Instytut Techniki Budowlanej
(Institute of Building Technique)
**RESEARCH LABORATORIES COMPLEX**
**accredited by the Polish Center for Accreditation**
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AB 023



**FIRE RESEARCH DEPARTMENT**

**FIRE RESEARCH LABORATORY**

# TEST REPORT NO. LZP01-06097/21/R28NZP

This test report contains test results covered by the scope of accreditation.

This report was issued in three copies, two of which were received by the Client and one remained with ITB.

| | |
|---|---|
| **Client:** | **VITRINTEC Sp z o.o.**<br>(system provider) |
| **Client address:** | ul. Karola Olszewskiego 19 C 25-663 Kielce |

**INFORMATION REGARDING THE PRODUCT**

| | |
|---|---|
| **Manufacturer (company name and address):** | *VITRINTEC Sp z o.o.*<br>*ul. Karola Olszewskiego 19 C*<br>*25-663 Kielce* |
| Name and address of the Production Plant: | *VITRINTEC Sp z o.o.*<br>*ul. Karola Olszewskiego 19 C*<br>*25-663 Kielce* |
| **Product name:** | Aluminum profile wall, **SILENCE LOFT FS EI30 system** by VITRINTEC, filled with **CONTRAFLAM 30** glass by VETROTECH Saint-Gobain |
| **Reference document for the product:** | - |
| **Information regarding the product:** | *Non-load-bearing walls* |
| **Designation of the construction product type:** | *The manufacturer did not provide a unique identification code for the product* |

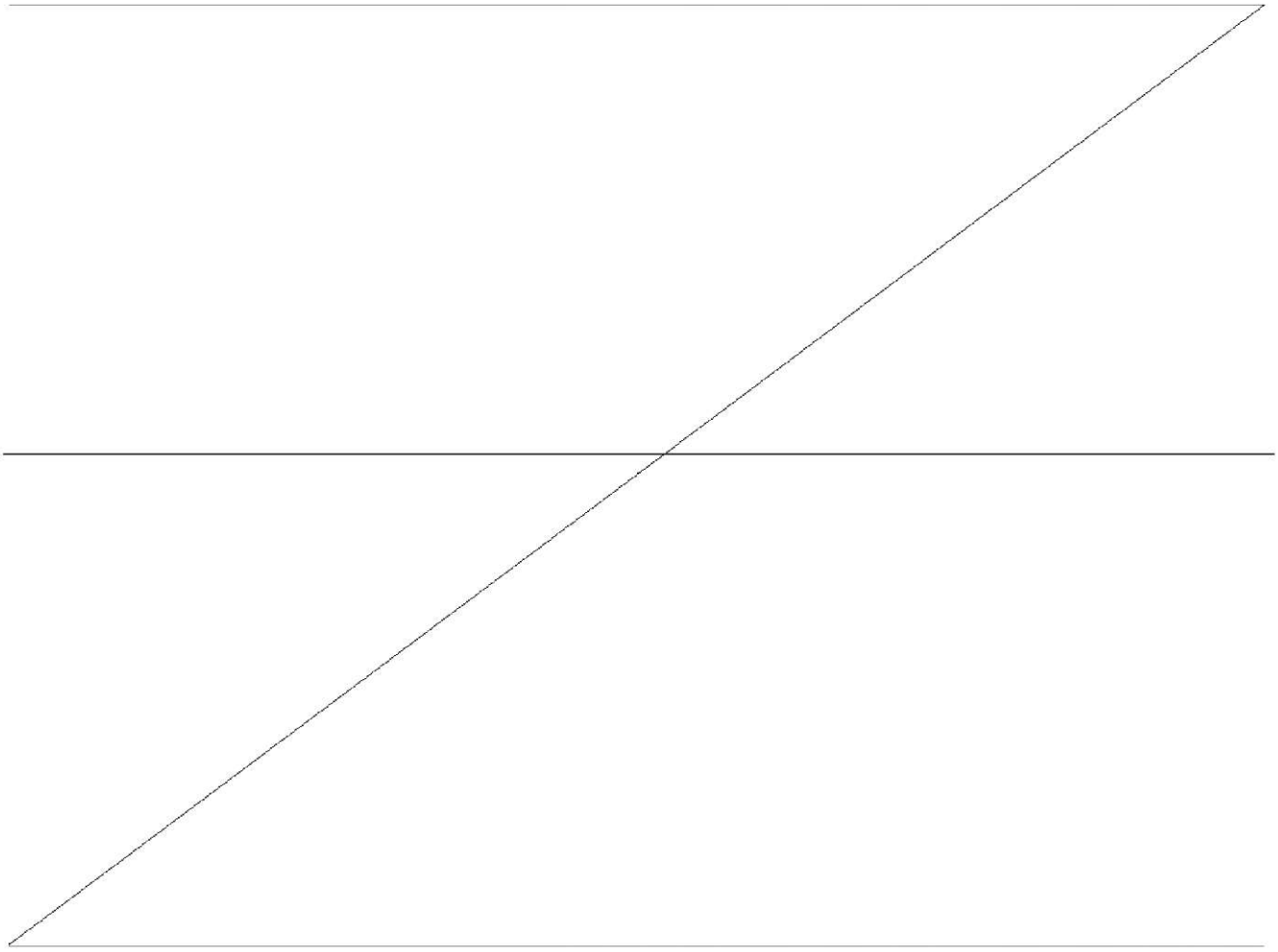
**INFORMATION REGARDING THE TEST OBJECT**

| | |
|---|---|
| **Research object:**<br>description, condition and identification | *A detailed description and identification of the test object can be found in section 1.4 of this report.*<br>*Technical documentation and drawings can be found in Appendix No. 1 to this report.* |

| | |
|---|---|
| | *Photographic documentation illustrating the test object and the test procedure can be found in Appendix No. 3 to this report.*<br>*Information regarding the test object obtained from the Client can be found in the Acceptance Report for the object to testing no. LZP01- 06097/21/R28NZP (Appendix No. 4 to this Report)* |
| **Date of collecting the object for tests:** | *2021-03-19* |
| **Admission procedure for the object to tests,**<br>**Admission protocol number for the object to tests:** | *The object was admitted to the laboratory in accordance with Procedure PZ ZLB 18, admission protocol number: No. LZP02-06097/20/R20NZP (Appendix No. 4 to this report).* |

**INFORMATION REGARDING THE TEST**

| | |
|---|---|
| **Start date of the test:** | *2021-03-19* |
| **End date of the test:** | *2021-03-19* |
| **Test method/procedure:** | ***PN-EN 1364-1:2015-08***<br>*Fire resistance tests for non-load-bearing elements - Part 1: Walls.* |



## 1. DESCRIPTION OF THE TEST ELEMENT

### 1.1. Size of test element

The test element and all of its components were of actual dimensions. The dimensions of the front opening of the furnace did not limit the dimensions of the wall.

### 1.2. Number of test elements

The fire resistance test was carried out on one, asymmetrical test element. Heating from the side of MI004 glazing beads.

### 1.3. Verification of test elements

A data compliance control was made before and after the fire resistance test (in the possible extent) for data included in the documentation delivered by the Client with the delivered test element. In the following technical description of the test element the nominal values, declared by the Client, are provided. In the event the nominal values declared by the Client deviate considerably from the values measured by the Laboratory, the the technical description will include nominal values declared by the Client and marked with (D) and/or the values measured by Laboratory, marked with (M).

### 1.4. Description of the test element

The test element, non-load-bearing partition wall, the SILENCE LOFT FS system, was made and installed from elements of the SILENCE LOFT FS system elements by the company VITRINTEC Sp z o.o. ul. Karola Olszewskiego 19 C, 25-663 Kielce. Construction of the examined wall is presented in Fig. 1 ÷ 7 in the Appendix No. 1.

The test element had the following dimensions: 3054 x 3026 mm (widrh x height).

The structure of the test element was made of aluminum profiles with the following catalog numbers:

- SI001 - frame profile (vertical and bottom edge),
- SI402 - frame profile (upper edge),
- SI004 - vertical mullion profile,
- SI406 - clamped strip in the area between the glass on SI001 and SI402 profiles,
- MI001 - glazing bead attached to SI001 profiles from the VSG glass side,
- MI003 - glazing bead attached to SI001 profiles from the VSG glass side,
- MI004 - glazing bead attached to SI004 profiles from the VSG glass side,

- MI404 - glazing bead attached to SI004 profiles from the side of the fire-resistant glass,
- MI410 - glazing bead cap MI404,
- SI008 - base profile of the horizontal mullion, between glass panes,
- SI009 - fastened profile of the horizontal mullion, between glasses,
- MI006 - mullion profile glued to the VSG glass side
- MI009 - mullion profile glued to the EI30 glass side
- Flat bar with a cross-section of 5x38 mm - an alternative profile for MI006
- Flat bar with a cross-section of 8x38 mm - an alternative profile for MI009

Aluminum profiles with a construction depth of 78.2 mm and a height of 30 mm were used, made of aluminum alloy EN AW 6063, in accordance with PN-EN 573-3 and PN-EN 515, with thermal inlays made of polyamide reinforced with glass fiber (PA 66 GF 25) with cat. no. AEI01 clamped in the axis of the portion of fastening profiles the fire-resistant glass (profile, cat. no. SI001, SI402 and MI404). Aluminum profiles, along with the process of clamping the polyamide spacer in them, were manufactured by Cortizo Sp. z o. o.

Perimeter frame sections with cat. no. SI001, SI402 were filled with insulating inserts made of plasterboard, cat. no. KG0925, with cross-section dimensions 9.5 x 25 mm, according to drawing 2 ÷ 3 in the Appendix No. 1.

Profiled elements of vertical mullions, cat. no. SI004 filled with insulating inserts made of plasterboard type F, cat. no. KG1214, with cross-section dimensions 12.5 x 14 mm, according to drawing 2 ÷ 3 in the Appendix No. 1

Profiled elements of vertical mullions, cat. no. SI004 were attached to the upper and lower profiles of the perimeter frame using the stainless steel angled bars KWSI04 with thickness of 3 mm (two angled bars per each mullions). The angle bar has been inserted into the socket of the SI004 profile and then fixed with means of two self-drilling screws 4,8 x 50 mm (cat. no. TW4850). Dimension of the angle bar is shown in Fig. 6, Appendix No. 1.

In the test element, decorative horizontal mullions are mounted between two SI004 mullions. The SI008 profiles were attached to the SI004 mullions with means of stainless steel angled bars KWSI08, with thickness of 2 mm (two angled bars per each mullion). SI009 profiles have been clamped with SI008 profiles with means of embossed latches.

The wall has been filled with three Contraflam 30 glass panes from Vetrotech Saint-Gobain with thickness of 16 mm and laminated glass type VSG 55.1 with thickness of 10.38 mm, glass no. 1 and 3

with dimensions 750 x 3000 mm (width x height), whereas glass no. 2 with dimensions of 1500 x 3000 mm, glass numbering according to Fig. 3 in the Appendix no. 2.

Contraflam 30 glass was mounted on hardwood under-glass blocks (cat. no. KXI2208), with dimensions of 22 x 80 x 8 mm (width x length x thickness) in the number of two blocks per each glass. The under-glazing blocks were placed at a distance of approx. 100 mm from the corner of the glass.

Contraflam 30 glass is attached by sliding the glass into the upper profiles (cat. no. SI402), in the axis of the thermal spacer, and then into the into bottom profiles (cat. no. SI001), embedding them between mullion profiles (cat. no. SI004) and the side ones (cat. no. SI001) with means of latching the i glazing beads, cat. no. MI003 for bottom and side profiles (cat. no. SI001), and screwing the glazing bead with thermal spacer, cat. no. MI404 for mullion profile (cat. no. SI004) with means of self-drilling screws, diam..4.8 x 50 mm (cat. no. TW4850).

Insertion depth of the glass into profiles amounted to: 12 mm for the upper, lower and side profiles of the frame, and 10 mm for the mullion profile. As attachment of glass in the frame profiles, the bent steel sheets were also used, cat. no. KWIU16 (for upper profile SI402), and cat. no. KWIF16 (for side profile SI001). Flat sheets were used to fasten the glass in the mullion profiles, cat. no. KWIB04 (for the glazing bead profile MI404).

The dimensions of the sheets are shown in Fig. 4, 5 in the Appendix no. 1. KWIU16 and KWIF16 sheets were attached to the mounting structure through aluminum profiles using steel screws type AMO III in the axis of the thermal spacer, spacing according to Fig. 1 in the Appendix no. 1. KWIF16 sheets additionally have oval holes in the axis of the bend that facilitate bending the sheet metal after installing the glass. Additionally, aluminum profiles were attached to the mounting structure with means of the second row of AMO III screws in the axis of the VSG glass.

Seals made of TPE thermoplastic elastomer type KB-97 were used between the Contraflam 30 glass in the aluminum profiles (cat. no. KU013) and KB-104 (cat. no. KU009) produced by AIB Sp. z o.o.

On the SI001 side profile, SI402 top profile and MI404 glazing beads, along their entire length of the glazing side of the Pyrobel 16 panes, in the axis of the thermal break, strips of FXL 200 with cross-section dimensions 18 x 1 mm from Rolf Kuhn are glued, cat. no. KF0118.

After assembly of Contraflam 30 glass, VSG 55.1 type glass was installed in the SI402, SI001 and SI004 profiles of the construction. VSG 55.1 type glass was mounted on hardwood under-glass blocks cat. no. KXI1714 with dimensions (width x length x thickness) 15/17 x 50 x 14 mm, two blocks per each glass. The under-glazing blocks were placed at a distance of approx. 100 mm from the corner of the glass.

VSG 55.1 glass is attached by sliding the glass into the upper profiles (cat. no. SI402), and then into the into bottom profiles (cat. no. SI001) by embedding them between the mullion profiles (cat. no. SI004) and the side ones (cat. no. SI001) with means of latching the i glazing beads, cat. no. MI001 for bottom and side profiles (cat. no. SI001) and latching the i glazing bead, cat. no. MI004 to mullion profile (cat. no. SI004). Insertion depth of the glass into profiles: 12 mm for the upper, lower and side profiles, and 10 mm for the mullion profile. Seals made of TPE thermoplastic elastomer type KB-101 were used between the VSG 55.1 glass and the aluminum profiles (cat. no. KU010) produced by AIB Sp. z o.o.

On the glass surface, in the axes of decorative mullions between glasses SI008 and SI009, decorative surface glazing bars were glued: MI006 and a 5 x 38 mm flat bar on the heated side (on the VSG glass side) and MI009, as well as 8 x 38 mm flat bar on the non-heated side (on the EI30 glass side). Gluing with means of double-sided acrylic tape with cross-sectional dimensions of 1 x 20 mm for mounting MI006/MI009 mullions and with cross-sectional dimensions of 1 x 35 mm for flat bars 5 x 38 mm/8x 38 mm

### 1.5. Selection of test elements

The laboratory participated in the selection of the test element.

## 2. INSTALLATION OF THE TEST ELEMENT

The test element was mounted in a standard, rigid structure with low density made of aerated concrete blocks having the density of 600 kg/m$^3$ and thickness of 120 mm.

The aluminum frame was attached to the mounting structure along the upper, lower and right vertical edges (seen from the unheated side) using galvanized steel screws type AMO III, 72 mm long, with a spacing as shown in Fig. 1 in Appendix No. 1. The left edge of the wall was left unattached (free edge).

The 30 mm wide gap between the frame and the mounting structure was tightly filled with mineral wool with a density of 80 kg/m$^3$.

The method of mounting the test element in the mounting structure is shown in Fig. 2, 3 in Appendix No. 1.

## 3. PREPARATION OF SAMPLE ELEMENT, SEASONING, VERIFICATION

The mounting structure was made 10 days before the test, and the test element was prepared by the Client at the Fire Test Laboratory at the Masovian Branch of ITB in Pionki, 5 days before the test.

Seasoning took place at an ambient air temperature of 16 to 23°C and a relative humidity of the ambient air of 30 to 60%.

## 4. TEST CONDITIONS

### 4.1. Ambient temperature and relative humidity

Ambient air temperature before the test, measured using a thermohygrometer installed in the test room: 20.5°C. Relative humidity of the ambient air before the test, measured using a thermohygrometer installed in the test room: 23%.

### 4.2. Temperature in the furnace

The temperature in the furnace was measured using A 16 plate thermometers, arranged in accordance with PN-EN 1363-1:2012. The heating temperature chart is shown in Fig. 1 in Appendix No. 2. The heating accuracy chart is shown in Fig. 2 in Appendix No. 2.

### 4.3. Pressure in the furnace

The pressure in the furnace was measured at a height of 0.29 m above the top of the test element and was maintained at 22.5 Pa, which corresponded to a pressure of 20 Pa at the reference point. The pressure chart in the furnace is shown in Fig. 12 in Appendix 2.

### 4.4. Temperature of the unheated surface of the element

The temperature of the unheated surface of the test element was measured using A 27 surface thermocouples, the arrangement and numbering of which is shown in Fig. 3 in Appendix No. 2.

### 4.5. Ambient temperature

The ambient temperature during the test, measured with the device according to PN-EN 1363-2012, is shown in Fig. 11 in Appendix No. 2.

## 5. RESEARCH RESULTS

The test lasted 36 minutes and 50 seconds.

### 5.1. Temperature on the unheated surface of the test element

Results of temperature measurements on the unheated surface of the test element in Fig. 4 ÷ 10 in Appendix No. 2.

### 5.2. Fire insulation, fire tightness

The result, expressed as the time, in whole minutes, that elapsed between the start of heating and the moment when the appropriate criteria were exceeded, is presented in the table below:

| | Fire tightness criterion | Time [min] | Location |
|---|---|---|---|
| 1. | Occurrence of sustained flame | 35 | Between panes 2 and 3, halfway up the wall |
| 2. | Cotton tampon catches fire | 36 without loss | - |
| 3. | Application of feeler gauges: | | |
| | 6 mm feeler gauge, | 36 without loss | - |
| | 25 mm feeler gauge | 36 without loss | - |
| | **Fire insulation criterion** | **Time** | **Location** |
| 4. | Average temperature increase by 140 $^0$C above the initial average temperature | 36 without loss | - |
| 5. | Maximum temperature increase by 180$^0$C above the initial average temperature | 36 without loss | - |
| 6. | Maximum temperature increase by 180°C above the initial temperature (other fixed thermocouples, if used, or movable thermocouple) | 36 without loss | - |

**5.3. Displacements**

The places of measurement of wall (and fixing structure) displacements in the direction perpendicular to their surface are shown in Fig. 3 in Appendix No. 2, and the values of the measured displacements are presented in the Table below:

| Time [min] | Displacement measurement [mm] | | | | | |
|---|---|---|---|---|---|---|
| | **A** | **B** | **C** | **D** | **E** | **F** |
| 0' | 0 | 0 | 0 | 0 | 0 | 0 |
| 10' | +36 | +87 | 101 | 10 | +83 | +77 |
| 20' | 111 | +83 | +37 | +7 | +59 | +55 |

| Time [min] | Displacement measurement [mm] | | | | | |
|---|---|---|---|---|---|---|
| | **A** | **B** | **C** | **D** | **E** | **F** |
| 25' | +79 | +59 | +31 | 10 | +45 | +43 |
| 30' | +83 | +49 | +34 | 10 | +44 | +39 |

the "+" sign indicates a movement towards the inside of the furnace.

## 6. OBSERVATIONS

0' - beginning of the test,

1 '27" - the inner glass of the set breaks in fields no. 3, 2, 1;

5'29" - the inner glass of the set in field No. 3 breaks and falls into the furnace;

5'59" - the inner glass of the set in field No. 2 breaks and falls into the furnace;

6'53" - the inner glass of the set in field No. 1 breaks and falls into the furnace;

9'14" - subsequent internal panes of sets in fields No. 1, 2, 3 break and fell into the furnace;

18'50" - smoke along the strip at the junction of glass 2 and 3;

29'12" - glowing under the profile along the strip at the junction of glass 2 and 3;

29'40" - applying a cotton tampon to the observation site from 29'12" - white tampon,
no ignition, no glow;

33'55" - fire for about 5 seconds at the vertical strip between glass 2 and 3, halfway wall height;

34'50" - applying a cotton tampon to the observation site from 33'55" - white tampon,
no ignition, no glow;

35'17" - continuous fire at the vertical strip between panes 2 and 3, halfway up the wall;

36'50" - **END OF THE STUDY** in consultation with the Client.

## 7. PHOTOGRAPHIC DOCUMENTATION

The view of the wall before the test is illustrated in Photo 2, during the test in Photo 3 ÷ 5, and after the test in Photo
6 in Appendix No. 3.

## 8. SCOPE OF APPLICATION OF THE RESULTS

The scope of application of the fire resistance test results of the tested element described in this Report according to point 13 of the PN-EN 1364-1:2015-08 standard.

## 9. FINAL REMARKS

This report provides the method of construction, test conditions and results obtained when a specific element of the described design has been tested in accordance with the procedure set out in EN 1363-1 and, where appropriate, with EN 1363-2. Any material change in size, construction details, loads, stresses, boundary conditions or conditions at the ends, other than that permitted by the immediate scope of application in the particular test method, is not covered by this report.

Due to the nature of the fire resistance test and the resulting difficulty in quantifying the uncertainty of the fire resistance measurement, it is not possible to determine a fixed level of accuracy for the results.

## 10. APPENDICES

- No. 1 Technical documentation,
- No. 2 Charts of temperature increases with the distribution of thermocouples, pressure chart, locations of displacement measurement,
- • No. 3 Photographic documentation,
- • No. 4 Protocol of accepting the object for testing.

**Responsible for the study: M.Sc. Eng. Jacek Kinowski**

Name and position

Signature

**The person authorizing the report Paweł Sulik, Ph.D Eng.**

Name and position

Signature

*The Test Laboratory declares that the test results refer only to the tested object. Without the written consent of the Research Laboratory, the Report may not be reproduced except in full.*
*The test report does not replace the documents required for placing construction products on the market and making them available.*

**MANAGER of the Fire Research Laboratory,**

**Ph.D., Eng. Bartłomiej Papis**

Name and position

**Warsaw, March 31, 2021**

# Appendix No. 1

# to Test Report No. LZP01-06097/21/R28NZP

## Technical Documentation

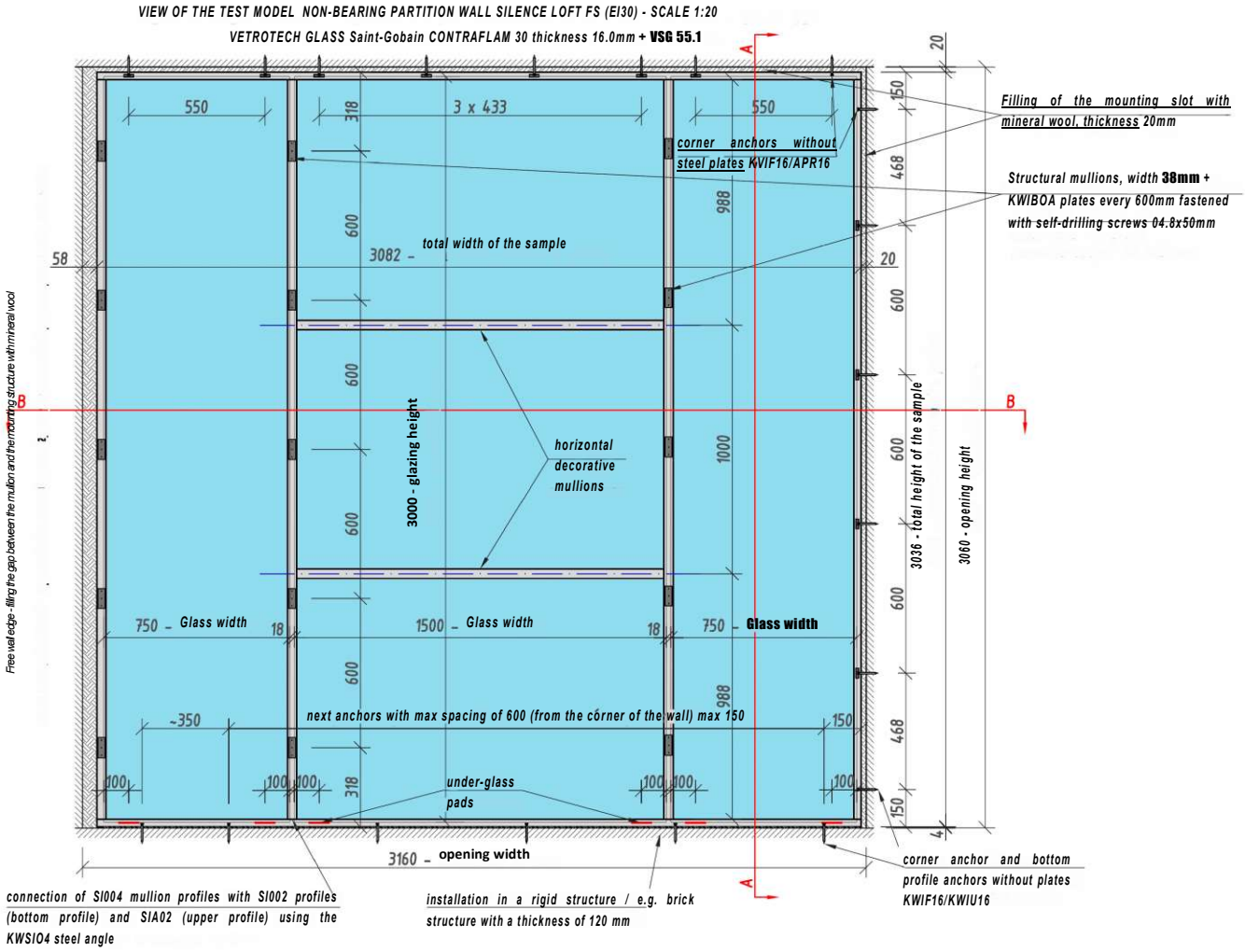



Fig. 1. General view of the test element from the heated side. Designation of cross-sections and attachment points

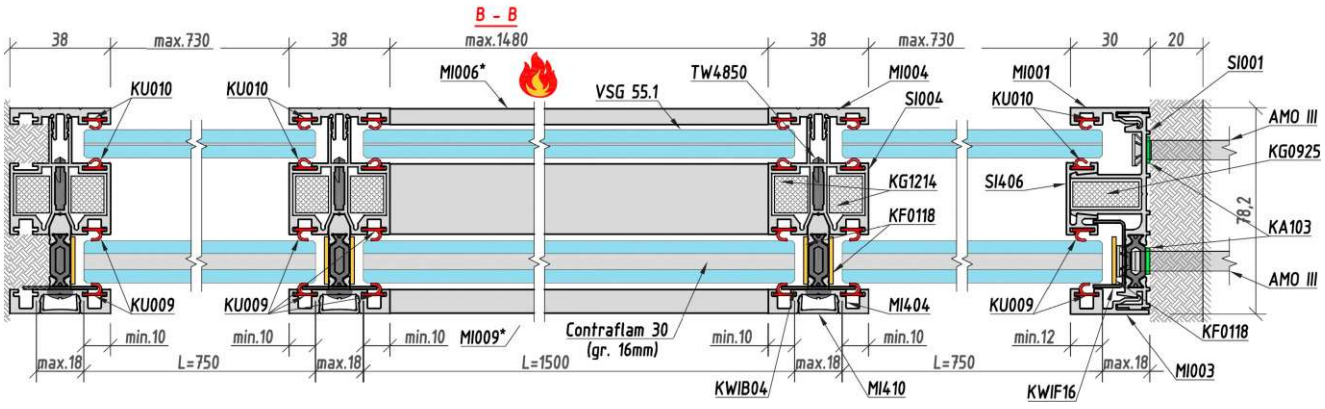



Fig. 2. Section B - B

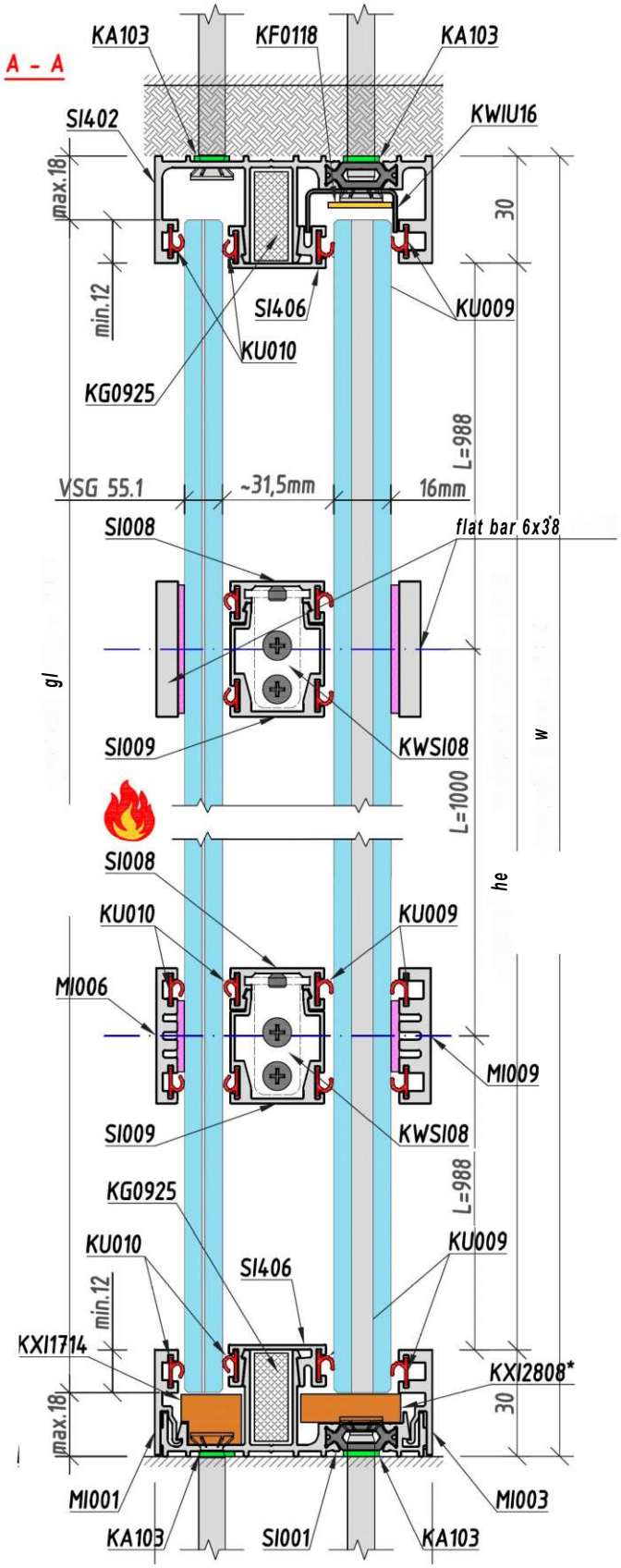



Fig. 3. Section A - A

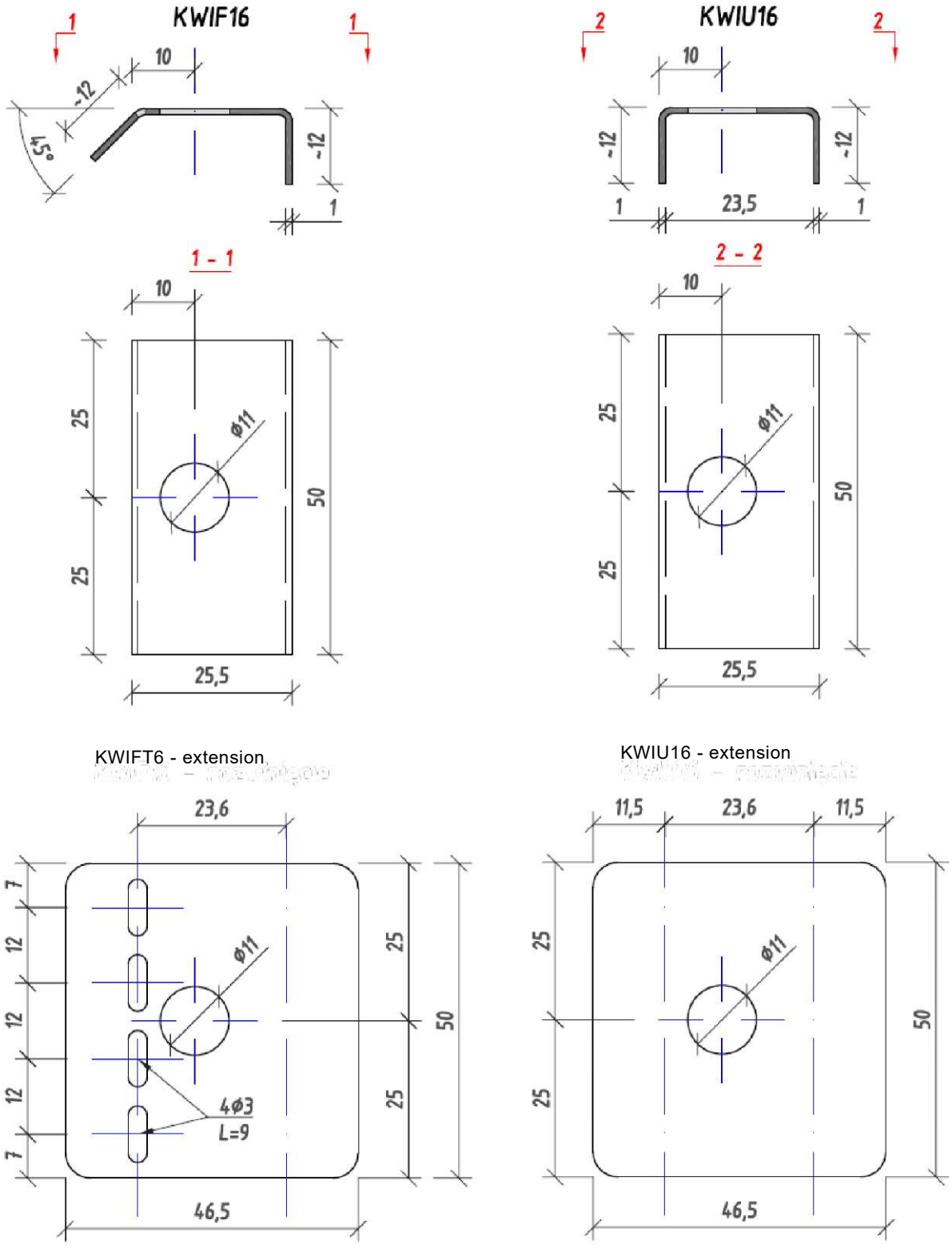



Fig. 4. Angles fixing the glass in the frame profiles

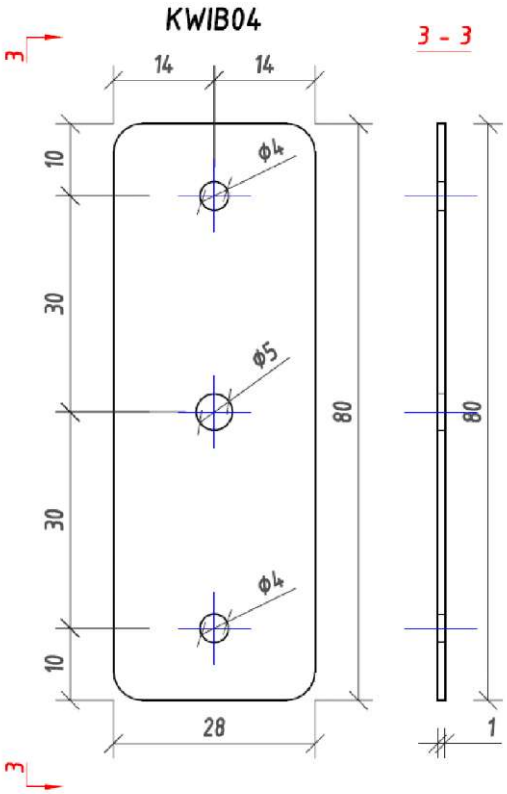



Fig. 5. A plate fixing glass in mullion profiles

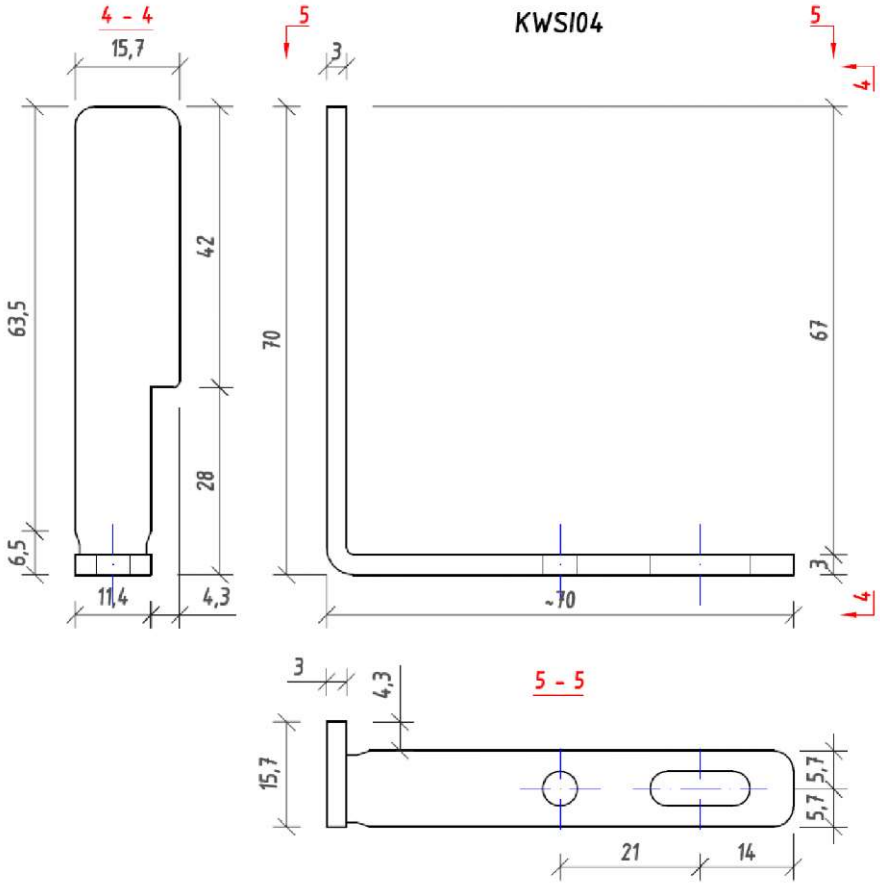



Fig. 6. Angle for mounting SI004 mullion profiles in SI001, SI402 frame profiles

## LEGEND:

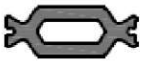
GLUED INTRUMESCENT GASKET ALONG THE ENTIRE LENGTH OF THE PROFILES

GLUED ACOUSTIC GASKET ALONG THE ENTIRE LENGTH OF THE PROFILES

DOUBLE-SIDED ADHESIVE ACRYLIC TAPE ALONG THE ENTIRE LENGTH OF THE PROFILES

HARDWOOD GLASS PAD PLACED POINTLY UNDER THE GLASS

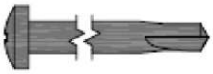
COOLING INSERT ALONG THE ENTIRE LENGTH OF THE PROFILES (made of plasterboards)



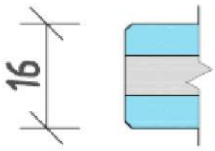
THERMAL SPACER CLAMPED ALONG THE PROFILES

LOCAL FIXINGS FOR FIRE GLASSES MADE OF STAINLESS STEEL (gr. 1mm - spacing according to drawing)

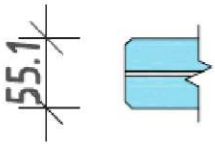
AMO III SCREW, length min. 72mm + mounting slot thickness



Self-drilling SCREW 04.8 - length 50 mm PH2 drive, galvanized




VTROTECH CONTRAFLAM 30 GLASS (thickness 16.0mm) as the weakest of the planned ones for use




LAMINATED GLASS VGS 55.1, as the weakest of those planned for use as a second filling

Fig. 7. Legend of markings

# Appendix No. 2 to Report No. LZP01-06097/21/R28NZP

## Temperature increase charts with the distribution of thermocouples and places of deformation measurement, pressure chart

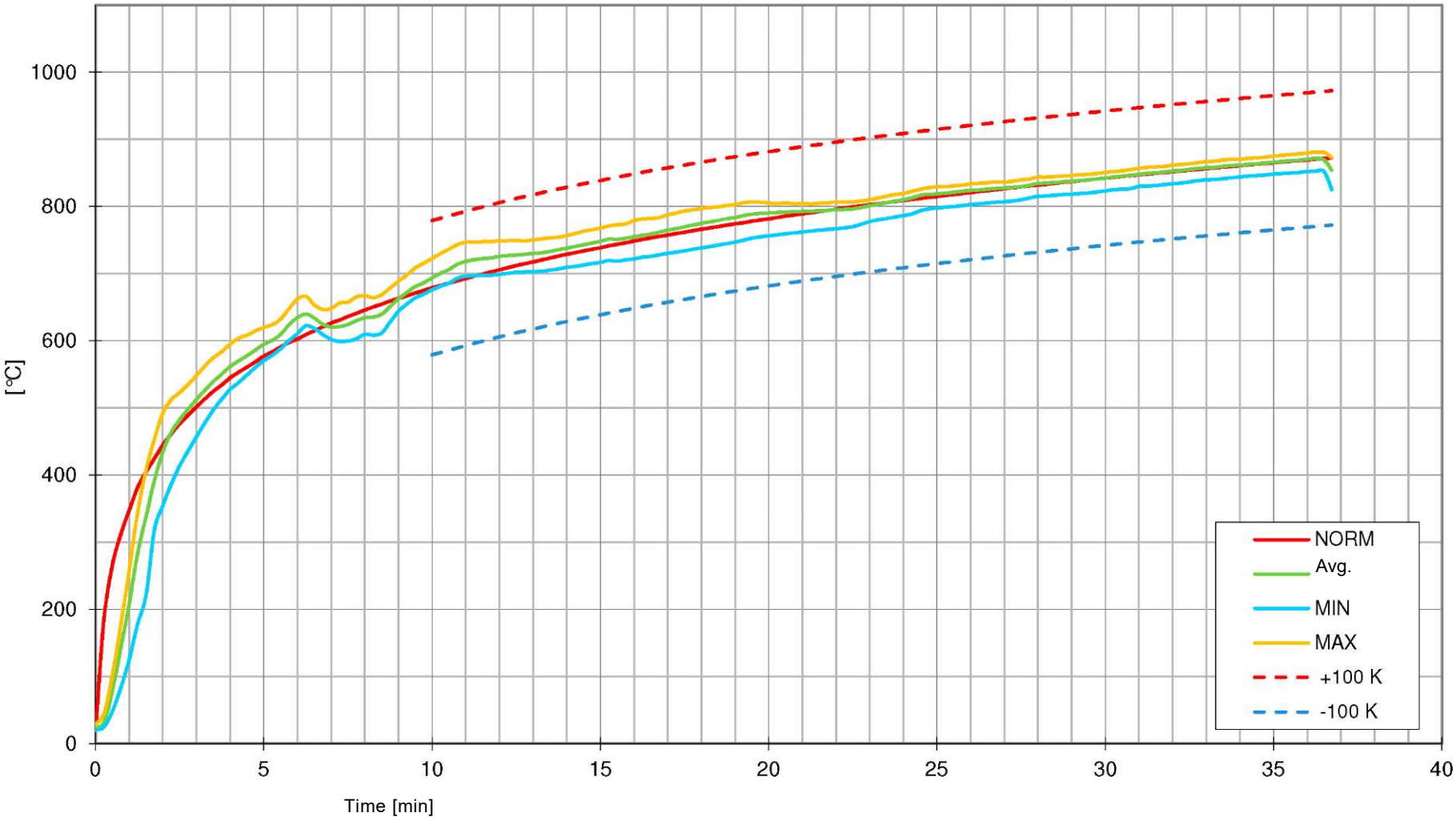



Fig. 1. Graph of the test element temperature heating

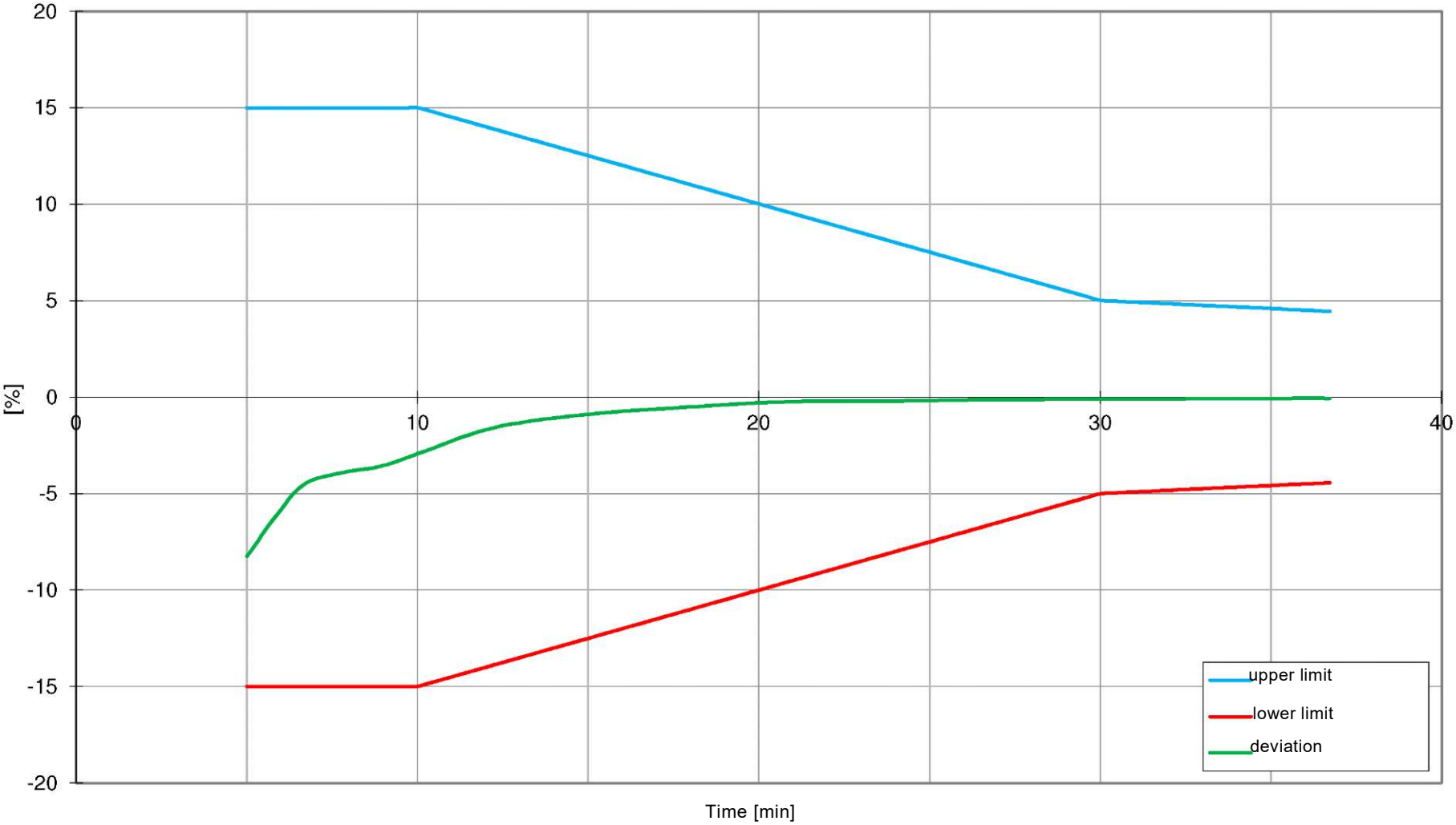



Fig. 2. Heating accuracy graph

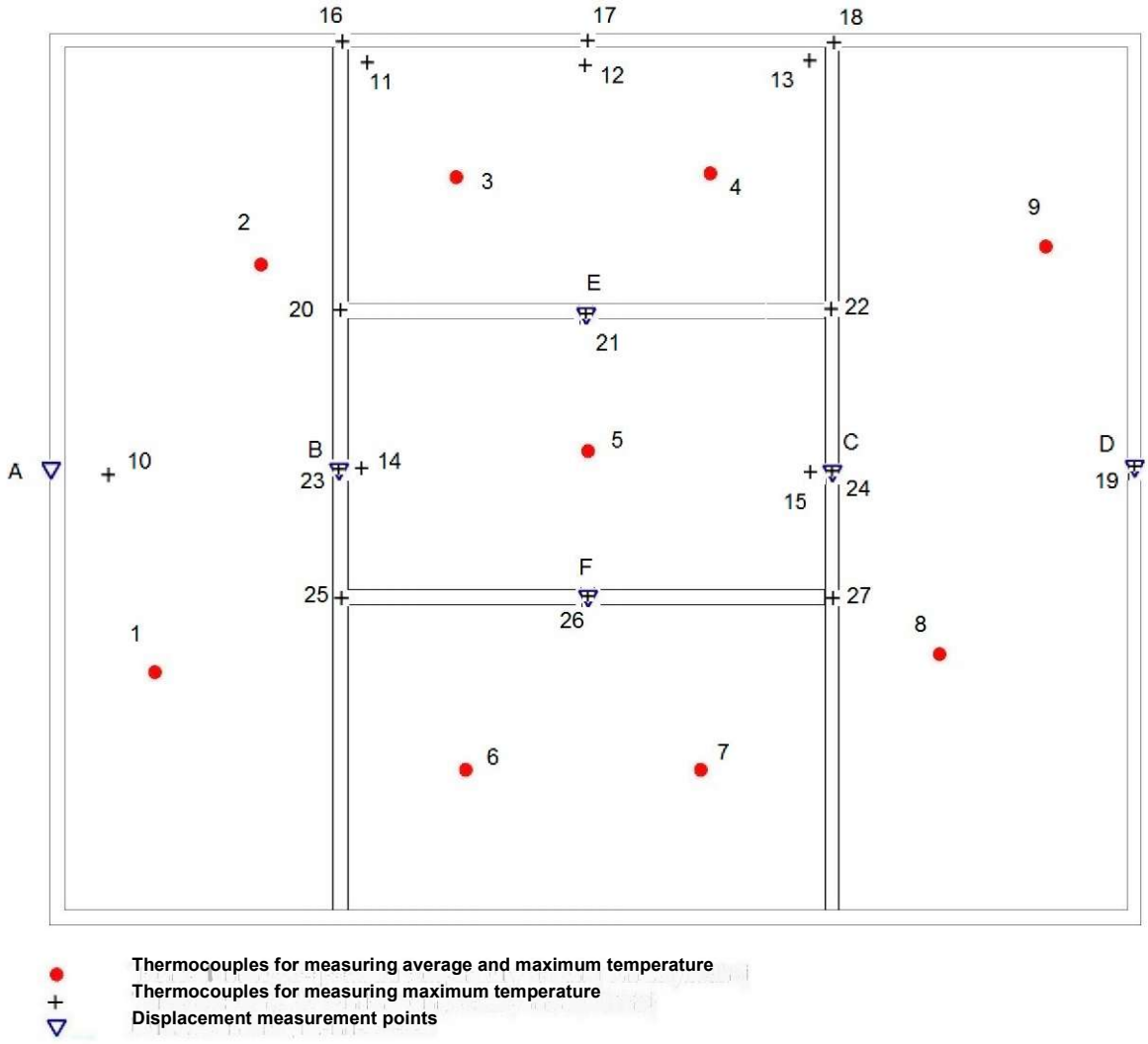



Fig. 3. Distribution of thermocouples on the unheated surface of the test element, numbering of glass panes and places of deformation measurement

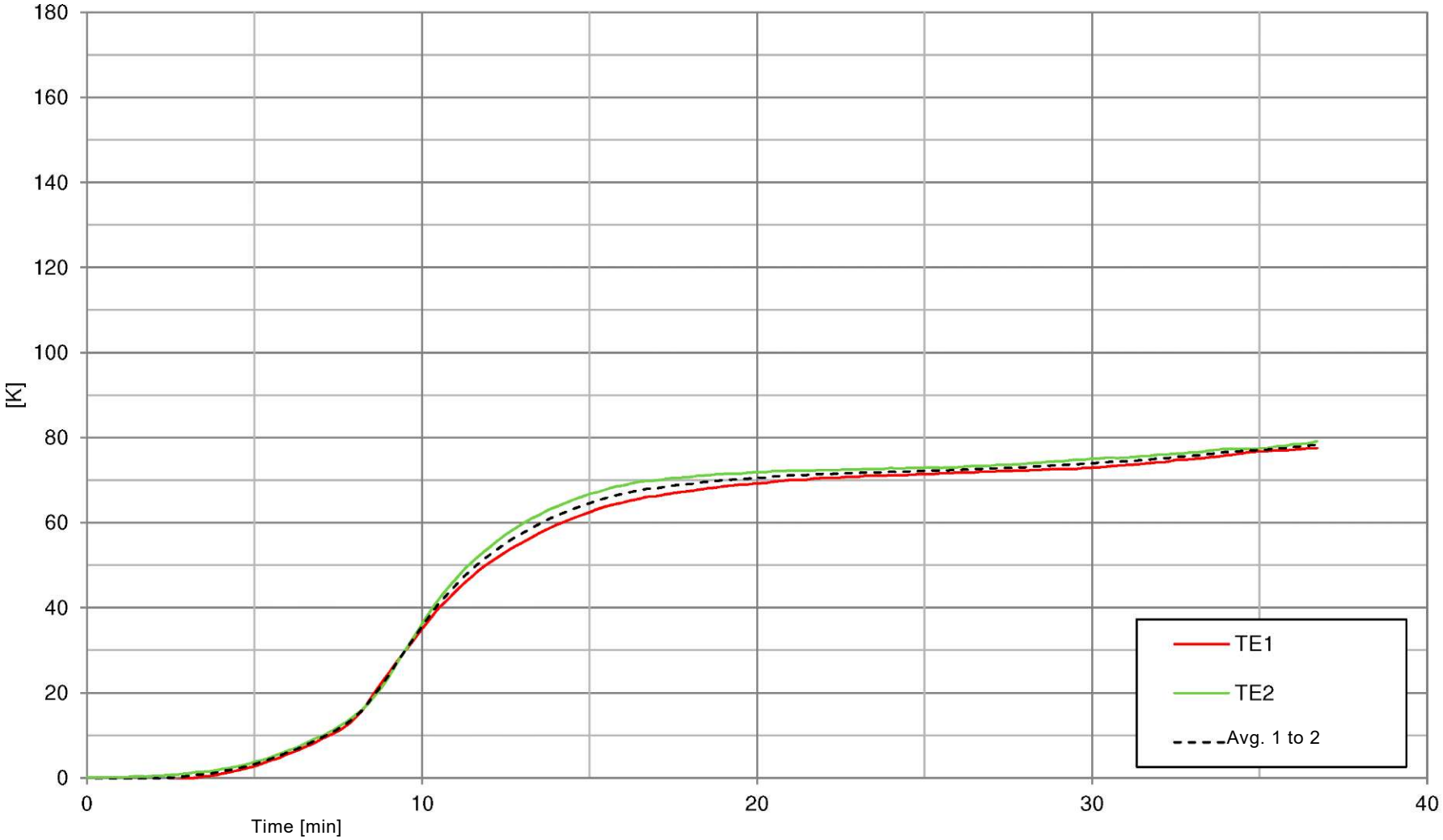



**Fig. 4. Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the average and maximum temperature**

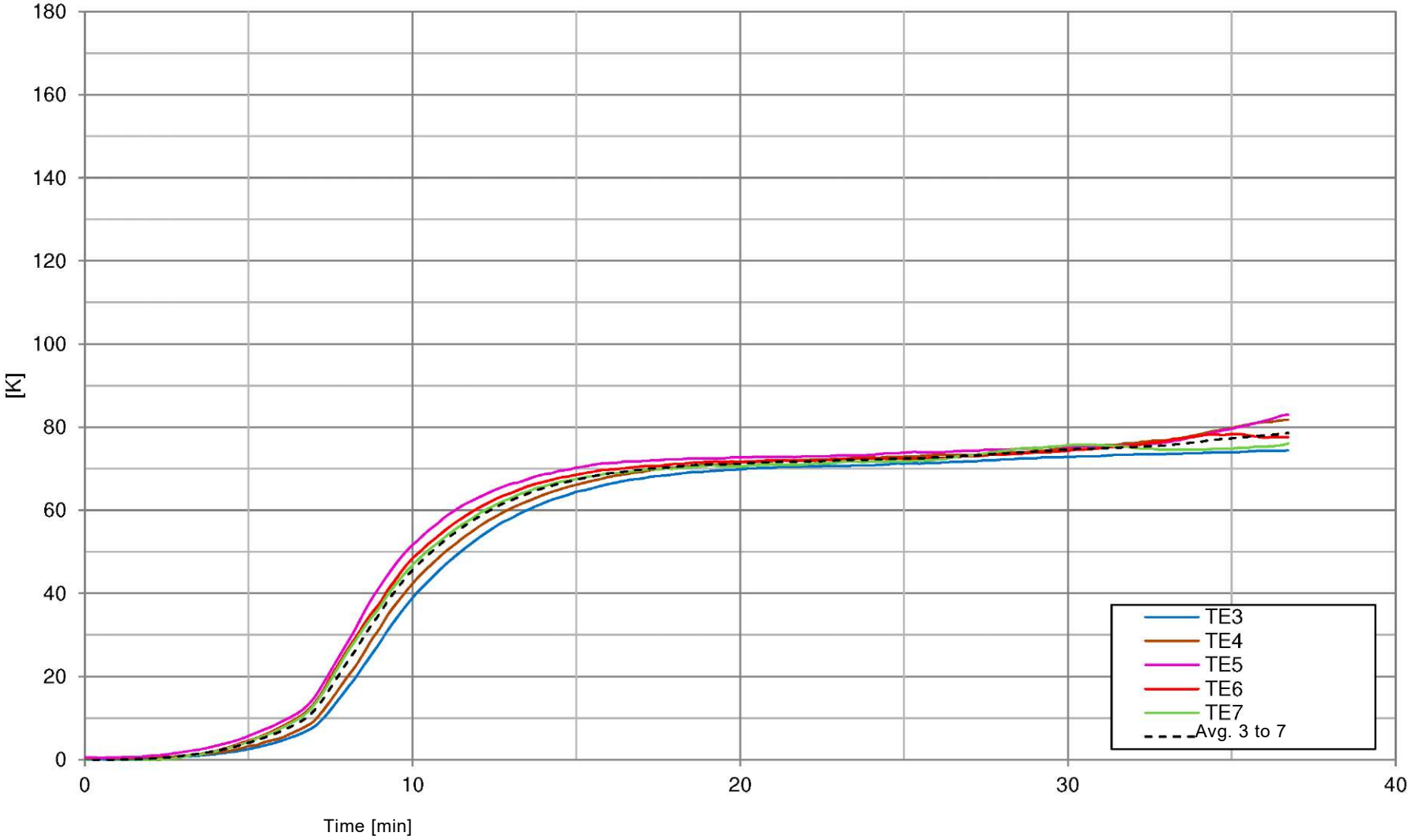



**Fig. 5. Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the average and maximum temperature**

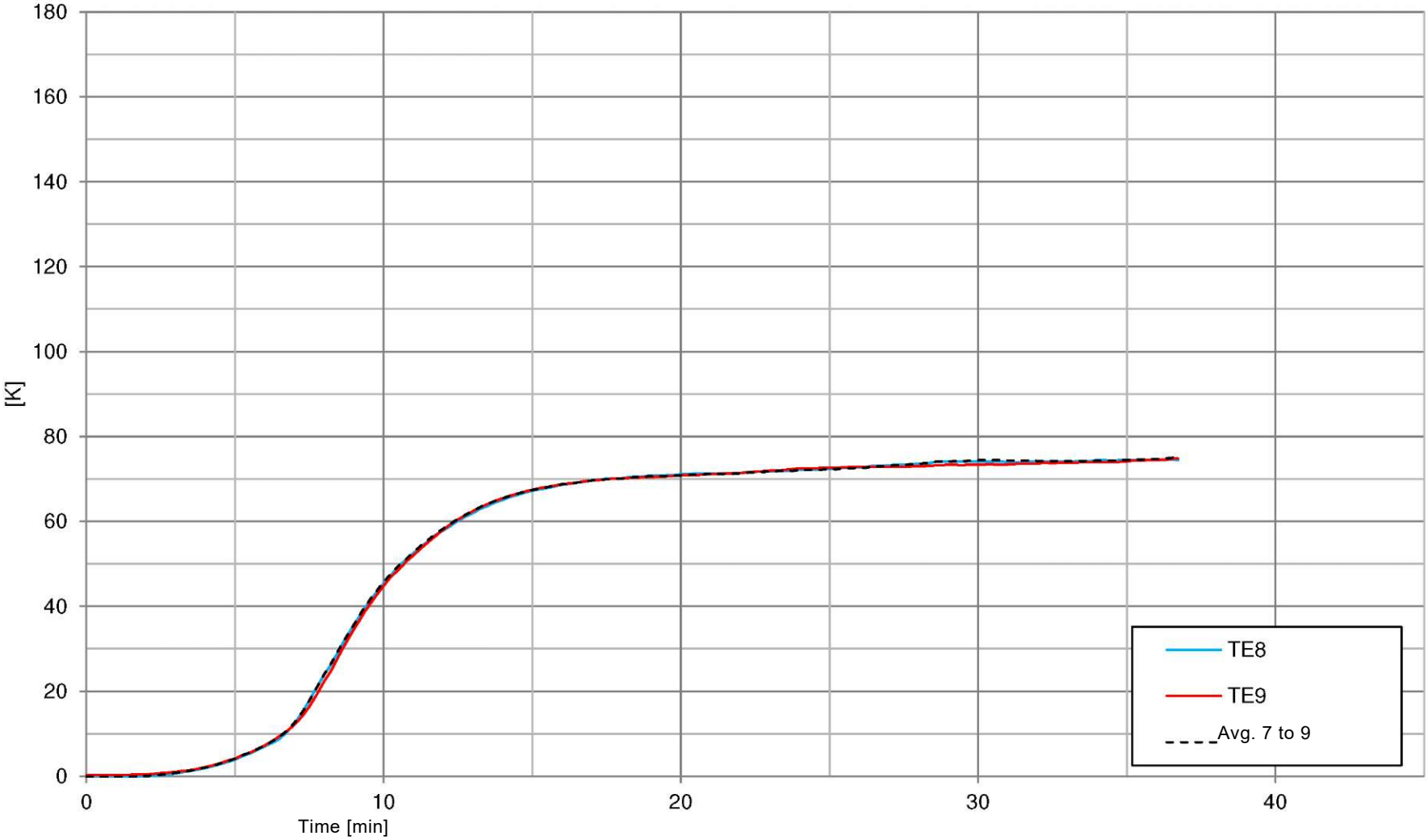



**Fig. 6. Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the average and maximum temperature**

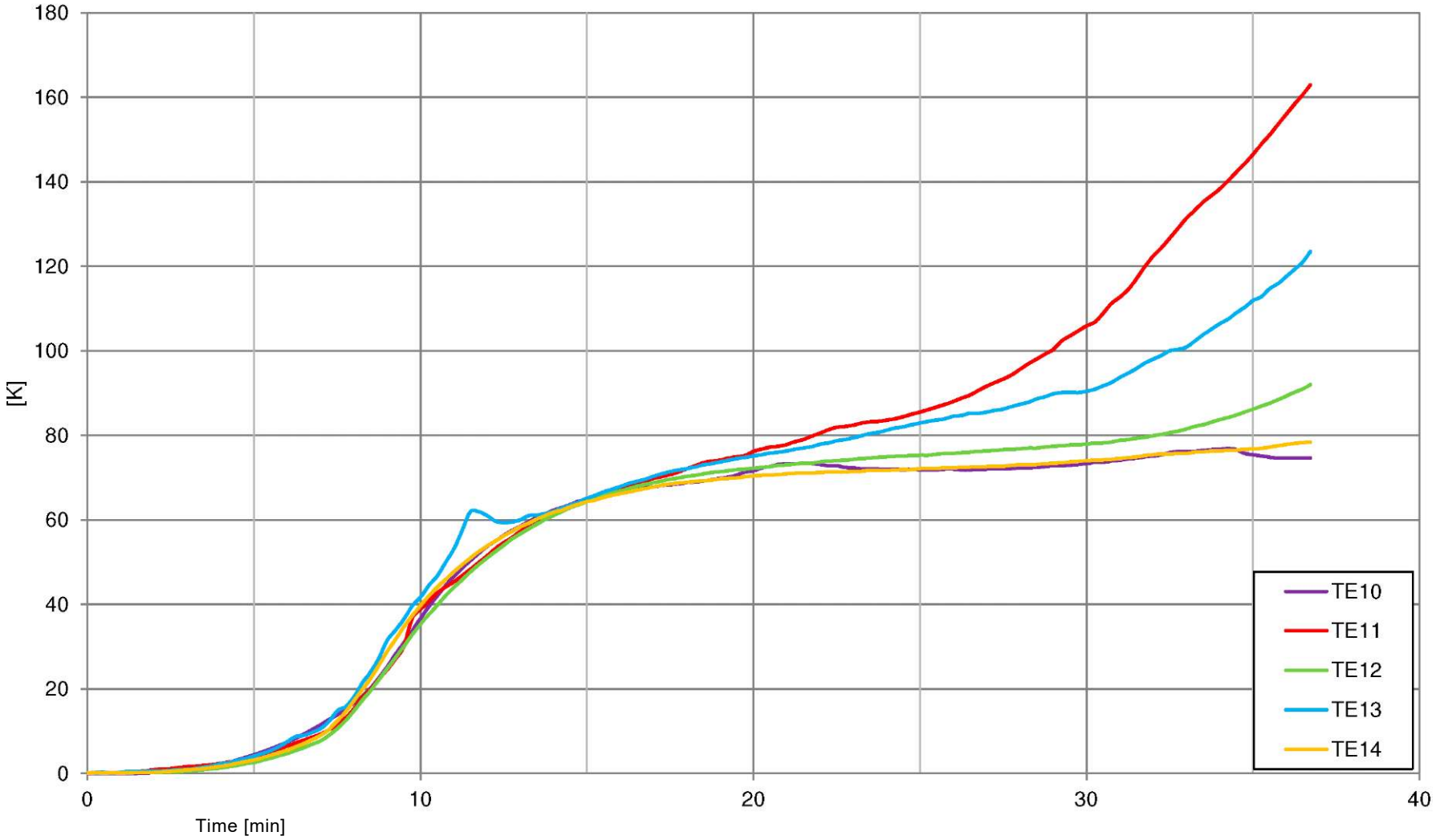



**Fig. 7. Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the maximum temperature**

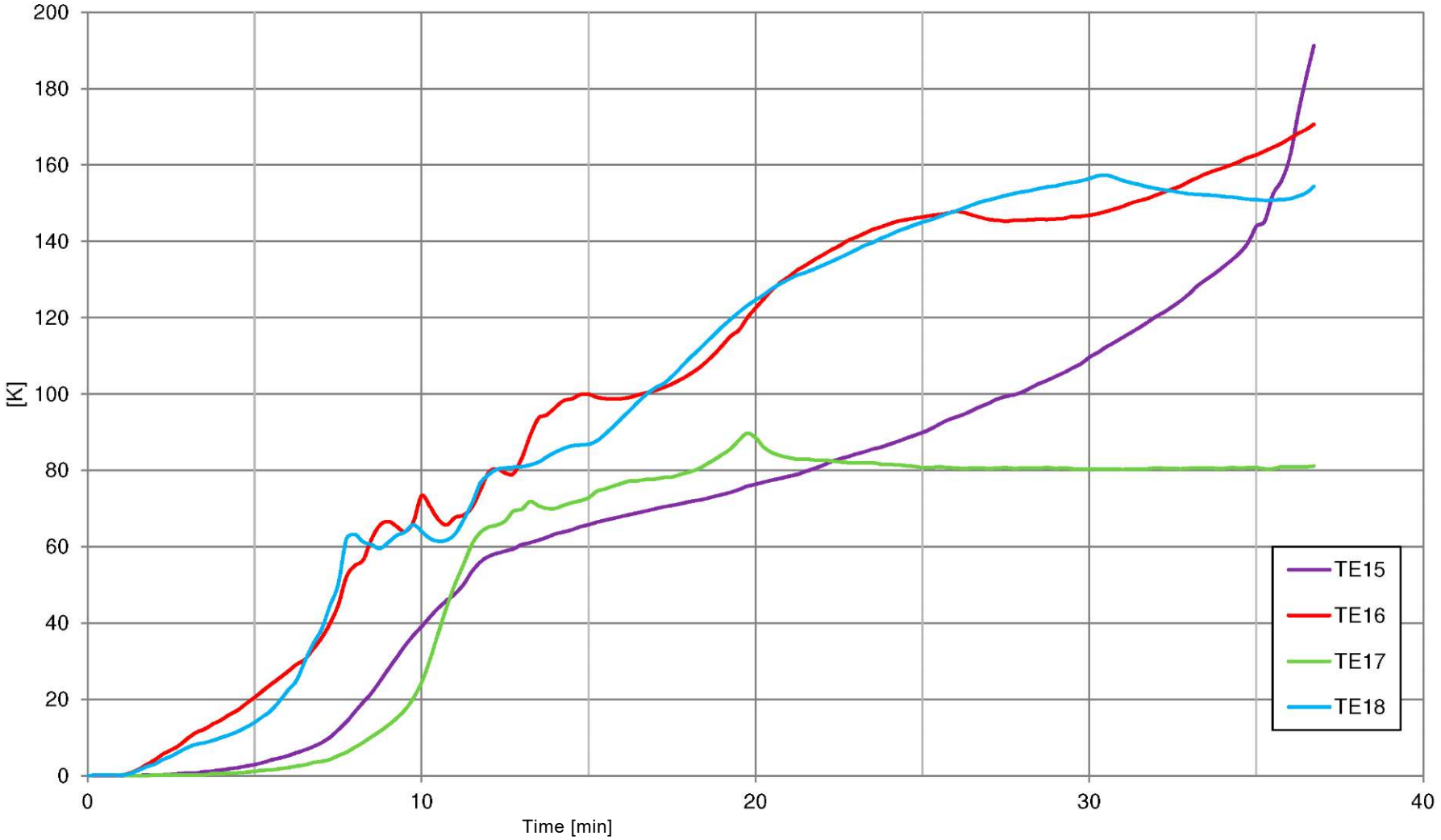



**Fig. 8. Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the maximum temperature**

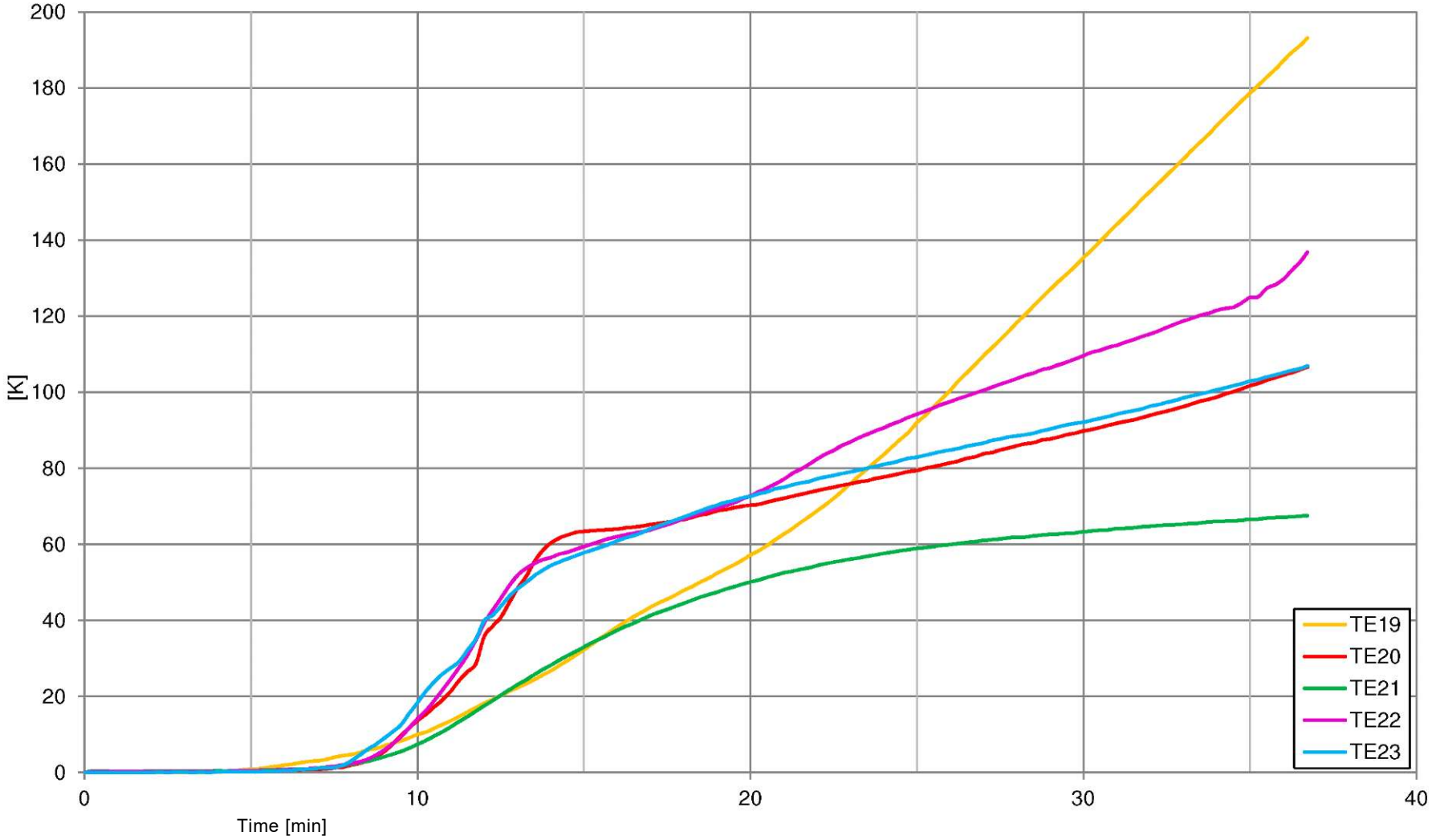



Fig. 9. **Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the maximum temperature on the frame**

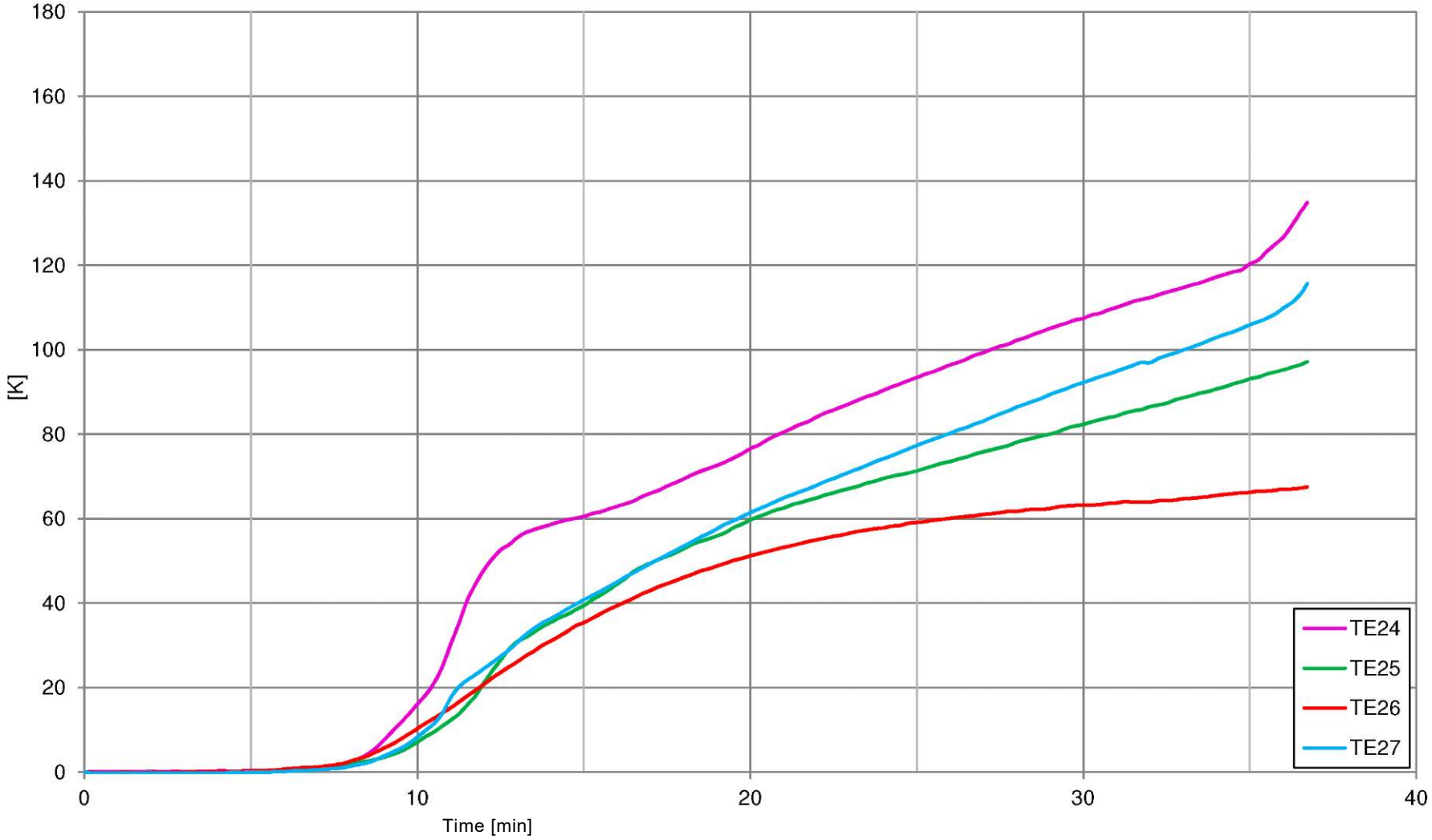



Fig. 10. **Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the maximum temperature on the frame**

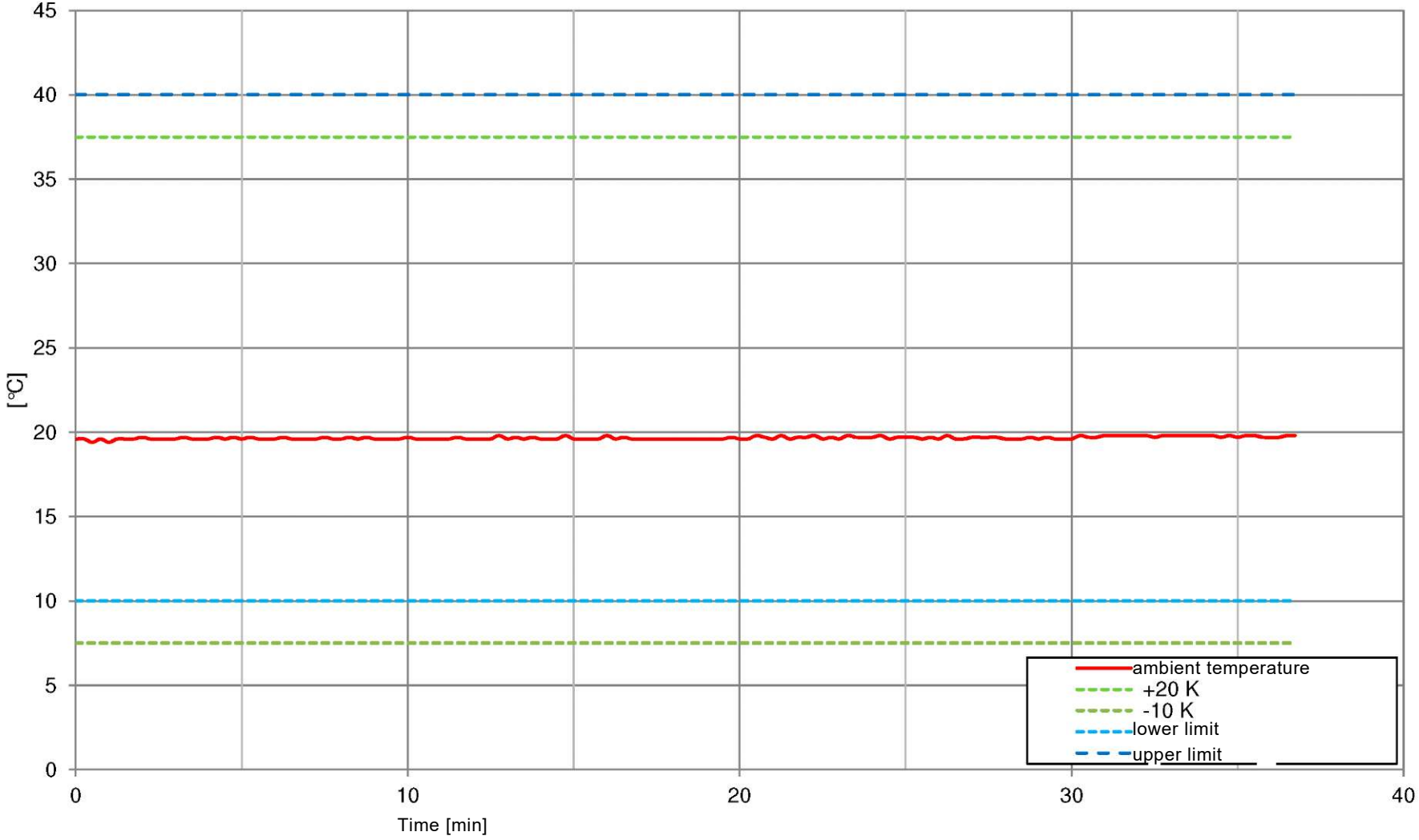



Fig. 11, Ambient temperature

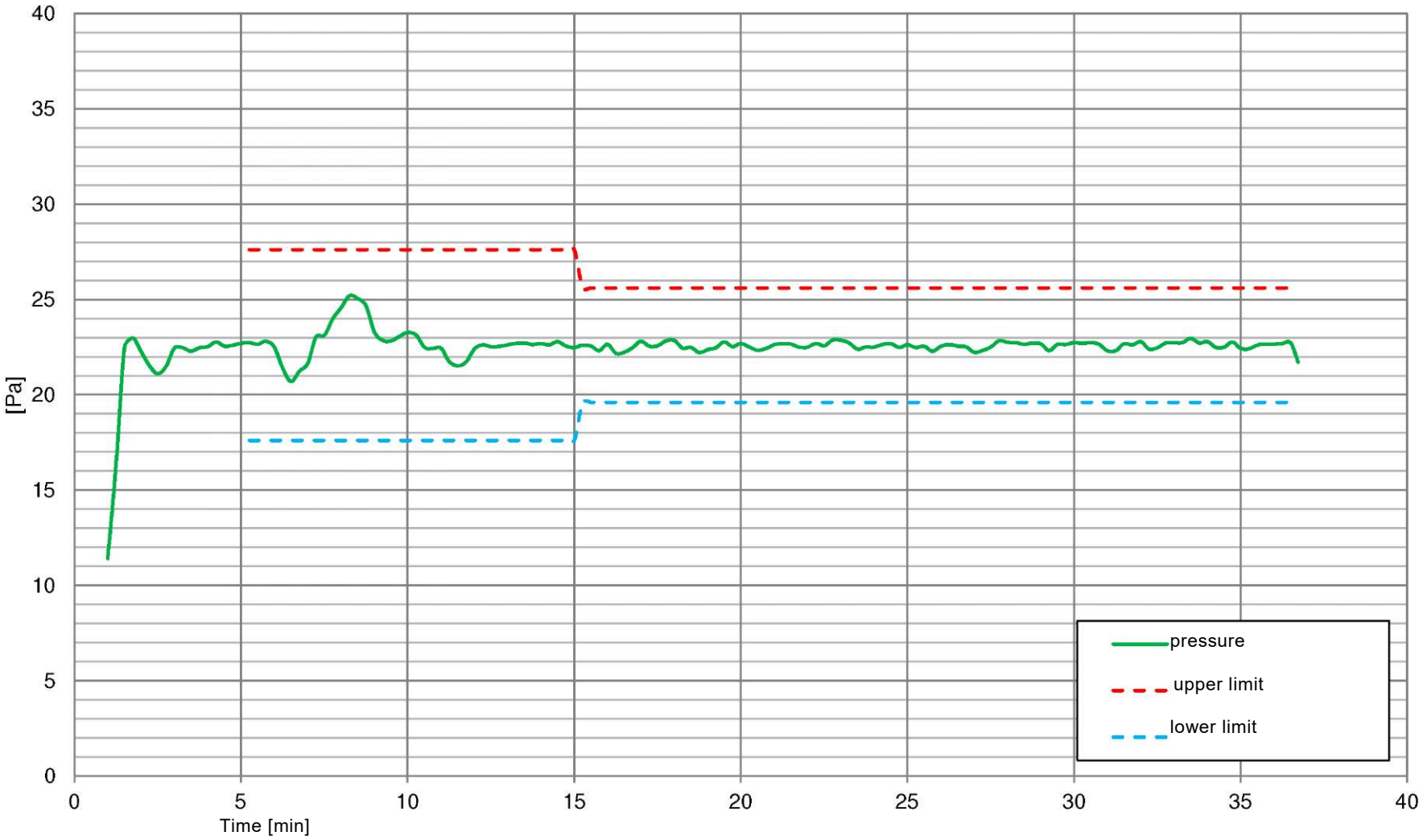



Fig. 12. Graph of pressure in the furnace at time of test

# Appendix No. 3 to Report

# No. LZP01-06097/21/R28NZP

## Photographic documentation

Photo 1. View of the non-heated surface of the test element before testing

Photo 2. View of the non-heated surface of the test element before testing


Photo 3. View of the non-heated surface of the test element at 1 minutes of the test


Photo 3. View of the non-heated surface of the test element at 19 minutes of the test

Photo 5. View of the non-heated surface of the test element at 31 minutes of the test

Photo 5. View of the non-heated surface of the test element at 36 minutes of the test

# Appendix No. 4 to Report No. LZP01-06097/21/R28NZP

## Admission protocol

**Institute of Building Technique (Instytut Techniki Budowlanej)**
**Research Laboratories COMPLEX**

**PROTOCOL OF ACCEPTANCE OF THE SPECIMEN FOR TEST NO. LZP01- 06097/18/R28NZP**

Number of the contract of the incoming document (or other number identifying the test object and the order): L2805

1 Object (name, type) accepted for testing by the Laboratory,
*SILENCE LOFT EI (Vitrintec)*
la. Appropriate number of the standard for the product: -

2. Method of packaging samples of the test object (based on visual inspection): none

3. External condition/characteristics of samples of the test object
*Very good*

The condition and size of the sample/number of elements delivered (etc.) enable tests to be performed in accordance with the specifications

**YES X NO**

**) If NO, the laboratory should not proceed with the tests. Please contact the ordering party

4. Labeling of samples of the test object by manufacturer: none

4a. information about the test object
- the manufacturer's name: *VITRINTEC SP. Z O.O. SP.K.*
place of production (name and address of production plant): *own facility,*
place of sampling
- production line -
batch: no.: test batch size 1 sample
production date: 00.2021
- type, kind and variety of product: silence loft EI
number/weight of samples 2x1m
Other information:
Or***)
As in**. Appendix No. 1** which constitutes an annex to this Protocol

5. CLIENT (Name, address):
5a X Manufacturer
□ Authorized representative
□ Importer

6. Other information regarding the acceptance of samples of the test object: Assembly by the Client

| Supplier / | Recipient |
|---|---|
| /Text illegible/ | /Text illegible/ |
| First name and last name. | First name and last name |
| Signature | Signature |

Pionki, 27/07/2018

* - if applicable
***) - If information from point 4a are included in the collection protocol or another document signed by the ordering party, you can include this document without having to copy the information)