REPORT

issued by an Accredited Testing Laboratory

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1002
ISO/IEC 17025

Assa AB
Box 371
631 05 ESKILSTUNA

Fire test of two steel doors

(Appendices: 1 – 22)

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 the accredited test methods:

- EN 1634-1:2008
- EN 1363-1:1999 and where appropriate EN 1363-2:1999

Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.

Product

Two single leaf hinged doors of steel

Product designation

Door	SP 35000
Door closer	DC300
Lock case	Connect 232-50
Striking plate	920MA

Sponsor

Assa AB
Box 371
631 05 ESKILSTUNA

Reference number

PX14104

1 Purpose of the test

The purpose of the test was to determine the fire resistance of the test specimens, two single leaf hinged doors of steel, described in chapter 2, when exposed to fire.

The test specimens are separating elements required to be tested with fire against the hinge side and against the frame side for a complete determination of the fire resistance.

One of the doors was tested against the hinge side and one of the doors was tested against the frame side.

2 Test specimen

The test specimens consisted of two single leaf hinged doors of steel. The test specimens were similar but not identical. The glazing beads were against fire in both doors and the door closers were mounted on the non fire exposed side in both cases. The outer dimensions (width x height) of the test specimens were 1100 x 2200 mm. The test specimens will be designated A and B in the rest of this test report.

The construction of the test specimen can be seen from the sponsor's drawings and specifications, test specimen A in appendices 1 and 3 – 11 and test specimen B in appendices 2 – 11. The test specimens are also described in chapter 2.2 and 2.3 below.

The information regarding the test specimens and their detailed components given in the sponsor's drawings and specifications, e.g. dimensions, quantities and physical properties, are nominal values provided by the sponsor. In case of irrelevant information, missing dimensions or when deviation outside what can be assessed as reasonable tolerances exists in the sponsor's drawings SP has crossed details or altered the drawings.

2.1 Delivery and assembly of the test specimens

Door leaves, frames and components for construction of the test specimen were selected and delivered to SP by the sponsor of the test. The door leaves, frames and components for the test specimen, arrived at SP on June 17, 2011. Manufacturer of the door leaves and frames was Stålprofil AB. The components were manufactured by ASSA AB (lock case and hardware), ASSA ABLOY (door closer and striking plate).

The test specimens were assembled by the components and materials in SP´s furnace hall by the sponsor of the test on June 17, 2011. The mounting of the doors and components of test specimen was overseen by SP.

2.2 Description of the construction

Each test specimen consisted of a glazed single leaf hinged steel door. The major components of the doors are listed in the table below.

Component	*Designation*	*Manufacturer*
Steel profiles	SP 35000	Stålprofil AB
Glass panes	Pyran S 6 mm	SCHOTT Technical Glass Solutions GmbH
Gypsum boards	12,5 mm	Knauf Danogips
Hinge	SP 84015013	-
Intumescent seal	Intumex LESK 1,8	-
Sealing	SP 40035	-
Door closer	DC300	ASSA ABLOY
Electric Striking Plate	920MA	ASSA ABLOY
Lock case	C232	ASSA AB
Hardware	-	ASSA AB

Door frames

The door frames consisted of uninsulated steel profiles.

The sills consisted of a steel profile.

Door leaves

The door leaves were constructed of a frame of steel profiles. The filling of the door consisted of two separate openings. The upper panels were made of glass panes. The lower panels were made of gypsum insulation boards with a steel plate at each side.

In the upper front edge of the door leaf and on the inside of the frame were a steel wedge mounted with the dimensions (width x length x thickness) 20 x 40 x 3 mm.

Hardware

The door leaves were attached to the frame with three hinges of steel.

In each door was a lock case designated C232 mounted with the centre approximately 1055 mm above the lower edge of the door leaf.

The latch bolt throw was 13,6 mm for test specimen A and 13,3 mm for test specimen B.

A door closer designated DC300 was mounted on each of the doors. The door closers were not activated during the test.

2.3 Supporting construction and mounting of the test specimen

The test specimens were mounted in a wall which was built up inside a frame of reinforced concrete. The opening dimensions of the concrete frame (width x height) was 3020 x 3020 mm.

The wall inside the concrete frame was constructed with two layers of 13 mm gypsum boards on each side of 70 mm thick steel studs. The wall was constructed as a flexible standard supporting construction in accordance with EN 1363-1:1999, item 7.2.2.1.

There were two openings in the wall. The openings were intended for mounting of two test specimens. One test specimen was mounted in each opening and the test specimens were tested simultaneously.

The openings in the wall for mounting of the test specimens were (width x height) 1130 x 2215 mm. The space between the openings was 300 mm.

The wall was built by SP´s personnel.

The test specimens were mounted in the wall with 5 screws of steel along each side, 3 screws of steel along the upper side and 3 screws of steel in the threshold. The space between the test specimen and the wall was filled with rock wool insulation.

The test specimen designated A was mounted in the left opening in the supporting construction seen from the non fire exposed side. The opening direction of test specimen A was in to the furnace.

The test specimen designated B was mounted in the right opening in the supporting construction seen from the non fire exposed side. The opening direction of test specimen B was out from the furnace.

The mounting of the test specimen was performed by the sponsor in SP´s furnace hall on June 17, 2011.

2.4 Conditioning

2.4.1 Moisture content

The test specimen was stored in SP's furnace hall before the test. The temperature in the furnace hall was 22 °C and the relative humidity was 70 % during this time.

2.4.2 Mechanical conditioning - operability test

Operability test was performed according to EN 14600:2005, chapter 5.1.1.1.

The door leaves were opened manually to an opening angle of > 90° and thereafter closed manually. This opening/closing procedure was repeated 25 times for each door.

2.5 Verification

2.5.1 Verification of the test specimen

The verification of the test specimen being in accordance with the sponsor's drawings and specifications was carried out by SP in conjunction with the assembly of the test specimen.

2.5.2 Verification of included materials

No verification of included materials were performed.

2.6 Pre-test measurements, examination and preparation

2.6.1 Door clearances

The clearances between the door leafs and the adjacent frame members and between the door leafs and the sill were measured prior the test.

The measuring points and the measuring results for test specimen A are shown in appendix 12.

The measuring points and the measuring results for test specimen B are shown in appendix 13.

2.6.2 Closing speed

The test specimens were controlled in accordance with EN 14600:2005, chapter 4.9.2.1 that the closing speed forced by the door closer not exceeded the maximum speed 300 mm/s.

The closing speed on test specimen A was measured to 118 mm/s.

The closing speed on test specimen B was measured to 185 mm/s.

2.6.3 Retention force door closers

The retention forces were measured in accordance with EN 1634:2008, chapter 10.1.3.

The maximum retention force on test specimen A was 45,0 N.

The maximum retention force on test specimen B was 61,0 N.

2.6.4 Return force test

The return force of the latch bolt was measured according to EN 12209:2003, chapter 6.1.2. The return force was measured with the lock case mounted in the door leaf.

The maximum return force of the latch bolt on test specimen A was 4,0 N.

The maximum return force of the latch bolt on test specimen B was 4,2 N.

2.7 Mounting of the test specimen on the furnace and final setting

The concrete frame with the wall and the test specimens was placed on SP's vertical furnace.

The door leafs were opened 300 mm and closed automatically.

The door closers were not activated during the test.

3 Fire test - procedure and test results

The fire test was performed on SP's vertical furnace on June 21, 2011. The test lasted 100 minutes.

3.1 Witness of test

The test was witnessed by Björn Bovin, Kenneth Svensson and Per Eriksson from ASSA AB, Roland Olsson from Stålprofil AB and Jan Sandin from Schott Scandinavia AB.

3.2 Furnace control

The furnace was controlled in accordance with EN 1363-1:1999.

3.2.1 Temperatures

The furnace temperature was measured with 6 plate thermometers (PT1 – PT6). The junction of the thermocouples were positioned approximately 100 mm from the fire exposed surface of the test specimen. The position of the thermocouples can be seen in appendix 14.

The average temperature in the furnace (average of PT1 – PT6) in relation to the standard time-temperature curve is shown in appendix 15.

The temperature at each plate thermometer (PT1 – PT6) in relation to the standard time-temperature curve is shown in appendix 16.

The percent deviation of the area under the average furnace time-temperature curve from the area under the standard time-temperature curve and permitted deviation, is shown in appendix 17.

3.2.2 Pressure

The furnace pressure was controlled so that a pressure of 0 Pa was kept on level with 500 mm above the lower edge of the test specimens (the notional floor level).

The furnace pressure was controlled at the position 410 mm above the lower edge of the test specimens.

Using a pressure gradient of 8,5 Pa/m of the height of the furnace the control pressure was calculated to be -0,9 Pa in order to establish a pressure of 0 Pa on level with 500 mm above the lower edge of the test specimens.

The furnace pressures on level 500 mm above the lower edge of the test specimens are shown in a graph in appendix 18.

3.3 Ambient temperature

The ambient air temperature was measured with one thermocouple.

The ambient air temperature during the test is shown in appendix 19.

The ambient air temperature at the beginning of the test was 20 °C.

3.4 Measurements on the test specimen

3.4.1 Deflection

The deflection of the test specimens during the test was measured with a laser meter.

The measuring points and the deflection of the test specimen A during the test is shown in appendix 20.

The measuring points and the deflection of the test specimen B during the test is shown in appendix 21.

The measurement of deflections were interrupted after 60 minutes because of heavy radiation from the test specimens.

3.5 Observations

Photographs taken during and after the test are shown in appendix 22.

3.5.1 Observations during the test

Time min:s	*Observations (the observations refer to the unexposed side if nothing else is stated)*
00:00	The test starts.
02:00	Test specimen B: some smoke production above the door closer.
02:30	Test specimen B: the door leaf has deformed in the upper left corner.
07:30	Test specimen A: some smoke production by the lock.
08:00	Test specimen B: some smoke production above the door closer.
11:40	Test specimen B: a plug in the door closer falls down and liquid drops from the door closer.
12:30	Test specimen B: some smoke production in front edge of the door by the lock.
14:00	Test specimen B: some liquid from the door closer drops on the glass.
14:30	Test specimen A: flames with a duration of one second occurs in the lower left corner between the door leaf and threshold.
14:40	Test specimen A: a plug in the door closer falls down and liquid drops from the door closer.
17:00	Test specimen A and B: some smoke production from the underside of the door closer.
19:30	Test specimen B: A small gap has occurred between the door leaf and the frame in the upper left corner – no integrity failure.
30:40	Test specimen B: integrity test with a 6 mm gap gauge is performed in the upper left corner between the door leaf and frame – no failure. Integrity test with a 6 mm gap gauge is also performed in the lower left corner between the door leaf and the threshold – no failure.
50:00	Test specimen A and B: the door leaf are dark discoloured.
77:00	Test specimen B: the covering on the door closer is deformed.
83:40	Test specimen B: a part of the door closer falls down.
87:40	Test specimen A: the supporting wall has cracked by the upper left corner of the door .
89:50	The supporting wall between the test specimens is heavily deformed and it is glowing inside the wall.
95:00	Test specimen A and B: a gap occurs between the supporting wall and the test specimens.
98:00	Gypsum plaster board falls down on inside of the furnace.
100:00	The test is terminated. The supporting wall falls apart.

3.5.2 Observations after the test

The door closers are deformed and has fallen apart.

The hardware has melted on the fire exposed side of the doors

4 Summary

The test specimen, described in chapter 2, has been tested according to the accredited test methods:

- EN 1634-1:2008
- EN 1363-1:1999 and where appropriate EN 1363-2:1999

The result of the pre-test measurements is shown in chapter 2.6 and the result of the fire test is shown in chapter 4.1 below.

4.1 Fire test

The test specimen was an asymmetrical separating element according to the test standard. The test lasted for 100 minutes.

The test specimen designated A in this report consisted of a single leaf hinged door with opening direction in to the furnace.

The test specimen designated B in this report consisted of a single leaf hinged door with opening direction out from the furnace.

The following results were obtained:

Test specimen A:

Integrity

- sustained flaming	100 minutes, no failure
- gap gauge	100 minutes, no failure
- cotton wool pad	100 minutes, no failure

Test specimen B:

Integrity

- sustained flaming	100 minutes, no failure
- gap gauge	100 minutes, no failure
- cotton wool pad	100 minutes, no failure

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.

5 Field of direct application of test results

The direct applicability of the test results to constructions similar to the construction described in this report is described in clause 13 of EN 1634-1:2008.

SP Technical Research Institute of Sweden
Fire Technology - Fire Resistance

Performed by

Charlotta Skarin

Examined by

Patrik Johansson

Appendices: 1 – 22 (one page per appendix)

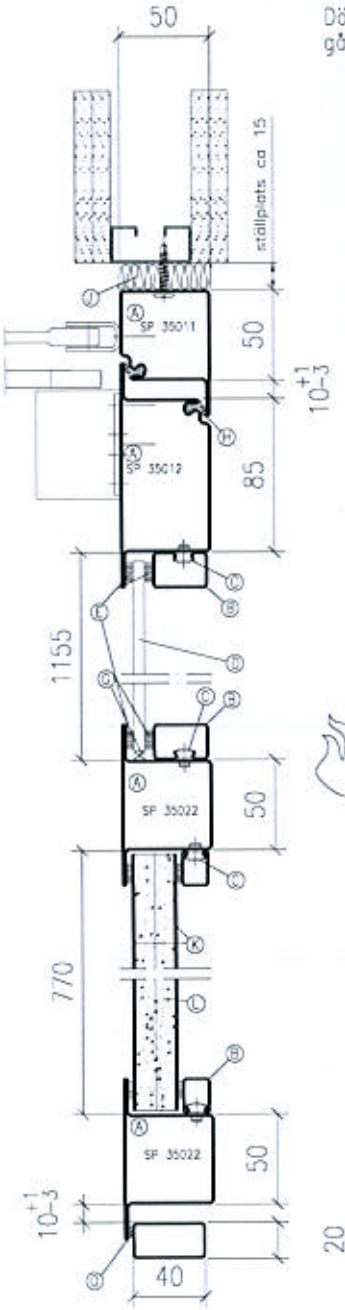
SP APP: 1
REF: PX14104
SIGN: G

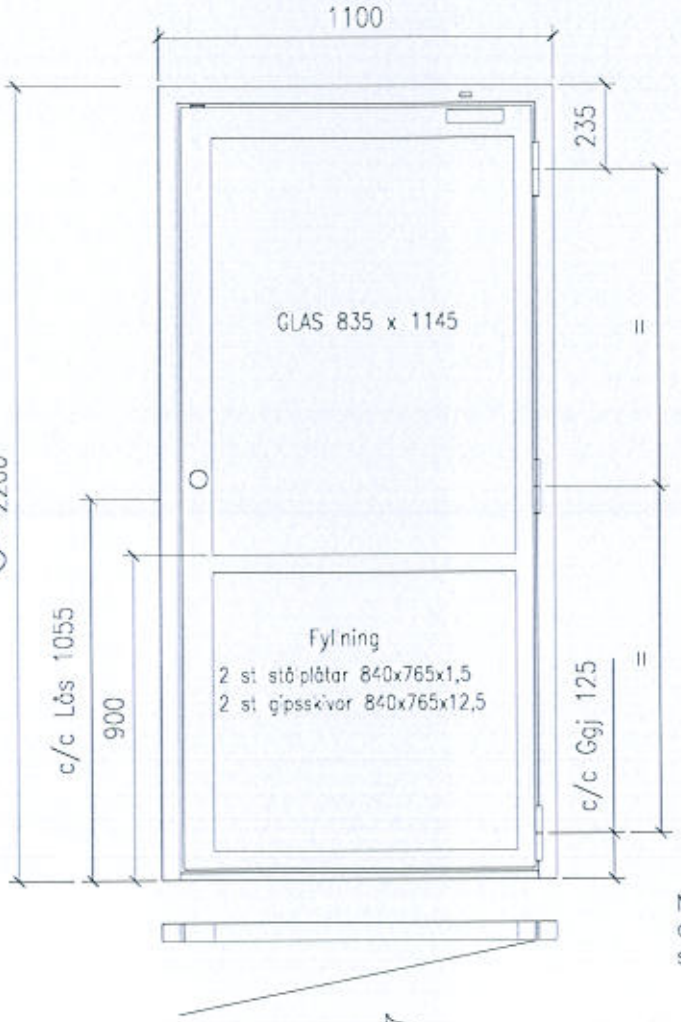
Beslagning
Låshus: ASSA Connect 232-50
Cylinderbeh.: ASSA 256
Slutbleck: ASSA ABLOY 920MA

Dörrstängare: ASSA DC300
gångjärnssida

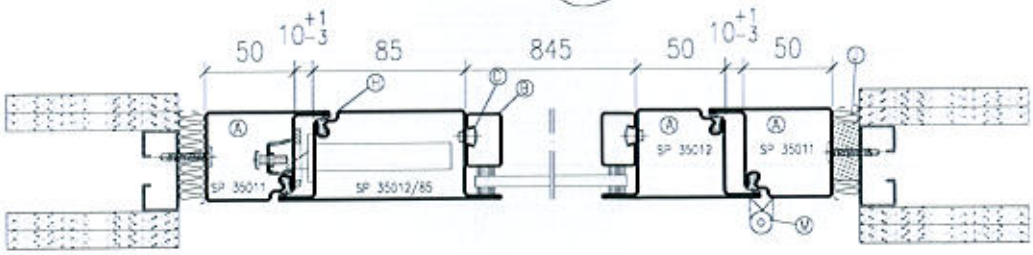
Stålprofil system SP 35000 enkeldörr
Brandteknisk klass E60 enligt SS-EN 1634-1

Pos	Benämning	Material	Anmärkning
A	Stålprofil system SP 35000	Stål tjocklek 1,5 mm	Blank stålyta lämplig för lackering
B	Glaslist SP 40000	Serdalmiförzinkat tr=1,25 mm	SP 43020/SP 41520
C	Glaslistskruv SP 40020	Stål ø4,8 L= 12,5 mm	
D	Glasrutor Pyran S	Brandskyddsglas, Schott	Tjocklek 6 mm
E	Glasningsband	Kerafix Flexlit	5 x 15mm
G	Glasklossar	Promatec H	80 x 6 x 5 mm
H	Anslagstätning SP 40035	Kloropren 60 Shore	
I	Infästning	Skruv ø 5,5, Unite E 12	
J	Stenull	Paroc brandtät 585-00	Drevning
K	Stålplåt	Tjocklek 1,5mm	Lämplig för lackering
L	Gipsskiva x 2	Tjocklek 12,5mm	Knopf Danogips
M	Gångjärn SP 84015013	Längd 150 mm	3st/dörrblad
O	Brandsvällande band. Intumex	LESK 1,8	





Not. Urtag för slutbleck och monteringsstolpe f:ka stolpe Solid 730.



REV A Uppdatering behör 110630 J.A

Ritad av	Kontr.	Datum	Skala	Rit.Nr.
J.A	T11-011	110609	1:4	4-4619-A

STÅLPROFIL

Titel: SP 35000
Enkeldörr Ut

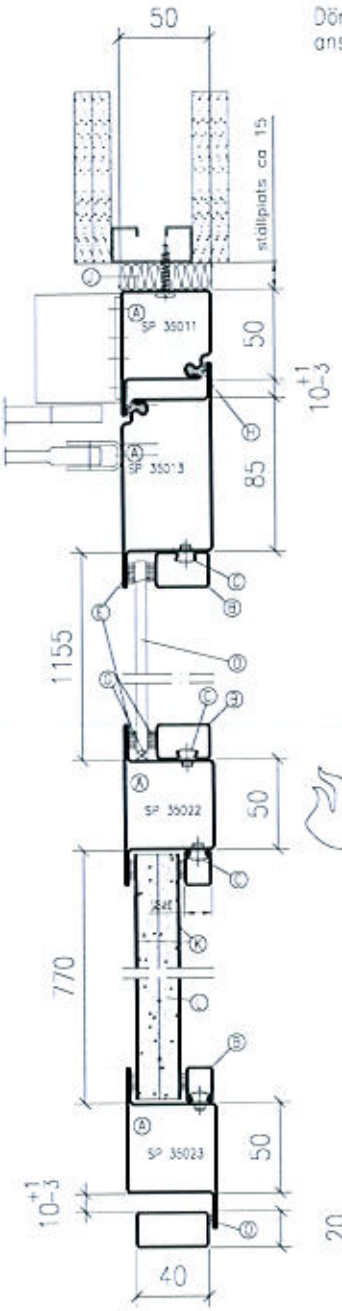
SP APP: 2
REF: PX14104
SIGN: G

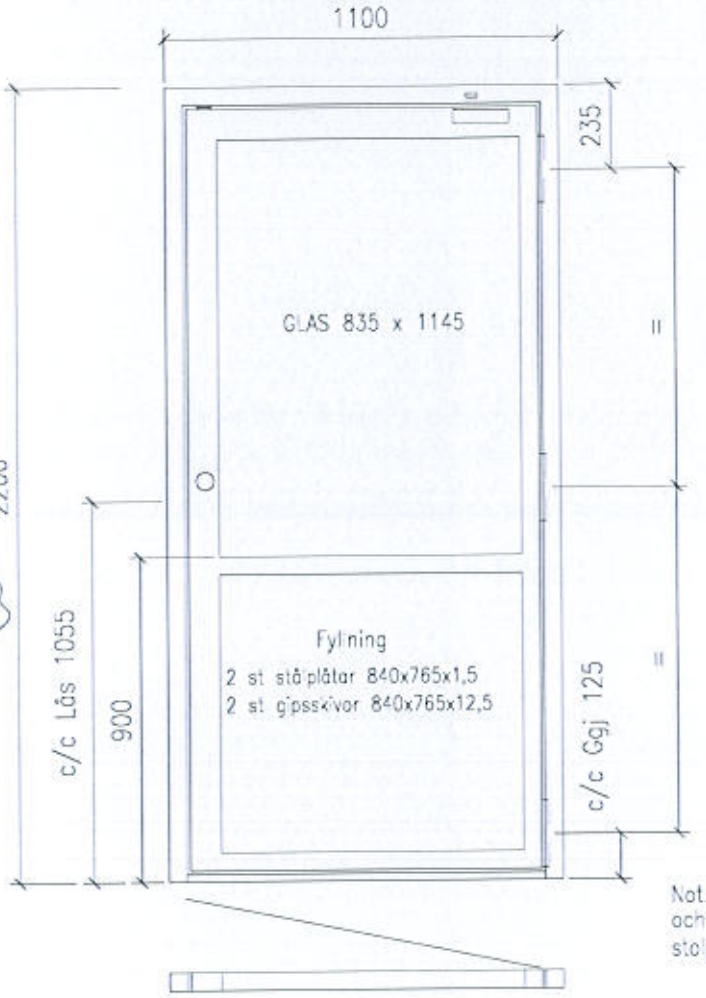
Beslagning
Låshus: ASSA Connect 232-50
Cylinderbeh.: ASSA 256
Slutbleck: ASSA ABLOY 920MA

Dörrstängare: ASSA DC300
anslagssida

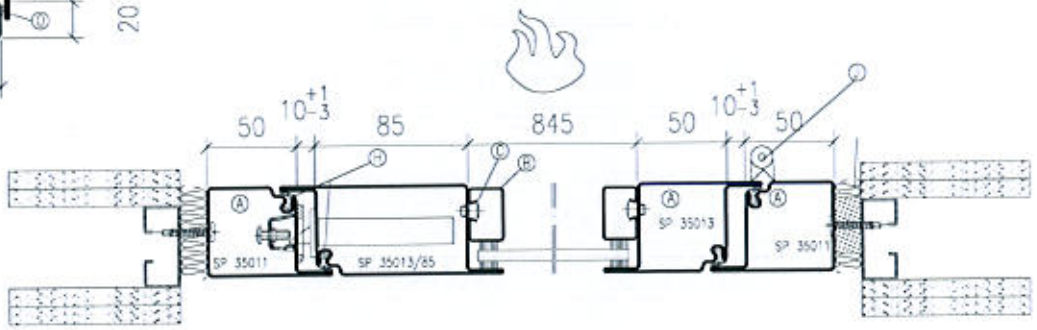
Stålprofil system SP 35000 enkeldörr
Brandteknisk klass E60 enligt SS-EN 1634-1

Pos	Benämning	Material	Anmärkning
A	Stålprofil system SP 35000	Stål Tjocklek 1,5 mm	Blank stålyta lämplig för lackering
B	Glaslister SP 40000	Sendzimirförzinkat t=1,25 mm	SP 43020/SP 41520
C	Glaslistskruv SP 40020	Stål ø4,8 L= 12,5 mm	
D	Glasrutor Pyran S	Brandskyddsglas, Schott	Tjocklek 6 mm
E	Glasningsband	Keraflex Flexlit	5 x 15mm
G	Glasklossar	Promatec H	80 x 6 x 5 mm
H	Anslagstätning SP 40035	Kloroprén 60 Shore	
I	Infästning	Skruv ø 5,5, Unite E 12	
J	Stenull	Paroc brandtät 585-00	Drevning
K	Stålplåt	Tjocklek 1,5mm	Lämplig för lackering
L	Gipsskiva x 2	Tjocklek 12,5mm	Knipuf Danogips
M	Gängjärn SP 84015013	Längd 150 mm	3st/dörrblad
O	Brandsvällande band, Intumex	LESK 1,8	





Not. Urtag för slutbleck och monteringsstolpe lika stolpe Solid 730.



REV A Uppdatering behör 110630 JA

Ritad av	SP-test nr	Datum	Skala	Rit.Nr.
J.A	T11-011	110609	1:4	4-4920-A

STÅLPROFIL

Titel: SP 35000
Enkeldörr In

NO.		Drawing No.	Name	Material	their assembly code		amount	
1	A2	DC300-01	body	YL113	00		1	
2	A4	GL3-03	oring 37X2	oil resistant rubber	00		2	
3	A4	DC200-04	front cap	Aluminum rod	00		1	
4	A4	DC200-07	piston	forged steel 20Cr	00		1	
5	A4	325.05	assembled valve	assembled parts	00		1	
6	A4	ES200.07-03	one-way vavle	round steel 45	00		1	
		GB308-64	steel balt 5		00		1	
7	A4	DC200-02	pinion	round steel 20Cr	00		1	
8	A4	DC300-08	outer spring	spring wire 60Si2Mn	00		1	
9	A4	DC300-09	inner spring	spring wire 60Si2Mn	00		1	
10	A4	DC300.10	end cap	assembled parts	00		1	
11	A4	DC200-24	beaing house	round steel 45	00		2	
12	A4	GL2-23	oring 30X2.5	oil resistant rubber	00		2	
13	A3	BA-20	oring 21.8X2.7	oil resistant rubber	00		2	
14	A3	GB290-82	bearing 941/17		00		2	
15	A4	DC200-25	retainer ring	steel plate 65Mn	00		2	
16	A4	BA-22	washer	steel plate 65Mn	00		2	
17	A4	DC300-26	cover plate	Aluminum plate	00		1	
18	A4	DC200-27	pinion cap	ABS	00		1	
19	A4	325-13	oring 8X1.9	oil resistant rubber	00		3	
20	A4	DC200-11/12	parts of adjust valve	rod H59 / POM	00		3	
21	A4	DC200.15	arm	assembled parts	00		1	
		Screws:						
		GB819/T-2000	Cross head screw	M5X38			4	
		GB/T15856.2	Cross head screw self-drilling self-tapping	ST4.8X60			4	
		GB818/T-2000	pan- head screw	M5X12			2	
		GB/T15856.1	pan head screw self-drilling self-tapping	ST4.8X32			2	
		GB/T70.2-2000	Ping Hexagon head screw	M6X16			1	

APP: 3
REF: PX14104
SIGN: G

借(通)用件登记
描 图
描 校
计算机检索号
底图总号
签 字
日 期

标记	处数	更改文件号	签 字	日期
编 制		审 核		
校 对		日 期		

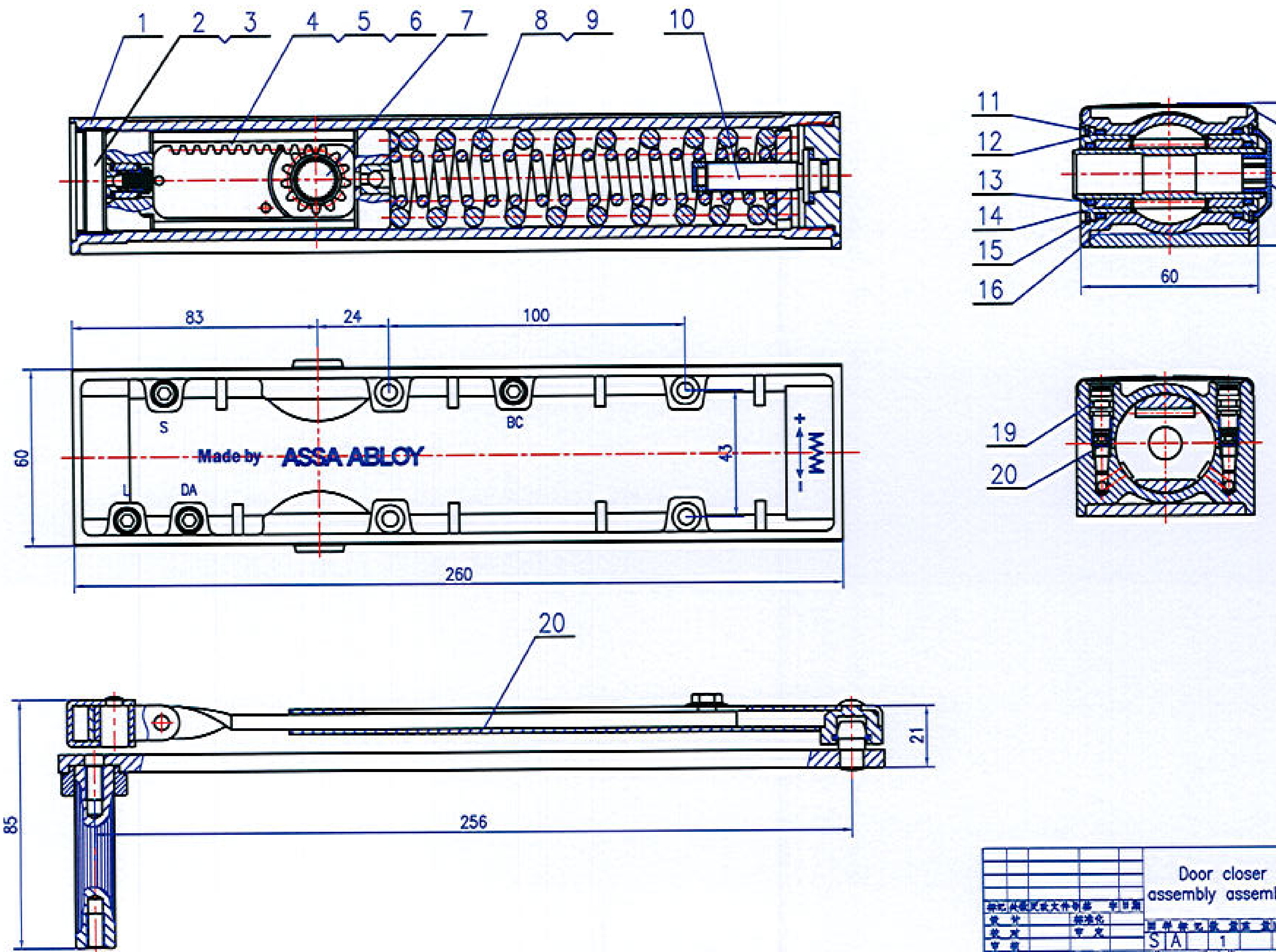
DC300 Door closer

图 样 标 记	共 1 页
S A	第 1 页

shenfei liyi enterprise

parts list

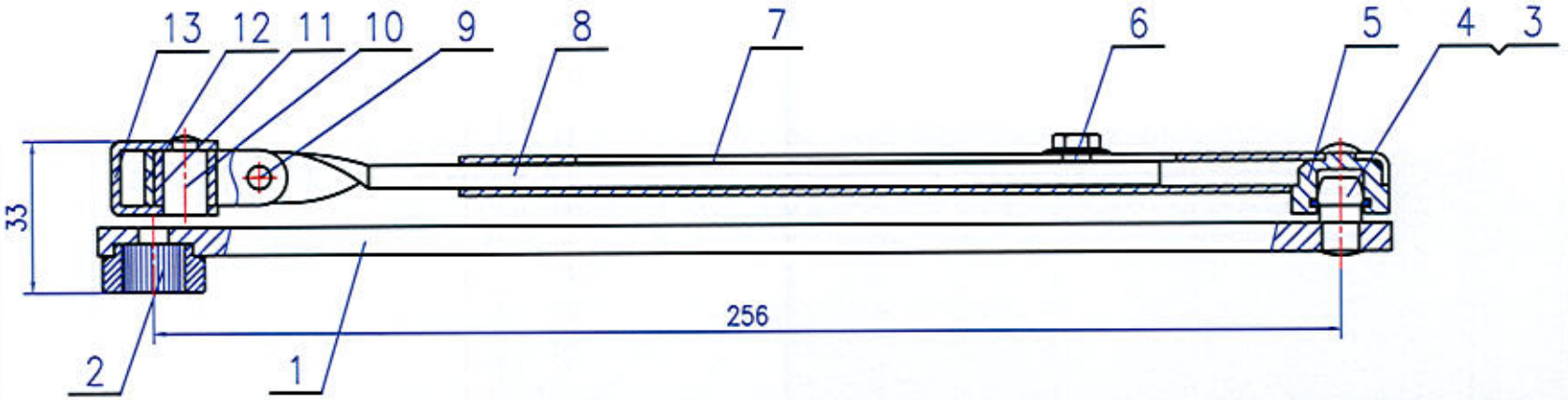
DC300.00LMX



SP
APP: 4
REF: PX14104
SIGN: G

Door closer assembly assembly	shenfei liyi enterprise
	assembly assembly
S A 1 1:1	DC300.00

DC200.15



NO.	code	name	Amount	material
14	DC200.15-04	Connecting pin	1	round steel 45
13	DC200.15-10	support	1	steel plate
12	DC200.15-09	support Central	1	steel plate
11	DC200.15-08	Connecting rod bearings	1	FZ1360
10	DC200.15-07	bearing pin	1	round steel 45
9	GB863.1-86	rivert	1	
8	DC200.15-11	regulation under	1	steel plate
7	DC200.15-06	bush	1	steel plate
6	BG.16-03	screw with teeth	1	round steel 35
5	DC200.15-06	dack	1	round steel 45
4	DM234.16-09	wire ring	1	spring wire 80
3	DC200.15-03	arm spindle	1	round steel 45
2	DC200.15-02	arm head	1	round steel 45
1	DC200.15-01	arm	1	steel plate

APP: SP
REF: DX141104
SIGN:

标记	处数	更改文件号	签字	日期
设计			标准化	
校对			审定	
审核				
工艺			日期	

Parts of arm

shenfei liyi enterprise

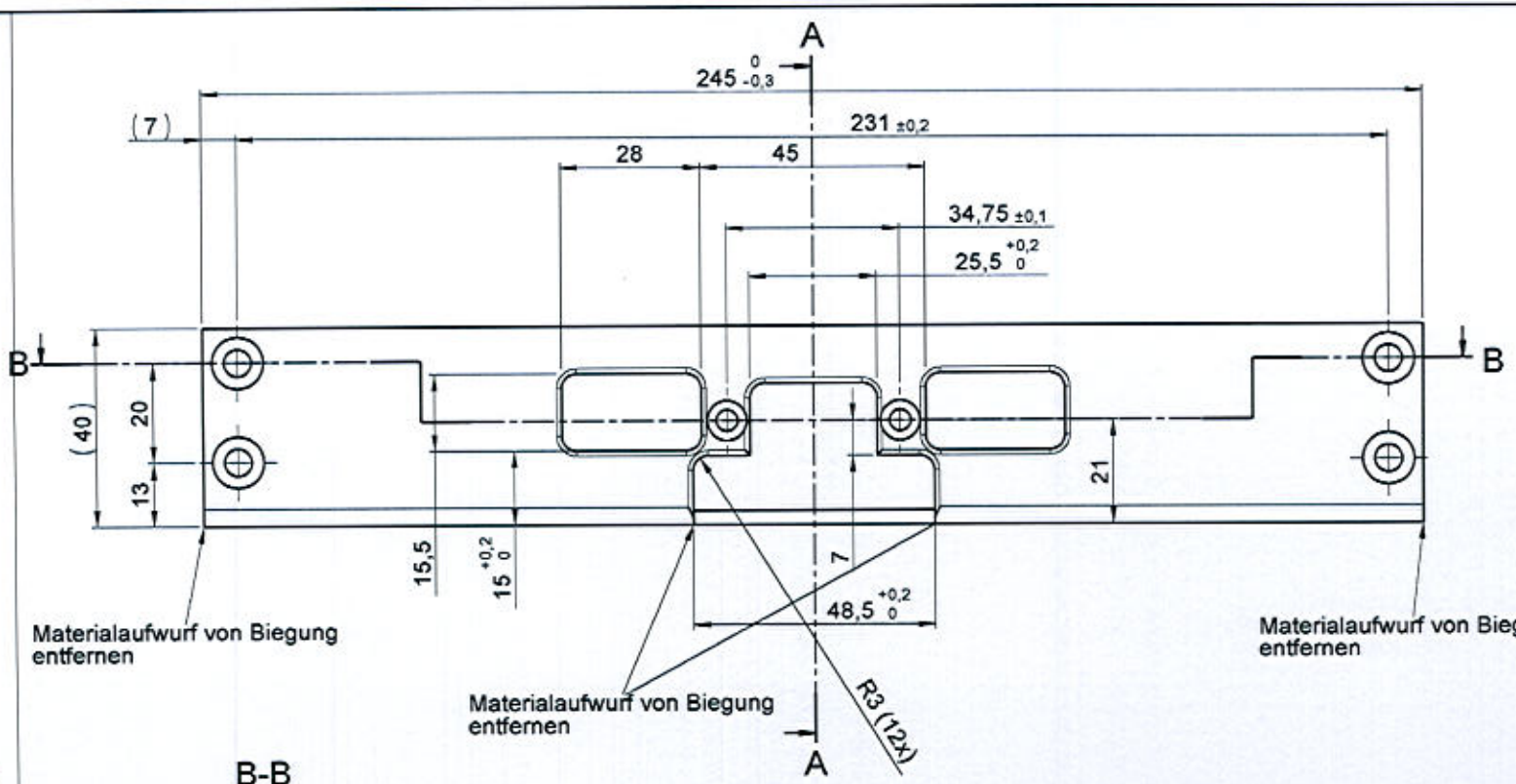
arm assembly assembly

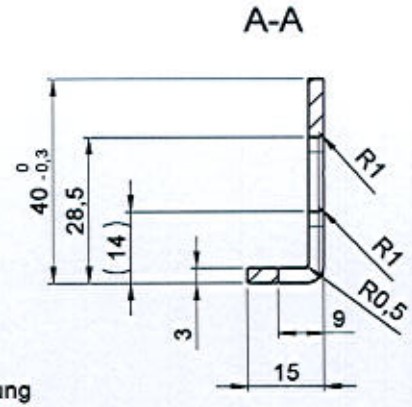
图样标记	数量	重量	比例
S A	1		1:1

共 页 第 页

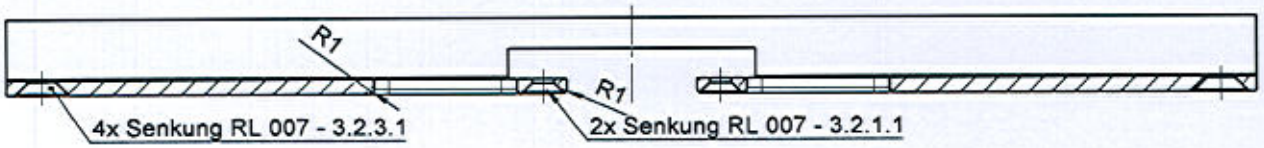
DC200.15

描图
描校
计算机检索号
底图总号
签字
日期





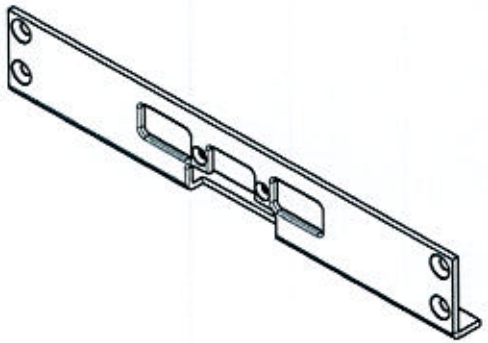
Zeichnung dient zur Uebersicht der Schliessblechvarianten und zur Herstellung des Rohteils



Werkstückkanten RL 007 - 4.3

Oberflächenrauhigkeit RL 007 - 5.1.1

Nicht bemasste Radien R 0,5



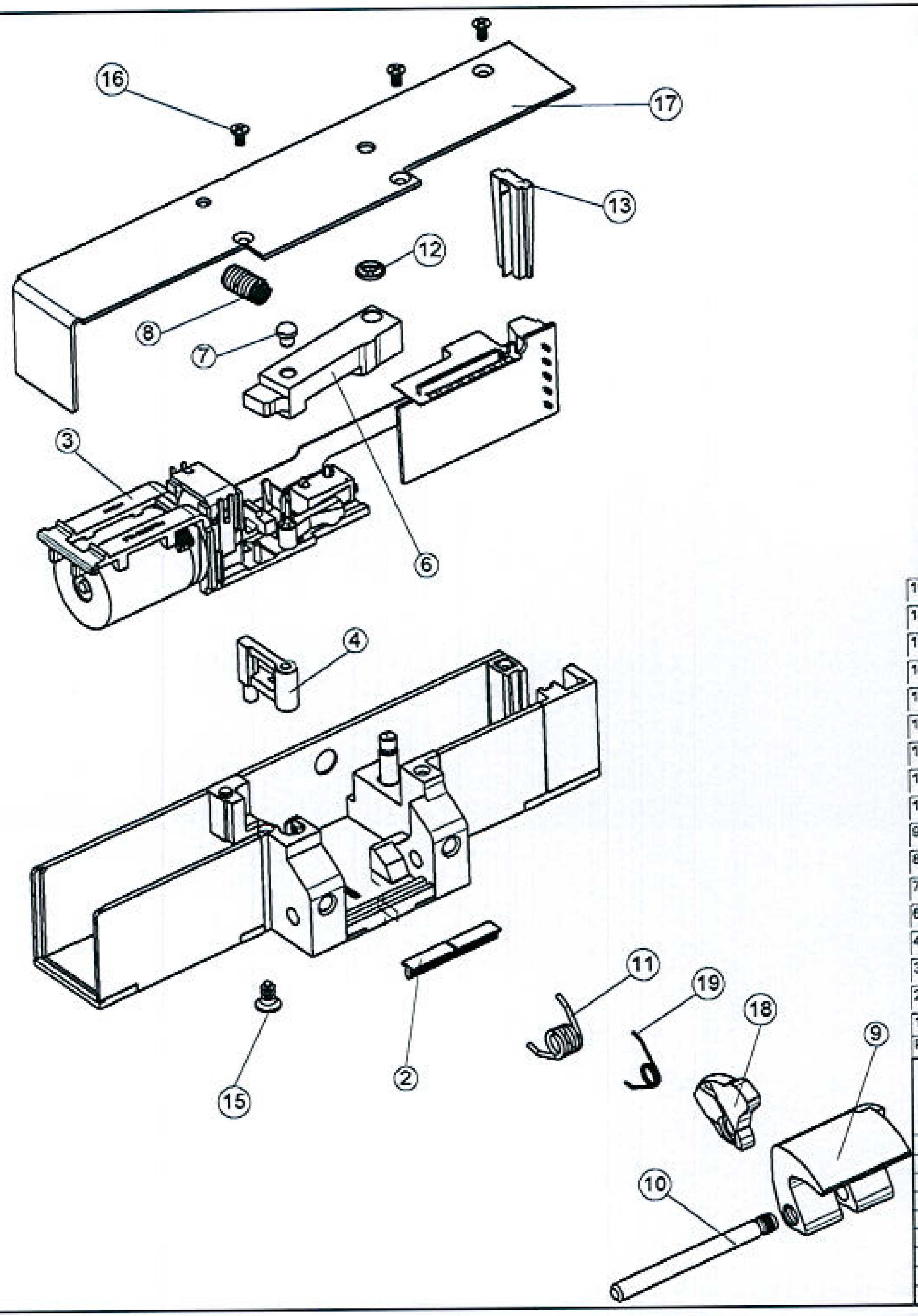
SP APP: PX14104 SIGN:

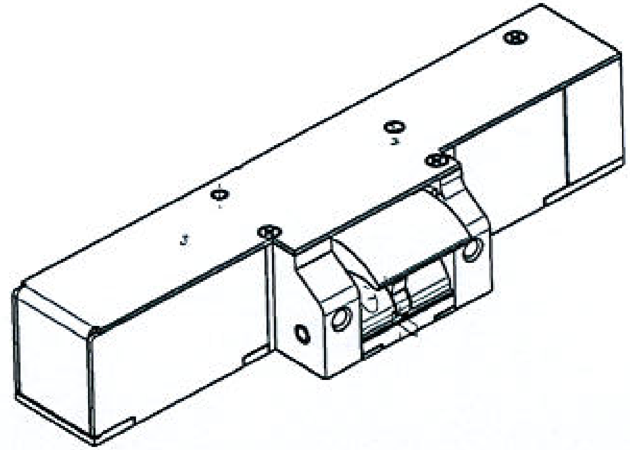
Einmalige Freigabe fuer 50 Stueck gemaess Besprechungsprotokoll vom 08.09.2010

Mit den gefertigten Teilen ist eine Erstmusterpruefung durchzufuehren; vor Beauftragung des EMPBs Rueecksprache mit R&D

Toleranzen RL007 - 4.2					Gewicht/ weight: g	Maßstab/scale: 1:1	157341
						Werkstoff/material:	
					Datum/date	Name/name	Benennung/name: Schliessblech ASSA 930
				Bearb. author Gepr. checked	10.07.09	schmid	
5	Entwicklungsstep_5	13.05.11	schmid				
4	Entwicklungsstep_4	01.02.11	schmid	freig. approved			
3	Entwicklungsstep_3	07.12.10	schmid	ASSA ABLOY Sicherheitstechnik GmbH Bildstockstrasse 20 72458 Albstadt			Zeichnungsnummer/drawing number: 710.500-00-20
2	Entwicklungsstep_2	07.10.10	schmid				Blatt sheet 1 (A3)
1	Entwicklungsstep_1	30.09.10	schmid				1 von 1
Stand stage	Aenderung description	Datum date	Name name				

167466	--------28C35-01	RL 007 - 4.1.2	Edelstahl	ASSA	
DB-Nr.	Zeichn./Teile-Nr.	Werkstoff-Nr.	Farbe	Firmenlogo	Bemerkung





APP: 7
REF: PX14104
SIGN: G

19	1	STK	Schenkelfeder verstaerkt	701.560-40-03	2.0501-02380000	
18	1	STK	Schieberplatte	710.560-40-02	710.5604002	
17	1	STK	Deckel	710.500-00-16	710.5000016 35	
16	3	STK	Senkschraube mit Kreuzsch	DIN 965 M 2.0 x 4.0 -	2.0401-00440000	A 006 049
15	1	STK	Gewindefurchende Schraub	WN 1413 KB30.0x6.0-10.9-Z	A006042	A 006 042
13	1	STK	Leiterplattenhalterung	701.500-00-11	701.5000011	
12	1	STK	Sicherungsscheibe	14.1000-00-10	14.10000010	
11	1	STK	Fallenfeder	701.500-00-07	2.0501-02370000	
10	1	STK	Fallenachse	710.500-00-06		
9	1	STK	Falle	720.560-00-05		
8	1	STK	Druckfeder	11.00-00-04	2.0501-00030000	
7	1	STK	Bundbolzen	710.500-00-52	710.5000052 35	
6	1	STK	Wechsel	720.500-00-03-2		
4	1	STK	Anker	720.500-00-02		
3	1	STK	Spule kompl.	740.560-20-00...		
2	2	STK	Gummianschlag	142.00-00-97	142.000097	
1	1	STK	Gehaeuse kompl.	720.500-00-40-10-00		
Pos	Menge	Einh	Benennung	Zeichn.-Nr.	Teile-Nr.	Hinweis

Gewicht/weight: g

Maßstab/scale: 1:1

161961

Werkstoff/material:

Datum/date: 16.03.10 — Name/name: schmid (Bearb. author; Gepr. checked; Freig. approved)

Benennung/name:

TOE 740 RR

ASSA ABLOY
Sicherheitstechnik GmbH
Bildstockstrasse 20
72458 Albstadt

Zeichnungsnummer/drawing number:

740.560-----...

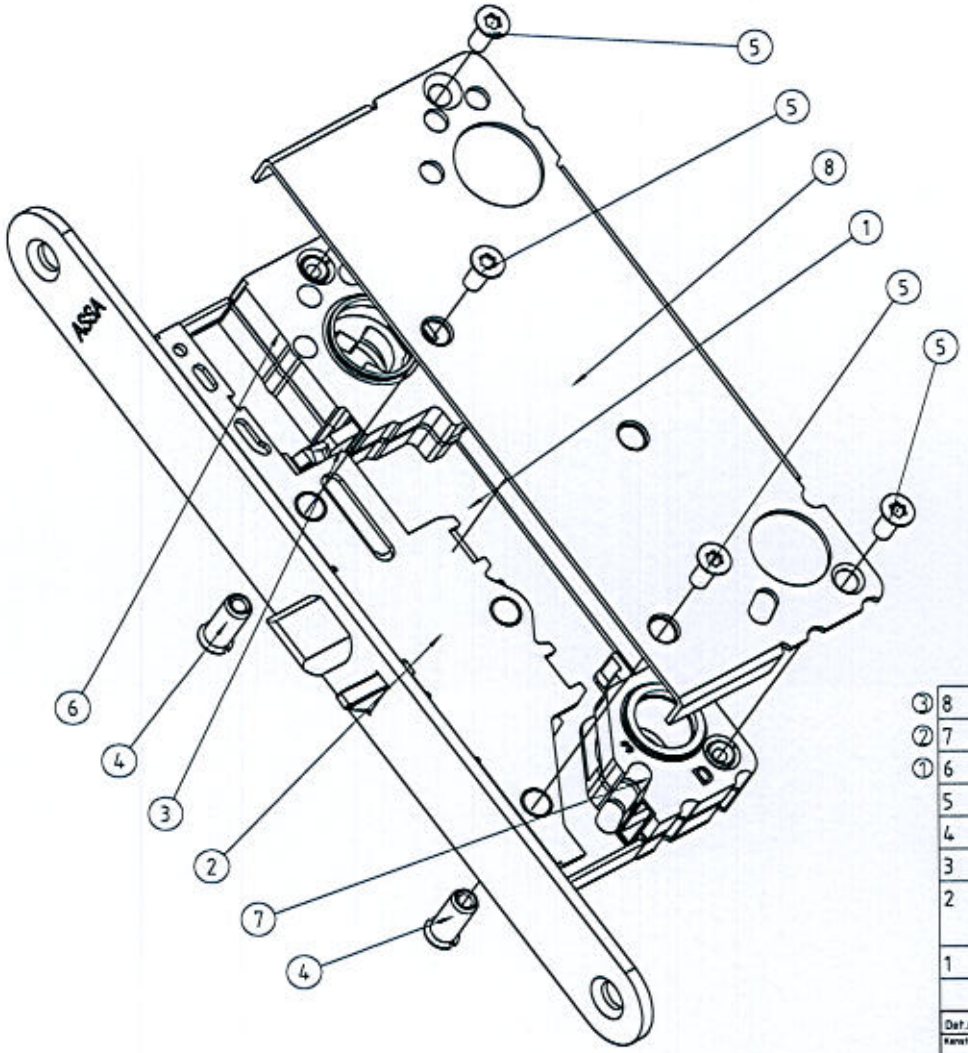
Blatt sheet: 1 (A3)

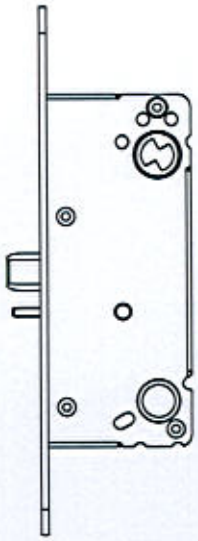
1 von 1

Stand state | Aenderung description | Datum date | Name name

Weitergabe sowie Vervielfältigung dieser Unterlage, Verwertung und Mitteilung ihres Inhaltes nicht gestattet soweit nicht ausdrücklich zugestanden. Zuwiderhandlungen verpflichten zu Schadenersatz. Alle Rechte für den Fall der Patenterteilung oder Gebrauchsmustereintragung vorbehalten

Litt.	Ändr.order	Ändring nr.	Datum	Sign.	Litt.	Ändr.order	Ändring nr.	Datum	Sign.
A	0236/12	-	021010	PPu	B	0303/03	1 - 3	030530	PPu





SP APP: 8
REF: PX14104
SIGN: G

Måttskiss 358042

③	8	1	Täckplåt 50 Optimal	Cover Plate 50	Ritn.nr 358461
②	7	1	Hörnenhet Optimal	Handle unit	Ritn.nr 358458
①	6	1	Cylinderenhet	Cylinder unit	Ritn.nr. 357896
	5	4	Skruv	Screw	Ritn.nr 807046
	4	2	Nippel	Screw nut	Ritn.nr 467544
	3	1	Tryckstång /50	Rod /50	Ritn.nr 357421
	2	1	Stolpenhet cylinderfall	Forend Unit Cylinder Latch	Ritn.nr 357692
	1	1	Kista 50	Case 50	Ritn.nr 357418
Dat.nr	Antal	Benämning	Material/Dimension/Kod	Anm.	

Ritad: KCo | Granskad | Godk. | Datum: 01-10-03 | Vy placering | Skala: 2:1 | Generell tol. | Generell yt j. Ra

ASSA ESKILSTUNA-SWEDEN

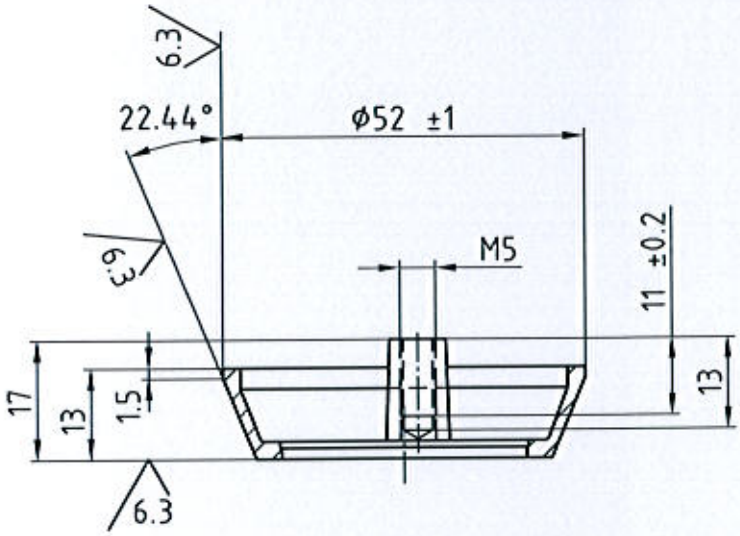
Låshus 232-50
Lock case 232-50

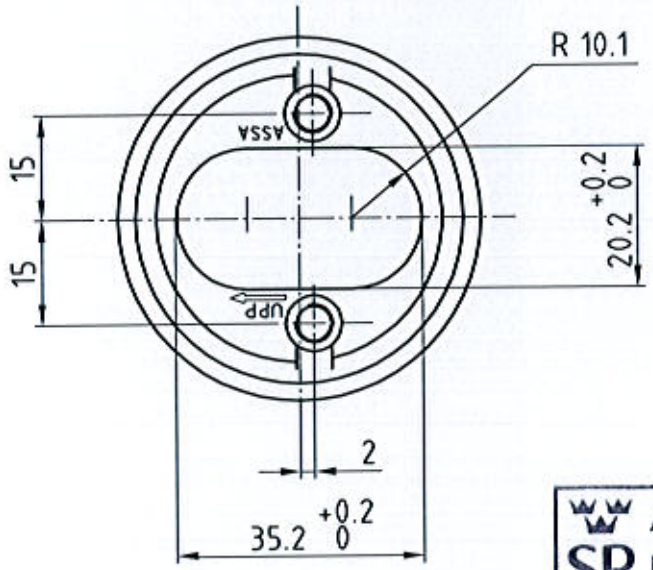
Ersätter | Ersatt av

Ritn. nr: 357690 | Littra: B

Released 100408

Litt.	Ändr.order	Ändring nr.	Datum	Sign.	Litt.	Ändr.order	Ändring nr.	Datum	Sign.
B	819/01		980504	IUr					





SP APP: 9
REF: PX14104
SIGN: G

Hot forged stamping
Varmpressat utförande

Blank drawing

Ämnesritning 804303

Det.nr	Antal	Benämning	Material/Dimension/Kod	Anm.

Konstr.	Ritad	Granskad	Godk.	Datum	Vy placering	Skala	Generell tol.	Generell ytj. Ra
	IUr		UJo	850522		1:1		

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Cylinderring 13 mm
Utsida Outside

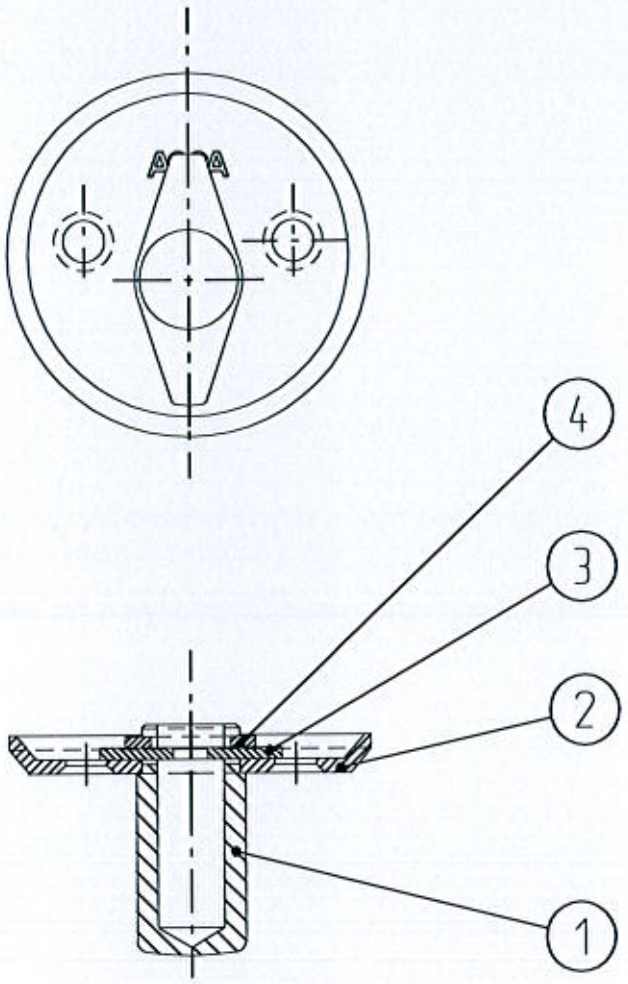
Ersätter	Ersatt av
412703 A	

Ritn. nr: 412703

Littra: B

Released 100519

Litt.	Ändr.order	Ändring nr.	Datum	Sign.	Litt.	Ändr.order	Ändring nr.	Datum	Sign.
B	516/09	1	950421	IUr	C	0245/03	2 - 3	021104	L.Ny



	Alt.	Vedskylt	Stoppring	
①	i	807395	469548	②
	i i	806204	469548	③

SP APP: 10
REF: PX14104
SIGN: G

Det.nr	Antal	Benämning	Material/Dimension/Kod	Anm.
4	1	Stoppring		Ritn.nr se tabell
3	1	Bricka		Ritn.nr 411523
2	1	Vredskylt		Ritn.nr se tabell
1	1	Vred		Ritn.nr 38997

Konstr.	Ritad	Granskad	Godk.	Datum	Vy placering	Skala	Generell tol.	Generell ytj. Ra
	IUr		U.Jo	890103		1:1		

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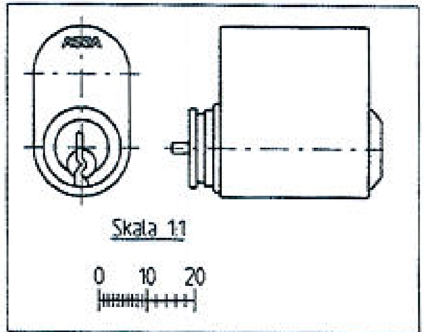
Cylindervred
Gruppritning

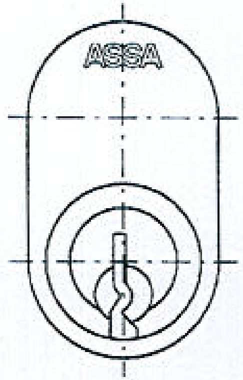
Ersätter 411652 C | Ersatt av

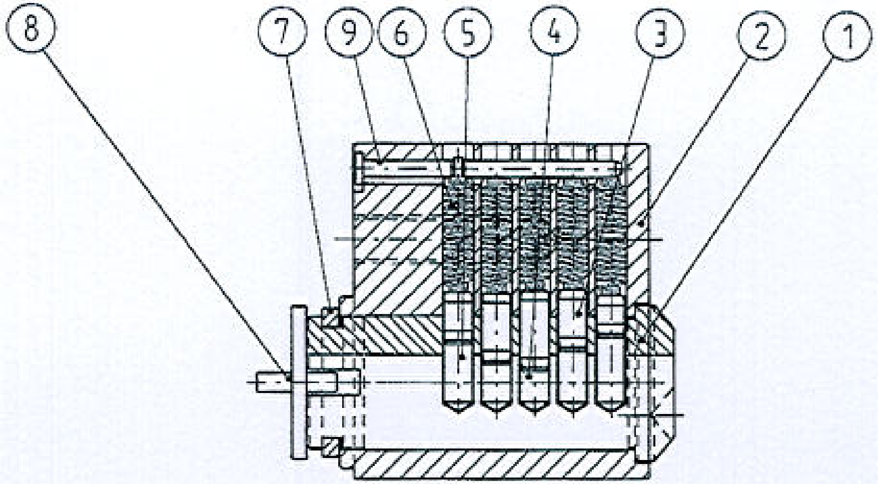
Ritn. nr 411652 | Littra C

Released 100408



Lit	Ändr order	Ändring nr	Datum	Sign	Lit	Ändr order	Ändring nr	Datum	Sign
A	545/02		951109	IUr					
B	812/01	1	980320	JWi					



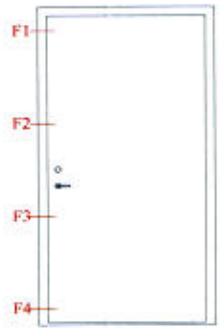


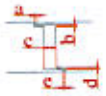
Det nr	Antal	Benämning	Material/Dimension/Kod	Anm.
9	1	Täckpinne		Ritn.nr 809071
① 8	1	Medbringare		Ritn.nr 353603
7	1	Stoppring		Ritn.nr 469397
6	5	Fjäder		Ritn.nr 42800
5	5	Understift		Ritn.nr 450000-05
4		Understift		Ritn.nr 802314
3	5	Överstift		Ritn.nr 450023-25
2	1	Hus		Ritn.nr 809292
1	1	Cylinderkärna		Ritn.nr 809291

Konstr	Ritad	Granskad	Godk LWi	Datum 951108
Yt-placering	Skala 2:1	Generell tol.	Generell yty Ra	
ASSA ESKILSTUNA - SWEDEN	Cylinder 551 Sammanställning	Ersätter 809348 A	Ersatt av	
		Ritn nr 809348	Lättva B	

SP
APP: 11
REF: PX14104
SIGN: G

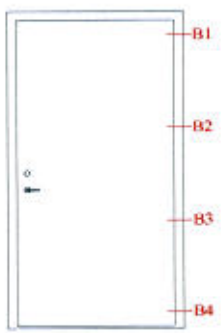
Test specimen A





Gaps: Front edge

	a	b	c	d	e
F1	1,7	4,0	8,0	3,8	2,0
F2	1,3	4,4	7,6	3,3	1,2
F3	1,0	4,1	7,6	2,8	1,4
F4	2,3	3,0	8,8	3,6	1,8



Gaps: Back edge

	a	b	c	d	e
B1	3,1	1,7	10,0	2,5	2,3
B2	2,7	1,6	8,5	2,7	2,7
B3	2,8	2,1	10,0	2,8	2,4
B4	3,4	2,5	10,4	2,9	2,8

Gaps: Upper edge

	a	b	c	d	e
U1	4,5	3,9	10,6	4,4	4,2
U2	3,8	3,3	11,5	3,7	3,8
U3	3,4	1,5	11,0	1,9	3,2

Gaps: Lower edge

	a	b	c	d	e
L1	7,2	6,1			
L2	8,1	5,9			
L3	8,1	5,5			

Minimum declared (a)			7		
Maximum declared (b)			11		
Category			A		

Minimum declared (a)			7		
Maximum declared (b)			11		
Category			A		

Minimum declared (a)			7		
Maximum declared (b)			11		
Category			!!		

Gaps outside the standard

Minimum declared (a)	7				
Maximum declared (b)	11				
Category	A				

If the measured gaps does not fullfill regulations for category B will the new maximum gaps be as calculated below.

Category			B		
Minimum declared (a)			7		
Practical maximum allowed			10		

Category			B		
Minimum declared (a)			7		
Practical maximum allowed			11		

Category			B		
Minimum declared (a)			7		
Practical maximum allowed			12		

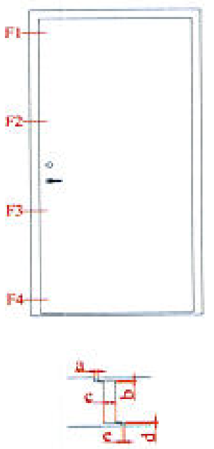
Category	B				
Minimum declared (a)	7				
Practical maximum allowed	10				

SP Science Partner

SP APP: REF: PX14104 SIGN:

Test specimen B

APP: 13
REF: PX14104
SIGN: G

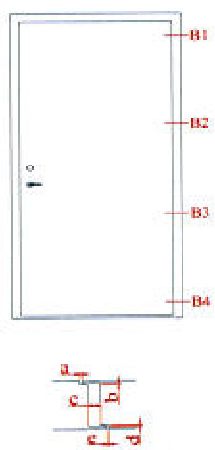


Gaps: Front edge

	a	b	c	d	e
F1	1,2	3,5	7,3	3,8	0,4
F2	1,5	3,4	7,7	4,1	0,4
F3	2,3	4,5	8,2	5,5	1,0
F4	2,6	5,8	9,7	7,2	1,5
Minimum declared (a)			7		
Maximum declared (b)			11		
Category			A		

If the measured gaps does not fullfill regulations for category B will the new maximum gaps be as calculated below.

Category			B		
Minimum declared (a)			7		
Practical maximum allowed			10		



Gaps: Back edge

	a	b	c	d	e
B1	3,2	2,6	10,0	3,9	3,3
B2	3,0	2,7	9,5	2,7	2,9
B3	3,4	2,9	9,7	3,1	3,2
B4	3,7	3,0	9,8	3,8	3,5
Minimum declared (a)			7		
Maximum declared (b)			11		
Category			B		

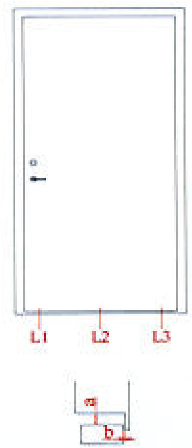
Category					
Minimum declared (a)					
Practical maximum allowed					

Gaps: Upper edge

	a	b	c	d	e
U1	4,2	3,1	11,6	3,9	3,6
U2	3,8	3,1	10,9	3,7	3,5
U3	3,8	3,4	10,9	3,4	3,3
Minimum declared (a)			7		
Maximum declared (b)			11		
Category			! !		

Gaps outside the standard

Category			B		
Minimum declared (a)			7		
Practical maximum allowed			12		



Gaps: Lower edge

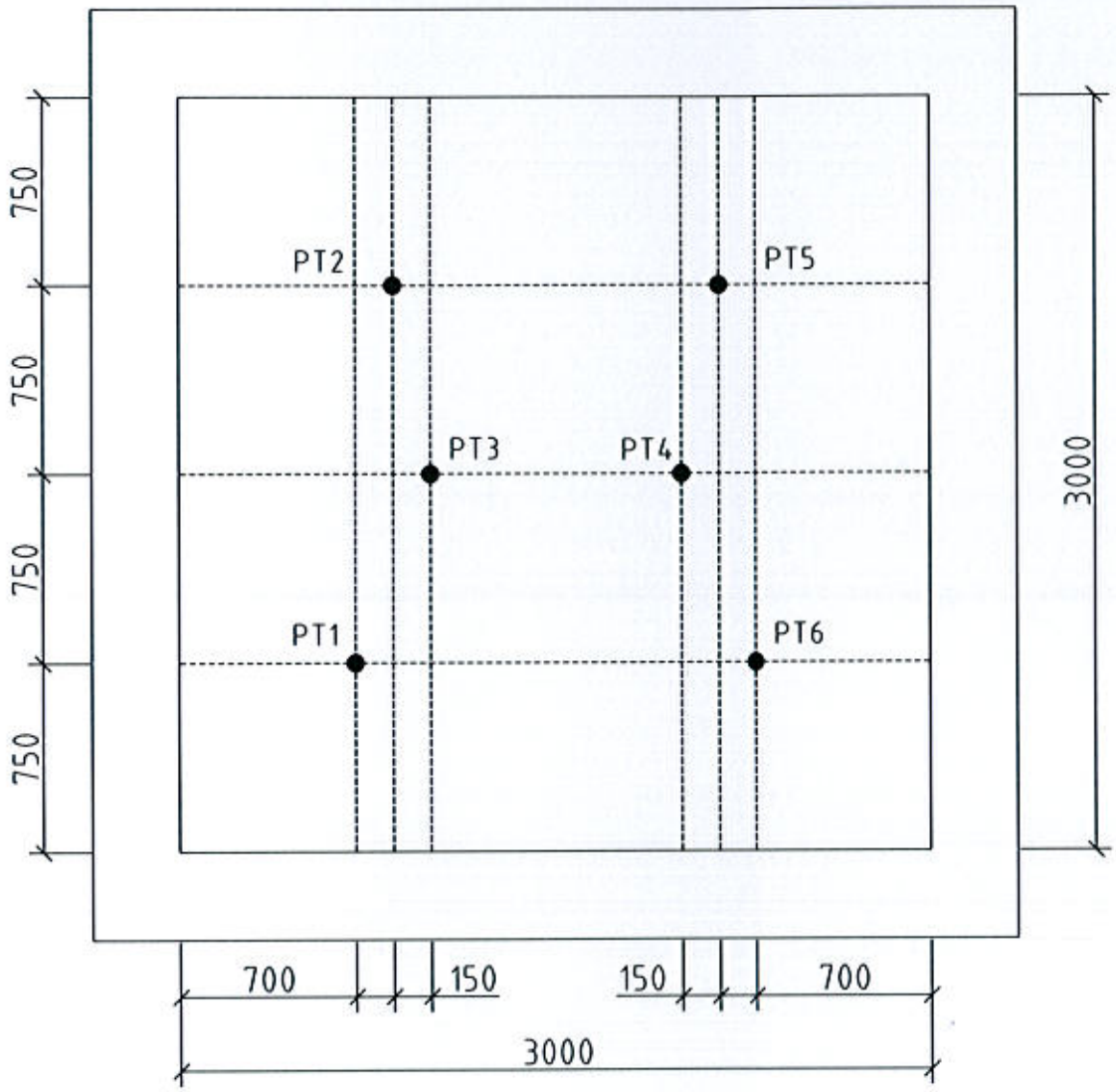
	a	b	c	d	e
L1	8,2	7,8			
L2	9,0	6,5			
L3	8,8	5,5			
Minimum declared (a)	7				
Maximum declared (b)	11				
Category	A				

Category	B				
Minimum declared (a)	7				
Practical maximum allowed	11				

Vertical Furnace

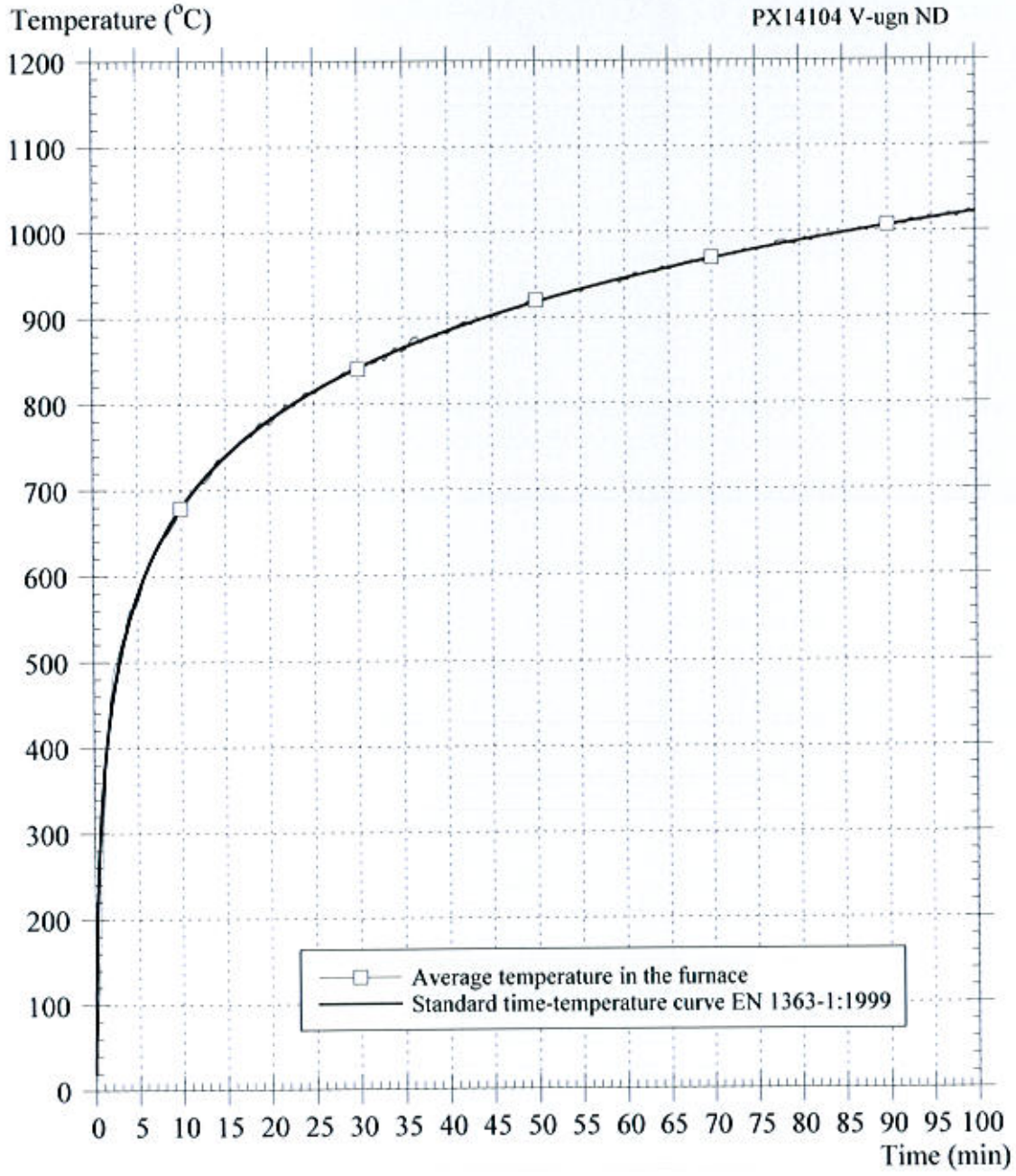
Position of plate thermocouples in furnace

Appendix No: 14	
Report No: PX14104	
Date: 2011-08-24	Rev. Date:
Scale: 1:30	Sign: CS

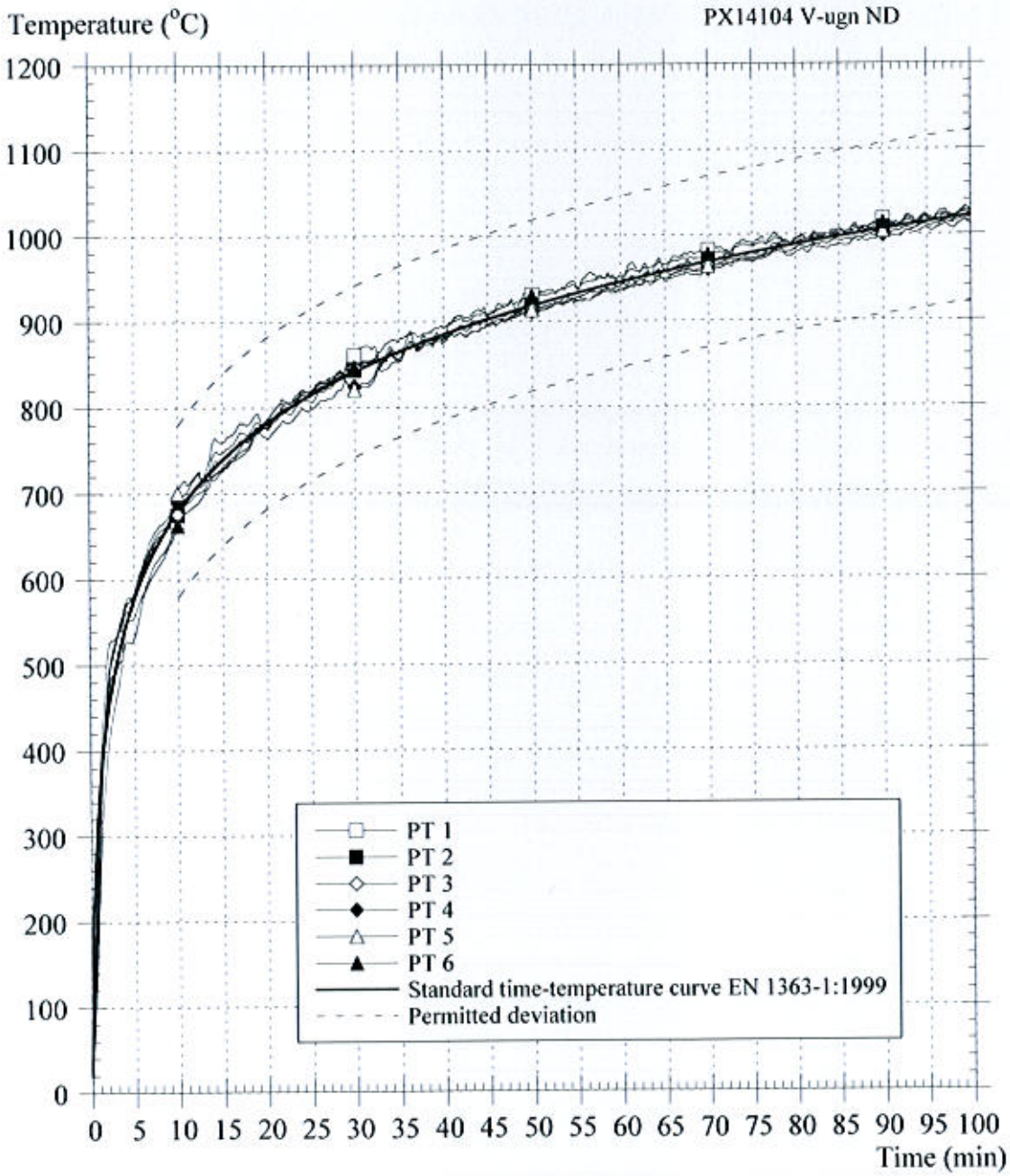


● PT1-PT6: Thermocouples in the furnace

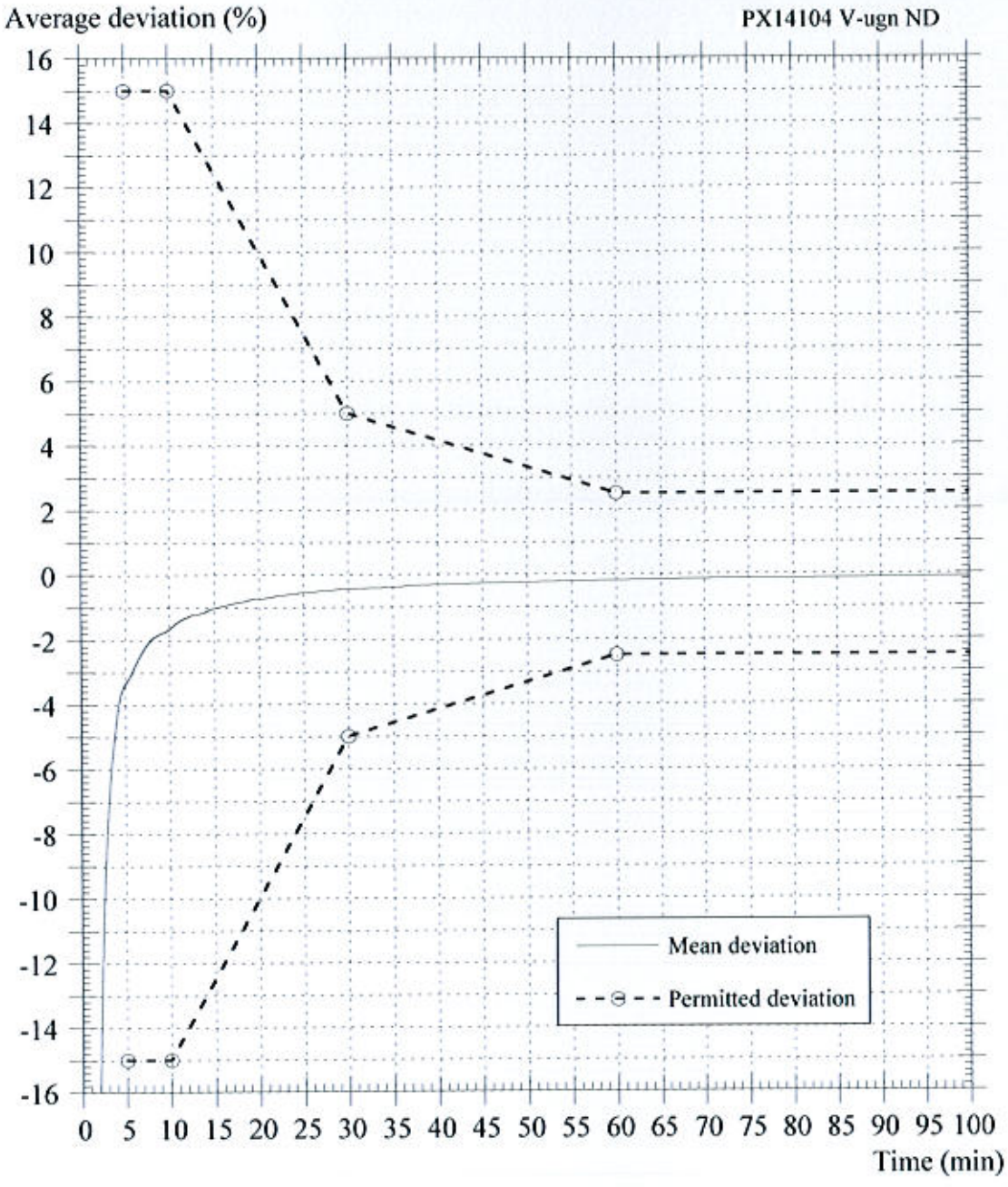
Temperature in the furnace



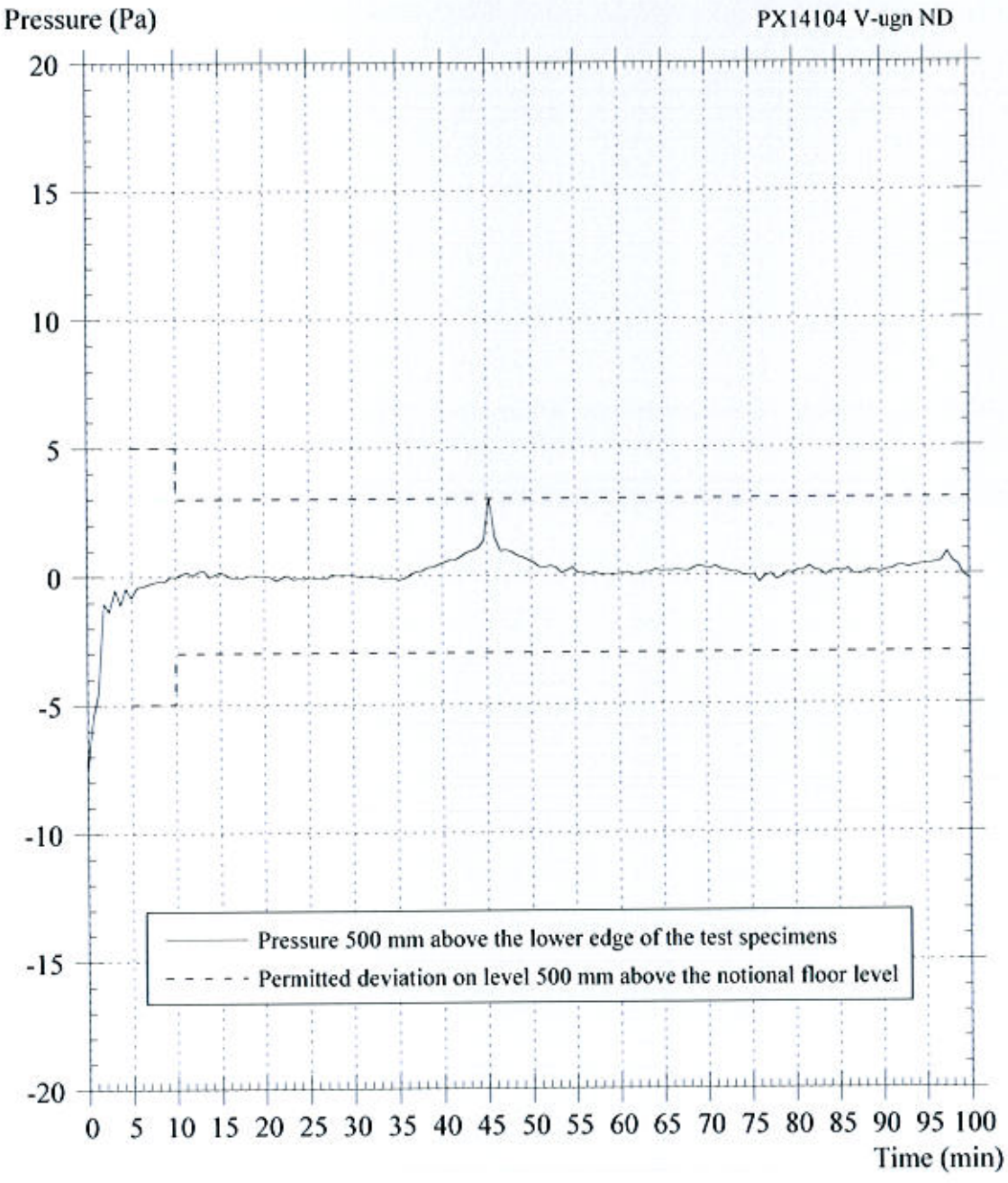
Temperature in the furnace



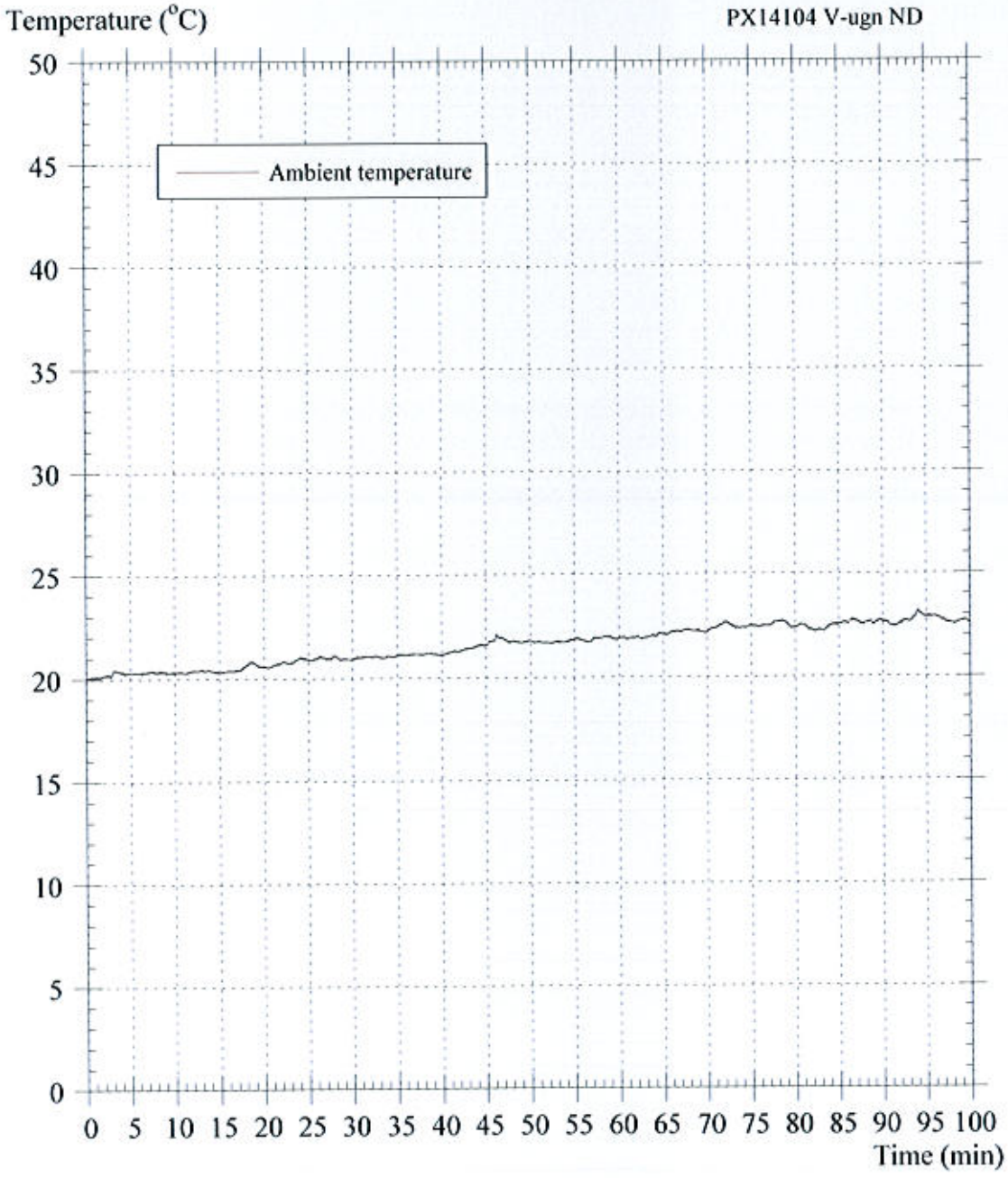
Percent deviation of the average furnace temperature from the standard time-temperature curve



Pressure in the furnace in relation to the ambient pressure in the laboratory



Ambient temperature



Test specimen A

Measured deflections (mm)

(Schematic drawing of the door)

Positive value indicates deflection inwards the furnace.
Negative value indicates deflection outwards the furnace.

Explainations of the table below:
F = Door frame
DL = Door leaf
C = Centre of the door leaf

R = Smoke or other disruption of the sight

Pos.	1		2		3		4	5	
Time (min)	F	DL	F	DL	F	DL	C	F	DL
0	0	0	0	0	0	0	0	0	0
10	R	R	14	9	R	R	34	0	-2
20	6	2	15	13	6	7	26	-1	-1
30	8	2	15	14	8	8	35	1	1
40	12	7	18	18	14	12	35	1	1
50	15	15	28	25	22	22	38	1	2
55	15	R	30	24	26	24	35	1	3
60	11	15	25	23	25	24	33	1	5

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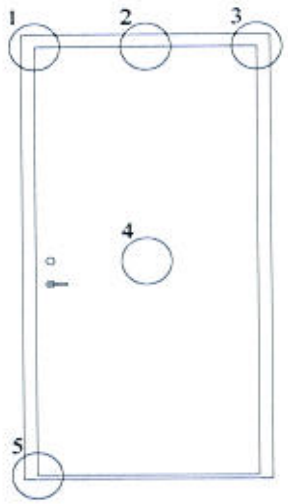

Test specimen B

Measured deflections (mm)

(Schematic drawing of the door)

Positive value indicates deflection inwards the furnace.
Negative value indicates deflection outwards the furnace.

Explainations of the table below:
F = Door frame
DL = Door leaf
C = Centre of the door leaf

R = Smoke or other disruption of the sight

Pos.	1		2		3		4	5	
Time									
(min)	F	DL	F	DL	F	DL	C	F	DL
0	0	0	0	0	0	0	0	0	0
10	R	R	14	6	-14	5	26	-1	-25
20	-2	-27	12	-1	13	13	19	-1	-26
30	9	-27	15	3	13	15	23	-1	-28
40	13	-18	20	8	15	18	28	0	-26
50	19	-8	26	18	20	23	35	1	-23
55	22	-6	26	18	21	22	35	0	-22
60	23	-7	25	16	19	20	31		

Appendix: 22

Report: PX14104

Photo No: 1
Time: 00:22 min:s

The test specimen at the beginning of the test.

Photo No: 2
Time: 71:55 min:s

The test specimen during the test.

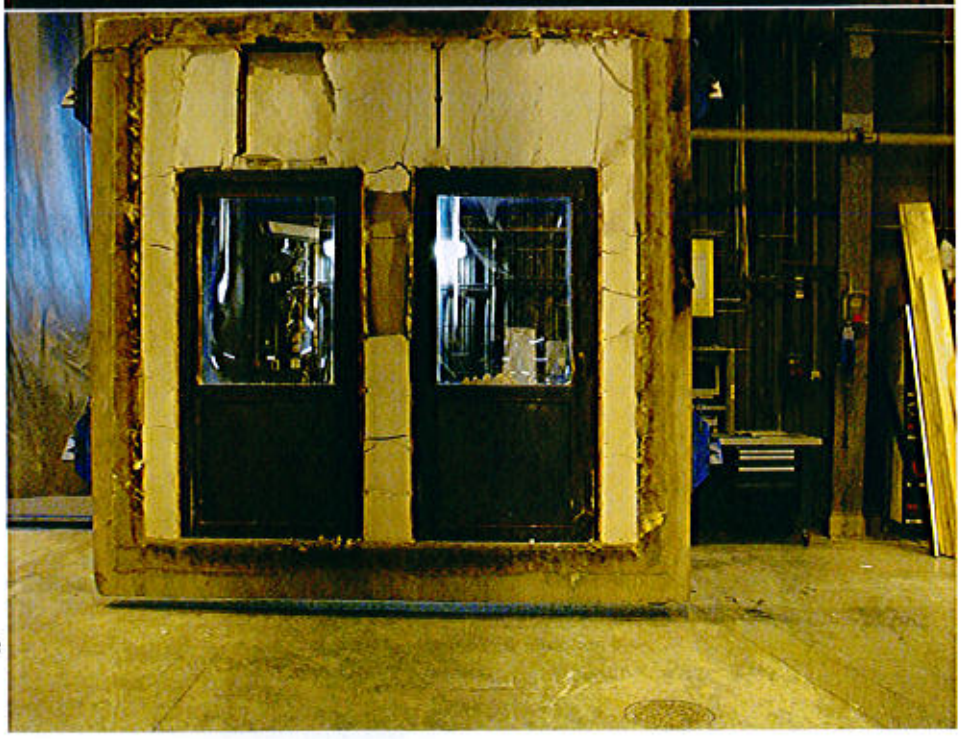

Photo No: 3
After the test.

The fire exposed side after the test.