



**LABORATORIJ ZA TOPLINSKA MJERENJA d.o.o.**  
**(LABORATORY FOR THERMAL MEASUREMENTS Ltd.)**  
**Laboratory**

Stubička Slatina 26, 49243 Oroslavje, Croatia  
Tel. ++385-(0)49-27-40-21, Fax ++385-(0)49-27-40-04;  
e-mail: [ltm@ltm.hr](mailto:ltm@ltm.hr); web: [www.ltm.hr](http://www.ltm.hr)



**FIRE RESISTANCE CLASSIFICATION REPORT**  
**FOR CONSTRUCTION PRODUCTS ACCORDING TO**  
**HRN EN 13501-2:2016**

**No. R-4372/19-1**  
**Date of issue: 24/09/2019**

Sponsor: MUCIĆ & CO d.o.o., Međugorska 34,  
88320 Ljubuški, BOSNIA & HERZEGOVINA

Prepared by: LTM d.o.o. / Laboratory, Stubička Slatina 26,  
49243 Oroslavje, CROATIA

Number of notified body: NB 2483

Product type: FIRE RESISTANT NON-LOADBEARING WALL MADE OF REINFORCED  
CONCRETE THERMOPANELS (with vertical joint)

Product name: **AB - TB26/90/120**

Manufacturer: MUCIĆ & CO d.o.o., Međugorska 34,  
88320 Ljubuški, BOSNIA & HERZEGOVINA



The laboratory has been accredited by the: CROATIAN ACCREDITATION AGENCY – HAA

The laboratory has been notified by the: EUROPEAN COMMISSION (NB)

The laboratory has been approved by the: MINISTRY OF CONSTRUCTION AND PHYSICAL PLANNING  
CROATIAN REGISTER OF SHIPPING

This Classification report consists of 5 pages and can be used or copied only as a whole.

## INTRODUCTION

This classification report determines the fire resistance of the product specimen, FIRE RESISTANT NON-LOADBEARING WALL MADE OF REINFORCED CONCRETE THERMOPANELS, named **AB - TB26/90/120** in line with procedures specified in the standard HRN EN 13501-2:2016. Standards applied in product testing and evaluation are specified in chapter 2.

## 1. BASIC DATA OF THE SPECIMEN

- 1.1 Intended use: FIRE RESISTANT NON-LOADBEARING WALL MADE OF REINFORCED CONCRETE THERMOPANELS, named **AB - TB26/90/120** is defined as a non-loadbearing wall element with fire resistance. Its intended use is to prevent the spread of fire between two fire compartments.
- 1.2 Description: Test specimen dimensions are 3000x3000x260mm (width x height x thickness).  
The specimen is composed of two concrete panels of different dimensions. The panels consist of three basic layers. On both sides there is class C30/37 concrete. The thickness of the concrete of the loadbearing layer is 120 mm, and the thickness of the concrete of the façade layer is 60 mm, of the manufacturer GP KRK d.d. The panels are reinforced with ribbed reinforcing steel type B500B of Ø8 mm dimension in combination with reinforcement mesh type Q131, of the manufacturer ArcelorMittal Zenica d.o.o. Between concrete layers there is stone wool insulation of 120 kg/m<sup>3</sup> density, of 80 mm thickness, type KI SmartRoof Thermal, manufacturer Knauf Insulation. The internal (loadbearing) layer of the panel is connected to the external (façade) layer of the panel with connecting anchors type ThermoPin H210 (42 pcs/9 m<sup>2</sup>) and type ThermoPin D295 (21 pcs/9 m<sup>2</sup>), manufacturer BT Innovation, Germany.  
The panels are placed on the loadbearing supporting construction using appropriate connecting steel elements connected to the foreseen supporting structure by bolted connection. After assembly and fixation of panels, stone wool rope, type FC A1, manufacturer Knauf Insulation, is inserted in the joint between panels and in the joint with the supporting construction, and for sealing panel joints, intumescent sealant is used, type Sittol silicon basso modulo, manufacturer Torggler Chimica Spa, Italy.

## 2. APPLIED STANDARDS

- HRN EN 1363-1:2012 Fire resistance tests – Part 1: General requirements (EN 1363-1:2012)
- HRN EN 1364-1:2015 Fire resistance tests for non-loadbearing elements – Part 1: Walls (EN 1364-1:2015)
- HRN EN 13501-2:2016 Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services (EN 13501-2:2016)



## 3. TEST REPORT

| Laboratory name  | Sponsor   | Test report no.             | Test method        |
|--|---|-----------------------------|--------------------|
| LTM d.o.o.,<br>Stubička Slatina 26,<br>49243 Oroslavje,<br>CROATIA | MUCIĆ & CO d.o.o.,<br>Međugorska 34,<br>88320 Ljubuški,<br>BOSNIA & HERZEGOVINA | I-4372/19-1<br>(10/09/2019) | HRN EN 1364-1:2015 |

## 4. TEST RESULTS

| Test method and report number                         | Parameters   | Test results                           |
|---|--|--|
| HRN EN 1364-1:2015<br><br>I-4372/19-1<br>(10/09/2019) | Temperature curve  | standard temperature-time curve        |
|   | Direction of placing panels  | vertical                               |
|   | Maximum dimension of panels on the specimen  | 2500x3000x260 mm<br>(w x h x d)        |
|   | Deflection (< 100 mm)  | > 121 min.                             |
|   | <b>E</b> - Integrity:<br>- excessive cracks<br>- ignition of the cotton pad<br>- sustained flaming       | > 121 min.<br>> 121 min.<br>> 121 min. |
|   | <b>I</b> - Insulation:<br>- average temperature increase >140 K<br>- maximum temperature increase >180 K | > 121 min.<br>> 121 min.               |
|   | <b>W</b> - Thermal radiation >15 kW/m <sup>2</sup>   | -                                      |

(-) Not measured, as temperature increase over 300°C was not expected.





5. CLASSIFICATION AND FIELD OF DIRECT APPLICATION

5.1 Classification references: This classification has been carried out in accordance with the standard HRN EN 13501-2:2016, clause 7.5.2.

5.2 Classification: FIRE RESISTANT NON-LOADBEARING WALL MADE OF REINFORCED CONCRETE THERMOPANELS, named **AB - TB26/90/120** has been classified into classes according to the following example of possible combinations of properties and classes, applicable for this element.

|   |   |   |   |  |   |   |   |   |   |   |         |    |    |   |   |   |
|---|---|---|---|--|---|---|---|---|---|---|---------|----|----|---|---|---|
| R | E | I | W |  | t | t | - | M | S | C | IncSlow | sn | ef | r | G | K |
|---|---|---|---|--|---|---|---|---|---|---|---------|----|----|---|---|---|

This product can be classified into one of the following classes.  
No other classifications are permitted.

|           |    |    |    |    |    |    |     |
|-----------|----|----|----|----|----|----|-----|
| <b>E</b>  | -  | 20 | 30 | -  | 60 | 90 | 120 |
| <b>EI</b> | 15 | 20 | 30 | 45 | 60 | 90 | 120 |
| <b>EW</b> | -  | 20 | 30 | -  | 60 | 90 | 120 |

**Fire resistance classification (maximum classes):**

**E 120 / EI 120 / EW 120**



## 5.3 Field of direct application:

In the field of direct application for the FIRE RESISTANT NON-LOADBEARING WALL MADE OF REINFORCED CONCRETE THERMOPANELS, named **AB - TB26/90/120**, the following changes in relation to the tested specimen are permitted:

- wall height reduction,
- wall thickness increase,
- components thickness increase,
- reduction of linear dimensions of panels, but not thickness,
- reduction of distance of loadbearing profiles,
- reduction of distance of fixations,
- increase in the number of vertical joints of tested type,
- vertical joints of tested type,
- increase of wall width by up to 1,0 m from the tested (up to 4,0 m of width) for vertically arranged panels,
- unlimited increase of wall height for vertically arranged panels,
- installation into massive supporting constructions with the same or higher fire resistance than the tested specimen is permitted.

## 5.4 Limitations:


This classification report does not represent approval or product certification.

The classification report validity period depends on the validity period of the test report (i.e. until the product, product standard, field of direct application of the product, standards related to the product or legal regulations change), and is valid mostly 5 years.

The authorized institution can extend the validity of this report after the expiry of this period.


This report is valid until 24/09/2024.

CLASSIFICATION PREPARED BY:

  
.....  
(Marin Žuljević, Master in Occ. Saf.)



DIRECTOR:

  
.....  
(Tomislav Skušić, BSc.)



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**NB 2483**

Stubička Slatina, 10/09/2019

**FIRE RESISTANCE TEST REPORT**  
**FOR BUILDING MATERIALS AND BUILDING ELEMENTS**  
**ACCORDING TO HRN EN 1364-1:2015**

**No. I-4372/19-1**

Product type: FIRE RESISTANT NON-LOADBEARING WALL MADE OF REINFORCED CONCRETE THERMOPANELS

Product name: AB - TB26/90/120

Manufacturer: MUCIĆ & CO d.o.o., Međugorska 34,  
88320 Ljubuški, BOSNIA & HERZEGOVINA

Sponsor: MUCIĆ & CO d.o.o., Međugorska 34,  
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The laboratory has been approved by the: MINISTRY OF CONSTRUCTION AND PHYSICAL PLANNING  
CROATIAN REGISTER OF SHIPPING

Test results refer only to test specimens. The test report can be used or copied only as a whole.

Number of pages: 7

Number of appendices: 10

LTM-LP-06.Ob11/Edition 1



## 1. INTRODUCTION

This report contains fire resistance test results of the specimen FIRE RESISTANT NON-LOADBEARING WALL MADE OF REINFORCED CONCRETE THERMOPANELS, named AB - TB26/90/120 in line with procedures of reference standards listed in clause 3.1 of this report.

## 2. BASIC DATA OF THE PRODUCT SPECIMEN

- 2.1 Dimension of the specimen: 3000x3000x260 mm (width x height x thickness).  
The specimen is composed of two concrete panels of different dimensions. One panel is of 2500x3000x260 mm dimensions and 3750 kg weight, and the second panel is of 500x3000x260 mm dimensions and of 750 kg weight.  
Measured and entered dimension refers to the test specimen and corresponds to dimensions from enclosed technical documentation.
- 2.2 Basic specimen composition: The panels consist of an internal (loadbearing) layer, insulation layer and external (façade) layer.  
The internal (loadbearing) layer of the panel is of 120 mm thickness, and it is made of fresh concrete marked according to classes in line with the standard HRN EN 206-1:2006, with the following values of required performance: concrete strength class C30/37 (37 N/mm<sup>2</sup>), exposure classes XC4 (carbonation-induced corrosion), XS1 (corrosion induced by chlorides from the sea), XD2 (wet, rarely dry environment), XA1 (slight chemical action), consistency class S4 (slump 160-210 mm), chloride content class Cl 0,20 (chloride content by mass of cement 0,20%), class according to maximum grain D<sub>max</sub> 16 (maximum grain mm). Cement CEM I 42,5 N (general purpose cement) is used in the concrete mix in the quantity of 335 kg/m<sup>3</sup>. The concrete with specified characteristics is manufactured in the MUCIĆ & CO d.o.o. plant. The concrete in the panels is reinforced with ribbed reinforcing steel type B500B of Ø8 mm dimension in combination with reinforcement mesh type Q131, of the manufacturer ArcelorMittal Zenica d.o.o.  
Admixture (plasticizer) type Dynamon PC30, manufacturer Mapei S.p.A., Italy, is added to the concrete mix.  
The external (façade) layer of the panel is of 60 mm thickness, and it is made of reinforced concrete of the same performance as the internal (loadbearing) layer.  
The internal (loadbearing) layer of the panel is connected to the external (façade) layer of the panel with connecting anchors type ThermoPin H210 (42 pcs/9 m<sup>2</sup>) and type ThermoPin D295 (21 pcs/9 m<sup>2</sup>), manufacturer BT Innovation, Germany.  
The insulation layer consists of stone wool of 120 kg/m<sup>3</sup> density, of 80 mm thickness, type KI SmartRoof Thermal, manufacturer Knauf Insulation.  
Stone wool rope type FC A1, manufacturer Knauf insulation, is inserted in the joints between two panels.  
For sealing panel joints intumescent sealant, type Sittol silicon basso modulo, manufacturer Torggler Chimica Spa, Italy, is used.
- 2.3 Quantity of specimens: Testing was conducted on one specimen with vertical joint of two panels.
- 2.4 Sampling: On 22/07/2019, the sponsor delivered one panel of 2500x3000x260 mm dimensions and one panel of 500x3000x260 mm dimensions used to assemble the test specimen.  
The specimen was not marked with a factory number, and at acceptance, it was marked with record number EB-068/19.



- 2.5 Specimens fixation: Specimen fixation was realized on 22/07/2019. Specimen fixation was realized by the sponsor's employees. The specimen was installed in the supporting construction made of reinforced concrete of 1600 kg/m<sup>3</sup> density. Panels were placed in the supporting construction in the manner that on three sides, horizontally on top and bottom, and on one vertical side, panels were fixed with 10 steel plates of 100x200x8 mm dimensions and steel anchor bolts Ø10 mm, of the manufacturer Fisher. One vertical side of the specimen remained free. After assembly, the joints were filled with stone wool rope and intumescent seal, type Sittol silicon basso modulo, manufacturer Torggler Chimica Spa, Italy. There was ceramic wool on the free vertical side between the panel and the supporting construction.
- 2.6 Technical documentation: Technical documentation was delivered before delivery of test specimens, marked no. 05/2019.
- 2.7 Specimen inspection: Before testing, verification, i.e. compliance of drawings with specifications and the test specimen was performed. It was concluded that the test specimen corresponds to enclosed drawings with specifications in the technical documentation delivered by the sponsor. Specimen inspection consisted of checking panels dimensions and the assembly procedure.
- 2.8 Conditioning the specimen: According to the sponsor's statement, before delivery to Ltm, the specimens were dried in the manufacturer's plant for 90 days, and stabilization of specimen mass was determined by weighing, in standard environment conditions. To achieve balance between strength and humidity, before fixation to the test furnace, test specimens were located in the fire laboratory with ambient atmosphere of approx. 50% relative humidity and 20°C, in line with the standard HRN EN 1363-1:2012, clause 8.1.

### 3. TEST PROCEDURE

- 3.1. Reference standards: HRN EN 1363-1:2012 Fire resistance tests - Part 1: General requirements (EN 1363-1:2012)  
HRN EN 1364-1:2015 Fire resistance tests for non-loadbearing elements - Part 1: Walls (EN 1364-1:2014)
- 3.2. Test date: 23/07/2019  
Sponsor's representatives were present during the test.
- 3.3. Laboratory conditions: - ambient temperature 27,8°C  
- relative humidity 67%
- 3.4. Fire test furnace: The fire furnace of 3000x3000x1250 mm dimensions (width x length x depth) enables standard exposure of test specimens to fire in respect of thermal exposure and pressure. The fire in the fire space is realized with six burners fueled by liquid fuel (heating oil), in line with the standard HRN EN 1363-1:2012, clause 4.1 and 4.2. The air temperature in the test space 24 hours before the fire test was maintained at 20 (±5)°C.
- 3.5. Heating the furnace: Heating in the furnace was determined according to the standard temperature time curve (ETK for short), in line with the standard HRN EN 1363-1:2012, clause 5.1, and defined according to the following formula:

$$T = 345 \log(8t + 1) + 20. \quad T... \text{ average temperature in the furnace, (}^\circ\text{C)}$$

$$t... \text{ time, (min.)}$$





- 3.6. Temperatures in the furnace: The temperature in the furnace was measured with six uniformly distributed thermocouples in line with the standard HRN EN 1363-1:2012, clause 4.5.1.1. Thermocouples are made of NiCr-Ni, (type K) wire with the measuring point on the plate located in the free space of the furnace.  
Thermocouples were positioned so that they are not in contact with the open flame from the burners, and are 100 mm distant from the test specimen side exposed to fire.
- 3.7. Pressure in the furnace: Static overpressure in the fire space of the test furnace was maintained in the range of  $15 \pm 3$  Pa. The sensor – pressure gauge was placed so that pressure was measured at the height of 2,3 m from the furnace floor, and regulated with the blocking part of the main and relief furnace chimney.
- 3.8. Temperatures on the specimen:  
The temperature on the specimen side unexposed to fire was measured with 11 thermocouples NiCr-Ni, (type K) wire  $\varnothing 0,5$  mm, welded on copper discs  $\varnothing 12,0$  mm, and of 0,2 mm thickness, in line with the standard HRN EN 1363-1:2012, clause 4.5.1.2.  
Thermocouples were covered with inorganic insulating pad of  $30 \times 30 \times 2,0$  mm dimensions, and were fixed to measuring places by gluing using inorganic glue.  
Measuring average temperature increase and measuring maximum temperature of the unexposed side of the specimen was recorded by thermocouples placed in positions in line with the standard HRN EN 1364-1:2015, clause 9.1.2.
- Measuring average temperature increase on the unexposed side (criterion 140 K):  
Measuring places nos. 2, 3, 4, 5... center of each quarter of the specimen  
Measuring place no. 1..... center of the specimen
- Measuring maximum temperature increase on the unexposed side (criterion 180 K):  
Measuring places nos. 8, 9, 10 ..... 20 mm from the edge of the specimen  
Measuring place no. 11..... center of the specimen, 20 mm from the vertical joint of panels  
Measuring place no. 6..... 150 mm from the free edge in the center of the specimen  
Measuring place no. 7..... 20 mm from the edge of the specimen in place of vertical profile
- 3.9. Specimen deflection: Specimen deflection was measured in eight points.  
Measuring point D1 ..... in the center of the specimen  
Measuring points D2-D5 ..... at quarters of the vertical and horizontal centerline of the specimen  
Measuring point D6 ..... at  $\frac{3}{4}$  height of the specimen (20 mm from the free zone of the wall)  
Measuring point D7 ..... at  $\frac{1}{2}$  height of the specimen (20 mm from the free zone of the wall)  
Measuring point D8 ..... at  $\frac{1}{4}$  height of the specimen (20 mm from the free zone of the wall)



## 4. OBSERVATIONS DURING THE FIRE TEST

## 4.1. Visual observations:

| Time (min:s) | Side* | Observation  |
|--------------|-------|--|
| 00:00        |       | Beginning of the test.   |
| 24:10        | ES    | Sporadic falling off of concrete from the specimen surface.                      |
| 45:00        | ES    | Loud bangs are audible.  |
| 50:10        | ES    | Reinforcement is showing on the right side of the specimen.                      |
| 60:00        | US    | No changes on the specimen.  |
| 63:10        | US    | Dripping of condensate on the specimen surface.                                  |
| 82:20        | US    | Appearance of steam and dripping of condensate on the free edge of the specimen. |
| 90:00        | US    | No changes on the specimen.  |
| 121:20       |       | Test discontinued at the sponsor's request.                                      |

\* ES – exposed side  
US – unexposed side

- 4.2. Temperature increase: Allowed average temperature increase on the specimen side unexposed to fire (140 K) was not exceeded until 122<sup>nd</sup> minute.  
Allowed maximum temperature increase on the specimen side unexposed to fire (180 K) was not exceeded until 122<sup>nd</sup> minute.
- 4.3. Specimen integrity: Specimen integrity loss did not occur until 122<sup>nd</sup> minute.



## 5. TEST RESULTS:

| Parameter   | Time till the performance criterion is archived |
|---|---|
| Integrity <b>E</b> – testing with cotton pad        | > 121 min                                       |
| Integrity <b>E</b> – testing with gap gauge Ø 6 mm  | > 121 min                                       |
| Integrity <b>E</b> – testing with gap gauge Ø 25 mm | > 121 min                                       |
| Integrity <b>E</b> – sustained flaming              | > 121 min                                       |
| Insulation <b>I</b> – average temperature (140 K)   | > 121 min                                       |
| Insulation <b>I</b> – maximum temperature (180 K)   | > 121 min                                       |





## 6. DIRECT APPLICATION OF TEST RESULTS


The field of direct application of test results applies in line with clause 13 of the standard EN 1364-1:2015. Determining certain parts of the field of direct application shall be done in the classification procedure (evaluation of test results).

This report details the method of construction, the test conditions and results obtained when the specific element of construction described herein was following the procedure outlined in HRN EN 1363-1:2012, and where appropriate HRN EN 1363-2:2002, where all the details are described in full. Any significant deviation with respect to size, constructional details, loads, stresses, ranges, other than those allowed in the relevant test method for the direct field of application, is not covered by this report.

Because of the nature of the fire resistance testing and consequent difficulty in quantifying the uncertainty of measurement of the resistance, it is not possible to provide a stated degree of accuracy of the result.


This test report does not represent approval of the tested product by the test laboratory or the accreditation body supervising the activities of the laboratory.

TEST PERFORMED BY:

  
 (Marin Žuljević, Master in Occ. Saf.)



DIRECTOR:

  
 (Tomislav Skušić, BSc.)

## 7. APPENDICES

1. Sketch of measuring places of temperature and pressure in the furnace (1 sheet)
2. Diagram and table of temperature and pressure in the fire furnace (3 sheets)
3. Diagram and table of ambient temperature (2 sheets)
4. Sketch of measuring places of temperature on the specimen side unexposed to fire (1 sheet)
5. Diagram and table of average temperature on the specimen side unexposed to fire (2 sheets)
6. Diagram and table of maximum temperature on the specimen side unexposed to fire (2 sheets)
7. Sketch of locations of measuring specimen deflection (1 sheet)
8. Diagram and table of specimen deflection (1 sheet)
9. Test specimen photographs (5 sheets)
10. Technical documentation no. 05/2019 delivered by the sponsor (13 sheets)

SKETCH OF MEASURING PLACES OF TEMPERATURE AND PRESSURE IN THE FURNACE

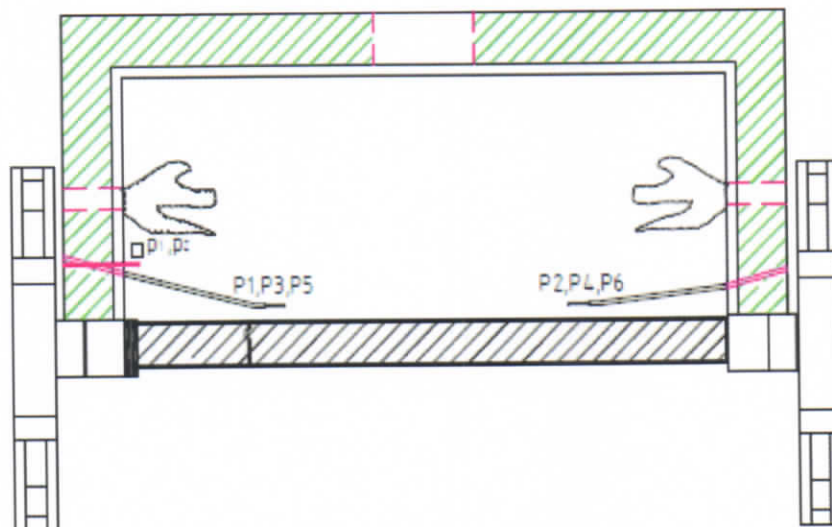
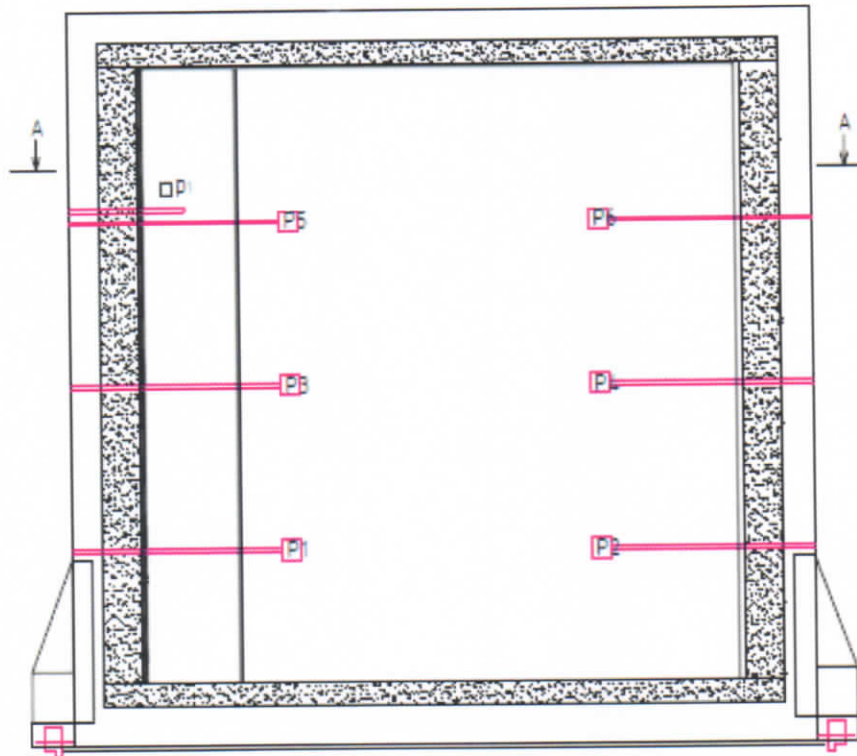
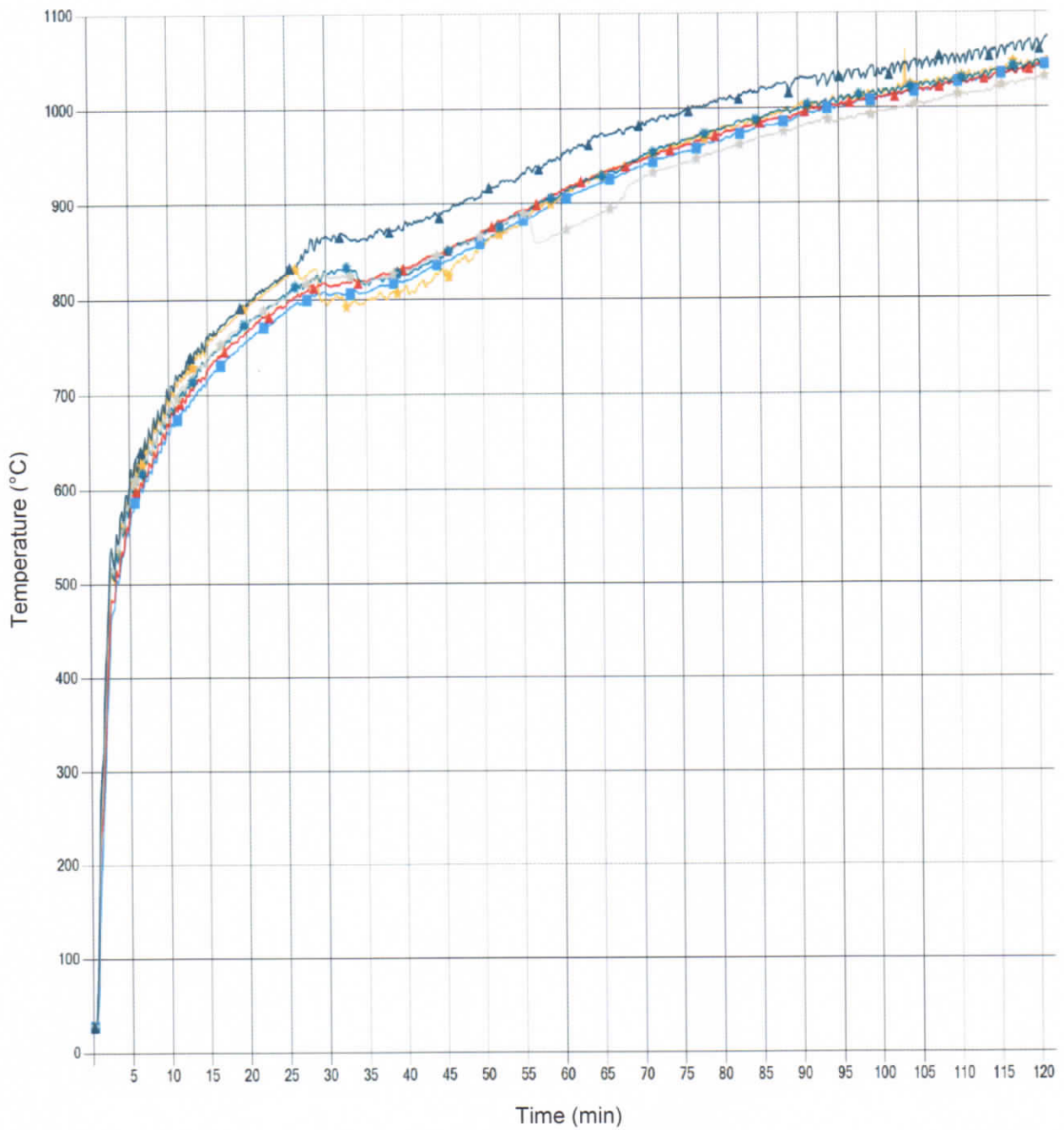


DIAGRAM OF TEMPERATURES AND PRESSURE IN THE FURNACE



—■— P1    —■— P2    —■— P3    —■— P4    —■— T5    —■— T6





Diagram of comparison of default and average achieved temperature in the furnace

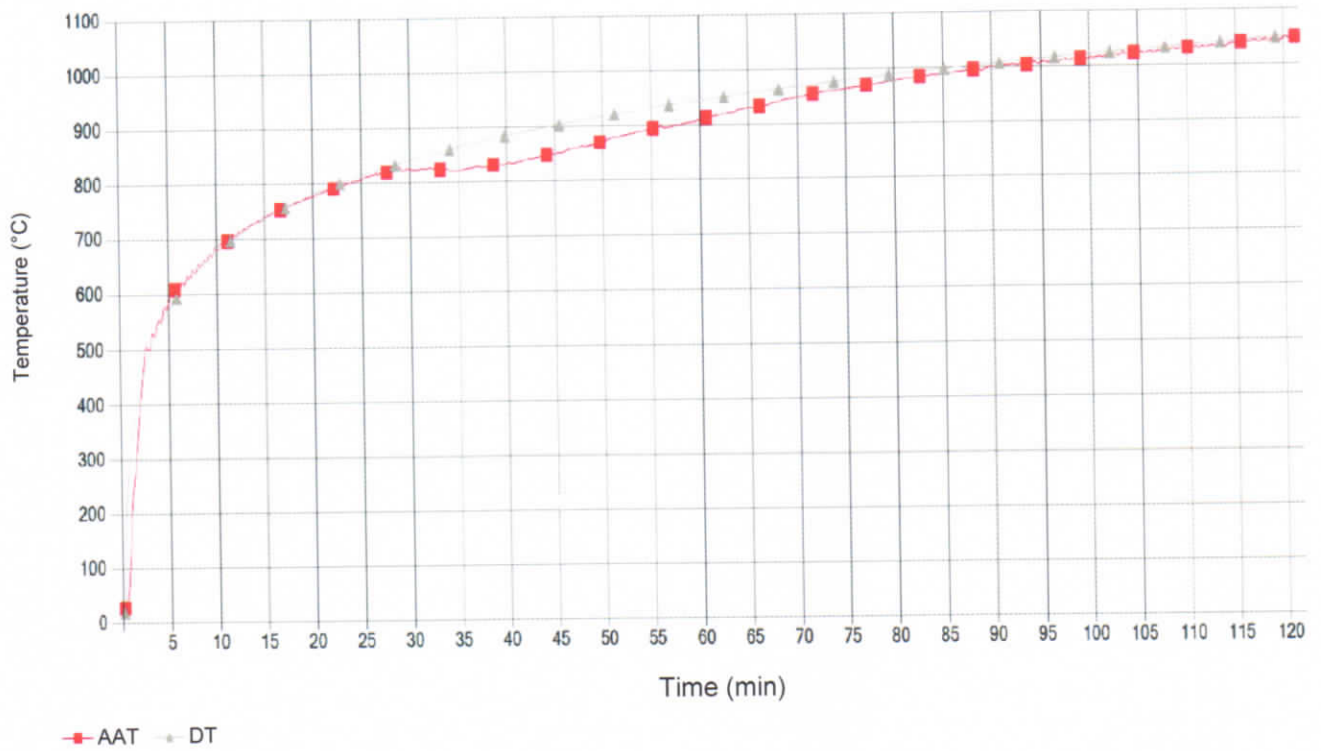
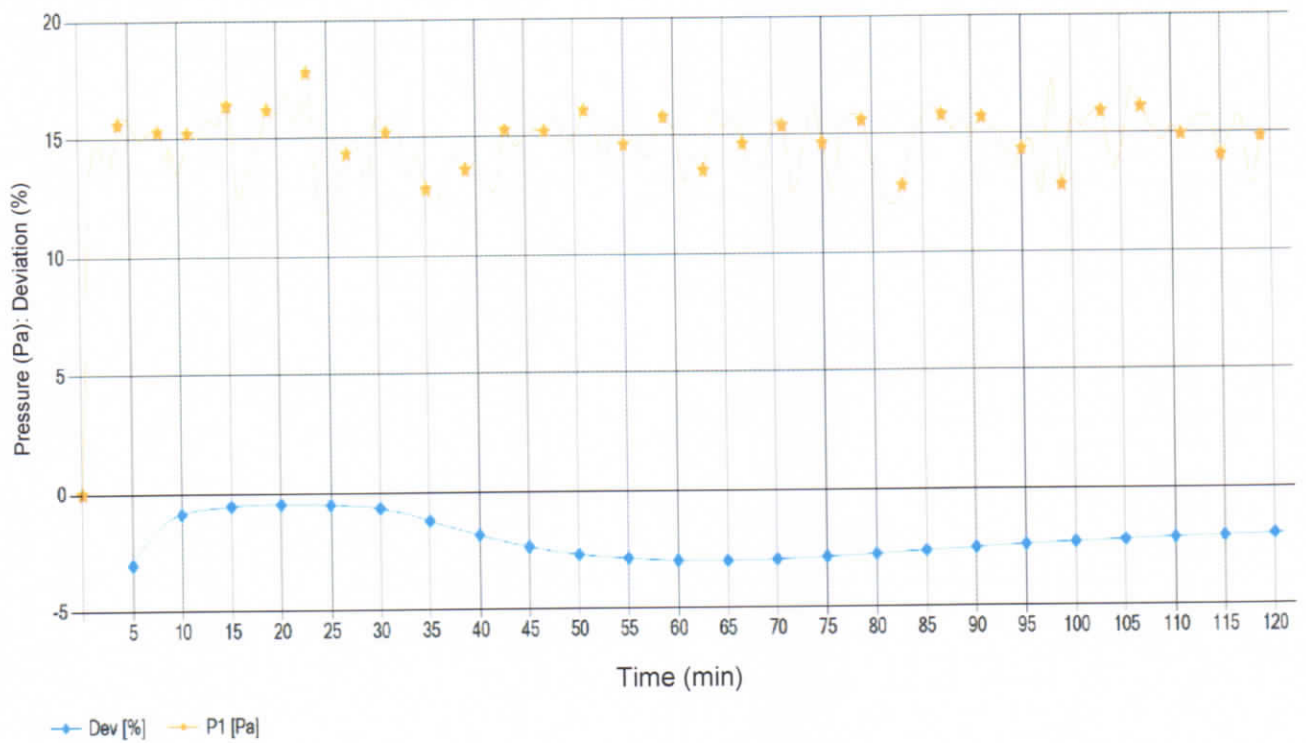


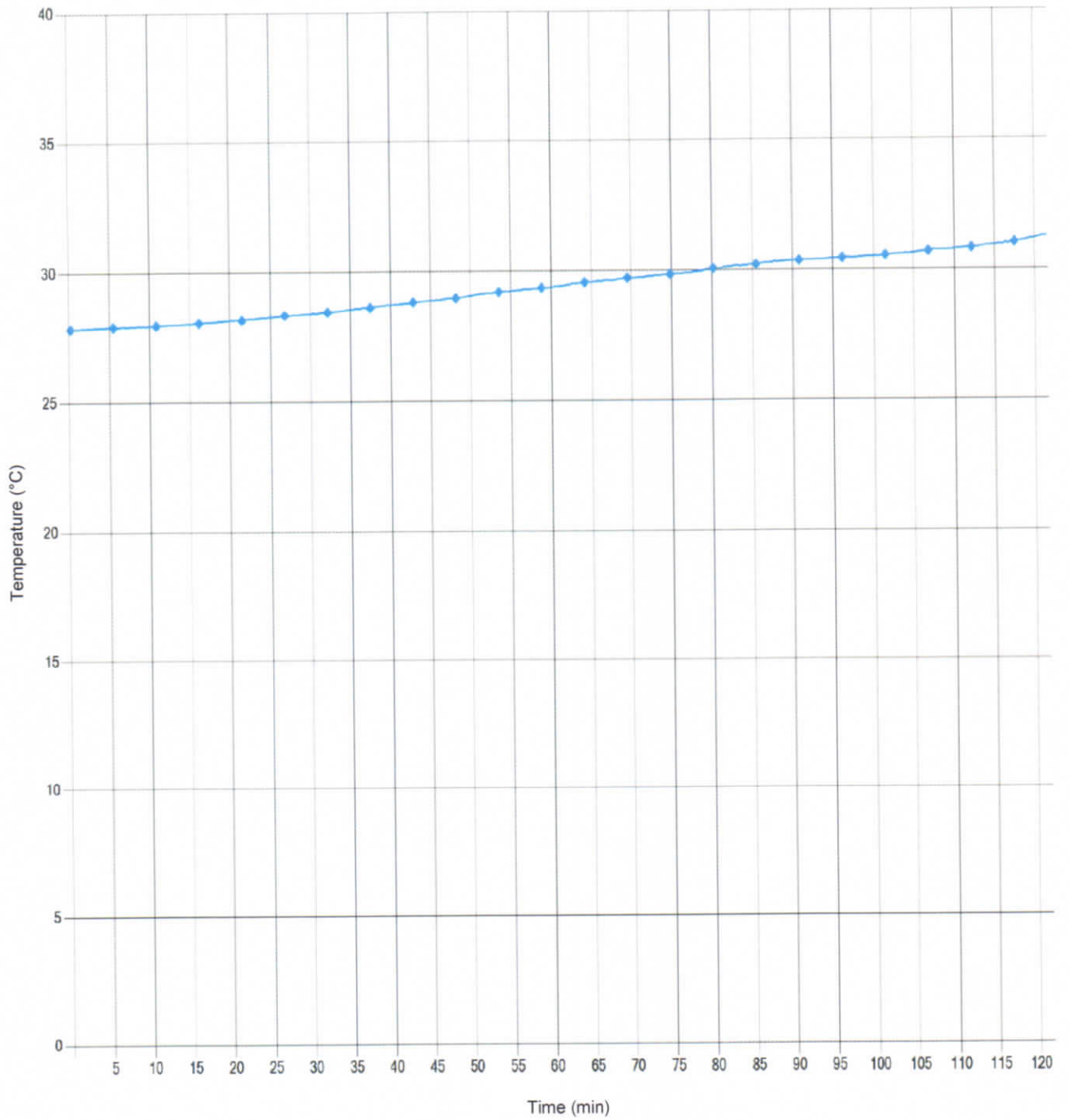
Diagram of overpressure and deviations in the furnace



| Time [min] | Temperature [°C] |        |        |        |        |        |         |        | Dev [%] | Pressure [Pa]<br>p1 |
|------------|------------------|--------|--------|--------|--------|--------|---------|--------|---------|---------------------|
|            | P1               | P2     | P3     | P4     | T5     | T6     | AAT     | DT     |         |                     |
| 00         | 27.8             | 27.9   | 28     | 28     | 28.1   | 28.1   | 28.0    |        |         | 0.0                 |
| 06         | 588.8            | 618.1  | 594.1  | 611    | 609.9  | 625.9  | 608.0   | 603.1  | -2.3    | 14.9                |
| 12         | 683.9            | 719.3  | 692.7  | 702.2  | 704.5  | 726.5  | 704.8   | 705.4  | -0.7    | 15.2                |
| 17         | 735              | 769.9  | 745.9  | 753    | 756.8  | 774    | 755.8   | 757.2  | -0.5    | 12.5                |
| 22         | 770.7            | 805.1  | 781    | 785.9  | 788.4  | 809.4  | 790.1   | 795.6  | -0.5    | 16.8                |
| 27         | 796.3            | 821.1  | 806.9  | 811.3  | 814.7  | 842.5  | 815.5   | 826.1  | -0.6    | 12.6                |
| 31         | 807              | 802    | 815.2  | 826.8  | 823.8  | 869.2  | 824.0   | 846.7  | -0.7    | 15.9                |
| 34         | 807              | 795.5  | 817.3  | 822.3  | 817.8  | 861.7  | 820.3   | 860.5  | -1.1    | 13.5                |
| 38         | 814.8            | 805.2  | 826.5  | 822.9  | 824.3  | 871.7  | 827.6   | 877.1  | -1.6    | 13.5                |
| 41         | 823.6            | 807.9  | 835.9  | 830.7  | 833.8  | 879.7  | 835.2   | 888.4  | -2.0    | 13.8                |
| 44         | 836.1            | 825.6  | 848.7  | 841.7  | 845.4  | 889.2  | 847.8   | 899.0  | -2.3    | 15.3                |
| 47         | 847.1            | 840.3  | 858    | 857.1  | 855.5  | 901.8  | 860.0   | 908.8  | -2.5    | 15.3                |
| 50         | 861.2            | 855.8  | 871.1  | 869.2  | 867.9  | 913.4  | 873.1   | 918.1  | -2.7    | 15.0                |
| 53         | 874.8            | 872.4  | 884.3  | 880.9  | 881.8  | 925.5  | 886.6   | 926.8  | -2.8    | 15.7                |
| 55         | 882.8            | 879.1  | 894.6  | 888.9  | 889.3  | 932.9  | 894.6   | 932.3  | -2.9    | 15.6                |
| 58         | 895.9            | 901    | 906    | 905.4  | 862.3  | 942.2  | 902.1   | 940.3  | -3.0    | 14.1                |
| 60         | 904.1            | 909.4  | 914.4  | 911.4  | 870.7  | 952.5  | 910.4   | 945.3  | -3.0    | 15.8                |
| 62         | 912.4            | 918.6  | 921.1  | 919.4  | 878    | 961.6  | 918.5   | 950.2  | -3.0    | 13.1                |
| 64         | 919              | 929.5  | 928.7  | 927.5  | 886.3  | 971.3  | 927.1   | 955.0  | -3.0    | 13.5                |
| 66         | 925.9            | 935.2  | 935.8  | 934.5  | 894.1  | 973.2  | 933.1   | 959.6  | -3.0    | 15.3                |
| 68         | 932.2            | 941    | 939.3  | 940.6  | 913.2  | 978    | 940.7   | 964.1  | -3.0    | 14.6                |
| 70         | 939              | 947.1  | 946    | 950.3  | 925.7  | 983.8  | 948.6   | 968.4  | -3.0    | 13.5                |
| 72         | 947.2            | 951    | 952.9  | 956.7  | 934.5  | 986    | 954.7   | 972.6  | -2.9    | 15.4                |
| 74         | 950.8            | 962.1  | 957.1  | 962.9  | 939    | 992.9  | 960.8   | 976.7  | -2.9    | 14.3                |
| 76         | 955.7            | 963.1  | 962.1  | 968.4  | 944.1  | 998.1  | 965.3   | 980.7  | -2.8    | 14.6                |
| 77         | 958.4            | 968.6  | 965.8  | 970.7  | 947    | 1001.7 | 968.7   | 982.6  | -2.8    | 12.5                |
| 79         | 964.6            | 975.6  | 969.7  | 976.8  | 952.8  | 1005.9 | 974.2   | 986.5  | -2.8    | 15.8                |
| 80         | 965.9            | 979.1  | 971.1  | 977.9  | 954.2  | 1010.4 | 976.4   | 988.4  | -2.8    | 15.6                |
| 82         | 972.3            | 981    | 976.4  | 986.1  | 960.8  | 1010.1 | 981.1   | 992.1  | -2.7    | 12.9                |
| 83         | 974.2            | 986.5  | 980    | 986.8  | 962.7  | 1016.3 | 984.4   | 993.9  | -2.7    | 12.0                |
| 85         | 980.6            | 986.2  | 985    | 989.3  | 969.8  | 1019.4 | 988.4   | 997.4  | -2.6    | 14.6                |
| 86         | 982.6            | 990.8  | 986.6  | 992.9  | 971.2  | 1020.2 | 990.7   | 999.2  | -2.6    | 15.6                |
| 88         | 985.8            | 996.1  | 990.8  | 996.8  | 975.3  | 1025.3 | 995.0   | 1002.6 | -2.6    | 15.8                |
| 89         | 986.5            | 995.1  | 989.5  | 996.9  | 976.2  | 1021.7 | 994.3   | 1004.3 | -2.5    | 15.2                |
| 90         | 991.6            | 1003.6 | 993.8  | 999.7  | 980.4  | 1030.9 | 1 000.0 | 1006.0 | -2.5    | 15.6                |
| 91         | 994.5            | 1001.6 | 997.5  | 1003.6 | 982.8  | 1030.9 | 1 001.8 | 1007.6 | -2.5    | 15.0                |
| 93         | 999.9            | 1004   | 1001.1 | 1006.5 | 988.8  | 1034.6 | 1 005.8 | 1010.9 | -2.4    | 15.3                |
| 94         | 999.9            | 1008.2 | 1002   | 1007.3 | 987.1  | 1033.2 | 1 006.3 | 1012.5 | -2.4    | 14.8                |
| 95         | 1003.2           | 1007.9 | 1002.3 | 1009.8 | 986.9  | 1033   | 1 007.2 | 1014.1 | -2.4    | 13.5                |
| 96         | 1003.2           | 1009.8 | 1005.2 | 1011.7 | 988.5  | 1037.5 | 1 009.3 | 1015.6 | -2.4    | 14.3                |
| 97         | 1004.7           | 1012   | 1005.4 | 1012.2 | 988.6  | 1038.8 | 1 010.3 | 1017.2 | -2.4    | 14.6                |
| 98         | 1007.6           | 1012.2 | 1007.9 | 1013.4 | 992.8  | 1033.9 | 1 011.3 | 1018.7 | -2.3    | 12.5                |
| 99         | 1007.6           | 1013.6 | 1008.2 | 1015.4 | 992.7  | 1041.7 | 1 013.2 | 1020.2 | -2.3    | 17.3                |
| 101        | 1012.4           | 1016.8 | 1012.1 | 1019.6 | 997    | 1039.3 | 1 016.2 | 1023.2 | -2.3    | 15.6                |
| 102        | 1011.8           | 1014   | 1011.8 | 1015.6 | 997.4  | 1035.6 | 1 014.4 | 1024.7 | -2.3    | 15.3                |
| 103        | 1013.5           | 1021.8 | 1014   | 1018.7 | 998.9  | 1043.4 | 1 018.4 | 1026.2 | -2.2    | 15.8                |
| 104        | 1017.7           | 1023.4 | 1016   | 1021.8 | 1002.2 | 1042.5 | 1 020.6 | 1027.6 | -2.2    | 15.9                |
| 105        | 1018.6           | 1023.5 | 1017.4 | 1020.8 | 1004.6 | 1043.3 | 1 021.4 | 1029.1 | -2.2    | 13.6                |
| 106        | 1018.7           | 1027.6 | 1019.5 | 1025   | 1005.3 | 1049.4 | 1 024.3 | 1030.5 | -2.2    | 14.3                |
| 107        | 1022.5           | 1027.8 | 1021.3 | 1027   | 1008.1 | 1048.9 | 1 025.9 | 1031.9 | -2.2    | 16.8                |
| 108        | 1022.1           | 1025.9 | 1021.7 | 1025.5 | 1008.7 | 1044.3 | 1 024.7 | 1033.3 | -2.2    | 16.1                |
| 109        | 1025.5           | 1029.2 | 1023.2 | 1026.6 | 1010.8 | 1049.1 | 1 027.4 | 1034.6 | -2.1    | 15.2                |
| 110        | 1027.1           | 1030.7 | 1026.9 | 1030.9 | 1013.9 | 1054.5 | 1 030.7 | 1036.0 | -2.1    | 14.6                |
| 111        | 1027.2           | 1029.3 | 1024.4 | 1028.4 | 1013.6 | 1044.8 | 1 027.9 | 1037.4 | -2.1    | 15.3                |
| 112        | 1027.8           | 1032   | 1027.6 | 1031.6 | 1015.1 | 1053.3 | 1 031.2 | 1038.7 | -2.1    | 14.9                |
| 113        | 1027.9           | 1035.9 | 1028.4 | 1031   | 1015.1 | 1053.9 | 1 032.0 | 1040.0 | -2.1    | 15.3                |
| 114        | 1029.7           | 1035.3 | 1028.2 | 1033.3 | 1015.9 | 1054.2 | 1 032.8 | 1041.4 | -2.1    | 15.7                |
| 115        | 1033.5           | 1035   | 1031.7 | 1034.3 | 1020.7 | 1050.4 | 1 034.3 | 1042.7 | -2.1    | 15.5                |
| 116        | 1035.5           | 1039.1 | 1033.9 | 1037.6 | 1022   | 1053.8 | 1 037.0 | 1044.0 | -2.1    | 14.0                |
| 117        | 1039.1           | 1047.2 | 1037.1 | 1043.1 | 1025.4 | 1067.1 | 1 043.2 | 1045.3 | -2.0    | 15.0                |
| 118        | 1039.1           | 1047   | 1039.4 | 1044.8 | 1026.4 | 1068.1 | 1 044.1 | 1046.5 | -2.0    | 15.6                |
| 119        | 1040.1           | 1045.3 | 1039.5 | 1044.8 | 1026.9 | 1070.4 | 1 044.5 | 1047.8 | -2.0    | 12.8                |
| 120        | 1042.3           | 1047.7 | 1043.6 | 1048.2 | 1030   | 1070   | 1 047.0 | 1049.0 | -2.0    | 14.8                |
| 121        | 1044.6           | 1048.2 | 1044.4 | 1048.1 | 1031.9 | 1071.3 | 1 048.1 | 1050.3 | -2.0    |                     |



DIAGRAM OF AMBIENT TEMPERATURE



→ Ta

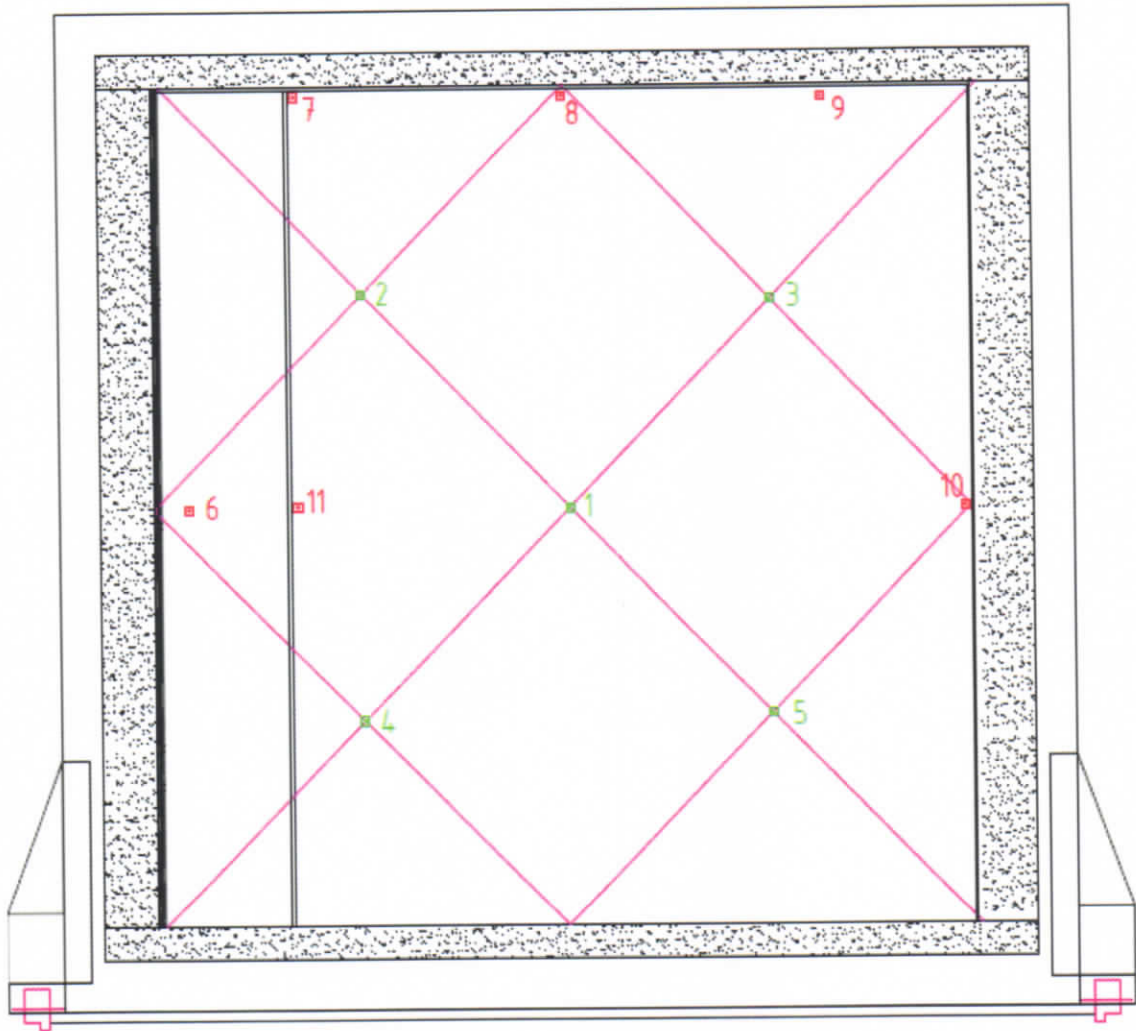




| Time<br>[min] | Temperature<br>[°C] |
|---------------|---------------------|
|               | Ta                  |
| 00            | 27.8                |
| 06            | 27.9                |
| 12            | 28                  |
| 17            | 28.1                |
| 22            | 28.2                |
| 27            | 28.3                |
| 31            | 28.4                |
| 34            | 28.5                |
| 38            | 28.7                |
| 41            | 28.7                |
| 44            | 28.9                |
| 47            | 29                  |
| 50            | 29.1                |
| 53            | 29.2                |
| 55            | 29.3                |
| 58            | 29.3                |
| 60            | 29.4                |
| 62            | 29.5                |
| 64            | 29.6                |
| 66            | 29.6                |
| 68            | 29.7                |
| 70            | 29.7                |
| 72            | 29.8                |
| 74            | 29.8                |
| 76            | 29.9                |
| 77            | 29.9                |
| 79            | 30                  |
| 80            | 30.1                |
| 82            | 30.1                |
| 83            | 30.2                |
| 85            | 30.2                |
| 86            | 30.3                |
| 88            | 30.3                |
| 89            | 30.3                |
| 90            | 30.4                |
| 91            | 30.4                |
| 93            | 30.4                |
| 94            | 30.4                |
| 95            | 30.4                |
| 96            | 30.5                |
| 97            | 30.5                |
| 98            | 30.5                |
| 99            | 30.5                |
| 101           | 30.6                |
| 102           | 30.6                |
| 103           | 30.6                |
| 104           | 30.6                |
| 105           | 30.6                |
| 106           | 30.7                |
| 107           | 30.7                |
| 108           | 30.7                |
| 109           | 30.8                |
| 110           | 30.8                |
| 111           | 30.8                |
| 112           | 30.8                |
| 113           | 30.9                |
| 114           | 30.9                |
| 115           | 30.9                |
| 116           | 31                  |
| 117           | 31                  |
| 118           | 31.1                |
| 119           | 31.1                |
| 120           | 31.2                |
| 121           | 31.3                |



SKETCH OF MEASURING PLACES OF TEMPERATURE ON THE SPECIMEN SIDE  
UNEXPOSED TO FIRE

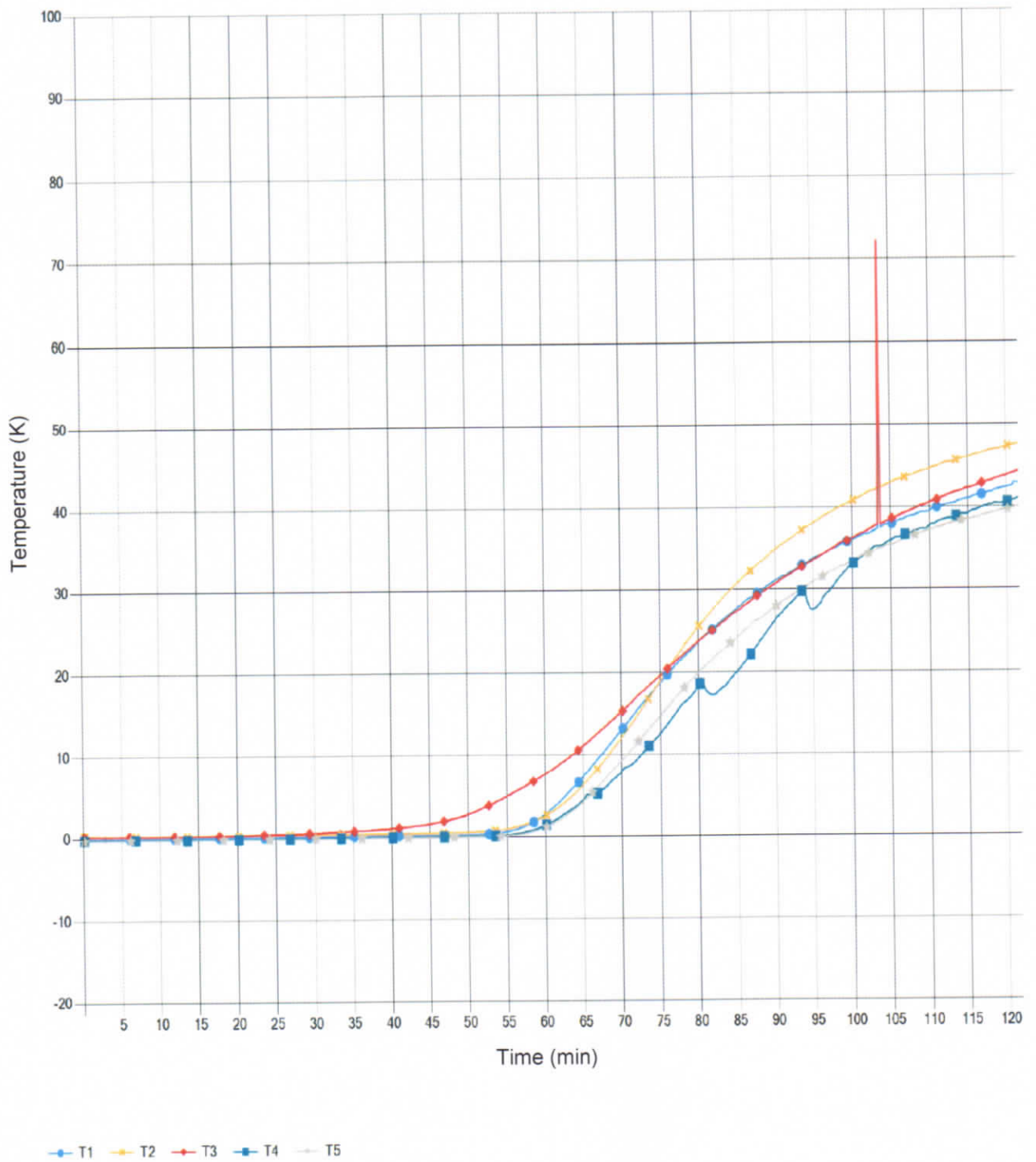


1-5 – Measuring average temperature of unexposed specimen side (140 K)

6-11 – Measuring maximum temperature of unexposed specimen side (180 K)



DIAGRAM OF AVERAGE TEMPERATURE ON THE SPECIMEN SIDE UNEXPOSED TO FIRE

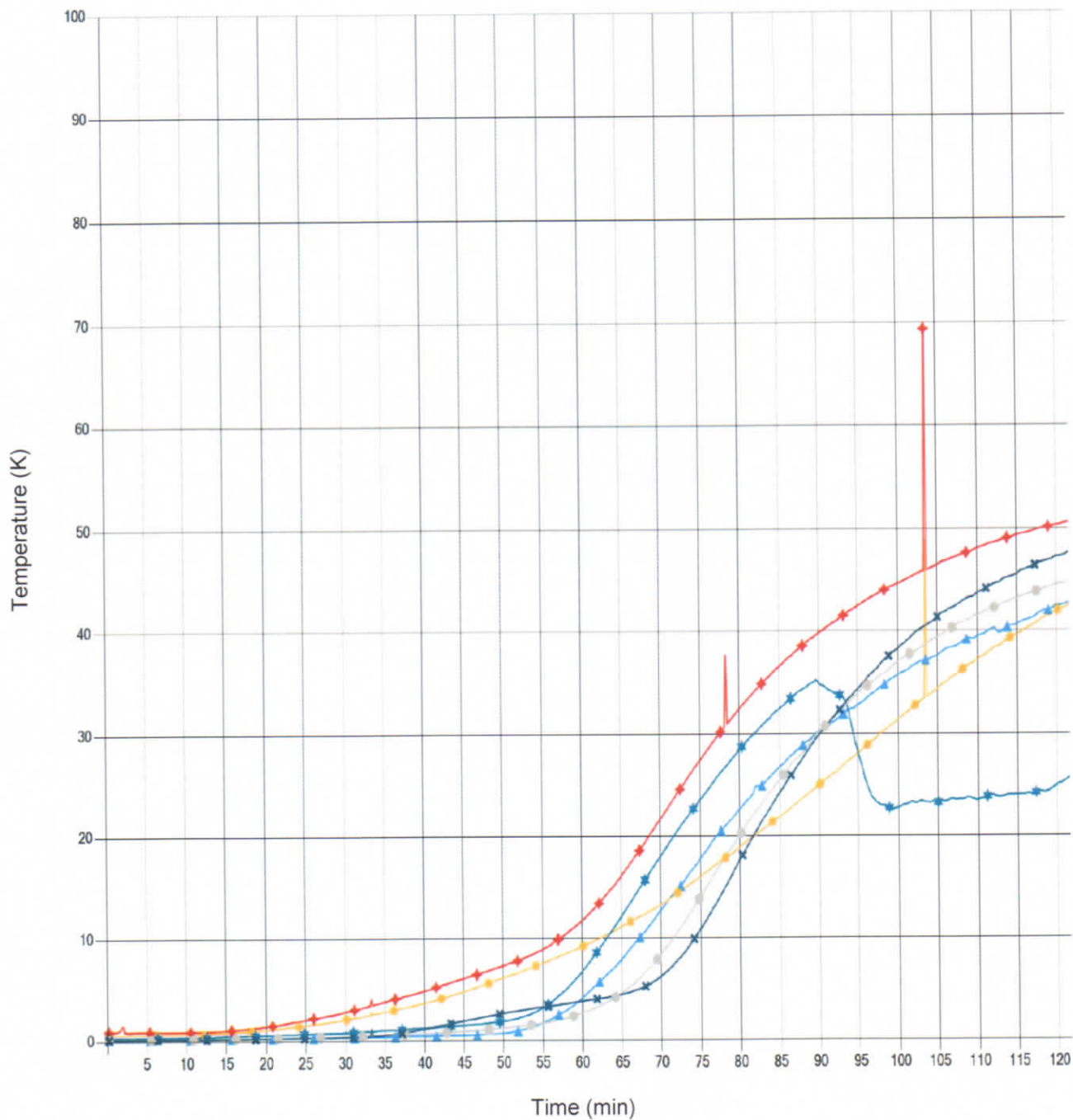




| Time [min] | Temperature [K] |      |      |      |      |      |
|------------|-----------------|------|------|------|------|------|
|            | T1              | T2   | T3   | T4   | T5   | AAT  |
| 00         | 0               | 0.3  | 0.2  | -0.2 | -0.2 | 0    |
| 06         | 0               | 0.2  | 0.2  | -0.2 | -0.2 | 0    |
| 12         | 0               | 0.2  | 0.2  | -0.2 | -0.2 | 0    |
| 17         | 0               | 0.3  | 0.3  | -0.2 | -0.2 | 0.1  |
| 22         | 0               | 0.3  | 0.4  | -0.2 | -0.2 | 0.1  |
| 27         | 0.1             | 0.3  | 0.4  | -0.1 | -0.1 | 0.1  |
| 31         | 0.1             | 0.3  | 0.6  | -0.1 | -0.1 | 0.2  |
| 34         | 0.1             | 0.4  | 0.7  | 0    | -0.1 | 0.2  |
| 38         | 0.2             | 0.4  | 0.9  | 0    | 0    | 0.3  |
| 41         | 0.2             | 0.4  | 1.1  | 0    | 0    | 0.3  |
| 44         | 0.2             | 0.5  | 1.4  | 0    | 0    | 0.4  |
| 47         | 0.2             | 0.5  | 2    | 0    | 0    | 0.5  |
| 50         | 0.3             | 0.5  | 2.8  | 0.1  | 0    | 0.7  |
| 53         | 0.4             | 0.7  | 4    | 0.1  | 0.1  | 1.1  |
| 55         | 0.7             | 1    | 5    | 0.2  | 0.1  | 1.4  |
| 58         | 1.6             | 1.7  | 6.5  | 0.7  | 0.6  | 2.2  |
| 60         | 2.8             | 2.6  | 7.7  | 1.4  | 1.2  | 3.1  |
| 62         | 4.5             | 3.8  | 9    | 2.5  | 2.2  | 4.4  |
| 64         | 6.4             | 5.4  | 10.4 | 3.8  | 3.6  | 5.9  |
| 66         | 8.7             | 7.5  | 12   | 5    | 5.4  | 7.7  |
| 68         | 10.9            | 9.7  | 13.7 | 6.2  | 7.4  | 9.6  |
| 70         | 13.3            | 12.2 | 15.4 | 8.2  | 9.5  | 11.7 |
| 72         | 15.7            | 14.9 | 17.2 | 9.6  | 11.6 | 13.8 |
| 74         | 17.8            | 17.7 | 18.8 | 11.7 | 13.8 | 16   |
| 76         | 20              | 20.4 | 20.5 | 14   | 16   | 18.2 |
| 77         | 21              | 21.8 | 21.4 | 15.3 | 17.1 | 19.3 |
| 79         | 22.8            | 24.4 | 23   | 17.3 | 19.1 | 21.3 |
| 80         | 23.8            | 25.6 | 23.8 | 18.6 | 20.1 | 22.4 |
| 82         | 25.4            | 27.8 | 25.2 | 17.4 | 21.8 | 23.5 |
| 83         | 26.3            | 28.8 | 26   | 18.1 | 22.6 | 24.4 |
| 85         | 27.8            | 30.8 | 27.4 | 20.2 | 24.2 | 26.1 |
| 86         | 28.6            | 31.7 | 28.1 | 21.4 | 25.1 | 27   |
| 88         | 29.8            | 33.3 | 29.5 | 23.9 | 26.5 | 28.6 |
| 89         | 30.5            | 34.1 | 30.1 | 25.2 | 27.2 | 29.4 |
| 90         | 31.1            | 34.9 | 30.7 | 26.5 | 27.9 | 30.2 |
| 91         | 31.6            | 35.6 | 31.4 | 27.5 | 28.6 | 30.9 |
| 93         | 32.7            | 36.9 | 32.5 | 29.3 | 29.8 | 32.2 |
| 94         | 33.2            | 37.6 | 33.1 | 28.4 | 30.4 | 32.5 |
| 95         | 33.8            | 38.1 | 33.6 | 27.6 | 31   | 32.9 |
| 96         | 34.2            | 38.8 | 34.2 | 28.8 | 31.5 | 33.5 |
| 97         | 34.8            | 39.3 | 34.8 | 29.9 | 32.1 | 34.2 |
| 98         | 35.2            | 39.9 | 35.4 | 31.2 | 32.6 | 34.9 |
| 99         | 35.7            | 40.3 | 35.8 | 32.2 | 33   | 35.4 |
| 101        | 36.5            | 41.2 | 36.7 | 33.9 | 34   | 36.5 |
| 102        | 36.7            | 41.8 | 37.2 | 34.6 | 34.3 | 36.9 |
| 103        | 37.3            | 42.2 | 37.8 | 35.2 | 34.7 | 37.4 |
| 104        | 37.7            | 42.5 | 38.1 | 35.4 | 35.1 | 37.8 |
| 105        | 38              | 43   | 38.6 | 36   | 35.4 | 38.2 |
| 106        | 38.4            | 43.4 | 39   | 36.3 | 35.8 | 38.6 |
| 107        | 38.8            | 43.7 | 39.4 | 36.7 | 36.3 | 39   |
| 108        | 39              | 44   | 39.7 | 37.1 | 36.5 | 39.3 |
| 109        | 39.4            | 44.4 | 40.2 | 37.4 | 36.9 | 39.6 |
| 110        | 39.6            | 44.7 | 40.6 | 37.8 | 37.2 | 40   |
| 111        | 40              | 45   | 40.9 | 38.2 | 37.5 | 40.3 |
| 112        | 40.2            | 45.3 | 41.3 | 38.5 | 37.8 | 40.6 |
| 113        | 40.5            | 45.5 | 41.7 | 38.8 | 38.1 | 40.9 |
| 114        | 40.8            | 45.8 | 42   | 39.1 | 38.3 | 41.2 |
| 115        | 41              | 46   | 42.3 | 39.3 | 38.5 | 41.4 |
| 116        | 41.4            | 46.3 | 42.6 | 39.6 | 38.7 | 41.7 |
| 117        | 41.6            | 46.6 | 42.9 | 40   | 39   | 42   |
| 118        | 41.8            | 46.8 | 43.2 | 40.3 | 39.2 | 42.3 |
| 119        | 42.2            | 47   | 43.5 | 40.4 | 39.5 | 42.5 |
| 120        | 42.4            | 47.3 | 43.8 | 40.6 | 39.6 | 42.7 |
| 121        | 42.9            | 47.4 | 44.1 | 40.8 | 39.9 | 43   |



DIAGRAM OF MAXIMUM TEMPERATURE ON THE SPECIMEN SIDE UNEXPOSED TO FIRE



T6 T7 T8 T9 T10 T11

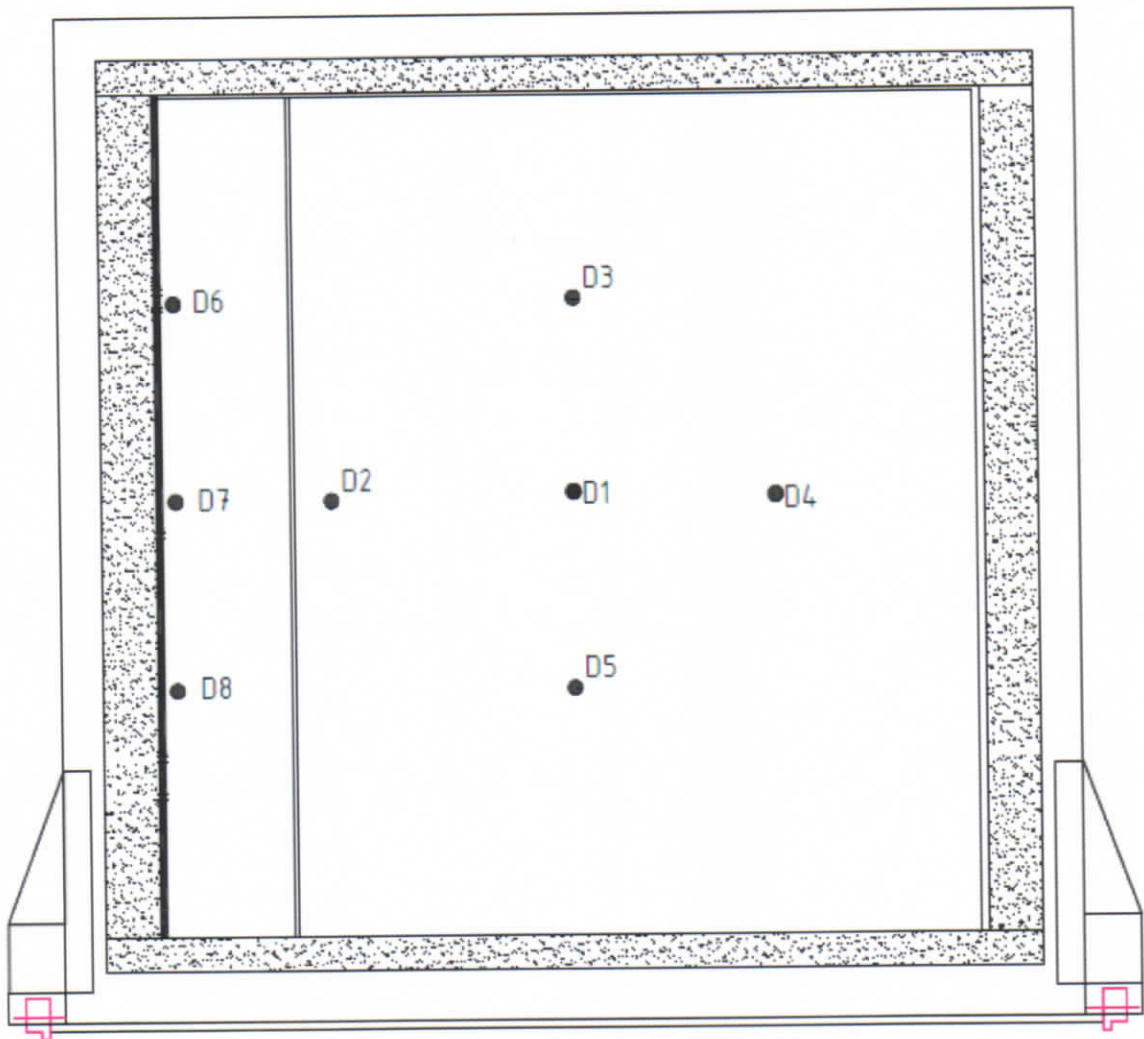


| Time<br>[min] | Temperature [K] |      |      |      |      |      |      |
|---------------|-----------------|------|------|------|------|------|------|
|               | T6              | T7   | T8   | T9   | T10  | T11  | MAT  |
| 00            | 0.2             | 0.6  | 0.9  | 0.3  | 0.2  | 0.1  | 0.9  |
| 06            | 0.2             | 0.6  | 0.9  | 0.3  | 0.2  | 0.1  | 0.9  |
| 12            | 0.2             | 0.6  | 0.9  | 0.4  | 0.2  | 0.1  | 0.9  |
| 17            | 0.2             | 0.9  | 1.1  | 0.5  | 0.2  | 0.2  | 1.1  |
| 22            | 0.2             | 1.2  | 1.6  | 0.6  | 0.3  | 0.2  | 1.6  |
| 27            | 0.3             | 1.7  | 2.3  | 0.7  | 0.4  | 0.3  | 2.3  |
| 31            | 0.3             | 2.2  | 3    | 0.8  | 0.4  | 0.4  | 3    |
| 34            | 0.4             | 2.6  | 3.6  | 1    | 0.5  | 0.5  | 3.6  |
| 38            | 0.4             | 3.3  | 4.4  | 1.1  | 0.6  | 0.9  | 4.4  |
| 41            | 0.5             | 3.8  | 5.1  | 1.2  | 0.7  | 1.3  | 5.1  |
| 44            | 0.5             | 4.5  | 5.9  | 1.4  | 0.8  | 1.8  | 5.9  |
| 47            | 0.6             | 5.3  | 6.6  | 1.6  | 1    | 2.2  | 6.6  |
| 50            | 0.7             | 6.1  | 7.3  | 1.9  | 1.2  | 2.7  | 7.3  |
| 53            | 1.1             | 7    | 8.2  | 2.5  | 1.4  | 3    | 8.2  |
| 55            | 1.7             | 7.6  | 9    | 3.3  | 1.7  | 3.3  | 9    |
| 58            | 3               | 8.6  | 10.5 | 5.2  | 2.2  | 3.6  | 10.5 |
| 60            | 4.3             | 9.2  | 11.8 | 6.9  | 2.7  | 3.8  | 11.8 |
| 62            | 5.7             | 9.9  | 13.4 | 9    | 3.3  | 4.1  | 13.4 |
| 64            | 7.2             | 10.7 | 15.2 | 11.2 | 4.2  | 4.3  | 15.2 |
| 66            | 9.1             | 11.6 | 17.3 | 13.5 | 5.3  | 4.7  | 17.3 |
| 68            | 10.8            | 12.4 | 19.4 | 15.9 | 6.8  | 5.3  | 19.4 |
| 70            | 12.9            | 13.3 | 21.8 | 18.2 | 8.6  | 6.4  | 21.8 |
| 72            | 14.7            | 14.4 | 24.2 | 20.5 | 10.6 | 7.9  | 24.2 |
| 74            | 16.8            | 15.4 | 26.5 | 22.7 | 13   | 9.9  | 26.5 |
| 76            | 19              | 16.6 | 28.6 | 24.8 | 15.4 | 12.3 | 28.6 |
| 77            | 20              | 17.2 | 29.7 | 25.8 | 16.7 | 13.6 | 29.7 |
| 79            | 21.8            | 18.3 | 31.6 | 27.7 | 19   | 16.4 | 31.6 |
| 80            | 22.8            | 18.9 | 32.5 | 28.6 | 20.2 | 17.8 | 32.5 |
| 82            | 24.9            | 20.1 | 34.3 | 30.2 | 22.5 | 20.5 | 34.3 |
| 83            | 25.2            | 20.7 | 35.1 | 31.1 | 23.5 | 21.9 | 35.1 |
| 85            | 26.8            | 21.9 | 36.6 | 32.5 | 25.6 | 24.4 | 36.6 |
| 86            | 27.6            | 22.5 | 37.3 | 33.2 | 26.7 | 25.6 | 37.3 |
| 88            | 29.1            | 23.8 | 38.6 | 34.4 | 28.3 | 27.8 | 38.6 |
| 89            | 29.6            | 24.4 | 39.3 | 34.9 | 29.4 | 29   | 39.3 |
| 90            | 30.3            | 25.1 | 39.8 | 34.8 | 30.3 | 30   | 39.8 |
| 91            | 30.8            | 25.7 | 40.4 | 34.3 | 31   | 31   | 40.4 |
| 93            | 31.9            | 27   | 41.5 | 33.4 | 32.6 | 32.8 | 41.5 |
| 94            | 32.5            | 27.6 | 42   | 30.7 | 33.3 | 33.7 | 42   |
| 95            | 32.9            | 28.2 | 42.5 | 27.6 | 34.1 | 34.5 | 42.5 |
| 96            | 33.5            | 28.9 | 43   | 24.8 | 34.6 | 35.4 | 43   |
| 97            | 34.1            | 29.5 | 43.5 | 23.4 | 35.2 | 36.2 | 43.5 |
| 98            | 34.7            | 30.2 | 43.9 | 23   | 35.8 | 37.1 | 43.9 |
| 99            | 35.3            | 30.8 | 44.4 | 22.6 | 36.4 | 37.8 | 44.4 |
| 101           | 36.1            | 32   | 45.1 | 23.1 | 37.5 | 39   | 45.1 |
| 102           | 36.7            | 32.7 | 45.5 | 23.2 | 38   | 39.8 | 45.5 |
| 103           | 37.1            | 33.3 | 45.9 | 23.3 | 38.4 | 40.3 | 45.9 |
| 104           | 37.3            | 33.8 | 46.2 | 23.3 | 39   | 40.8 | 46.2 |
| 105           | 37.7            | 34.5 | 46.6 | 23.3 | 39.4 | 41.5 | 46.6 |
| 106           | 38.2            | 35   | 46.9 | 23.5 | 40   | 42   | 46.9 |
| 107           | 38.5            | 35.6 | 47.2 | 23.6 | 40.5 | 42.4 | 47.2 |
| 108           | 38.9            | 36.2 | 47.5 | 23.6 | 40.8 | 42.9 | 47.5 |
| 109           | 39.3            | 36.7 | 47.8 | 23.7 | 41.2 | 43.3 | 47.8 |
| 110           | 39.5            | 37.2 | 48.1 | 23.6 | 41.6 | 43.8 | 48.1 |
| 111           | 39.9            | 37.7 | 48.4 | 23.9 | 42   | 44.2 | 48.4 |
| 112           | 40.3            | 38.3 | 48.6 | 23.9 | 42.3 | 44.6 | 48.6 |
| 113           | 40              | 38.7 | 48.9 | 23.9 | 42.6 | 45   | 48.9 |
| 114           | 40.5            | 39.3 | 49.1 | 24   | 42.9 | 45.3 | 49.1 |
| 115           | 40.7            | 39.6 | 49.3 | 24   | 43.2 | 45.7 | 49.3 |
| 116           | 41.1            | 40.1 | 49.5 | 24.2 | 43.5 | 46.1 | 49.5 |
| 117           | 41.4            | 40.6 | 49.8 | 24.2 | 43.8 | 46.4 | 49.8 |
| 118           | 41.9            | 41.1 | 50   | 24.4 | 44.1 | 46.7 | 50   |
| 119           | 42.1            | 41.5 | 50.2 | 24.6 | 44.3 | 47   | 50.2 |
| 120           | 42.5            | 42   | 50.3 | 25.1 | 44.6 | 47.3 | 50.3 |
| 121           | 42.7            | 42.3 | 50.5 | 25.4 | 44.7 | 47.5 | 50.5 |





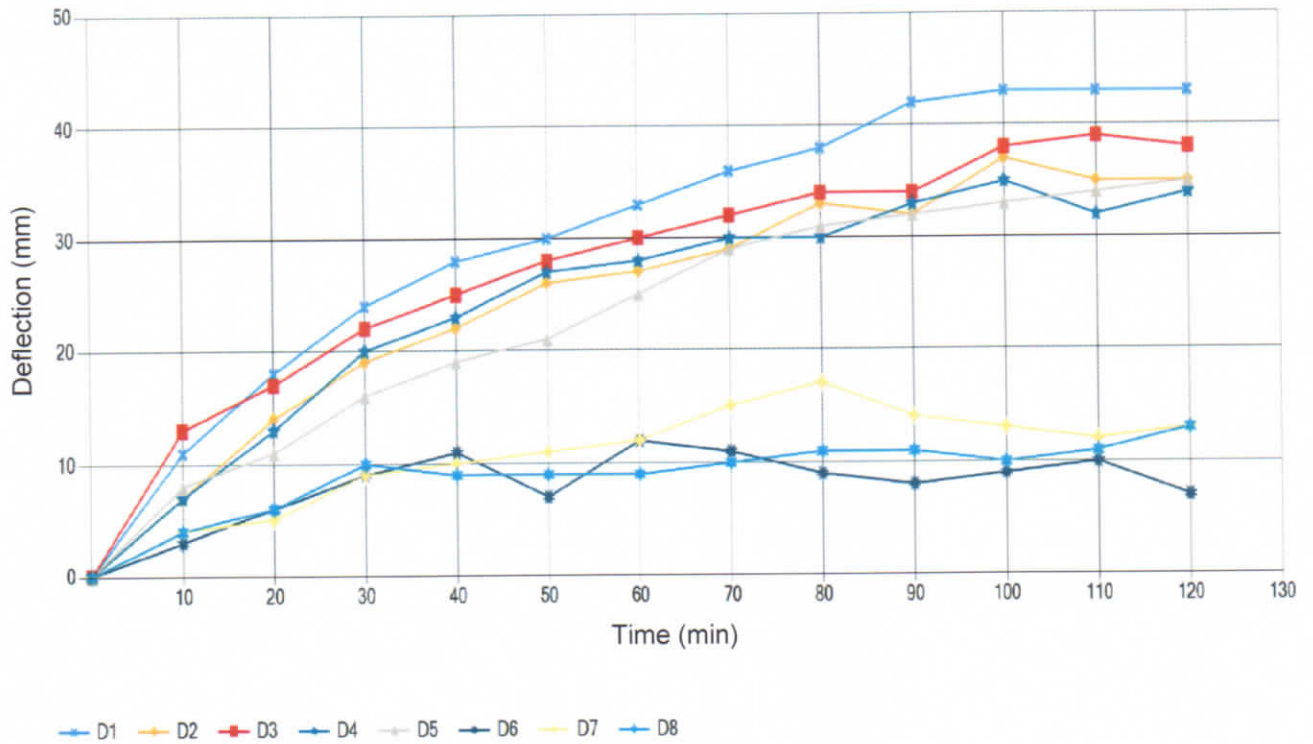
SKETCH OF LOCATIONS OF MEASURING SPECIMEN DEFLECTION



Note: Positive values represent deflection of the specimen toward the furnace, and negative ones represent deflection away from the furnace.



DIAGRAM OF SPECIMEN DEFLECTION



| Time [min] | Deflection [mm] |    |    |    |    |    |    |    |
|------------|-----------------|----|----|----|----|----|----|----|
|            | D1              | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| 00         | 0               | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 10         | 11              | 7  | 13 | 7  | 8  | 3  | 4  | 4  |
| 20         | 18              | 14 | 17 | 13 | 11 | 6  | 5  | 6  |
| 30         | 24              | 19 | 22 | 20 | 16 | 9  | 9  | 10 |
| 40         | 28              | 22 | 25 | 23 | 19 | 11 | 10 | 9  |
| 50         | 30              | 26 | 28 | 27 | 21 | 7  | 11 | 9  |
| 60         | 33              | 27 | 30 | 28 | 25 | 12 | 12 | 9  |
| 70         | 36              | 29 | 32 | 30 | 29 | 11 | 15 | 10 |
| 80         | 38              | 33 | 34 | 30 | 31 | 9  | 17 | 11 |
| 90         | 42              | 32 | 34 | 33 | 32 | 8  | 14 | 11 |
| 100        | 43              | 37 | 38 | 35 | 33 | 9  | 13 | 10 |
| 110        | 43              | 35 | 39 | 32 | 34 | 10 | 12 | 11 |
| 120        | 43              | 35 | 38 | 34 | 35 | 7  | 13 | 13 |



TEST SPECIMEN PHOTOGRAPHS

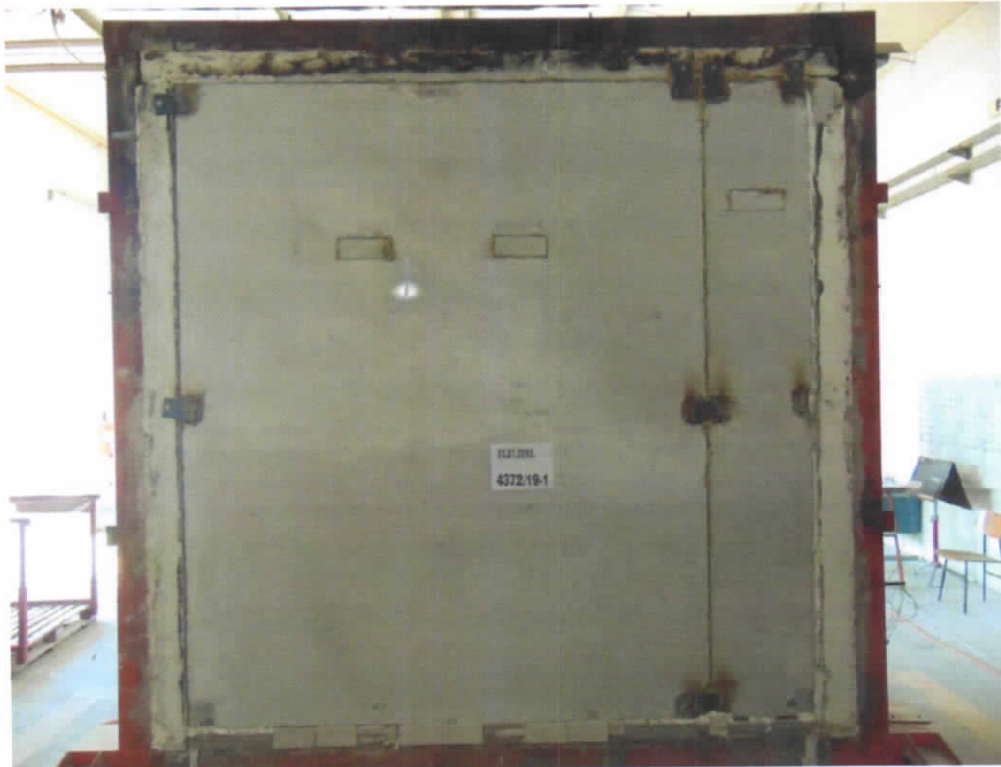


Photo 1: Specimen on the side exposed to fire before testing



Photo 2: Beginning of the test







Photo 3: 15<sup>th</sup> minute of testing



Photo 4: 30<sup>th</sup> minute of testing





Photo 5: 45<sup>th</sup> minute of testing



Photo 6: 60<sup>th</sup> minute of testing





Photo 7: 91<sup>st</sup> minute of testing



Photo 8: 105<sup>th</sup> minute of testing







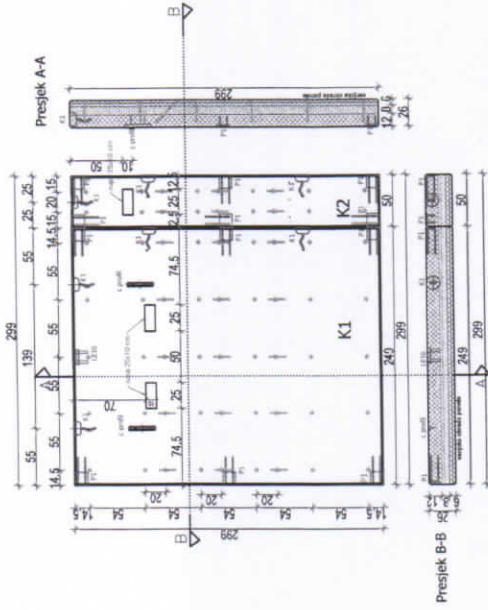
Photo 9: 122<sup>nd</sup> minute, test discontinued



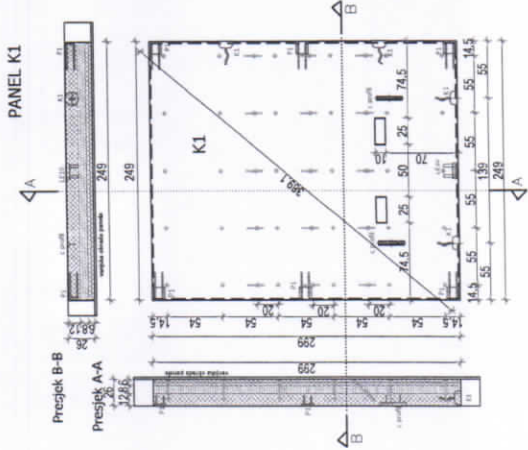
Photo 10: Specimen on the side exposed to fire after testing



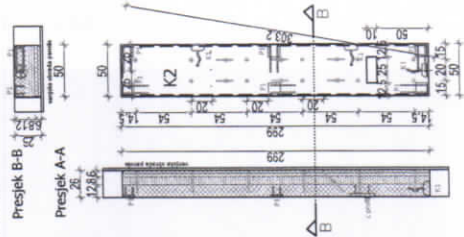
OPREMA: pogled s vanjske strane sa spojevima za vezu sa AB konstrukcijom i kukama za dizanje i transport:



POLOŽAJ PANELE U KALUPI:



PANEL K2

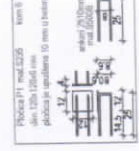


FASADNI ELEMENTI - AB PANEL  
12+8+6=26 cm

NACRT ELEMENTA: Uzorak K1  
KRATKA OZNAKA ELEMENTA: K1

| K1       |         | K2       |         |
|----------|---------|----------|---------|
| KOLUČINA | KOMADA: | KOLUČINA | KOMADA: |
| 1        | 1       | 1        | 1       |

OPIS SPOJEVA I DETALJI:  
KUKU: K1  
KUKA 4t - kom. 4  
OPIS SPOJEVA ZA PROIZVODNJU:  
"LE10" 2 kom  
"C" profila 2 kom



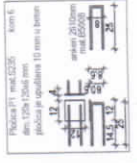
| K1                          |   | K2                          |   |
|-----------------------------|---|-----------------------------|---|
| Materijal                   | 1 | Materijal                   | 1 |
| Opis                        | 1 | Opis                        | 1 |
| Opis spojeva                | 1 | Opis spojeva                | 1 |
| Opis spojeva za proizvodnju | 1 | Opis spojeva za proizvodnju | 1 |

FASADNI ELEMENTI - AB PANEL  
12+8+6=26 cm

NACRT ELEMENTA: Uzorak K2  
KRATKA OZNAKA ELEMENTA: K2

| K1       |         | K2       |         |
|----------|---------|----------|---------|
| KOLUČINA | KOMADA: | KOLUČINA | KOMADA: |
| 1        | 1       | 1        | 1       |

OPIS SPOJEVA I DETALJI:  
KUKU: K1  
KUKA 4t - kom. 3  
OPIS SPOJEVA ZA PROIZVODNJU:



| K1                          |   | K2                          |   |
|-----------------------------|---|-----------------------------|---|
| Materijal                   | 1 | Materijal                   | 1 |
| Opis                        | 1 | Opis                        | 1 |
| Opis spojeva                | 1 | Opis spojeva                | 1 |
| Opis spojeva za proizvodnju | 1 | Opis spojeva za proizvodnju | 1 |

VANJSKA OBRADA AB PANELE:

INKA

TERMOIZOLACIJA kamena vuna D=8 cm

AB PANEL unutarnji nosivi sloj 12 cm+ kamena vuna 8 cm+ vanjski sloj 6 cm= ukupno debljina 26 cm:

OPIS SPOJEVA ZA MONTAŽU:

mač za "C" profil l=20 cm 2 kom  
zupčasta podloška za mač 2 kom  
betonski vijak M16, l=15cm 2 kom  
T vijak za LE kutiju 2 kom  
podloška + matica za T vijak 6 kom  
pločica F1 20x10x0,5cm 9 kom

|                         |                                  |
|-------------------------|----------------------------------|
| Investitor              | MUCIĆ & CO Ljubuški              |
| Gradjevina              | UZORAK AB PANEL d=26 cm          |
| Lokacija                | XX                               |
| Faza projekta           | IZVEDENI PROJEKT KONSTRUKCIJE    |
| Sadržaj nacrt           | PLAN OPLATE PANELE, POZ. K1 I K2 |
| Projektant voditelj     |                                  |
| Projektant konstrukcije |                                  |
| Nacrt izradio           |                                  |



MUCIĆ & CO d.o.o.  
graditeljstvo, projektiranje, inženjering

|                       |                    |
|-----------------------|--------------------|
| Broj projekta         | K-uzorak 05/2019   |
| Datum                 | svibanj, 2019.god. |
| Mjenilo               | M 1:50             |
| Opisile u proizvodnji |                    |
| List br.              | 1.1.               |

Put za Medugorje bb  
88320 Ljubuški-BiH  
Tel.: 00387/09835660  
Fak.: 00387/09835601  
e-mail:mucic.projekt@mucic.ba

