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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0556-T

efectis era avrasya

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EFECTIS ERA AVRASYA TEST VE BELGELENDİRME A.Ş.

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

Şekerpınar – Çayırova, KOCAELİ

AB-0556-T
03.09.2014
RFTR14030

DENEY RAPORU
TEST REPORT

Müşterinin adı/adresi *Customer name/address*	:	MESA, KANTUR-AKDAŞ, ARTAŞ, ÖZTAŞ ORTAKLIĞI 842 Ada 58 Parsel Atakent- Halkalı, Küçükçekmece ISTANBUL / TURKEY
İstek numarası *Order No.*	:	EEA-14-000164
Numunenin adı ve tarifi *Name and identity of test sample*	:	Single Leaf Fire Exit Door with Corner Frame - 90 x 210 cm
Numunenin kabul tarihi *The date of receipt of sample*	:	15.07.2014
Açıklamalar *Remarks*	:	
Deneyin yapıldığı tarih *Date of test*	:	21.07.2014
Raporun sayfa sayısı *Number of pages of the Report*	:	20 (Totally 31 pages with annexes)

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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*
TEST VE BELGELENDİRME A.Ş. efectis era avrasya	03.09.2014	B. Acicbe Burak ACİCBE	Onur DAĞ

1. SCOPE

Fire resistance test, in conformity with the general requirements of standards TS EN 1363-1, with substitute or additional methods of standard TS EN1363-2 and with the particular requirements of standard TS EN 1634-1 "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", only exception of the conditioning requirements that is mention in Annex A of TS EN 1634-1 .

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 Fire Exit Door with Corner Frame - 90 x 210 cm

Direction of fire : Hinges away from fire

Manufacturer : CMD METAL ÇELİK KAPI VE YANGIN KAPISI İNŞ. PAZ. SAN. VE DIŞ TİC. LTD. ŞTİ.
İOSB Atatürk San. Sit. 2. Sokak No:27/28 Başakşehir ISTANBUL/TURKEY

Sponsor of test : MESA, KANTUR-AKDAŞ, ARTAŞ, ÖZTAŞ ORTAKLIĞI
842 Ada 58 Parsel Atakent- Halkalı, Küçükçekmece ISTANBUL / TURKEY

3.2. Construction

A side opening steel door construction, "Single Leaf Fire Exit Door with Corner Frame - 90 x 210 cm" was mounted in a masonry supporting construction, made of aerated concrete blocks with the mounting clearances dimensions of 990 x 2100 mm (*w x h*).

The supporting construction was supplied by the test laboratory (Efectis Era Avrasya) and consisted of aerated concrete blocks which have a density of 450 kg/m³ and thickness of 200 mm. The sponsor of the test was applied wall plaster (GESEREPAIR 730) to the un exposed surface of the supporting construction.

3.3. Components

3.3.1. Door Frame:

The frame studs and header were welded to each other. Wall plaster was filled between the supporting construction and the frame. Intumescent seal was used at the contact points of the door frame and the leaf. The frame was supported by anchorage plates and fixed to supporting construction by steel bolts.

- *Type : Shaped from DKP steel plate.*
- *Dimensions :*
  - *Frame studs : 16/35 x 76 x 2100/2142 mm (w x d x h)*
  - *Frame header : 16/35 x 76 x 910/1083 mm (w x d x h)*
  - *Wall thickness of the steel plate : 1,5 mm.*
- *Seal :*
  - *Type : Intumescent seal strip – Intuflex ORBIS*
    - *Dimensions : 2 x 20 mm (t x w)*
    - *Locations : Contact points of the leaf and frame.*
- *Filler :*
  - *Type : Wall plaster – GESEREPAIR 730*
    - *Measured density : 1900 kg/m³*
    - *Nominal thickness : 3 ± 1 mm*
- *Fixing :*
  - *Type : Steel bolt*
    - *Dimensions : M8 X 160 (Ø x l)*
    - *Location : 3 pcs at each stud (250 and 1075 mm from top of the leaf and 250 mm from bottom of the leaf), 2 pcs at the header (250 mm from each leaf corner).*
- *Reinforcement:*
  - *Type : Anchorage plate*
    - *Dimensions : 50 x 150 x 3 (d x w x t)*
    - *Locations : 2 pcs at each stud.*

See figures 1-5 for details.

3.3.1.1. Leaf:

The leaf was covered by steel plates with insulation inside. Between two layers of gypsum board, stone wool was used. Intumescent seal was used at contact points of the leaf and the frame. The leaf supported by Ω steel profiles.

- *Covering plate* : *DKP steel plate, wall thickness; 0,8 mm.*
- *Dimensions* : *900/1015 x 2100/2113 x 58 mm (w x h x t).*
- *Insulation* :
  - *Type* : *Gypsum board – ATIŞKAN*
    - *Nominal thickness* : *12 + 12 mm (2 layers.)*
    - *Mass per unit area* : *Less than 10 kg/m²*
    - *Fire classification according to EN 13501-1: A2-s1,d0*
    - *Mass per unit area of paper facing: Less than 200 gr/m²*
  - *Type* : *Stone wool – WOOLER*
    - *Nominal density* : *40 kg/m³*
    - *Nominal thickness* : *32 mm*
- *Seal* :
  - *Type* : *Intumescent seal strip – Intuflex ORBIS*
    - *Dimensions* : *2 x 20 mm (t x w)*
    - *Locations* : *Contact points of the leaf and frame.*
- *Reinforcement:*
  - *Type* : *Ω shaped steel profile*
    - *Dimensions* : *32 x 120 x 1 mm (w x l x t)*
    - *Locations* : *2 pcs inside the leaf. See figure 6.*

See figures 2-4 for details.

3.3.1.2. Accessories:

- *Hinges* :

The leaf was hung on two steel hinges.

- *Type* : *Steel Spring Hinge – MCMD 1001-01 – CMD - DEMİROĞLU*
  - *Dimensions* : *27 x 170 mm (Ø x l)*
  - *Locations* : *170 and 1842 from top of the frame.*

See figure 7.

- *Panic bar :*
  - *Type : PBDMR 1001-3 – CMD - DEMİROĞLU*
    - *Location : 1000 mm from the bottom of the door sill.*

  See figure 2.

- *Door handle:*
  - *Type : Anti-panic handle – MUL-T-LOCK*
    - *Location : 936,3 mm from the bottom of the door sill.*

- *Lock:*
  - *Type : Mortised lock – NEMEF - 1739*
    - *Location : 886 mm from the bottom of the door sill.*

- *Fire lock: Provides fixing between the leaf and the frame by self-closing when heated.*
  - *Type : YKCMD 1001-02 – CMD - DEMİROĞLU*
    - *Location : 2 pcs., on the leaf at top and bottom of the lock side.*

  See figure 8.

See figure 1-8 for details.

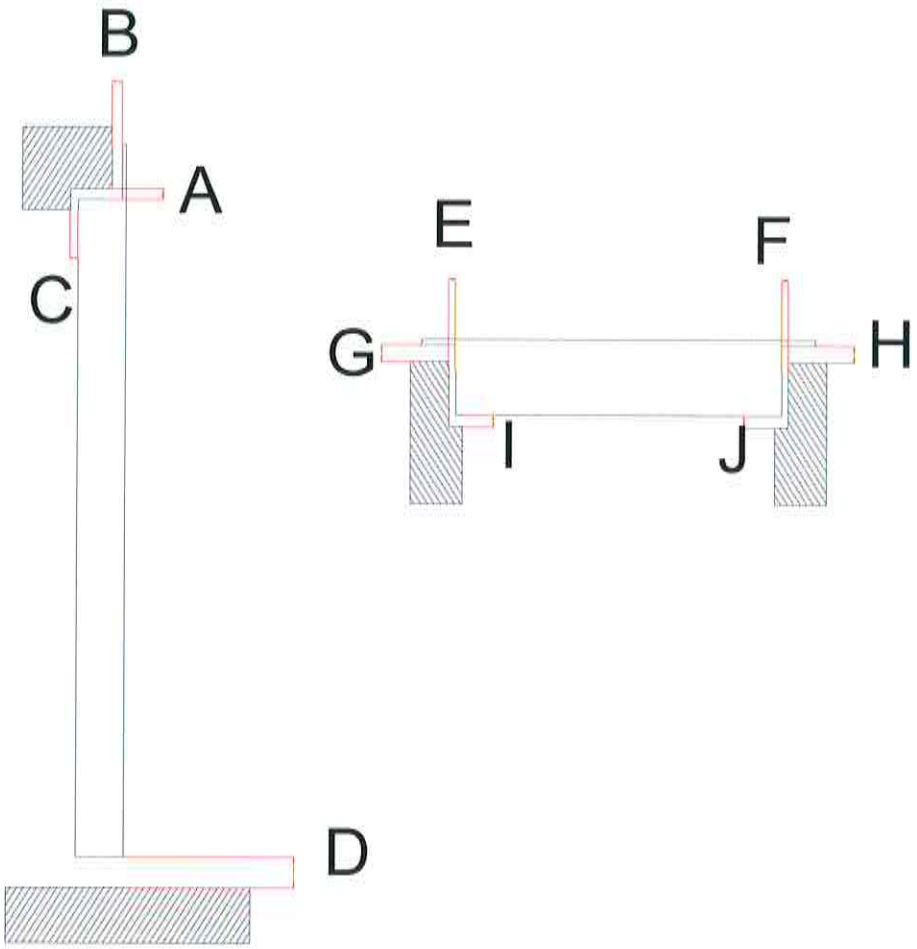
4. PRE-TEST PROCESSES

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 manufacturer (CMD METAL ÇELİK KAPI VE YANGIN KAPISI İNŞ. PAZ. SAN. VE DIŞ TİC. LTD. ŞTİ.).

4.2. Gap measurements



	A	B	C	D	E	F	G	H	I	J
First	9,0	7,0	3,0	4,0	4,0	6,0	8,0	4,0	4,0	3,5
Middle	7,0	6,0	5,0	6,0	6,0	6,0	7,0	5,0	5,0	4,0
Third	7,0	8,0	6,0	3,0	6,0	5,0	6,0	6,0	1,5	1,5

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 of the leaf of doorset: 58N

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

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 : 30,3 ± 2,7°C
Relative humidity : 50 ± 9 %.

5. TEST PROCESS

5.1. Method

The fire test was conducted according to the TS EN 1634-1.
The heating of the furnace followed the standard fire curve, as specified in the TS EN 1363-1.

The target overpressure in the furnace was 0 Pa at 500 mm above floor level and 20 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 2,7 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 (TC21 up to TC38), see figure B2).
- There was no need to use roving thermocouple
- The deformation of the test specimen (See Figure B3 and Table B1)

The positions of the thermocouple and displacement measurements are given in figure B1.

6. OBSERVATIONS

Table 1: Observations during heating.

0	Heating started. See figure **C1-C2**.
4	Smoke release between the door frame and the leaf.
6	Deformation at top and bottom edges between the door frame and the leaf.
12	**F** – Panic bar of the door dropped.
17	Opening between the door frame and the leaf at the top.
51	Temperature increased at Thermocouple Nr. 35, **ΔT > 180 °C. I_1 failed for the Door.**
57	Falling parts of the seal from the top.
62	Smoke release from the bottom of the door.
73	Opening between the door frame and the leaf at the hinge side.
80	Opening increased between the door frame and the leaf at the hinge side.
83	Cotton pad was applied to the opening between the door frame and the leaf at the hinge side. No ignition.
86	Cotton pad was applied to the opening between the door frame and the leaf at the hinge side. No ignition.
89	Cotton pad was applied to the opening between the door frame and the leaf at the hinge side. No ignition.
93	Cotton pad was applied to top of the lock side between the frame and supporting construction. Ignition. **Integrity failed for the Door.**
94	Test was terminated after consulted with the sponsor. See figure **C3-C4**.

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 TS EN 1363-1.

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.

8. SUMMARY

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

Table 2: Summary of test results of the test specimen

	Results
Integrity, **(E)**	
– Cotton pad	93rd minute.
– Gap gauges Ø 6 mm	no failure (not applied)
Ø 25 mm	no failure (not applied)
– Flames longer than 10 sec.	not observed.
Insulation:, [I]	
– average temperature	93rd minute (due to the failure of integrity)
– maximum temperature	51st minute by TC 35 for I_1.
	93rd minute (due to the failure of integrity) for I_2.
Test was terminated at 94th minute after consulted with 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 TS EN 1363-1, and when appropriate TS EN 1363-2. 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).

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 doorsets which satisfy the insulation criteria (Allowed for only: $EI_1 45$, $EI_2 90$).

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.

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 TS EN 1634-1.

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

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 sample 'Single Leaf Fire Exit Door with Corner Frame - 90 x 210 cm' is given in the classification report (EEA – 14 – 021).

a) Category A classification:

Due to the Category A classification of Door, 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	Min.	Max.
Height	525 mm (% 75)	2415 mm (%15)
Width	450 mm (% 50)	1035 mm (%15)
Area	-	2,268 m² (%20)

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
A	7,7	9,0	10,35
B	7,0	8,0	9,5
C	4,7	6,0	7,35
D	4,3	6,0	7,15
E	5,3	6,0	7,65
F	5,7	6,0	7,85
G	7,0	8,0	9,5
H	5,0	6,0	7,5
I	3,5	5,0	6,25
J	3,0	4,0	5,5

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):

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:

- 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 450 kg/m^3, having a thickness of at least 200 mm. It is not allowed to change surface coating that used at unexposed side of supporting construction.

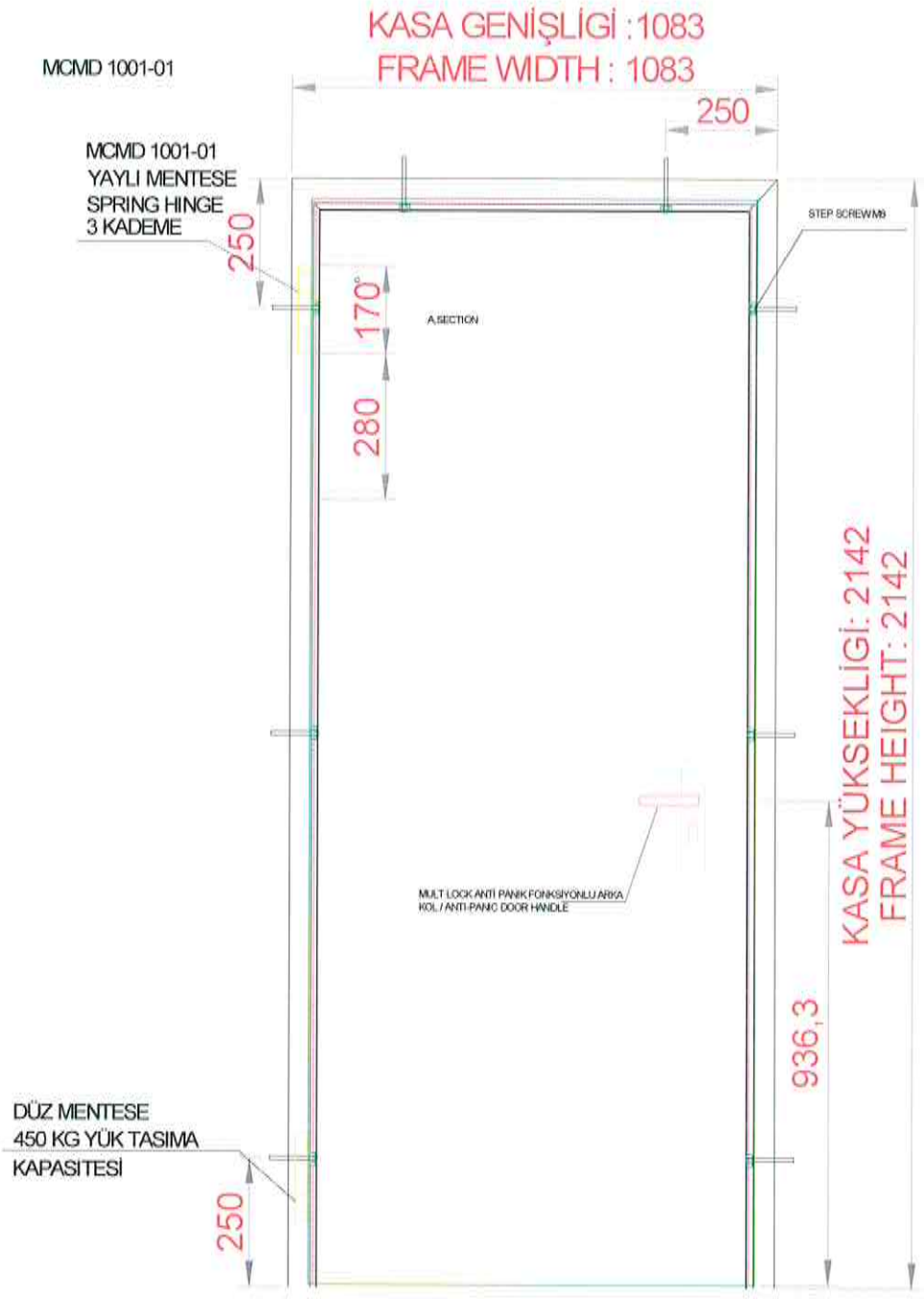


Figure 1: Unexposed side view of the Door.

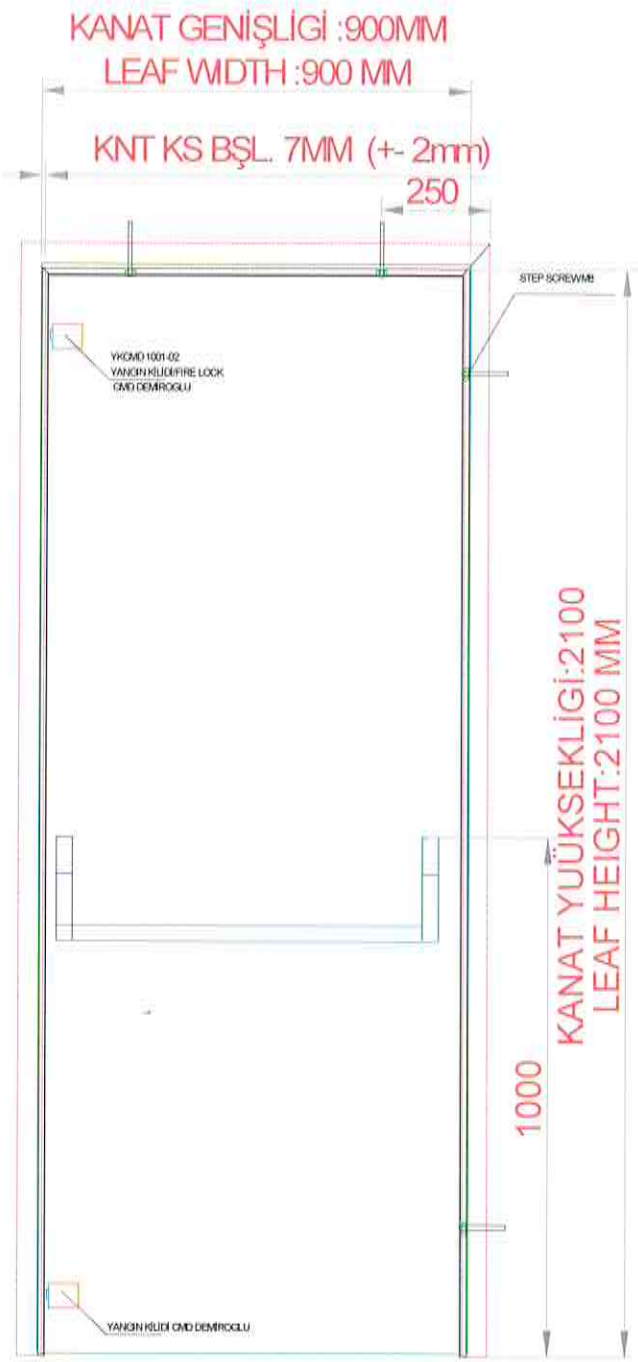


Figure 2: Exposed side view of the Door.

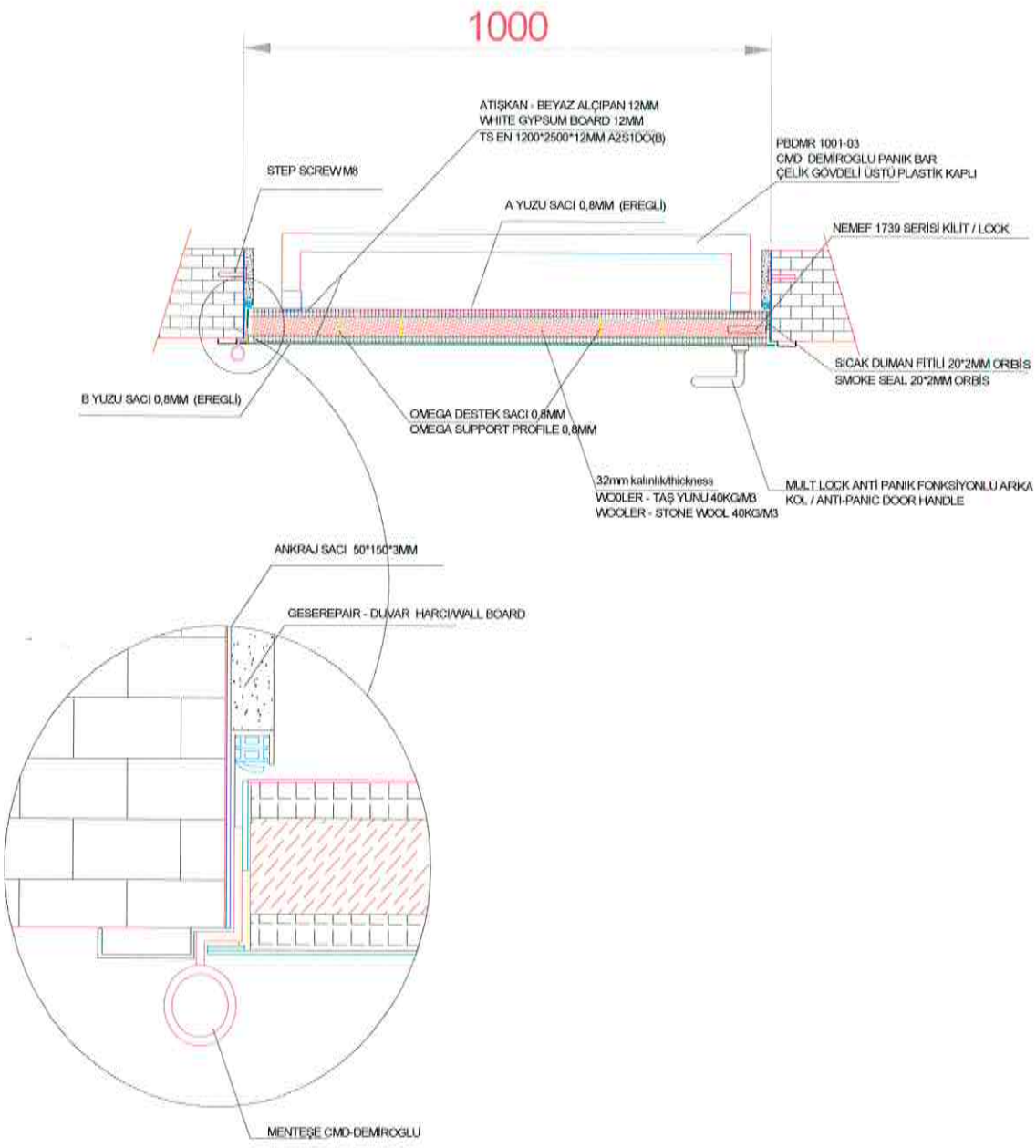


Figure 3: Detailed cross section of the Door.

YAN GÖRÜNÜŞ/SIDE VIEW

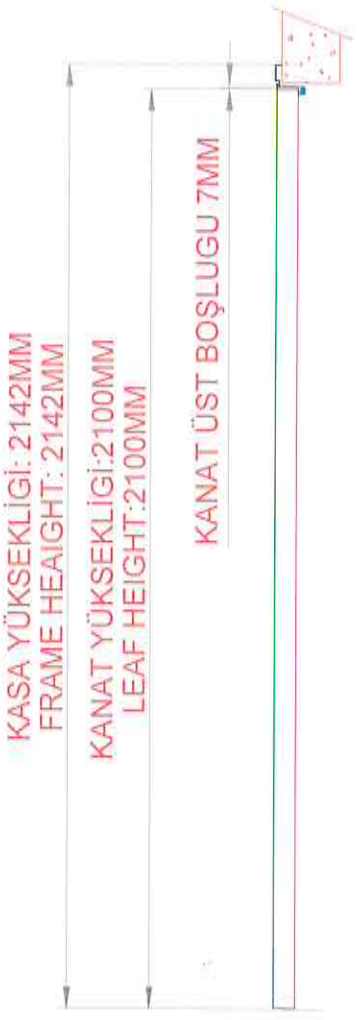


Figure 4: Side view of the Door.

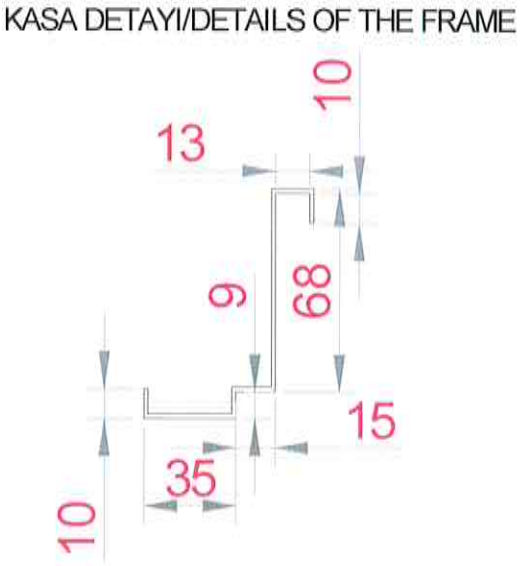


Figure 5: Details of the frame.

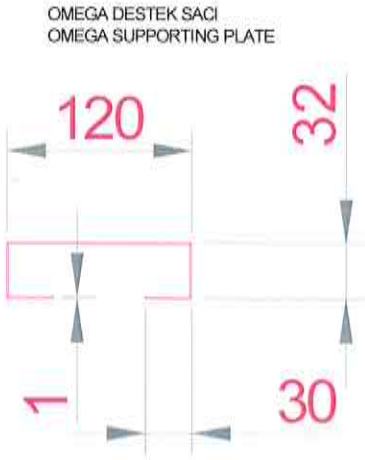


Figure 6: Details of the omega supporting profile

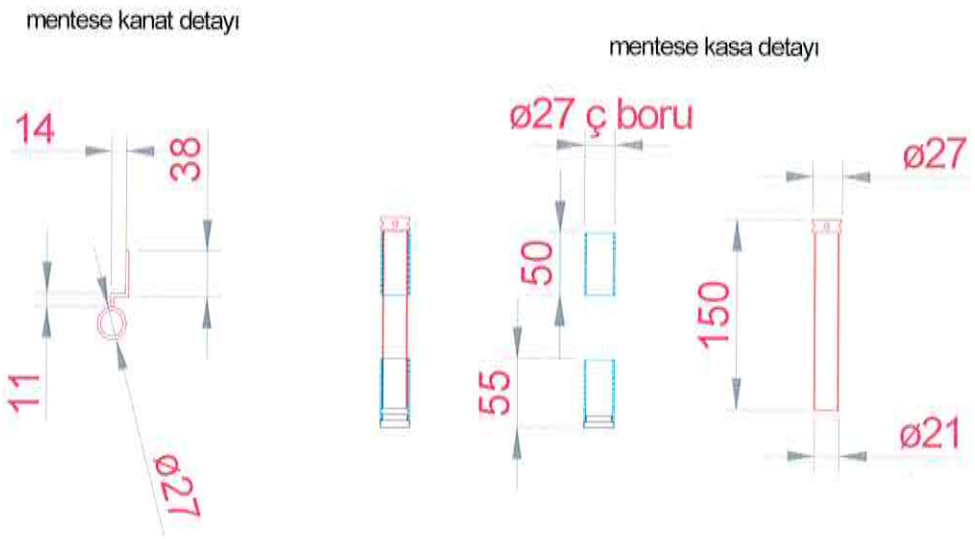


Figure 7: Details of the hinge

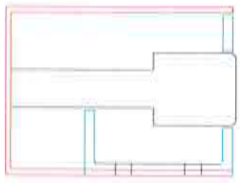


Figure 8: Details of the fire lock

APPENDIXES:

Appendix A: Furnace and laboratory conditions

Appendix B: Test results

Appendix C: Photos

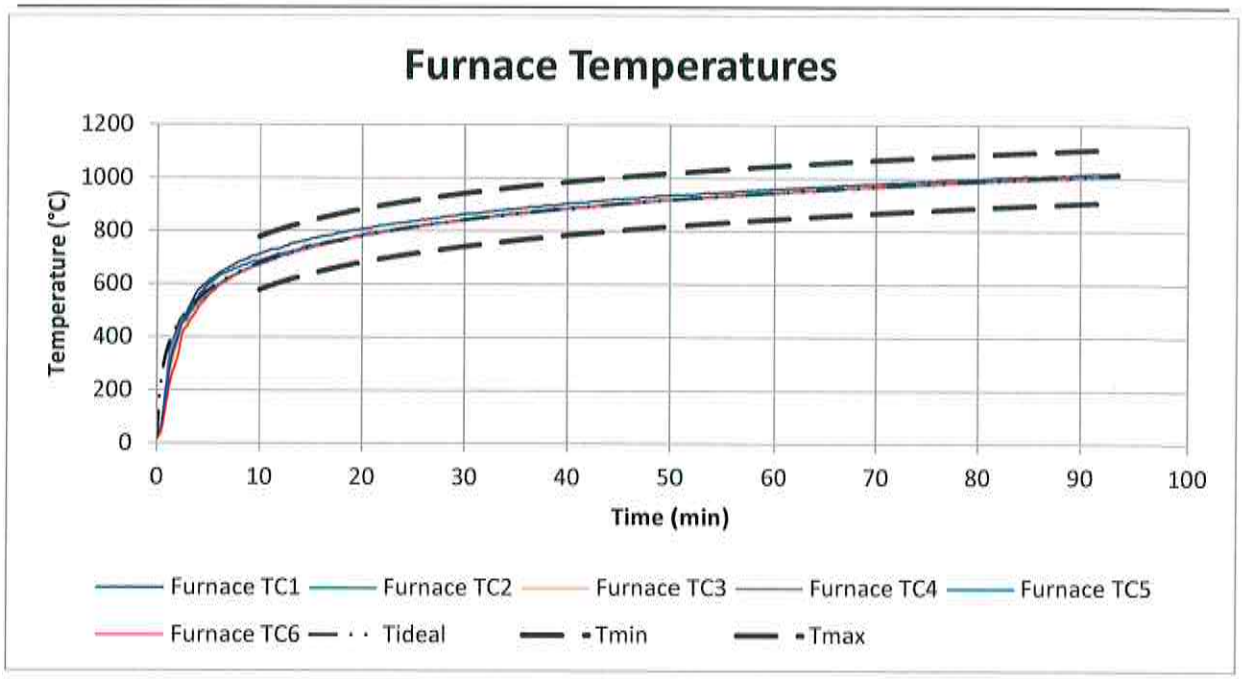


Figure A1: Furnace Temperatures.

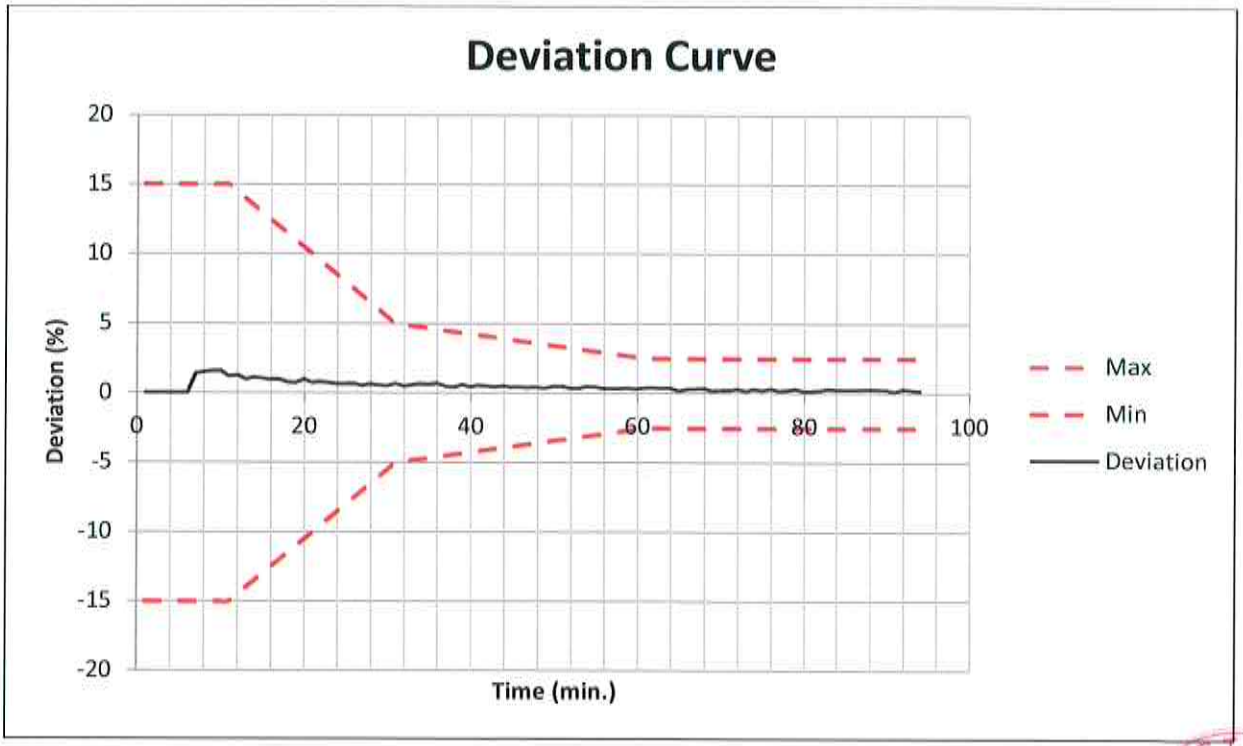


Figure A2: Deviation of furnace temperature.

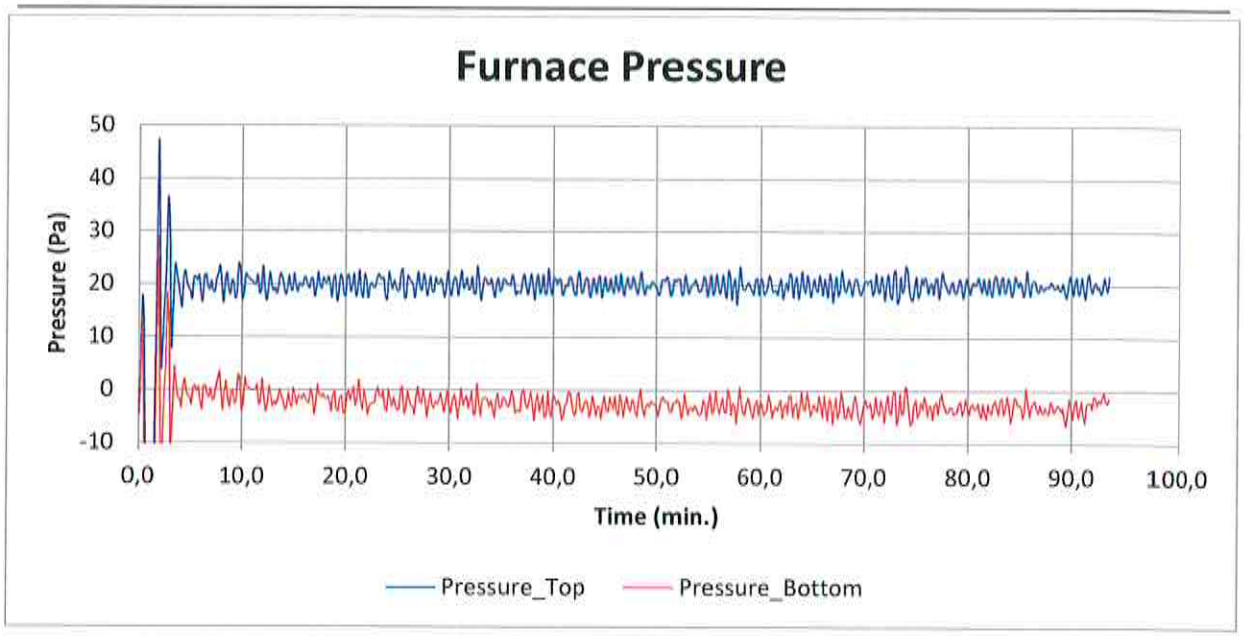


Figure A3: Pressure in the furnace.

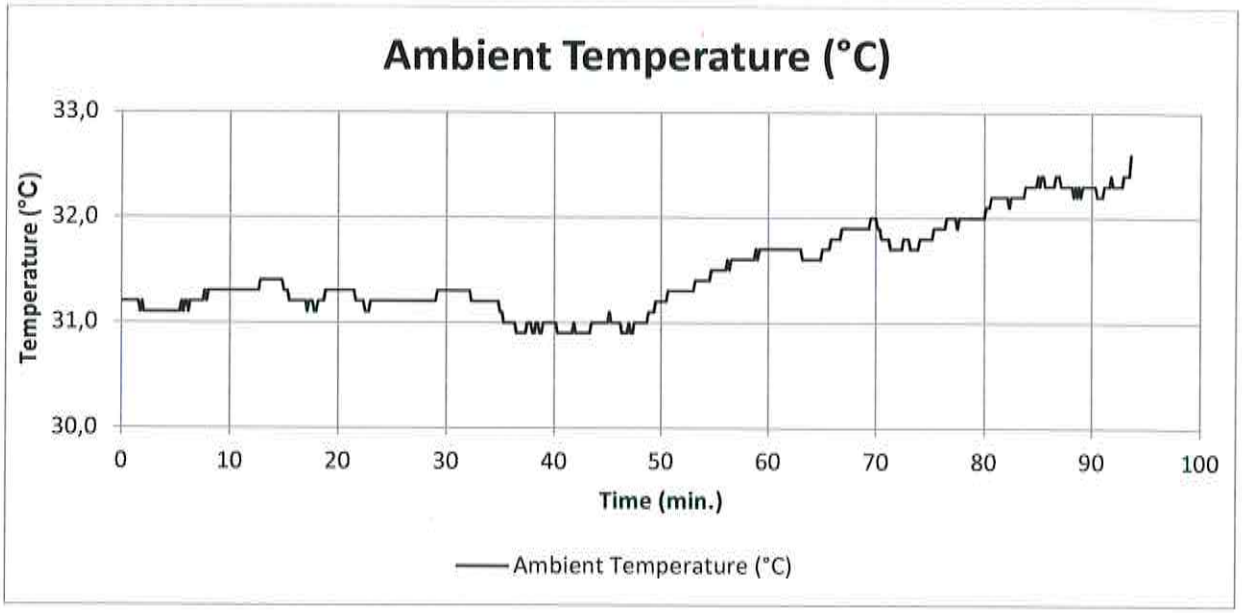


Figure A4: Ambient temperature at laboratory.

Phone: +902626581662 Fax.: +902626581669 E-mail: info@erayonetim.com turkey@efectis.com Web: www.erayonetim.com www.efectis.com

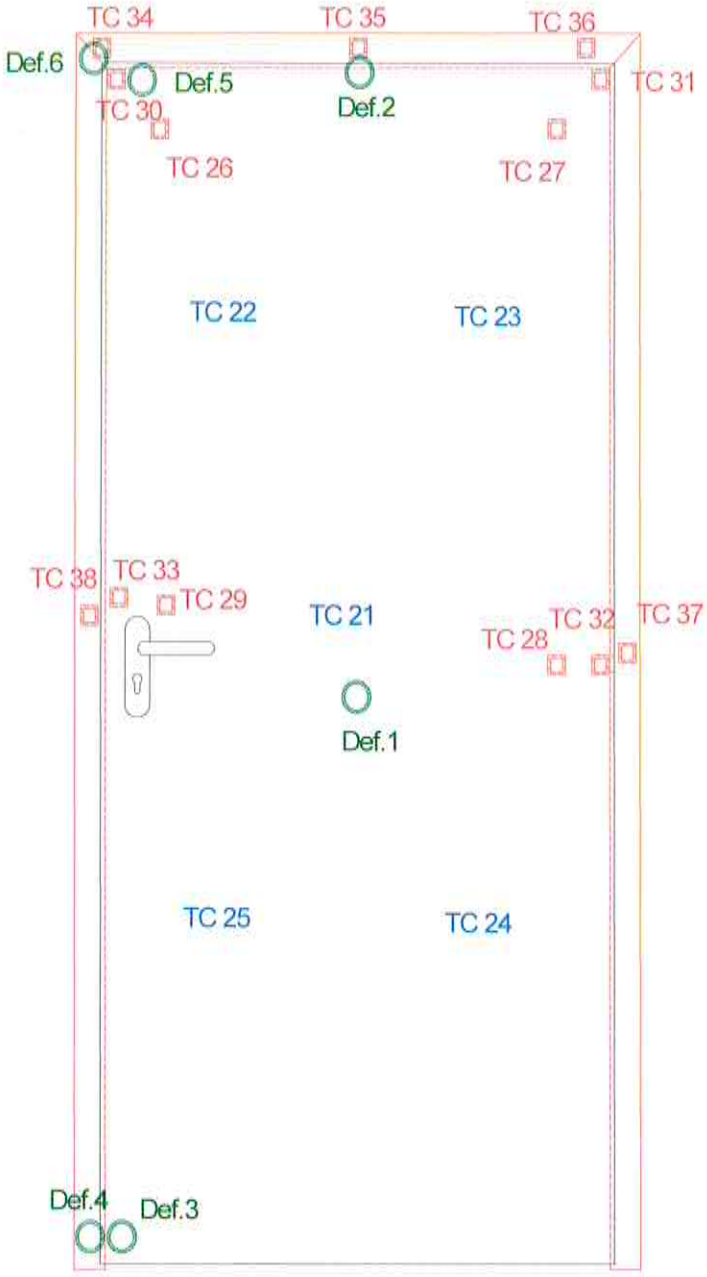


Figure B1: Locations of thermocouples and deflection sensors.

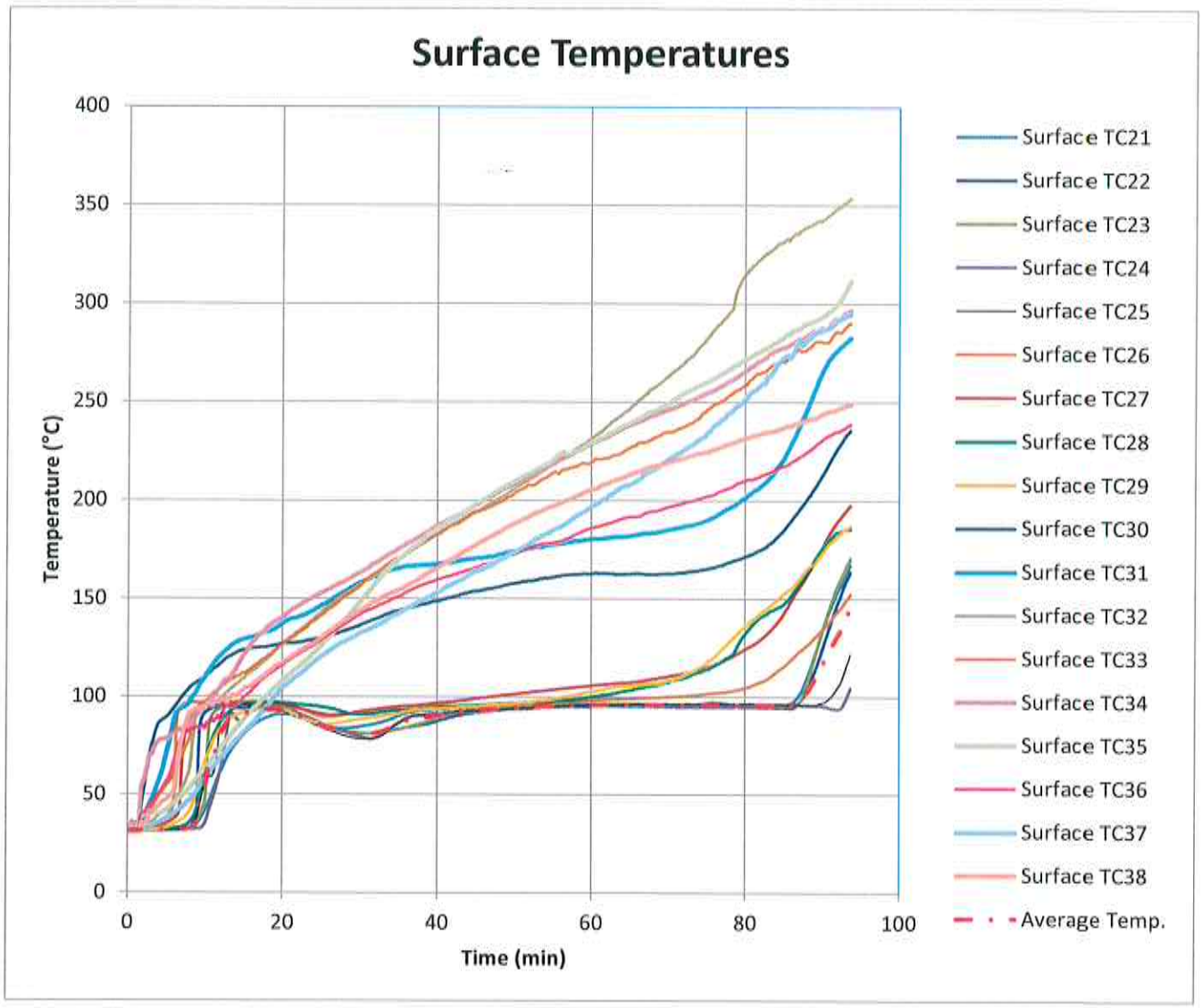


Figure B2: Surface temperatures of Door.

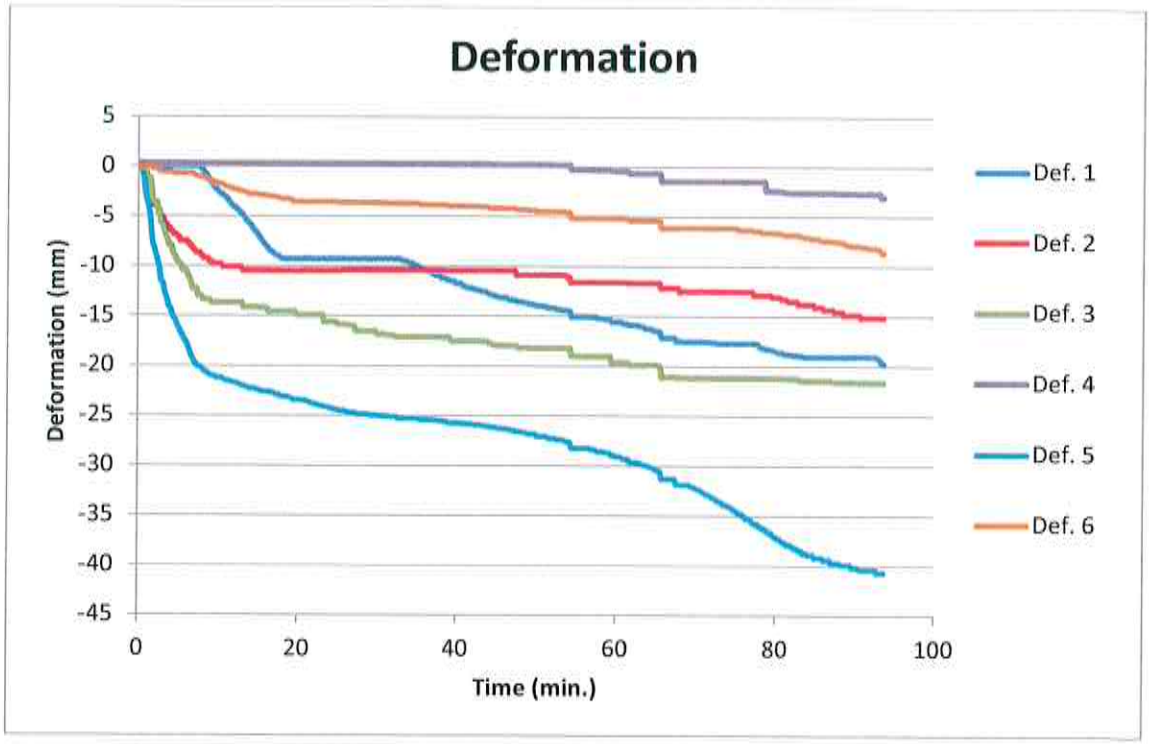


Figure B3: Deformation of the test specimen.

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)
0,0	-0,05	-0,05	0,00	0,30	-0,03	0,00
2,0	0,05	-3,78	-3,53	0,30	-8,03	-0,23
4,0	0,05	-6,18	-7,93	0,30	-14,13	-0,58
6,0	0,08	-7,48	-10,40	0,28	-17,60	-0,73
8,0	-0,30	-8,98	-13,00	0,30	-20,25	-1,08
10,0	-2,48	-9,78	-13,65	0,30	-21,15	-1,68
12,0	-4,05	-10,08	-13,65	0,30	-21,63	-2,28
14,0	-5,73	-10,45	-14,13	0,30	-22,23	-2,78
16,0	-7,93	-10,45	-14,15	0,30	-22,55	-2,93
18,0	-9,20	-10,45	-14,53	0,30	-23,00	-3,20
20,0	-9,25	-10,48	-14,88	0,30	-23,38	-3,53
22,0	-9,25	-10,45	-14,88	0,30	-23,70	-3,55
24,0	-9,23	-10,45	-15,55	0,30	-24,15	-3,53
26,0	-9,23	-10,40	-15,85	0,28	-24,50	-3,60
28,0	-9,25	-10,38	-16,50	0,30	-24,78	-3,63
30,0	-9,23	-10,38	-16,78	0,30	-24,93	-3,65
32,0	-9,23	-10,38	-16,93	0,28	-25,05	-3,70
34,0	-9,50	-10,40	-17,08	0,30	-25,20	-3,70
36,0	-10,23	-10,38	-17,08	0,30	-25,33	-3,83
38,0	-10,95	-10,40	-17,10	0,28	-25,45	-3,85
40,0	-11,68	-10,43	-17,48	0,28	-25,68	-3,95
42,0	-12,13	-10,43	-17,48	0,28	-25,78	-3,95
44,0	-12,68	-10,43	-17,55	0,28	-26,00	-4,03
46,0	-13,10	-10,43	-17,93	0,23	-26,23	-4,15
48,0	-13,50	-10,88	-18,15	0,23	-26,53	-4,30
50,0	-13,83	-10,85	-18,18	0,25	-26,80	-4,38
52,0	-14,13	-10,88	-18,18	0,20	-27,20	-4,50
54,0	-14,38	-11,05	-18,18	0,18	-27,53	-4,55
56,0	-15,00	-11,60	-19,00	-0,30	-28,18	-5,15
58,0	-15,18	-11,60	-19,00	-0,30	-28,53	-5,15
60,0	-15,53	-11,60	-19,60	-0,43	-28,98	-5,15
62,0	-15,83	-11,63	-19,85	-0,65	-29,58	-5,38
64,0	-16,18	-11,65	-19,83	-0,65	-29,93	-5,38

Time (min)	Def. 1 (mm)	Def. 2 (mm)	Def. 3 (mm)	Def. 4 (mm)	Def. 5 (mm)	Def. 6 (mm)
66,0	-17,08	-12,15	-21,03	-1,43	-31,23	-6,13
68,0	-17,40	-12,55	-21,10	-1,43	-31,80	-6,13
70,0	-17,48	-12,48	-21,13	-1,43	-32,15	-6,10
72,0	-17,55	-12,48	-21,13	-1,43	-33,03	-6,10
74,0	-17,65	-12,50	-21,13	-1,43	-33,90	-6,10
76,0	-17,65	-12,50	-21,13	-1,45	-34,95	-6,30
78,0	-17,90	-12,85	-21,13	-1,45	-35,98	-6,43
80,0	-18,40	-13,05	-21,15	-2,38	-37,05	-6,58
82,0	-18,75	-13,48	-21,20	-2,55	-37,80	-6,80
84,0	-18,98	-13,78	-21,40	-2,55	-38,65	-7,05
86,0	-18,98	-14,03	-21,40	-2,55	-39,10	-7,33
88,0	-18,98	-14,53	-21,55	-2,60	-39,65	-7,48
90,0	-18,95	-14,83	-21,55	-2,63	-40,10	-7,90
92,0	-18,98	-15,08	-21,58	-2,63	-40,33	-8,10

Figure C1: Unexposed side of the test specimen before the test.

Figure C2: Exposed side of the test specimen before the test.

Figure C3: Unexposed side of the test specimen after the test.

Figure C4: Exposed side of the test specimen after the test.