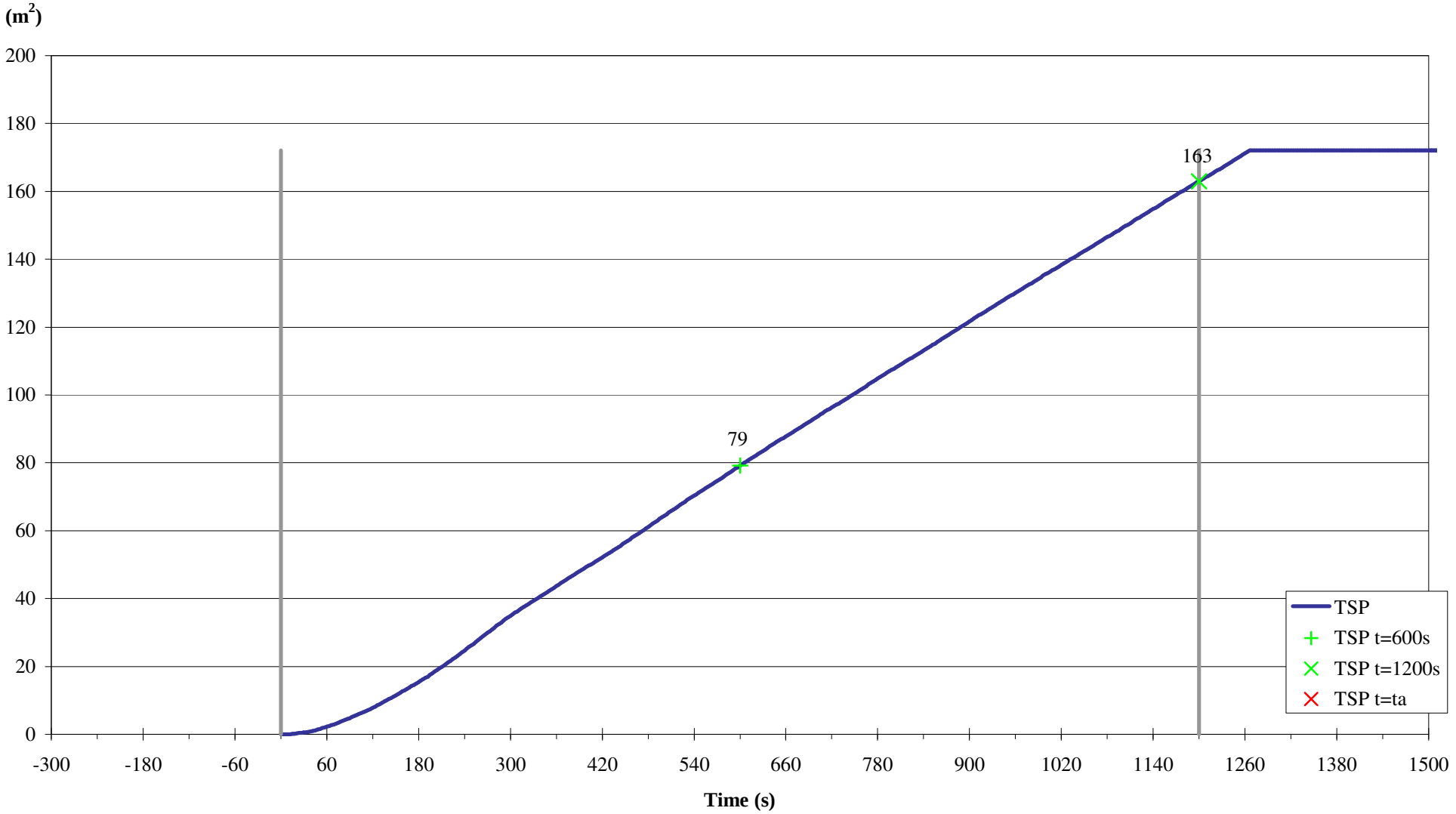
THR: Total Heat Relase (MJ)



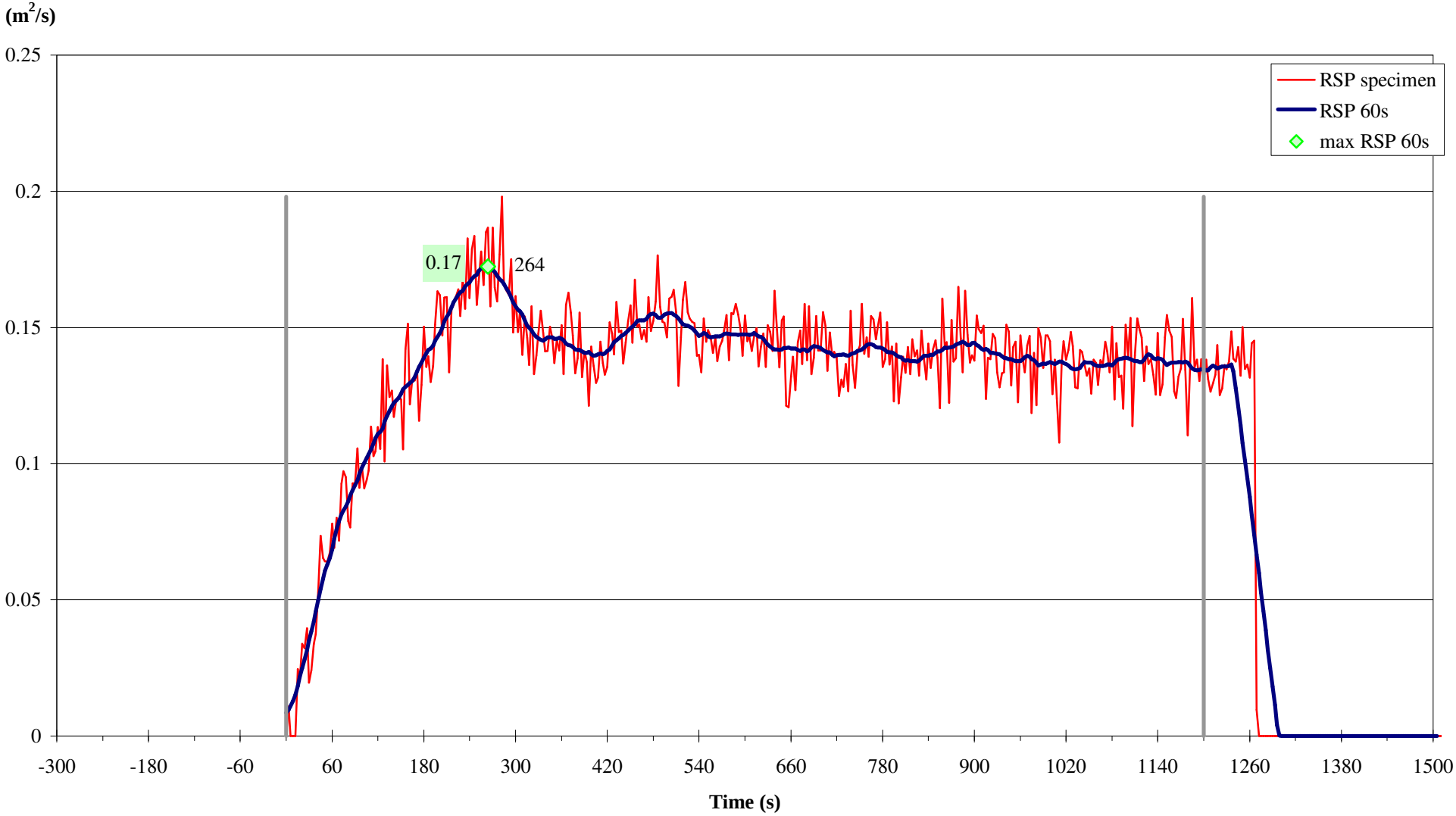
Transmittance (%)



TSP: Total Smoke Production of the specimen (m^2)



RSP: Rate of Smoke Production (m^2/s)



S.B.I.

- Single test presentation -

Description

Laboratory	:	**LSFire Testing Institute**
Product	:	**Thermodular RF**
Test number	:	**3**
Test date	:	**23/11/2011**

Conditions

Roomtemperature (dgr C)	:	**16**
Ambient pressure (Pa)	:	**101400**
Humidity (%)	:	**59**

Results

Ignition time (visual) [s]	=	**35**
Ignition time (dRHR=3kW) [s]	=	**225**
Ignition time (dT=2.5K) [s]	=	**27**
RHR$_{30s}$ maximum [kW]	=	**4.5**
THR600s (=RHR integral) [MJ]	=	**1.4**
THR1200s (=RHR integral) [MJ]	=	**2.7**
FIGRA [W/s] 0,2 MJ	=	**10.6**
FIGRA [W/s] 0,4 MJ	=	**10.6**
dT $_{30s}$ maximum [K]	=	**26.6**
dT integral [K·s]	=	**34110**
Transmittance minimum [%]	=	**89.0**
RSP$_{60s}$ maximum [m^2/s]	=	**0.18**
TSP600s (=SPR integral) [m^2]	=	**79.4**
TSP1200s (=SPR integral) [m^2]	=	**166.9**
SMOGRA [m^2/s^2]	=	**8.8**
Lateral Flame Spread $_{edge}$	=	**no**
Flaming Droplets Particles $_{f=<10s}$	=	**no**
Flaming Droplets Particles $_{f>10s}$	=	**no**

t* (barycentric time) at t=1200s [s]	=	**649**
FIGRA t* 1200s [1000·MJ/s]	=	**2.8**
MAHRE [kW]	=	**2.2**
FIGRA new [W/s]	=	**14.6**

Data processing

k $_{t}$	:	**0.995**
k $_{rho}$	:	**1.08**
E $_{1}$ (kJ/m^3 O_2)	:	**17200**
Radius of tube (m)	:	**0.125**

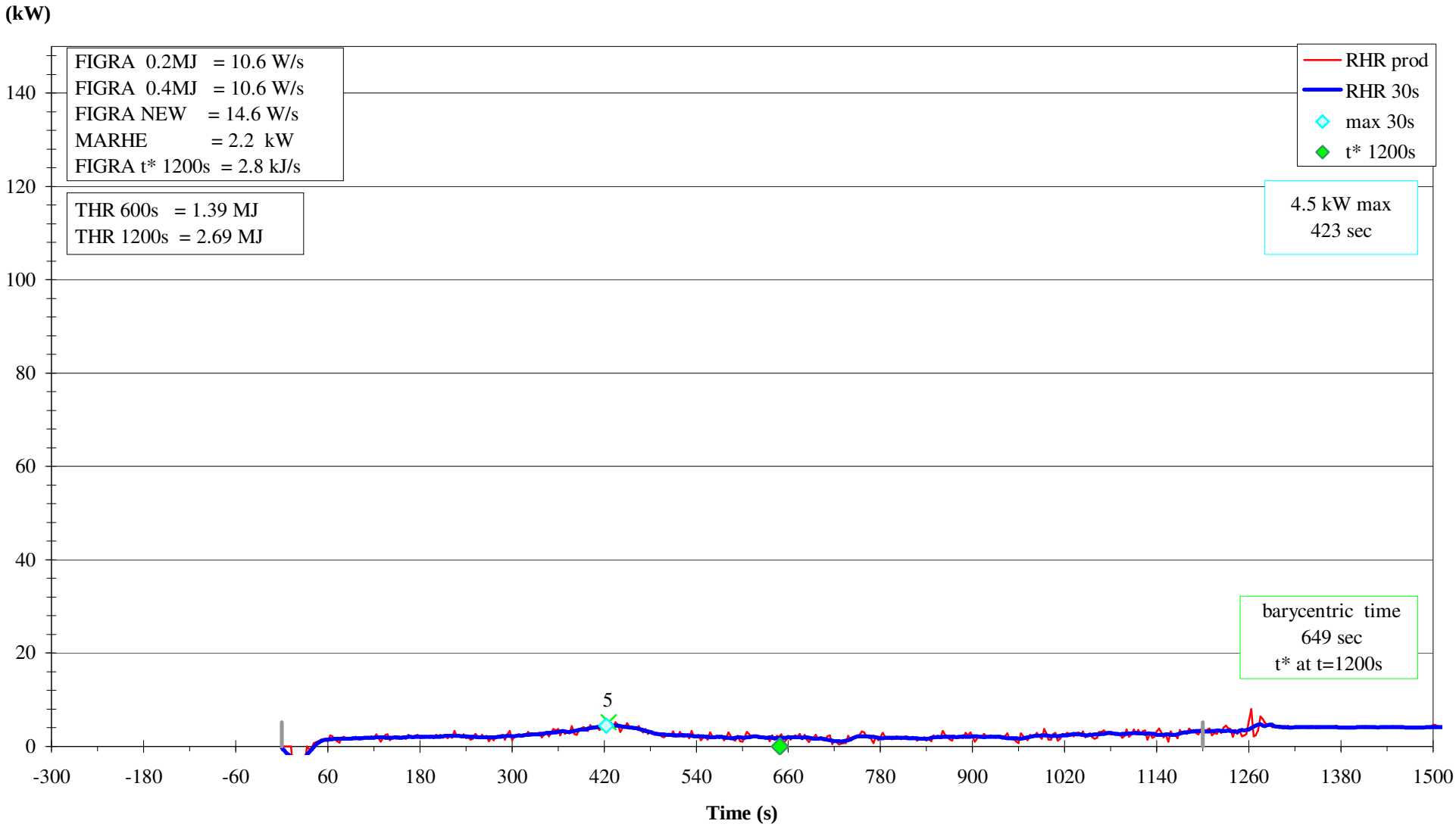
General

Program	:	**SBI**
Software Version (xls-workbook)	:	**mar-10**
Date of processing	:	23-nov-11

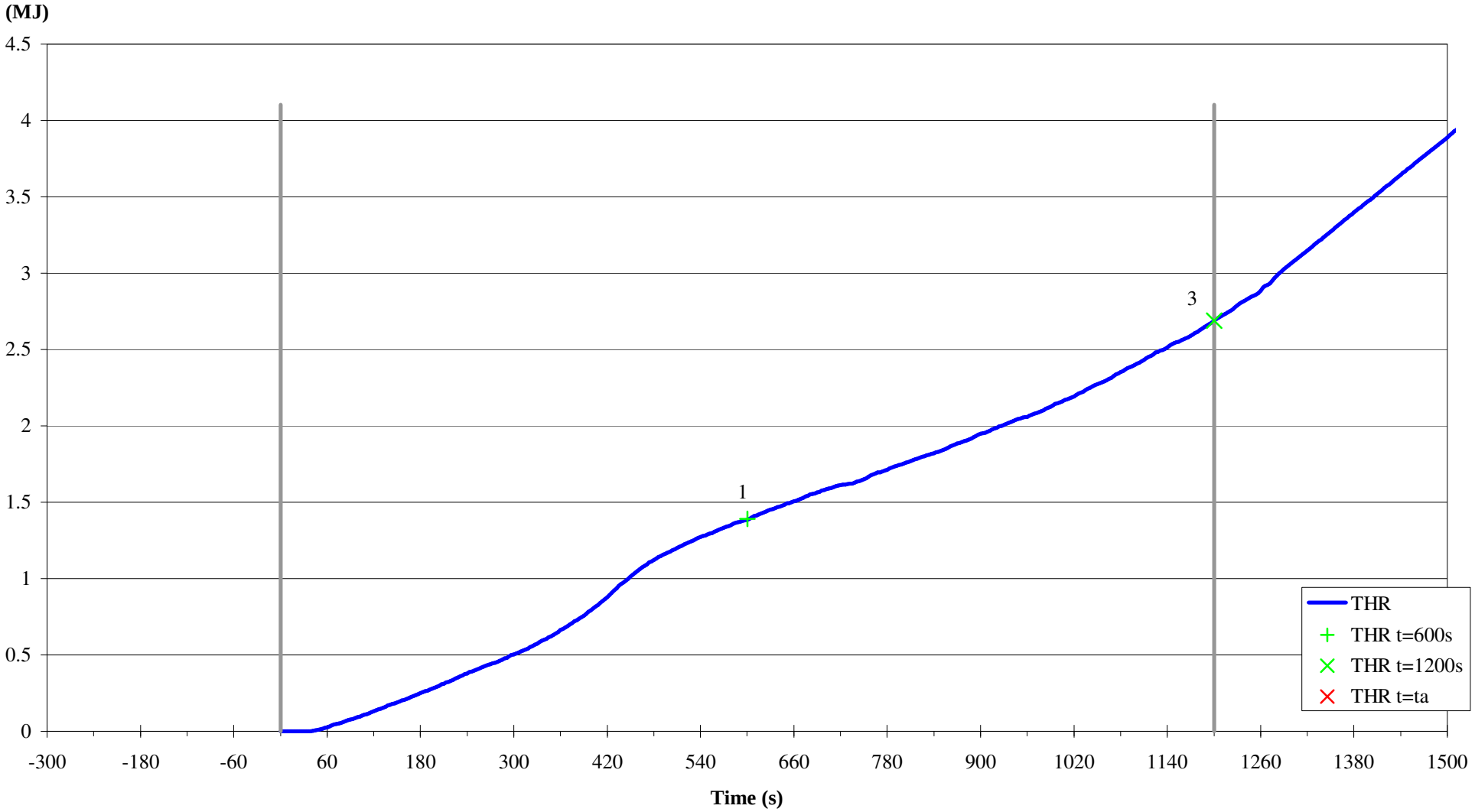
LABORATORY DIRECTOR
- Maddalena Pezzani -

TEST OPERATOR
- Matteo Cappelletti -

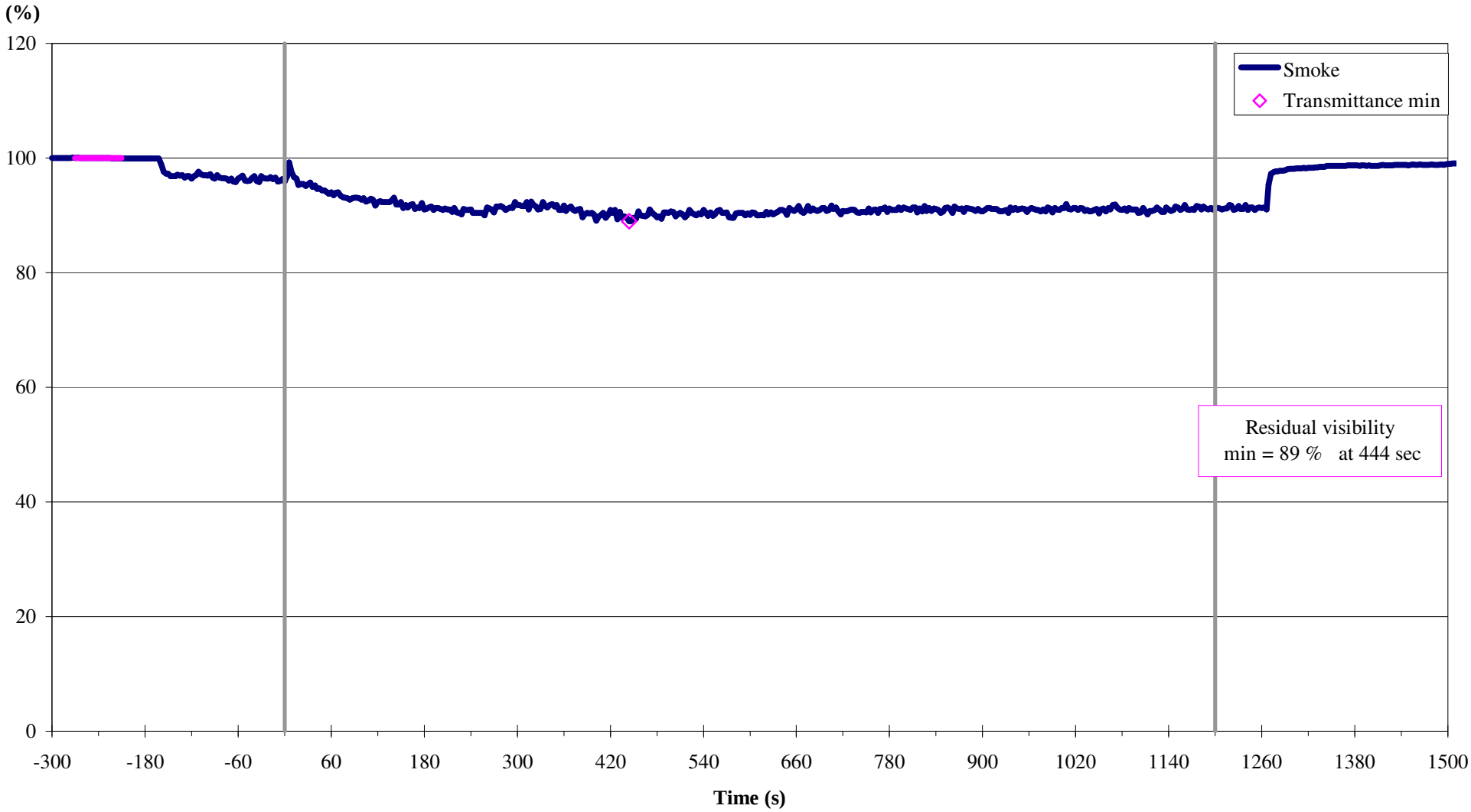
RHR: Rate of Heat Release net (kW)



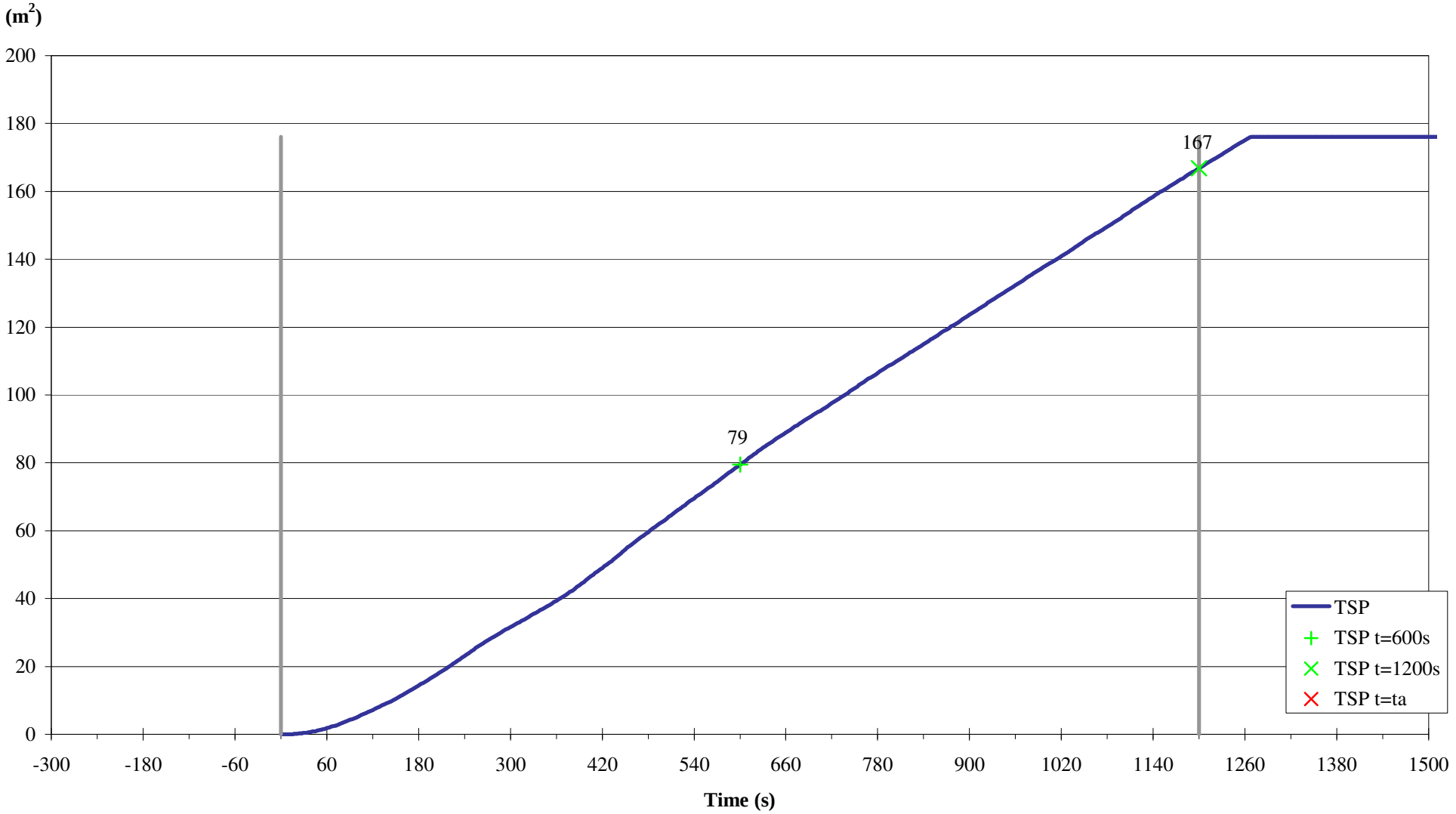
THR: Total Heat Relase (MJ)



Transmittance (%)



TSP: Total Smoke Production of the specimen (m^2)



RSP: Rate of Smoke Production (m^2/s)