



EFFECTIS ERA AVRASYA TEST VE BELGELENDİRME A.Ş.

TOSB TAYSAD Organize San. Böl. 1. CD. ,15. Yol No: 1

Şekerpınar – Çayırova, KOCAELİ

07.04.2017

RFTR17046

DENEY RAPORU

TEST REPORT

| | | |
|---|---|--|
| Müşterinin adı/adresi <i>Customer name/address</i> | : | NOVATA ENDÜSTRİ ENERJİ YAT. SAN VE TİC. A.Ş. Şerifali Mh. Çetin Cad. Kible Sk. Bemege İş Merkezi No:7 K:3 Ümraniye/ İSTANBUL/ TURKEY |
| İstek numarası <i>Order No.</i> | : | TORUNLAR GAYRİMENKUL YATIRIM ORTAKLIĞI A.Ş. Rüzgarlıbahçe Mahallesi Özalp Çıkmazı No: 4 34805 Beykoz/ İSTANBUL/ TURKEY EEA-16-000932 |
| Numunenin adı ve tarifi <i>Name and identity of test sample</i> | : | Single Leaf Steel Fire Doors "TRN-NVT-125, NVT-CMD-132" |
| Numunenin kabul tarihi <i>The date of receipt of sample</i> | : | 06.03.2017 |
| Açıklamalar <i>Remarks</i> | : | |
| Deneyin yapıldığı tarih <i>Date of test</i> | : | 09.03.2017 |
| Raporun sayfa sayısı <i>Number of pages of the Report</i> | : | 26 (Totally 39 pages with annexes) |

Türk Akreditasyon Kurumu(TÜRKAK) deney raporlarının tanınması konusunda Avrupa Akreditasyon Birliği(EA) ve Uluslararası Laboratuvar Akreditasyon Birliği(ILAC) ile karşılıklı tanınma antlaşmasını imzalamıştır.

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Deney ve /veya ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri (olması halinde) ve deney metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.

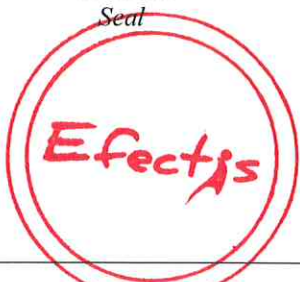
The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report

Mühür
Seal

Tarih
Date

Deney Sorumlusu
Person in charge of test

Laboratuvar Müdürü
Head of Testing Laboratory



07.04.2017

Yusuf ÜSTÜNDAĞ

Ali BAYRAKTAR

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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1. SCOPE

Fire resistance test, in conformity with the general requirements of standards EN 1363-1:2012, with substitute or additional methods of standard EN 1363-2:1999 and with the particular requirements of standard EN 1634-1:2014 "Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware - Part 1: Fire resistance tests for doors, shutters and openable windows". Conditioning (Paragraph number 8) of standard EN 1363-1:2012 was not taken consideration in this project. Conditioning time must be 28 days.

2. TEST LABORATORY

Name : Efectis Era Avrasya Test ve Belgelendirme A.Ş.
Address : TOSB TAYSAD Organize San. Böl. 1. CD. ,15. Yol No: 1
Şekerpınar – Çayırova, KOCAELİ / TURKEY

3. DESCRIPTION OF THE TEST SPECIMEN

3.1. General

Product identification : Single Leaf Steel Fire Doors "TRN-NVT-125, NVT-CMD-132"

TRN-NVT-125 : Door Nr.1
NVT-CMD-132 : Door Nr.2

Direction of fire : Hinges away from fire

Manufacturer : CMD METAL ÇELİK KAPI VE YANGIN KAPISI DIŞ TİC. LTD. ŞTİ.
İ.O.S.B Atatürk Oto San. Sit. 12 B Sok. 11 A Blok No: 703-704
İkitelli/ Başakşehir/ İSTANBUL/ TURKEY

Sponsor of test : NOVATA ENDÜSTRİ ENERJİ YAT. SAN VE TİC. A.Ş
Şerifali Mh. Çetin Cad. Kible Sk. Bemege İş Merkezi No:7 K:3
Ümraniye/ İSTANBUL/ TURKEY

: TORUNLAR GAYRİMENKUL YATIRIM ORTAKLIĞI A.Ş.
Rüzgarlıbahçe Mahallesi Özalp Çıkmaı No: 4 34805
Beykoz/ İSTANBUL/ TURKEY

3.2. Construction

Single action steel door constructions, Single Leaf Steel Fire Doors "TRN-NVT-125, NVT-CMD-132" were mounted in a masonry supporting construction, made of aerated concrete blocks with the mounting clearances dimensions of 910 X 2110 mm (w x h) for both door.

The supporting construction was supplied by the test laboratory (Efectis Era Avrasya) and consisted of aerated concrete blocks which have a density of 650 kg/m³ and thickness of 200 mm.

3.3. Components

3.3.1. Door Nr.1

3.3.1.1. Door Frame:

The frame studs and header were welded to each other and fixed to the supporting construction with steel screws and L shaped DKP steel profile. Water based fire resistant mortar was used between the supporting construction and the frame. PVC seal was used rebated edge of frame. Intumescent seal strip was used at contact point of leaf and frame.

- Type : Shaped from DKP steel plate.
- Dimensions :
 - Frame studs : 16/70 x 79,5 x 2100/2184 mm (w x d x h)
 - Frame header : 16/70 x 79,5 x 1070/900 mm (w x d x l)
 - Frame sill : 16/70 x 79,5 x 1070/900 mm (w x d x l)
 - Wall thickness of the steel plate : 1,5 mm.
- Insulation :
 - Type : Water based fire resistant mortar – ASTRO FM COMPOUND – ASTROFLAME
 - Nominal density : 1155 ± 55 kg/m³
 - Nominal thickness : 20 mm
 - Thermal conductivity: 0,289 W/mK
 - Location: Between supporting construction and the frame.
- Seal :
 - Type : PVC seal – YILMAZ PLASTİK
 - Dimensions : 10 x 14 mm (w x h)
 - Locations : At rebated edges of the frame.
 - Type : Intumescent seal strip – ORBİS
 - Dimensions : 20 x 2 mm (w x t)
 - Locations : Contact points of the leaf and the frame (1 line)
At sill (2 lines)

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- Fixing :
 - Type : L shaped DKP steel – Fixing the frame parts
 - Dimensions: 150/150 x 100 x 2 mm (w x h x t)
 - Location: 2 pcs. at each stud. At 350 mm from bottom of the door and at 300 mm from the top of the door.
 - Type : Steel bolt – Fixing the frame parts
 - Dimensions : 8 X 105 mm (Ø x l)
 - Location : 4 pcs. at each stud. From the bottom of the door distances were respectively 250, 650, 1450 and 1890 mm. 2 pcs at the header. 228,5 mm distance from edges of the frame, c.t.c distance was 613 mm.

3.3.1.2. Leaf:

The leaf was covered by steel plates at both sides with insulation inside. Gypsum board, stone wool and ceramic fiber were used as insulation. Leaf was reinforced with Ω steel profile.

- Covering plate : DKP steel plate; wall thickness: 1,5 mm.
- Dimensions : 975/900 x 2095/2075 x 70 mm (w x h x t)
- Insulation :
 - Type : Gypsum board – ATIŞKAN
 - Nominal thickness : 12 + 12 mm
 - Mass per unit area : 9,5 kg/m²
 - Fire classification according to EN 13501-1: A2-s1,d0 (b)
 - Location: Unexposed side and exposed side – (2 layers)
 - Type : Ceramic fiber – HITEX INSULATION (NINGBO) CO. LTD.
 - Mass per unit area : 1,3 kg/m²
 - Nominal thickness : 4+4 mm
 - Location : Between stone wool and gypsum board – 2 layers. Unexposed side and exposed side.
 - Type : Stone wool - WOOLER
 - Nominal density : 80 kg/m³
 - Nominal thickness : 42 mm
 - Location : Between the ceramic fibers.
- Reinforcement:
 - Type : Ω shaped steel profile
 - Dimensions : 120 x 32/30 x 1 mm (w x d x t)
 - Locations : 3 pcs profile used inside of the leaf. Starting with 174 mm distance from edge of the leaf, c.t.c distances were 259 and 253 mm

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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3.3.1.3. Accessories:

- Hinges :

The leaf was hung on three steel hinges.

- Type : Steel Spring Hinge – CMD- MCMD 1001-01
 - Dimensions : 27 x 170 mm (Ø x l)
 - Locations : 212 mm distance from top of the frame, c.t.c distances were 480 and 852 mm.

- Lock:

- Type : Surface leaf mounted fire lock – CMD – YKCMD 1001-02 (Self-closing lock with temperature)
 - Dimension : 70 x 50 x 50 mm (l x w x d)
 - Location : 2 pcs. lock used surface on the leaf. 200 mm distance from top of the leaf. 450 mm distance from bottom of the leaf.

- Door closer :

- Type : Door closer – DORMA TS 89F
 - Location : 344 mm from the edge of the leaf.

- Panic bar :

- Type : Panic bar with lock – CMD - PBCMD 1001-03 (Lock: DORMA 1739)
 - Location : 1000 mm from the door sill.

For detailed information see figures 1-4 and 9-10.

3.3.2. Door Nr.2

3.3.2.1. Door Frame:

The frame studs and header were welded to each other and fixed to the supporting construction with steel screws and L shaped DKP steel profile. Water based fire resistant mortar was used between the supporting construction and the frame. PVC seal was used rebated edge of frame. Intumescent seal strip was used at contact point of leaf and frame.

- Type : Shaped from DKP steel plate.

- Dimensions :

- Frame studs : 16/70 x 79,5 x 2100/2184 mm (w x d x h)
- Frame header : 16/70 x 79,5 x 1070/900 mm (w x d x l)
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 - Nominal density : 1155 ± 55 kg/m³
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- Seal :
 - Type : PVC seal – YILMAZ PLASTİK
 - Dimensions : 10 x 14 mm (w x h)
 - Locations : At rebated edges of the frame.
 - Type : Intumescent seal strip – ORBİS
 - Dimensions : 20 x 2 mm (w x t)
 - Locations : Contact points of the leaf and the frame (1 line)
At sill (2 lines).
- Fixing :
 - Type : L shaped DKP steel – Fixing the frame parts
 - Dimensions: 150/150 x 100 x 2 mm (w x h x t)
 - Location: 2 pcs. at each stud. At 350 mm from bottom of the door and at 300 mm from the top of the door.
 - Type : Steel bolt – Fixing the frame parts
 - Dimensions : 8 X 105 mm (Ø x l)
 - Location : 4 pcs. at each stud. From the bottom of the door distances were respectively 250, 650, 1450 and 1890 mm. 2 pcs at the header. 228,5 mm distance from edges of the frame, c.t.c distance was 613 mm.

3.3.2.2. Leaf:

The leaf was covered by steel plates at both sides with insulation inside. Gypsum board, stone wool and ceramic fiber were used as insulation. Leaf was reinforced with Ω steel profile.

- Covering plate : DKP steel plate; wall thickness: 1 mm.
- Dimensions : 975/900 x 2095/2075 x 70 mm (w x h x t)
- Insulation :
 - Type : Gypsum board – ATIŞKAN
 - Nominal thickness : 12 + 12 mm
 - Mass per unit area : 9,5 kg/m²
 - Fire classification according to EN 13501-1: A2-s1,d0 (b)
 - Location: Unexposed side and exposed side – (2 layers)
 - Type : Ceramic fiber – HITEX INSULATION (NINGBO) CO. LTD.
 - Mass per unit area : 1,3 kg/m²
 - Nominal thickness : 4+4 mm
 - Location: Between stone wool and gypsum board – 2 layers. Unexposed side and exposed side.

- Type : Stone wool - WOOLER
 - o Nominal density : 80 kg/m³
 - o Nominal thickness : 42 mm
 - o Location : Between the ceramic fibers.

- Reinforcement:

- Type : Ω shaped steel profile
 - o Dimensions : 120 x 32/30 x 1 mm (w x d x t)
 - o Locations : 3 pcs profile used inside of the leaf. Starting with 174 mm distance from edge of the leaf, c.t.c distances were 259 and 253 mm.

3.3.2.3. Accessories:

- Hinges :

The leaf was hung on three steel hinges.

- Type : Steel Spring Hinge – CMD- MCMD 1001-01
 - o Dimensions : 27 x 170 mm (\varnothing x l)
 - o Locations : 212 mm distance from top of the frame, c.t.c distances were 480 and 852 mm.

- Lock :

- Type : Surface leaf mounted fire lock – CMD – YKCMD 1001-02
(Self-closing lock with temperature)
 - o Dimension : 70 x 50 x 50 mm (l x w x d)
 - o Location : 2 pcs. lock used surface on the leaf. 200 mm distance from top of the leaf. 450 mm distance from bottom of the leaf

- Door closer :

- Type : Door closer – DORMA TS 89F
 - o Location : 344 mm from the edge of the leaf

- Panic bar :

- Type : Panic bar with lock – CMD - PBCMD 1001-03 (Lock: DORMA 1739)
 - o Location : 1000 mm from the door sill.

For detailed information see figures 5-10.

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.

The test specimen was assembled by the sponsor.

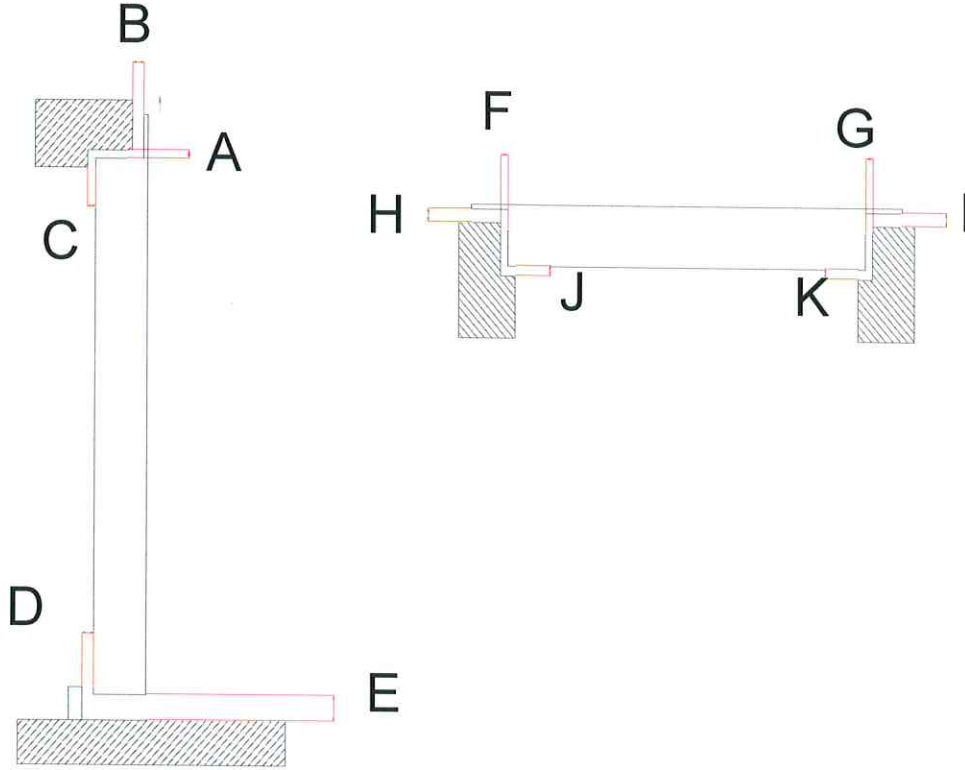


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4.2. Gap measurements



| Door Nr.1 | A | B | C | D | E | F | G | H | I | J | K |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| First | 3,0 | 3,0 | 3,0 | 3,0 | 2,0 | 3,0 | 3,0 | 2,0 | 3,0 | 2,0 | 2,0 |
| Second | 4,0 | 2,0 | 2,0 | 4,0 | 3,0 | 4,0 | 2,0 | 3,0 | 4,0 | 3,0 | 3,0 |
| Third | 2,0 | 2,0 | 2,0 | 4,0 | 3,0 | 4,0 | 3,0 | 3,0 | 5,0 | 3,0 | 2,0 |
| Door Nr.2 | A | B | C | D | E | F | G | H | I | J | K |
| First | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 | 2,0 | 2,0 | 3,0 | 3,0 | 3,0 | 2,0 |
| Second | 4,0 | 4,0 | 4,0 | 5,0 | 2,0 | 3,0 | 3,0 | 4,0 | 5,0 | 3,0 | 3,0 |
| Third | 5,0 | 3,0 | 4,0 | 3,0 | 3,0 | 4,0 | 3,0 | 4,0 | 3,0 | 3,0 | 4,0 |

Dimensions in mm.

4.3. Self-closing test

The functionality tests of the doors have been made before the fire resistance test by both laboratory and customer.

Closing force was determined of the leave of doorset.

Door Nr.1: 23 N

Door Nr.2: 27 N

The leaves of doors were submitted to 25 opening/closing operations under normal speed. No visible disorder was noted after this test.

4.4. Direction of fire

The test was performed with hinges turning away from fire.

4.5. Conditioning

The construction was stored in the laboratory of Efectis Era Avrasya A.S. under the following conditions:

Ambient temperature: $20,8 \pm 6,1^{\circ}\text{C}$

Relative humidity : $44,5 \pm 15,5 \%$.

5. TEST PROCESS

5.1. Method

The fire test was conducted according to the EN 1634-1:2014.

The heating of the furnace followed the standard fire curve, as specified in the EN 1363-1:2012.

The target overpressure in the furnace was 0 Pa at 500 mm above floor level and 19 Pa at the top of the test specimen.

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, measured at sill level and a height of 2,9 meter above the furnace floor level (see figure A3).
- Ambient temperature in the laboratory (see figure A4).
- The surface temperatures on the unexposed side of the test specimen (TC3 up to TC36), see figure B2-B5).
- There was no need to use roving thermocouple
- The deformation of the test specimen (See Figure B6 and Table B1).
- The positions of the thermocouples and displacement measurements are given in figure B1.

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6. OBSERVATIONS

Table 1: Observations during heating.

| | |
|-----|---|
| 0 | Heating started. See photo C1-C2 . |
| 4 | Smoke release from the door gaps between the frame and the leaf. |
| 8 | Deformation between frame and leaf at top and bottom of lock side of doors. |
| 13 | Intensively smoke release between frame and leaf at bottom of the lock side for Door Nr.1. |
| 15 | Deformation at middle of the leaves away from the furnace. |
| 18 | Blackening on the frame surfaces of doors. |
| 20 | Blackening on the leaf surfaces of Door. Nr.2 |
| 22 | Intensively smoke release between frame and leaf for Door Nr.2 |
| 30 | Intumescent seals started to drop. |
| 39 | Temperature increased at Thermocouple Nr.31, $\Delta T \geq 180$ °C. I₁ failed for Door Nr.2. |
| 45 | F- Flaming at the edges of the leaves |
| 61 | Temperature increased at Thermocouple Nr.14, $\Delta T \geq 180$ °C. I₁ failed for Door Nr.1. |
| 95 | Blackening at the edges of the leaves |
| 125 | Temperature increased at Thermocouple Nr.10, $\Delta T \geq 180$ °C. I₂ failed for Door Nr.1. |
| 132 | Test was terminated after consulted with sponsor. See photo C3 . |

F: Furnace side (exposed surface)

7. TEST RESULTS

7.1 Results

The results are given in Table 2 and appendixes B and C.

During the heating the temperature in the laboratory complied with the EN 1363-1:2012.

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

| | Door Nr.1. | Door Nr.2. |
|--|--|--|
| Integrity, (E) – Cotton pad – Gap gauges \varnothing 6 mm \varnothing 25 mm – Flames longer than 10 sec. | no failure (not applied). no failure (not applied). no failure (not applied). not observed. | no failure (not applied). no failure (not applied). no failure (not applied). not observed. |
| Insulation:, [I] – average temperature – maximum temperature | no failure. 61 st minute by TC 14 for I ₁ . 125 th minute by TC 10 for I ₂ . | no failure. 39 th minute by TC 31 for I ₁ . |
| The heating was terminated at 132 nd minute after consulted with the sponsor. | | |

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 1363-1:2012, 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.

Except if otherwise specified hereafter, the design of the door-unit shall be identical to that of the test specimen. It is not allowed to modify the number of door leaves and the operating mode (e.g. swing door or pivoted door, single or double acting door).

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9.2 Specific Restrictions Concerning Materials and Structures

9.2.1. Metal structures

It is allowed to increase the steel envelope around the fixed frames in order to allow for thicker supporting structures. It is allowed to increase the steel thickness by 25 % maximum.

It is not allowed to change type of the metal.

The number of stiffening elements for doors without thermal insulation and the number and the type of their attachments in the panel manufacture may be increased in proportion to the increase of the dimensions, but it is not allowed to be reduced.

9.2.2. Decorative coatings

9.2.2.1. Paint

Electrostatic powder painting is allowed for the surfaces of the door frames. Any painting is not allowed on the hardware components and on the surfaces of door leaves.

9.2.2.2. Decorative laminate

Decorative laminates and timber veneers up to 1,5 mm thickness are allowed to be added to the faces (but not the edges) of leaves and frames in door-sets which satisfy the insulation criteria (Allowed for only: Door Nr.1: EI₁60,EI₂120; Door Nr.2: EI₁30,EI₂120).

9.2.3. Fixings

It is permitted to increase the number of fasteners used to attach the fire resistant doors onto the supporting structures but it is not allowed to be reduced, and it is allowed to reduce the distance between the fasteners but it is not allowed to be increased.

9.2.4. Hardware

It is allowed to increase the number of movement-limiting devices such as locks, bolts and hinges but it is not allowed to be reduced.

Where self-closing characteristics are not required, it is allowed to remove closing device.

9.3 Permissible Size Variations

9.3.1 General

Doors with dimensions which are different from those of the test specimens shall be permitted within some extent, but variations depend on the type of product and on the time during which the fire resistance criteria are met.

The increase and decrease of dimensions permitted by the field of direct application are applicable to the overall size of each leaf, each side panel, each transom panel and each over panel independently and including ant rebates which may be present on the leaf or panel.

The limits of permitted size variation are given in Annex B of the standard EN 1634-1:2014.

9.3.2 Dimension variations according to the type of product

9.3.2.1. Permissible dimension variations of the leaf

The amount of variation of size permitted is dependent on whether the classification time was just reached (category 'A') or whether an extended time (category 'B' overrun) in accordance with the following values was fulfilled before the test was concluded.

| Classification time | All performance criteria fulfilled for at least |
|---------------------|---|
| 15 minutes | 18 minutes |
| 20 minutes | 24 minutes |
| 30 minutes | 36 minutes |
| 45 minutes | 52 minutes |
| 60 minutes | 68 minutes |
| 90 minutes | 100 minutes |
| 120 minutes | 132 minutes |

Consequently, increase of the dimension is only valid in case of related performance about "Category B overrun" is achieved in Clause 8, Table 2.

The 'Category A' and 'Category B' classification of the samples 'TRN-NVT-125, NVT-CMD-132' are given in the classification report (EEA – 17 – 031).

a) Category A classification:

Due to the Category A classification of Door Nr.1 and Door Nr.2, no size increase is allowed. The reduction of the metal doorsets is limited at %75 in height and % 50 in width.

b) Category B classification:

| Overall dimension of the leaf | DOOR Nr.1 | | DOOR Nr. 2 | |
|-------------------------------|----------------------|-------------------------------|----------------------|------------------------------|
| | Min. | Max. | Min. | Max. |
| Height | 1571,25 mm (% 75) | 2409,25 mm (%15) | 1571,25 mm (% 75) | 2409,25 mm (%15) |
| Width | 487,5 mm (% 50) | 1121,25 mm (%15) | 487,5 mm (% 50) | 1121,25 mm (%15) |
| Area | - | 2,451 m ² (%20) | - | 2,451m ² (%20) |

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Size increases are only allowed for the doorsets provided that used with the gaps indicated in the table below

| | Average measured | Maximum measured | Practical maximum allowed |
|------------------|------------------|------------------|---------------------------|
| Door Nr.1 | | | |
| A | 3,0 | 4,0 | 5,50 |
| B | 2,3 | 3,0 | 4,67 |
| C | 2,3 | 3,0 | 4,67 |
| D | 3,7 | 4,0 | 5,83 |
| E | 2,7 | 3,0 | 4,83 |
| F | 3,7 | 4,0 | 5,83 |
| G | 2,7 | 3,0 | 4,83 |
| H | 2,7 | 3,0 | 4,83 |
| I | 4,0 | 5,0 | 6,50 |
| J | 2,7 | 3,0 | 4,83 |
| K | 2,3 | 3,0 | 4,67 |
| Door Nr.2 | | | |
| A | 4,0 | 5,0 | 6,50 |
| B | 3,3 | 4,0 | 5,67 |
| C | 3,7 | 4,0 | 5,83 |
| D | 3,7 | 5,0 | 6,33 |
| E | 2,7 | 3,0 | 4,83 |
| F | 3,0 | 4,0 | 5,50 |
| G | 2,7 | 3,0 | 4,83 |
| H | 3,7 | 4,0 | 5,83 |
| I | 3,7 | 5,0 | 6,33 |
| J | 3,0 | 3,0 | 5,00 |
| K | 3,0 | 4,0 | 5,50 |

9.3.2.2. Other changes

For doors with smaller dimensions, the relative position of the movement-limiting devices (e.g. hinges, bolts, etc.) shall remain identical to that of the test specimen, or any modification in the distance between them shall be limited to the same reduction percentage as the dimension reduction of the test specimen.

It is not allowed to change the relative position of the movement-limiting devices (Hinges, bolts, etc.). It is permitted to modify the distance with the same percentage for the reduction of the test specimen.

For larger doorset sizes the following also must be applied (Category B):

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- 1) The height of the latch above floor level must be equal to or greater than the tested height, and the maximum of any change in height must be proportional to the increase in doorset height;
- 2) The distance of the top hinge from the top of door leaf must be equal to or less than that tested;
- 3) The distance of the bottom hinge from bottom of door leaf must be equal to or less than that tested.
- 4) For three hinges or distortion preventers are used, the distance between bottom of the door leaf and centre restraint must be equal to or greater than tested.

9.4 Direction of Fire

The fire resistance behaviour specified in section 8 of this test report shall be valid for only the following direction of fire:

Door Nr. 1:

- Integrity : Opening away from the fire and towards the fire
- Thermal insulation : Opening away from the fire.

Door Nr. 2:

- Integrity : Opening away from the fire and towards the fire
- Thermal insulation : Opening away from the fire.

9.5 Supporting Construction

Rigid block with a density of at least 650 kg/m³, having a thickness of at least 200 mm.

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10. DRAWINGS

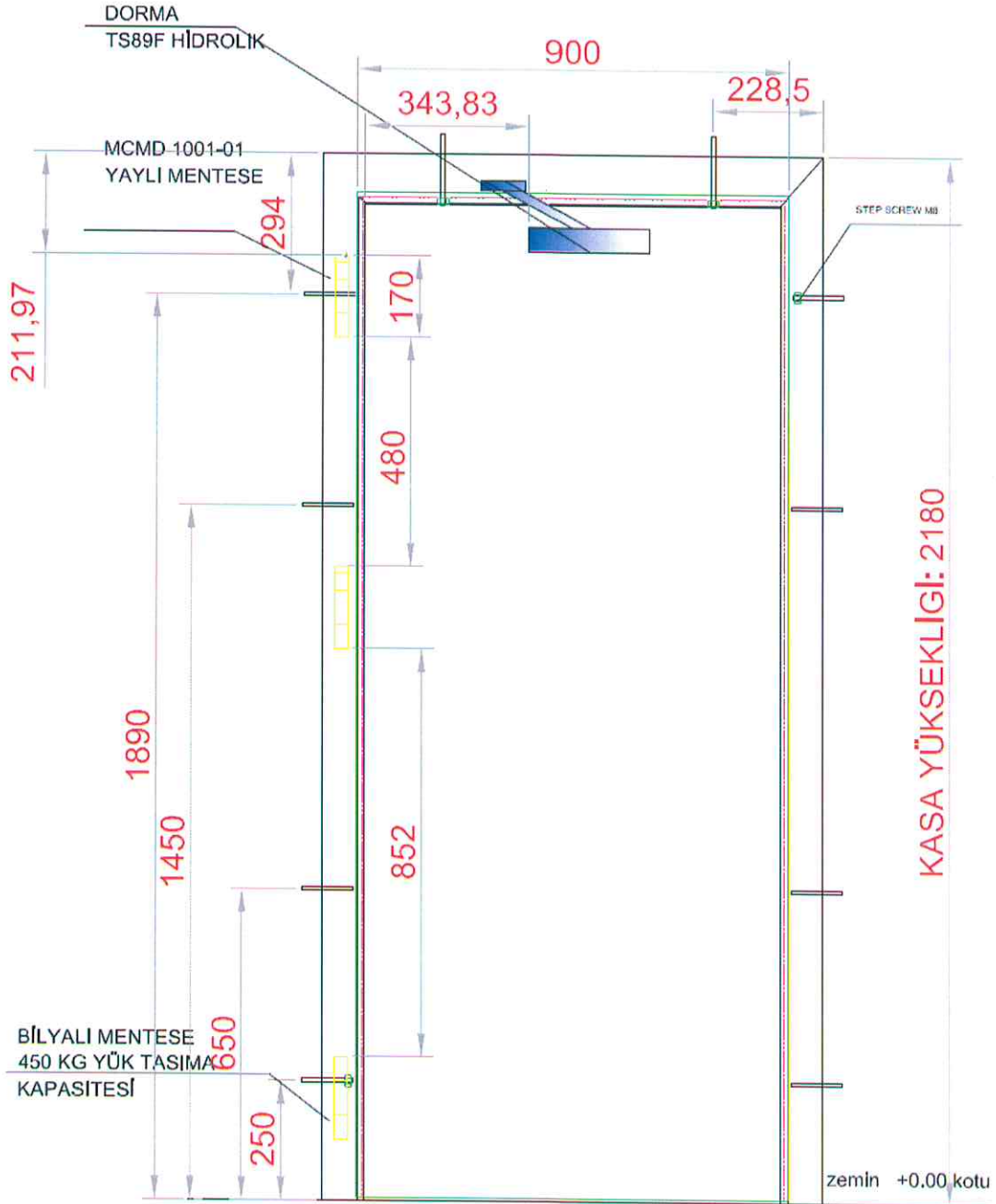


Figure 1: Unexposed side view of the Door Nr. 1.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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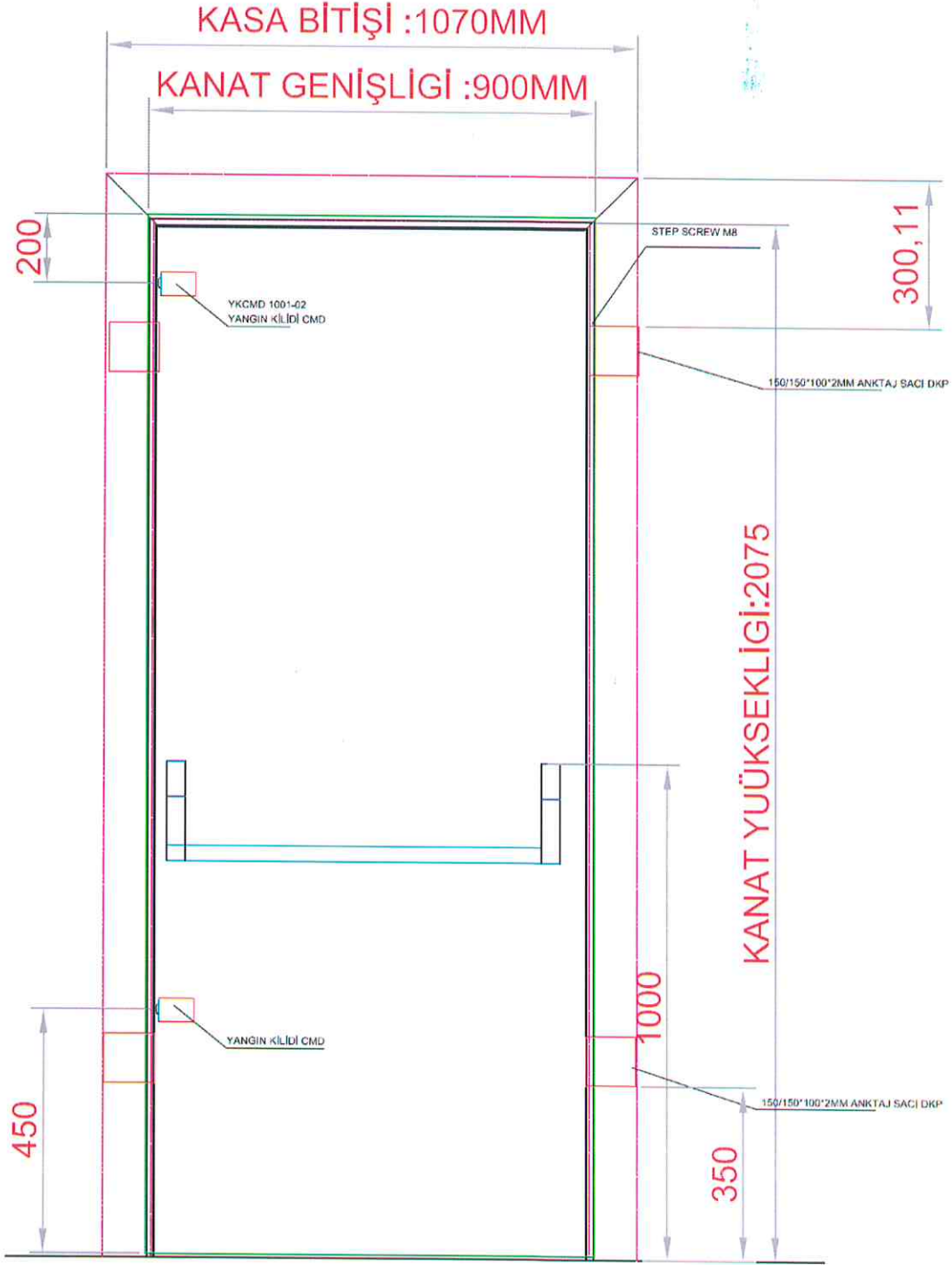


Figure 2: Exposed side view of the Door Nr.1.

Efectis

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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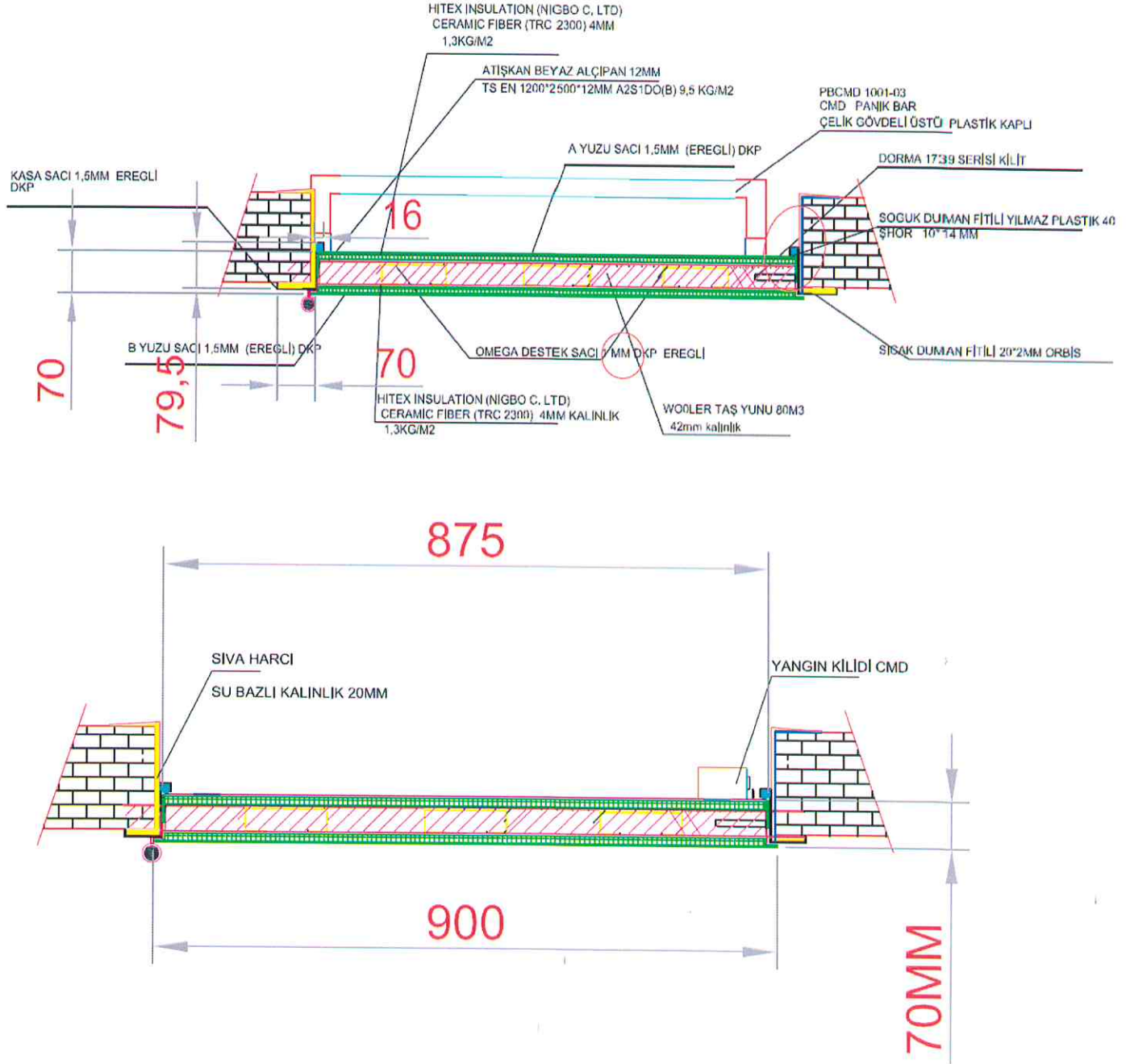


Figure 3: Detailed cross section view of the Door Nr.1.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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Efectis

YAN GÖRÜNÜŞ

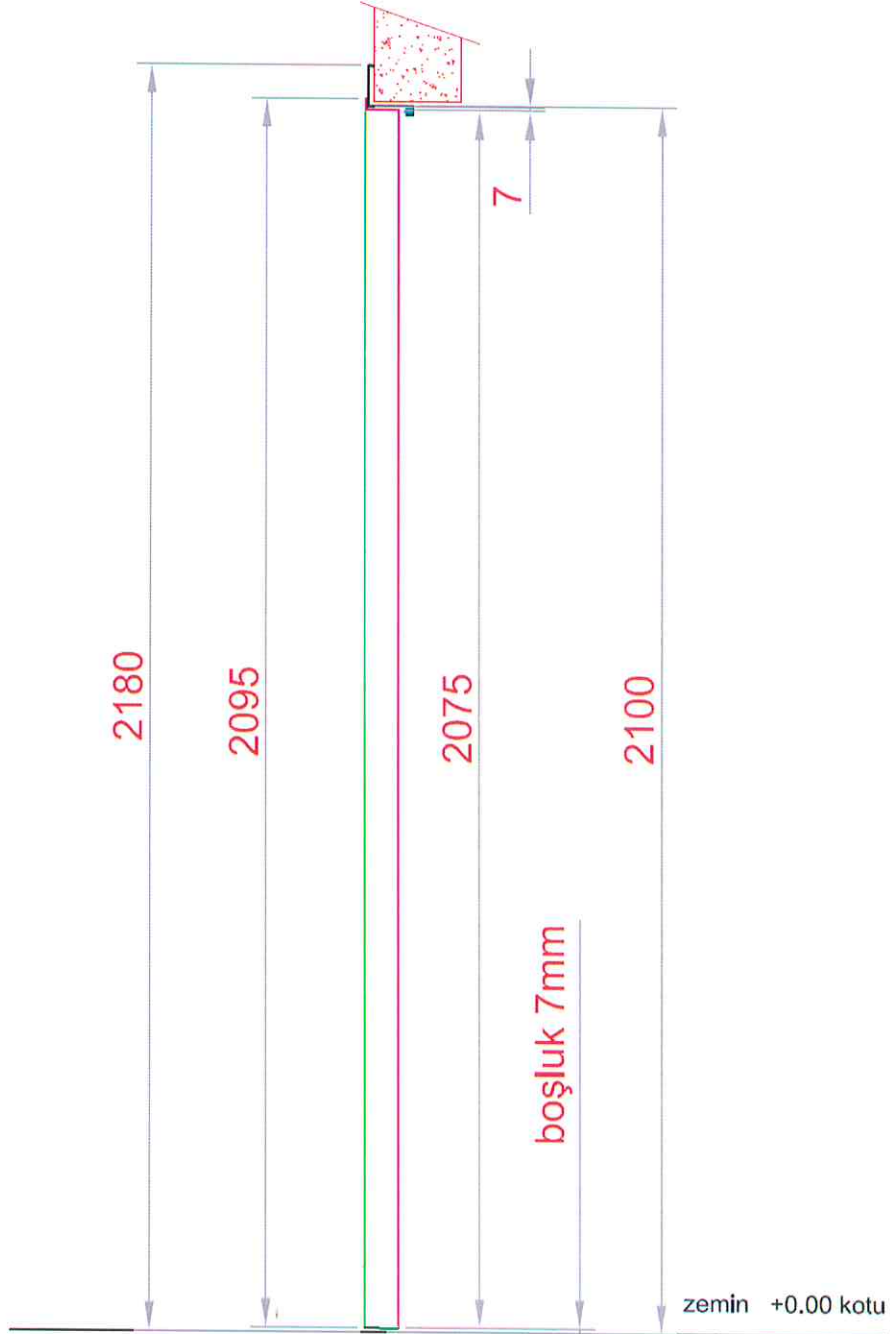


Figure 4: Longitudinal section view of the Door Nr. 1.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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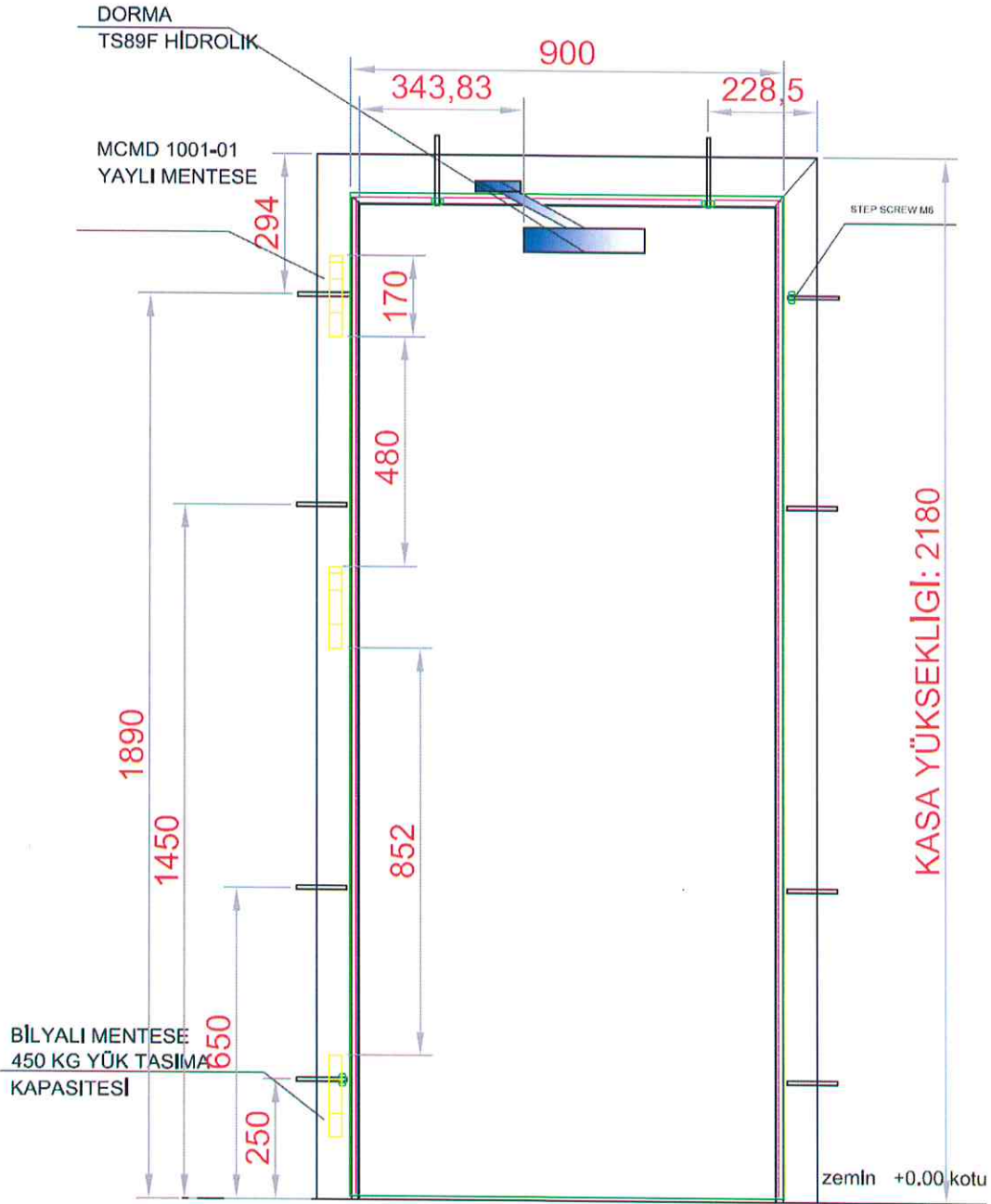


Figure 5: Unexposed side view of the Door Nr.2.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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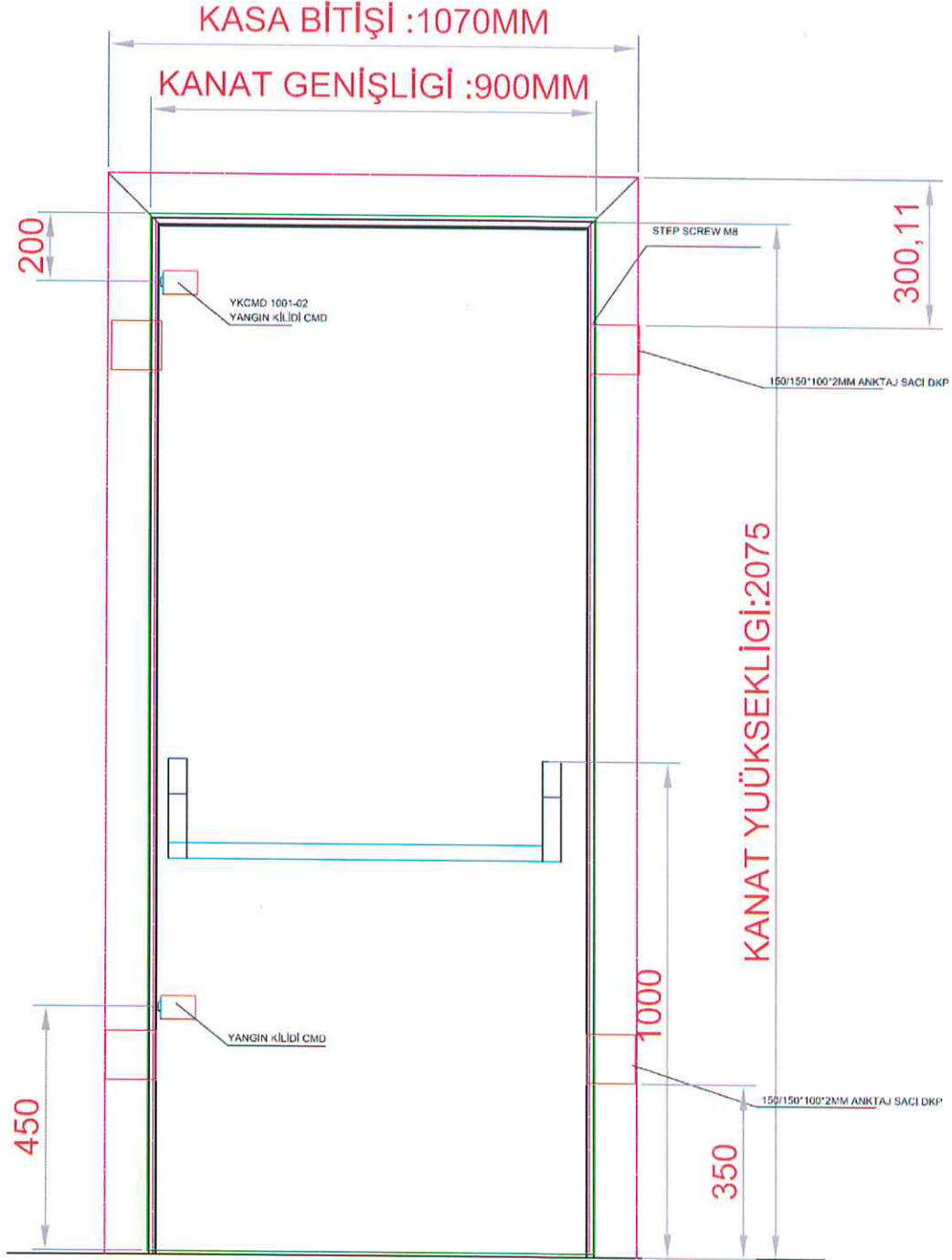


Figure 6: Exposed side view of the Door Nr.2.

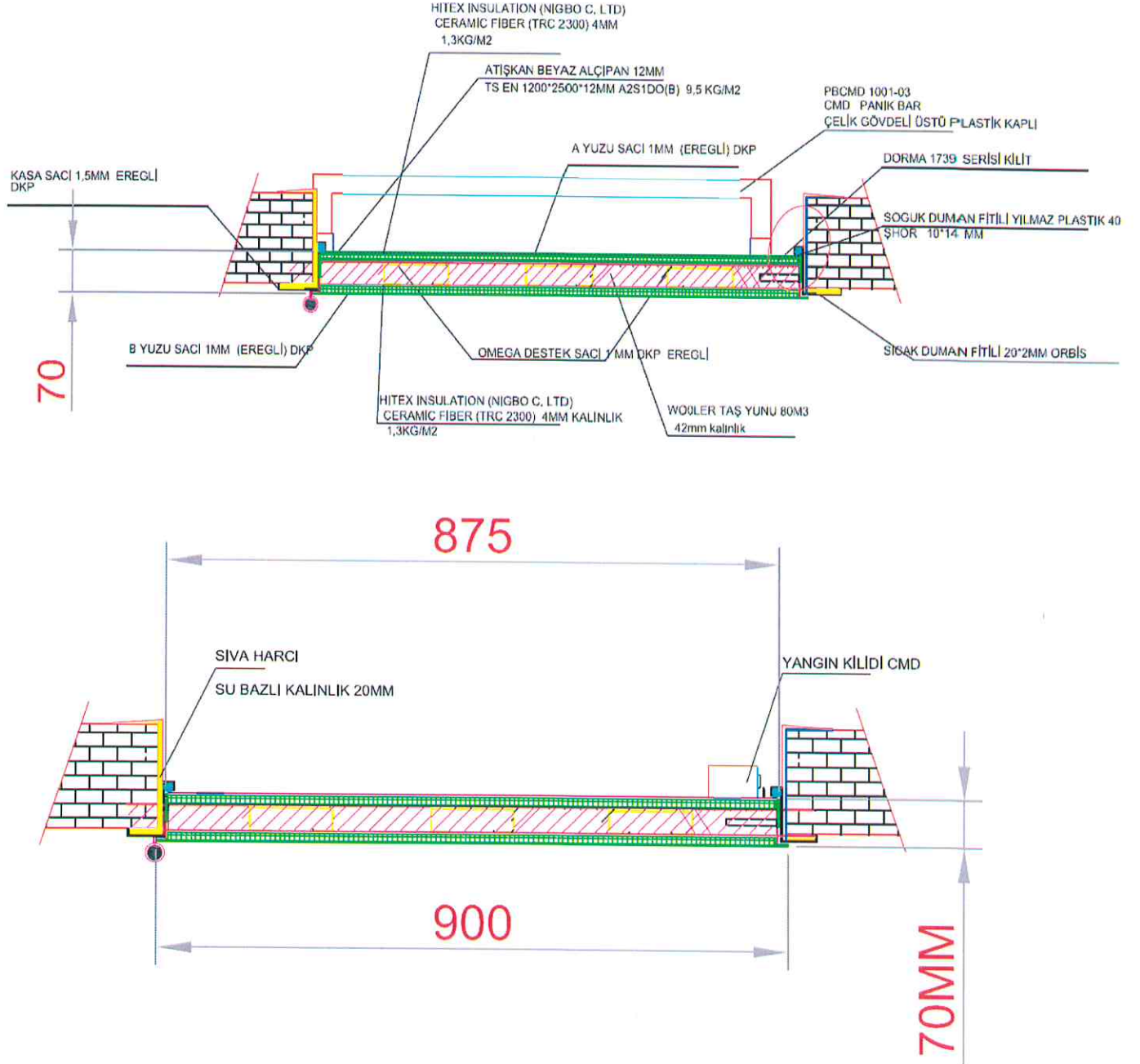


Figure 7: Detailed cross section view of the Door Nr.2.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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YAN GÖRÜNÜŞ

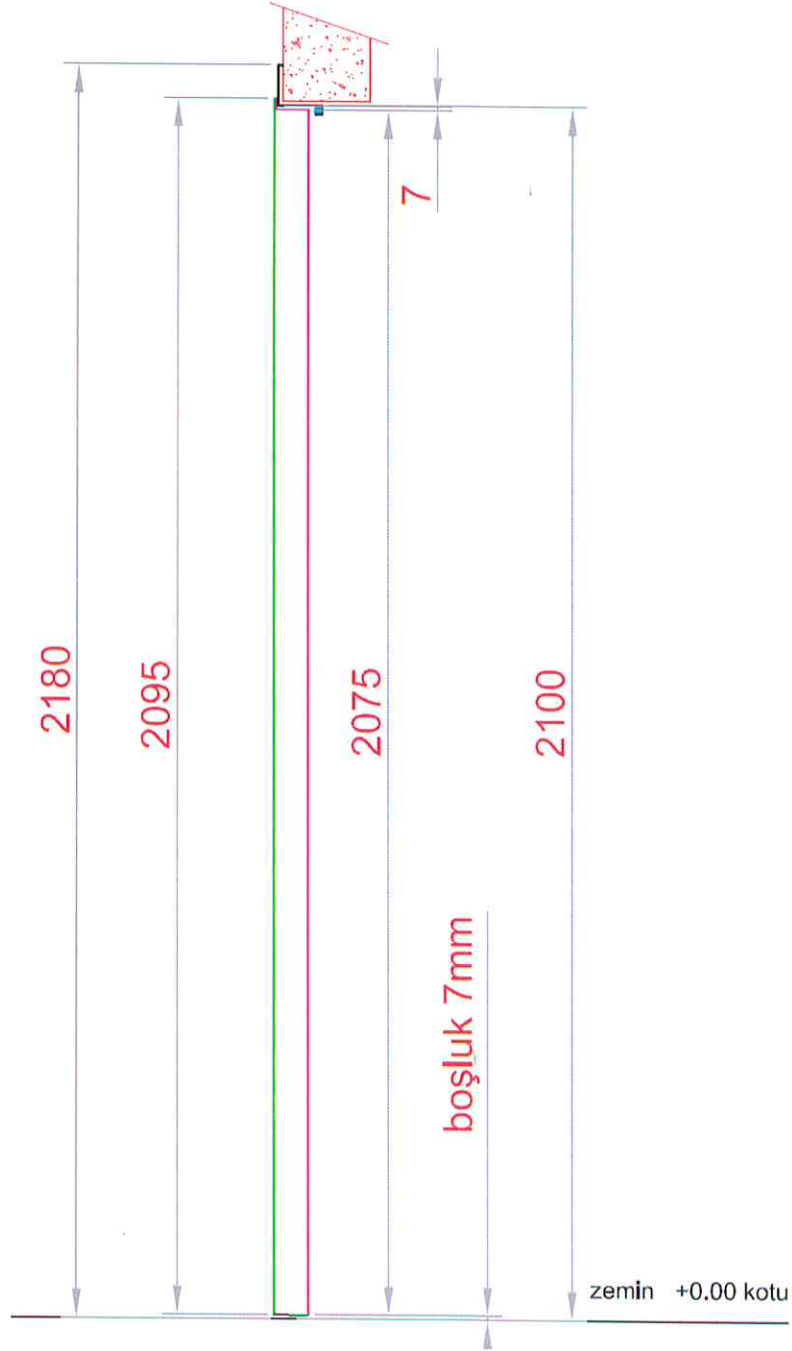


Figure 8: Longitudinal section view of the Door Nr. 2.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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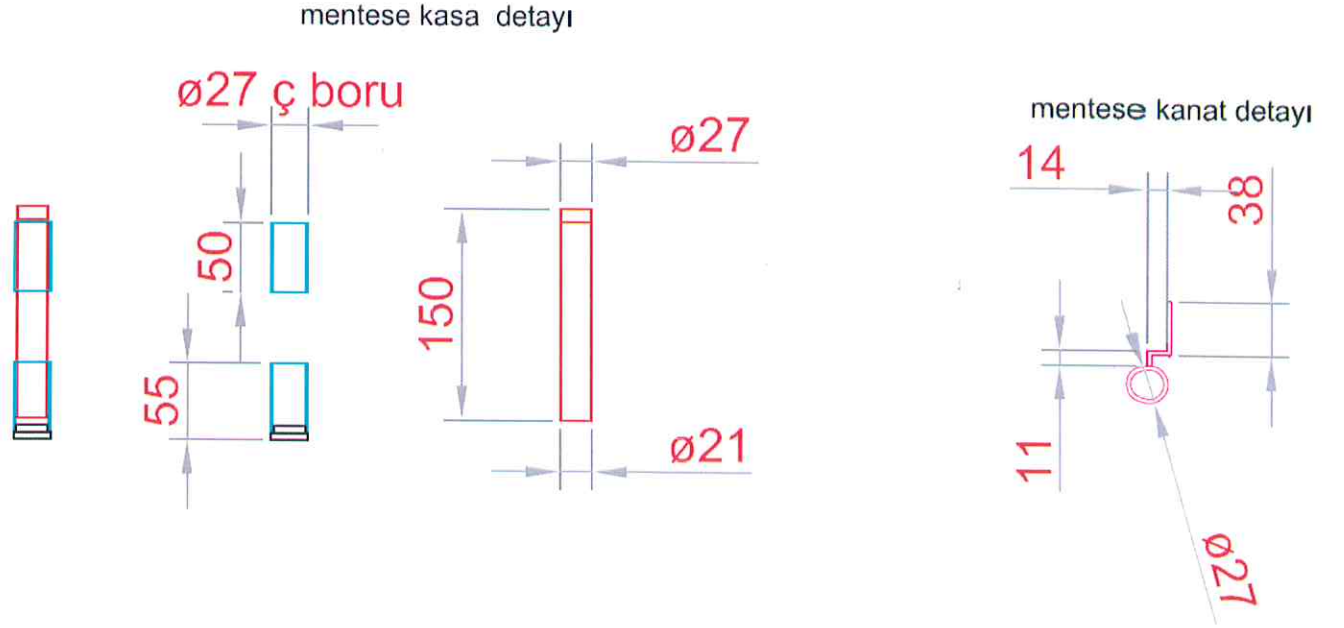


Figure 9: Detailed view of hinge of the Doors.

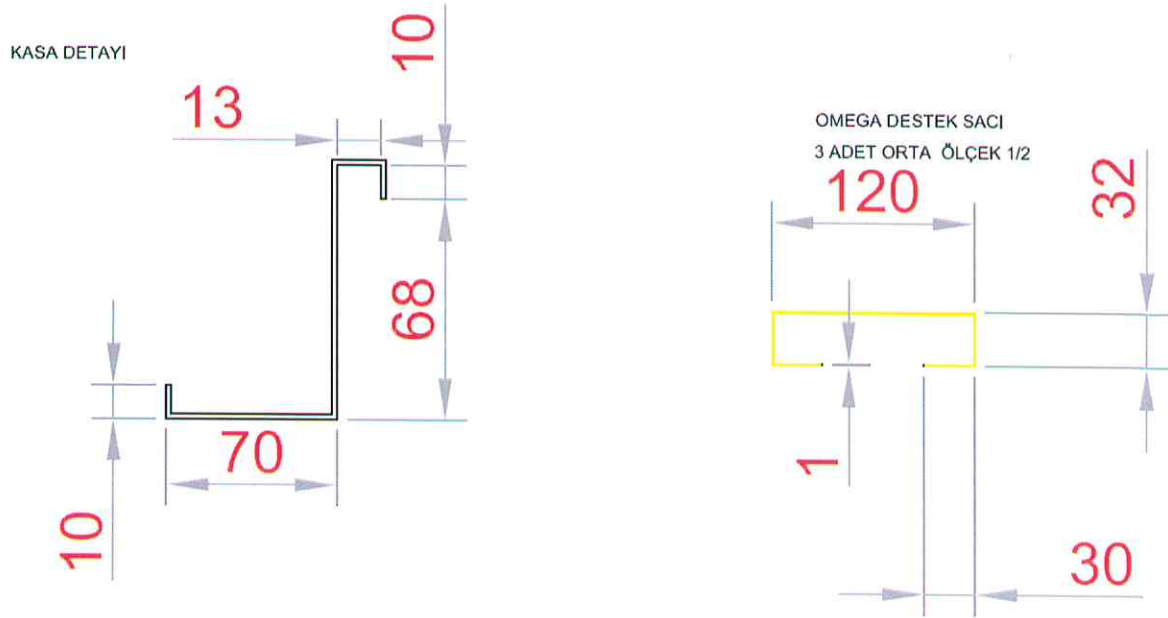
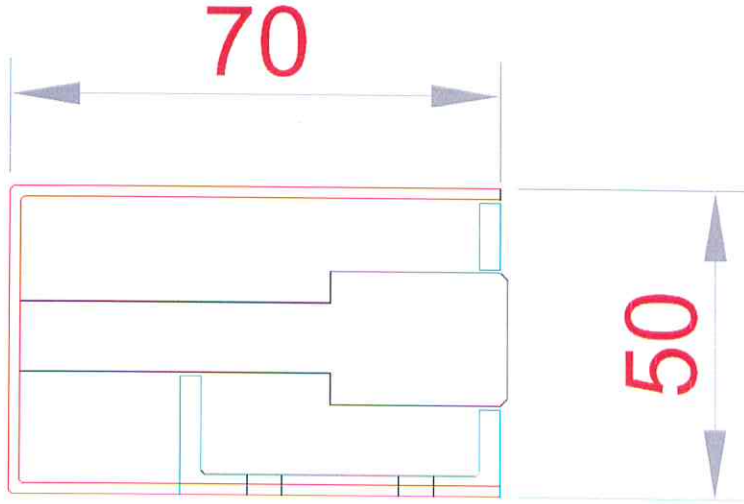


Figure 10: Detailed view of frame and Ω profile of the Doors.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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YKCMD 1001-02
ısı ulastığında
kendiliginden kapanan
kilit

Figure 10: Fire lock section view of the Doors.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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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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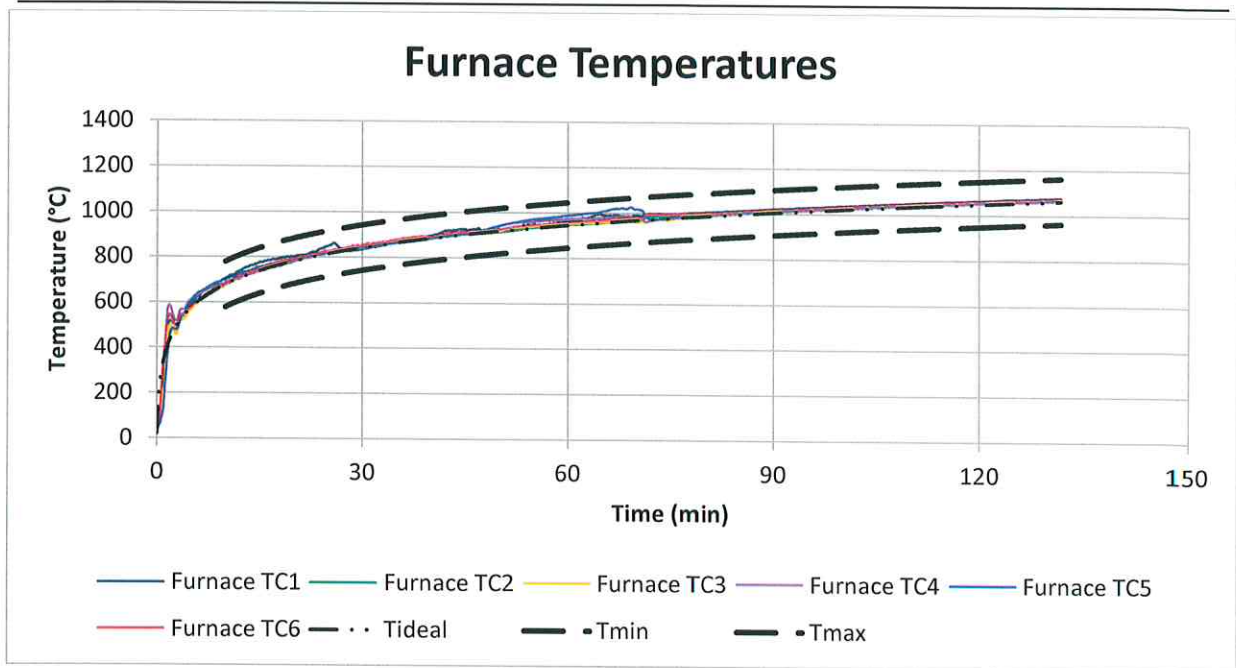


Figure A1: Furnace Temperatures

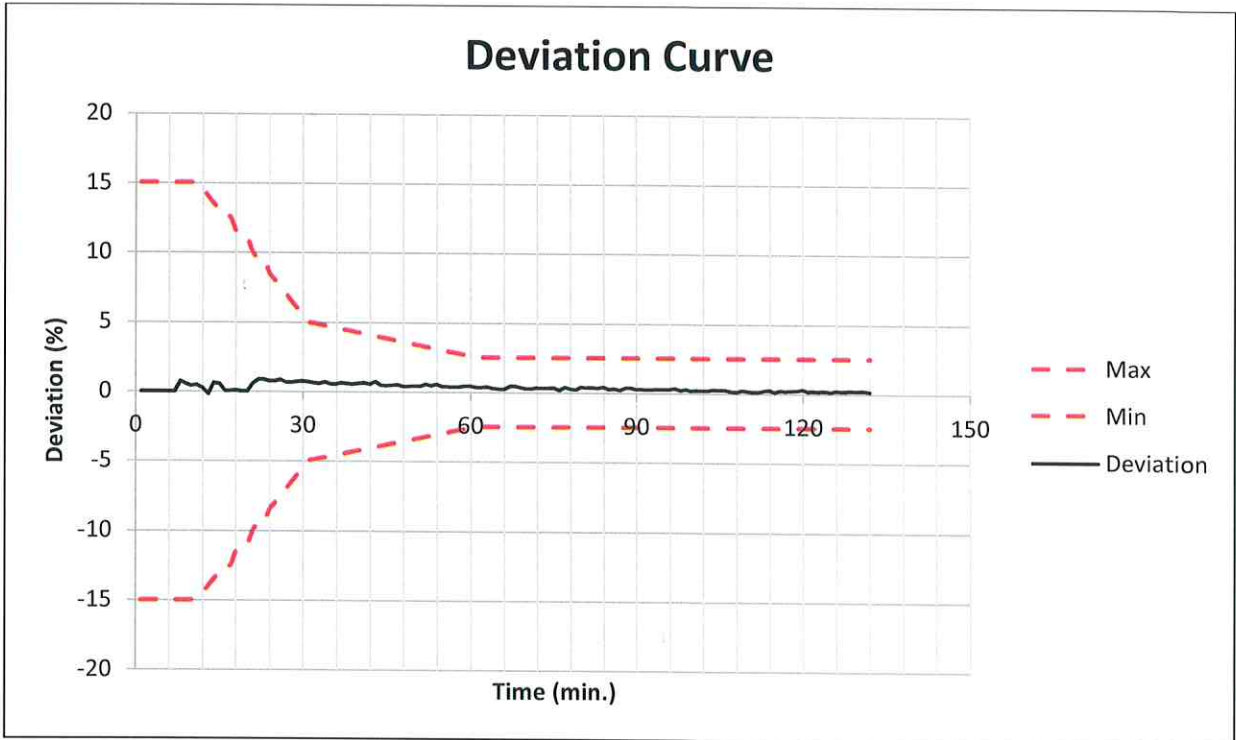


Figure A2: Deviation of furnace temperature.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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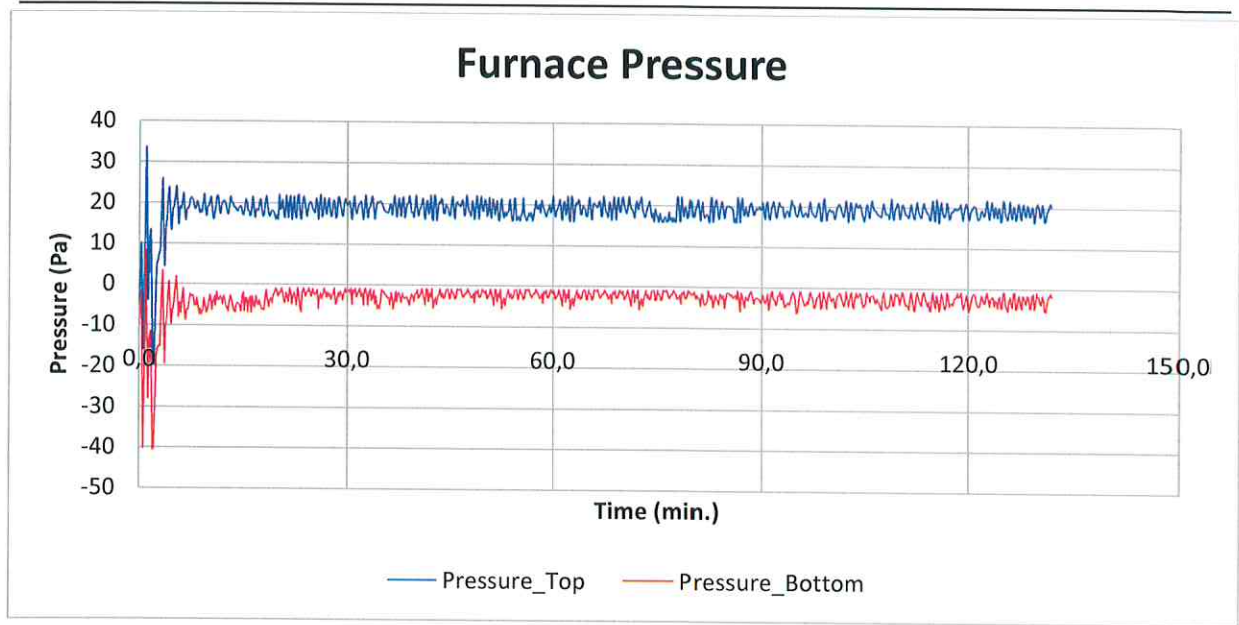


Figure A3: Pressure in the furnace

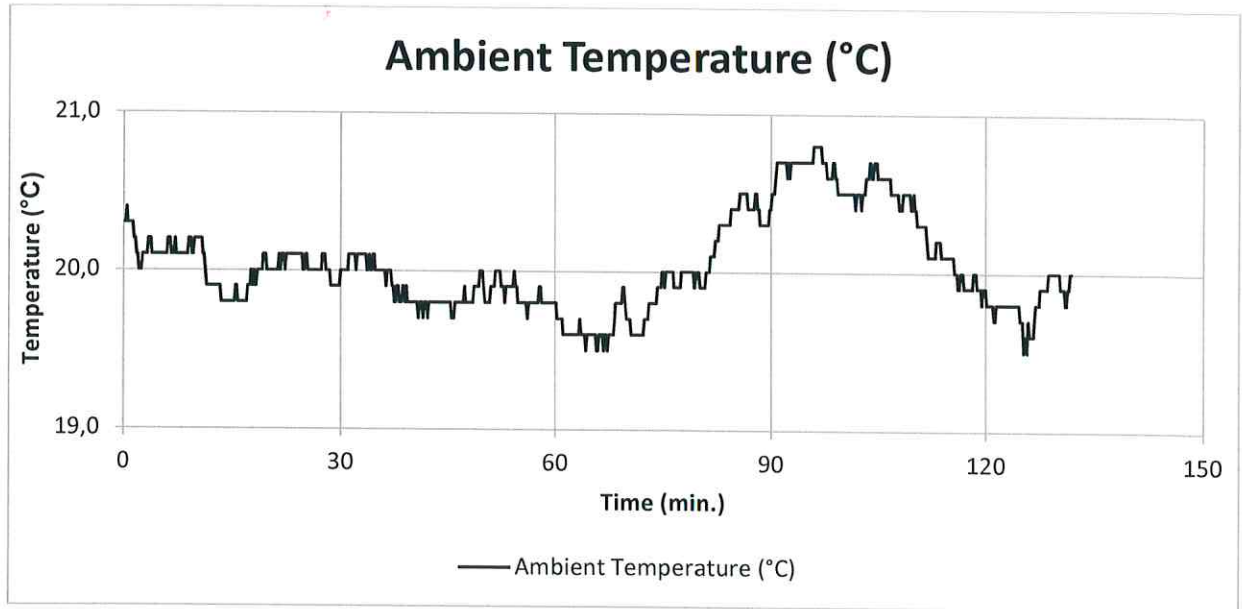


Figure A4: Ambient temperature at laboratory

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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KAPI NO.2 / DOOR NR.2

KAPI NO.1 / DOOR NR.1

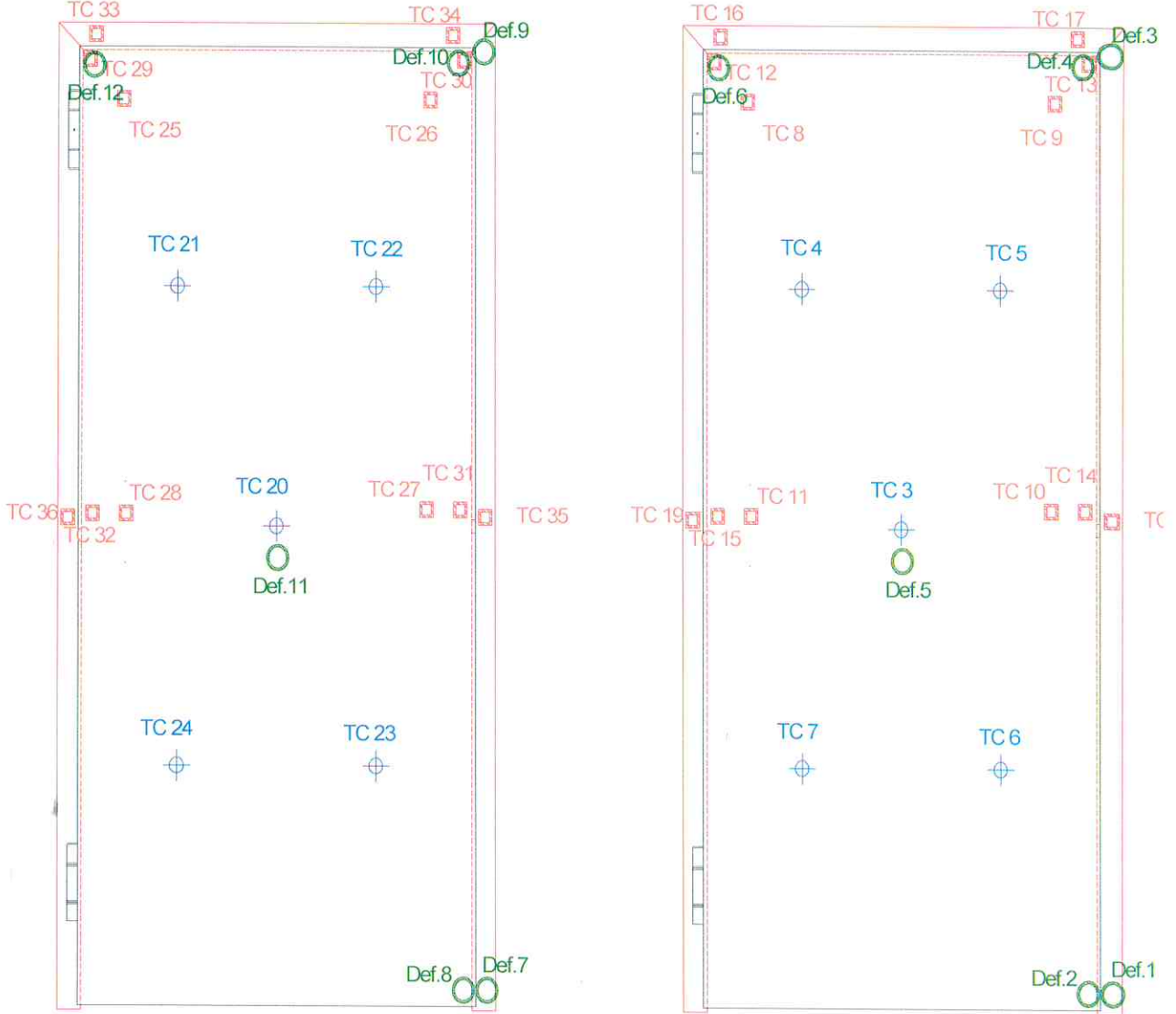


Figure B1: Locations of thermocouples and deflection sensors.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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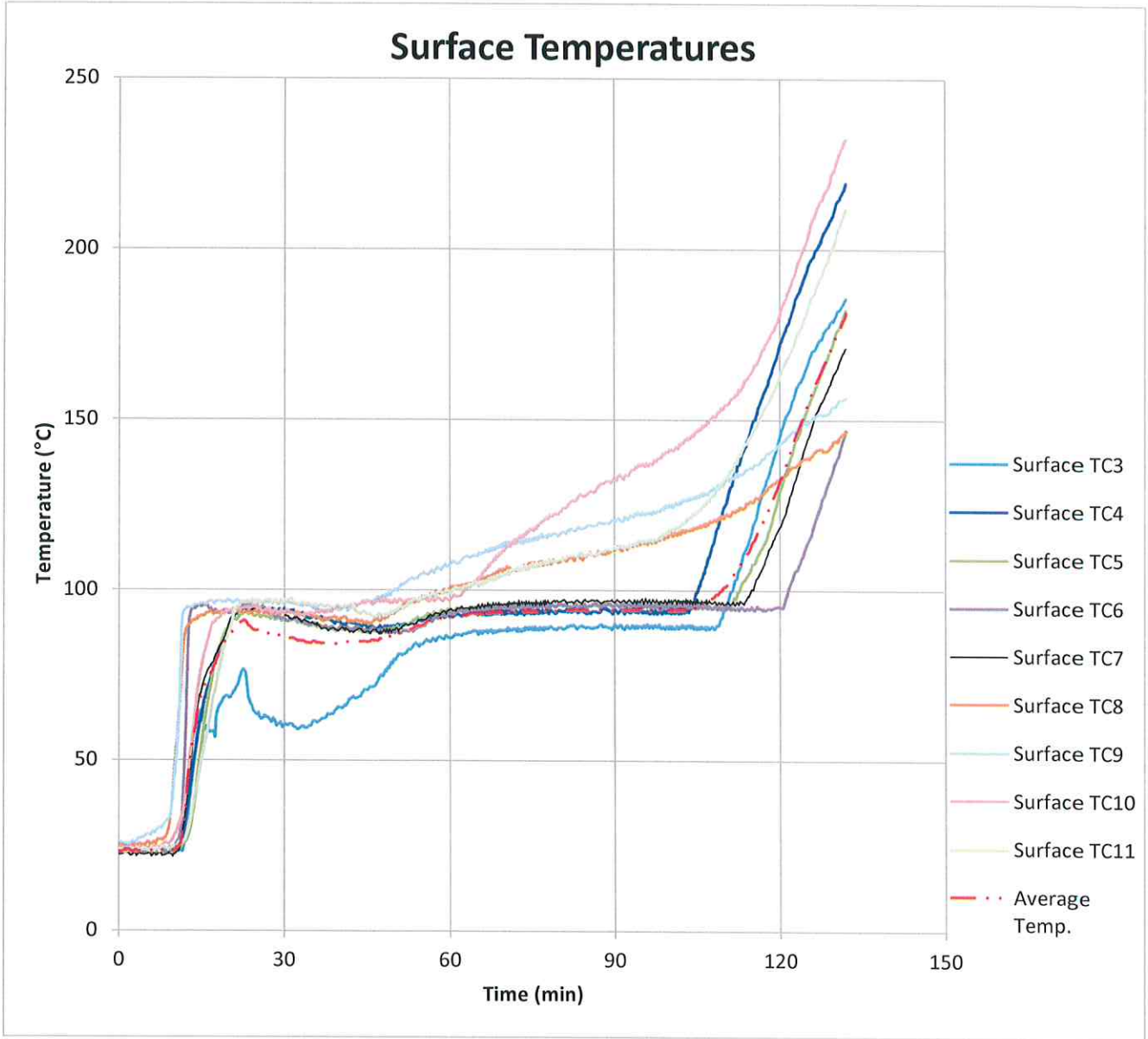


Figure B2: Surface temperatures of Door Nr.1 (TC3 – TC11 and avg. temperature)

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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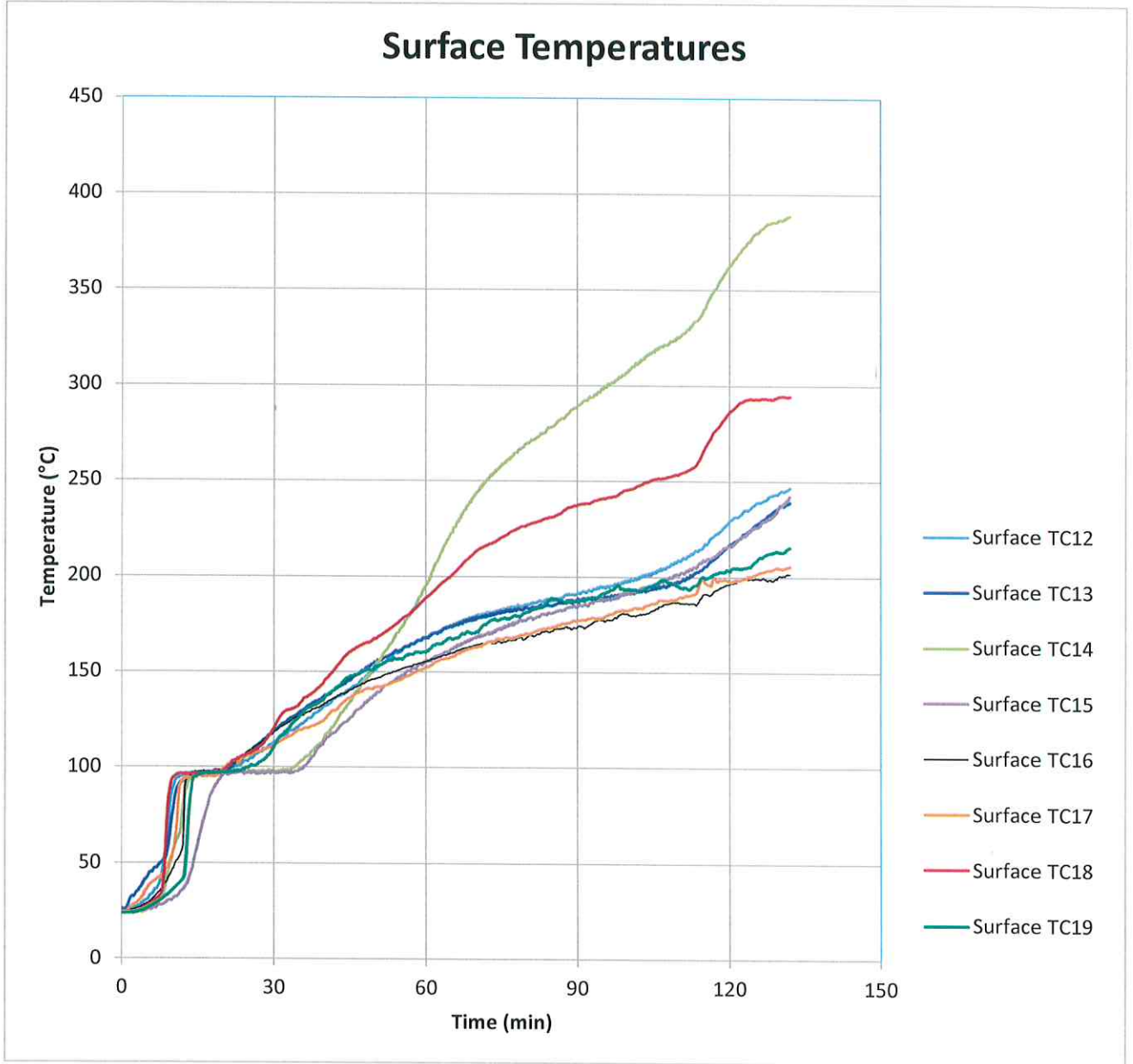


Figure B3: Surface temperatures of Door Nr.1 (TC12 – TC19)

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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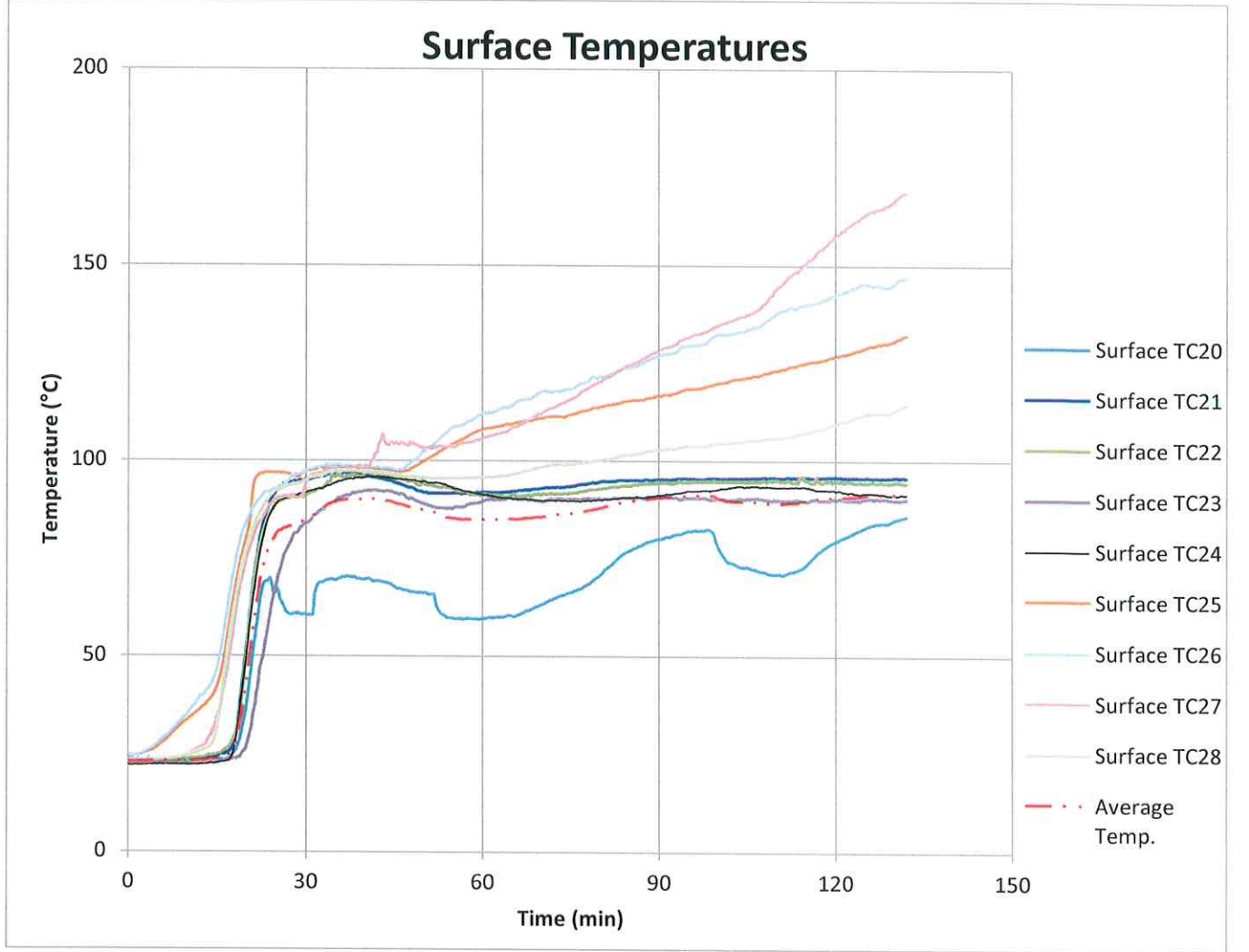


Figure B4: Surface temperatures of Door Nr.2 (TC20 – TC28 and avg. temperature)

Efectis

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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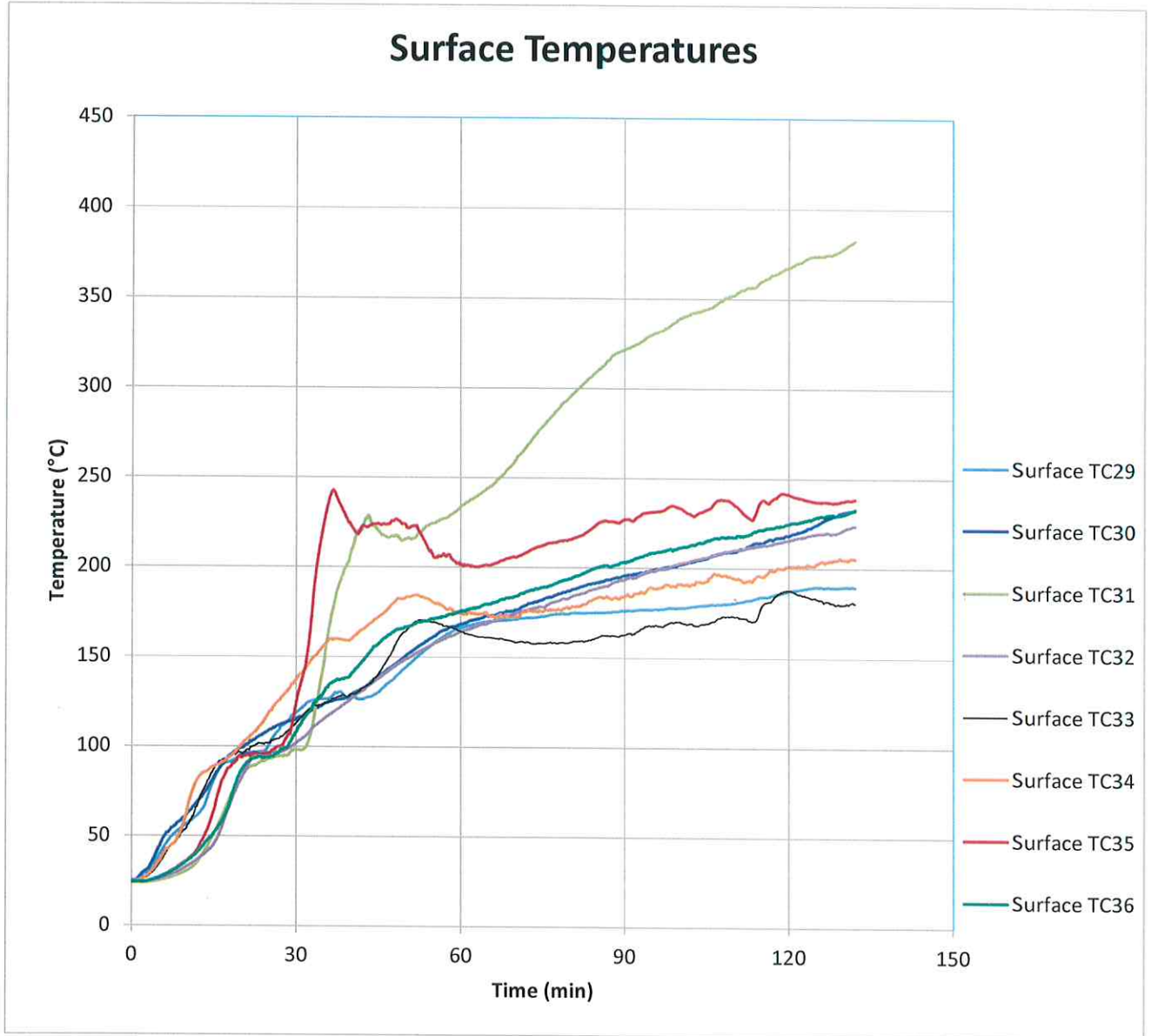


Figure B5: Surface temperatures of Door Nr.2 (TC29– TC36)

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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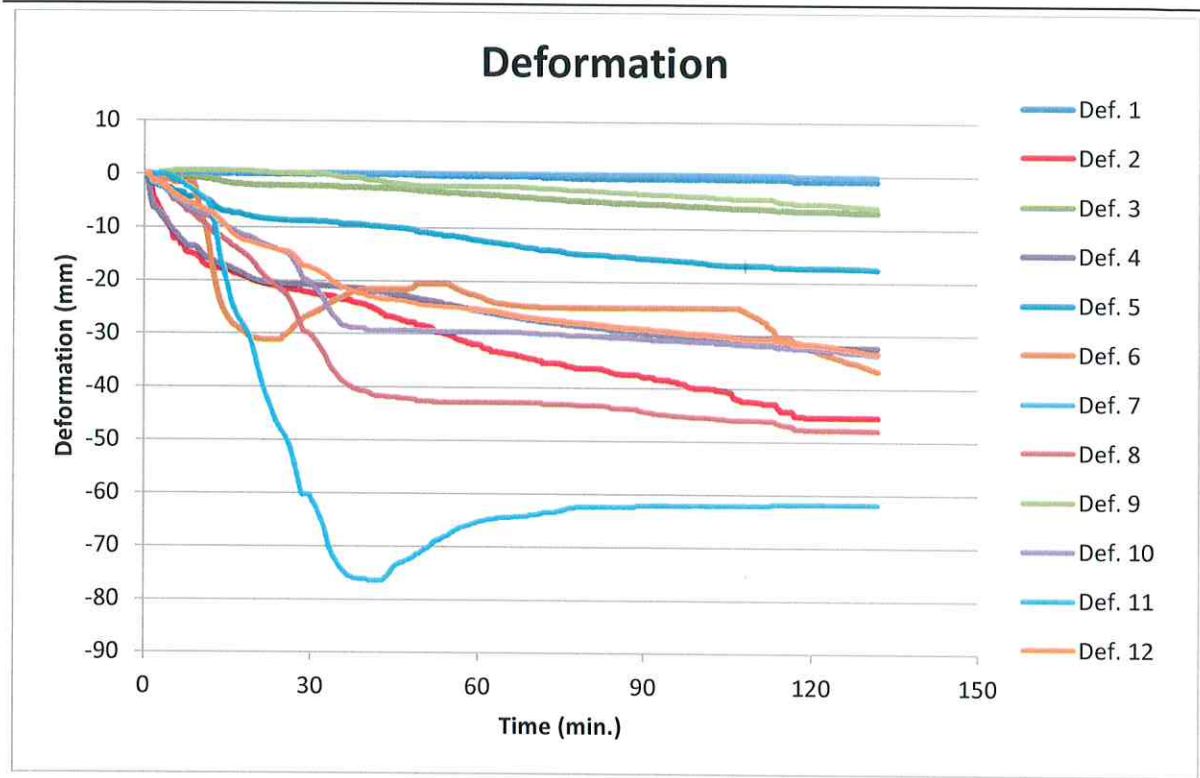


Figure B6: Deformation of the test specimens

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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Table B1: Data obtained from deformation sensors.

| Time (min.) | Def. 1 (mm) | Def. 2 (mm) | Def. 3 (mm) | Def. 4 (mm) | Def. 5 (mm) | Def. 6 (mm) | Def. 7 (mm) | Def. 8 (mm) | Def. 9 (mm) | Def. 10 (mm) | Def. 11 (mm) | Def. 12 (mm) |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|
| 0,0 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| 2,0 | 0,00 | -4,88 | -0,03 | -6,45 | -1,88 | -0,18 | 0,08 | -0,93 | 0,03 | -1,50 | 0,08 | -1,33 |
| 4,0 | 0,10 | -8,63 | 0,03 | -8,90 | -2,55 | -0,98 | 0,15 | -2,90 | 0,45 | -2,90 | 0,03 | -2,25 |
| 6,0 | 0,03 | -12,28 | -0,28 | -11,35 | -3,35 | -1,60 | 0,18 | -5,03 | 0,70 | -4,85 | -1,10 | -4,03 |
| 8,0 | 0,03 | -14,85 | -0,65 | -13,53 | -4,28 | -1,60 | 0,23 | -7,08 | 0,70 | -6,28 | -2,35 | -5,25 |
| 10,0 | 0,08 | -15,78 | -0,73 | -14,28 | -4,28 | -5,95 | 0,20 | -8,63 | 0,70 | -7,20 | -3,78 | -6,18 |
| 12,0 | 0,15 | -17,60 | -0,88 | -16,03 | -5,18 | -14,78 | 0,23 | -10,35 | 0,73 | -8,15 | -5,93 | -7,15 |
| 14,0 | 0,08 | -17,88 | -1,35 | -17,15 | -6,83 | -24,48 | 0,23 | -11,98 | 0,70 | -9,23 | -16,03 | -8,88 |
| 16,0 | 0,10 | -18,50 | -1,78 | -17,93 | -7,33 | -28,18 | 0,20 | -13,53 | 0,68 | -10,63 | -24,08 | -11,18 |
| 18,0 | 0,05 | -19,35 | -1,88 | -18,83 | -7,58 | -29,65 | 0,23 | -14,90 | 0,65 | -11,48 | -28,30 | -12,45 |
| 20,0 | 0,05 | -20,18 | -2,05 | -19,85 | -8,08 | -30,93 | 0,23 | -16,93 | 0,58 | -12,20 | -33,50 | -12,95 |
| 22,0 | 0,00 | -20,83 | -2,10 | -20,43 | -8,38 | -31,20 | 0,20 | -19,48 | 0,45 | -13,33 | -41,13 | -13,65 |
| 24,0 | -0,03 | -21,25 | -2,08 | -20,53 | -8,53 | -31,20 | 0,23 | -21,20 | 0,25 | -14,23 | -46,53 | -14,18 |
| 26,0 | 0,05 | -21,70 | -2,15 | -20,73 | -8,68 | -30,03 | 0,23 | -23,08 | 0,18 | -14,93 | -50,05 | -14,63 |
| 28,0 | 0,03 | -21,95 | -2,13 | -20,75 | -8,70 | -27,88 | 0,23 | -27,63 | 0,18 | -18,05 | -57,85 | -16,43 |
| 30,0 | -0,05 | -22,40 | -2,15 | -20,78 | -8,70 | -26,43 | 0,23 | -30,20 | 0,15 | -20,45 | -60,30 | -17,58 |
| 32,0 | 0,03 | -22,83 | -2,20 | -20,98 | -8,85 | -25,40 | 0,23 | -33,00 | 0,03 | -22,88 | -65,03 | -18,58 |
| 34,0 | -0,03 | -23,05 | -2,20 | -21,05 | -8,98 | -24,00 | 0,23 | -36,75 | -0,20 | -26,40 | -71,50 | -20,15 |
| 36,0 | 0,10 | -23,73 | -2,43 | -21,35 | -9,33 | -23,15 | 0,23 | -39,10 | -0,63 | -28,50 | -74,70 | -21,33 |
| 38,0 | 0,05 | -24,25 | -2,45 | -21,43 | -9,35 | -22,08 | 0,23 | -40,43 | -0,63 | -28,90 | -76,03 | -22,23 |
| 40,0 | 0,05 | -24,68 | -2,50 | -21,63 | -9,53 | -21,68 | 0,23 | -40,88 | -0,98 | -29,20 | -76,18 | -22,78 |
| 42,0 | 0,03 | -25,63 | -2,55 | -21,95 | -9,70 | -21,68 | 0,20 | -41,75 | -1,10 | -29,40 | -76,48 | -23,28 |
| 44,0 | 0,00 | -26,80 | -2,65 | -22,33 | -9,93 | -21,68 | 0,25 | -41,93 | -1,50 | -29,40 | -75,28 | -23,58 |
| 46,0 | 0,03 | -27,25 | -2,60 | -22,68 | -10,03 | -21,65 | 0,23 | -42,15 | -1,68 | -29,38 | -73,25 | -23,73 |
| 48,0 | -0,05 | -27,93 | -2,83 | -23,05 | -10,28 | -21,50 | 0,23 | -42,30 | -1,90 | -29,40 | -72,25 | -24,05 |
| 50,0 | -0,13 | -28,53 | -3,03 | -23,53 | -10,85 | -20,60 | 0,23 | -42,68 | -2,10 | -29,55 | -70,88 | -24,53 |
| 52,0 | -0,18 | -29,18 | -3,10 | -23,80 | -11,03 | -20,60 | 0,20 | -42,70 | -2,13 | -29,58 | -69,48 | -24,70 |
| 54,0 | -0,18 | -30,00 | -3,35 | -24,40 | -11,48 | -20,60 | 0,20 | -42,90 | -2,13 | -29,60 | -68,20 | -24,93 |
| 56,0 | -0,18 | -30,85 | -3,38 | -24,70 | -11,50 | -21,35 | 0,20 | -42,93 | -2,13 | -29,60 | -66,98 | -24,98 |
| 58,0 | -0,28 | -31,50 | -3,48 | -25,13 | -11,85 | -22,25 | 0,20 | -42,90 | -2,15 | -29,60 | -66,13 | -25,28 |
| 60,0 | -0,20 | -32,03 | -3,58 | -25,53 | -12,25 | -22,88 | 0,20 | -42,90 | -2,15 | -29,60 | -65,38 | -25,38 |
| 62,0 | -0,18 | -32,88 | -3,75 | -25,90 | -12,60 | -23,70 | 0,20 | -42,90 | -2,15 | -29,60 | -64,88 | -25,60 |
| 64,0 | -0,28 | -33,50 | -3,68 | -26,23 | -12,80 | -24,30 | 0,20 | -42,90 | -2,15 | -29,60 | -64,58 | -25,85 |

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| Time (min.) | Def. 1 (mm) | Def. 2 (mm) | Def. 3 (mm) | Def. 4 (mm) | Def. 5 (mm) | Def. 6 (mm) | Def. 7 (mm) | Def. 8 (mm) | Def. 9 (mm) | Def. 10 (mm) | Def. 11 (mm) | Def. 12 (mm) |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|
| 66,0 | -0,20 | -33,83 | -3,98 | -26,60 | -13,10 | -24,50 | 0,20 | -42,90 | -2,15 | -29,60 | -64,48 | -26,30 |
| 68,0 | -0,18 | -34,20 | -4,10 | -27,00 | -13,48 | -24,73 | 0,20 | -42,90 | -2,23 | -29,65 | -64,30 | -26,70 |
| 70,0 | -0,33 | -34,70 | -4,18 | -27,28 | -13,70 | -24,83 | 0,20 | -42,93 | -2,35 | -29,78 | -64,00 | -26,95 |
| 72,0 | -0,50 | -35,48 | -4,38 | -27,58 | -14,10 | -25,00 | 0,15 | -43,20 | -2,50 | -29,93 | -63,55 | -27,23 |
| 74,0 | -0,43 | -35,45 | -4,50 | -27,80 | -14,15 | -25,00 | 0,15 | -43,20 | -2,53 | -29,93 | -63,53 | -27,40 |
| 76,0 | -0,50 | -36,00 | -4,63 | -28,10 | -14,48 | -25,00 | 0,18 | -43,23 | -2,68 | -30,10 | -62,83 | -27,63 |
| 78,0 | -0,58 | -36,48 | -4,73 | -28,33 | -14,83 | -25,03 | 0,18 | -43,38 | -2,83 | -30,23 | -62,45 | -27,83 |
| 80,0 | -0,55 | -36,45 | -4,90 | -28,48 | -14,90 | -25,03 | 0,18 | -43,40 | -2,83 | -30,25 | -62,45 | -27,95 |
| 82,0 | -0,60 | -36,50 | -4,93 | -28,70 | -14,93 | -25,03 | 0,18 | -43,43 | -2,95 | -30,35 | -62,43 | -28,15 |
| 84,0 | -0,63 | -37,13 | -4,98 | -29,00 | -15,10 | -25,03 | 0,18 | -43,70 | -3,15 | -30,55 | -62,40 | -28,45 |
| 86,0 | -0,58 | -37,50 | -5,13 | -29,18 | -15,20 | -25,03 | 0,20 | -43,95 | -3,20 | -30,55 | -62,43 | -28,60 |
| 88,0 | -0,65 | -37,58 | -5,20 | -29,33 | -15,35 | -25,00 | 0,18 | -44,03 | -3,30 | -30,63 | -62,45 | -28,75 |
| 90,0 | -0,58 | -38,05 | -5,30 | -29,60 | -15,60 | -25,03 | 0,18 | -44,53 | -3,50 | -30,83 | -62,18 | -28,98 |
| 92,0 | -0,60 | -38,40 | -5,38 | -29,83 | -15,73 | -25,00 | 0,18 | -44,93 | -3,63 | -31,03 | -62,15 | -29,20 |
| 94,0 | -0,55 | -38,58 | -5,38 | -30,00 | -15,83 | -25,00 | 0,18 | -45,08 | -3,63 | -31,05 | -62,15 | -29,30 |
| 96,0 | -0,58 | -38,93 | -5,55 | -30,28 | -15,98 | -25,00 | 0,18 | -45,30 | -3,70 | -31,05 | -62,18 | -29,48 |
| 98,0 | -0,65 | -39,80 | -5,70 | -30,58 | -16,10 | -25,00 | 0,18 | -45,50 | -3,85 | -31,23 | -62,15 | -29,75 |
| 100,0 | -0,60 | -40,08 | -5,78 | -30,73 | -16,35 | -25,00 | 0,18 | -45,58 | -3,88 | -31,30 | -62,13 | -29,85 |
| 102,0 | -0,55 | -40,18 | -5,85 | -30,90 | -16,58 | -25,00 | 0,18 | -45,68 | -3,98 | -31,33 | -62,15 | -29,95 |
| 104,0 | -0,68 | -40,58 | -5,95 | -31,18 | -16,75 | -25,00 | 0,18 | -45,85 | -4,15 | -31,55 | -62,13 | -30,15 |
| 106,0 | -0,63 | -41,73 | -6,10 | -31,58 | -16,83 | -24,98 | 0,18 | -46,10 | -4,33 | -31,70 | -62,13 | -30,48 |
| 108,0 | -0,68 | -42,53 | -6,13 | -31,70 | -16,88 | -25,43 | 0,15 | -46,10 | -4,35 | -31,70 | -62,10 | -30,63 |
| 110,0 | -0,60 | -42,65 | -6,10 | -31,83 | -16,88 | -26,63 | 0,18 | -46,13 | -4,33 | -31,73 | -62,13 | -30,70 |
| 112,0 | -0,68 | -42,95 | -6,23 | -31,83 | -16,90 | -27,78 | 0,18 | -46,20 | -4,33 | -31,75 | -62,13 | -30,70 |
| 114,0 | -0,63 | -43,70 | -6,40 | -32,23 | -17,20 | -30,50 | 0,15 | -46,65 | -4,75 | -32,28 | -61,90 | -31,10 |
| 116,0 | -0,68 | -44,45 | -6,48 | -32,28 | -17,20 | -30,50 | 0,10 | -47,13 | -4,95 | -32,30 | -61,90 | -31,15 |
| 118,0 | -0,98 | -45,38 | -6,55 | -32,33 | -17,28 | -31,48 | -0,13 | -47,75 | -5,23 | -32,55 | -61,88 | -31,63 |
| 120,0 | -1,03 | -45,55 | -6,63 | -32,33 | -17,30 | -32,68 | -0,13 | -47,88 | -5,23 | -32,58 | -61,88 | -31,68 |
| 122,0 | -0,93 | -45,53 | -6,55 | -32,30 | -17,30 | -33,43 | -0,13 | -47,88 | -5,23 | -32,63 | -61,85 | -31,93 |
| 124,0 | -0,98 | -45,55 | -6,55 | -32,30 | -17,30 | -34,05 | -0,13 | -47,88 | -5,30 | -32,83 | -61,88 | -32,15 |
| 126,0 | -0,90 | -45,55 | -6,70 | -32,30 | -17,30 | -34,80 | -0,13 | -47,90 | -5,55 | -33,15 | -61,88 | -32,48 |
| 128,0 | -0,98 | -45,55 | -6,83 | -32,30 | -17,35 | -35,33 | -0,13 | -47,93 | -5,63 | -33,23 | -61,88 | -32,68 |
| 130,0 | -0,98 | -45,58 | -6,78 | -32,33 | -17,43 | -36,00 | -0,10 | -47,95 | -5,80 | -33,48 | -61,85 | -33,15 |
| 132,0 | -1,03 | -45,58 | -6,88 | -32,30 | -17,55 | -36,78 | -0,13 | -48,00 | -5,90 | -33,68 | -61,90 | -33,43 |

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
İmzasız ve mühürsüz raporlar geçersizdir.

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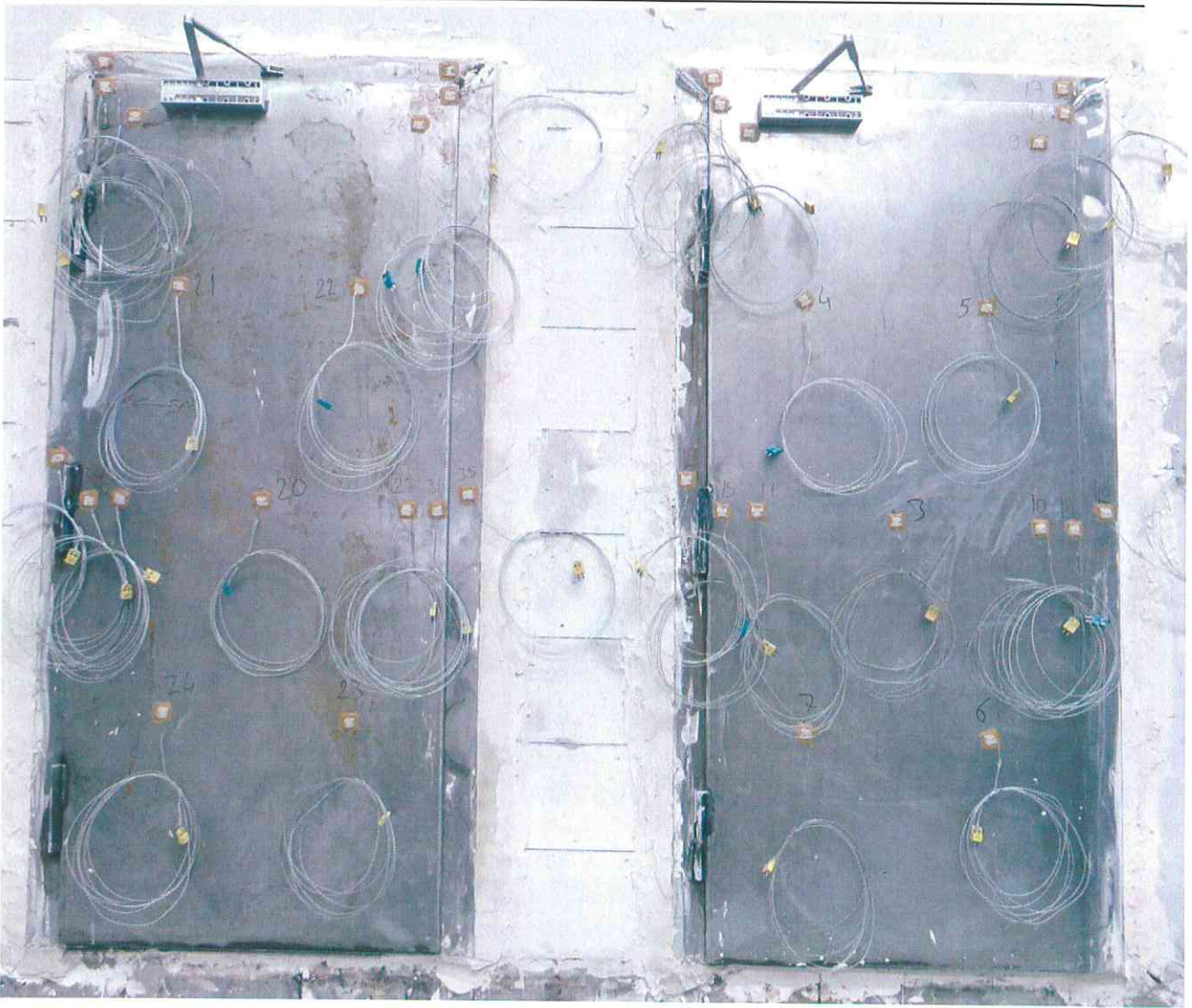


Photo C1: Unexposed side of the test specimens before the test.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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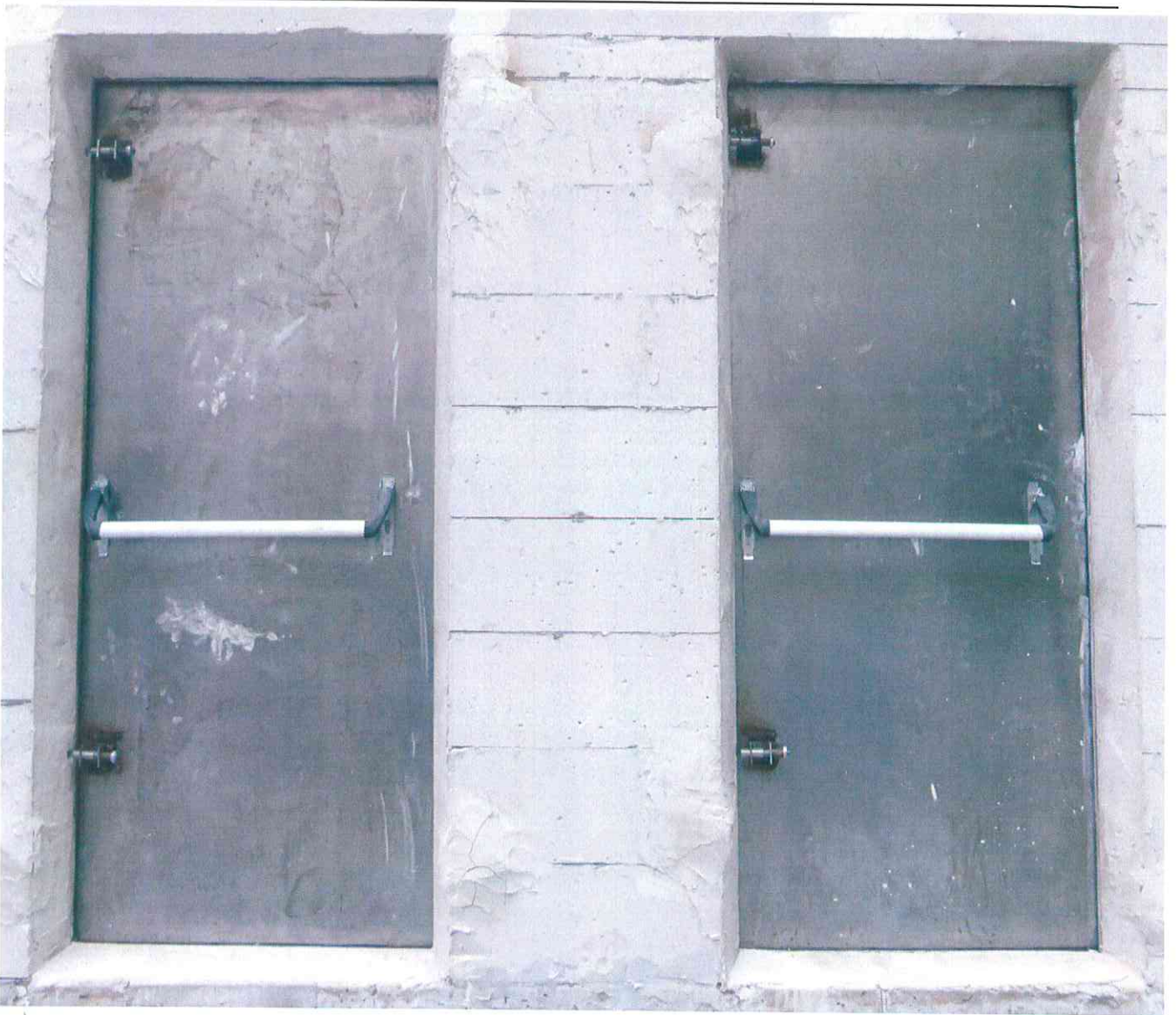


Photo C2: Exposed side of the test specimens before the test.

Efectis

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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Photo C3: Unexposed side of the test specimens after the test.

Bu rapor, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

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