Instytut Techniki Budowlanej
(Institute of Building Technique)
RESEARCH LABORATORIES COMPLEX
accredited by the Polish Center for Accreditation
accreditation certificate no. AB 023

AB 023

FIRE TEST DEPARTMENT

FIRE TEST LABORATORY

TEST REPORT NO. LZP04-06097/18/R03NZP

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.** (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.* *ul. Karola Olszewskiego 19 C* *25-663 Kielce*
Name and address of the Production Plant:	*VITRINTEC Sp z o.o.* *ul. Karola Olszewskiego 19 C* *25-663 Kielce*
Product name:	**Aluminum profile wall, without muntins, in the** SILENCE EI30 system by VITRINTEC, filled with **Contraflam Structure 30** glass made by Vetrotech Saint-Gobain
Reference document for the product:	
Information regarding the product and the declared scope of use and the resulting system for assessing and verifying constancy of performance properties:	*Non-load-bearing walls,* ***System 3***
Designation of the construction product type:	*The manufacturer did not provide a unique identification code for the product*

INFORMATION REGARDING THE RESEARCH SUBJECT

Research object:	*A detailed description and identification of the research object can be found in point 1.4 of this report.*

description, condition and identification	*Technical and drawing documentation 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.* *Information regarding the test object obtained from the Client is included in the test object acceptance report no. LZP04- 06097/18/R03NZP (Appendix No. 4 to this report).*
Date of acceptance of the test object:	*2019-01-21*
Test object acceptance procedure, Test object acceptance protocol number:	*The object was admitted to the laboratory in accordance with Procedure PZ ZLB 18, admission protocol number: No. LZP04-06097/18/R03NZP (Appendix No. 4 to this report).*

RESEARCH INFORMATION

Research start date:	*2019-01-21*
Test completion date:	*2019-01-21*
Test method/procedure:	***PN-EN 1364-1:2015-08*** *Fire resistance tests of non-load-bearing elements* *Part 1: Walls.*

1. DESCRIPTION OF THE TEST ELEMENT

1.1. Size of the 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 Contraflam Structure 30 fire-resistant glass.

1.3. Verification of test elements

Before and after the fire resistance test, the compliance of the data (to the extent possible) contained in the documentation provided by the Ordering Party with the delivered test element was checked. The technical description of the test element below contains the nominal values declared by the Ordering Party. If the nominal values declared by the Ordering Party differ significantly from the values measured by the Laboratory, the technical description includes the nominal values declared by the Client marked as (D) and/or the values measured by the Laboratory marked as (M).

1.4. Description of the test element

A test element, a non-load-bearing partition wall, without mullions of the SILENCE EI30 system, was made of elements of the SILENCE EI30 system and installed by VITRINTEC Sp z o. o. ul. Karola Olszewskiego 19 C, 25-663 Kielce. The structure of the tested wall is shown in Fig. 1 ÷ 5 in Appendix No. 1.

The test element had the following dimensions: 3024 x 3000 mm (width 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),
- SI002 - frame profile (upper edge),
- SI003 - clamped strip in the area between the glass on SI001 and SI002 profiles,
- MI001 - glazing bead attached to SI001 profiles.

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 profile

parts of the profiles mounting the fire glass. 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 and SI002 were filled, in accordance with Figures 2 and 3 in Appendix No. 1, with insulating inserts made of plasterboard with cat. no. KG0926, with cross-section dimensions of 9.5 x 26 mm.

The wall was filled with Contraflam Structure 30 glass panes from Vetrotech Saint - Gobain, 23 mm thick, and laminated glass type VSG 55.1 gr. 10.38 mm with dimensions (numbering according to Fig. 3 in Appendix No. 1; width x height):

- Glass no. 1: 750 x 2970 mm,
- Glass no. 2: 1500 x 2970 mm,
- Glass no. 3: 750 x 2970 mm.

Contraflam Structure 30 glass was mounted on hardwood under-glass blocks (cat. no. KXI2204), with dimensions of (width x length x thickness) 22 x 80 x 4 mm, two blocks for each glass. The under-glass blocks were placed at a distance of 100 mm from the corners of the glass.

The Contraflam Structure 30 glass was attached by inserting the glass into closed profiles (upper, cat. no. SI002), in the axis of the polyamide gasket, and then into the lower and side profiles (SI001), also in the axis of the polyamide gasket, and latching the glazing beads with cat. no. MI001. Depth of insertion of the glass into the profiles: 16 mm for the lower profiles, 14 mm for the upper and side profiles. Bent steel sheets were also used to fasten the glass, cat. no. KWI23 (attached to SI002 profiles) and cat. no. KWI23-0 (attached to SI001 profiles). Dimensions of the sheets are shown in Fig. 5 in Appendix No. 1. The sheets were attached to the aluminum profiles of the frame using steel screws of the type AMO III TYP 1 (conical-flat head screws) with a spacing as shown in Fig. 1 in Appendix 1 (two screws for each mounting point).

Seals made of TPE thermoplastic elastomer with the addition of non-flammable material, type KB-101, manufactured by AIB Sp. z o.o., are used between the Contraflam Structure 30 glass and aluminum profiles, cat. no. KUI010.

Vertical joints of Contraflam Structure 30 glass panes, with a width of 4 mm, were made using silicone type (DC) 895 from Dow Corning (cat. no. KSD895) and the intumescent material Kerafix FXL 200 with a cross-section 2 x 1 3 mm by Rolf Kuhn, cat. no. KF0213.

On the side and top profiles, along their entire length on the glazing side, strips of FXL 200 intumescent tape from Rolf Kuhn were glued, with cross-section dimensions of 20 x 1 mm, cat. no. KF0120.

After installing Contraflam Structure 30 glass, VSG 55.1 glass was installed in the structure profiles. VSG 55.1 type glass was mounted on hardwood glass blocks (cat. no. KXI1710), with dimensions of (width x length x thickness) 10 x 15/17 x 40 mm, two blocks for each glass. The under-glass blocks were placed at a distance of 100 mm from the corners of the glass.

The VSG 55.1 glass was attached by inserting the glass into closed profiles (upper, cat. no. SI002) and then into the bottom and side profiles (SI001), and clamping the glazing beads with cat. no. MI001. Depth of insertion of the glass into the profiles: 16 mm for the lower profiles, 14 mm for the upper and side profiles. Seals made of TPE thermoplastic elastomer with the addition of non-flammable material, type KB-101, manufactured by AIB Sp. z o.o., are used between the VSG 55.1 glass and aluminum profiles, cat. no. KUI010.

Vertical joints of VSG 55.1 glass panes, with a width of 4 mm, were made using TPE thermoplastic elastomer seals cat. no. KUM OH with an "H"-shaped cross-section and double-sided tapes, cat. no. KY060, type TESA ACX PLUS 7054 by TESA.

1.5. Selection of test elements

The laboratory participated in the selection of the test element. **2.**

2. INSTALLATION OF THE TEST ELEMENT

The test element was installed in a mounting structure made of aerated concrete blocks with a density of 650 kg/m^3 and 120 mm thick with a reinforced concrete lintel made of ordinary concrete (density 2200 kg/m^3) with a cross-section of 120 x 180 mm (width x height).

The aluminum frame was attached to the reinforced concrete lintel and to the masonry wall along the upper, lower and right vertical edges (looking from the unheated side) using galvanized steel screws type AMO III TYP 1 (conical-flat head screws) 72 mm long at a spacing according to Fig. 1 in Annex 1 (two screws for each mounting point).

The 20 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 left edge of the wall was left unattached (free edge). The space between the mounting structure and the glass pane, approximately 50 mm wide, was filled with mineral wool with a density of approximately 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 7 days before the test (with the reinforced concrete lintel being made three months before the test), and the test element was prepared by the Ordering Party at the Fire Test Laboratory in 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 28 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: 16.5°C. Relative humidity of the ambient air before the test, measured using a thermohygrometer installed in the test room: 28%.

4.2. Temperature in the furnace

The temperature in the furnace was measured using 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 0.46 m above the top edge of the test element and was maintained at 23.9 Pa, which corresponded to a pressure of 20 Pa at the reference point. The pressure chart in the furnace is shown in Fig. 11 in Appendix No. 2.

4.4. Temperature of the unheated surface of the element

The temperature of the unheated surface of the test element was measured using 22 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 1363-1:2012, is shown in Fig. 10 in Appendix No. 2.

5. RESEARCH RESULTS

The test lasted 37 minutes and 29 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 ÷ 9 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	37 without loss	-
2.	Cotton tampon catches fire	37 without loss	-
3.	eler gauges: 6 mm feeler gauge, 25 mm feeler gauge		
		37 without loss	-
		37 without loss	-
	Fire insulation criterion	**Time**	**Location**
4.	Average temperature increase by 140 °C above the initial average temperature	37 without loss	
5.	Maximum temperature increase by 180 °C above the initial average temperature	37 without loss	
6.	Maximum temperature increase by 180 °C above the initial temperature (other fixed thermocouples, if used, or movable thermocouple)	37 without loss	

5.3. Displacements

The places of measurement of wall 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**
0'	0	0	0	0	0
10'	+3	+5	+8	+6	+4

20'	+5	+10	+5	+10	+4
25'	+5	+11	+7	+11	+5
30'	+6	+13	+9	+14	+5

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

6. OBSERVATIONS

0' - start of the test,

2'28" - the inner layer of the glass pane in the glass no. 2 is detached (glass according to Fig. 3, Appendix No. 2);

2'41" - the inner layer of the glass pane in glass no. 2 is detaching;

2'50" - the inner layer of the glass pane in glass no. 1 is detaching;

3'55" - smoke between the glass panes;

4'27" - the inner layer of the glass pane in glass no. 3 breaks and falls into the furnace;

6'40" - the inner layer of the glass pane in glass no. 1 and 2 breaks and falls into the furnace;

26'10" - placing the movable thermocouple in the upper right corner of the test element test where intense smoking and blackening were observed T = 93°C;

33'40" - fragments of gel fall from the inner layer of glass no. 2 into the furnace;

37'29" - **end of test** in consultation with the Client.

7. PHOTOGRAPHIC DOCUMENTATION

The view of the wall before the test is illustrated in Photo 1 + 2, during the test in Photo. 3 ÷ 6, and after the test in Photo 7+ 8 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. ATTACHMENTS

- 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,

M.Sc. Eng. Bartłomiej Sędłak

Name and posifion

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

Title, Name and Surname

Warsaw, March 27, 2019

Appendix No. 1

to Report No. LZP04-06097/18/R03NZP

Technical Documentation

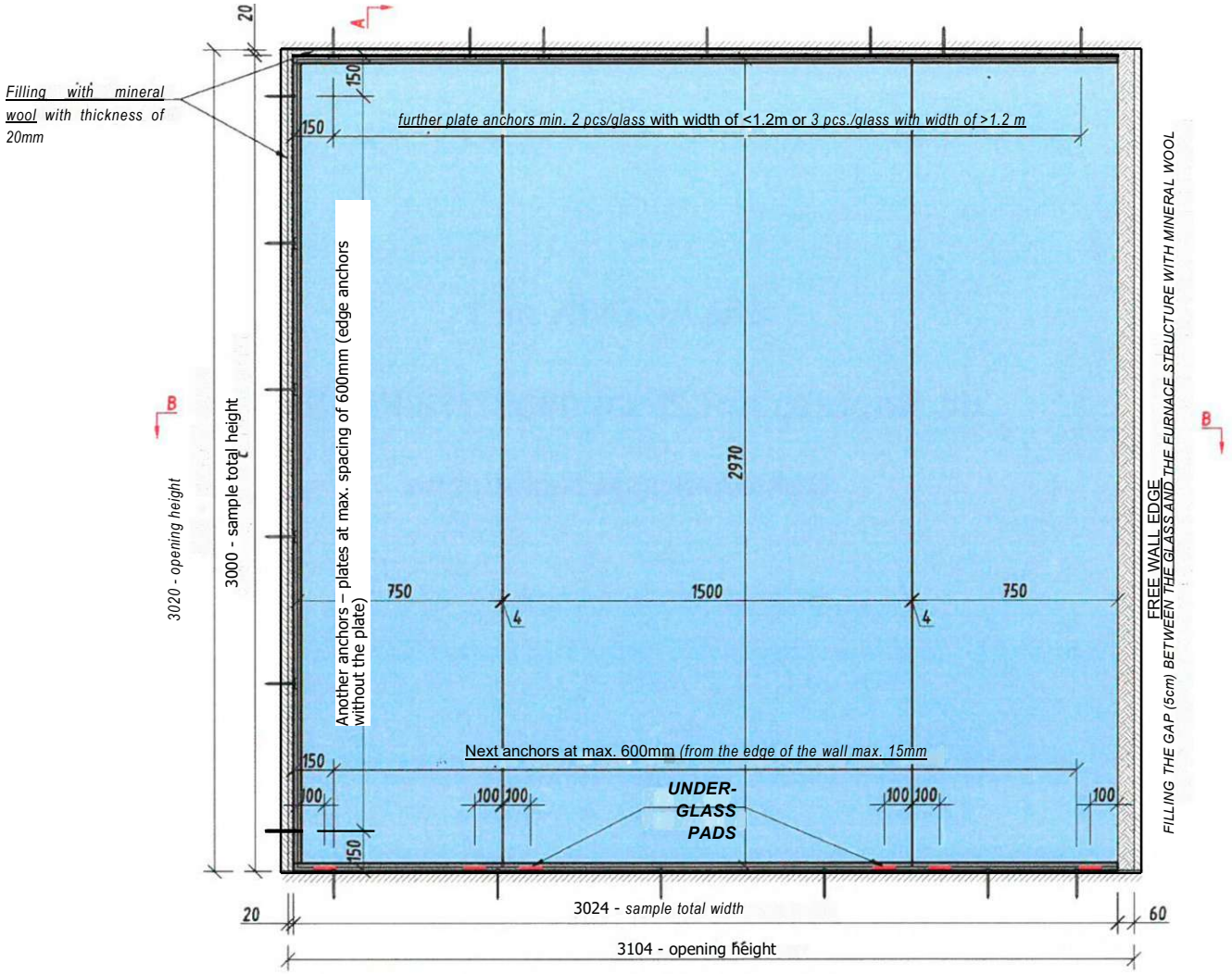

Fig. 1. General view of the test element from the heated side.
Designation of cross-sections and attachment points

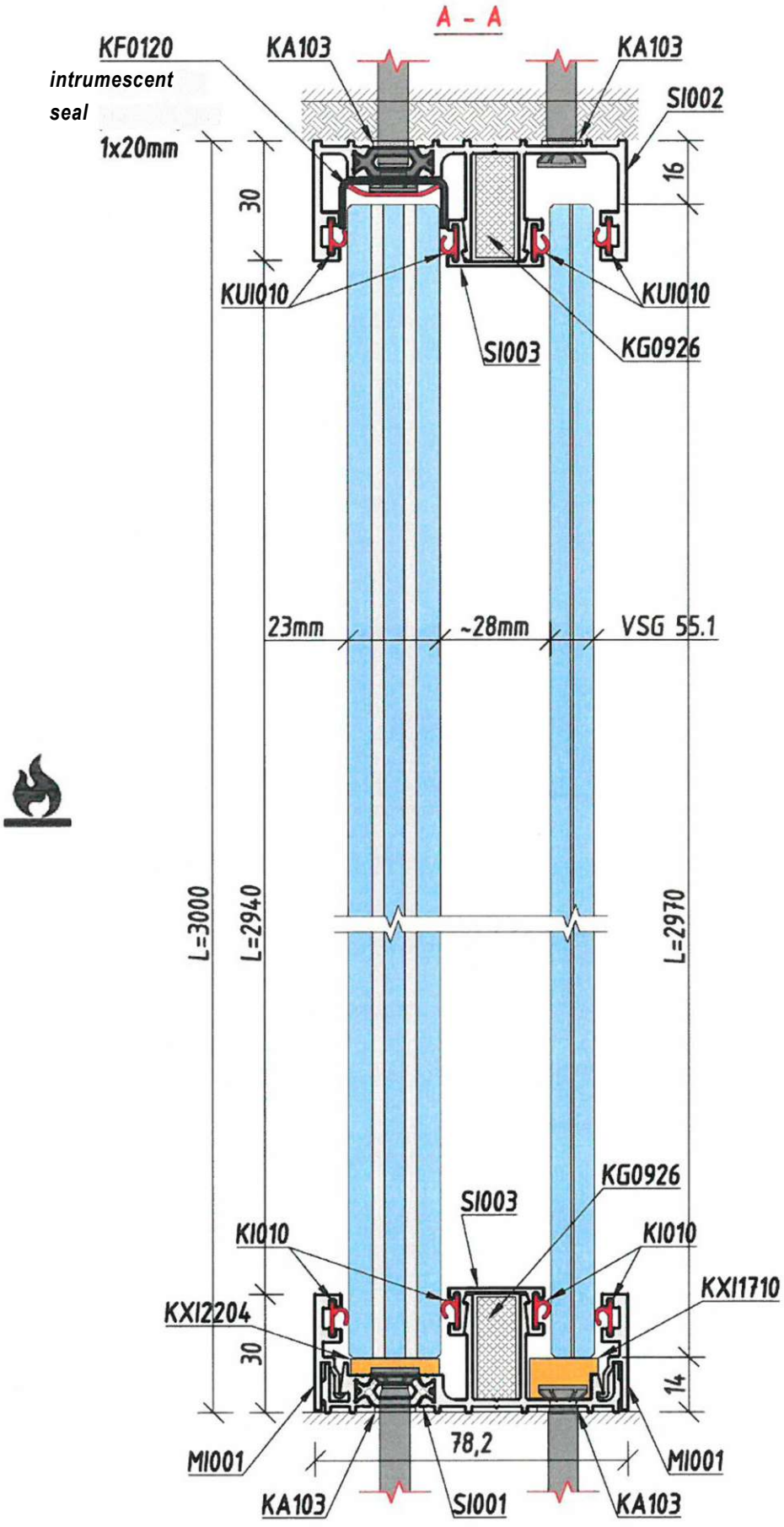

Fig. 2. Section A - A

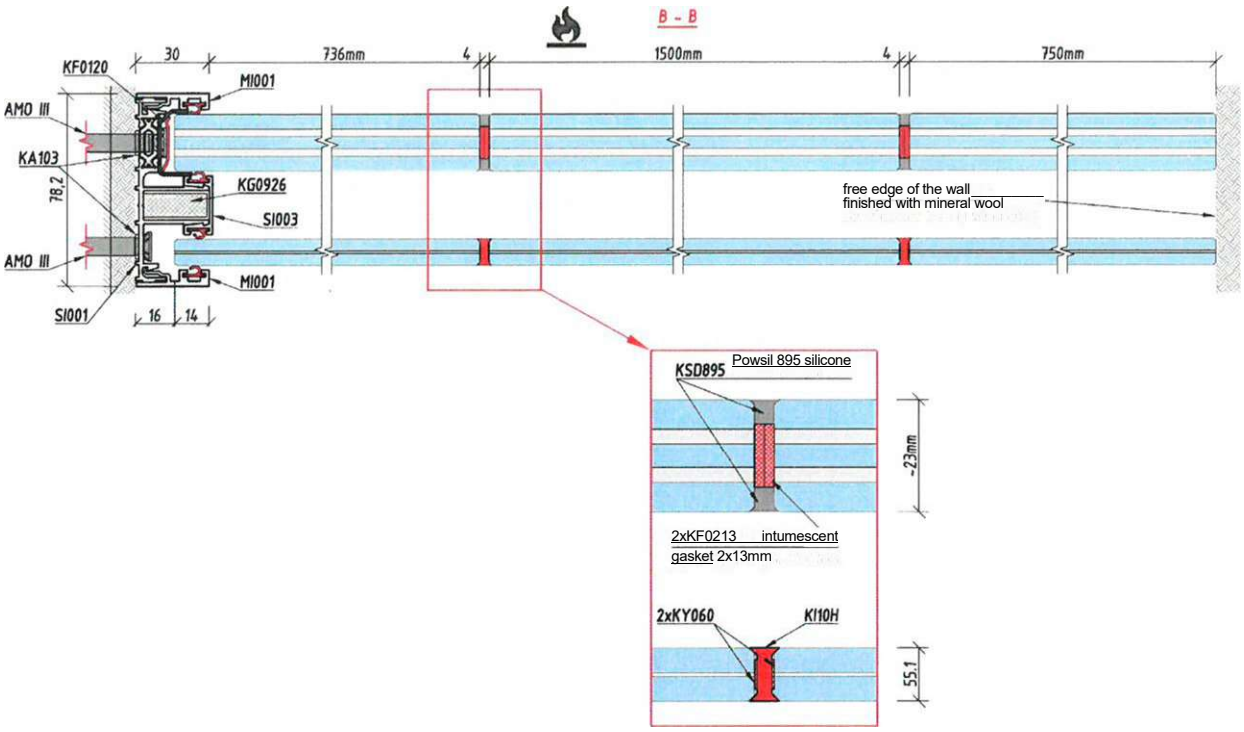

Fig. 3. Section B - B

LEGEND:

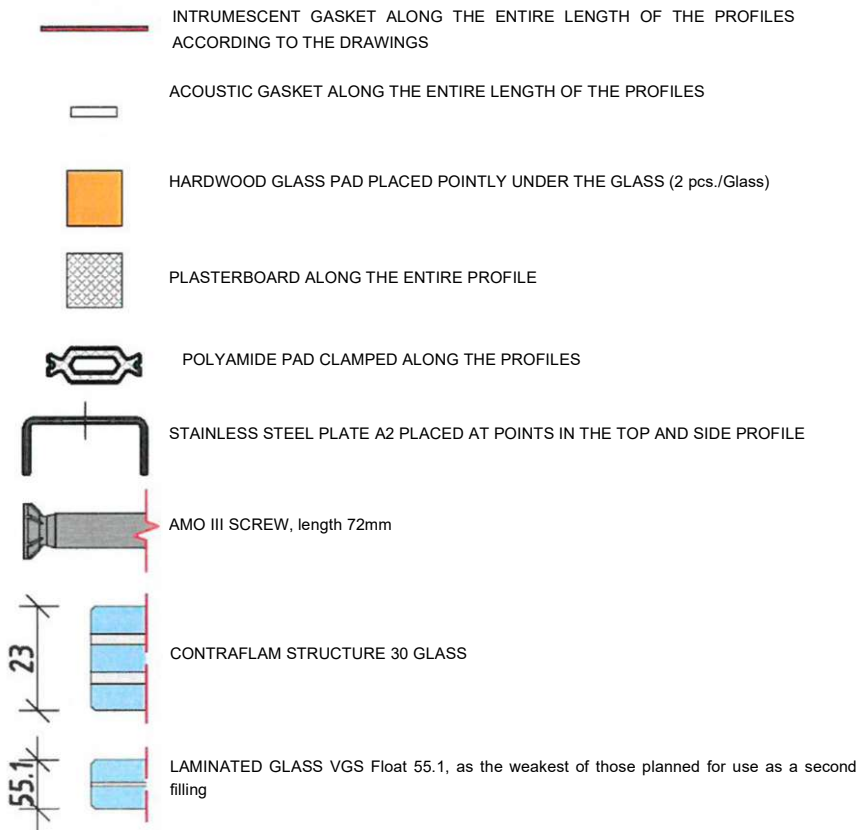

Fig. 4. Legend of markings

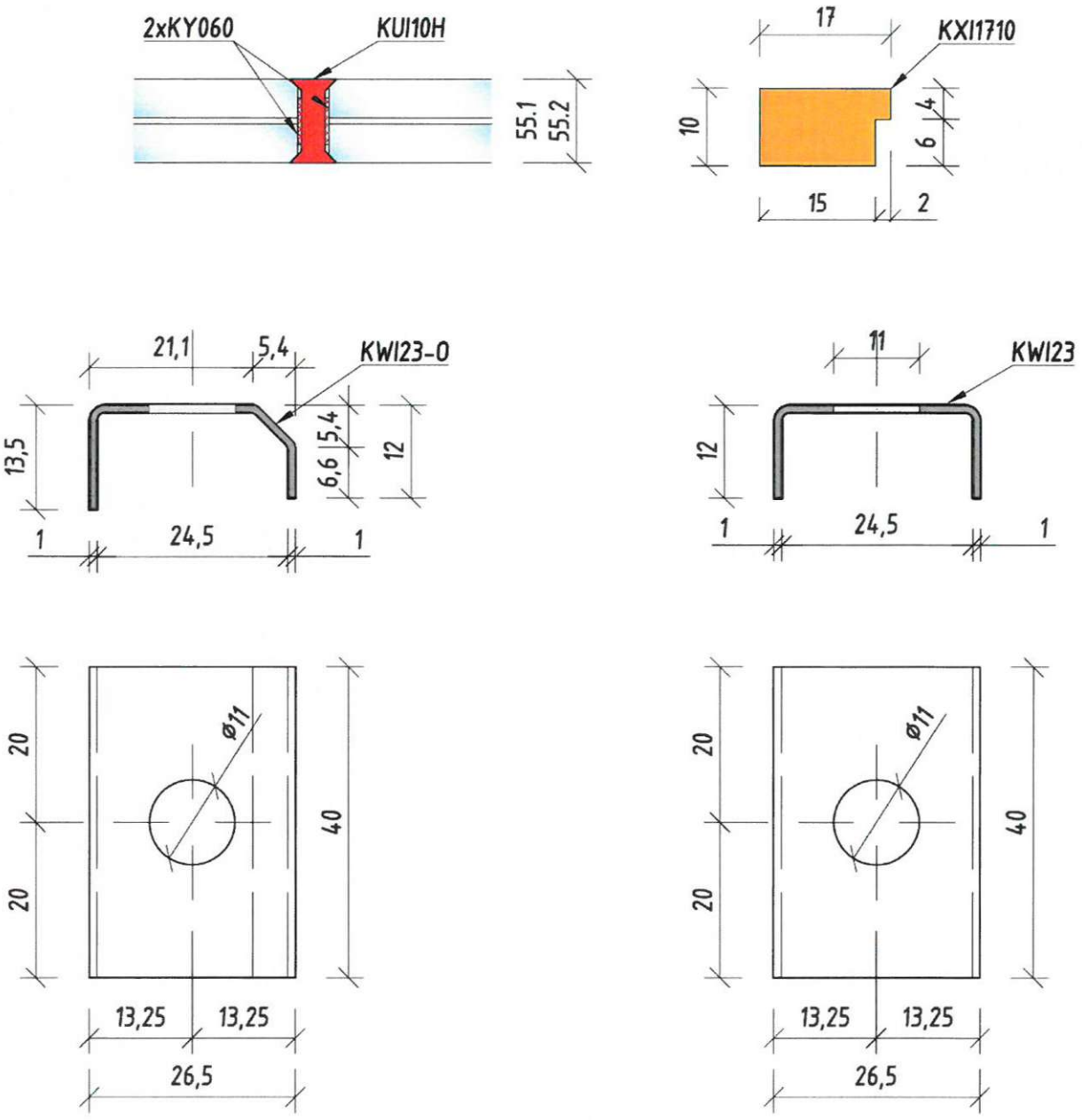

Fig. 5. Glass mounting sheets, detail of the connection of the classless glass, washer for the classless glass

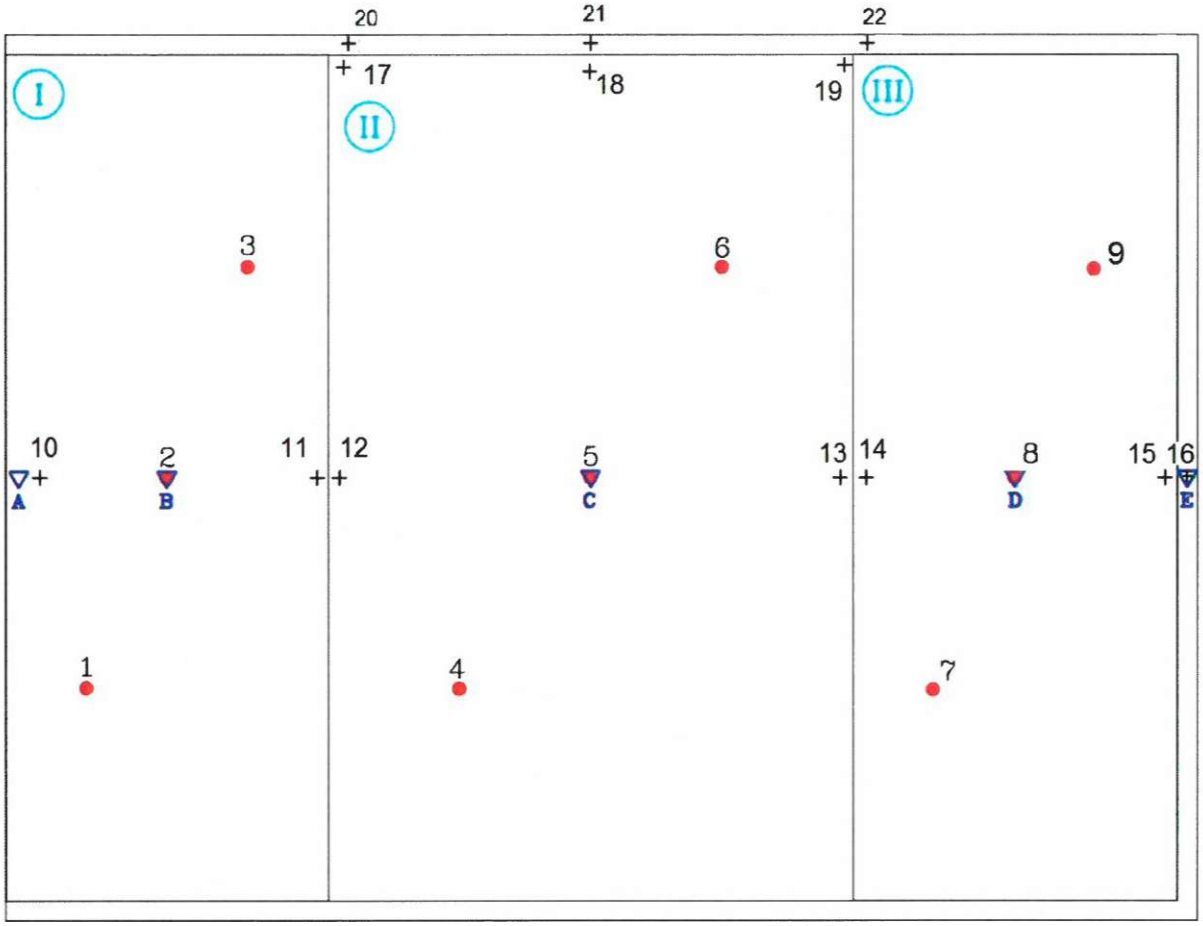

Fig. 3. Distribution of thermocouples on the unheated surface of the test element, numbering of glass panes and places of deformation measurement

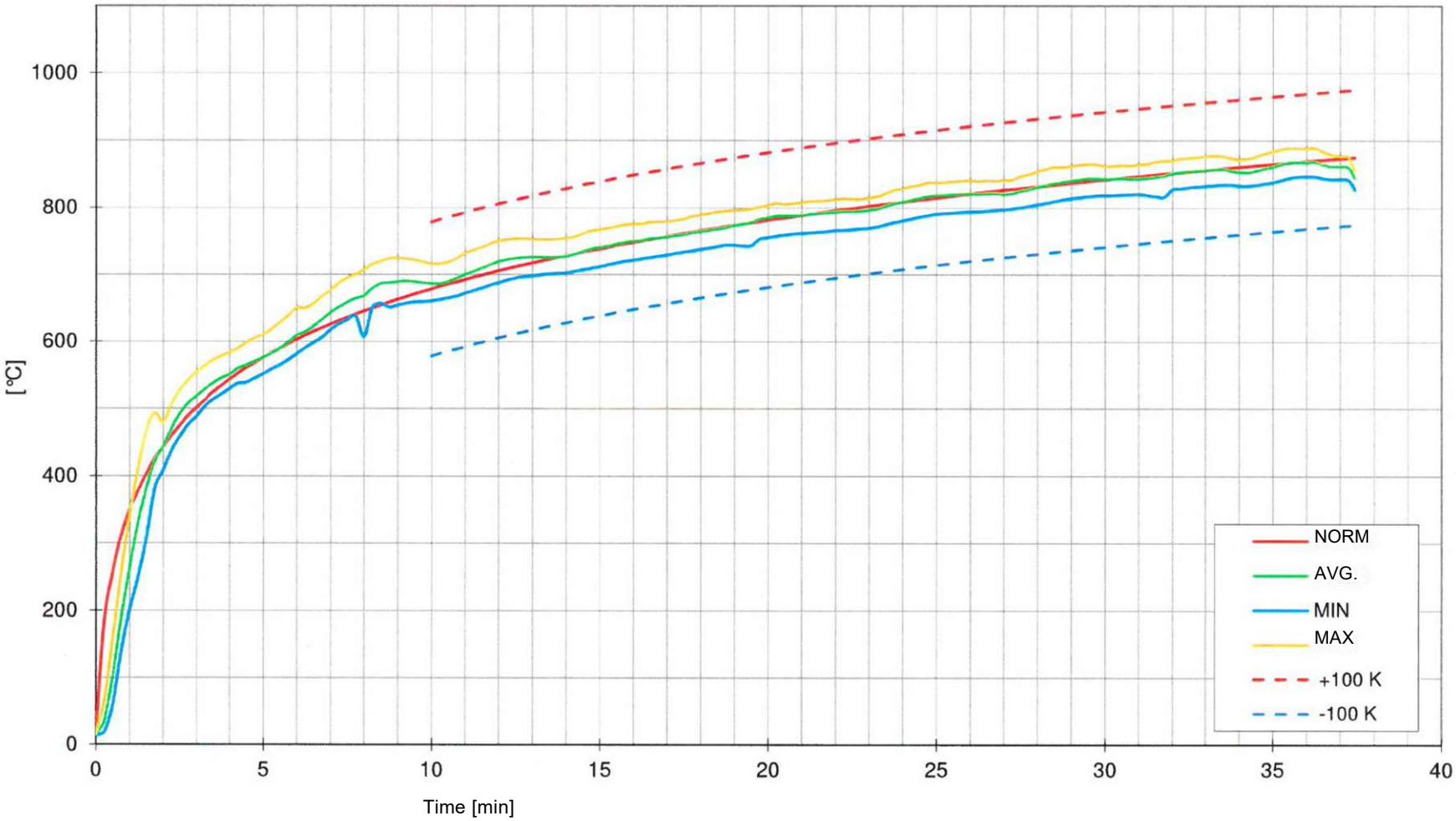

Fig. 1. Graphs of the test element heating temperature

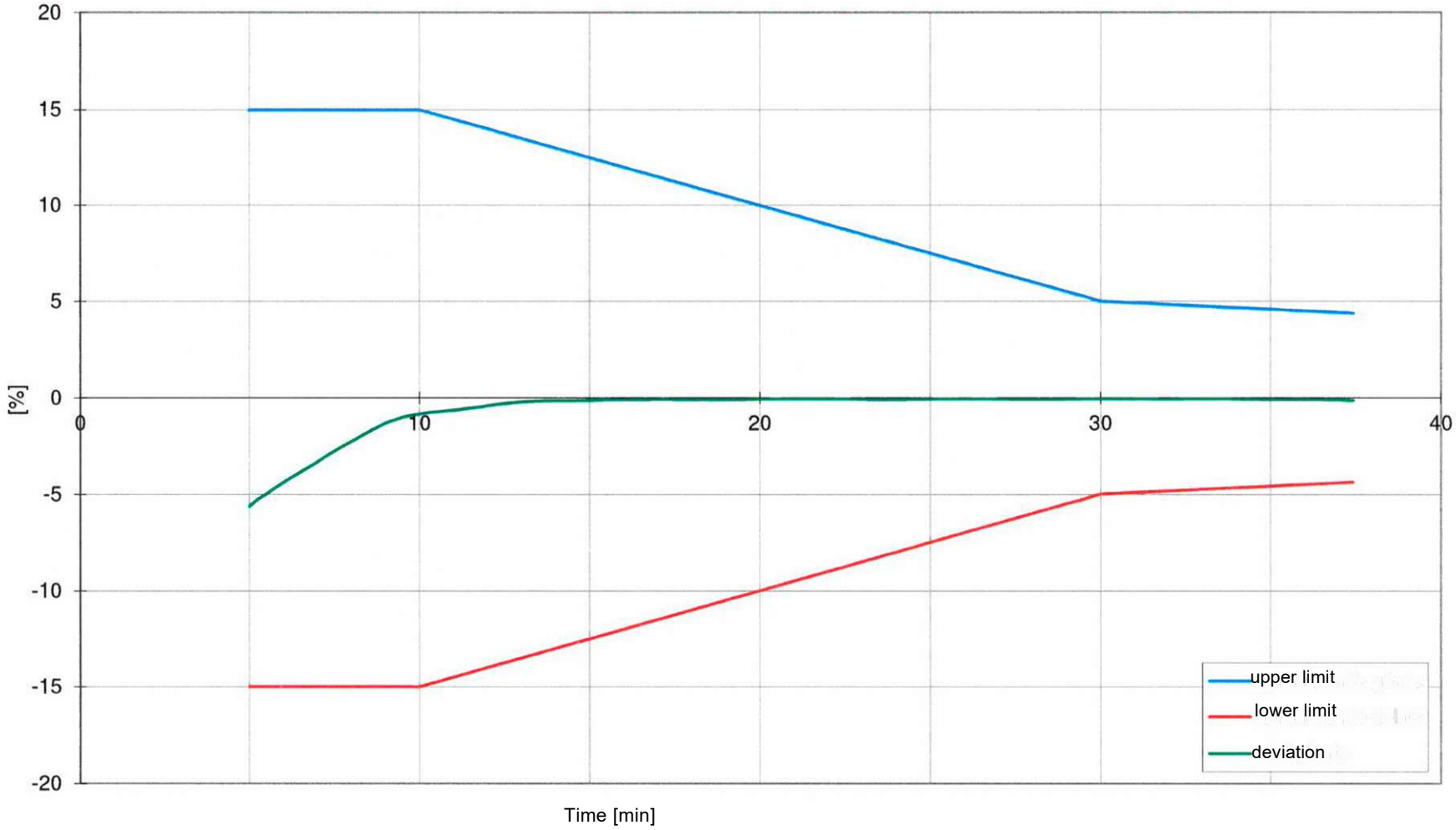

Fig. 2. Graph of the accuracy of heating

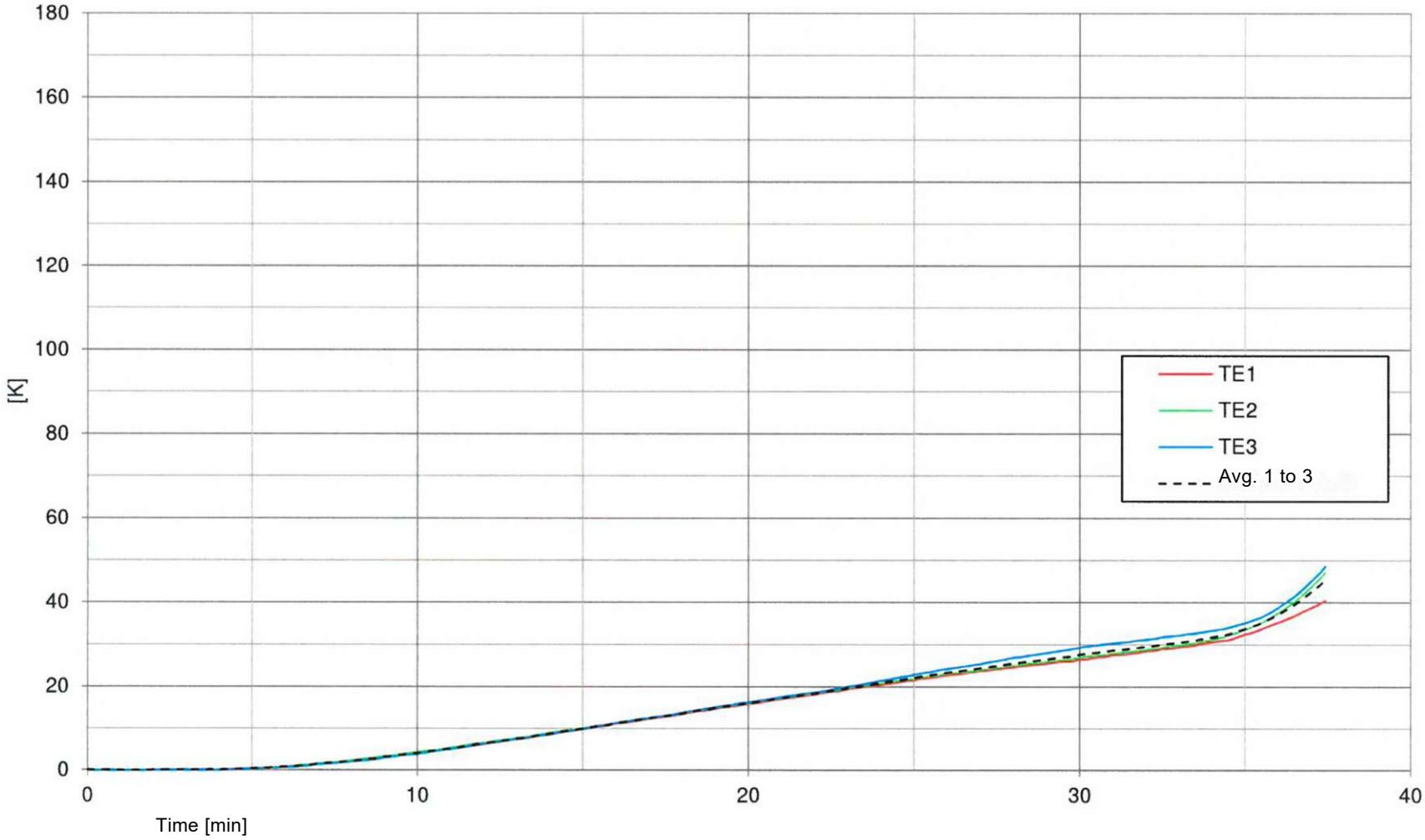

Fig. 4. Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the average (maximum) temperature

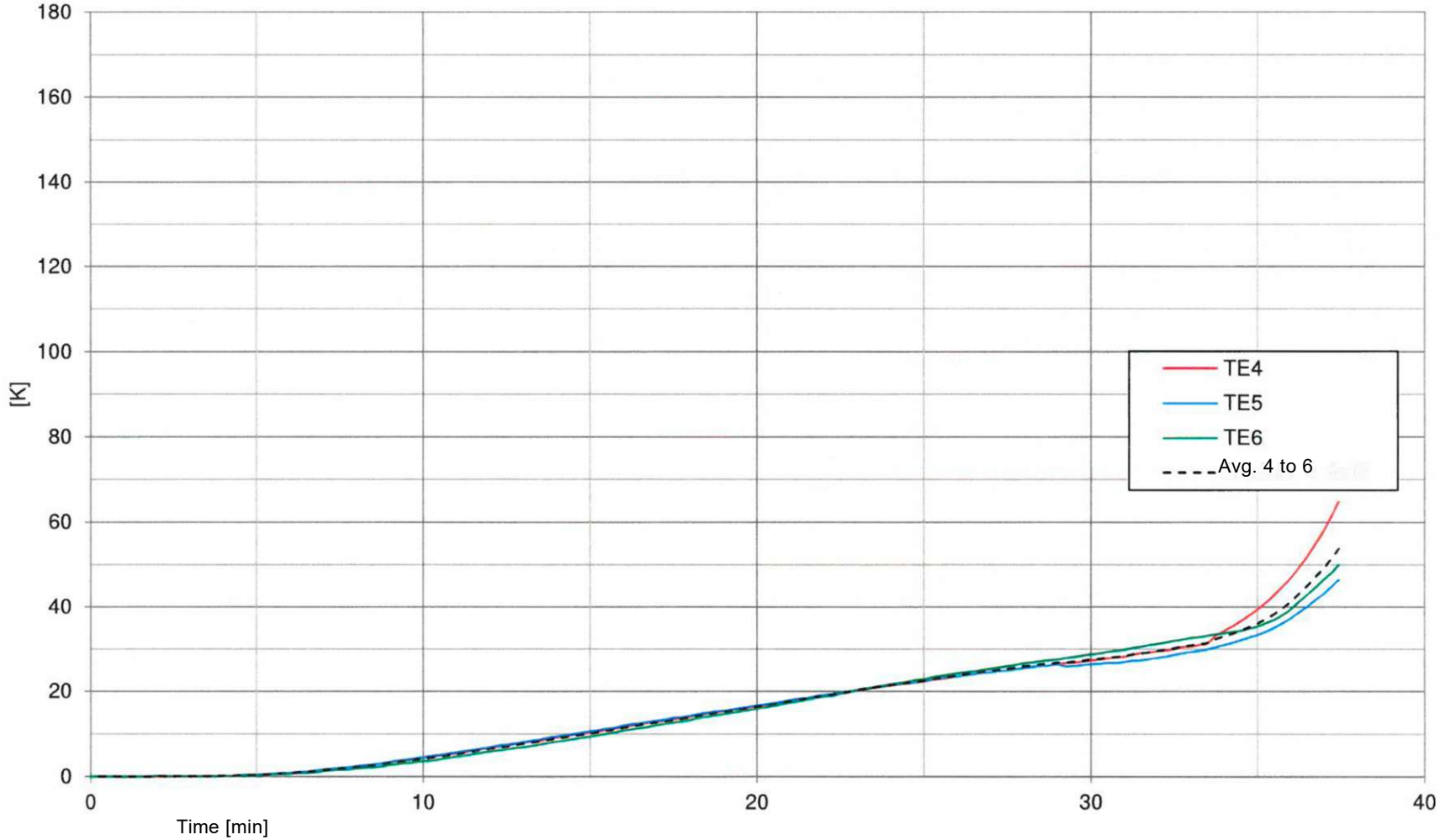

Fig. 5. Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the average (maximum) temperature

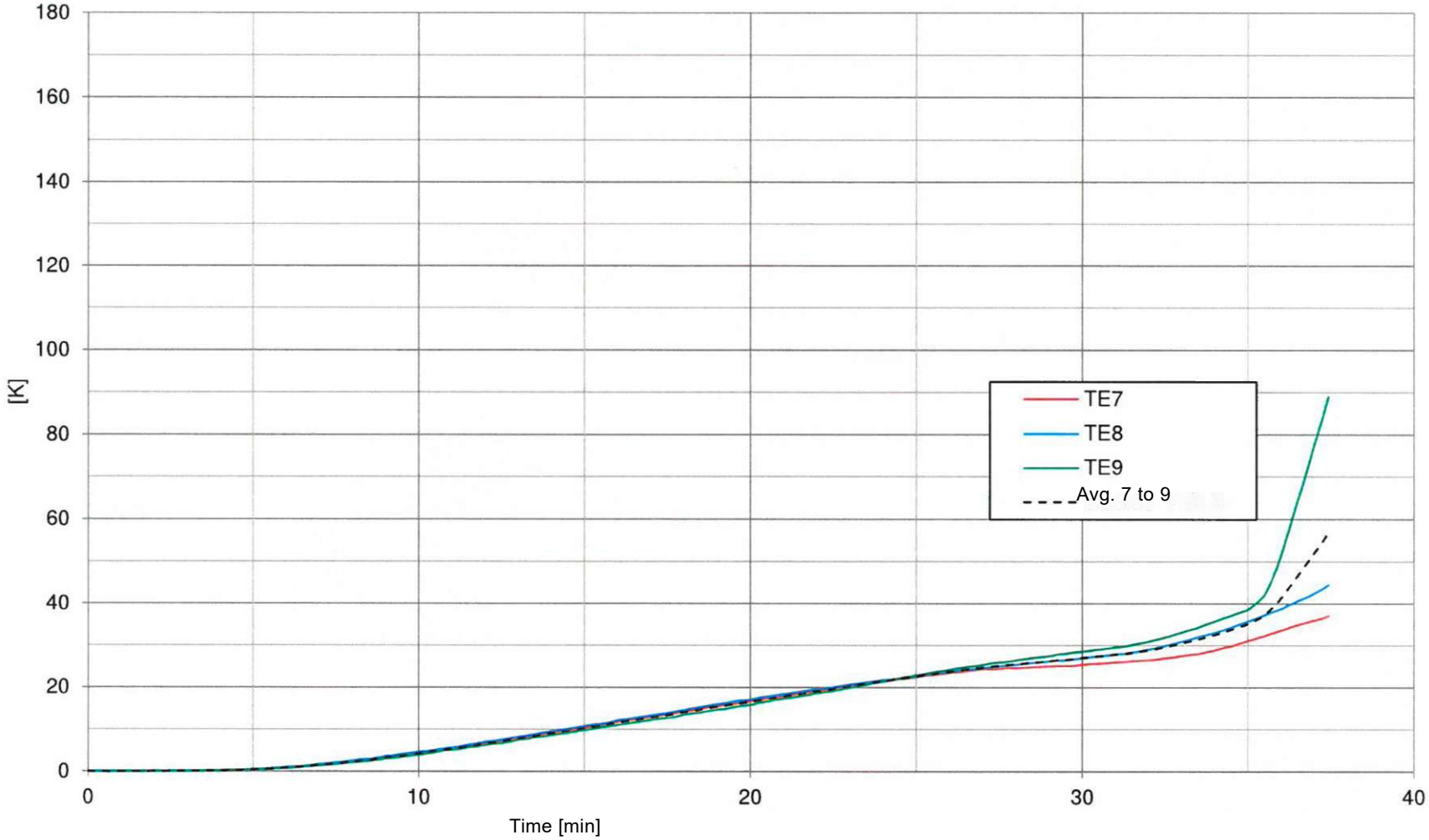

Fig. 6. Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the average (maximum) temperature

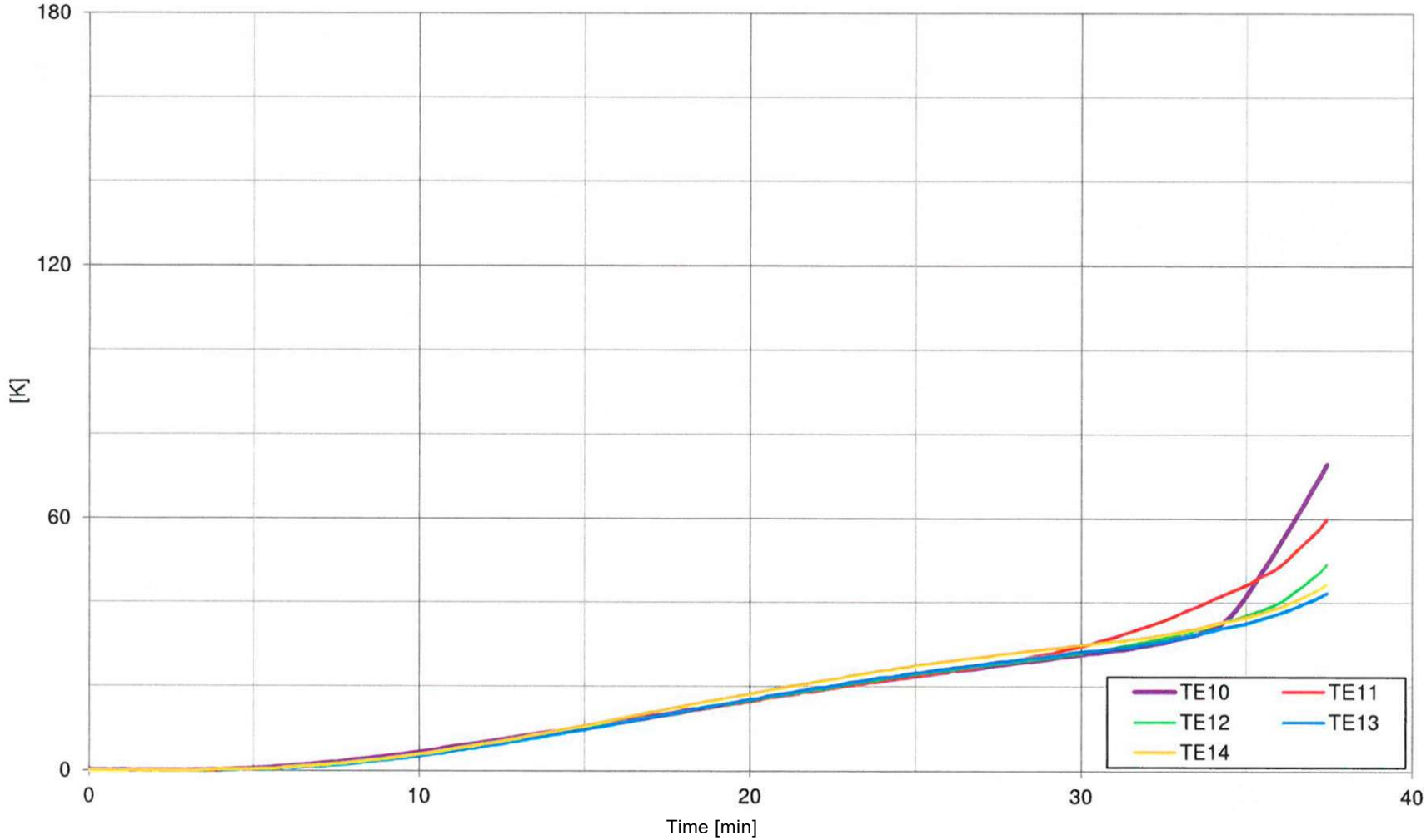

Fig. 7. Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the (maximum temperature

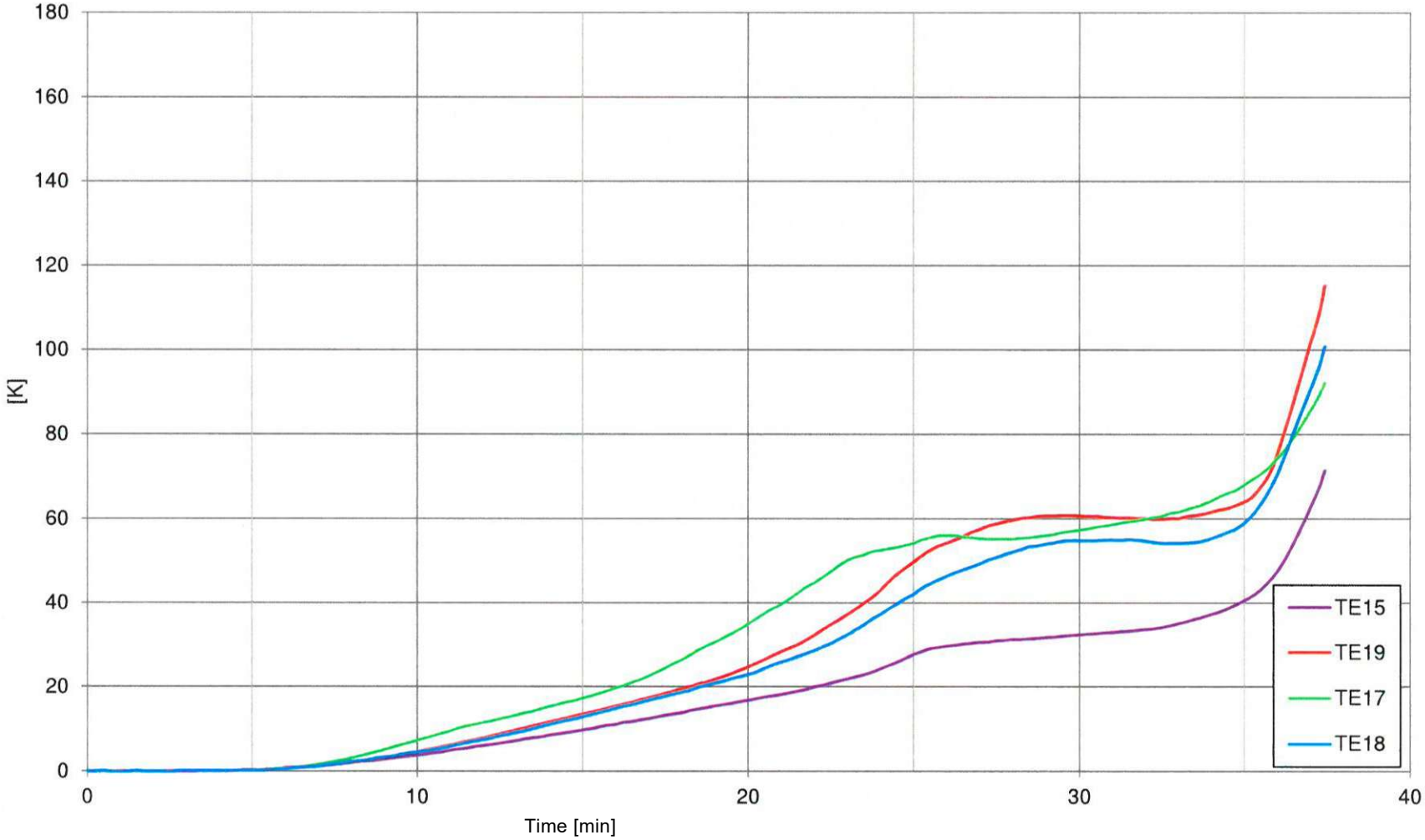

Fig. 8. **Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the maximum temperature**

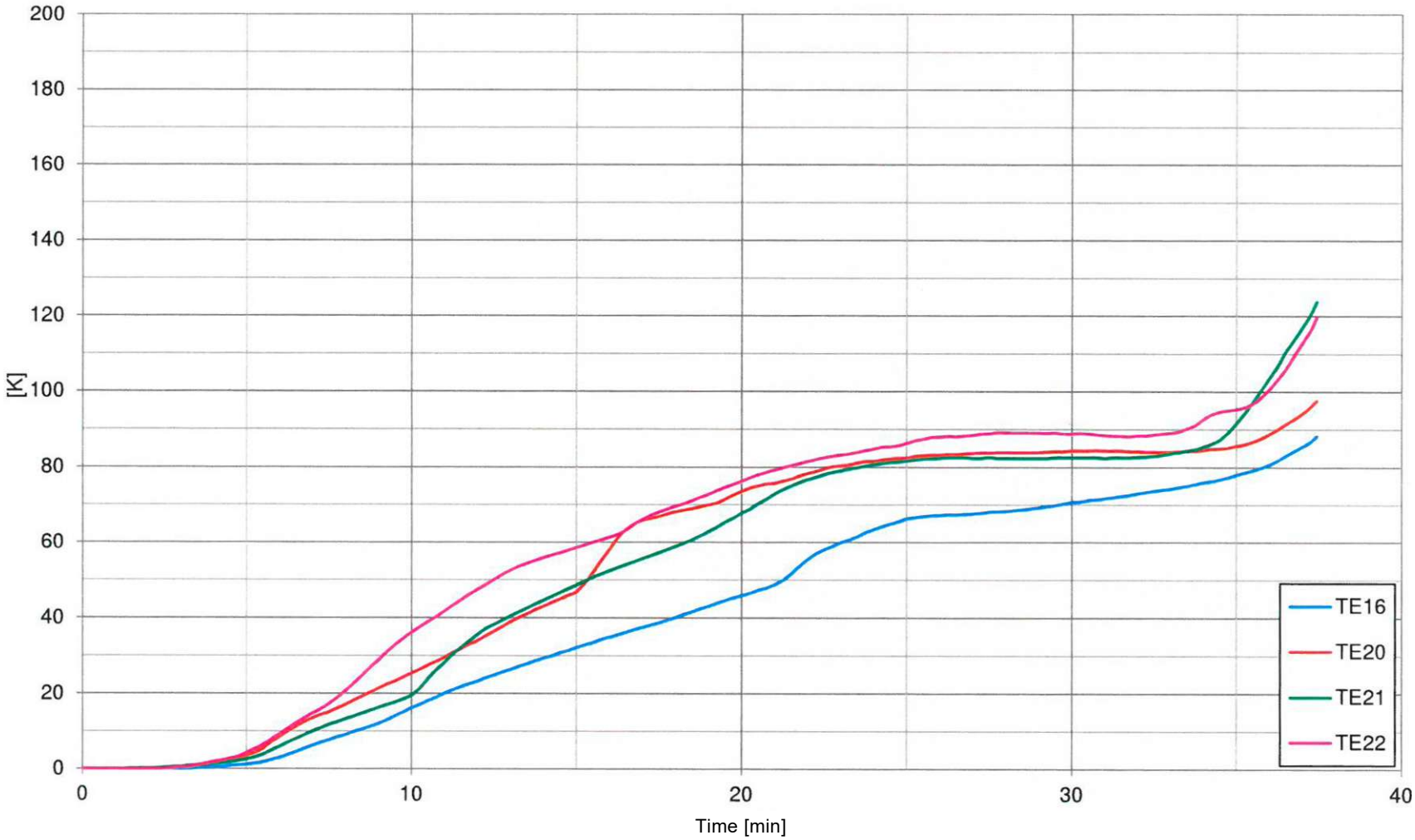

Fig. 9. Graph of temperature increases on the unheated surface of the test element - indications of thermocouples for measuring the maximum temperature of the frame (for information only)

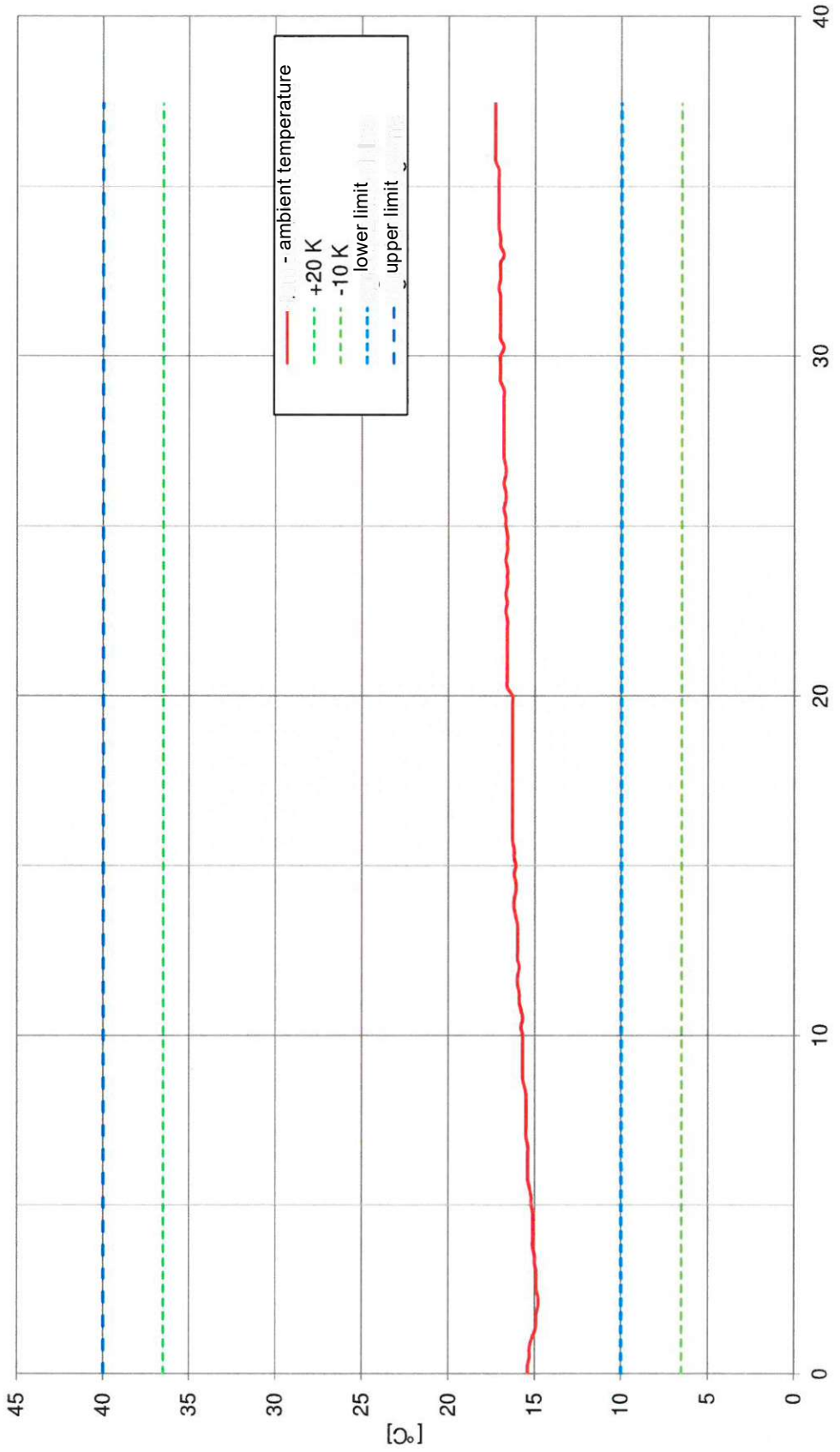

Fig. 10

Ambient temperature

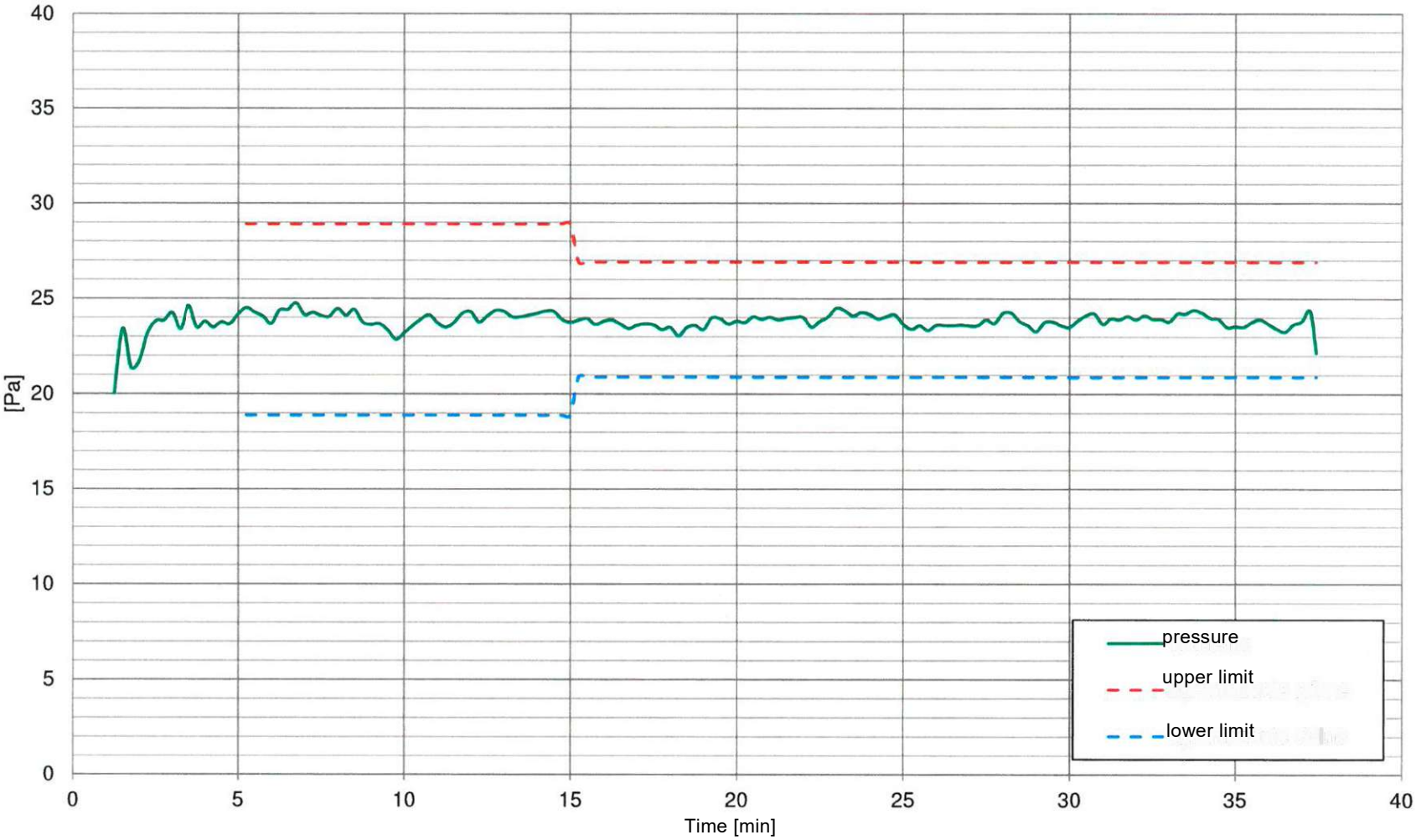

Fig. 11. Graph of pressure in the furnace during the test

Appendix No. 3 to Report

No. LZP04-06097/18/R03NZP

Photographic documentation

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

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

Photo 3. View of the heated surface of the test element in the 5th minute of the test

Photo 4. View of the non-heated surface of the test element at 7 minutes of the test

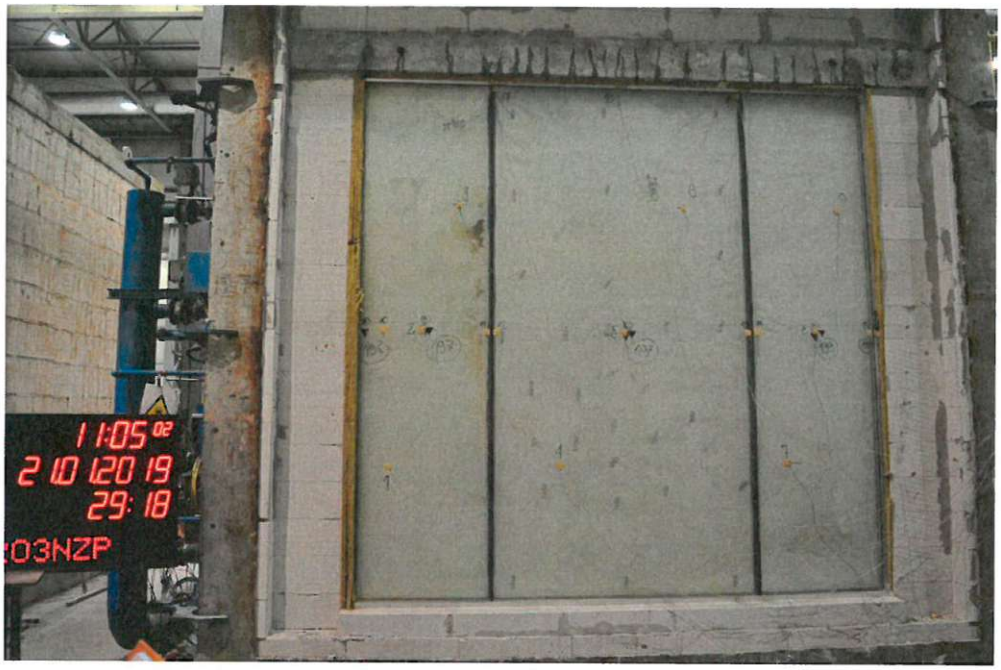

Photo 5. View of the non-heated surface of the test element at 30 minutes of the test

Photo 6. View of the non-heated surface of the test element at 36 minutes of the test

Photo 7. View of the non-heated surface of the test element after the test

Photo 8. View of the non-heated surface of the test element after the test

Appendix No. 4 to Report No. LZP04-06097/18/R03NZP

Acceptance protocol

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

PROTOCOL OF ACCEPTANCE OF THE SPECIMEN FOR TEST NO. LZP01- 06097/18/R03NZP

Number of the contract of the incoming document (or other number identifying the test object and the order): 06097/18/R03NZP

1 Object (name, type) accepted for testing by the Laboratory,
S I L E N C E E I 3 0
la. Appropriate number of the standard for the product: -

2. Method of packaging samples of the test object (based on visual inspection): /text illegible/

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: -

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): *Vitrintec Sp. z o.o. Olszewskiego 19C, Kielce*
place of sampling Vitrintec facility
- production line -
batch: no.: - size 3000 x 3024 mm
production date: 01.2019
- type, kind and variety of product: silence EI30
number/weight of samples 1
Other information: /text illegible/
Or***)
As in**. Appendix No. 1 from test report** 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)