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EFFECTIS ERA AVRASYA TEST VE BELGELENDİRME A.Ş.

DİLOVASI OSB. 5. Kısım Fırat Cad. 1. No:18 41455

Dilovası, KOCAELİ

DENEY RAPORU

TEST REPORT

AB-0556-T

RFTR21254

10.12.2021

Müşterinin adı/adresi : PROMAST KİMYA SAN. TİC. A.Ş.
Customer name/address : Ovacık Mah. Hacıoğlu Sk. No:21 B/0, Başiskele, Kocaeli /TURKEY

İstek numarası : EEA-21-000834-REV
Order No.

Numunenin adı ve tarifi : Insulated firestop joint system (Fire Foam B1, Fireseal B1 and Acryseal-FR B1)
Name and identity of test sample

Numunenin kabul tarihi : 02.11.2021
The date of receipt of sample

Açıklamalar :
Remarks

Deneyin yapıldığı tarih : 30.11.2021
Date of test

Raporun sayfa sayısı : 17 (Totally 42 pages with annexes)
Number of pages of the Report

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report

Mühür

Seal

Tarih

Date

Deney Sorumlusu

Person in charge of test

Laboratuvar Müdürü

Head of Testing Laboratory



10.12.2021

e-signed
Yiğitcan KEPİR

e-signed
Ali BAYRAKTAR

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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1. SCOPE

Fire resistance test, in conformity a general requirements of standards EN1363-1:2020, with substitute or additional methods of standard EN1363-2:1999 and a particular requirements of standard EN 1366-4:2021 "Fire resistance tests for service installations - Part 4: Linear joint seals".

2. TEST LABORATORY

Name : Efectis Era Avrasya Test ve Belgelendirme A.Ş.

Address : Dilovası OSB 5. Kısım Fırat Caddesi No:18 Dilovası, Kocaeli / TURKEY

3. DESCRIPTION OF THE TEST SPECIMEN**3.1. General**

Product identification : Insulated firestop joint system (Fire Foam B1, Fireseal B1 and Acryseal-FR B1)

Manufacturer of product : PROMAST KİMYA SAN. TİC. A.Ş.
Ovacık Mah. Hacıoğlu Sk. No:21 B/0, Başiskele, Kocaeli /TURKEY

Sponsor of test : PROMAST KİMYA SAN. TİC. A.Ş.
Ovacık Mah. Hacıoğlu Sk. No:21 B/0, Başiskele, Kocaeli /TURKEY

3.2. Construction

Insulated firestop joint system (Fire Foam B1, Fireseal B1 and Acryseal-FR B1) were filled into the joints of aerated concrete-aerated concrete wall system.

The supporting construction was supplied by the test laboratory (Efectis Era Avrasya) and consisted of aerated concrete blocks which have a nominal gross dry density of 450 kg/m³ and thickness of 200 mm.

➤ Joints:

- Aerated concrete – horizontal joints:
 - Joint width: 20 mm, 20 mm, 20 mm, 10 mm.
- Aerated concrete – vertical joints:
 - Joint width: 30 mm, 20 mm, 20 mm, 20 mm, 20 mm, 10 mm, 10 mm, 10 mm, 10 mm, 20 mm, 30 mm, 10 mm, 30 mm, 20 mm.

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3.3. Components**3.3.1.1. Specimen 1**

Joint was filled with "Fireseal B1" a depth of 20 mm and "Stone wool" a depth of 20 mm at exposed side, "Fireseal B1" a depth of 20 mm and "Stone wool" a depth of 20 mm at unexposed side and with "Fire Foam B1" a depth of 120 mm between these products.

3.3.1.2. Specimen 2

Joint was filled with "Acryseal-FR B1" a depth of 20 mm at exposed side, "Acryseal-FR B1" a depth of 20 mm at unexposed side and with "Fire Foam B1" a depth of 160 mm between two products.

3.3.1.3. Specimen 3

Joint was filled with "Fireseal B1" a depth of 20 mm at exposed side, "Fireseal B1" a depth of 20 mm at unexposed side and with "Fire Foam B1" a depth of 160 mm between two products.

3.3.1.4. Specimen 4

Joint was fully filled with "Fire Foam B1".

3.3.1.5. Specimen 5

Joint was filled with "Fireseal B1" a depth of 20 mm and "Stone wool" a depth of 30 mm at exposed side, "Fireseal B1" a depth of 20 mm and "Stone wool" a depth of 30 mm at unexposed side and with "Fire Foam B1" a depth of 100 mm between these products.

3.3.1.6. Specimen 6

Joint was filled with "Acryseal-FR B1" a depth of 20 mm at exposed side, "Acryseal-FR B1" a depth of 20 mm at unexposed side and with "Fire Foam B1" a depth of 160 mm between two products.

3.3.1.7. Specimen 7

Joint was filled with "Fireseal B1" a depth of 20 mm at expose side, "Fireseal B1" a depth of 20mm at unexposed side and with "Fire Foam B1" a depth of 160 mm between two products.

3.3.1.8. Specimen 8

Joint was filled with "Acryseal-FR B1" a depth of 20 mm and "Stone wool" a depth of 20 mm at exposed side, "Acryseal-FR B1" a depth of 20 mm and "Stone wool" a depth of 20 mm at unexposed side and with "Fire Foam B1" a depth of 120 mm between these products.

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3.3.1.9. Specimen 9

Joint was filled with "Acryseal-FR B1" a depth of 20 mm and "Stone wool" a depth of 20 mm at exposed side, "Acryseal-FR B1" a depth of 20 mm and "Stone wool" a depth of 20 mm at unexposed side.

3.3.1.10. Specimen 10

Joint was filled with "Fireseal B1" a depth of 10 mm at exposed side, "Fireseal B1" a depth of 10 mm at unexposed side and with "Fire Foam B1" a depth of 180 mm between two products.

3.3.1.11. Specimen 11

Joint was filled with "Acryseal-FR B1" a depth of 10 mm at exposed side, "Acryseal-FR B1" a depth of 10 mm at unexposed side and with "Fire Foam B1" a depth of 180 mm between two products.

3.3.1.12. Specimen 12

Joint was filled with "Fireseal B1" a depth of 10 mm at exposed side, "Fireseal B1" a depth of 10 mm at unexposed side and "Polyethylene seal" a depth of 15 mm placed at both sides.

3.3.1.13. Specimen 13

Joint was fully filled with "Fire Foam B1".

3.3.1.14. Specimen 14

Joint was fully filled with "Fire Foam B1".

3.3.1.15. Specimen 15

Joint was fully filled with "Fire Foam B1".

3.3.1.16. Specimen 16

Joint was filled with "Acryseal-FR B1" a depth of 10 mm at exposed side, "Acryseal-FR B1" a depth of 10 mm at unexposed side and "Polyethylene seal" a depth of 15 mm placed at both sides.

3.3.1.17. Specimen 17

Joint was filled with "Acryseal-FR B1" a depth of 20 mm at exposed side, "Acryseal-FR B1" a depth of 20 mm at unexposed side and with "Fire Foam B1" a depth of 160 mm between two products.

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3.3.1.18. Specimen 18

Joint was filled with " Fireseal B1 " a depth of 20 mm and "Stone wool" a depth of 20 mm at exposed side, " Fireseal B1 " a depth of 20 mm and "Stone wool" a depth of 20 mm at unexposed side.

- Type: Fire Foam B1 Fire resistant polyurethane based B1 foam
 - Density: 28-32 kg/m³
- Type: Fireseal B1 notral based silicone
 - Density: 1,26 g/lt
- Type: Acryseal-FR B1 acrylic based sealent
 - Density: 1,52 g/ml
- Type: Stone wool
 - Density: 70 kg/m³
- Type: Polyethylene seal
 - Density: 25-30 kg/m³

Length of joints: 900 mm.

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Specimen Ref.	Gap width/depth	Orientation
1	20/200 mm	Horizontal
2	20/200 mm	Horizontal
3	20/200 mm	Horizontal
4	10/200 mm	Horizontal
5	30/200 mm	Vertical
6	20/200 mm	Vertical
7	20/200 mm	Vertical
8	20/200 mm	Vertical
9	20/200 mm	Vertical
10	10/200 mm	Vertical
11	10/200 mm	Vertical
12	10/200 mm	Vertical
13	10/200 mm	Vertical
14	20/200 mm	Vertical
15	30/200 mm	Vertical
16	10/200 mm	Vertical
17	30/200 mm	Vertical
18	20/200 mm	Vertical

See figure 1-10 for joint locations.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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4. PRE-TEST PROCESSES

4.1. Verification of specimen

Efectis Era Avrasya A.S. verified the used materials and parts against the supplied data and drawings during installation of the test specimen and not involved in the selection of test specimen.

Brand, type, quantity and dimension information of the components, when it is not possible to be verified by the laboratory, are given according to the sponsor's declaration and the responsibility belongs to the sponsor. The test specimens are tested as received from the sponsor (when the laboratory does not carry out sampling).

The test product was implemented by sponsor.

4.2. Conditioning

From the moment of installation until the fire resistance test, the construction was stored in the laboratory of Efectis Era Avrasya A.S. under the following conditions:

Temperature	: $17,7 \pm 3,8$ °C
Relative humidity	: 48 ± 11 %.
Conditioning period	: 28 days (in accordance with technical specification of product).

5. TEST PROCESS

5.1. Method

The fire test was conducted according to the European standard EN 1366-4:2021.

The heating of the furnace followed the standard fire curve, as specified in the European standard EN 1363-1:2020.

The target overpressure in the furnace was 15 Pa at centre of lowest located joint.

5.2. Measurements

Following test data were measured during the test:

- Ambient temperatures inside the furnace with six plate thermocouples (Furnace TC1 to Furnace TC6), evenly distributed over the directly heated surface (see figure **A1**).
- The pressure in the furnace (see figure **A3**).
- Ambient temperature in the laboratory (see figure **A4**).
- The surface temperatures on the unexposed side of the test specimen (TC 3 up to TC128), see figure **B2-B19**).
- The positions of the thermocouple are given in figure **B1**.

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6. OBSERVATIONS

Table 1: Observations during heating

0	Heating started. See photo C1-C2.
24	Smoke release between joints and supporting construction.
30	No considerable change. The specimens continues to satisfy Integrity (E) and Insulation (I) criteria.
60	No considerable change. The specimens continues to satisfy Integrity (E) and Insulation (I) criteria.
90	No considerable change. The specimens continues to satisfy Integrity (E) and Insulation (I) criteria.
120	No considerable change. The specimens continues to satisfy Integrity (E) and Insulation (I) criteria.
134	Smoke release from Specimen 15.
138	Opening on the surface of Specimen 15. Cotton pad was applied, ignition. Integrity (E) failed for Specimen 15. The joint was closed with ceramic wool after failure of integrity.
180	No considerable change. The specimens continues to satisfy Integrity (E) and Insulation (I) criteria.
240	No considerable change. The specimens continues to satisfy Integrity (E) and Insulation (I) criteria.
249	Opening on the surface of Specimen 14. Cotton pad was applied, ignition. Integrity (E) failed for Specimen 14. The joint was closed with ceramic wool after failure of integrity.
300	No considerable change. The specimens continues to satisfy Integrity (E) and Insulation (I) criteria.
360	Test was terminated after consulted a customer. See photo C3-C4.

7. TEST RESULTS**7.1 Results**

The results are given in Table 2 and appendix B.

During the heating the temperature in the furnace complied a standard EN 1363-1:2020.

7.2 Uncertainty of measurements

Due to the nature of fire resistance testing, in which several non-linear effects are present in both the test configuration and the test specimen, which influence each other, it is at this moment not yet possible to give a stated degree of uncertainty of measurement.

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8. SUMMARY

The most important results of the examination are given in table 2.

Table 2: Summary of test results of the test specimen

Specimen No.	Criteria	
	Integrity, (E) – Cotton pad – Flames longer than 10 sec.	Insulation, (I) – Maximum temperature
Specimen 1	N.A-N.	N
Specimen 2	N.A-N.	N
Specimen 3	N.A-N.	N
Specimen 4	N.A-N.	N
Specimen 5	N.A-N.	N
Specimen 6	N.A-N.	N
Specimen 7	N.A-N.	N
Specimen 8	N.A-N.	N
Specimen 9	N.A-N.	N
Specimen 10	N.A-N.	N
Specimen 11	N.A-N.	N
Specimen 12	N.A-N.	N
Specimen 13	N.A-N.	N
Specimen 14	249 th minute	*
Specimen 15	138 th minute	*
Specimen 17	N.A-N.	N
Specimen 18	N.A-N.	N
*: Insulation criteria was failed due to failure of Integrity.		
The heating was terminated at 360 th minute after consulted a sponsor.		

"N": No failure/not observed

"N.A.": Not applied

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9. FIELD OF DIRECT APPLICATION OF TEST RESULTS**9.1 General**

This report details the method of construction, the test conditions and the results obtained when the specific elements of construction described herein was tested following the procedure outlined in EN 1363-1:2020, and when appropriate EN 1363-2:1999. Any significant deviation with respect to size, constructional details, load stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report

9.2 Orientation

The possible orientation and the scope of application are defined in EN 1366-4:2021 and Table 3. According to the table the specimens was tested B orientation which means the scope of application is B.

Tested Orientation	Application
A	A, C, E ^a
B	B
D	C, D
^a Orientation E will only be covered by test orientation A if shear movement was chosen and one face of the joint was fixed and the other face was moved.	

Key

- A linear joint in a horizontal test construction
- B vertical linear joint in a vertical test construction
- C horizontal linear joint in a vertical test construction
- D horizontal wall joint abutting a floor, ceiling or roof
- E horizontal floor joint abutting a wall

9.3 Supporting construction

Aerated concrete blocks with a density of at least 650 kg/m³, having a thickness of at least 20 mm.

9.4 Seal position

Test results are valid only for the position in which the product was tested.

9.5 Mechanically induced movement

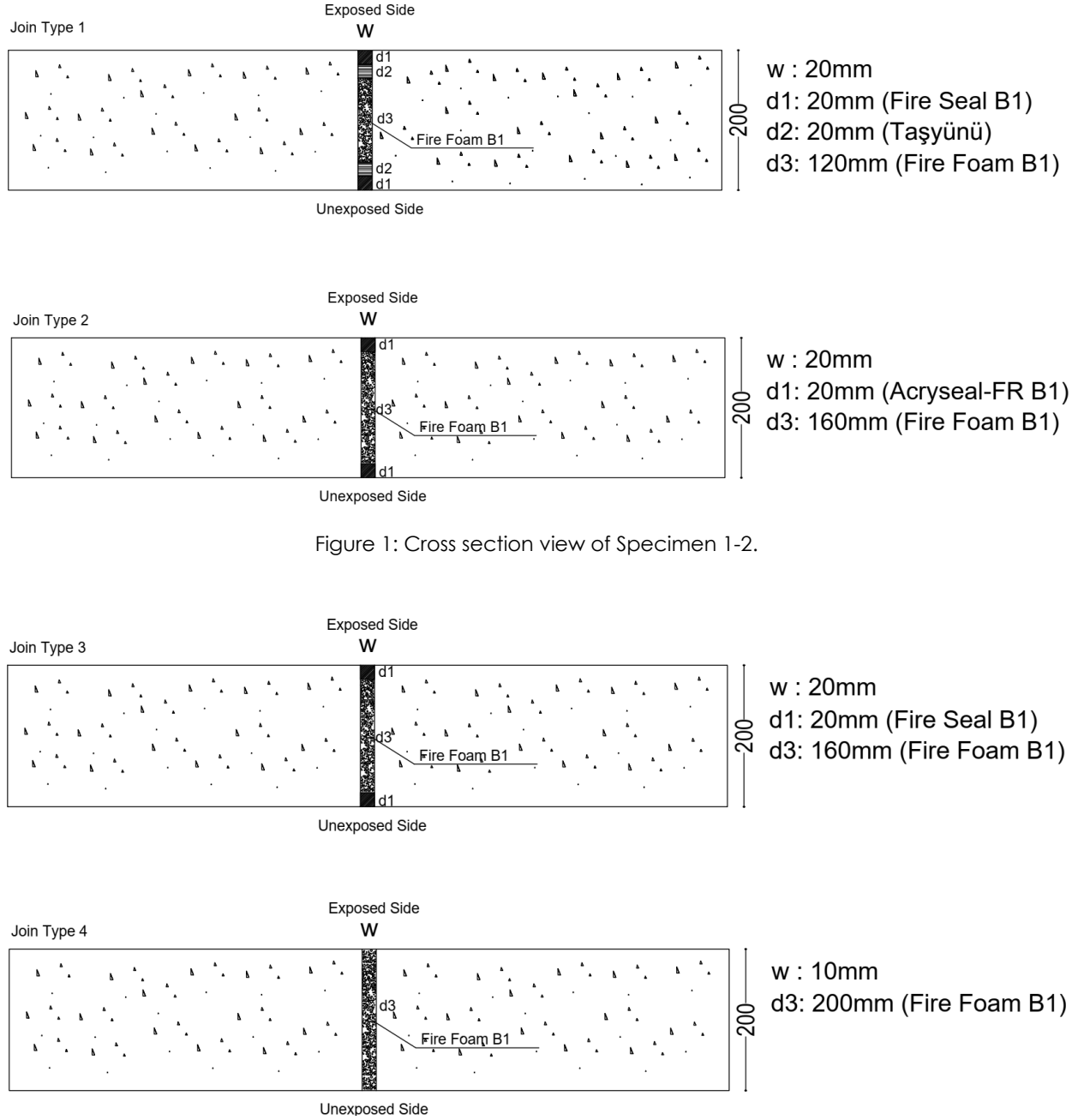
The movement capability of the linear joint seal is not allowed to exceed $\pm 7,5$ % due to be tested without mechanically induced movement.

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10. DRAWINGS



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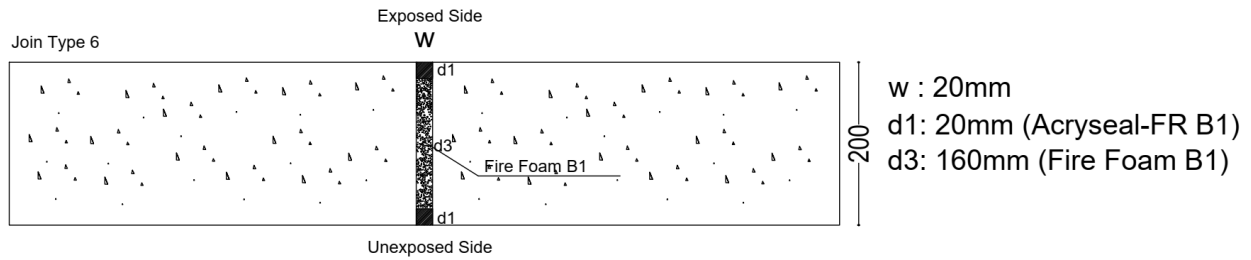
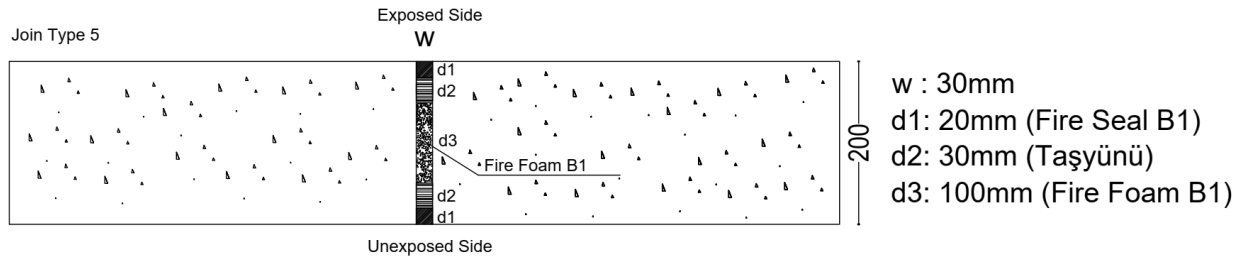


Figure 3: Cross section view of Specimen 5-6.

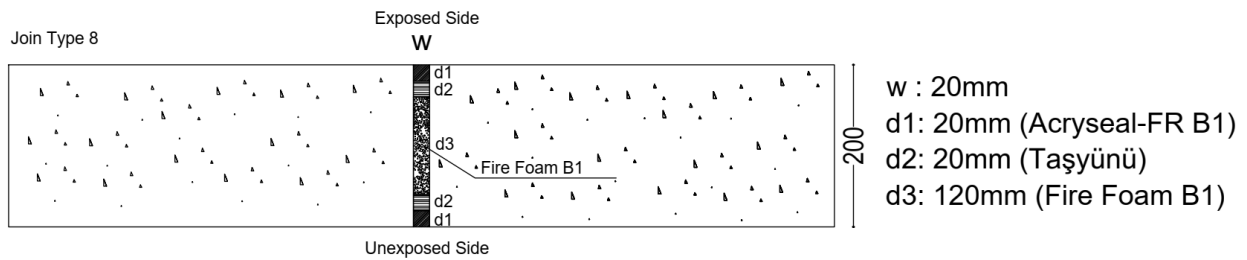
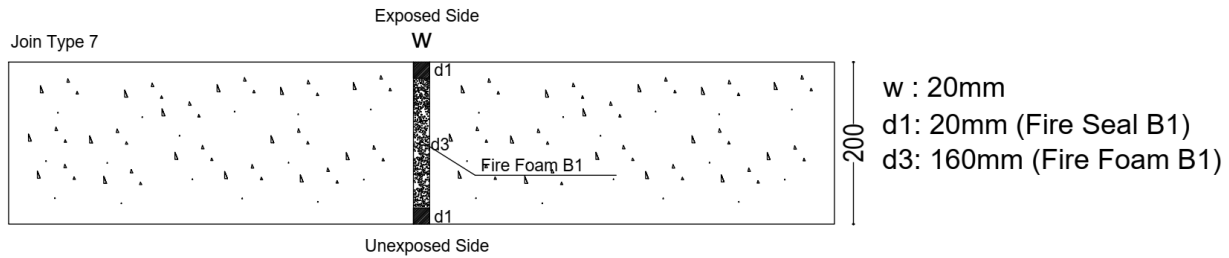


Figure 4: Cross section view of Specimen 7-8.

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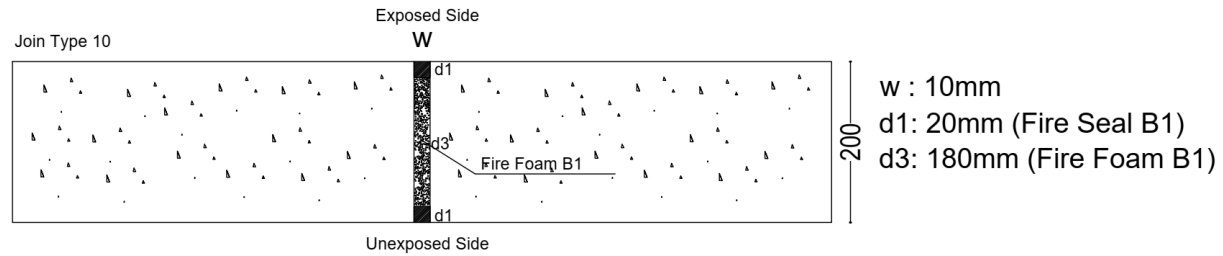
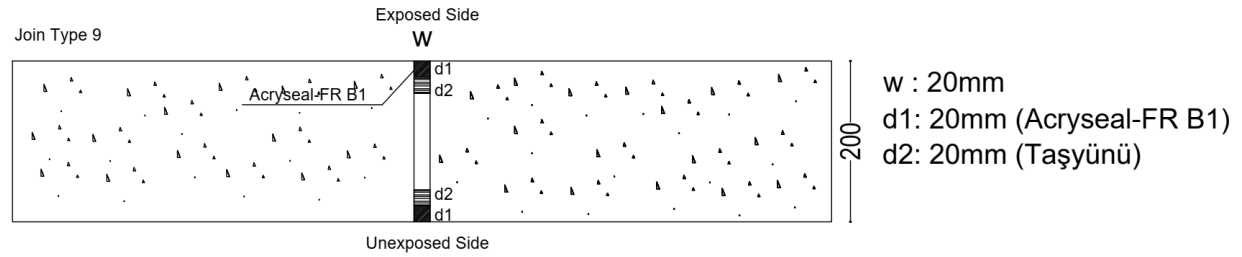


Figure 5: Cross section view of Specimen 9-10.

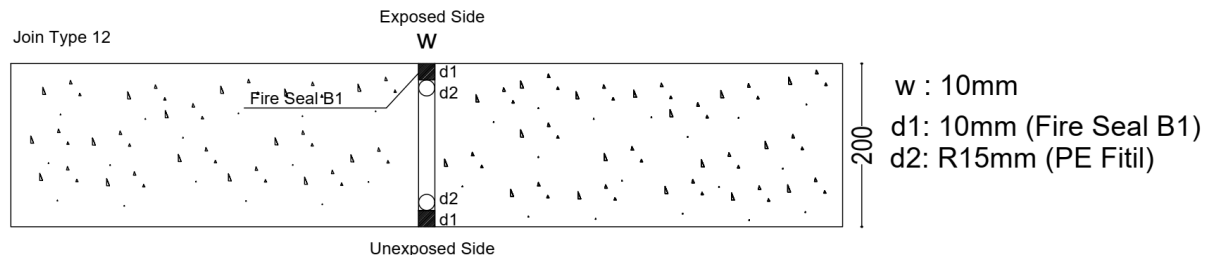
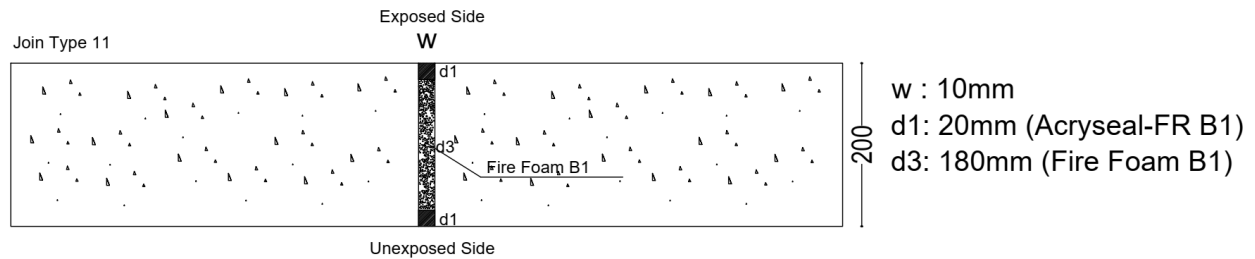


Figure 6: Cross section view of Specimen 11-12.

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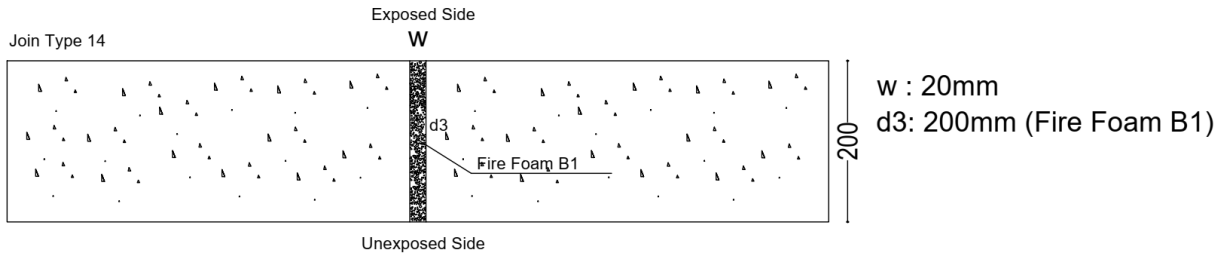
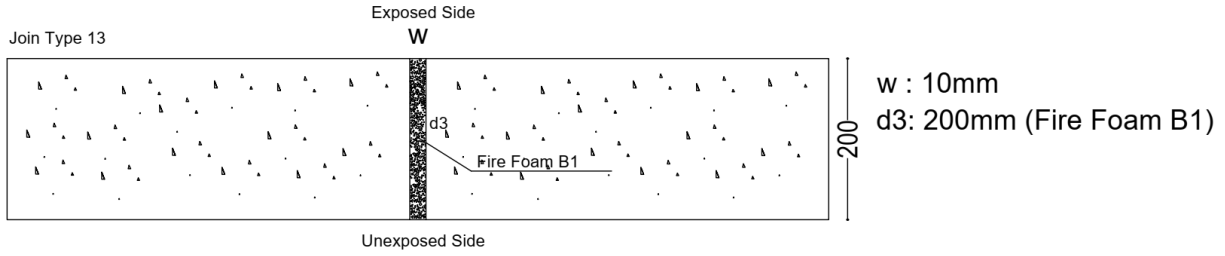


Figure 7: Cross section view of Specimen 13-14.

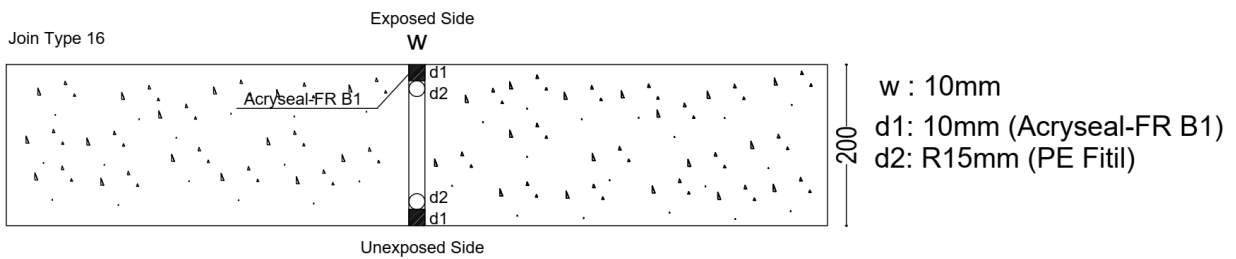
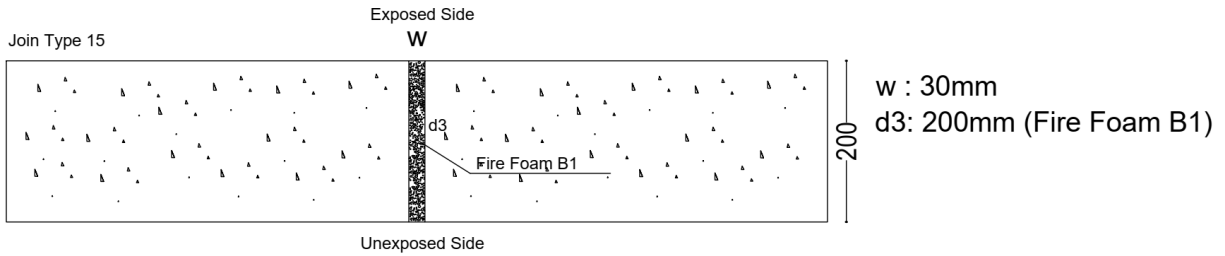


Figure 8: Cross section view of Specimen 15-16.

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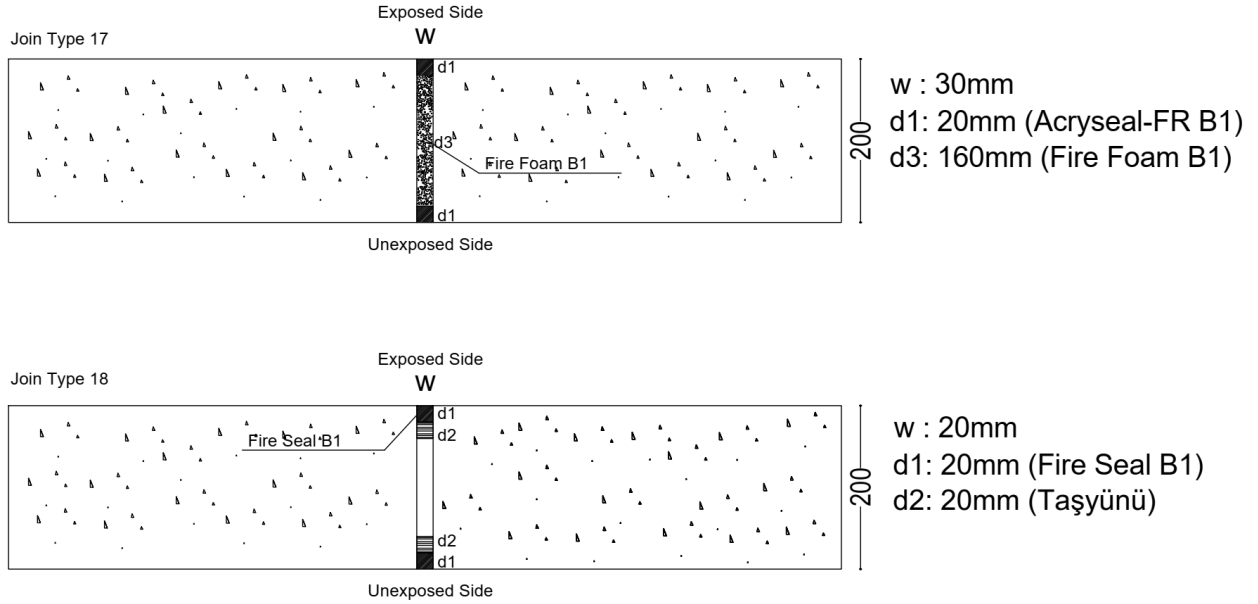


Figure 9: Cross section view of Specimen 17-18.

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Wall Thickness mm	Tested Product	Joint No	Position	Joint Width w (mm)	Joint Depth d1 (mm)	Backer Rod (Exposed Side) d2 (mm)	Joint Depth d3 (mm)	Backer Rod (UnExposed Side) d2 (mm)	Joint Depth d1 (mm)
200	FireFoam B1	1	Horizontal	20	20 (FireSeal B1)	Stone wool (20mm*20mm)	120 (FireFoam B1)	Stone wool (20mm*20mm)	20 (FireSeal B1)
200	FireFoam B1	2	Horizontal	20	20 (FireStop B1)		160 (FireFoam B1)		20 (FireStop B1)
200	FireFoam B1	3	Horizontal	20	20 (FireSeal B1)		160 (FireFoam B1)		20 (FireSeal B1)
200	FireFoam B1	4	Horizontal	10			200		
200	FireFoam B1	5	Vertical	30	20 (FireSeal B1)	Stone wool (30mm*30mm)	100 (FireFoam B1)	Stone wool (30mm*30mm)	20 (FireSeal B1)
200	FireFoam B1	6	Vertical	20	20 (FireStop B1)		160 (FireFoam B1)		20 (FireStop B1)
200	FireFoam B1	7	Vertical	20	20 (FireSeal B1)		160 (FireFoam B1)		20 (FireStop B1)
200	FireFoam B1	8	Vertical	20	20 (FireStop B1)	Stone wool (20mm*20mm)	120 (FireFoam B1)	Stone wool (20mm*20mm)	20 (FireStop B1)
200	FireStop. B1	9	Vertical	20	20 (FireStop B1)	Stone wool (20mm*20mm)	120 (Gap)	Stone wool (20mm*20mm)	20 (FireStop B1)
200	FireFoam B1	10	Vertical	10	10 (FireSeal B1)		180 (FireFoam B1)		10 (FireSeal B1)
200	FireFoam B1	11	Vertical	10	10 (FireStop B1)		180 (FireFoam B1)		10 (FireStop B1)
200	FireSeal B1	12	Vertical	10	10 (FireSeal B1)	PE 15mm	150 (Gap)	PE 15mm	10 (FireSeal B1)
200	FireFoam B1	13	Vertical	10			200 (FireFoam B1)		
200	FireFoam B1	14	Vertical	20			200 (FireFoam B1)		
200	FireFoam B1	15	Vertical	30			200 (FireFoam B1)		
200	FireStop B1	16	Vertical	10	10 (FireStop B1)	PE 15mm	150 (Gap)	PE 15mm	10 (FireStop B1)
200	FireFoam B1	17	Vertical	30	20 (FireStop B1)		160 (FireFoam B1)		20 (FireStop B1)
200	FireSeal B1	18	Vertical	20	20 (FireSeal B1)	Stone wool (20mm*20mm)	120 (Gap)	Stone wool (20mm*20mm)	20 (FireSeal B1)

Figure 10: Specimen application details.

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APPENDIXES:

Appendix A: Furnace and laboratory conditions

Appendix B: Test results

Appendix C: Photos

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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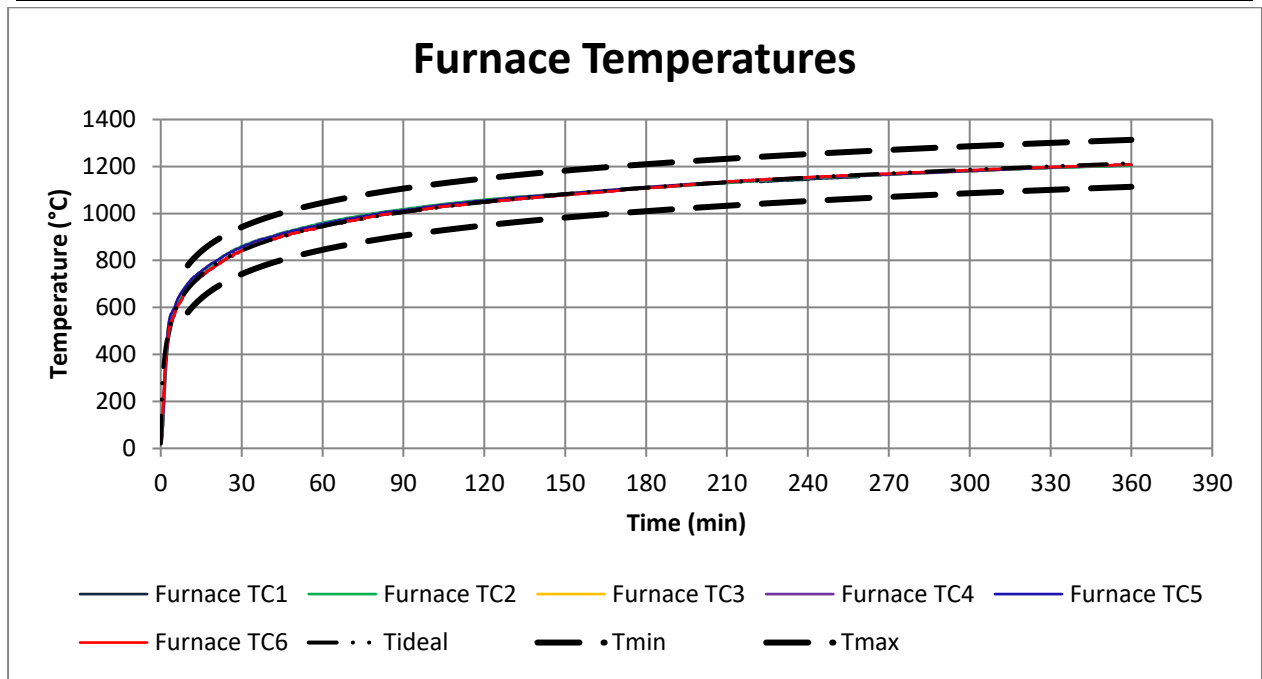


Figure A1: Furnace Temperatures

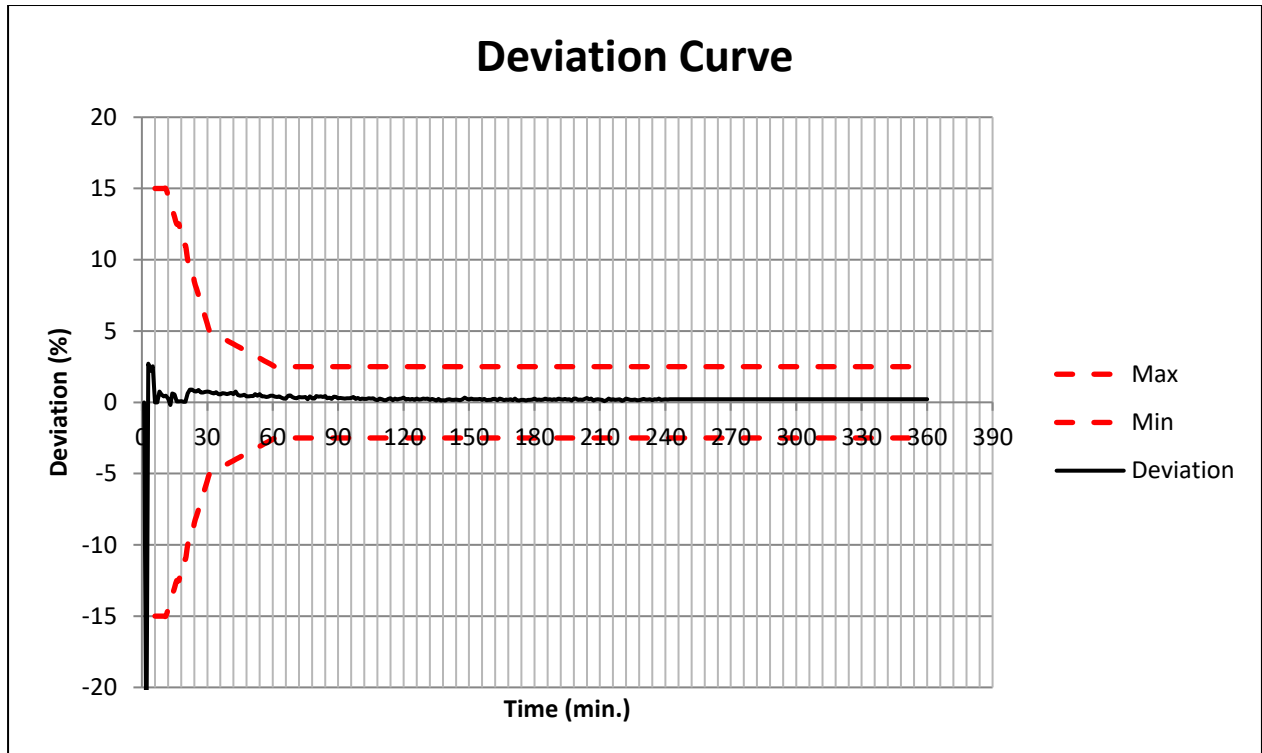


Figure A2: Deviation of furnace temperature

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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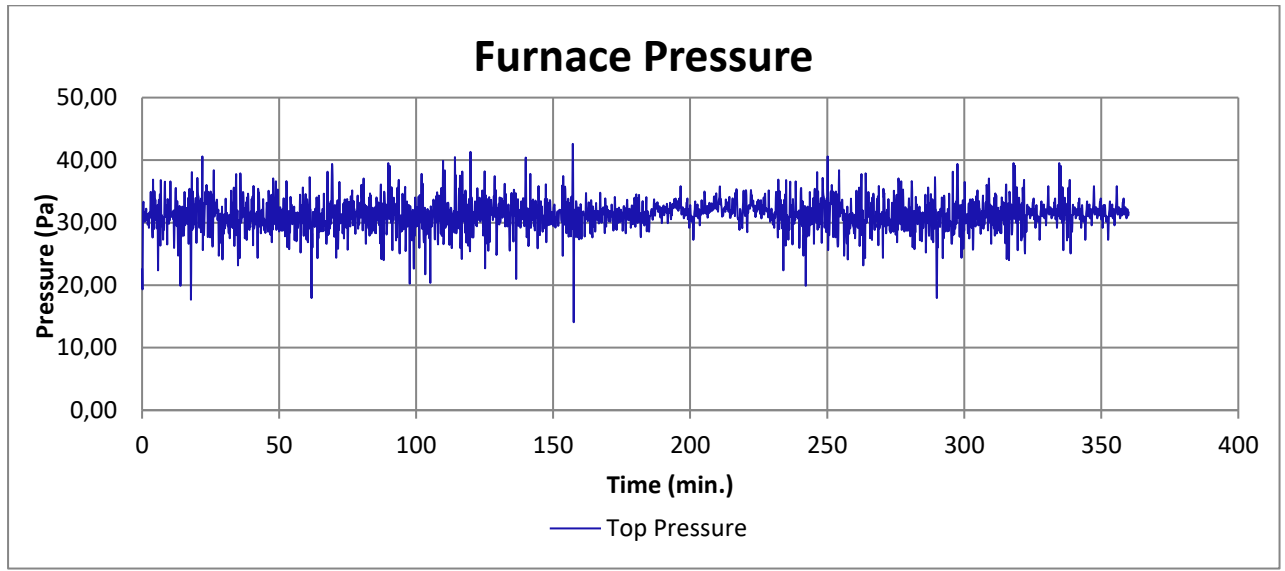


Figure A3: Pressure in the furnace

* The fluctuations and out of limit values derived from instant changes of the burner operation ratio.

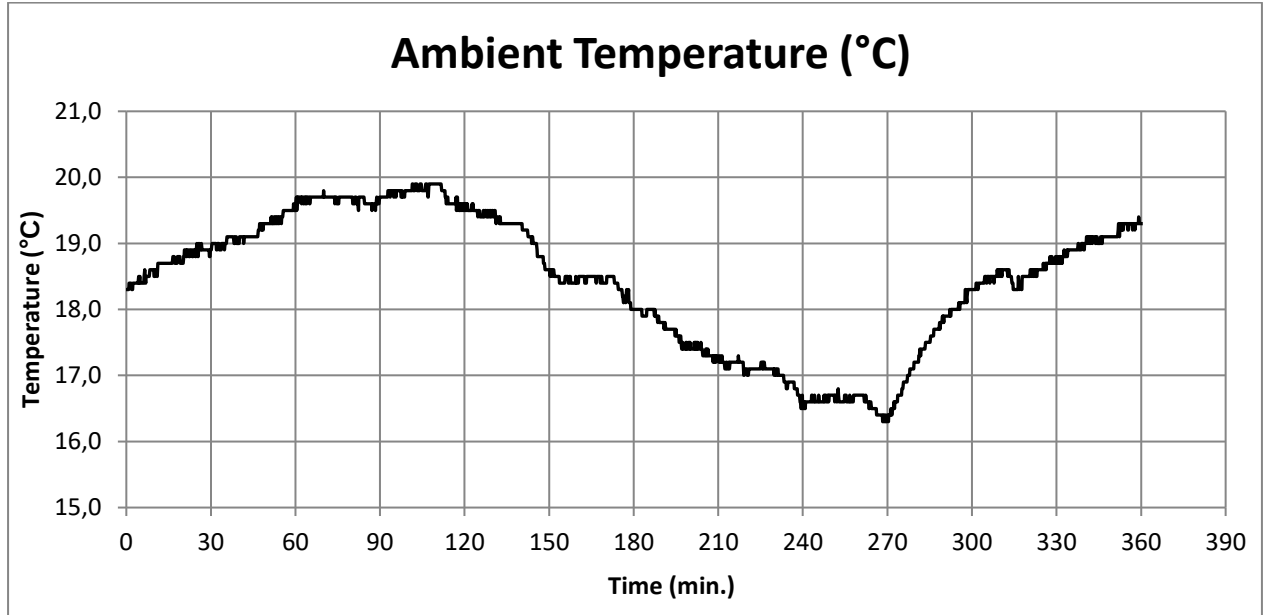


Figure A4: Ambient temperature at laboratory

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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Appendix B

EFECTIS ERA AVRASYA TEST VE BELGELENDİRME A.Ş.

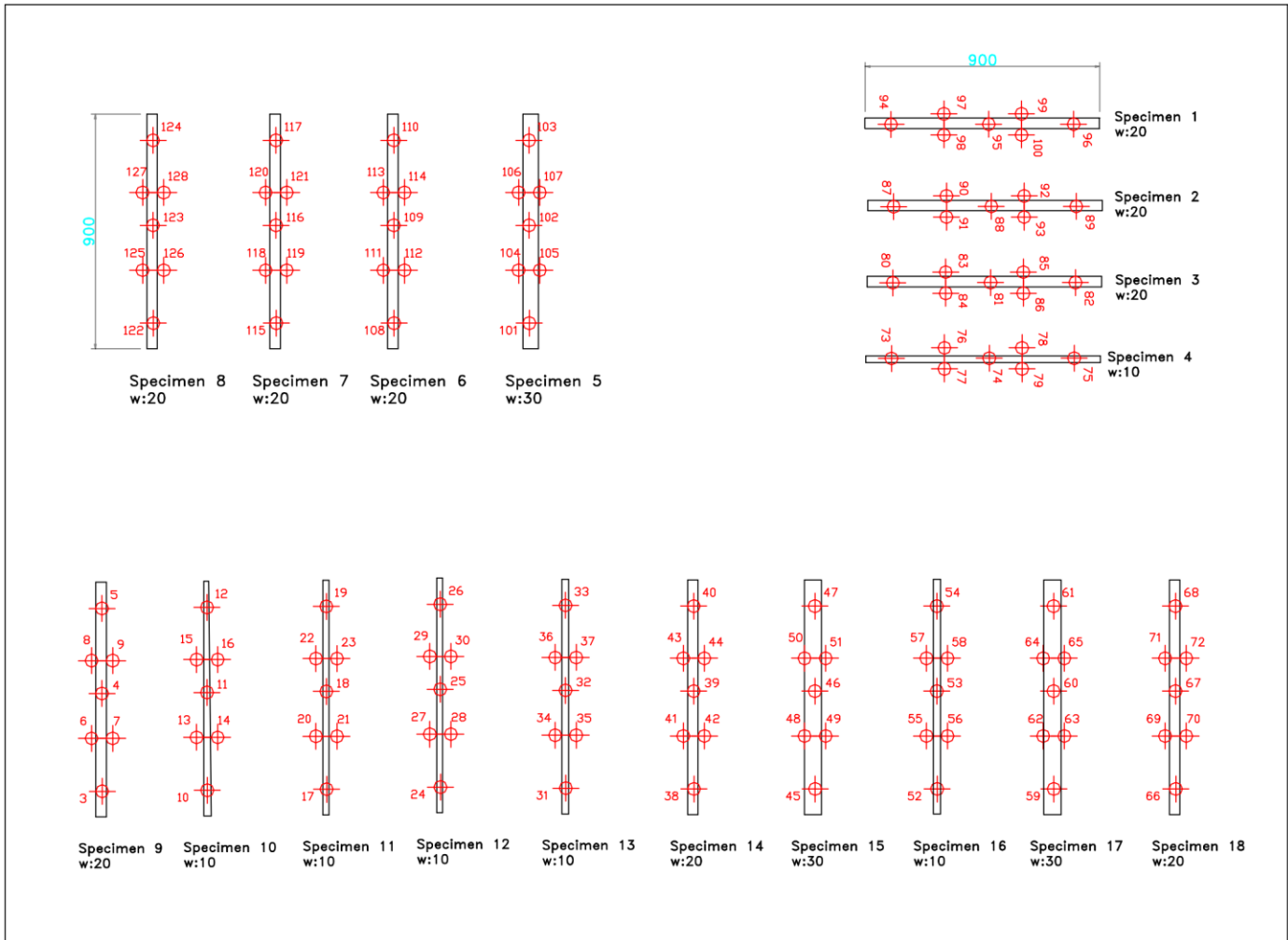


Figure B1: Locations of thermocouples.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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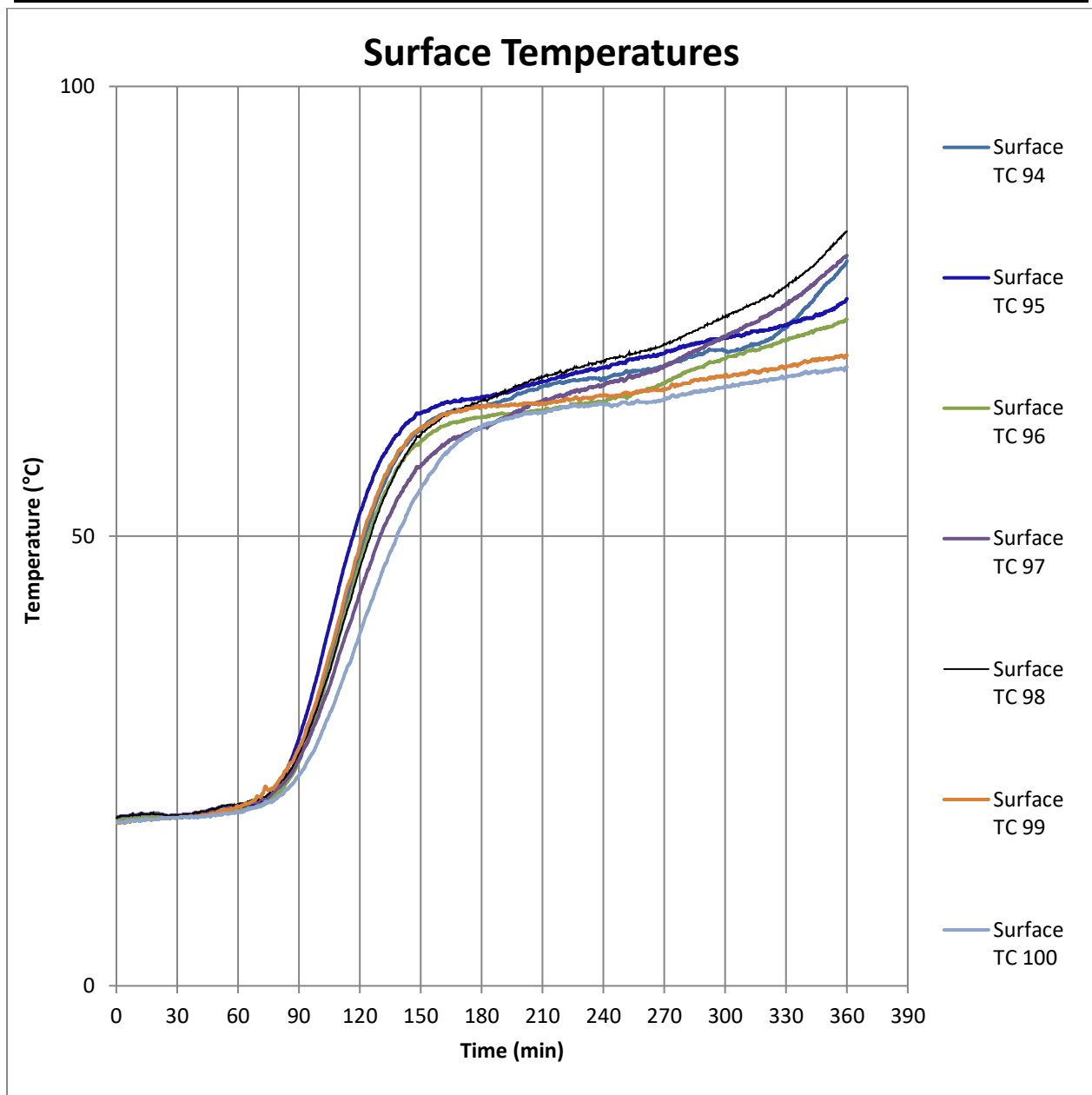


Figure B2: Surface temperatures of Specimen 1.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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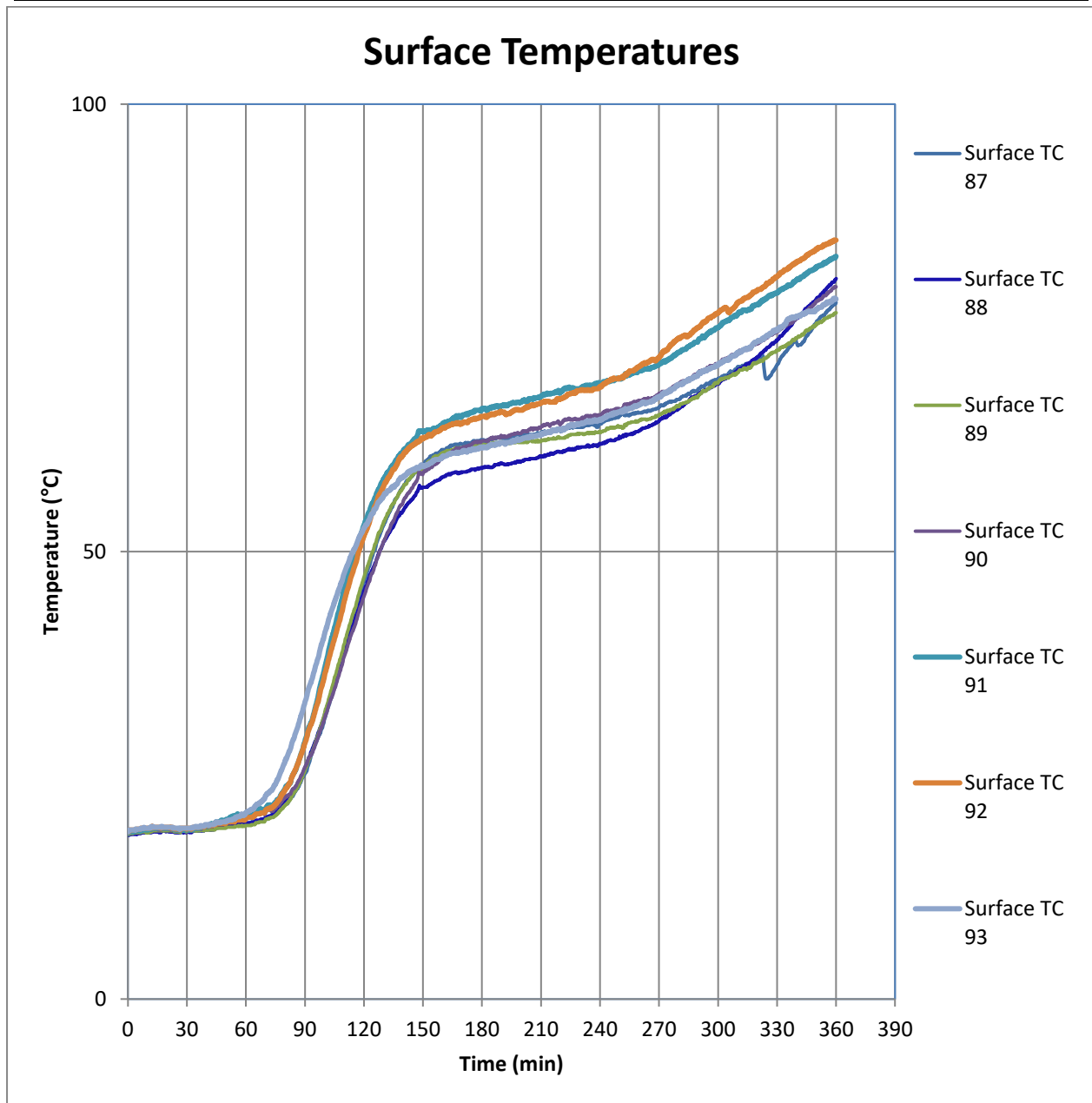


Figure B3: Surface temperatures of Specimen 2.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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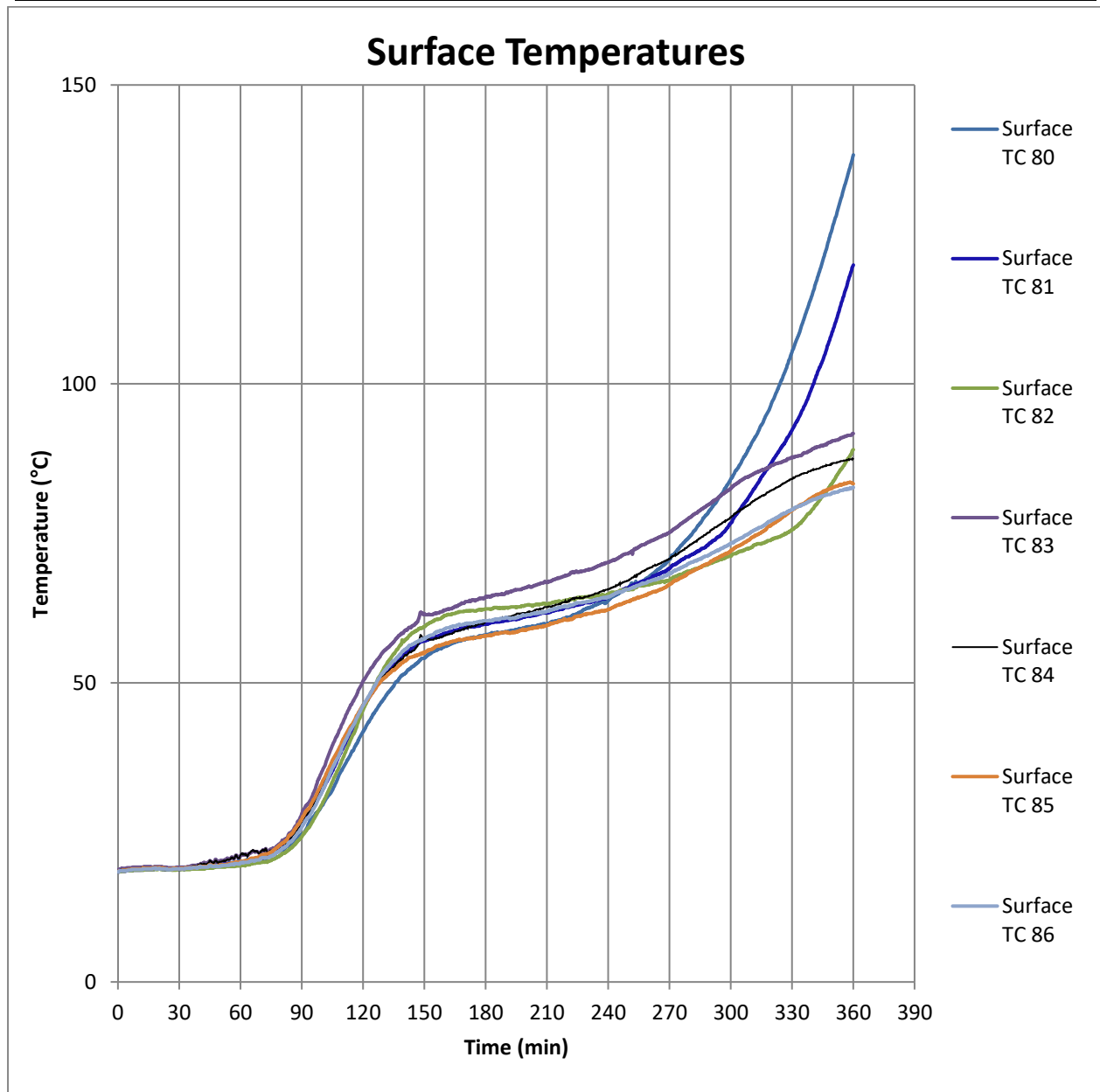


Figure B4: Surface temperatures of Specimen 3.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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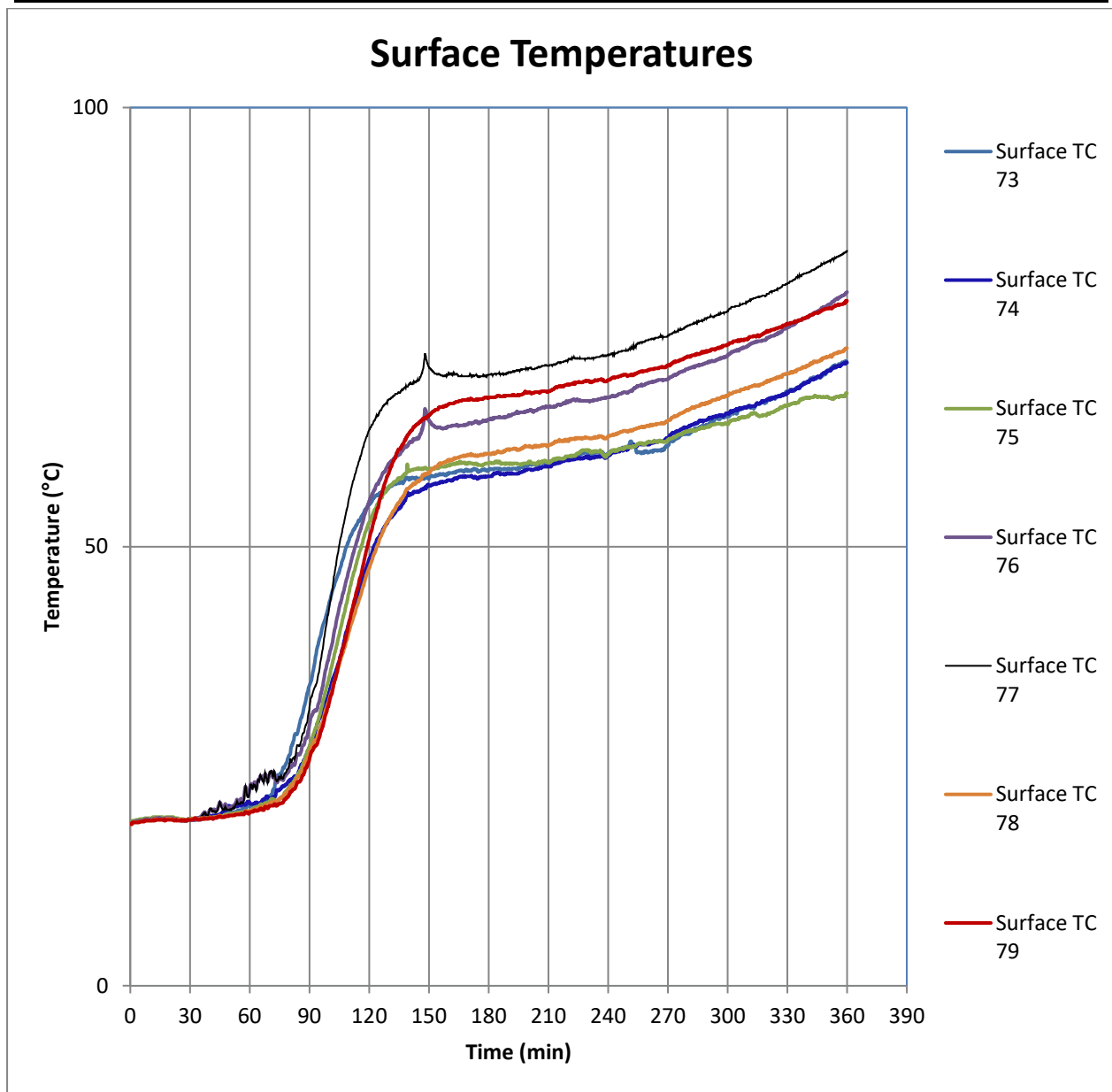


Figure B5: Surface temperatures of Specimen 4.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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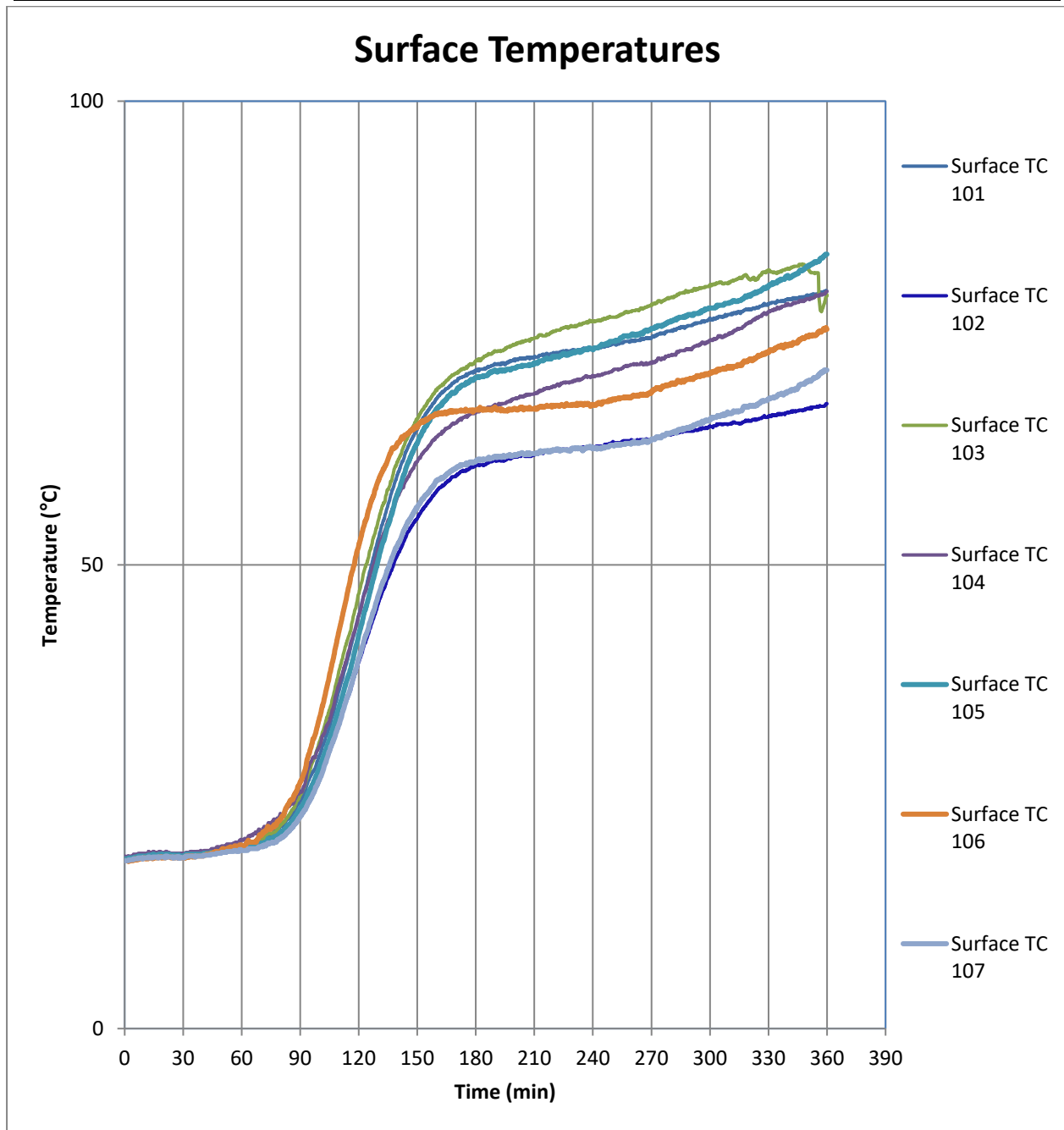


Figure B6: Surface temperatures of Specimen 5.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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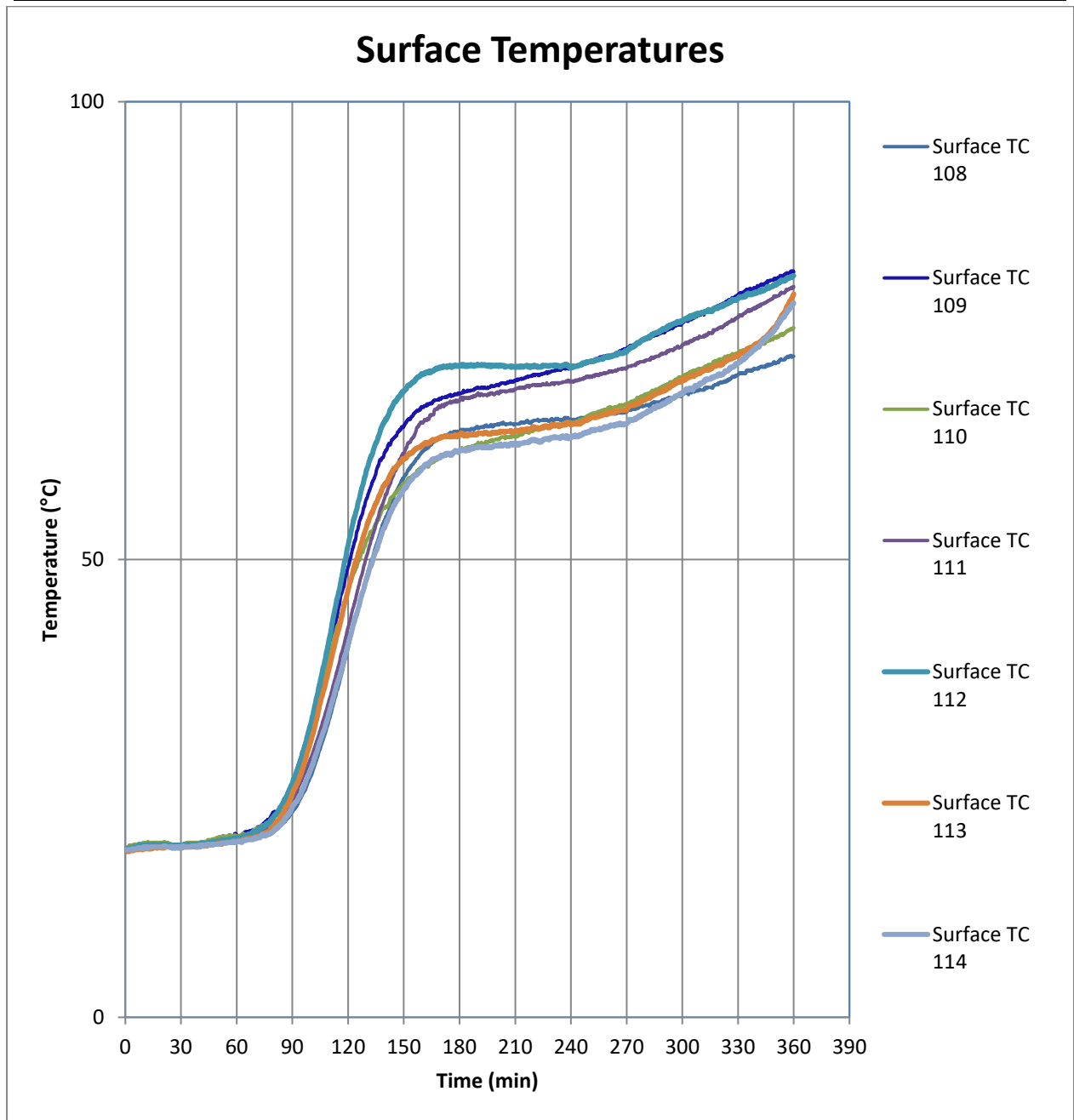


Figure B7: Surface temperatures of Specimen 6.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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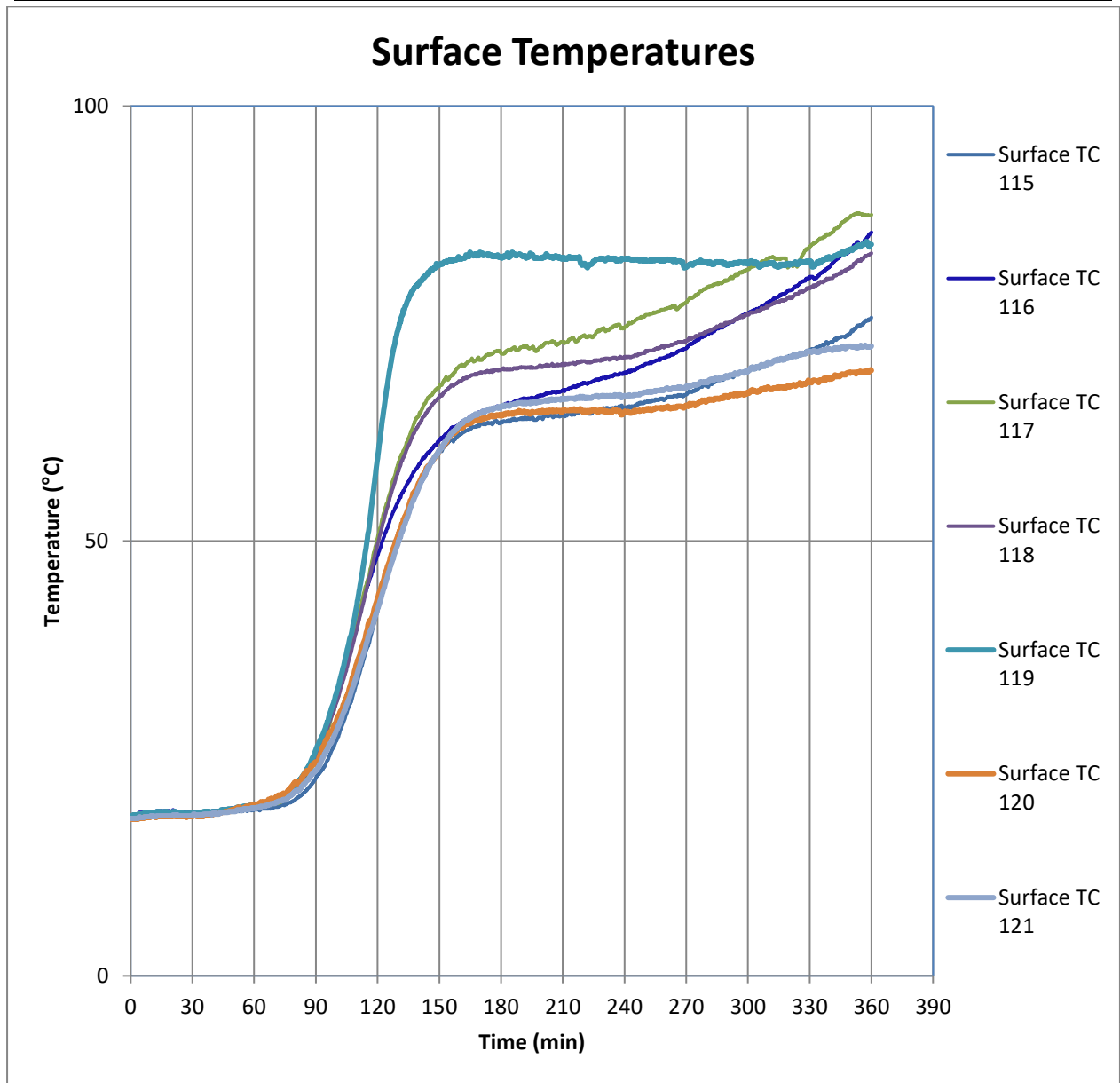


Figure B8: Surface temperatures of Specimen 7.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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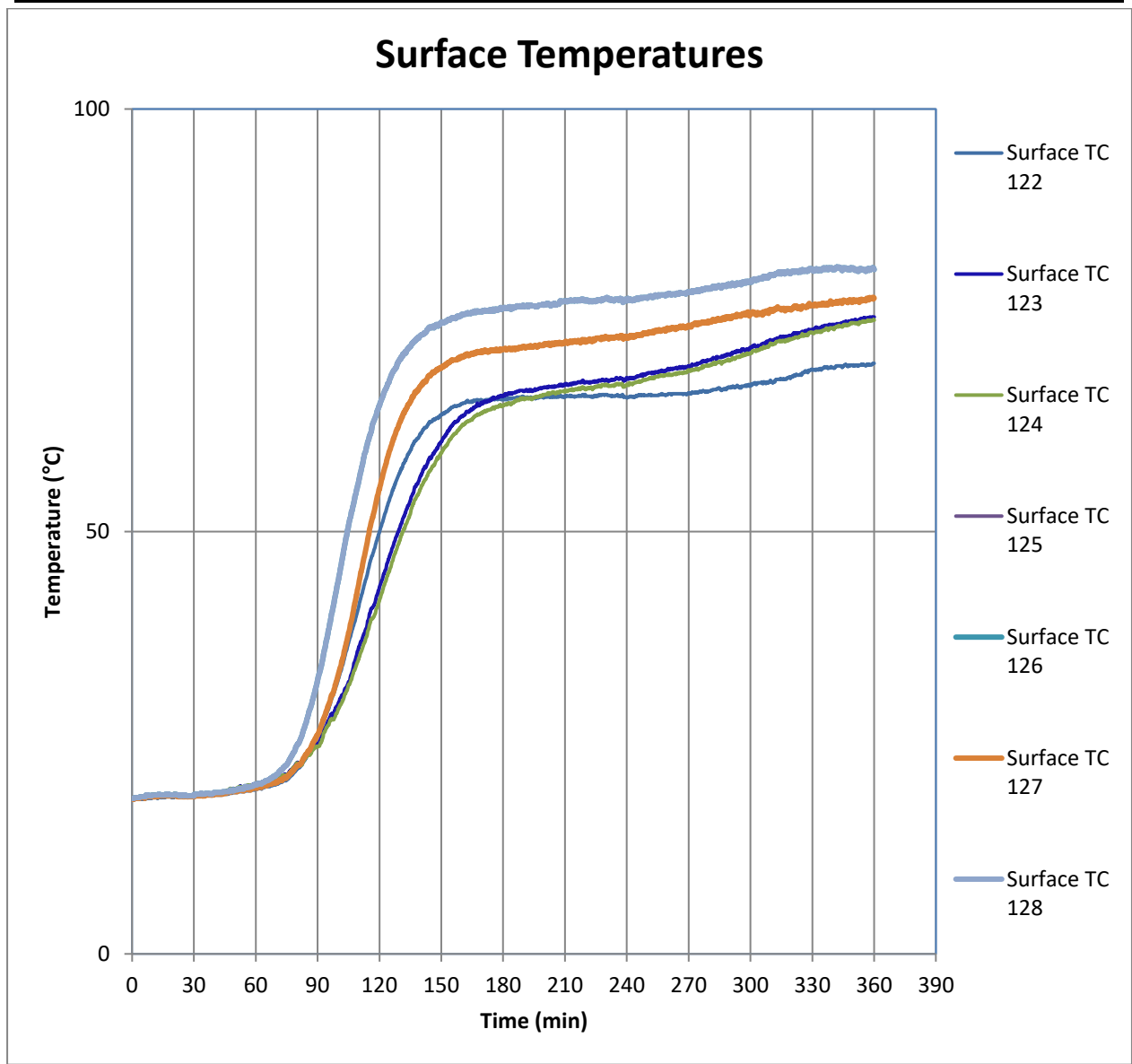


Figure B9: Surface temperatures of Specimen 8.
*TC 44 was malfunctioned because of melting at the seal.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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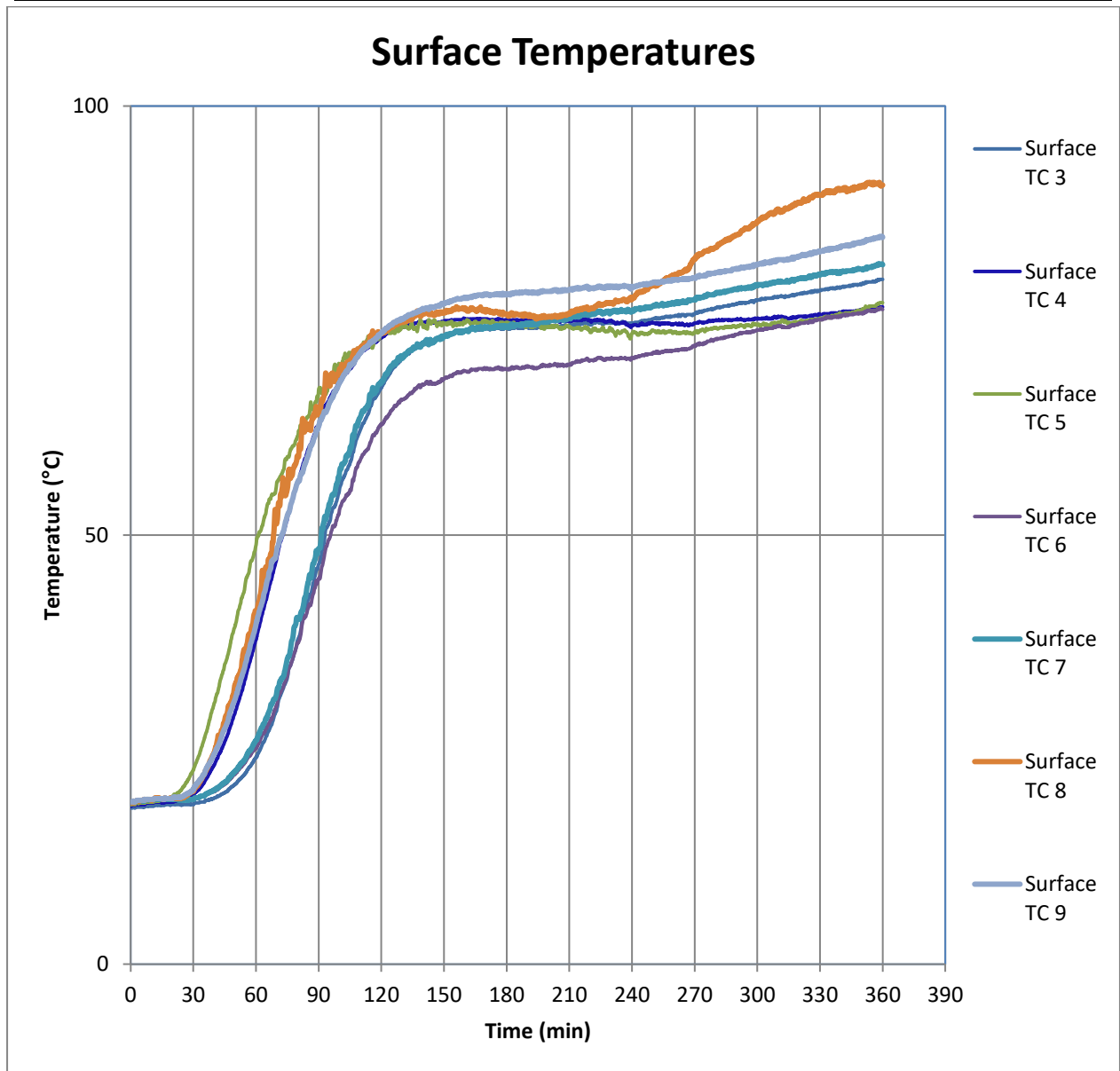


Figure B10: Surface temperatures of Specimen 9.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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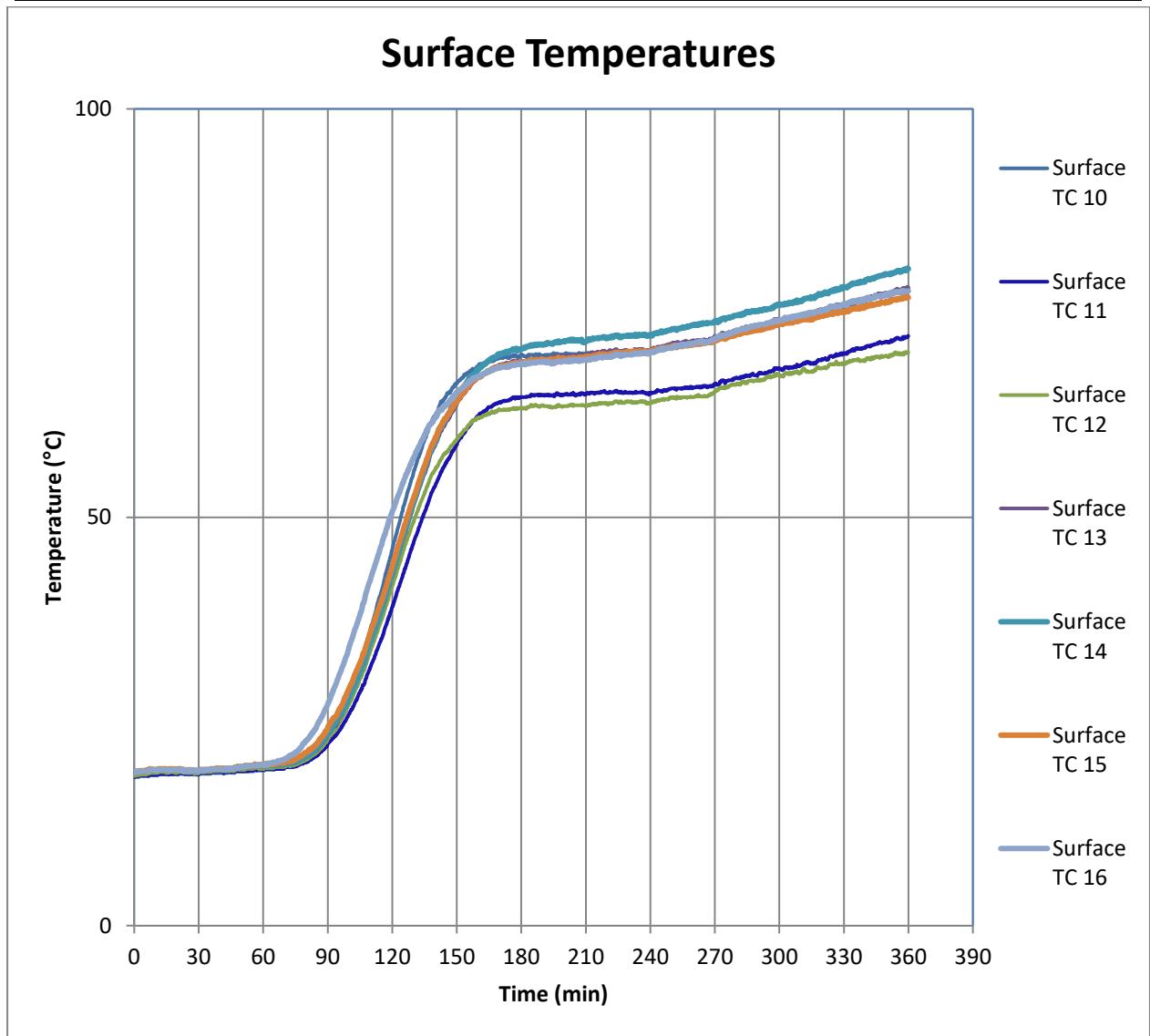


Figure B11: Surface temperatures of Specimen 10.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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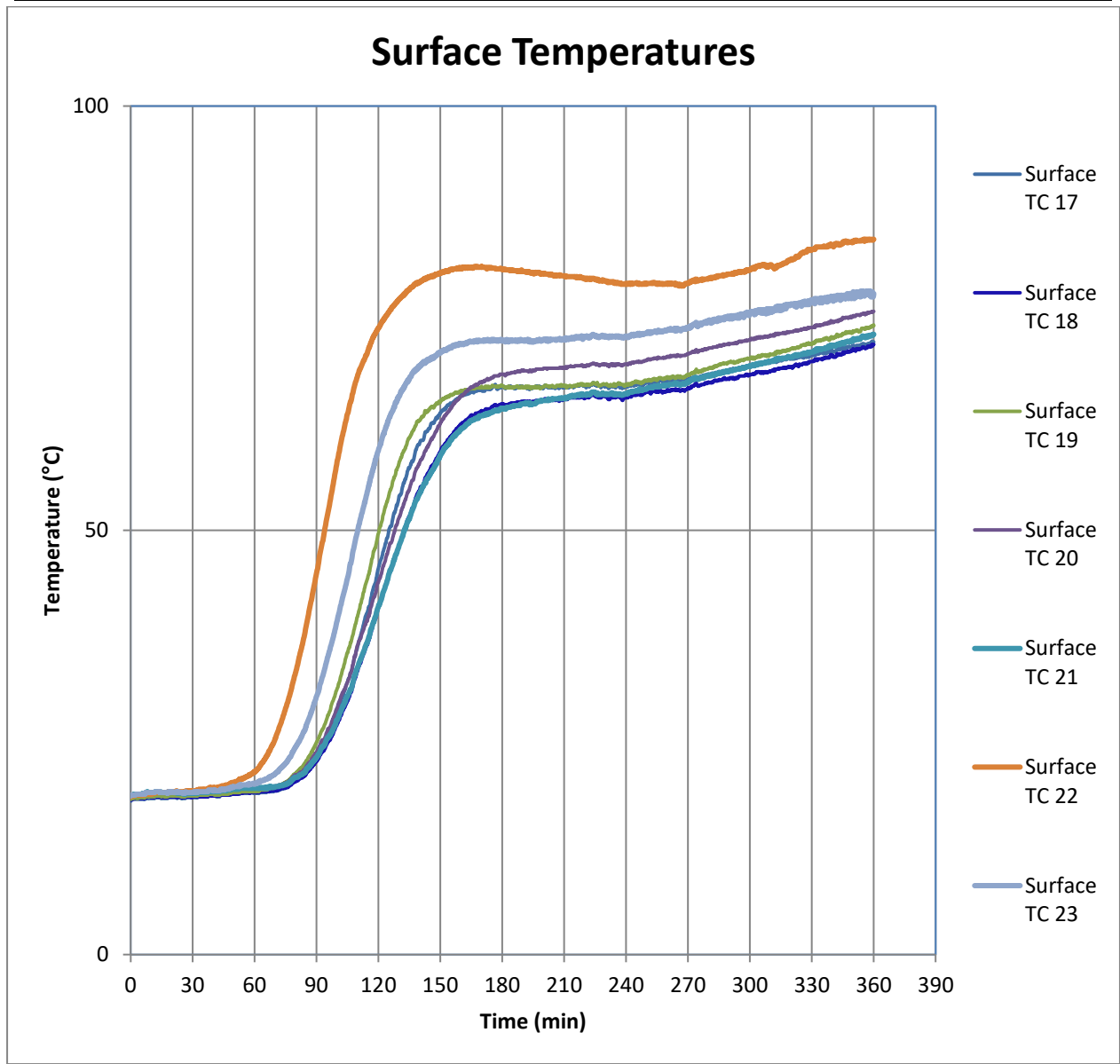


Figure B12: Surface temperatures of Specimen 11.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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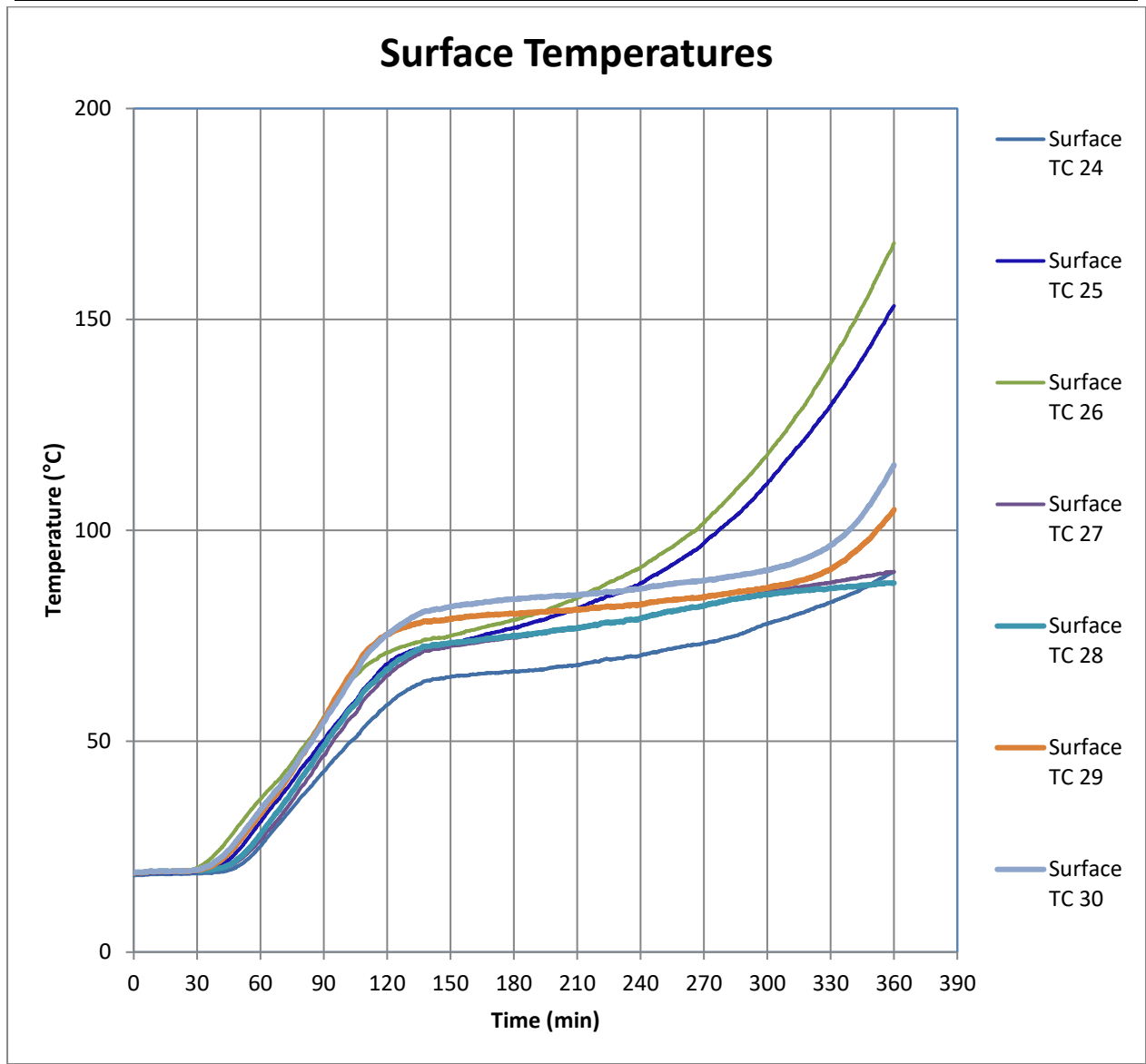


Figure B13: Surface temperatures of Specimen 12.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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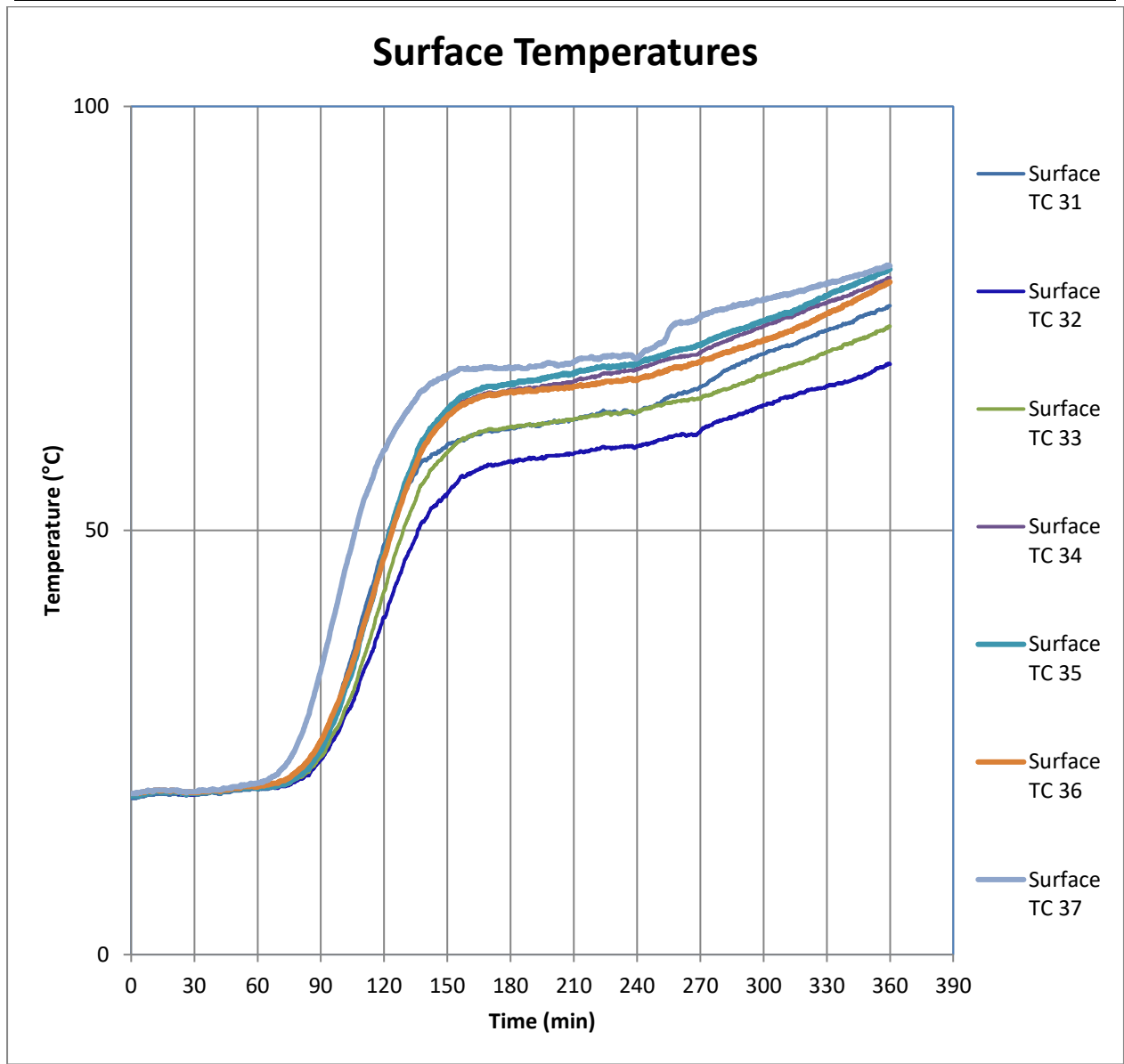


Figure B14: Surface temperatures of Specimen 13.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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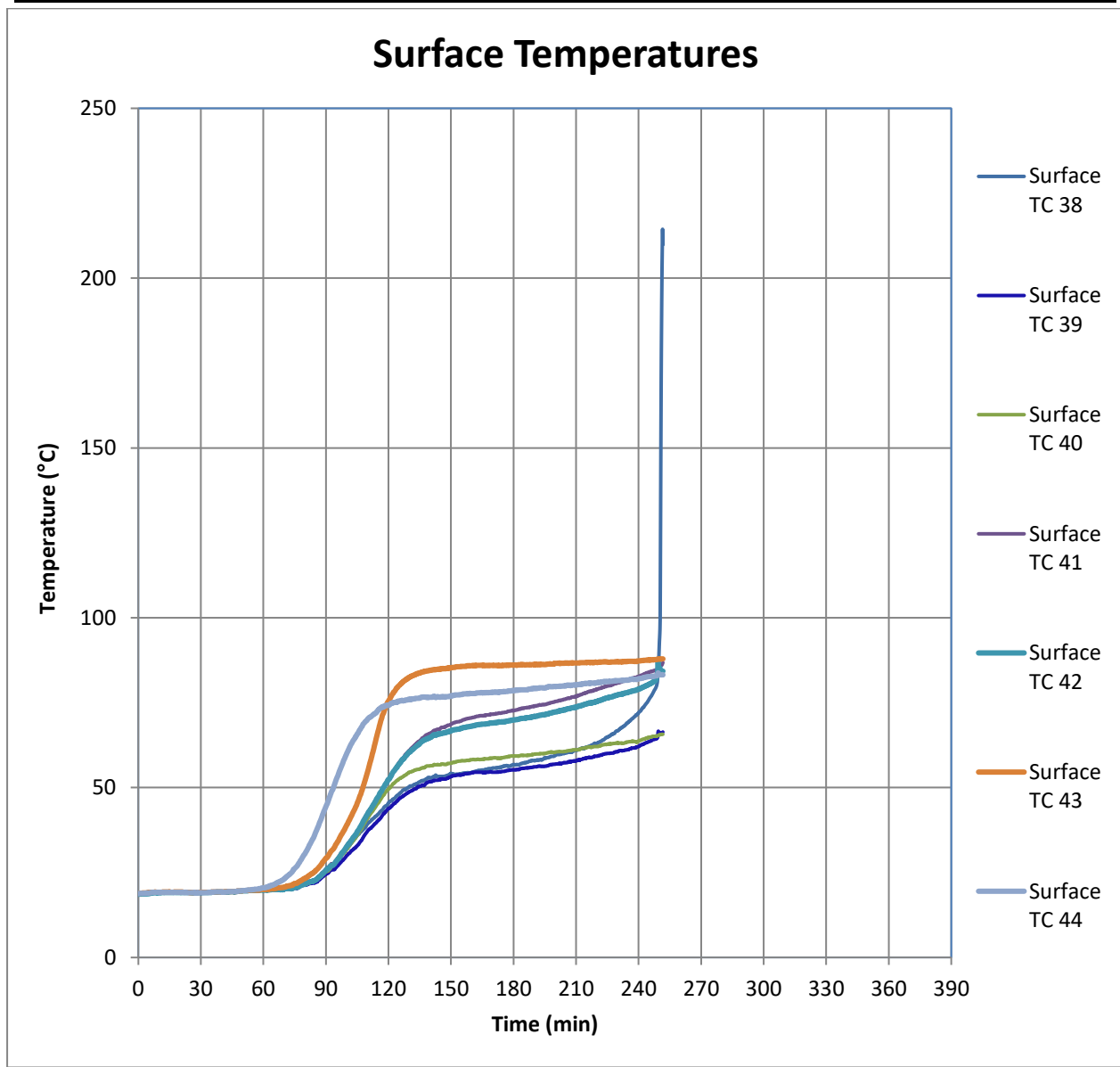


Figure B15: Surface temperatures of Specimen 14.

*Thermocouples removed at 251st minute because of failure of integrity.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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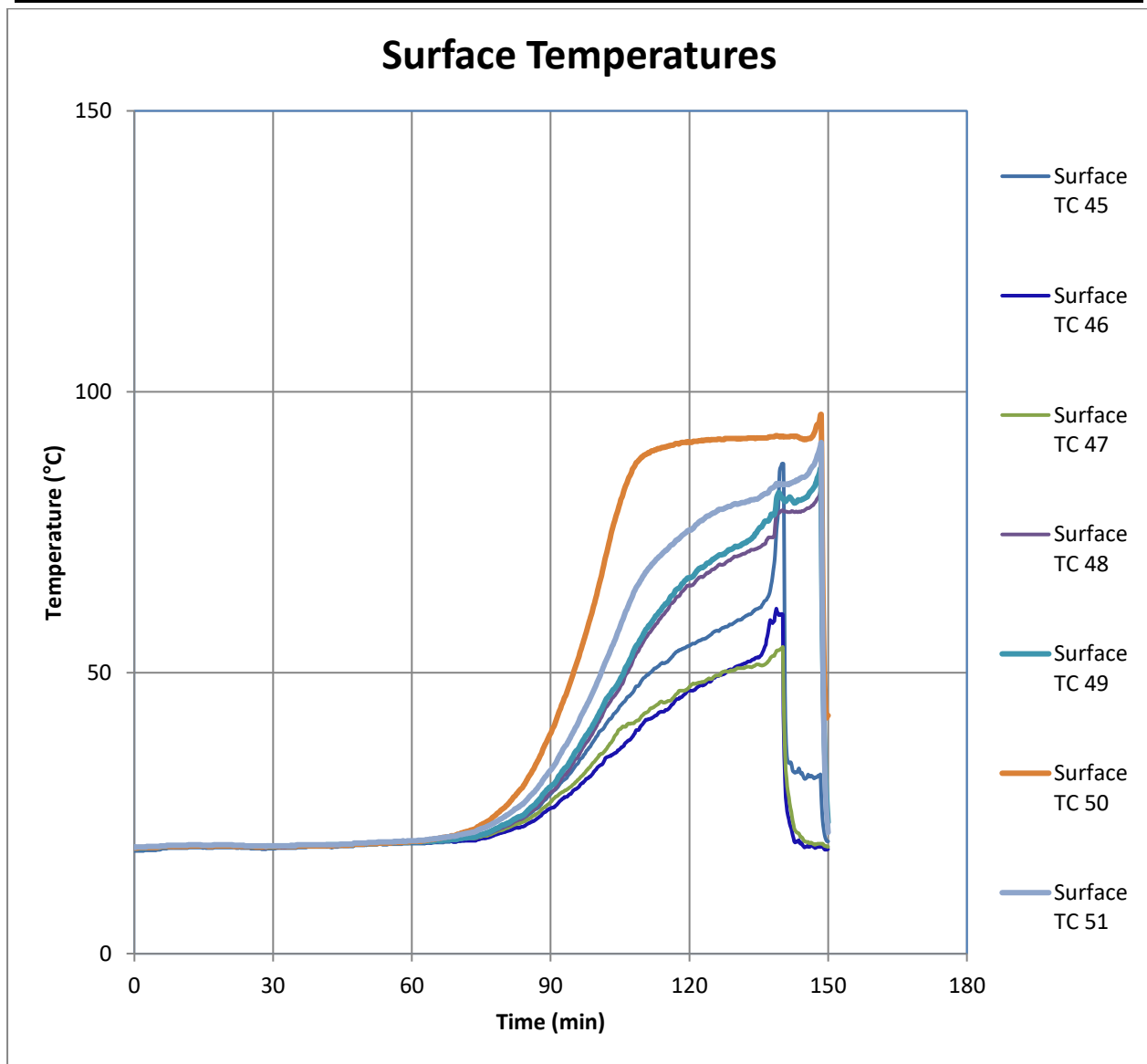


Figure B16: Surface temperatures of Specimen 15.

*Thermocouples removed at 150th minute because of failure of integrity.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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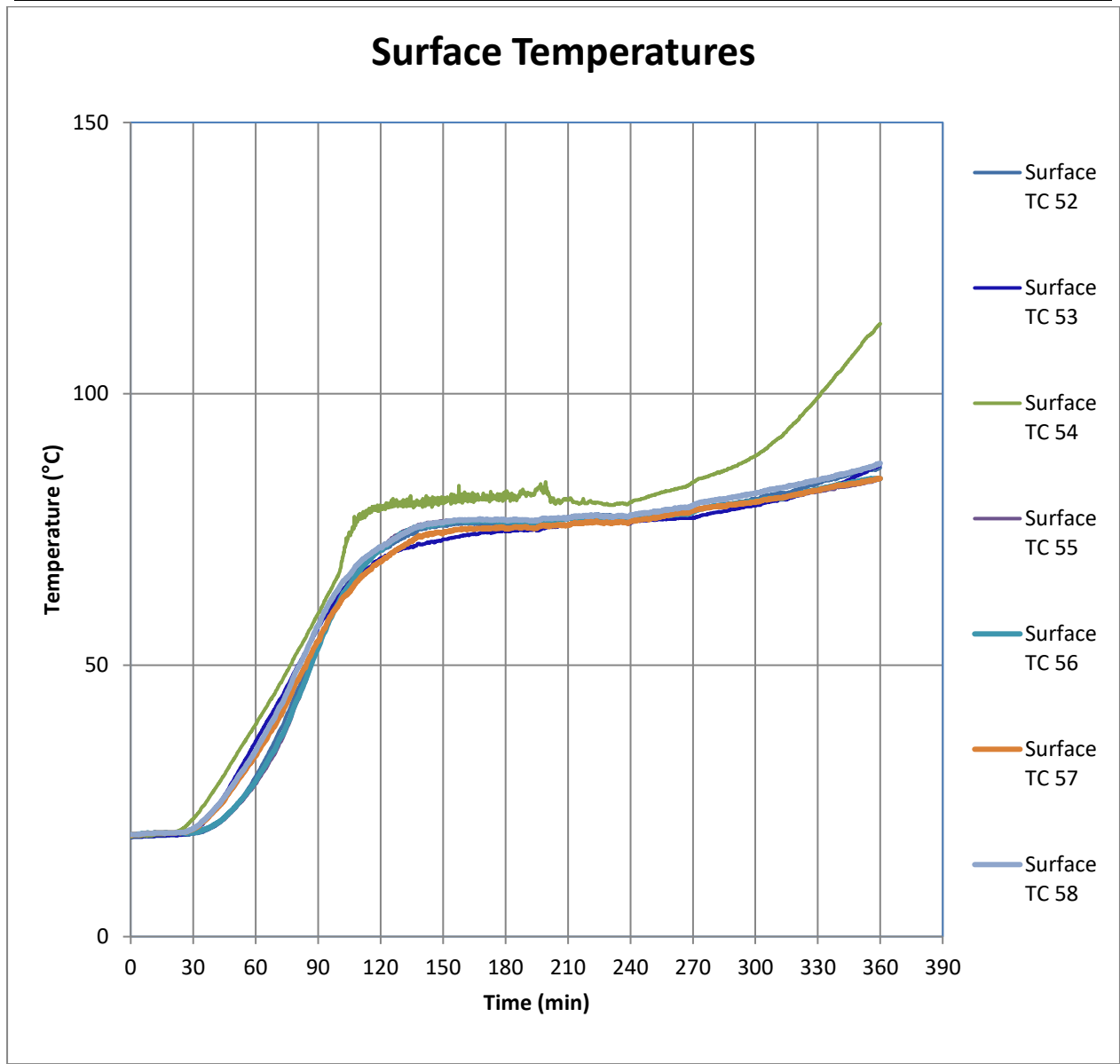


Figure B17: Surface temperatures of Specimen 16.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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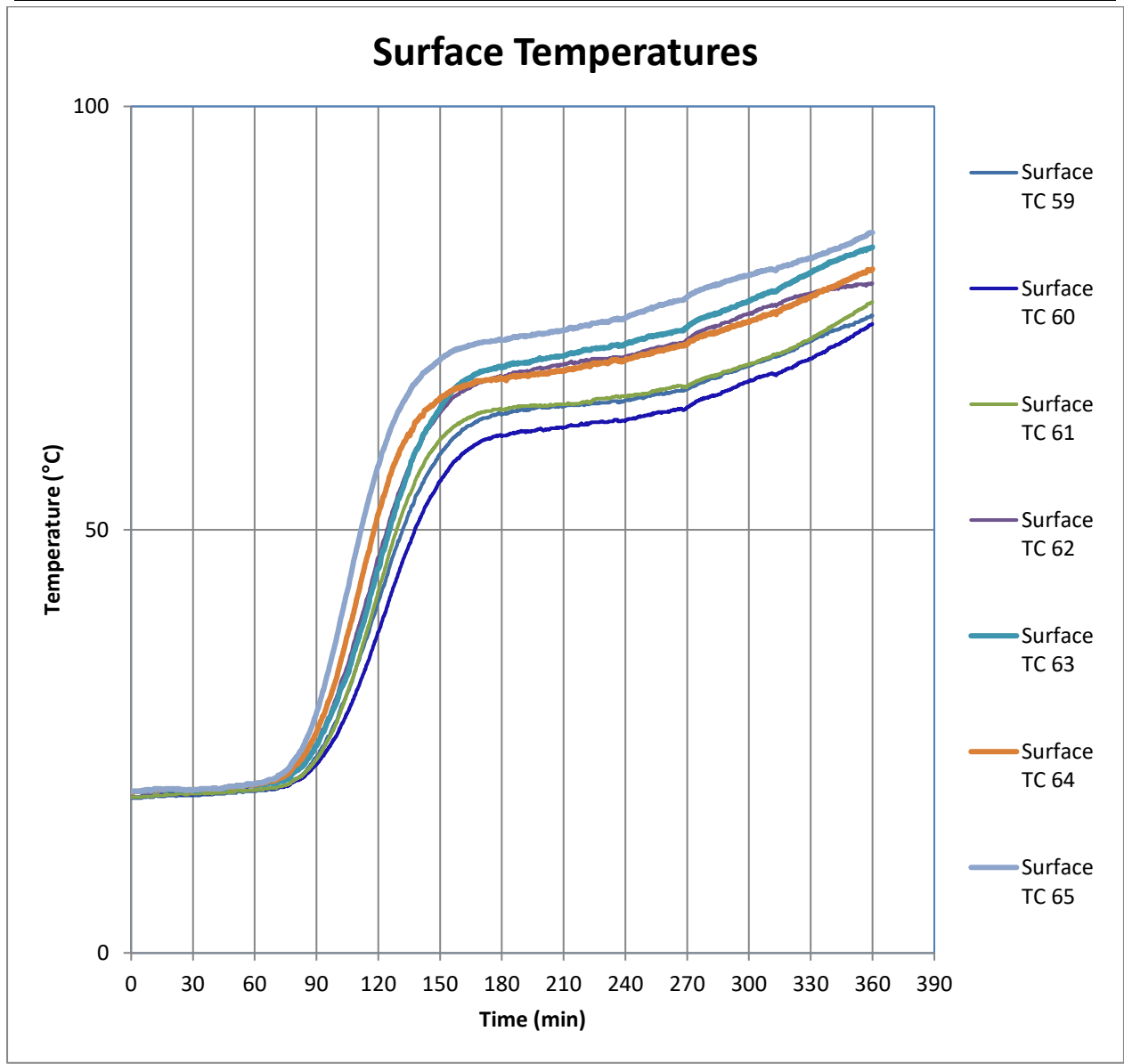


Figure B18: Surface temperatures of Specimen 17.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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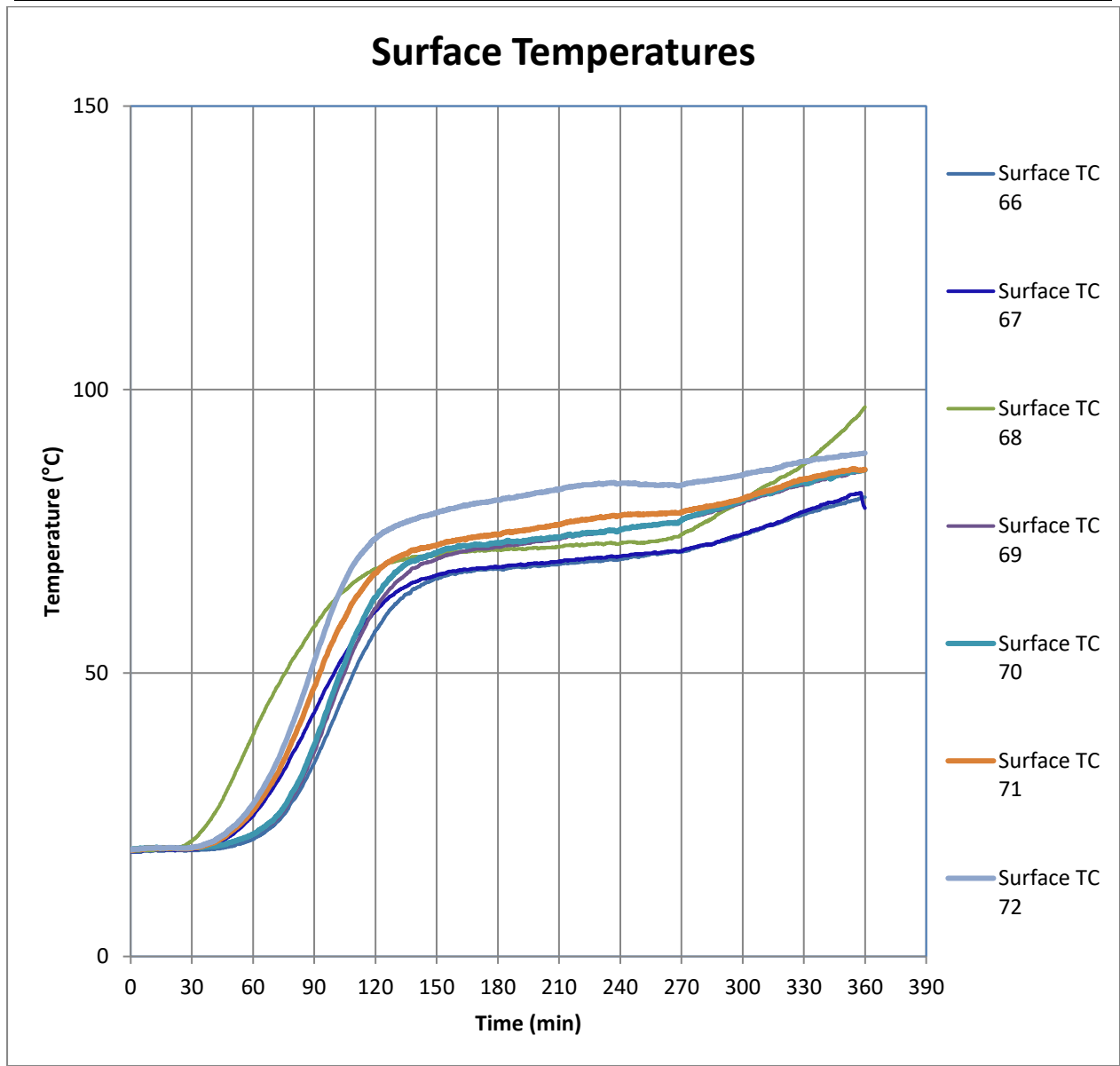


Figure B19: Surface temperatures of Specimen 18.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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Photo C1: Unexposed side of the test construction before the test.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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Photo C2: Exposed side of the test construction before the test.

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Photo C3: Unexposed side of the test construction after the test.

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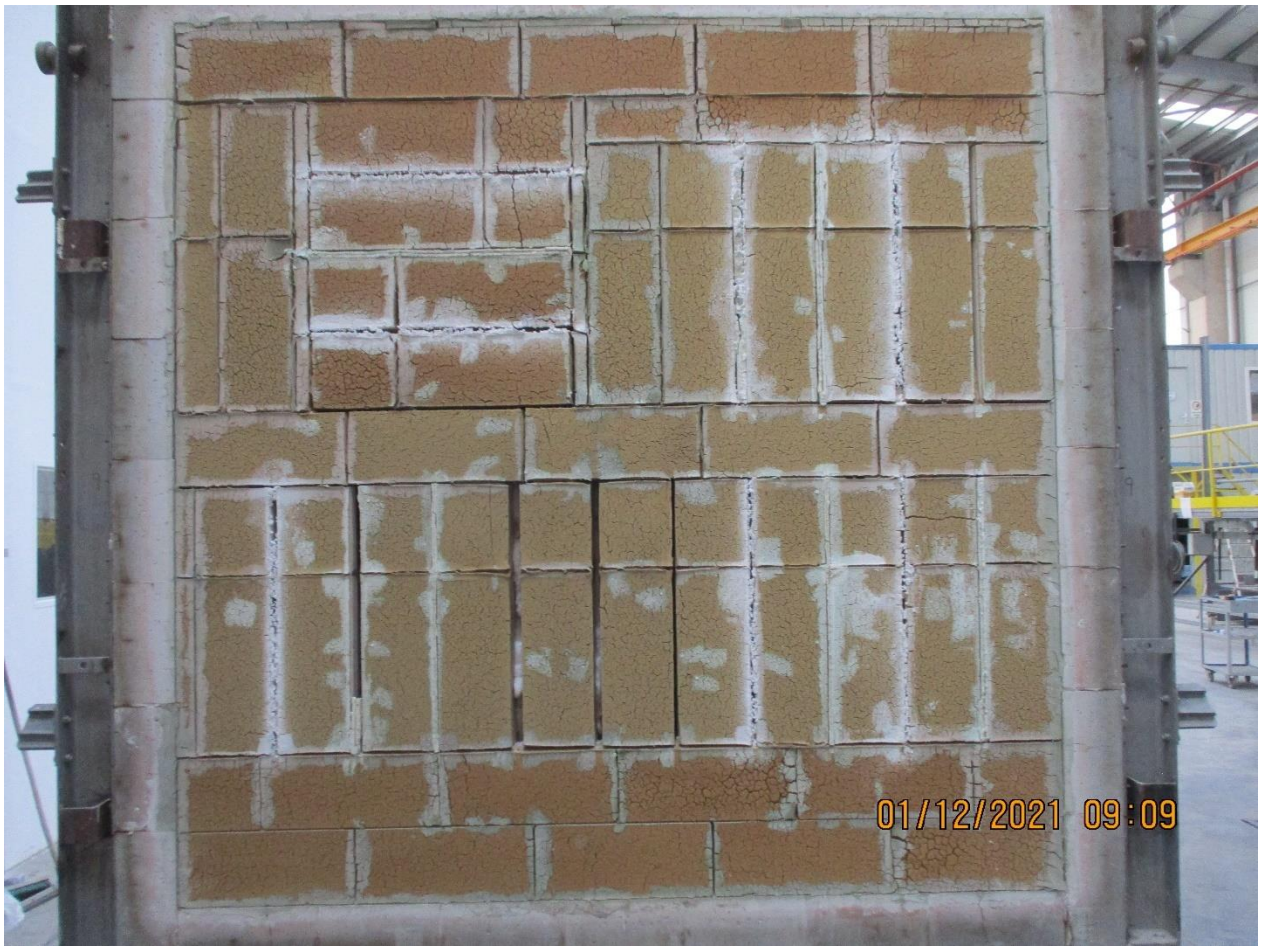


Photo C4: Exposed side of the test construction after the test.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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