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Testing. Advising. Assuring.

Title:

The fire resistance performance of a single-acting, single-leaf doorset incorporating various items of hardware when tested in accordance with BS EN 1634-1:2014

Report No:

388801

Prepared for:

Wenzhou OUDE Gating Technology Development CO.,LTD
No. 316 Jinhai 1st Avenue, China.
Jinhai Industry Zone
Wenzhou.

Date:

23rd October 2017

Notified Body No:

0833

UKAS TESTING
0249

Summary

Objective	To determine the fire resistance performance of a single-acting, single-leaf doorset, incorporating various items of hardware tested in accordance with BS EN 1634-1: 2014.
Test Sponsor	**Wenzhou OUDE Gating Technology Development CO.,LTD** No. 316 Jinhai 1st Avenue, China, Jinhai Industry Zone, Wenzhou
Summary of Tested Specimens	The doorset had overall dimensions of 2073 mm high by 1003 mm wide and incorporated a door leaf of overall dimensions 2030 mm high by 932 mm wide by 44 mm thick. The door leaf was hung within a softwood door frame on three zinc plated steel hinges. The door leaf was formed from a graduated density chipboard core with hardwood lippings to the vertical edges. The doorset incorporated a surface mount overhead closer fitted in parallel arm configuration to the exposed face of the leaf. The doorset was installed opening away from the heating conditions of the test and was unlatched for the test duration.

Test Results:

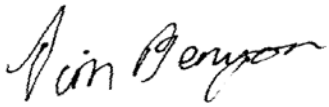
Integrity performance	Sustained flaming	36 minutes*
	Gap gauge	36 minutes*
	Cotton Pad	36 minutes*
Insulation performance		36 minutes*

*The test was discontinued after 36 minutes.

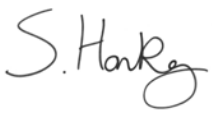
Date of Test	10th September 2017

Signatories

Responsible Officer
D. Fitzsimmons*
Technical Officer



Approved
T. Benyon*
Certification Engineer



Head of Department
S. Hankey*
Business Unit Manager

* For and on behalf of **Exova Warringtonfire**.

Report Issued

Date: 23rd October 2017

CONTENTS **PAGE NO.**

Test Procedure

Introduction

The doorset was required to provide a fire separating function and was therefore tested in accordance with BS EN 1634-1: 2014 'Fire resistance tests for doors and shutter assemblies - Part 1: Fire doors and shutters'. This test report should be read in conjunction with that Standard and with BS EN 1363-1: 2012 'Fire resistance tests - Part 1: General requirements' and BS EN 1363-2: 1999, 'Fire resistance tests - Part 2: Alternative and additional procedures'.

The specimen was judged on its ability to comply with the performance criteria for integrity and insulation, as required by BS EN 1634-1: 2014.

The specific purpose of the test was to evaluate the effects of the inclusion of various items of building hardware into a previously tested doorset construction. Because of this, no direct field of application for the doorset is included in this report.

Fire Test Study Group/EGOLF

Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.

Instruction To test

The test was conducted on the 10th September 2017 on behalf of **Wenzhou OUDE Gating Technology Development CO.,LTD** the sponsor of the test.

Test Specimen Construction

A comprehensive description of the test construction is given in the Schedule of Components. The description is based on a detailed survey of the specimen and information supplied by the sponsor of the test.

The doorsets' storage, installation, and test preparation took place in the test laboratory between the 9th and 10th of September 2017.

Installation

The doorset incorporating the hardware was mounted within an aperture provided within a low density rigid supporting construction. The doorset was mounted such that it opened away from the heating conditions of the test.

Representatives of **Exova Warringtonfire** conducted the installation on the 9th September 2017.

Sampling

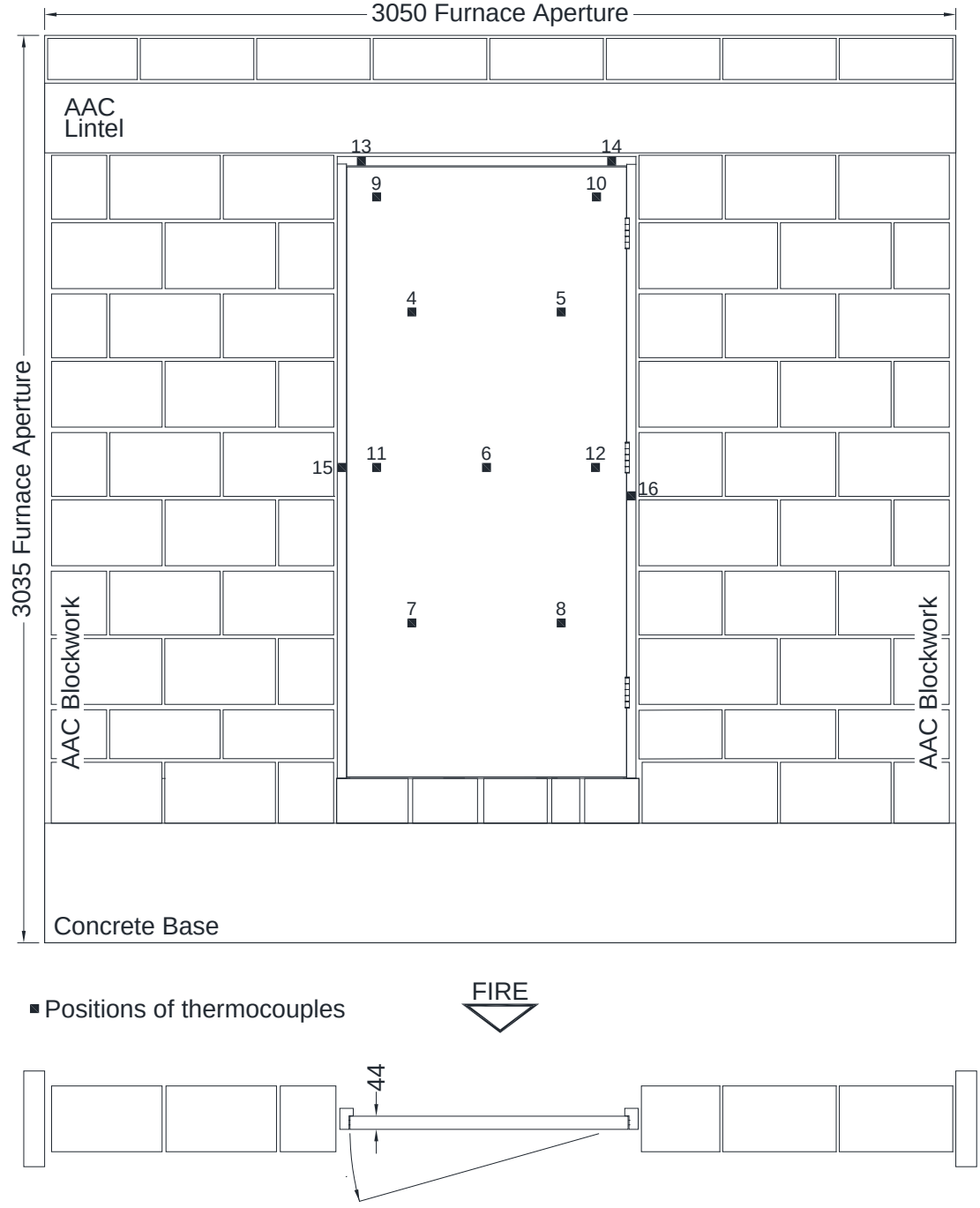
A representative of **Warrington Certification** sample selected the doorset hardware on the 28th August 2017.

Conditioning

The specimens' storage, construction, and test preparation took place in the test laboratory over a total, combined time of 2 days. Throughout this period of time both the temperature and the humidity of the laboratory were measured and recorded as being within a range of from 17.5°C to 21°C and 63.5% to 69% respectively.

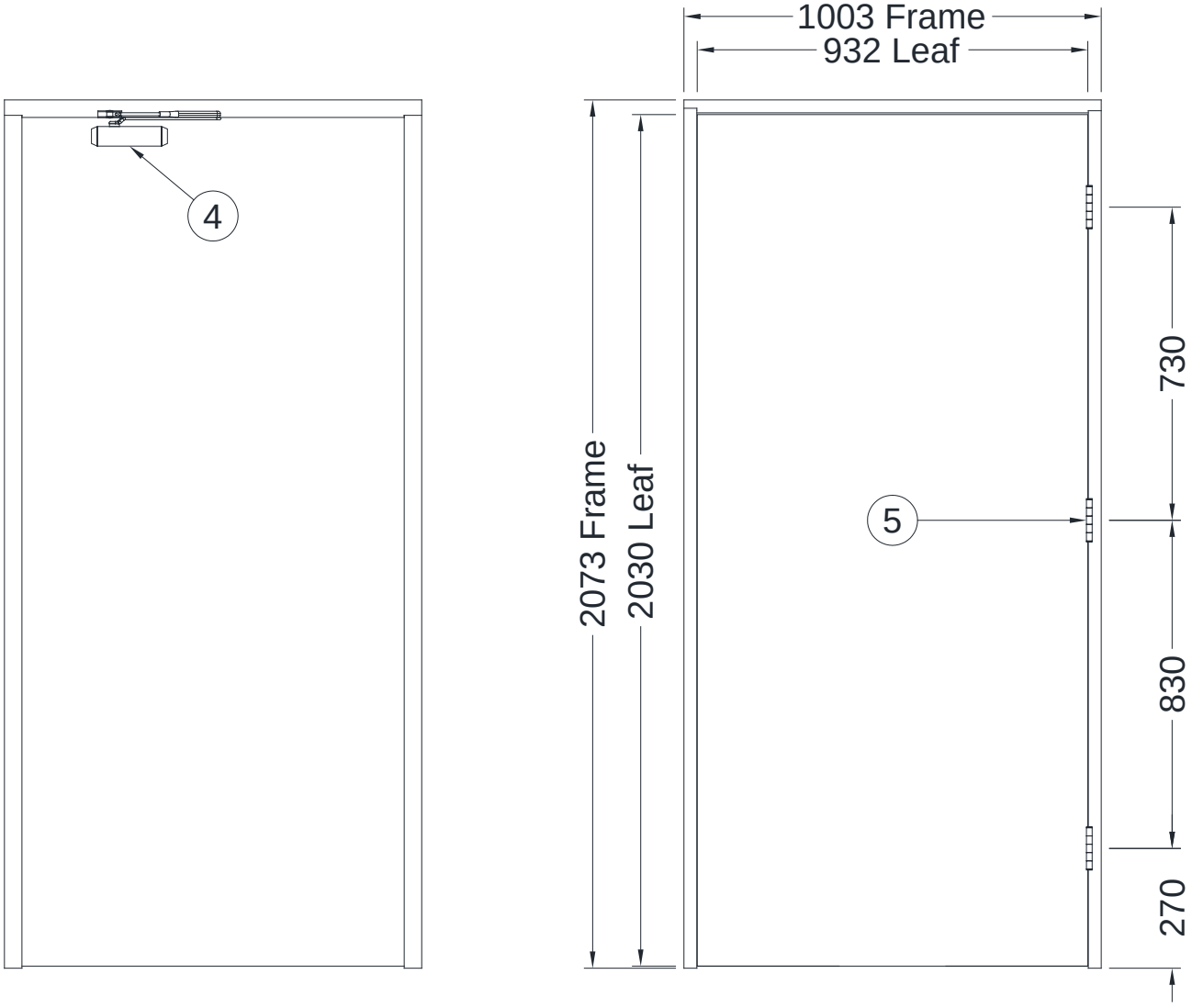
Test Specimen

Figure 1- General Elevation of Test Construction



Do not scale. All dimensions are in mm

Figure 2 – Detail of doorset

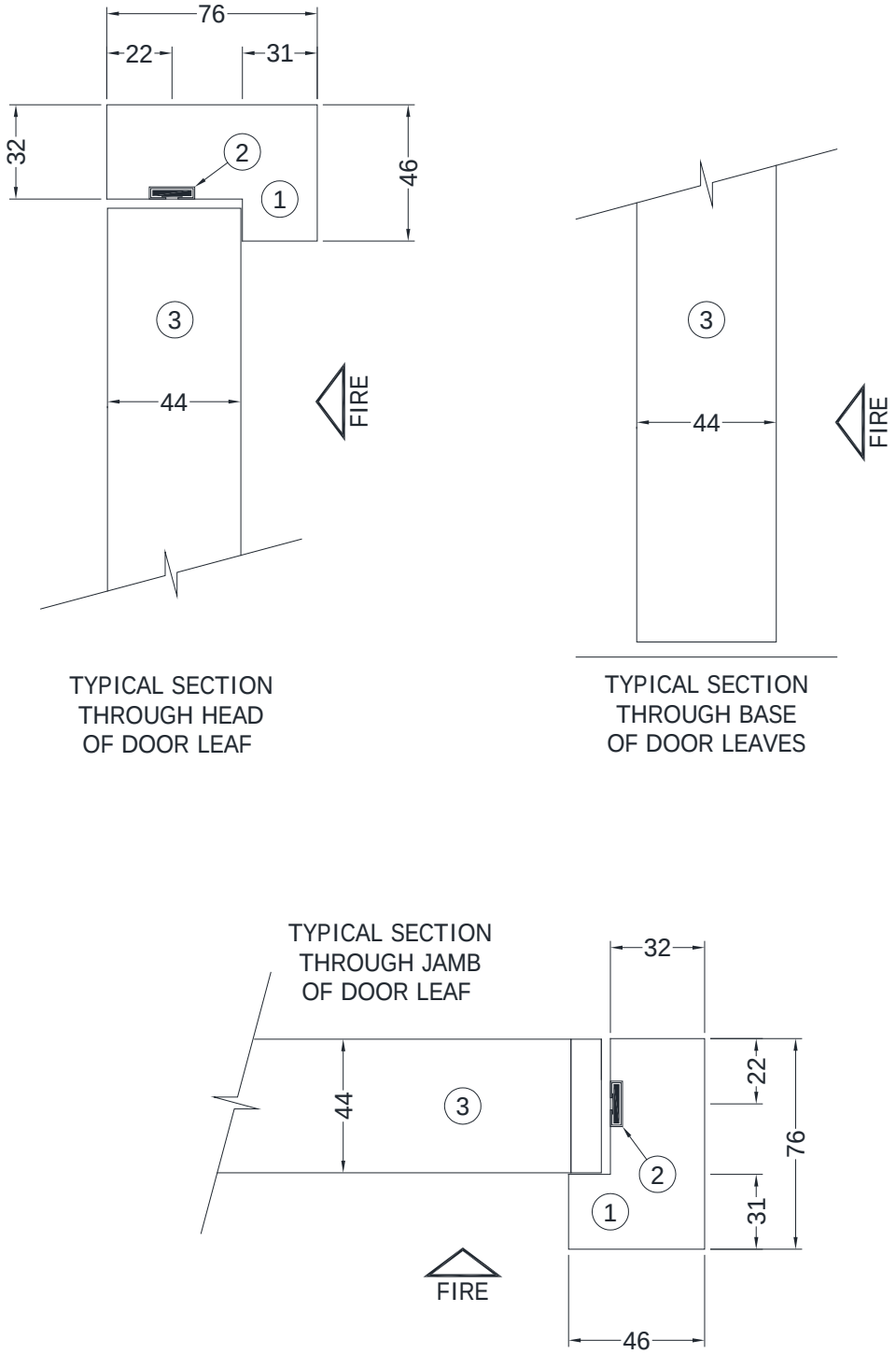


View from the exposed face

View from the unexposed face

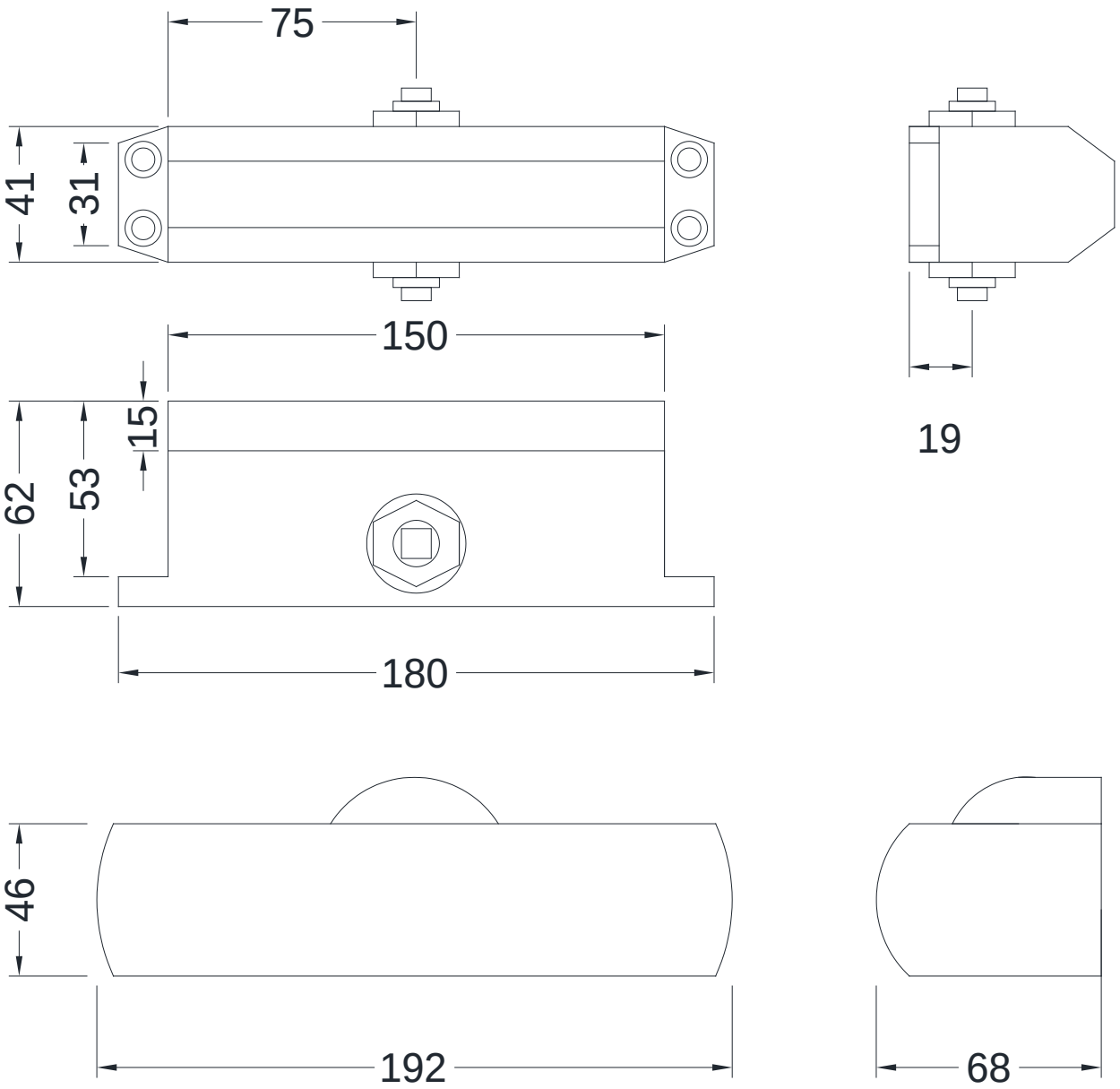
Do not scale. All dimensions are in mm

Figure 3 – Details of doorset



Do not scale. All dimensions are in mm

Figure 4 – Details of specimen item 4



Do not scale. All dimensions are in mm

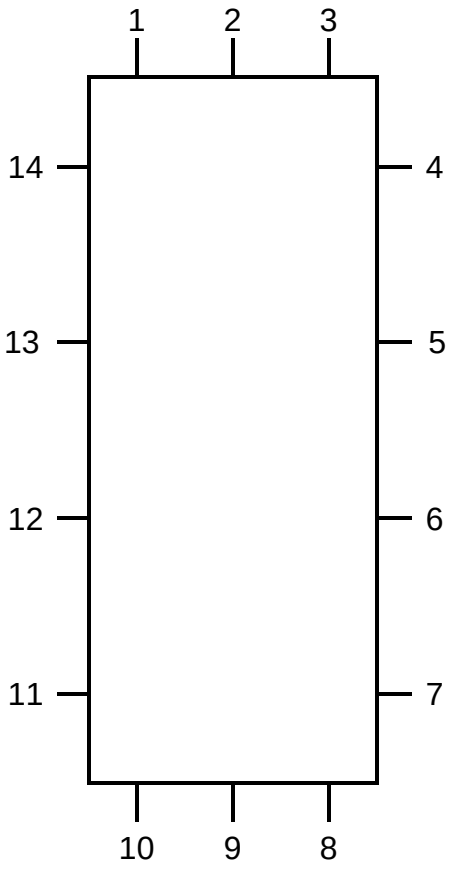
Schedule of Components

(Refer to Figures 1 to 4)
(All values are nominal unless stated otherwise)
(All other details are as stated by the sponsor)

Item		Description
1. Door Frame Jamb & Head		
Material	:	Pine Softwood
Density	:	510 ~ 550 kg/m^3 nominal
Average moisture content	:	10.2 % (measured with a Protimeter moisture meter by Exova Warringtonfire)
Overall size	:	76 mm x 46 mm, with 45 mm x 14 mm deep rebate
Jambs to head jointing method	:	Stub mortice & screwed, using 75 mm long x 4.6 mm diameter countersunk head wood screws
Fixing method	:	Through screwed and plugged
Fixings		
i. type	:	Countersunk head wood screws
ii. material	:	Steel screws with plastics plugs
iii. overall size	:	100 mm long by 4.8 diameter
iv. centres	:	4 off, evenly spaced at 505 – 730 mm centres along the unhinged jamb 6 off nominally 50 mm above and below each hinge position
2. Intumescent Seal		
Manufacturer	:	Pyroplex Ltd
Reference	:	CF 355
Material	:	Graphite intumescent strip within a polyvinyl chloride, PVC, carrier
Overall size	:	15 mm x 4 mm
Fixing method	:	Self adhered into grooves within rebate of frame, strips were interrupted at furniture positions
3. Door Leaf		
Manufacturer	:	Halspan
Reference	:	Prima
Overall thickness	:	44 mm
Construction		
Core	:	Chipboard
Lippings	:	Hardwood 8mm thick, to vertical edges only
i. Species	:	Sapele
ii. Density	:	620 ~ 660 kg/m^3, nominal
Adhesive to lipping		
i. Manufacturer	:	Polyvine
ii. Type	:	Formalhyde
iii. Reference	:	Casamite
iv. Curing Method	:	Cold press
v. Application method	:	Brushed

Item		Description
4. Door Closer		
Manufacturer	:	Wenzhou Oude Gating Technology Development Co. Ltd
Reference	:	5023AWE
Material		
i. Body	:	Steel
ii. Closer arm	:	Steel
iii. Cover	:	Plastic
iv. Bracket	:	Steel
Overall size (body)	:	180 mm long x 41 mm high x 62 mm deep
Overall size (Cover)	:	192 mm long x 46 mm high x 68 mm deep
Fixing method	:	Exposed face
Maximum opening moment	:	36.7Nm (newton metre)
Maximum closer moment	:	19.1Nm
5. Hinges		
Manufacturer	:	Royde & Tucker Ltd
Reference	:	Hi-Load 102
Primary material	:	Zinc plated steel
Overall sizes		
i. knuckle	:	104 mm long by 13.8 mm diameter
ii. blades	:	100 mm long by 35 mm wide by 3 mm thick
Fixings		
i. type	:	Countersunk head wood screws
ii. material	:	Steel
iii. size	:	29 mm long by 5.1 mm diameter
iv. number off per blade	:	5 off
v. maximum distance of fixing screws from exposed face of door leaf	:	61 mm
vi. minimum distance of fixing screws from exposed face of door leaf	:	51 mm
Bedding material	:	1 mm Interdens sheet by 1 mm thick

Doorset Clearance Gaps



View from unexposed face

Gap Dimension in mm at Position													
1	2	3	4	5	6	7	8*	9*	10*	11	12	13	14
3.3	3.4	3.2	3.2	3.6	3.6	2.9	5.9	6.1	5.2	3.0	3.2	3.2	3.0
Mean		3.2		Maximum			3.6		Minimum			2.9	

Gap Between Face of Leaf and Doorstop in mm at Position													
1	2	3	4	5	6	7	8*	9*	10*	11	12	13	14
3.8	1.1	0.8	0.9	1.2	0.4	0.1	n/a	n/a	n/a	0.3	1.0	0.8	2.1

* Dimension not included in calculations

ALL DIMENSIONS ARE IN mm

Instrumentation

General	The instrumentation was provided in accordance with the requirements of the Standard.
Furnace	The furnace was controlled so that its mean temperature complied with the requirements of BS EN 1363-1: 2012 Clause 5.1 using six plate thermometers, distributed over a plane 100 mm from the surface of the test construction.
General	Thermocouples were provided to monitor the unexposed surface of the specimens and the output of all instrumentation was recorded at no less than one minute intervals as follows.
Thermocouples 4 to 8	At five positions on the doorset, one approximately at the centre and one at the approximate centre of each quarter section of the doorset.
Thermocouples 9 to 12	At four positions on the door, positioned 100 mm in from the door leaf vertical edges, two at mid-height and two in the top corners.
Thermocouples 13 to 16	At four positions on the unexposed face of the door frame, at two positions on the top horizontal frame member, one positioned approximately 50 mm from each vertical edge and one on each vertical member, positioned at mid height The locations and reference numbers of the various unexposed surface thermocouples are shown in Figure 1.
Roving Thermocouple	A roving thermocouple was available to measure temperatures on the unexposed surface of the specimens at any position which might appear to be hotter than the temperatures indicated by the fixed thermocouples.
Integrity Criteria	Cotton pads and gap gauges were available to evaluate the integrity of the specimens.
Furnace Pressure	The furnace atmospheric pressure was controlled so that it complied with the requirements of BS EN 1363-1: 2012. Clause 5.2. The calculated pressure differential relative to the laboratory atmosphere at the top of the doorset was 13.4 (±3) Pa.

Test Observations

Time		All observations are from the unexposed face unless noted otherwise.
mins	secs	The ambient air temperature in the vicinity of the test construction was 17ºC at the start of the test with a maximum variation of +1ºC during the test.
00	00	**The test commences.**
01	34	Light steam/smoke release from the head and the top half of the vertical edges.
03	00	When viewed from the exposed face, the door leaf has ignited.
05	00	Steam/smoke release continues at the head and the top half of the vertical edges of the doorset.
05	30	When viewed from the exposed face, the closer is still in place.
07	40	The frame at the head is beginning to discolour as steam/smoke release decreases at the head and leading edge.
10	00	When viewed from the exposed face, the closer is still in place.
12	00	When viewed from the exposed face, the closer has fallen away from the doorset.
13	20	Steam/smoke release continues to decrease and is now only observed from the head towards the trailing edge and the top two hinge positions.
21	00	Steam/smoke release continues to decrease.
25	00	No significant visible change.
30	00	No significant visible change.
36	00	**The test is discontinued.**

Test Photographs

The exposed face of the Doorset prior to the start of the test

The unexposed face of the Doorset after a test duration of 5 minutes

The unexposed face of the Doorset after a test duration of 20 minutes

The unexposed face of the Doorset after a test duration of 30 minutes

The unexposed face of the Doorset after a test duration of 35 minutes

Temperature and Deflection Data

Mean furnace temperature, together with the temperature/time relationship specified in the Standard

Time Mins	Specified Furnace Temperature Deg. C	Actual Furnace Temperature Deg. C
0	20	35
1	349	366
2	445	482
3	502	500
4	544	557
5	576	580
6	603	545
7	626	611
8	646	642
9	663	652
10	678	658
11	693	702
12	706	720
13	717	712
14	728	736
15	739	746
16	748	757
17	757	760
18	766	763
19	774	770
20	781	786
21	789	795
22	796	802
23	802	807
24	809	812
25	815	816
26	820	819
27	826	823
28	832	834
29	837	840
30	842	844
31	847	849
32	852	855
33	856	863
34	860	862
35	865	866
36	869	879

Individual and mean temperatures recorded on the unexposed surface of the Doorset

Time Mins	T/C Number 4 Deg. C	T/C Number 5 Deg. C	T/C Number 6 Deg. C	T/C Number 7 Deg. C	T/C Number 8 Deg. C	Mean Temp Deg. C
0	19	20	20	20	19	20
1	19	20	20	20	19	20
2	20	20	20	20	19	20
3	20	20	20	20	19	20
4	20	20	20	20	19	20
5	20	20	20	20	20	20
6	20	20	20	20	20	20
7	20	21	21	21	20	21
8	20	21	21	21	20	21
9	21	22	21	21	20	21
10	22	22	22	22	21	22
11	23	23	23	24	23	23
12	25	25	25	25	24	25
13	27	26	26	27	26	26
14	29	28	28	29	28	28
15	30	29	29	31	30	30
16	32	31	31	33	32	32
17	34	32	32	34	33	33
18	36	34	34	36	35	35
19	38	36	36	37	37	37
20	39	37	37	39	38	38
21	41	39	39	41	40	40
22	43	41	40	42	42	42
23	44	42	42	44	43	43
24	46	44	43	45	44	44
25	48	46	45	46	46	46
26	49	47	46	48	47	47
27	51	49	48	49	49	49
28	52	51	49	51	50	51
29	54	53	51	52	52	52
30	55	54	53	54	54	54
31	57	56	54	55	55	55
32	58	57	56	57	56	57
33	60	59	57	58	58	58
34	61	61	59	59	59	60
35	62	62	60	60	60	61
36	63	64	62	62	61	62

Individual temperatures recorded on the unexposed surface of the Doorset 100 mm in from door leaf edge

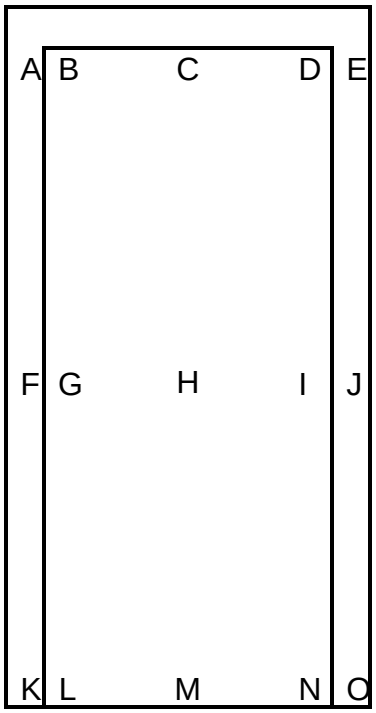
Time Mins	T/C Number 9 Deg. C	T/C Number 10 Deg. C	T/C Number 11 Deg. C	T/C Number 12 Deg. C
0	19	19	20	16
1	19	21	20	16
2	20	20	20	16
3	21	22	20	16
4	21	23	20	16
5	21	22	20	17
6	21	23	20	17
7	21	23	20	17
8	22	24	20	17
9	23	26	21	16
10	25	28	21	17
11	27	30	22	17
12	30	33	23	17
13	32	36	24	17
14	35	38	25	17
15	37	40	26	17
16	39	43	28	17
17	42	45	29	17
18	43	47	31	17
19	45	49	32	17
20	47	50	34	17
21	48	52	35	17
22	50	53	37	17
23	51	54	38	17
24	52	56	40	17
25	54	57	42	17
26	55	58	44	17
27	56	59	45	17
28	57	60	47	17
29	58	61	49	17
30	59	62	50	17
31	60	63	52	17
32	61	64	54	17
33	62	65	56	17
34	62	66	57	17
35	63	66	59	17
36	64	67	60	17

Individual temperatures recorded on the unexposed surface of Door Frame

Time Mins	T/C Number 13 Deg. C	T/C Number 14 Deg. C	T/C Number 15 Deg. C	T/C Number 16 Deg. C
0	18	18	18	14
1	19	25	21	*
2	19	36	25	*
3	21	48	37	*
4	26	53	45	*
5	28	61	51	*
6	31	63	55	*
7	32	66	58	*
8	33	69	59	*
9	33	70	59	*
10	33	70	60	*
11	33	70	60	*
12	33	70	61	*
13	34	70	62	*
14	35	69	62	*
15	36	67	62	*
16	37	67	62	*
17	38	66	61	21
18	40	65	61	21
19	42	65	61	21
20	44	65	61	21
21	47	65	61	21
22	49	66	62	21
23	52	68	63	21
24	56	70	63	21
25	59	72	63	21
26	62	74	64	21
27	65	77	64	20
28	69	79	65	20
29	72	82	66	20
30	80	84	67	20
31	87	86	67	20
32	88	88	68	21
33	88	90	69	20
34	88	92	70	20
35	88	94	72	20
36	89	96	74	20

*Thermocouple Malfunction

Horizontal deflections of the door leaves and door frames during the test

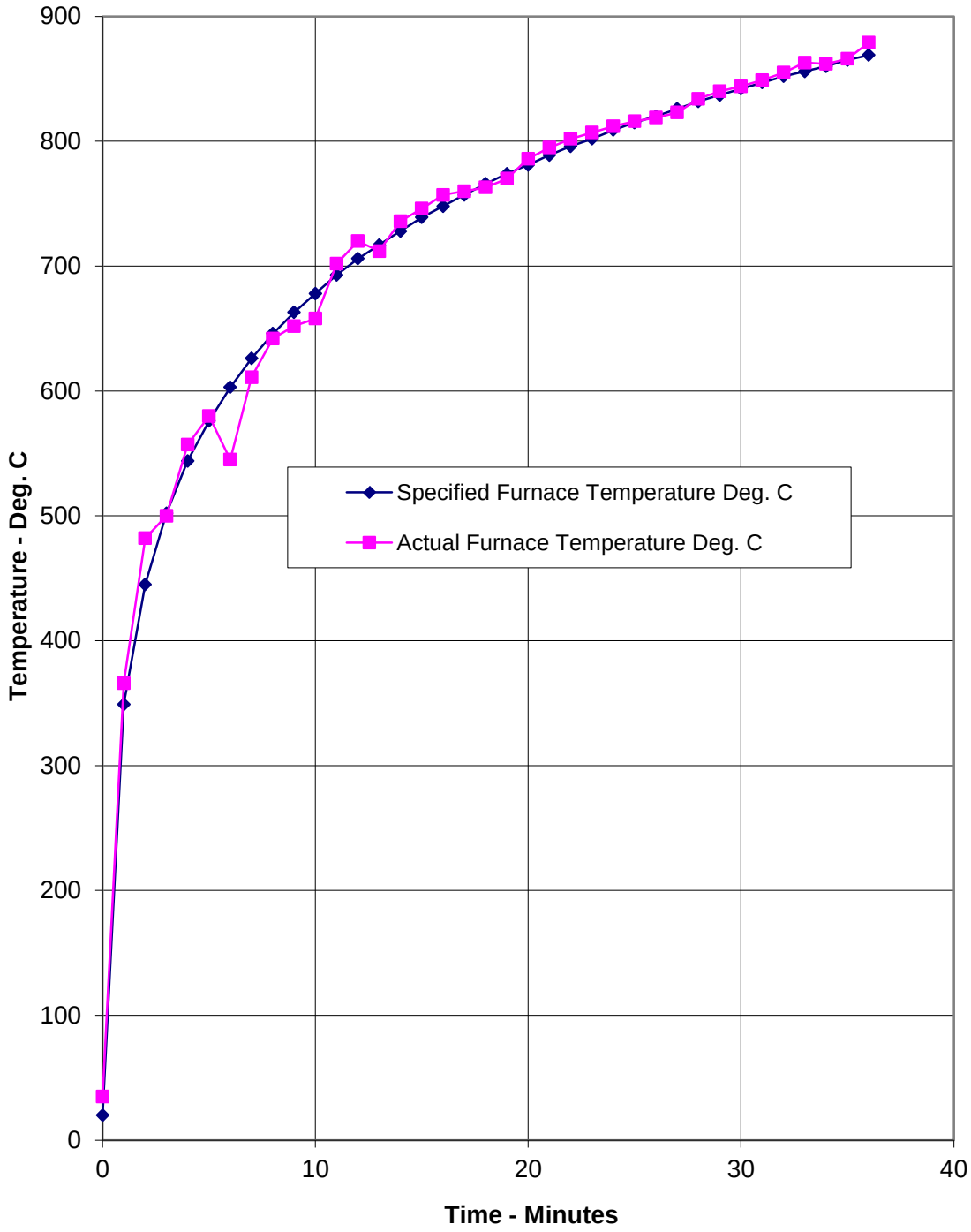


Deflections - mm															
TIME mins	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	1	-2	-3	2	2	2	-8	-2	*	3	-3	1	0	0	0
10	2	-3	-4	1	3	-1	-1	-2	*	2	*	0	-3	1	2
15	-2	-4	-11	2	-10	-5	-13	-2	-7	-1	-4	2	-3	0	-2
20	-4	-5	-13	2	-9	-6	-12	-9	-6	0	-3	0	-3	0	-1
25	2	0	-10	1	-9	-2	-12	-18	-10	-2	-1	14	0	5	1
30	3	2	-9	0	-9	0	-11	-16	-9	1	0	15	1	6	1

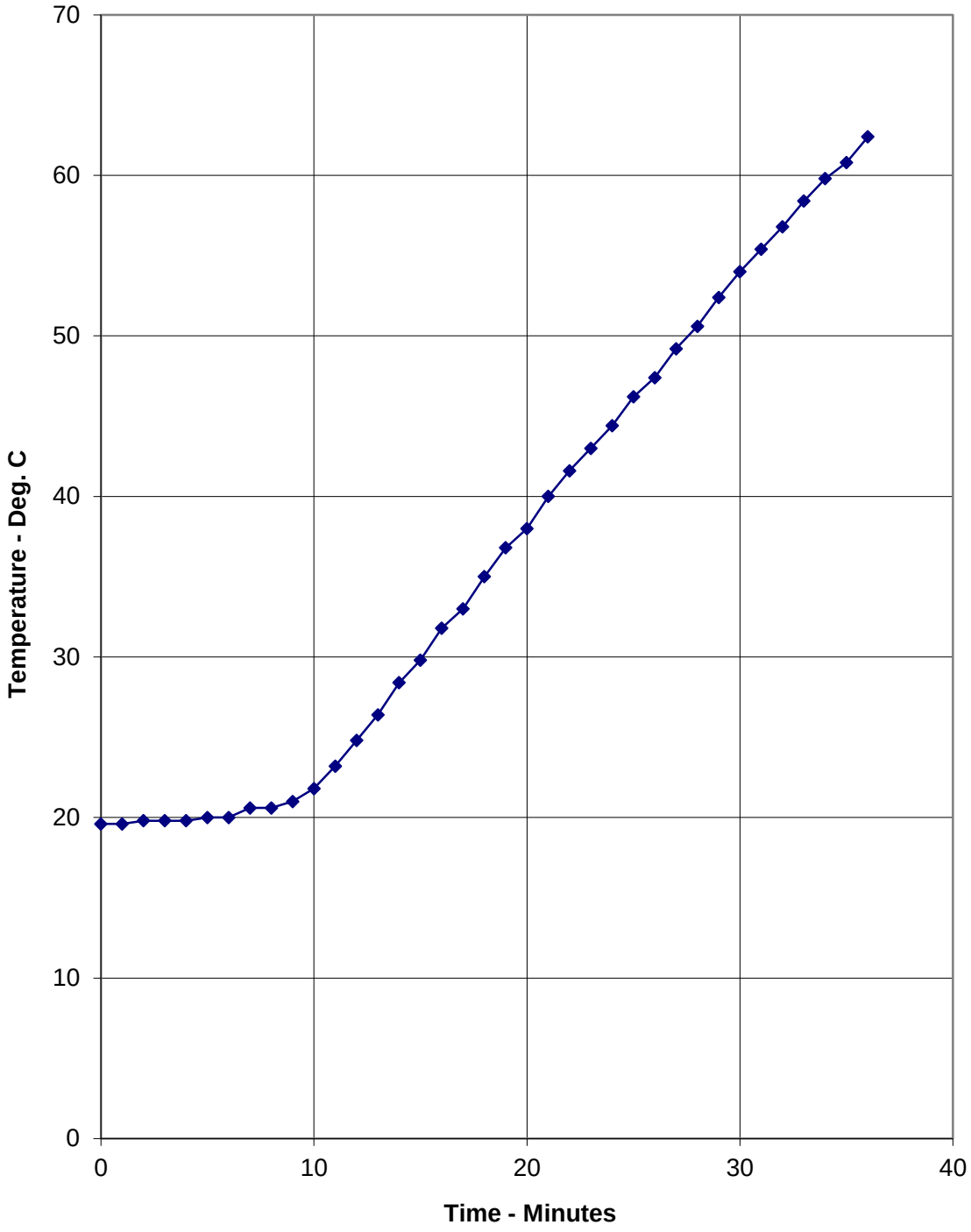
A positive value indicate a deflection towards the heating conditions of the test

*Laser reading malfunction

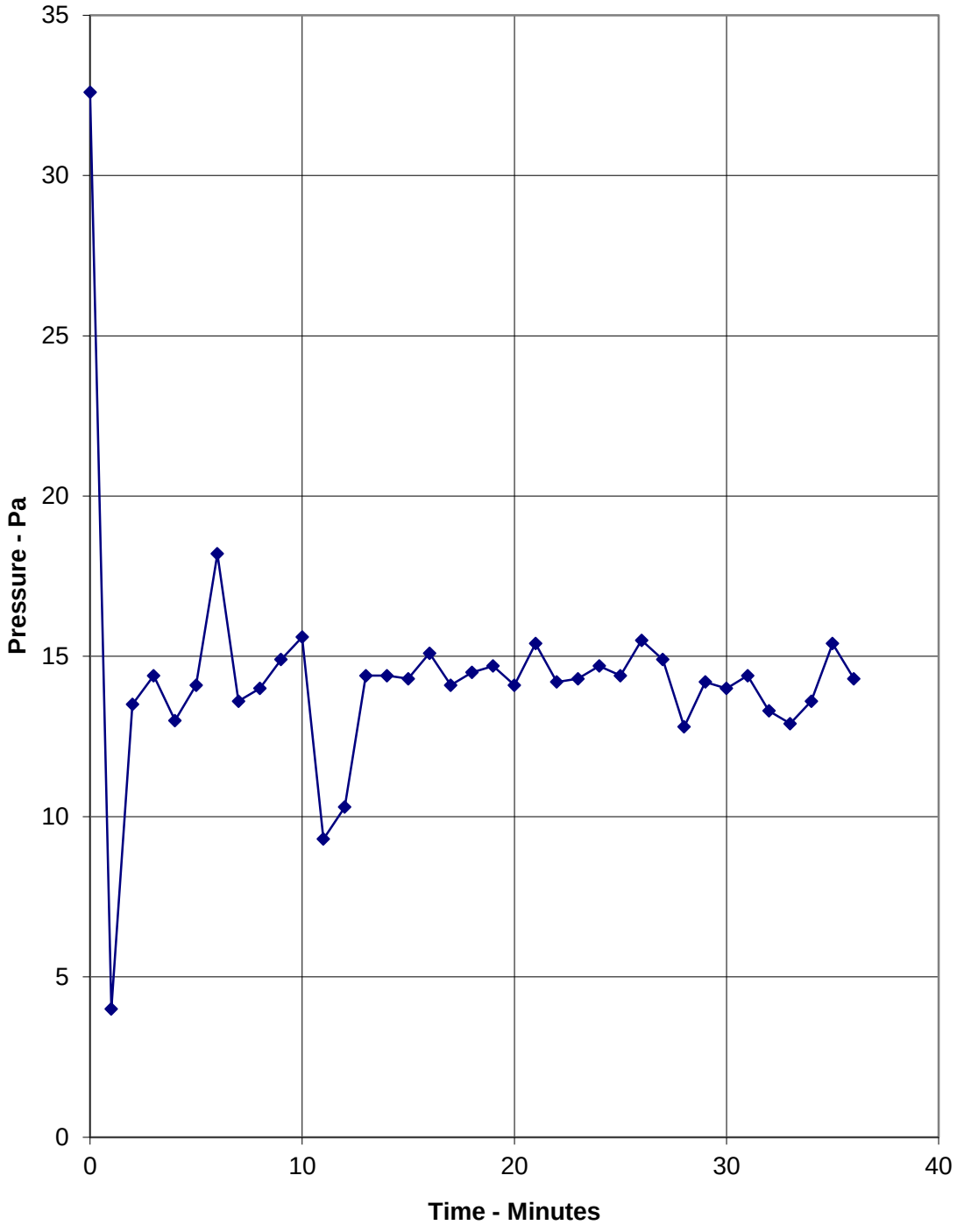
Graph showing mean furnace temperature, together with the temperature/time relationship specified in the Standard



Graph showing mean temperatures recorded on the unexposed surface of Doorset



Graph showing recorded furnace pressure at the head of the Doorset



Performance Criteria and Test Results

Integrity

It is required that the specimen retain its separating function, without either causing ignition of a cotton pad when applied, or permitting the penetration of a gap gauge as specified in BS EN 1634-1: 2014, or resulting in sustained flaming on the unexposed surface. **These requirements were satisfied for the periods shown below:**

Sustained flaming	36 minutes*
Gap gauge	36 minutes*
Cotton pad	36 minutes*

Insulation

The mean temperature rise of the unexposed surface shall not be greater than 140°C and that the maximum temperature rise shall not be greater than 180°C (except on the door frame, where the maximum temperature rise shall not exceed 360°C).Insulation failure also occurs simultaneously with integrity failure as specified in BS EN 1634-1: 2014. **These requirements were satisfied for the periods shown below:**

36 minutes*

The test was discontinued after 36 minutes.

Ongoing Implications

Limitations

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 BS EN 1363-1: 2012 and where appropriate BS EN 1363-2: 1999. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report. Annex A of BS EN 1363-1: 2012 provides guidance information on the application of fire resistance tests and the interpretation of test data.

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.

Conclusions

Evaluation against objective

A single-acting, single-leaf doorset incorporating various items of hardware has been subjected to a fire resistance test in accordance with BS EN 1634-1: 2014, Fire resistance tests for door and shutter assemblies, BS EN 1363-1: 2012 General requirements and BS EN 1363-2: 1999, Alternative and additional procedures.

The evaluation of the doorset against the requirements of BS EN 1634-1: 2014 showed that it satisfied the requirements for the following periods.

Test Results:

Integrity performance	Sustained flaming	36 minutes*
	Gap gauge	36 minutes*
	Cotton Pad	36 minutes*
Insulation		36 minutes*

*The test was discontinued after 36 minutes.

Warrington Certification Sample Report

warrington certification

Sample Report

This report provides a record of the information relating to samples taken by Warrington Certification Limited, or its agent, for certification of the products detailed below.

WCL Job No.	FM387438
Manufacturer	Wenzhou Oude Gating Technology Development Co., Ltd
Manufacturing site	No. 316 Jinhai 1st Avenue, Jinhai Industry Zone, Wenzhou, China.
Place of sampling	No. 316 Jinhai 1st Avenue, Jinhai Industry Zone, Wenzhou, China.
Traceability information	Date/time of production: 15 ~ 29 Apr 2017 Production unit/line: One line only Batch number: No batch Shift: One shift only
Product Number/ Description	5023 EN 3 door closer
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	These door closers are produced without any marking and label
Marking of the samples by EWCL	All selected samples are signed by Exova Warringtonfire Inspector.
Stock/batch quantity from which samples selected and sample quantity	6No. 5023 with covers (3 No with both parallel arm and 3 No with projecting arm) were selected randomly from 94 pcs.
Results of tests and/or inspections during manufacture	Sampling only, no FPC required this time.
Essential Characteristics to be tested ie. Test reference	EN 1634-1
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	Samples to be dispatched by manufacturer to Exova Warringtonfire within one week.
Date of sampling	28 Aug 2017
WCL notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warrington Certification Limited)
Print: Lu Ji Ze	Print: Leo Zuo
Date:28 Aug 2017	Date: 28 Aug 2017