Evidence of Performance

Fire resistance of door and shutter assemblies

Test Report
No. 18-003111-PR04

(PB-C04-01-en-04)

Client	Pacific Rim Wood Ltd Ground Floor Suite Block B, The Old Kelways, Somerton Road Langport Somerset, TA10 9SJ United Kingdom
Product	single leaf assembly
Designation	**"Flamebreak Type 430"**
Overall dimensions of assembly (W x H)	996 mm x 2,199 mm
Clear opening (W x H)	902 mm x 2,152 mm
Material	timber door timber block frame
Glass type	"Pyrobelite", IGU
Type of opening	hinged doorset
Exposed face	opening face
Supporting construction	solid high density structure, thickness 240 mm

Fire resistance

Criteria	Test results
Integrity	**34 minutes**
Insulation	**29 minutes**
Termination of test	**in the 36th minute**

ift Rosenheim
13.11.2020

ift Rosenheim * Notifizierte Prüf-, Überwachungs- und Zertifizierungsstelle PÜZ * EG-Referenz-Nr. 0757

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Basis

BS 476-20:1987
BS 476-22:1987

Test report 18-003111-PR04 (PB-C04-01-en-02) dated 14.03.2019

Representation

Instructions for use

This test report serves to demonstrate the fire resistance of door and shutter assemblies. This test report does not provide any verification of applicability as set out by the relevant Building Control Authorities!

Validity

The data and results given refer solely to the tested and described specimen. Testing for fire resistance does not allow any statement to be made on any further characteristics regarding performance and quality of the construction submitted.

Notes on publication

The **ift** Guidance Sheet "Conditions and Guidance for the Use of **ift** Test Documents" applies.
The cover sheet can be used as an abstract.

Contents

The report comprises a total of 36 pages (incl. Annexes)

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1 Object

1.1 Representation of test specimen

Single leaf assembly - type "Flamebreak Type 430". Hinged doorset as timber door with timber block frame, clear opening dimensions (W x H) 902 mm x 2,152 mm, mounted to solid high density structure, thickness 240 mm, fire exposed face is the opening face.

A comprehensive description of the test specimen with all details is given in the Annex, Section A.1.

The drawings and data on the construction/design of the test specimen were prepared by the client and made available to the testing body prior to testing.

Conformity of the drawings with the tested specimen was checked.

The gap sizes measured on this test specimen are tabulated in the Annex, Section A.1.

2 Procedure

2.1 Sampling

The test specimen was selected by the client. The test specimen was manufactured as a prototype in individual production, thus no specimen was taken from ongoing production. To our knowledge, no specimens have been taken by supervisory authorities.

Number	1
Sampling	Sampling of the specimen wasn't carried out by **ift** Rosenheim.
Delivered on	11.10.2018 by client
	Note: Frame construction and leaves supplied to the **UL International (UK) Ltd** and assembled in its laboratory to produce the test specimen.
Registration number	46953-001
Building of test wall	12.10.2018
Mounting of test specimen	October 2018 by UL
	Note: Three other specimens were mounted to the test wall. There was no mutual interaction as per BS 476-22.
	The test results of the other specimens are presented in the separate project No. 18-003111-PR01, 18-003111-PR02 and 18-003111-PR03.
Date of test	23.10.2018
Testing body	**ift** Rosenheim GmbH
	Theodor-Gietl-Straße 7-9 D-83026 Rosenheim

2.2 Methods

Basis

BS 476-20:1987	Fire tests on building materials and structures – Part 20: Method for determination of the fire resistance of elements of construction (general principles)
BS 476-22:1987	Fire tests on building materials and structures – Part 22: Method for determination of the fire resistance of non-loadbearing elements of construction
Boundary conditions	as per standard specifications
Deviation	There were no deviations from the test method/s and/or test conditions.
Procedure Conditioning	There was sufficient time between erecting the supporting construction, delivery of the specimen and the actual fire resistance test to ensure adequate conditioning of the supporting construction under the ambient conditions prevailing in the test station as set out in BS 476-20. From the experience of the testing body it was decided not to carry out any further conditioning measures for the supporting construction and the test specimen.
Operability test / Opening cycles	Prior to fire resistance testing, 25 opening cycles (active leaf and inactive leaf) were performed. The test specimen was opened manually, and closed by the closing device of the test specimen.
Recording of measured values	The following measured values were continuously recorded during the test: • Temperature on the **exposed** face at 20 measurement points. • Pressure difference on the **exposed** face at 2 measurement points. • Surface temperatures on the unexposed face of the specimen according to the layout of measurement points specified by BS 476-22. • Ambient temperature in test station • Deflections of test specimen on unexposed face Moreover, all changes of the test specimen, on both the exposed and the unexposed faces were observed and recorded.

Temperature and pressure on the **exposed** face	The temperature on the **exposed** face was raised in accordance with the standard temperature-time curve of BS 476-20 using 10 burners fuelled with EL grade fuel oil according to DIN 51603. The average value of the temperature profile on the **exposed** face, measured at the 20 measurement points according to BS 476-20, Clause C.1.2, is plotted in the Annex, Section A.2. The pressure conditions on the **exposed** face were adjusted in accordance with BS 476-20, Clause C.1.3, and monitored during the test.

2.3 Test equipment

Test equipment	Device No.
Test furnace and associated measuring devices	24930
Roving thermocouple	29121
Chronometer (stop watch)	29109 29110
Distance meter (ruler)	20337
Deflection measurement system	20382
Gap gauge, Ø = 6 mm	29164 20843
Gap gauge, Ø = 25 mm	29165 20844
Cotton pad holder	29169 29171

2.4 Testing personnel

Mr. Ruby	Mrs. Rieß	Mr. Baumhauer	Mr. Scholz

3 Results

3.1 Measured values and test observations

The results of conditioning are presented in the Annex, Section A.2.

The test observations are contained in the Annex, Section A.2.

The measured values referring to surface temperatures and deflections of test specimen, furnace temperatures, furnace pressure and deviations from the standard time / temperature curve, are presented in the Annex, Section A.2.

3.2 Summary and evaluation of test results

Table 1 Expression of results [1]

Reference	Performance criteria	Failure criteria	Test results	
BS 476-20 C.10.3	Integrity	Ignition of cotton pad	**No** ignition of cotton pad	-
		Penetration of specimen with 6 mm gap gauge	Gap gauge could **not** be moved in a gap ≥150 mm	-
		Penetration of specimen with 25 mm gap gauge	Gap gauge could **not** pass through the specimen	-
		Flames on unexposed face	Flames > 10 s did emerge on unexposed face in the	35th minute
BS 476-20 C.10.4 and 10.4 a)	Average temperature rise	Exceedance of admissible average temperature rise over initial temperature on unexposed face of specimen [K]: **Max. admissible average value = 140 K**	**No** exceedance until the end of test in the	36th minute
			Max. ΔT - average [K]	48
BS 476-20 C.10.4 and 10.4 b)	Maximum temperature rise	Exceedance of maximum admissible temperature rise over initial temperature on unexposed surface of door leaf (without 50 mm edge area of door leaf) [K]: **Door leaf: max. admissible individual value = 180 K**	Exceedance in the	30th minute
			At measurement point	6
			ΔT [K] at exceedance	186
BS 476-20 3.3	Ambient - temperature	Start of test: **adm. T 5°C - 35°C**	[°C]	19.9
		During test: **adm. ΔT (+5) K (insulated specimen)** **adm. ΔT (+15) K (insulated specimen)**	ΔT [K]	+ 1.7
BS 476-20 3.2	Furnace pressure	Pressure on **exposed** face at top edge of test specimen (1000 mm = 0 Pa)	[Pa]	10.3 ± 1.6

[1] For layout of measurement points, refer to the Annex, Section A.2

3.3 Evaluation of test results according to BS 476-22

The fire resistance classes achieved by the test specimen when exposed to fire testing according to BS 476-22 are tabulated below:

Table 2 Comparison of test results with criteria laid down by fire resistance standard

Criteria	Test results
Integrity	**34 minutes**
Insulation	**29 minutes**
Termination of test	**in the 36th minute**

The test was terminated on client's request.

3.4 Limitations

The results only relate to the behaviour of the specimen of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires.

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over 5 years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

ift Rosenheim
13.11.2020

Annex

Client Pacific Rim Wood Ltd
Langport Somerset, TA10 9SJ (United Kingdom)
Project 18-003111-PR04 (PB-C04-01-en-02)
Product **"Flamebreak Type 430"**
Date of test 23.10.2018

A.1 Test specimen

A.1.1 Description of test specimen

The inspection of the test specimen and the coordination of the documents were carried out by UL International (UK) Ltd. Item designations / numbers as well as material specifications were supplied by the client.

Product	single-leaf fire resistant door
Exposed face[2]	opening face
Manufacturer	John Watson Joinery Ltd, Usworth Road Industrial Estate, Belle Vue Way, Hartlepool, TS25 1JZ
Designation / type / item no.	"Flamebreak Type 430"
External dimensions of element (W x H)	996 mm x 2,199 mm
Supporting construction	solid high density structure
Solid high density structure	vertically perforated brick (900 kg/m³)
Thickness	240 mm
Fixing devices (type)	100 mm long steel concrete screws
Number	total: 8 pcs. each side: 4 pcs. at top: none
Fixing distances	at sides from T.S.F.F.: from the corners each 150 mm, between the fixing devices maximum 600 mm
Position of fixing devices in frame	from opening face: approximately 35 mm
Connecting joints	15 mm
Infills of joints	mineral wool, sealed with silicone
Frame / frame member	
Design	block frame
System, manufacturer	"JWR60", John Watson Joinery Ltd
Material, thickness	timber, european redwood, 90 mm
Profile dimensions (W x D)	47 mm x 90 mm
Width of frame face	opening face: 32 mm closing face: 47 mm
Rebate design	single rebated
Rebate dimensions (W x D)	15 mm x 47 mm
Clear opening dimensions (W x H)	902 mm x 2,152 mm
Frame rebate dimensions (W x H)	932 mm x 2,167 mm
Corner connection	comb joint

[2] Notes: The fire load density takes place on one side. The test is part of a test series. The selection of the exposed face arises of the combination of test series.

Surface treatment	without
Threshold / horizontal piece at bottom	
Manufacturer	Stormguard Slimline
Material	aluminium
Fixing	screw fixing to floor level
Dimensions (D x H)	60 mm x 15 mm
Joint	butt joint inside frame
Intumescent material	
Manufacturer	Sealed Tight Solutions (STS)
Item no.	"ST1504"
Dimensions (W x T)	1 pcs. 15 mm x 4 mm
Position	15 mm from the opening face
Fixing type	self-adhesive
Seal	
System	rebate seal
Manufacturer	Sealed Tight Solutions (STS)
Item no.	"ST1009"
Material	neoprene
Position	mitre-cut at corners
Fixing	ends / connection bonded with instant adhesive
Door leaf	
Rebate design	unrebated
Gap dimensions[3]	nominal dimension 3 mm
Total thickness	44 mm
External leaf dimensions (W x H)	926 mm x 2,150 mm
Total weight	47 kg
Surface treatment	without
Type	plywood door
Frame (wood type, raw density (kg/m³))	mixed tropical hardwood, raw density 480 kg/m³
Profile dimensions (W x D)	at top: 1 pcs. 35 mm x 36 mm, incorporating a 9 mm x 9 mm tongue located into the core material hinge sided, lock sided and at bottom: no frame
Insert stripping / edging strip	without
Reinforcement	without
Inner core	
Configuration	3-layers of lamels laid in alternate directions - grooved to accept the stiles and rails albisia falcatta 140 - 360 kg/m³
Gluing of inner core	fully adhered

[3] see information sheet attached

Glue (system, manufacturer)	PVA
Outside facing (material, manufacturer, thickness)	plywood, t = 4 mm
Gluing of outside facing (system, manufacturer)	PVA
Lippings (material, manufacturer, thickness)	all edges, sapele, t = 8 mm, 640 kg/m³
Gluing of lippings (system, manufacturer)	PUR glue, "Technomelt PUR", Henkel
Intumescent material	without
Seal	without
Floor seal	without
Infill in door leaf	
Design	Insulating glazing consists of fire resisting laminated glass
System	"Pyrobelite 12EG"
Manufacturer	AGC
Evidence of conformity	CE 1121-CPD-CA0004
Total thickness	22 mm
External dimensions (W x H)	167 mm x 892 mm
Weight (kg)	5 kg
Panel configuration	from fire unexposed to fire exposed face: LSG 6.8, 7 mm / steel spacer, 8 mm / "Pyrobelite", 7 mm
Mounting of infill	
Load transmission / glazing blocks (material, raw density (kg/m³), dimensions)	glazing blocks, sapele 2 mm x 20 mm x 25 mm, 640 kg/m^3
Position of glazing blocks (each infill)	2 pcs., distance from corners: 30 mm
Glazing bead	double-sided
Material	sapele
Profile dimensions (W x D)	16 mm x 25 mm
Fixing	steel pins 50 mm
Distance of fixing	distance from corners: 50 mm in-between the fixing points: e ≤ 150 mm
Edge cover of glazing / panel	on four sides continuous around perimeter: 10 mm
Width of battens	at sides: 375.5 mm at top: 200 mm at bottom: 1,050 mm
Outer and inner sealing	wet glazing
Glazing preformed tape (system, dimensions (W X T))	glazing tape, 10 mm x 5 mm
Manufacturer	Sealed Tight Solutions (STS)
Item no.	"ST105 GT"
Seal	silicone

Intumescent material	
Manufacturer	Sealed Tight Solutions (STS)
System	"ST 30 x 2 graphite liner"
Dimensions (W x T)	30 mm x 2 mm
Position	around glass aperture
Fixing	self-adhesive
Active leaf – interlocking device	
Main lock (lock type)	multiple auto locking
System	AV-2
Manufacturer	Winkhaus
Item no.	2559895
Material	Steel
Number of latches / deadbolts	1 pcs. latch / 1 pcs. deadbolt / 2 pcs. hooks
Latchbolt bite	6 mm
Latchbolt projection	10 mm
Hook bites	hooks from top: 21 mm / 20 mm
Backset	55 mm
Handle pin	spindle, solid, a = 8 mm x 8 mm
Lock case dimensions (W x H x D)	73 mm x 185 mm x 15 mm
Faceplate type, material	flat faceplate with radius corners
Faceplate dimensions (W x H x D)	20 mm x 1,770 mm x 3 mm
Fixing device (number, type and dimensions of screws)	12 pcs. 7 mm x 38 mm woodscrews
Intumescent material	
Manufacturer	Sealed Tight Solutions (STS)
System	"ST30 Graphite lock kit"
Dimensions	central case: 140 mm x 50 mm
Position	both sides
Main strike plate (type)	flat strike plates
Manufacturer	Winkhaus
Item no.	main look: F24-908 centre keep hooks: F24-908 single pocket keep
Material	steel
Dimensions (W x H x D)	24 mm x 235 mm x 2.5 mm
Latch / deadbolt opening (W x H)	latch 8.5 mm x 21 mm / deadbolt 13 mm x 52 mm
Fixing device (number, type and dimensions of screws)	central plate: 3 pcs. 7 mm x 25 mm woodscrews hook plates: 4 pcs. 7 mm x 25 mm woodscrews
Intumescent material	
Manufacturer	Sealed Tight Solutions (STS)

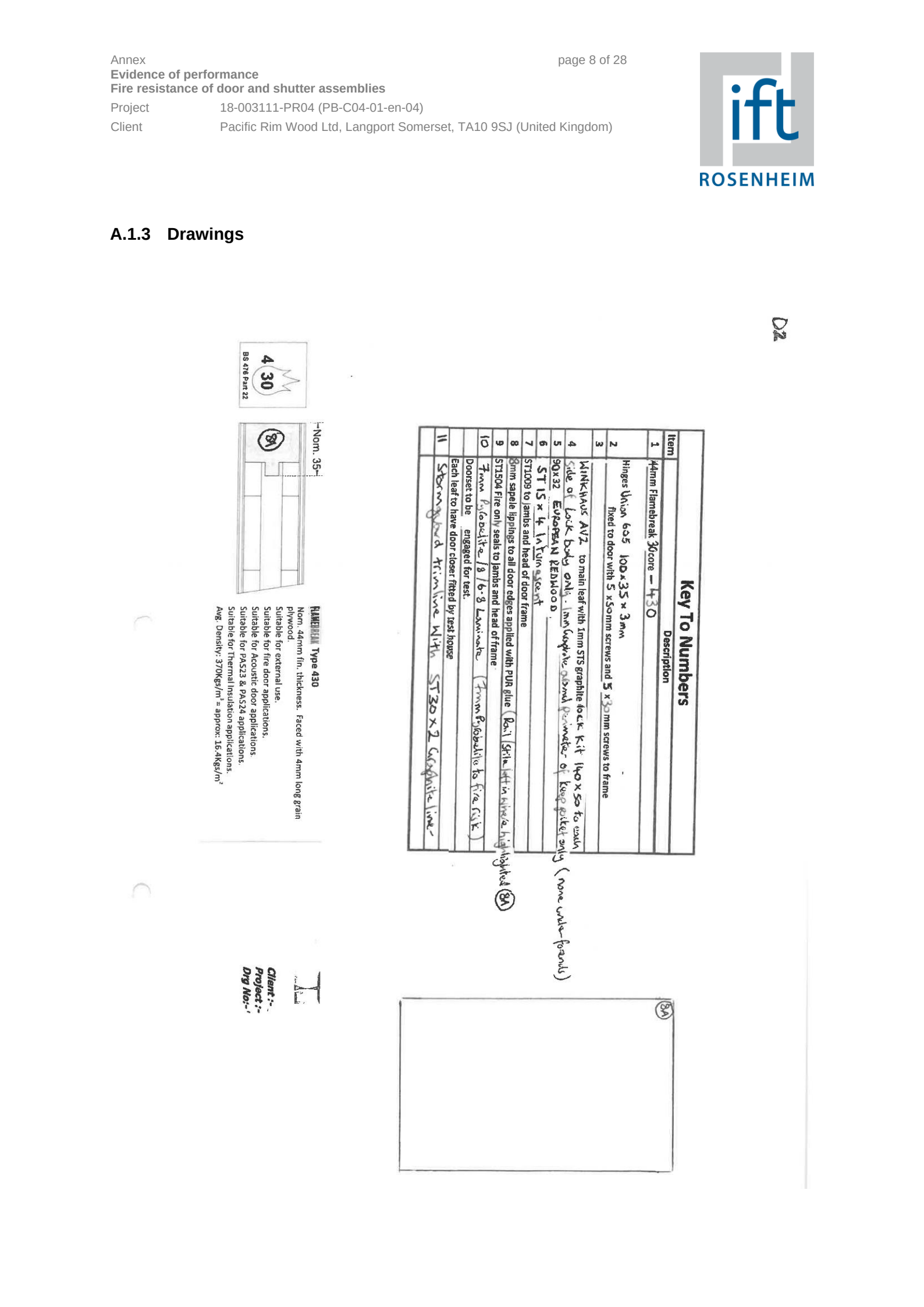
System	"ST Graphite"
Dimensions (T)	1 mm
Position	around perimeter of hook pockets
Handle type	handle
Manufacturer	ERA FAB & FIX
Item no.	"Windsor Inline Lever 1F302"
Material	solid die cast zinc
Handle height	1070 mm from bottom of door
Fixing device (number, type and dimensions of screws)	2 pcs. M5 x 55 mm
Round / profile cylinder	Euro Profile
Manufacturer	U.A.P Kinetica 3*
Item no.	KIN 30 / 30NAS
Door closing device	
Design	door closer at top
Manufacturer	Eclipse
Item no.	28730
Installation type	face fixed
Fixing device (number, type and dimensions of screws)	4 pcs. 10 mm x 30 mm
Hinges	
Design	surface-mounted hinge
System	HI Load Lift Off
Manufacturer	Union
Item no.	605
Number (each leaf)	4 pcs.
Material	grade II steel
Dimensions	38 mm x 100 mm
Fixing device (number, type and dimensions of screws, type and dimensions of welding)	10 pcs. per hinge 10 mm x 30 mm screws
Hinge reference lines (frame to top)	204 mm / 403 mm / 1,102 mm / 1,801 mm

A.1.2 Characteristic values of building materials

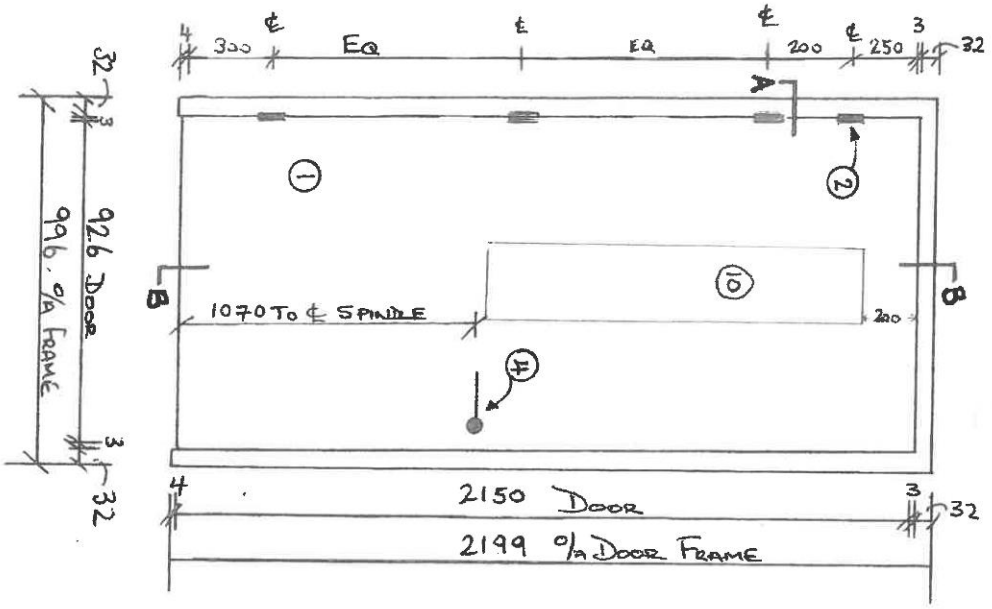
Designation of building material	Manufacturer	Thick-ness [mm]	Weight per unit area [kg/m²]	Density [kg/m³]	Moisture content [%]	Building material class as per EN 13501-1
Intumescent material "ST Graphite"	Sealed Tight Solutions (STS)	1 / 2(4)	(5)	(5)	(5)	(6)
Intumescent material "ST30 Graphite look kit"	Sealed Tight Solutions (STS)	50 / 25(4)	(5)	(5)	(5)	(6)
Intumescent material "ST1504"	Sealed Tight Solutions (STS)	4(4)	(5)	(5)	(5)	(6)
rebate seal "ST1009"	Sealed Tight Solutions (STS)	(5)	(5)	(5)	(5)	(6)

(4) Declared by manufacturer
(5) Determination not performed
(6) No information given

A.1.3 Drawings

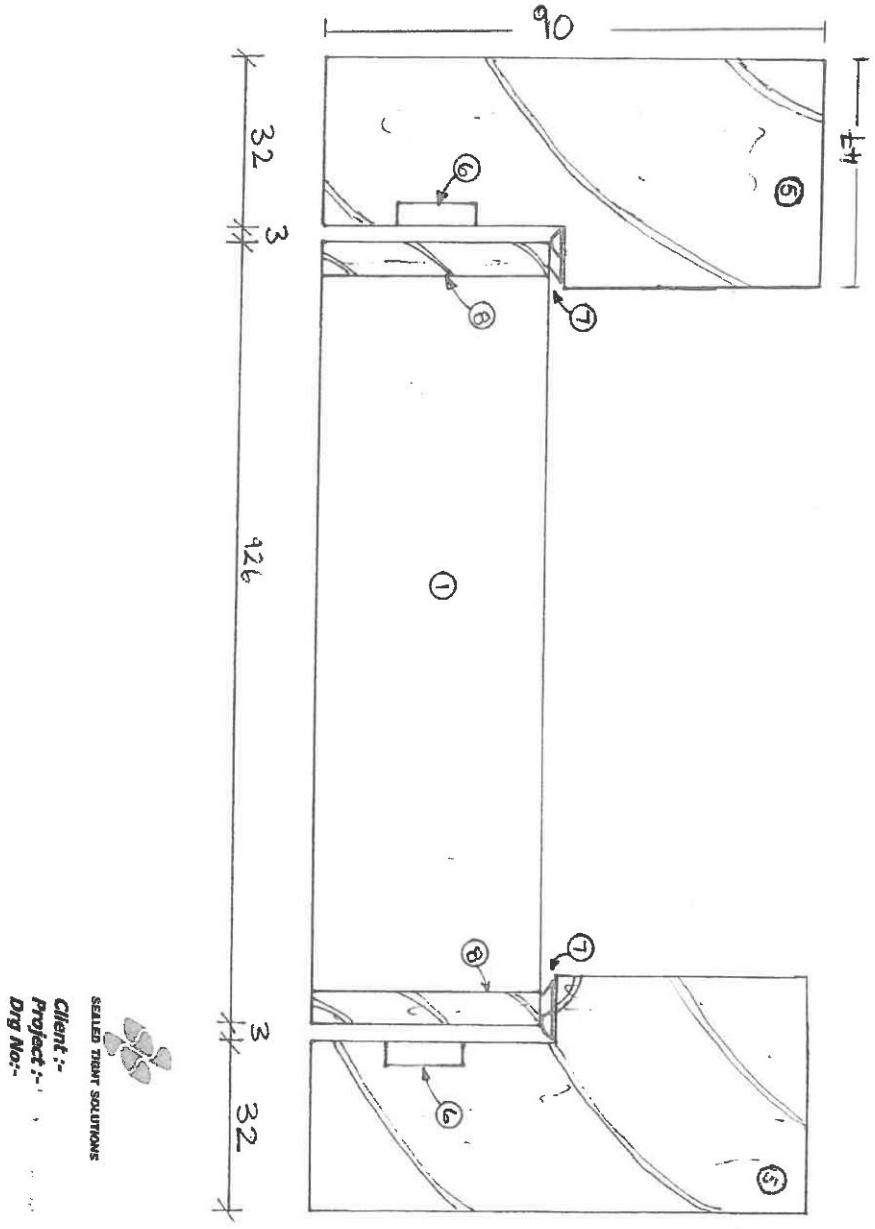


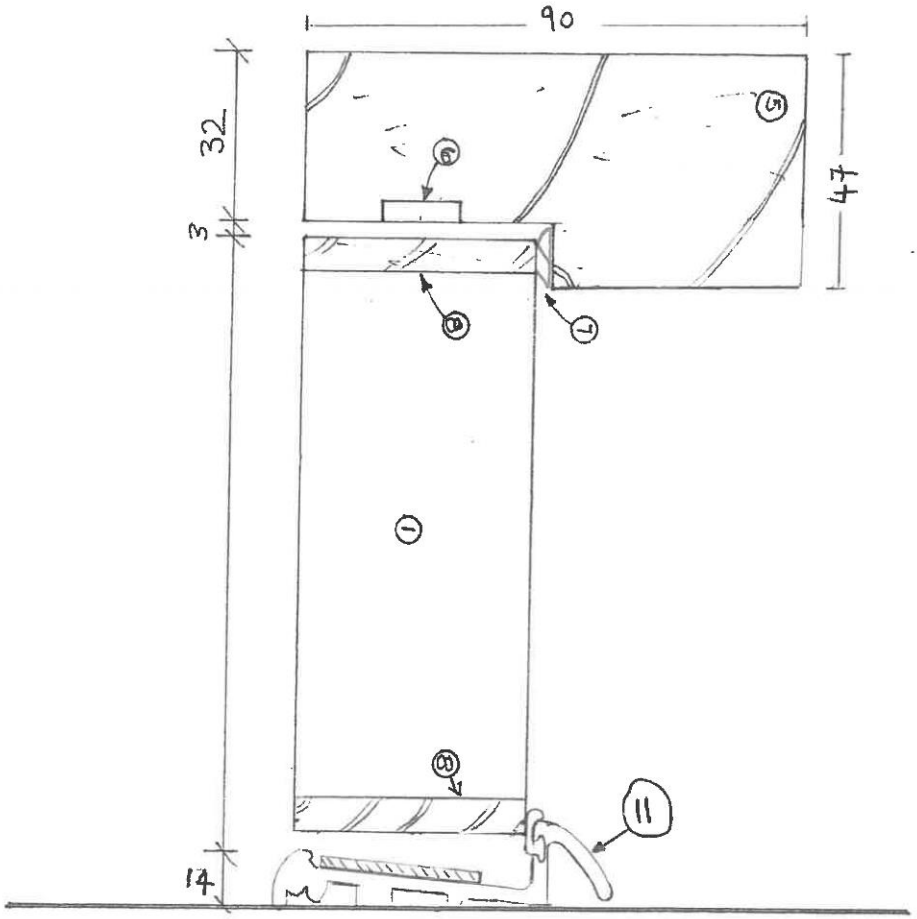
D2



10 Glazing 7mm Pyrobelite (8mm Steel / 6.8 laminate
Cut out Size 175mm x 900mm
Glass Size 167mm x 512mm

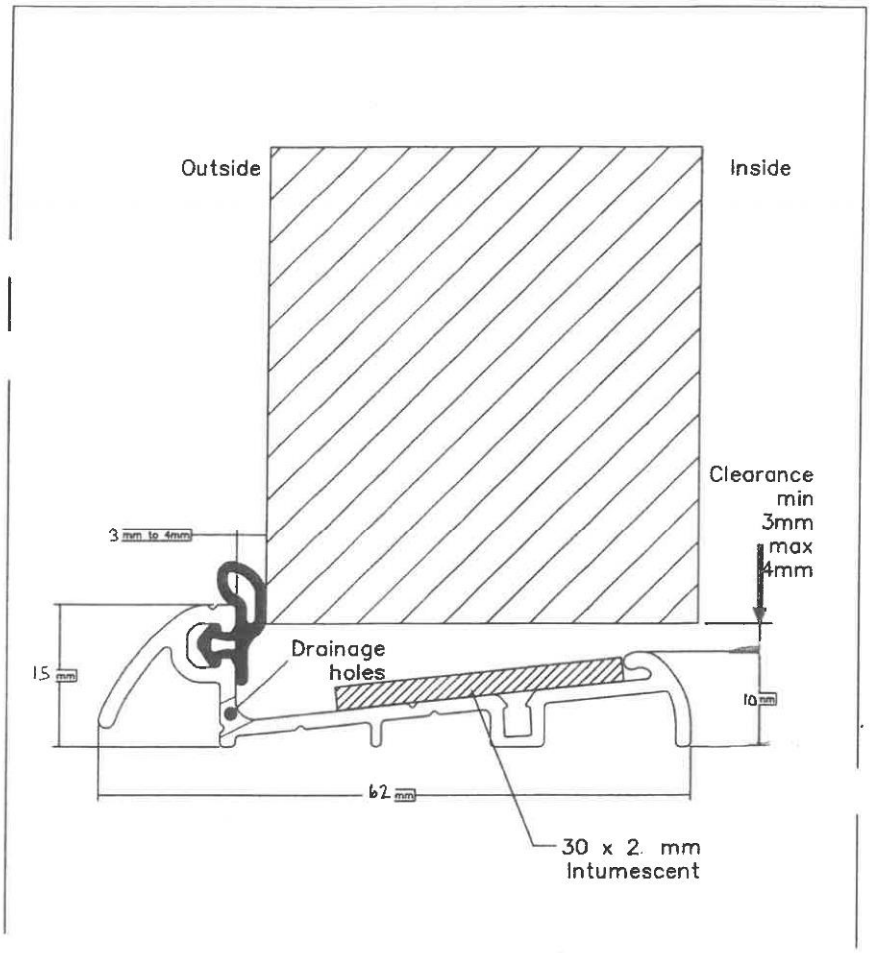
D2


90
32
3
126
3
32
44
1
5
6
7
8
SEALED TIMM SOLUTIONS
Client :-
Project :-
Drg No:-



SEALED LIGHT SOLUTIONS

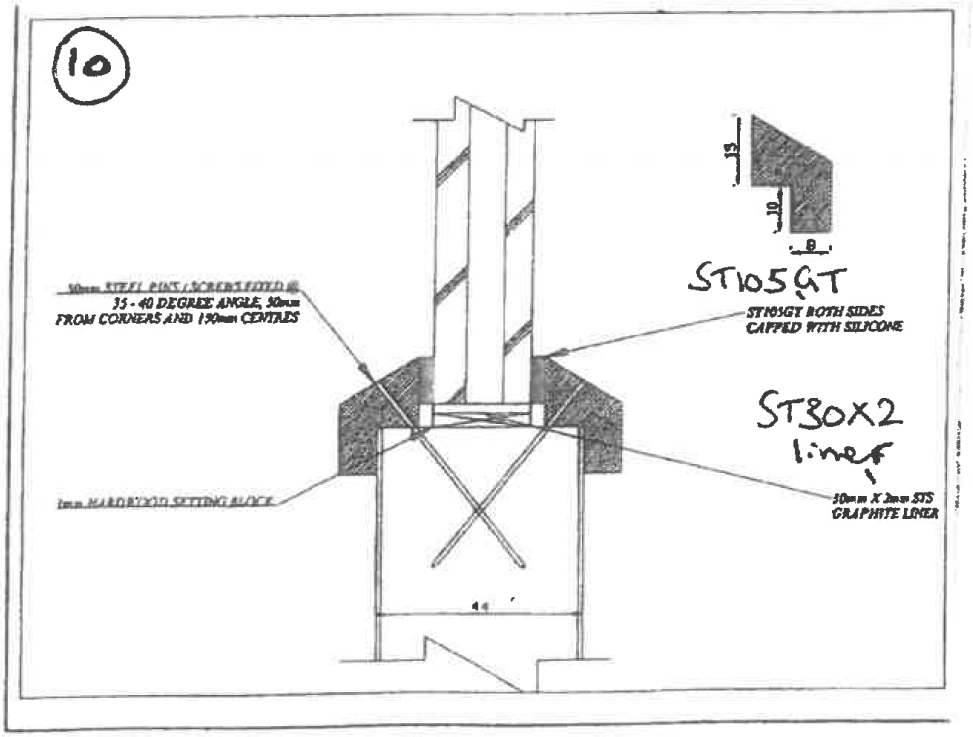
D1



TITLE

Slimline FD30 Threshold

D2


10
35 - 40 DEGREE ANGLE, 50mm
FROM CORNERS AND 190mm CENTRES
ST105GT
STRAIGHT BOTH SIDES
CAPPED WITH SILICONE
ST80X2
liner
GRAPHITE LINER

A.1.4 Photographs

Photo 1: Specimen before testing

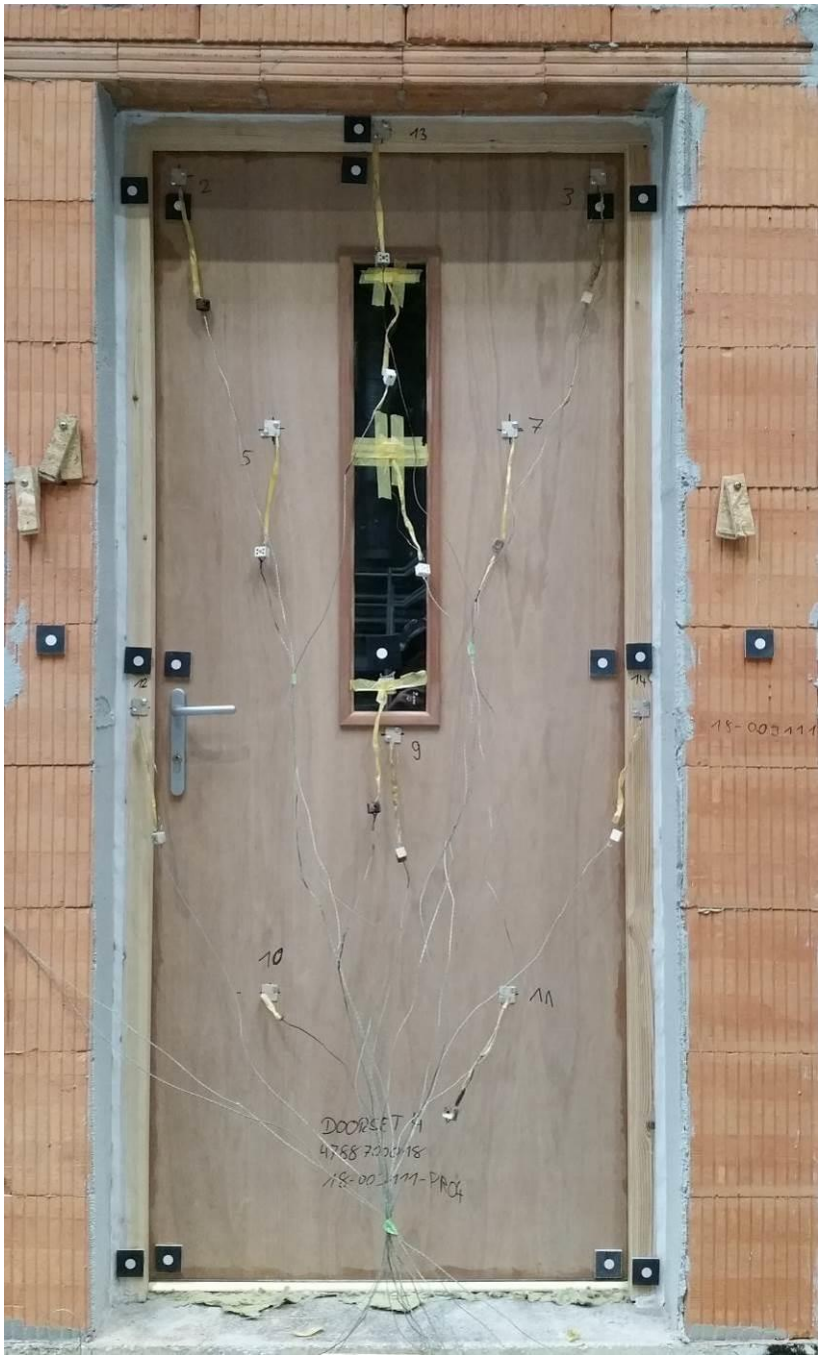
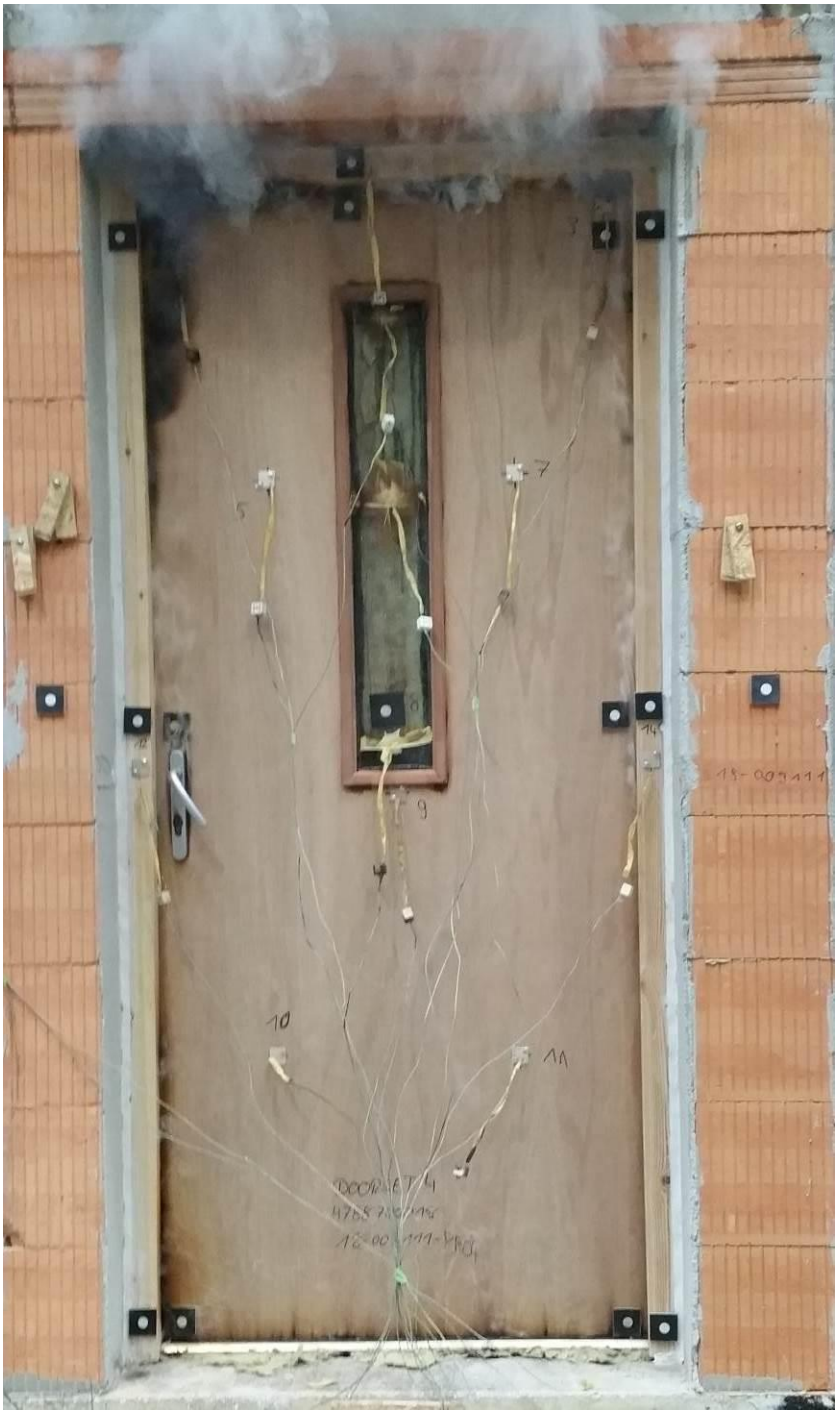


Photo 2: Specimen before testing

Doorset 1	Doorset 2	Doorset 3	Doorset 4
Project No. 18-003111-PR01	Project No. 18-003111-PR02	Project No. 18-003111-PR03	Project No. 18-003111-PR04

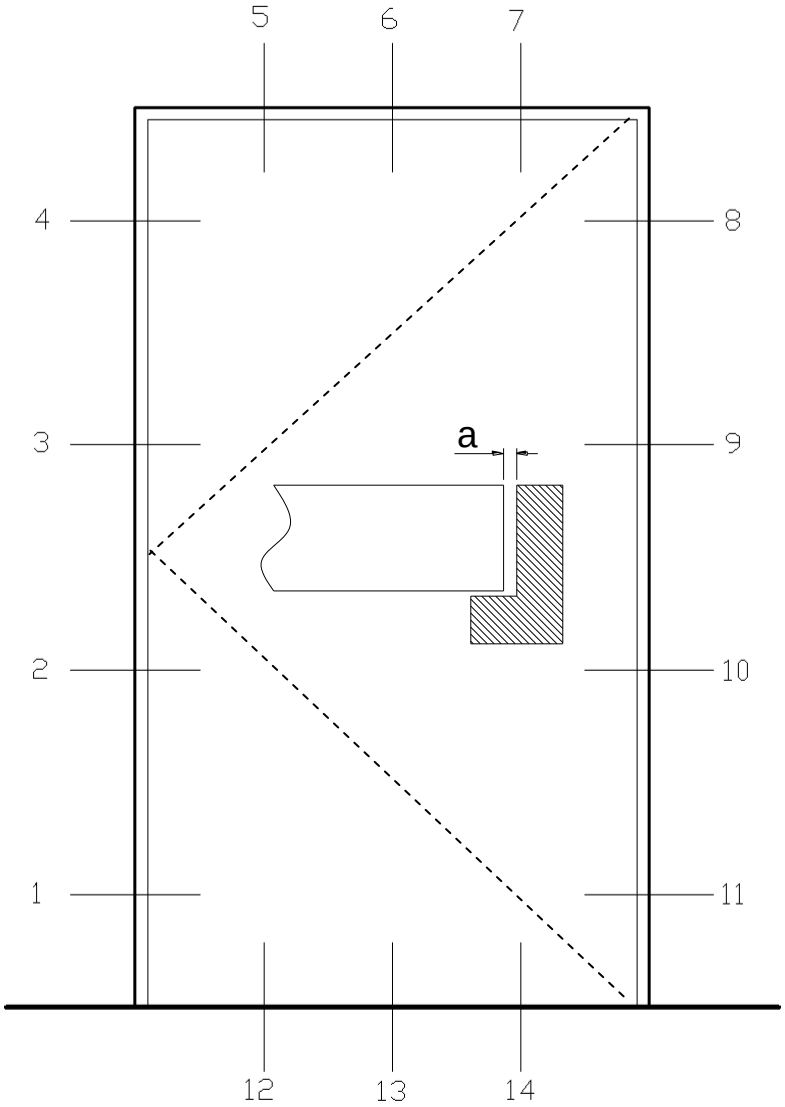
The test results of the other test specimens are presented in the separate project No.: 18-003111-PR01, 18-003111-PR02 and 18-003111-PR03.

Photo 3: Specimen at the end of the test in the 36th minute



A.1.5 Gap sizes

schematic view, of the **un**exposed face, sizes [mm]



No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Size a	2.8	3.6		1.9	2.1	2.7	2.2	3.1	3.1		4.9	1.2	2.5	2.4

A.2 Measured values and observations

A.2.1 Conditioning

Performance criteria	Requirements	Test results
Operability test	The sample was checked for operability in the fire restraint frame prior to being mounted on the test furnace, from fully closed to the maximum possible opening and at least 90 degrees and back to fully closed for 25 cycles. This opening operation was manually performed, the closing operation was performed by the closing device.	The operability is ensured.

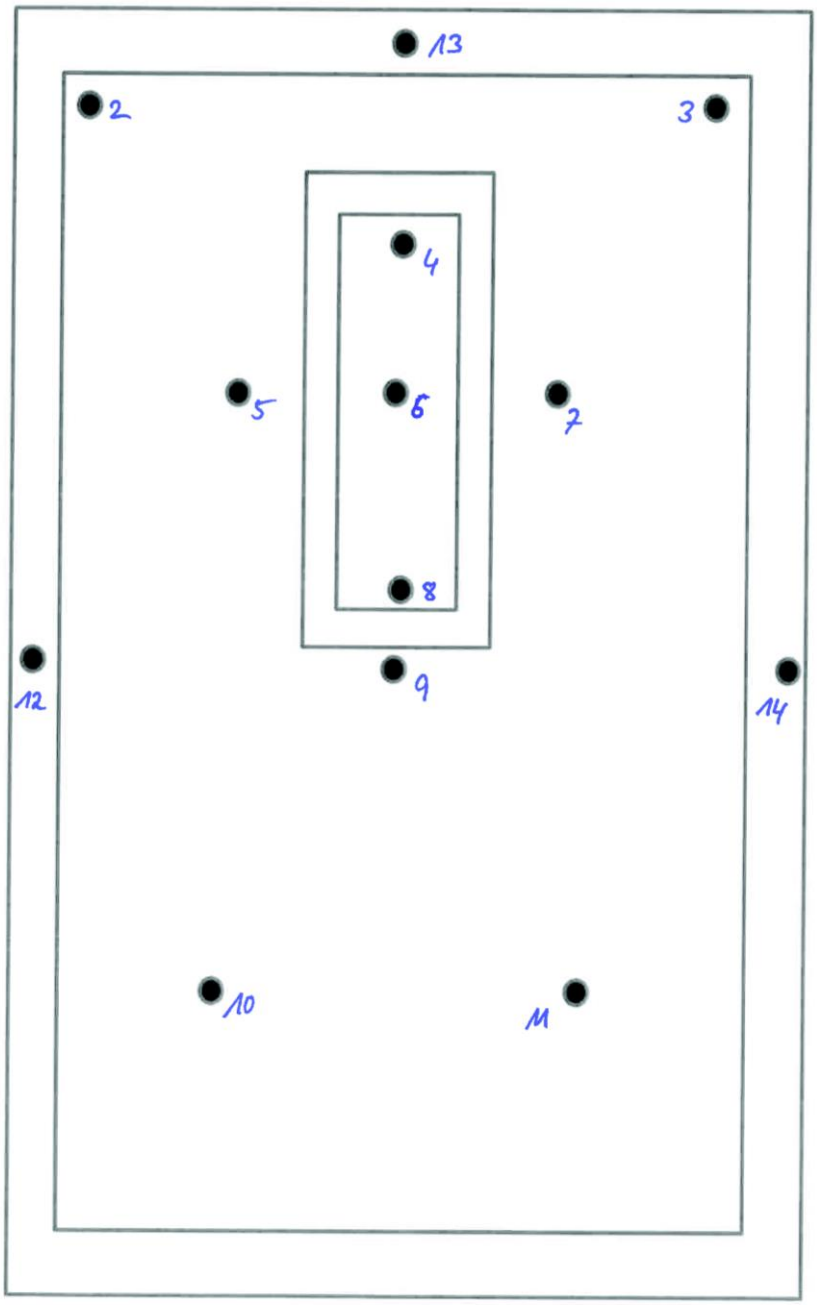
A.2.2 Test observations

Test duration (in the minute)	Face of specimen [7]	Observations
4	Z	crack formation at exposed pane of fire protection glass, incipient reaction of interlayer
	Z	low release of smoke from door gap on lock side at half the height
6	Z	low release of smoke from door gap on lock side from bottom to half the height
8	Z	low release of smoke from door gap on lock side from bottom to half the height
9	Z	low release of smoke at door gap in upper corners on lock side, discoloration of door leaf in the areas
	Z	intumescent layer of glass completely reacts
11	Z	release of smoke reduced, only a little from door gap in upper corner on lock side, at top to full element width, on lock side to half height
12	Z	discoloration of door leaf at edge area on lock side until approx. halfway up
15	Z	low release of smoke at door gap, on lock side, at bottom
20	Z	low release of smoke from door gap on lock side from bottom to half the height
26	Z	burst of flame < 2 seconds from door gap in upper corner on lock side
27	Z	average release of smoke at door gap in upper corner on lock side
31	Z	integrity retained
32	Z	low release of smoke at door gap in upper corner on hinge side
	Z	discoloration of door leaf in area of fixing of the glazing
35	Z	persistent flames from door gap at upper corner on lock side, for approx. 30 seconds
36	Z	test specimen covered, end der evaluation; test continued until the 44th minute
Test discontinued in the 36th / 44th minute		

[7] A = exposed face, Z = unexposed face

A.2.3 Surface temperatures

A.2.3.1 Layout of measurement points - surface temperatures



A.2.3.2 Temperature of unexposed face

Table 3 Average value (MW) as per BS 476-20, Clause C.10.4 and 10.4 a) - Temperature rise [K] at measurement points of thermocouples (TE)

min / TE	5	7	9	10	11	MW
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	3	0	0	1
6	0	0	6	0	0	1
7	0	0	7	1	0	2
8	1	1	7	1	0	2
9	1	1	6	1	0	2
10	1	1	6	2	1	2
11	2	2	6	3	1	3
12	3	3	7	4	1	4
13	4	4	8	5	1	4
14	5	5	9	6	1	5
15	6	7	11	7	1	6
16	8	9	15	9	1	8
17	9	11	18	11	1	10
18	11	13	20	13	1	12
19	13	15	22	16	1	13
20	15	17	23	18	1	15
21	18	19	25	21	1	17
22	20	21	26	24	1	18
23	24	24	26	28	1	21
24	29	27	27	34	2	24
25	35	31	28	40	2	27
26	42	36	29	46	2	31
27	47	40	31	50	2	34
28	52	44	32	52	2	36
29	55	49	33	53	2	38
30	58	53	35	54	2	40
31	60	56	36	54	2	42
32	61	60	37	55	2	43
33	61	63	39	57	2	44
34	63	66	40	58	2	46
35	64	70	42	60	2	48

Table 4 Maximum value as per BS 476-20, Clause C.10.4 and 10.4 b) - Temperature rise [K] at measurement points of thermocouples (TE)

min / TE	2	3
0	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	1
7	0	1
8	1	1
9	14	2
10	13	3
11	15	4
12	19	6
13	21	7
14	21	8
15	19	10
16	18	11
17	18	12
18	17	14
19	16	15
20	17	17
21	19	19
22	18	20
23	19	22
24	20	24
25	21	26
26	22	29
27	20	32
28	19	37
29	20	42
30	24	46
31	28	50
32	31	53
33	31	57
34	30	60
35	45	63

Table 5 Maximum value as per BS 476-20, Clause C.10.4 and 10.4 b) - Temperature rise [K] at measurement points of thermocouples (TE)

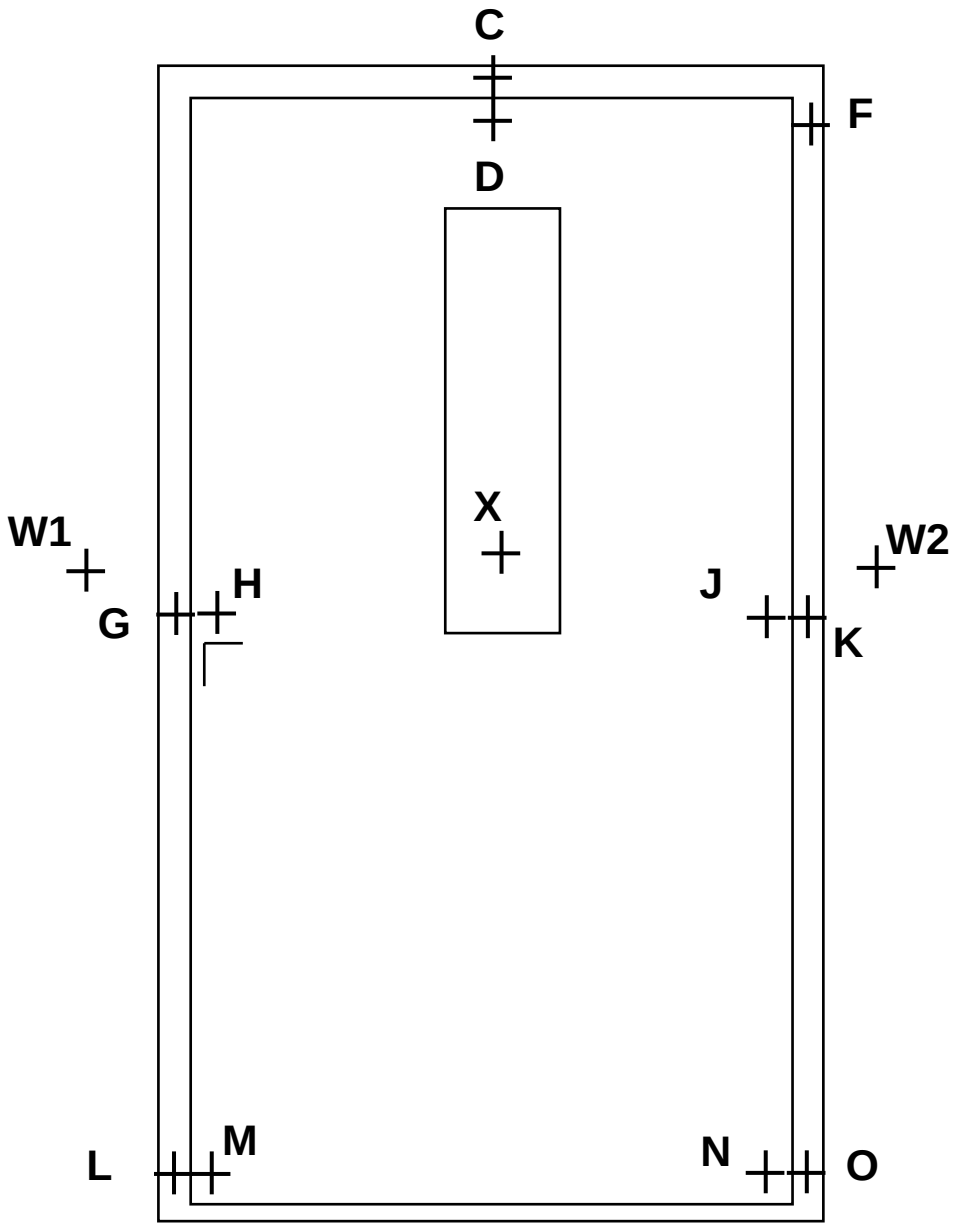
min / TE	4	6	8
0	0	0	0
1	1	2	2
2	2	3	4
3	4	6	6
4	6	8	9
5	18	14	27
6	31	19	40
7	45	26	45
8	57	37	47
9	63	42	52
10	66	47	60
11	67	53	64
12	68	60	66
13	70	65	67
14	72	67	69
15	75	69	70
16	78	72	72
17	81	76	74
18	85	80	77
19	90	84	80
20	96	89	84
21	102	96	88
22	109	103	92
23	117	111	97
24	126	119	102
25	135	130	105
26	145	141	113
27	154	154	121
28	163	166	130
29	171	178	138
30	180	189	148
31	191	197	159
32	202	209	171
33	212	220	183
34	224	232	196
35	236	240	210

Table 6 Maximum value as per BS 476-20, Clause C.10.4 and 10.4 b) - Temperature rise [K] at measurement points of thermocouples (TE)

min / TE	12	13	14
0	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	1	0	0
6	1	1	0
7	1	1	0
8	1	1	0
9	1	4	0
10	1	7	1
11	1	7	1
12	1	7	1
13	1	6	1
14	1	6	1
15	1	6	1
16	1	6	1
17	1	6	1
18	1	7	1
19	1	7	1
20	2	8	1
21	2	8	1
22	2	9	1
23	2	9	2
24	2	9	2
25	3	10	2
26	4	11	2
27	4	12	2
28	4	13	3
29	5	14	3
30	5	16	3
31	5	17	4
32	6	19	4
33	6	20	4
34	7	22	5
35	7	25	5

A.2.4 Deflection

A.2.4.1 Layout of measurement points - deflection measurement



A.2.4.2 Measured values - deflection

Table 7 Distances of surface from reference point [mm] at measurement points at top and at centre of test specimen [8]

MP / min	C	D	F	G	H	X	J
0	0	0	0	0	0	0	0
5	-5	7	-8	-10	1	1	0
10			-6	-2	-5	-2	-1
15	-3	-16	-11	-7	-7	-2	-1
20	-9	-15	-11	-14	-16	-8	-4
25	-18	-13	-16	-19	-19	-7	-8
30	-17	-21	-15	-18	-12	-3	-5

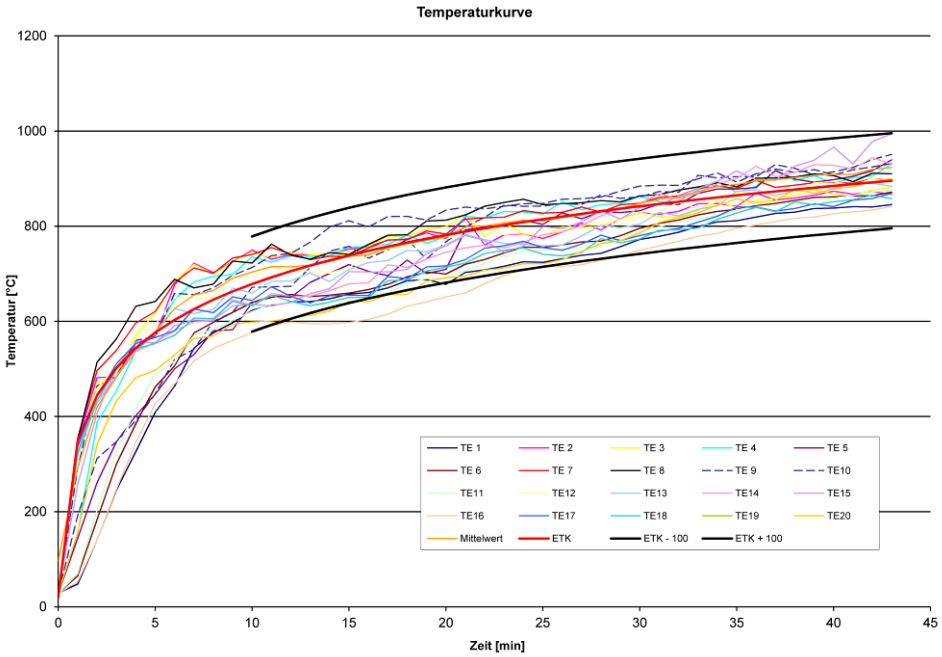
Table 8 Distances of surface from reference point [mm] at measurement points at centre, at bottom of test specimen and on wall[8]

MP / min	K	L	M	N	O	W1	W2
0	0	0	0	0	0	0	0
5	0	1	0	-4	2	-2	2
10	-2	-2	-9	-2	0	-1	0
15	-4	-5	-7	-6	0	-7	-3
20	-9		-7	-4	-2	-17	-4
25	-6	-7	-10	-6	-2	-18	-7
30	-6	-7	-7	-4	-1	-21	-5

[8] Negative values denote deflection towards the **exposed** face.
Missing values were not included.

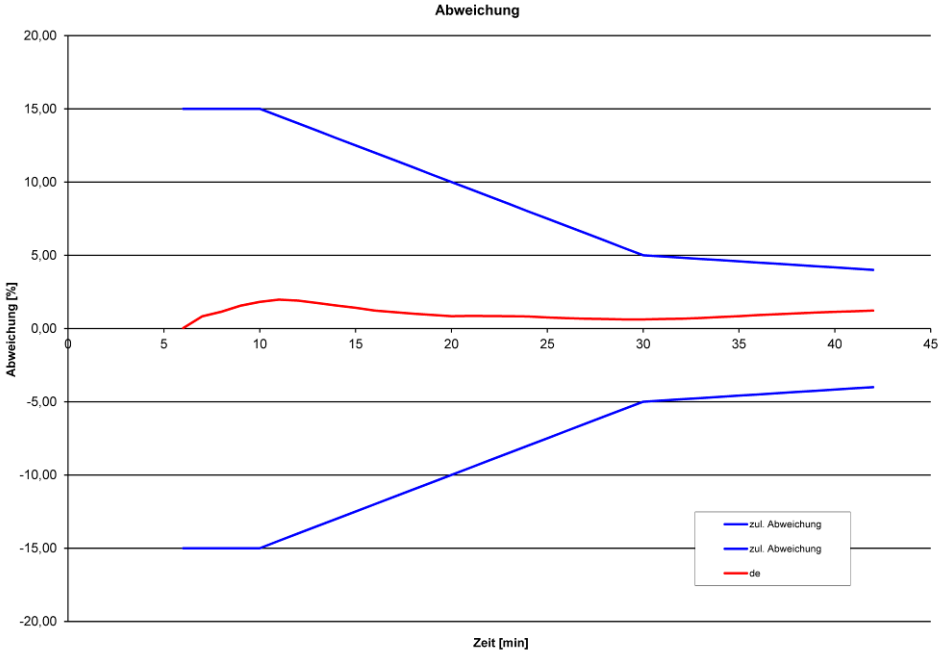
A.2.5 Furnace values

A.2.5.1 Temperature curve in furnace



A.2.5.2 Permissible deviations / tolerances

Permissible deviations / tolerances of the resulting average time/temperature curve from the standard time / temperature curve acc. to BS 476-20, Clause 3.1.2



A.2.5.3 Pressure curve in furnace