TEST REPORT
EU FAÇADE TEST 8

Name of sponsor:	The Danish Institute of Fire and Security Technology		
Product name:	EU facade test draft 6		
File no.:	PGC10038A	**Revision no.:**	0
Test date:	2024-06-19	**Date:**	26-08-2024
Pages:	13	**Encl.:**	84
Ref:	MMN / CHD		

Danish Institute of Fire and Security Technology
Jernholmen 12, DK-2650 Hvidovre
Phone: +45 36 34 90 00 · Mail: dbi@dbigroup.dk · www.dbigroup.dk

Client information

Client: The Danish Institute of Fire and Security Technology

Address: Jernholmen 12

2650 Hvidovre

Denmark

The results relate only to the items tested. The report should only be reproduced in extenso - in extracts only with a written agreement with this institute.

Content

Date of test

The test was conducted on 2024-06-19

Purpose of test

Examination of the fire performance of a façade using the large fire exposure.

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

ASSESSMENT OF FIRE PERFORMANCE OF FACADES USING LARGE FIRE EXPOSURE

Draft revision 6
Draft Date: 2022 – 11 – 18

The test was not performed accredited.

Test specimen

The trade name and sponsors identification mark are stated below:

Trade name:	BFUH-8
Identification mark:	None

The components for the test specimen were delivered and mounted by the sponsor.

Drawings and description

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

Type	Drawing No.	Dated	Subject
Drawing	1	05-30-2024	Facaderamme
Drawing	2	05-30-2024	Vindspærre
Drawing	3	05-30-2024	L Afstandslister
Drawing	4	05-30-2024	V Afstandslister
Drawing	5	05-30-2024	Facadebeklædning
Drawing	DE01-03	05-30-2024	Detaljer
Drawing	Flammeafbøjer BFUH-7 1 of 2	04-04-2024	2 mm plade
Drawing	Flammeafbøjer BFUH-7 2 of 2	04-04-2024	2 mm plade
Drawing	GKB-119661-1	04-04-2024	2 mm plade
Drawing	GKB-119661-2	04-04-2024	2 mm plade
Drawing	GKB-119661-3 1 of 2	04-04-2024	2 mm plade
Drawing	GKB-119661-3 2 of 2	04-04-2024	2 mm plade
Drawing	GKB-119661-4	04-04-2024	2 mm plade
Drawing	GKB-119661	04-04-2024	2 mm plade

The documentation is supplied and 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: Height: 7600 mm Main width: 3905 mm Wing width: 1500 mm Thickness: 283.5 mm
With flame deflector: 588.5 mm

The test specimen was a ventilated façade made of vertical wood cladding, mounted on horizontal formwork.
Flame deflector profiles were installed above fire chamber and windows on the main facade. The façade wing consisted of 100 mm thick aerated concrete.

The build-up of the façade system is shown on the attached drawings, supplied by the sponsor. The construction of the facade is described from the first layer on the aerated concrete frame.

First Layer: The first layer consisted of prefabricated cassettes which were built from untreated construction wood C24 with dimensions 45 x 195 mm which had a nominal density of 480 kg/m³. A 45 x 95 wooden beam with a nominal density of 480 kg/m³ was mounted on the bottom construction wood. There were 3 cassettes in total, and they were mounted with 289 mm horizontal gap in between. See drawing No. 1.

The backside of the prefabricated cassettes was closed with 12 mm OSB board with a nominal density of 550 kg/m³.

Fixing of first layer: The construction woods C24 were fixed to each other with steel angles designated Simpson Strong-tie ABR9020 with screws designated Paslode DS413 4.0 x 40 mm at 4 corners of the cassette.

The T- conjunctions of the construction woods were fixed with nails designated TJEP GR 3.1 x 90 mm with a c/c distance of 20 mm.

The OSB boards were fixed on the prefabricated cassette with nail designated Tjep ZE 2.5 x 65 ring. The c/c distance of the nails was approx. 150 mm.

The cassettes were put on 2 ACW 155 Simpson strong-tie console bracket which were fixed to the aerated concrete frame with 4 screws designated Spit ACS CSK ø8 x 90/30 mm. One screw designated Paslode 5.0 x 40 mm was used to connect the cassette and each console bracket. All the other edges of prefabricated cassettes were fixed to the aerated concrete with steel angles designated Paslode 90 x 90 x 65. 4 screws designated Paslode 5.0 x 40 mm were used to connect the angle to the wood. The angles were fixed to the aerated concrete with one screw designated Spit ACS CSK ø8 x 90/30 mm. The angles were mounted with a c/c distance of approx. 600 mm in horizontal and 900 mm in vertical. The gap between the cassettes and the concrete was approx. 15 mm.

Gaps in the first layer: The gaps between the cassettes were filled with insulation. The insulation designated Rockwool flexibatts 37 with the thickness of the wall with the nominal density of 32 kg/m³ were placed in the gap. The gap was closed off by the second layer (weatherboard), mounted on to a 25 x 50 mm wooden batten in the top of the gap. The wood had a nominal density of 450 kg/m³. See drawing No. DE01-03.

The 45 x 45 mm wooden batten with a nominal density of 450 kg/m³ was fixed to the construction wood C24 with screws designated NKT Spun+ 4.5 x 70 mm. See drawing No. DE01-03.

Insulation in the cassette: The in-blown insulation consisted of Isocell paper insulation with a nominal density of 54 kg/m^3.

Trickle Protection Membrane was used on both sides of the cassette, closing off the opening to the in-blown insulation. The membrane had a thickness on 0.5 mm and was mounted with staples.

Second layer: The second layer was 9.5 mm boards designated Knauf weatherboard 365, which had a nominal density of 768kg/m^3. See drawing No. 2.

A z-profile size 20 x 10 x 20 mm with the thickness of 0.55 mm was mounted to cover the joint of two weatherboards, one side of the z-profile was mounted between the construction wood and the board, the other side covered the upper edge of the below board.

Fixing of second layer: The boards were fixed with nails designated Tjep ZE 2.5 x 50 mm with a c/c distance of 300 mm.

Knauf W tape 60 mm x 22.8 mm was used to close off joints of the board after mounting.

Flame deflector: The flame deflectors were made with 2 mm steel profile. The profile was fixed on the façade with screws designated RedHorse CORONA™ RXB 4.8 X 60 EPDM-9.5B, the c/c distance between screws was 300 mm. Top and bottom profile fasten with RF rivet designated Gesipa 4.0 x 8.0 mm, the c/c distance between rivets was approx. 200 mm. Joint in fire deflectors between top and bottom profile is offset according to drawings. The longitudinal holes were minimum 20 mm long and the screws were placed in the middle of elongated hole during assembly so that expansion could take place. The flame deflectors protruded 305 mm out from the surface of the cladding andprotruded approx. 600 mm out from the edge of the main façade. The air gap inside the Flame deflectors was filled with insulation at the ends to prevent a horizontal air flow.

All details about the flame deflectors are shown on the following drawings: Flammeafbøjer BFUH-7 (1), Flammeafbøjer BFUH-7 (2), GKB-119661-1, GKB-119661-2, GKB-119661-3, GKB-119661-4, GKB-119661.

The steel was painted with Jet black RAL 9005 designated “Teknodur combi 3442-23” mixed with hardener designated “Teknodur hardener 7227-23”

Formwork: The impregnated wood formworks with a dimension of 25 x 50 mm with a nominal density of 450 kg/m³ were mounted vertically and then horizontally on the main façade. See drawing No. 3 and 4.

The 22 x 100 mm wooden batten with a nominal density of 450 kg/m³ was mounted horizontally on the vertical formwork. The distance between the horizontal wooden batten and the flame deflector was 496 mm.

Fixing of formwork: The vertical formwork was nailed with 2.5 x 65 mm Tjep ZE, per 120 mm.
The horizontal formwork and wooden batten were nailed with 3.1 x 90 mm Tjep ZE, per 600 mm.

Cladding: Wooden planks designated Finnforest Thermowood profile 330 with a dimension of 21 x 118 mm and nominal density of 435 kg/m³ with groove and tongue were mounted horizontally on the top of the formworks as the cladding.

2 extra cladding profiles were mounted vertically on the left side of the 2 bottom cassettes, see drawing No. 5.

The cladding was cut horizontally 583 mm below the flame deflector.

The cladding was extended by two wooden planks in the width. A steel profile was mounted before the mounting of the two extra profiles.

Fixing of cladding: The cladding was fixed on the formwork horizontally with two nails per profile designated Tjep ZE 2.5 x 50 mm ring. See drawing No.5.

Window and fire chamber details: The powder-coated galvanized steel profiles were mounted around the window and fire chamber with Tjep ZE 2.5 x 50 mm Ring nails. The c/c distance of nails was 300 mm.

Insulation and sealant: 45 mm soft stone wool was mounted on the cassettes, where the prefabricated cassettes was mounted to the concrete, pressed up against the stone wool.

The side of the main façade was covered by mineral wool insulation. See photo No. 10.

Between the prefabricated cassette and the aerated concrete around the fire chamber and the window, the ceramic wool was used to close the gap.

Fire sealant was used to close off the gaps around the window.

Measured by DBI

Product		Construction wood 195mm	OSB board	Isocell Blown insulation	Knauf Weatherboard 365	45 x 45 wooden beam
Density	kg/m³	459	655*	64*	806	529*
Thickness	mm	44.5	11.6	-	9.7	44.6
Moisture content	%	17.3	8.0	9.5	0.2	12.9
Organic content	%	-	-	-	-	-
Sampling method		Extra material	Extra material	Extra material	Extra material	Extra material
Drying temperature	°C	105	105	55	55	105

Product		45x 95mm wooden beam	25 x 50 formwork	Frøslev klinkeprofil	22 x 100 wooden batten	Rockwool slab
Density	kg/m³	525*	520*	455	478	36
Thickness	mm	43.5	26.8	-	21.1	128.7
Moisture content	%	17.2	13.6	5.0	13.9	0.3
Organic content	%	-	-	-	-	2.1
Sampling method		Extra material	Extra material	Extra material	Extra material	Extra material
Drying temperature	°C	105	105	105	105	105

*The measured density of OSB board, Isocell Blown insulation, 45 x 45 mm wooden beam, 45x 95mm wooden beam, 25 x 50 formwork were more than 10% higher than the nominal density.

Test conditions

Conditioning

The materials for the test specimen were delivered on the 03-06-2024 to the DBI laboratory and 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.
The installation of the test specimen on the test rig was completed on the 10-06-2024.

Mounting

The test specimen was mounted on the test rig that had a size of 7990 mm in height and with main surface of 3620 mm and wing 1500 mm wide. The surface of the test rig was built with 150 mm aerated concrete blocks, with a nominal density of 575 kg/m³.

The design and location of the combustion chamber opening in the main face was in accordance with the design details specified in the standard ASSESSMENT OF FIRE PERFORMANCE OF FACADES USING LARGE FIRE EXPOSURE Draft revision 6, Draft Date: 2022 – 11 – 18.

Each of the two vertical sides was closed off with stone wool before the fire test
The fire test was conducted in the following conditions:

- Ambient temperature: approx. 19 °C at the start of the test (see Enclosures 3.0 and 3.1)
- Ambient air velocity: Not measured (test undertaken indoor where ambient air speed and/or wind did not affect the test)
- Mechanical exhaust: 80.000 m^3/h (at ambient temperature) even distributed in the ceiling of the test hall with a combined exhaust duct to the air filter cleaning system.

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

Temperature observations were taken continually during the entire testing time.

The temperatures were measured on the external and internal layers of the test specimen as indicated on DBI drawing enclosure no. 1.0 - 1.1. All thermocouples that were used according to the standard ASSESSMENT OF FIRE PERFORMANCE OF FACADES USING LARGE FIRE EXPOSURE are named I.1.1-1.9, I.2.1-2.5, I.3.1-3.5. All other thermocouples are for informative uses.

The temperature was determined by means of type-K sheathed thermocouples specified in, ASSESSMENT OF FIRE PERFORMANCE OF FACADES USING LARGE FIRE EXPOSURE.

The thermocouples named I.1.1-1.9, I.2.1-2.5, I.3.1-3.5. were constructed of junctions of nickel chromium/nickel aluminium (type K) wire as defined in EN 60584-1 contained within mineral insulation in a heat resisting alloy sheath of nominal diameter 2.0 mm. Designated as a sheathed thermocouple.

The furnace plate thermocouples were constructed according to EN 1363-1, and all other thermocouples were made from type-k thermocouples wire with 0.5mm in diameter twisted together in the end.

The wood crib was constructed flowing the principles in ASSESSMENT OF FIRE PERFORMANCE OF FACADES USING LARGE FIRE EXPOSURE. The dimensions of the spruce sticks were approx. 45x45 mm and the external dimension of the 24-layer wood crib was 1.5m x 1m x 1.08m (width x depth x height). The wood crib was stored at approx. 20°C in dry conditions and was at the time of the fire test in equilibrium with the surroundings. The spruce sticks were nailed together to construct the crib and was installed on a closed bottom surface made of a 20 mm thick calcium silicate board with dimensions of 1300 mm x 1900 mm. The crib was placed 100 mm from the back wall and centred from the sidewalls of the combustion chamber. The average density of the wood was approx. 500 kg/m^3.

In front of the combustion chamber, a platform was placed which had a size of 1850 x 3200 mm. It was placed with the upper edge 100 mm below the floor of the combustion chamber. This was done to simulate a comparable air flow and buoyancy that will occur if the weight for fallings parts was used. which should have been placed in front of the facade according to ASSESSMENT OF FIRE PERFORMANCE OF FACADES USING LARGE FIRE EXPOSURE section 4.7.4.

The test was terminated after 61 minutes.

Test results

Duration of the test was 61 minutes.

Measurements

The enclosed graphs and tables show:

Enclosures 2.0 and 2.1	The temperature in the fire chamber during the test
Enclosures 3.0 and 3.1	Ambient temperature The ambient temperature in the laboratory during the test
Enclosures 4.0 and 4.1	Location 1 - Flux
Enclosures 5.0 and 5.1	Temperature measured in the ventilated cavity
Enclosures 6.0 and 6.1	Temperature measured in the ventilated cavity
Enclosures 7.0 and 7.1	Location 1,2 - Plate TC 1.4m and 2.5m height Plate TC.1 Location 1 Plate TC.2 Location 2
Enclosures 8.0 and 8.1	Location 2 - 5 m from facade 4.5 m height.
Enclosures 9.0 and 9.1	Location 1 - TC on PlateTC
Enclosures 10.0 and 10.1	Location 1 - TC on Flux Flux.TC.2 located 3 m from fire chamber
Enclosures 11.0 and 11.1	Location 2 - TC TC.1 Location 1 TC.2 Location 2
Enclosures 12.0 and 12.1	Temperature rise measured 50mm from the facade
Enclosures 13.0 and 13.1	Temperature rise measured in ventilation layer
Enclosures 14.0 and 14.1	Temperature rise measured in middle of insulation
Enclosures 15.0 and 15.1	Temperature rise measured according to the standard - 50 mm from facade. Minimum of 30 sec

Enclosures 16.0 and 16.1	Temperature rise measured according to the standard - ventilation layer. Minimum of 30 sec
Enclosures 17.0 and 17.1	Temperature rise measured according to the standard - in the middle of the insulation. Minimum of 30 sec
Enclosures 18.0 and 18.1	Vertical measurements on main facade
Enclosures 19.0 and 19.1	Vertical measurements on main facade
Enclosures 20.0 and 20.1	Vertical measurements on the wing
Enclosures 21.0 and 21.1	Vertical measurements on the wing
Enclosures 22.0 and 22.1	Horizontal measurements
Enclosures 23.0 and 23.1	Horizontal measurments
Enclosures 24.0 and 24.1	Plate thermocouple on facade
Enclosures 25.0 and 25.1	Heat flux on window
Enclosures 26.0 and 26.1	TC on window heat Flux Flux.TC. on window
Enclosures 27.0 and 27.1	Temperature rise measured behind the windbreaker board

Visual observations:

Time / Minutes	Visual observations:
0	Test commences
1:00	The flames extended to the top right part of the first window.
2:41	The cladding above the fire chamber began burning.
3:20	The top profile above the fire chamber began to bend.
4:30	The secondary flame deflector exhibited minor bending.
5:02	The flames extended to the secondary flame deflector.
6:50	The cladding on the first floor was burning in several places.
7:25	The secondary flame deflector exhibited minor bending.
9:06	A minor amount of smoke emerged from the steel profiles on the left side between the cladding.
13:11	The secondary flame deflector began to whiten.
13:42	The flames burned the upper cladding beneath the second flame deflector.
16:14	The flames did not affect the left side of the window.
19:32	The cladding began to fall or detach.
28:00	Most of the cladding had fallen from the right side.
32:00	At this juncture, the left side began to burn heavily.
33:00	Fire reached the edge of both the flame deflectors.
52:00	Nearly all of the cladding had fallen.
61:00	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.

Conclusion

Fire testing according to daft version of: ASSESSMENT OF FIRE PERFORMANCE OF FACADES USING LARGE FIRE EXPOSURE, 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:

Performance	Criteria	Test result
Fire spread		
	Vertical fire spread	No failure
	Horizontal fire spread	36 minutes
	Burning parts	21 minutes
Falling parts – Level 0		
	Falling parts – (Level 0)	21 minutes
Falling parts – Level 1		
	Falling parts – (Level 1)	Not measured
Falling parts – Level 2		
	Falling parts – (Level 2)	Not measured

The test was terminated after 61 minutes.

Remarks

The test was an Ad-Hoc test, there is no field of application.

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 ASSESSMENT OF FIRE PERFORMANCE OF FACADES USING LARGE FIRE EXPOSURE.

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.

The test was not performed accredited.

Danish Institute of Fire and Security Technology

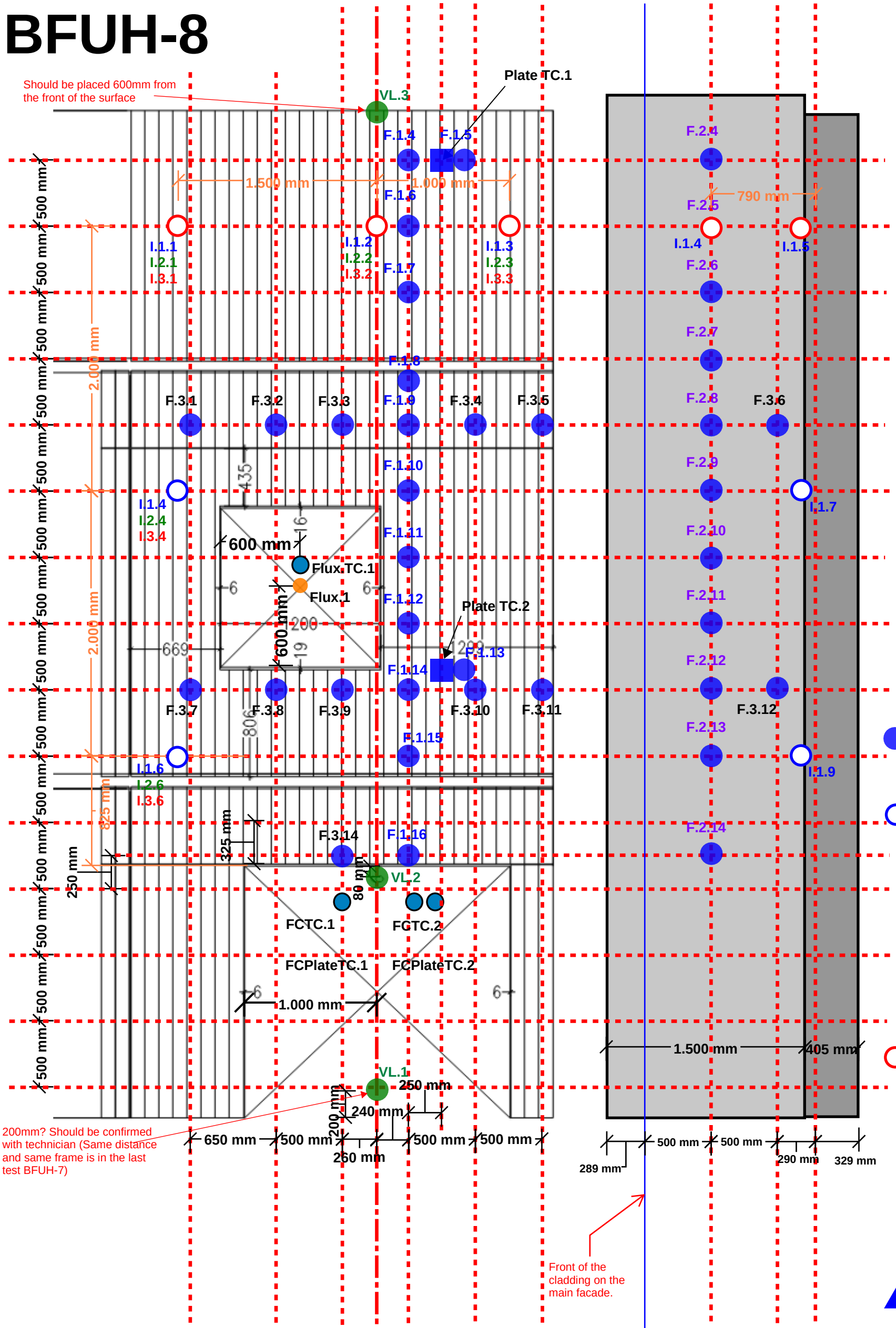
Mads Møllgren
Resistance to Fire Engineer

Chunyang Dong
M.Sc. (Safety Eng.)

The Danish Institute of Fire and Security Technology
Jernholmen 12
2650 Hvidovre
Denmark

Enclosures:	**84**
DBI drawings:	4
DBI graphs and tables:	52
Photo sheets:	14
Sponsors drawings:	14

BFUH-8



File no.: PGC10038A
Test date: 19-06-2024
Enclosure: 1.1
Danish Institute of Fire and security Technology
Sponsor: DBI
Subject: EU Facade test 8

Thermocouple location on the facade surface proposed by Guoxiang (5 cm from the wood panel surface).

Thermocouple location on the facade surface required according to the standard (3 measurements: 5 cm out on exposed surface, middle of cavity and center of insulator).

I.1.6 -> I.1.9 50mm ud igennem facade (Hele vejen igennem)
I.2.6 + I.2.8 I midten af ventilationslag
I.3.6 + I.3.8 I midten af isolering

Thermocouple location on the facade surface required according to the standard (2 measurements: 5 cm out on exposed surface and middle of the cavity)

I.1.1 -> I.1.5 50mm ud igennem facade (Hele vejen igennem)
I.2.1 -> I.2.3 I midten af ventilationslag
I.3.1 -> I.3.3 I midten af isolering

Thermocouple within the ventilated cavity.

Water cooled heat flux censor at the center of the secondary window.

Plate thermometer at the surface of the facade, flush to the surface of the facade.

Velocity probe locations for flow velocity measurement

Materialer:

22mm Frøslev klinkeprofil – Termowood (lodret) LBM:

Rundhovedet rustfri A4 pistolsøm 2,5x50

Generelt:

–

Opbygning:

22mm Frøslev klinkeprofil – Termowood (lodret)

22x45mm Afstandslister (gran) pr. 600mm (krydsforskallet)

9,5mm Knauf Weatherboard 365

45x195mm stoplekonstruktion pr. 600mm

195mm Isocell (isolering kl 37)

195mm Rockwool (isolering kl 37) (over vinduer og i lukkestykker)

Revisionstekst:

A) Befæstigelse tilføjet

BFUH-8 Facadetest ved DBI - Test 1

Gældende

Facadebeklædning

BYGHERRE:
Fælledby
–
–

DATO: 2024-05-30 REV. NR/DATO: –

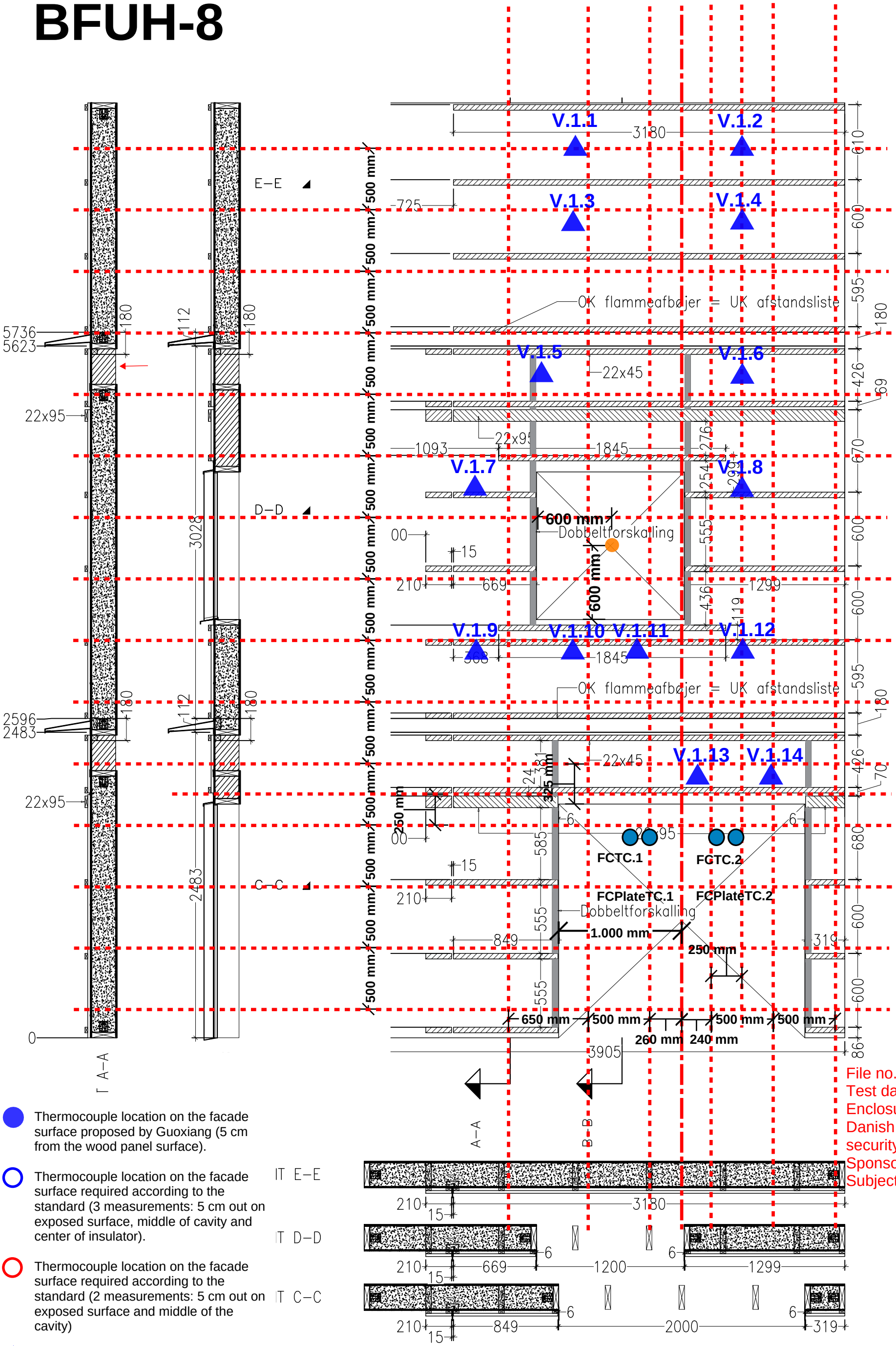
ANSV: CMA MÅL: 1:30 ANTAL: –

TEGN.NR: 5

BM Byggeindustri Lupinvej 18 - 9500 Hobro - Tlf. +45 9852 1744

K:\031_Teknisk\02 Brand\Fælledby Brandtest\BFUH-8 Mock-Up_Test 1.dwg

BFUH-8



- Thermocouple location on the facade surface proposed by Guoxiang (5 cm from the wood panel surface).
- Thermocouple location on the facade surface required according to the standard (3 measurements: 5 cm out on exposed surface, middle of cavity and center of insulator).
- Thermocouple location on the facade surface required according to the standard (2 measurements: 5 cm out on exposed surface and middle of the cavity)
- Thermocouple within the ventilated cavity.
- Water cooled heat flux censor at the center of the secondary window.
- Plate thermometer at the surface of the facade, flush to the surface of the facade.

File no.: PGC10038A
Test date: 19-06-2024
Enclosure: 1.2
Danish Institute of Fire and security Technology
Sponsor: DBI
Subject: EU Facade test 8

BFUH-8 Facadetest ved DBI - Test 1 — Gældende

V Afstandslister

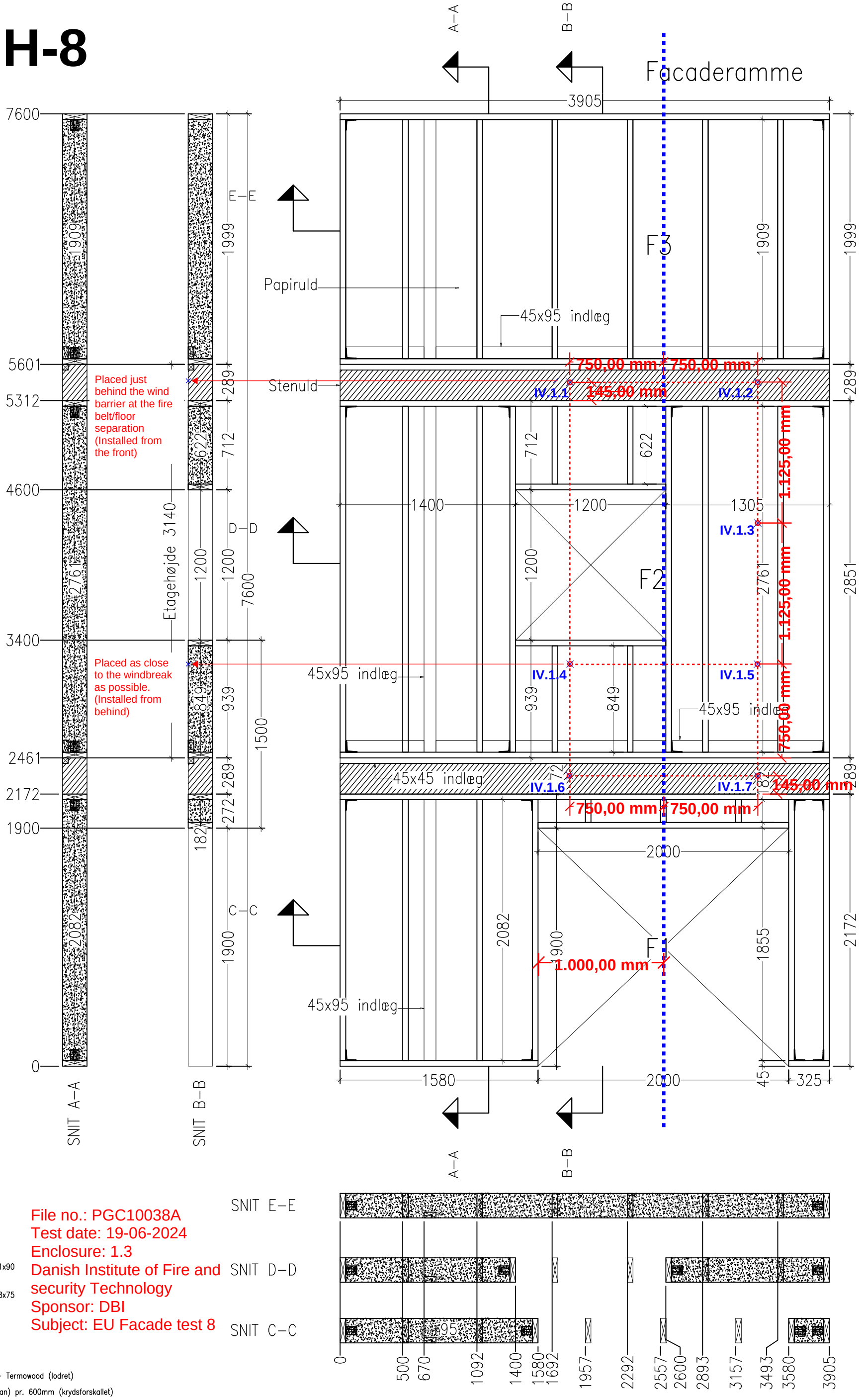
BYGHERRE: Fælledby
–
–

DATO: 2024–05–30 REV. NR/DATO: –
ANSV: CMA MÅL: 1:30 ANTAL: –
TEGN.NR: 4

BM Byggeindustri Lupinvej 18 - 9500 Hobro - Tlf. +45 9852 1744

K:\031_Teknisk\02 Brand\Fælledby Brandtest\BFUH–8 Mock–Up_Test 1.dwg

BFUH-8



Materialer:

Træ:

F1:

45x195:

F2:

45x195:

45x45:

F3:

45x195

45x45

Vinkelbeslag:

Simpson ABR9020

Kamsøm 4x40

Samling af trærammer:

Ringede pistolsøm 3,1x90

45x45 indlæg:

Ringede pistolsøm 2,8x75

Generelt:

–

Opbygning:

22mm Frøslev klinkeprofil – Termowood (lodret)

22x45mm Afstandslister (gran) pr. 600mm (krydsforskallet)

9,5mm Knauf Weatherboard 365

45x195mm stoplekonstruktion pr. 600mm

195mm Isocell (isolering kl 37)

195mm Rockwool (isolering kl 37) (over vinduer og i lukkestykker)

Revisionstekst:

A) Isolering tilføjet, opdatering af befæstigelse

File no.: PGC10038A
Test date: 19-06-2024
Enclosure: 1.3
Danish Institute of Fire and security Technology
Sponsor: DBI
Subject: EU Facade test 8

BFUH-8 Facadetest ved DBI - Test 1

Gældende

Facaderamme

BYGHERRE:
Fælledby
–
–

DATO: 2024–05–30 REV. NR/DATO: –

ANSV: CMA MÅL: 1:30 ANTAL: –

TEGN.NR: 1

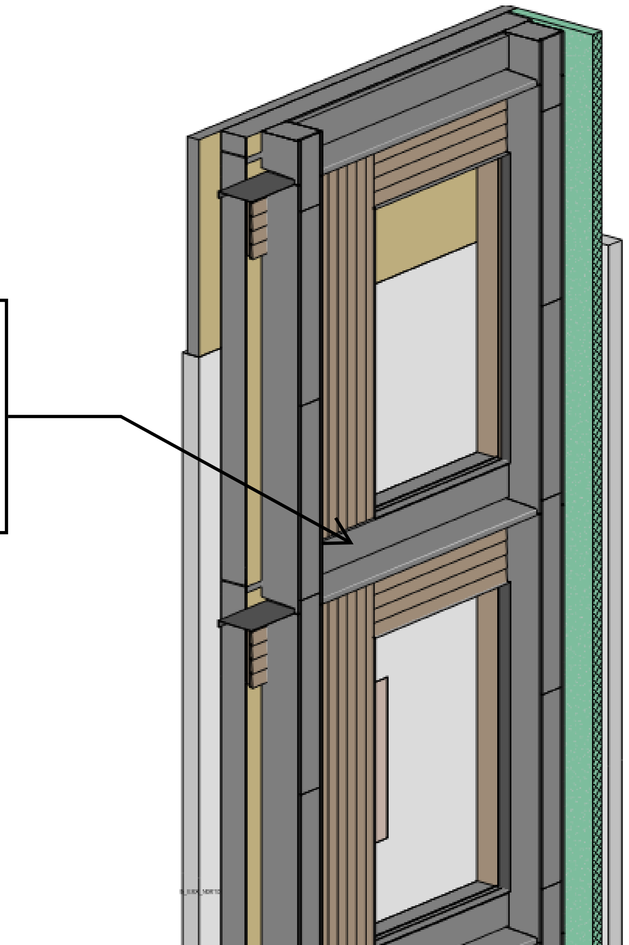
BM Byggeindustri Lupinvej 18 - 9500 Hobro - Tlf. +45 9852 1744

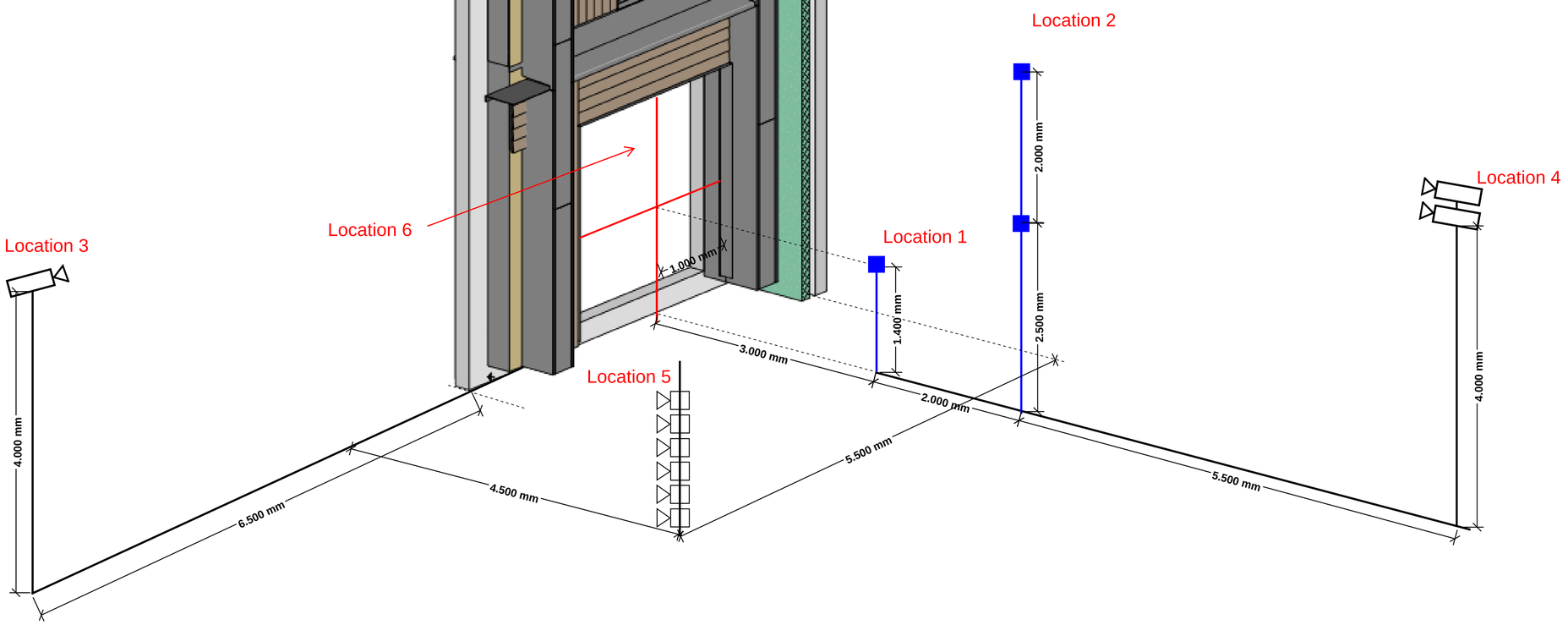
K:\031_Teknisk\02 Brand\Fælledby Brandtest\BFUH–8 Mock–Up_Test 1.dwg

BFUH-8
CAMERA LOCATION

The isometry is copied from BFUH-5, as no isometry was made for this test.

But this shouldn't matter since camera locations are set in relation to the fire chamber and the rig.





NOTE:

- Location 1: 3 m away to the center of the combustion chamber (both horizontally and vertically), a plate thermometer, a thermocouple and a water cooled heat flux censor.
- Location 2: 5 m away from the facade wall, 2.5 m above the ground and 4.5 m above the ground, a plate thermometer and a thermocouple.

Location 3 : 1 camera from the side view, 4 meters hight, mounted on the SP-FIRE rig, observerving the test from the side.

Location 4: 1 camera from front view, 4 meters hight, mounted on the gas-beton rig, at the opposite end of the facadehall in the corner.

Location 5: 6 blue LED lights, light should focus on the second section of the facade.

Location 6: two plate thermometers + two wire thermocouples inside the combustion chamber.

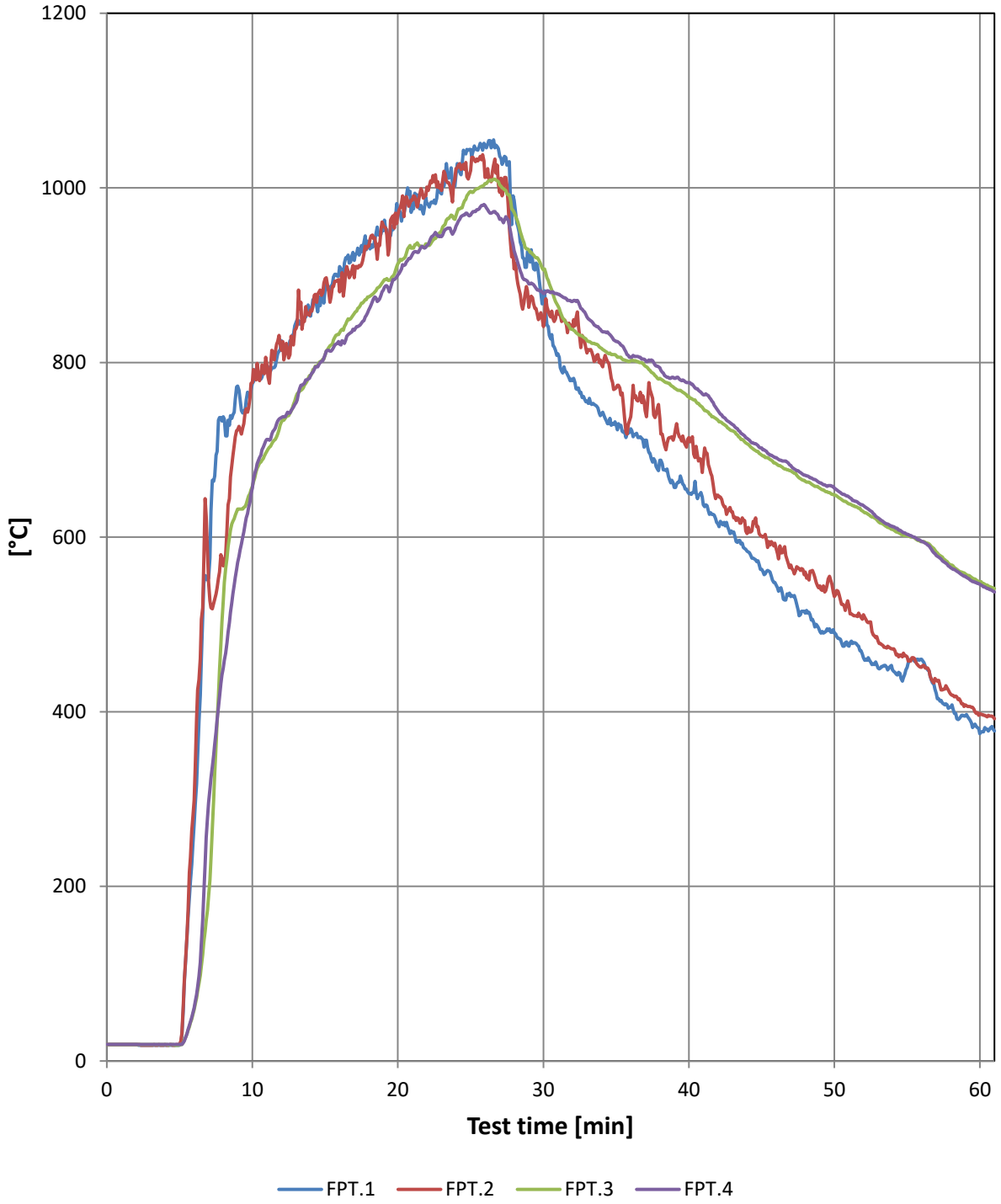
Location 7 and 8: bi-direction velocity tube together with a wire temperature thermocouple to measure the measuring the flow speed towards the wood crib

Note: height indicator every 500 mm at two edges of the facade.

Mock-up
2023-11-28

File no.: PGC10038A
Test date: 19-06-2024
Enclosure: 1.4
Danish Institute of Fire and security Technology
Sponsor: DBI
Subject: EU Facade test 8

The temperature in the fire chamber during the test



FireChamberPlateTC.1 FireChamberPlateTC.2
FireChamberTC.1 FirechamberTC.2

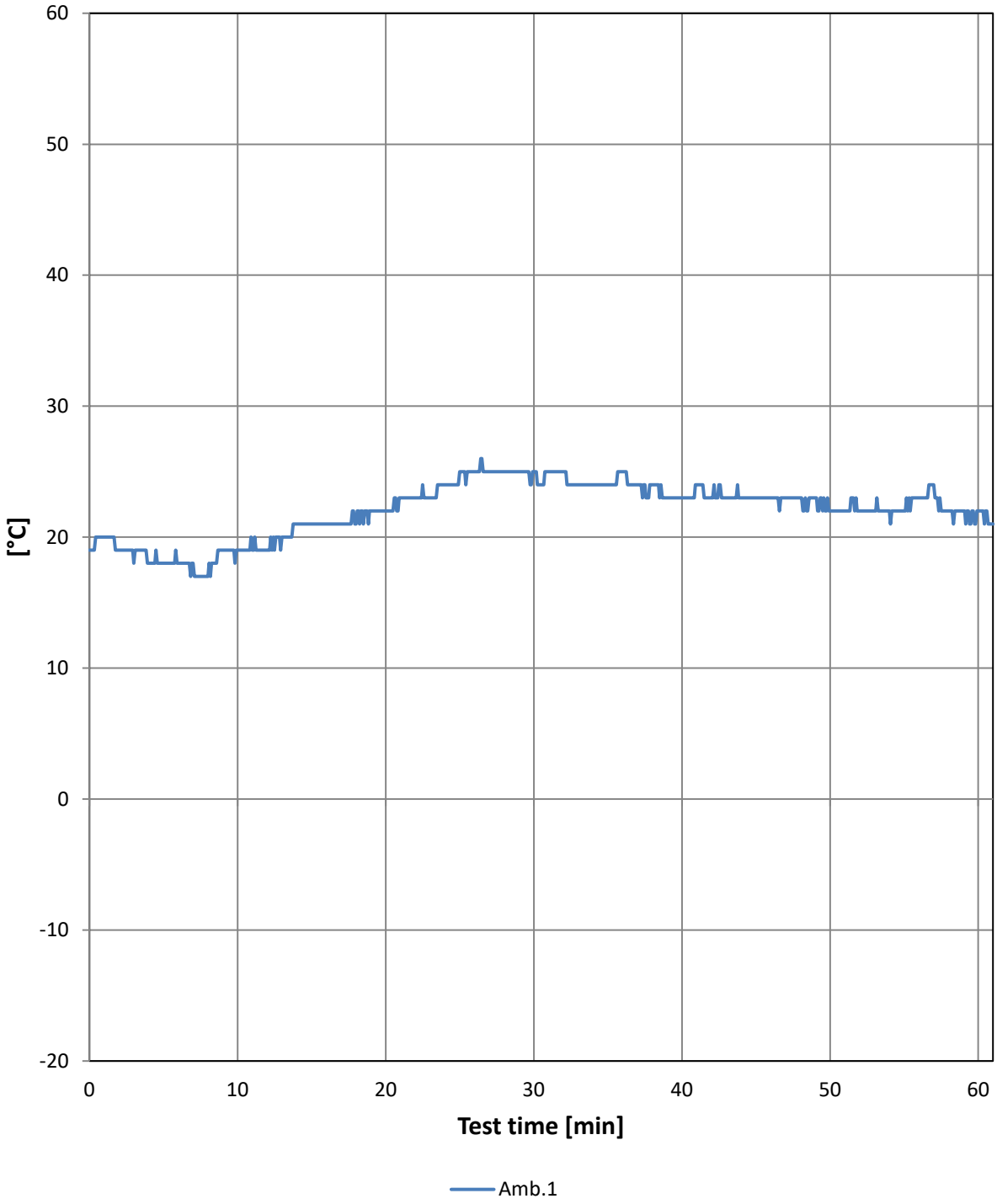
The temperature in the fire chamber during the test

Min. / °C	FPT.1	FPT.2	FPT.3	FPT.4
0	19	19	19	19
2	19	19	19	19
4	18	19	19	19
6	272	299	59	61
8	738	567	527	450
10	776	777	658	656
12	825	814	732	737
14	853	860	785	785
15	885	896	809	809
16	910	881	834	821
18	937	933	875	860
20	975	969	913	900
22	982	1001	936	934
24	1014	1022	968	956
26	1049	1012	1005	980
28	986	907	972	928
30	871	841	906	879
32	779	838	838	870
34	741	797	816	836
36	724	738	802	806
38	688	736	782	794
40	650	714	761	777
42	615	648	734	745
44	584	604	707	713
46	545	587	684	691
48	513	560	664	671
50	490	532	648	656
52	462	511	629	636
54	448	472	609	612
56	460	451	595	595
58	405	420	568	565
60	375	398	549	546
61	378	392	541	537

FireChamberPlateTC.1 FireChamberPlateTC.2
FireChamberTC.1 FirechamberTC.2

Ambient temperature

The ambient temperature in the laboratory during the test

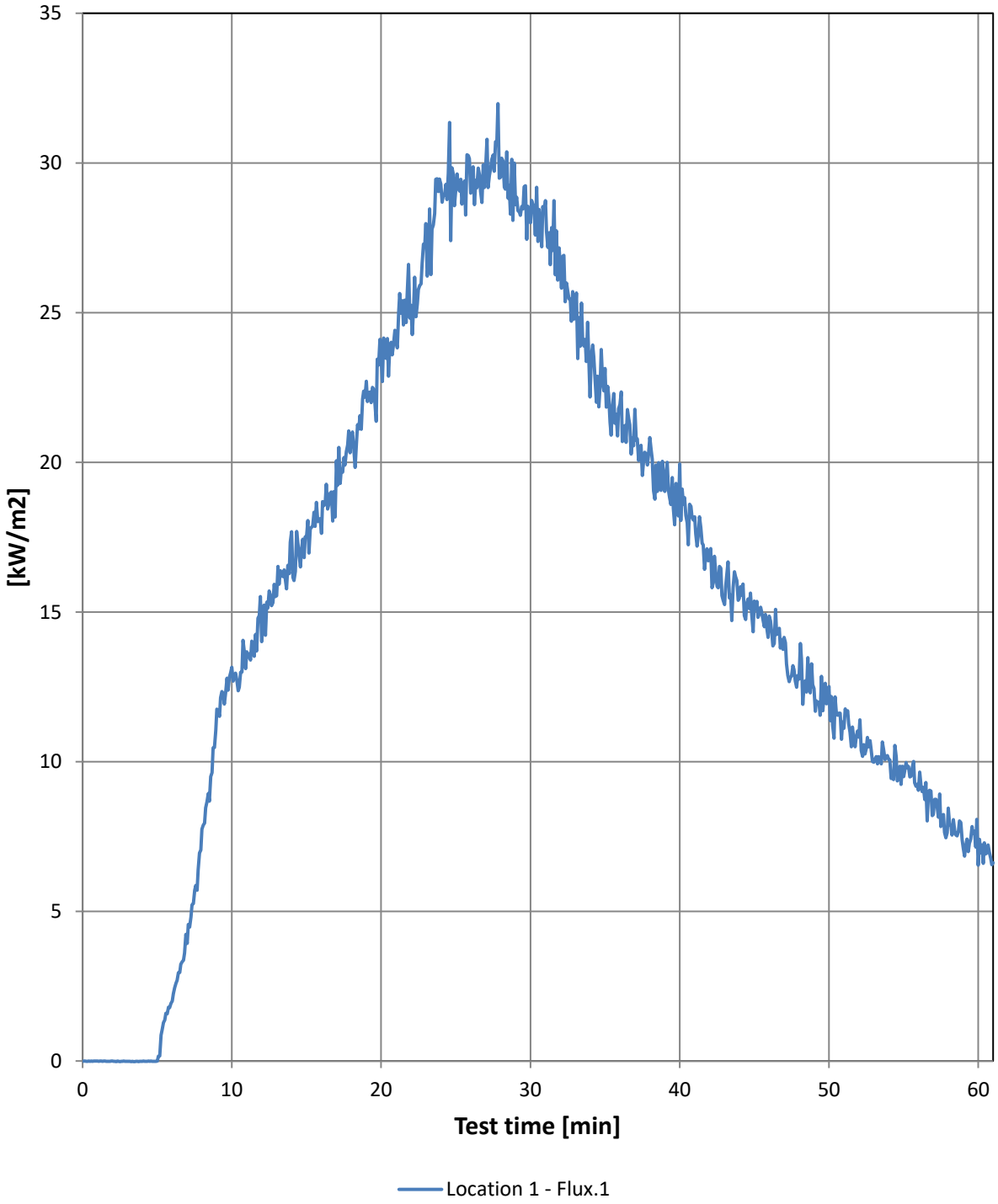


Ambient temperature

The ambient temperature in the laboratory during the test

Min. / °C	Amb.1
0	19
2	19
4	18
6	18
8	17
10	19
12	19
14	21
15	21
16	21
18	21
20	22
22	23
24	24
26	25
28	25
30	25
32	25
34	24
36	25
38	24
40	23
42	23
44	23
46	23
48	23
50	22
52	22
54	22
56	23
58	22
60	22
61	21

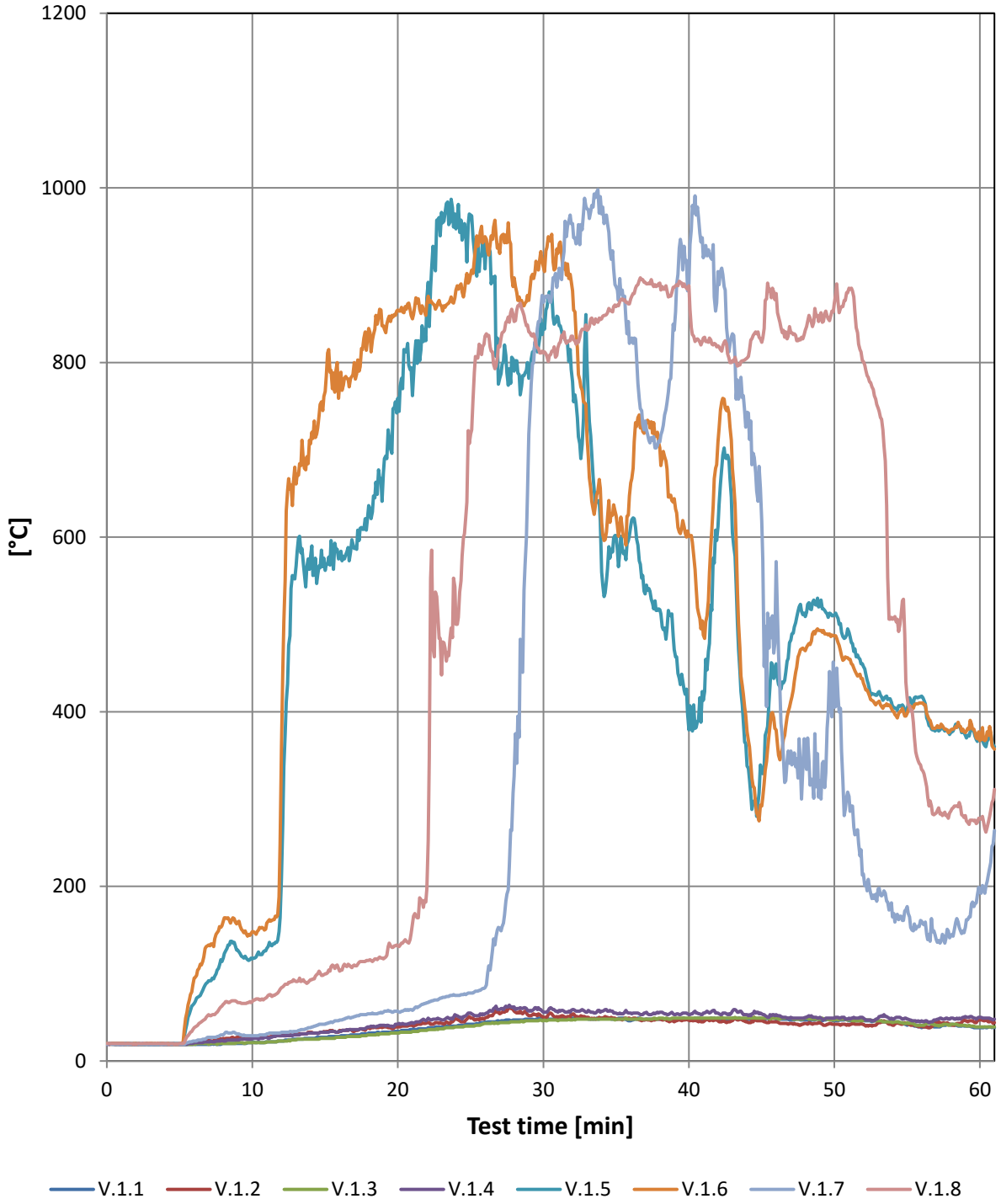
Location 1 - Flux



Location 1 - Flux

Min. / kW/m2	Location 1 - Flux.1
0	0
2	0
4	0
6	2
8	8
10	13
12	14
14	18
15	18
16	18
18	21
20	24
22	25
24	29
26	29
28	30
30	28
32	27
34	22
36	22
38	21
40	20
42	17
44	15
46	15
48	13
50	13
52	11
54	10
56	9
58	8
60	7
61	7

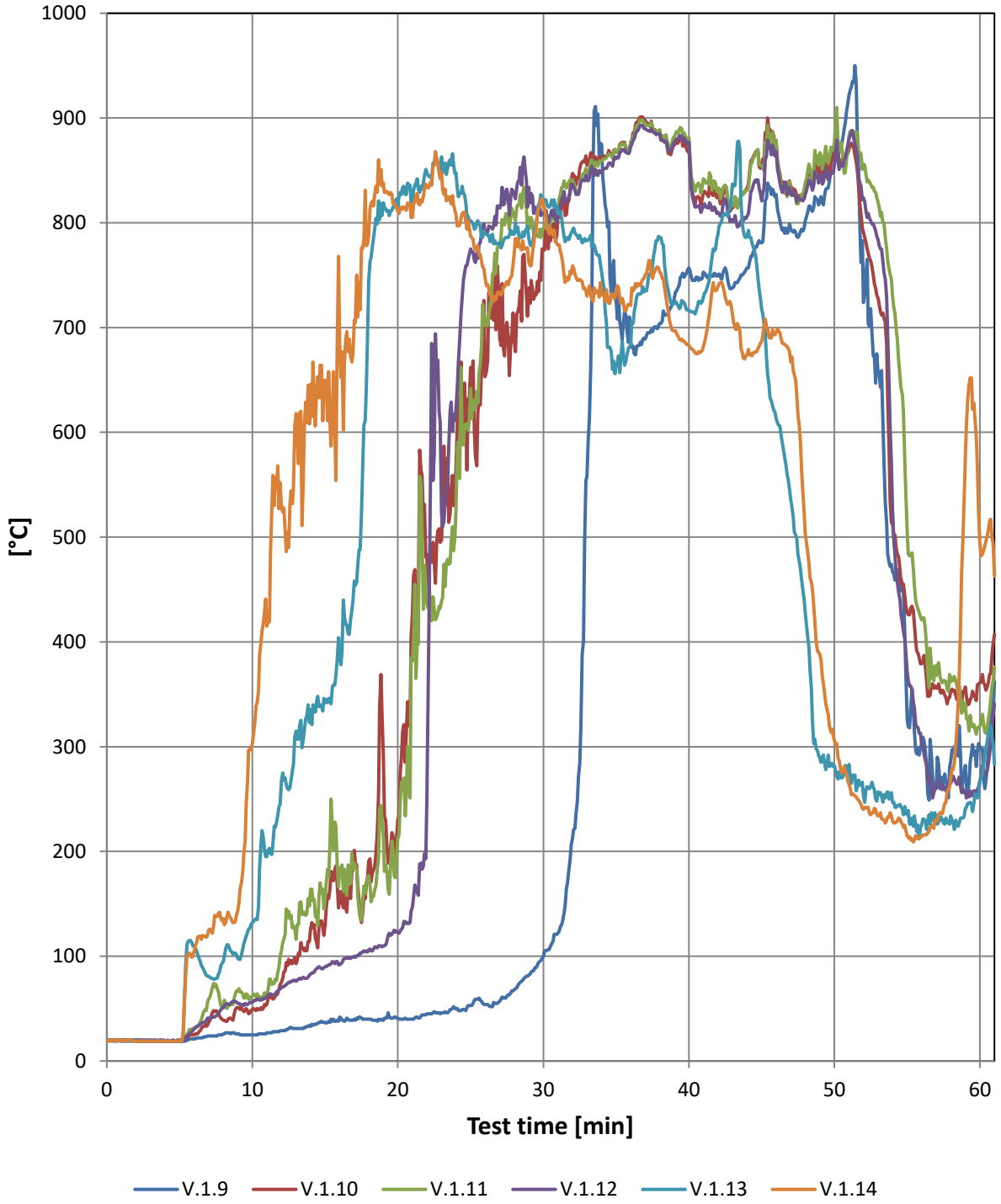
Temperature measured in the ventilated cavity



Temperature measured in the ventilated cavity

Min. / °C	V.1.1	V.1.2	V.1.3	V.1.4	V.1.5	V.1.6	V.1.7	V.1.8
0	20	20	20	19	20	20	19	20
2	19	19	20	19	20	20	19	19
4	19	19	19	19	20	19	19	20
6	19	21	20	21	66	95	23	38
8	20	26	20	23	118	160	30	65
10	21	27	21	26	117	148	29	68
12	23	29	23	29	209	357	33	84
14	26	33	25	32	577	707	38	93
15	27	33	26	33	562	767	42	100
16	28	35	27	34	576	774	47	103
18	32	38	30	39	636	839	54	115
20	34	39	32	42	759	860	57	132
22	37	44	35	47	874	868	67	197
24	40	48	39	52	953	883	75	500
26	45	49	43	54	907	944	84	830
28	47	57	45	62	790	897	326	847
30	49	50	46	56	844	909	869	811
32	49	53	47	59	778	882	959	830
34	49	49	48	57	560	617	970	850
36	46	48	48	55	613	662	826	873
38	48	48	49	56	517	702	709	891
40	48	47	49	53	379	601	890	888
42	49	46	49	55	612	709	904	819
44	48	45	49	53	338	377	743	805
46	48	45	49	53	455	379	572	879
48	47	43	49	50	509	470	341	837
50	46	42	47	49	511	487	405	868
52	47	42	47	49	452	433	214	801
54	44	41	44	48	406	401	165	506
56	38	40	41	46	418	410	160	334
58	41	42	42	49	376	379	143	286
60	38	47	39	50	368	367	193	278
61	38	44	39	48	360	357	264	311

Temperature measured in the ventilated cavity

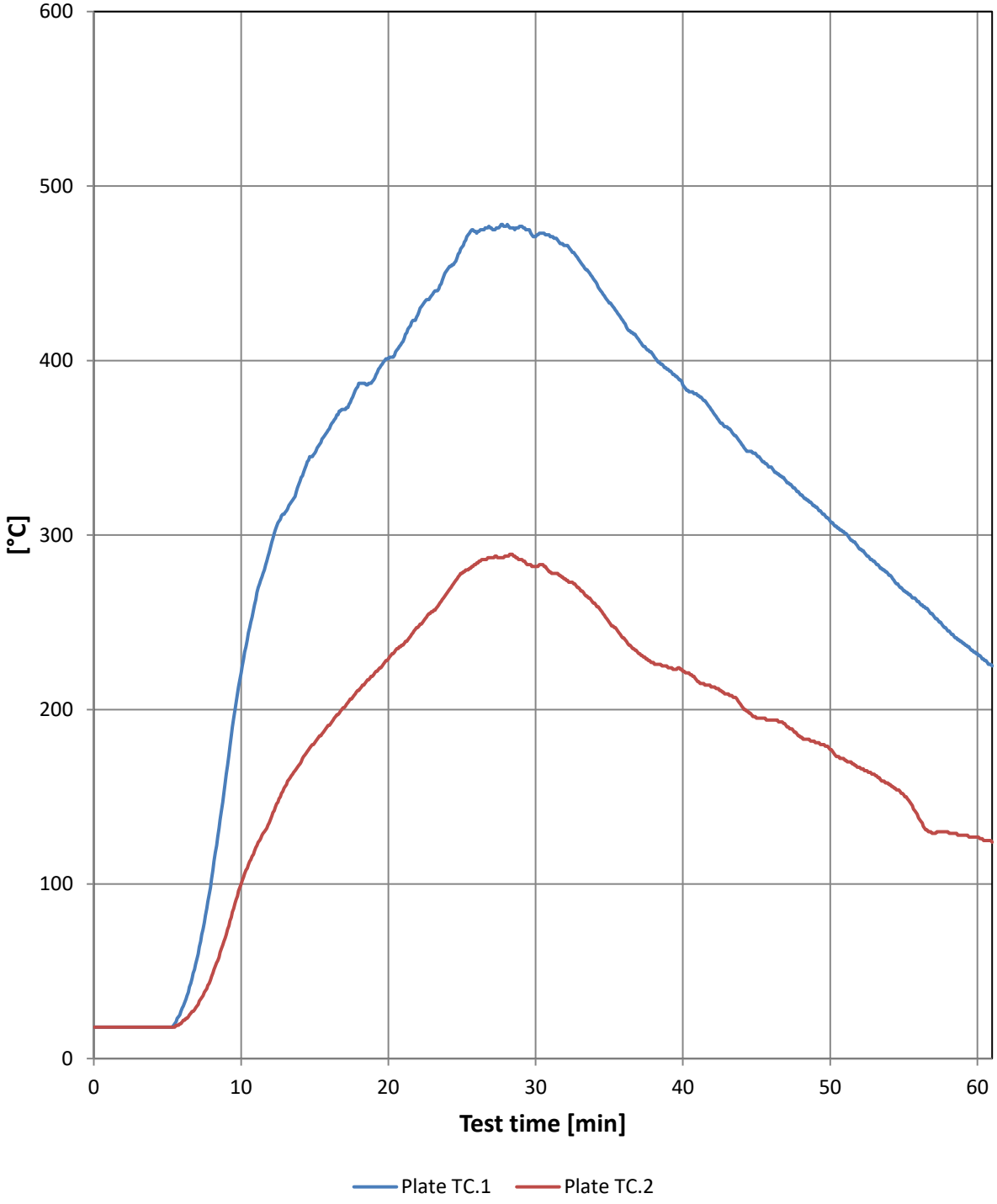


Temperature measured in the ventilated cavity

Min. / °C	V.1.9	V.1.10	V.1.11	V.1.12	V.1.13	V.1.14
0	19	20	20	20	20	19
2	19	20	20	20	19	19
4	19	19	19	19	19	19
6	21	25	31	31	110	105
8	26	39	51	51	95	136
10	25	49	62	56	132	303
12	29	75	105	70	267	528
14	33	126	164	83	335	646
15	37	130	156	90	342	650
16	42	153	182	92	386	687
18	40	191	177	106	745	788
20	41	230	212	123	815	811
22	45	483	437	249	848	835
24	50	565	525	622	848	808
26	54	653	702	791	790	748
28	68	689	806	827	789	770
30	100	775	795	810	823	817
32	213	847	840	837	793	759
34	875	861	859	848	753	731
36	686	877	876	873	684	721
38	704	888	889	885	786	753
40	757	872	881	877	716	683
42	750	826	833	810	789	739
44	757	833	831	806	787	674
46	827	878	879	868	613	695
48	802	836	838	827	428	503
50	874	869	876	855	282	306
52	724	791	856	824	253	240
54	467	513	730	527	247	229
56	301	379	421	301	225	214
58	286	353	362	265	234	270
60	300	361	319	267	266	496
61	362	407	376	341	283	463

Location 1,2 - Plate TC 1.4m and 2.5m height

Plate TC.1 Location 1
Plate TC.2 Location 2

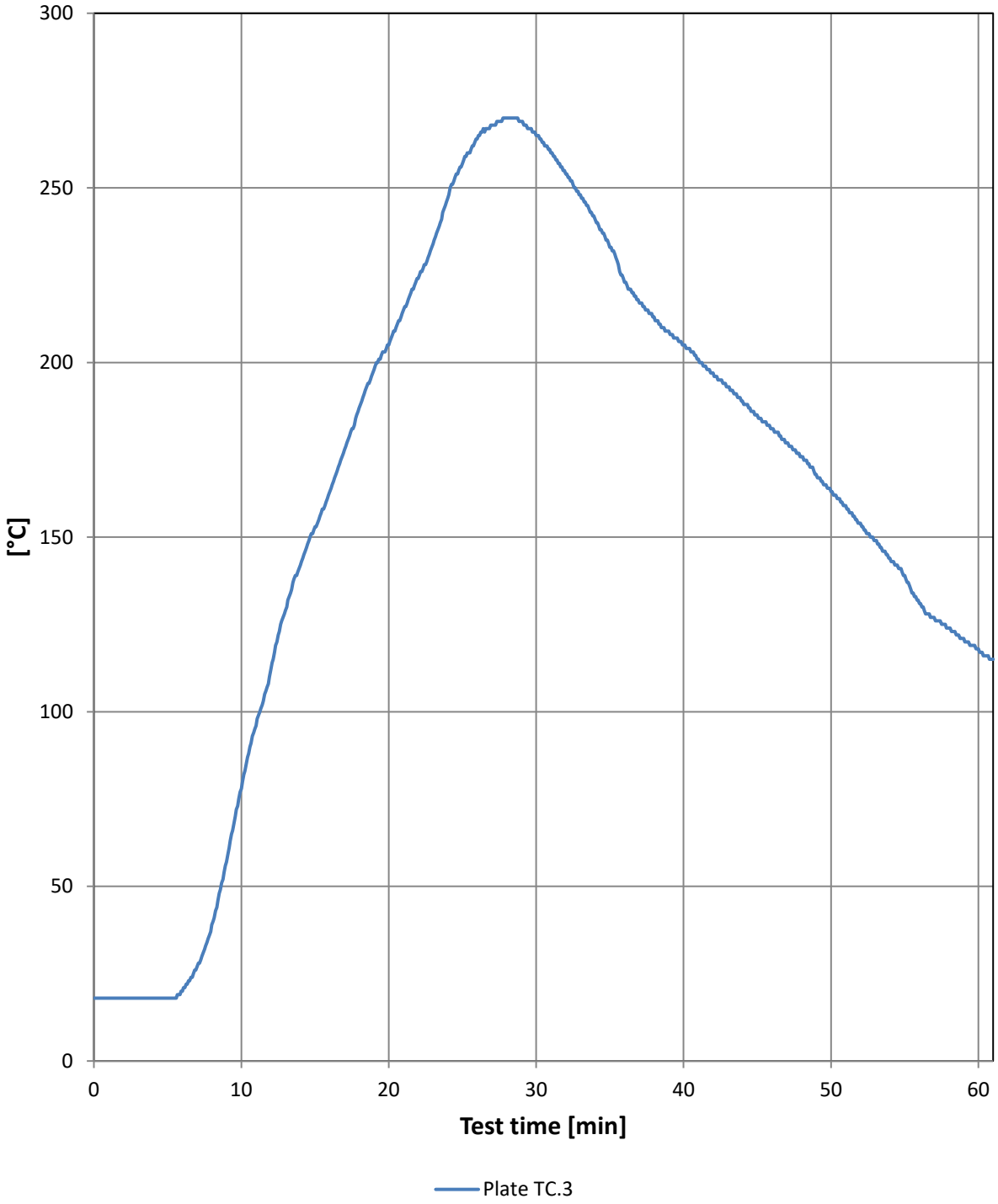


Location 1,2 - Plate TC 1.4m and 2.5m height

Plate TC.1 Location 1
Plate TC.2 Location 2

Min. / °C	Plate TC.1	Plate TC.2
0	18	18
2	18	18
4	18	18
6	29	21
8	103	47
10	221	100
12	293	137
14	331	169
15	347	181
16	361	191
18	387	211
20	401	229
22	426	247
24	452	267
26	473	284
28	477	288
30	471	282
32	466	275
34	446	261
36	422	241
38	403	227
40	386	222
42	371	213
44	352	202
46	339	194
48	323	184
50	308	177
52	292	167
54	277	157
56	262	138
58	245	130
60	232	127
61	225	124

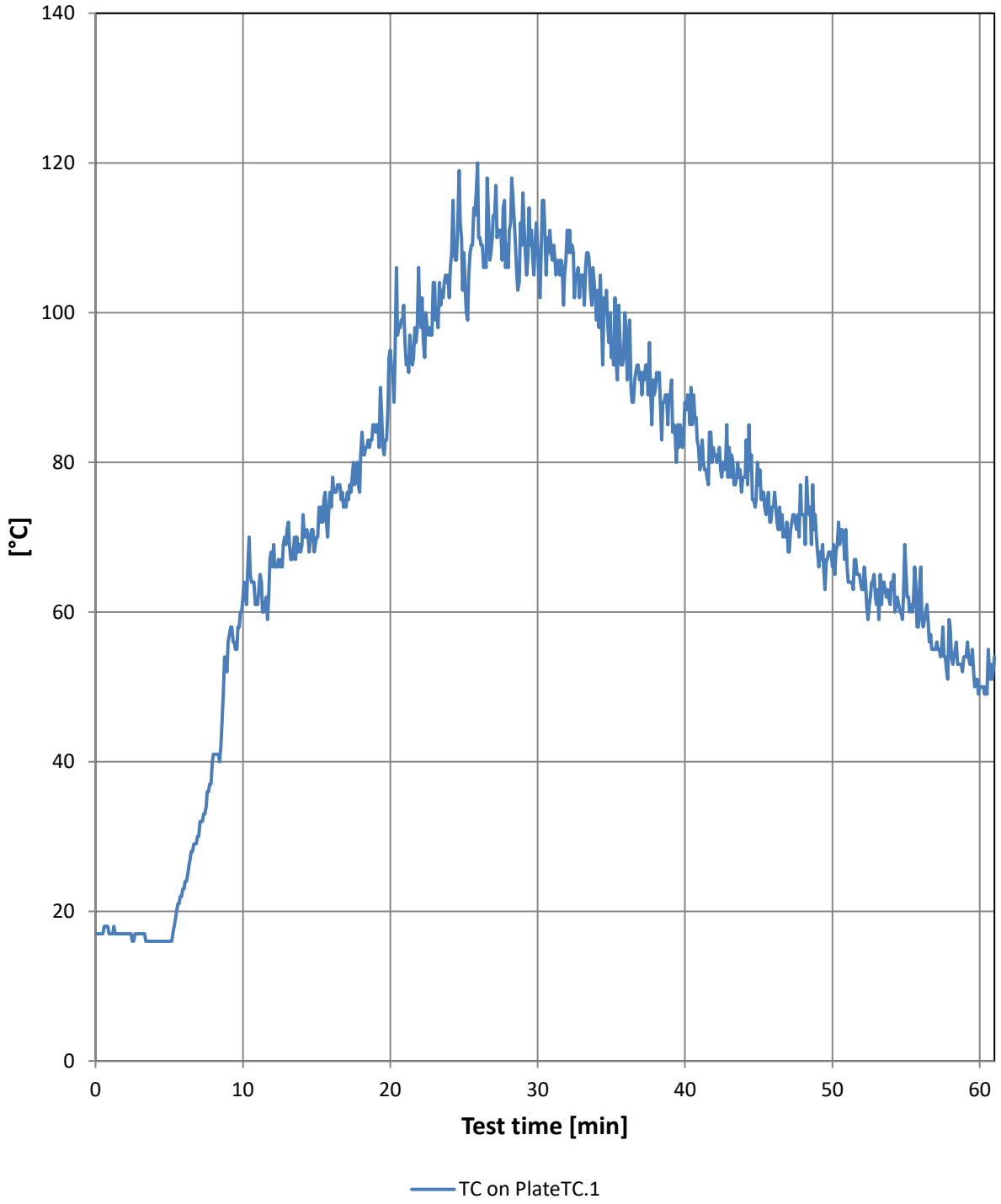
Location 2 - 5 m from facade 4.5 m height.



Location 2 - 5 m from facade 4.5 m height.

Min. / °C	Plate TC.3
0	18
2	18
4	18
6	20
8	39
10	78
12	112
14	142
15	153
16	163
18	187
20	205
22	224
24	247
26	264
28	270
30	265
32	254
34	241
36	223
38	213
40	205
42	197
44	189
46	181
48	173
50	163
52	154
54	144
56	131
58	124
60	118
61	115

Location 1 - TC on PlateTC

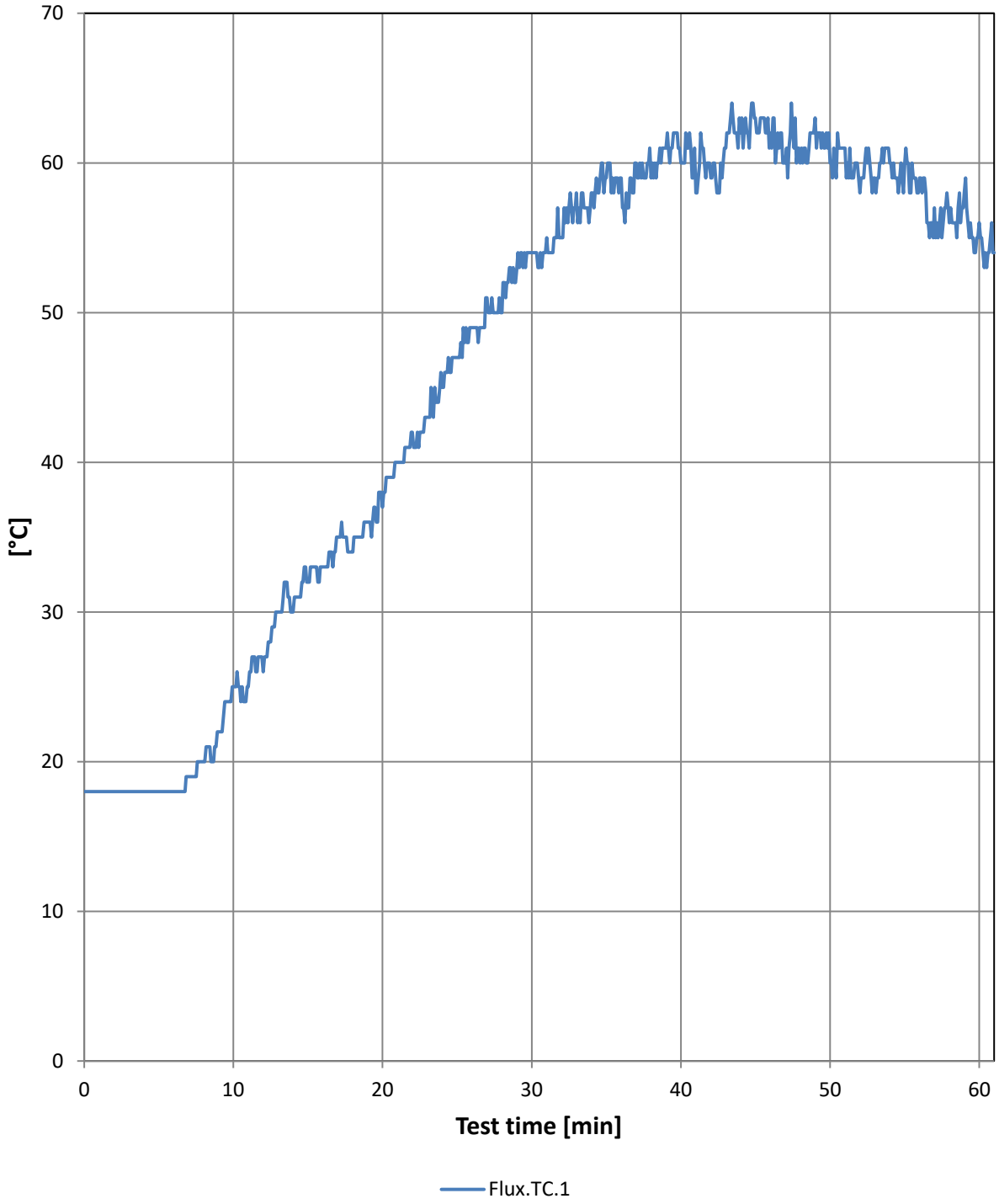


Location 1 - TC on PlateTC

Min. / °C	TC on PlateTC.1
0	17
2	17
4	16
6	23
8	41
10	62
12	66
14	69
15	70
16	74
18	81
20	95
22	100
24	102
26	110
28	106
30	109
32	111
34	99
36	98
38	90
40	88
42	81
44	78
46	74
48	73
50	66
52	63
54	64
56	66
58	58
60	50
61	54

Location 1 - TC on Flux

Flux.TC.2 located 3 m from fire chamber

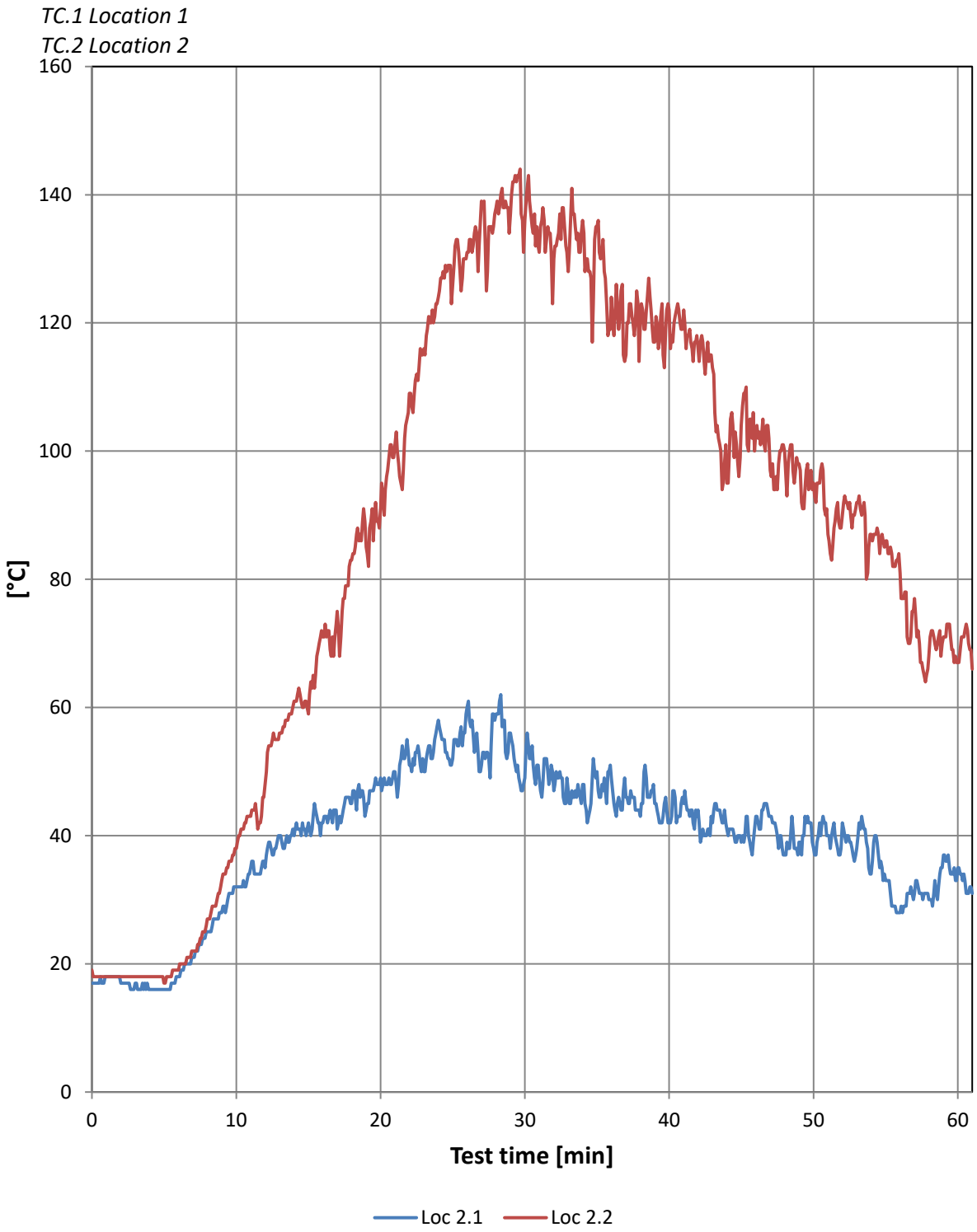


Location 1 - TC on Flux

Flux.TC.2 located 3 m from fire chamber

Min. / °C	Flux.TC.1
0	18
2	18
4	18
6	18
8	20
10	25
12	26
14	30
15	32
16	33
18	34
20	37
22	42
24	45
26	49
28	50
30	54
32	55
34	58
36	59
38	59
40	60
42	59
44	62
46	62
48	60
50	60
52	58
54	60
56	59
58	56
60	56
61	54

Location 2 - TC

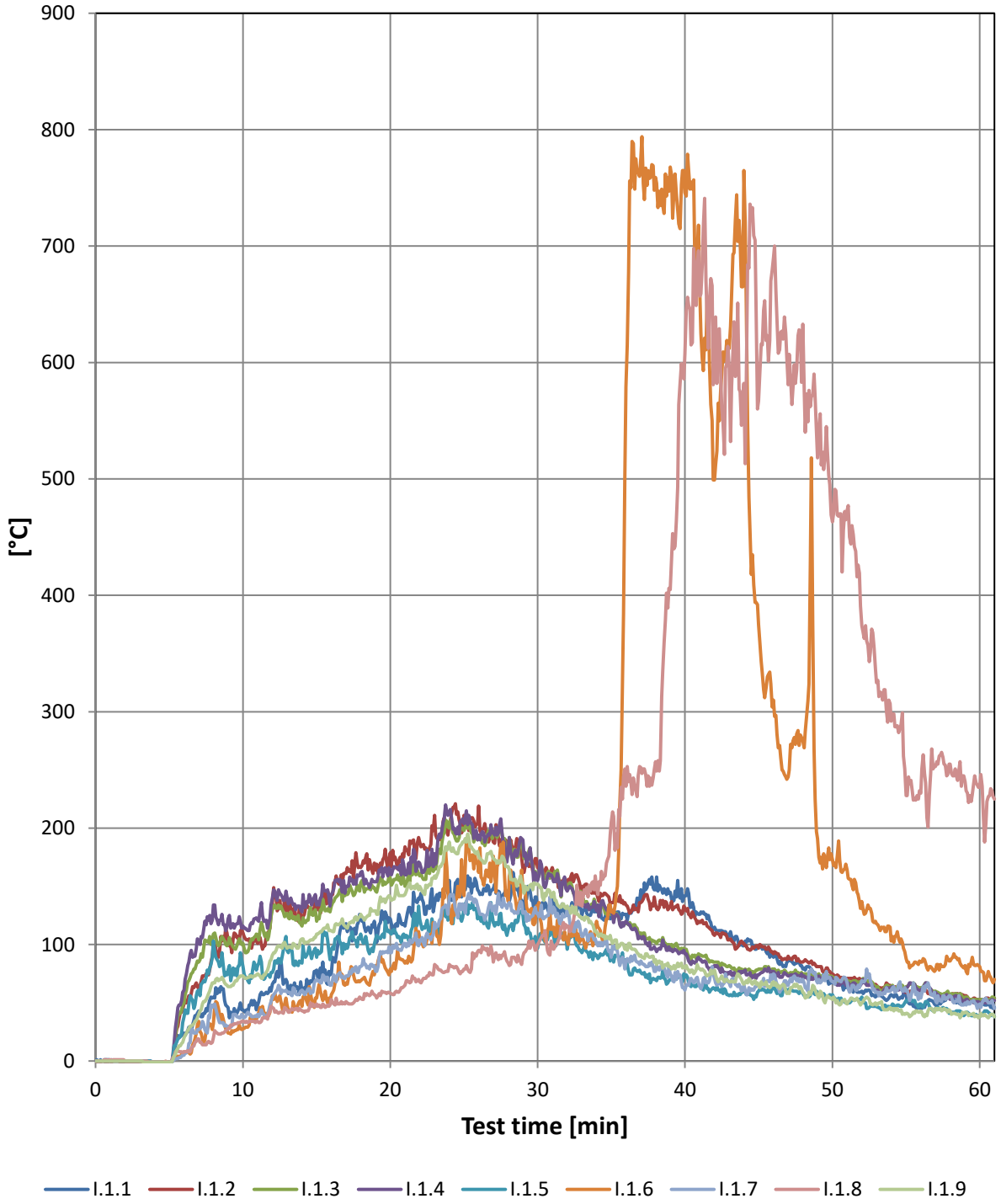


Location 2 - TC

TC.1 Location 1
TC.2 Location 2

Min. / °C	Loc 2.1	Loc 2.2
0	17	19
2	17	18
4	16	18
6	18	19
8	25	27
10	32	38
12	35	48
14	40	61
15	42	59
16	42	71
18	45	83
20	49	91
22	51	109
24	58	124
26	60	131
28	59	138
30	49	136
32	47	130
34	48	136
36	49	124
38	43	120
40	42	122
42	44	116
44	41	95
46	43	103
48	37	100
50	38	95
52	42	90
54	34	87
56	28	81
58	30	68
60	35	67
61	31	66

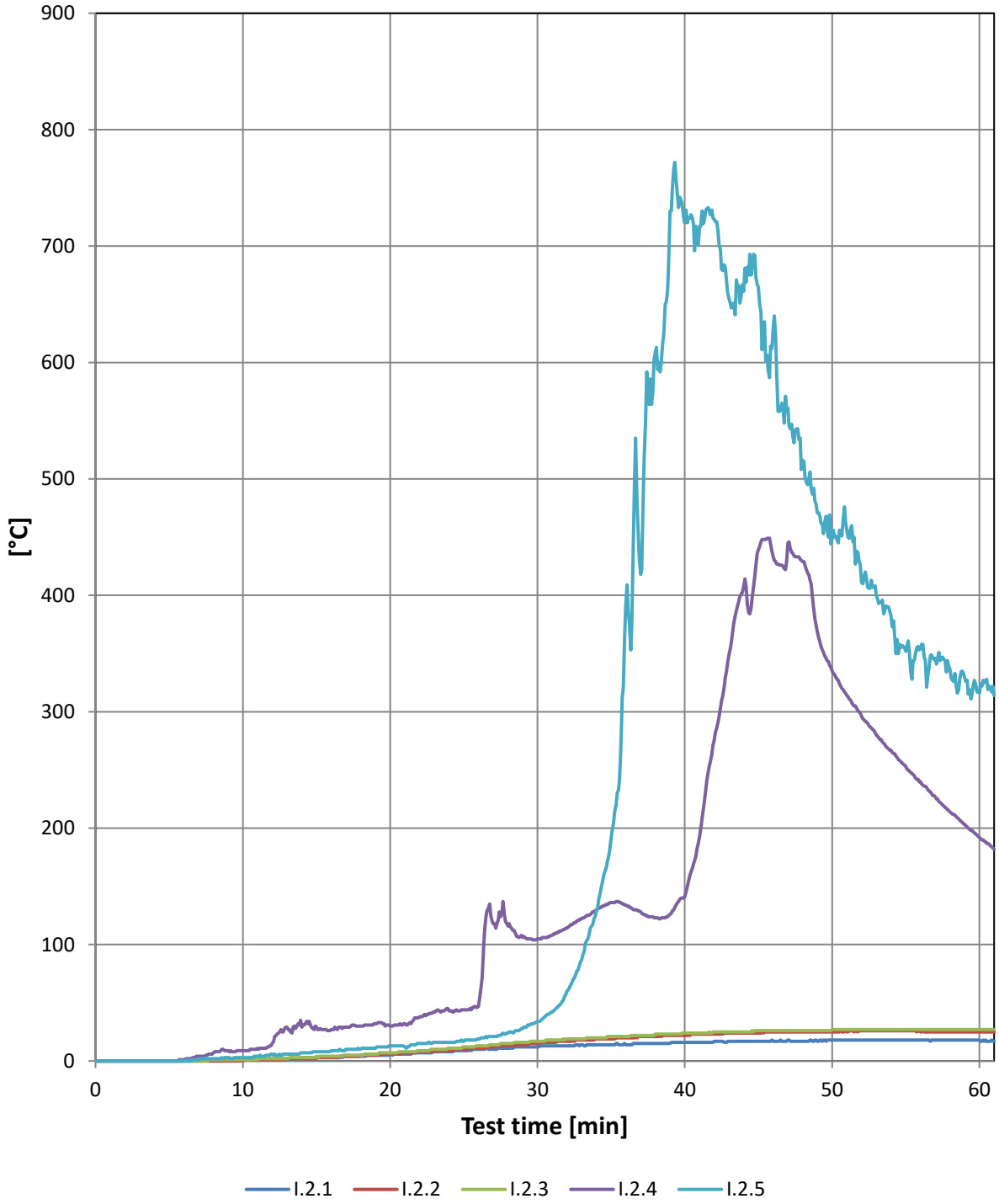
Temperature rise measured 50mm from the facade



Temperature rise measured 50mm from the facade

Min. / °C	I.1.1	I.1.2	I.1.3	I.1.4	I.1.5	I.1.6	I.1.7	I.1.8	I.1.9
0	0	0	0	0	0	0	0	0	0
2	0	-1	0	0	0	0	0	0	0
4	-1	-1	-1	-1	-1	-1	-1	-1	-1
6	24	49	50	61	38	8	5	8	20
8	55	100	109	134	103	32	48	20	67
10	44	110	101	116	81	28	38	34	73
12	66	136	130	140	76	56	55	46	91
14	60	121	116	128	84	47	61	43	105
15	78	131	120	134	89	54	70	49	109
16	75	143	133	143	96	57	65	53	112
18	123	166	153	162	109	69	81	54	126
20	122	179	157	164	110	79	93	58	141
22	139	188	159	170	122	106	104	68	150
24	155	203	200	214	126	131	141	83	188
26	146	219	191	194	128	162	130	95	176
28	145	189	181	182	113	137	135	84	167
30	131	166	156	155	97	133	127	100	152
32	125	154	151	146	96	103	130	115	133
34	128	144	132	129	91	120	101	149	111
36	126	134	118	120	87	579	84	236	99
38	147	134	102	96	70	759	77	257	87
40	142	131	95	92	72	746	61	607	80
42	115	108	85	82	62	499	71	588	78
44	99	101	78	77	60	765	65	582	66
46	89	92	79	77	62	310	75	690	68
48	79	85	74	71	58	275	70	633	59
50	68	75	72	70	57	173	68	463	53
52	60	70	69	67	55	137	69	374	50
54	57	64	64	63	47	103	61	292	44
56	45	59	63	59	49	85	54	230	43
58	55	57	57	53	41	86	56	255	43
60	49	53	52	50	38	81	49	235	38
61	46	54	54	52	38	70	45	225	38

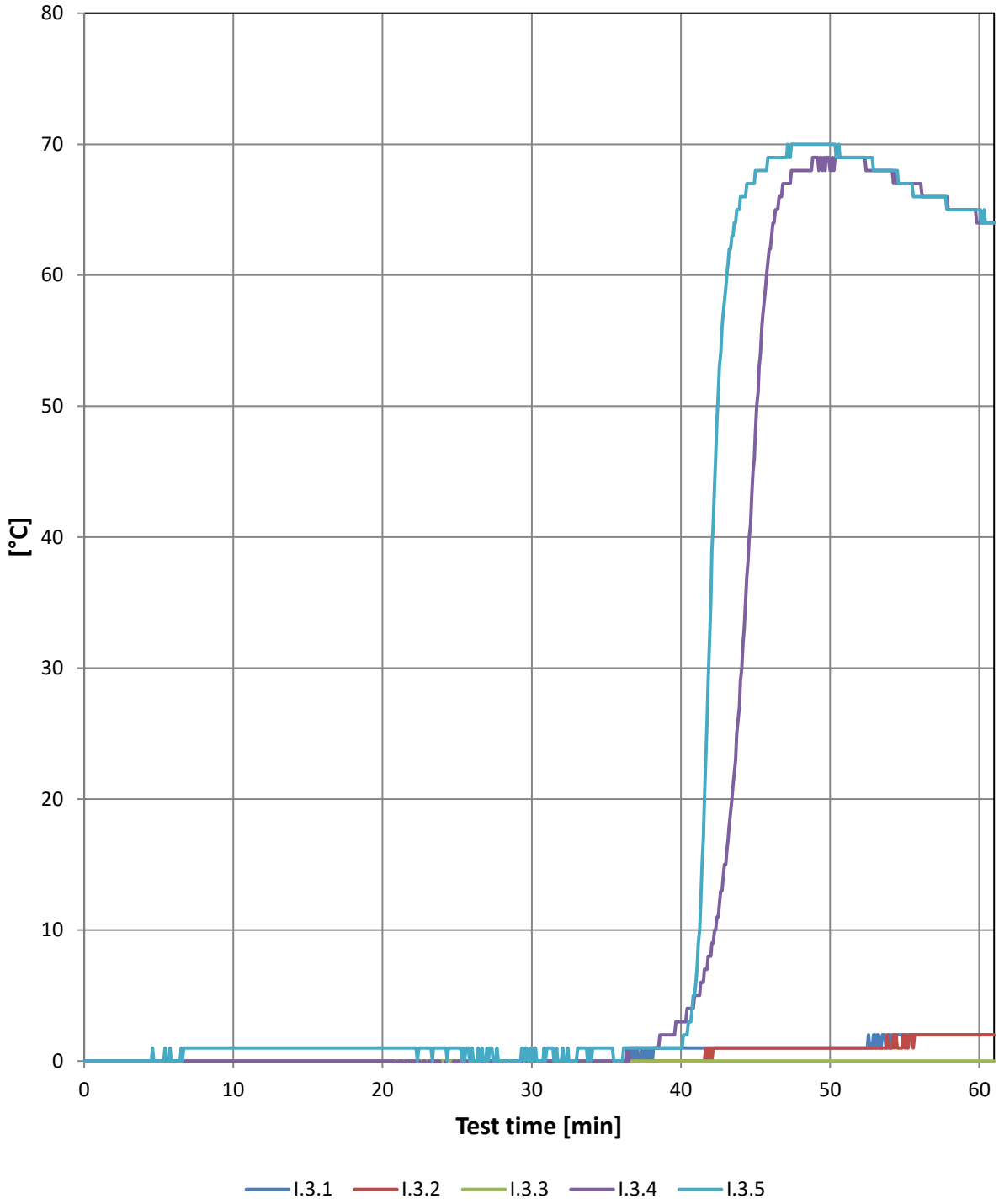
Temperature rise measured in ventilation layer



Temperature rise measured in ventilation layer

Min. / °C	I.2.1	I.2.2	I.2.3	I.2.4	I.2.5
0	0	0	0	0	0
2	0	0	0	0	0
4	0	0	0	0	0
6	0	0	0	1	0
8	1	0	1	7	2
10	1	0	1	9	3
12	2	1	2	15	6
14	3	2	3	29	7
15	3	2	4	29	8
16	3	3	4	27	9
18	4	5	5	30	10
20	6	6	7	30	13
22	7	8	9	38	15
24	8	9	11	43	16
26	10	11	13	47	19
28	11	13	15	116	24
30	12	15	17	105	34
32	13	17	19	114	60
34	14	19	20	130	128
36	14	20	21	134	391
38	15	21	23	123	609
40	16	22	24	141	720
42	17	23	25	276	723
44	17	24	25	408	661
46	17	25	26	433	630
48	17	25	26	429	516
50	18	25	27	335	449
52	18	26	27	296	411
54	18	26	27	267	383
56	18	25	27	240	354
58	18	25	27	214	337
60	18	25	27	192	316
61	17	25	27	182	314

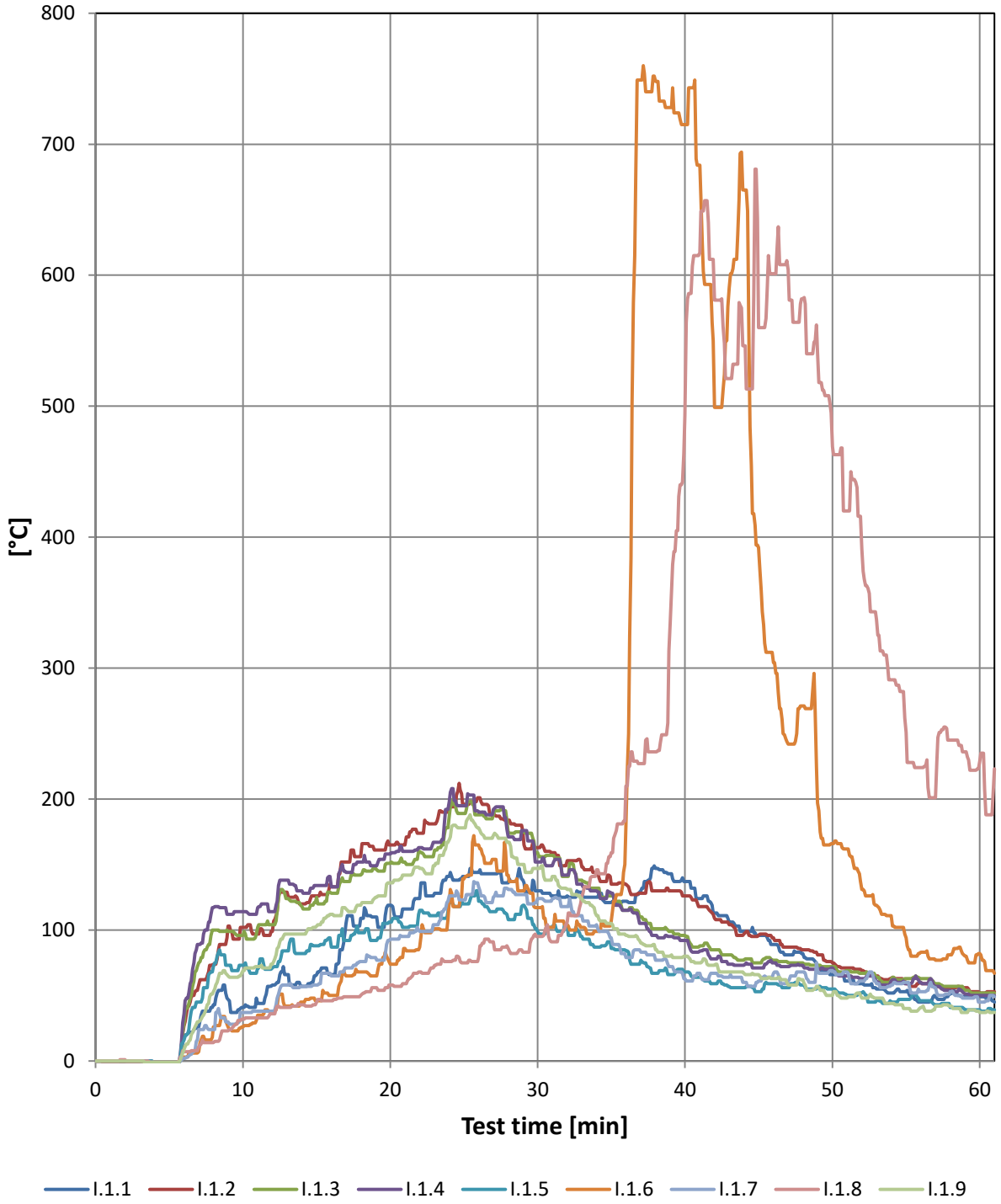
Temperature rise measured in middle of insulation



Temperature rise measured in middle of insulation

Min. / °C	I.3.1	I.3.2	I.3.3	I.3.4	I.3.5
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	1
10	0	0	0	0	1
12	0	0	0	0	1
14	0	0	0	0	1
15	0	0	0	0	1
16	0	0	0	0	1
18	0	0	0	0	1
20	0	0	0	0	1
22	0	0	0	0	1
24	0	0	0	-1	1
26	0	0	0	-1	1
28	0	0	0	-1	0
30	0	0	0	0	0
32	0	0	0	0	0
34	0	0	0	0	0
36	0	0	0	0	0
38	1	0	0	1	1
40	1	0	0	3	1
42	1	1	0	8	35
44	1	1	0	29	66
46	1	1	0	62	69
48	1	1	0	68	70
50	1	1	0	68	70
52	1	1	0	69	69
54	2	1	0	68	68
56	2	2	0	67	66
58	2	2	0	65	65
60	2	2	0	64	65
61	2	2	0	64	64

Temperature rise measured according to the standard - 50 mm from facade. Minimum of 30 sec

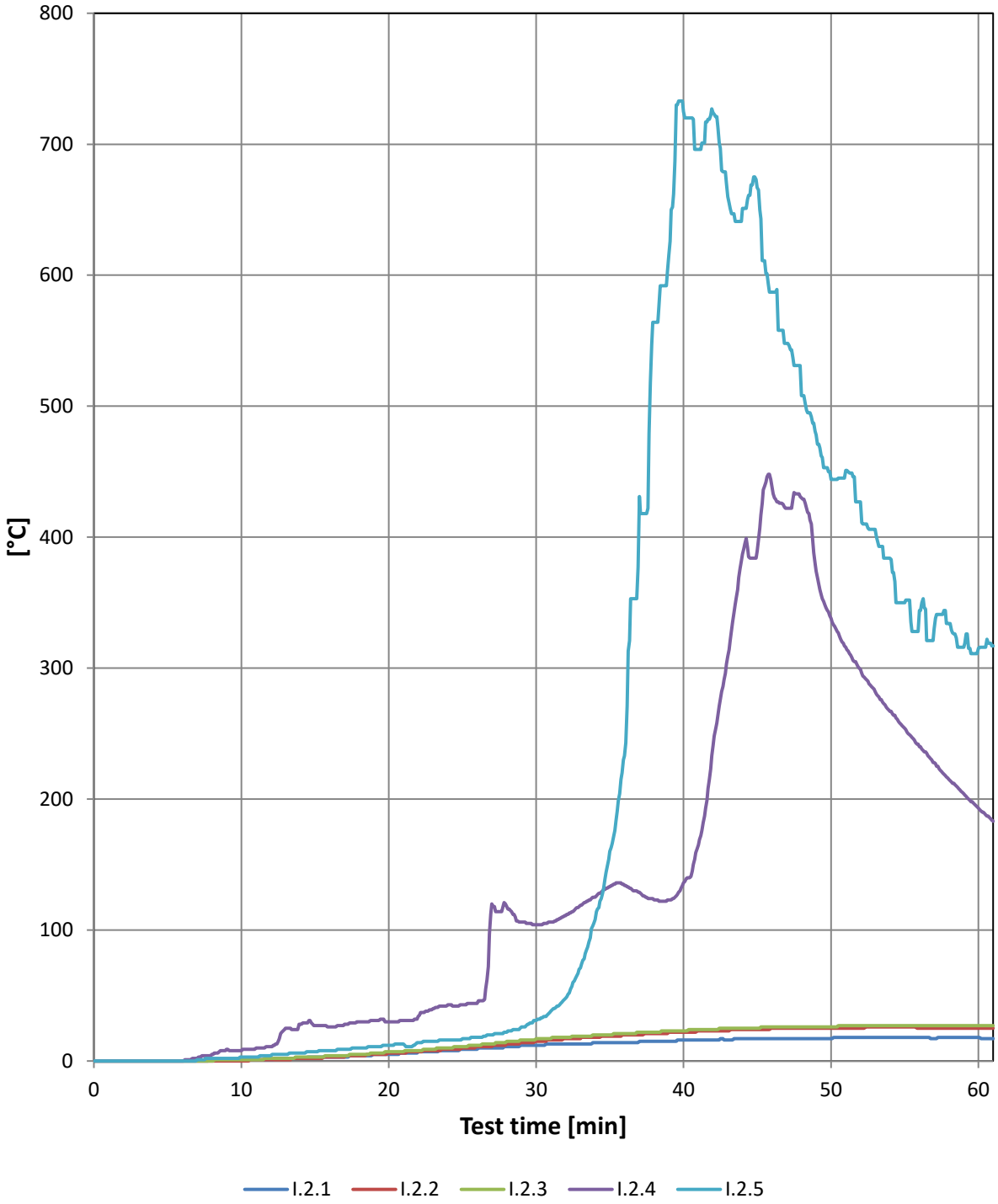


Temperature rise measured according to the standard - 50 mm from facade. Minimum of 30 sec

Min. / °C	I.1.1	I.1.2	I.1.3	I.1.4	I.1.5	I.1.6	I.1.7	I.1.8	I.1.9	I.1.Max
0	0	0	0	0	0	0	0	0	0	0
2	0	-1	0	0	0	0	0	1	0	1
4	-1	-2	-1	-1	-1	-1	-1	-1	-1	-1
6	19	27	29	36	16	3	2	7	9	36
8	43	74	100	117	72	26	24	14	53	117
10	41	102	96	114	73	26	37	32	69	114
12	58	99	104	114	71	38	38	36	74	114
14	57	120	118	130	82	45	57	43	97	130
15	66	126	125	134	88	46	58	45	103	134
16	66	133	128	133	87	50	65	46	112	133
18	109	156	142	152	98	68	76	50	119	156
20	119	165	151	158	106	74	93	58	136	165
22	124	174	160	163	115	87	99	68	147	174
24	141	194	187	198	121	122	126	76	169	198
26	144	201	188	190	122	165	133	79	178	201
28	136	184	174	171	108	142	131	86	167	184
30	130	163	159	152	99	117	124	95	147	163
32	126	153	141	142	104	104	118	106	131	153
34	125	144	132	130	87	99	104	146	111	146
36	122	135	115	115	84	180	79	210	96	210
38	147	130	101	96	67	748	77	236	85	748
40	137	126	96	92	68	715	63	493	80	715
42	113	109	85	78	59	499	67	581	73	581
44	99	97	77	73	56	665	60	546	67	665
46	89	94	77	75	59	304	67	601	63	601
48	82	85	75	73	58	271	68	582	62	582
50	66	75	72	71	55	166	69	469	50	469
52	59	69	67	63	52	131	61	391	48	391
54	52	63	62	61	45	111	58	291	44	291
56	45	60	63	60	46	83	53	224	41	224
58	51	56	57	54	41	81	53	245	42	245
60	51	52	52	50	39	82	45	229	37	229
61	45	53	52	50	39	67	49	223	37	223

Failure [min]	-	-	-	-	-	36,33	-	40,00	-	36,33
Failure°C	500	500	500	500	500	500	500	500	500	500

Temperature rise measured according to the standard - ventilation layer. Minimum of 30 sec

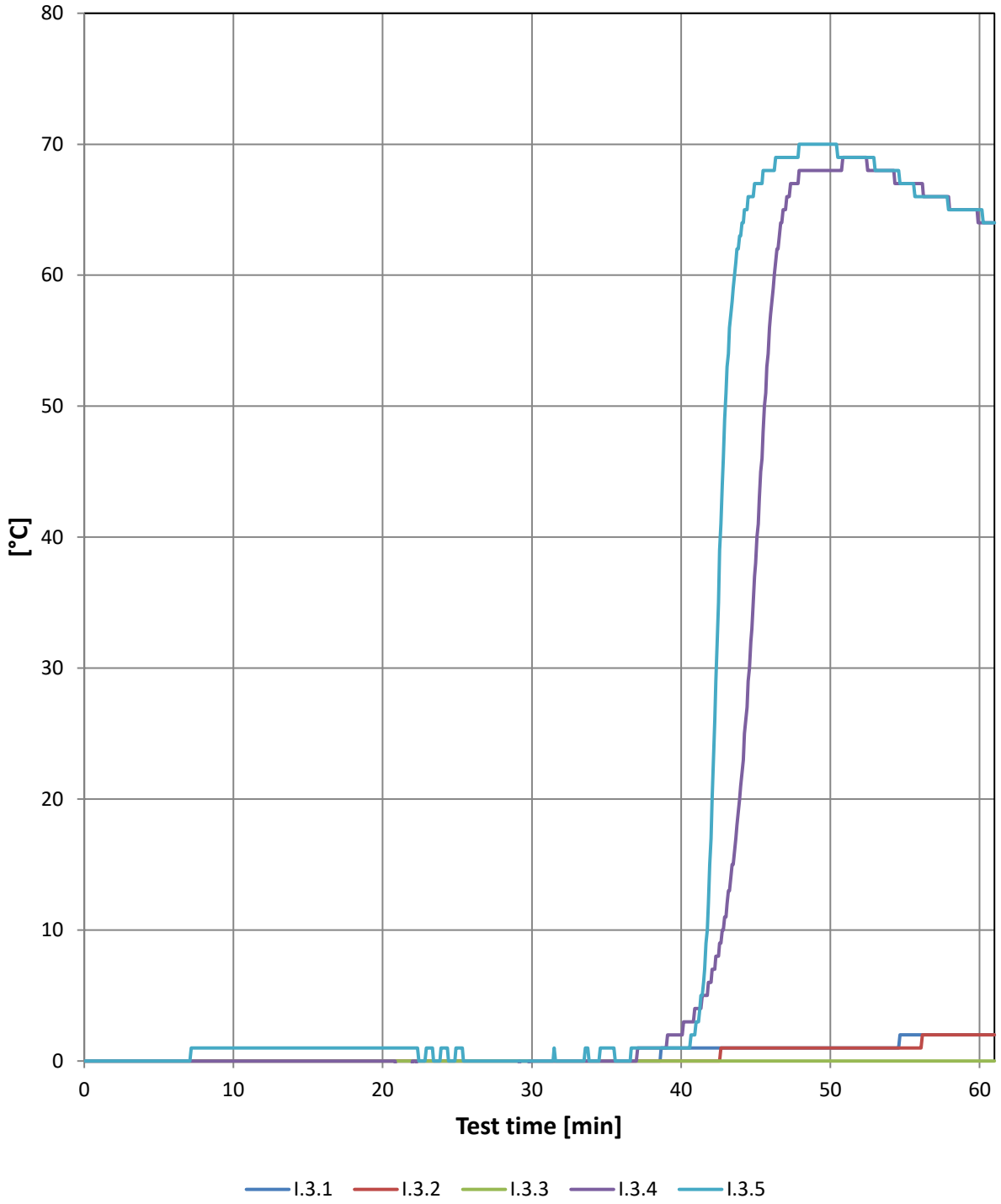


Temperature rise measured according to the standard - ventilation layer. Minimum of 30 sec

Min. / °C	I.2.1	I.2.2	I.2.3	I.2.4	I.2.5	I.2.Max
0	0	0	0	0	0	0
2	0	0	0	0	0	0
4	0	0	0	0	0	0
6	0	0	0	0	0	0
8	1	0	0	5	2	5
10	1	0	1	8	3	8
12	1	1	2	11	4	11
14	2	2	3	28	6	28
15	3	2	3	27	7	27
16	3	3	4	26	8	26
18	4	4	5	30	10	30
20	5	6	7	30	12	30
22	7	7	8	34	14	34
24	8	9	10	43	16	43
26	9	11	12	44	18	44
28	11	13	15	118	22	118
30	12	15	17	104	31	104
32	13	17	18	111	48	111
34	14	18	20	125	108	125
36	14	20	21	134	233	233
38	15	21	22	123	564	564
40	16	22	23	136	725	725
42	16	23	24	241	724	724
44	17	24	25	387	651	651
46	17	25	26	438	587	587
48	17	25	26	430	508	508
50	17	25	26	338	444	444
52	18	25	27	299	427	427
54	18	26	27	267	384	384
56	18	25	27	240	344	344
58	18	25	27	215	334	334
60	18	25	27	193	315	315
61	17	25	27	183	317	317

Failure [min]	-	-	-	-	37,67	37,67
Failure°C	500	500	500	500	500	500

Temperature rise measured according to the standard - in the middle of the insulation. Minimum of 30 sec

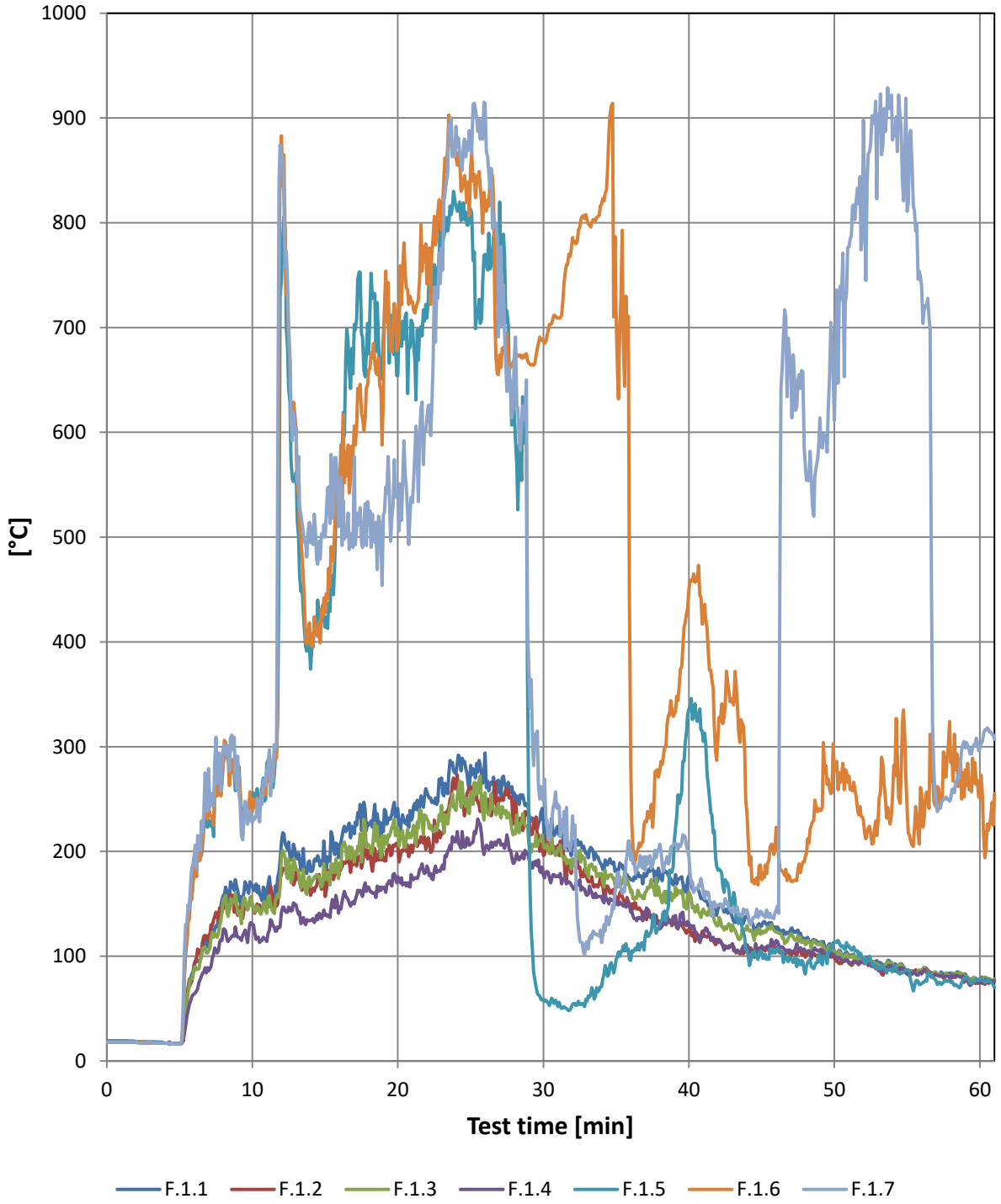


Temperature rise measured according to the standard - in the middle of the insulation. Minimum of 30 sec

Min. / °C	I.3.1	I.3.2	I.3.3	I.3.4	I.3.5	I.3.Max
0	0	0	0	0	0	0
2	0	0	0	0	0	0
4	0	0	0	0	0	0
6	0	0	0	0	0	0
8	0	0	0	0	1	1
10	0	0	0	0	1	1
12	0	0	0	0	1	1
14	0	0	0	0	1	1
15	0	0	0	0	1	1
16	0	0	0	0	1	1
18	0	0	0	0	1	1
20	0	0	0	0	1	1
22	0	0	0	0	1	1
24	0	0	0	-1	1	1
26	0	0	0	-1	0	0
28	0	0	0	-1	0	0
30	0	0	0	0	0	0
32	0	0	0	0	0	0
34	0	0	0	0	0	0
36	0	0	0	0	0	0
38	0	0	0	1	1	1
40	1	0	0	2	1	2
42	1	0	0	6	17	17
44	1	1	0	21	63	63
46	1	1	0	57	68	68
48	1	1	0	68	70	70
50	1	1	0	68	70	70
52	1	1	0	69	69	69
54	1	1	0	68	68	68
56	2	1	0	67	66	67
58	2	2	0	65	65	65
60	2	2	0	64	65	65
61	2	2	0	64	64	64

Failure [min]	-	-	-	-	-	-
Failure°C	500	500	500	500	500	500

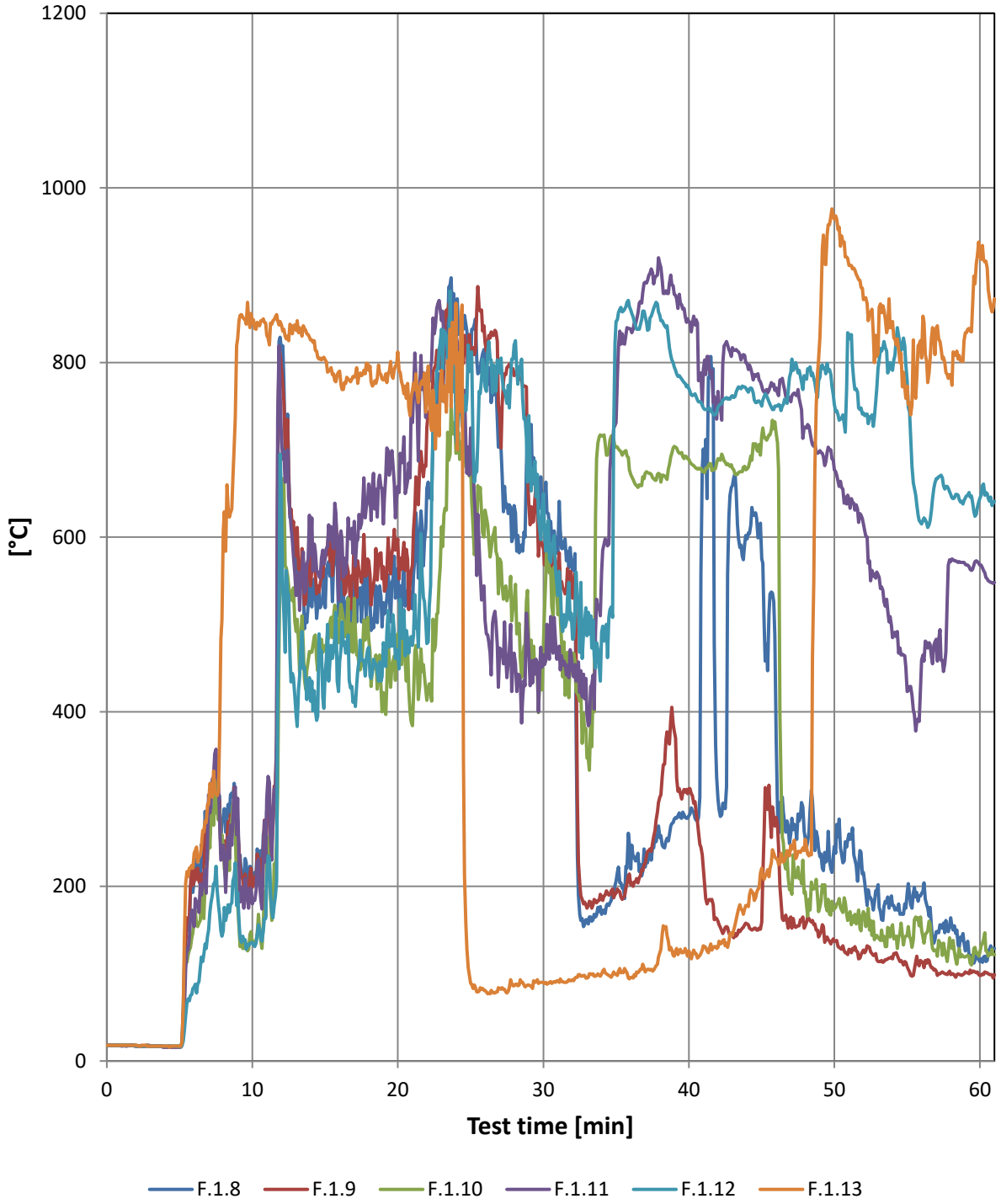
Vertical measurements on main facade



Vertical measurements on main facade

Min. / °C	F.1.1	F.1.2	F.1.3	F.1.4	F.1.5	F.1.6	F.1.7
0	19	19	18	18	19	18	18
2	18	18	18	18	18	18	18
4	17	17	17	17	17	17	17
6	93	89	89	64	180	187	196
8	158	145	155	126	285	286	298
10	168	149	149	130	251	238	227
12	209	178	196	142	745	883	864
14	181	158	167	134	374	397	495
15	190	157	174	139	414	428	500
16	204	181	189	147	525	522	512
18	225	201	206	166	675	660	512
20	241	205	223	176	654	681	545
22	257	206	231	186	709	742	613
24	274	260	239	210	817	863	892
26	294	243	256	203	770	813	914
28	256	238	219	189	621	670	668
30	228	196	205	177	59	687	248
32	210	188	193	166	54	786	234
34	187	168	179	157	71	818	113
36	173	146	161	142	96	281	192
38	177	131	159	126	130	277	207
40	177	124	161	131	336	450	195
42	145	113	129	113	182	310	149
44	138	105	129	111	105	235	144
46	124	108	123	115	104	223	144
48	117	99	111	105	83	195	570
50	105	98	104	101	113	277	611
52	99	95	99	94	98	230	898
54	91	89	92	89	85	253	879
56	84	86	84	83	74	255	740
58	84	79	81	80	75	285	250
60	78	75	78	74	77	251	298
61	77	76	78	77	70	255	307

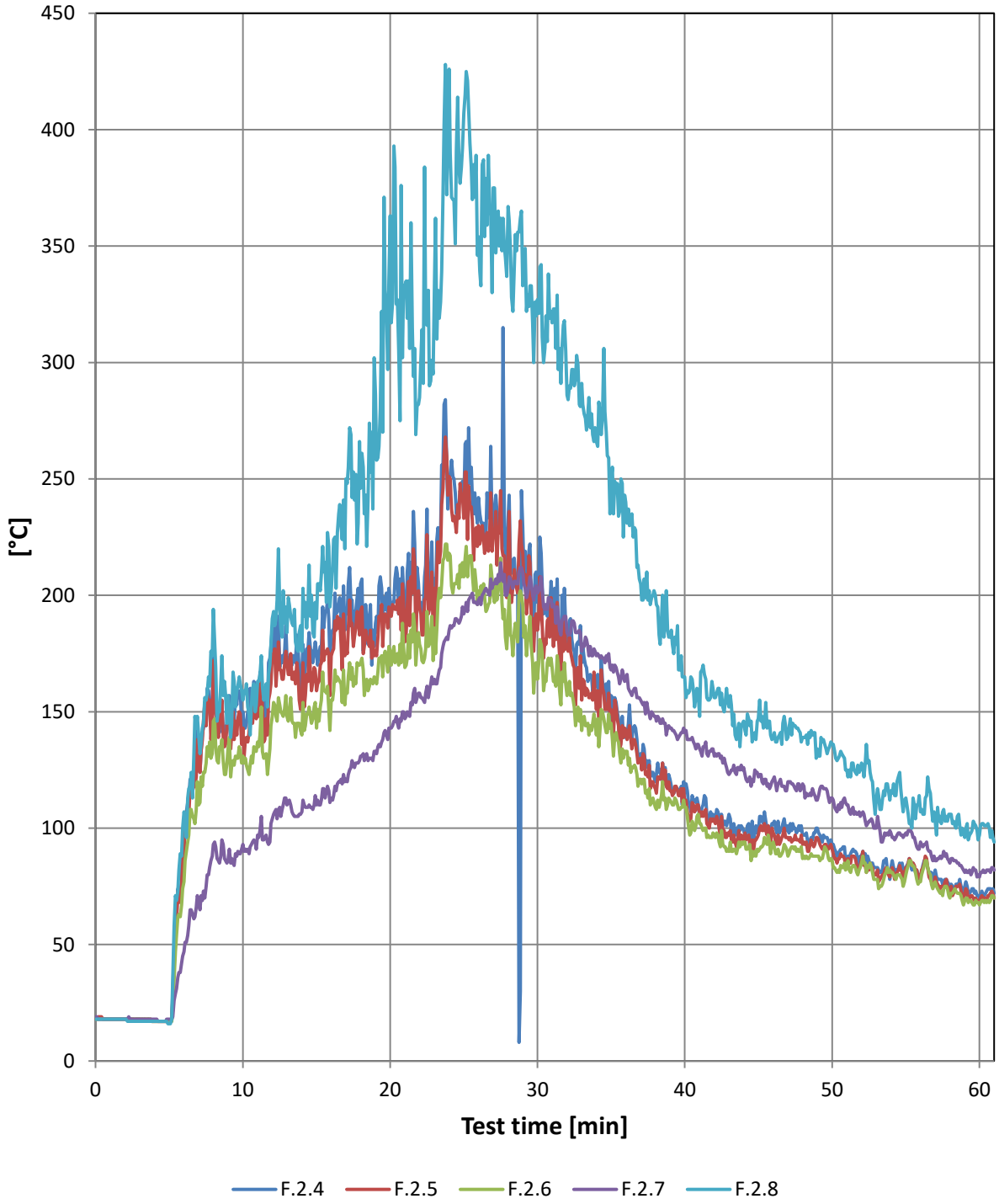
Vertical measurements on main facade



Vertical measurements on main facade

Min. / °C	F.1.8	F.1.9	F.1.10	F.1.11	F.1.12	F.1.13
0	18	18	18	18	18	18
2	17	18	18	17	17	18
4	16	16	17	16	17	17
6	209	206	162	154	85	238
8	276	246	246	247	149	607
10	208	199	135	180	136	845
12	815	794	616	711	644	843
14	527	544	468	579	412	826
15	519	583	476	575	445	803
16	526	572	505	599	457	790
18	529	573	484	661	474	791
20	564	598	489	658	466	812
22	656	726	413	781	478	759
24	872	755	696	833	713	868
26	811	823	631	505	772	81
28	636	785	526	467	820	86
30	644	587	480	465	650	90
32	562	530	443	447	483	93
34	168	188	716	561	491	100
36	220	202	672	838	860	96
38	256	302	672	913	854	124
40	281	312	689	847	770	126
42	300	160	690	767	749	130
44	598	157	678	799	768	178
46	371	279	719	771	750	232
48	255	155	194	726	782	254
50	246	137	174	677	752	964
52	216	127	171	615	742	872
54	178	117	156	485	791	847
56	192	114	150	459	615	805
58	164	99	133	572	649	786
60	114	98	124	568	644	923
61	129	99	122	548	641	873

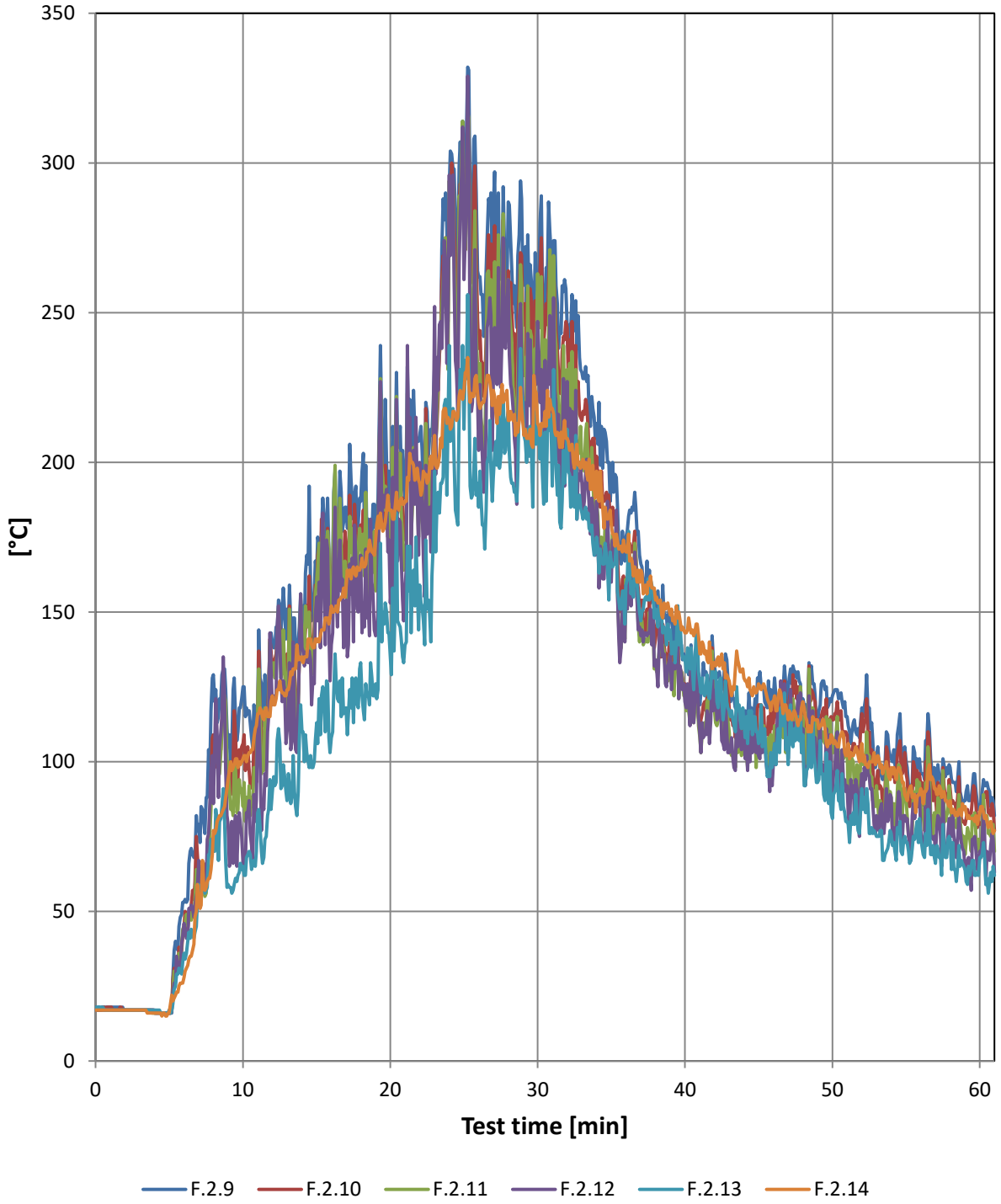
Vertical measurements on the wing



Vertical measurements on the wing

Min. / °C	F.2.4	F.2.5	F.2.6	F.2.7	F.2.8
0	18	18	18	19	18
2	18	18	18	18	18
4	17	17	17	18	17
6	88	90	77	47	107
8	178	172	146	93	194
10	150	143	131	93	155
12	186	175	148	104	190
14	168	156	140	107	176
15	175	159	143	110	190
16	183	174	155	113	202
18	205	193	171	131	246
20	198	193	176	143	363
22	196	195	179	158	285
24	251	251	218	185	426
26	242	230	202	198	354
28	233	217	189	203	367
30	197	185	164	201	327
32	179	178	157	184	286
34	161	151	140	174	266
36	141	142	133	164	240
38	120	117	109	148	200
40	115	111	109	141	165
42	104	103	97	131	156
44	99	95	94	126	146
46	102	98	94	121	139
48	97	93	87	119	139
50	93	91	86	113	136
52	88	87	85	106	128
54	83	81	81	98	116
56	80	79	77	94	107
58	74	73	70	85	106
60	70	68	67	79	97
61	72	70	70	82	94

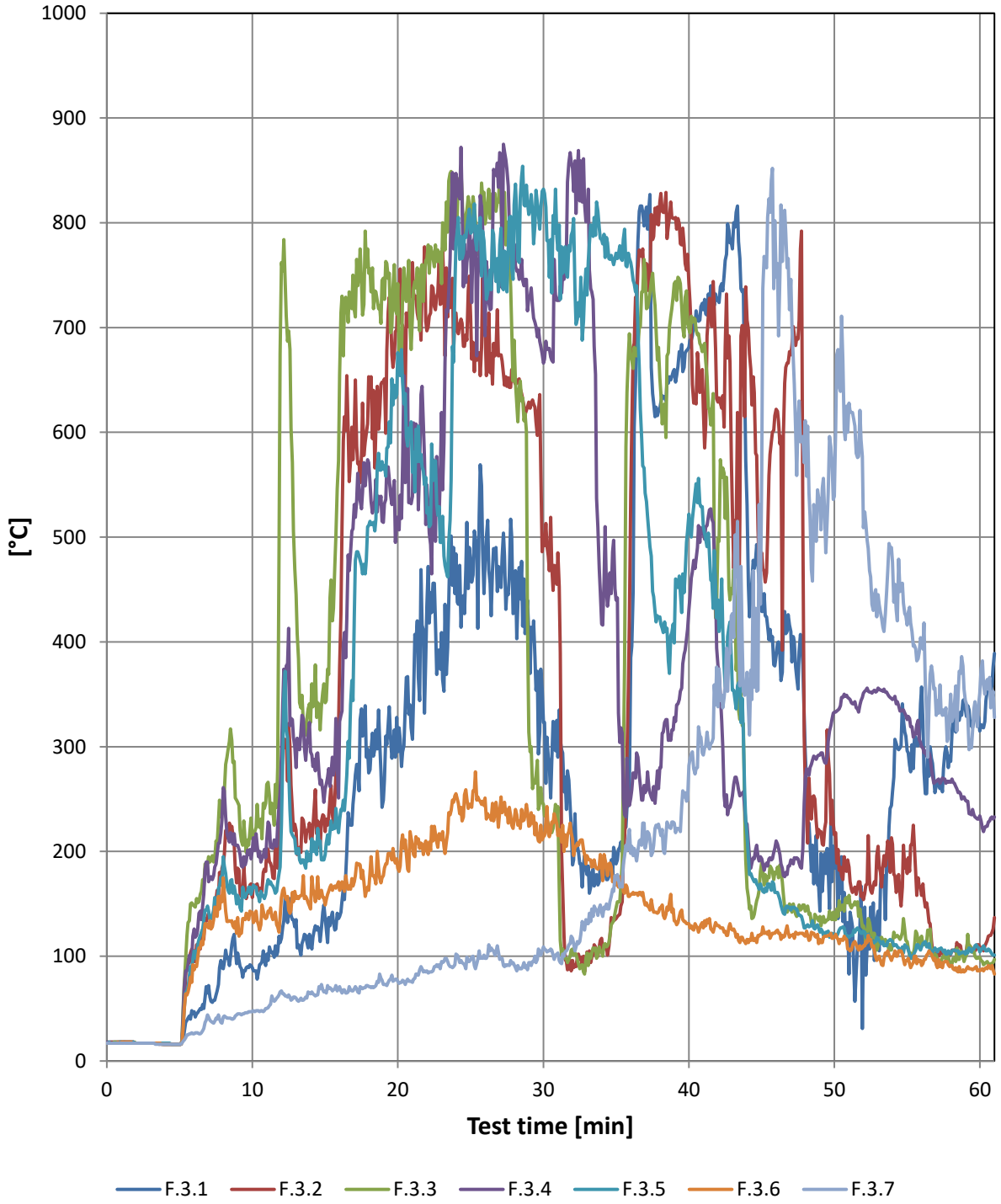
Vertical measurements on the wing



Vertical measurements on the wing

Min. / °C	F.2.9	F.2.10	F.2.11	F.2.12	F.2.13	F.2.14
0	18	18	17	17	18	17
2	17	17	17	17	17	17
4	16	16	16	17	17	16
6	53	45	45	46	36	28
8	129	109	101	86	72	77
10	125	106	85	66	65	101
12	140	131	129	119	90	122
14	144	145	142	138	110	135
15	163	158	160	155	113	140
16	152	155	151	139	108	152
18	187	179	174	169	133	165
20	181	172	165	153	135	184
22	209	199	199	200	159	193
24	292	285	294	296	239	214
26	262	238	211	204	185	220
28	287	264	261	261	217	214
30	260	254	263	247	209	213
32	245	245	231	227	211	208
34	213	202	187	187	175	197
36	175	161	161	159	159	170
38	151	141	132	134	151	154
40	134	126	122	120	135	143
42	132	122	117	118	129	133
44	116	113	109	110	113	128
46	122	113	107	100	102	120
48	121	118	115	111	109	120
50	122	114	103	88	81	108
52	118	116	105	96	91	106
54	101	96	88	88	76	98
56	96	92	86	77	74	91
58	98	91	88	81	74	87
60	85	79	74	70	68	83
61	82	77	70	63	62	77

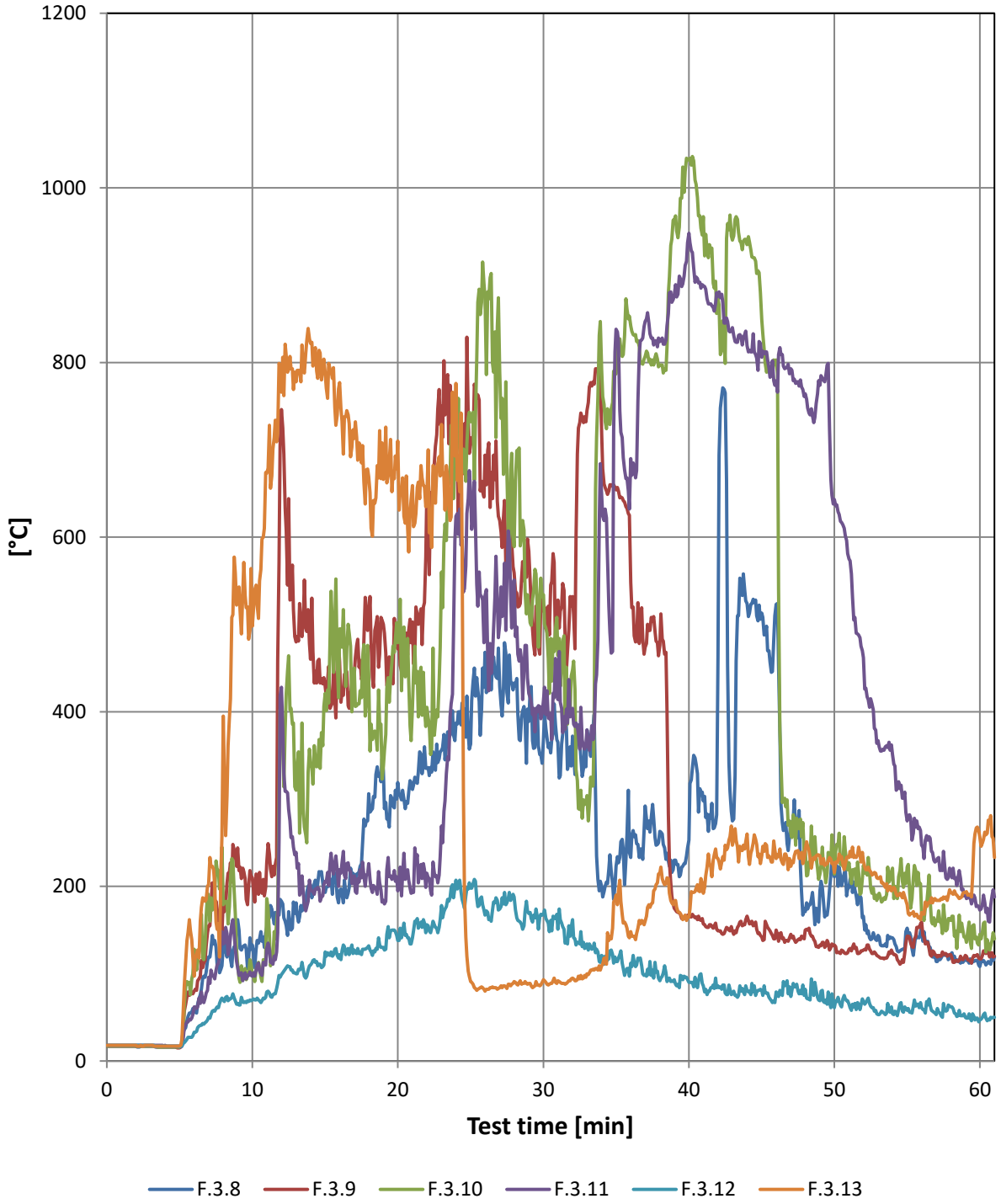
Horizontal measurements



Horizontal measurements

Min. / °C	F.3.1	F.3.2	F.3.3	F.3.4	F.3.5	F.3.6	F.3.7
0	18	17	18	18	17	17	17
2	17	17	17	17	17	17	17
4	16	16	16	16	17	16	16
6	47	95	148	126	105	87	26
8	88	188	243	261	195	175	42
10	89	156	212	201	164	142	47
12	117	270	762	292	226	156	67
14	113	212	323	295	191	145	64
15	136	219	342	260	197	149	67
16	138	376	655	324	230	163	71
18	275	653	752	571	511	163	71
20	295	739	742	519	676	184	76
22	434	697	765	550	523	201	86
24	484	714	816	847	781	255	102
26	474	701	799	692	763	251	98
28	428	649	688	780	817	230	92
30	323	499	245	666	832	214	109
32	187	96	107	852	792	211	117
34	181	117	104	417	784	183	142
36	385	540	672	251	762	159	198
38	623	820	652	280	424	146	220
40	681	742	699	431	522	131	282
42	728	629	499	377	440	129	338
44	530	707	165	226	215	116	371
46	387	622	179	210	161	124	748
48	295	263	143	269	127	119	611
50	184	216	135	333	121	118	539
52	118	154	129	351	124	110	509
54	257	207	113	345	114	99	476
56	357	158	119	300	109	91	401
58	286	102	92	266	102	91	350
60	315	109	99	234	104	86	351
61	389	137	97	233	101	83	328

Horizontal measurments



Horizontal measurments

Min. / °C	F.3.8	F.3.9	F.3.10	F.3.11	F.3.12	F.3.13
0	17	17	17	18	18	18
2	17	17	17	18	18	18
4	16	16	16	18	17	17
6	60	80	128	62	33	97
8	131	182	179	134	70	395
10	133	210	99	97	70	498
12	183	746	381	428	99	766
14	202	460	339	197	110	822
15	193	429	421	206	125	788
16	195	457	495	219	122	777
18	306	500	443	226	132	669
20	319	472	479	195	138	710
22	335	654	405	215	156	644
24	387	699	707	624	207	776
26	468	694	875	533	167	80
28	433	559	589	551	188	91
30	369	515	534	413	168	93
32	372	532	448	404	162	95
34	200	719	792	648	121	109
36	233	548	842	690	112	148
38	263	476	797	824	92	215
40	253	165	1032	948	90	165
42	462	149	873	876	86	232
44	524	166	935	819	81	260
46	523	150	803	779	79	232
48	171	150	243	764	82	243
50	211	133	214	643	61	216
52	166	127	224	462	68	229
54	141	124	221	351	54	196
56	153	159	170	247	61	170
58	122	122	161	217	62	193
60	108	117	145	173	47	257
61	119	120	140	188	50	233

Plate thermocouple on facade

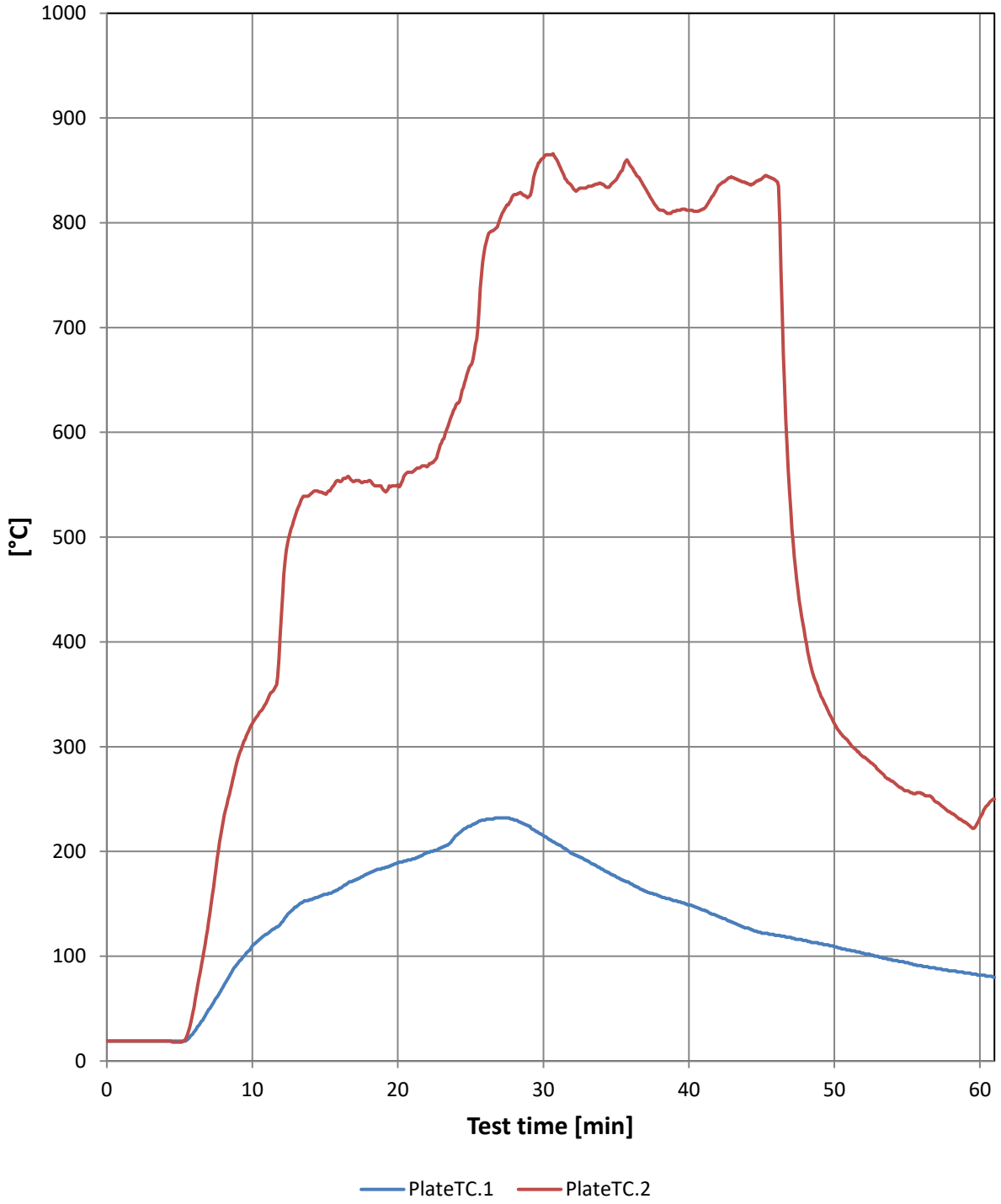
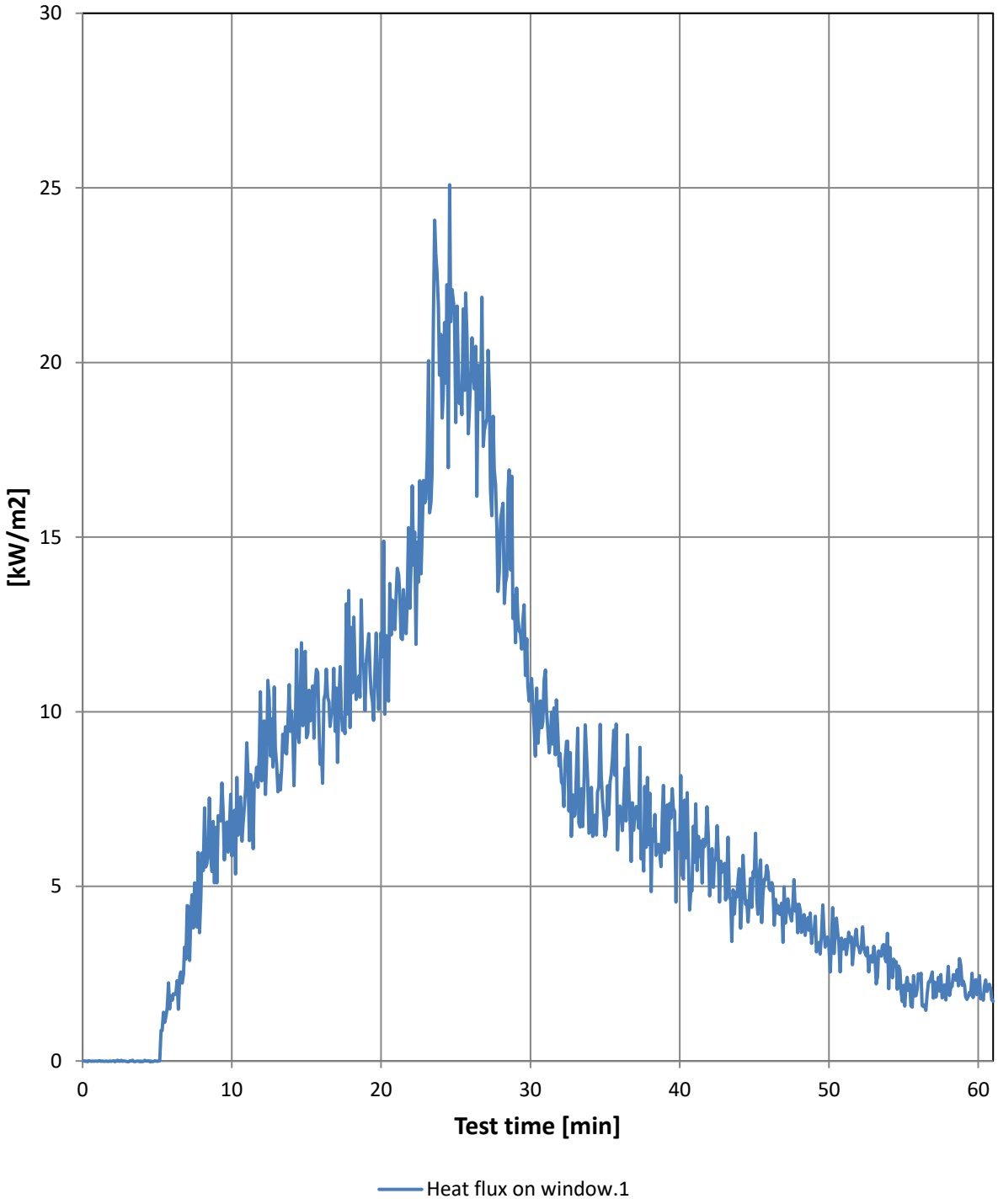


Plate thermocouple on facade

Min. / °C	PlateTC.1	PlateTC.2
0	19	19
2	19	19
4	19	19
6	28	52
8	71	229
10	110	322
12	132	426
14	154	541
15	159	541
16	165	553
18	179	554
20	189	550
22	199	567
24	215	626
26	230	777
28	230	827
30	215	862
32	198	834
34	183	837
36	169	854
38	157	812
40	149	812
42	138	835
44	127	838
46	120	840
48	115	404
50	109	322
52	103	290
54	96	267
56	91	255
58	86	237
60	82	232
61	80	250

Heat flux on window

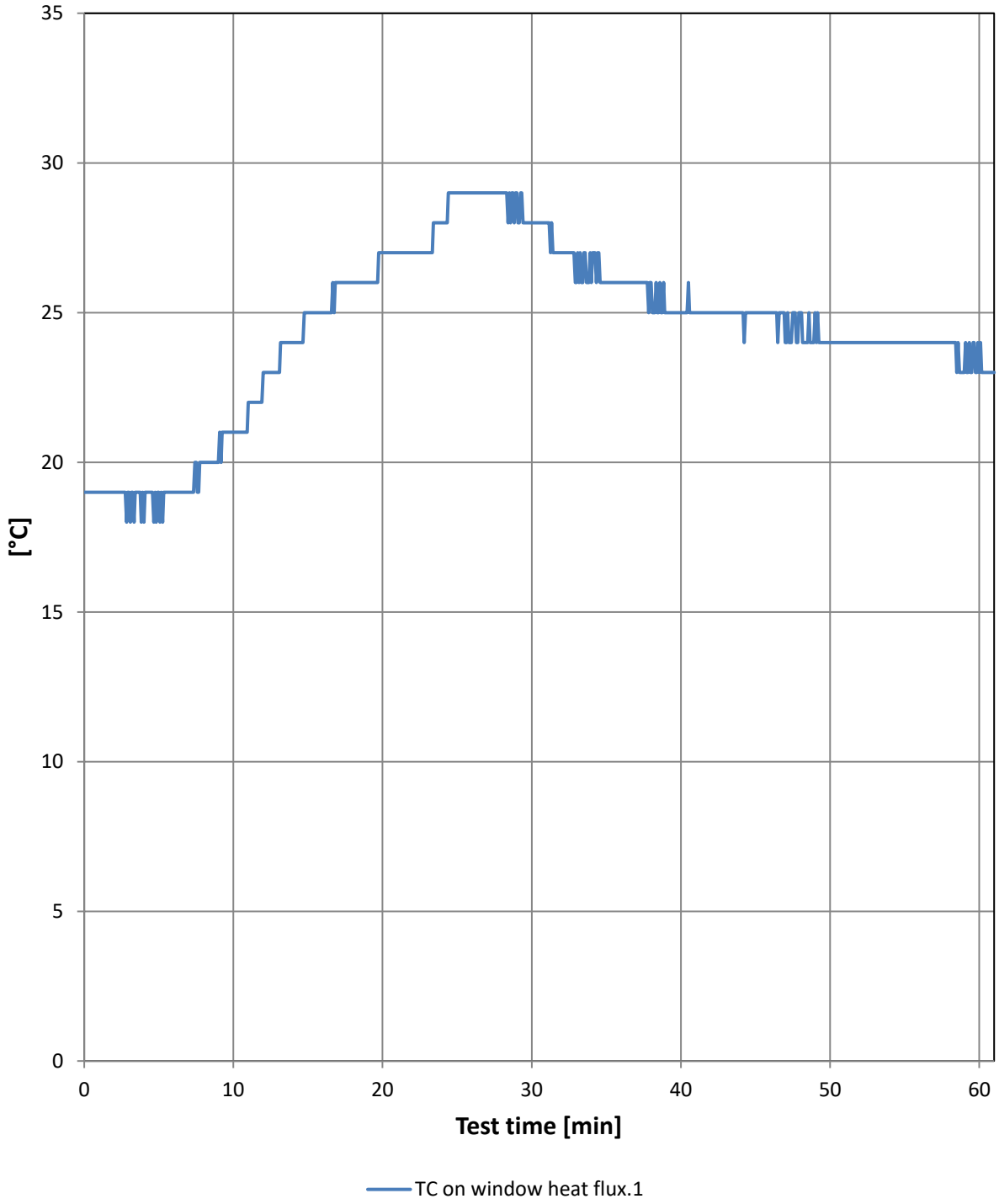


Heat flux on window

Min. / kW/m2	Heat flux on window.1
0	0
2	0
4	0
6	2
8	6
10	6
12	8
14	10
15	9
16	9
18	12
20	12
22	14
24	21
26	20
28	16
30	11
32	9
34	7
36	7
38	8
40	6
42	5
44	6
46	5
48	4
50	3
52	3
54	2
56	3
58	3
60	2
61	2

TC on window heat Flux

Flux.TC. on window

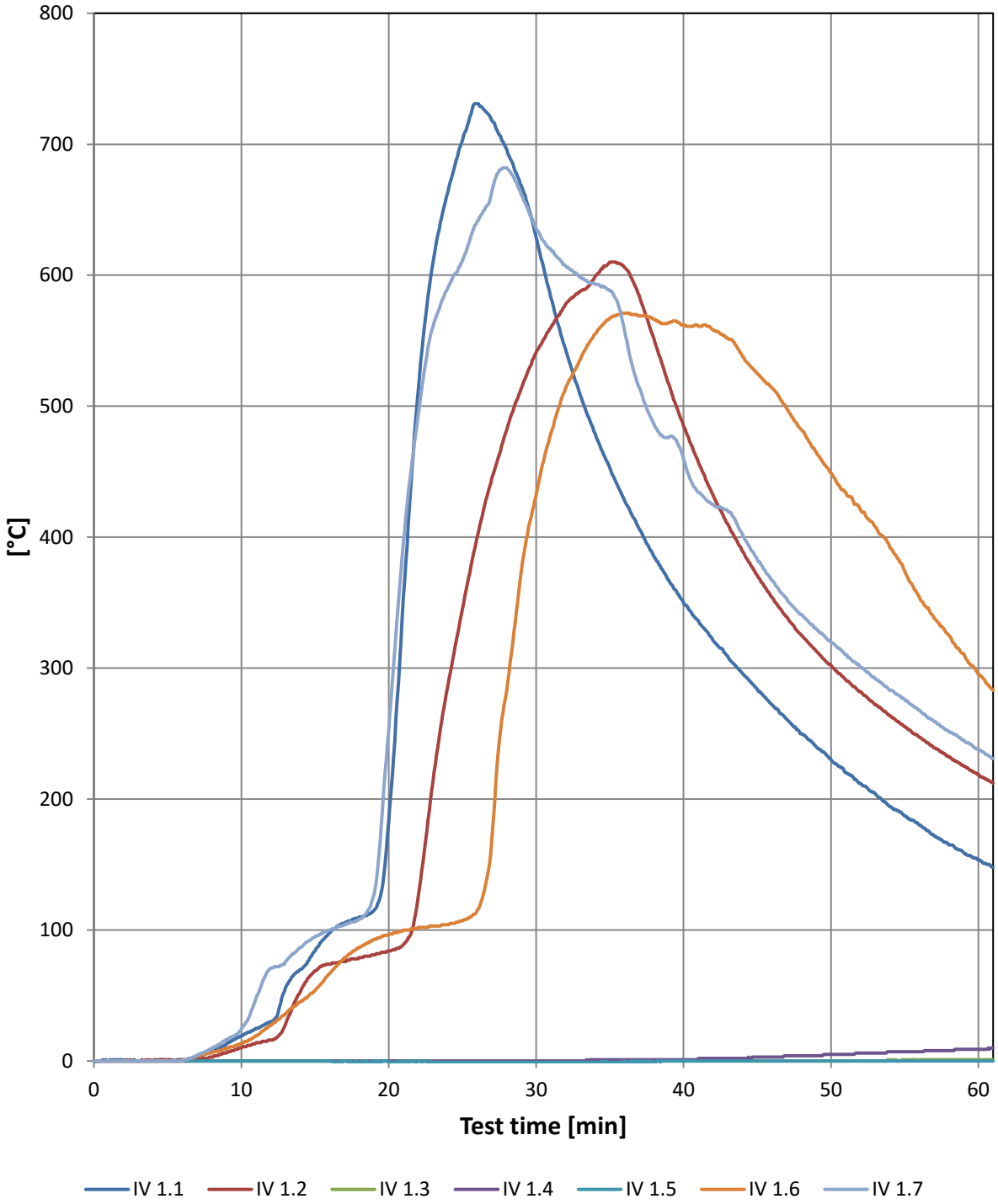


TC on window heat Flux

Flux.TC. on window

Min. / °C	TC on window heat flux.1
0	19
2	19
4	18
6	19
8	20
10	21
12	23
14	24
15	25
16	25
18	26
20	27
22	27
24	28
26	29
28	29
30	28
32	27
34	26
36	26
38	26
40	25
42	25
44	25
46	25
48	25
50	24
52	24
54	24
56	24
58	24
60	23
61	23

Temperature rise measured behind the windbreaker board



Temperature rise measured behind the windbreaker board

Min. / °C	IV 1.1	IV 1.2	IV 1.3	IV 1.4	IV 1.5	IV 1.6	IV 1.7	IV 1.Max
0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
6	1	1	0	0	0	1	0	1
8	7	3	0	0	0	6	10	10
10	19	10	0	0	0	13	24	24
12	30	16	0	0	0	27	71	71
14	70	53	0	0	0	45	87	87
15	84	69	0	0	0	54	95	95
16	98	74	0	0	0	67	100	100
18	110	79	0	0	-1	87	108	110
20	183	84	0	0	-1	97	253	253
22	511	125	0	0	0	102	493	511
24	663	286	0	0	-1	104	590	663
26	731	400	0	0	-1	115	641	731
28	696	482	0	0	-1	283	682	696
30	629	541	0	0	-1	432	636	636
32	543	578	0	0	-1	514	607	607
34	479	599	0	1	-1	555	593	599
36	428	606	0	1	0	571	558	606
38	385	551	0	1	-1	566	486	566
40	350	485	0	1	0	562	460	562
42	321	432	0	2	0	558	425	558
44	296	389	0	2	0	538	402	538
46	272	354	0	3	0	514	367	514
48	250	325	0	4	0	482	341	482
50	230	302	0	5	0	449	320	449
52	212	282	0	6	0	421	301	421
54	194	264	1	7	0	392	283	392
56	180	247	0	7	0	354	268	354
58	165	232	1	8	0	325	252	325
60	154	219	1	9	0	295	238	295
61	148	212	1	10	0	283	231	283

Failure [min]	21,83	28,50	-	-	-	31,58	22,08	21,83
Failure°C	500	500	500	500	500	500	500	500

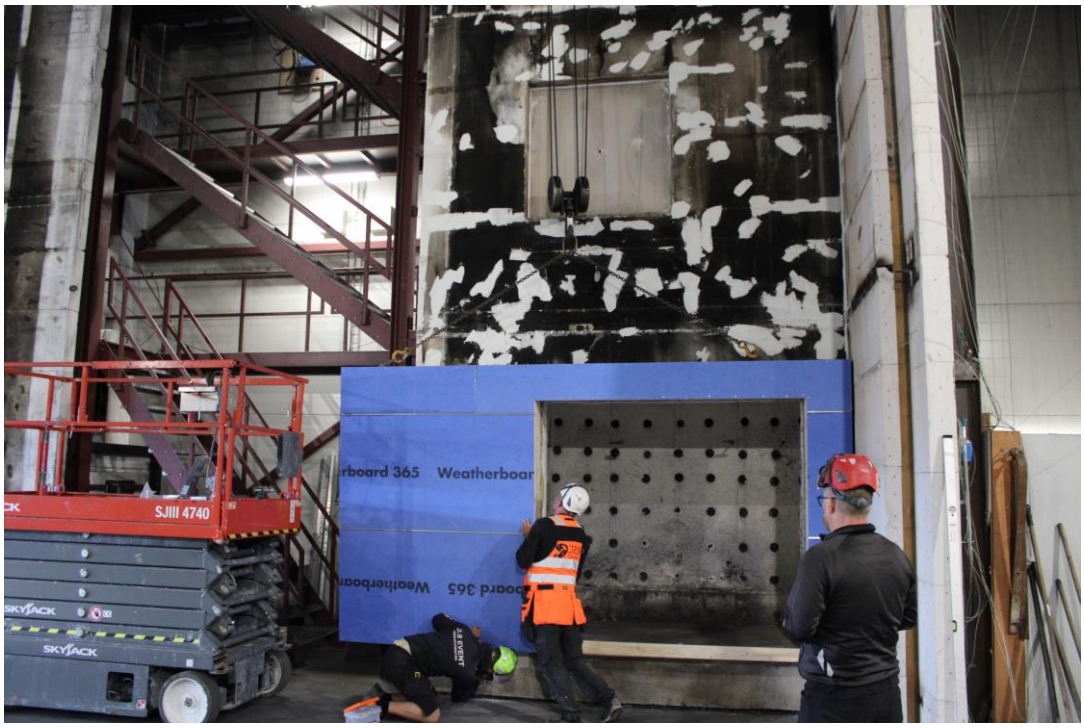


Photo No. 1 Prefabricated cassettes were mounted to the aerated concrete with stone wool in between the cassette and the concrete.

Photo No. 2 The prefabricated cassettes was mounted with steel brackets, leaving a gap.

Photo No. 3 The vertical gaps was closed off with rockwool and weatherboards as seen in the picture.

Photo No. 4 Internal thermocouples was mounted in the gap and wired out through the side.

Photo No. 5 The pre painted flame deflectors was mounted above the gaps spanning further out than the wall.

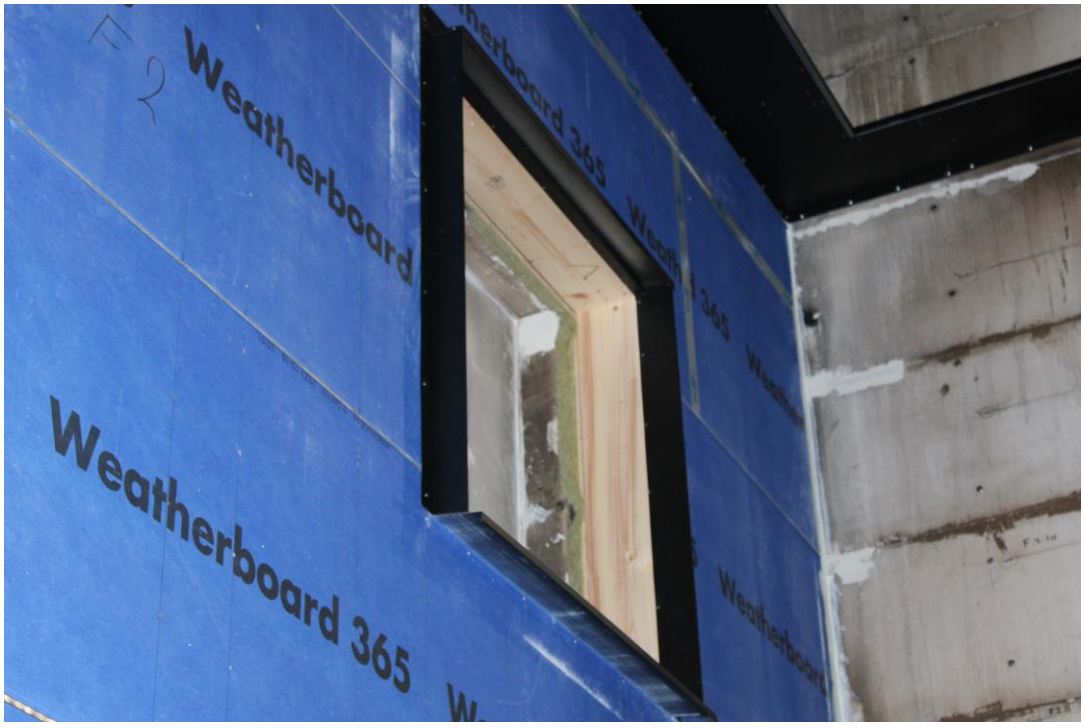


Photo No. 6 Pre painted steel mounted around the window.

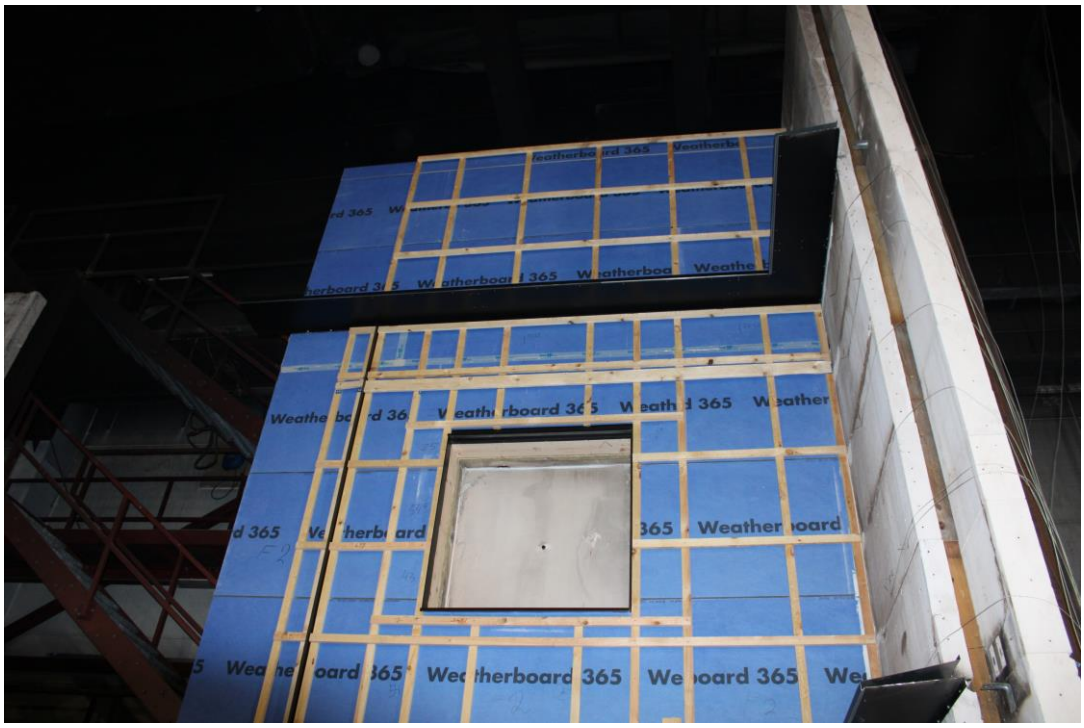


Photo No. 7 Vertical and horizontal formworks was mounted

Photo No. 8 Vertical cladding was mounted. No cladding was mounted on the wing.

Photo No. 9 The ends of the flame deflector was closed off with stone wool.

Photo No. 10 Test specimen before start test

Photo No. 11 2 minutes into the test. Flames reaching first flame deflector.

Photo No. 12 Test specimen 5 minutes into the test

Photo No. 13 Test specimen 8 minutes into the test

Photo No. 14 Test specimen 10 minutes into the test

Photo No. 15 Test specimen 12 minutes into the test

Photo No. 16 Test specimen 21 minutes into the test

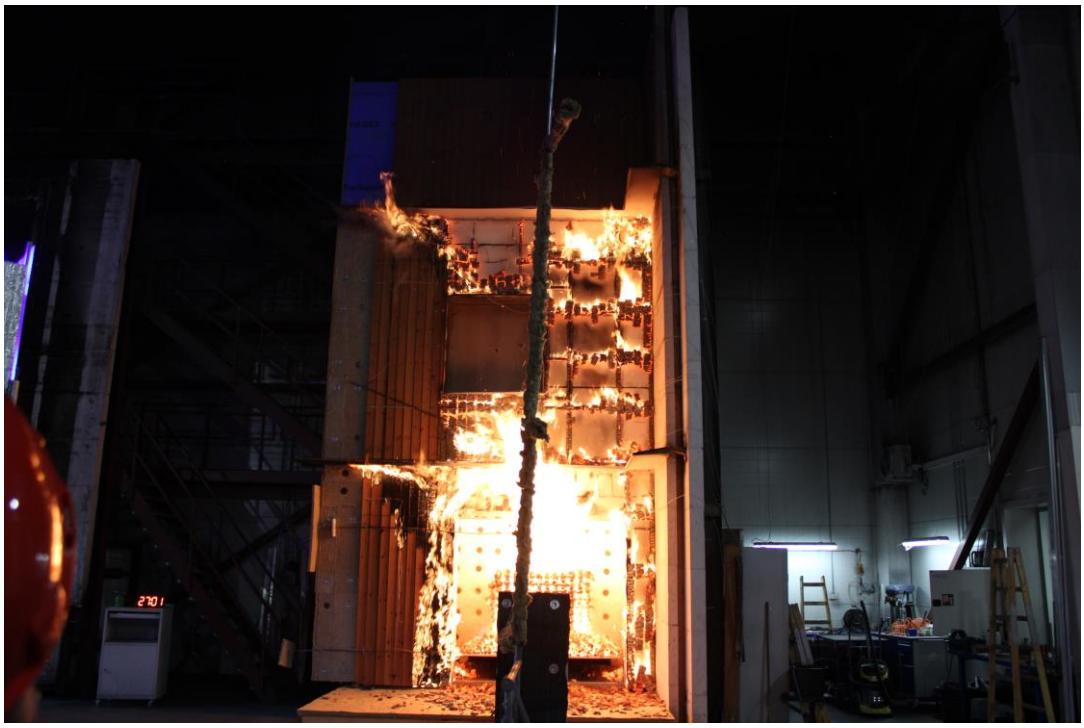


Photo No. 17 Test specimen 27 minutes into the test

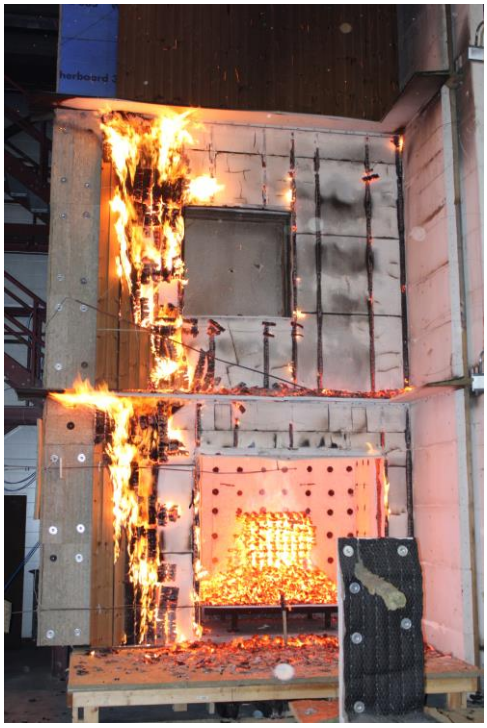


Photo No. 18 Test specimen 37 minutes into the test

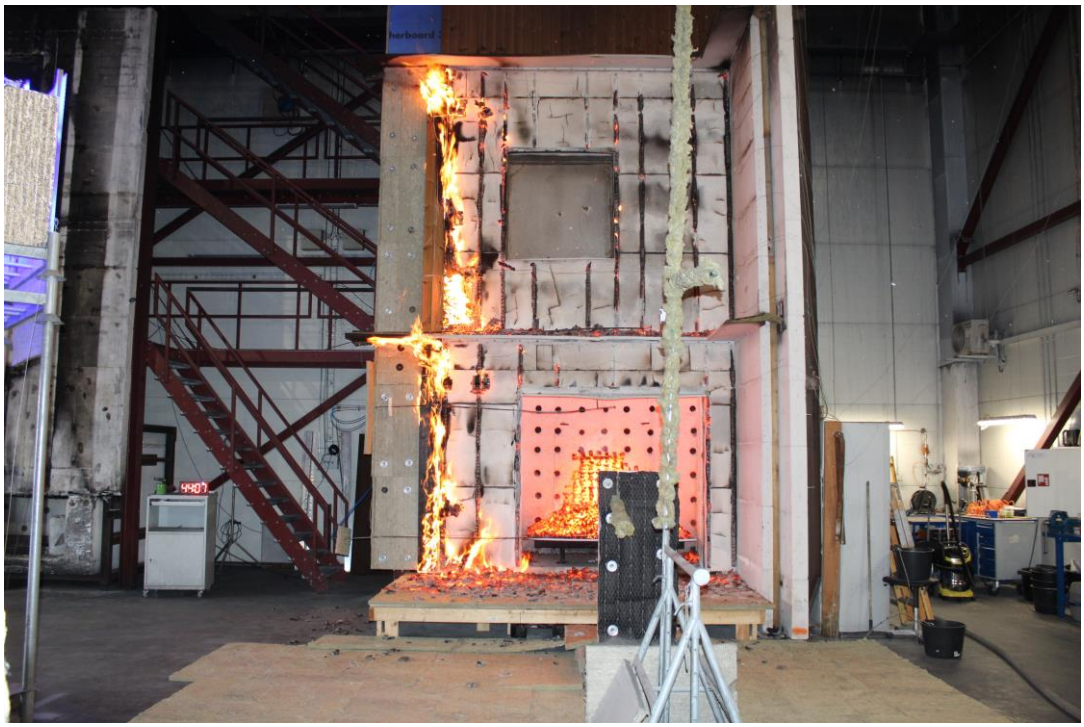


Photo No. 19 Test specimen 44 minutes into the test

Photo No. 20 Test specimen 52 minutes into the test

Photo No. 21 Test stopped

Photo No. 22 Test specimen after the test

Photo No. 23 Test specimen after the test. Detailed photo below the first flame deflector

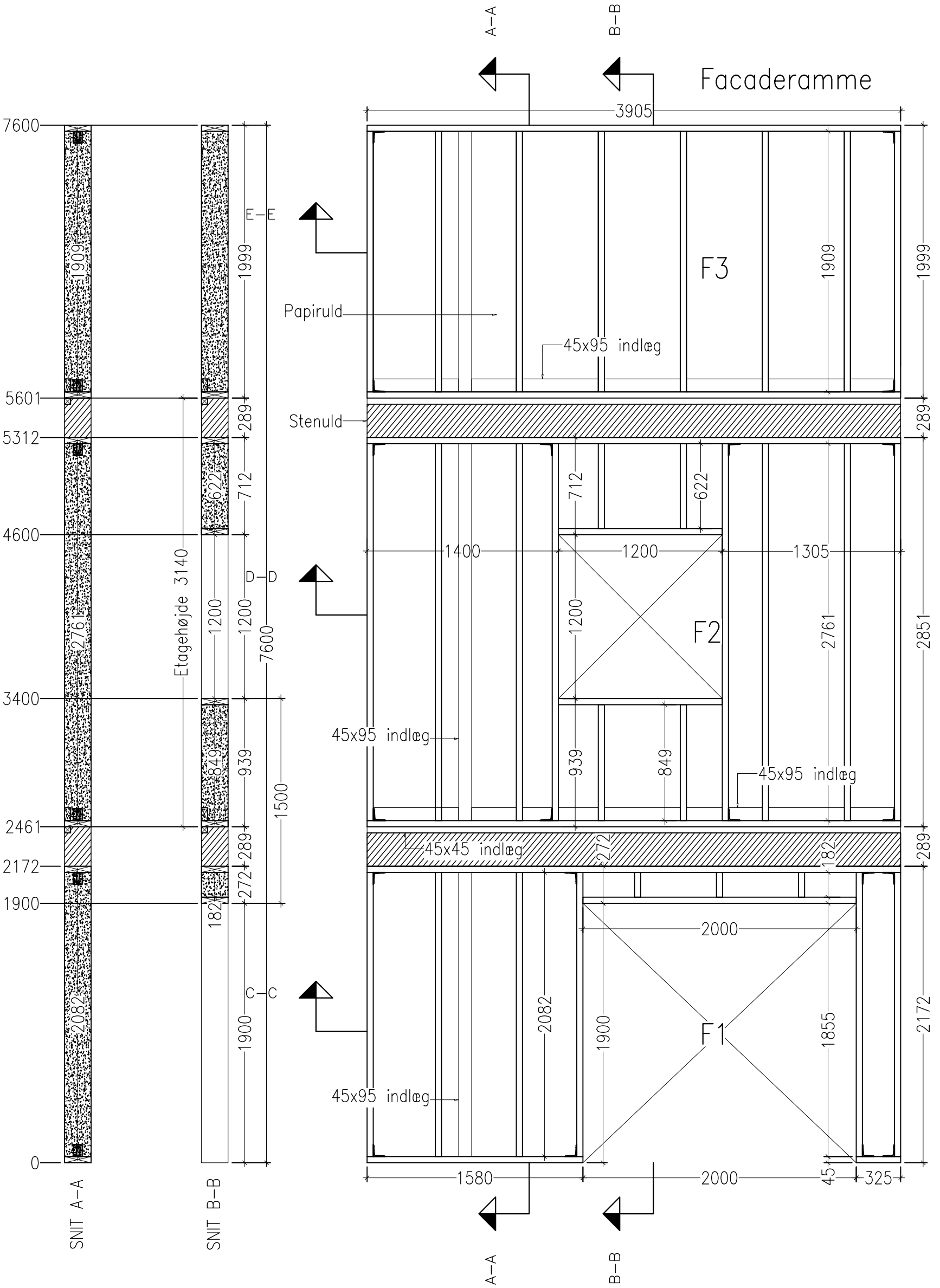
Photo No. 24 Test specimen after the test. Detailed photo of corner below the first flame deflector

Photo No. 25 Test specimen after the test. Detailed photo of wooden frame

Photo No. 26 Test specimen after the test. Detailed photo of 2nd flame deflector

Photo No. 27 Test specimen after the test. Detailed photo of top prefabricated cassette

Photo No. 28 Test specimen after the test. Detailed photo of top prefabricated cassette. (charring on the lower formwork).



Materialer:

Træ:

F1:

45x195:

F2:

45x195:

45x45:

F3:

45x195

45x45

Vinkelbeslag:

Simpson ABR9020

Kamsøm 4x40

Samling af trærammer:

Ringede pistolsøm 3,1x90

45x45 indlæg:

Ringede pistolsøm 2,8x75

Generelt:

–

Opbygning:

22mm Frøslev klinkeprofil – Termowood (lodret)

22x45mm Afstandslister (gran) pr. 600mm (krydsforskallet)

9,5mm Knauf Weatherboard 365

45x195mm stoplekonstruktion pr. 600mm

195mm Isocell (isolering kl 37)

195mm Rockwool (isolering kl 37) (over vinduer og i lukkestykker)

Revisionstekst:

A) Isolering tilføjet, opdatering af befæstigelse

DBI
PGC10038A

Mads

BFUH-8 Facadetest ved DBI - Test 1

Gældende

Facaderamme

BYGHERRE:
Fælledby
–
–

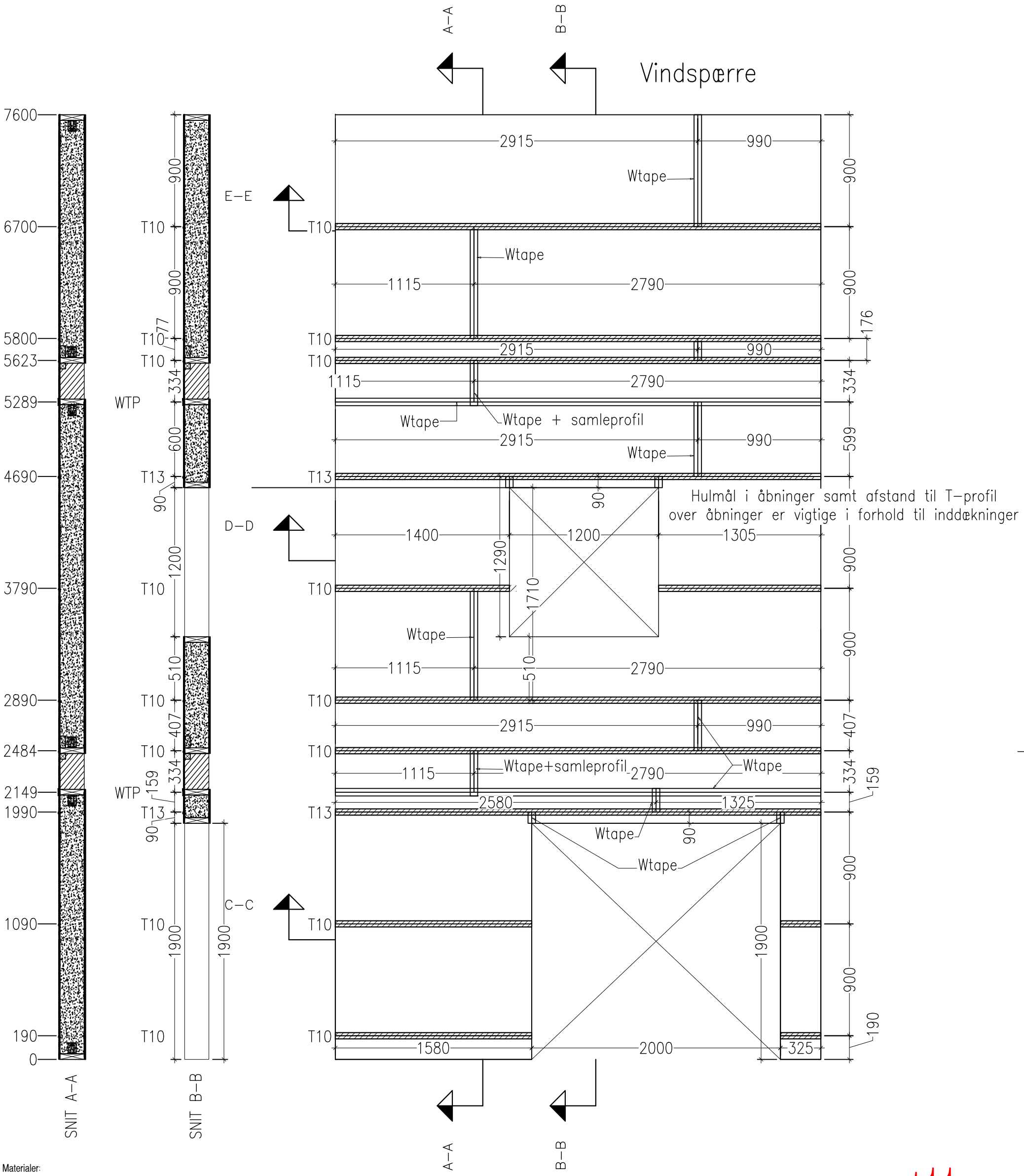
DATO: 2024-05-30 REV. NR/DATO: –

ANSV: CMA MÅL: 1:30 ANTAL: –

TEGN.NR: 1

BM Byggeindustri Lupinvej 18 - 9500 Hobro - Tlf. +45 9852 1744

K:\031_Teknisk\02 Brand\Fælledby Brandtest\BFUH-8 Mock-Up_Test 1.dwg



Materialer:

Vindspærre:

9,5 Knauf Weatherboard 365 – 900x3000mm – 12 stk.

Knauf W–tape til lodrette og vandrette samlinger

13 mm T–profil – leveres af BM Byggeindustri A/S

Ringede galvaniserede pistolsøm 2,5 x 50

195mm Isocell isolering – bagside afdækkes af isoleringsdug fra Isocell

12mm OSB3 1220x2420 på bagside for at holde på isolering. Samme befæstigelser som vindspærre.

Generelt:

–

Opbygning:

22mm Frøslev klinkeprofil – Termowood (lodret)

22x45mm Afstandslister (gran) pr. 600mm (krydsforskallet)

9,5mm Knauf Weatherboard 365

45x195mm stoplekonstruktion pr. 600mm

195mm Isocell (isolering kl 37)

195mm Rockwool (isolering kl 37) (over vinduer og i lukkestykker)

Revisionstekst:

A) Vindspærre ændret i størrelse og lagt ned. Flere T–profiler. Isoleringsdug og OSB–plade tilføjet.

DBI
PGC10038A

Mads Mølle

BFUH-8 Facadetest ved DBI - Test 1

Gældende

Vindspærre

BYGHERRE:
Fælledby
–
–

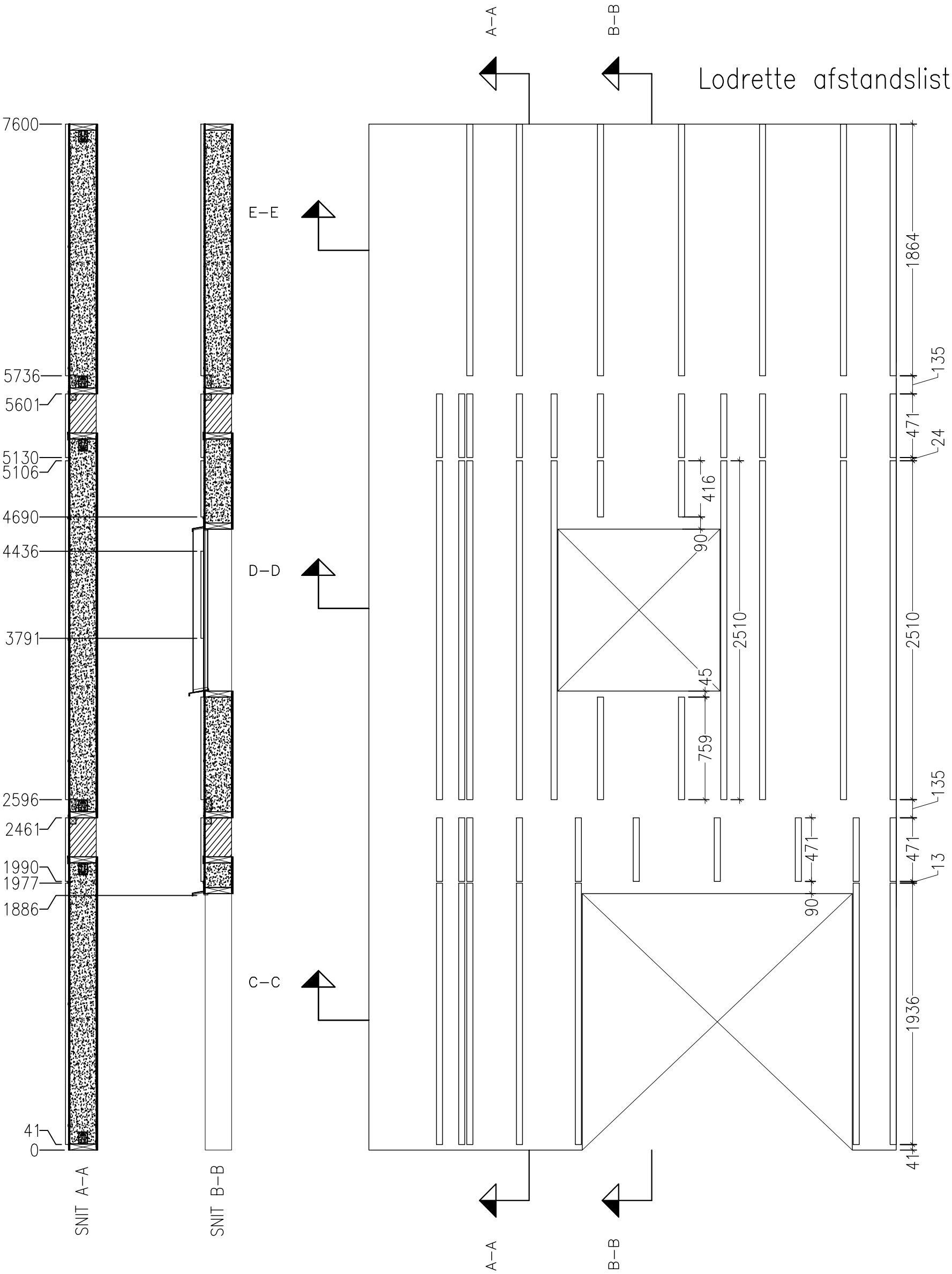
DATO: 2024–05–30 REV. NR/DATO: –

ANSV: CMA MÅL: 1:30 ANTAL: –

TEGN.NR: 2

BM Byggeindustri Lupinvej 18 - 9500 Hobro - Tlf. +45 9852 1744

K:\031_Teknisk\02 Brand\Fælledby Brandtest\BFUH–8 Mock–Up_Test 1.dwg



Materialer:

22x45mm afstandslister i gran ubehandlet LBM:
Ringede galvaniserede pistolsøm 2,8 x 75
Flammeafbøjer leveres af Facadeplan

Vinduesinddækninger leveres af BM Byggeindustri og monteres inden afstandslister

Generelt:

–

Opbygning:

22mm Frøslev klinkeprofil – Termowood (lodret)
22x45mm Afstandslister (gran) pr. 600mm (krydsforskallet)
9,5mm Knauf Weatherboard 365
45x195mm stoplekonstruktion pr. 600mm
195mm Isocell (isolering kl 37)
195mm Rockwool (isolering kl 37) (over vinduer og i lukkestykker)

Revisionstekst:

A) Befæstigelse tilføjet

DBI
PGC10038A

BFUH-8 Facadetest ved DBI - Test 1

Gældende

L Afstandslister

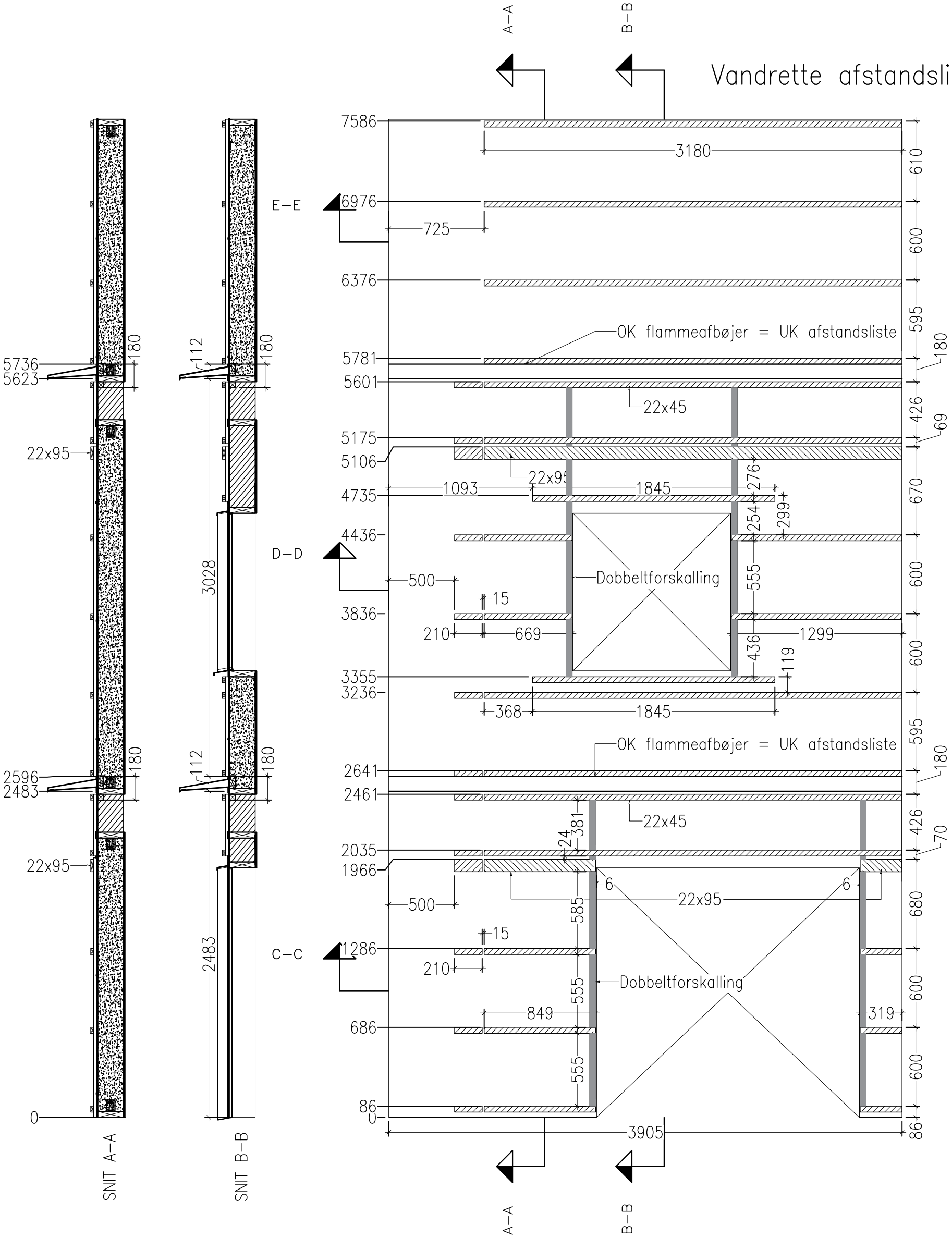
BYGHERRE:
Fælledby
–
–

DATO: 2024-05-30 REV. NR/DATO: –
ANSV: CMA MÅL: 1:30 ANTAL: –
TEGN.NR: 3

BM Byggeindustri Lupinvej 18 - 9500 Hobro - Tlf. +45 9852 1744

K:\031_Teknisk\02 Brand\Fælledby Brandtest\BFUH-8 Mock-Up_Test 1.dwg

Vandrette afstandslister



Materialer:

22x45mm + 22x95 afstandslister i gran ubehandlet LBM:

Ringede galvaniserede pistolsøm 3,1 x 90

Generelt:

–

Opbygning:

22mm Frøslev klinkeprofil – Termowood (lodret)

22x45mm Afstandslister (gran) pr. 600mm (krydsforskallet)

9,5mm Knauf Weatherboard 365

45x195mm stoplekonstruktion pr. 600mm

195mm Isocell (isolering kl 37)

195mm Rockwool (isolering kl 37) (over vinduer og i lukkestykker)

Revisionstekst:

A) Bredforskalling samt befæstigelse tilføjet

DBI
PGC10038A

BFUH-8 Facadetest ved DBI - Test 1 — Gældende

V Afstandslister

BYGHERRE:
Fælledby
–
–

DATO: 2024-05-30 REV. NR/DATO: –

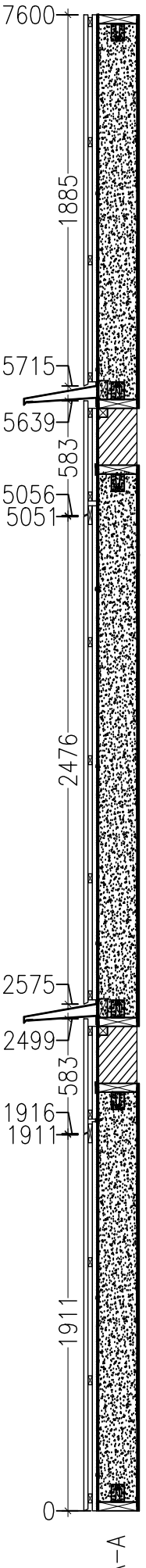
ANSV: CMA MÅL: 1:30 ANTAL: –

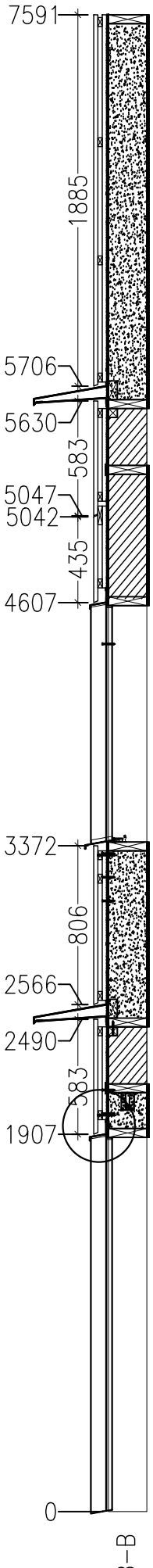
TEGN.NR: 4

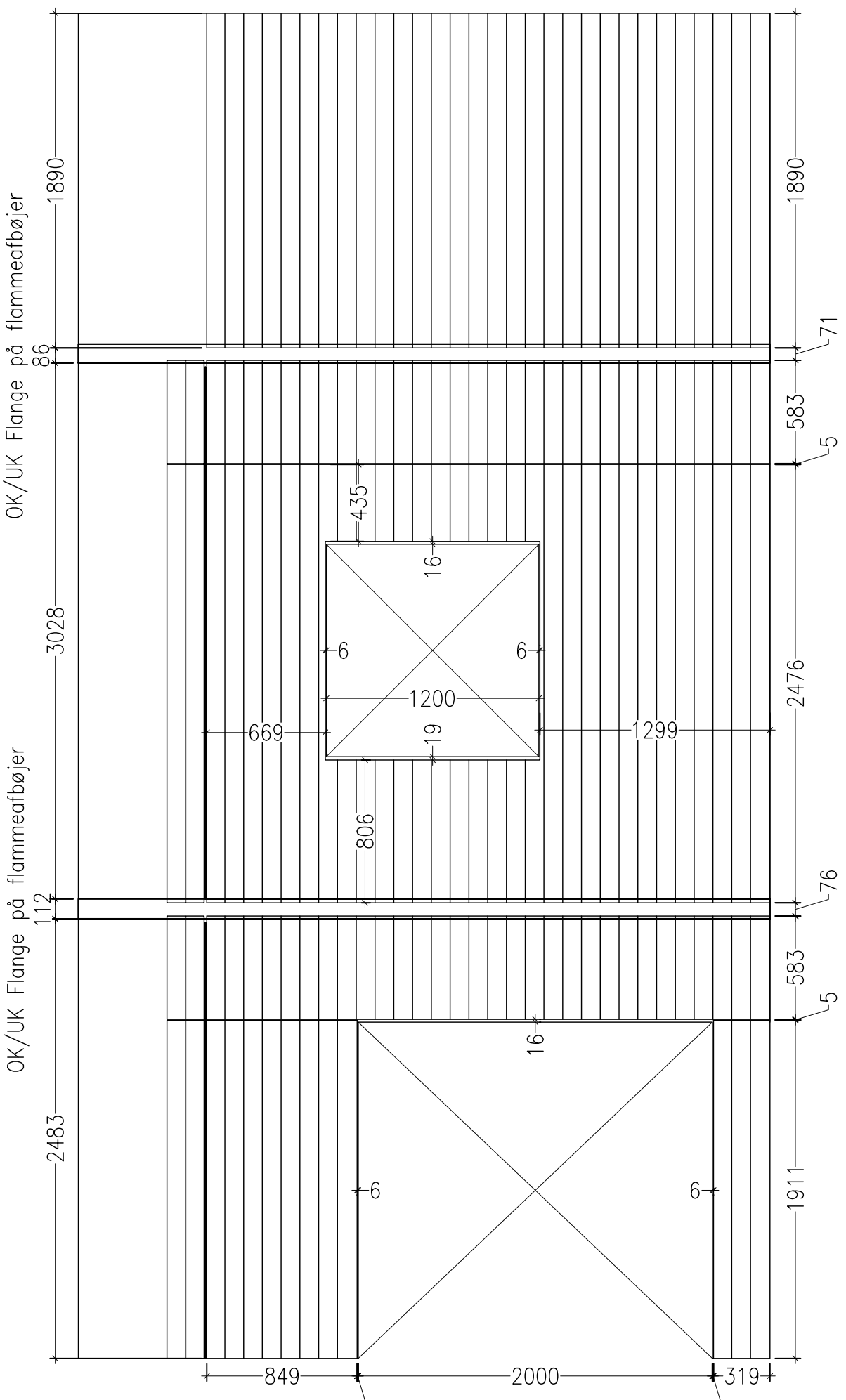
BM Byggeindustri Lupinvej 18 - 9500 Hobro - Tlf. +45 9852 1744

K:\031_Teknisk\02 Brand\Fælledby Brandtest\BFUH-8 Mock-Up_Test 1.dwg

Facade







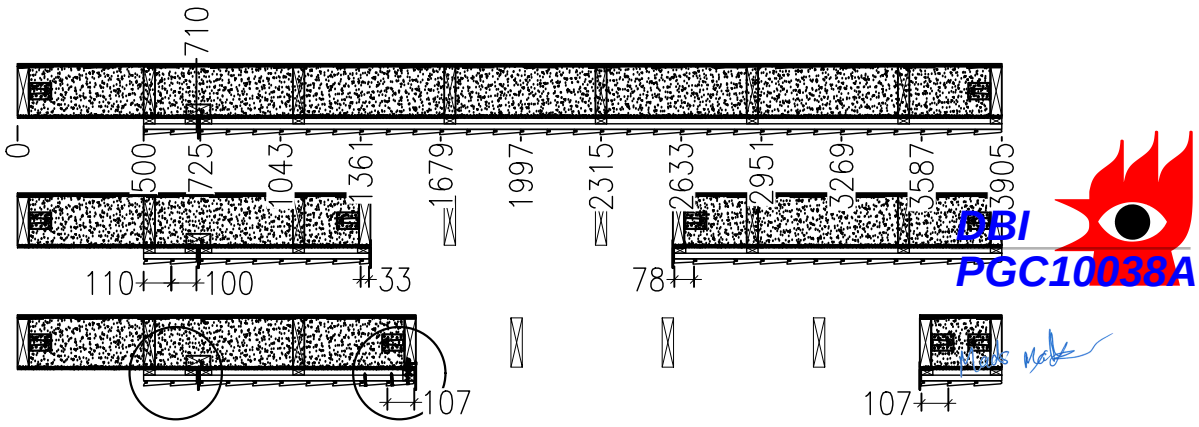
SNIT

SNIT

SNIT E–E

SNIT D–D

SNIT C–C



DBI
PGC10038A

Materialer:

22mm Frøslev klinkeprofil – Termowood (lodret) LBM:
Rundhovedet rustfri A4 pistolsøm 2,5x50

Generelt:

–

Opbygning:

22mm Frøslev klinkeprofil – Termowood (lodret)
22x45mm Afstandslister (gran) pr. 600mm (krydsforskallet)
9,5mm Knauf Weatherboard 365
45x195mm stoplekonstruktion pr. 600mm
195mm Isocell (isolering kl 37)
195mm Rockwool (isolering kl 37) (over vinduer og i lukkestykker)

Revisionstekst:

A) Befæstigelse tilføjet

BFUH-8 Facadetest ved DBI - Test 1

Gældende

Facadebeklædning

BYGHERRE:
Fælledby
–
–

DATO: 2024-05-30 REV. NR/DATO: –

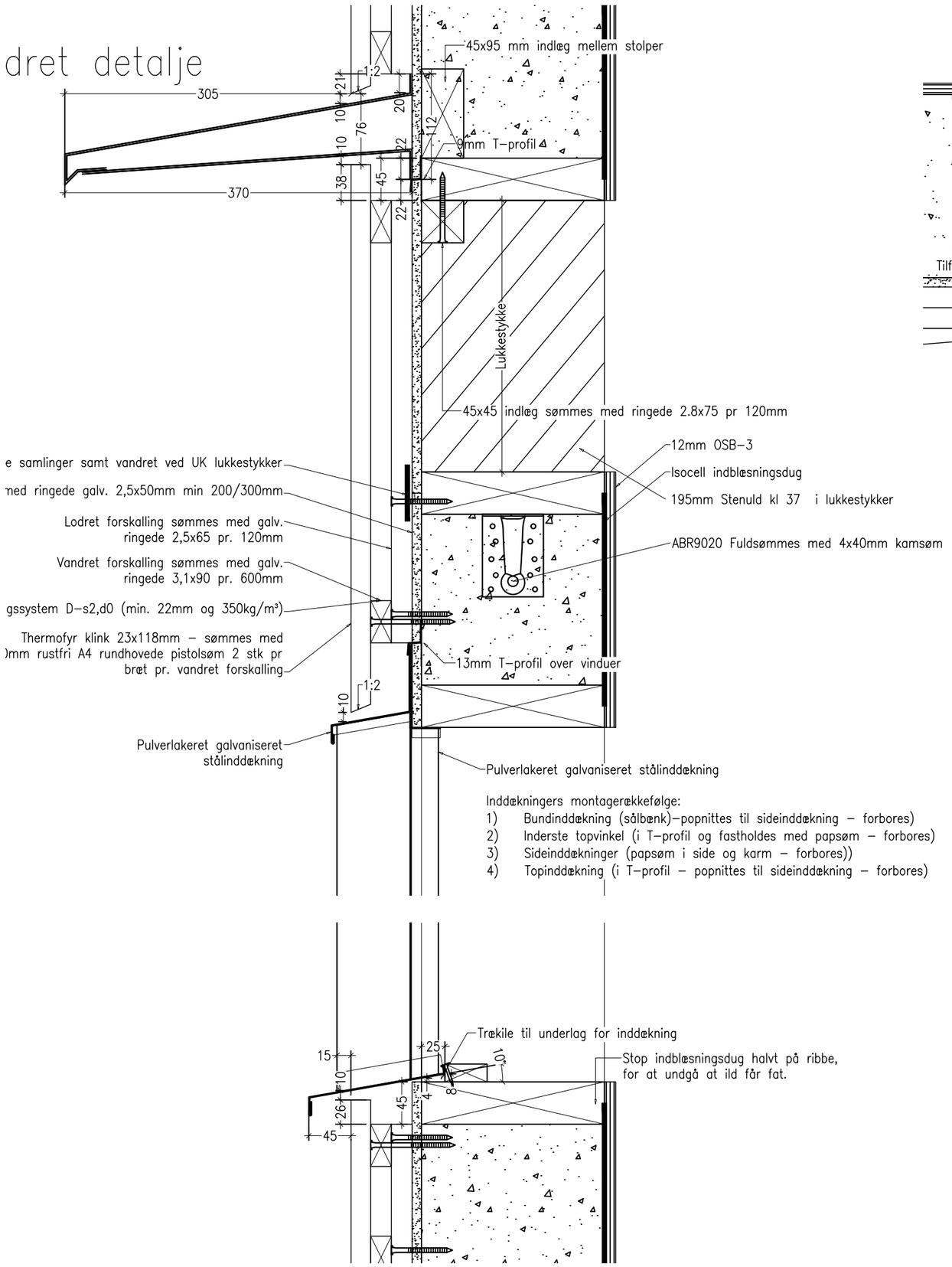
ANSV: CMA MÅL: 1:30 ANTAL: –

TEGN.NR: 5

BM Byggeindustri Lupinvej 18 - 9500 Hobro - Tlf. +45 9852 1744

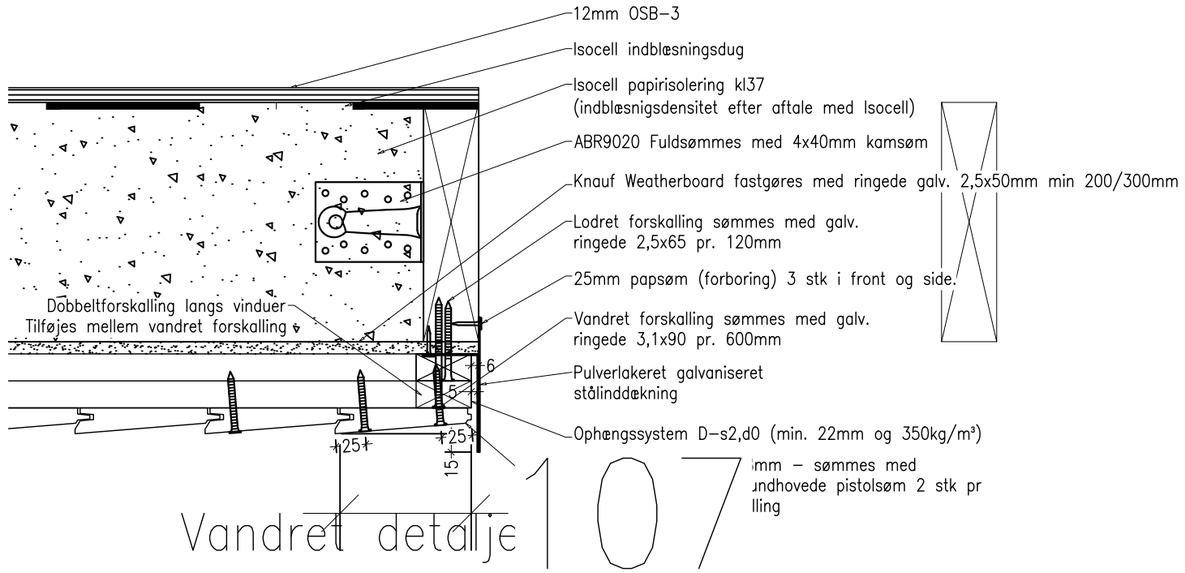
K:\031_Teknisk\02 Brand\Fælledby Brandtest\BFUH-8 Mock-Up_Test 1.dwg

dret detalje

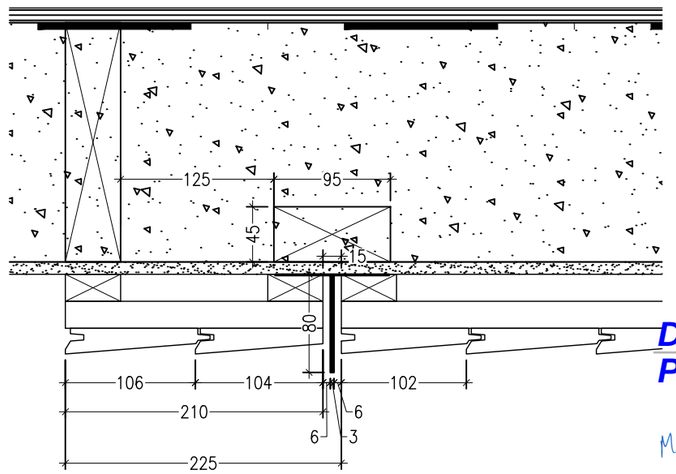


Inddækningers montagerækkefølge:

1) Bundinddækning (sålbænk)–popnittes til sideinddækning – forbores)
2) Inderste topvinkel (i T–profil og fastholdes med papsøm – forbores)
3) Sideinddækninger (papsøm i side og karm – forbores))
4) Topinddækning (i T–profil – popnittes til sideinddækning – forbores)



Vandret detalje 107



DBI
PGC10038A

Mads Mock

BFUH-8 Facadetest ved DBI - Test 1 — Gældende

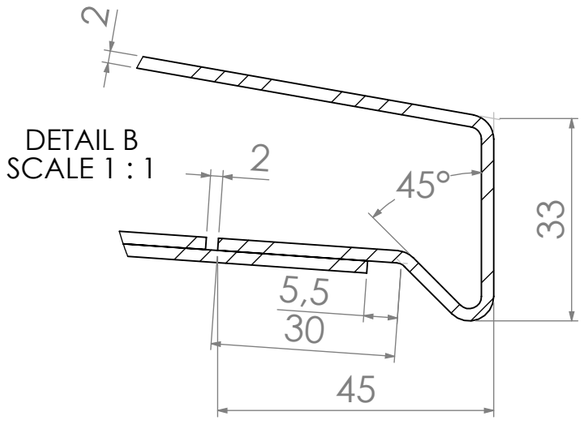
Detaljer

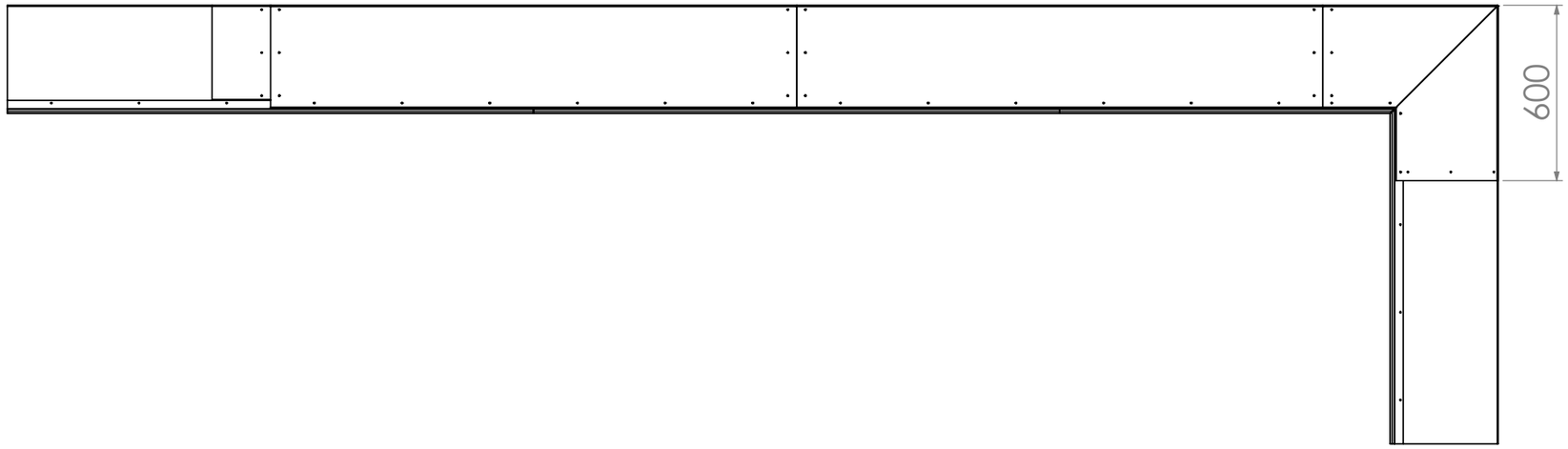
BYGHERRE: Fælledby
–
–

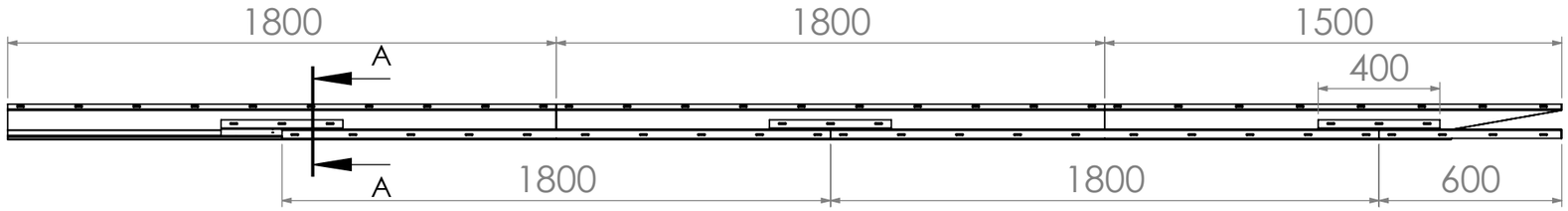
DATO: 2024-05-30 REV. NR/DATO: –
ANSV: CMA MÅL: 1:5 ANTAL: –
TEGN.NR: DE01-03

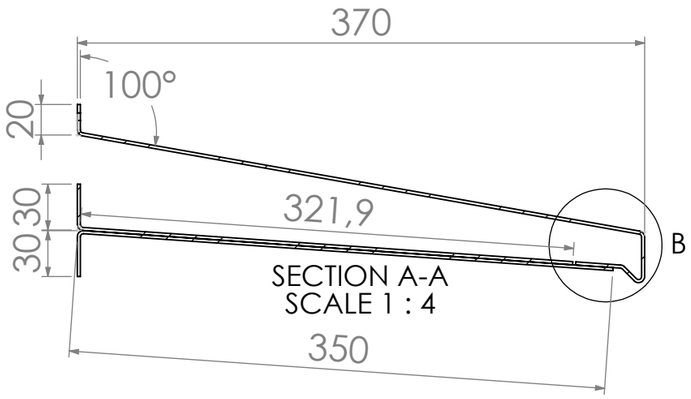
BM Byggeindustri Lupinvej 18 - 9500 Hobro - Tlf. +45 9852 1744

K:\031_Teknisk\02 Brand\Fælledby Brandtest\BFUH-8 Mock-Up_Test 1.dwg









	NAME	DATE
DRAWN	casper	04-04-2024

Hvor intet andet er angivet, er tolerancer i henhold til DS/ISO 2768-1(m)
Alle mål er i millimeter, medmindre andet er angivet.
Tegningen må ikke skaleres.

GLADSAXE KLIP & BUK

Folder name: X:\Facadeplan\BFUH-7\

Customer:

TITLE: 2 mm plade

MATERIAL: DX51D Z275 (Varm-Galv)

DWG NO. Flammeafbøjer BFUH-7

REVISION

WEIGHT: 77970.48

SCALE:1:20

A3

SHEET 1 OF 2

DBI
PGC10038A

Mads Mølk

	NAME	DATE
DRAWN	casper	04-04-2024

Hvor intet andet er angivet, er tolerancer i henhold til DS/ISO 2768-1(m)
Alle mål er i millimeter, medmindre andet er angivet.
Tegningen må ikke skaleres.

GLADSAXE KLIP & BUK

Folder name:
X:\Facadeplan\BFUH-7\

Customer:

TITLE:
2 mm plade

MATERIAL:
DX51D Z275 (Varm-Galv)

DWG NO.
Flammeafbøjer BFUH-7

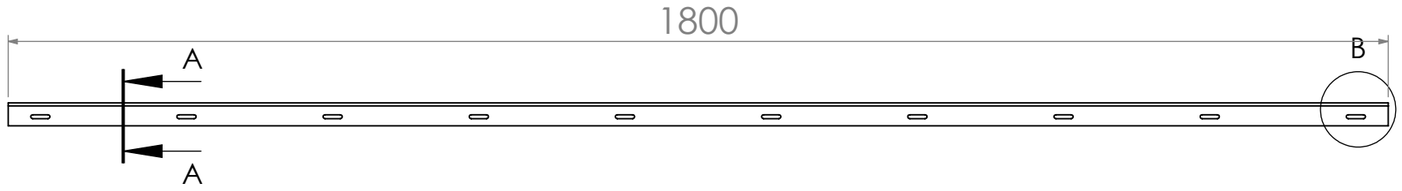
REVISION

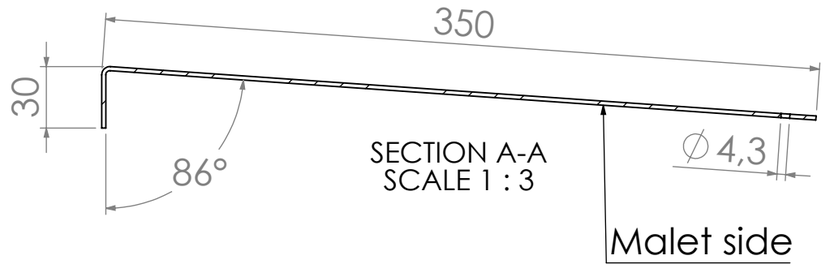
WEIGHT: 77970.48

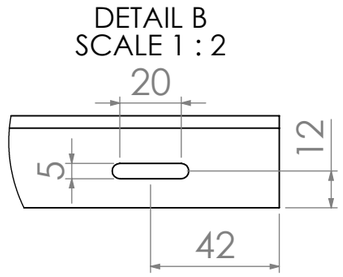
SCALE:1:15

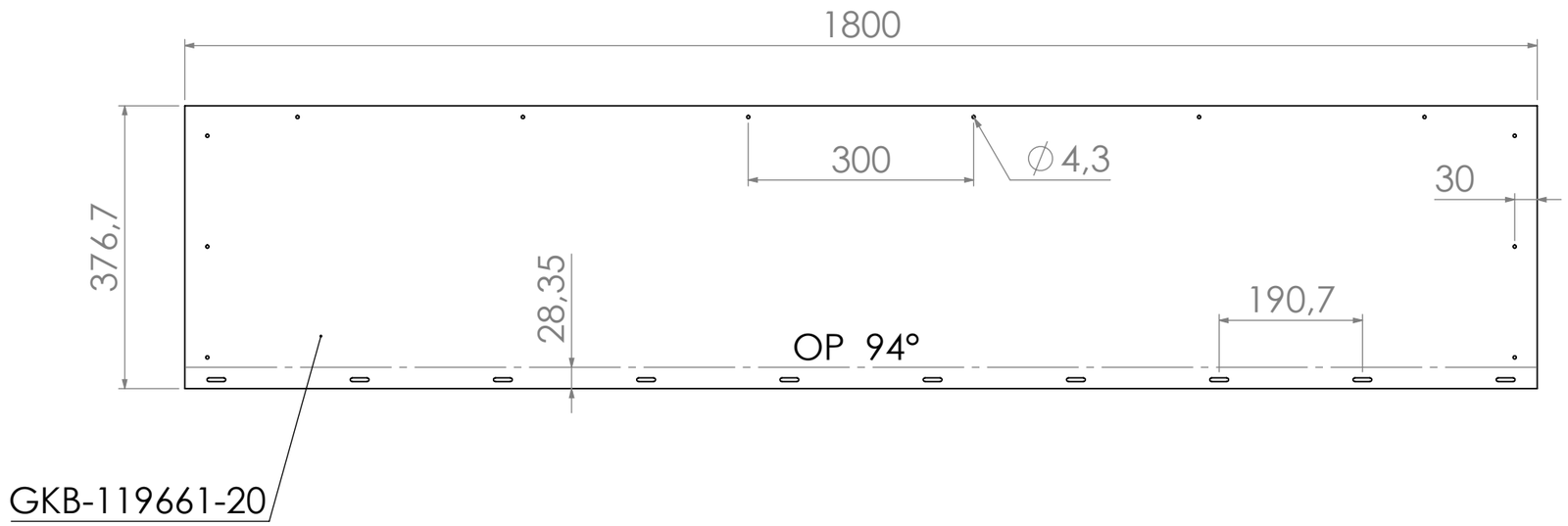
A3

SHEET 2 OF 2









DBI
PGC10038A

Mads Mdk

OV: R1
UV: Spor 12-30°
BT: 0,5 mm

	NAME	DATE
DRAWN	casper	04-04-2024

GLADSAXE KLIP & BUK

Folder name: X:\Facadeplan\BFUH-7\

Customer:

TITLE: 2 mm plade

Hvor intet andet er angivet, er tolerancer i henhold til DS/ISO 2768-1(m)
Alle mål er i millimeter, medmindre andet er angivet.
Tegningen må ikke skaleres.

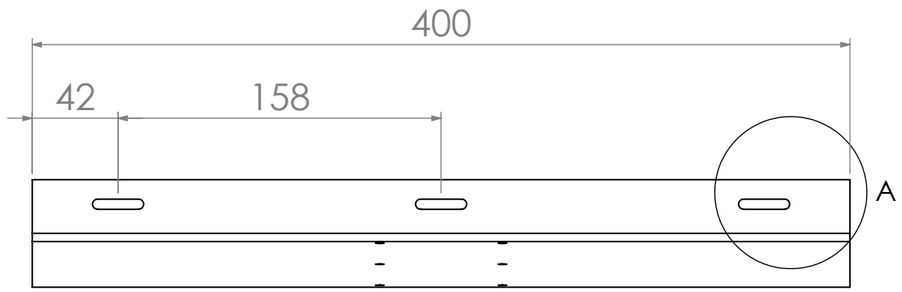
MATERIAL: DX51D Z275 (Varm-Galv)

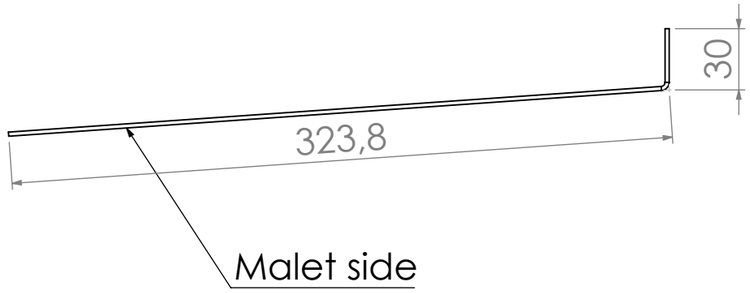
DWG NO. GKB-119661-1

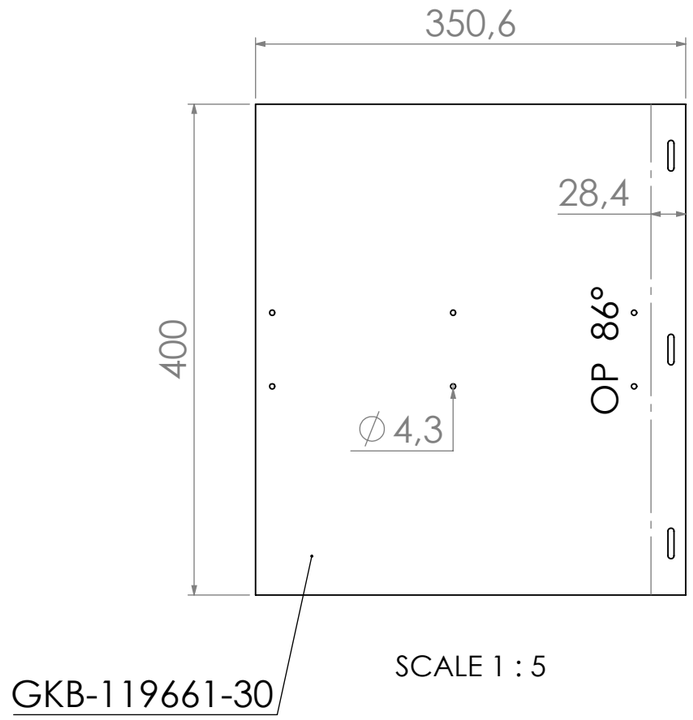
REVISION

WEIGHT: 77970.48

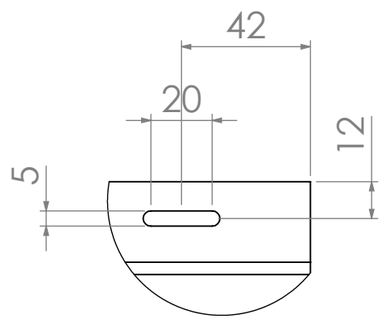
SCALE:1:8 | A3 | SHEET 1 OF 1







SCALE 1 : 5



DETAIL A
SCALE 1 : 2

DBI
PGC10038A

OV: R1
UV: Spor 12-30°
BT: 0,5 mm

	NAME	DATE
DRAWN	casper	04-04-2024

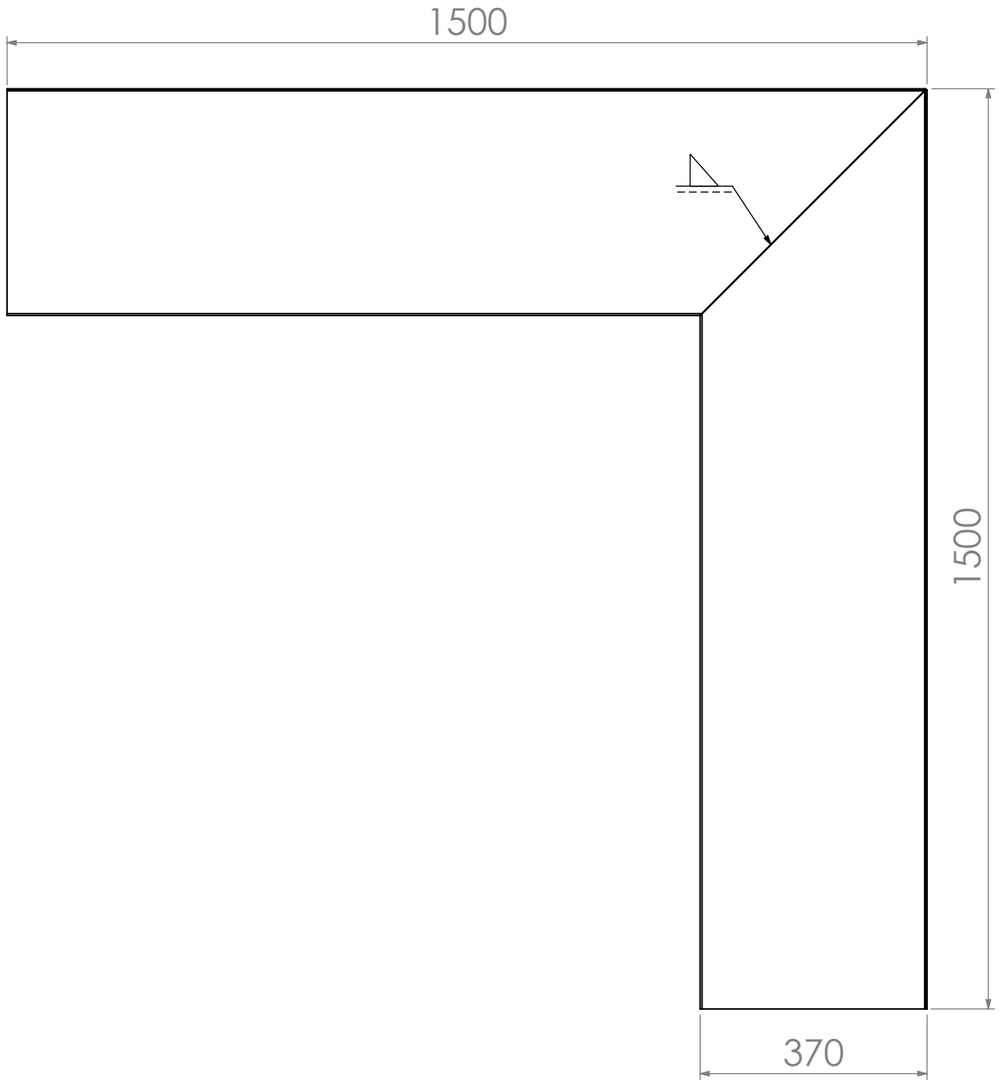
GLADSAXE KLIP & BUK

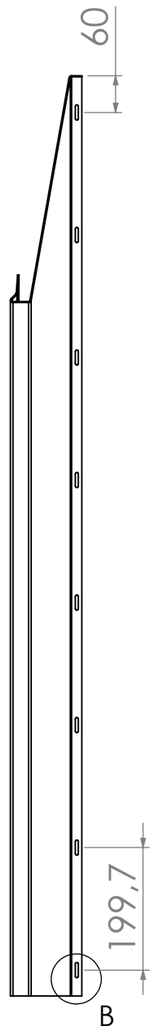
Folder name: X:\Facadeplan\BFUH-7\
Customer:
TITLE: 2 mm plade

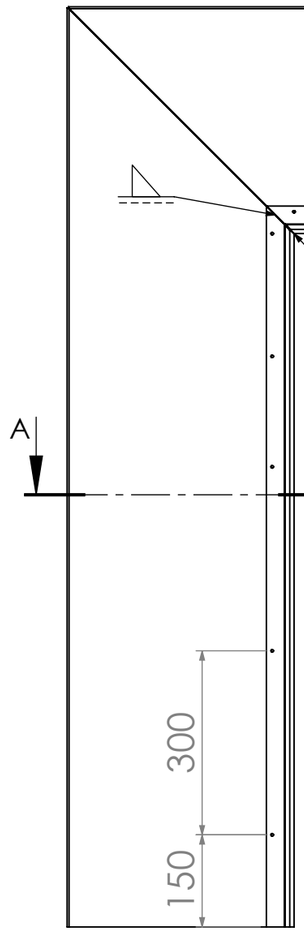
Hvor intet andet er angivet, er tolerancer i henhold til DS/ISO 2768-1(m)
Alle mål er i millimeter, medmindre andet er angivet.
Tegningen må ikke skaleres.

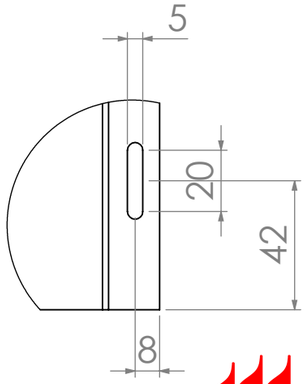
MATERIAL: DX51D Z275 (Varm-Galv)
DWG NO. GKB-119661-2
REVISION

WEIGHT: 77970.48 | SCALE:1:3 | A3 | SHEET 1 OF 1

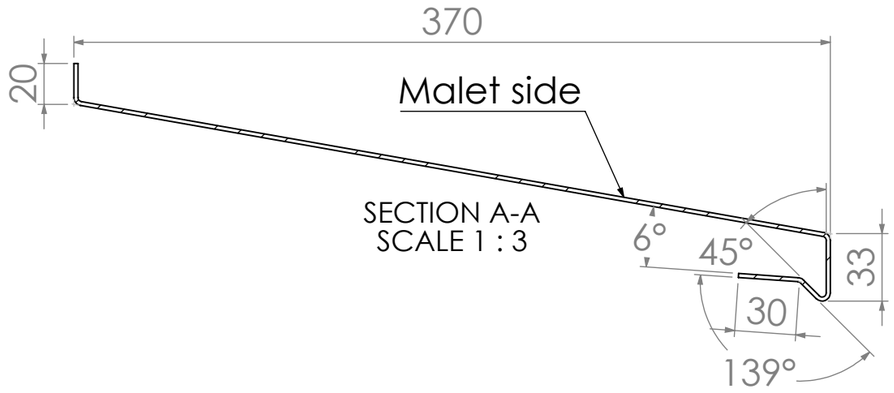








DETAIL B
SCALE 2 : 1



	NAME	DATE
DRAWN	casper	04-04-2024

Hvor intet andet er angivet, er tolerancer i henhold til DS/ISO 2768-1(m)
Alle mål er i millimeter, medmindre andet er angivet.
Tegningen må ikke skaleres.

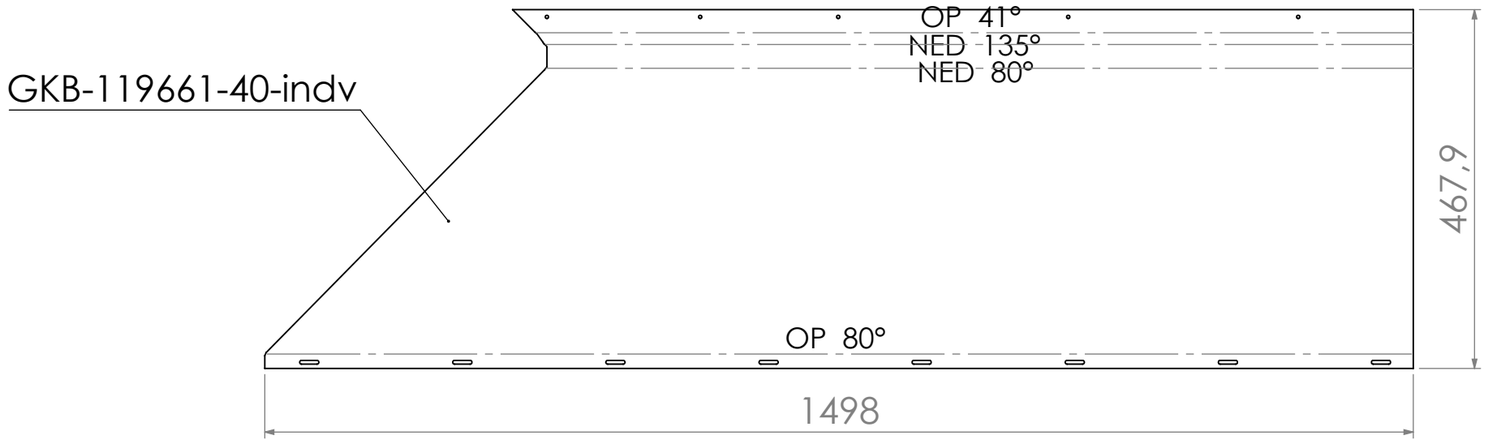
GLADSAXE KLIP & BUK

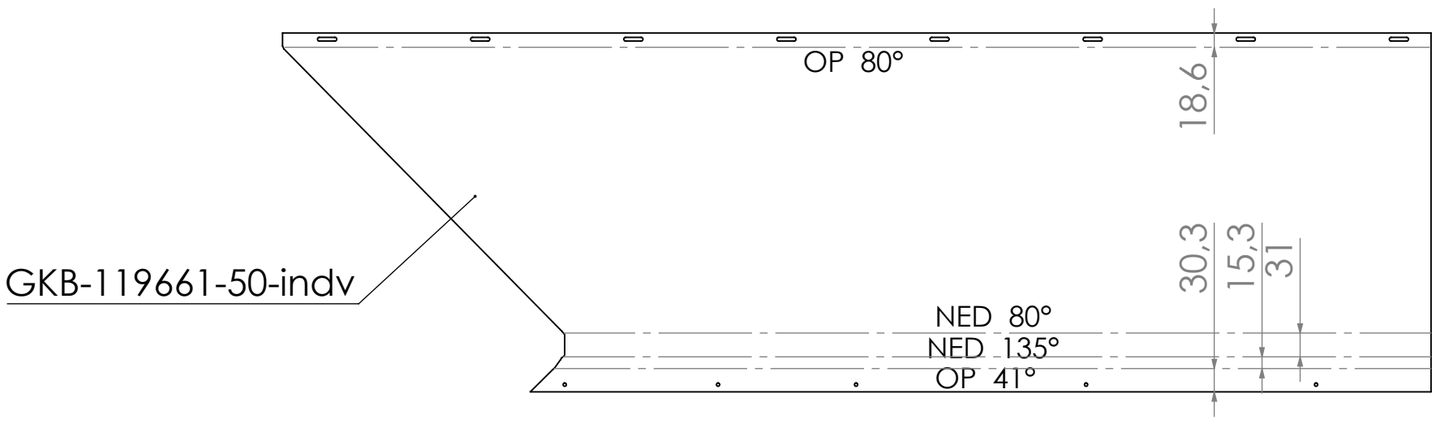
Folder name: X:\Facadeplan\BFUH-7\
Customer:
TITLE: 2 mm plade

MATERIAL: DX51D Z275 (Varm-Galv)
DWG NO. GKB-119661-3
REVISION

WEIGHT: 77970.48
SCALE:1:10
A3
SHEET 1 OF 2

DB1
PGC10038A





DBI
PGC10038A

OV: R1
UV: Spor 12-30°
BT: 0,5 mm

	NAME	DATE
DRAWN	casper	04-04-2024

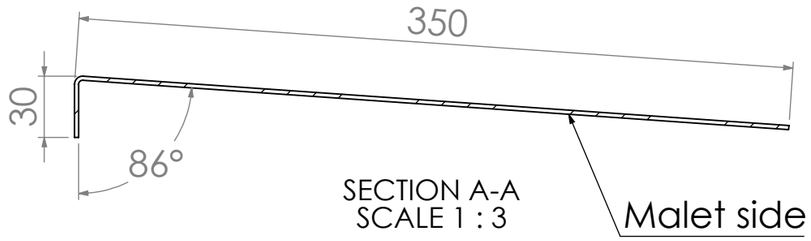
Hvor intet andet er angivet, er tolerancer i henhold til DS/ISO 2768-1(m)
Alle mål er i millimeter, medmindre andet er angivet.
Tegningen må ikke skaleres.

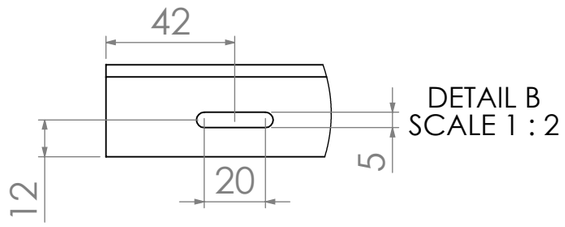
GLADSAXE KLIP & BUK

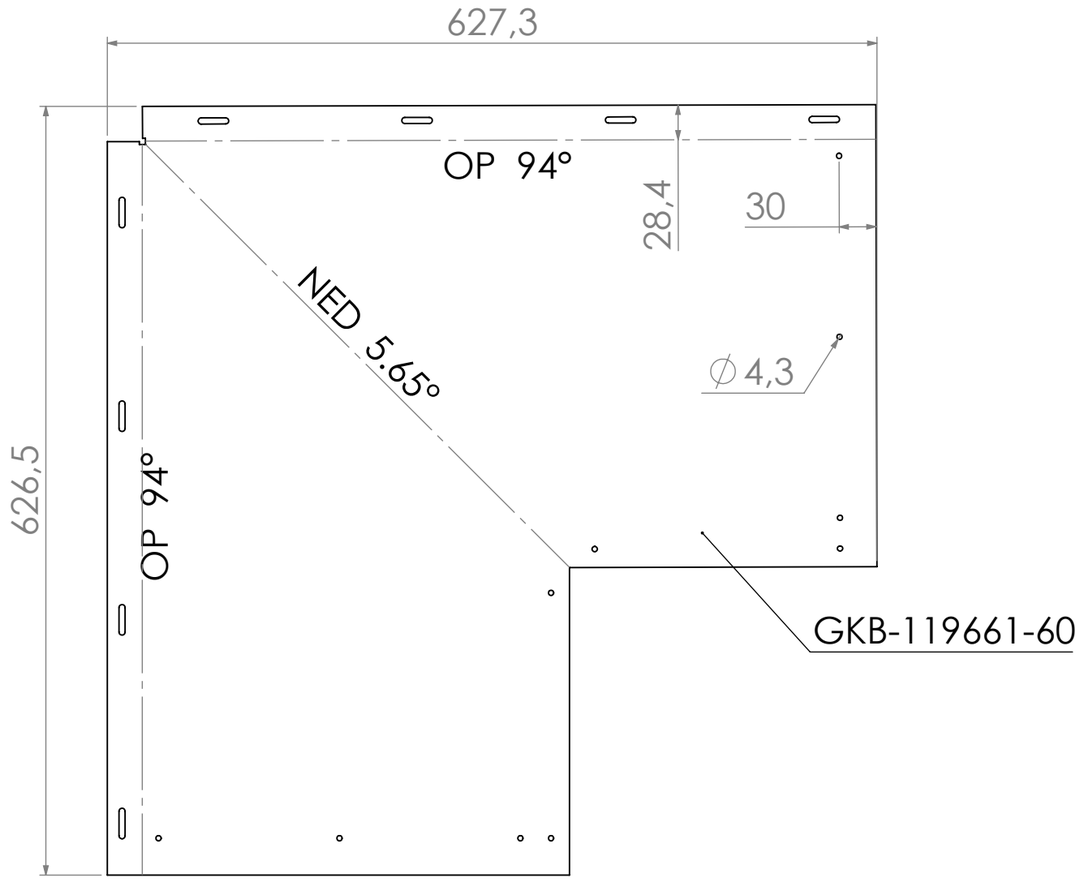
Folder name: X:\Facadeplan\BFUH-7\
Customer:
TITLE: 2 mm plade

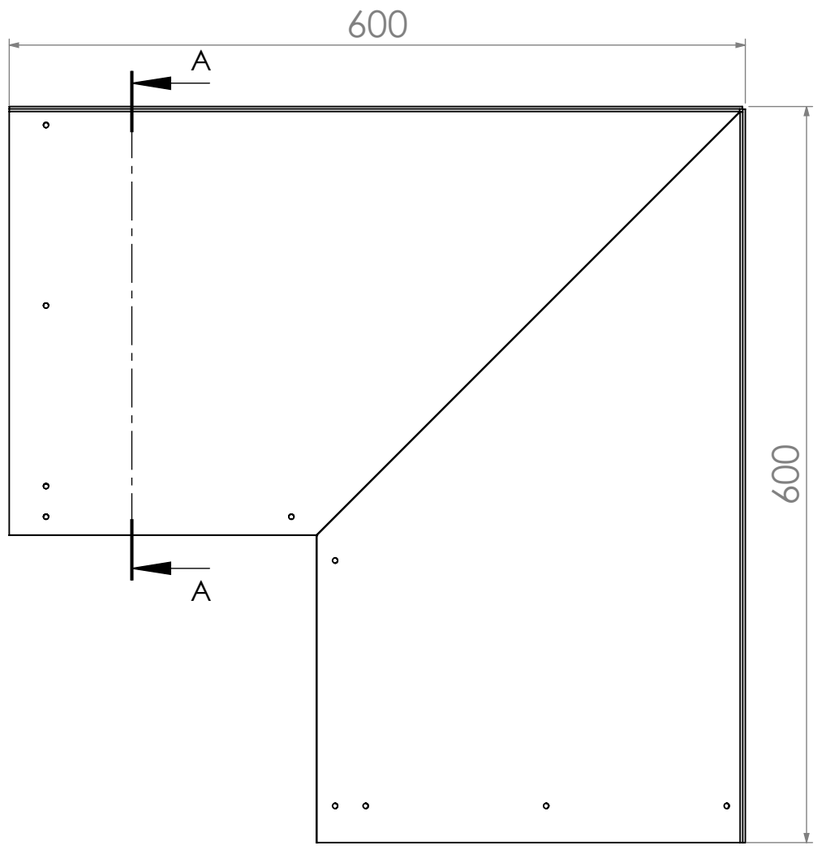
MATERIAL: DX51D Z275 (Varm-Galv)
DWG NO. GKB-119661-3
REVISION

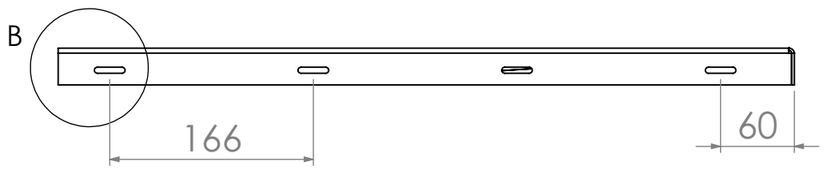
WEIGHT: 77955.55
SCALE:1:8
A3
SHEET 2 OF 2











DBI
PGC10038A

OV: R1
UV: Spor 12-30°
BT: 0,5 mm

	NAME	DATE
DRAWN	casper	04-04-2024

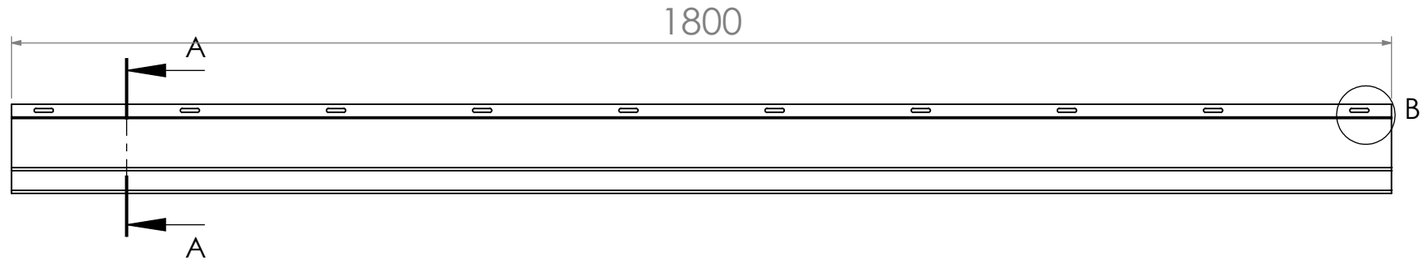
Hvor intet andet er angivet, er tolerancer i henhold til DS/ISO 2768-1(m)
Alle mål er i millimeter, medmindre andet er angivet.
Tegningen må ikke skaleres.

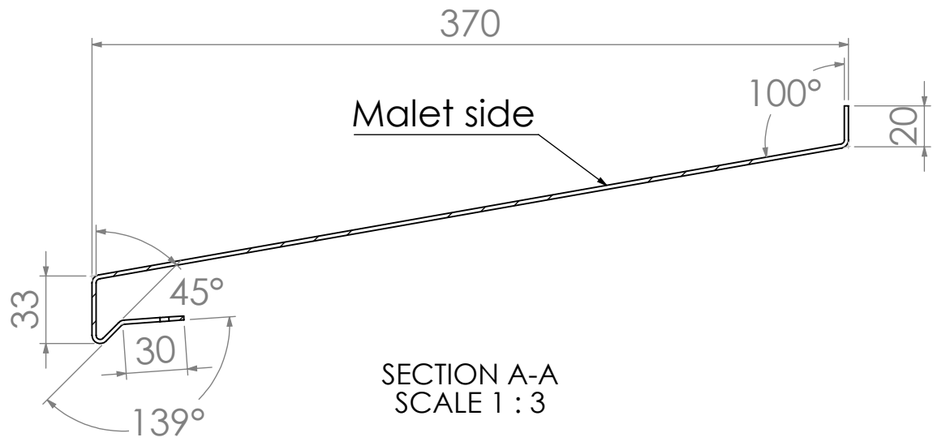
GLADSAXE KLIP & BUK

Folder name: X:\Facadeplan\BFUH-7\
Customer:
TITLE: 2 mm plade

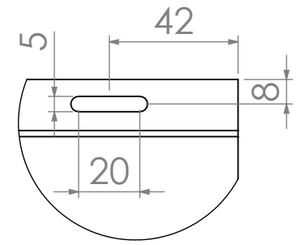
MATERIAL: DX51D Z275 (Varm-Galv)
DWG NO. GKB-119661-4
REVISION

WEIGHT: 77970.48
SCALE:1:5
A3
SHEET 1 OF 1

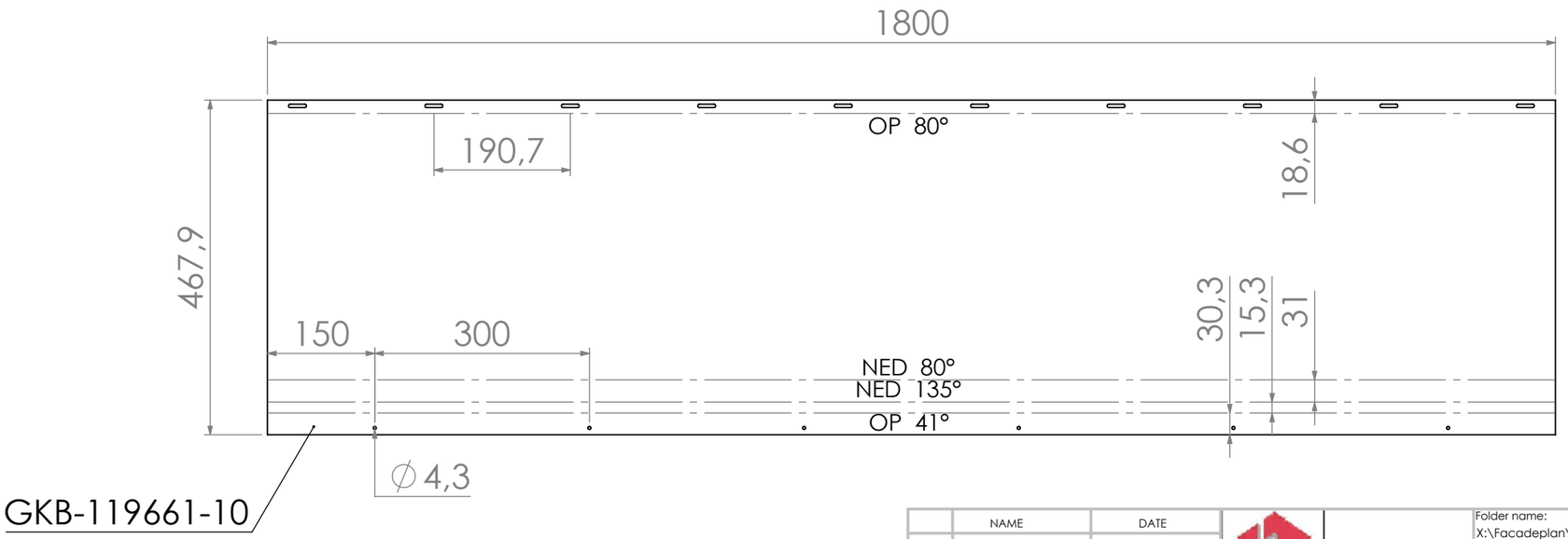




SECTION A-A
SCALE 1 : 3



DETAIL B
SCALE 1 : 2



DBI
PGC10038A

OV: R1
UV: Spor 12-30°
BT: 0,5 mm

	NAME	DATE
DRAWN	casper	04-04-2024

GLADSAXE KLIP & BUK

Folder name: X:\Facadeplan\BFUH-7\
Customer:
TITLE: 2 mm plade

Hvor intet andet er angivet, er tolerancer i henhold til DS/ISO 2768-1(m)
Alle mål er i millimeter, medmindre andet er angivet.
Tegningen må ikke skaleres.

MATERIAL: DX51D Z275 (Varm-Galv)
DWG NO. GKB-119661
REVISION

WEIGHT: 77970.48 | SCALE:1:8 | A3 | SHEET 1 OF 1