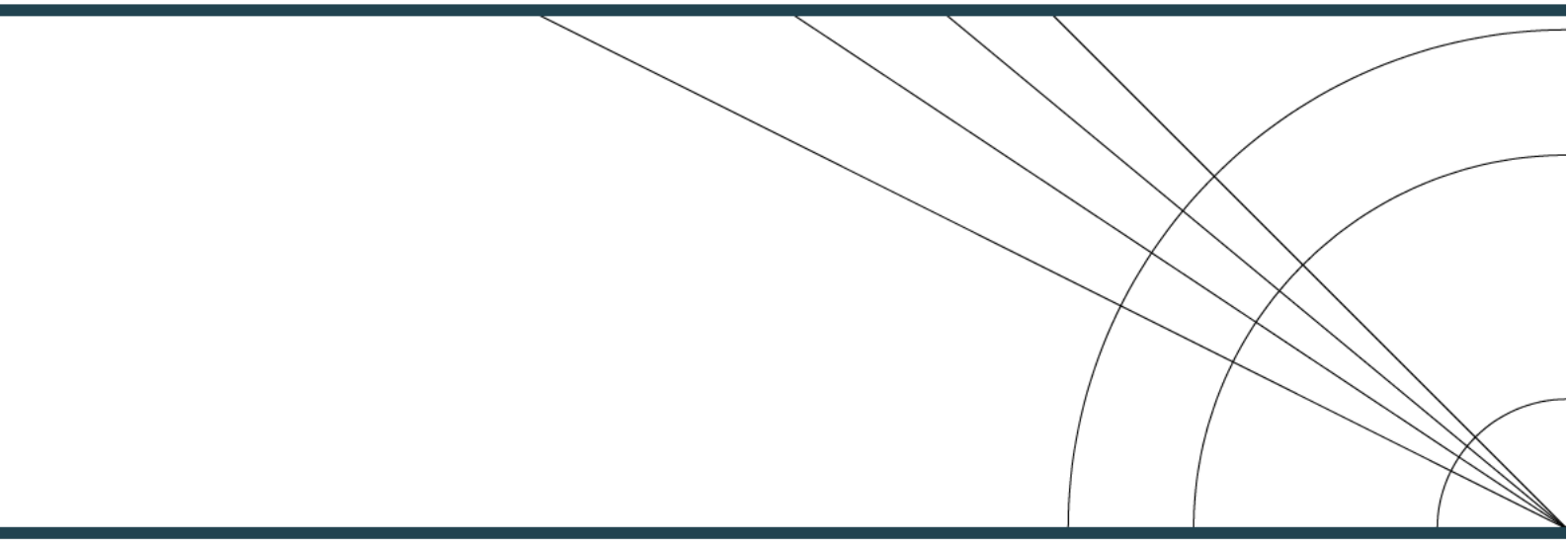
DBI
FIRE AND SECURITY

TEST REPORT
LOADBEARING DECK

Name of sponsor:	Wood:UpHigh		
Product name:	Loadbearing deck		
File no.:	PGA12249A	**Revision no.:**	0
Test date:	2023-05-15	**Date:**	01-02-2024
Pages:	11	**Encl.:**	50
Ref:	RKP / KTO		



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ilac-MRA DANAK
TEST Reg.no.0012

Client information

Client: Wood:UpHigh

Address: Jernholmen 12

2650 Hvidovre

Denmark

The test is part of the project Wood:UpHigh. The project is partly sponsored by Uddannelses- og Forskningsstyrelsen through DBI's performance contract, Realdania and Grundejernes Investeringsfond. The project is headed by DBI, except for the construction of test specimens for the fire tests, which is headed by LOGIK&CO.

Content

1 Date of test

The test was conducted on 2023-05-15

2 Purpose of test

The test specimen has been subjected to a standard fire test in accordance with the following standards:

EN 1363-1:2020 Fire resistance tests – General requirements

in conjunction with

EN 1365-2:2014 – Fire resistance tests for loadbearing elements – Part 2: Floors and roofs

3 Test specimen

The trade name and sponsors identification mark are stated below:

Trade name:	None
Identification mark:	None

The components for the test specimen were delivered and mounted by LOGIK&CO.

4 Drawings and description

Details of the construction are shown in the enclosed documentation as stated below:

Type	Drawing No.	Dated	Subject
Drawing	1.1	15-05-2023	Loadbearing floor
Drawing	1.2	15-05-2023	Loadbearing floor – plywood – top layer
Drawing	1.3	15-05-2023	Loadbearing floor – loadbearing beams
Drawing	1.4	15-05-2023	Loadbearing floor – wooden battens and sound dampening device
Drawing	1.5	15-05-2023	Loadbearing floor – clay boards
Drawing	1.6	15-05-2023	Loadbearing floor – hemp boards

The documentation is supplied by the sponsor and it is stamped by DBI - Danish Institute of Fire and Security Technology

Description

The test specimen consisted of the components described in the following. DBI inspected the components during mounting, the test and after the test.

The sponsor carried out the selection of the products for the test specimen as well as the mounting.

Test specimen

External measures: Length: 4600 mm Width: 3000 mm Thickness: 480 mm

The test specimen is a loadbearing deck consisting of wooden beams with boards. The boards on the underside of the construction are attached to a sound dampening system.

The test specimen was asymmetrical.

Top layer

A 21 mm plywood board layer was fixed to the loadbearing beams on the unexposed side. The plywood had 7 layers of laminate glued together with the nominal dimensions of 1220 x 2440 x 21 mm and a nominal density of 750 kg/m3.

The fixation was with 5.0 x 50 mm screws. Five screws across the width in each loadbearing beam. Distance from the grove side was approximately 150 mm and the distance from the tongue side was approximately 50 mm.

Beams:

A total of 5 loadbearing beams were used in the deck construction, all 4510 mm long. The beams are 45 x 295 mm dry graded C24 construction spruce wood with a nominal density of 450 kg/m^3. The beams were spaced c/c 600 mm.

The beams were fixed to an end beam with two steel screws 8.0 x 120 mm [redacted] screws (TX40) in each end, and two steel brackets designated [redacted] with the dimensions 105 x 105 x 2 x 90 mm. The brackets were fixed with six screws in each flange and positioned at the top and the bottom of each beam, see photo no. 5.

At both sides of the construction a beam of 45 x 295 mm was cut into pieces as to not carry any load.

See drawing no. 1.3 and 1.4 and photo nos. 1 and 5.

Sound dampening system:

The sound dampening system consists of steel brackets with a rubber insert and two layers of battens.

Steel brackets
The steel profiles with rubber have the trade name [redacted].
The steel brackets had two different steel profiles. The bottom profile was a U shape with the dimensions 92 x 73 x 1.5 mm (height x width x thickness). The top profile was a hat profile with the dimensions 25 / 68 / 25 x 40 x 1.5 mm (width of flanges x height x thickness).

A rubber piece with a M8 threaded rod are installed between the profiles. The rubber piece was under compression in the construction. The dimensions were Ø29 x 25 mm.

The steel brackets were positioned every 1250 mm on all loadbearing beams.

The total height of the device was 103 mm.

Battens
In the bottom profile a 45 x 70 mm batten made of spruce wood with a nominal density of 450 kg/m³ were fixed. These were parallel with the loadbearing beams. The battens were fixed to the profiles with 5.0 x 40 mm screws designated [redacted].

Perpendicular to the 45 x 70 mm battens, a layer of 20 x 95 mm battens was fixed. The battens were fixed with two 5.0 x 40 mm screws designated [redacted] in each 45 x 70 mm batten. The battens were placed with a c/c of 400 mm.

Insulation:

The insulation material used was a grass insulation designated [redacted] with a nominal thickness of 100 mm and nominal density of 40 kg/m³. The insulation was placed in the layer with the sound dampening steel profiles.

The tested slab size was 600 x 1200 mm (width x length).

See photo no. 11 and 13.

Clay boards:

Clay boards designated [redacted] [22] with the nominal dimensions of 22 x 1200 x 1000 mm and a nominal density of 750 kg/m³ were mounted on the exposed side to the 20 x 95 mm battens with 3,9 x 35 mm gypsum screws. Seven screws were fixed in four rows into the battens, with 15 mm to the board edge.

See photo no. 8.

Hemp boards

Hemp boards designated [redacted] with the nominal dimensions of 19 x 800 x 1200 mm and a nominal density of 650 kg/m³ were mounted on the exposed side to the clay boards with 3,9 x 57 mm gypsum screws. Each full board have 12 screws with 15 mm to the board edge.

See photo no. 9.

Mesh

A glass fiber mesh was positioned over the boards. The mesh was designated [redacted] with a 4 x 4 mm mesh size. The width of the mesh was 1000 mm and it had a surface weight of 160 g/m². The mesh was mounted with an overlap and stapled to the hemp boards.

See photo no. 10.

Rendering: The clay rendering designated [redacted] was used on the side of the test specimen. The plaster was mixed according to the manufacturer´s instructions. The plaster was applied in layer of approximately 3 mm.

See photo no. 12 and 14.

Measured by DBI

Product		Clay board	Hemp board	Plywood	Wood beams	Grass insulation
Density	kg/m³	656	628	766	434	50
Thickness	mm	22.2	19.6	20.7	45.0	100.0
Moisture content	%	3.85	2.76	9.50	11.07	6.42
Sampling method		Extra material	Extra material	Extra material	Extra material	Extra material
Drying temperature	°C	105	105	105	105	105

*The clay board is measured 12,5% lower in density than the stated nominal density of 750 kg/m³.

5 Test conditions

Conditioning

The test materials for the test specimen were delivered in week 18/19 to the DBI laboratory. The parts were stored under room temperature. On the day of the fire testing the condition of the test specimen was similar with respect to its moisture content as the test specimen would be in normal service.

Mounting

The test specimen was mounted simple supported in a test frame suitable for loaded tests with a clear opening of 3000 x 4000 mm. The span length was 4140 mm. The span of the loadbearing beams was parallel to the longest side.

Free edge was established along both long edges of the test specimen (2 x 25 mm stone wool with alu-foil in each side) to allow for unrestrained deformation of the test specimen.

Loading

The test specimen was loaded with a total applied load of 2.3 kN/m² during the test, corresponding to a total load of 34.2 kN.

The load was applied in two lines with a HEB100 steel beam at the quarter sections (1035 mm from each end of the construction). A centrally placed horizontal top beam distributed the load from the hydraulic jack to the two lines. The loading equipment had a total weight of 370 kg.

The deck was simple supported at the bottom in each end.

The load was applied in 10 steps prior to the fire test. The fire test was commenced approx. 20 minutes after reaching the final load on the test specimen.

Fire test

Observations were made during the test on the general behavior of the test specimen.

Temperature observations were taken continually during the entire testing time.

The surface temperatures were measured on the unexposed surface of the test specimen as indicated on DBI drawing no. 1.0.

The furnace temperature was determined by means of plate thermocouples uniformly distributed at a distance of approximately 100 mm from the exposed side of the test specimen. The furnace temperature was continuously controlled so as to follow the standard time temperature curve within the accuracy specified in EN 1363-1:2020.

The thermocouples were constructed according to the description in EN 1363-1:2020.

6 Test results

Duration of the test was 61 minutes.

Measurements

The enclosed graphs and tables show:

Enclosures 2.0 and 2.1	Furnace temperatures The actual minimum-, average- and maximum furnace temperature in relation to the standard temperature. The table also shows the area under the actual time-temperature curve as well as the area under the standard time-temperature curve.
Enclosures 3.0 and 3.1	Horizontal furnace pressure The differential pressure in the furnace during the test, measured 100 mm below the test specimen.
Enclosures 4.0 and 4.1	Ambient temperature The ambient temperature in the laboratory during the test
Enclosures 5.0 and 5.1	Average temperature Temperature rise on the unexposed side.
Enclosures 6.0 and 6.1	Maximum temperatures
Enclosures 7.0 and 7.1	Deformation The vertical deflection measured on the unexposed side (positive values indicates movement towards the furnace)
Enclosures 8.0 and 8.1	Load per hydraulic jack
Enclosures 9.0 and 9.1	Mid height beams on center beam and center left beam.
Enclosures 10.0 and 10.1	On sound dampers
Enclosures 11.0 and 11.1	On center batten 45 x 70 mm under the loadbearing beams
Enclosures 12.0 and 12.1	between battens and hempboards

Enclosures 13.0 and 13.1	Between hempboards and clay boards
Enclosures 14.0 and 14.1	Deflection rate
Enclosures 15.0 and 15.1	Load per hydraulic jack during the loading phase
Enclosures 16.0 and 16.1	Deformation during the loading phase The vertical deflection measured on the unexposed side (positive values indicates movement towards the furnace)

Visual observations:

Time / Minutes	Visual observations:	U = Unexposed side E = Exposed side
0	Test commences	
8	Faint smoke from sides.	U
11	Smoke from middle right floorboard.	U
11	Clay plaster starting to loosen	E
13	Smoke from between beam and plywood multiple places.	U
16	Hemp boards were visible, gaps starting to widen between boards	E
16	Clay plaster had fallen of test specimen and is hanging on the furnace thermocouples.	E
20	Increased smoke of all edges.	U
24	Clay plaster had fallen of the furnace thermocouples	E
26	Gaps between hemp boards starting to widen.	U
27	Increased smoke form joints right side of specimen	U
28	Some hemp board of the first layer had fallen.	U
33	Clay boards still in place	E
38	Stable condition on unexposed side	U
39	Heavy smoke from left side of corner.	U
42	All hemp boards had fallen off.	U
49	Clay boards had started to loosen	U
50	Clay boards had fallen.	U
51	Increased smoke in front end of test specimen.	U
52	Only flames visible in furnace.	U
53	Wood burning sounds	U
56	Cotton pad test front end right side. Slight discoloration	U

58	Cotton pad test front end right side. Medium discoloration	U
60	Cotton pad test front end right side. Ignition.	U
61	Test stopped	

The photographs on the attached photo sheets show the test specimen during the mounting, testing and after the test. See the description at each photo.

7 Conclusion

Fire resistance testing according to EN 1365-2:2014 of the construction described in this test report showed that failure according to the performance criteria stated in the test method occurred at the following time:

Load-bearing capacity (R): 60 minutes

- The load on the test specimen was maintained during the entire test.
- The measured vertical deflection did not exceed the criteria of $C = L^2/(400*h) = 179$ mm during the test.
- The measured rate of vertical deflection did not exceed the criteria of $dC/dt = L^2/(9000*h) = 7.97$ mm/min during the test.

Integrity (E): 60 minutes

- Sustained flaming did not occur during the test.
- The cotton pad was ignited after 60 minutes of testing.
- No through-going openings in the test specimen were created during the test.

Insulation (I): 60 minutes

- Failure of insulation occurred after 60 minutes of testing due to failure of integrity.
- The average temperature rise on the unexposed surface of the test specimen did not exceed 140°C during the test. The maximum average temperature rise measured during the test was 41°C.
- The maximum temperature rise on the unexposed surface of the test specimen did not exceed 180°C during the test. The maximum temperature rise measured during the test was 67°C.

8 Remarks

The field of direct application of the test results appears from EN 1365-2:2014, clause 13.

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

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

This report has only been printed in a pdf-version. DBI has not issued a hard copy version.

All values mentioned in this report are nominal values, production tolerances are not considered.

Danish Institute of Fire and Security Technology

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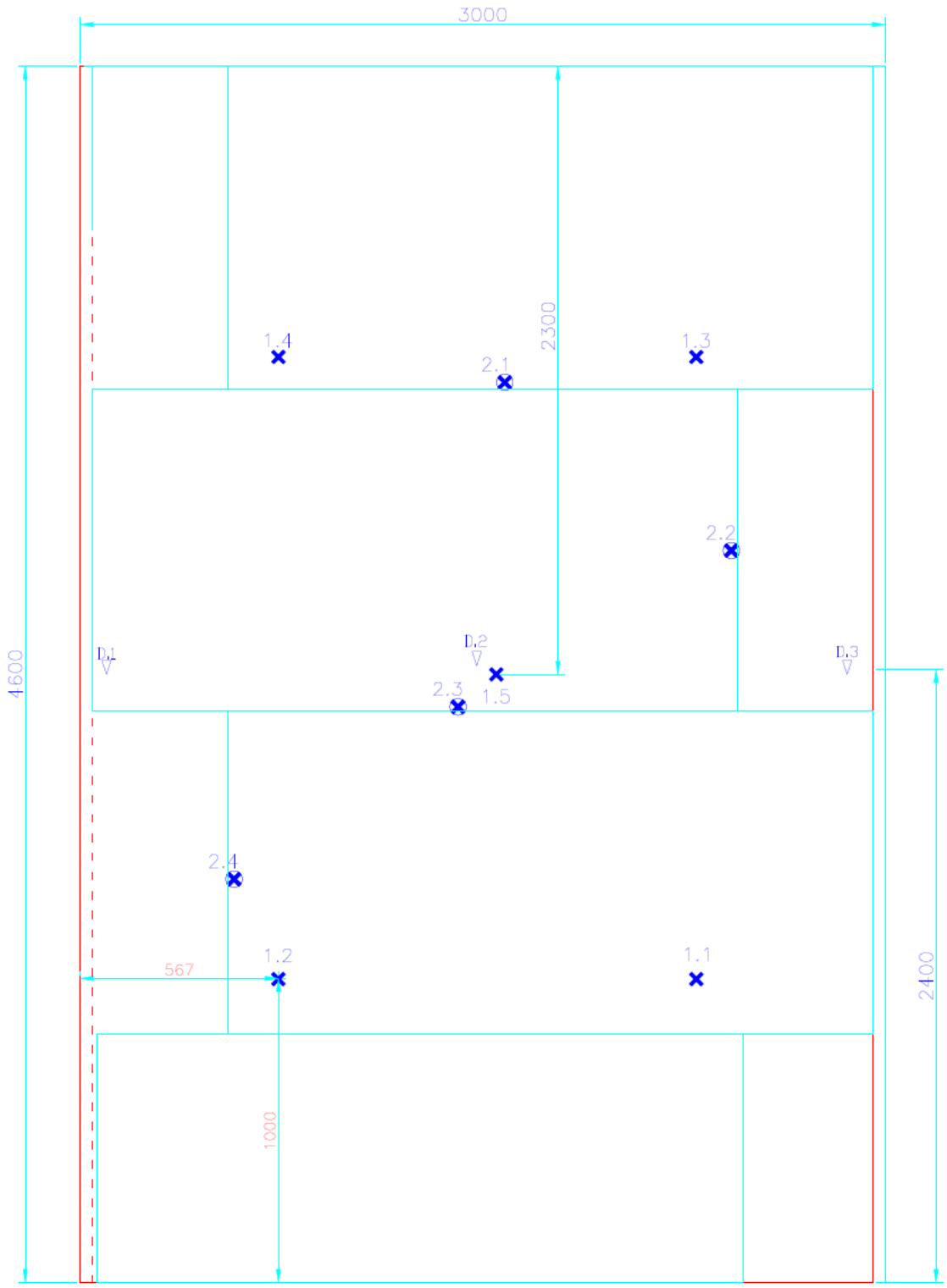
Wood:UpHigh	**Enclosures:**	**50**
Jernholmen 12	DBI drawings:	1
2650 Hvidovre	DBI graphs and tables:	30
Denmark	Photo sheets:	13
	Sponsors drawings:	6



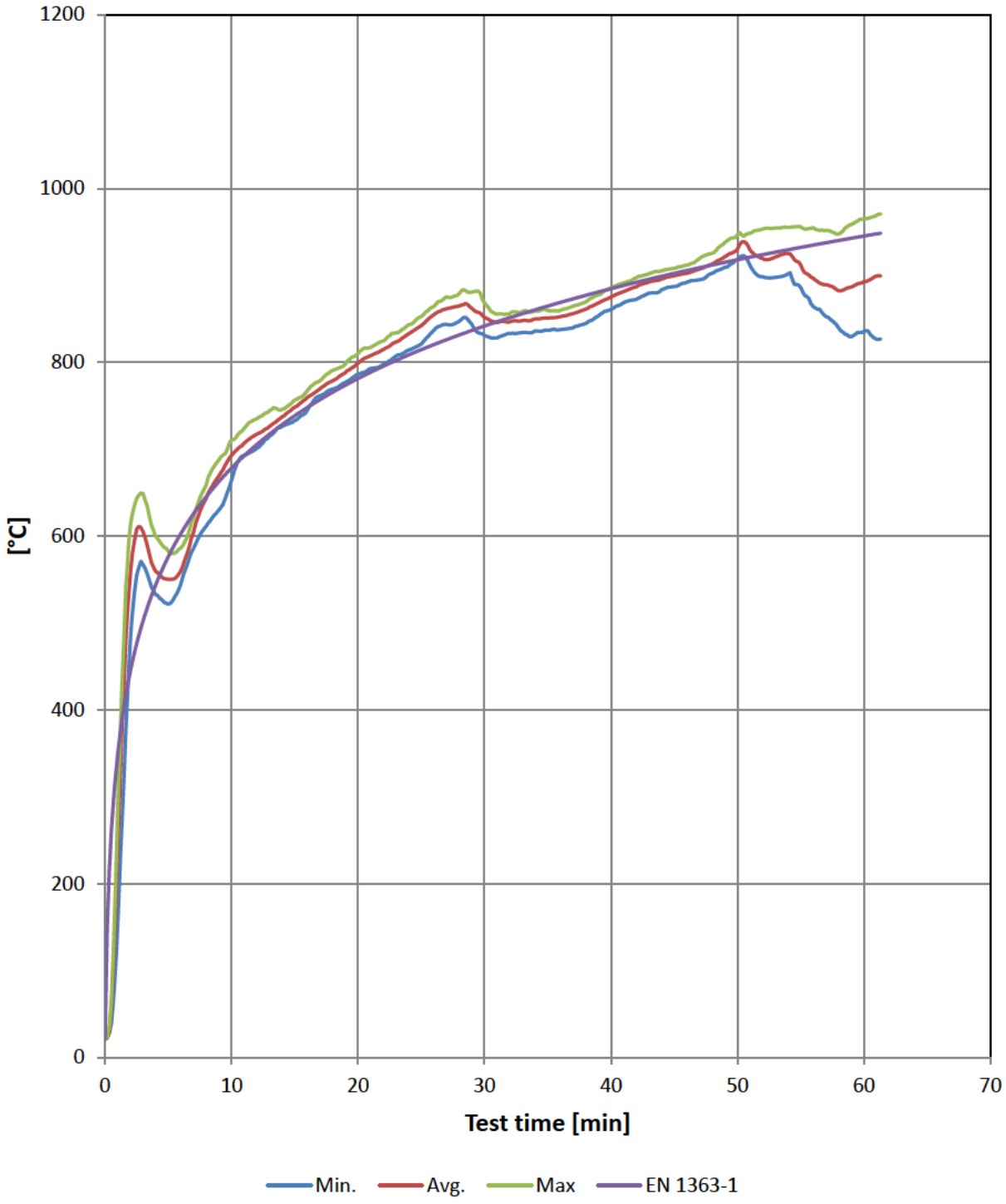
✖ Thermocouple placed on the unexposed surface (Average)

✖ Thermocouple placed on the unexposed surface (Maximum)

▽ Deflection measuring point

All measurements are in mm

Furnace

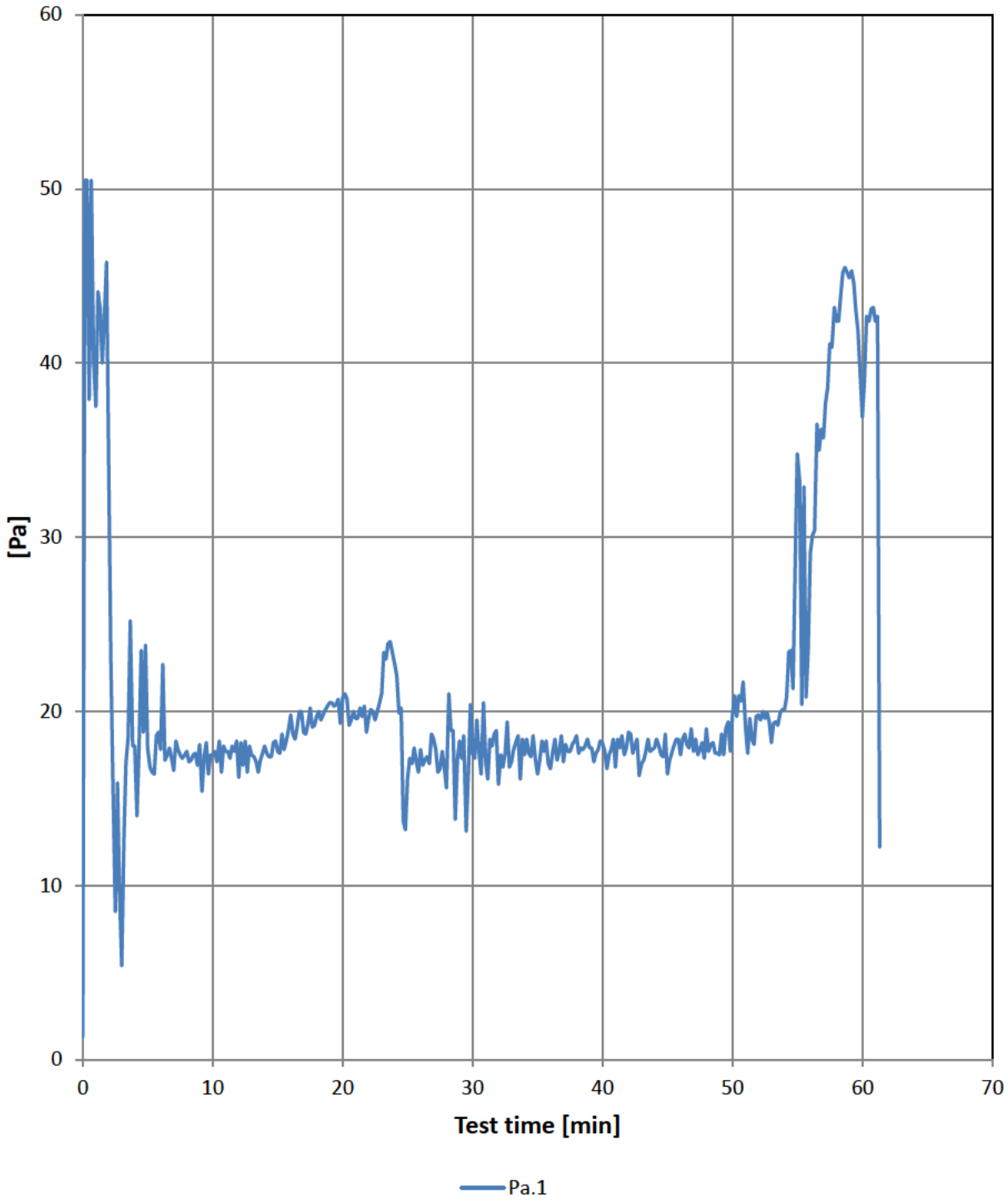

1200
1000
800
600
400
200
0
[°C]
0
10
20
30
40
50
60
70
Test time [min]
Min.
Avg.
Max
EN 1363-1

Furnace

Time	Measured			Norm	Area under curve			
Minutes	Minimum	Average	Maximum	EN 1363-1	Measured	EN 1363-1	Dev. [%]	Limit [%]
0	22	22	22	20	0	0	0.0	
2	478	556	611	445	508	640	-20.6	
4	533	560	600	544	1686	1639	2.8	
6	545	560	586	603	2792	2790	0.1	15
8	612	644	660	645	4001	4041	-1.0	15
10	665	693	711	678	5340	5366	-0.5	15
12	701	717	735	705	6753	6750	0.0	14
14	727	737	746	728	8206	8185	0.3	13
15	733	748	756	739	8949	8918	0.3	13
16	745	760	768	748	9702	9662	0.4	12
18	770	779	791	766	11242	11176	0.6	11
20	787	799	810	781	12818	12723	0.7	10
22	798	815	825	796	14434	14300	0.9	9
24	814	833	843	809	16080	15904	1.1	8
26	837	855	864	820	17767	17534	1.3	7
28	847	865	879	832	19489	19186	1.6	6
30	831	852	869	842	21212	20859	1.7	5
32	833	846	856	851	22907	22552	1.6	5
34	836	850	859	860	24603	24264	1.4	5
36	838	852	860	869	26305	25994	1.2	5
38	845	861	870	877	28018	27740	1.0	4
40	861	875	886	885	29754	29502	0.9	4
42	873	887	898	892	31517	31279	0.8	4
44	884	896	905	899	33301	33070	0.7	4
46	892	903	912	906	35101	34875	0.6	4
48	903	913	926	912	36916	36692	0.6	4
50	918	930	947	918	38758	38522	0.6	3
52	899	919	953	924	40617	40364	0.6	3
54	902	925	955	930	42460	42218	0.6	3
56	864	897	955	935	44282	44083	0.5	3
58	840	882	948	940	46060	45958	0.2	3
60	835	893	965	945	47834	47844	0.0	3
61	827	899	969	948	48730	48790	-0.1	3

Horizontal furnace pressure

The differential pressure in the furnace during the test, measured 100 mm below the test specimen



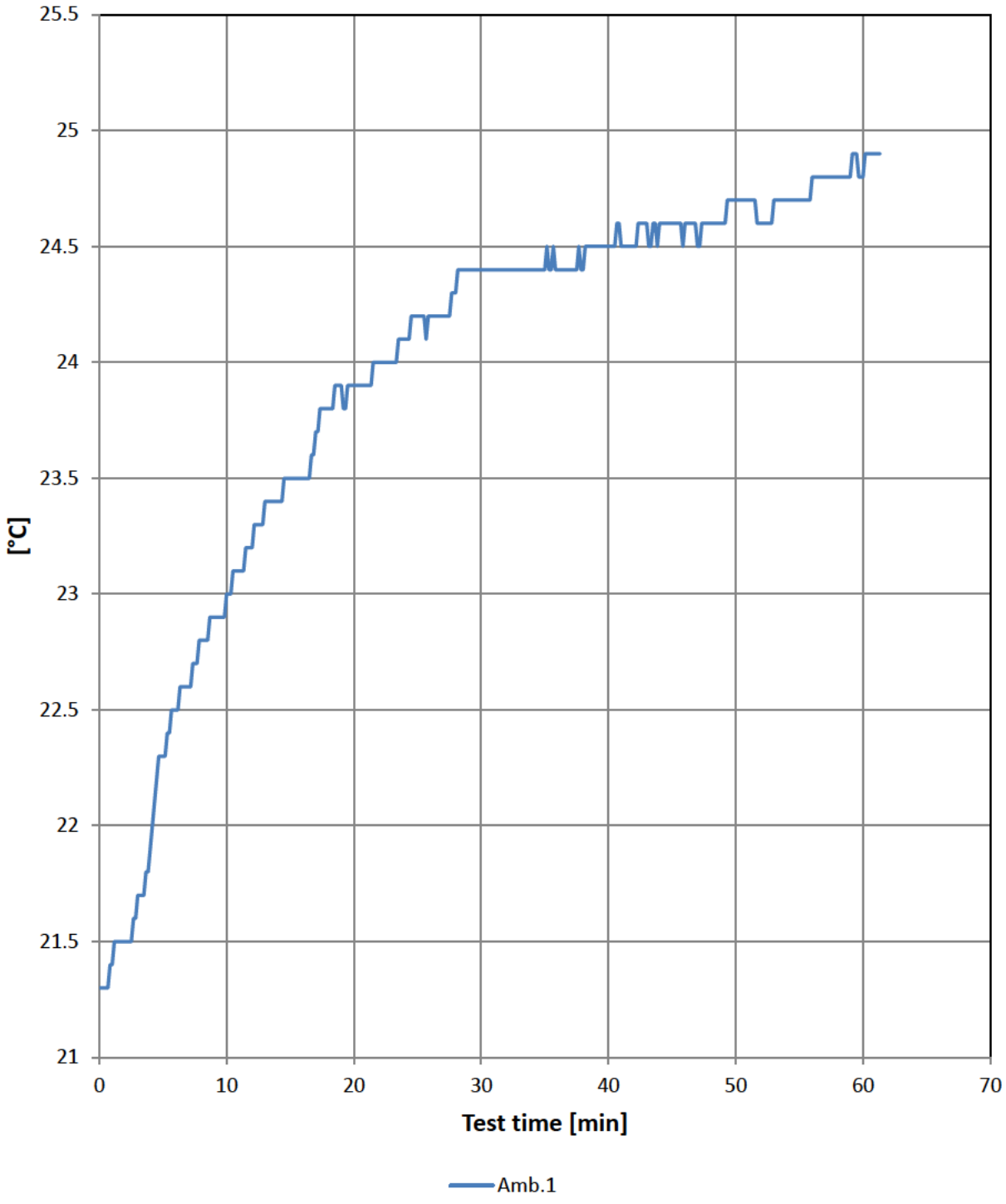
Horizontal furnace pressure

The differential pressure in the furnace during the test, measured 100 mm below the test specimen

Min. / Pa	Pa.1
0	1.3
2	34.2
4	18.0
6	17.8
8	17.7
10	17.5
12	16.2
14	18.0
15	17.7
16	19.8
18	19.7
20	20.8
22	19.6
24	22.7
26	17.8
28	15.6
30	17.6
32	15.8
34	17.5
36	16.7
38	18.6
40	18.2
42	18.8
44	17.9
46	17.5
48	19.0
50	19.8
52	19.8
54	20.1
56	29.1
58	42.4
60	36.9
61	42.4

Ambient temperature

The ambient temperature in the laboratory during the test



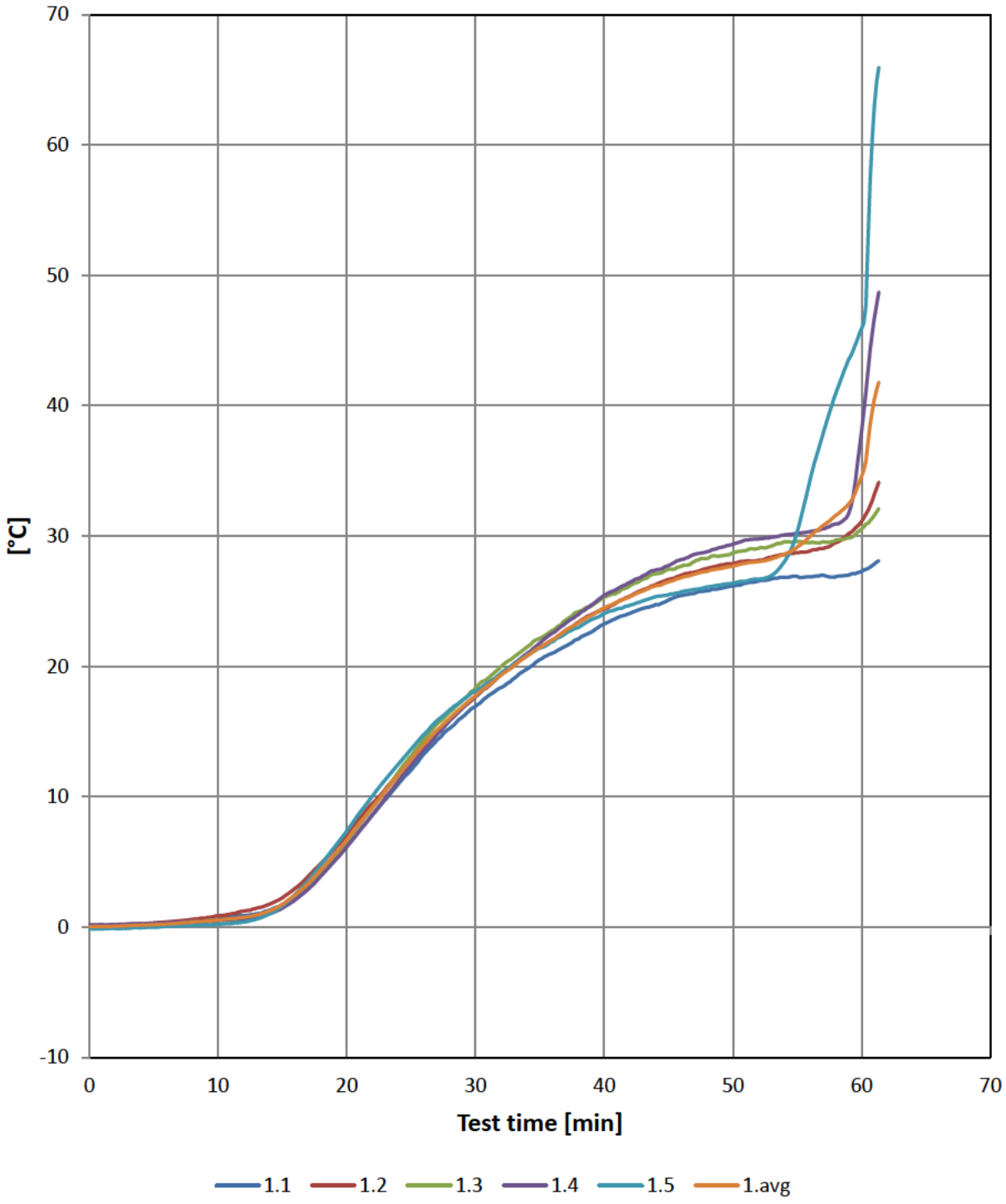
Ambient temperature

The ambient temperature in the laboratory during the test

Min. / °C	Amb.1
0	21.3
2	21.5
4	21.9
6	22.5
8	22.8
10	23.0
12	23.2
14	23.4
15	23.5
16	23.5
18	23.8
20	23.9
22	24.0
24	24.1
26	24.2
28	24.3
30	24.4
32	24.4
34	24.4
36	24.4
38	24.4
40	24.5
42	24.5
44	24.6
46	24.6
48	24.6
50	24.7
52	24.6
54	24.7
56	24.8
58	24.8
60	24.8
61	24.9

Average temperature

Temperature rise on the unexposed side



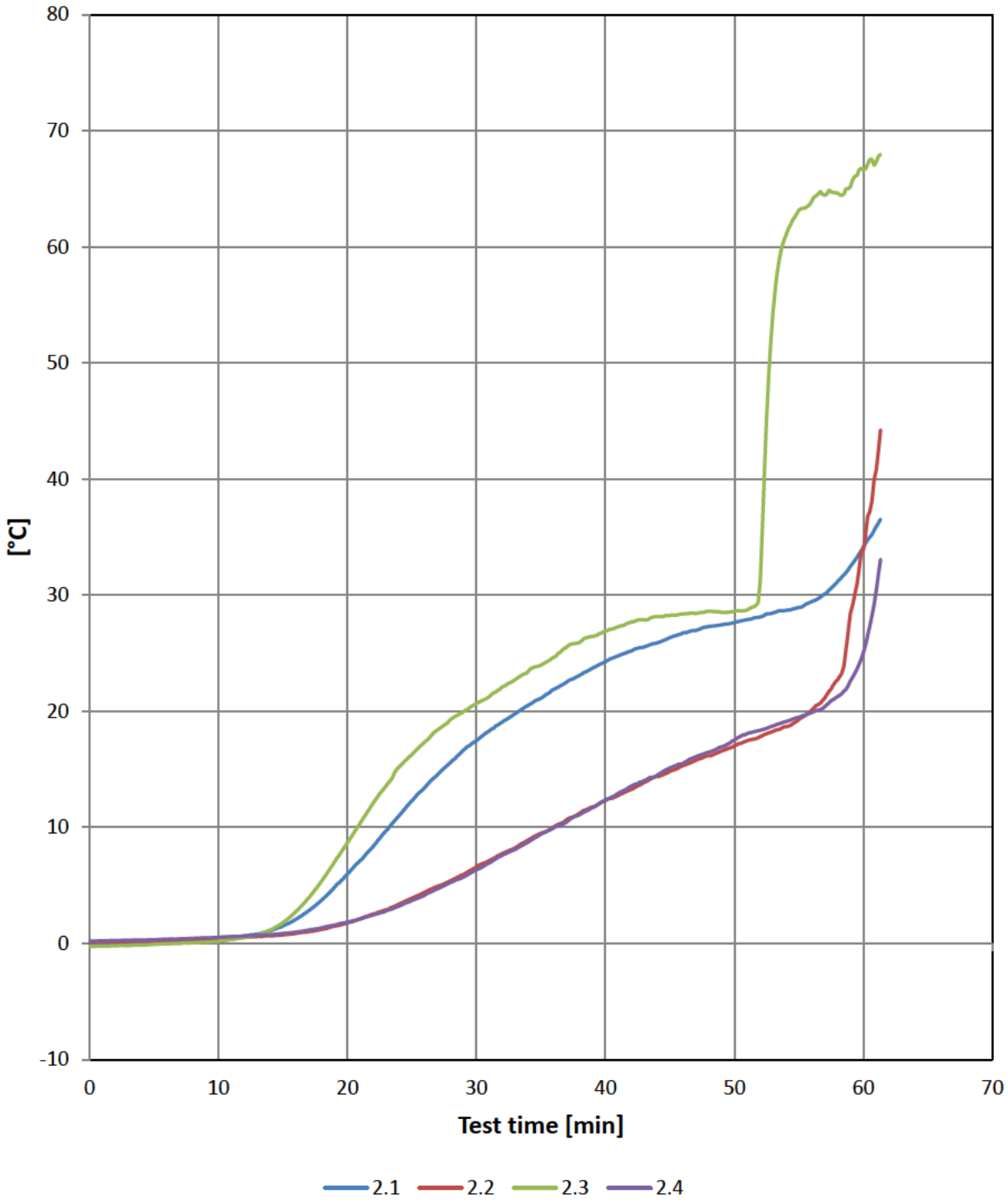
Average temperature

Temperature rise on the unexposed side

Min. / °C	1.1	1.2	1.3	1.4	1.5	1.Avg	1.Max
0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
8	0	1	0	0	0	0	1
10	1	1	1	0	0	1	1
12	1	1	1	1	0	1	1
14	1	2	1	1	1	1	2
15	2	2	2	1	2	2	2
16	2	3	2	2	3	2	3
18	4	5	4	4	5	4	5
20	6	7	7	6	7	7	7
22	9	10	9	9	10	9	10
24	11	12	12	11	12	12	12
26	13	14	14	14	15	14	15
28	15	16	17	16	17	16	17
30	17	18	18	18	18	18	18
32	18	19	20	19	19	19	20
34	20	21	21	21	21	21	21
36	21	22	23	23	22	22	23
38	22	23	24	24	23	23	24
40	23	24	25	25	24	24	25
42	24	25	26	26	25	25	26
44	25	26	27	27	25	26	27
46	25	27	28	28	26	27	28
48	26	28	28	29	26	27	29
50	26	28	29	29	26	28	29
52	27	28	29	30	27	28	30
54	27	29	30	30	28	29	30
56	27	29	29	30	34	30	34
58	27	29	30	31	41	32	41
60	27	31	31	38	46	35	46
61	28	33	32	47	63	41	63

Failure [min]	-	-	-	-	-	-	-
Failure°C	180	180	180	180	180	140	180

Maximum temperatures



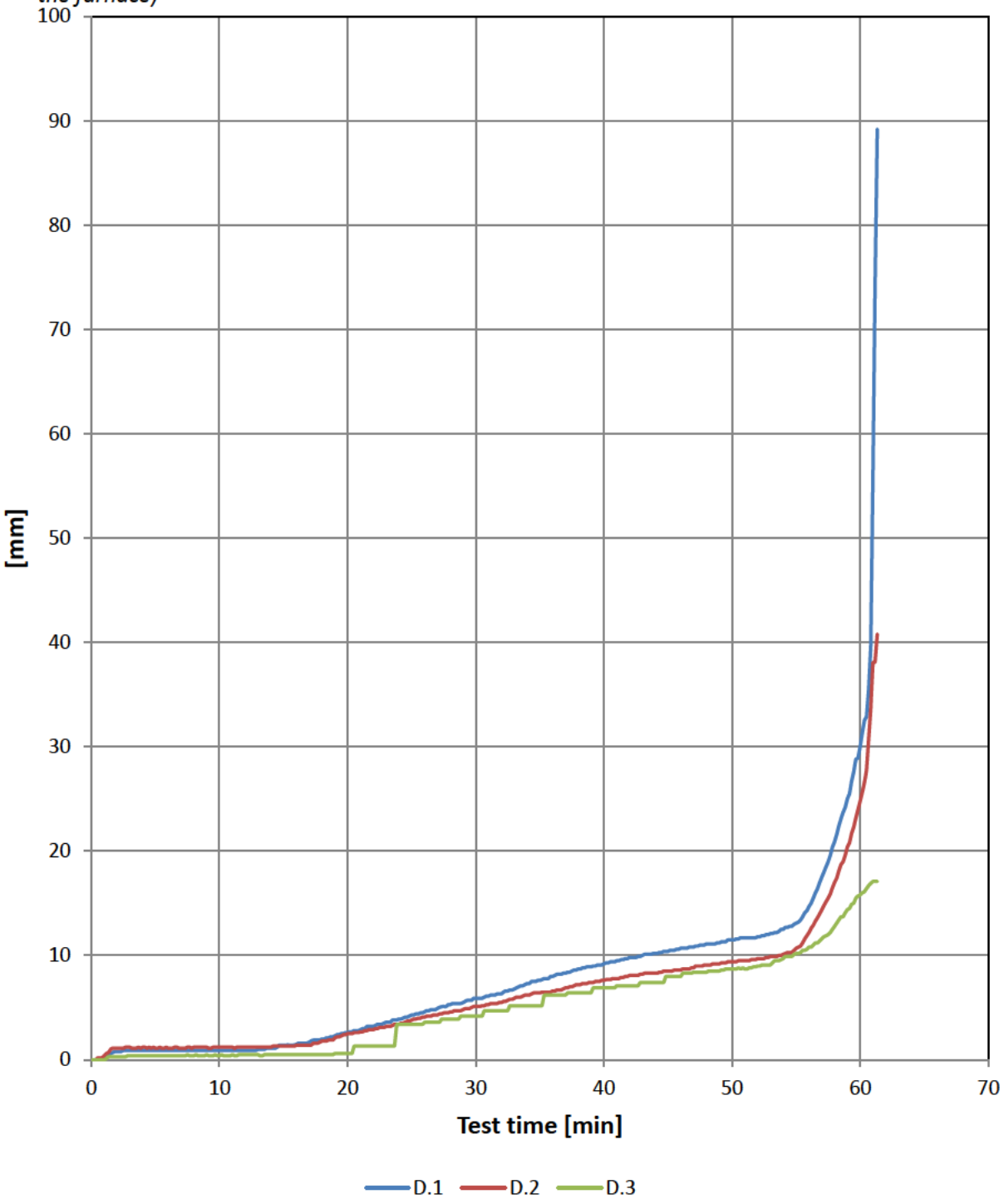
Maximum temperatures

Min. / °C	2.1	2.2	2.3	2.4	2.Max
0	0	0	0	0	0
2	0	0	0	0	0
4	0	0	0	0	0
6	0	0	0	0	0
8	0	0	0	0	0
10	0	0	0	1	1
12	1	1	1	1	1
14	1	1	1	1	1
15	2	1	2	1	2
16	2	1	3	1	3
18	4	1	5	1	5
20	6	2	9	2	9
22	8	3	12	2	12
24	11	3	15	3	15
26	13	4	17	4	17
28	16	5	19	5	19
30	17	7	21	6	21
32	19	8	22	8	22
34	21	9	23	9	23
36	22	10	25	10	25
38	23	11	26	11	26
40	24	12	27	12	27
42	25	13	28	14	28
44	26	14	28	15	28
46	27	15	28	16	28
48	27	16	29	16	29
50	28	17	29	18	29
52	28	18	31	18	31
54	29	19	61	19	61
56	29	20	64	20	64
58	31	23	65	21	65
60	34	34	67	25	67
61	36	41	67	30	67

Failure [min]	-	-	-	-	-
Failure°C	180	180	180	180	180

Deformation

The vertical deflection measured on the unexposed side (positive values indicates movment towards the furnace)



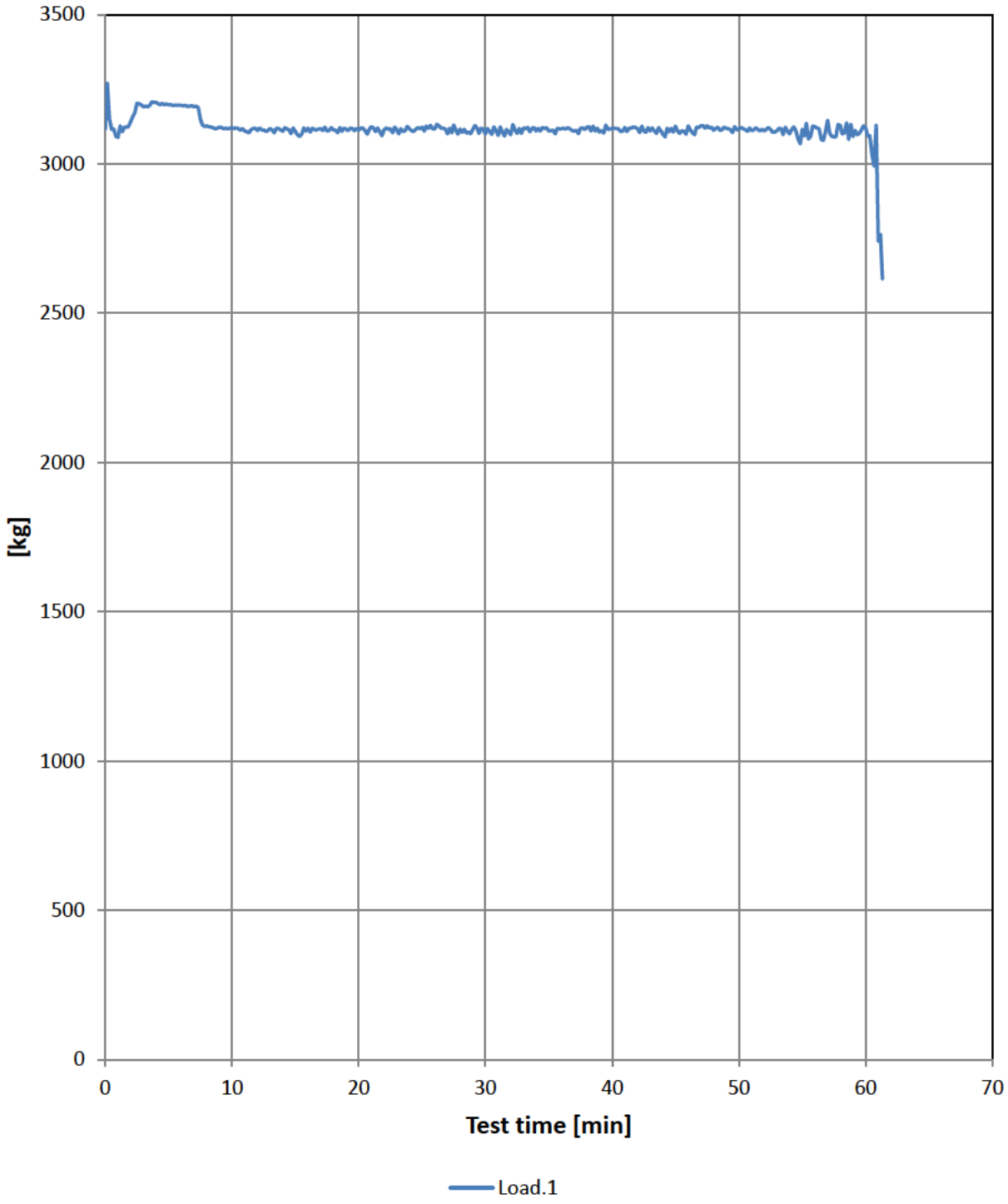
Deformation

The vertical deflection measured on the unexposed side (positive values indicates movment towards the furnace)

Min. / mm	D.1	D.2	D.3	D.Max
0	0.0	0.0	0.0	0.0
2	0.8	1.1	0.3	0.0
4	0.9	1.2	0.4	0.0
6	0.9	1.1	0.4	0.0
8	0.9	1.2	0.4	0.0
10	0.9	1.2	0.4	0.0
12	0.9	1.2	0.5	0.0
14	1.1	1.2	0.5	0.0
15	1.4	1.3	0.5	0.0
16	1.5	1.4	0.5	0.0
18	2.0	1.8	0.5	0.0
20	2.6	2.5	0.6	0.0
22	3.2	2.9	1.3	0.0
24	3.9	3.4	3.4	0.0
26	4.6	4.1	3.6	0.0
28	5.3	4.6	3.9	0.0
30	5.9	5.1	4.2	0.0
32	6.3	5.5	4.7	0.0
34	7.3	6.2	5.2	0.0
36	8.0	6.6	6.2	0.0
38	8.7	7.2	6.4	0.0
40	9.2	7.6	6.9	0.0
42	9.8	8.1	7.1	0.0
44	10.2	8.3	7.4	0.0
46	10.7	8.6	8.0	0.0
48	11.1	9.1	8.4	0.0
50	11.5	9.4	8.7	0.0
52	11.8	9.7	9.0	0.0
54	12.5	10.1	9.7	0.0
56	14.7	12.2	10.8	0.0
58	20.9	17.0	12.8	0.0
60	30.0	24.8	15.8	0.0
61	55.9	38.1	17.1	0.0

Failure [min]	-	-	-	-
Failuremm	179.0	179.0	179.0	179.0

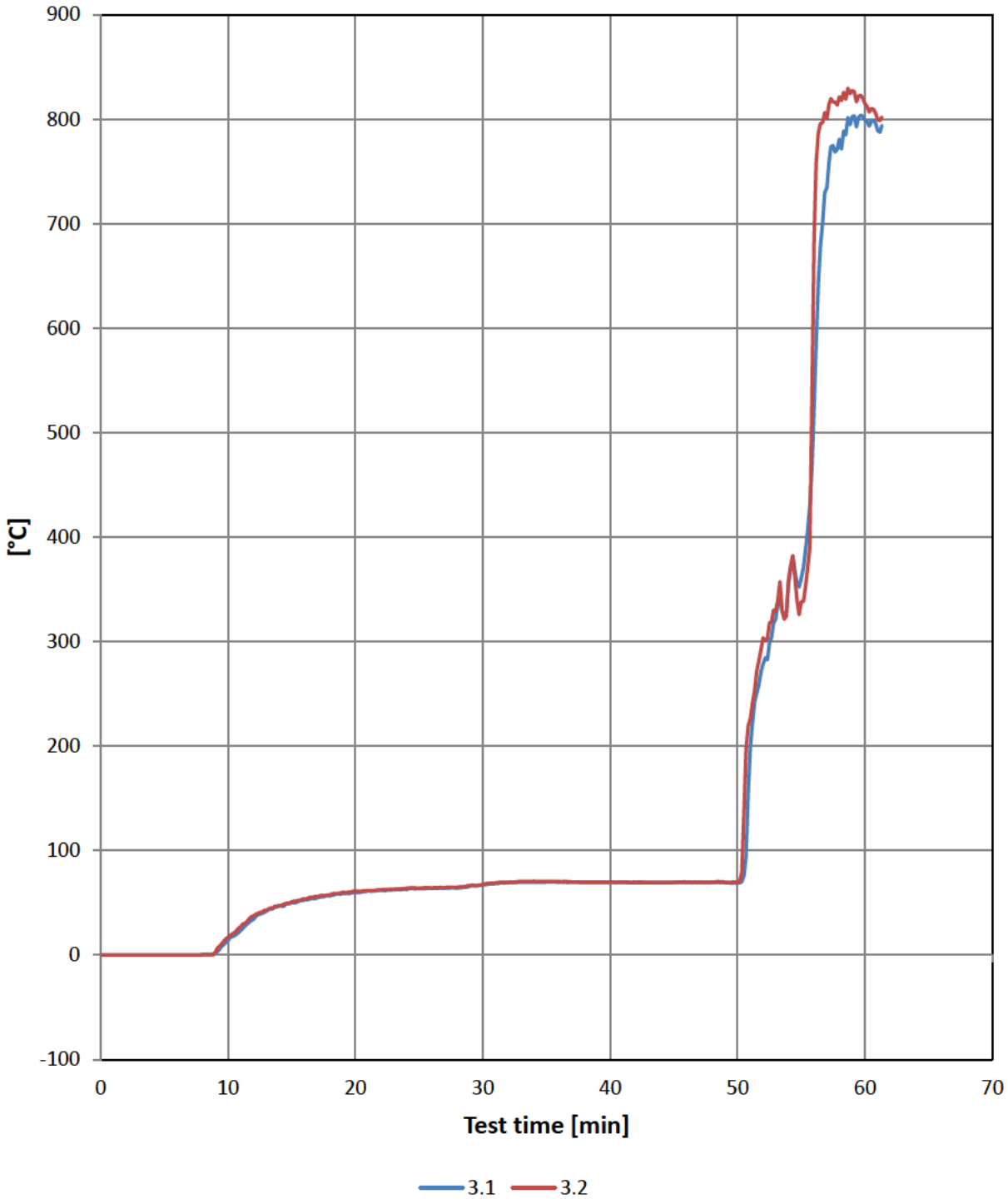
Load per hydralic jack



Load per hydralic jack

Min. / kg	Load.1
0	3117
2	3142
4	3206
6	3197
8	3128
10	3122
12	3113
14	3110
15	3109
16	3120
18	3114
20	3114
22	3115
24	3119
26	3117
28	3117
30	3102
32	3099
34	3111
36	3118
38	3124
40	3119
42	3118
44	3100
46	3128
48	3114
50	3117
52	3111
54	3101
56	3125
58	3130
60	3123
61	2742

Mid height beams on center beam and center left beam

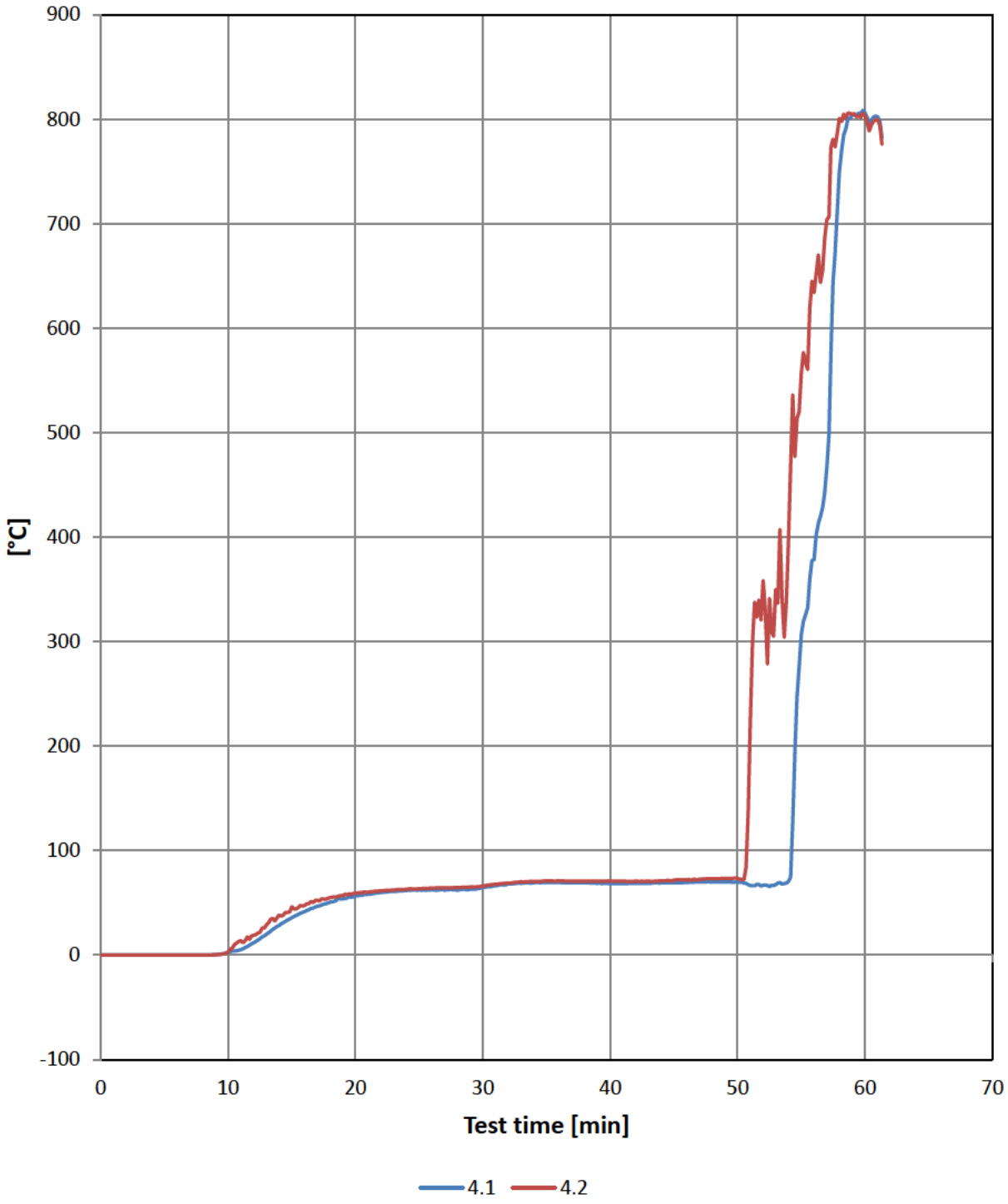


Mid height beams on center beam and center left beam

Min. / °C	3.1	3.2	3.Max
0	0	0	0
2	0	0	0
4	0	0	0
6	0	0	0
8	1	0	1
10	14	17	17
12	34	38	38
14	47	47	47
15	50	51	51
16	53	54	54
18	57	58	58
20	60	61	61
22	62	63	63
24	63	64	64
26	64	64	64
28	64	65	65
30	67	68	68
32	69	70	70
34	70	71	71
36	70	70	70
38	70	70	70
40	69	70	70
42	69	70	70
44	69	70	70
46	69	70	70
48	70	70	70
50	69	70	70
52	279	304	304
54	355	359	359
56	524	685	685
58	781	822	822
60	799	815	815
61	789	799	799

Failure [min]	51.67	51.33	51.33
Failure°C	270	270	270

On sound dampers

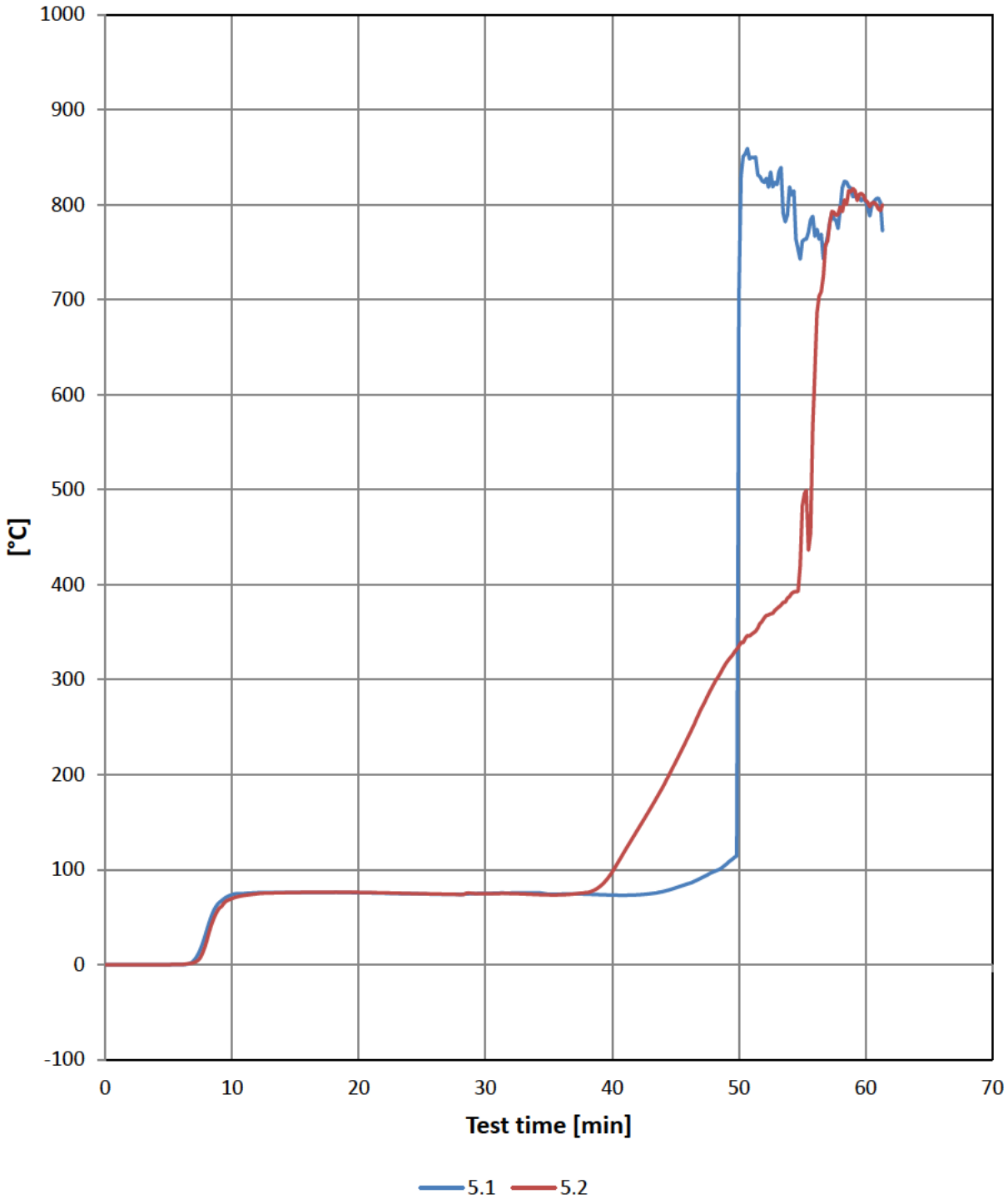


On sound dampers

Min. / °C	4.1	4.2	4.Max
0	0	0	0
2	0	0	0
4	0	0	0
6	0	0	0
8	0	0	0
10	3	3	3
12	12	19	19
14	28	38	38
15	36	46	46
16	42	47	47
18	51	55	55
20	57	59	59
22	60	62	62
24	62	63	63
26	63	64	64
28	62	65	65
30	65	66	66
32	68	69	69
34	69	70	70
36	69	71	71
38	69	71	71
40	68	71	71
42	69	71	71
44	69	71	71
46	70	72	72
48	70	73	73
50	70	74	73
52	67	359	358
54	71	397	397
56	379	634	634
58	750	801	801
60	807	803	807
61	802	800	802

Failure [min]	54.67	51.00	51.00
Failure°C	270	270	270

On center batten 45 x 70 mm under the loadbearing beams

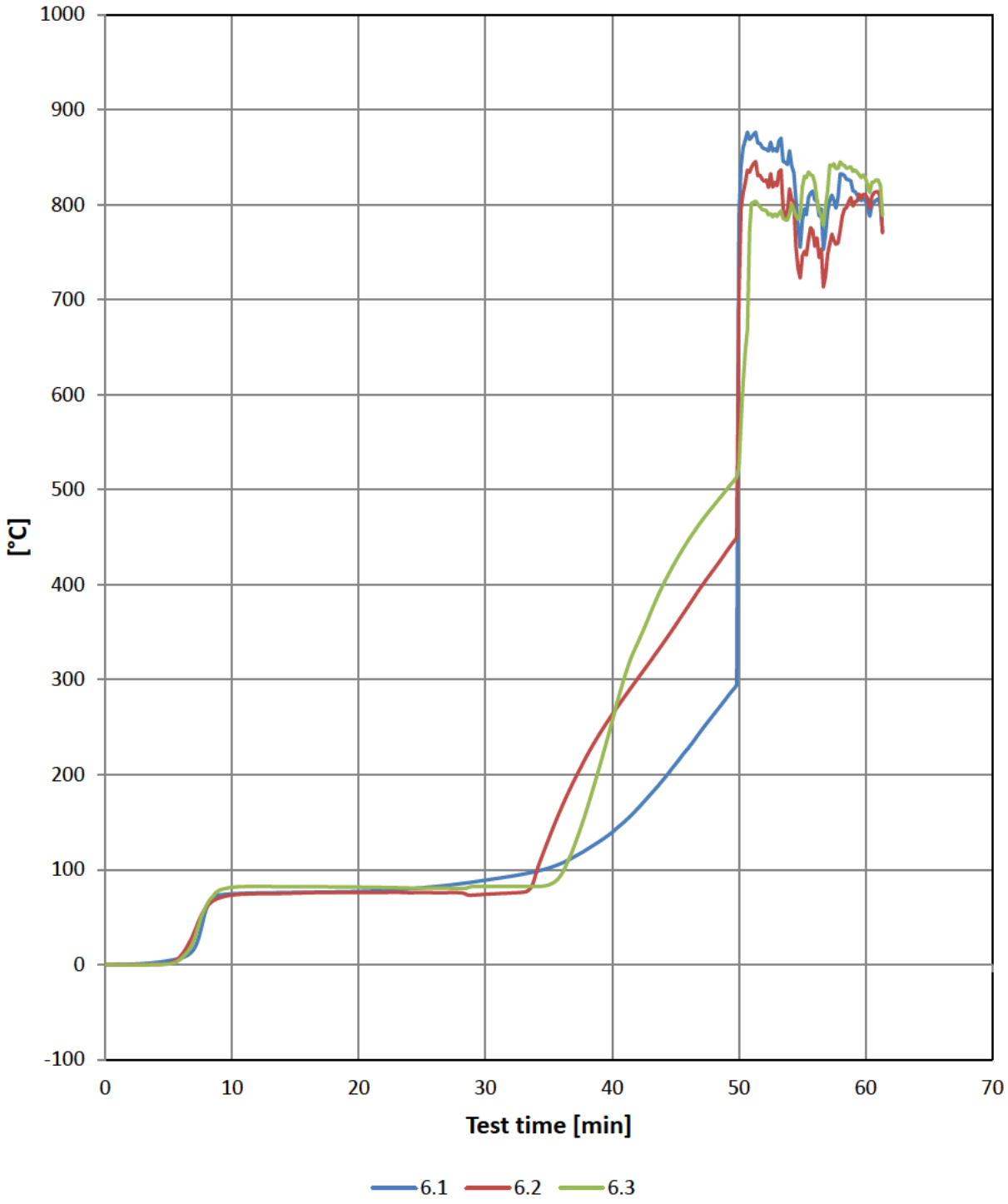


On center batten 45 x 70 mm under the loadbearing beams

Min. / °C	5.1	5.2	5.Max
0	0	0	0
2	0	0	0
4	0	0	0
6	0	0	0
8	35	25	35
10	74	70	74
12	76	75	76
14	76	76	76
15	76	76	76
16	76	76	76
18	76	76	76
20	76	76	76
22	75	76	75
24	75	75	75
26	74	74	74
28	74	74	74
30	75	75	75
32	76	75	76
34	75	74	75
36	74	74	74
38	74	76	76
40	73	98	97
42	73	142	142
44	77	187	187
46	85	240	240
48	98	295	295
50	702	335	702
52	824	365	824
54	819	388	819
56	767	624	767
58	795	798	798
60	804	805	805
61	807	796	807

Failure [min]	49.83	47.00	47.00
Failure°C	270	270	270

between battens and clay boards

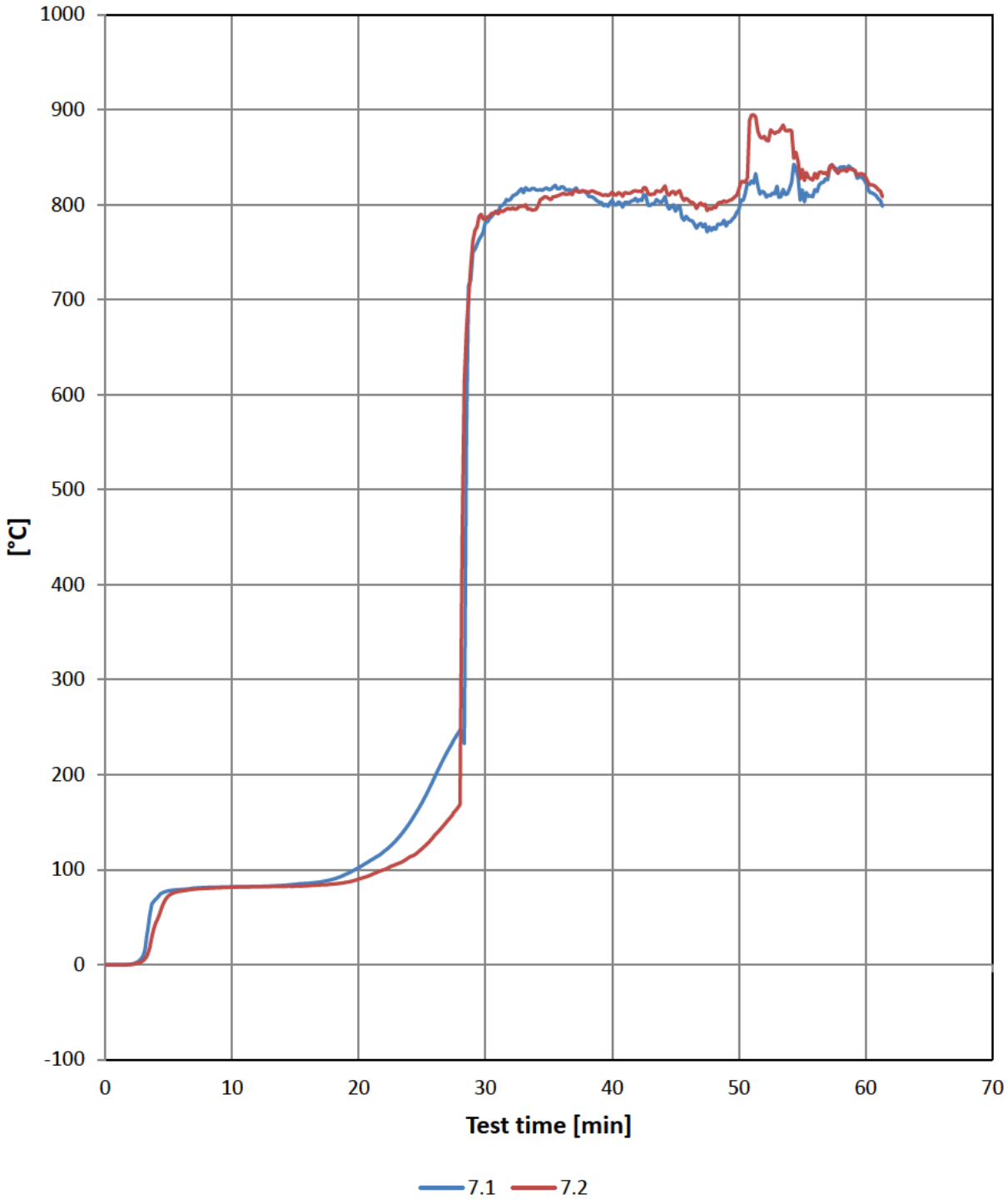


between battens and clay boards

Min. / °C	6.1	6.2	6.3	6.Max
0	0	0	0	0
2	0	0	0	0
4	2	0	0	2
6	7	10	7	9
8	59	61	63	63
10	74	73	81	81
12	75	75	82	82
14	76	75	82	82
15	76	75	82	82
16	76	76	82	82
18	77	76	82	82
20	77	76	82	82
22	78	76	81	81
24	80	76	81	81
26	82	76	81	82
28	85	76	80	85
30	89	74	82	89
32	93	75	82	93
34	98	96	82	98
36	107	165	95	165
38	121	220	164	219
40	139	264	257	263
42	164	301	339	339
44	194	338	399	399
46	228	378	447	447
48	263	416	483	483
50	787	704	523	787
52	859	825	794	859
54	857	817	790	857
56	805	756	823	823
58	833	773	845	845
60	804	811	828	828
61	806	814	826	826

Failure [min]	48.33	40.33	40.17	40.17
Failure°C	270	270	270	270

Between hempboards and clay boards

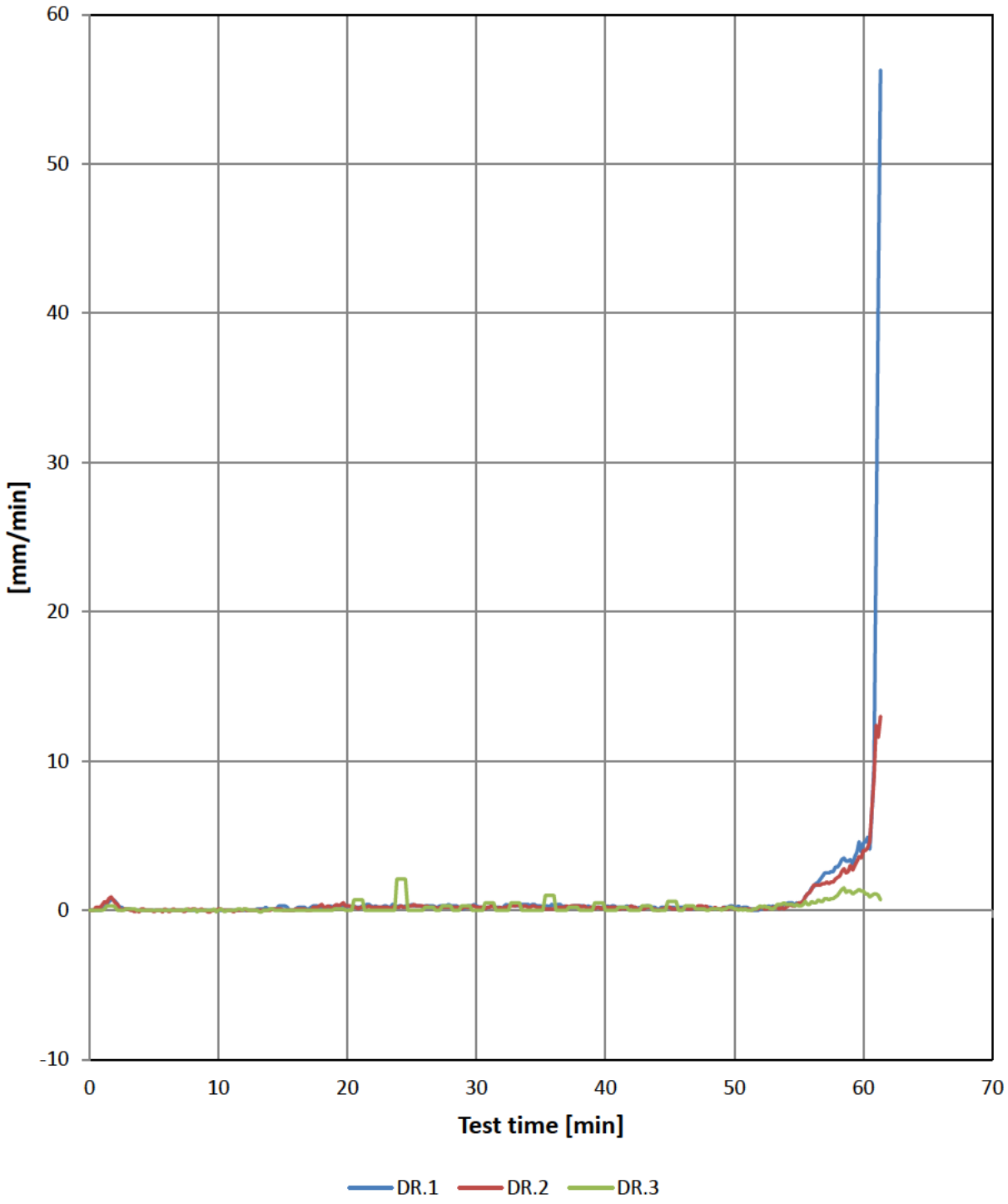


Between hempboards and clay boards

Min. / °C	7.1	7.2	7.Max
0	0	0	0
2	0	0	0
4	69	44	69
6	79	77	79
8	81	80	81
10	82	81	82
12	82	82	82
14	84	82	84
15	85	83	85
16	86	83	86
18	90	85	90
20	102	90	102
22	119	100	119
24	149	113	149
26	197	136	197
28	247	169	247
30	782	785	785
32	806	795	806
34	816	795	816
36	819	811	819
38	812	814	814
40	805	813	813
42	804	814	814
44	804	817	817
46	785	805	805
48	776	798	797
50	795	816	816
52	813	872	872
54	817	879	879
56	816	833	833
58	840	836	840
60	824	829	829
61	806	816	816

Failure [min]	28.33	28.00	28.00
Failure°C	270	270	270

Deflection rate

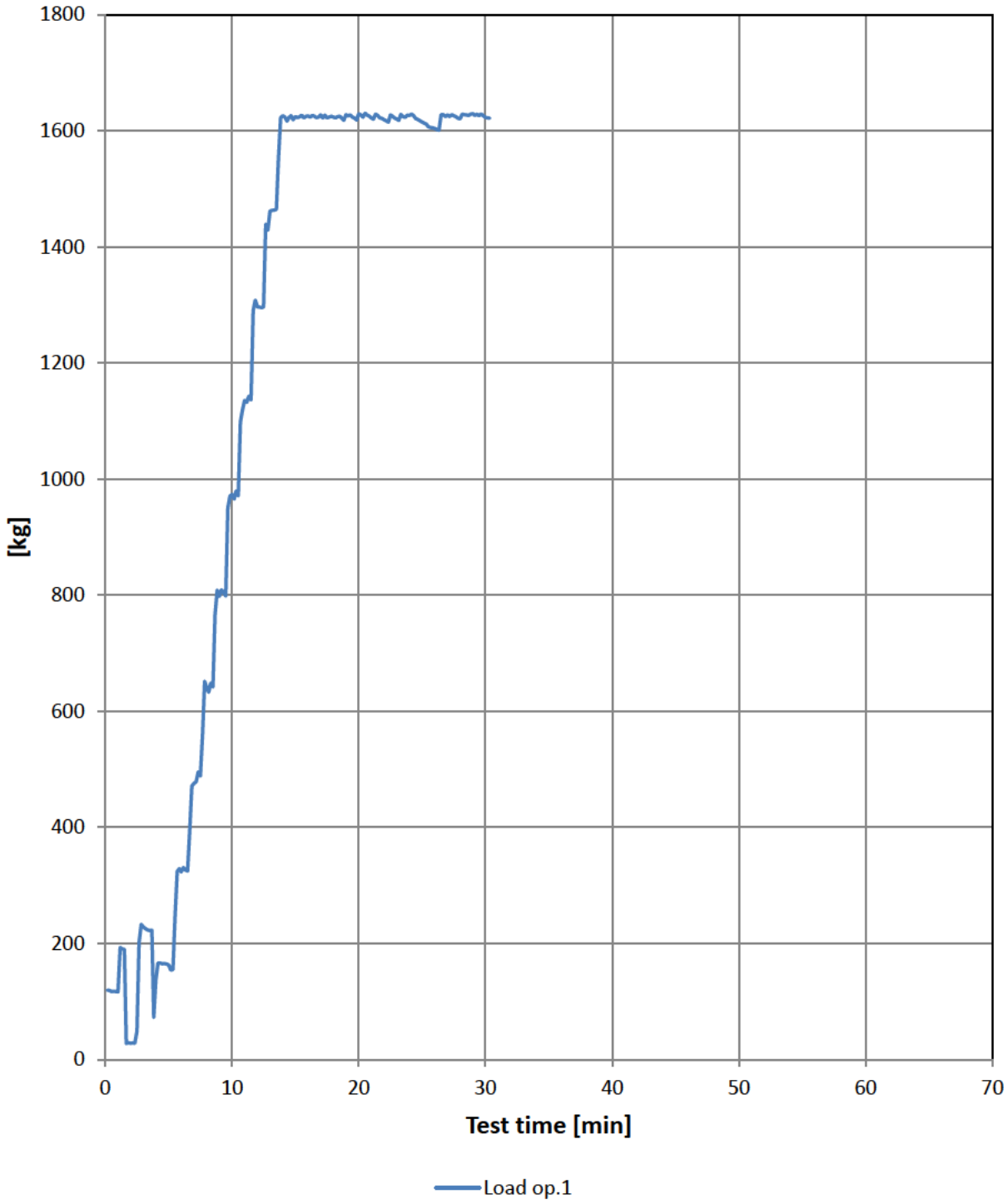


Deflection rate

Min. / mm/min	DR.1	DR.2	DR.3	DR.Max
0	0.0	0.0	0.0	0.0
2	0.6	0.5	0.2	0.6
4	0.0	0.1	0.0	0.1
6	0.0	0.0	0.0	0.0
8	0.0	0.1	0.0	0.1
10	0.0	0.1	0.0	0.1
12	0.0	0.1	0.1	0.1
14	0.1	0.0	0.1	0.1
15	0.3	0.0	0.0	0.3
16	0.1	0.1	0.0	0.1
18	0.2	0.4	0.0	0.4
20	0.2	0.3	0.0	0.3
22	0.2	0.2	0.0	0.2
24	0.3	0.2	2.1	2.1
26	0.3	0.2	0.2	0.3
28	0.3	0.2	0.3	0.3
30	0.3	0.2	0.0	0.3
32	0.1	0.1	0.0	0.1
34	0.4	0.2	0.0	0.4
36	0.3	0.1	1.0	1.0
38	0.3	0.3	0.0	0.3
40	0.2	0.2	0.0	0.2
42	0.3	0.3	0.0	0.3
44	0.1	0.0	0.0	0.1
46	0.2	0.1	0.0	0.2
48	0.2	0.1	0.0	0.2
50	0.2	0.1	0.1	0.2
52	0.1	0.2	0.3	0.3
54	0.4	0.2	0.4	0.4
56	1.5	1.4	0.6	1.5
58	2.9	2.2	1.0	2.9
60	4.5	4.0	1.3	4.5
61	24.6	12.4	1.1	24.6

Failure [min]	60.67	60.67	-	60.67
Failuremm/mi	7.0	7.0	7.0	7.0

Load per hydralic jack during the loading phase

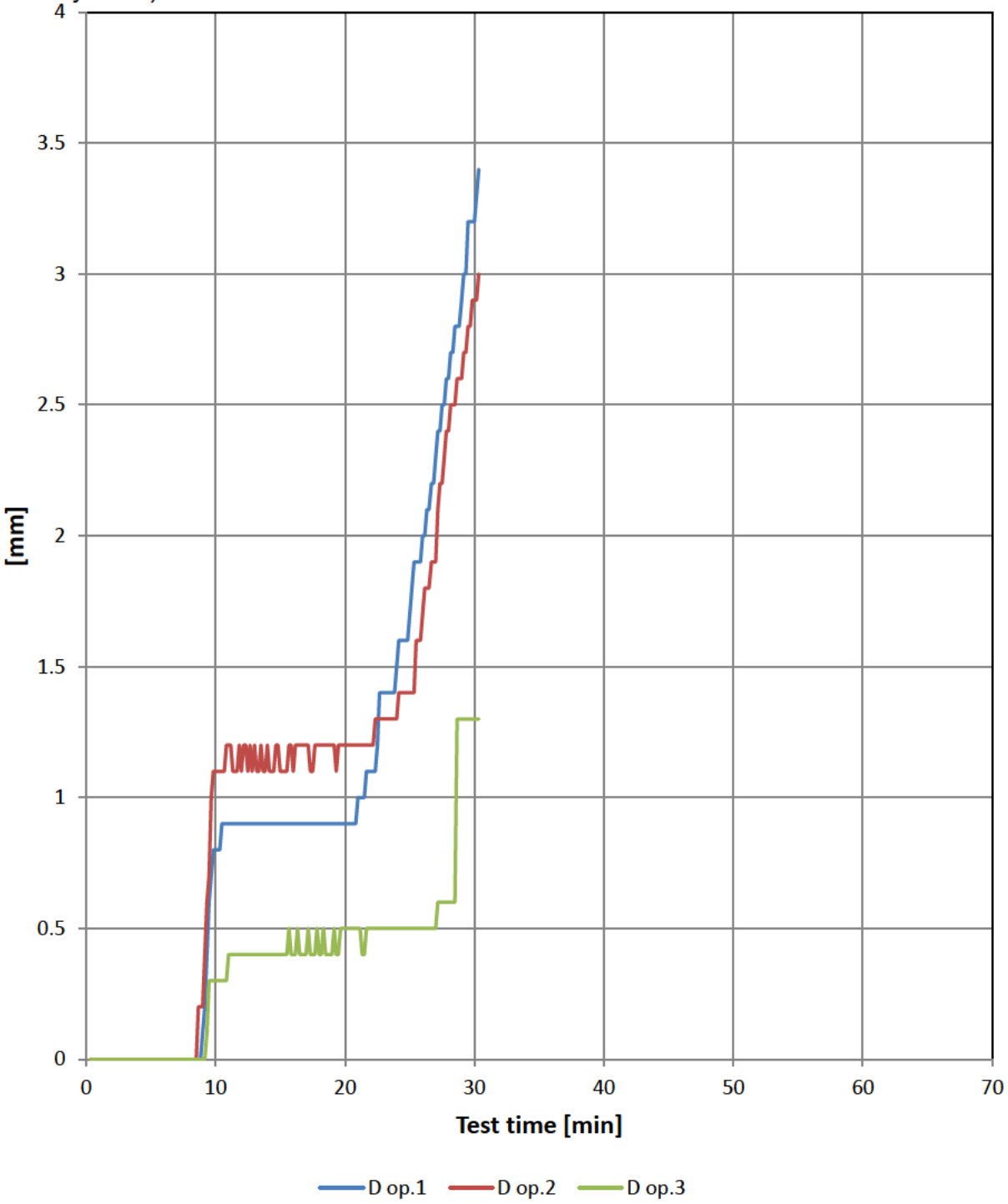


Load per hydralic jack during the loading phase

Min. / kg	Load op.1
0	0
1	117
2	28
3	229
4	138
5	163
6	323
7	476
8	641
9	798
10	974
11	1136
12	1297
13	1462
14	1626
15	1625
16	1626
17	1627
18	1624
19	1628
20	1629
21	1622
22	1619
23	1620
24	1627
25	1615
26	1604
27	1627
28	1621
29	1630
30	1624

Deformation during the loading phase

The vertical deflection measured on the unexposed side (positive values indicates movment towards the furnace)



Deformation during the loading phase

The vertical deflection measured on the unexposed side (positive values indicates movment towards the furnace)

Min. / mm	D op.1	D op.2	D op.3
0	0.0	0.0	0.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	0.0
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.1	0.2	0.0
10	0.8	1.1	0.3
11	0.9	1.2	0.4
12	0.9	1.1	0.4
13	0.9	1.2	0.4
14	0.9	1.2	0.4
15	0.9	1.1	0.4
16	0.9	1.1	0.4
17	0.9	1.2	0.4
18	0.9	1.2	0.4
19	0.9	1.2	0.4
20	0.9	1.2	0.5
21	1.0	1.2	0.5
22	1.1	1.2	0.5
23	1.4	1.3	0.5
24	1.5	1.3	0.5
25	1.7	1.4	0.5
26	2.0	1.7	0.5
27	2.3	1.9	0.5
28	2.6	2.4	0.6
29	2.9	2.6	1.3
30	3.2	2.9	1.3

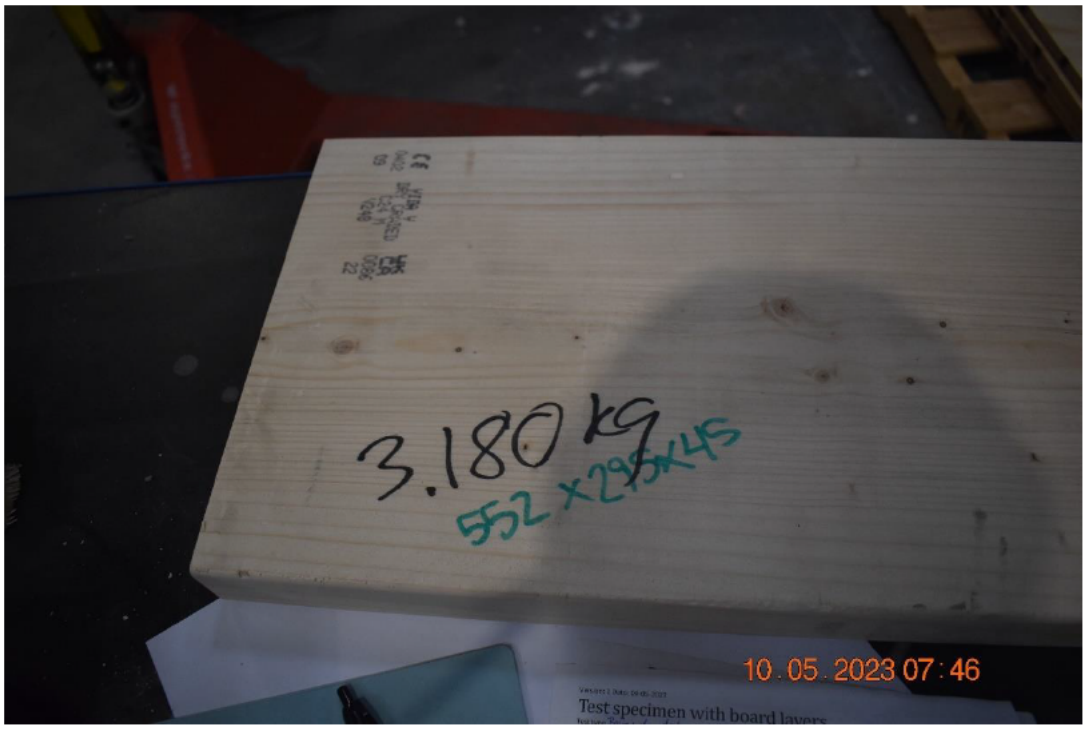


Photo No. 1 Timber joist.

Photo No. 3 Sounds bar installed on the timbre joist.

Photo No. 5 Timber joist connection.

Photo No. 6 Edge of frame.

Photo No. 7 Timbre frame.

Photo No. 8 Clay boards mounted to the timbre frame.

Photo No. 9 Hemp boards mounted to the clay boards.

Photo No. 10 Mesh installed

Photo No. 11 Insulation during installation

Photo No. 12 Clay rendering during mounting

Photo No. 13 Plywood as top layer

Photo No. 14 Test specimen seen from the exposed side before test

Photo No. 15 Test specimen seen from unexposed side before test start

Photo No. 16 Furnace at test start

Photo No. 18 Test specimen seen from unexposed side 10 minutes into testing

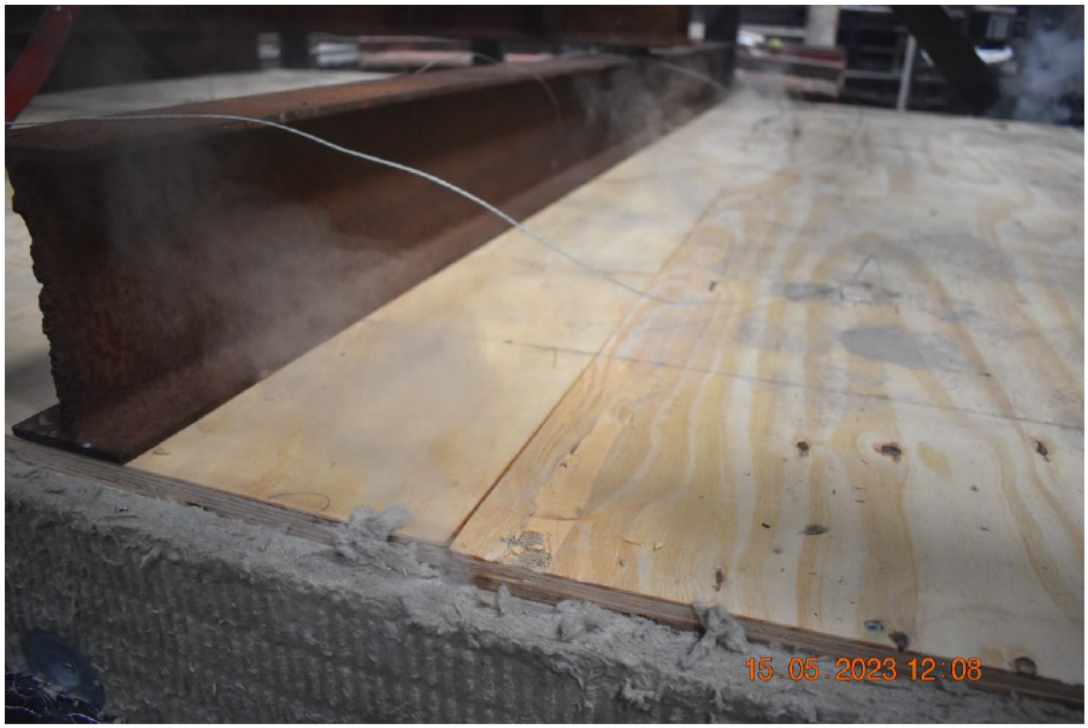


Photo No. 19 Test specimen seen from unexposed side 29 minutes into testing

Photo No. 20 Test specimen seen from unexposed side 32 minutes into testing

Photo No. 21 Test specimen seen from unexposed side 49 minutes into testing

Photo No. 22 Test specimen seen from unexposed side 57 minutes into testing

Photo No. 23 Cotton pad test result from unexposed side 60 minutes into testing

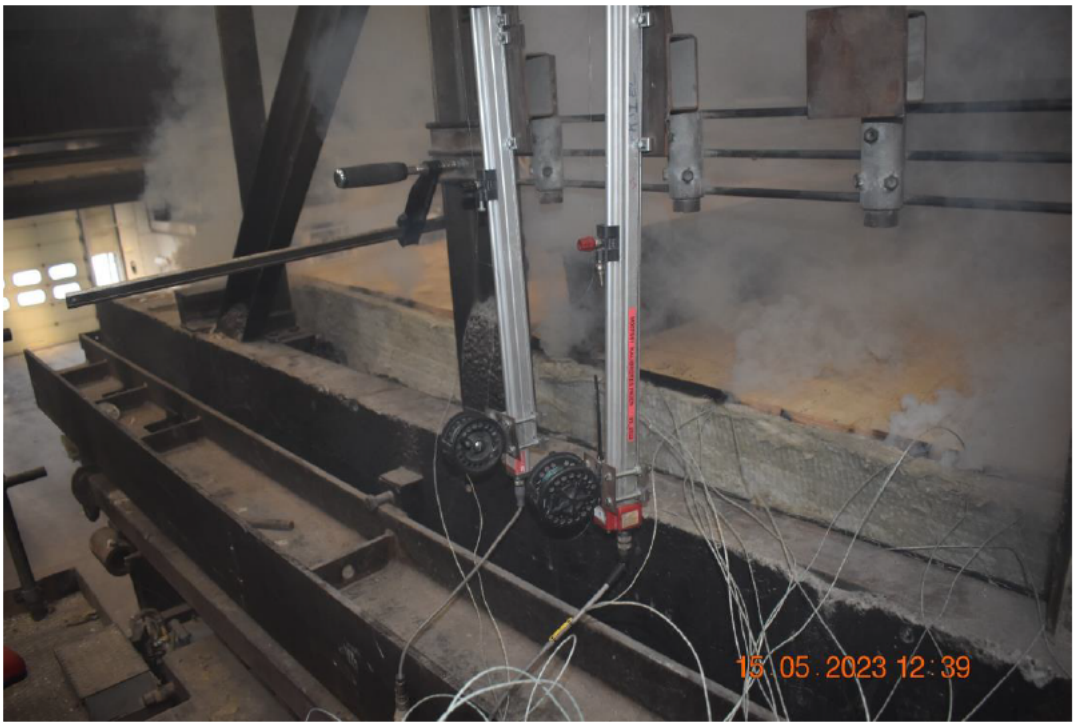


Photo No. 24 Test specimen seen from unexposed side at 60 minutes into testing

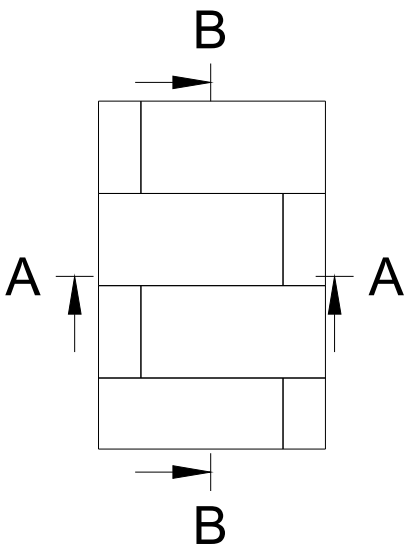
Photo No. 25 Test specimen seen immediately after the test

Photo No. 26 Test specimen seen immediately after the test

Photo No. 27 Test specimen seen immediately after the test

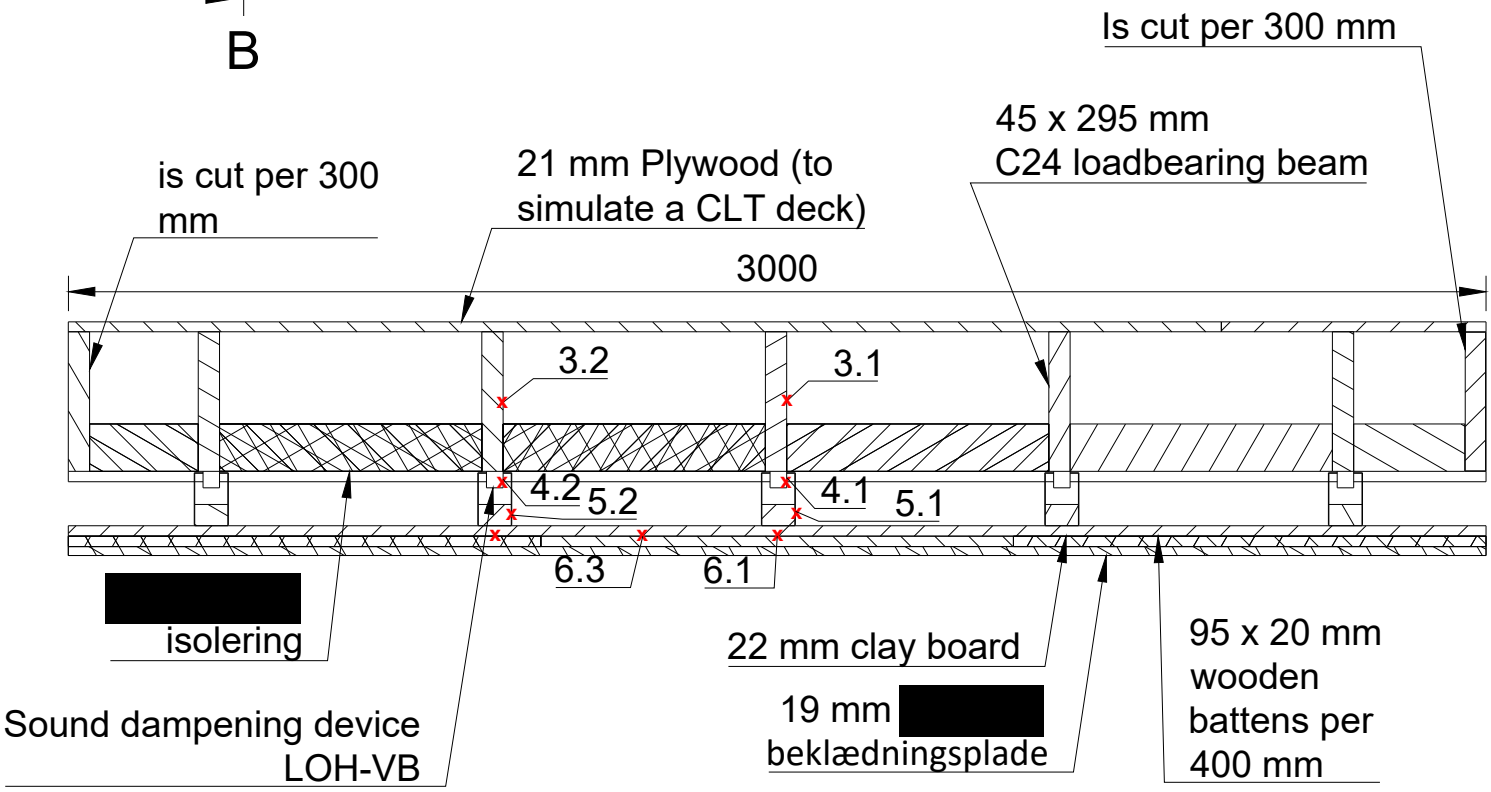
Photo No. 28 The loadbearing beams after the test

Photo No. 29 The sound dampening device after the test

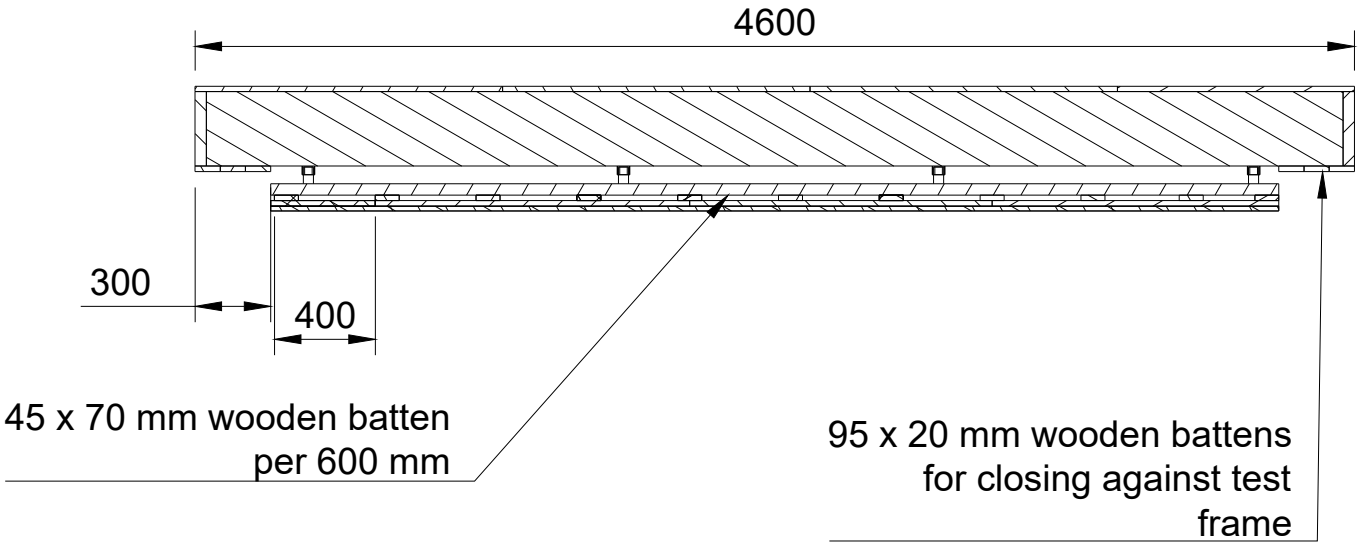


Exposed area 3000 x 4000 mm.
Outer dimension of construction 4600 x 3000 mm

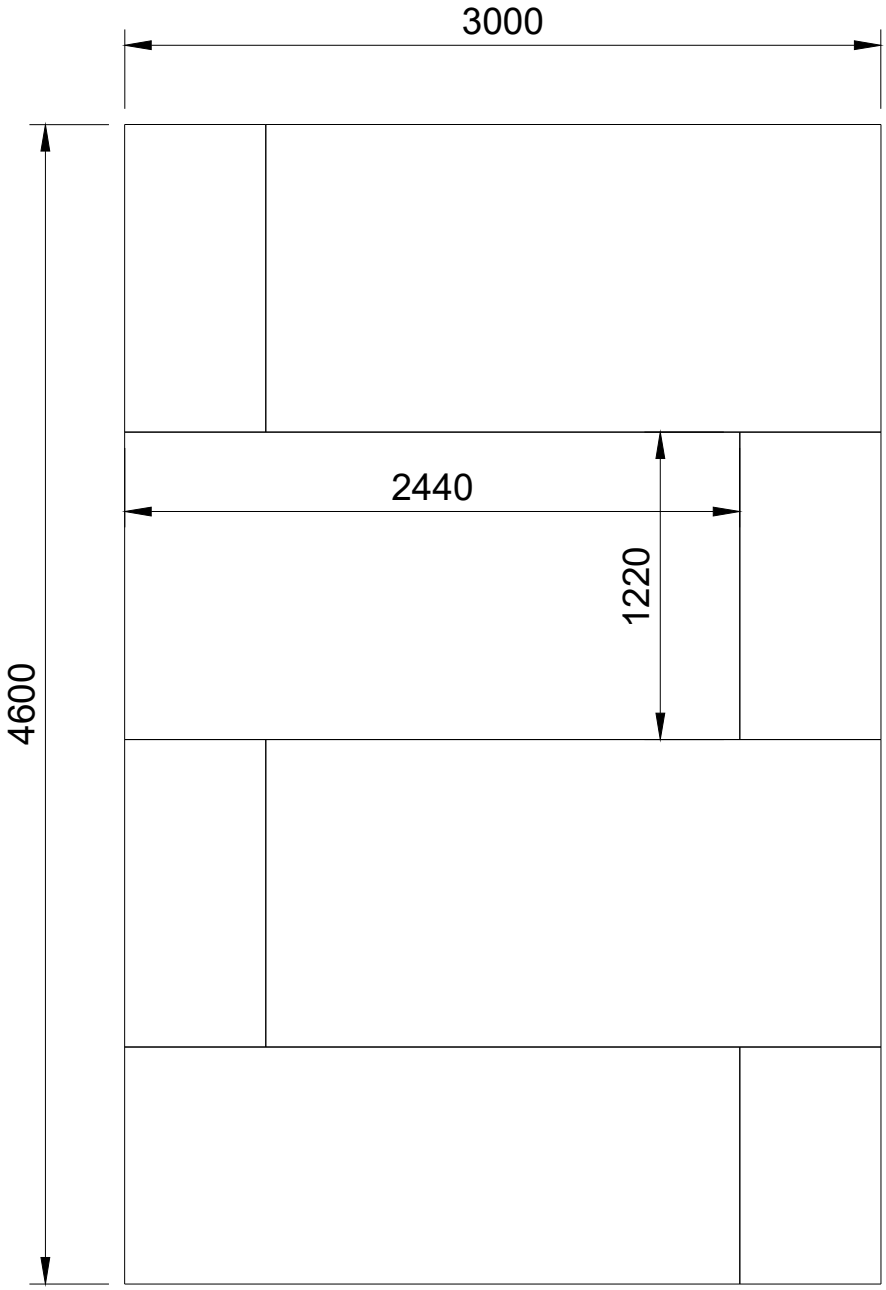
A-A (1:16)



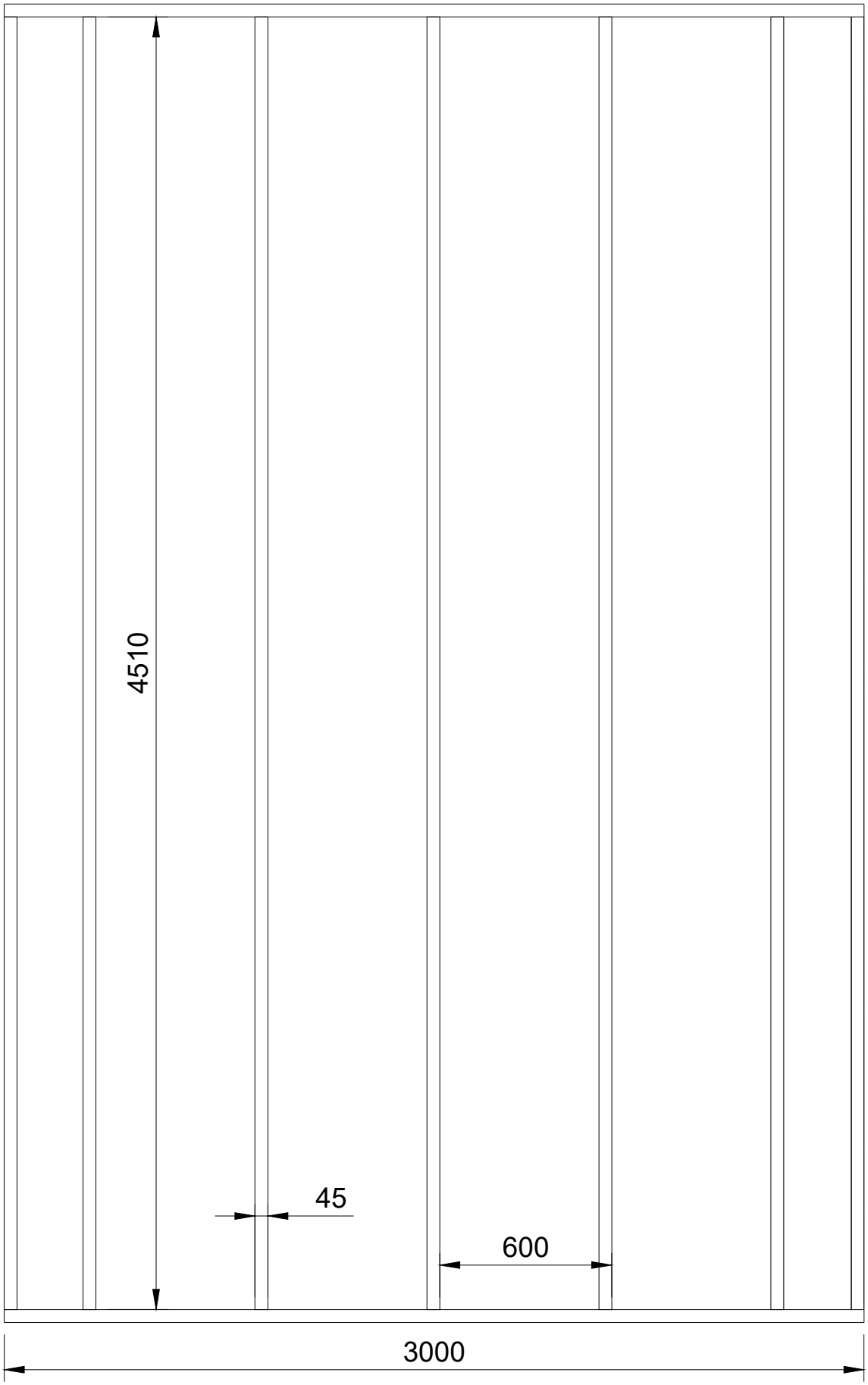
B-B (1:30)



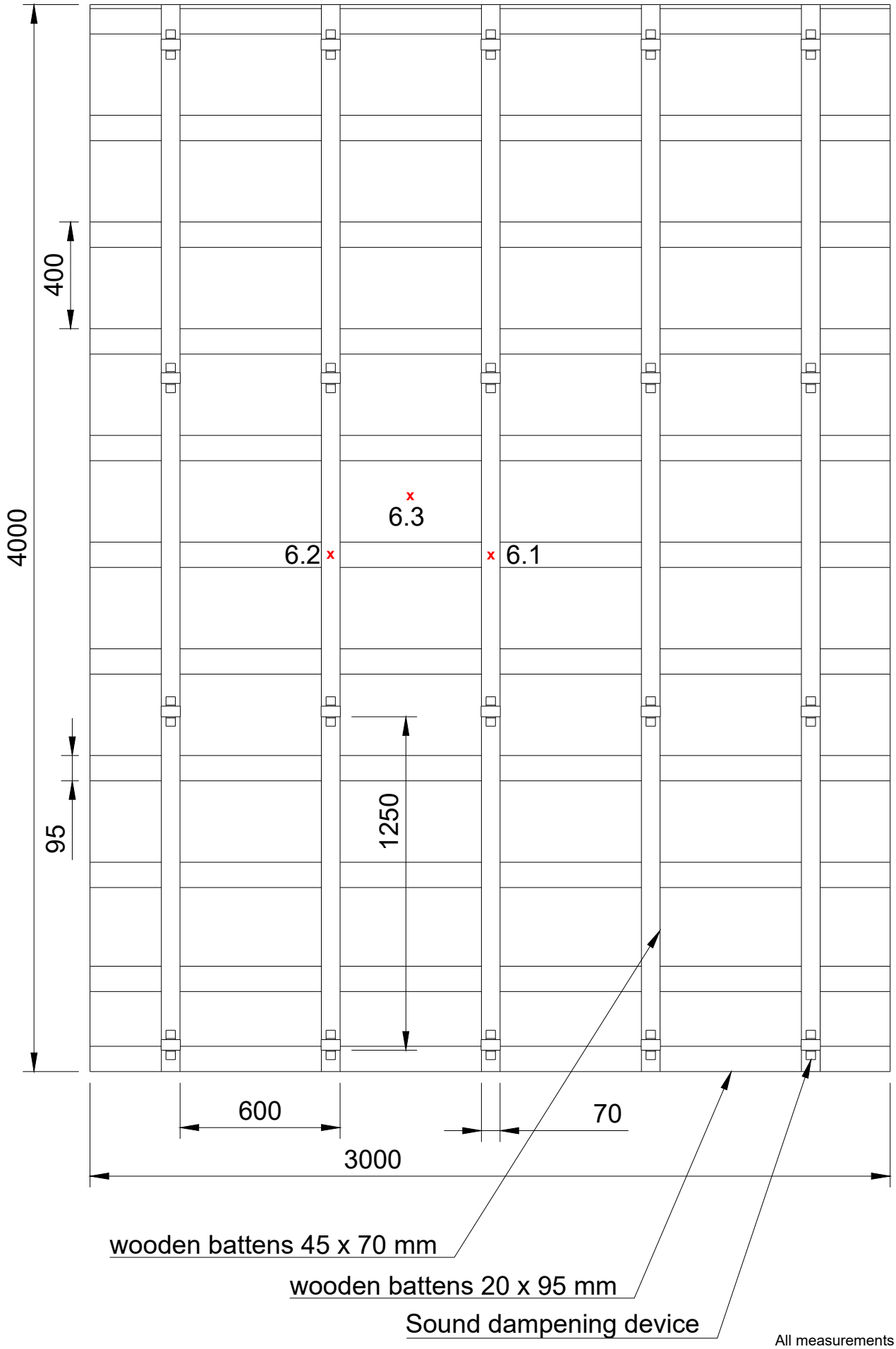
All measurements are in mm



All measurements are in mm



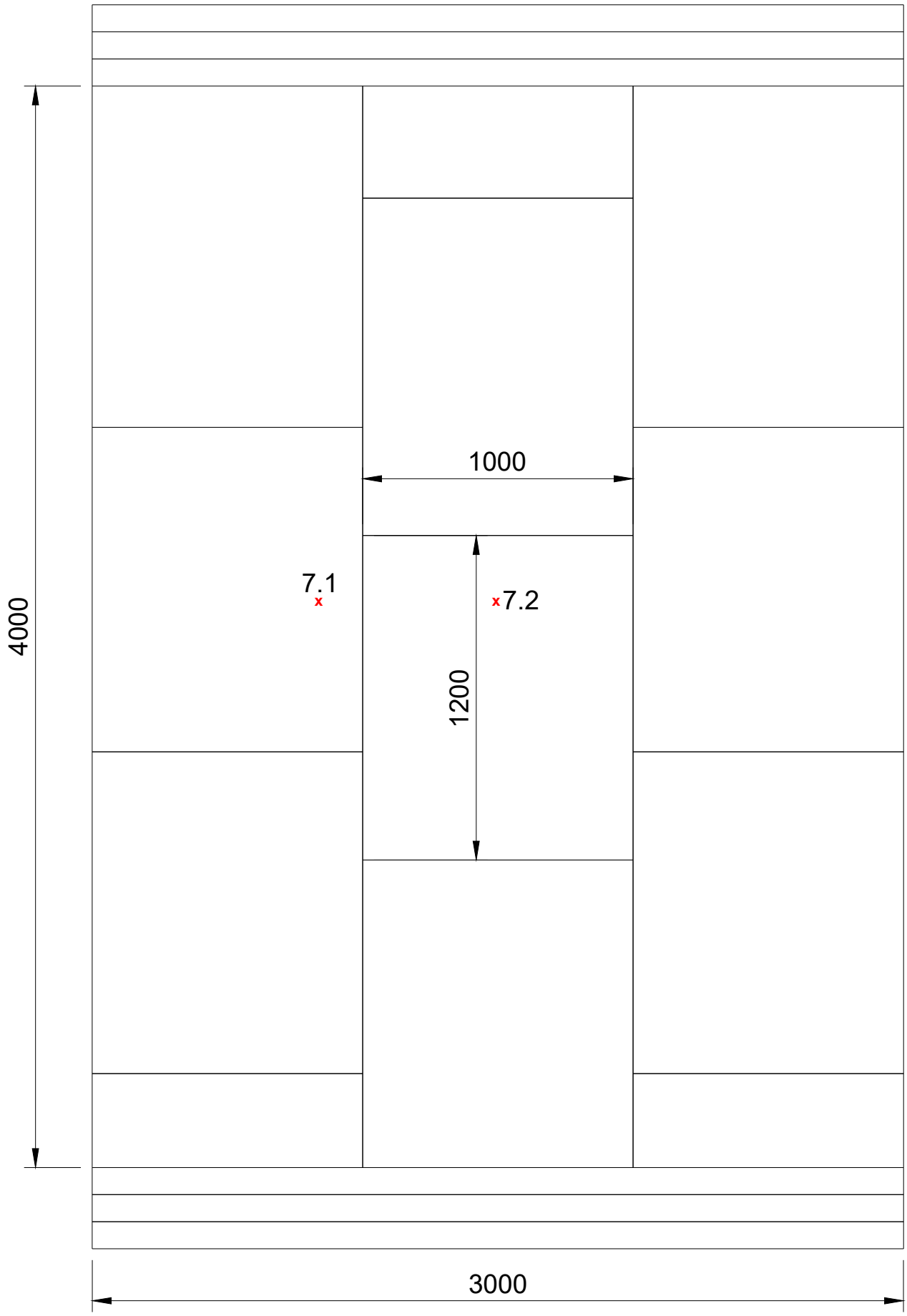
All measurements are in mm



All measurements are in mm

Danish Institute of Fire and Security Technology
Sponsor: Wood:UpHigh
Subject: Loadbearing floor - Wooden battens and sound dampening device

File No.: PGA12249A
Test date: 15-05-2023
Enclosure: 1.4



All measurements are in mm

Danish Institute of Fire and Security Technology
Sponsor: Wood:UpHigh
Subject: Loadbearing floor - Clay boards

File No.: PGA12249A
Test date: 15-05-2023
Enclosure: 1.5

All measurements are in mm