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DE

Einbau- und Wartungsanleitung Ein- und zweiflügelige Stahltüren



DEUTSCH 3



..... **8**

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Sehr geehrte Kundin, sehr geehrter Kunde,
wir freuen uns darüber, dass Sie sich für ein Produkt aus
unserem Hause entschieden haben.

1 Zu dieser Anleitung

Bitte lesen und beachten Sie diese Anleitung. Sie gibt Ihnen wichtige Informationen zu Einbau, Wartung und Pflege Ihrer Stahltür und ist ein wichtiges Dokument für die Bauakte. Sprechen Sie mit unserem Kundendienst, wenn Sie nach dem Durcharbeiten dieser Anleitung noch Fragen haben.

1.1 Verwendete Warnhinweise

Das allgemeine Warnsymbol kennzeichnet eine Gefahr, die zu **Verletzungen** oder **zum Tod** führen kann. Im Textteil wird das allgemeine Warnsymbol in Verbindung mit den nachfolgend beschriebenen Warnstufen verwendet. Im Bildteil verweist eine zusätzlich Angabe auf die Erläuterungen im Textteil.

GEFAHR

Kennzeichnet eine Gefahr, die unmittelbar zum Tod oder zu schweren Verletzungen führt.

1.2 Verwendete Symbole



Feuerschutz



Rauchschutz



Sicherheitstür



Schallschutz



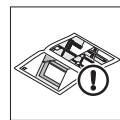
Funktionstür



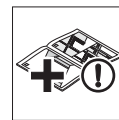
Wichtiger Hinweis



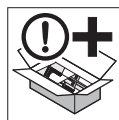
Siehe Textteil



Siehe Bildteil



Siehe Einbauanleitung im Zubehörpaket



Als Zubehör zu bestellen



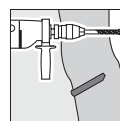
Korrektes Vorgehen



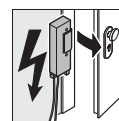
Unzulässiges Vorgehen (Vorgehensweise)



Schweißen



Bohren



Elektrischer Türöffner



Einbruchgefahr auf Öffnungsseite



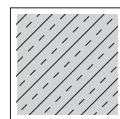
Einbruchgefahr auf Schließseite



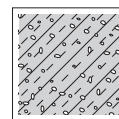
Sicherheitstür WK3 / A



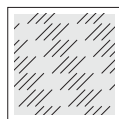
Fluchtweg



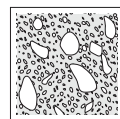
Mauerwerk / Beton



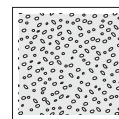
Porenbeton



Gips



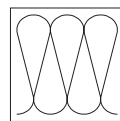
Beton



Mörtel



Zargendichtung CR
T60 / E_l 60 / HBS60
T90 / E_l 90 / HBS90
T120 / E_l 120 / HBS120
T30 / E_l 30 mit Mineralwollhinterfüllung



Dämmstoff A
(EN 13501-1)



Holz

Tab. 2: Zulässige Wände und Mindestwanddicken für Feuerschutz- und Rauchschutztüren (mm) siehe 4.2

Wand	H3D H_30 B	H3-1 H_30 C-1 H_30 D-1	H3-2 H_30 C-2 H_30 D-2 (VM)	H6-1 H_60 D-1	H6-2 H_60 D-2	H16-1	H16-2	H16-S1 H_90 E-1	HBS
Stahltür									
Beton DIN 1045-1, Festigkeit \geq C12/15	100	e \leq 1250 und k \leq 2500	e \leq 2500 und k \leq 2500	e \leq 1250 und k \leq 2500	e \leq 1250 und k \leq 2500	e \leq 625 und k \leq 750	e \leq 625 und k \leq 750	140	140
Mauerwerk DIN 1053-1, Steinfestigkeit \geq 12, Mörtelgruppe \geq 2	100	e \leq 1250 und k \leq 2500	e \leq 2500 und k \leq 2500	e \leq 1250 und k \leq 2500	e \leq 1250 und k \leq 2500	e \leq 1250 und k \leq 2500	e \leq 2500 und k \leq 2500	140	140
Porenbeton-Block oder Plansteine , DIN 4165-3, Festigkeitsklasse \geq 4, Porenbetonplatten nach allgemeiner bauaufsichtlicher Zulassung, Festigkeitsklasse \geq 4.4	115	e \leq 1250 und k \leq 2500	e \leq 2500 und k \leq 2500	e \leq 1250 und k \leq 2500	e \leq 1250 und k \leq 2500	e \leq 1250 und k \leq 2500	e \leq 2500 und k \leq 2500	240	175
Montagewand F90-A nach ABP, Bild 9D beachten, max. Höhe 5000 mm	115	e \leq 1250 und k \leq 2500	e \leq 2500 und k \leq 2500	e \leq 1250 und k \leq 2500	e \leq 2500 und k \leq 2500	e \leq 1250 und k \leq 2500	e \leq 2500 und k \leq 2500	200	175
siehe Tab. 1:									
Montagewand F90-A DIN 4102-4/Tab. 48, Bild 9D beachten, max. Höhe 5000 mm	100	e \leq 1250 und k \leq 2500	H3-2 H_30 C-2 (VM) e \leq 2500 und k \leq 2500	e \leq 1250 und k \leq 2500	e \leq 2500 und k \leq 2500	e \leq 1250 und k \leq 2500	e \leq 2500 und k \leq 2500	125	150
Montagewand F90-B DIN 4102-4/Tab. 49, Bild 9D beachten, max. Höhe 5000 mm	-	e \leq 1250 und k \leq 2500	e \leq 2500 und k \leq 2500 9/A6 und 9/B9	-	-	-	-	-	-
Montagewand F30-A	-	130	130	-	-	-	-	-	-
Gips-Wandbauplatten VG Orth, P-SAC 02 / III-488, Bild 9/E1 beachten	e \leq 1125 und k \leq 2125	-	-	-	-	-	-	-	-
Mindestwanddicken	100	-	-	-	-	-	-	-	-

3.3 Einbruchschutztüren

- Die Tür erfüllt ihre Einbruchschutzeigenschaften nur, wenn der Riegel komplett vorgeschlossen und der Schlüssel abgezogen ist.
- Sichern Sie die Türblätter an RC4/B Türen und an allen 2-flügeligen RC - Türen an den Bändern mit je zwei Schrauben (siehe Bildteil Punkt 8.4b und 10.2).
- Verwenden Sie nur Eckzargen, Eckzargen mit Gegenzarge und U - Zargen.
- Hinterfütern Sie an RC2/N Türen die Zarge im Bereich der Verriegelungspunkte, Bänder und Sicherungsbolzen druckfest.
- Hinterfütern Sie an RC3/A und RC4/B Türen die Zarge umlaufend druckfest.
- Montieren Sie an Türen mit Gläsern den Glashalterahmen mit Sicherungsglaschen auf der Angriffsseite.
- Montieren Sie die Hinterklotzung bei Austausch der oberen Verglasung wie vor der Montage.
- Messen Sie bei 2 - flügeligen Türen die unteren Spaltmaße von der Bodenmulde.
- Erschweren Sie bei Antipaniktüren den Eingriff mit Draht z.B. durch geringe Bodenluft oder Verwendung einer Flachrundschwelle.
- Füllen Sie die Zargen von RC2 Türen kpl. mit Mörtel aus, wenn sie in F90A Montagewände eingebaut werden.

3.3.1 Mindestanforderungen an einbruchhemmende Türen

Widerstandsklasse nach DIN EN V 1627 / DIN EN 1627 / VDS	RC2 / N	RC3 / A	RC4 / B
Mauerwerk DIN 1053 Teil 1 (mm)	115	115	240
Stahlbeton, mind. B12 / 15 (mm)	100	120	140
Porenbetonsteine Klasse 4 (mm)	175, 115 ¹⁾	300	-
Porenbetonplatten Klasse 4 (mm)	150	-	-
Montagewand F90 A	✓	-	-
Profilylinder nach DIN 18252 ³⁾	P2BS	P2BS	P3BS
Profilylinder ^{2) 3) 4)}	Klasse A	Klasse A	Klasse B
Schutzbeschlag nach DIN 18257 ³⁾	ES1 (ZA)	ES2 (ZA)	ES3 (ZA)
Schutzbeschlag ^{2) 3)}	Klasse A	Klasse A	Klasse B
Gläser EN 356 (Feuerschutz)	P4A	P6B / P7B	-

- 1) nur 1-Flügler, wir empfehlen Wanddicken ab 150 mm
- 2) für VdS anerkannte Türen
- 3) Schutzbeschlag oder Profilylinder muss mit Ziehschutz (ZA) ausgeführt sein.
- 4) nicht zwingend im Lieferumfang enthalten

3.4 Funktionstüren

Die Zargen müssen nicht zwingend hinterfüllt werden.

3.5 Feuerschutz und Außenanwendung

Feuerschutz und Außenanwendung bedarf einer eigenen Zulassung. Beachten Sie die separate Einbauanleitung Art- Nr. 479166.

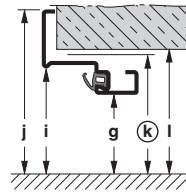
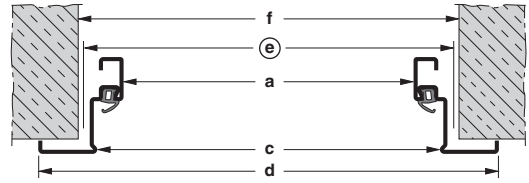
4 Montage

4.1 Vor der Montage

Klären Sie vor der Montage folgende Fragen:

- Welche Eigenschaften hat die Tür?
- Ist die Wandbauart zum Einbau der Tür geeignet?
- Ist die Höhenlage des Bodens bekannt (Meterriss)?
- In welche Richtung soll die Tür öffnen?
- Sind Bauvorschriften zu beachten?
- Muss die Wand im Bereich der Mauerschutzkästen ausgestemmt werden?

4.2 Maße



$a = e - 82$ $g = k - 42$
 $c = e - 36$ $i = k - 19$
 $d = e + 64$ $j = k + 31$
 $f = e + 10$ $l = k + 5$

Abb. 1: Maße

- a / g lichte Öffnungsweite / -höhe
- c / i lichte Falzbreite / -höhe
- d / j Zargenaußenmaßbreite / -höhe
- e / k Baurichtmaßbreite / -höhe
- f / l lichte Rohbaumaßbreite / -höhe EN 12519

4.3 Bei der Montage

- Beachten Sie die Einbauhinweise in den Zubehörpaketen.
- Verwenden Sie Montagebauteile, wenn sie mitgeliefert werden, z.B. Dübellaschen, Dübel oder Schrauben.
- Use the plugs indicated in section 8 and note the fitting instructions in the plug approval - see plug manufacturer's internet site.
- Beachten Sie, dass bei Zargen ohne Bodeneinstand der untere Montagewinkel vor der Montage entfernt werden muss.

4.4 Hinweise zum Bildteil

siehe Punkt	Beschreibung
8	Übersicht der Einbausituationen A = Einbau in Mauerwerk / Beton B = Einbau in Mauerwerk / Beton sichtbar C = Einbau in Porenbeton D = Einbau in Gipskarton / Leichtbau E = Einbau in Gips-Wandbauplatten
8.1	Dünn- und Dickfalz
8.2	Zargenformen
8.3a / 8.3b	Anzahl der Befestigungspunkte
8.3c	Einbauablauf
8.4a	Ausbau der Standardtür
8.4b	Ausbau der Sicherheitstür
8.5	Zusammenbau der Eckzarge
8.6	Bodenmulde und Montagewinkel
8.7	Befestigungsteile
8.8	Einbau Schattennutprofile
8.9	Leerrohre in der Zarge
8.10	Einsetzbare E – Öffner
8.11	Mauerschutzkästen in GKF – Wände
9.0	Einbausituationen
10.1a	Einbau mit Standardbändern
10.1b	Einbau mit 3D-Bändern
10.2	Einbau der Sicherheitstür

siehe Punkt	Beschreibung
10.3	Einstellen der Luftspalte
10.4	Entfernen der Bodenwinkel bei Zargen ohne Bodeneinstand
10.5	Einbau der Gegenzarge
10.6	Dichtungskeile mit Silikon befestigen
10.7	Einbau der Zargendichtung
10.8	Schließblech abfeilen
10.9	Anheben der Tür
10.10	Spannen des Federbandes
10.11	Umbau Glasrahmen
10.12	Umbau des Lüftungsgitters
10.13	Dämmschichtbildner bei Feuer- und Rauchschutz
10.14	Dämmschichtbildner an Sicherungsbolzen
10.15	Kennzeichnung großer Glasflächen
10.16	Paniktüren und RC3/A
10.17	Einbau Blockschloss bei Mehrfachverriegelung
11	Bodendichtungen
12	Türschließer
13.1	Schlüssel bei Paniktüren abziehen
13.2	Fehlbedienung des Schlosses vermeiden

5 Wartung und Pflege

5.1 Jährliche Wartungsarbeiten

- ▶ Kontrollieren Sie Türblatt, Zarge und Befestigung auf mechanische und korrosive Schäden.
- ▶ Kontrollieren Sie die Funktion des Schlosses und fetten Sie ggf. die Falle.
- ▶ Schmieren Sie Bolzenschlosser mit Teflonspray.
- ▶ Kontrollieren Sie die Befestigung der Anbauteile, wie z.B. Drücker, Schloss, Türschließer, Bänder usw.
- ▶ Fetten Sie Bandbolzen und Lagerringe.
- ▶ Kontrollieren Sie die Spaltmaße.
- ▶ Kontrollieren Sie die Sichtbarkeit der Kennzeichnung.



Lebensgefahr durch abgelöste Dämmschichtbildner

Durch abgelöste Dämmschichtbildner verliert der Feuerschutzabschluss seine Funktion.

- ▶ Ersetzen Sie abgelöste Dämmschichtbildner, siehe Bildteil Punkt 10.13.

- ▶ Tauschen Sie defekte Teile aus.
- ▶ Verwenden Sie nur Original-Ersatzteile des Herstellers.

Wenn Sie Mängel feststellen, die Sie nicht selbst beheben können, beauftragen Sie eine Fachfirma.

5.2 Erforderliche Oberflächenbehandlung für Elemente mit Standardgrundierung

Die Oberfläche von Türblatt und Zarge besteht aus einer Pulvergrundbeschichtung auf Epoxidharz Polyester Basis.

1. Entfernen Sie die Dichtung(en).
2. Schleifen Sie, bis auf die Dämmschichtbildner alle zu lackierenden Oberflächen an.
3. Reinigen Sie die Oberflächen gründlich.

4. Verwenden Sie für die Endbehandlung von Türblatt, Zarge und Dämmschichtbildner folgenden Beschichtungsaufbau:
 - Grundbeschichtung 2K Epoxi Haftgrund und Endbeschichtung mit geeigneten handelsüblichen Bautenlacken oder
 - Grund- und Schlussbeschichtung mit 2K PUR Lack.
 Verwenden Sie bei direkter Sonneneinstrahlung keine dunklen Anstriche. Beachten Sie das BFS Merkblatt Nr. 24 sowie die Verarbeitungshinweise der Lackhersteller und fertigen Sie eine Haftprobe an. Nehmen Sie die Endbehandlung innerhalb von drei Monaten nach Montage vor, um Korrosionsschäden zu vermeiden.
5. Bringen Sie die Dichtung(en) nach dem Trocknen der Farbe wieder an.

5.3 Reinigung

- ▶ Reinigen Sie die Oberflächen mit klarem Wasser oder handelsüblichem Lackreiniger.

5.4 Pflege von Edelstahlbauteilen

- ▶ Reinigen und pflegen Sie regelmäßig Bauteile aus Edelstahl mit der bei Hörmann erhältlichen Edel Glanz Edelstahlpflege und tragen Sie diese mit einem weichen Tuch auf.

6 Etikettierung und Kennzeichnung

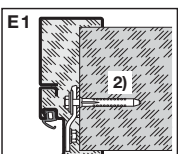
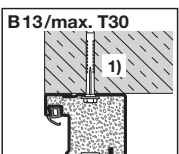
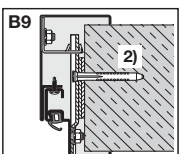
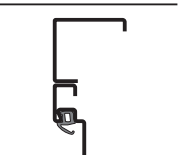
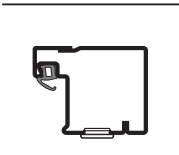
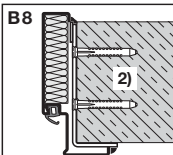
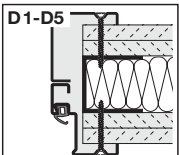
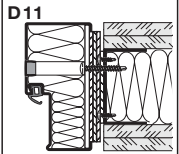
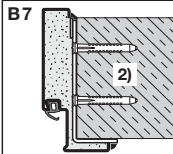
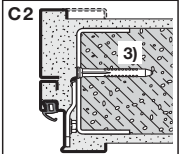
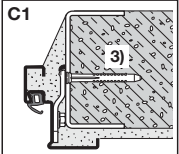
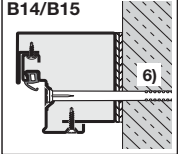
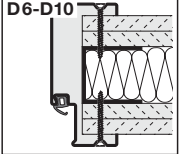
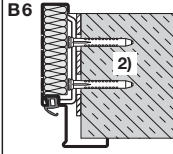
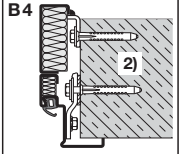
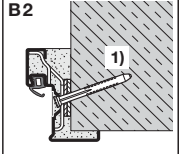
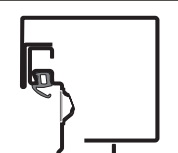
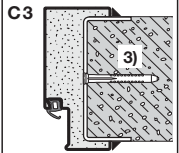
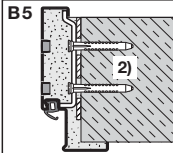
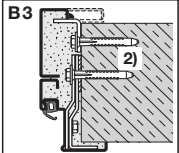
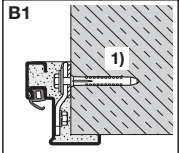
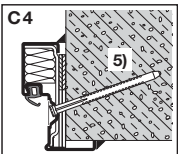
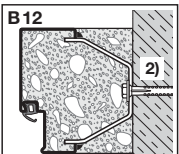
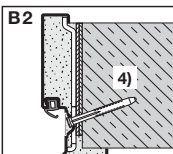
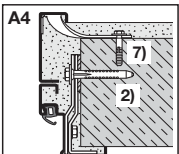
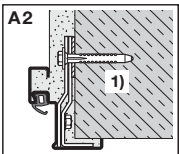
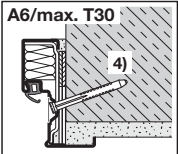
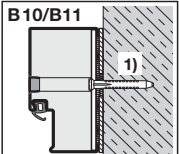
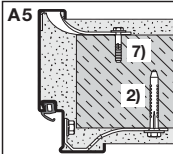
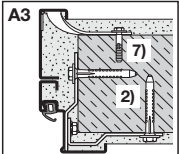
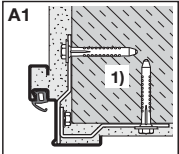
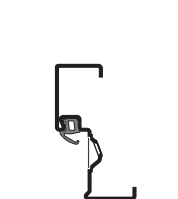
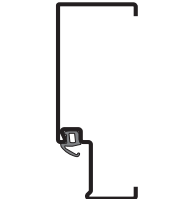
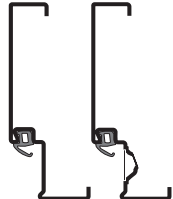
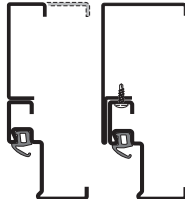
Das Etikett der Türtypen **D45-1, D45-2, D55-1, D55-2, D65-1, D65-2, E45-1, E45-2, E55-1, E55-2, E65-1, E65-2** ist auf Grundlage der Verordnung (EU) Nr. 305/2011 mit dem CE-Konformitätskennzeichen versehen. Die herangezogene und angewandte harmonisierte europäische Produktnorm ist EN 14351-1:2006 + A1:2010 „Fenster und Türen – Produktnorm, Leistungseigenschaften – Teil 1: Fenster und Außentüren ohne Eigenschaften bezüglich Feuerschutz und/oder Rauchdichtheit.“ Die Nummer der zugehörigen CE-Kennzeichnung bzw. Leistungserklärung ist im Falzbereich der Tür auf dem oben genannten Etikett zwischen dem Herstellerlogo und dem CE-Konformitätskennzeichen angegeben.

Türen, auf deren Etikett kein CE-Konformitätskennzeichen abgebildet ist, fallen nicht in den Anwendungsbereich der oben genannten harmonisierten europäischen Produktnorm und dürfen daher nicht über eine CE-Kennzeichnung bzw. Leistungserklärung verfügen.

7 Allgemeines

Die Inbetriebnahme der Tür ist so lange untersagt, bis festgestellt wurde, dass sie nach unseren Vorgaben montiert und auf ihre ordnungsgemäße Funktion überprüft wurde. Bei einer nicht mit uns abgestimmten Veränderung des Produkts verliert die Leistungserklärung ihre Gültigkeit.

8  4.3/4.4



- 1) Fischer:** FUR 10 x 80/100
Fischer: SXS 10 x 80/100
Hilti: HRD 10 x 80/100
MEA: MFR 10 x 80/100
Würth: W-UR 10 x 80/100



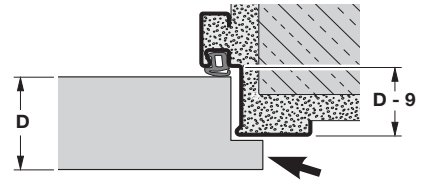
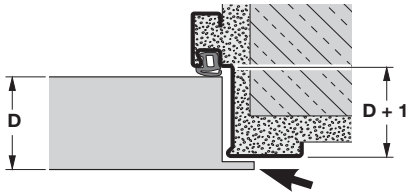
- 2) Fischer:** FUR 10 x 80/100/115
Fischer: SXS 10 x 80/100/120
Hilti: HRD 10 x 80/100
MEA: MFR 10 x 80/100/115
Würth: W-UR 10 x 80/100/115

- 3) Fischer:** FUR 10 x 80/100/115
Fischer: SXS 10 x 80/100/120
Hilti: HRD 10 x 80/100
MEA: MFR 10 x 80/100/115
Würth: W-UR 10 x 80/100/115

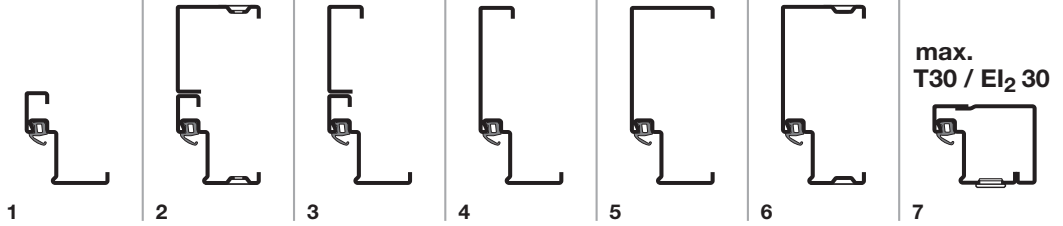
Fischer: GB10 → (T90) (2)

- 4) Fischer:** FUR 10 x 100
5) Fischer: FUR 10 x 160
6) Fischer: FUR 10 x 200
7) 8 x 40

8.1



8.2



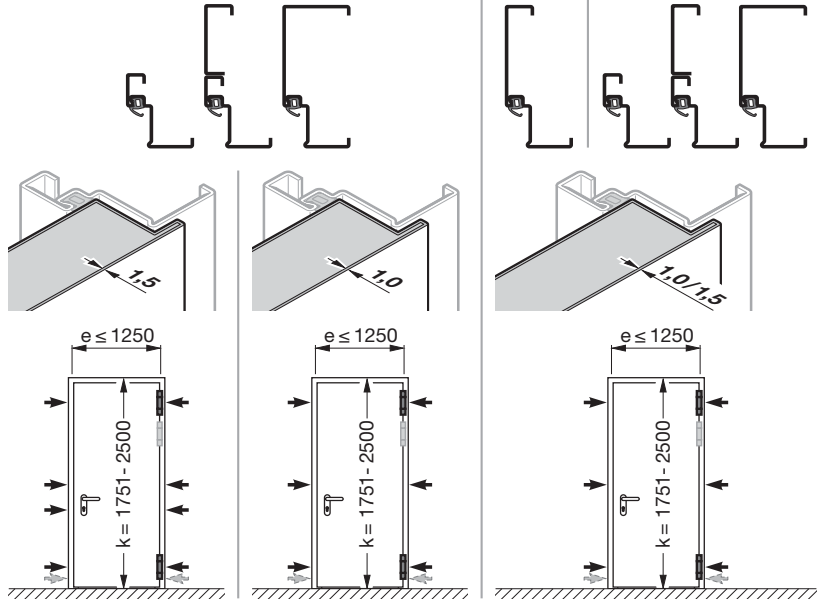
8.3a



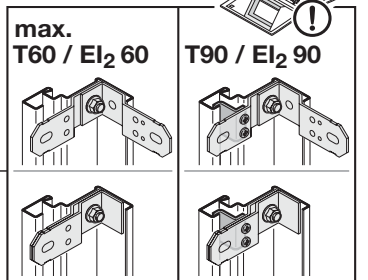
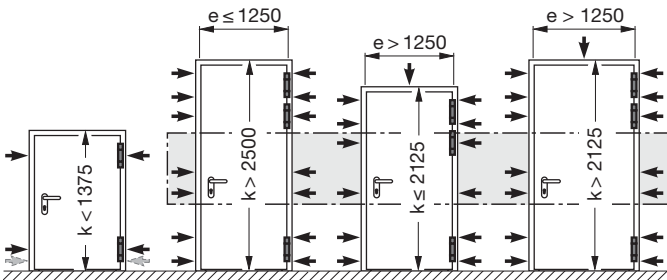
4.2/4.3

T60 / EI₂60 / T90 / EI₂90

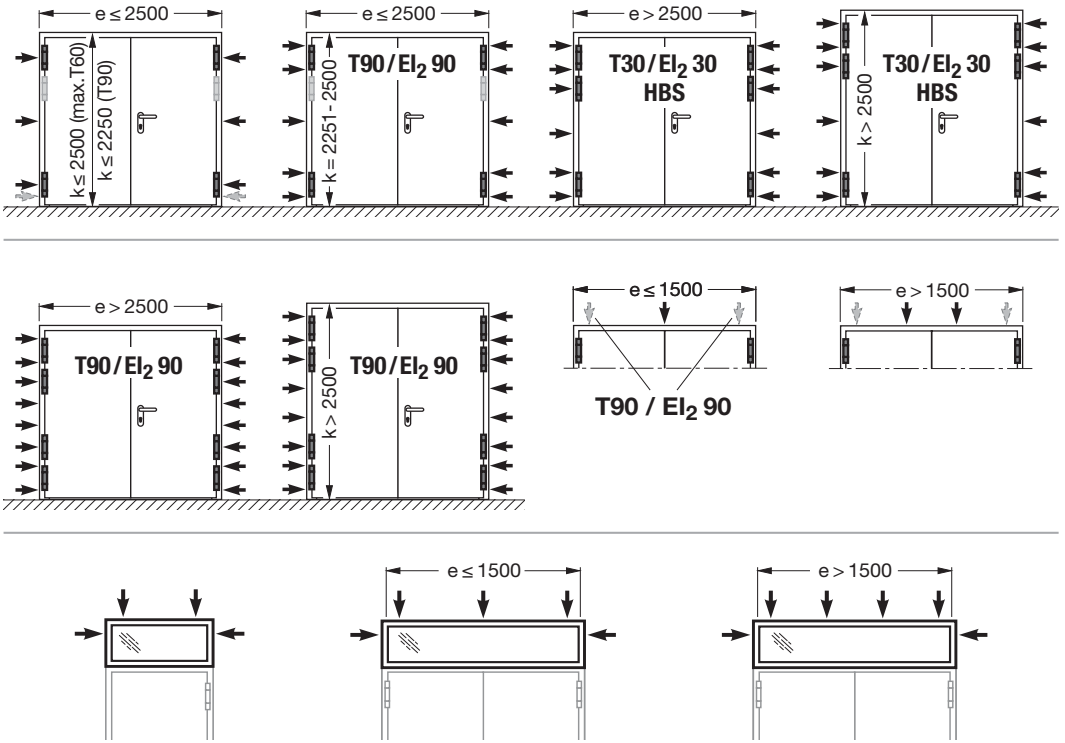
T30 / EI₂ 30 / HBS



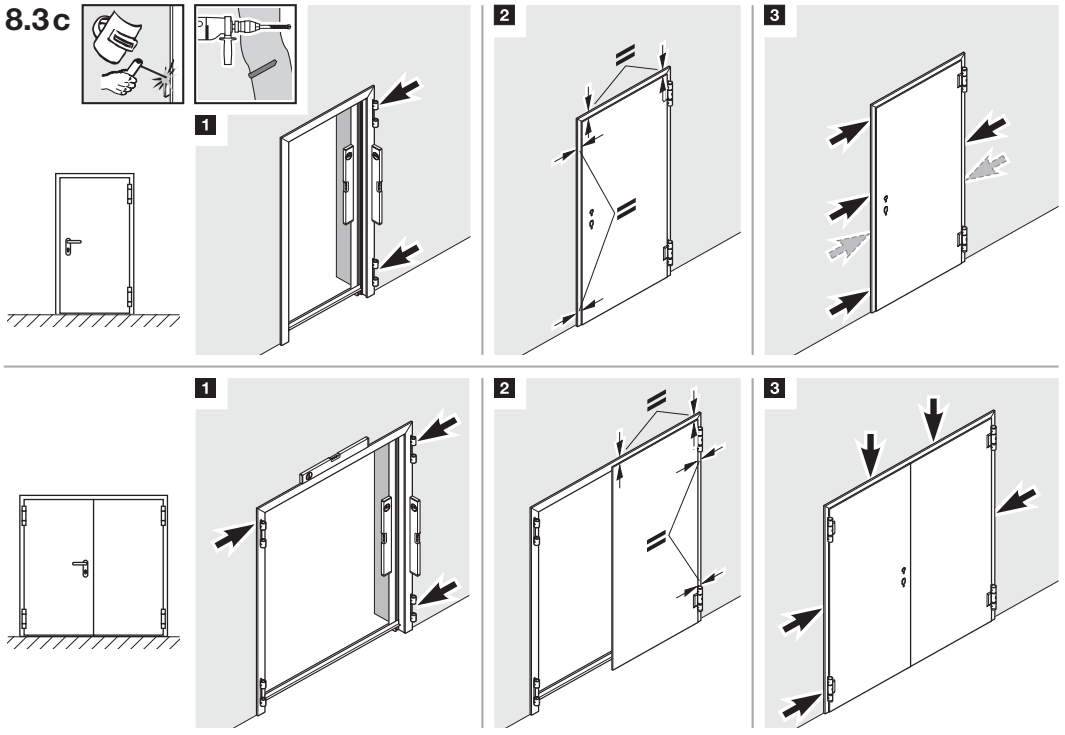
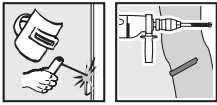
8.7a
8.7b

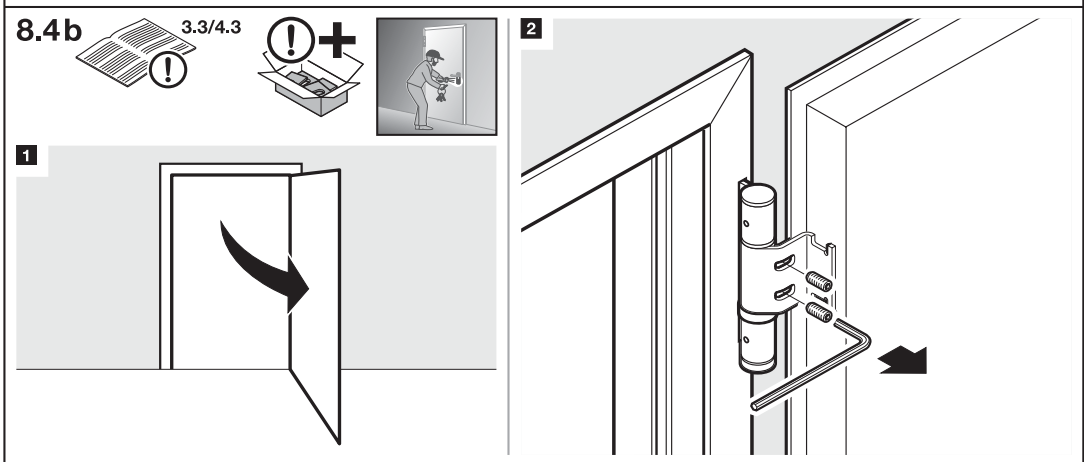
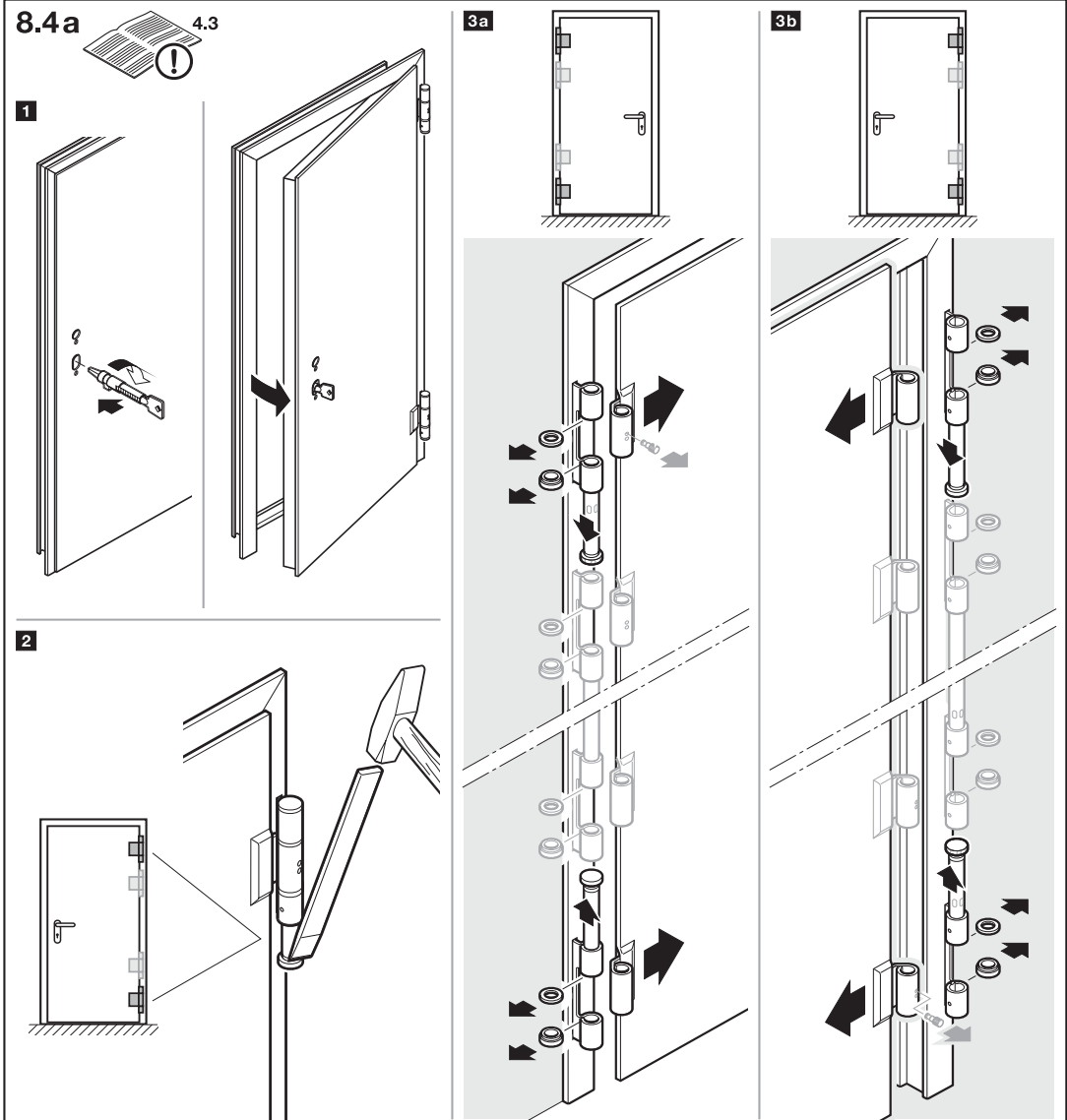


8.3b



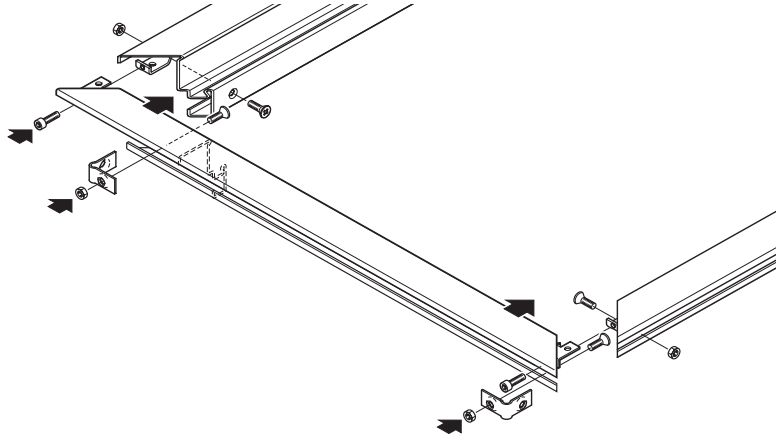
8.3c





8.5

4.3

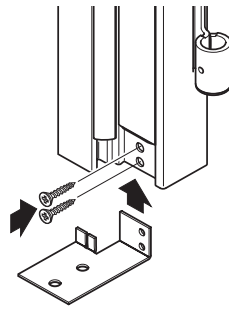
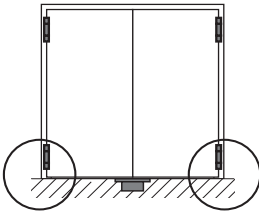


8.6

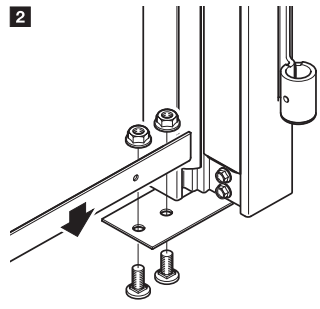
4.3



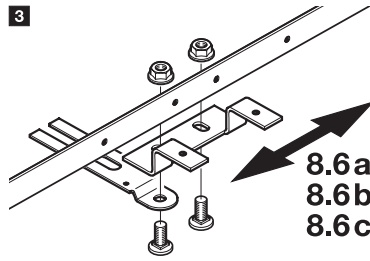
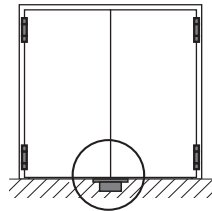
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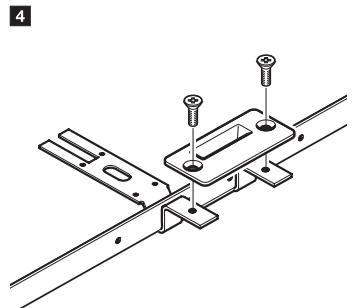
2



3

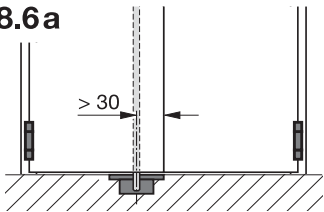


4

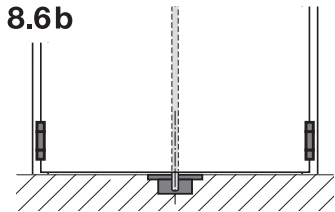


8.6a

> 30

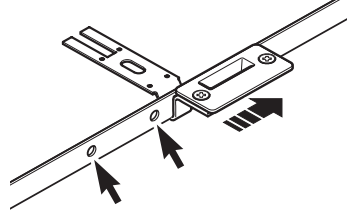
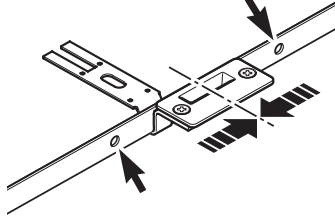
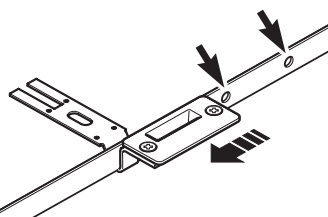
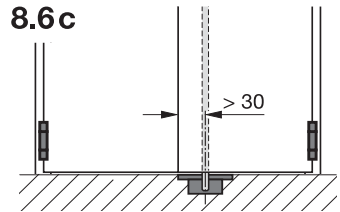


8.6b

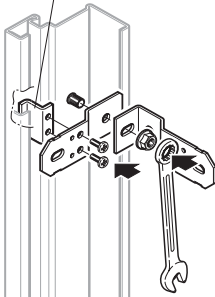
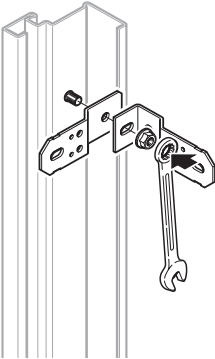
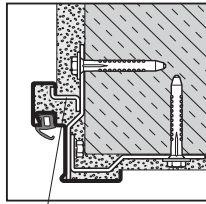
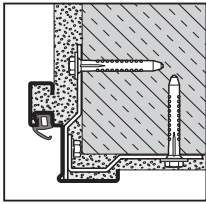


8.6c

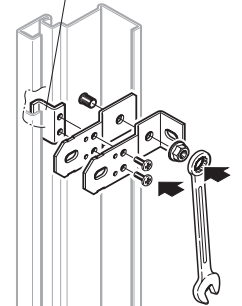
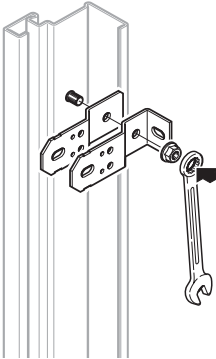
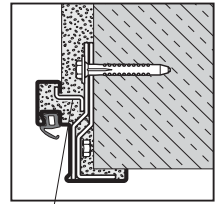
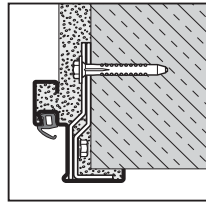
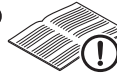
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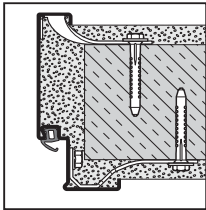
8.7a 4.3



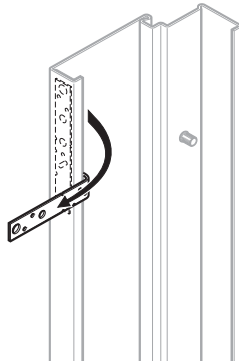
8.7b 4.3



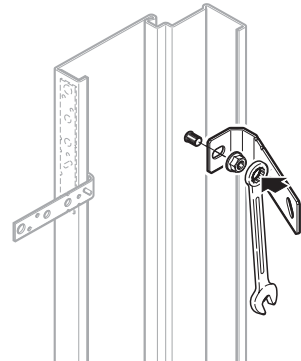
8.7c 4.3



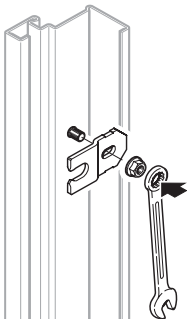
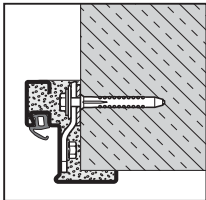
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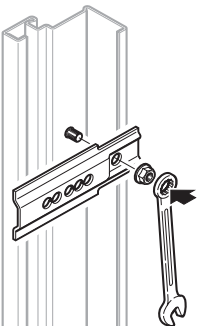
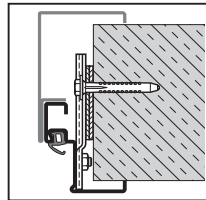
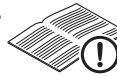
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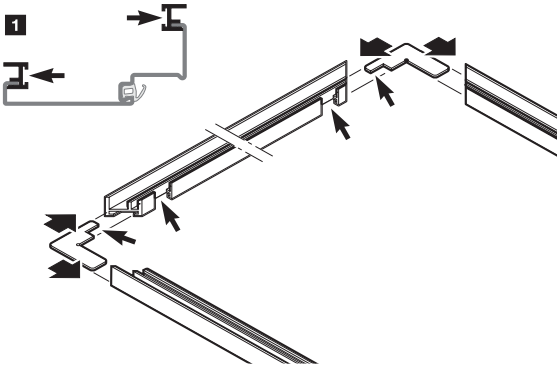
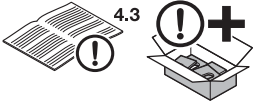
8.7d 4.3



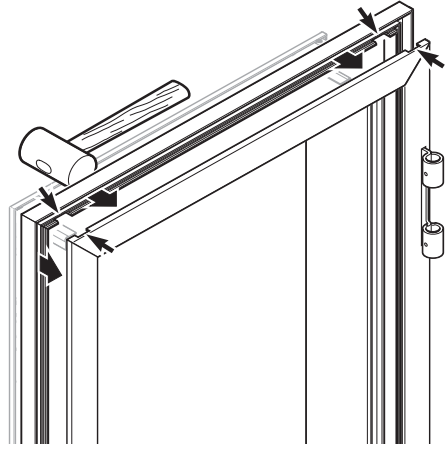
8.7e 4.3



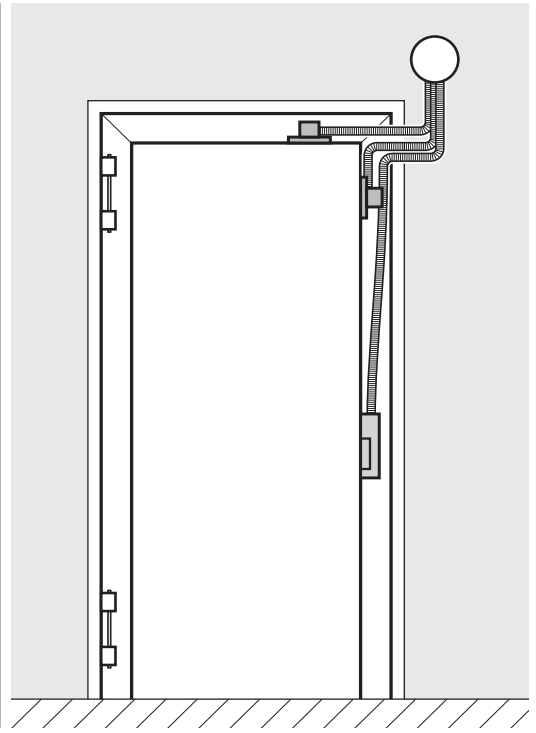
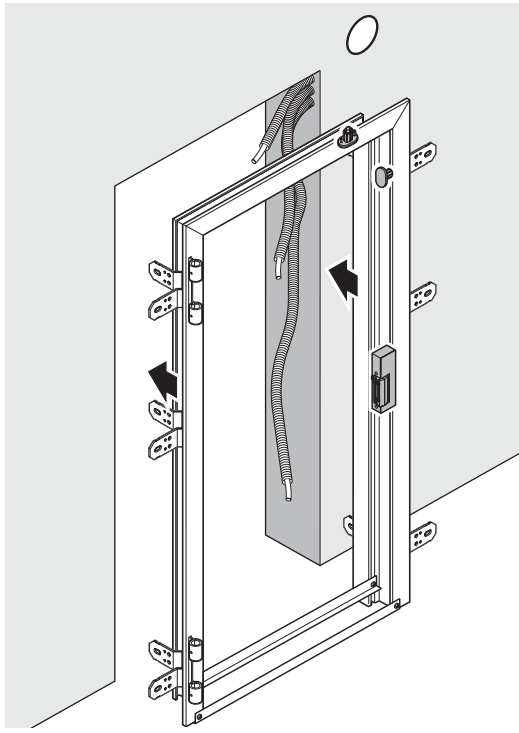
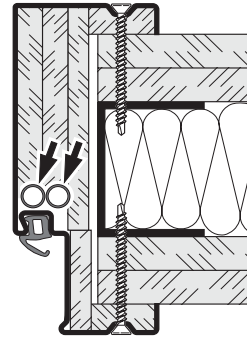
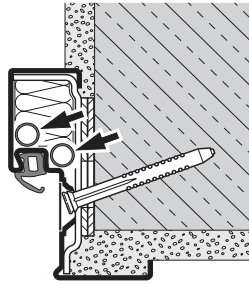
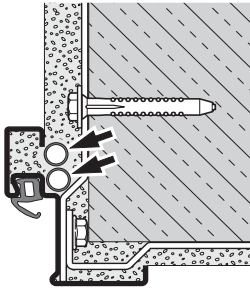
8.8



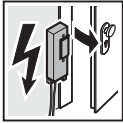
2



8.9



8.10



AC
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DC
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I.S.T. Systems

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Dorma

447/Basic

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x

Lucky Basic

x

x

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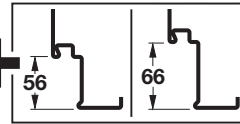
x

x

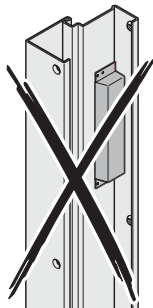
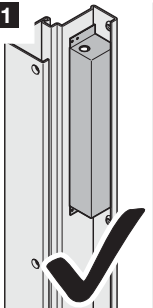
8.11



9/D

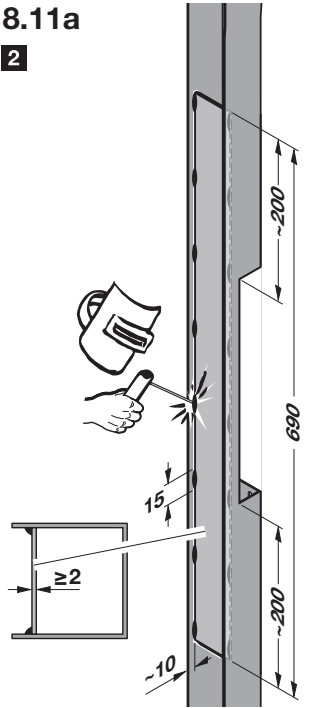


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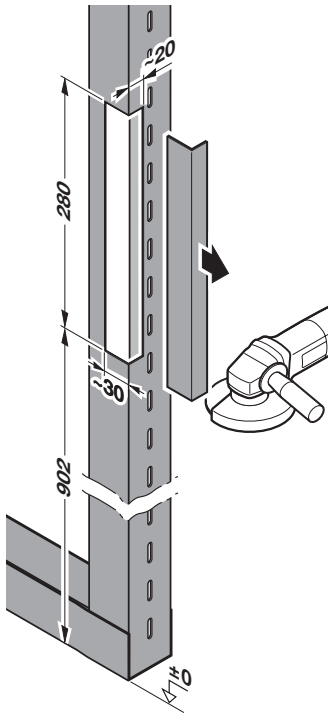
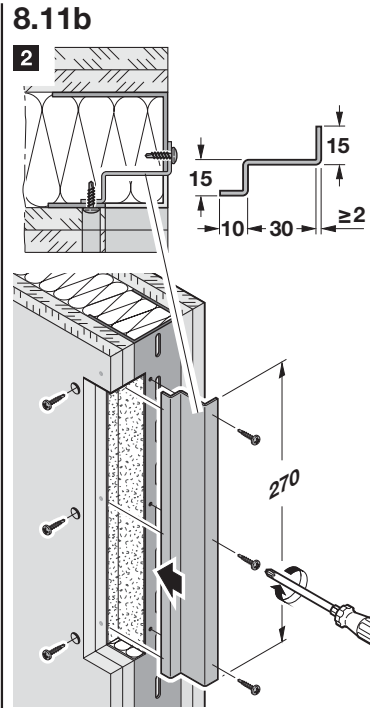
8.11a

2

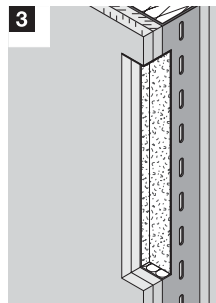


8.11b

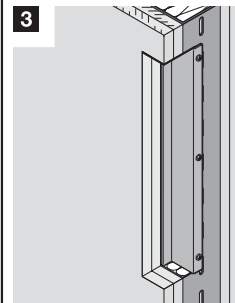
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3

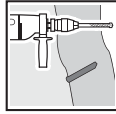
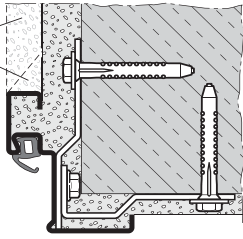


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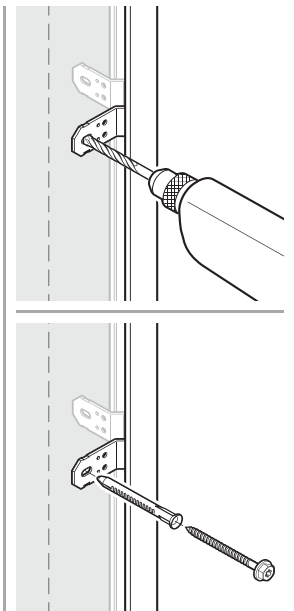
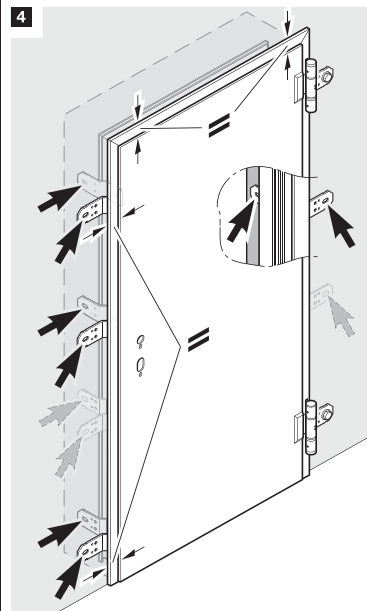
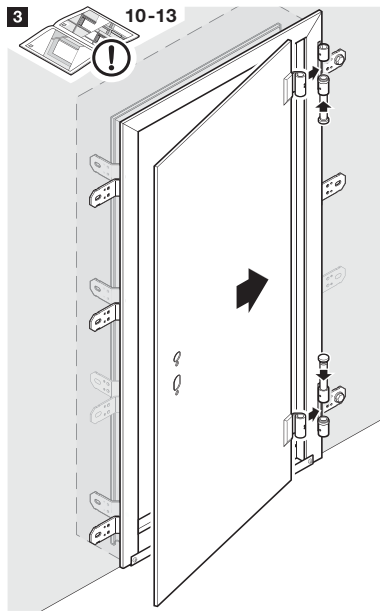
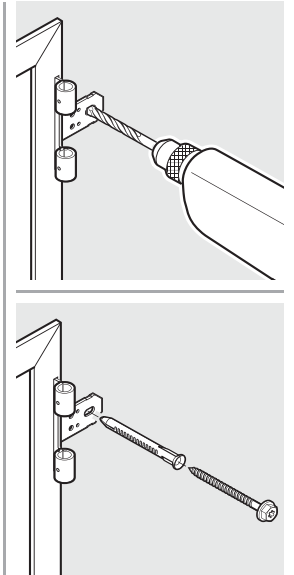
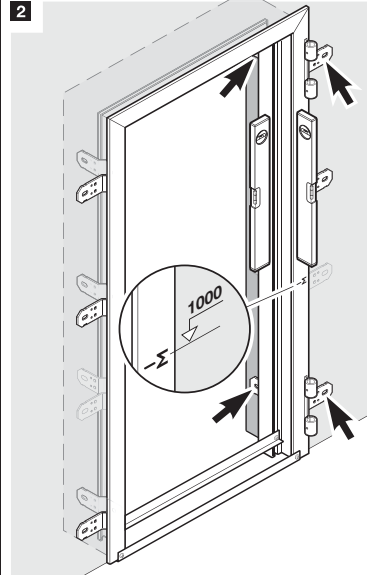
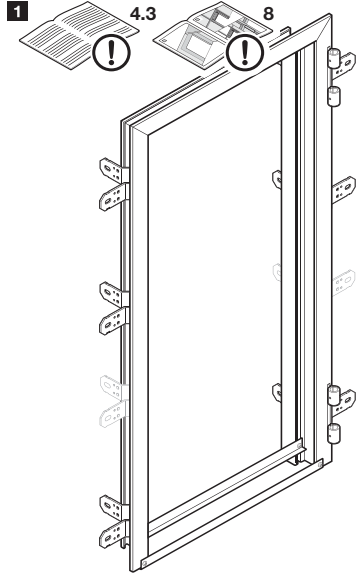
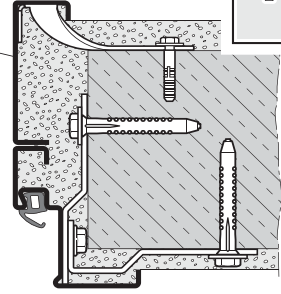
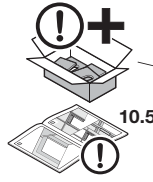


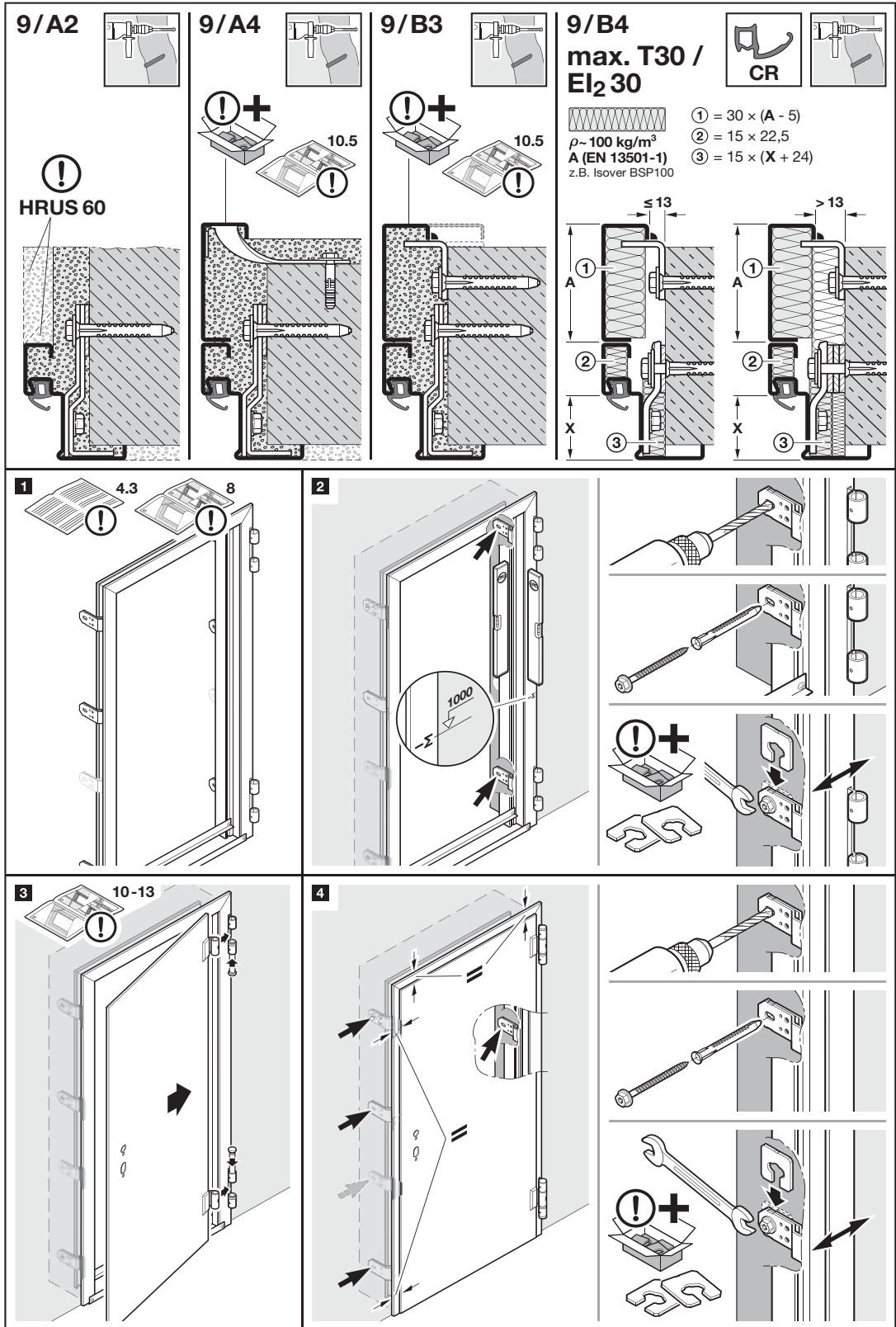
9/A1

! HRUS 60

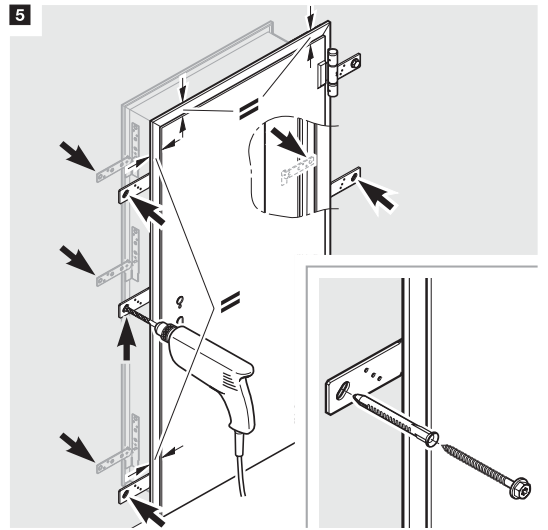
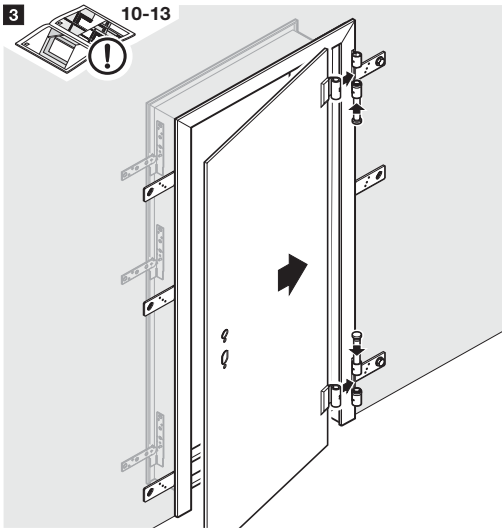
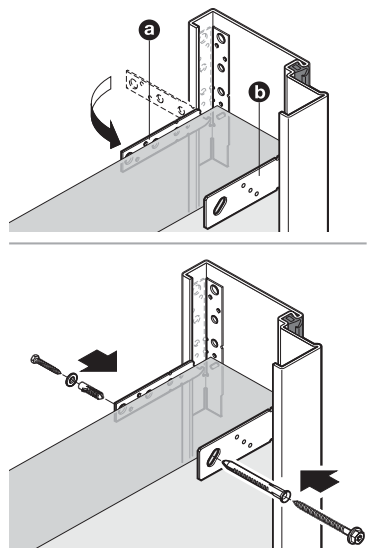
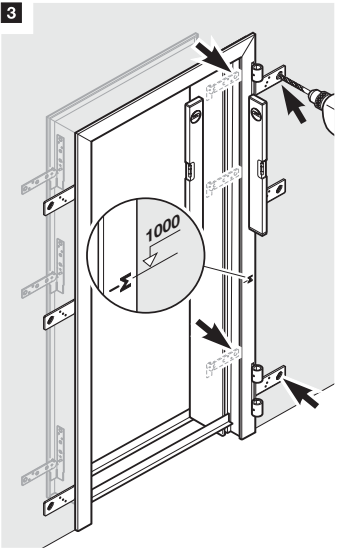
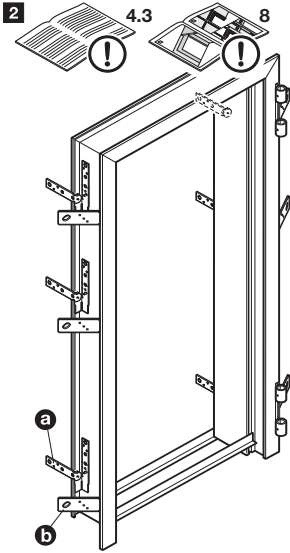
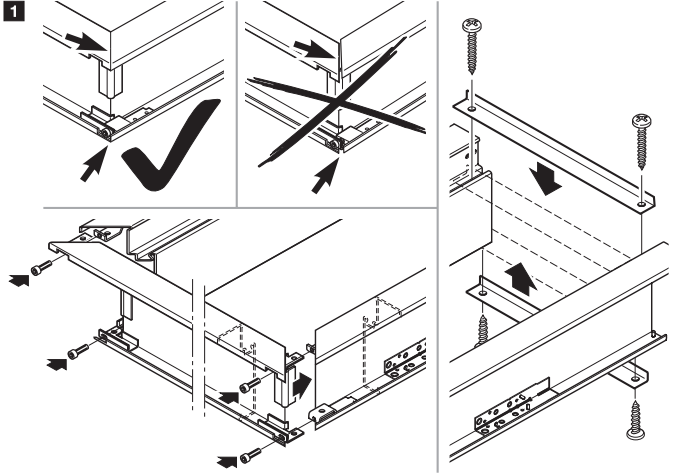
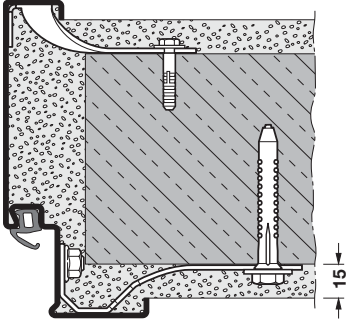
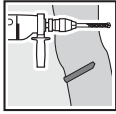


9/A3





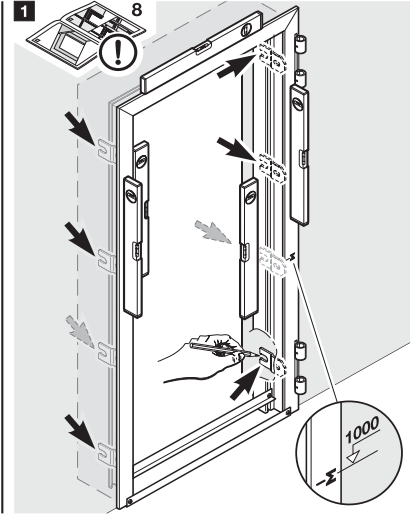
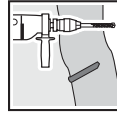
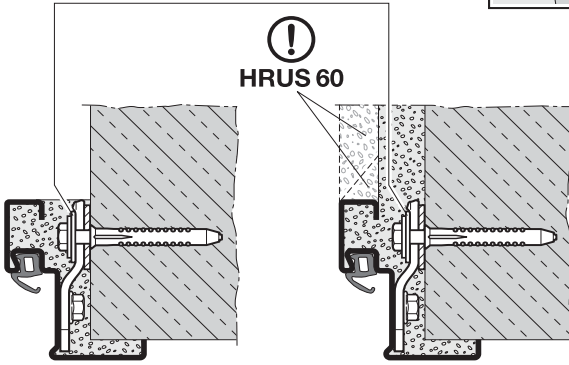
9/A5



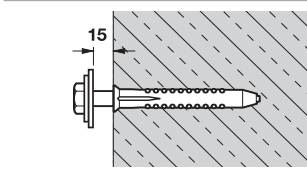
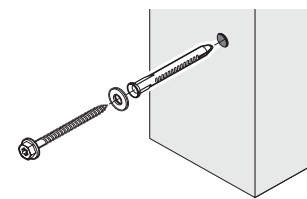
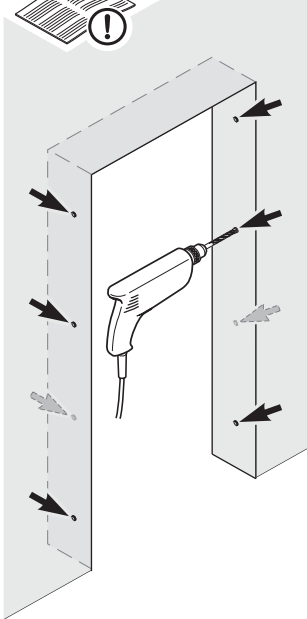
9/B1

DIN 9021-8.4-140 HV

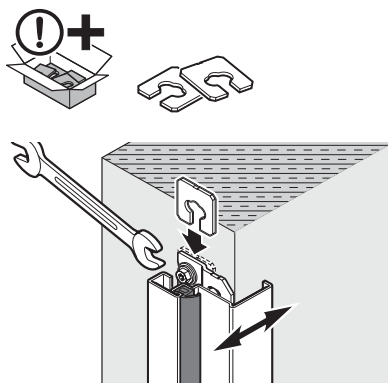
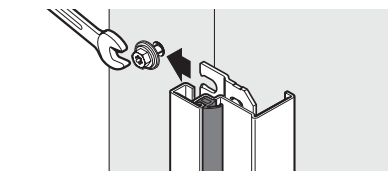
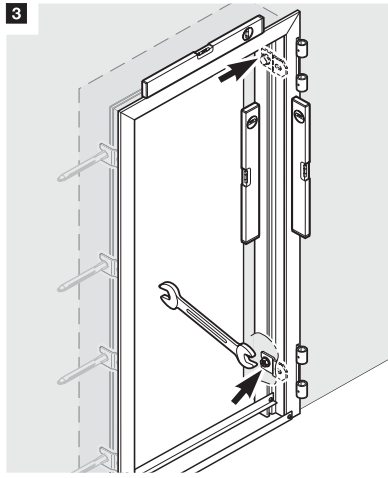
! HRUS 60



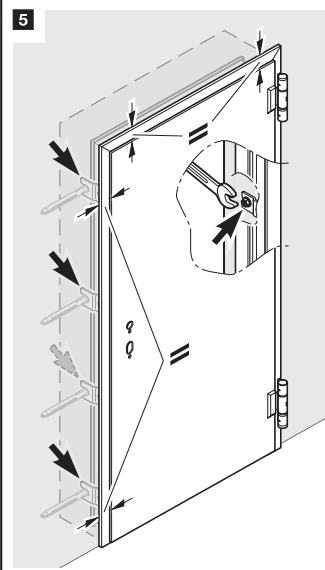
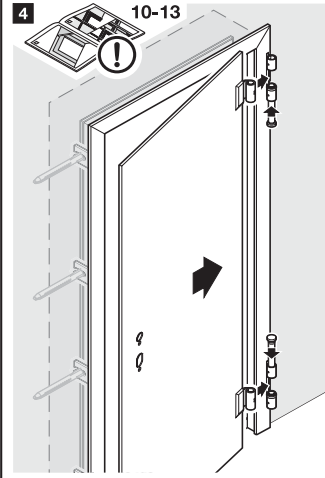
2 4.3

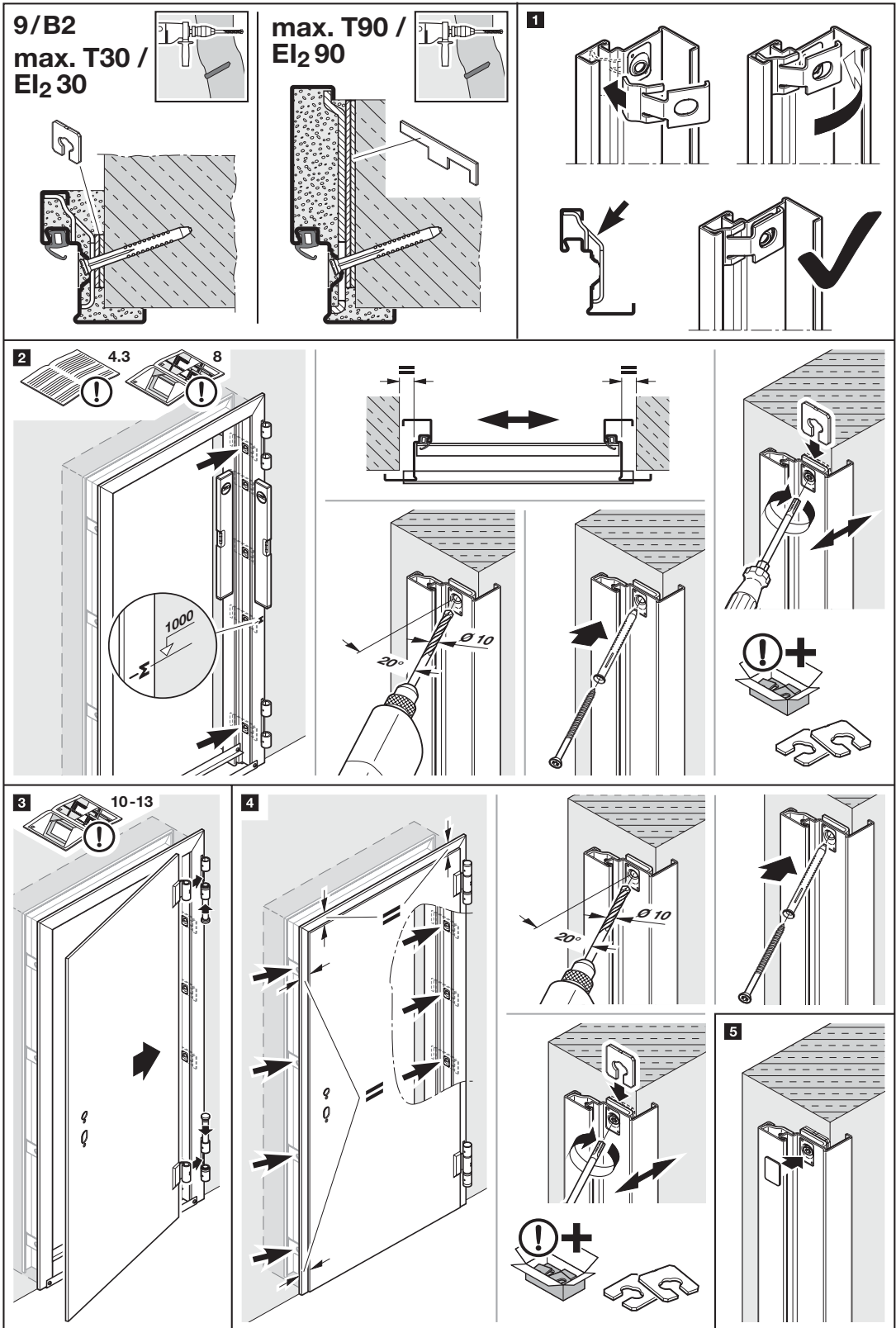


3



4 10-13





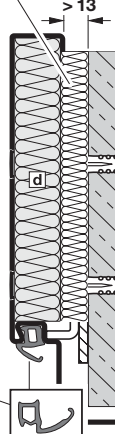
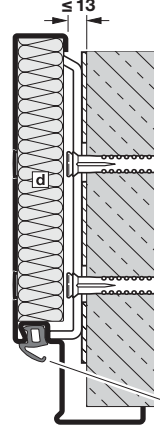
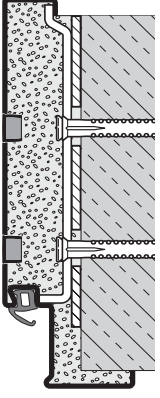
9/B5



9/B6
max. T30 /
EI2 30



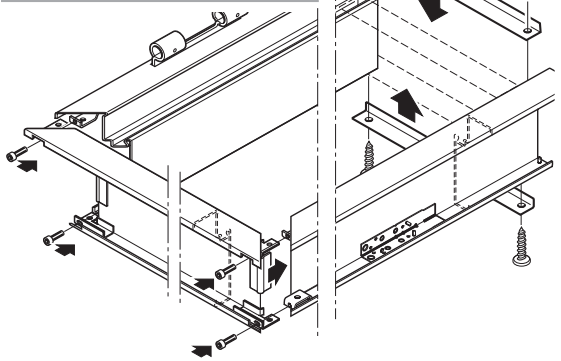
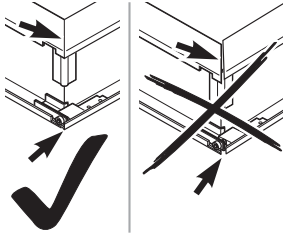
$\rho \sim 100 \text{ kg/m}^3$
A (EN 13501-1)



d Isover BSP100

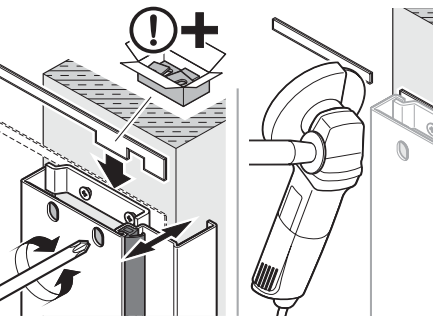
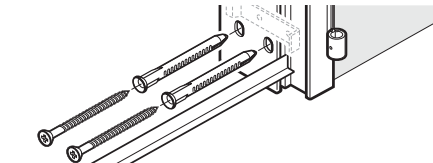
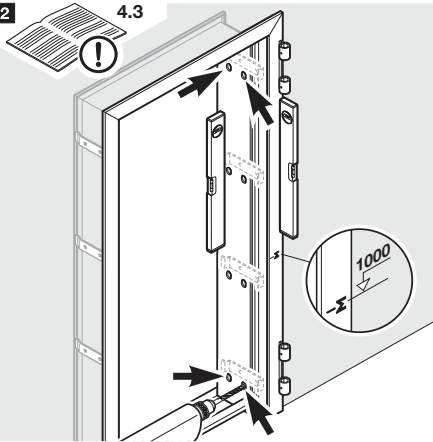
CR

1



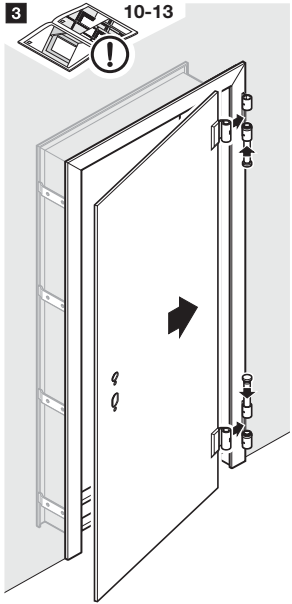
2

4.3

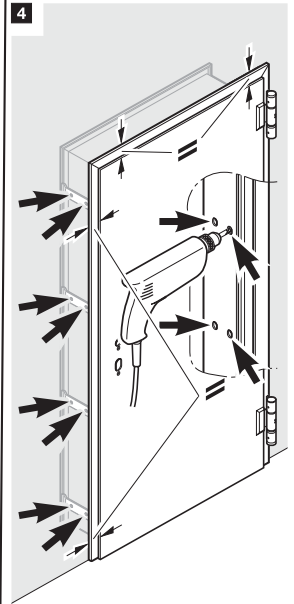


3

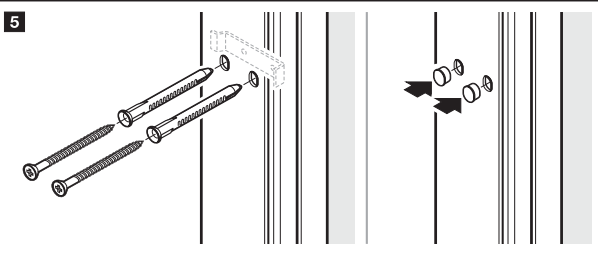
10-13

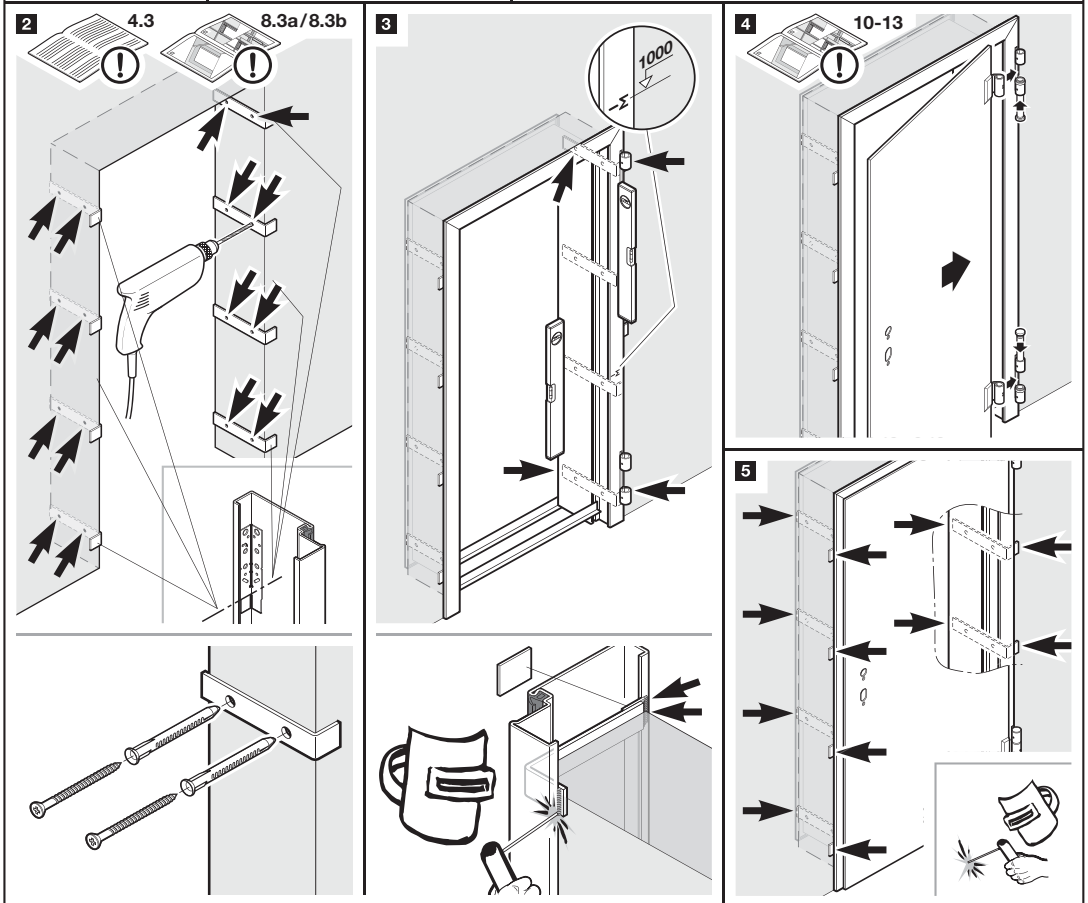
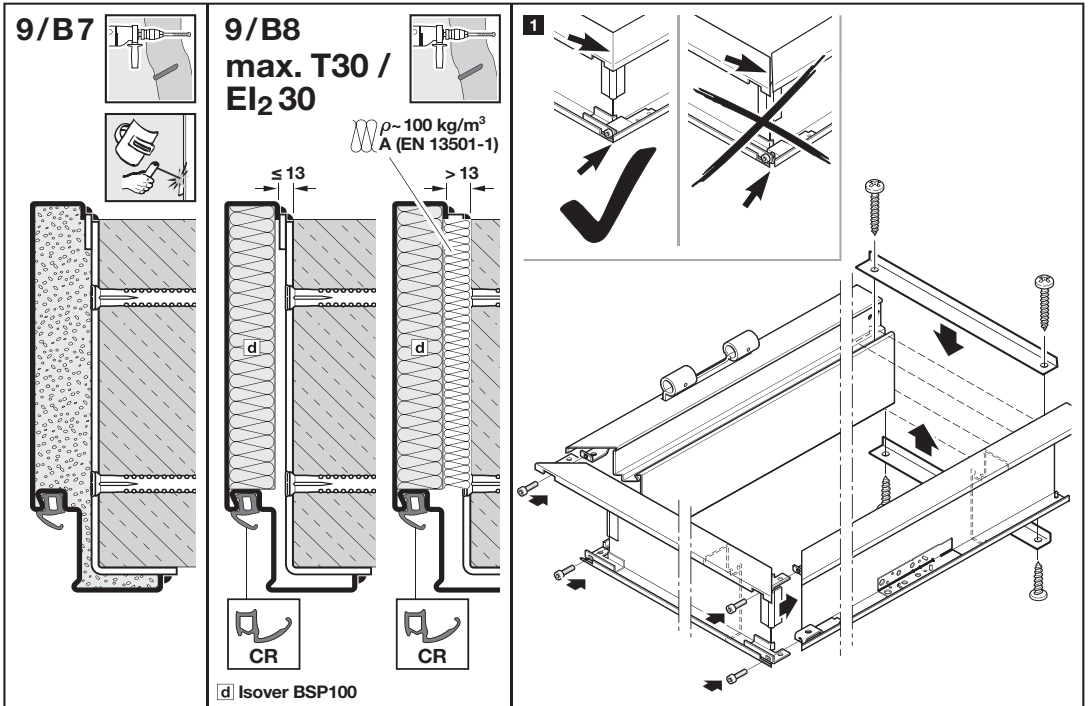


4



5





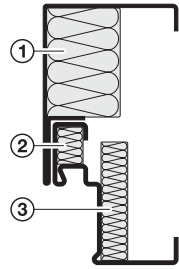
9/B9

max. T30/
EI₂30

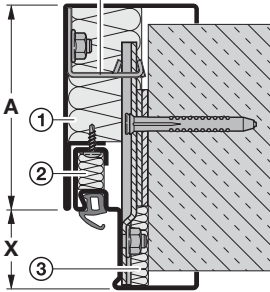


$\rho \sim 100 \text{ kg/m}^3$
A (EN 13501-1)
z.B. Isover BSP100

- ① = $40 \times (A - 42)$
- ② = $15 \times 22,5$
- ③ = $15 \times (X + 24)$



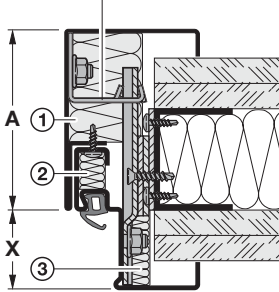
A > 94



➔ 2a 2b



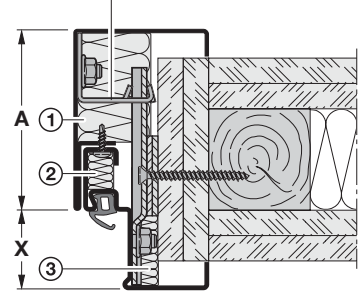
A > 94



➔ 2c



A > 94



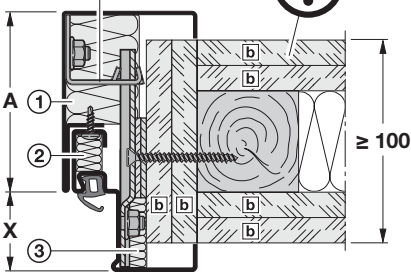
➔ 2d

max. T30/
EI₂30



+ 24)

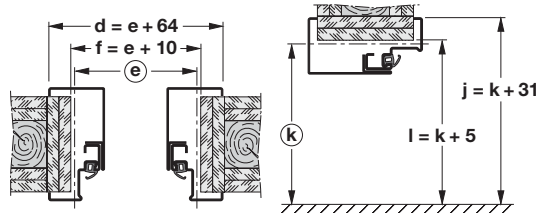
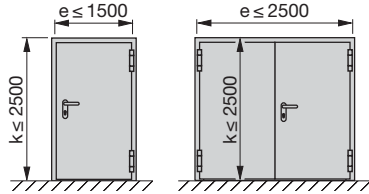
A > 94



F90B DIN 4102-4 Tab. 49

b A-12,5-EN 520

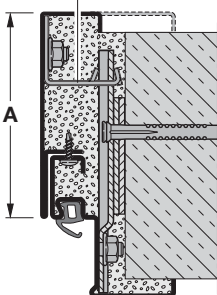
➔ 2e



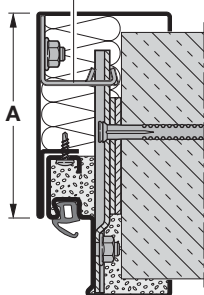
max. T90/
EI₂90



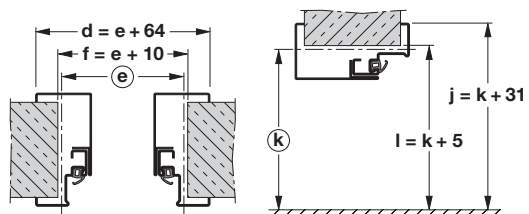
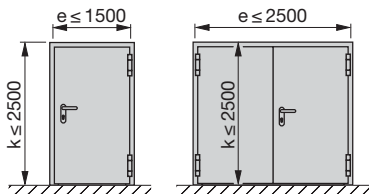
A > 94

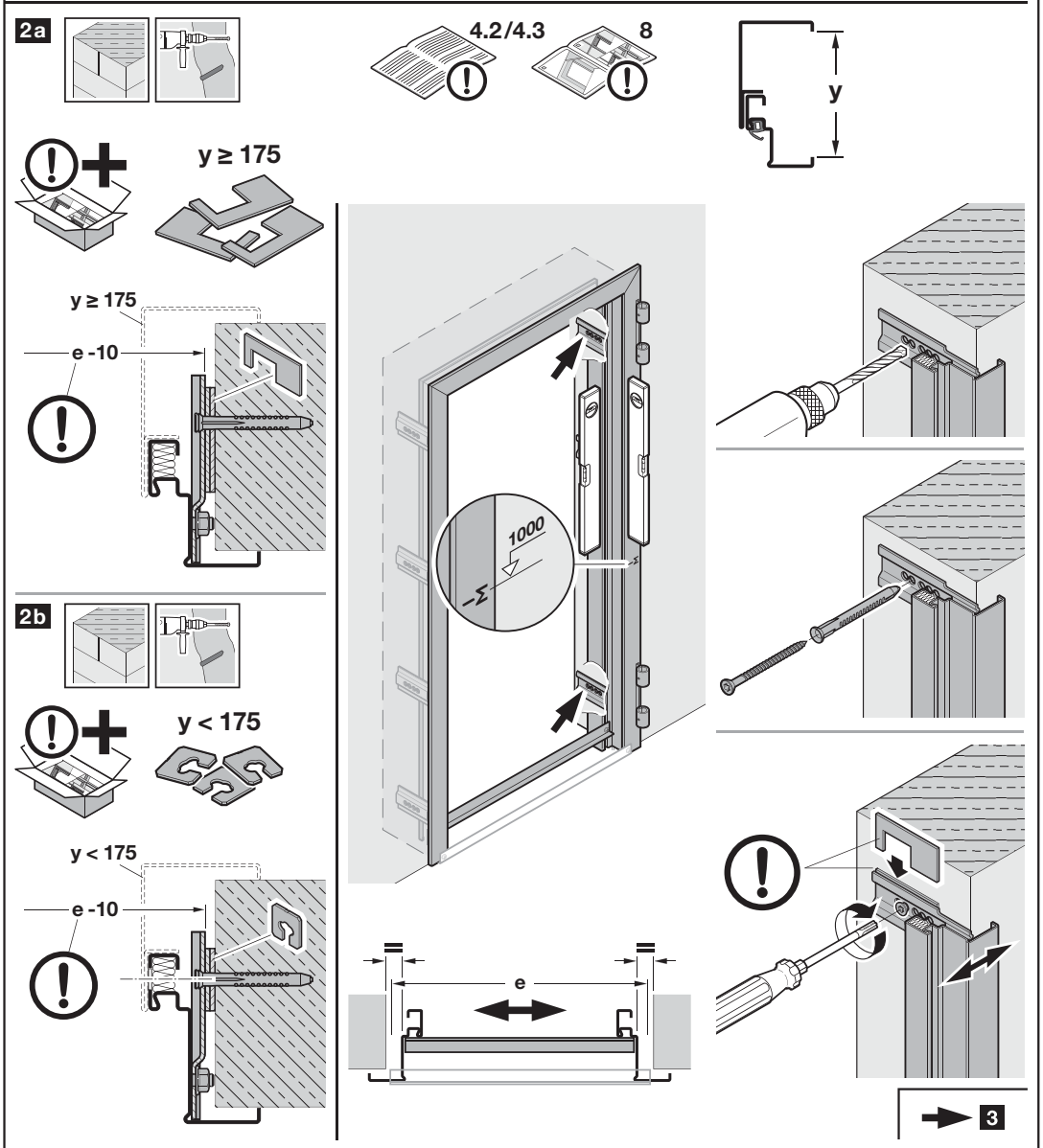
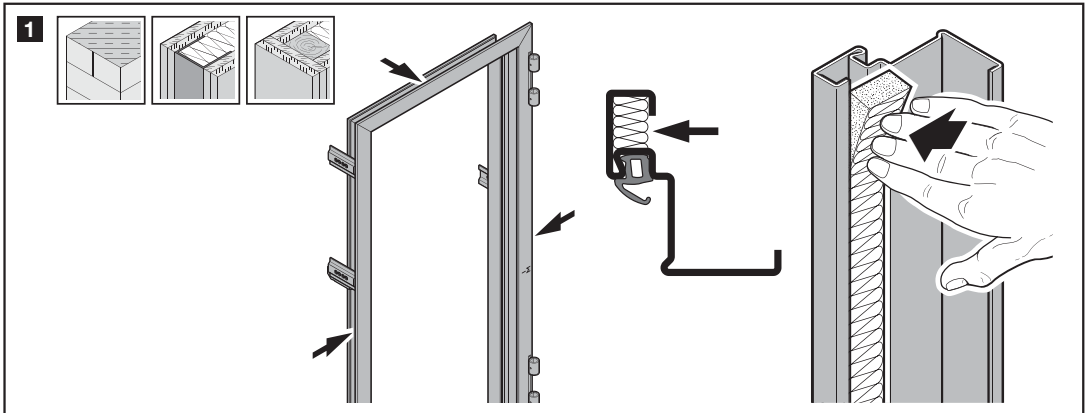


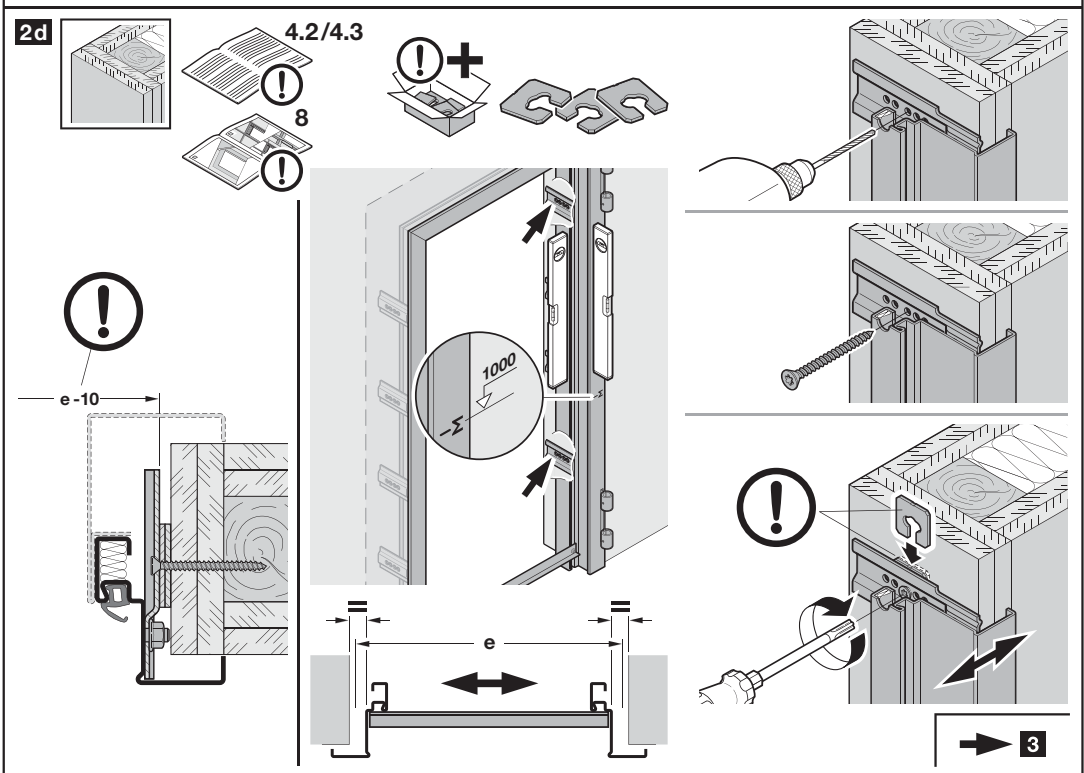
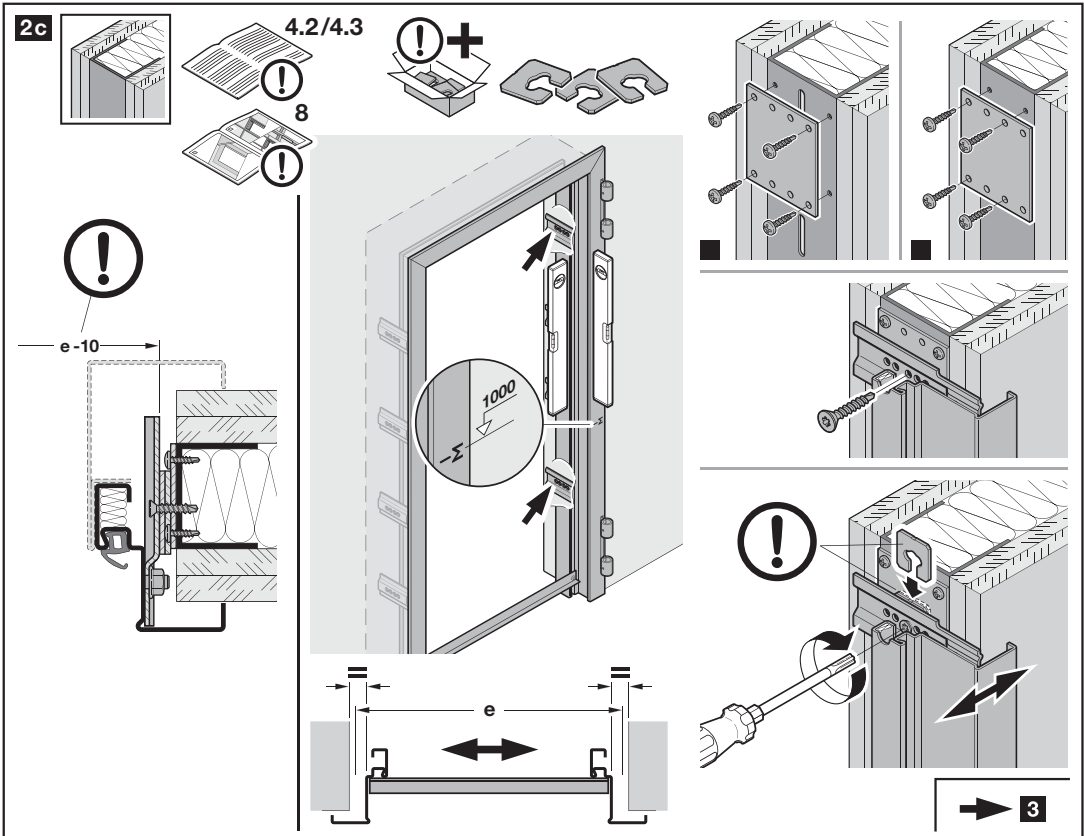
A > 94



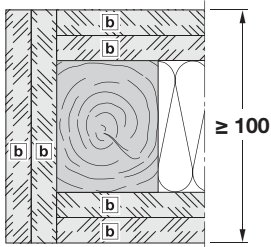
➔ 2a 2b



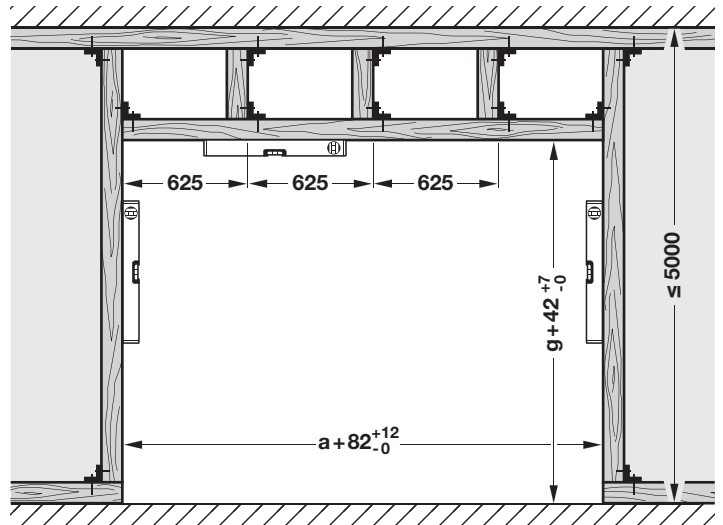




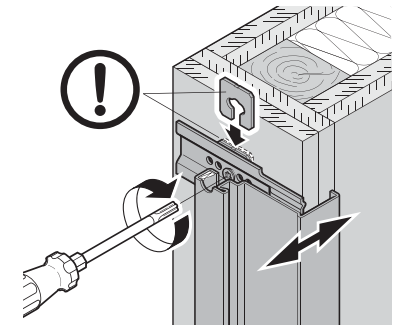
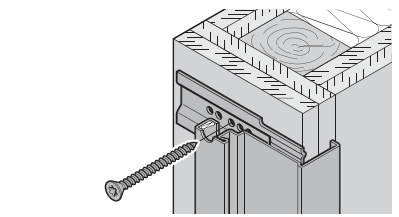
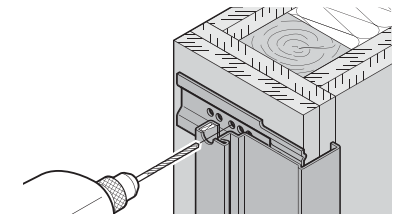
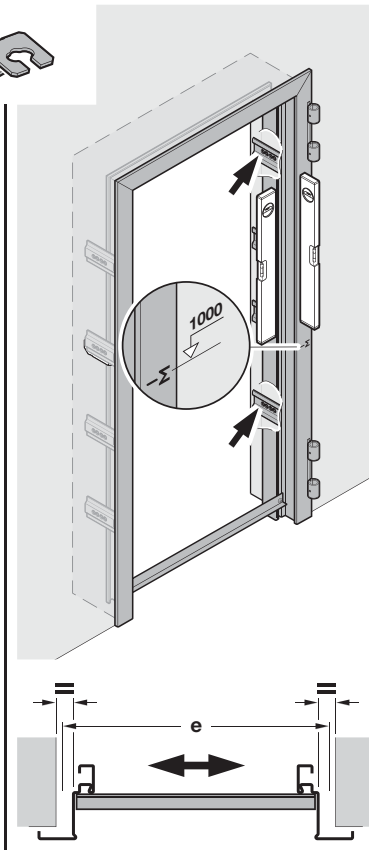
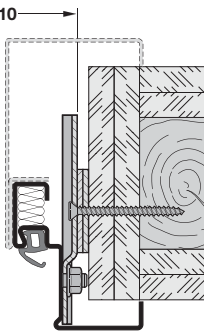
2e



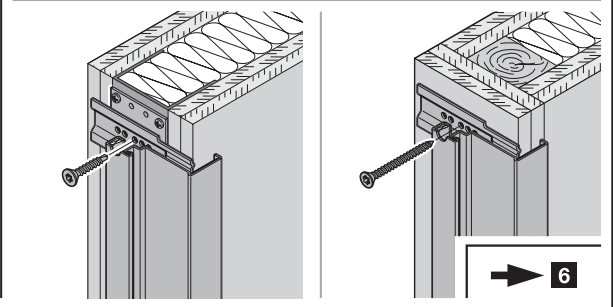
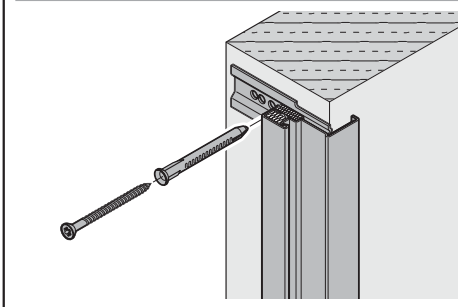
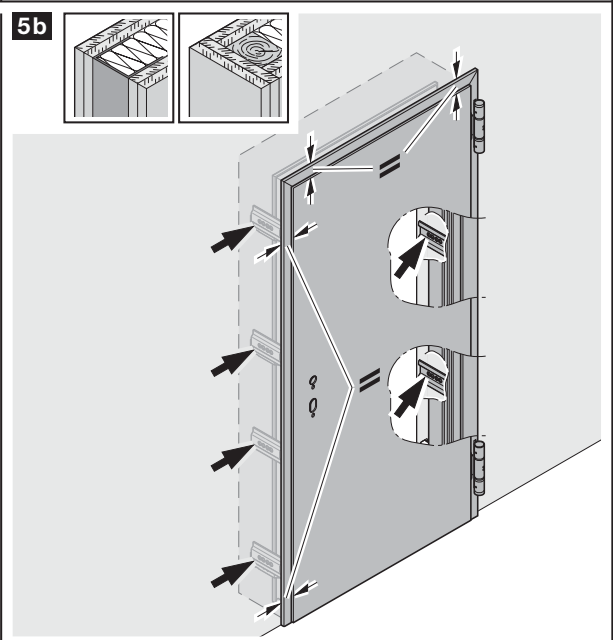
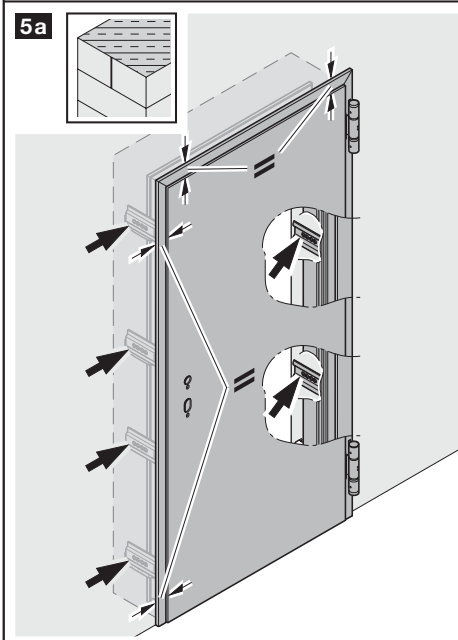
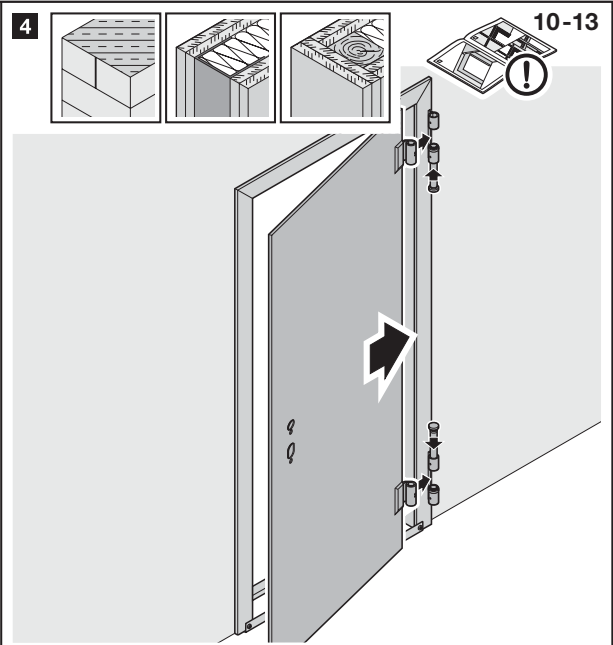
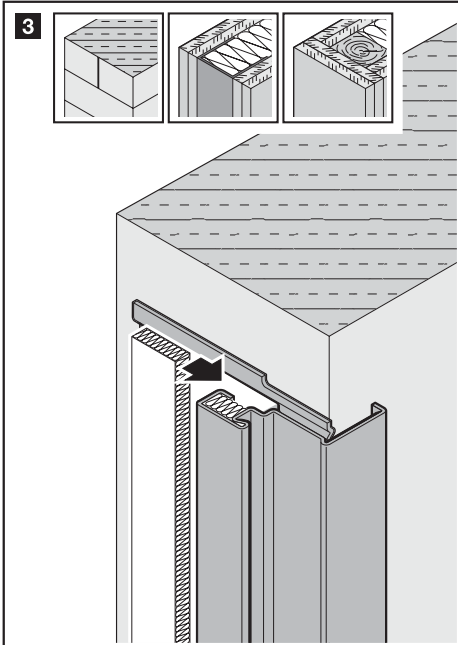
b A-12,5-EN 520

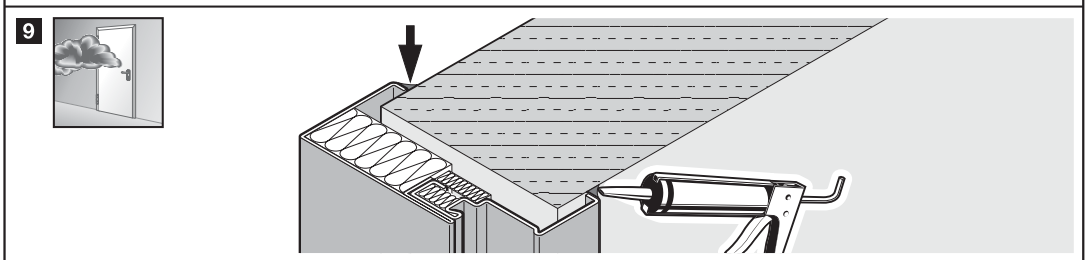
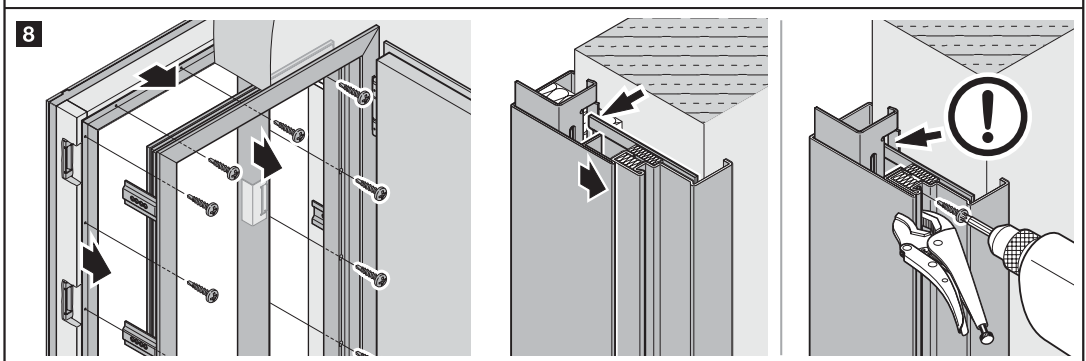
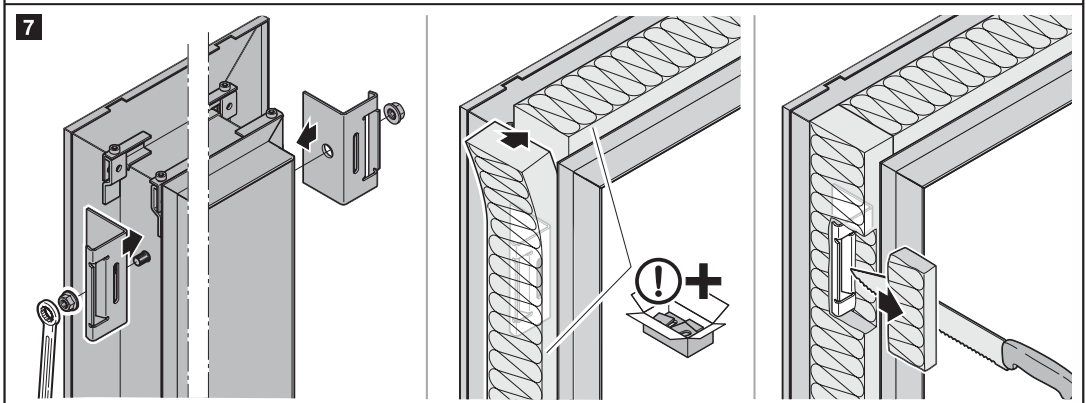
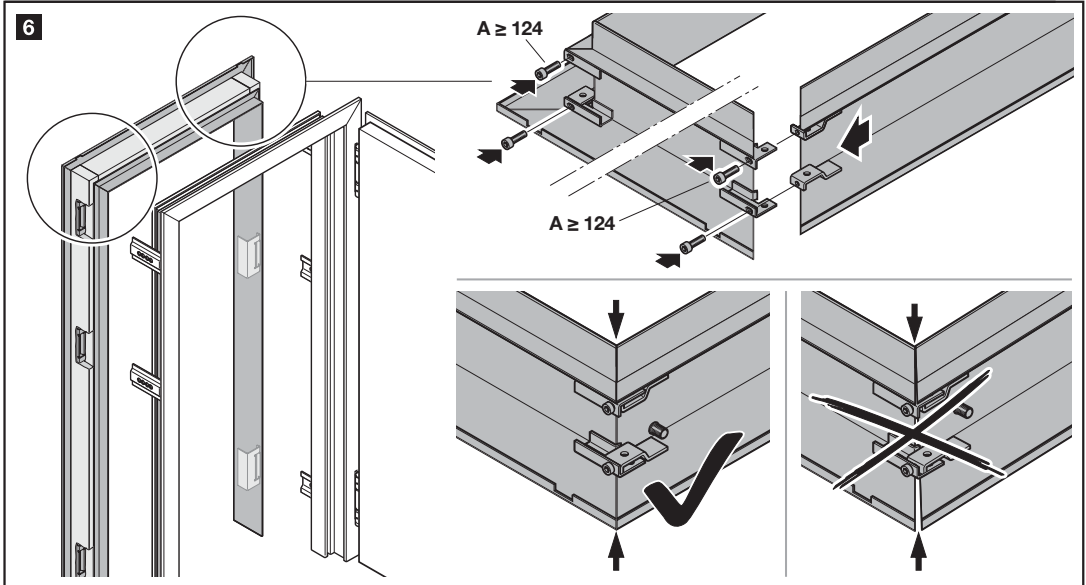


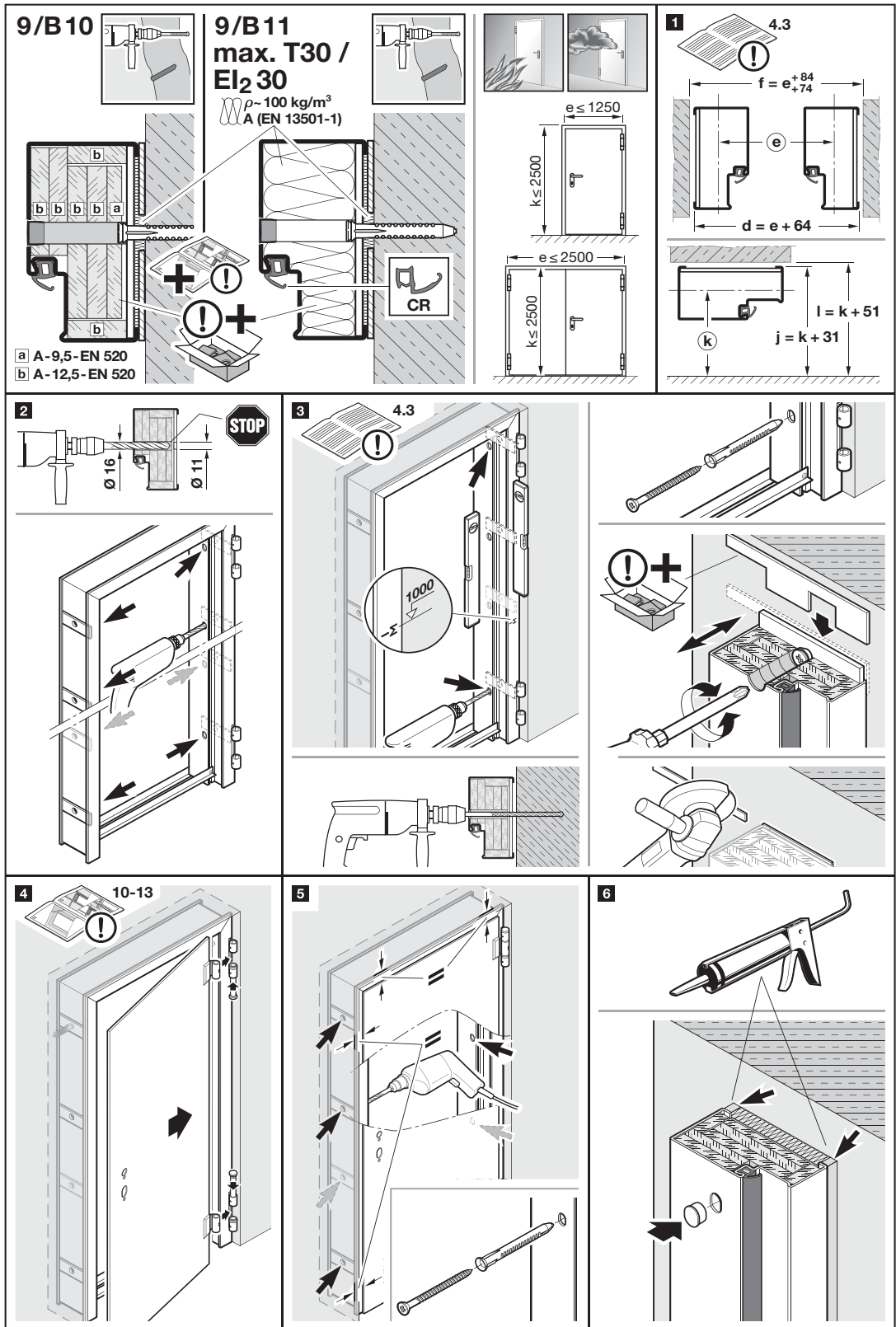
e-10



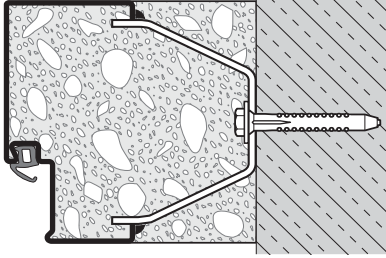
➔ 3



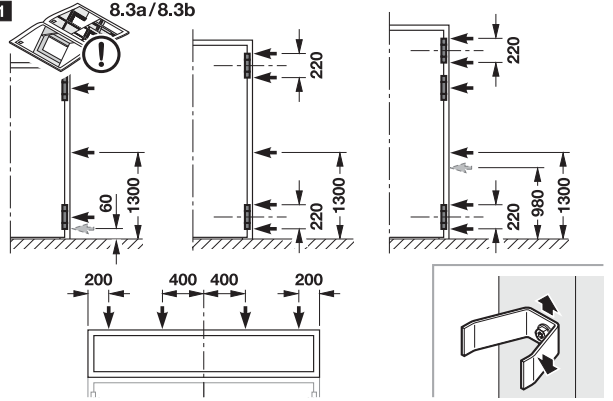




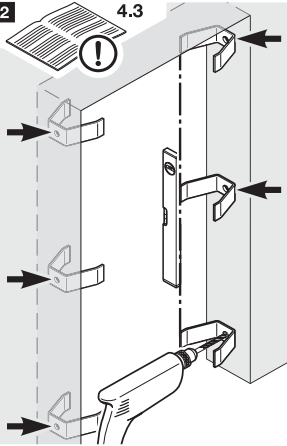
9/B12



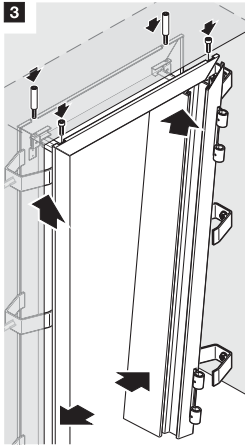
1 8.3a/8.3b



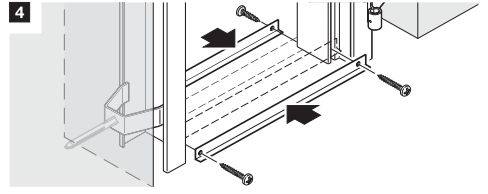
2 4.3



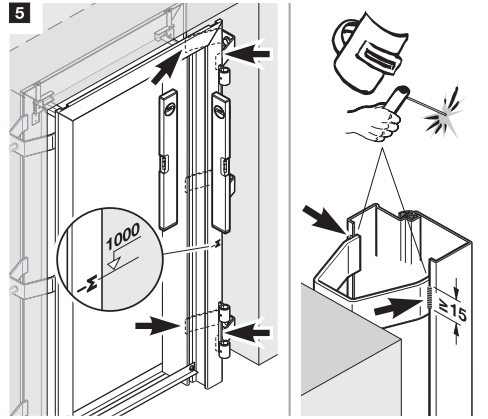
3



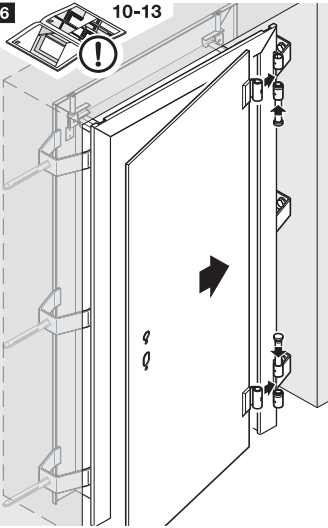
4



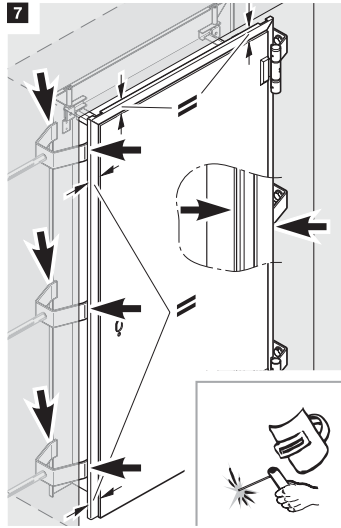
5



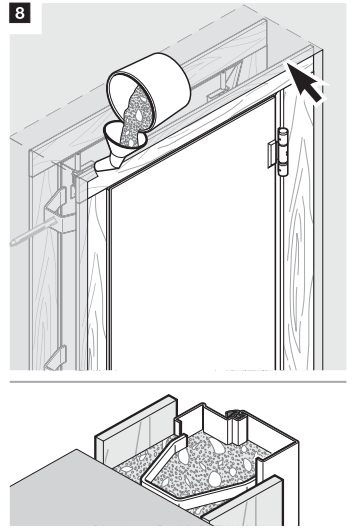
6 10-13



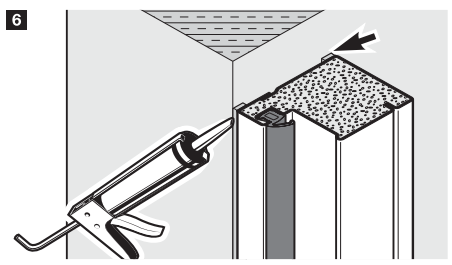
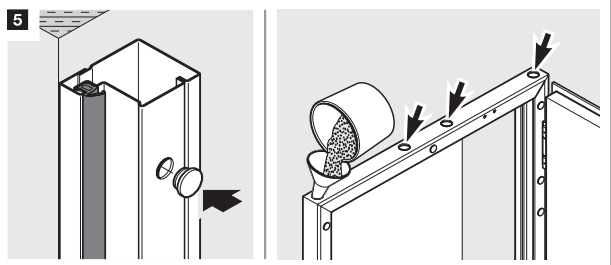
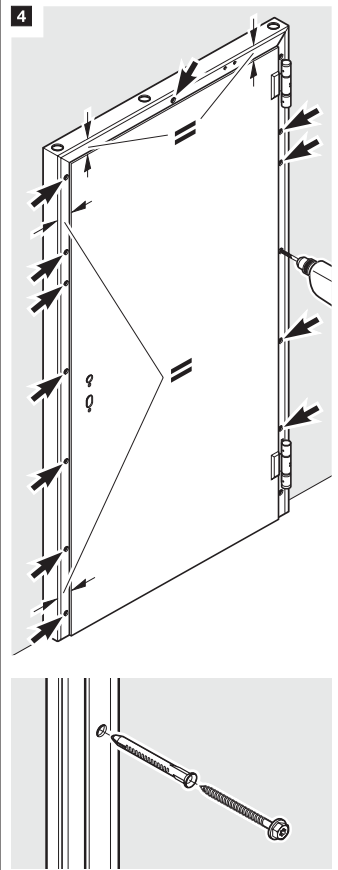
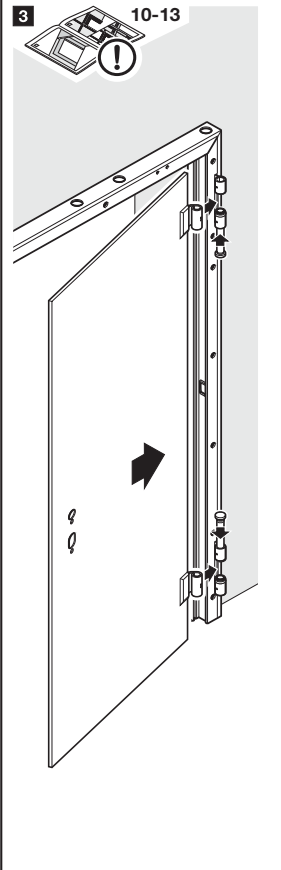
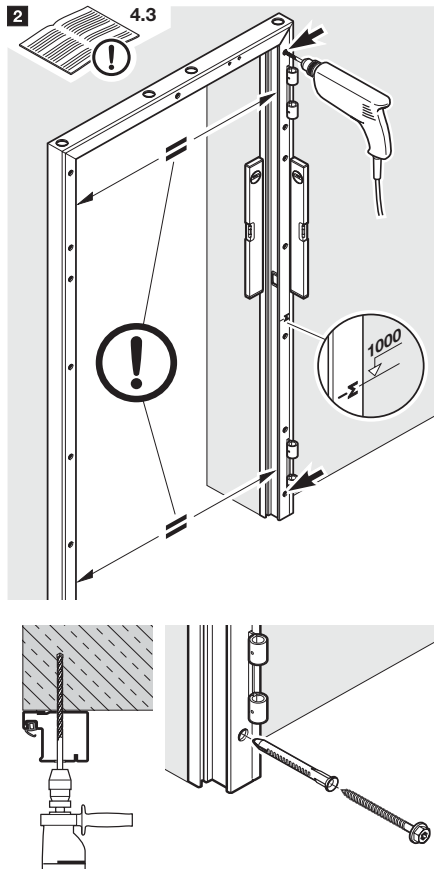
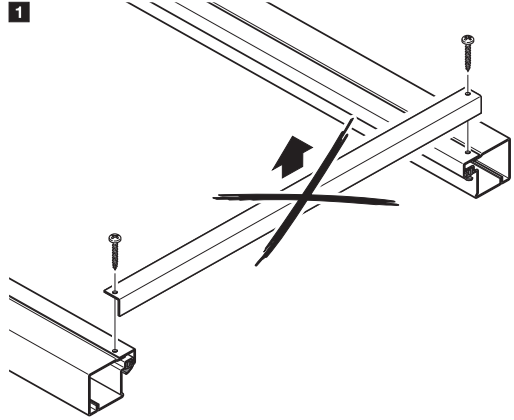
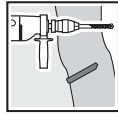
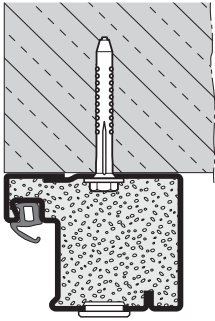
7

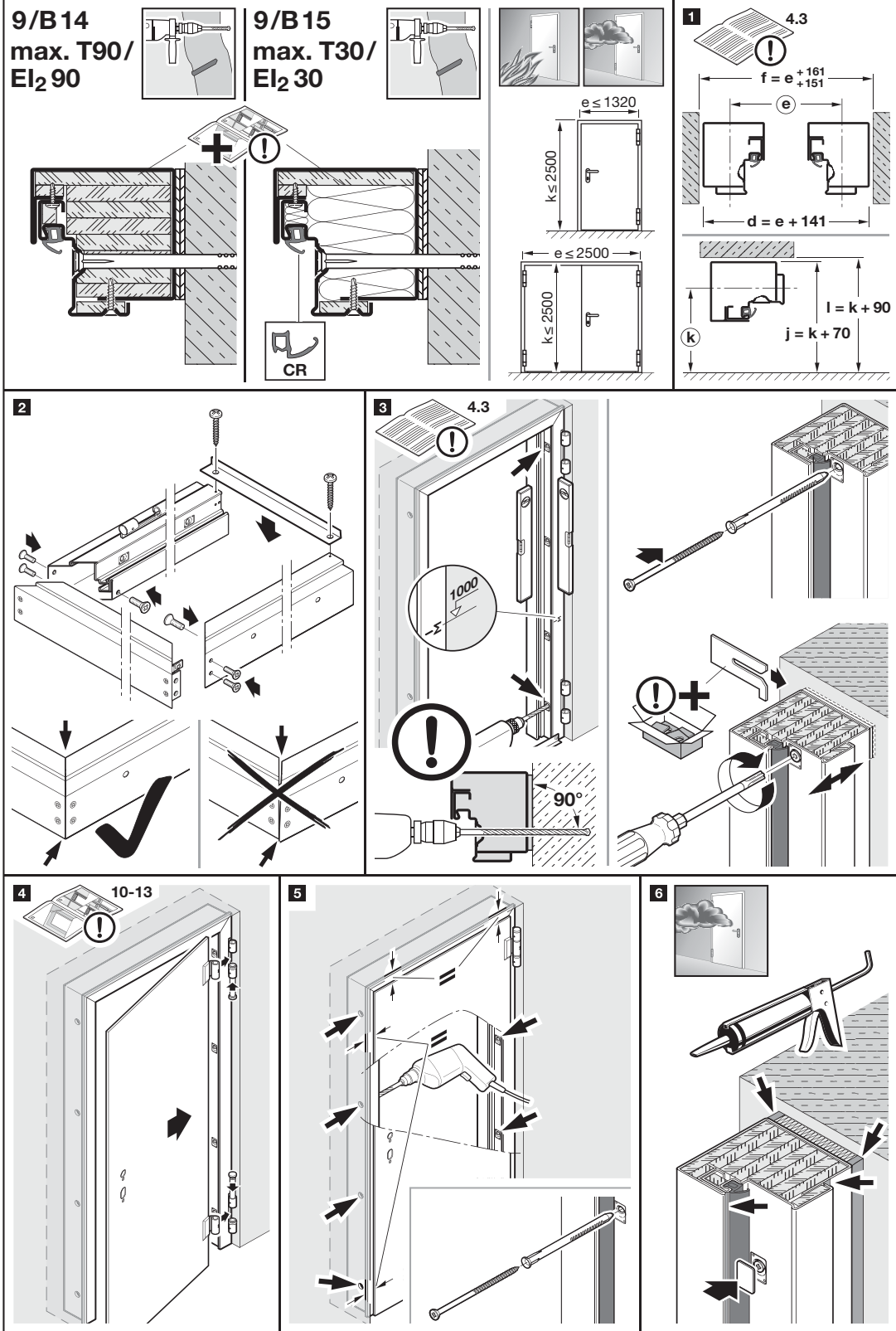


8



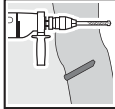
9/B13
max. T30 / EI₂30



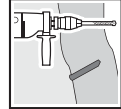


9/C1

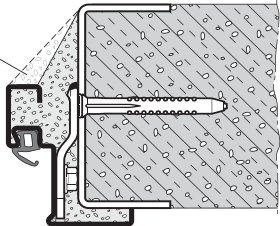
~~T90-2 / E1290-2~~



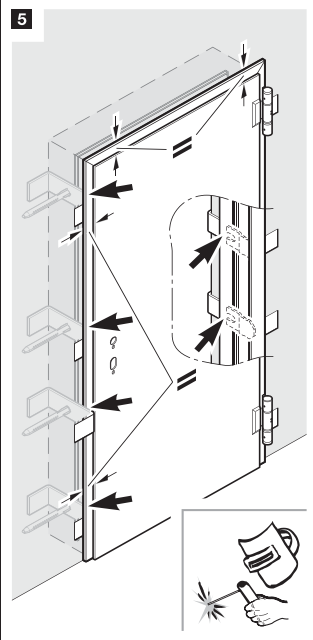
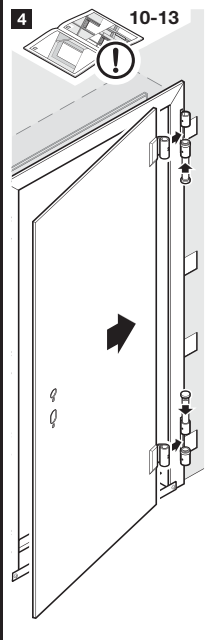
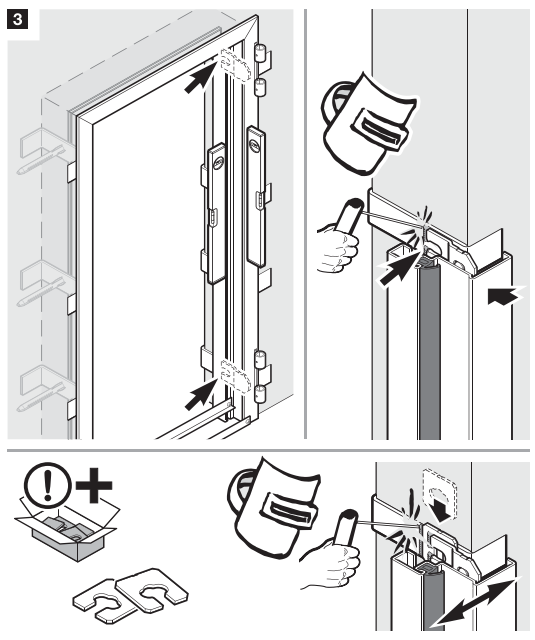
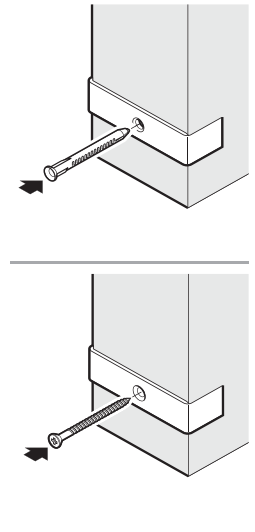
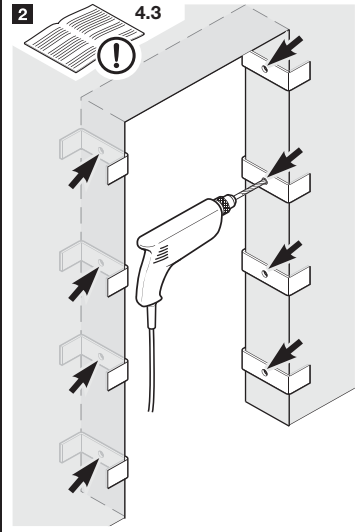
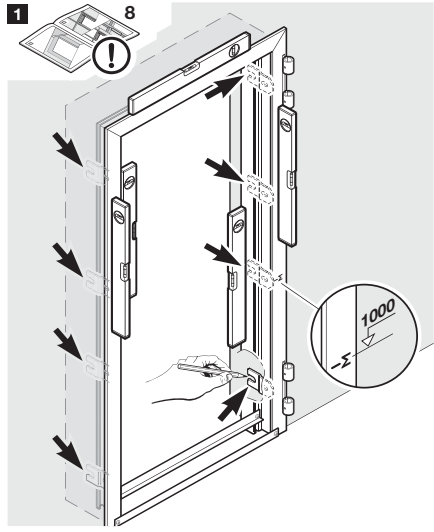
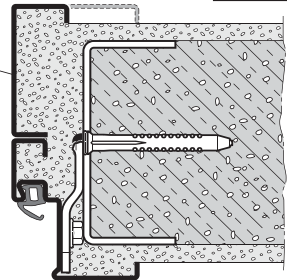
9/C2



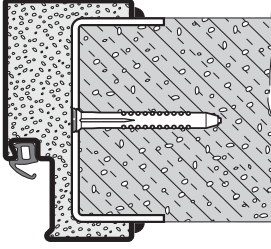
! HRUS 60



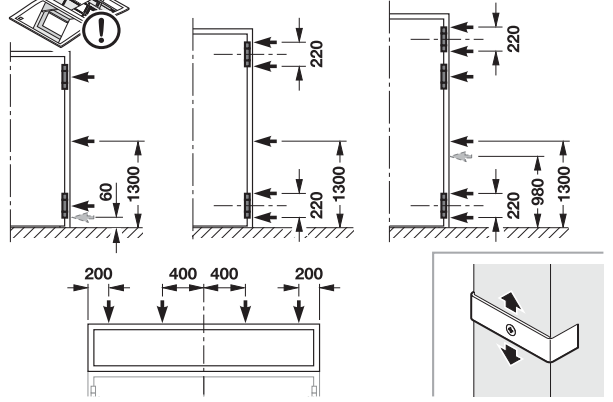
! +



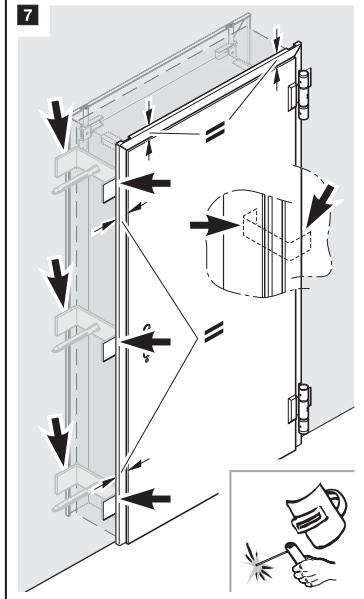
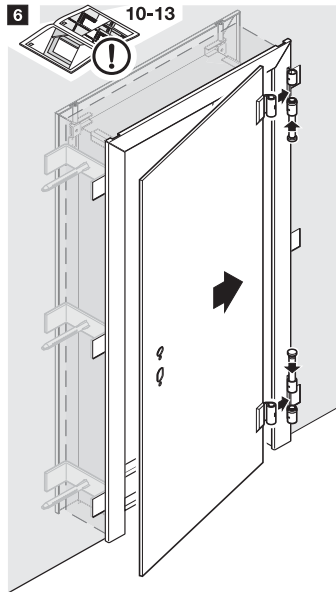
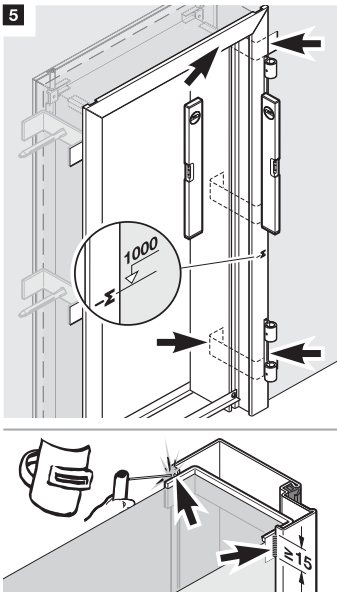
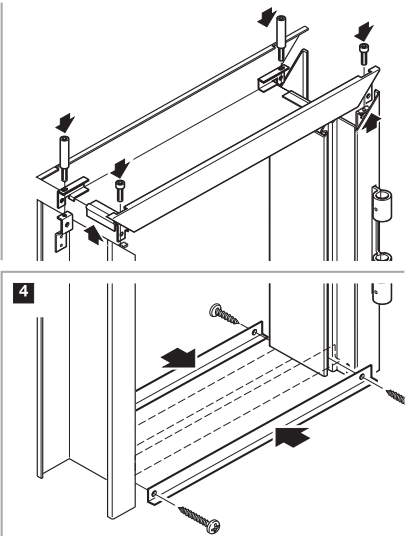
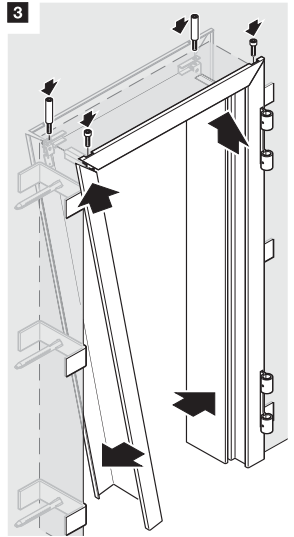
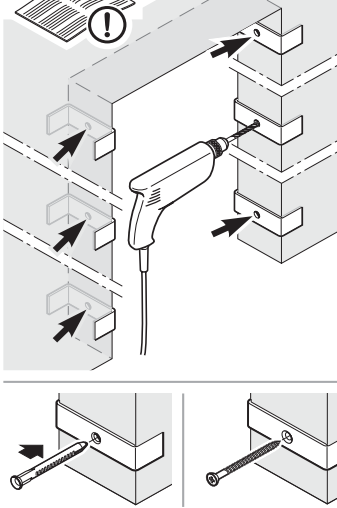
9/C3



1 8.3a/8.3b

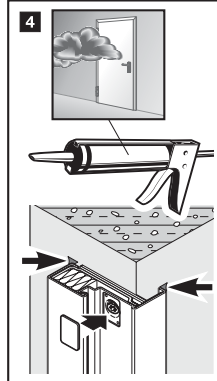
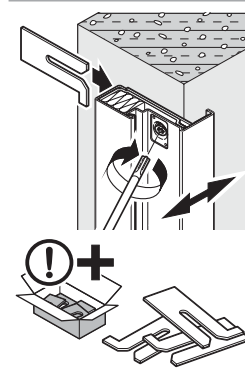
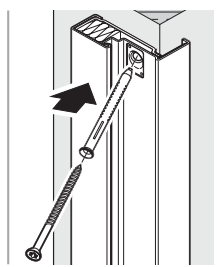
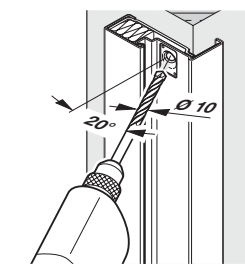
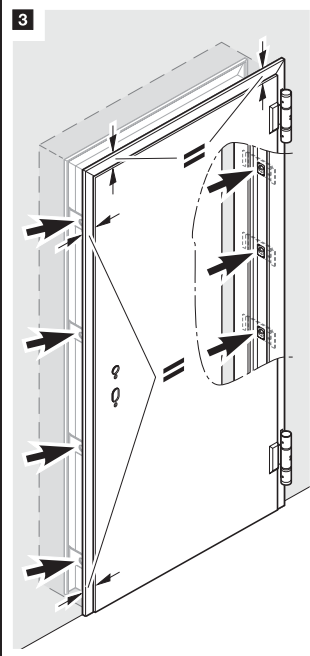
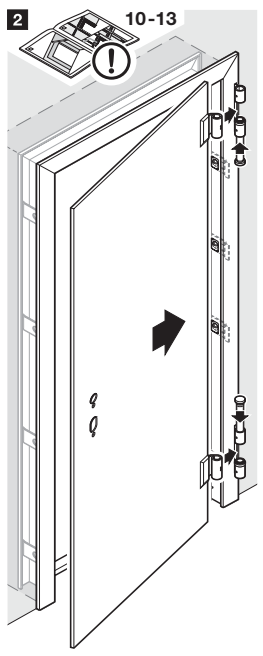
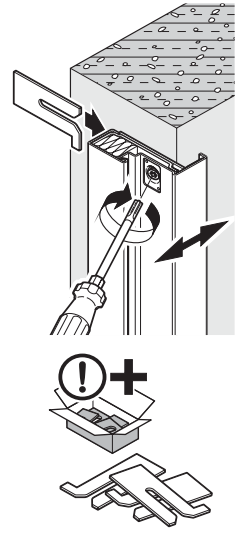
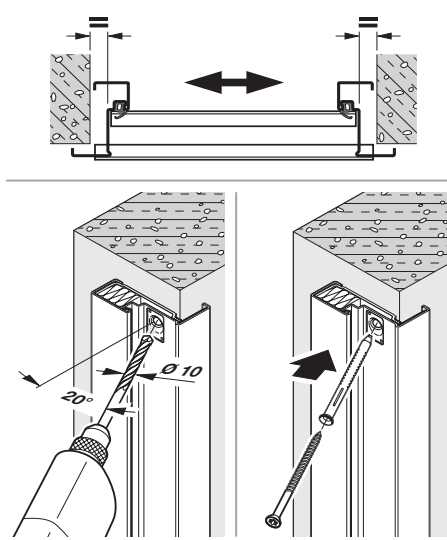
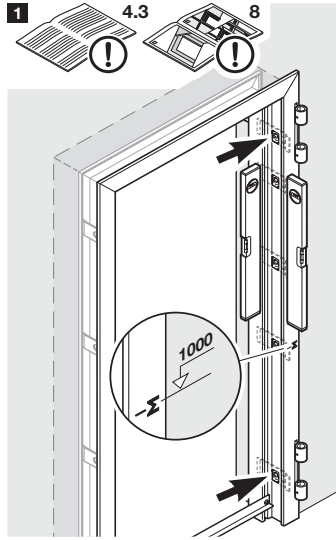
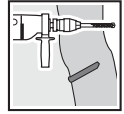
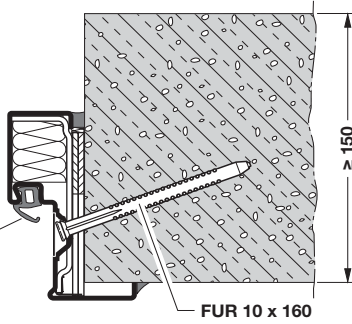


2 4.3



9/C4
max. T30 /
EI₂ 30

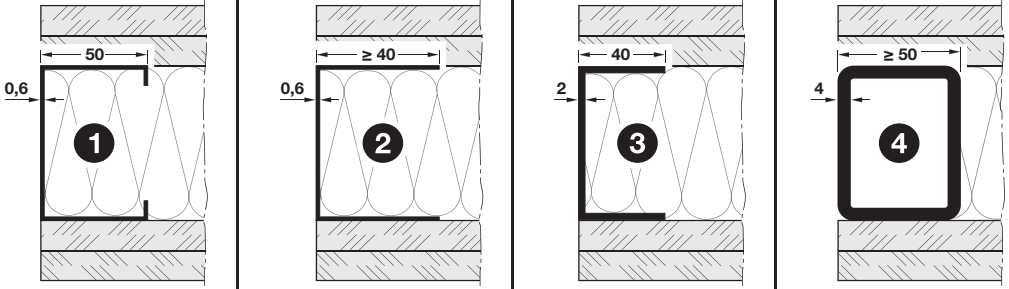
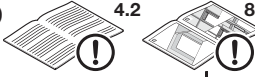
~~H30~~
~~H30B~~



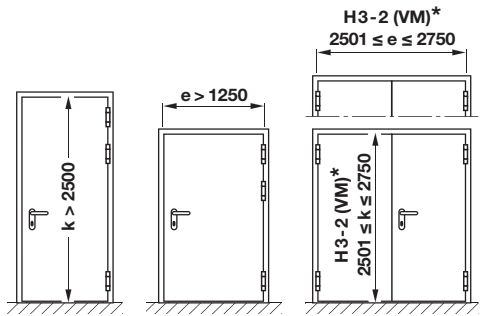
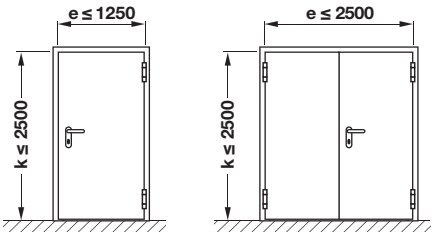
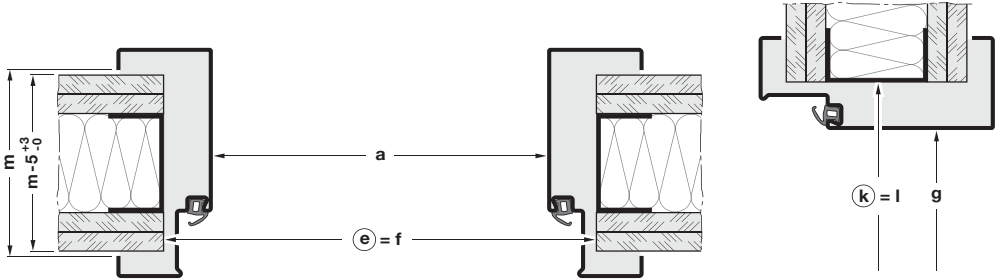
9/D

4.2

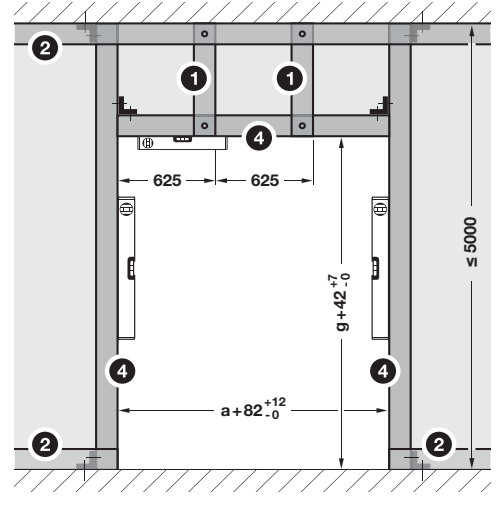
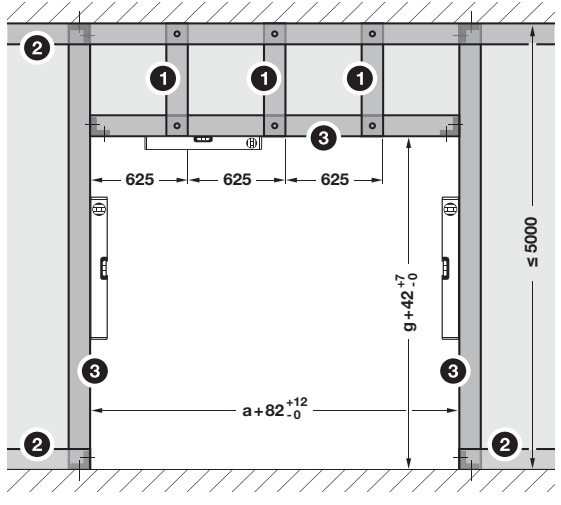
8.10/8.11



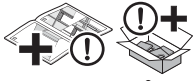
www.felko-systeme.de/teleskopstuetzen.php



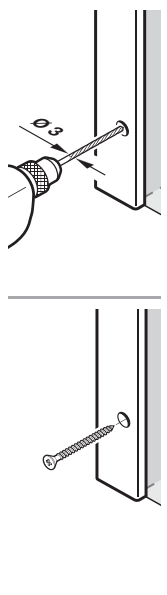
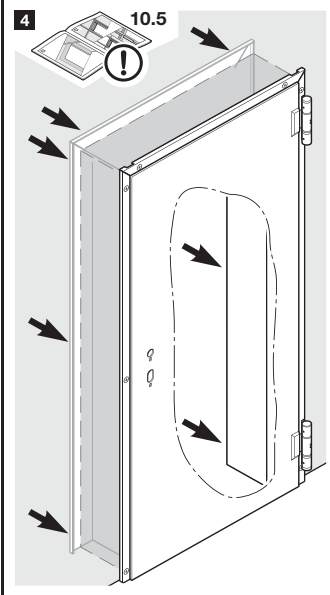
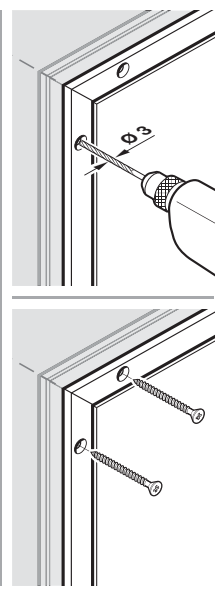
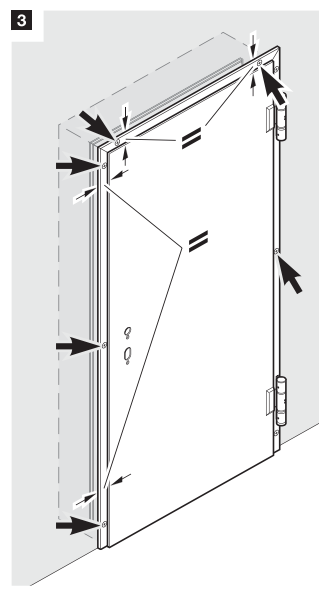
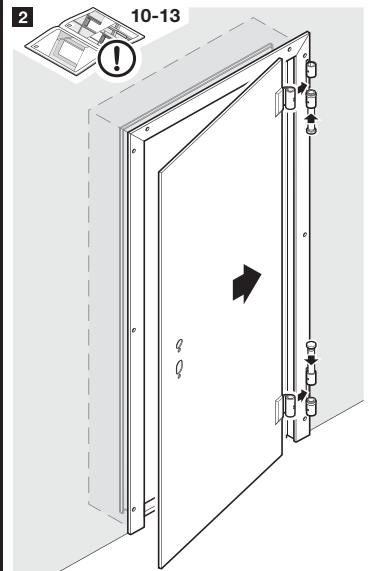
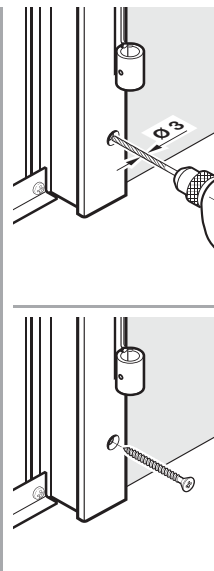
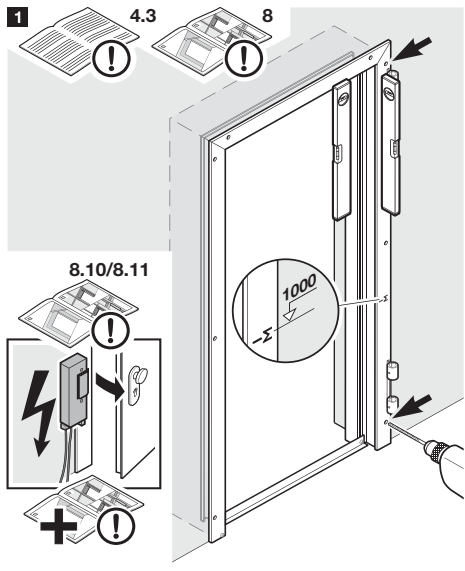
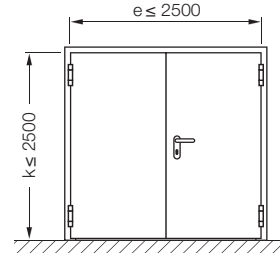
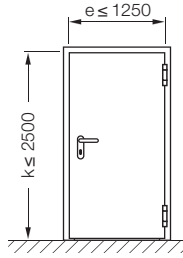
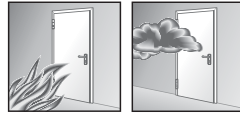
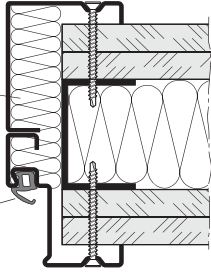
*www.felko-systeme.de/teleskopstuetzen.php

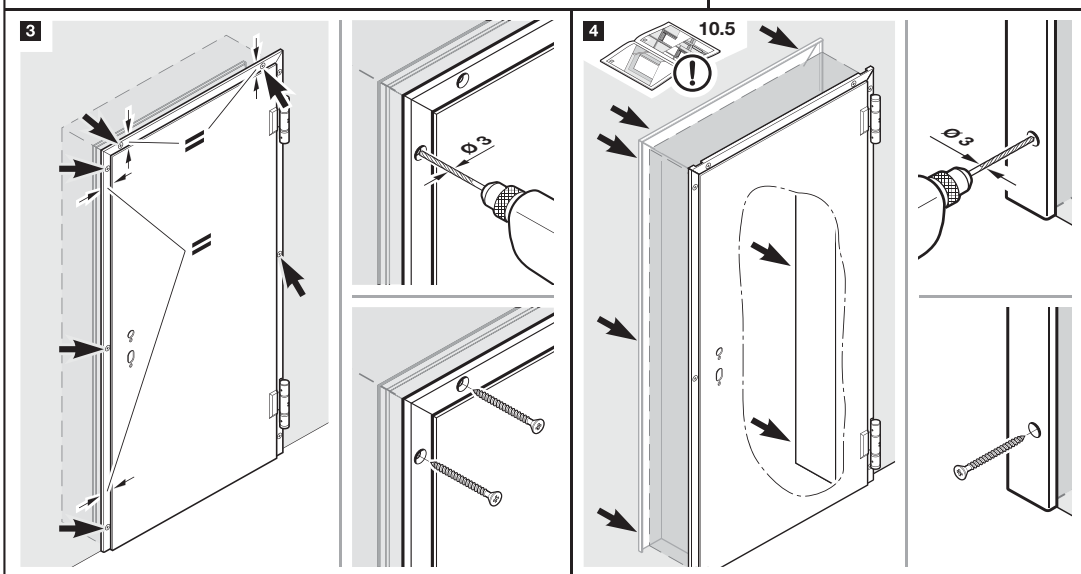
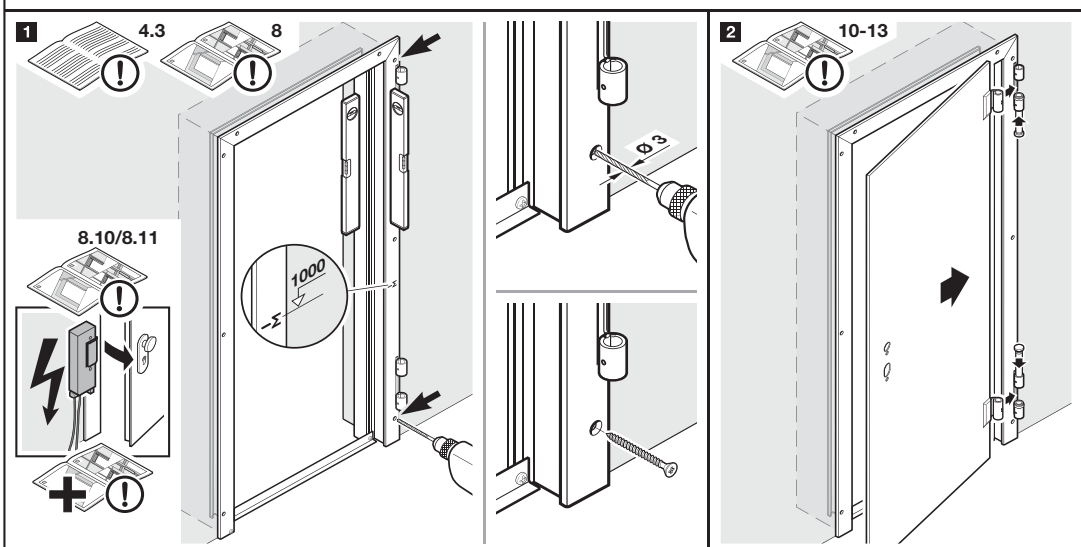
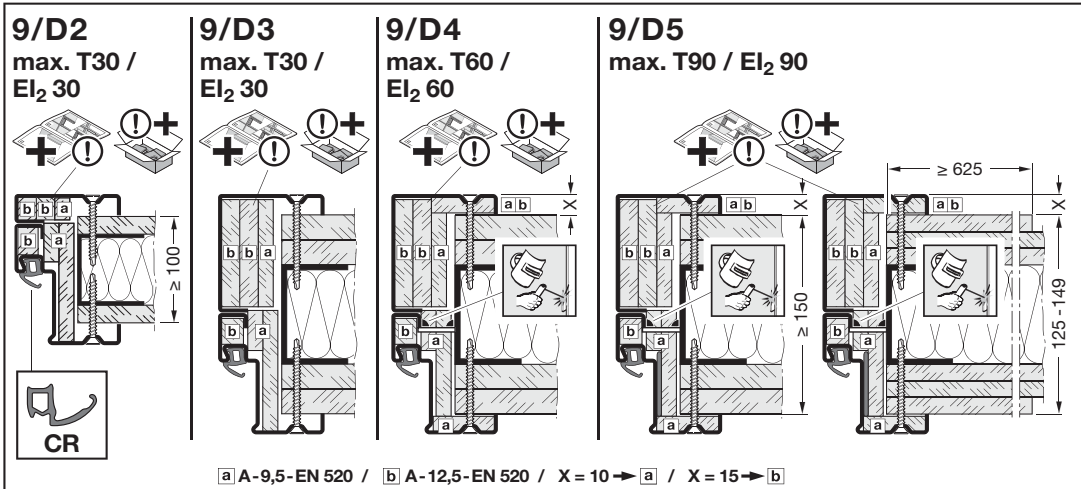


9/D1
max. T30 / EI₂30



$\rho \sim 100 \text{ kg/m}^3$
 A (EN 13501-1)

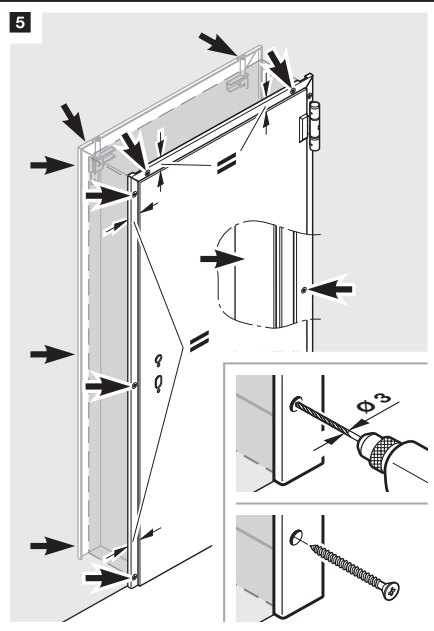
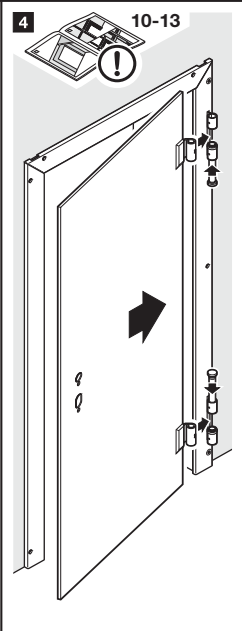
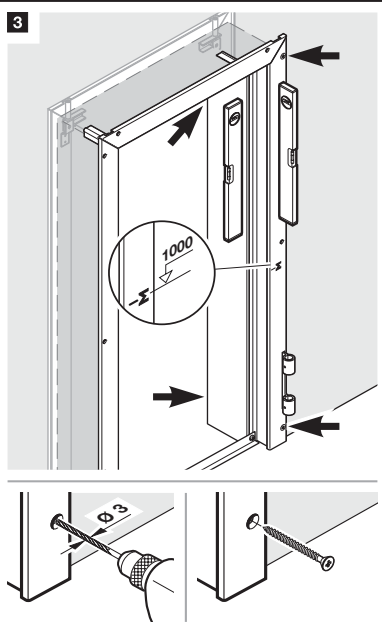
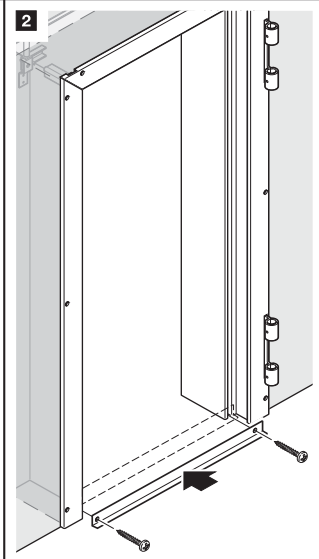
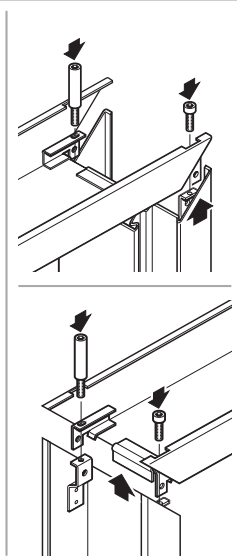
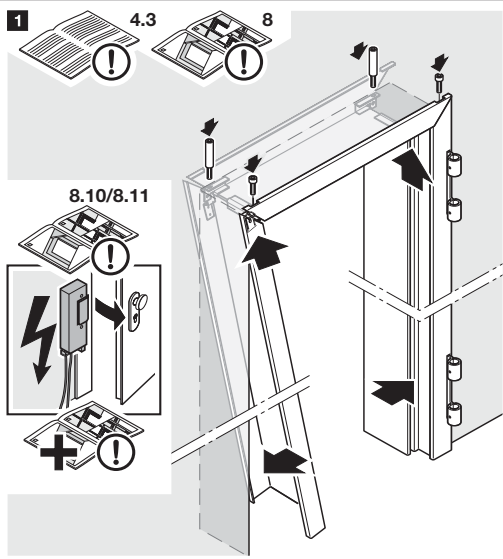
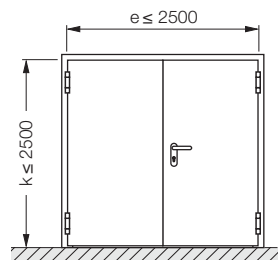
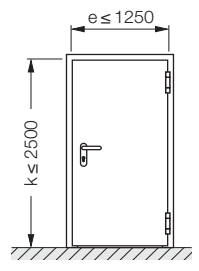
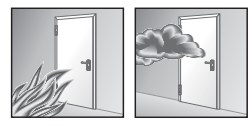
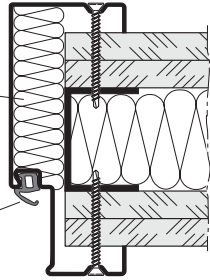




9/D6
max. T30 / EI₂30

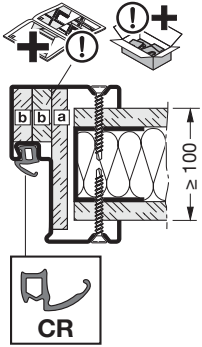


$\rho \sim 100 \text{ kg/m}^3$
 A (EN 13501-1)



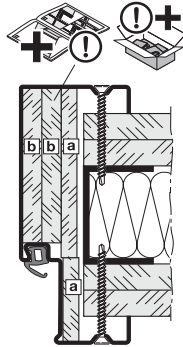
9/D7

max. T30 /
EI₂ 30



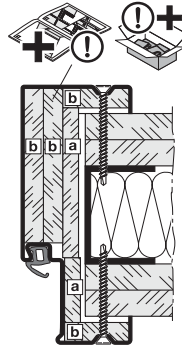
9/D8

max. T30 /
EI₂ 30



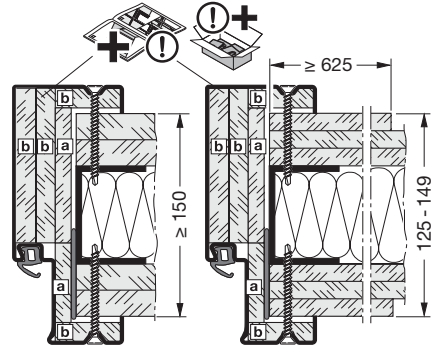
9/D9

max. T60 /
EI₂ 60

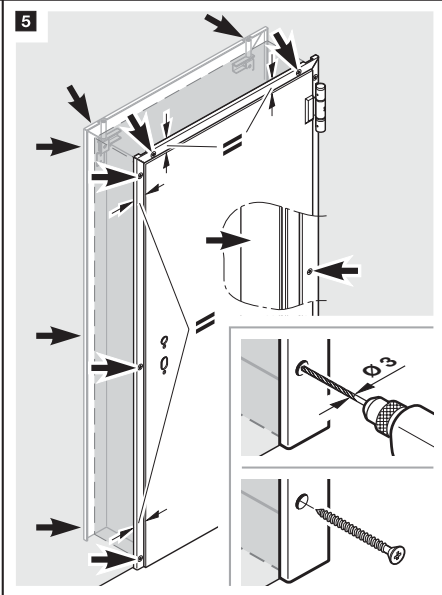
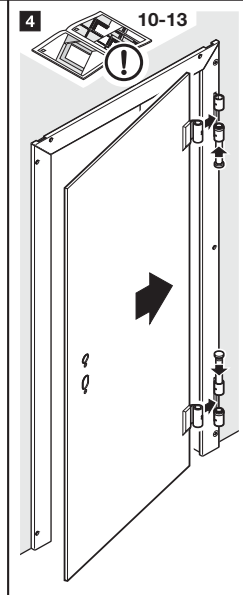
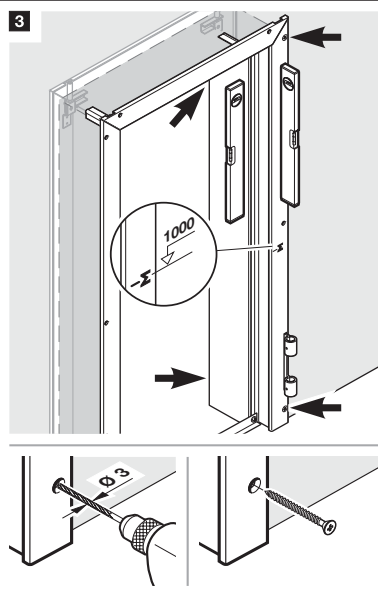
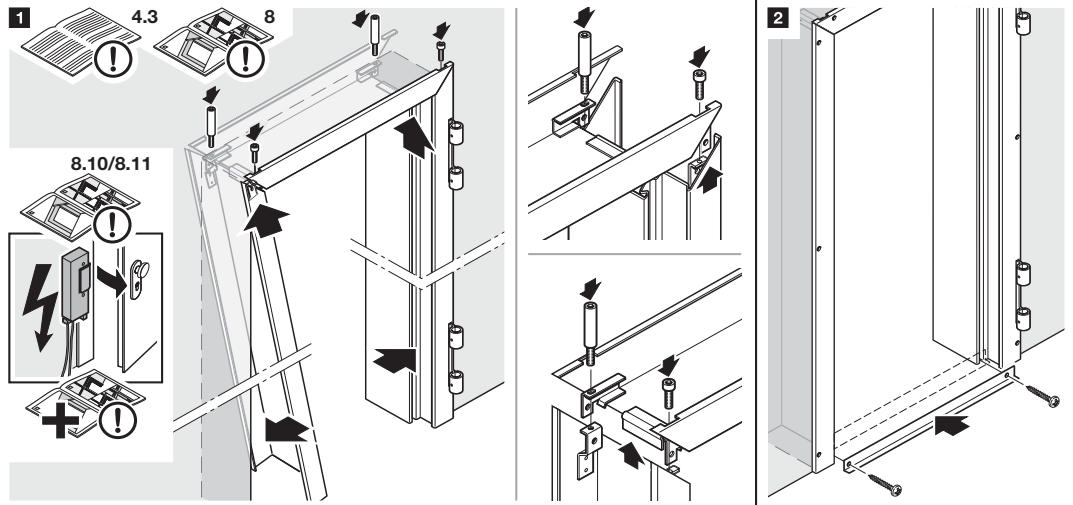


9/D10

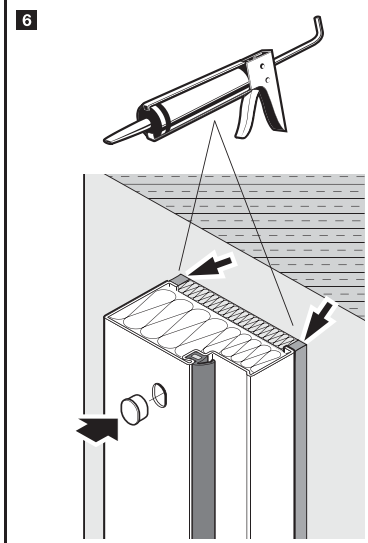
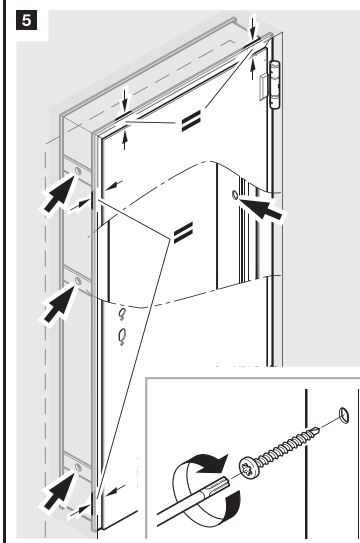
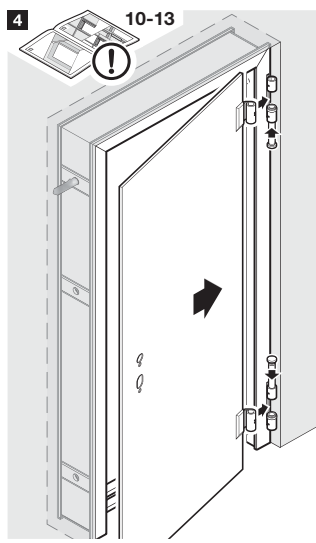
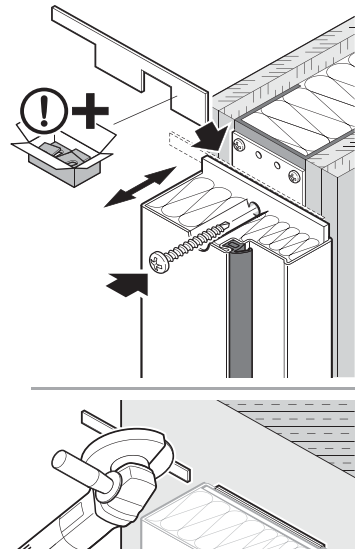
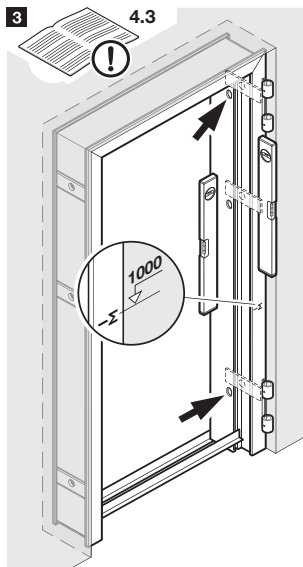
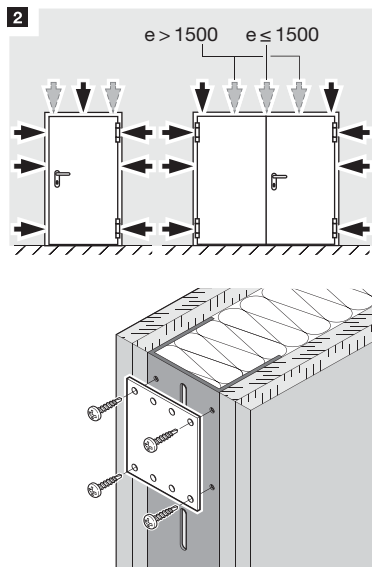
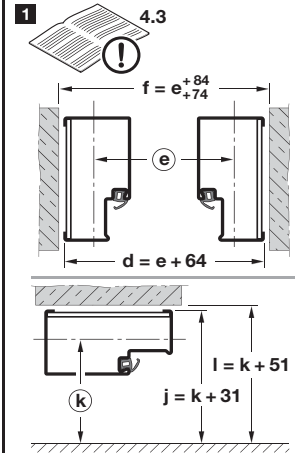
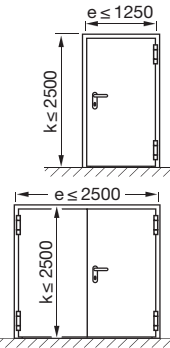
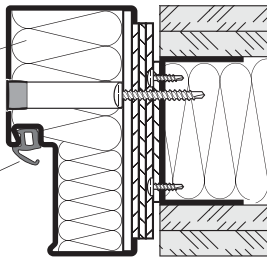
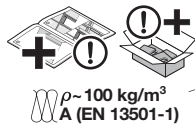
HF60D1/D2, max. T90 / EI₂ 90

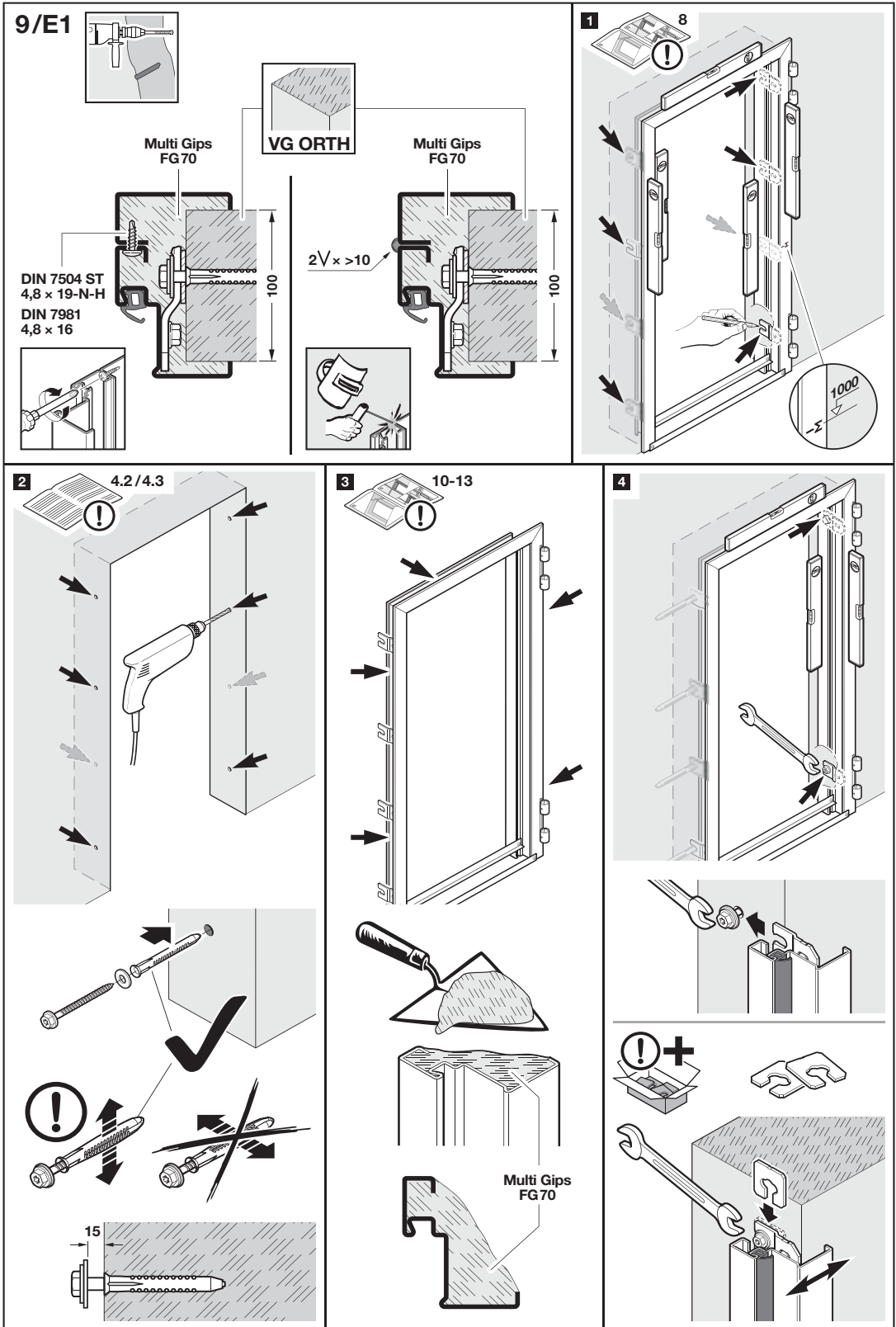


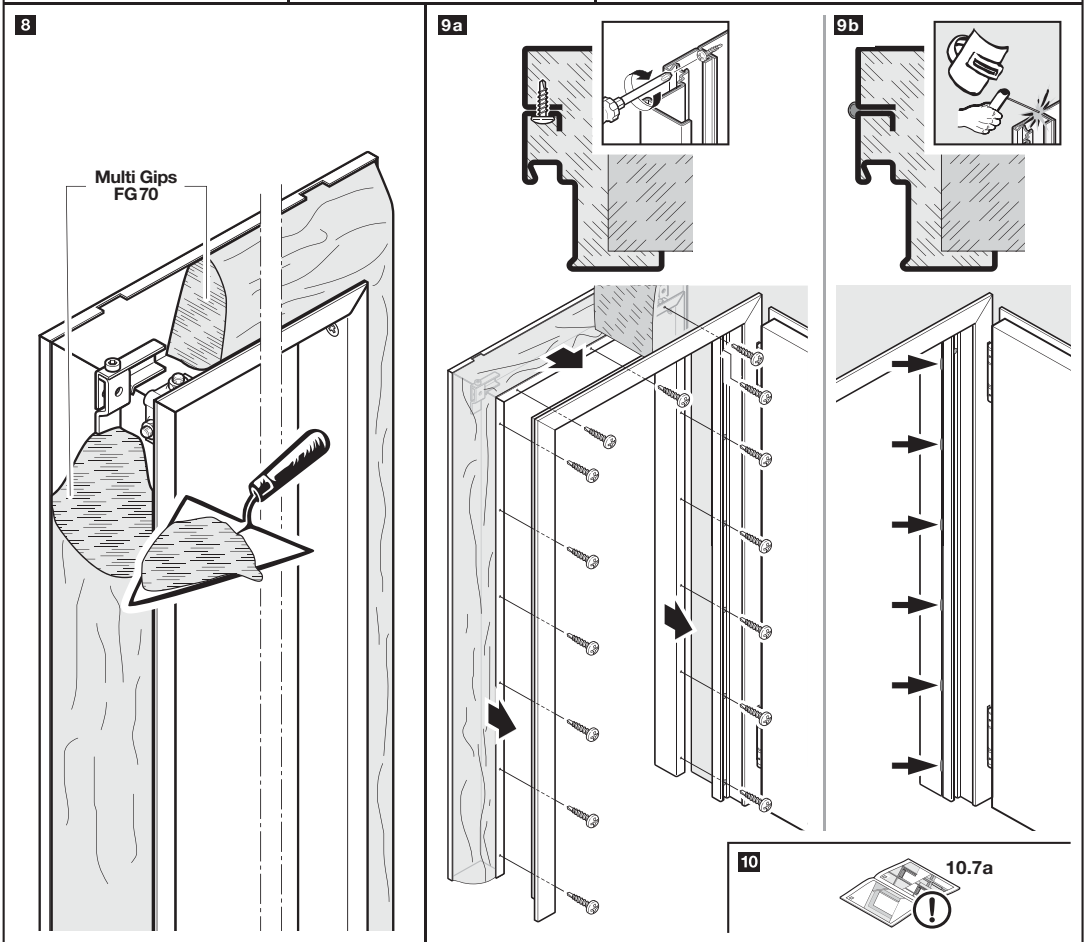
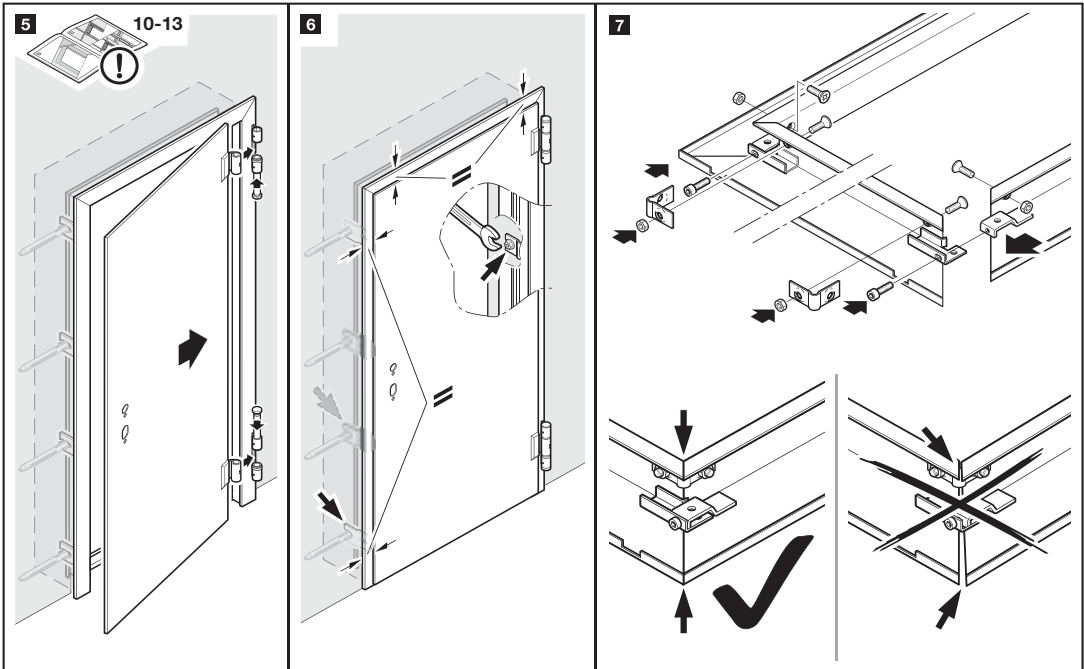
a A-9,5-EN 520 / b A-12,5-EN 520



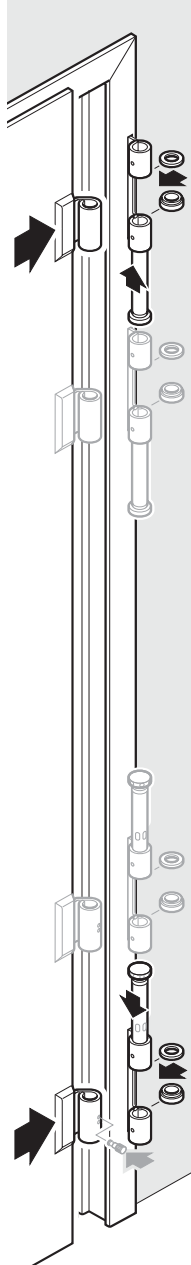
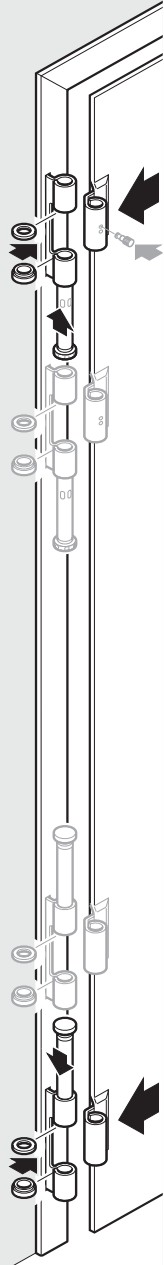
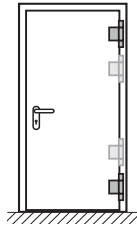
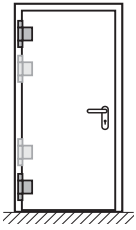
9/D11
max. T30 / EI₂30



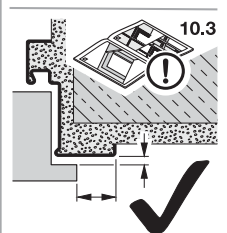
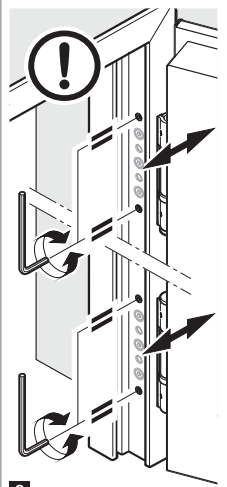
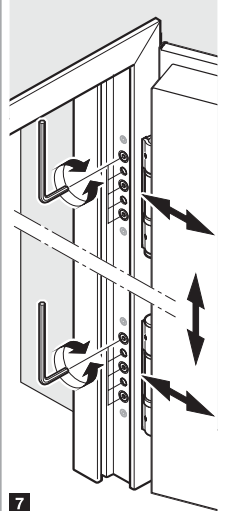
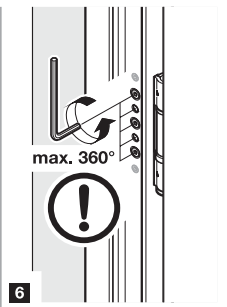
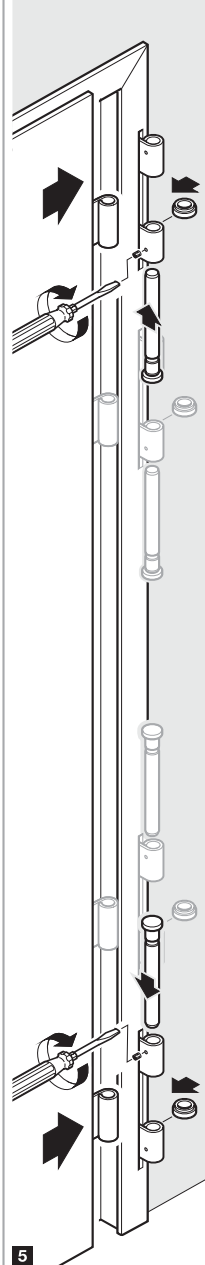
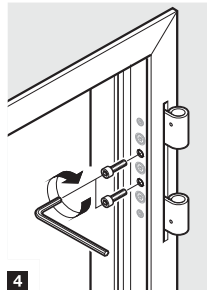
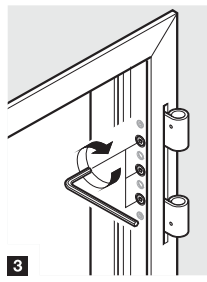
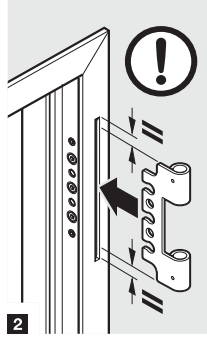
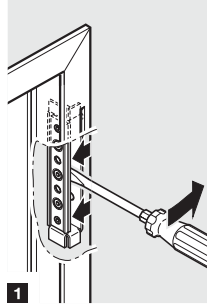
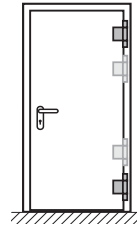




10.1a



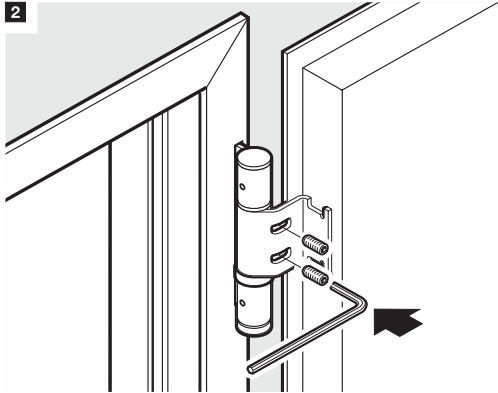
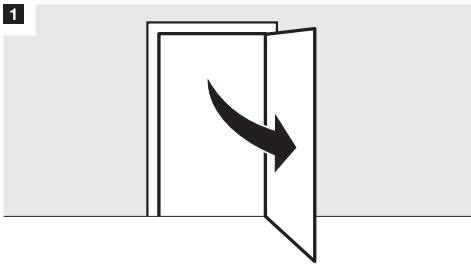
10.1b



10.2



2



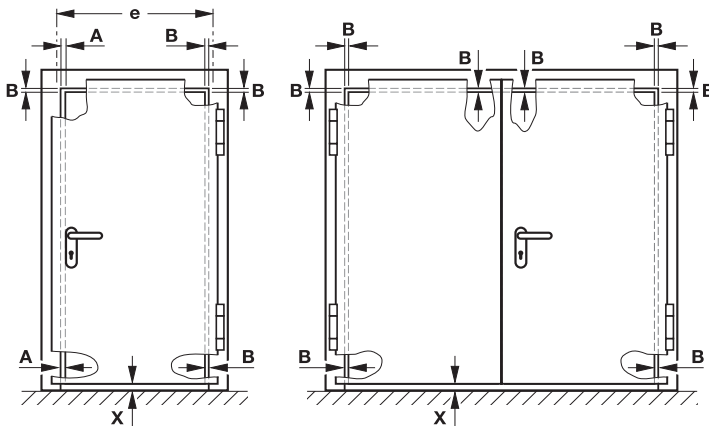
10.3



e	A
≤ 749	6 ⁺¹ ₋₂
750 - 874	6 ⁺¹ ₋₃
≥ 875	5 ⁺¹ ₋₂

B	C max. T30	C T60, T90, T120
4 ± 2	4 ± 2	10 ± 2

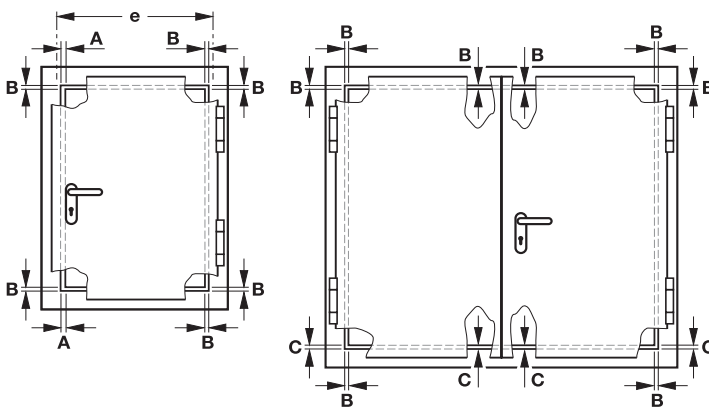
1



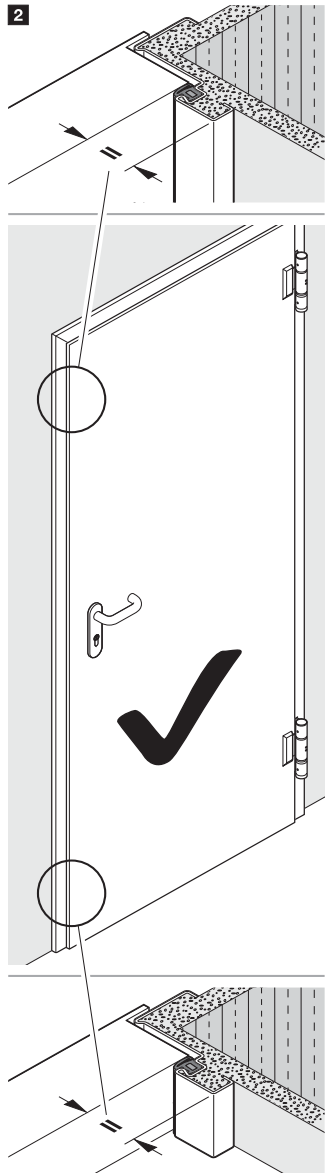
X = 10 ± 5

X = 10⁺²₋₅

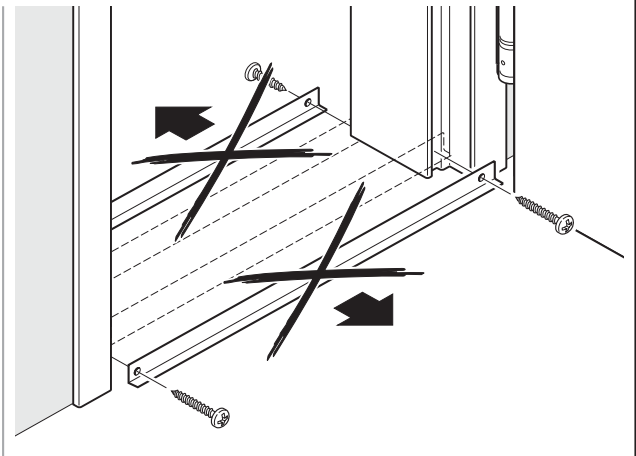
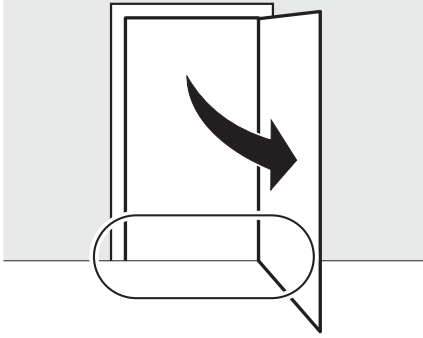
X = 10 - 5



2



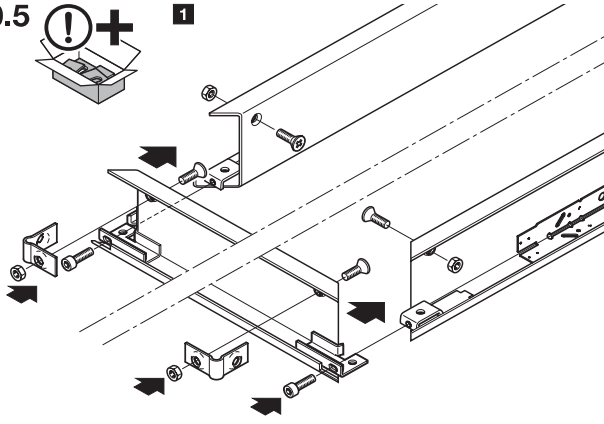
10.4



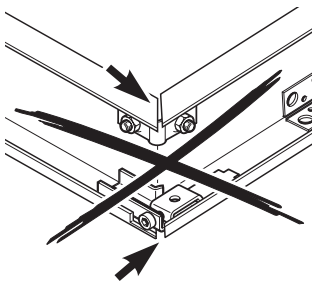
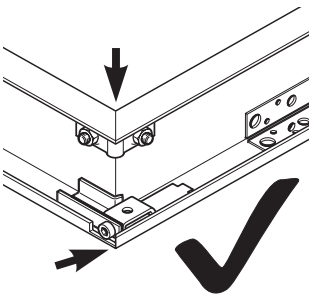
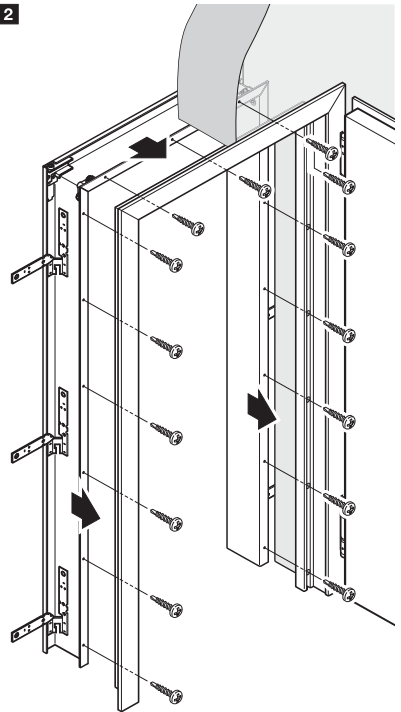
10.5



1

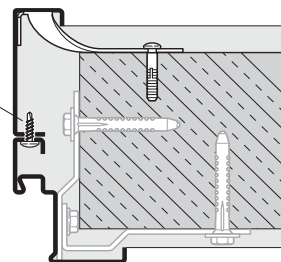
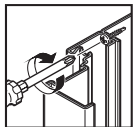


2



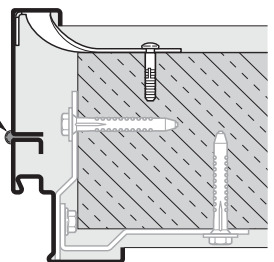
2a

DIN 7504 ST 4,8 x 19-N-H
DIN 7981 4,8 x 16



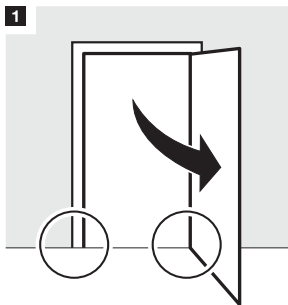
2b

$2\sqrt{x} > 10$



10.6

3.1/3.2

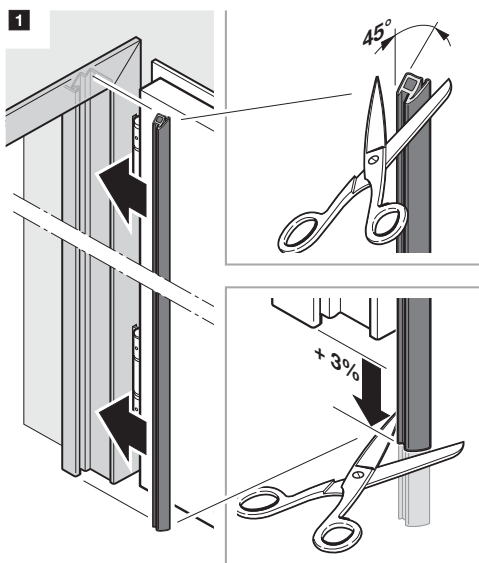
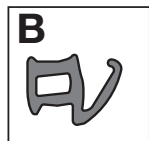


2

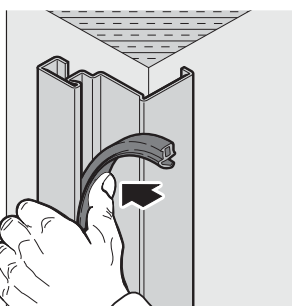


10.7a

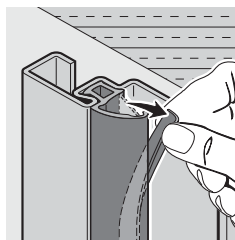
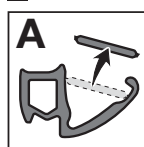
1



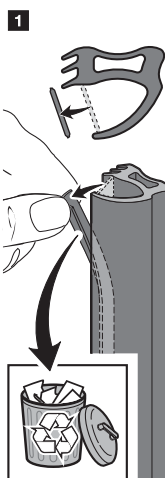
2



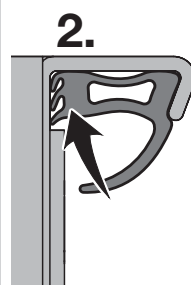
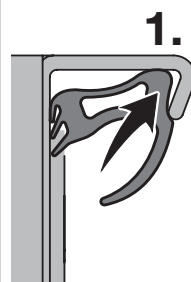
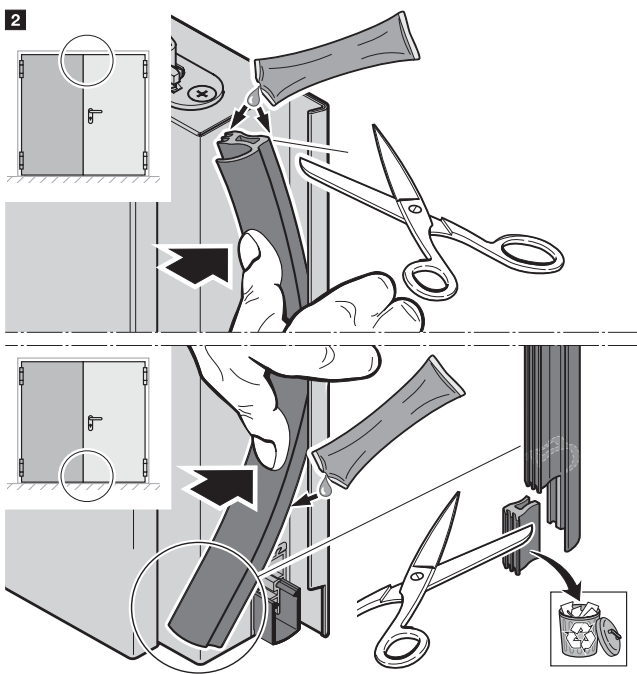
3



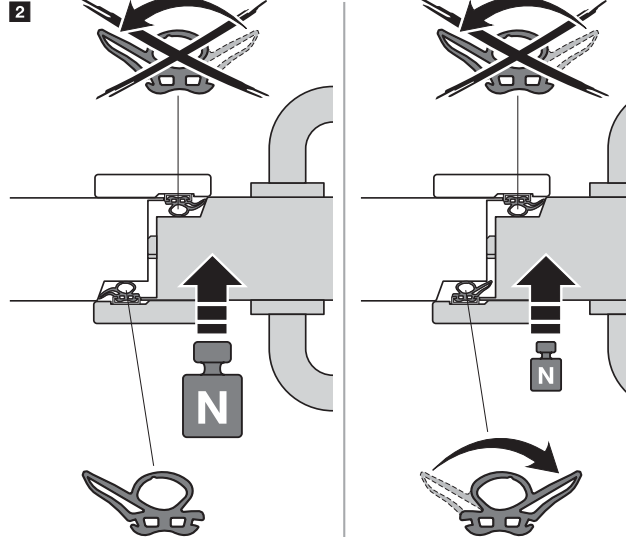
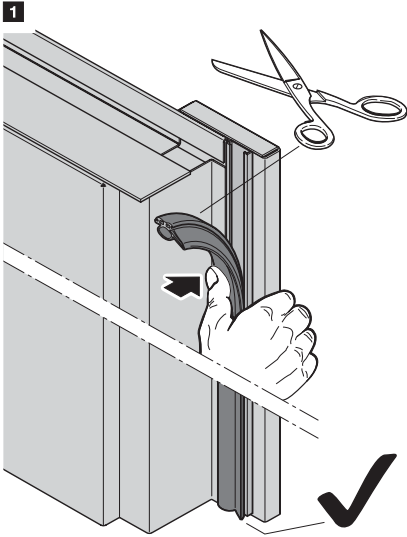
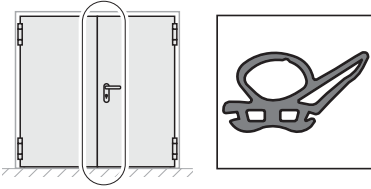
10.7b



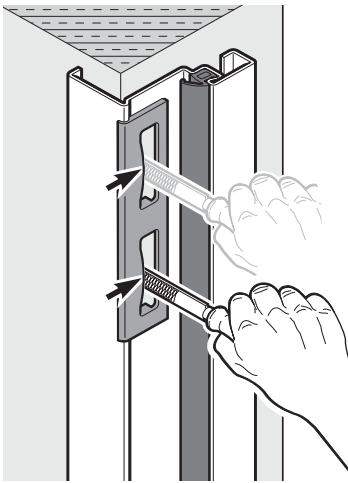
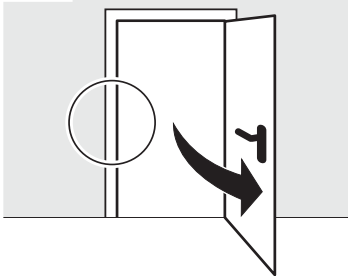
2



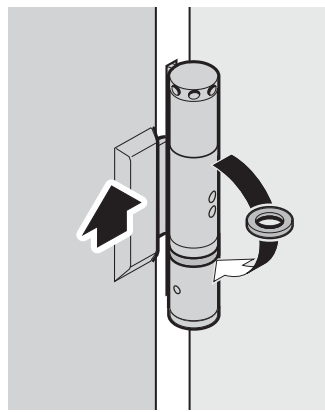
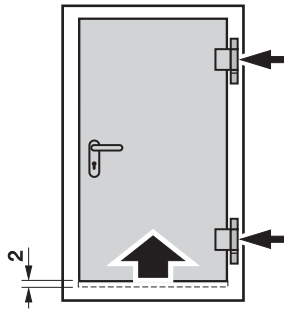
10.7c



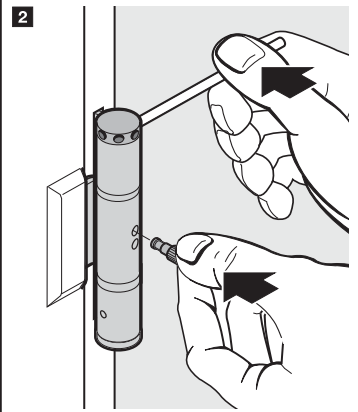
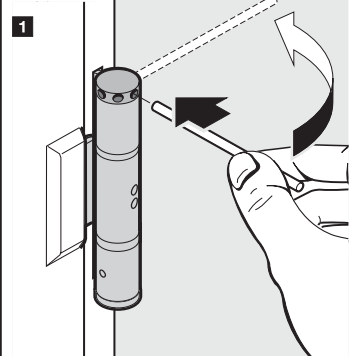
10.8



10.9



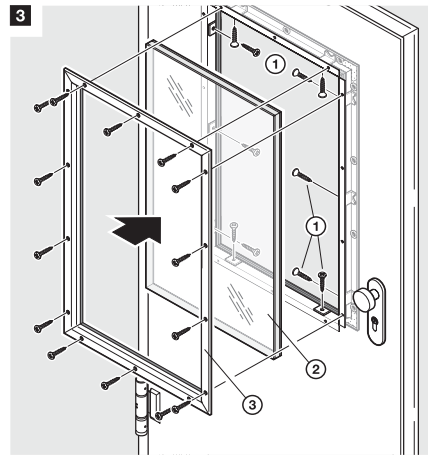
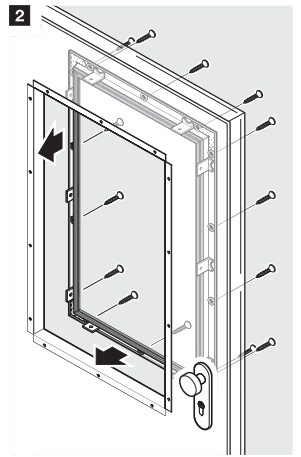
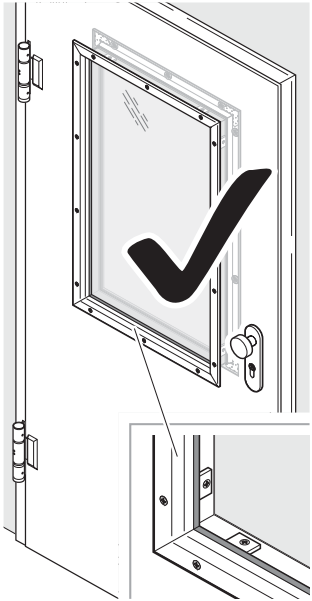
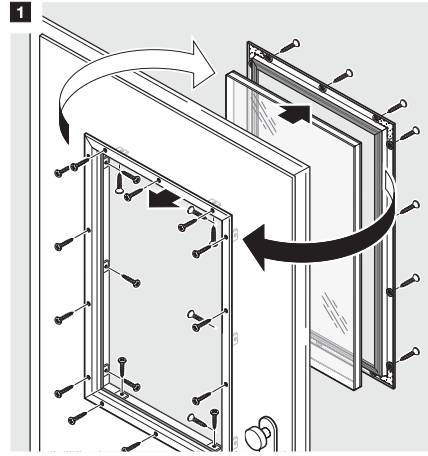
10.10



10.11 a



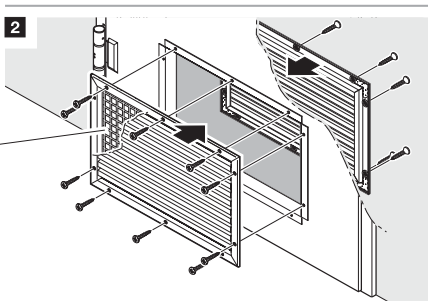
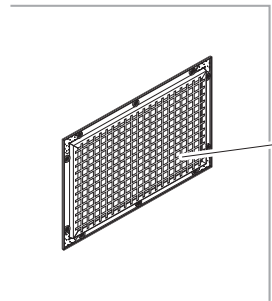
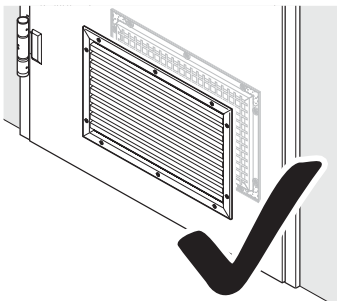
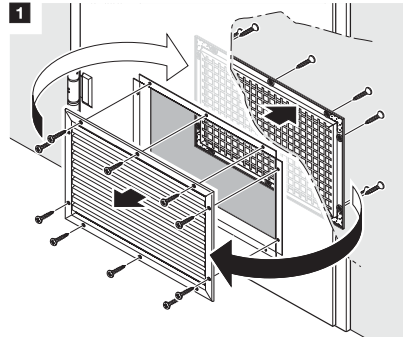
10.11 b



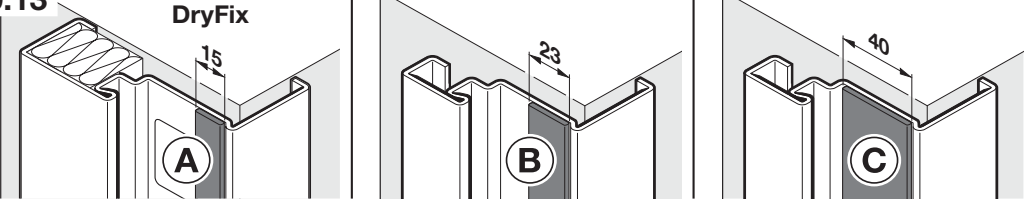
10.12 a



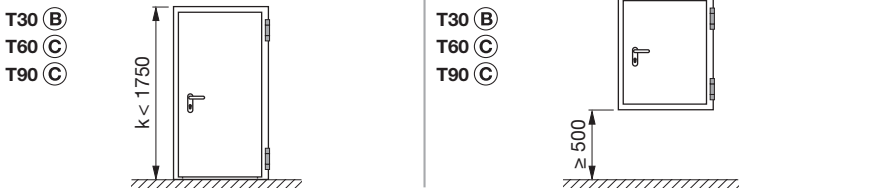
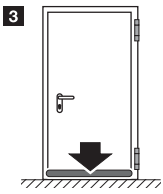
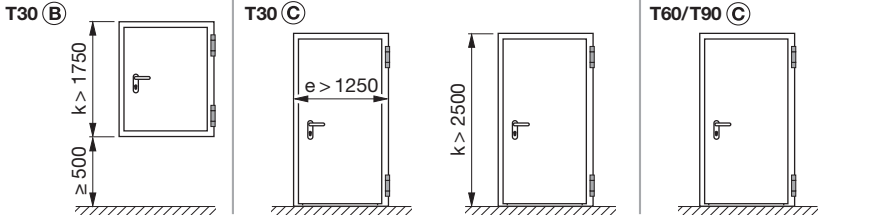
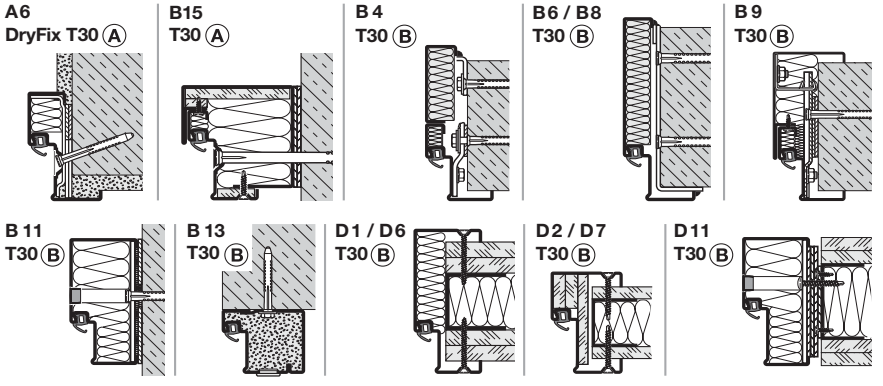
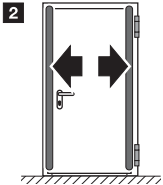
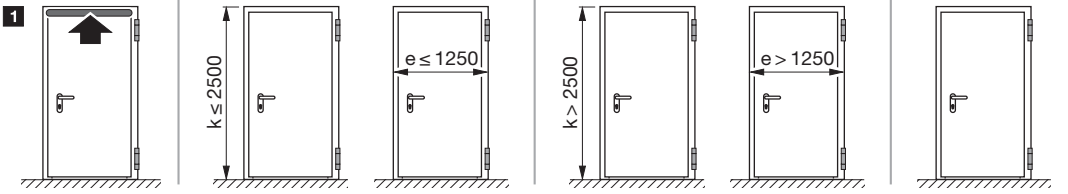
10.12 b



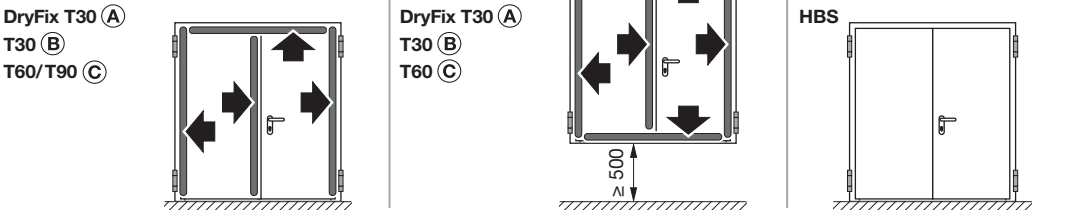
10.13



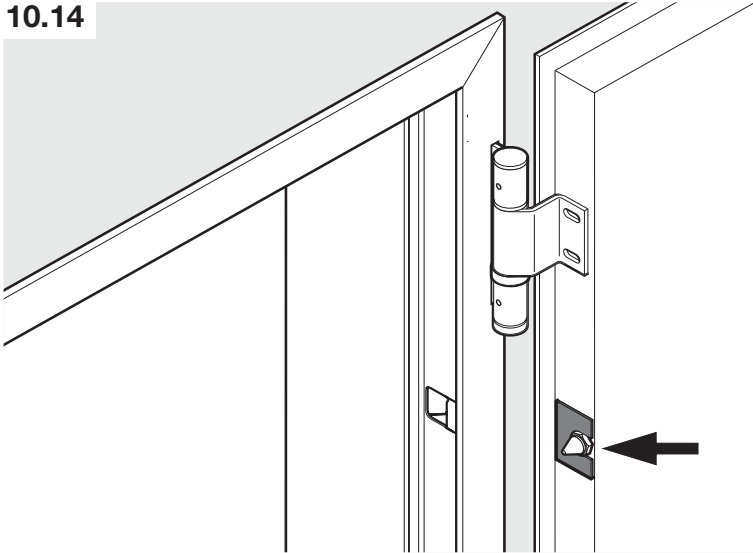
10.13a



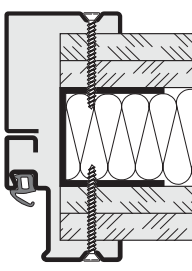
10.13b



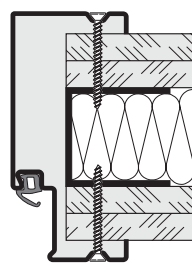
10.14



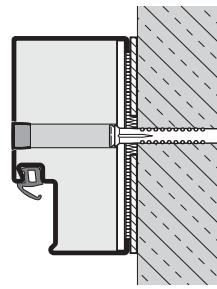
D1-D4



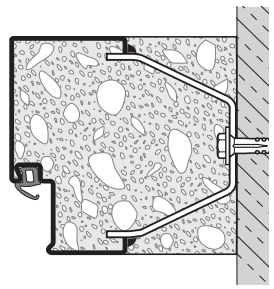
D5-D8



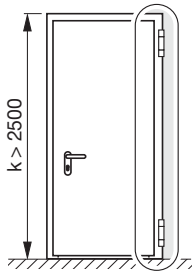
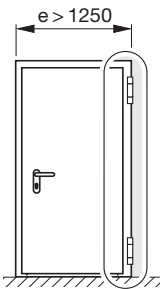
B10, B11



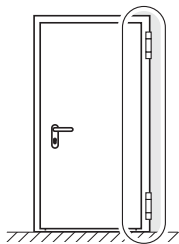
B12



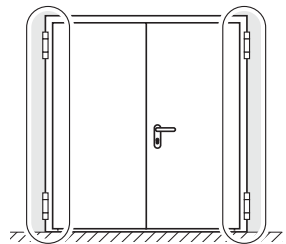
T30-1 / H_30-1



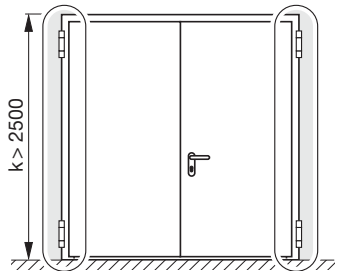
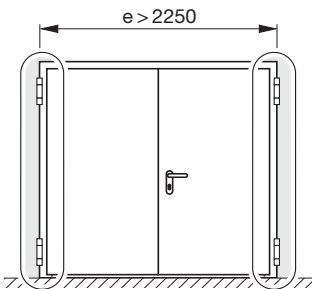
T60-1 / H_60-1
T90-1 / H_90-1



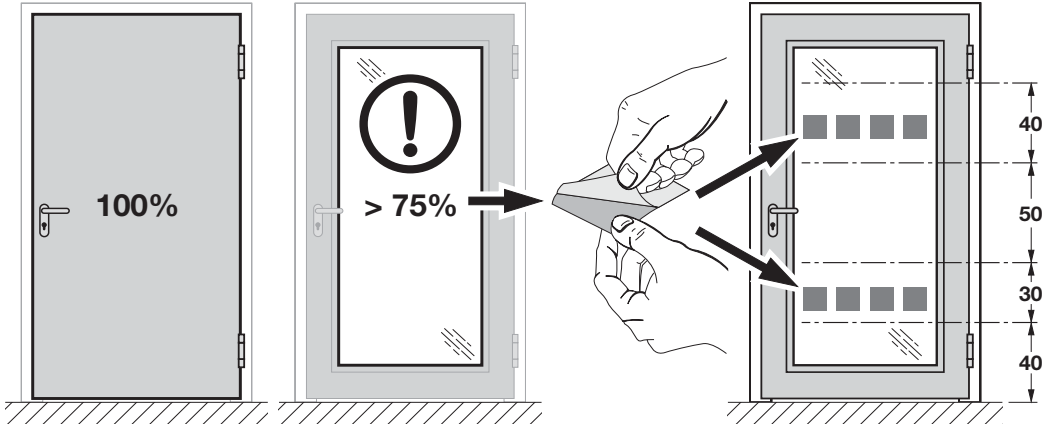
T30-2 RC3 / H_30-2 RC3



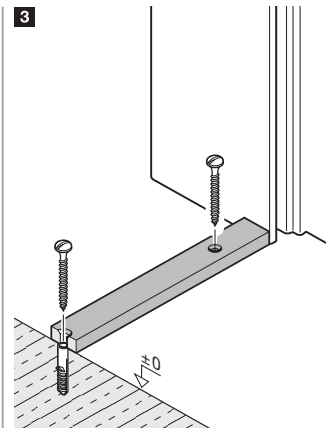
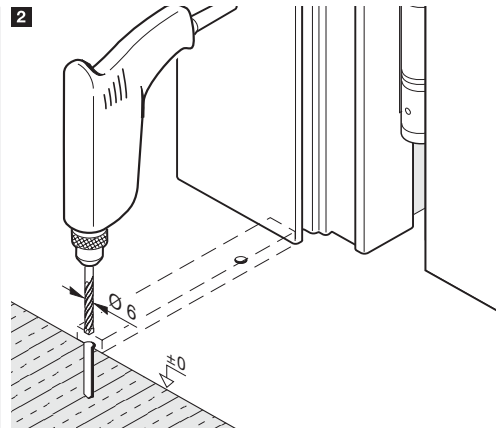
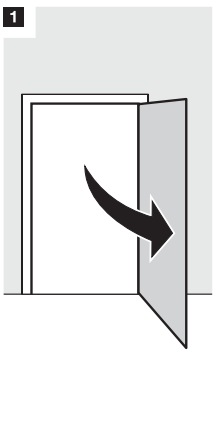
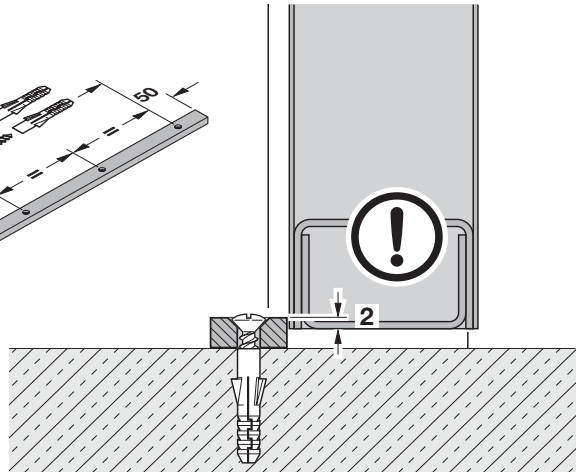
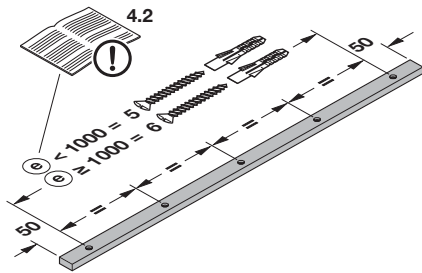
T60-2 / H_60-2
T90-2 / H_90-2



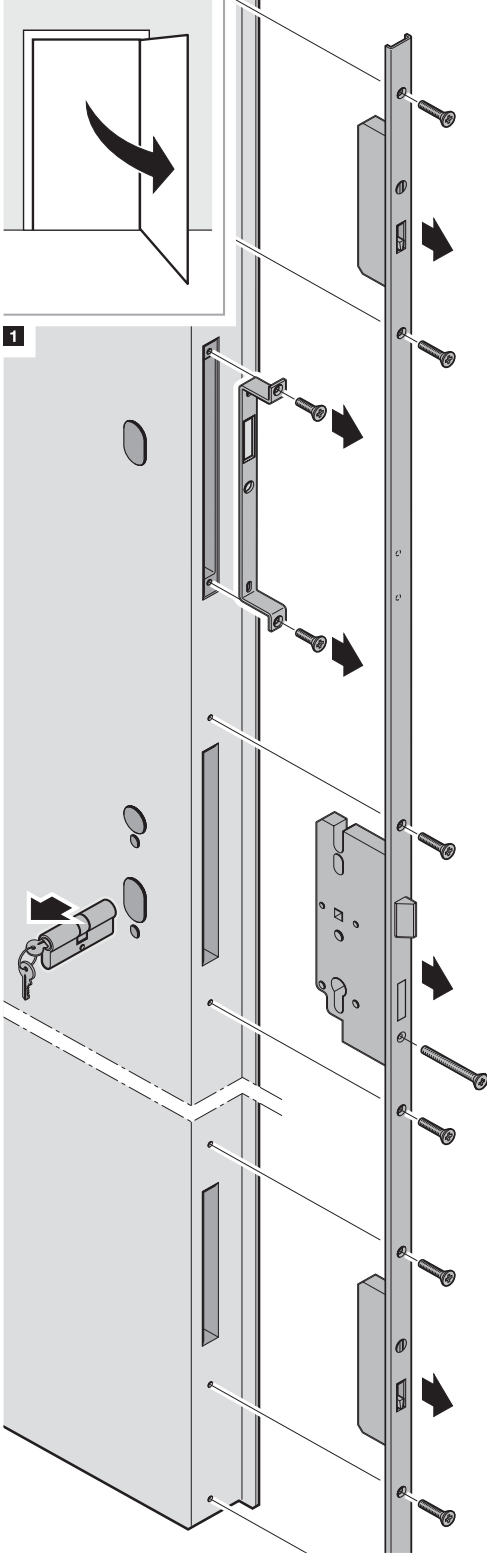
10.15



10.16

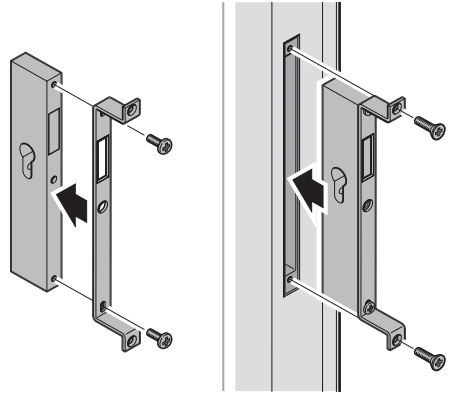


10.17

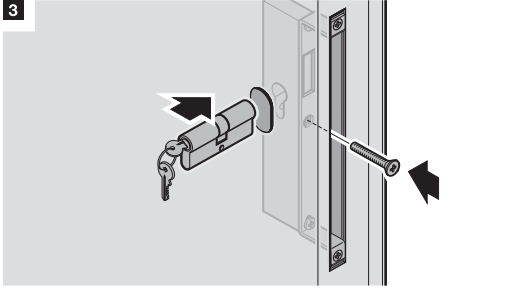


1

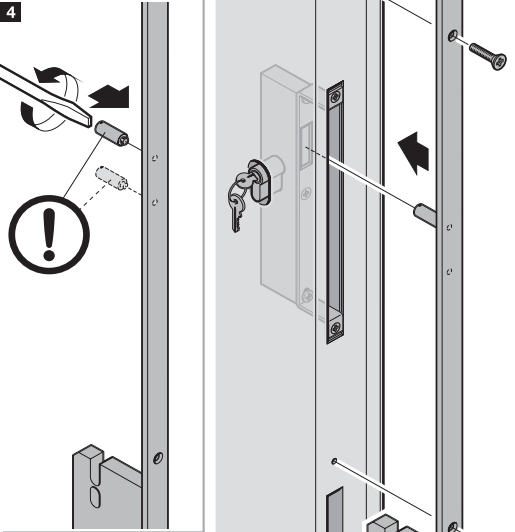
2



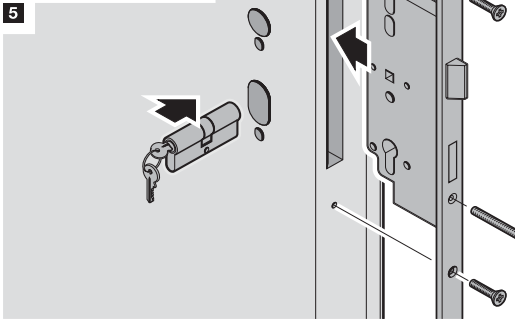
3

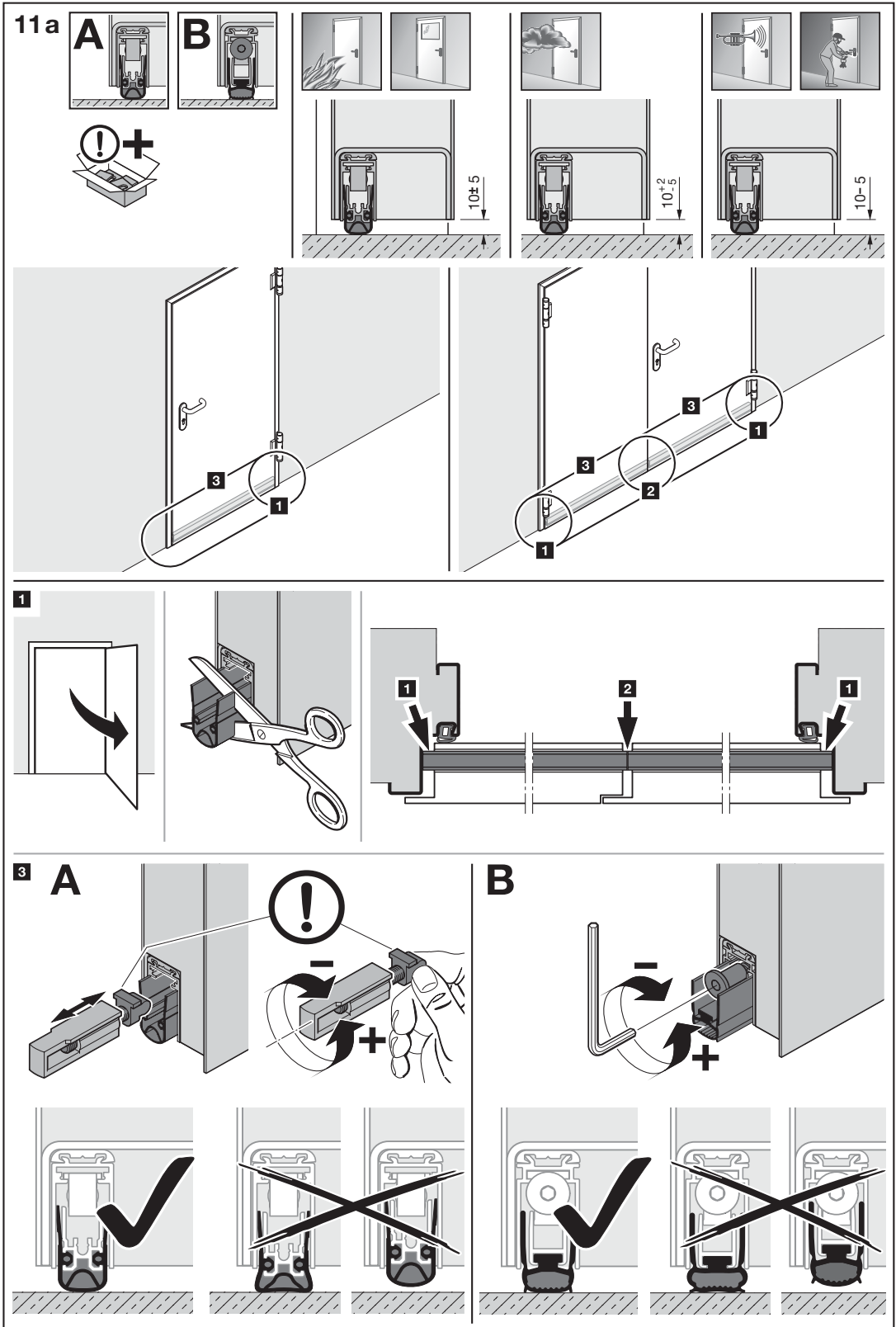


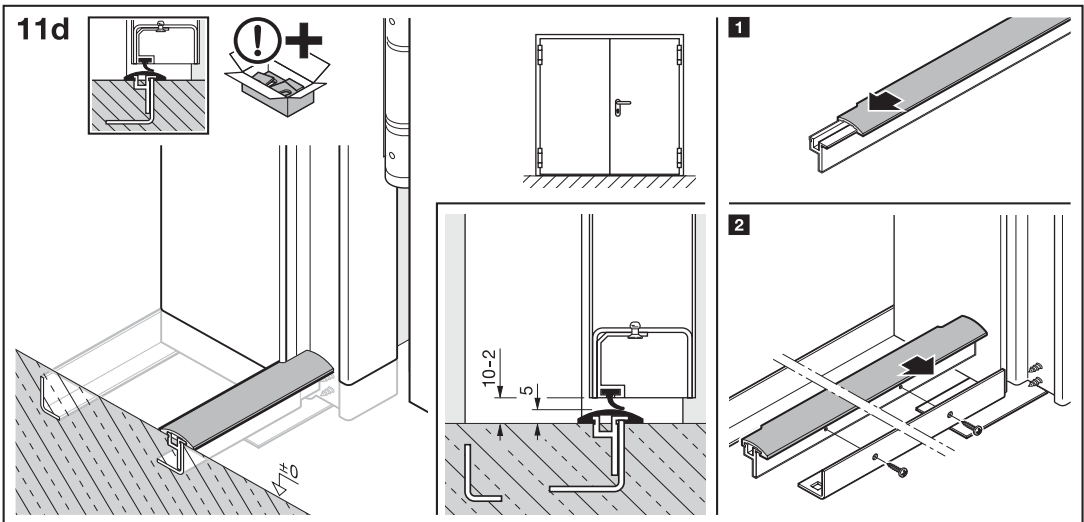
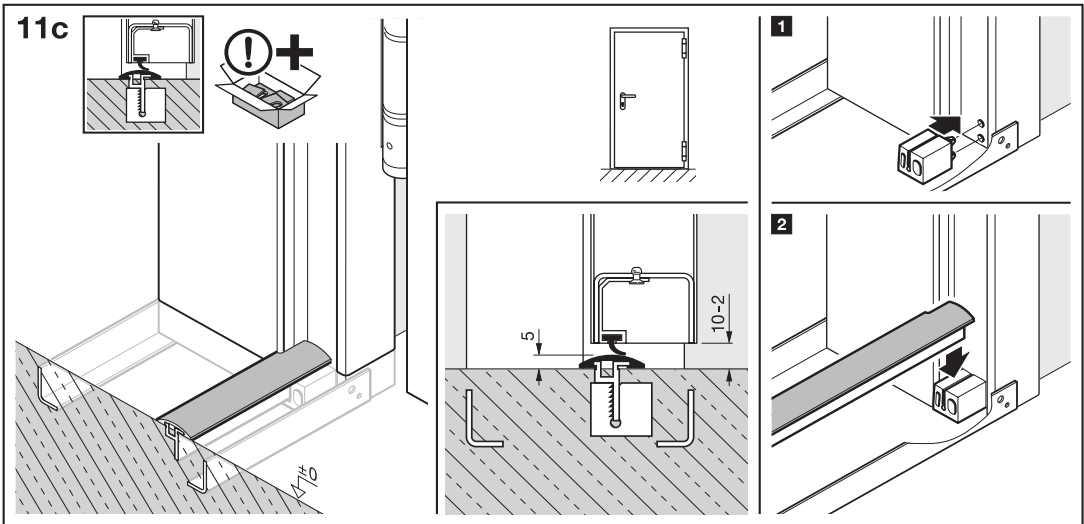
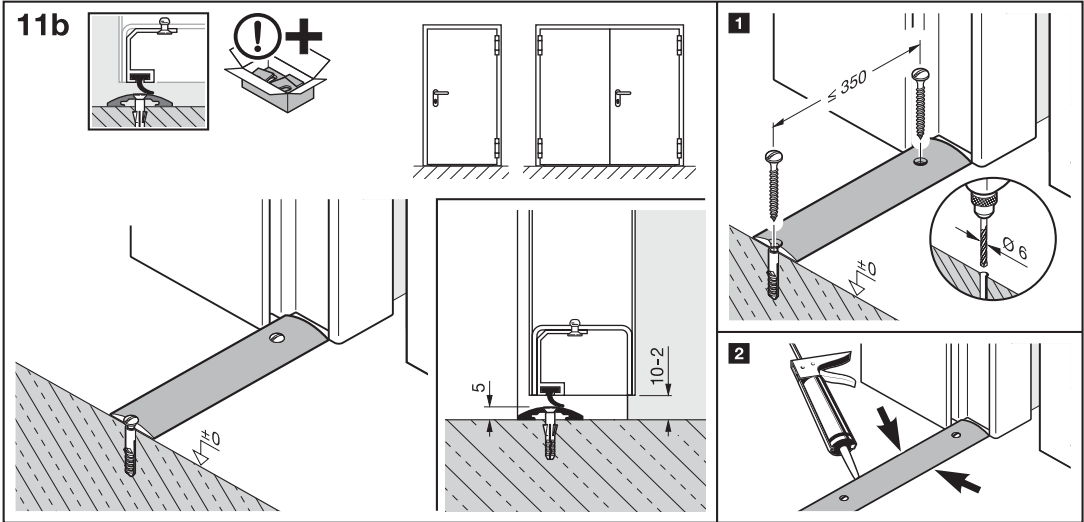
4

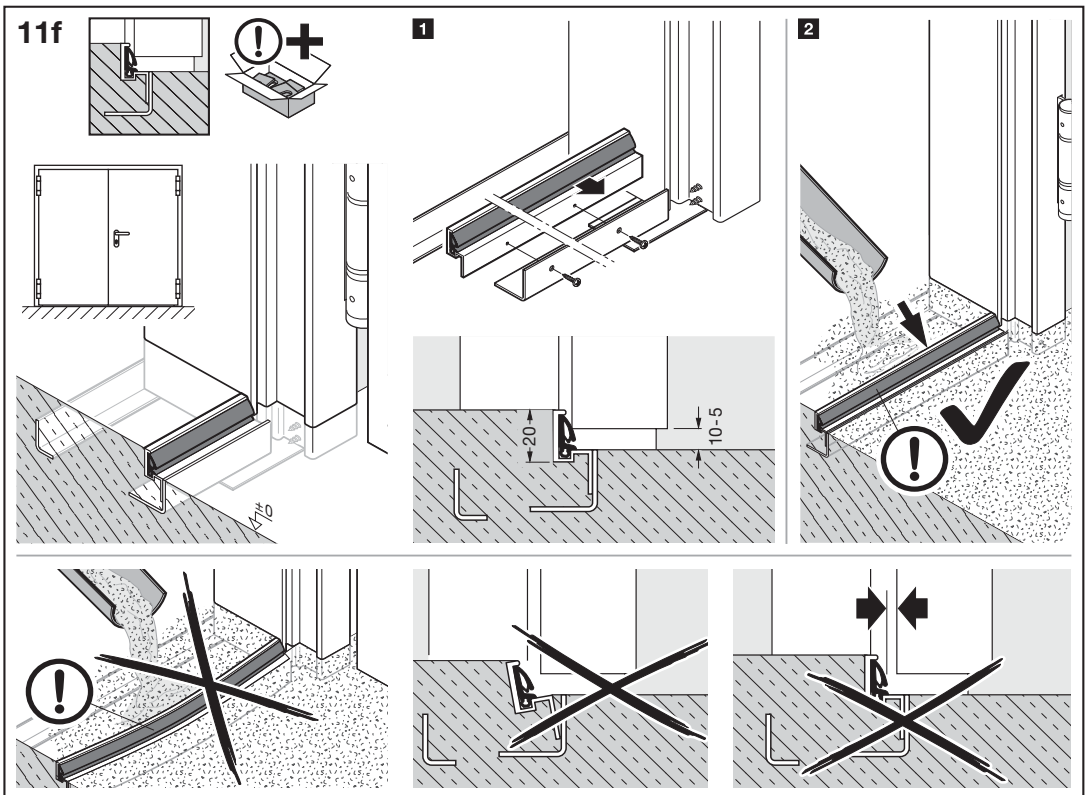
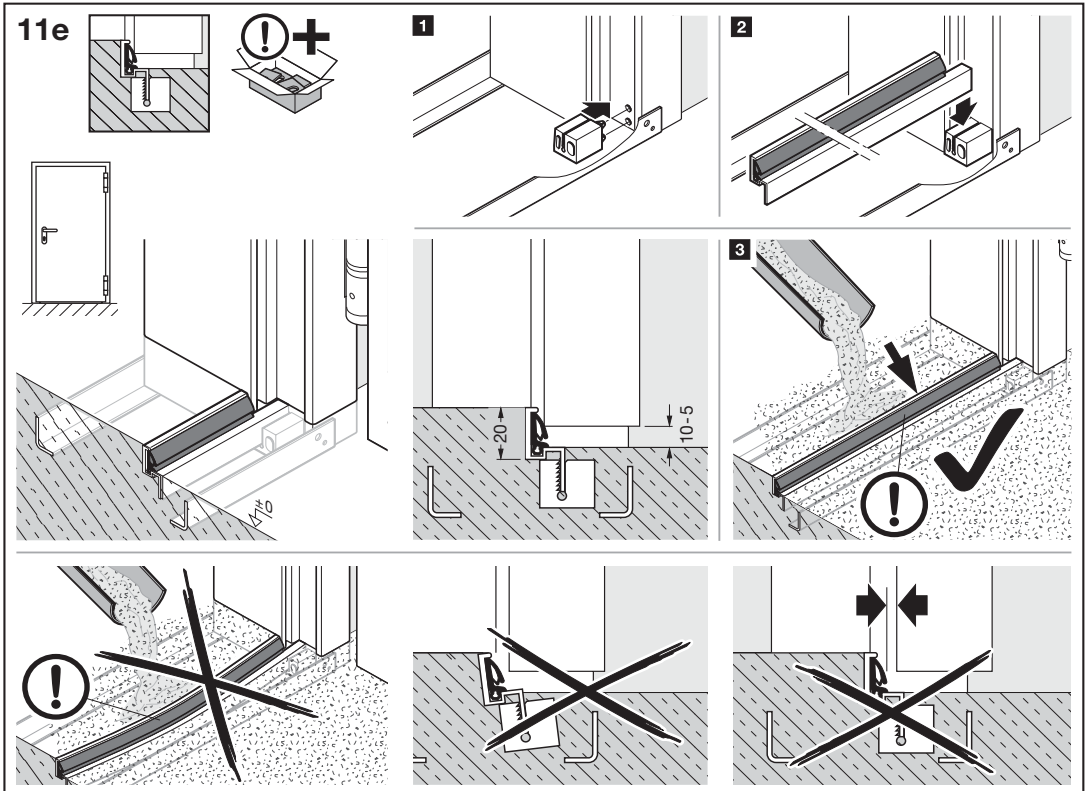


5





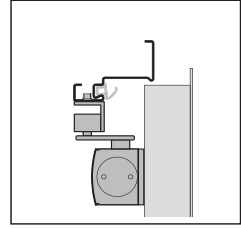
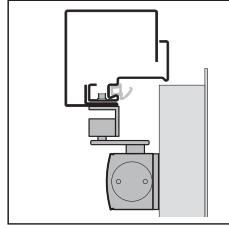




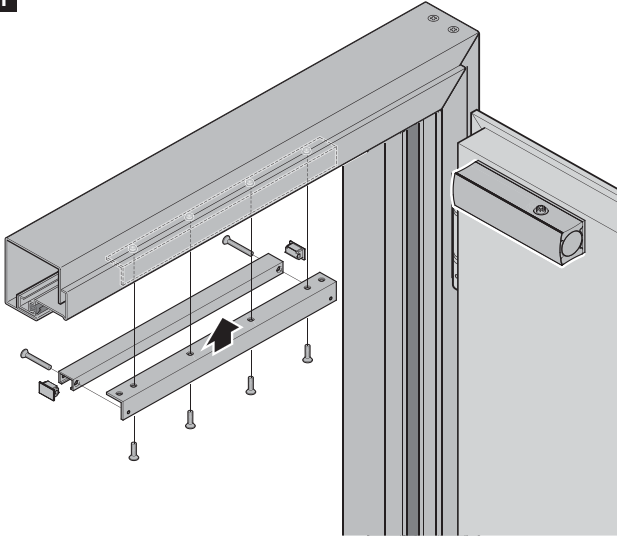
12a



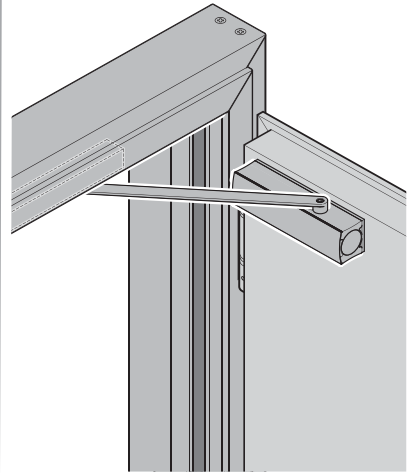
HDC 35 BG



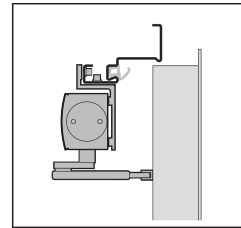
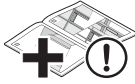
1



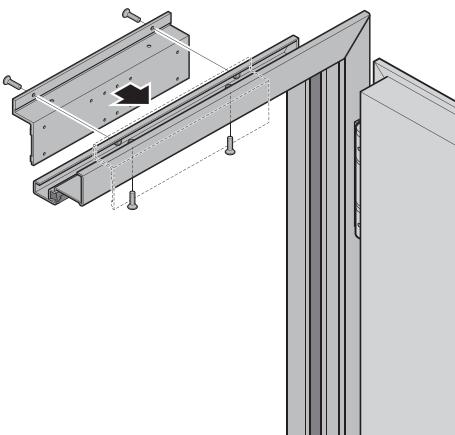
2



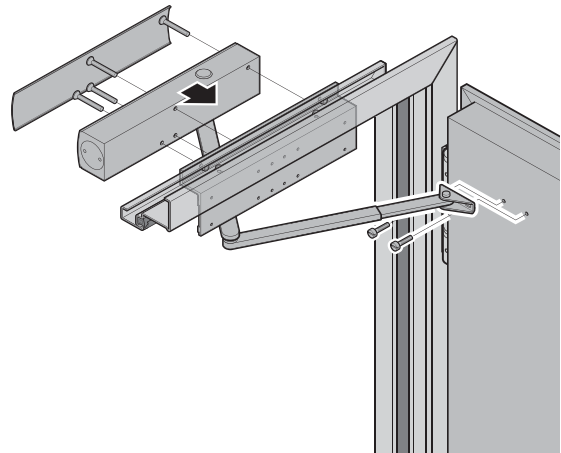
12b

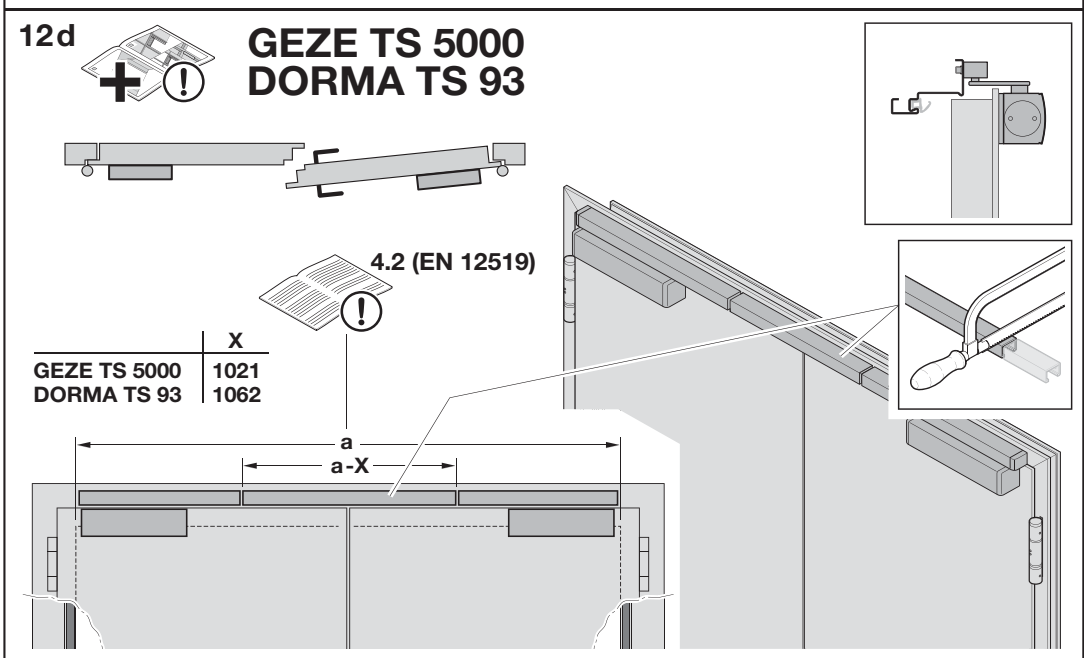
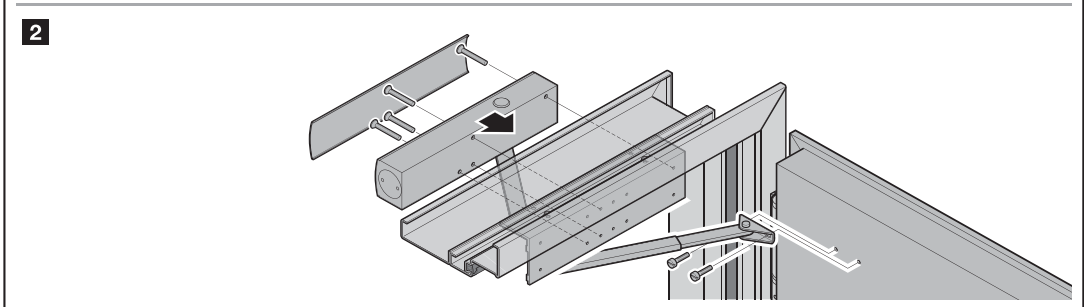
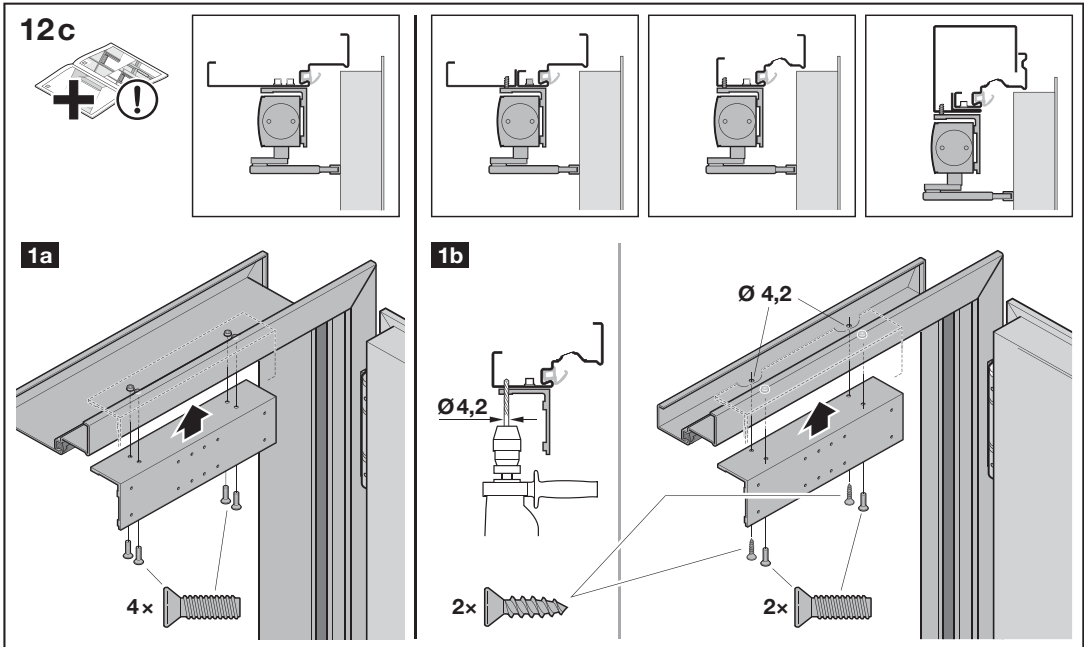


1



2



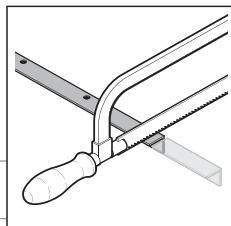
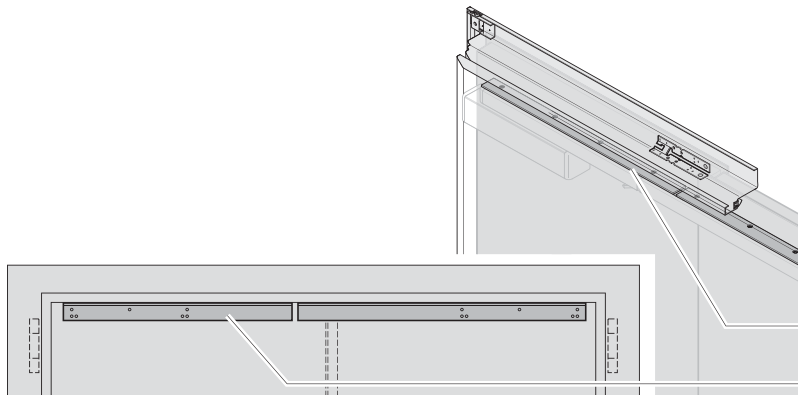
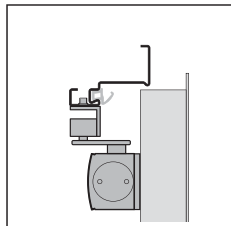


12e

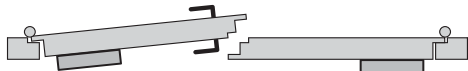


GEZE TS 5000 DORMA TS 93

1

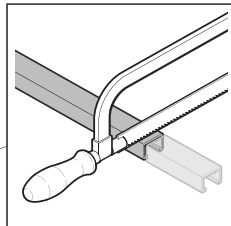
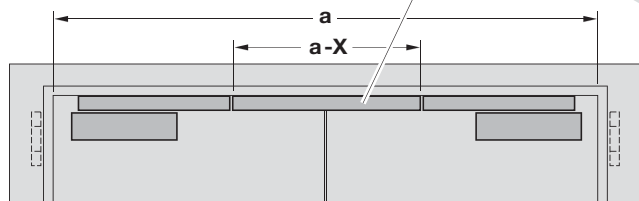


2



4.2 (EN 12519)

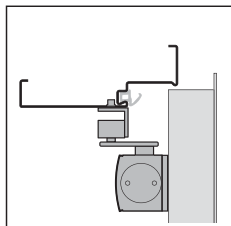
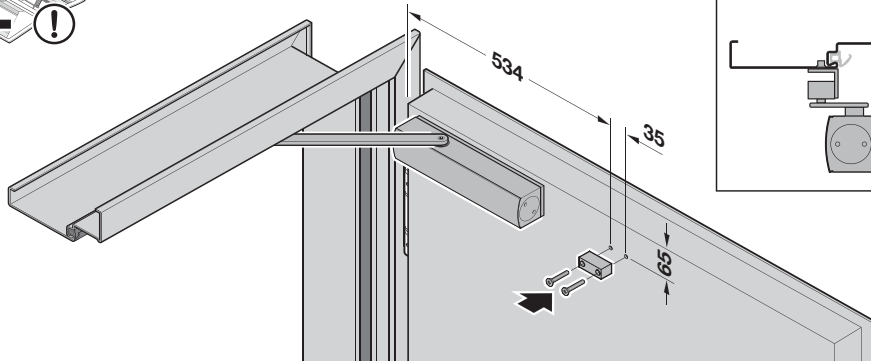
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GEZE TS 5000	1130
DORMA TS 93	1179

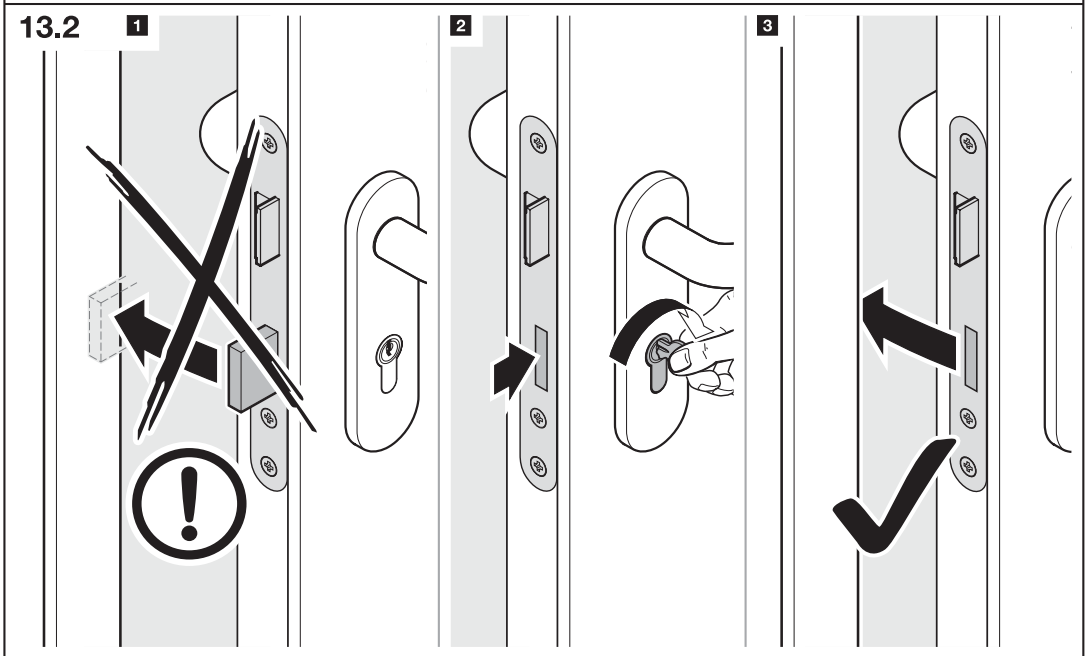
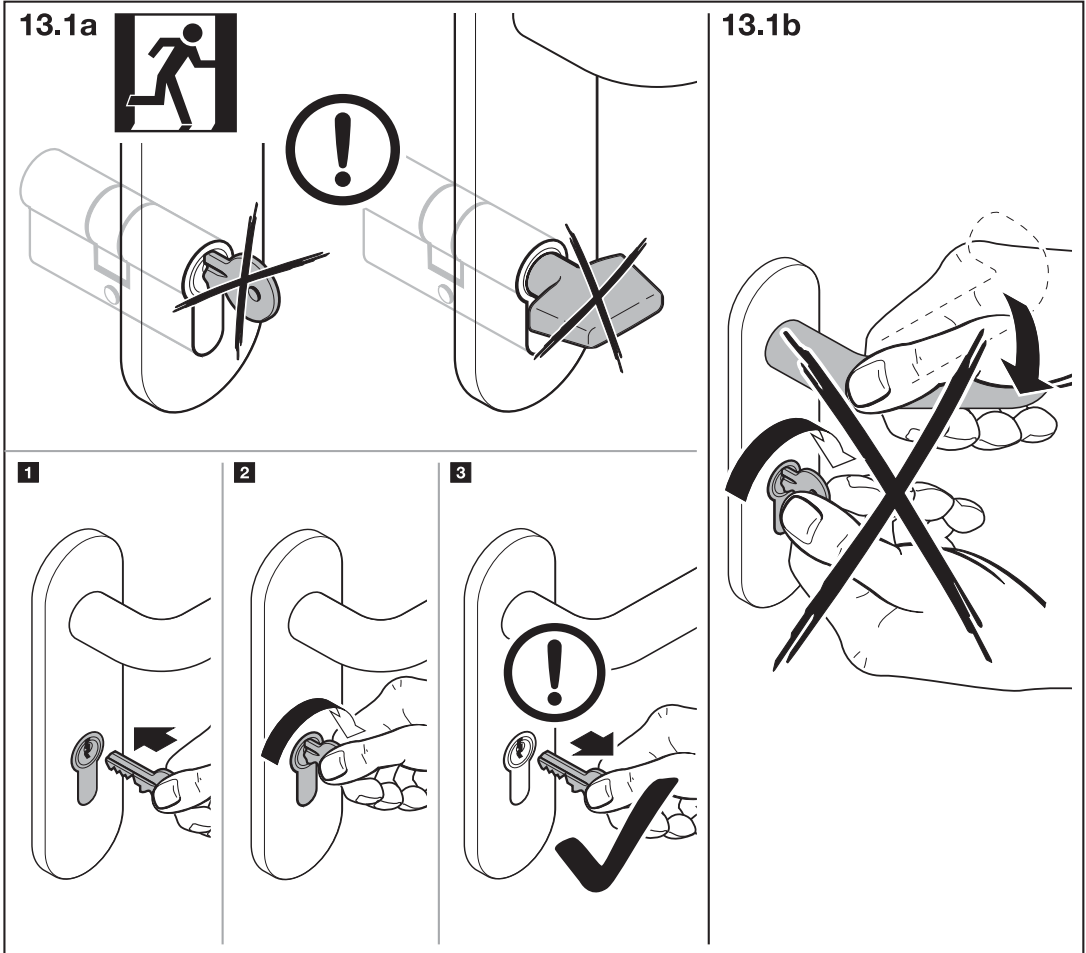


12f



TS 93 GSR BG





HÖRMANN KG Freisen	RS55-1 P-14-000005-PR01 - ift RS55-2 P-14-000005-PR02-ift	HÖRMANN KG Freisen	T30-1-FSA "H3D" T30-1-RS-FSA "H3D" T30-2-FSA "H3D" T30-2-RS-FSA "H3D" Z-6.20-1974	HÖRMANN KG Freisen	T30-1-FSA "H3" T30-1-RS-FSA "H3" T30-2-FSA "H3" T30-2-RS-FSA "H3" Z-6.20-1929	HÖRMANN KG Freisen	T60-1-FSA "H6" T60-1-RS-FSA "H6" T60-2-FSA "H6" T60-2-RS-FSA "H6" Z-6.20-2047
		MPA BS		MPA BS		MPA BS	

HÖRMANN KG Freisen	T90-1-FSA "H16-1" T90-1-RS-FSA "H16-1" T90-2-FSA "H16-2" T90-2-RS-FSA "H16-2" Z-6.20-2010	HÖRMANN KG Freisen	T90-1-FSA "H16 OD" T90-1-RS-FSA "H16 OD" T90-2-FSA "H16 OD" T90-2-RS-FSA "H16 OD" Z-6.20-2234	HÖRMANN KG Freisen	T30-1-FSA "H3 OD" T30-1-RS-FSA "H3 OD" T30-2-FSA "H3 OD" T30-2-RS-FSA "H3 OD" Z-6.20-2203
		MPA BS		MPA BS	



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