



**ET**

## **Paigaldus- ja hooldusjuhend**

Ühe- ja kahetiivalised metalluksed (OD-uksed, H3G, H16G, HS75, H16S1)

**EESTI** ..... **3**




..... **9**

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Käesoleva dokumendi paljundamine, müümine ja selle sisu edastamine on keelatud, kui ei ole meiepoolset ühest luba. Selle rikkumisel tuleb hüvitada meile tekitatud kahju. Kõik õigused patendi, kaubamärgi või tunnuse sissekande tegemiseks reserveeritud. Jätame omale õiguse teha muudatusi.

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Austatud klient,  
Meil on hea meel, et Te olete otsustanud meie toote kasuks.

## 1 Käesoleva juhendi kohta

Lugege see juhend läbi ja järgige seda. Juhend annab Teile vajalikku informatsiooni ukse paigaldamiseks ja hooldamiseks, lisaks on ta vajalik dokument ehitusaktide jaoks.

Kui Teil on pärast juhendi läbitöötamist veel küsimusi, pöörduge meie esinduste poole.

### 1.1 Kasutatud hoiatusmärgid

	<p>Üldine hoiatussümbol tähistab ohtu, mille tulemusena võivad inimesed <b>vigastada</b> või <b>surma</b> saada. Juhendi tekstiosas kasutatakse üldist hoiatussümbolit koos järgnevalt kirjeldatud ohuastetega. Juhendi piltidega osas viitab täiendav märkus selgitustele tekstiosas.</p>
	<b>OHT</b>
<p>Tähistab ohtu, mis võib vahetult põhjustada surma või raskeid vigastusi.</p>	

### 1.2 Kasutatud sümbolid



Tuletõke



Suitsutõke



Turvauks



Müratõkkeuks



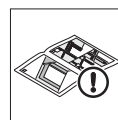
Funktsionaaluks



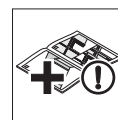
Oluline märkus



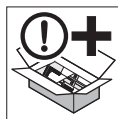
Vaata tekstiosa



Vaata pildiosa



Vaata paigaldusjuhendi lisade pakendis



Võimalik tellida tarvikutena



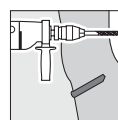
Õige toiming



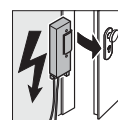
Lubamatu toiming (toimimisviis)



Keevitamine



Puurimine



Elektriline vasturaud



Sissemurdmisoho avanemisküljel



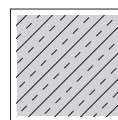
Sissemurdmisoho sulgemisküljel



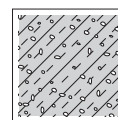
Evakuatsioonitee



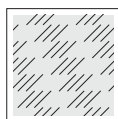
Puit



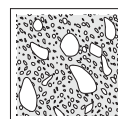
Betoon / müüritis



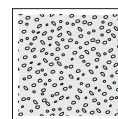
Poorbetoon



Kips



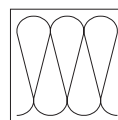
Betoon



Mörtel



Lengitähend CR  
T60 / El<sub>2</sub> 60 / HBS60  
T90 / El<sub>2</sub> 90 / HBS90  
T120 / El<sub>2</sub> 120 / HBS120  
T30 / El<sub>2</sub> 30 mineraalvillast täidisega



Isolatsioon A  
(EN 13501-1)

## 2 Ohutusjuhised

### OHT

#### Terasukse paigaldamine võib olla eluohtlik

Ukse paigaldamisel võib ukseraam ümber kukkuda ja selle alla jääv inimene võib surma saada.

- ▶ Kindlustage uks ja leng enne ja paigaldustööde ajal ümberkukkumise vastu.

- Kasutage toote paigaldamiseks ainult kvalifitseeritud ja vastavate oskustega töötajaid.
- Elektritööd võivad teostada ainult vastava väljaõppe saanud spetsialistid.
- Ärge teostage toote juures muudatusi ega paigaldage lisasid, mis võivad mõjutada ohutust.
- Keevitus- ja lihvimistööde vajadusel tuleb välistada tulest, gaasidest, tolmust, aurst, suitsust ja plahvatusesist lähtuvaid ohte.
- Keevitustöödel tuleb vältida, et paisuvad materjalid keevitamisel eralduva kuumuse tõttu reageerivad ja nõnda oma toime kaotavad.

## 3 Uste omadused

Pange tähele, et uksele võib olla ainult üks omadus või siis erinevad omadused nagu tuletõke, suitsutõke, mürakaitse ja sissemurdmiskindlus võivad olla omavahel kombineeritud või siis on ta hoopis funktsionaalusk.

### 3.1 Tule- ja suitsutõkkeused

- Vastava sertifikaadi leiata leheküljelt [www.hoermann.de/dokumentation/zulassungsbescheide-fuer-feuerschutzabschluesse/](http://www.hoermann.de/dokumentation/zulassungsbescheide-fuer-feuerschutzabschluesse/). Vastava sertifikaadi koopia peab ukse kasutuskohas olemas olema.
- Antud informatsioon kujutab endas miinimumnõudeid toote paigaldamiseks Saksamaal. Teistes riikides paigaldamisel kehtivad vastavad riigi nõuded, seejuures peavad materjalid oma omadustelt vastama vähemalt DIN normidele.
- Järgige normi DIN 18093 (tuletõkkeuste paigaldus) ja DIN 18100 (uste avad) või siis kasutusrigi asjakohaseid nõudeid.

- Tootja võib üksikjuhtudel ehituse näidiseeskirja § 22 ja § 23 vastavalt väljastada vastavusdeklaratsiooni.
- **Ukse kasutaja vastutab ukse tõrgeteta talitluse eest.**
- Vedruhingesisid ei või Saksamaal ustel ja luukidel kasutada, kui neil on järgmised omadused:
  - tiiva kaal > 80 kg
  - klaasistus
  - paigaldus elementseina (erand: mõõt < 1000 × 1000 mm)
  - kombinatsioonis suitsutõkkeustel vastavalt normile DIN 18095
  - 2-lehega

Väljaspool Saksamaad võivad kehtida teised eeskirjad, siiski soovitame kinni pidada Saksamaa vastavatest nõuetest.

- Kasutage suluseid, lukke, sulgemisvahendeid ja elektriseadmeid ainult siis, kui need on koos uksega katsetatud või sertifitseeritud või siis kui on olemas tootja vastav luba.
- Paigaldage 3-küljest valtsitud ning ilma alumise šahtüleminekuta ukсед šahtiseintesse pöranda alumisele tasemele.
- Kipskartongseinad ja seinte paksused: vaata Tabel 1:
- Lubatud seinte materjal ja seinte paksused: vaata Tabel 2:
- Kui vastavas paigaldussituatsioonis ei ole kirjeldatud teisiti, siis täitke leng mineraalse tsemendibaasil mõrdiga nagu näiteks Sakret LM21. U-lengid ja nurklengid (ilma ja koos vastulengiga) tuleb enne mõrdiga täitmist teostada, et nad mõrtli survele ära ei vänduks.
- **Suitsutõke:**
  - Kasutage põrandatihendit ja tihenduskiile (vaata piltidega osa punkt 10.6 ja 11).
  - Kui leng ei ole mõrdiga täidetud, siis tuleb lengi ja ehitise või teiste komponentide ühenduskohad mõlemalt poolt ja ilma lünkadeta vastava elastse vahendiga ära tihendada.
  - Kasutage lukusüdamikku.
- Tuletõkkeuste klaasistus ei tohi jääda otsese päikesevalguse kätte.

Tabel 1: Lubatud paigaldada F90A klassiga seintesse, mille seinapaksus vastab tule- ja suitsutõkkeuste minimaalsetele nõuetele, kõrgus ≤ 5000 mm

Sertifikaadi nr.	Sein	H3 OD H_30 OD	H3-1G H_30 D1	<sup>1)</sup> H3-2 VM H_30 D2	H16 S1 H_90 E1
P-3310/563/07-MPA BS	Knauf W 112	≥ 100 mm	≥ 100 mm	≥ 100 mm	≥ 125 mm
P-3391/170/08-MPA BS	Knauf W 131	≥ 116 mm	—	—	≥ 177 mm
P-3310/563/07-MPA BS	Knauf W 132	≥ 100 mm	—	—	—
P-3202/2028-MPA BS	Knauf W 352 / W 353	≥ 100 mm	≥ 100 mm	≥ 100 mm	≥ 150 mm
P-3956/1013-MPA BS	RiGips 3.40.01ff. / 3.41.01ff.	≥ 100 mm	≥ 100 mm	≥ 100 mm	—
P-3014/1393-MPA BS	RiGips 3.60.20	≥ 100 mm	≥ 100 mm	≥ 100 mm	≥ 125 mm
P-3020/0109-MPA BS	RiGips 6.70.10	≥ 165 mm	—	—	≥ 165 mm
P-SAC-02/III-681	LaFarge L11 – L14	≥ 100 mm	≥ 100 mm	≥ 100 mm	—
P-MPA-E-98-005	LaFarge L15	≥ 100 mm	—	—	≥ 125 mm
P-3515/0519-MPA BS	LaFarge L16	≥ 150 mm	—	—	≥ 150 mm
P-3391/0890-MPA BS	LaFarge L18	—	—	—	≥ 161 mm
P-MPA-E-99-047	Promat 450.81	≥ 140 mm	—	—	≥ 140 mm
P-11-003478-PR01	B + M W 50 / 100 – W 100 / 150	≥ 100 mm	—	—	—
P-3854/1372-MPA BS	Fermacell 1 S 31/3.1	≥ 95 mm	≥ 95 mm	≥ 95 mm	—

1) max. 2750 × 2750 mm

Tabel 2: Lubatud seinatüübid ja minimaalsed seinapakskused tule- ja suitsutõkkete jaoks (mm) vaata 4.2

Sein	Terasused		H3-1 OD H_30-1 OD		H3-2 OD H_30-2 OD		H3-1 G H_30 D1	H3-2 VM H_30 D2	H16-1 G H_90 D1	H16-2 G H_90 F-2	H16-S1 H_90 E-1	H16-1 OD H_90-1 OD	H16-2 OD H_90-2 OD
	<sup>1)</sup> k ≤ 2500	<sup>2)</sup> k > 2500	<sup>1)</sup> k ≤ 2500	<sup>2)</sup> k > 2500	—	—	—	—	—	—	—	—	—
<b>Betoon</b> DIN 1045-1, tugevusklass ≥ C12/15	100	140	100	140	140	140	140	140	140	140	120	140	140
<b>Müüritis</b> DIN 1053-1, kivitugevus ≥ 12, mörtli grupp ≥ 2	<sup>1)</sup> k ≤ 2500	k > 2500	<sup>1)</sup> k ≤ 2500	<sup>2)</sup> k > 2500	—	—	—	—	—	—	—	e ≤ 625 k > 750	e > 625 k > 750
<b>Poorbetoonist plokid või soonplokid</b> , DIN 4165-3, tugevusklass ≥ 4, Poorbetoonplaadid vastavalt üldine kasutusluba, tugevusklass ≥ 4.4	k ≤ 2500	—	k ≤ 2500	—	—	—	—	—	—	—	—	—	—
<b>Elementsein F90-A</b> vastavalt ABP järgige pilti 8.12, max kõrgus 5000 mm	<sup>3)</sup> —	—	<sup>3)</sup> —	—	—	—	<sup>3)</sup> —	<sup>3)</sup> —	—	—	<sup>3)</sup> —	—	—
<b>Elementsein F90-A</b> DIN 4102-4/ tabel 48, järgige pilti 8.12, max kõrgus 5000 mm	e ≤ 1320	—	e ≤ 2500	—	—	—	—	e ≤ 2750 ja k ≤ 2750	—	—	—	—	—
<b>Elementsein F90-B</b> DIN 4102-4/ tabel 49, max kõrgus 5000 mm	100	100	100	100	100	100	100	100	—	—	125	125	125
<b>Elementsein F30-B</b>	e ≤ 1250 ja k ≤ 2500	—	e ≤ 2500 ja k ≤ 2500	—	—	—	—	—	—	—	—	—	—
<b>Kipsist seinaplaadid</b> VG Orth, P-SAC 02 / III-488, järgige pilti 9/A17	<sup>4)</sup> 100 / <sup>5)</sup> 130	—	<sup>4)</sup> 100 / <sup>5)</sup> 130	—	—	—	—	—	—	—	—	—	—
	e ≤ 1125 ja k ≤ 2125	—	—	—	—	—	—	—	—	—	—	—	—
	185	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—
	100	100	100	100	—	—	—	—	—	—	—	—	—

1) ilma ülaosata

2) koos ülaosaga

3) vaata Tabel 1:

4) kaheosaline leng

5) Dryfix

### 3.2 Müratõkkeused

- Heliisolatsioon on sõltuvuses ust ümbritsevatest komponentidest. Sein ja ukse kombinatsioonist resulteeruv heliisolatsioon tuleb eraldi tõestada, kuna seda ei saa tuletada uste eraldi hinnatud heliisolatsiooni indeksist  $R_w$  või R.
- Antud heliisolatsiooni väärtus on saavutatav ainult siis, kui ukse ja põranda vaheline õhuvähe on max 10 mm.
- Jälgige, et tihendid oleksid vastu.
- Selleks, et põrandatihend täielikult oma tihendusfunktsiooni, peab põrand olema sirge.
- Lõigake betoonpõrand läve alla.
- Kasutage tihenduskiile ja põrandatihendit (vaata piltidega osa punkt 10.6 ja 11).
- Kasutage lukusüdamikku.
- Täitke leng täielikult mõrtliga.
- Liimige nurga all lõigatud lengitihendi nurgad kokku nt Kõratan UC 41 abil.

### 3.3 Turvaüksed

- Üksed vastavad sissemurdmiskindluse nõuetele ainult siis, kui riiv on täielikult suletud ja võti on eest ära tõmmatud.
- Kinnitage ukselehed kõigi 2 tiivaga RC - uste puhul hingede kohalt, igaüks kahe kruviga (vaata piltidega osa punkt 10.2).
- Kasutage ainult nurklenge, vastulengiga nurklenge ja U-lenge.
- Täitke RC2/N ustel leng lukustuspunktide, hingede ja turvanagade kohtades survekindla materjaliga.
- Täitke RC3/A klassi uste leng ümbertringi survekindla materjaliga.
- Paigaldage klaasistusega uste puhul üks nii, et klaasistusraami turvakõrvad jääksid sinna poole, kust üritatakse sisse murda.
- Ülemise klaasi välja vahetamisel tuleb tagaklots paigaldada nii nagu enne paigaldust.
- Mõõtke 2-lehelistel ustel alumised õhuvahed alates põrandasüvendist.
- Paanikafunktsiooniga ustel peab ukse alt sisse murdmine nt traadi abil olema raskendatud väikese põrandavahe või lameda läve kasutamisega.

#### 3.3.1 Minimaalsed nõuded turvaustele

Turvalisusklass vastavalt DIN EN V 1627 DIN EN 1627 / VDS	RC2 / N	RC3 / A	RC4 / B
Müüritis DIN 1053, osa 1 [mm] kivitugevus $\geq 12$	115	115	240
Raudbetoon, vähemalt C12 / 15 [mm]	100	120	140
Poorbetoonkivid, kl 4 [mm]	175, 115 <sup>1)</sup>	300	–
Poorbetoonplaadid, kl 4 [mm]	150	–	–
Lukusüdamik vastavalt normile DIN 18252 <sup>3)</sup>	P2BS	P2BS	P3BS
Lukusüdamik <sup>2) 3) 4)</sup>	Klass A	Klass A	Klass B
Turvakate vastavalt normile DIN 18257 <sup>3)</sup>	ES1 (ZA)	ES2 (ZA)	ES3 (ZA)
Turvakate <sup>2) 3)</sup>	Klass A	Klass A	Klass B
Klaasid EN 356 (tuletõke)	P5A <sup>5)</sup> / P8B <sup>6)</sup>	P5A <sup>6)</sup>	–

1) ainult 1-tiivaga üksed, soovitame sein paksusi alates 150 mm

2) Saksa kindlustajate ühenduse (VdS) poolt tunnustatud ustele

3) lukukate või lukusüdamik peavad olema tõmbekitsesega (ZA).

4) ei pea olema tarnekomplektis

5) mitte pääste- ja evakuaatsiooniteedel

6) pääste- ja evakuaatsiooniteedel

### 3.4 Funktsionaalused

Lengid ei pea ilmingimata täidetud olema.

### 3.5 Tuletõke ja kasutamine väliskeskkonnas

Tuletõkkeukse kasutamine väliskeskkonnas vajab eraldi vastavussertifikaati. Järgige eraldi paigaldusjuhendit - artikli nr 479166.

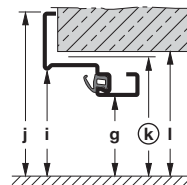
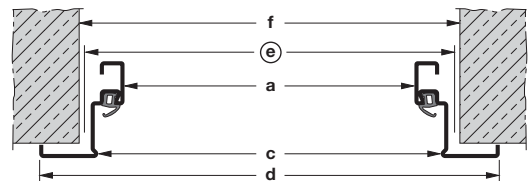
## 4 Paigaldus

### 4.1 Enne paigaldama asumist

Enne paigaldust tuleb leida vastus järgmistele küsimustele:

- Millised omadused on uksele?
- Kas seinakonstruktsioon on ukse paigalduseks sobiv?
- Kas põranda kõrgus on teada (kõrgusmärk + 1 m)?
- Mis suunas peab üks avanema?
- Kas ehituseeskirju tuleb järgida?
- Kas sein tuleb seinakaitseraami piirkonnas välja lõhkuda?

### 4.2 Mõõdud vastavalt normile EN 12519



$$\begin{aligned}
 a &= e - 82 & g &= k - 42 \\
 c &= e - 36 & i &= k - 19 \\
 d &= e + 64 & j &= k + 31 \\
 f &= e + \begin{matrix} 20 \\ 0 \end{matrix} & l &= k + \begin{matrix} 15 \\ 0 \end{matrix}
 \end{aligned}$$

Pilt 1: Mõõdud

a/g puhas valgusava laius / kõrgus

c/i puhas valtsilaius / -kõrgus

d/j lengi välislaius / -kõrgus

e/k moodullaius / -kõrgus

f/l puhas seinava laius / kõrgus (DIN 18100)

### 4.3 Paigaldamisel

- Järgige lisade pakis kaasas olevaid paigaldusjuhiseid.
- Kasutage paigaldusvahendeid, kui need on tarnekomplektiga kaasa pandud nt paigalduskõrvad, tüüblid või kruvid.
- Kasutage punktis 8 märgitud tüübleid.
- Kasutage nurklengi ja perforitud telliste või kipskivide ühendamisel FUR 10 x 80 / 100 mm tüüblit ning järgige paigaldusjuhendi punkti 8.
- Ärge kasutage perforitud telliste ja kärgtelliste korral lõkkpuuri.
- Horisontaalsete ja vertikaalsete puuravade korral peab minimaalne kaugus servast olema 50 mm ning arvestada tuleb tüübli laienemissuunaga.
- Valmis põrandale paigaldataval uksele tuleb alumine paigaldusvinkel enne paigaldust eemaldada.

#### 4.4 Märkused juhendi piltidega osa kohta

Vaata punkt	Kirjeldus
8	Paigaldussituatsioonid ja lengitüübid
8.1a	Kitsas valts
8.1b	Lai valts
8.1c	Lai mantelserv
8.2a / 8.2b	Kinnituspunktide arv
8.2c	Paigalduse käik
8.3a	Standardukse eemaldamine
8.3b	Turvaukse eemaldamine
8.4	Nurklengi kokkupanek
8.5	Põrandasüvend ja montaažinurk
8.6	Kinnitusdetailid
8.7	Minimaalne servakaugus ja tüübi laienemissuund
8.8	Peitsooneprofiili paigaldus
8.9	Läbiviigitoru lengis
8.10	Elektriline vasturaud
8.11	Lengitasku kipsseintele
8.12	Kipsist tuletõkeseinte ülesehitus
9.0	Paigaldusvõimalused
10.1a	Paigaldus standardhingedega
10.1b	Paigaldus 3D-hingedega
10.2	Turvaukse paigaldus
10.3	Õhupilu reguleerimine
10.4	Põrandavinkli eemaldamine lengidel, mida ei valata põranda sisse
10.5	Vastulengi paigaldus
10.6	Kinnitage tihenduskiilud silikooni abil
10.7	Lengitihendi paigaldus
10.8	Ukse tõstmine
10.9	Uksehinge pingutamine
10.10	Lukuvastuse kontroll
10.11	Ventilatsioonivõre modifitseerimine
10.12	Klaasiraami muutmine
10.13	Isolatsioonikihi moodustav materjal tule- ja suitsutõkke korral
10.14	Isolatsioonikihi moodustav materjal turvanaga juures
10.15	Suurte klaasipindade tähistus
10.16	Paanika- ja turvauksed RC3/A
10.17	Valvestusluku paigaldus mitmepunkti lukustuse korral
11	Põrandatihendid
12	Uksesulgur
13.1	Eemaldage paanikauste võti
13.2	Luku valesti kasutamise vältimine

## 5 Hooldus

### 5.1 Iga-aastased hooldustööd

- ▶ Otsige ukselehel, lengilt ja kinnitustelt mehaaniliselt ja korrosioonist põhjustatud kahjustusi.
- ▶ Kontrollige luku funktsiooni ja määri vajadusel kaldkeelt.
- ▶ Määrige poltlukke teflon määrdeainega.
- ▶ Kontrollige ukse külge kinnituvate osade kinnitust nagu nt lingid, lukk, ukksesulgur, uksehinged jne.
- ▶ Määrige hingepolt ja laagringe.
- ▶ Kontrollige õhuvahesid.
- ▶ Kontrollige, kas tähistus on nähtav.

**OHT**

**Eemaldunud isolatsioonikihi moodustavast materjalist lähtuv eluho**

Eemaldunud isolatsioonikihi moodustuva materjali tõttu kaotab tuletõkkeavataide oma funktsiooni.

- ▶ Asendage eemaldunud isolatsioonikihi moodustav materjal, vaata piltidega osa 10.13.

- ▶ Vahetage defekttsed osad välja.
- ▶ Kasutage üksnes originaalvaruosi.

Kui Te avastate puudusi, mida Te ei saa ise kõrvaldada, siis kutsuge nende kõrvaldamiseks vastavale tööle spetsialiseerunud firma.

### 5.2 Standardse krunditud pinnaga elementide pealispinna töötlemine

Ukselehe ja lengi pealispind on krunditud polüestripõhise epoksiidvaiguga pulbervärviga.

1. Eemaldage kõik tihendid.
2. Karestage kõik värvitavad pinnad välja arvatud isolatsioonikihi moodustava materjali.
3. Puhastage pealispindu korralikult.
4. Kasutage ukselehe, lengi ja isolatsioonikihi lõppviimistluse teostamiseks järgmist lahendust:
  - kruntimiseks 2-komponentset epoksiid-nakkekihti ja lõppviimistluseks sobiliku kaubandusvõrgust saada olevat värvi või
  - nii kruntimiseks kui lõppviimistluseks 2-komponentset polüüretaanvärvi.
5. Paigaldage tihendid pärast värvi kuivamist uuesti.

### 5.3 Puhastamine

- ▶ Puhastage pealispindu puhta vee ja tavalise värvitud pindade puhastusainega.

### 5.4 Roostevabast terasest detailide hooldus

- ▶ Puhastage ja hooldage roostevabast terasest detaile regulaarselt Hörmannilt saada oleva roostevaba terase hooldusvahendiga ning kandke see pinnale pehme lapi abil.

## 6 Etiketid ja märgistus

**Uksetüüpide D65-1, D65-2, D65-1 OD, D65-2 OD** etikett on määruse (EL) nr 305/2011 alusel tähistatud CE-vastavusmärgisega. Kasutatud ja rakendatud harmoneeritud Euroopa tootenorm on EN 14351-1:2006 + A1:2010 „Aknad ja ukсед – Tootestandard, toimeomadused – Osa 1: Aknad ja välisüksed, millele ei esitata tulepüvisus- ja/ või suitsutõkestusnõudeid.“ Vastava CE-märgise või toimevõimeklaratsiooni number asub ukse mantelserva alasse paigaldatud eelnevalt mainitud etiketil tootja logo ja CE-vastavusmärgistuse vahel.

Uksed, mille etiketil puudub CE-vastavusmärgis, ei kuulu ülal mainitud harmoneeritud Euroopa tootenormi kohaldatavuse alla ning neil ei tohi seetõttu olla CE-märgistust või siis toimevõimeklaratsiooni.

## **7 Üldteave**

Ust ei või senikaua kasutusele võtta, kuni on kindlaks tehtud, et ta on meie juhiste järgi paigaldatud ja tema korrektset toimivust on kontrollitud. Kui toodet muudetakse siis kaotab toimivusdeklaratsioon kehtivuse.

## **8 Toimivusdeklaratsioon**

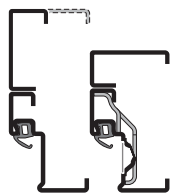
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**[www.hoermann.com/dop](http://www.hoermann.com/dop)**

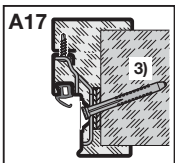
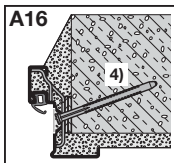
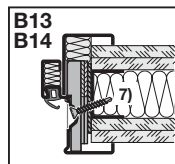
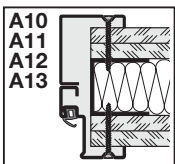
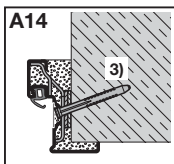
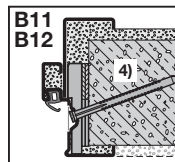
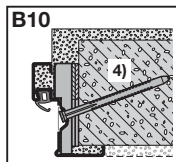
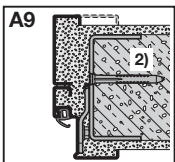
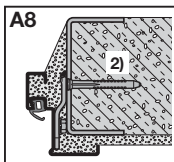
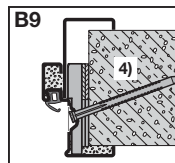
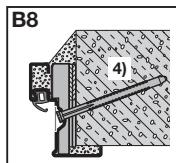
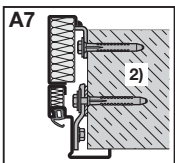
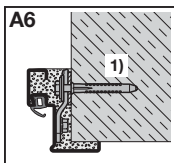
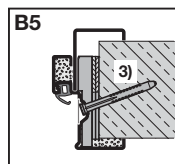
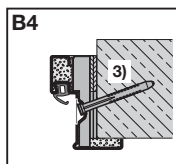
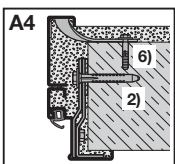
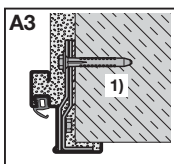
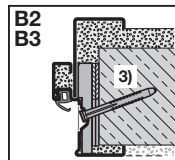
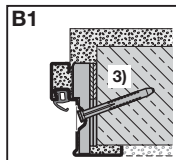
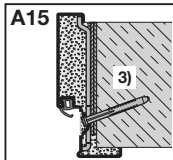
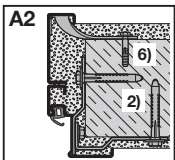
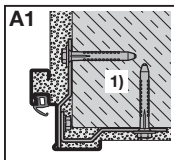
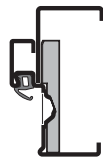
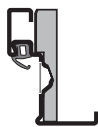


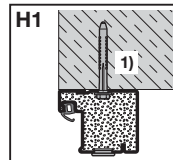
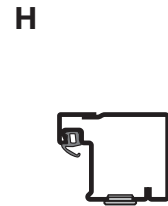
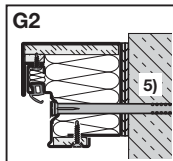
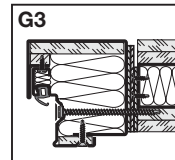
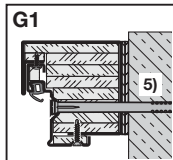
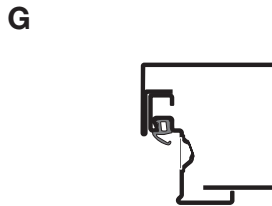
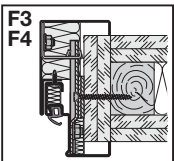
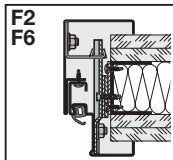
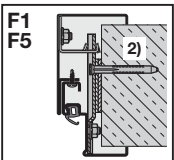
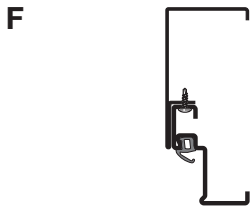
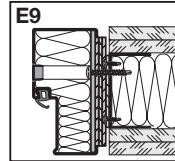
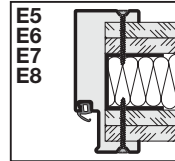
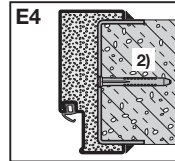
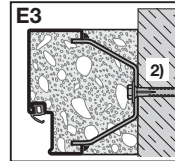
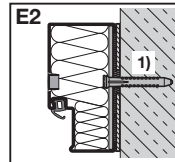
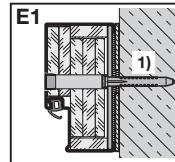
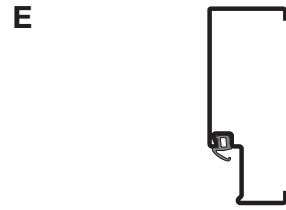
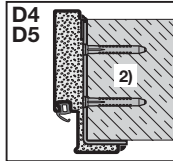
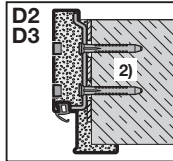
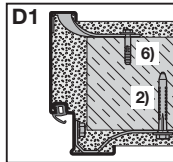
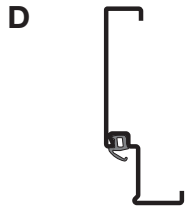
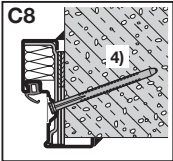
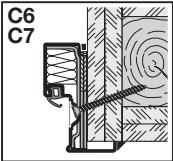
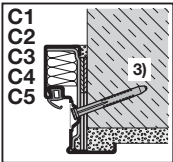
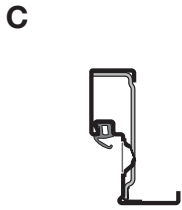


**A**



**B**





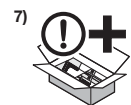
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Fischer: SXS 10 × 80/100  
Hilti: HRD 10 × 80/100  
MEA: MFR 10 × 80/100  
Würth: W-UR 10 × 80/100

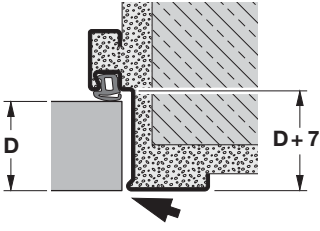


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Hilti: HRD 10 × 80/100  
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Würth: W-UR 10 × 80/100/115

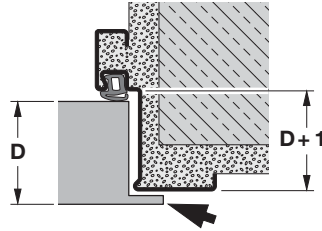
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4) Fischer: FUR 10 × 160  
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6) 8 × 40



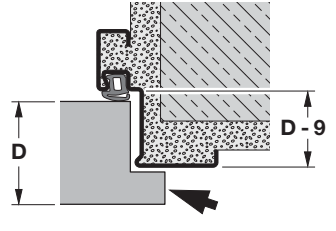
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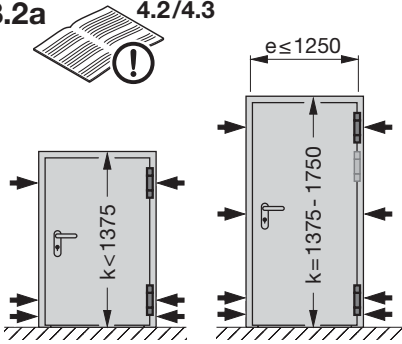
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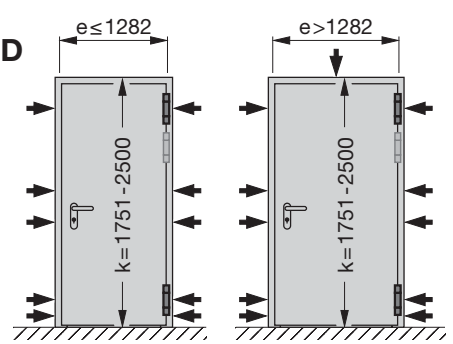
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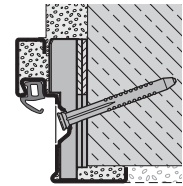
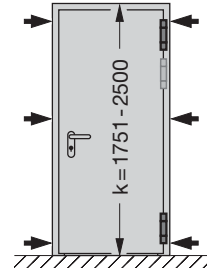
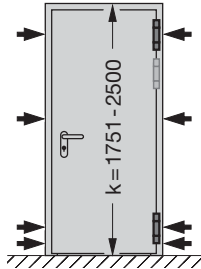
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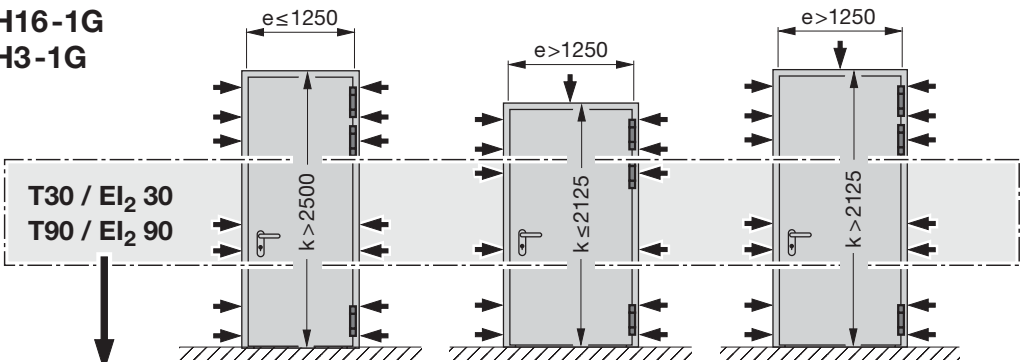
H16-S1  
H16-1 OD  
HS75



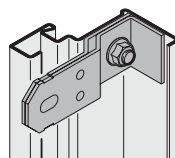
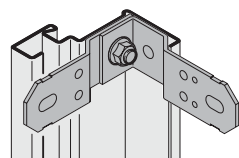
D65-1 OD  
H3-1 OD



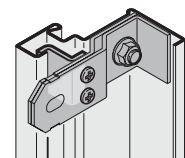
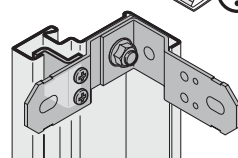
H16-1G  
H3-1G



T30 / EI<sub>2</sub> 30



T90 / EI<sub>2</sub> 90



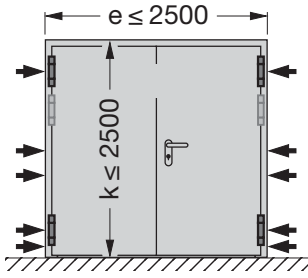
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8.6b

8.2b

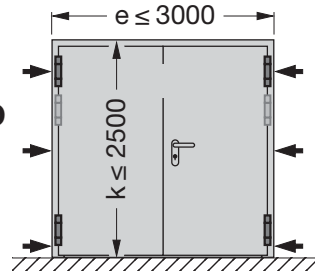


4.2/4.3

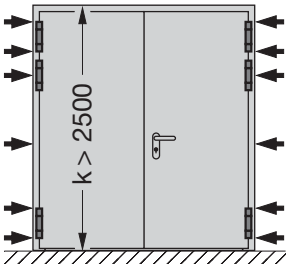
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H3-2 OD



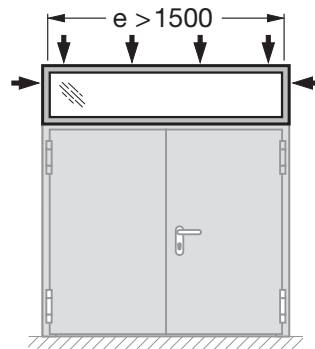
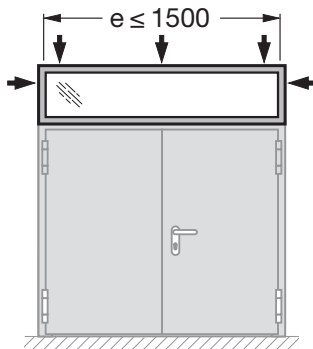
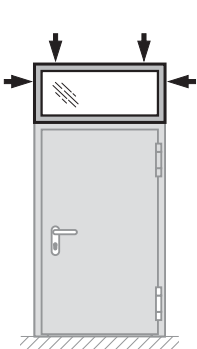
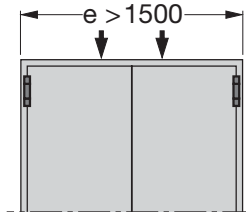
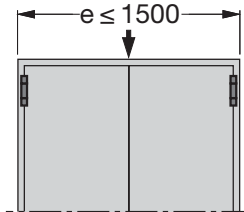
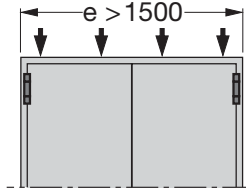
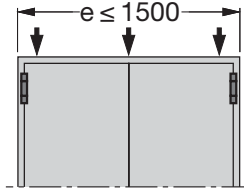
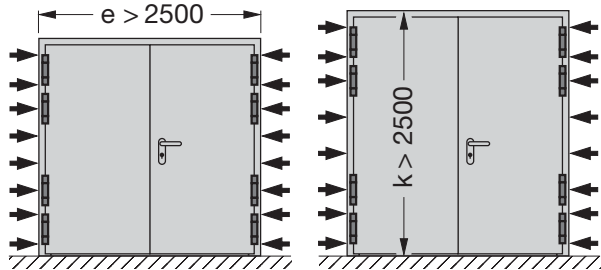
D65-2 OD



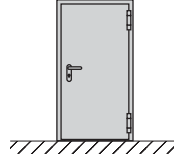
H3-2 VM



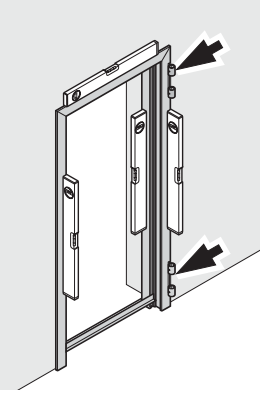
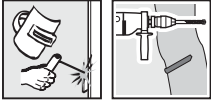
H16-2 G  
H\_90 F2



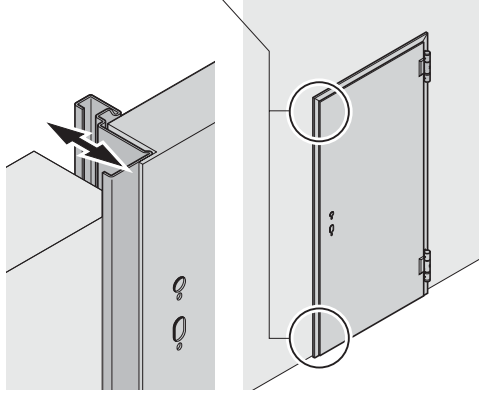
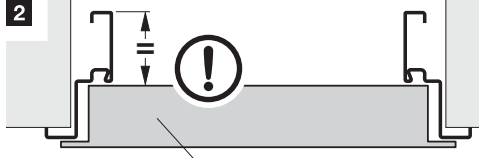
8.2c



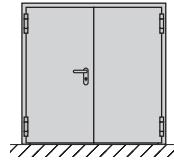
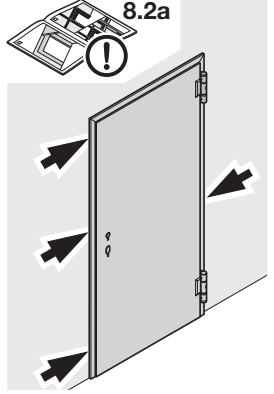
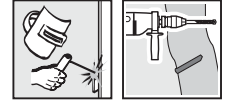
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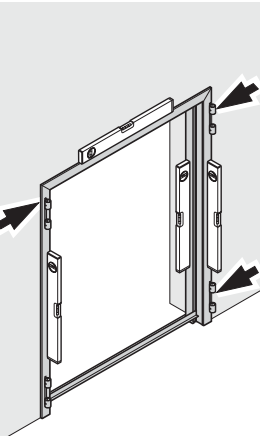
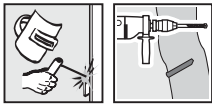
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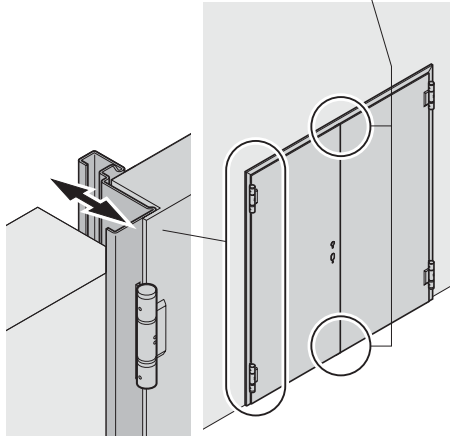
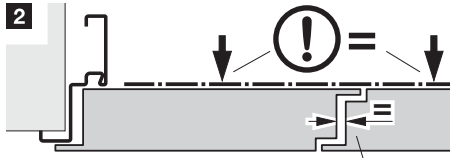
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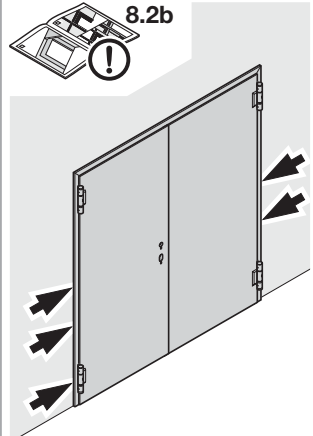
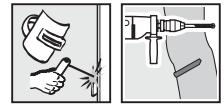
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2



3

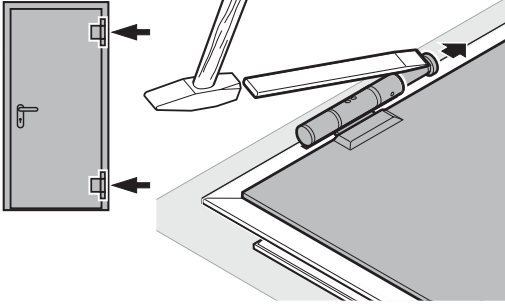


8.3a

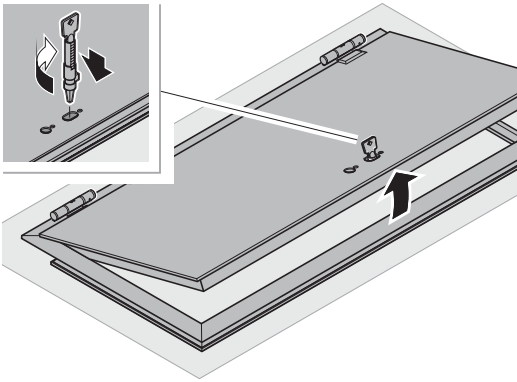
4.3



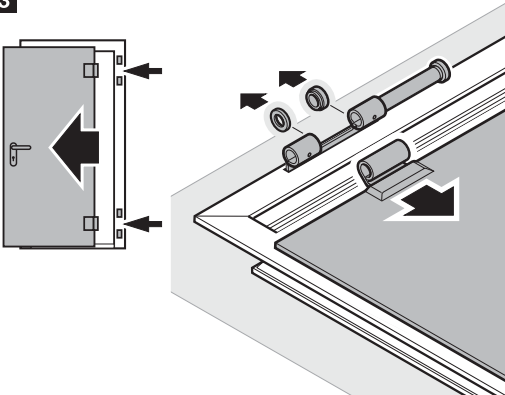
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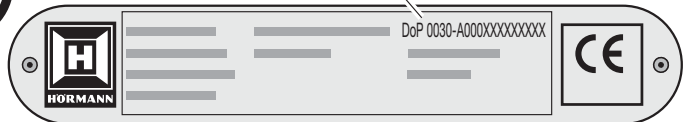
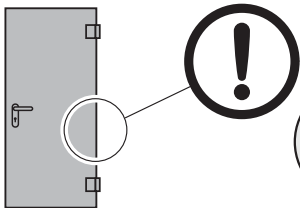
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3



4

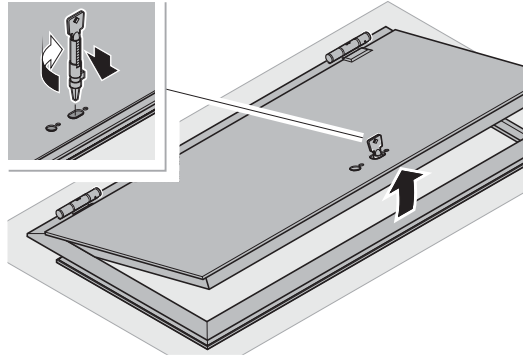


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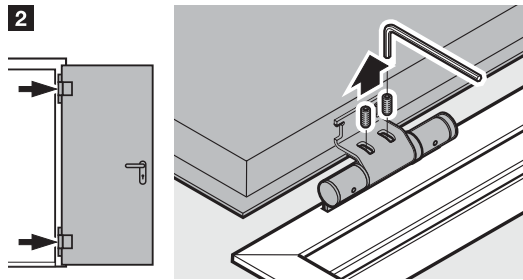
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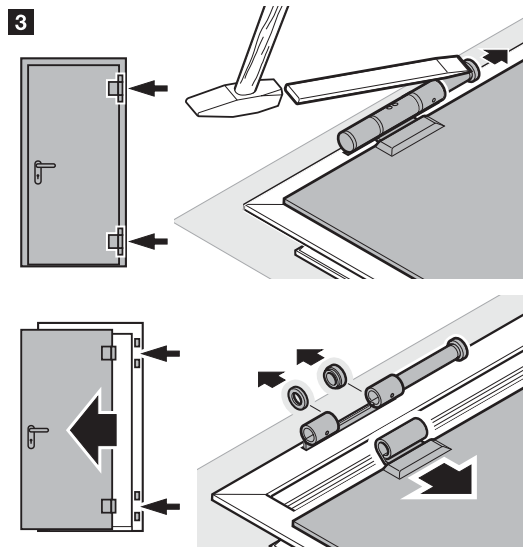
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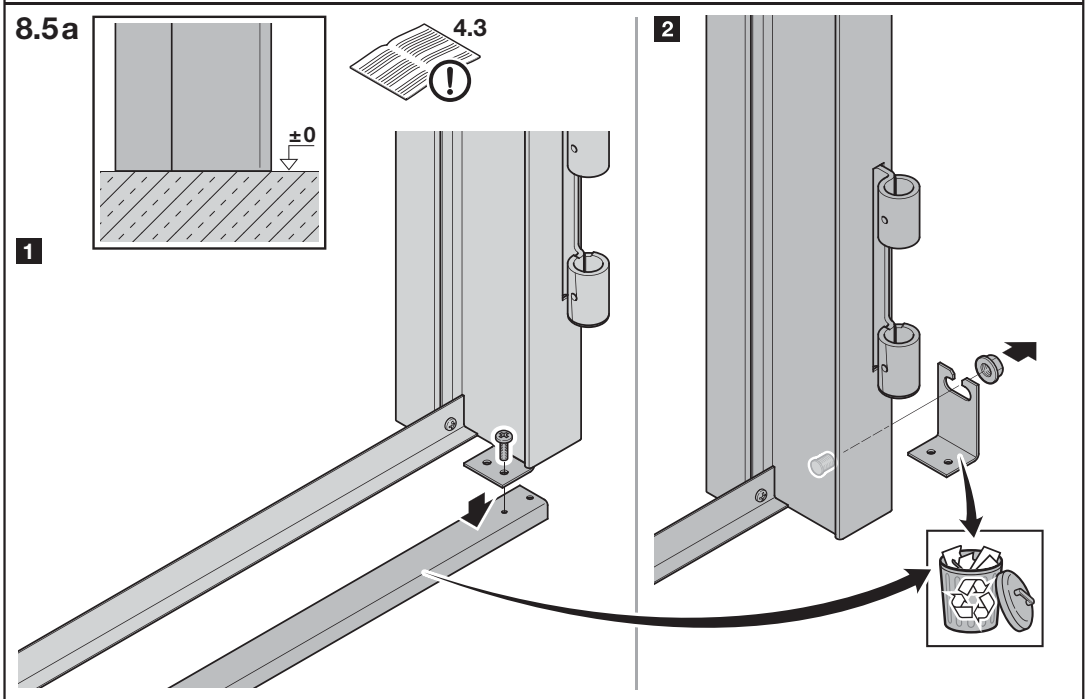
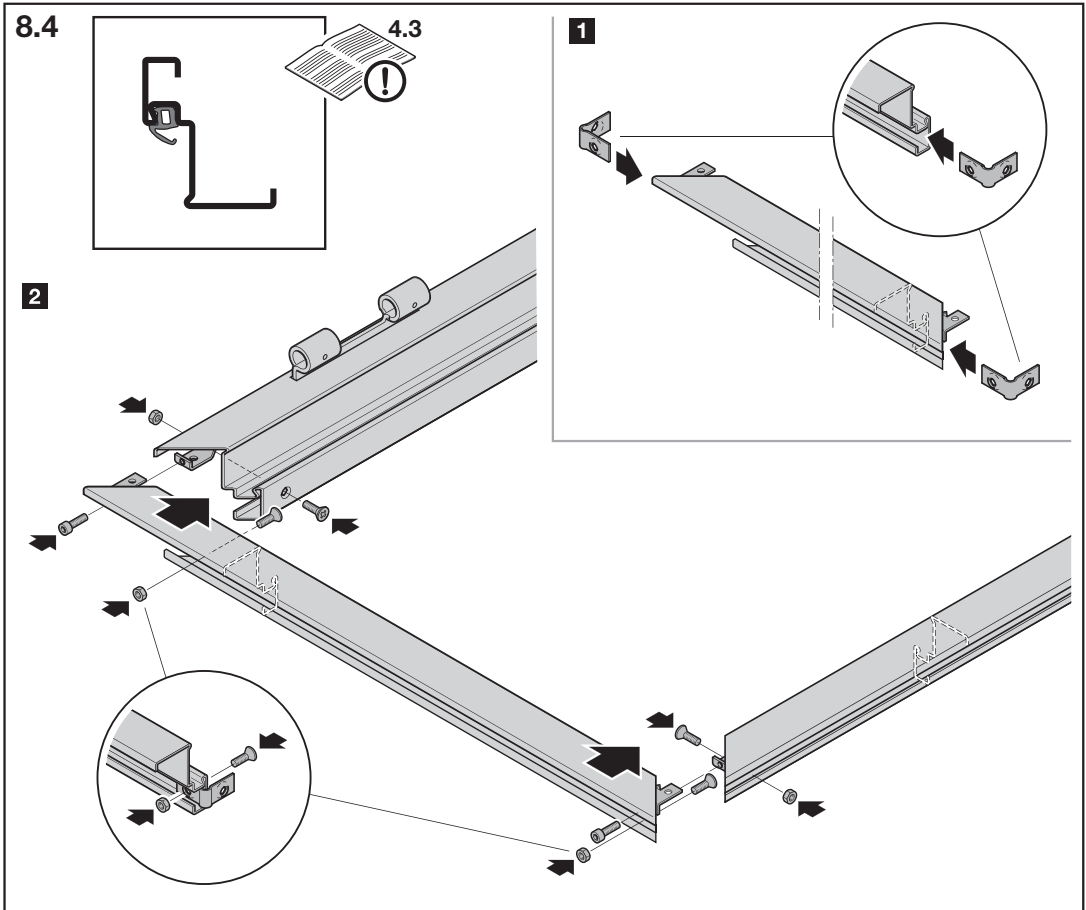


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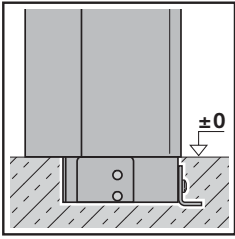
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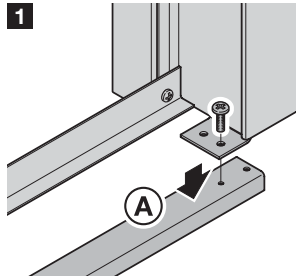


8.5b

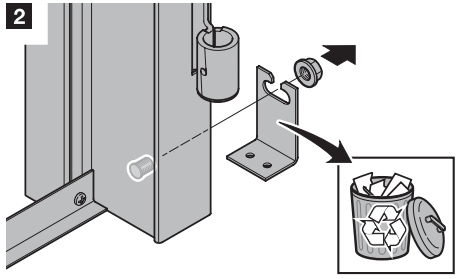
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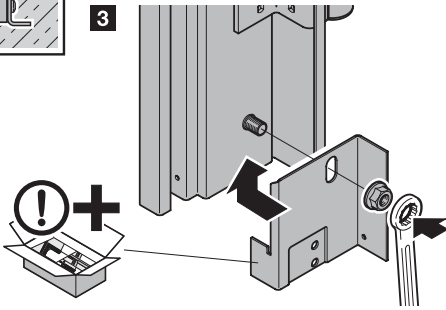
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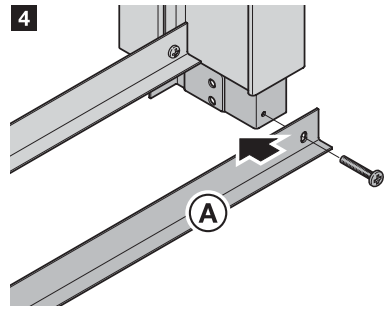
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3

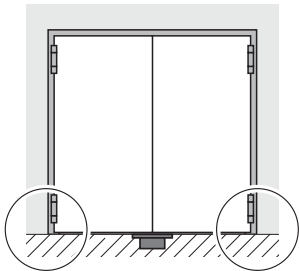
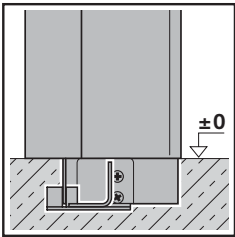


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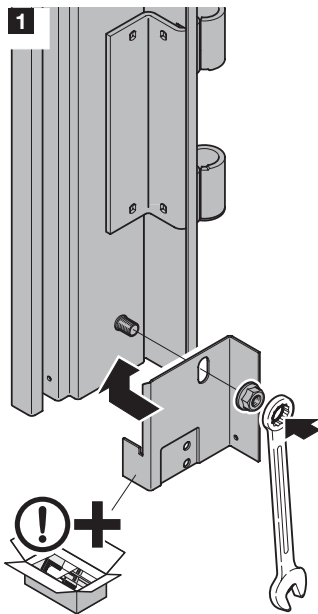


8.5c

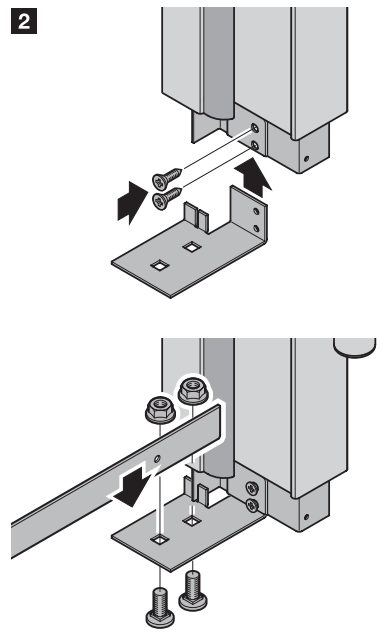
4.3



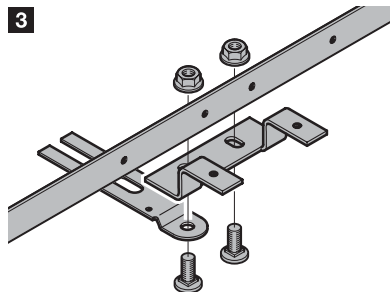
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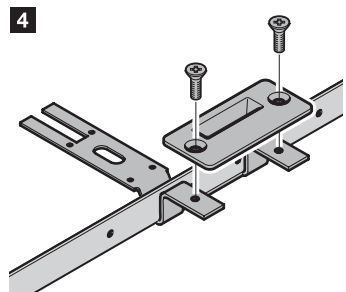
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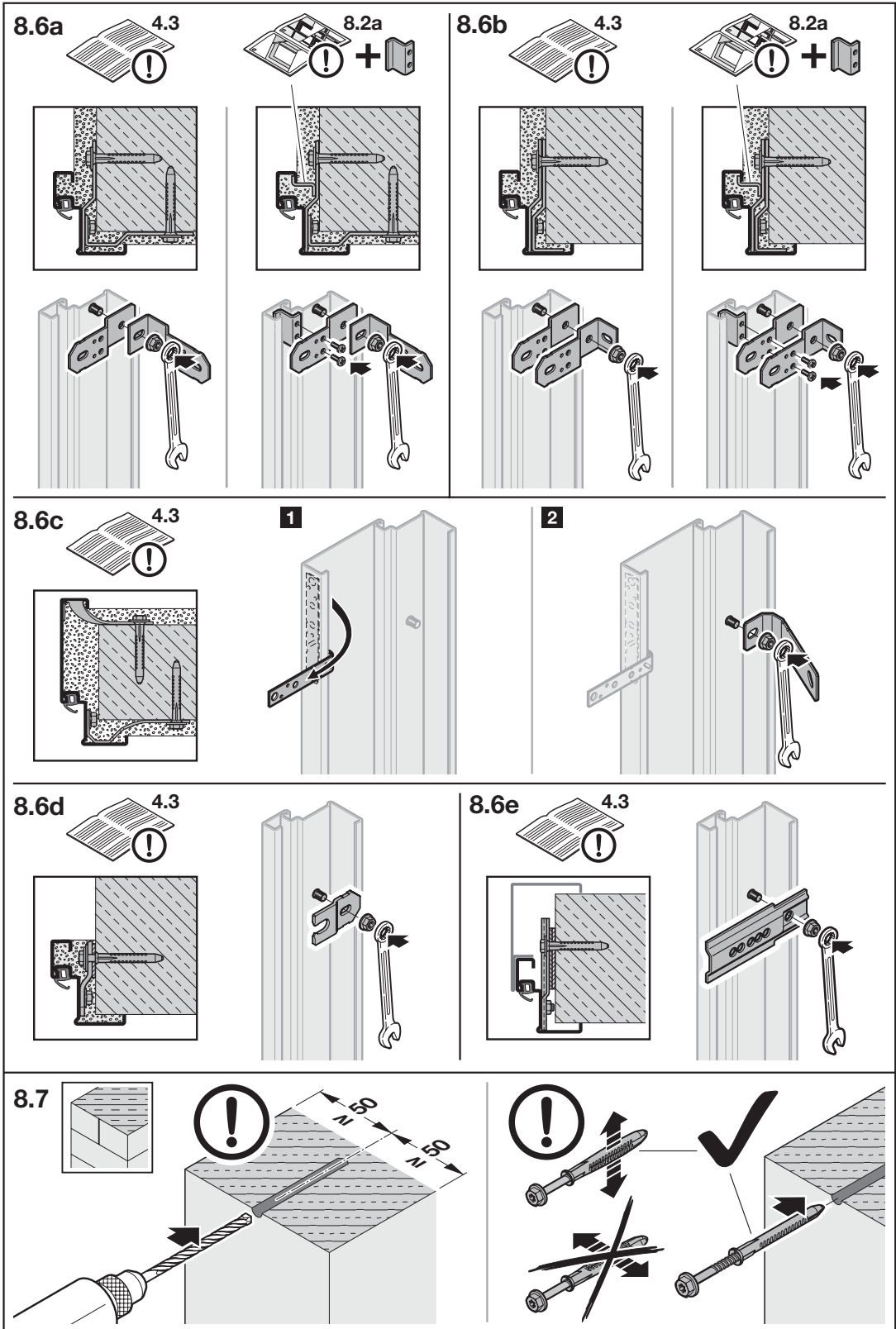
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4





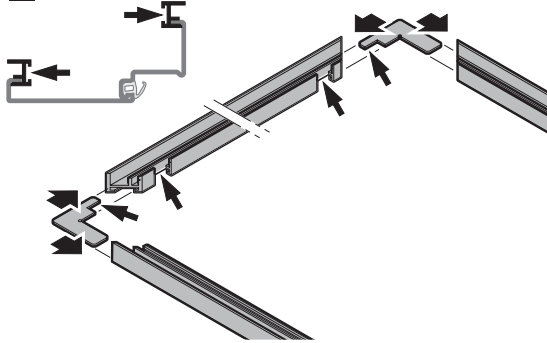


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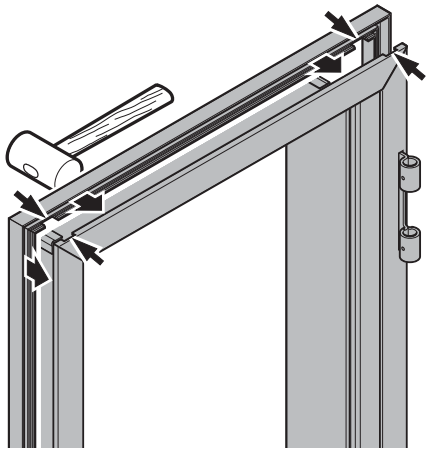
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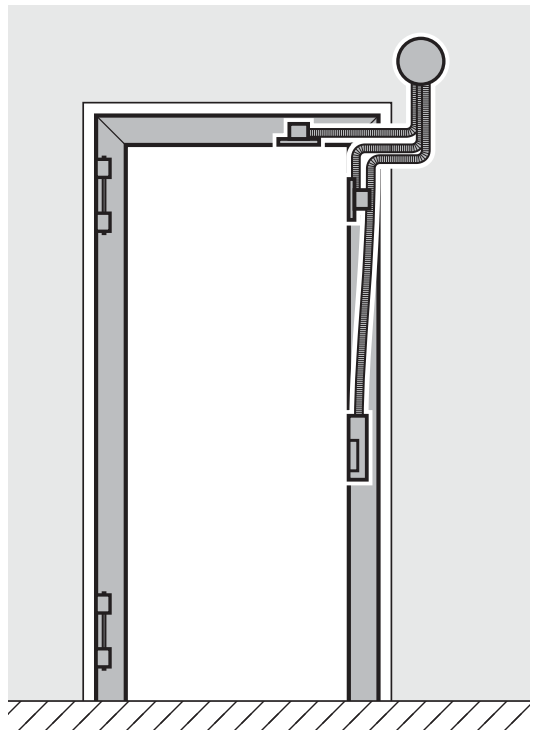
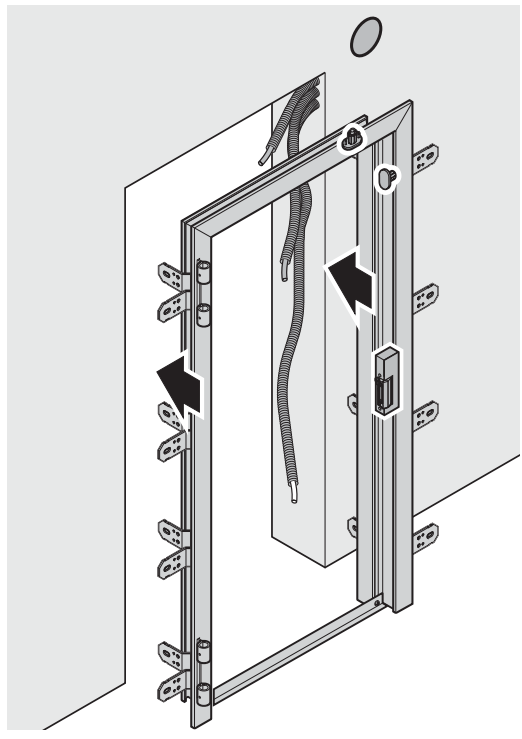
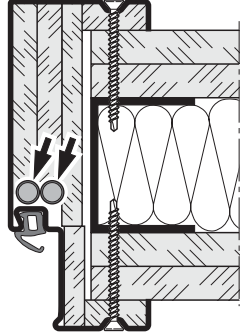
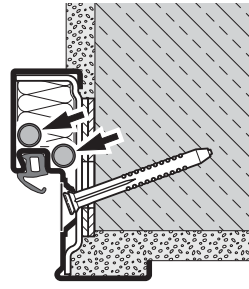
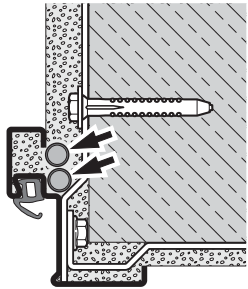
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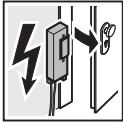
2



8.9



8.10



AC  
~

DC  
≡



I.S.T. Systems

FT200/FT201

x

x

x

x

142 UF

x

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x

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x

effeff

143

x

x (79/2)

x

x

x

x

14/34

x

x

x

x

Dorma

447/Basic

x

x

x

x

Lucky Basic

x

x

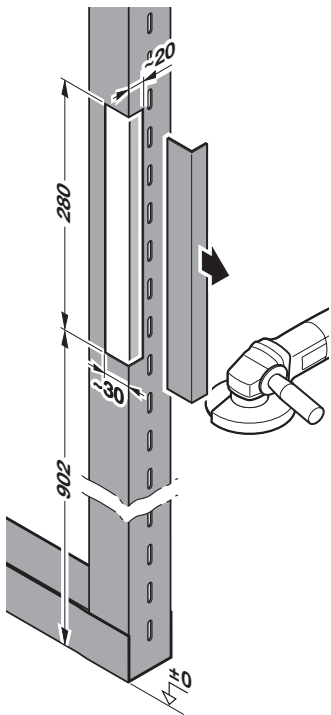
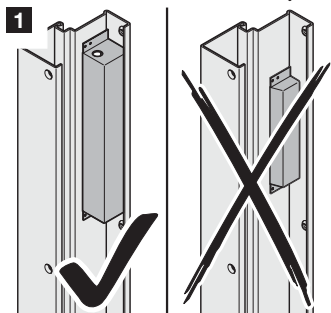
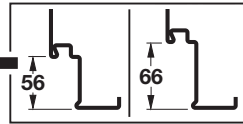
x

x

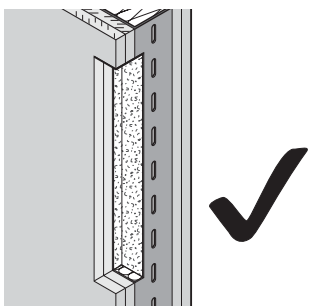
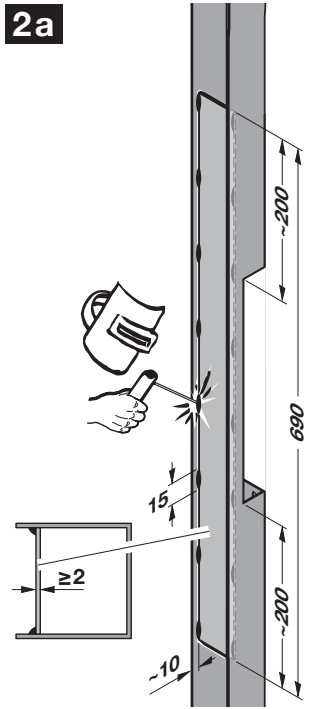
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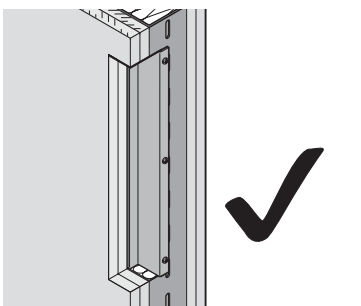
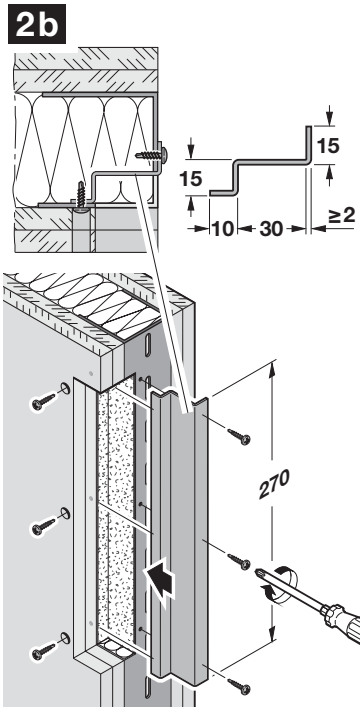
8.12



2a



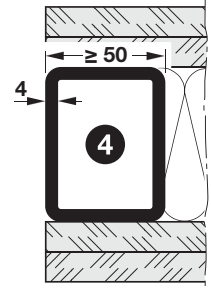
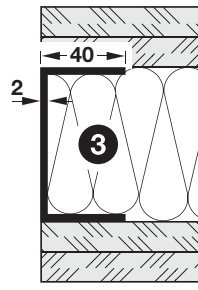
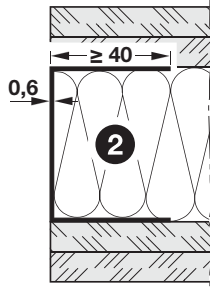
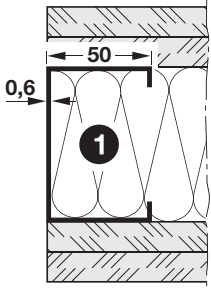
2b



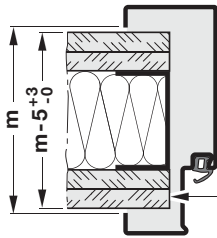
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4.2

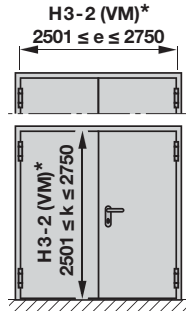
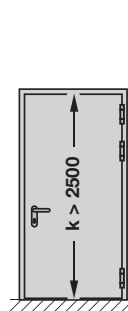
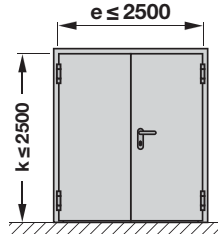
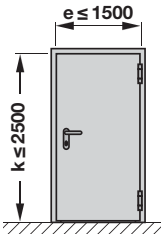
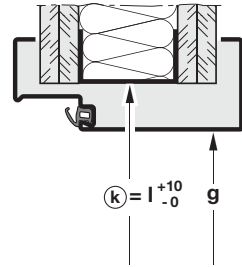
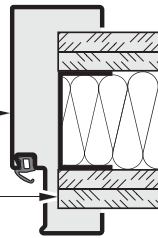
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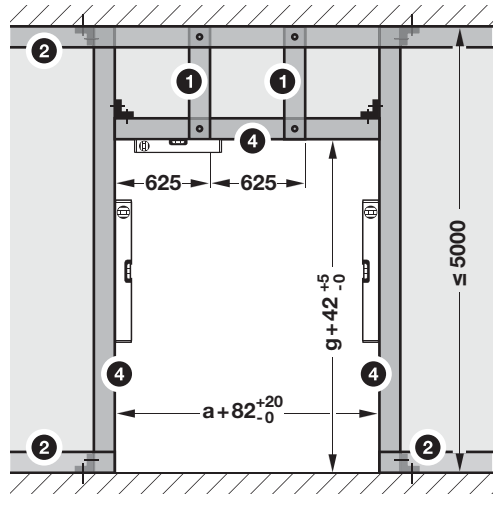
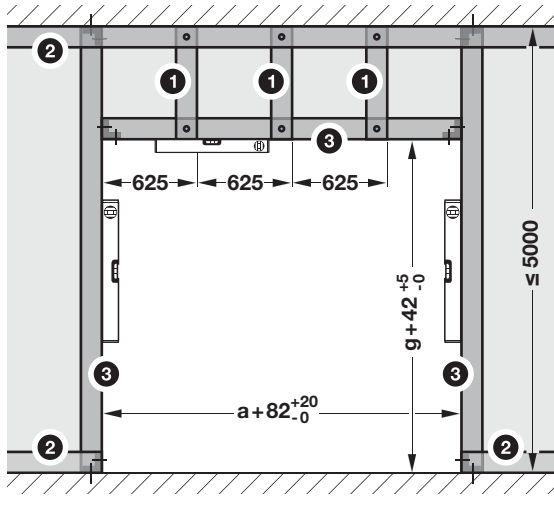
www.felko-systeme.de



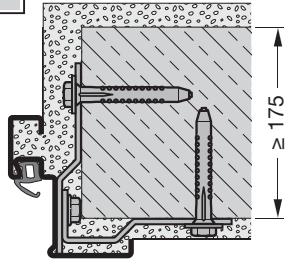
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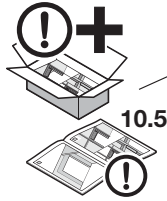
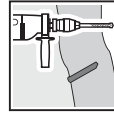
\*www.felko-systeme.de



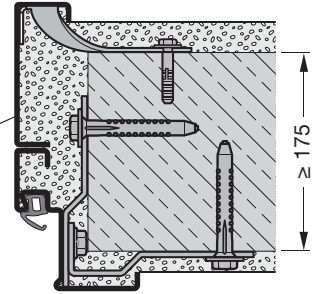
9/A1



9/A2



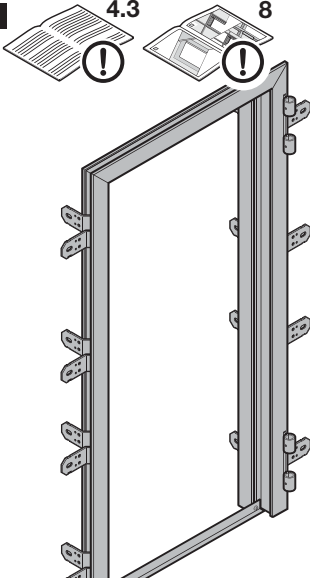
10.5



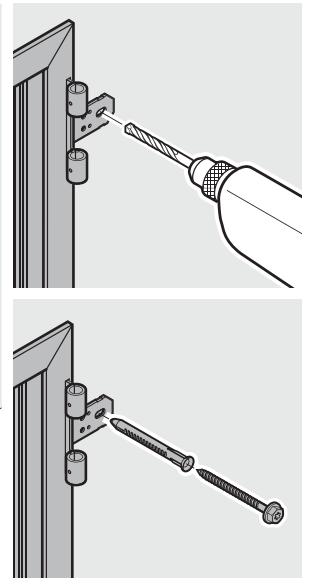
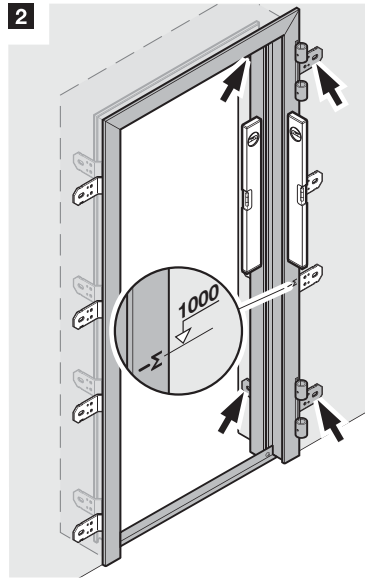
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4.3

8

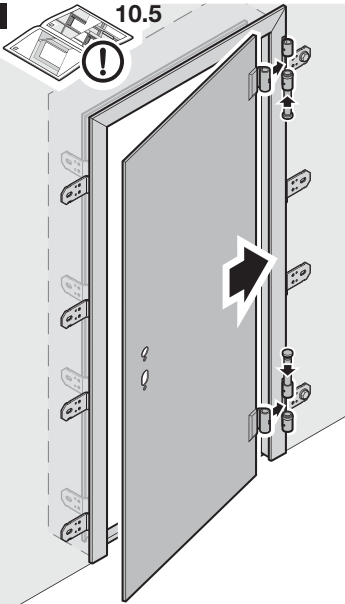


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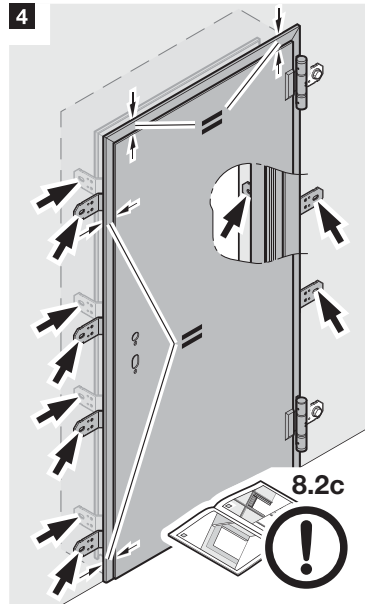


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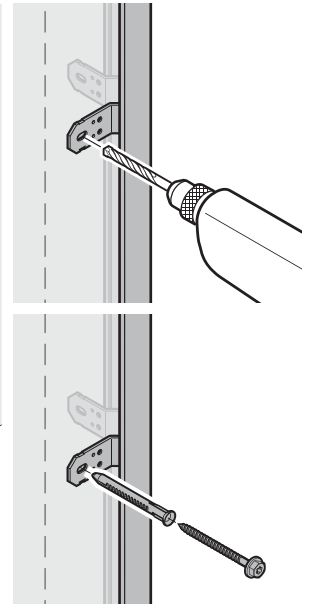
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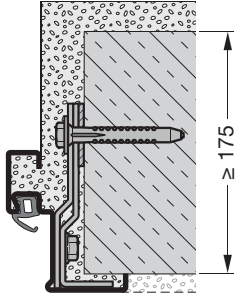
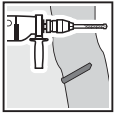
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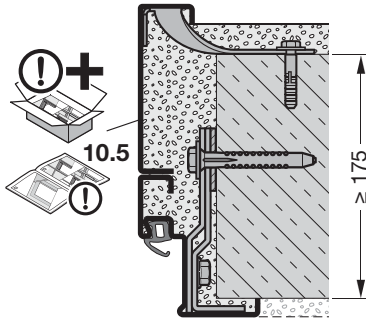
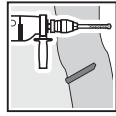
8.2c



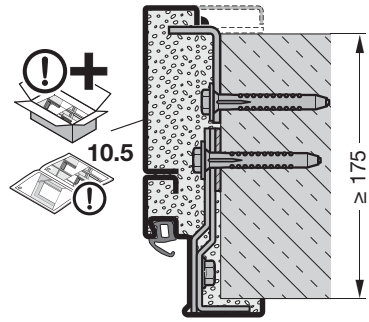
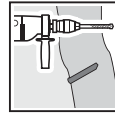
9/A3



9/A4



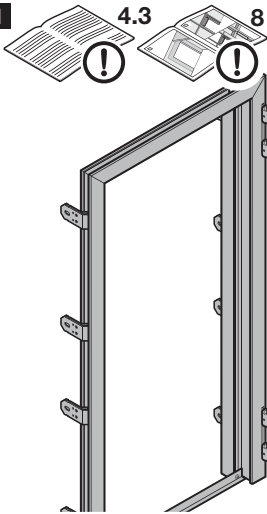
9/A5



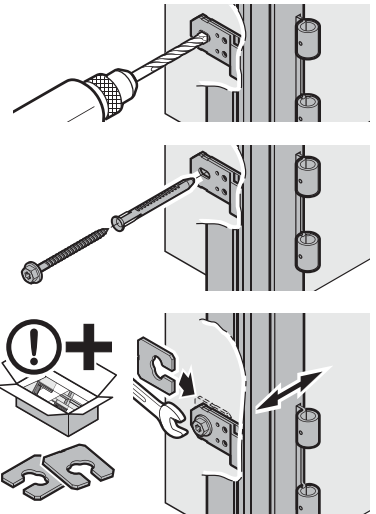
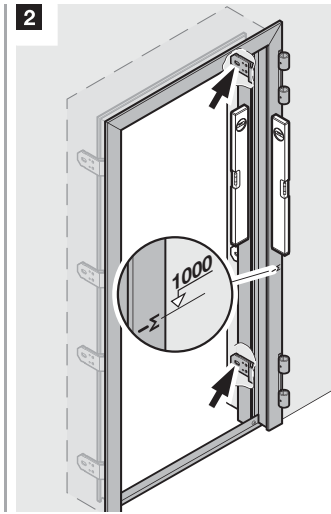
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4.3

8

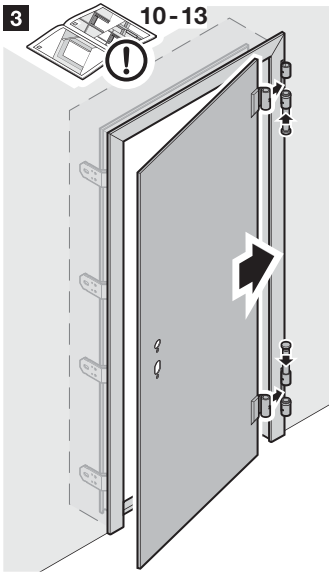


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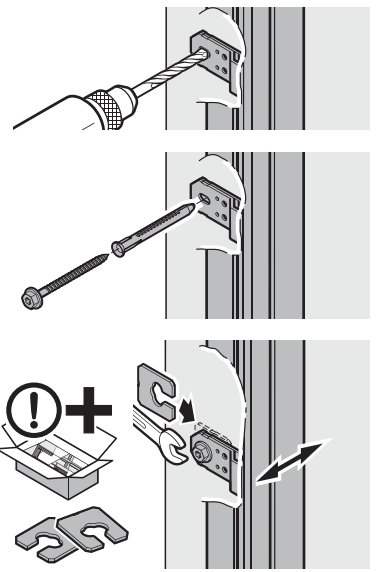
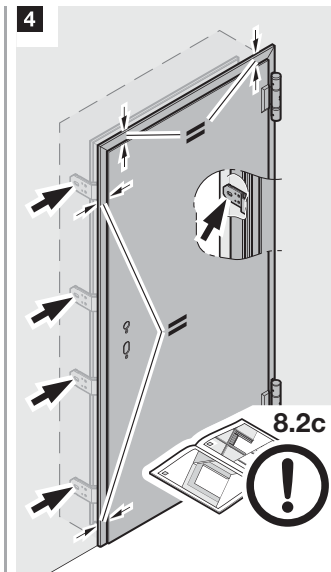


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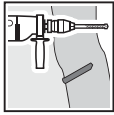
10-13



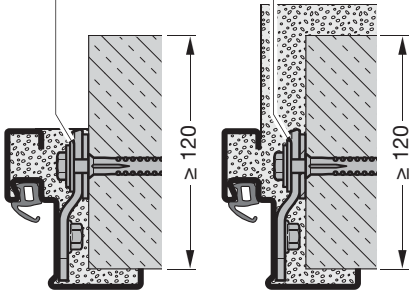
4



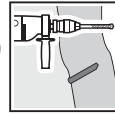
9/A6



DIN 9021-8.4-140 HV

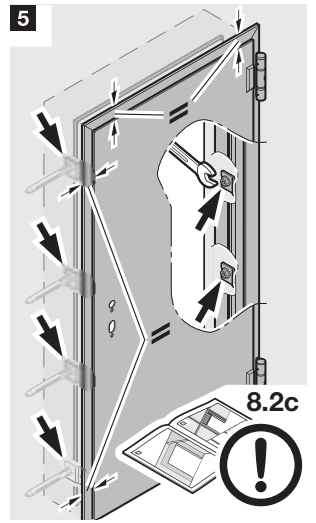
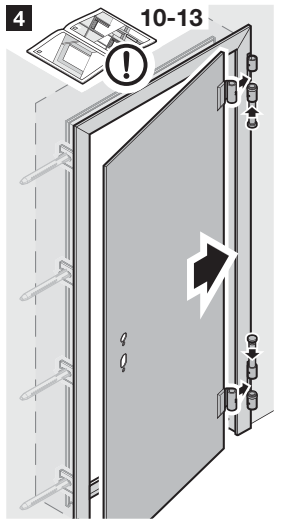
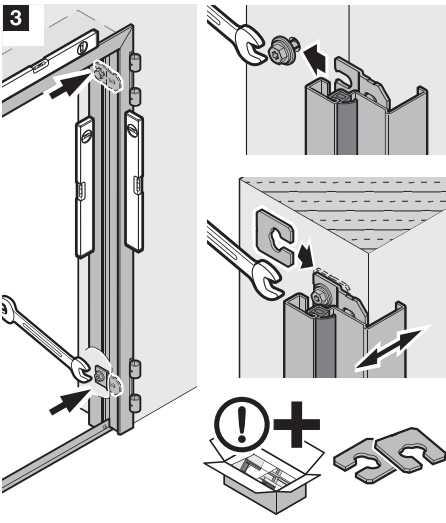
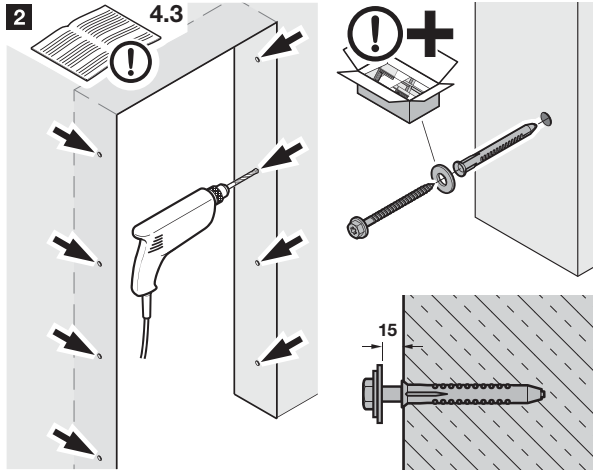
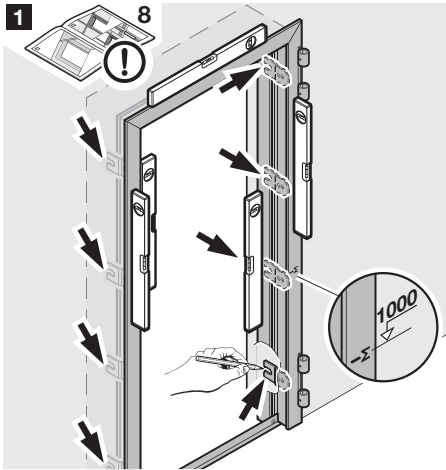
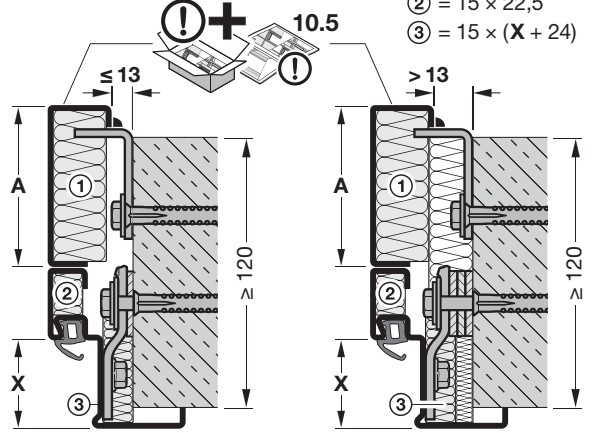


9/A7  
max. T30

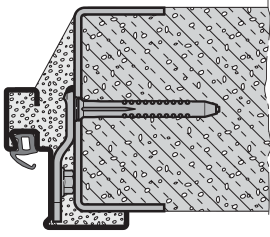


$\rho \sim 100 \text{ kg/m}^3$   
A (EN 13501-1)  
z.B. Isover BSP100

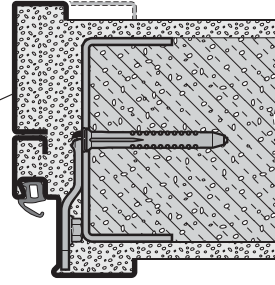
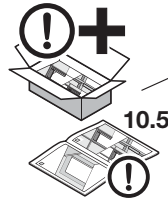
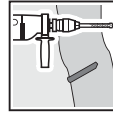
- ① =  $30 \times (A - 5)$
- ② =  $15 \times 22,5$
- ③ =  $15 \times (X + 24)$



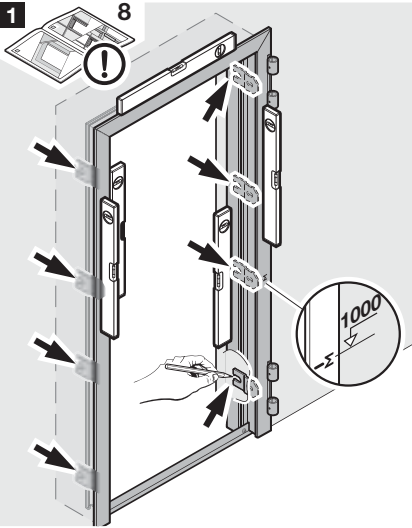
9/A8



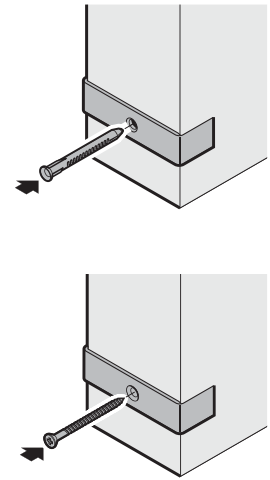
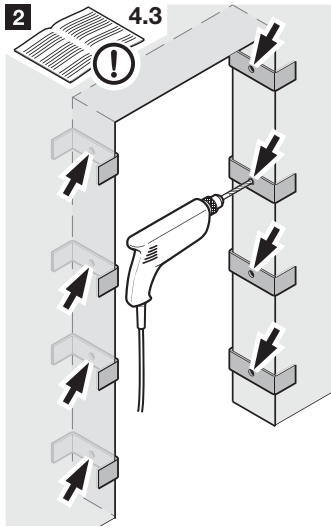
9/A9



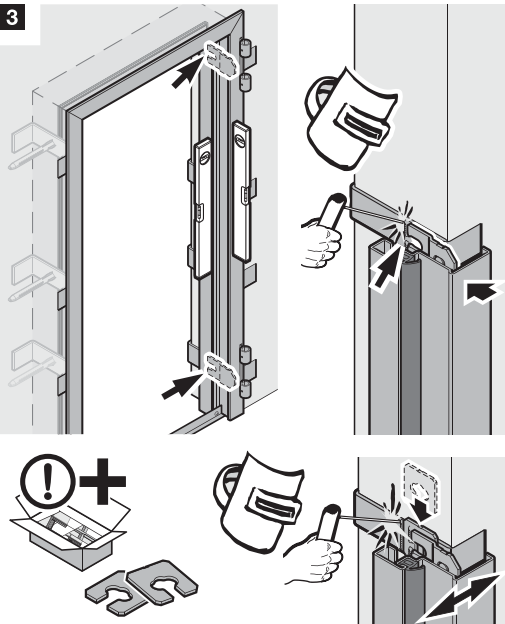
1 8



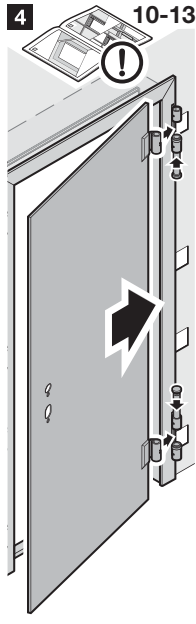
2 4.3



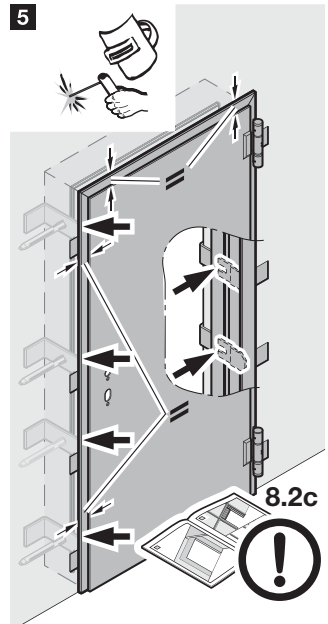
3



4 10-13



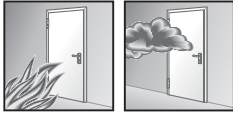
5



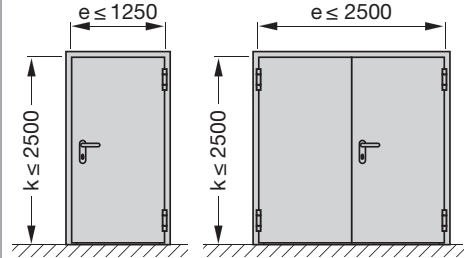
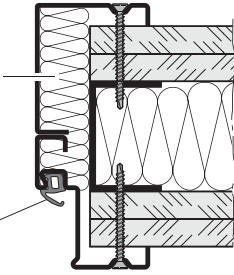
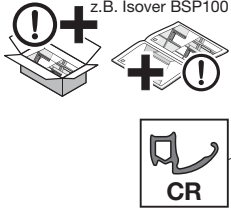


9/A10

max. T30/  
EI<sub>230</sub>



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



**1** 4.3 8

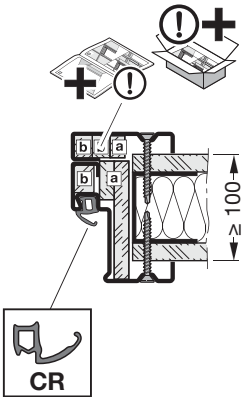
8.9/8.10

**2** 10-13

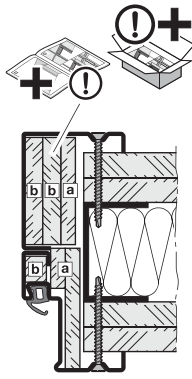
**3** 8.2c

**4** 10.5

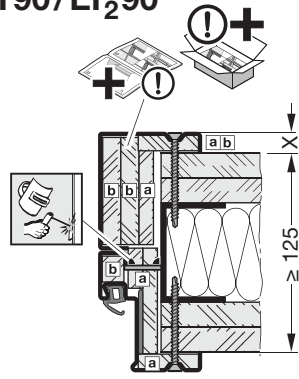
9/A11



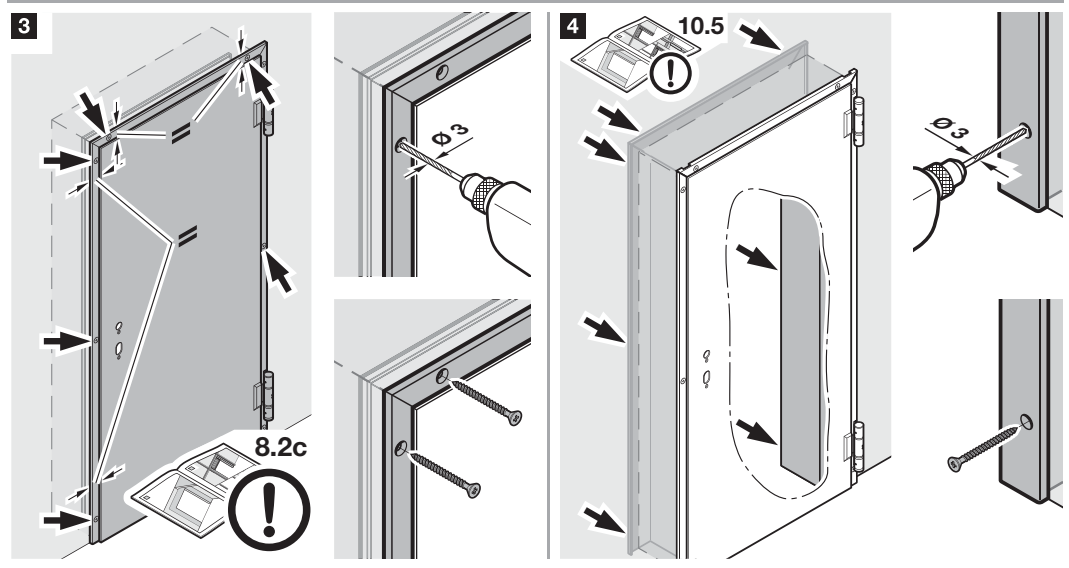
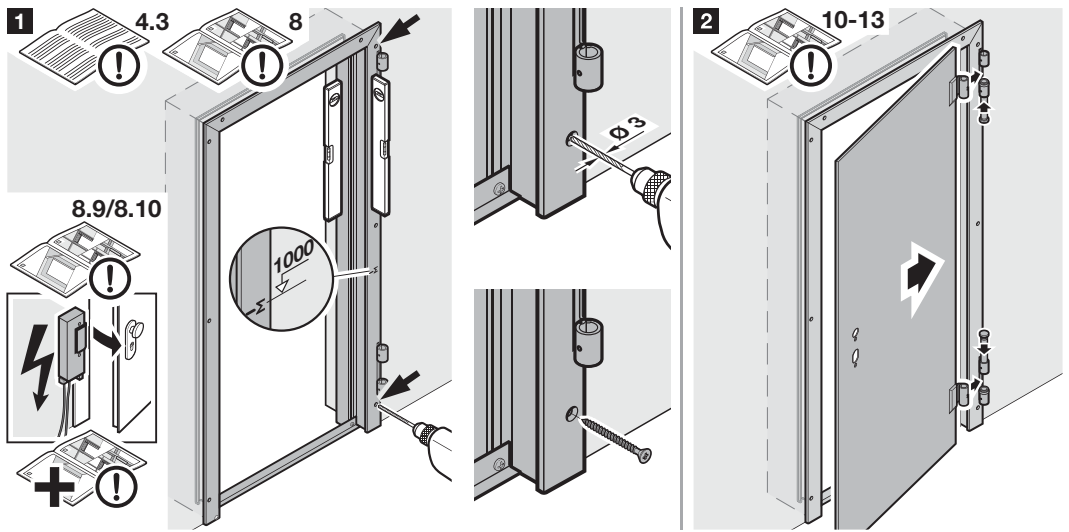
9/A12



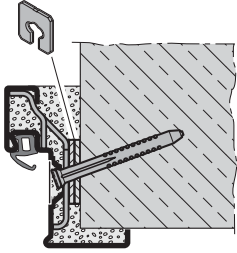
9/A13  
T90/EI<sub>2</sub>90



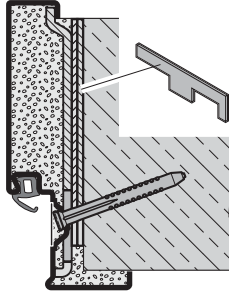
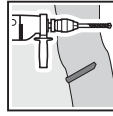
a A-9,5-EN 520 / b A-12,5-EN 520 / X = 10 → a / X = 15 → b



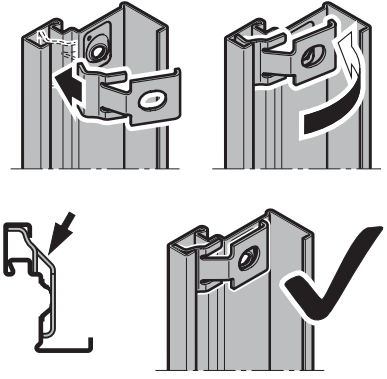
9/A14  
max. T30/  
EI<sub>2</sub>30



9/A15  
max. T90/  
EI<sub>2</sub>90



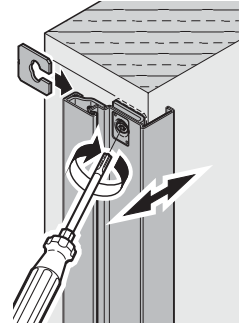
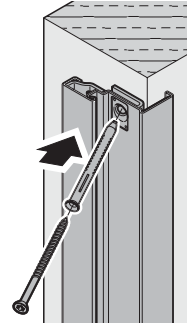
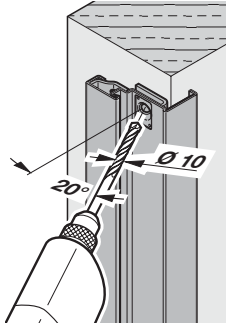
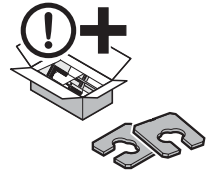
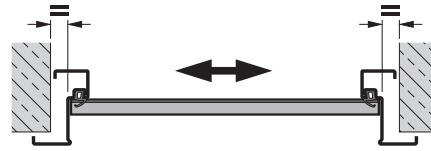
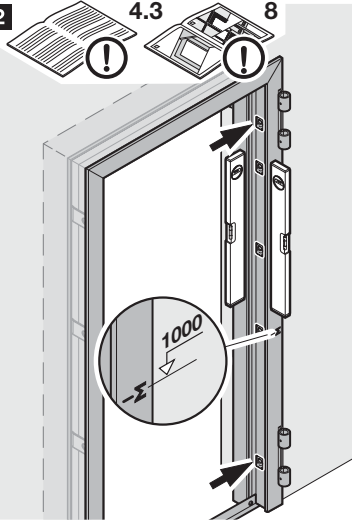
1



2

4.3

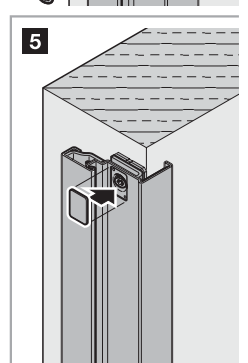
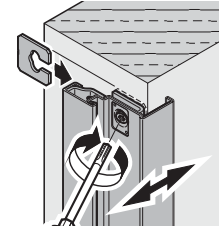
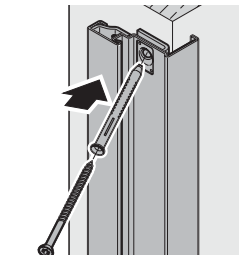
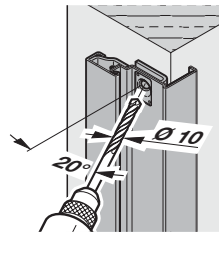
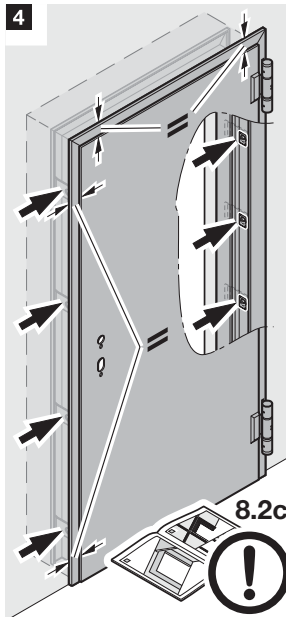
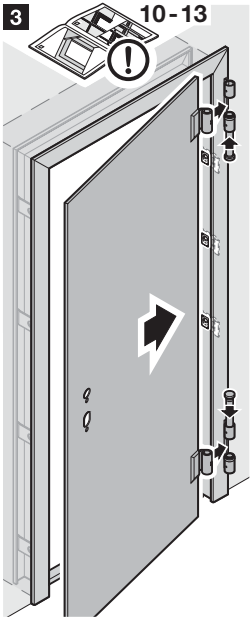
8



3

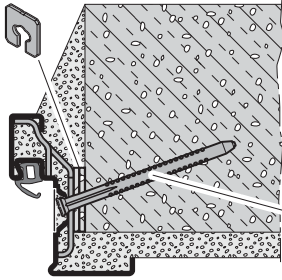
10-13

4



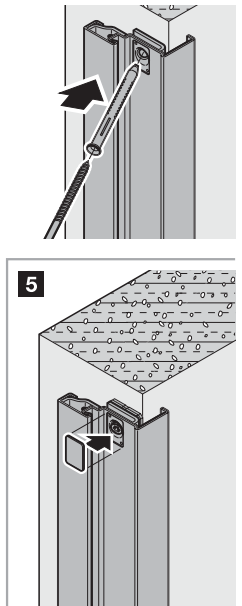
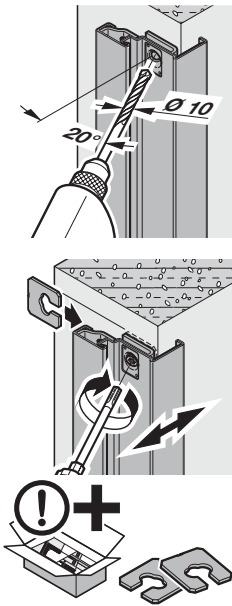
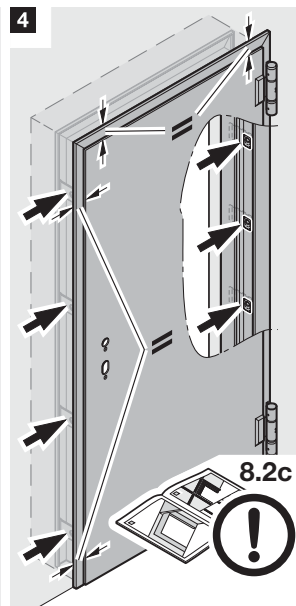
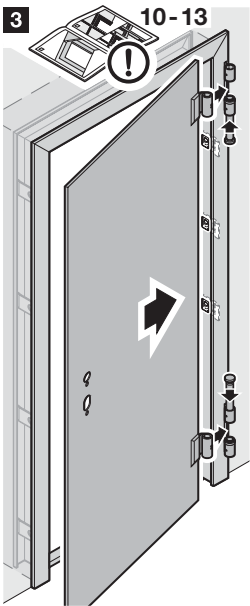
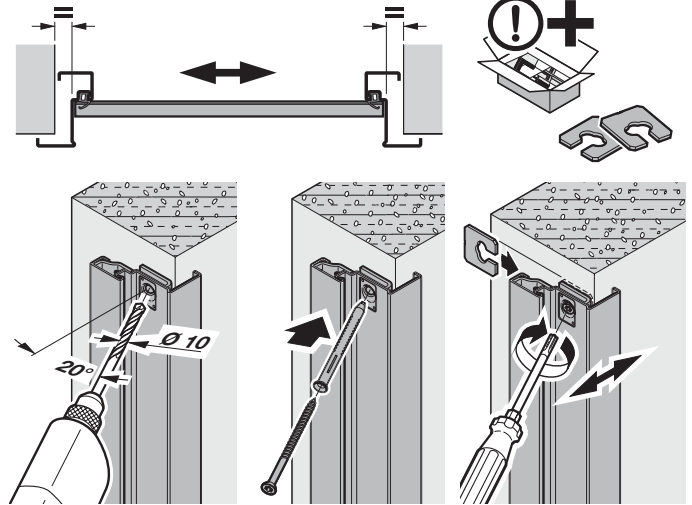
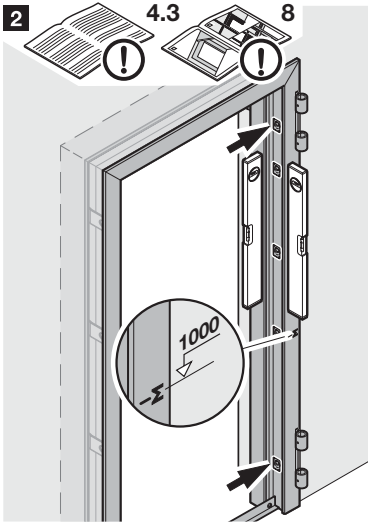
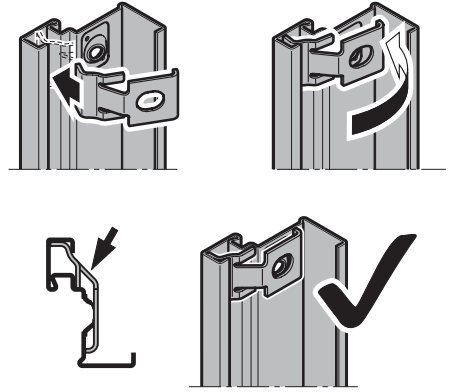
5

9/A16  
max. T30



FUR 10 x 160

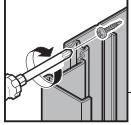
1



9/A17

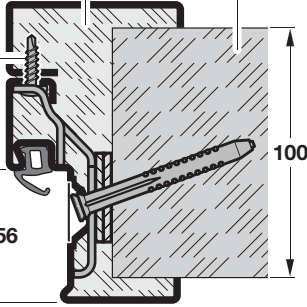


Multi Gips  
FG70

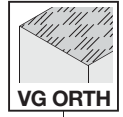


DIN 7504 ST  
4,8 x 19-N-H  
DIN 7981  
4,8 x 16

max. 56

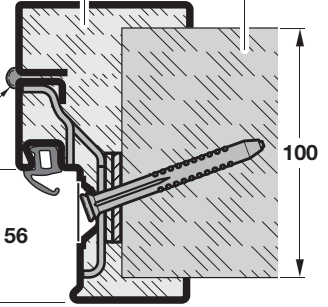


Multi Gips  
FG70

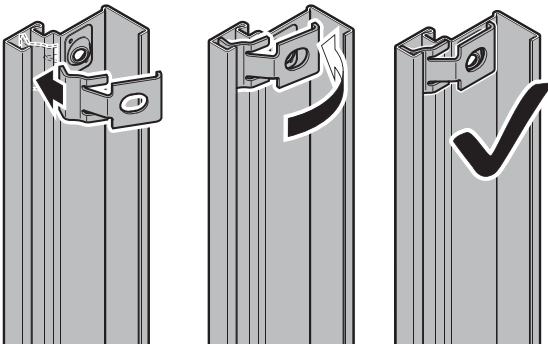
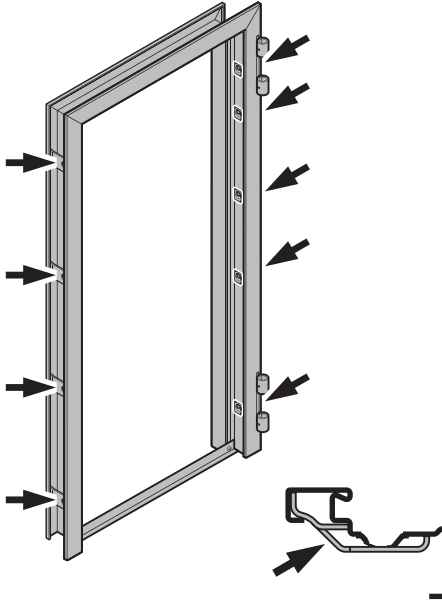


$2\sqrt{x} > 10$

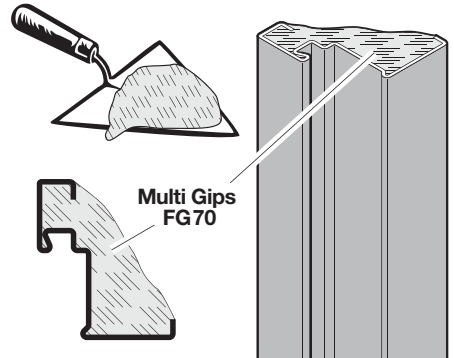
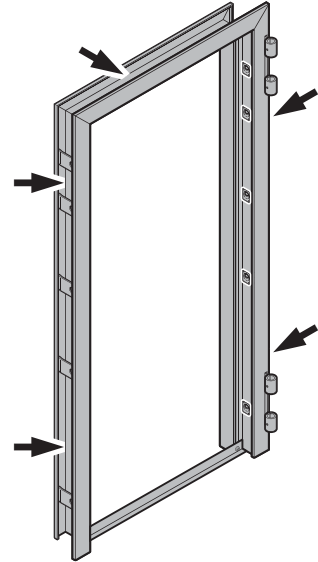
max. 56



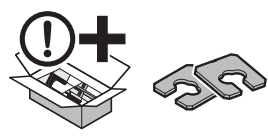
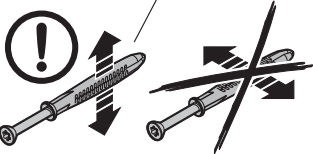
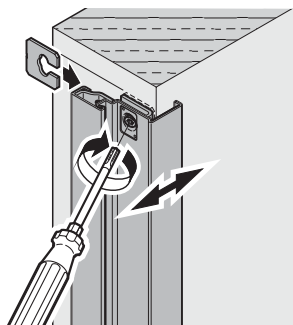
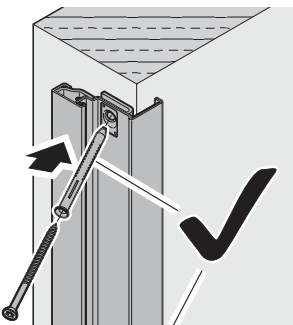
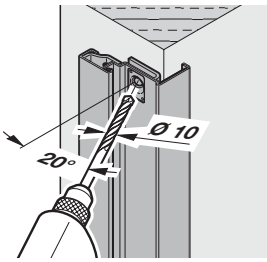
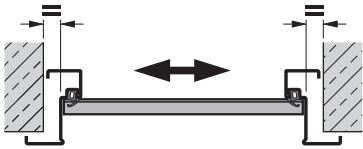
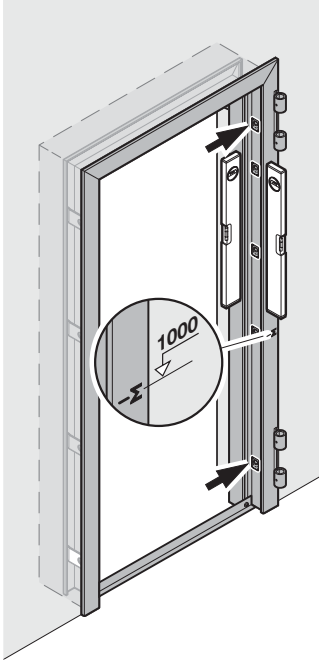
1



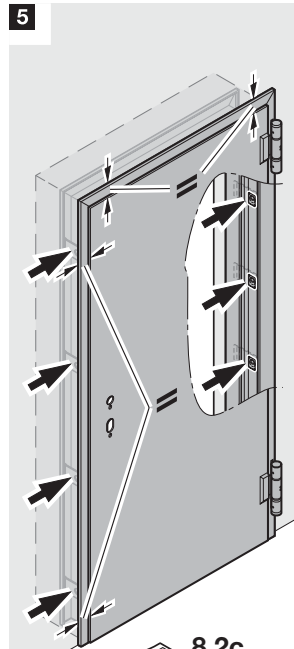
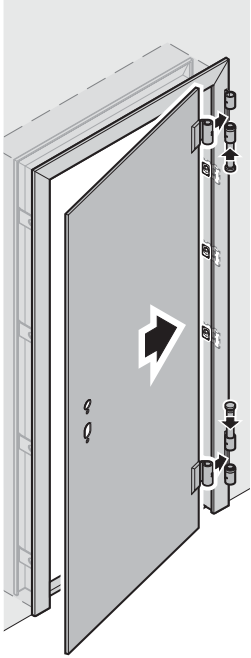
2



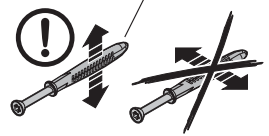
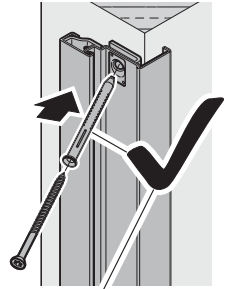
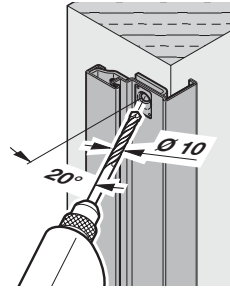
**3** 4.2/4.3 8



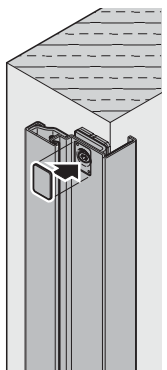
**4** 10-13

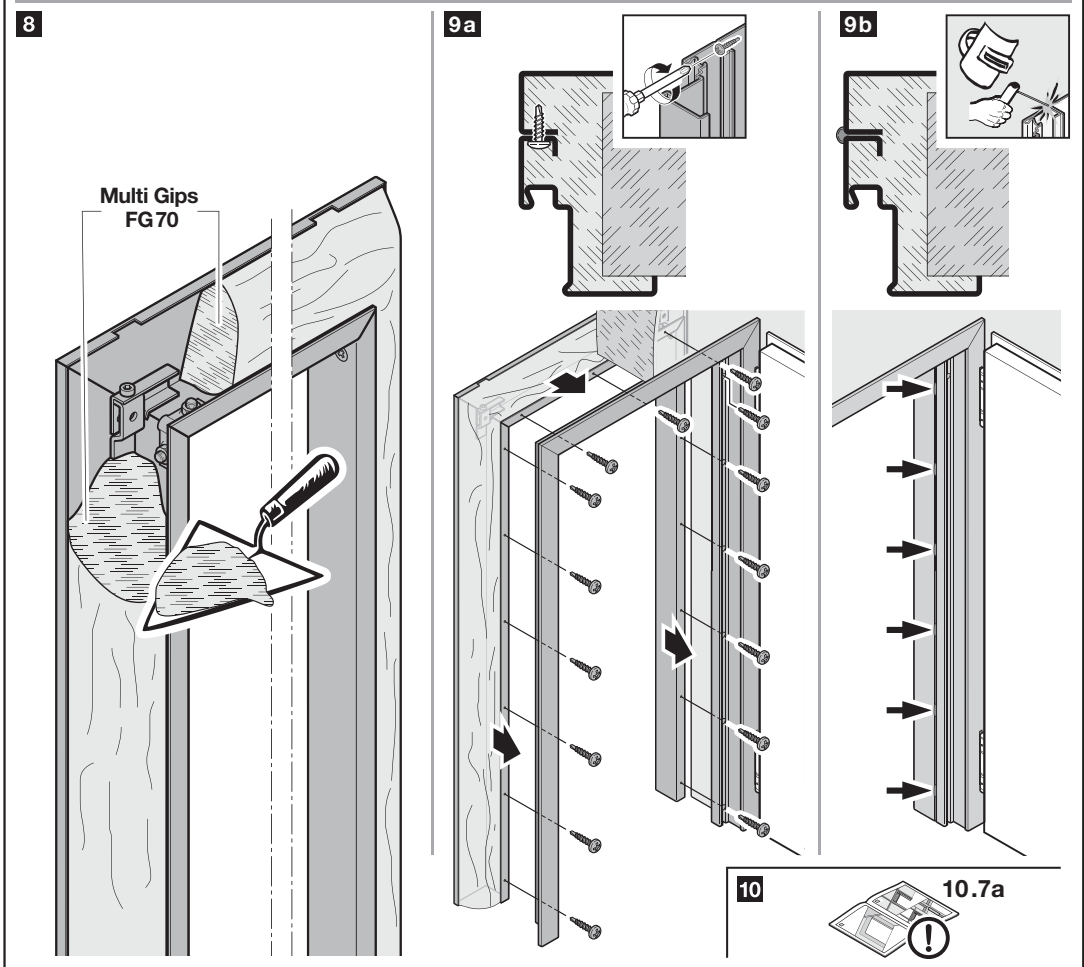
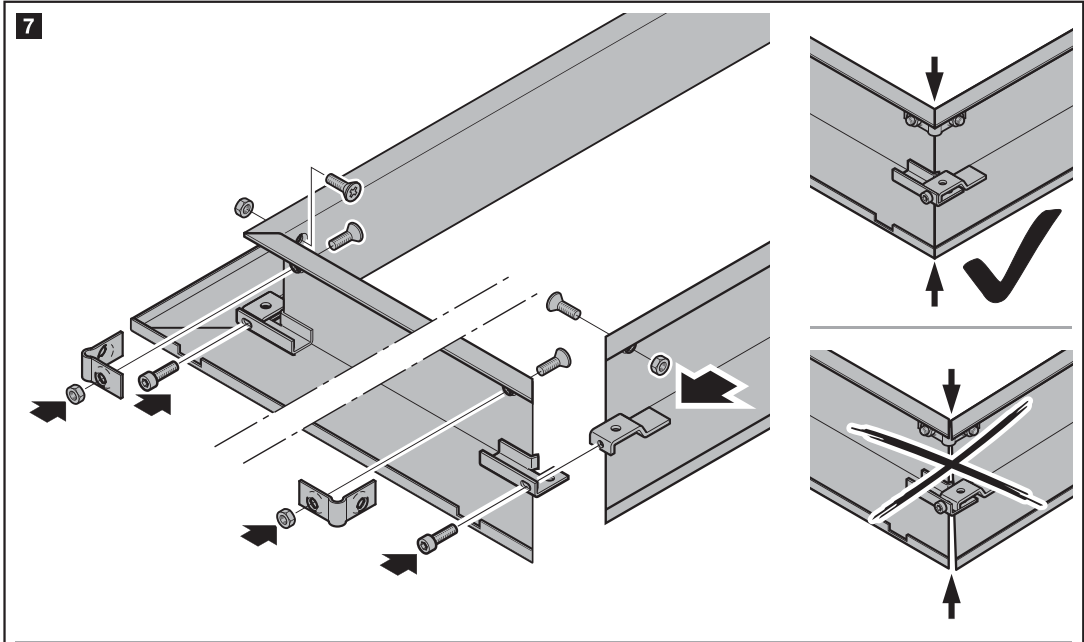


8.2c



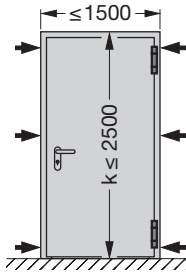
**6**



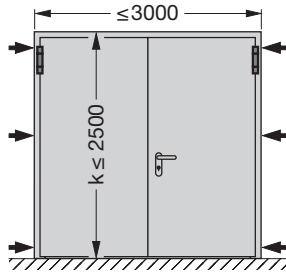


9/B1-B14

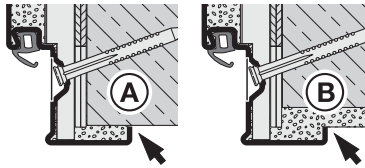
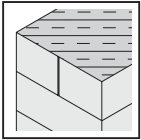
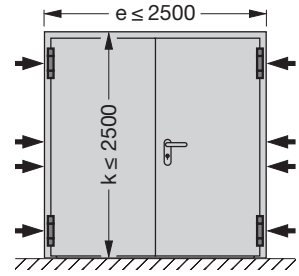
D65 - 1 OD



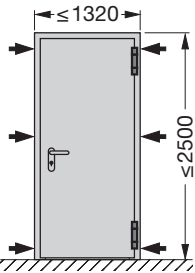
D65 - 2 OD



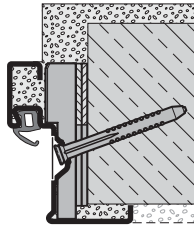
H3 - 2 OD



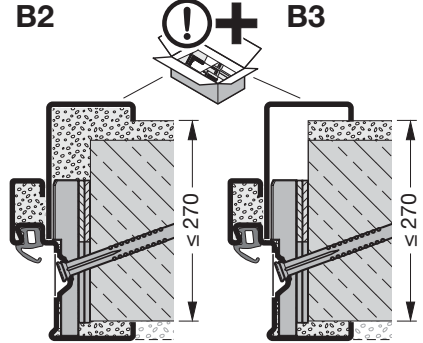
H3 - 1 OD



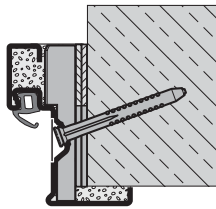
B1



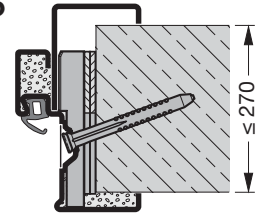
B2



B4

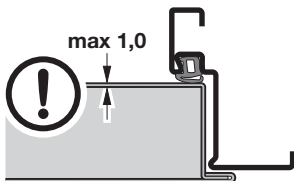
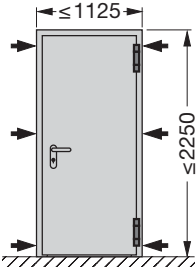


B5



max. T30/EI<sub>230</sub>

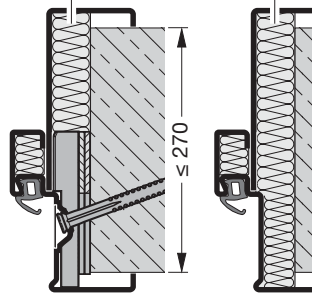
H3 - 1 OD



B6



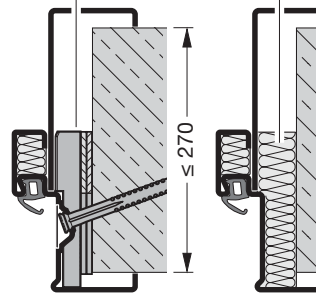
$\rho \sim 100 \text{ kg/m}^3$   
A (EN 13501-1)  
z.B. Isover BSP100



B7

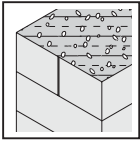


$\rho \sim 100 \text{ kg/m}^3$   
A (EN 13501-1)  
z.B. Isover BSP100

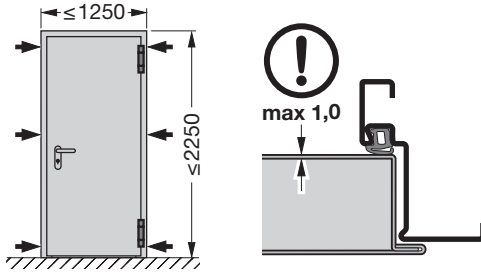


➔ 1 2 3a 4 ...

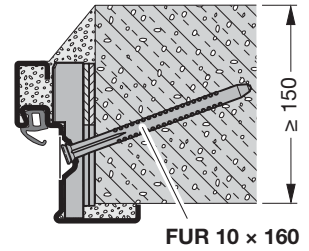




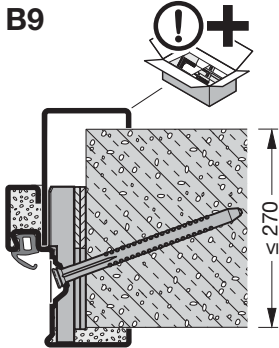
### H3-1 OD



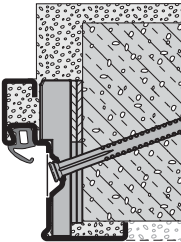
### B8



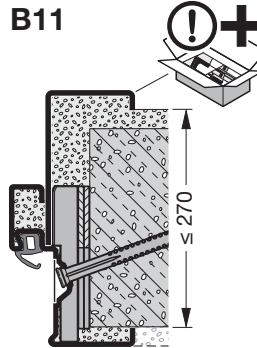
### B9



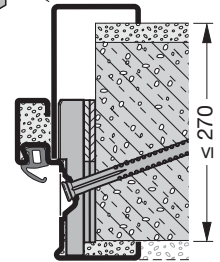
### B10



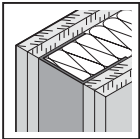
### B11



### B12

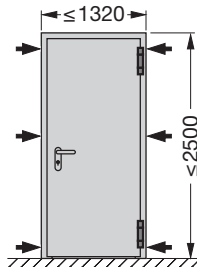


➔ 1 2 3a 4 ...

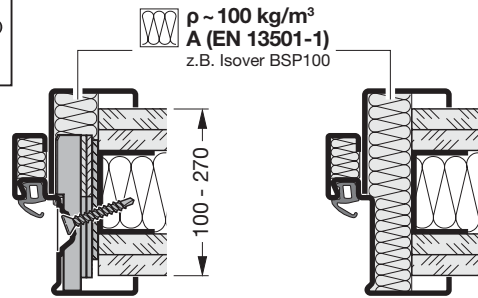


max. T30/EI<sub>230</sub>

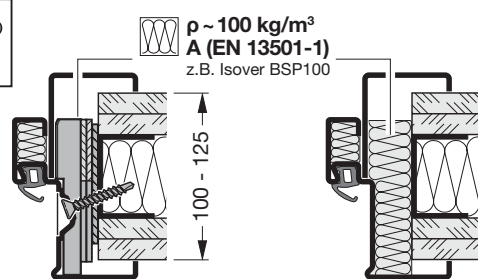
### H3-1 OD



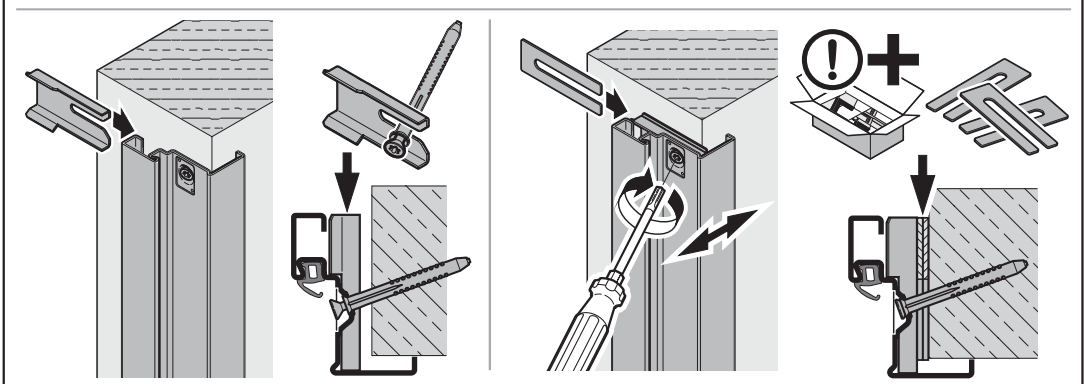
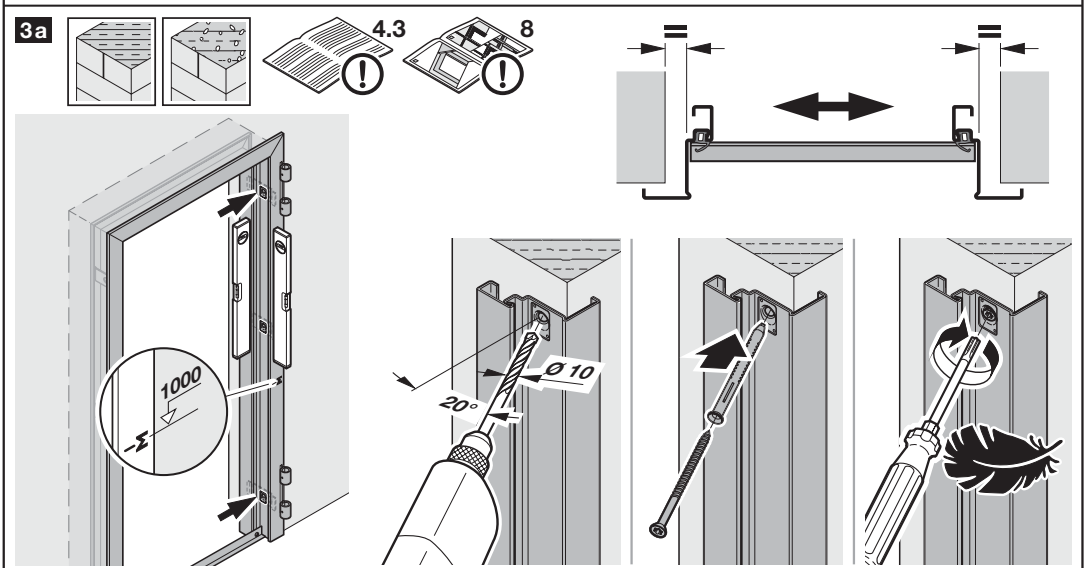
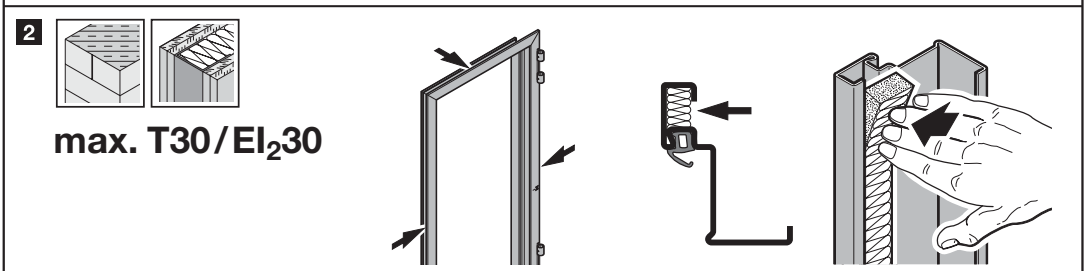
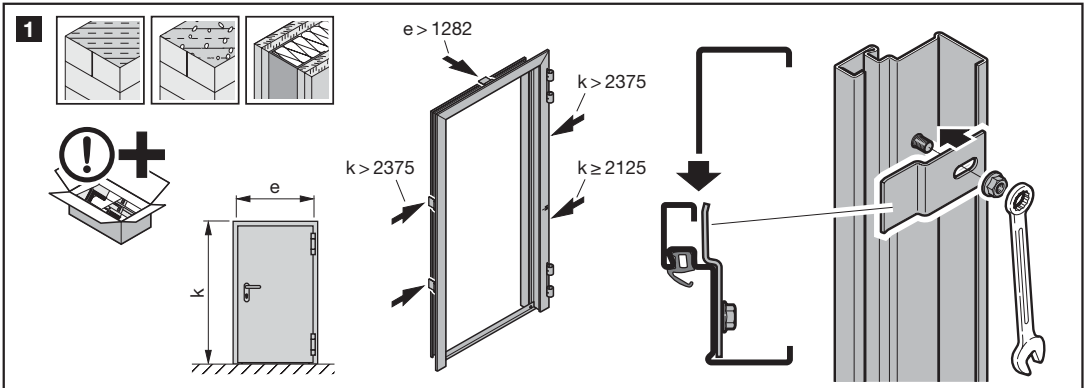
### B13

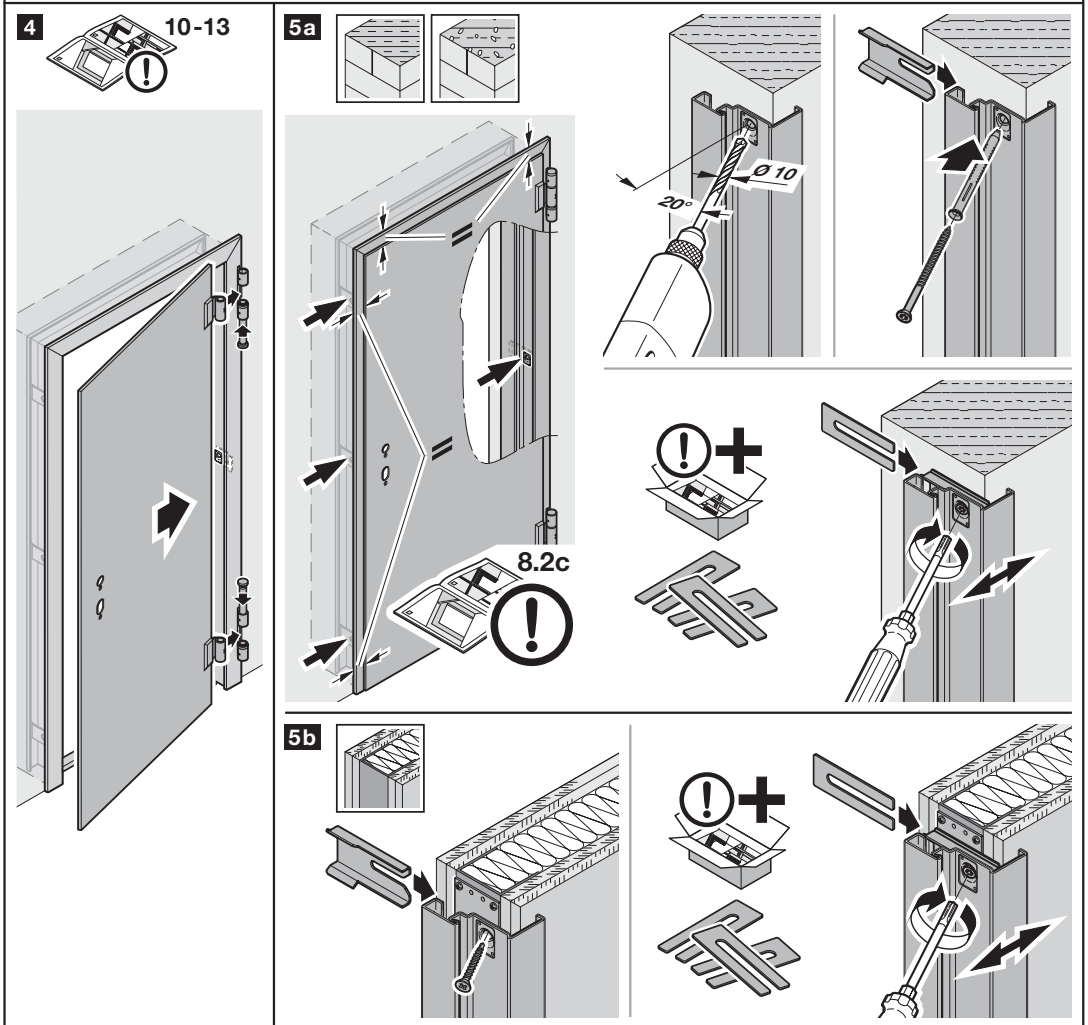
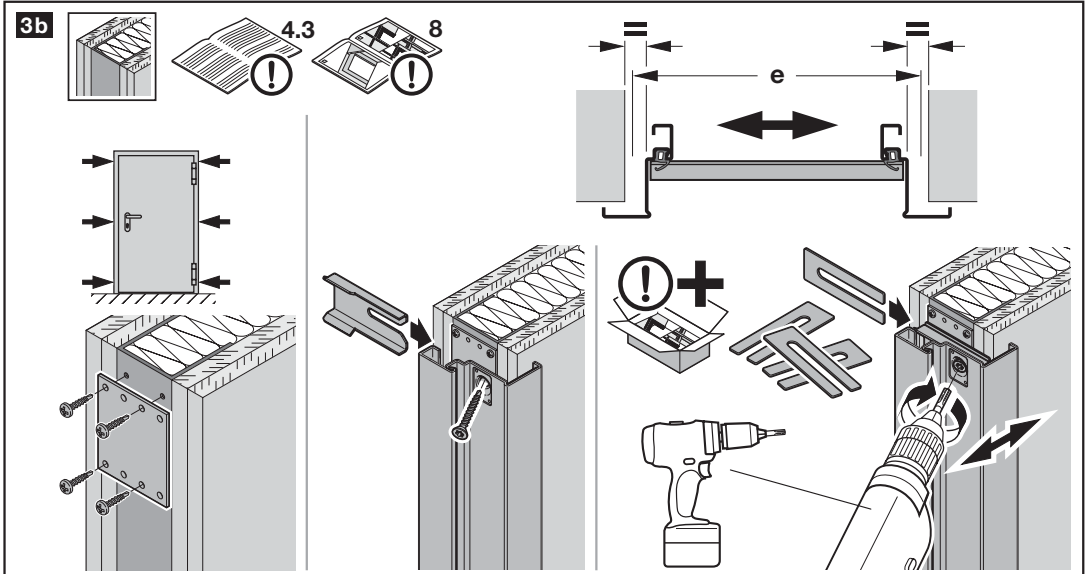


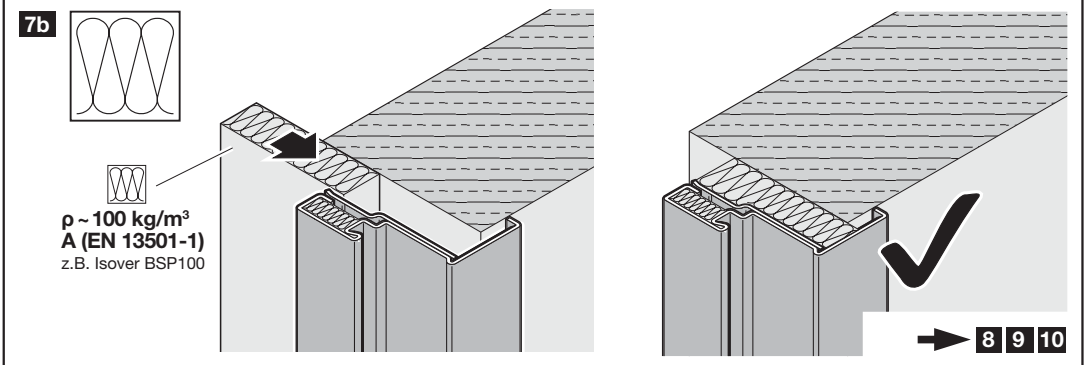
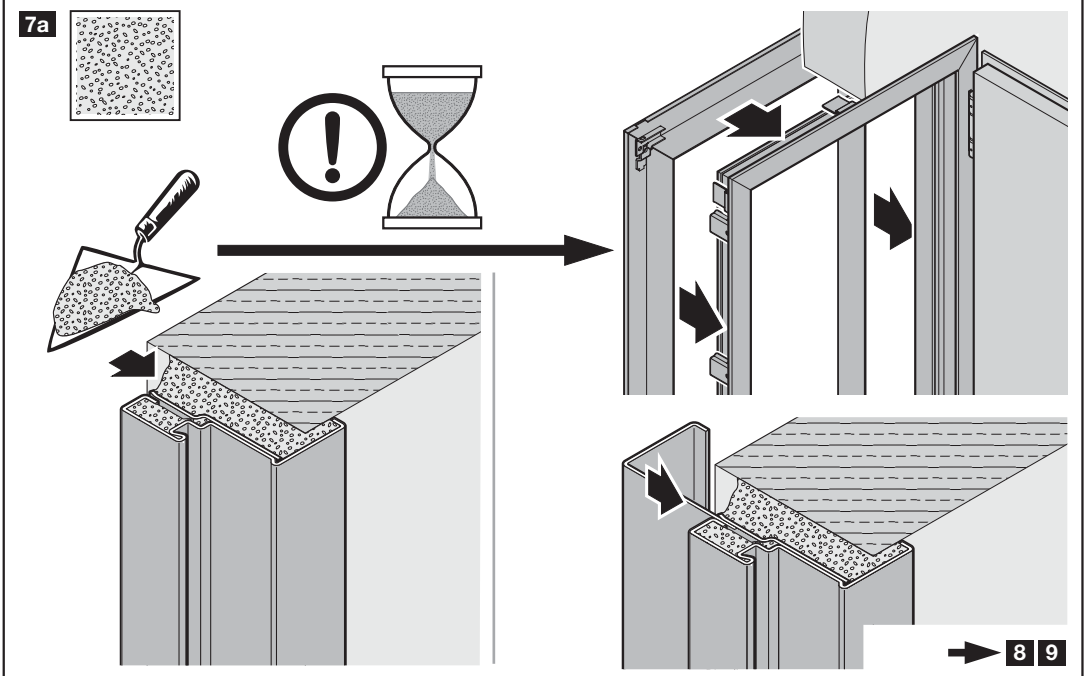
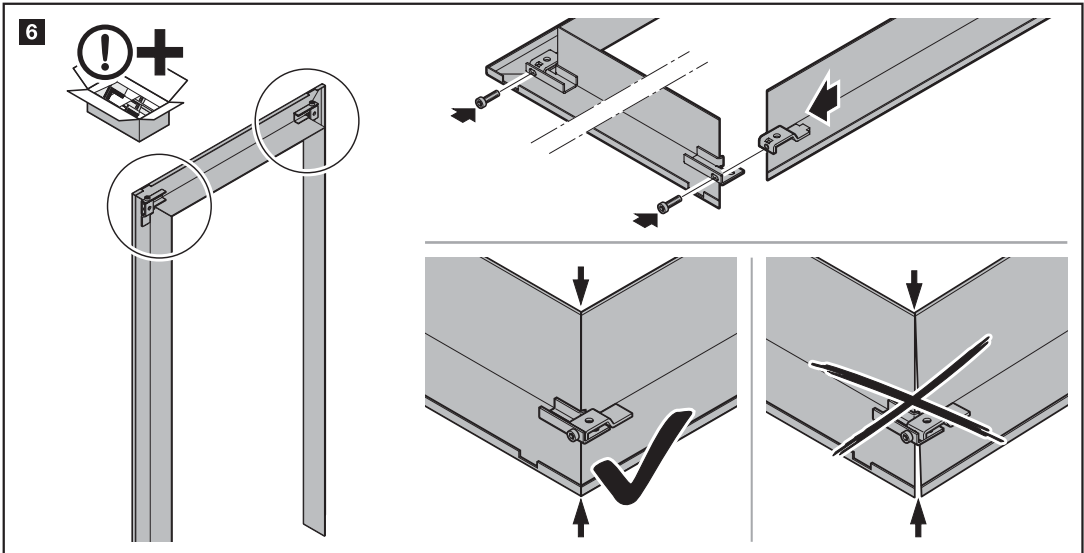
### B14



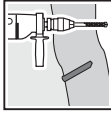
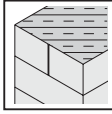
➔ 1 2 3b 4 ...



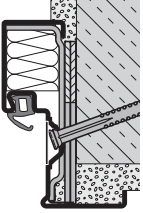




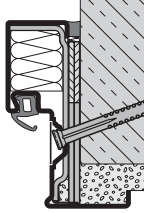
9/C1-C8  
max. T30/  
EI<sub>2</sub>30



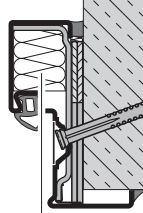
C1



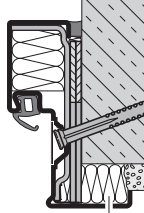
C2



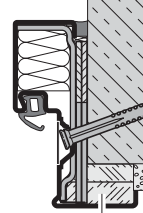
C3



C4

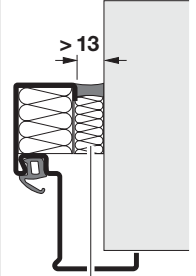


C5



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

A-EN 520

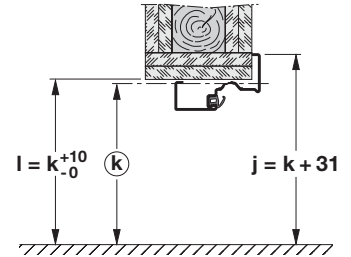
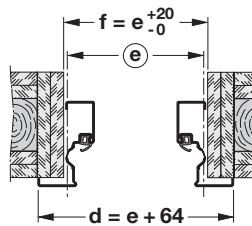


$\rho \sim 100 \text{ kg/m}^3$   
A (EN 13501-1)  
z.B. Isover BSP100

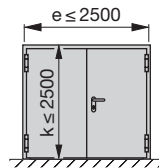
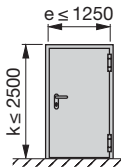
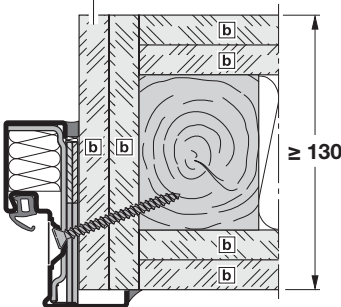
➔ 1a 2 ...

➔ 6

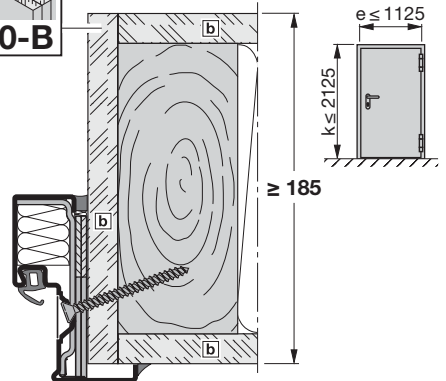
max. T30/  
EI<sub>2</sub>30



C6 F90B DIN 4102-4 Tab. 49



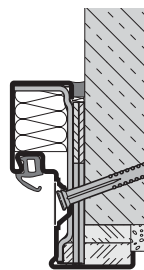
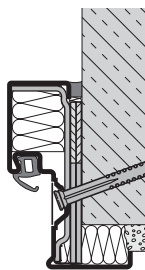
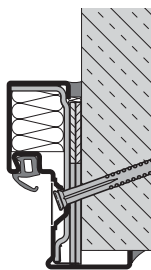
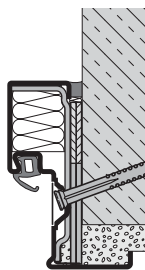
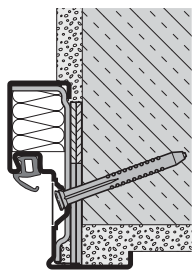
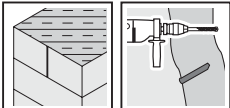
C7 F30B DIN 4102-4 Tab. 49



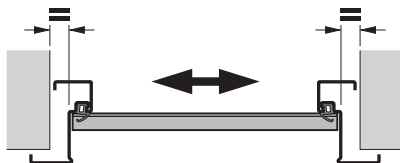
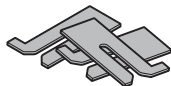
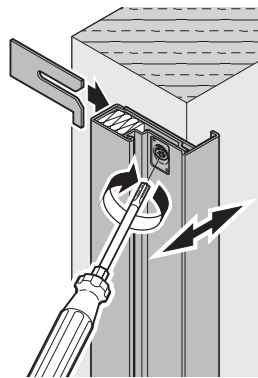
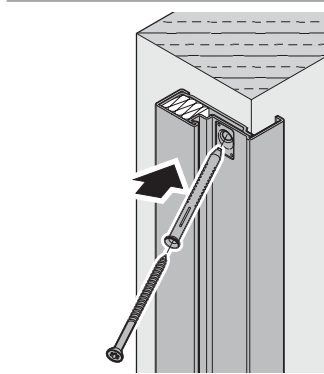
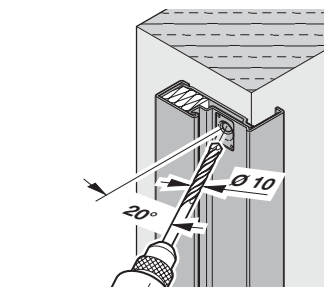
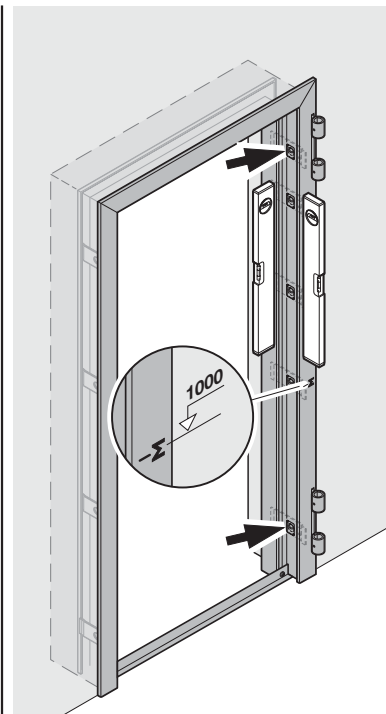
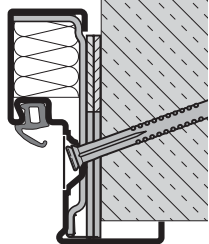
b A-12,5-EN 520

➔ 1b 2 ...

1a



e-10

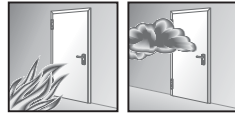
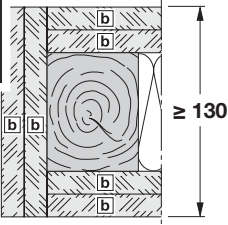


➔ 2

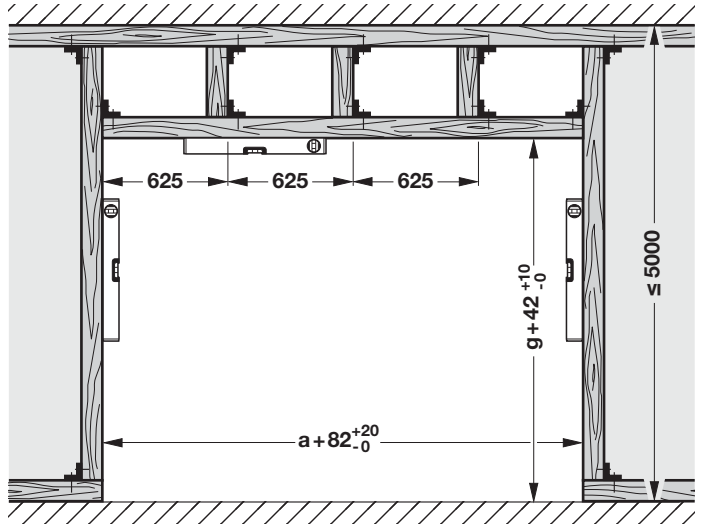
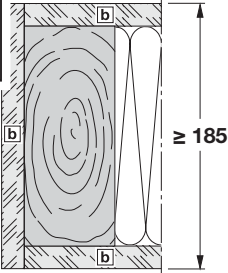
1b



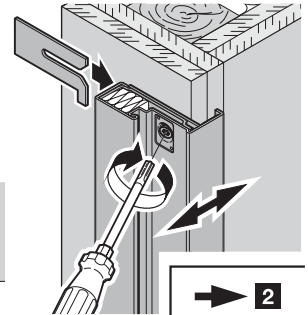
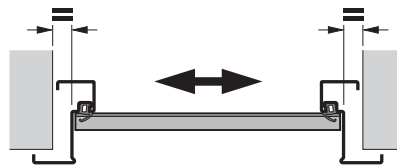
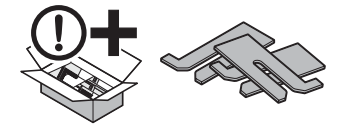
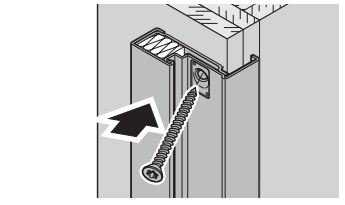
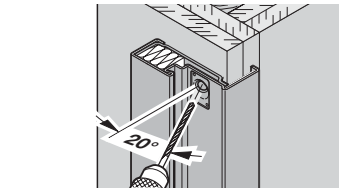
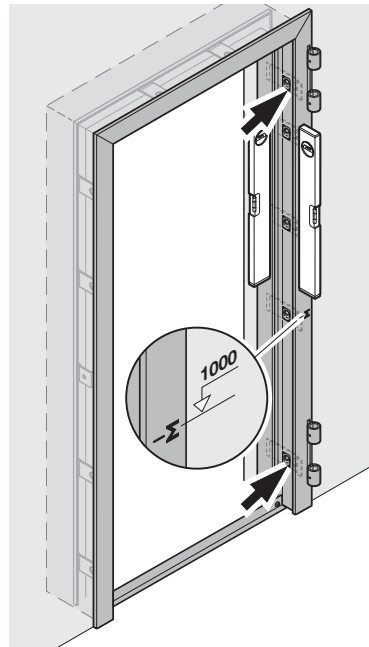
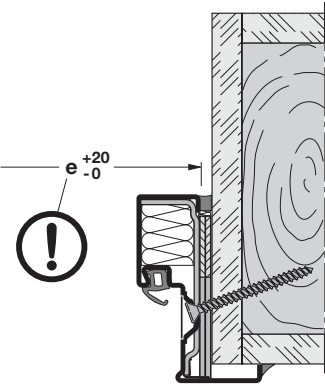
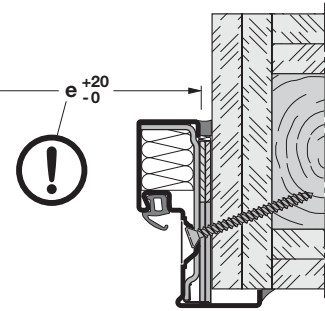
F90-B

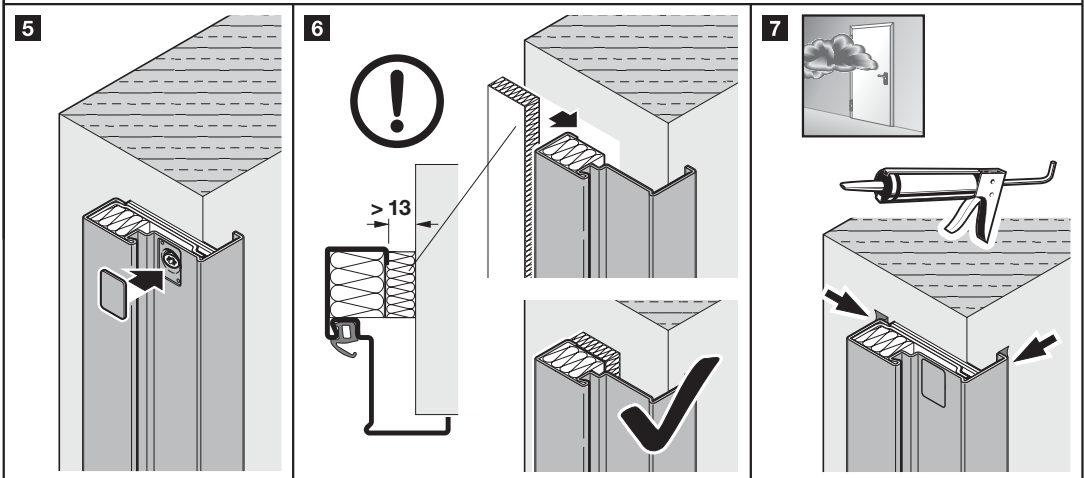
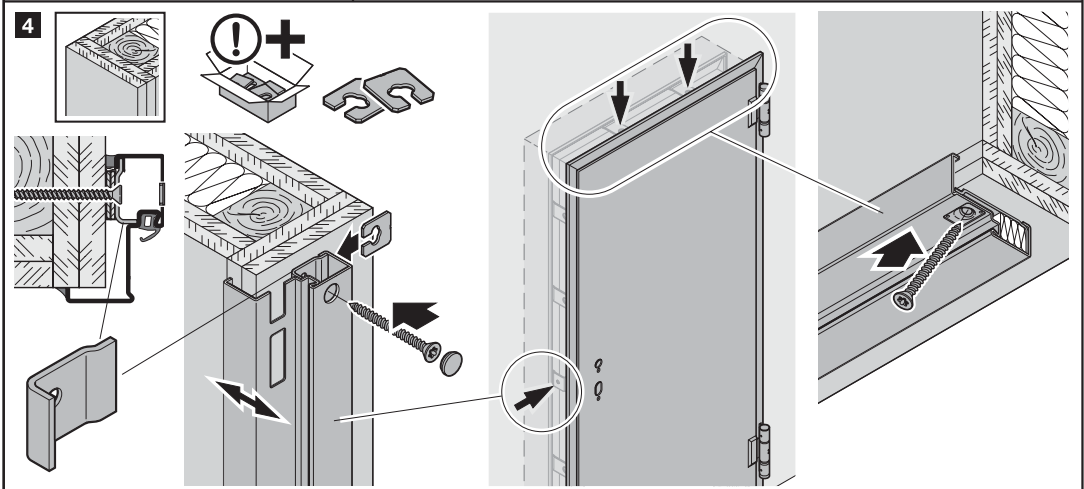
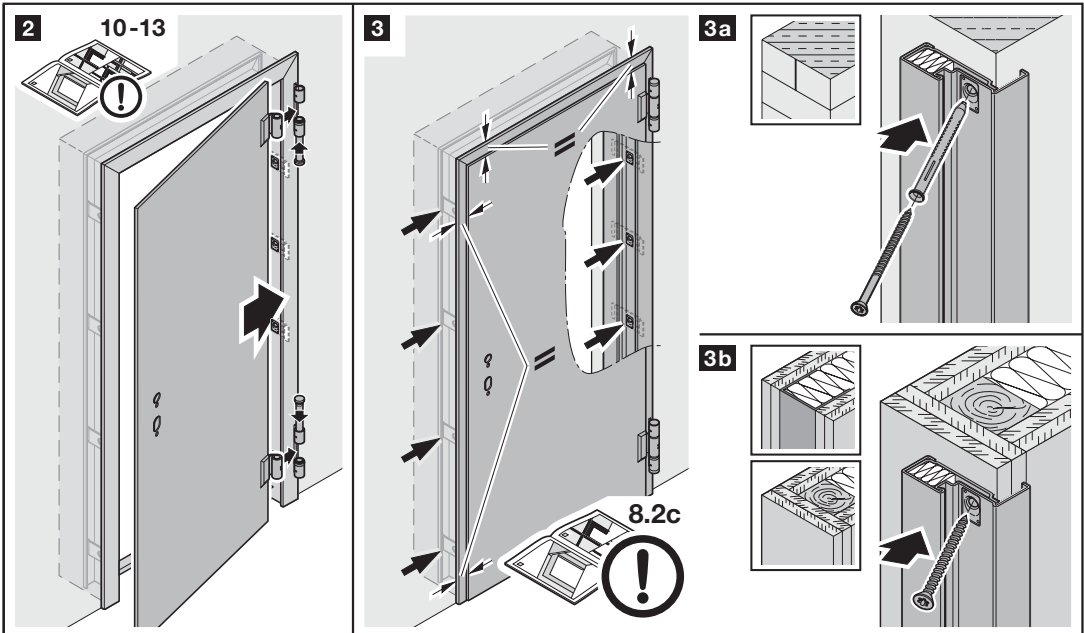


F30-B



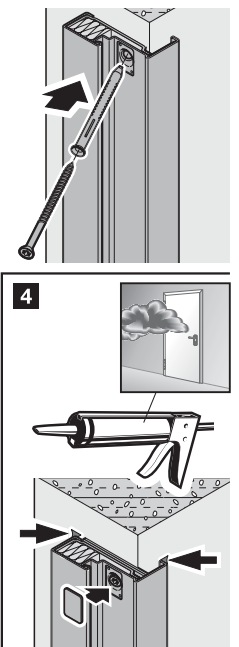
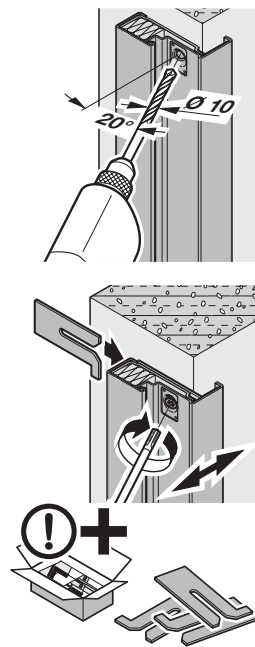
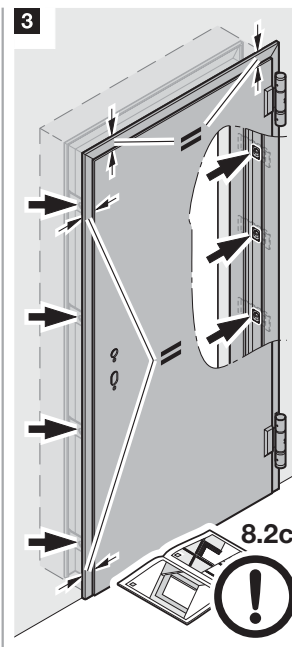
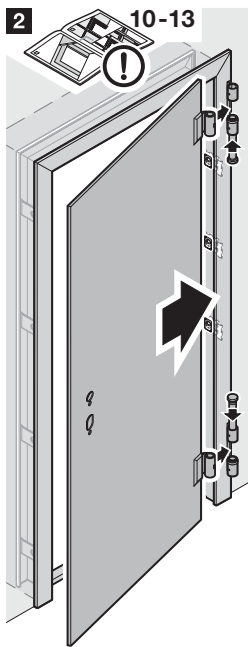
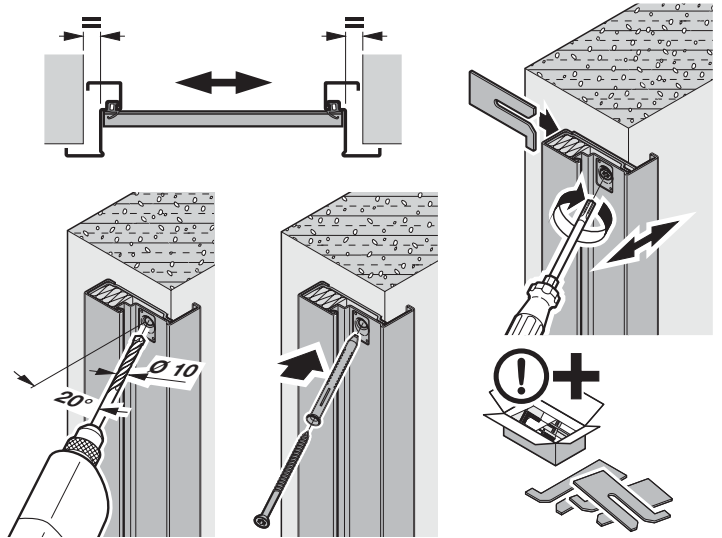
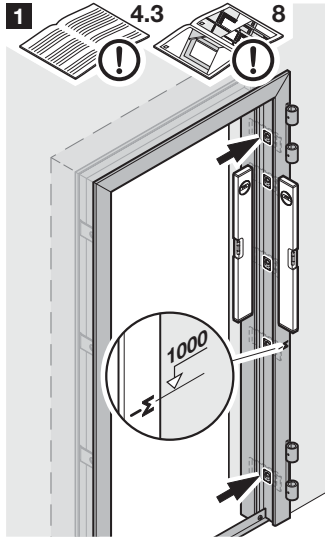
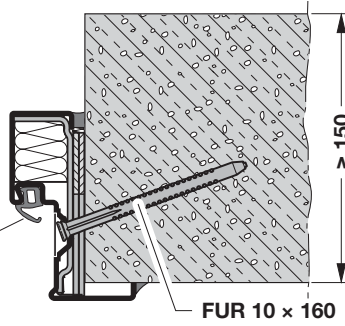
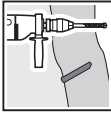
b) A-12,5-EN 520



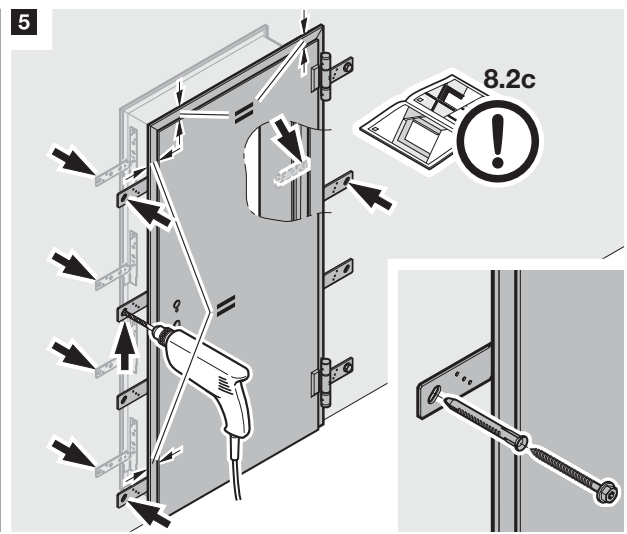
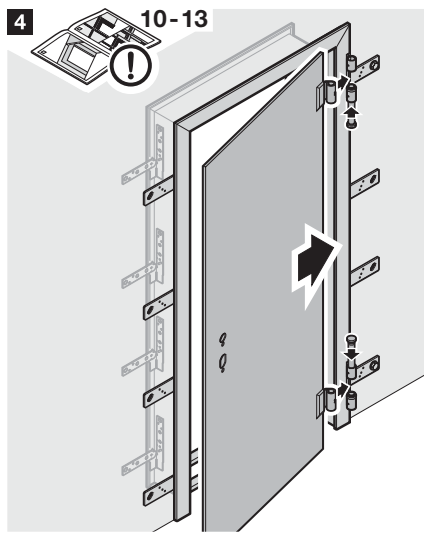
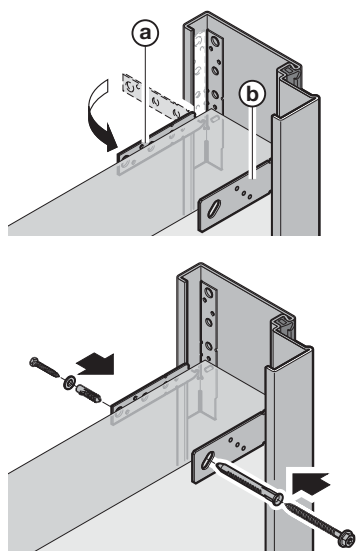
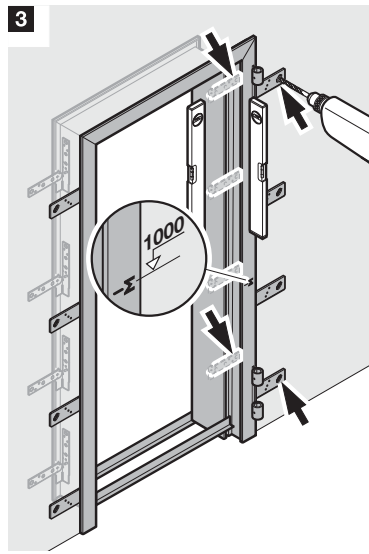
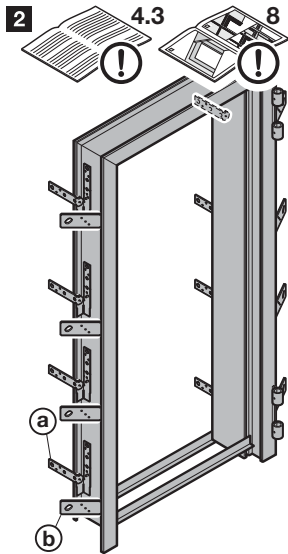
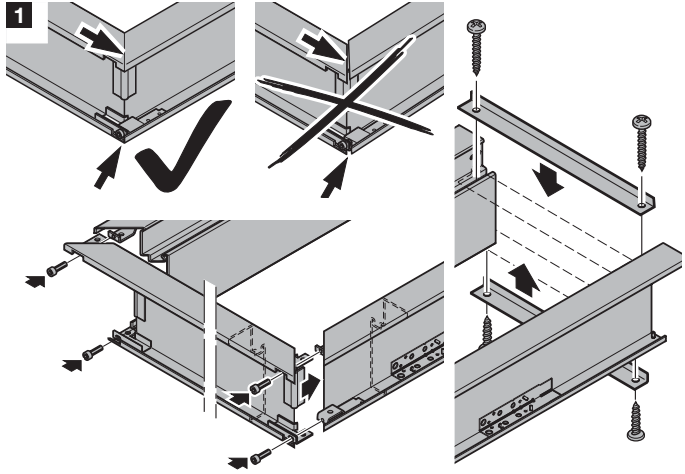
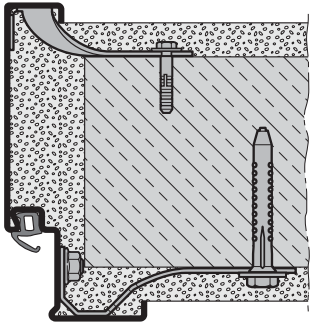


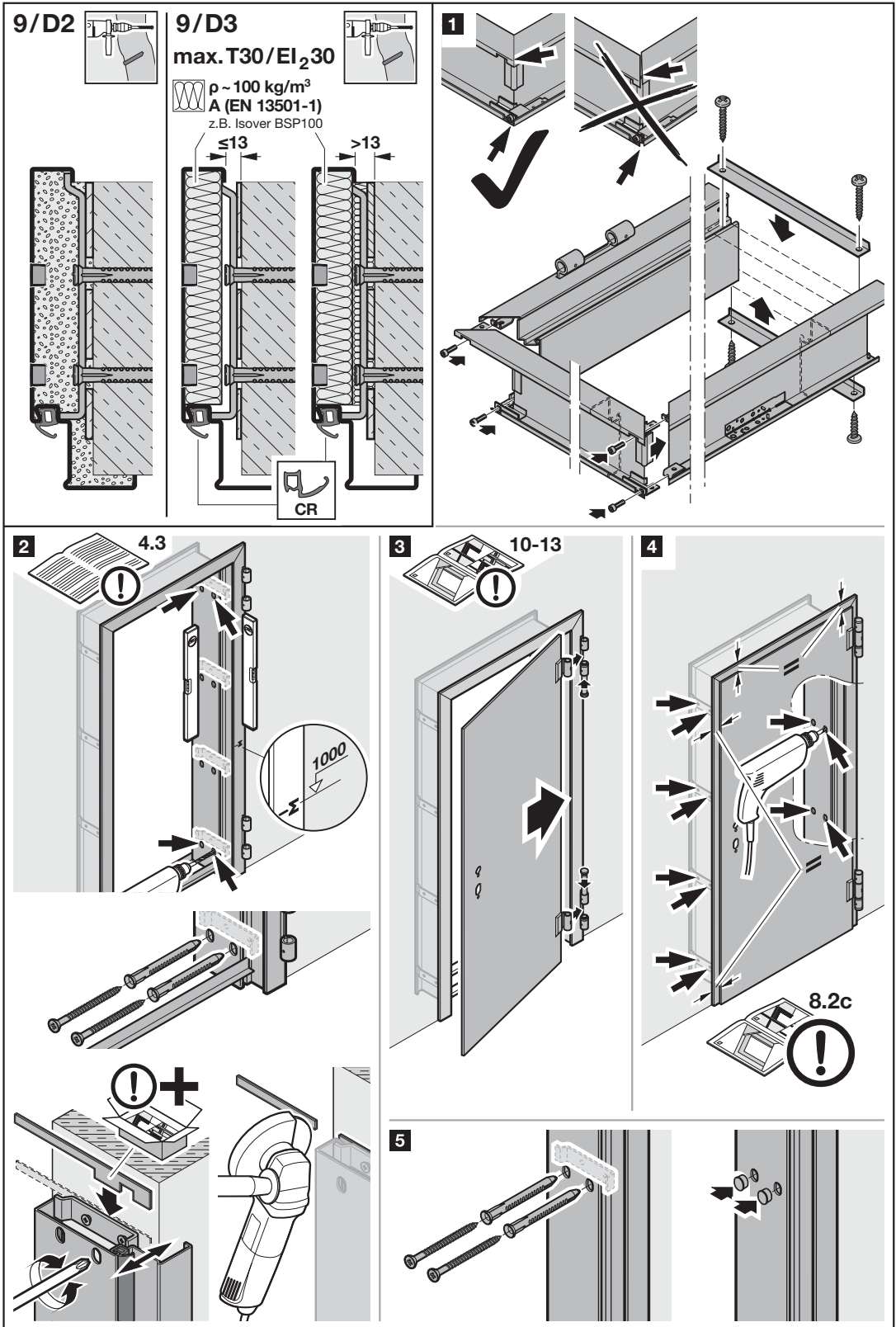


9/C8  
max. T30



9/D1





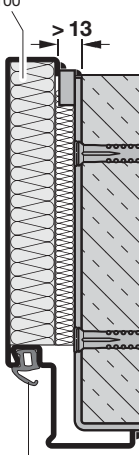
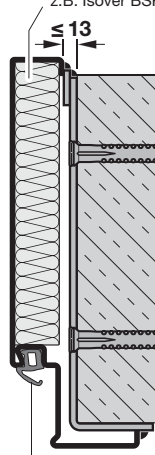
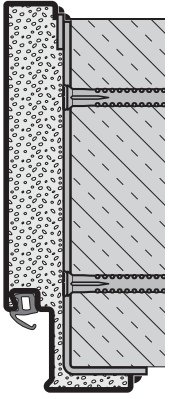
9/D4



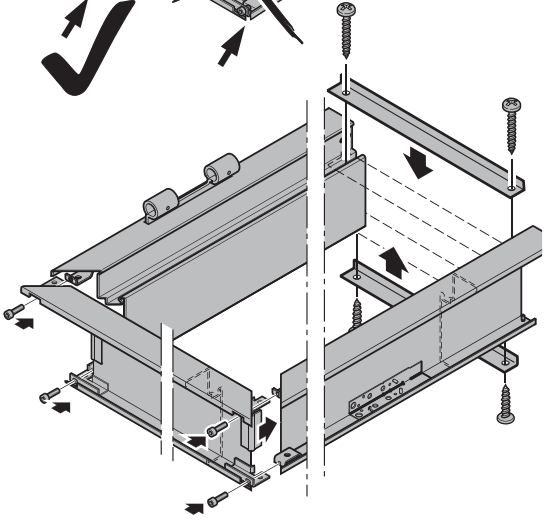
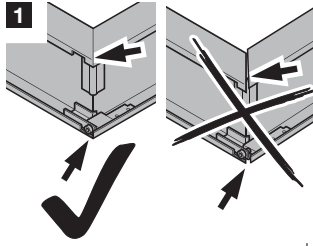
9/D5

max. T30/  
EI<sub>230</sub>

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



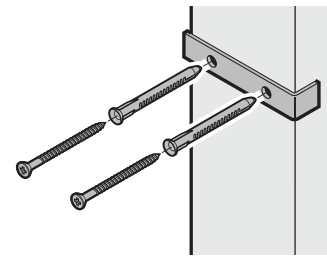
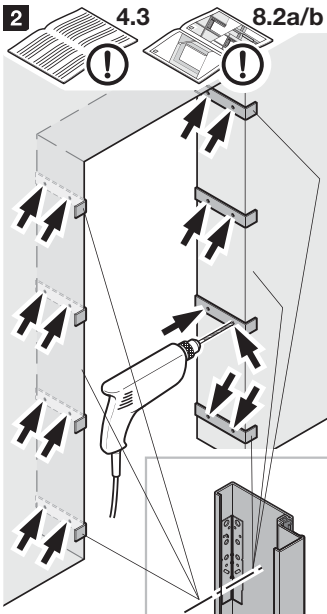
1



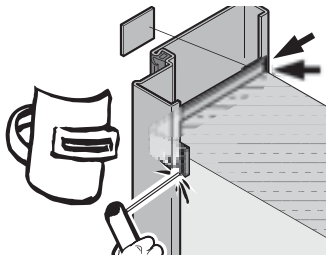
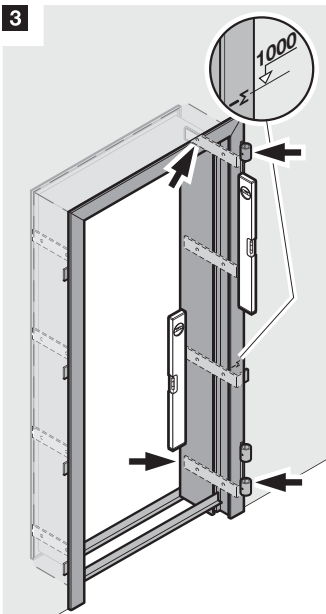
2

4.3

8.2a/b

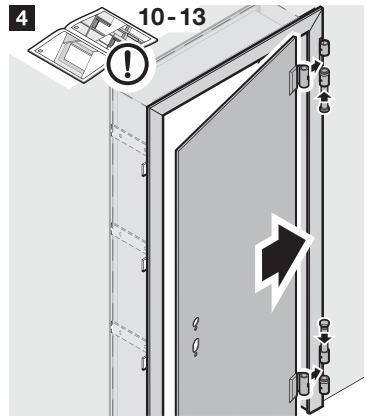


3



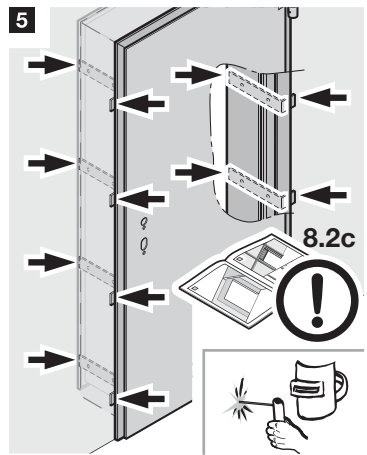
4

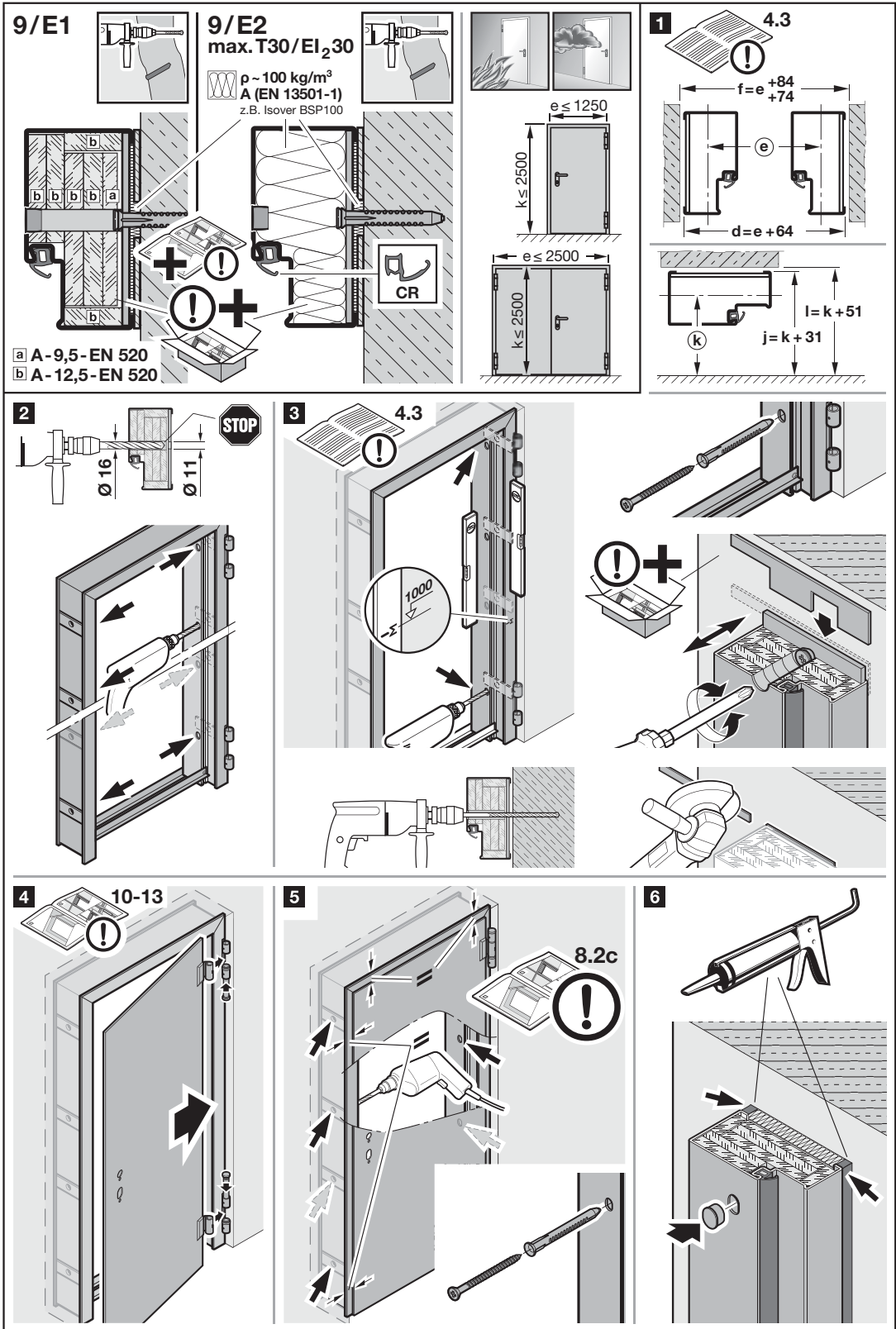
10-13



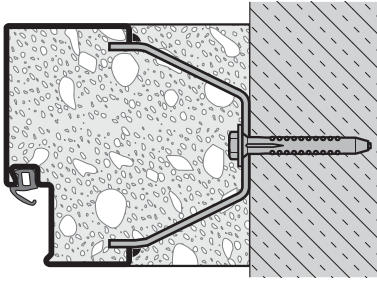
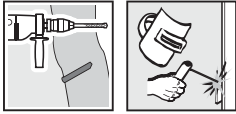
5

8.2c

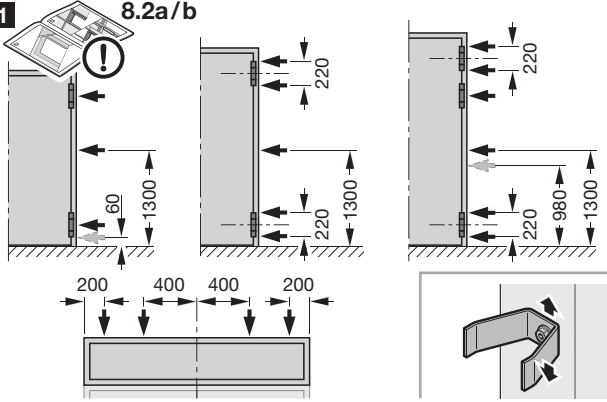




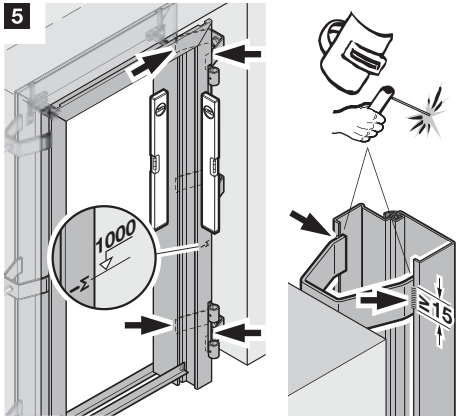
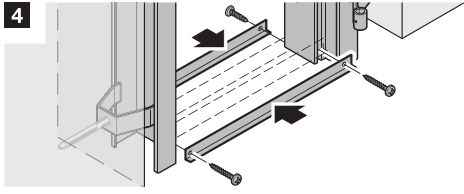
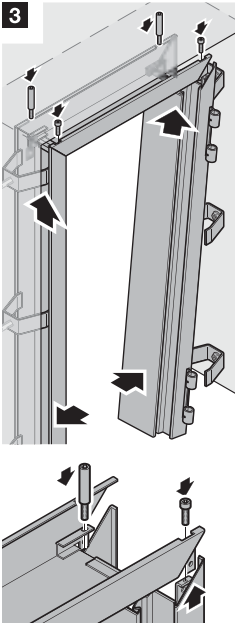
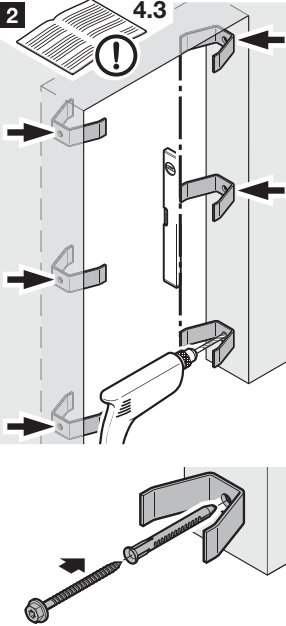
9/E3



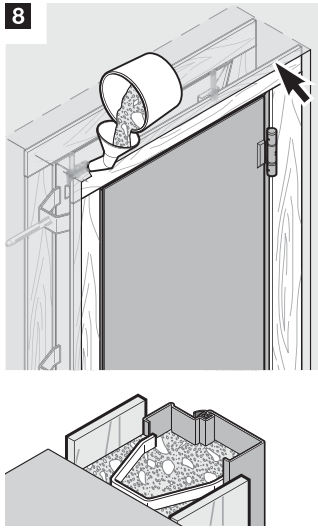
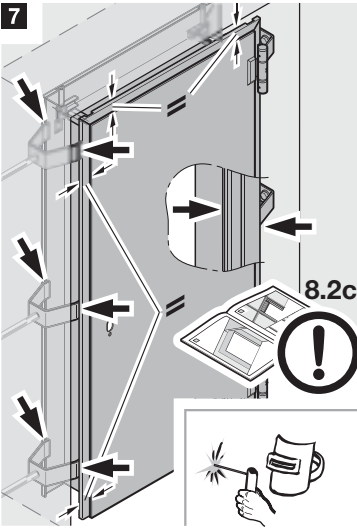
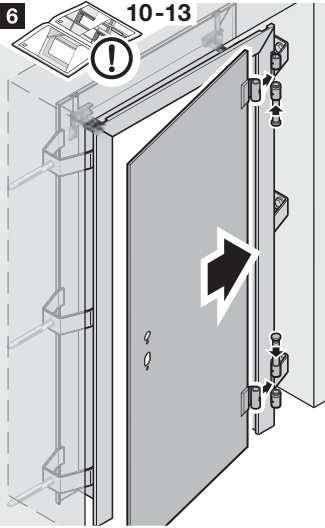
1 8.2a/b



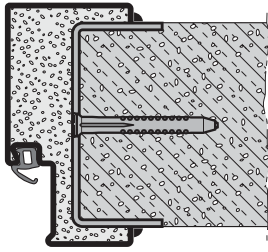
2 4.3



6 10-13

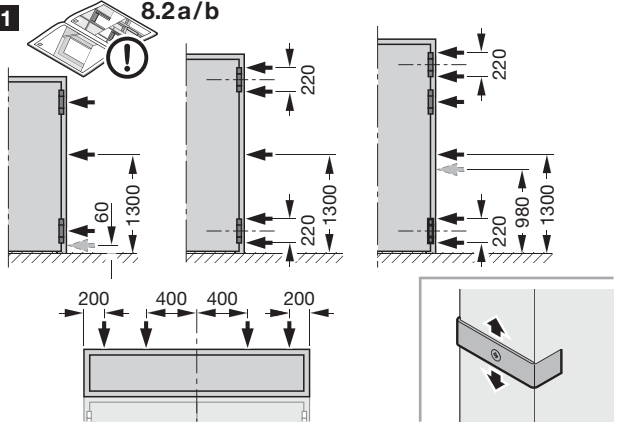


9/E4



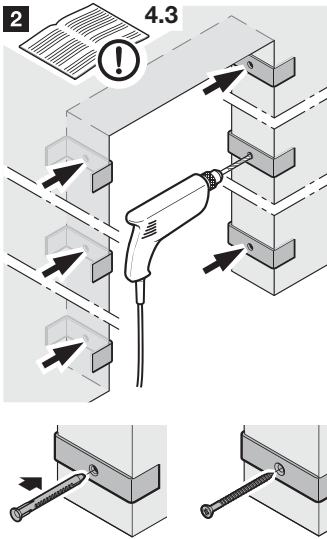
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8.2a/b

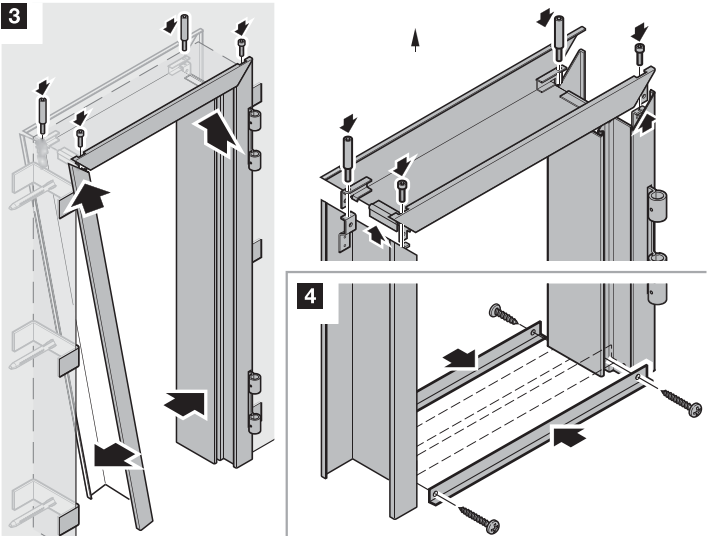


2

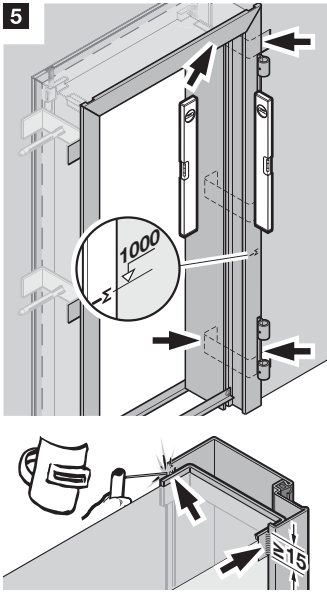
4.3



3

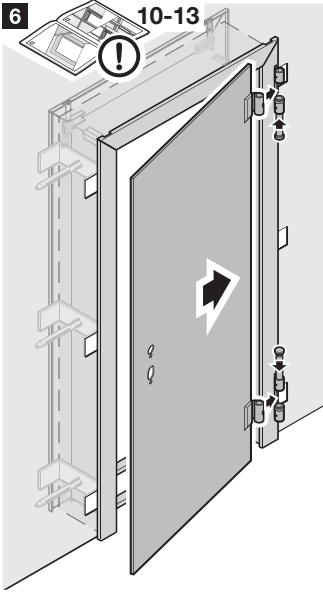


5

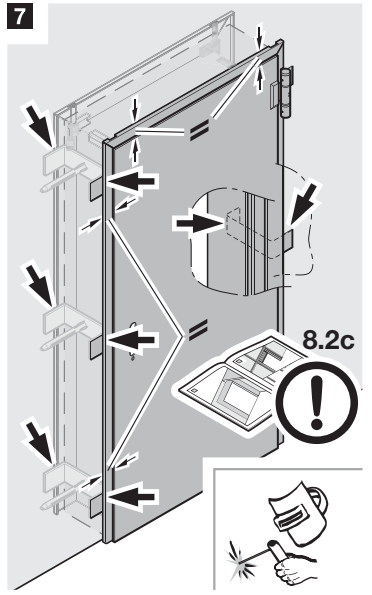


6

10-13

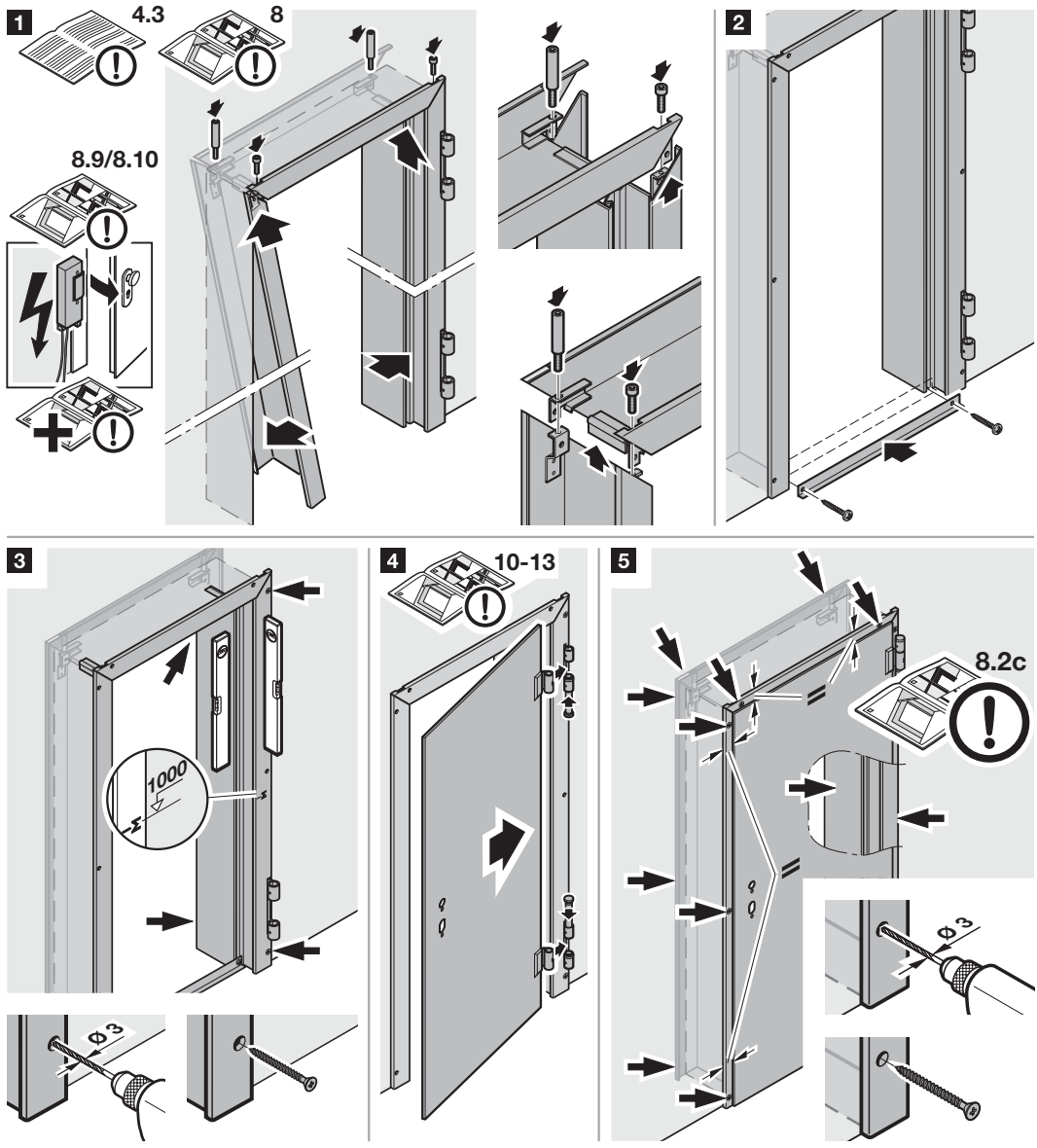
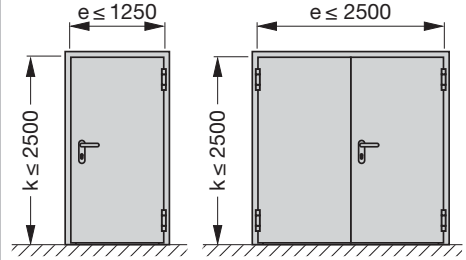
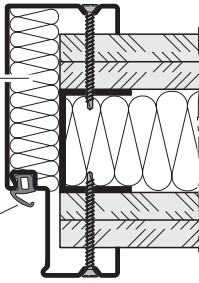
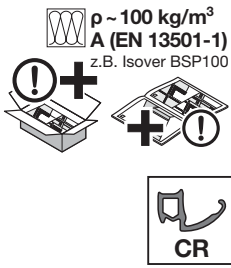
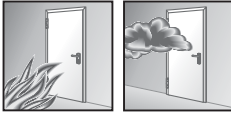


7



9/E5

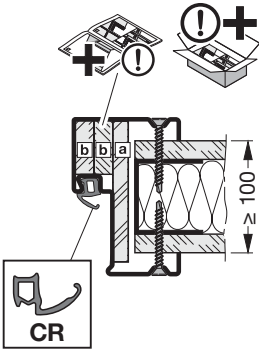
max. T30/  
EI<sub>2</sub>30





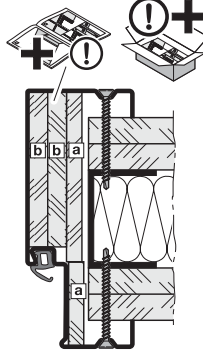
9/E6

max T30/EI<sub>2</sub>30



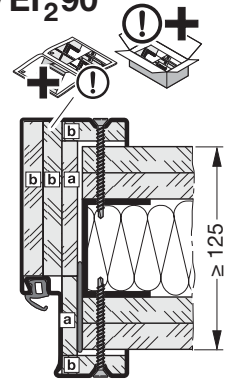
9/E7

max T30/EI<sub>2</sub>30

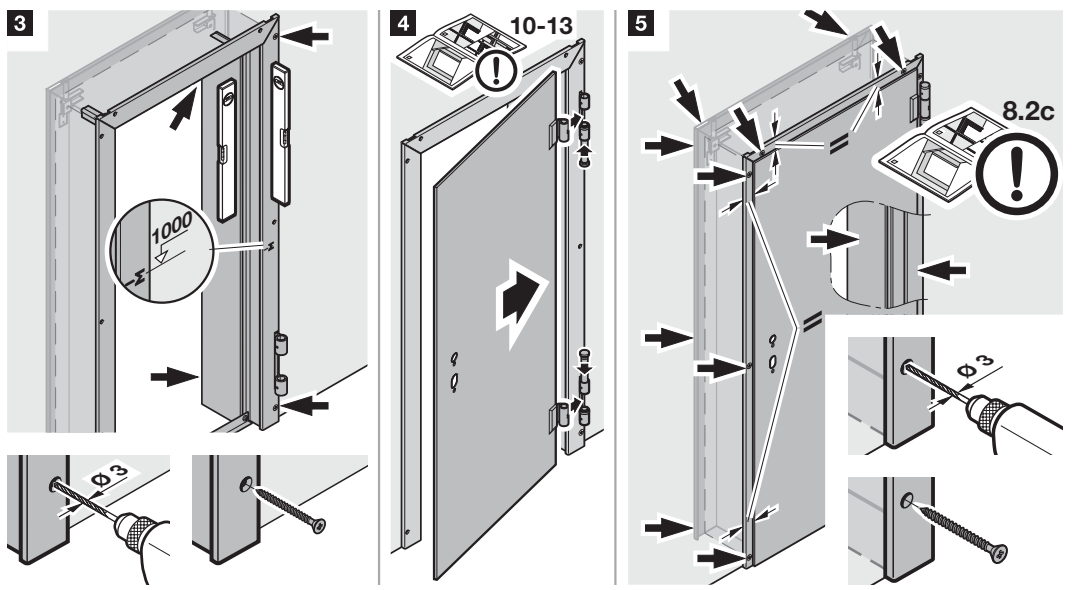
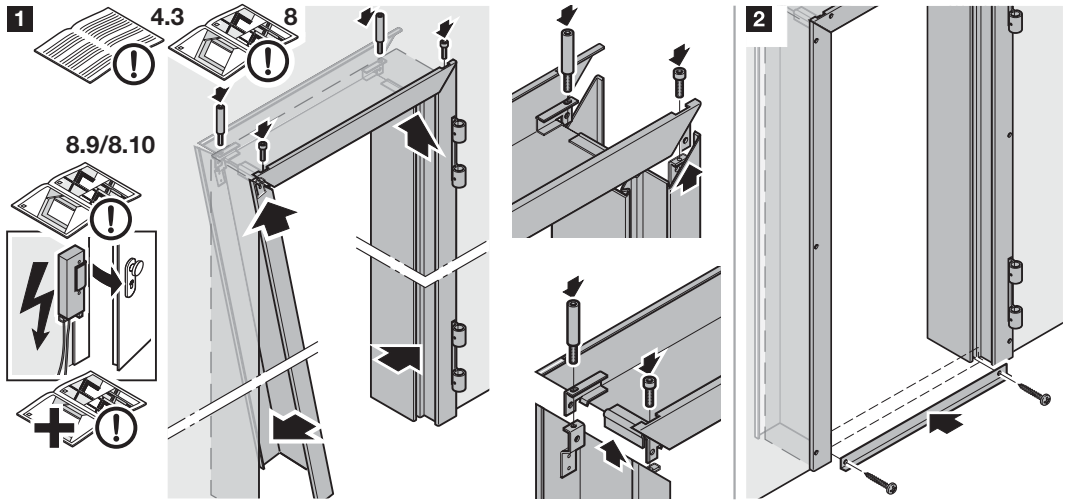


9/E8

T90/EI<sub>2</sub>90

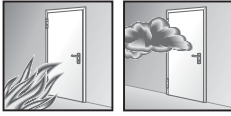


a A-9,5-EN 520 / b A-12,5-EN 520

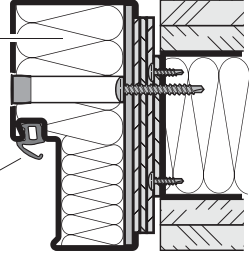
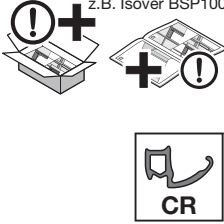


9/E9

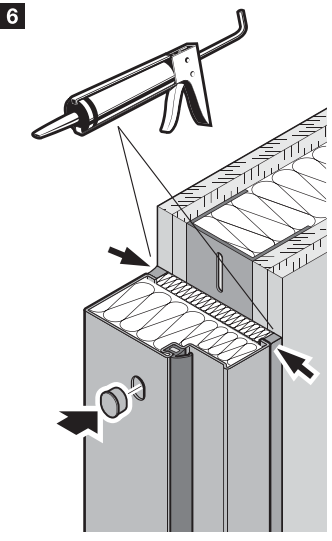
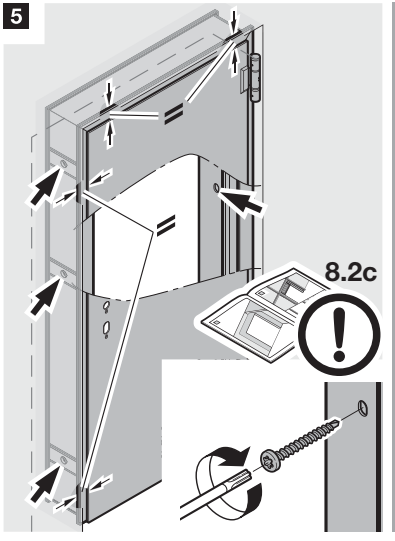
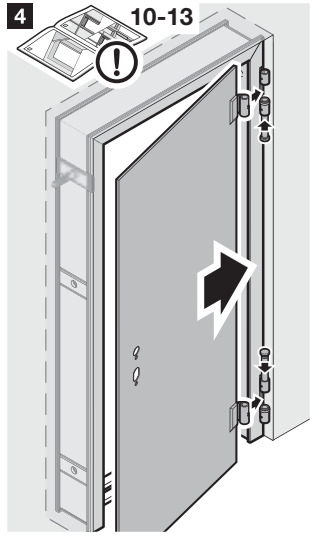
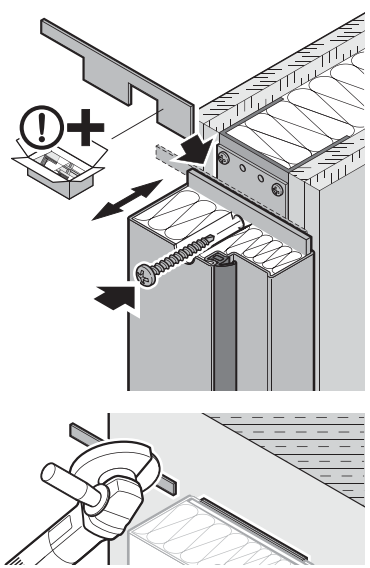
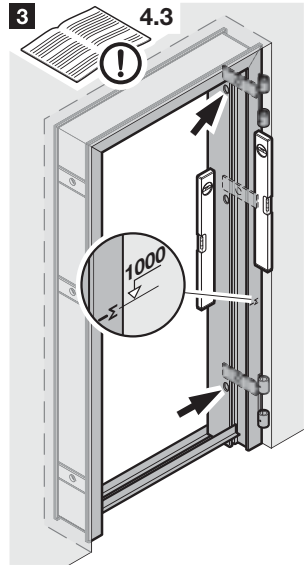
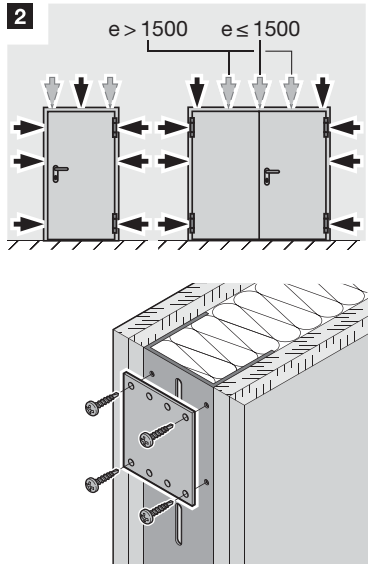
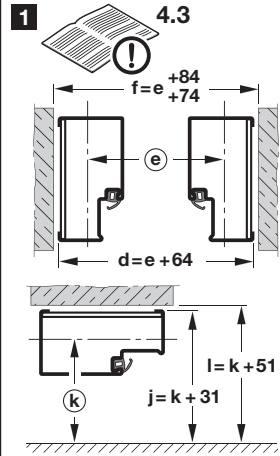
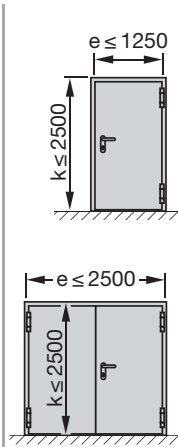
max. T30/  
EI<sub>2</sub>30



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



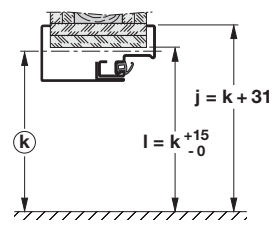
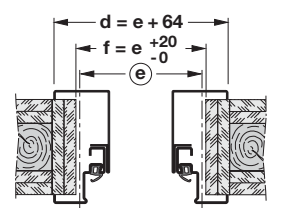
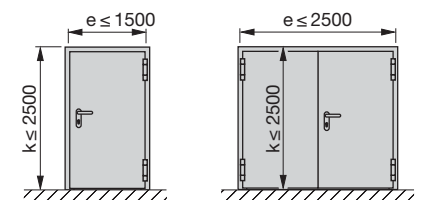
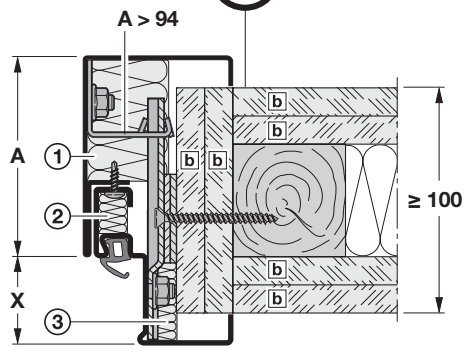
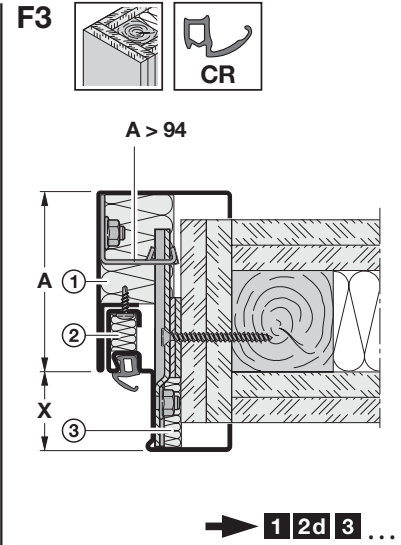
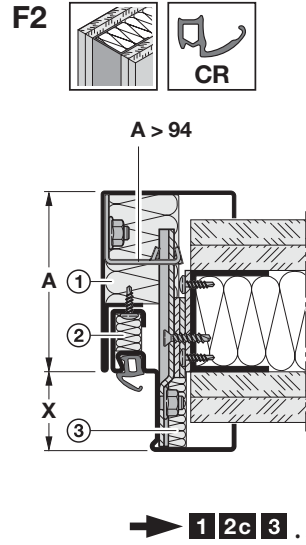
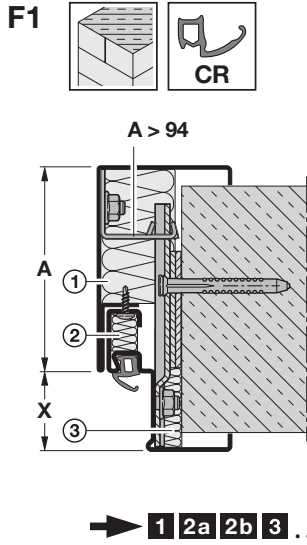
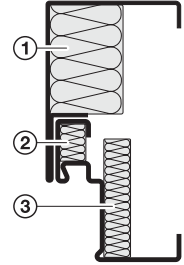
$\geq 125$



**9/F1-F4**  
**max. T30/ EI<sub>2</sub>30**

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

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



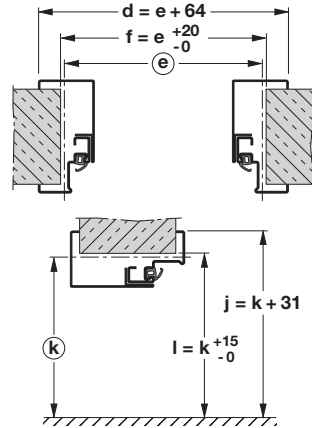
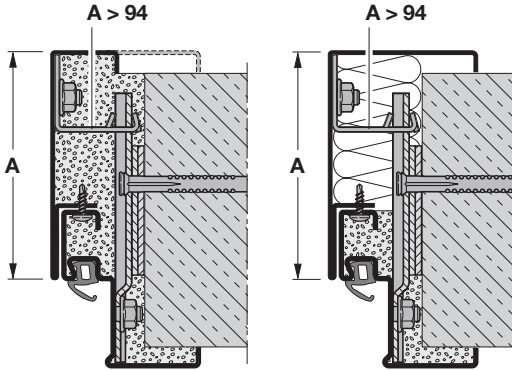
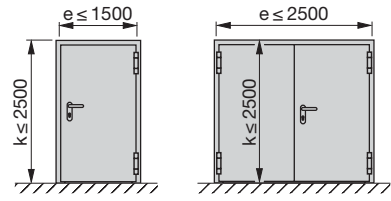
**F90B DIN 4102-4 Tab. 49**    **b** **A-12,5-EN 520**

➔ **1 2e 3 ...**

9/F5-F6

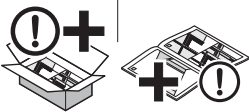
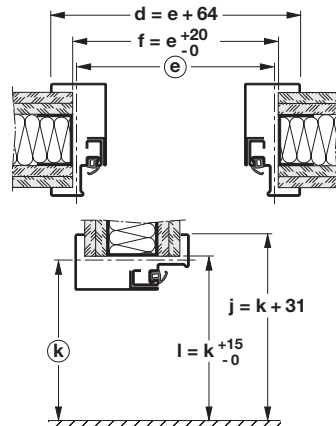
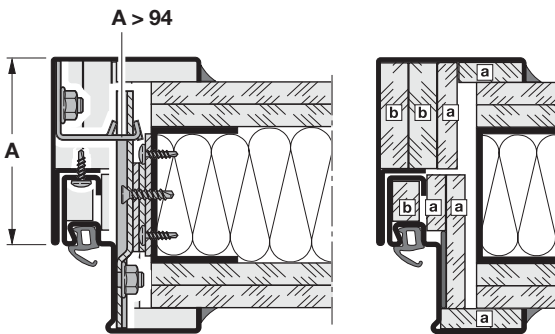
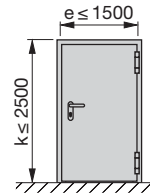
max. T90/ EI<sub>2</sub>90

F5



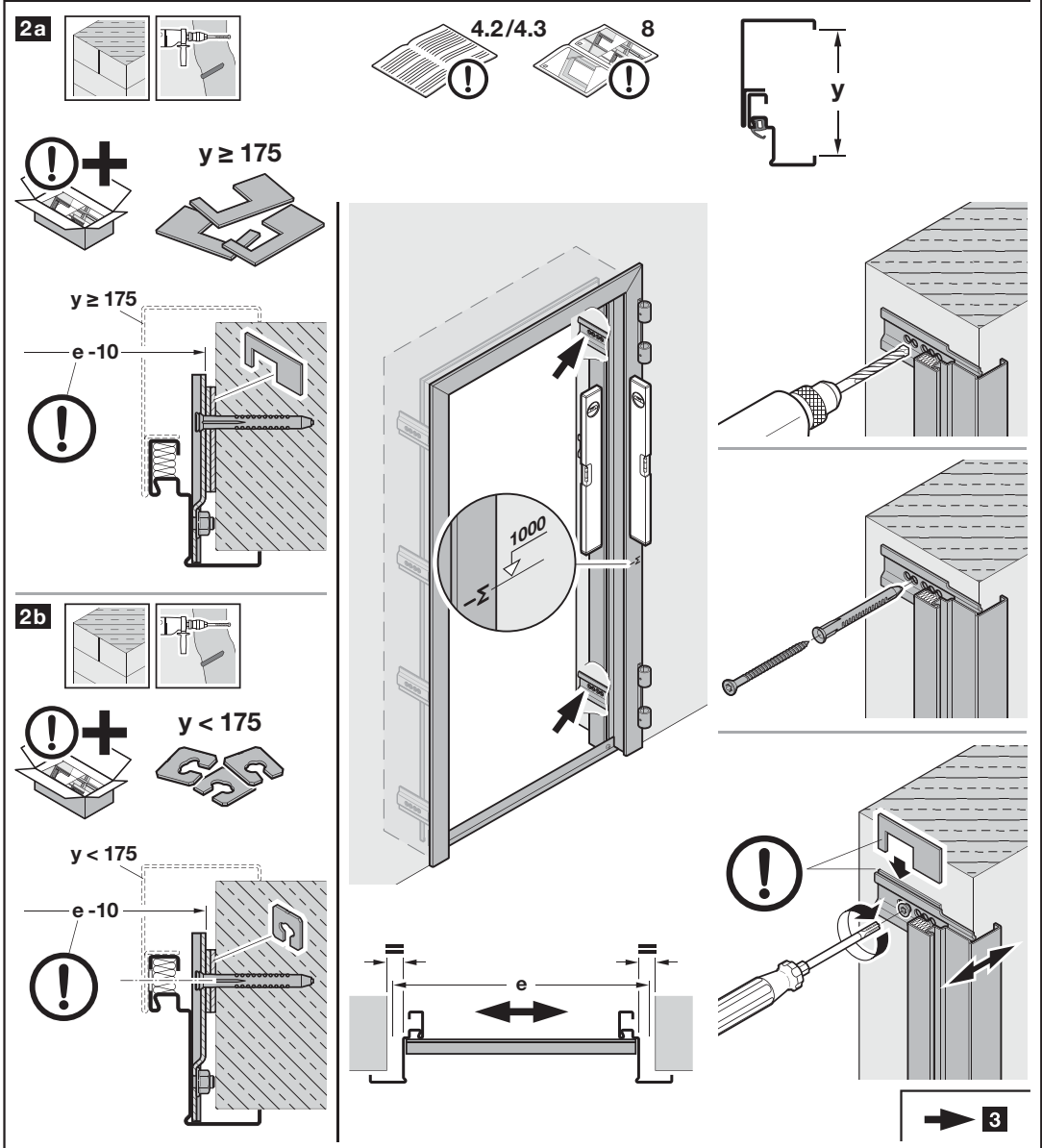
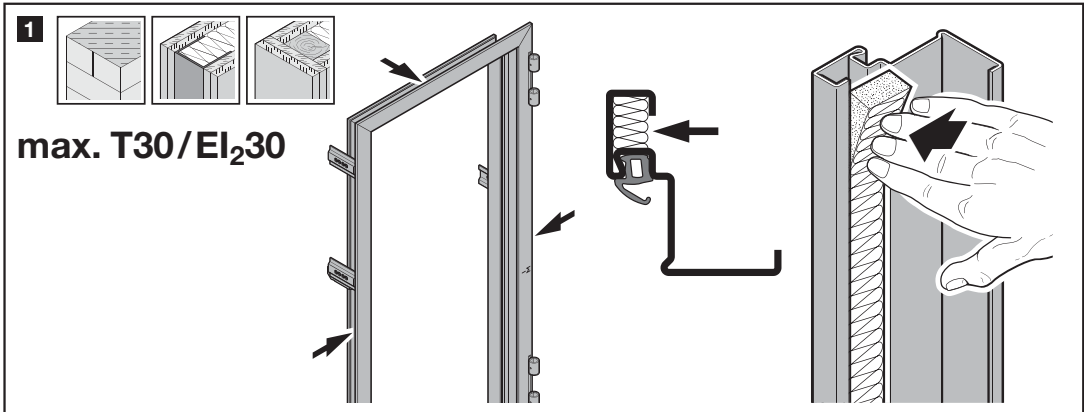
➔ 2a 2b 3 ...

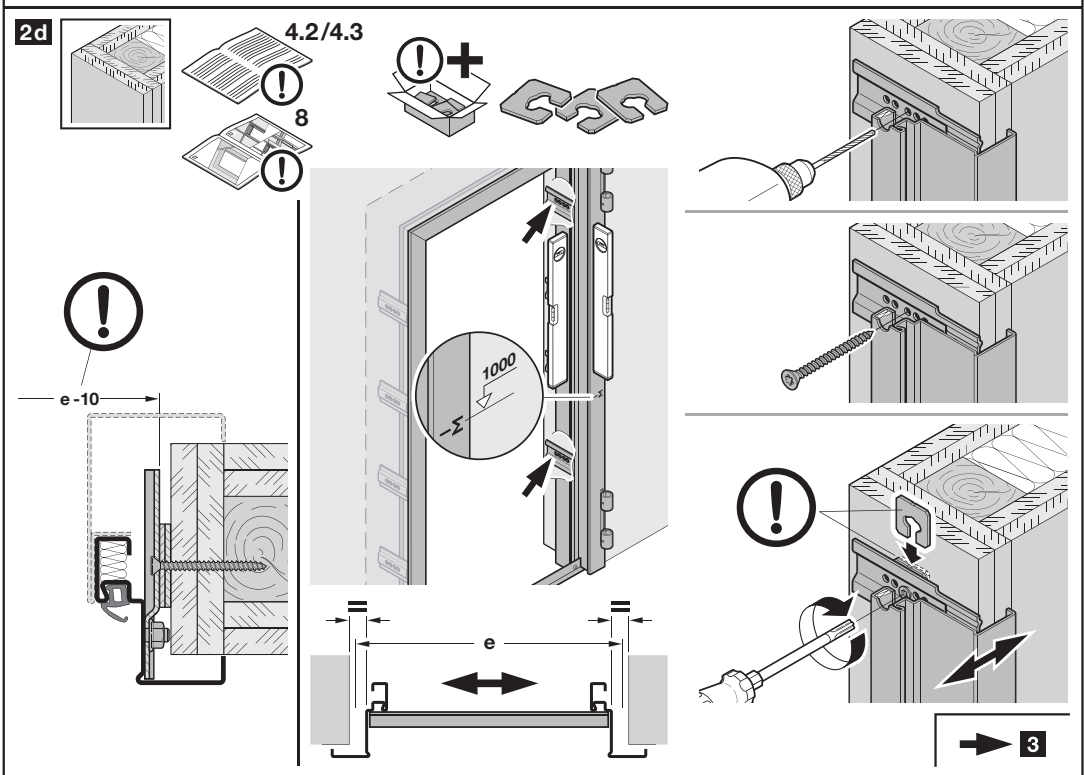
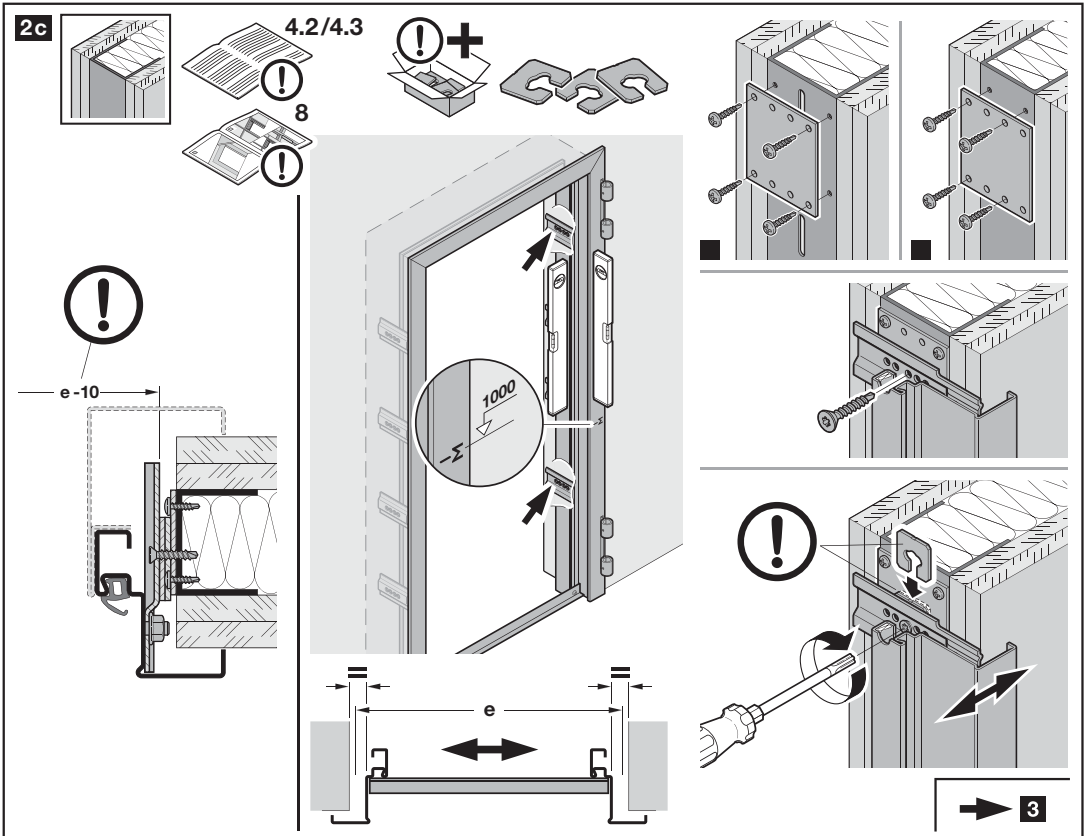
F6



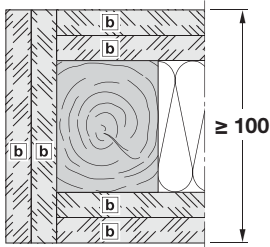
- a A-9,5-EN 520
- b A-12,5-EN 520

➔ 2c 3 ...

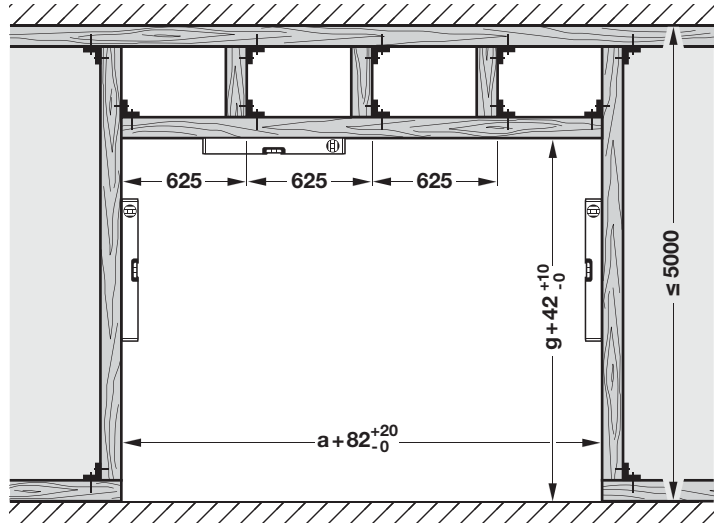




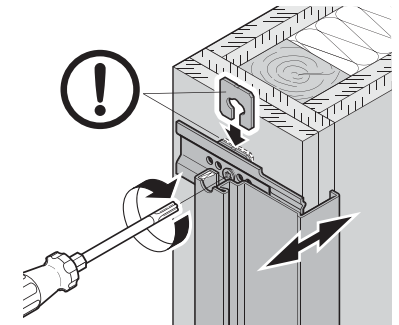
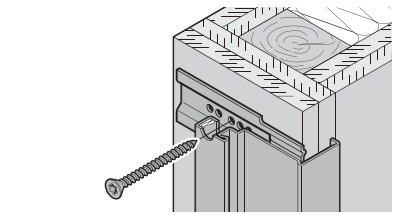
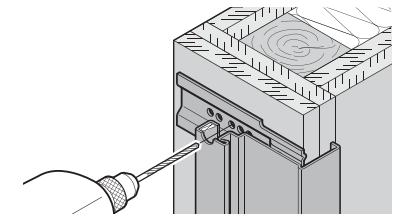
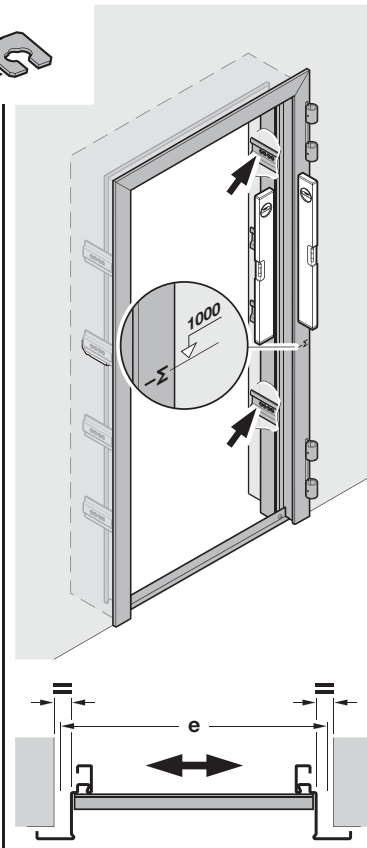
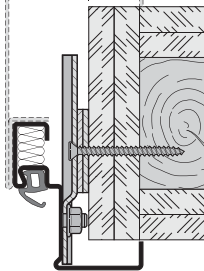
2e



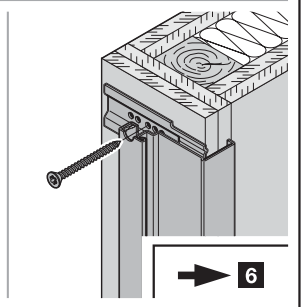
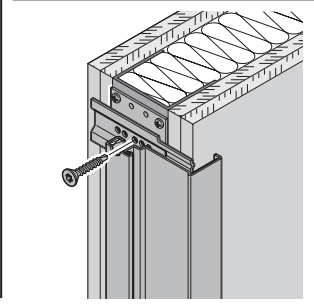
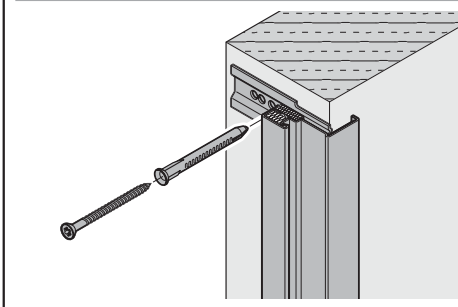
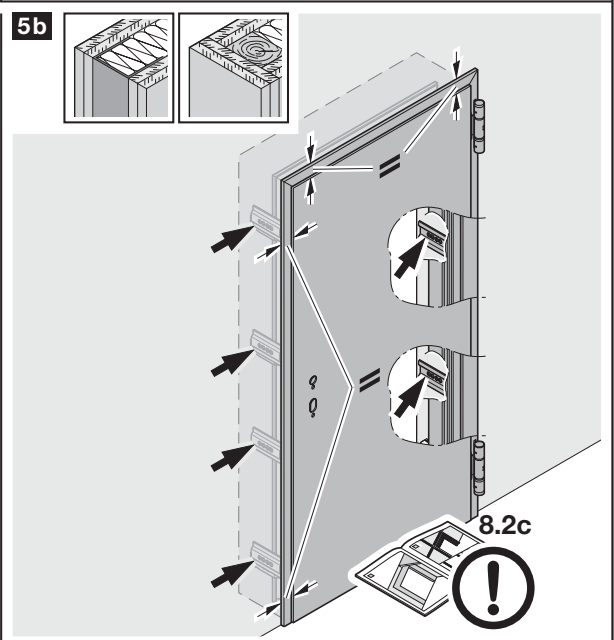
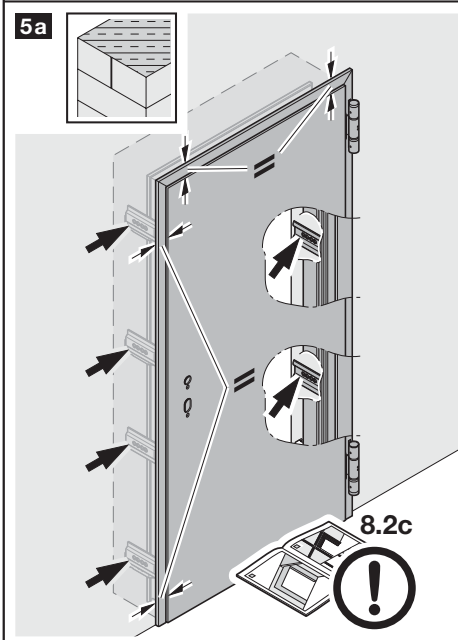
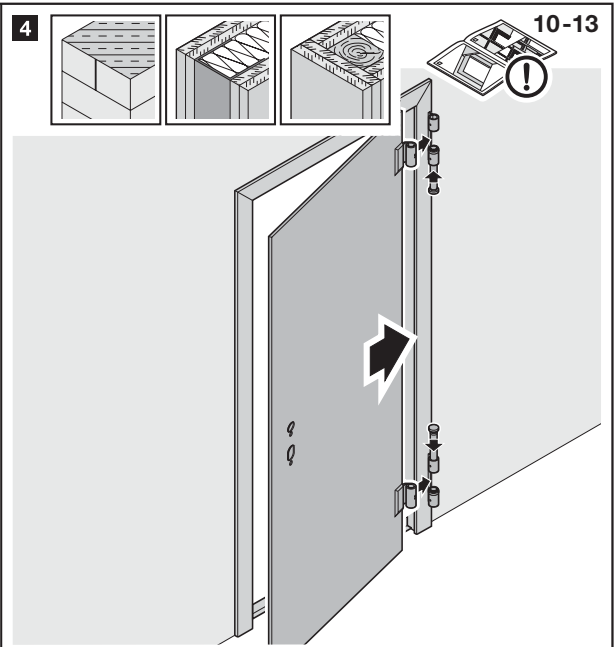
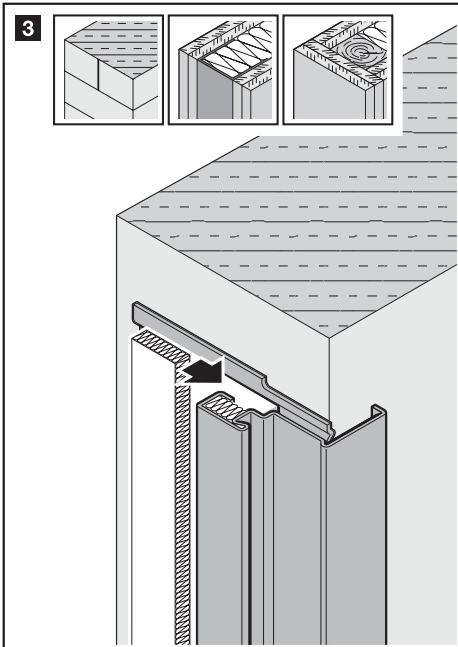
**b** A-12,5-EN 520



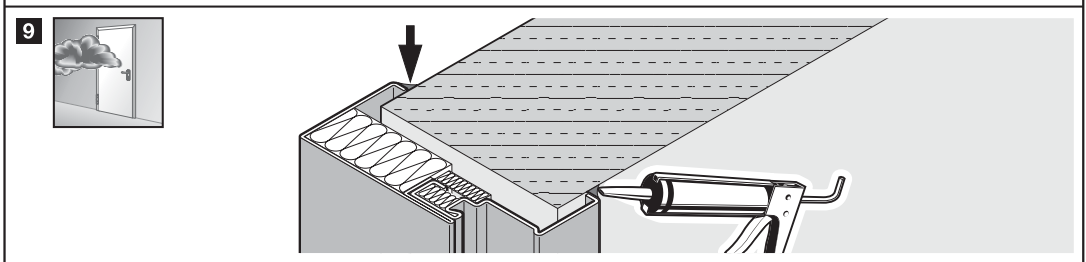
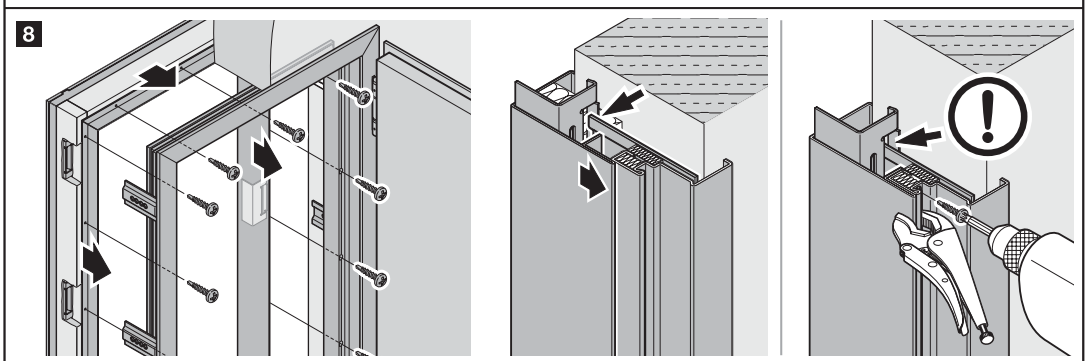
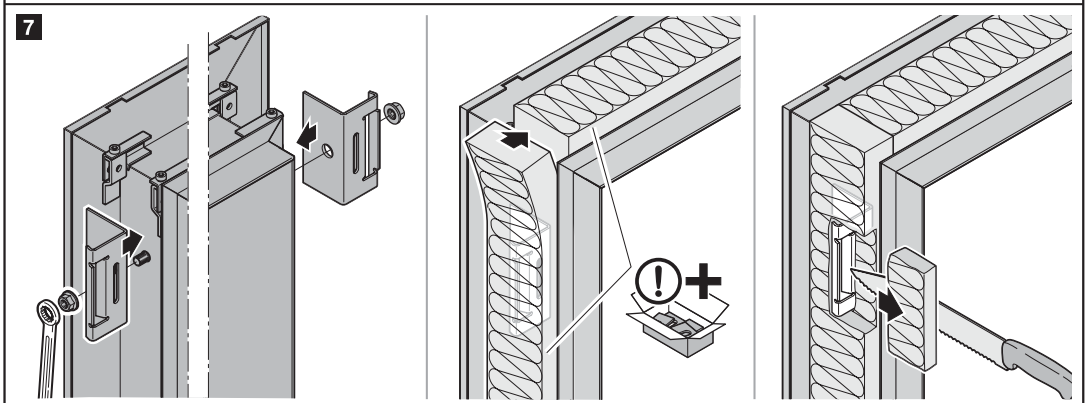
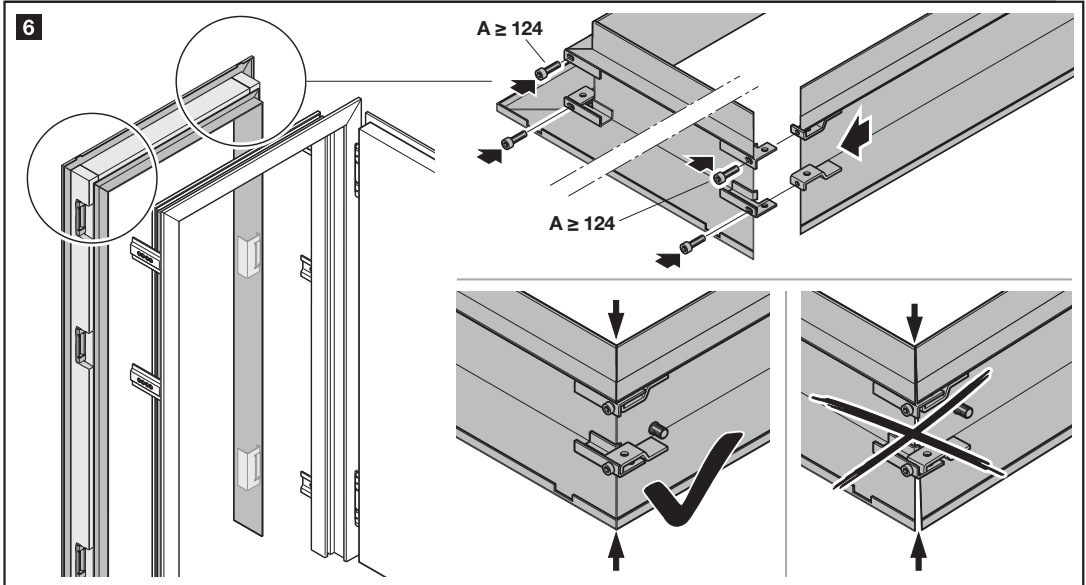
$e +20 -0$



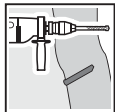
**3**



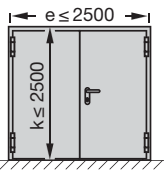
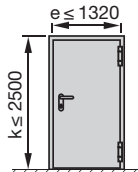
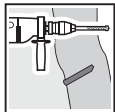




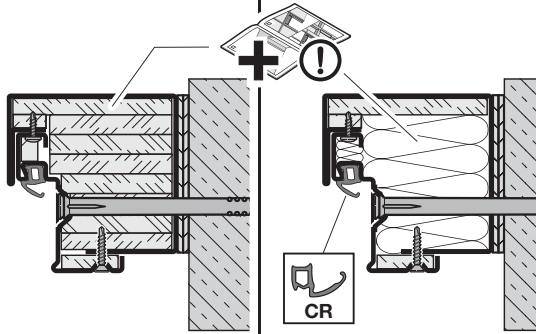
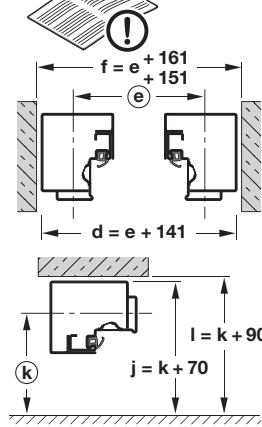
9/G1  
max. T90/  
EI<sub>2</sub>90



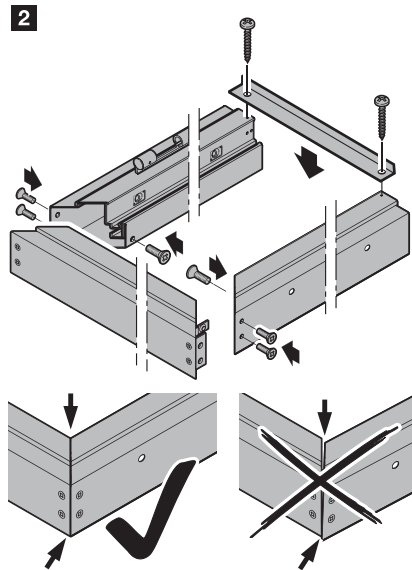
9/G2  
max. T30/  
EI<sub>2</sub>30



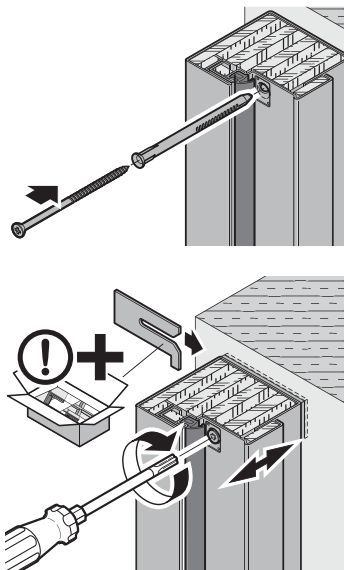
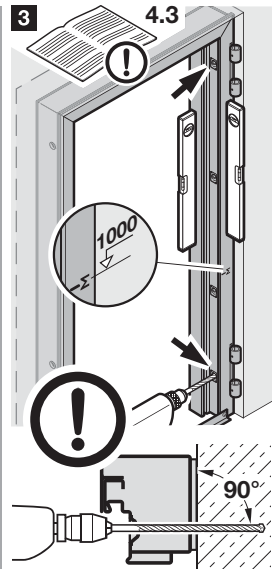
1 4.3



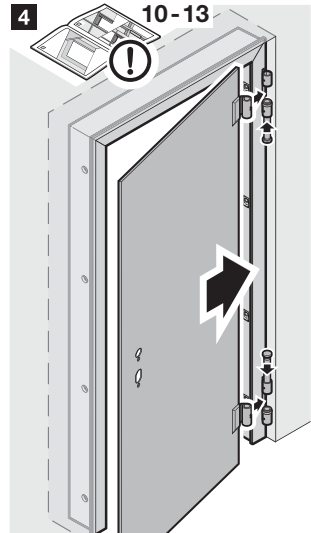
2



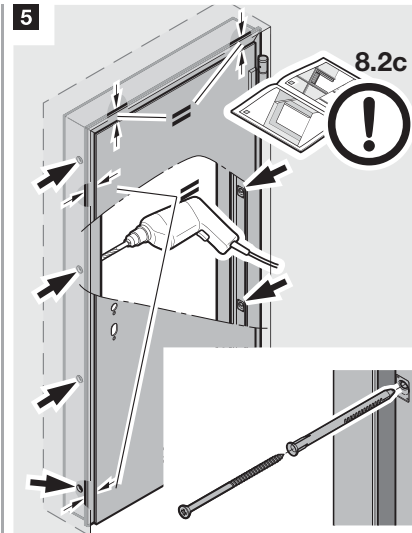
3 4.3



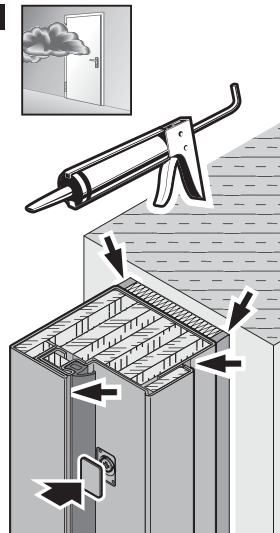
4 10-13



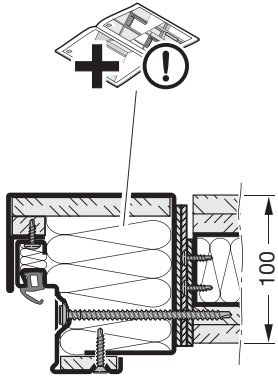
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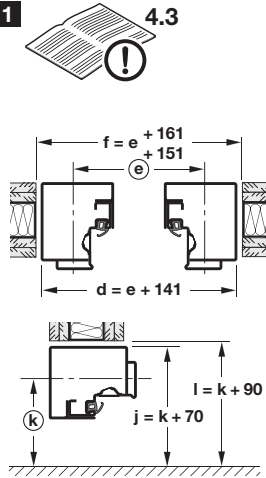
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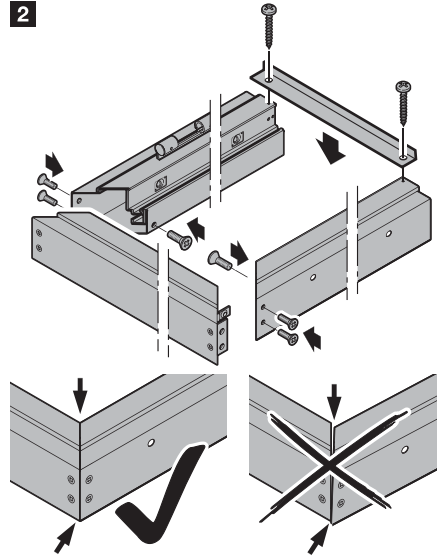
9/G3



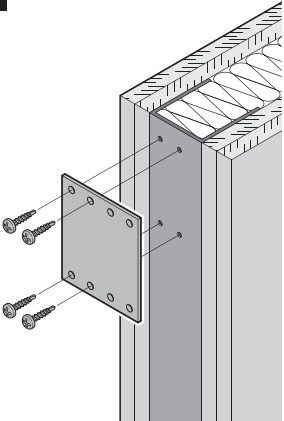
1 4.3



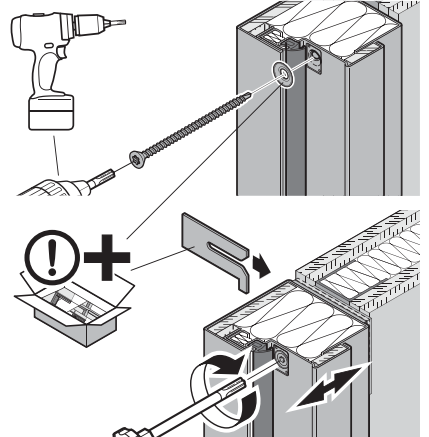
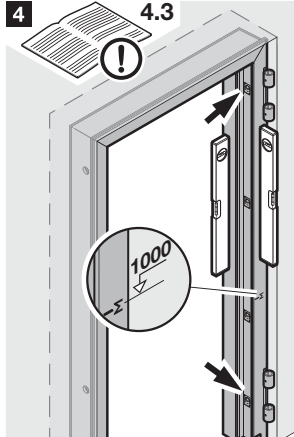
2



3

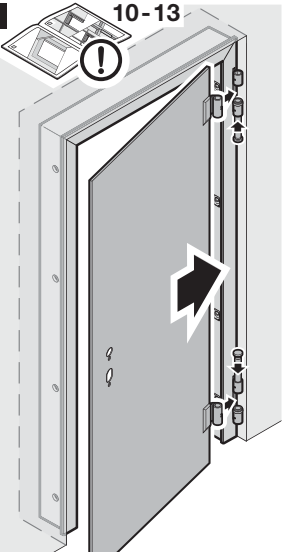


4 4.3

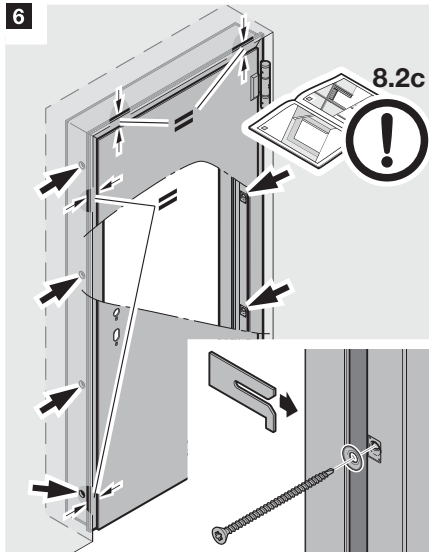


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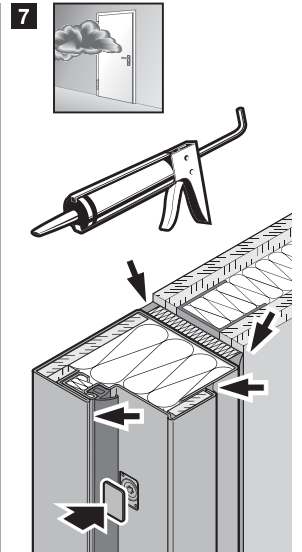
10-13



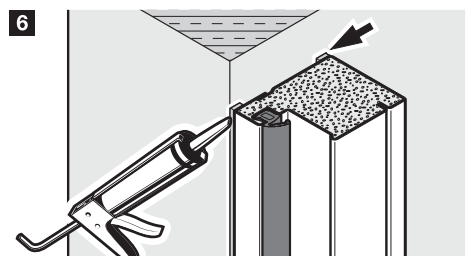
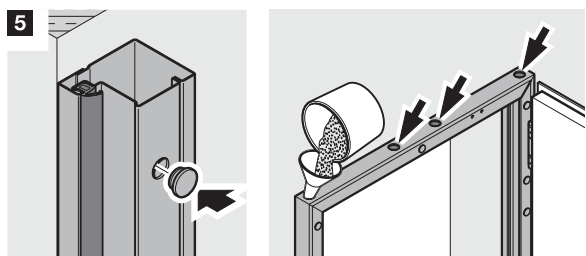
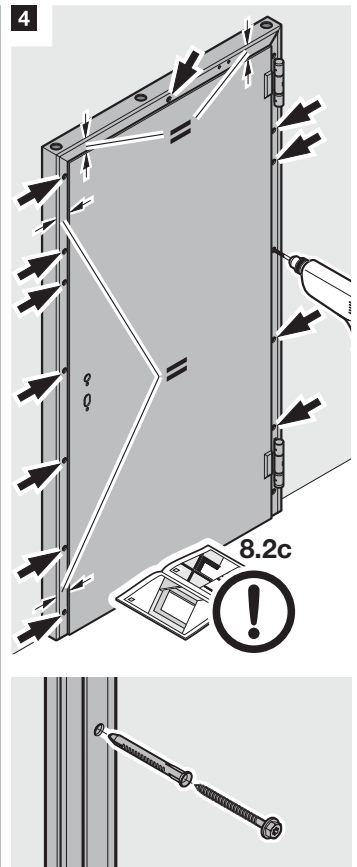
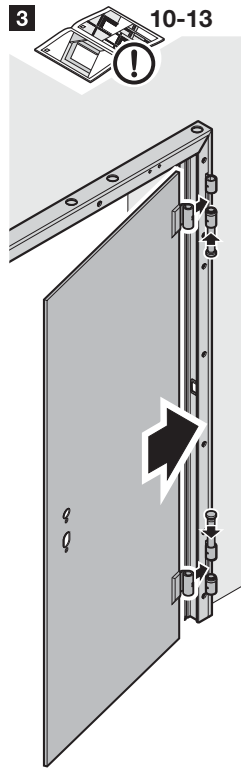
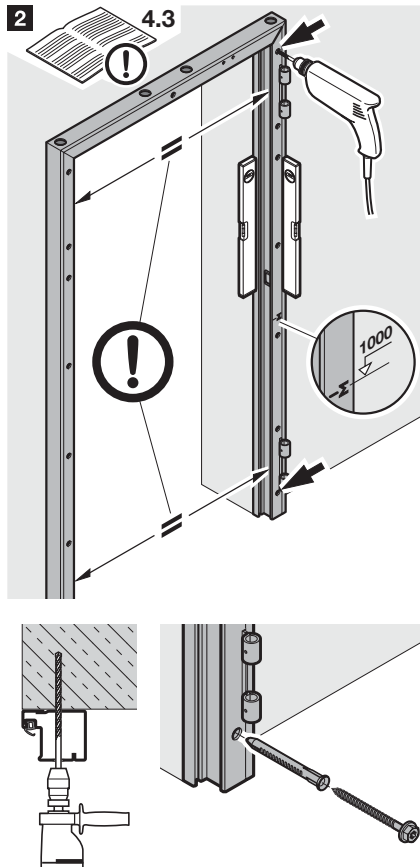
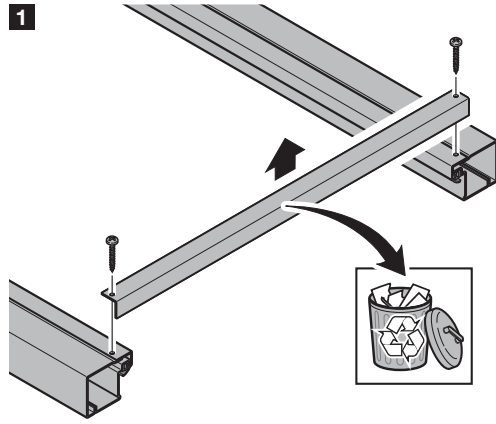
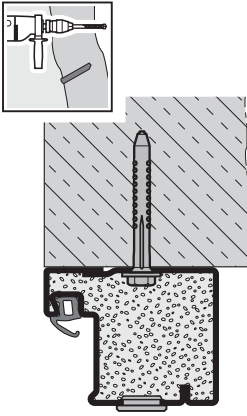
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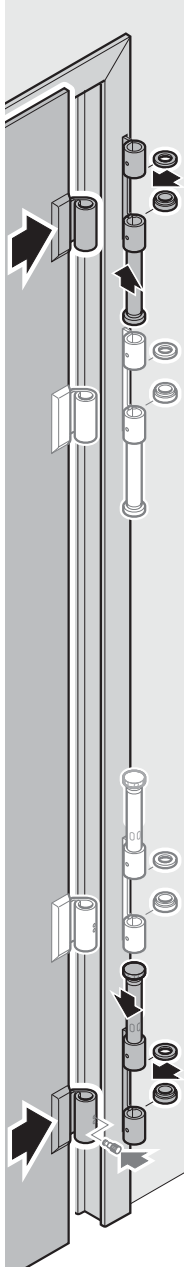
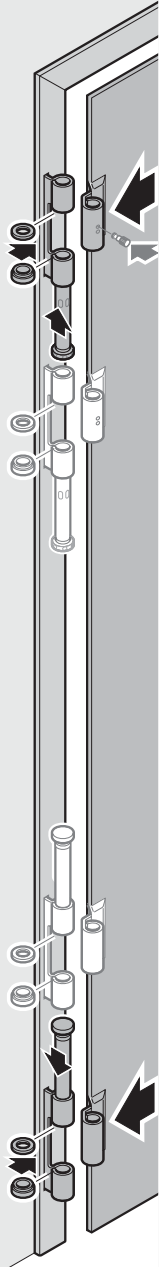
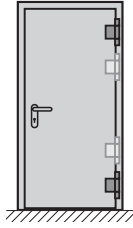
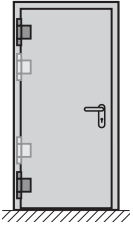
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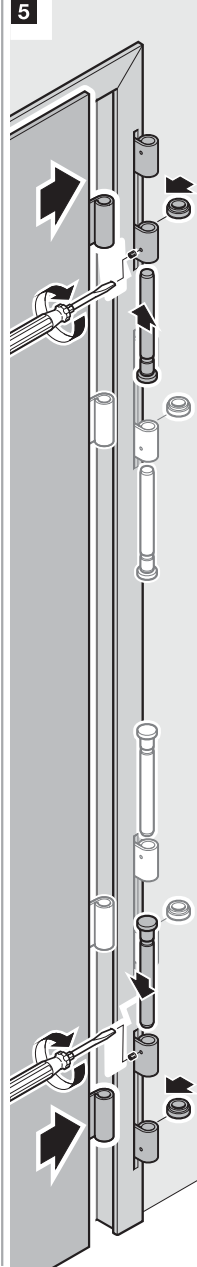
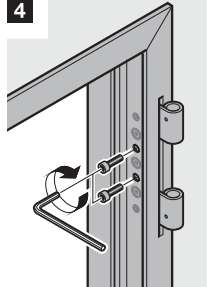
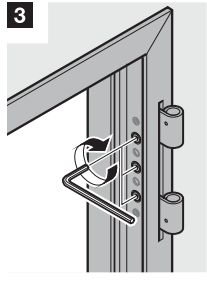
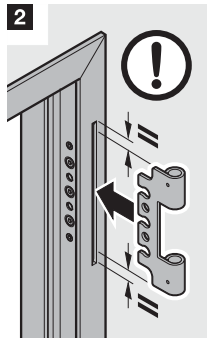
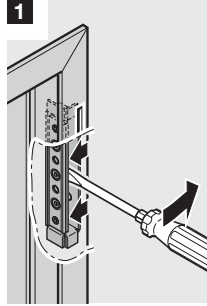
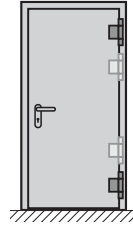
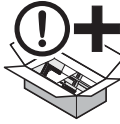
9/H1  
max. T30/  
EI<sub>2</sub>30



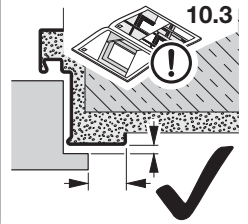
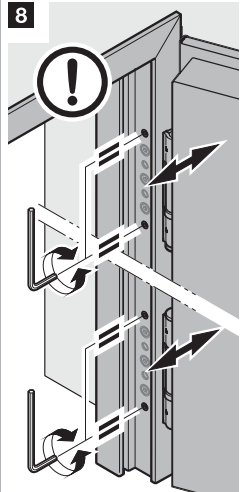
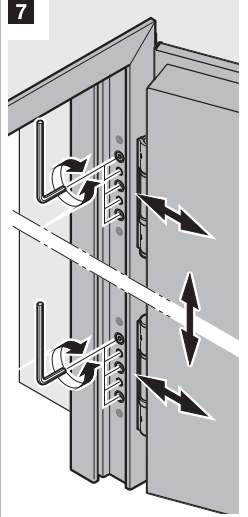
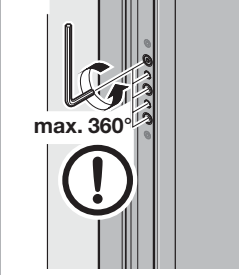
10.1a



10.1b



6

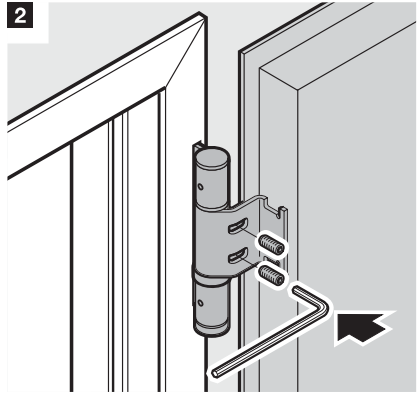
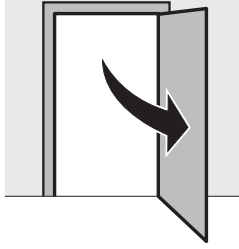
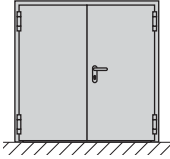


10.2



1

2

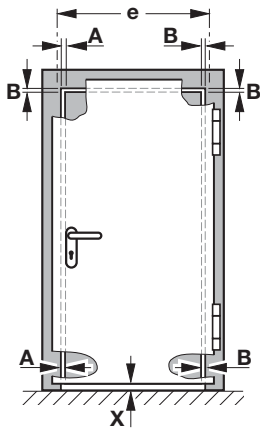


10.3

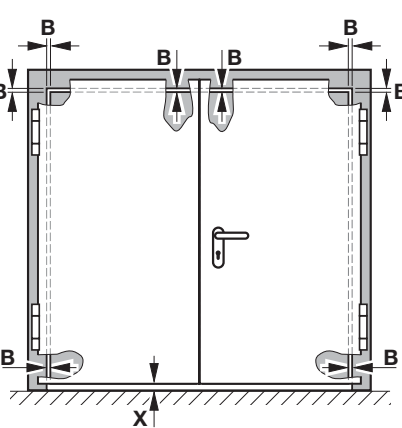


1

e	A	B	C max. T30	C T60, T90, T120
≤ 749	6 <sup>+1</sup> <sub>-2</sub>	4±2	4±2	10±2
750 - 874	6 <sup>+1</sup> <sub>-2</sub>			
≥ 875	5 <sup>+1</sup> <sub>-2</sub>			



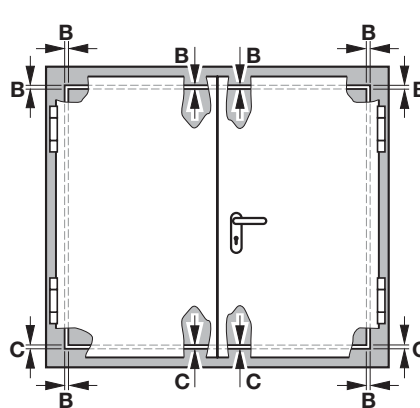
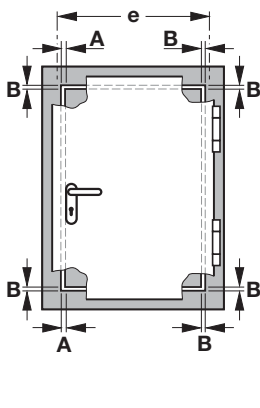
X=10±5



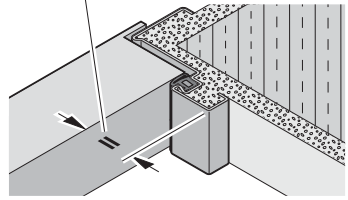
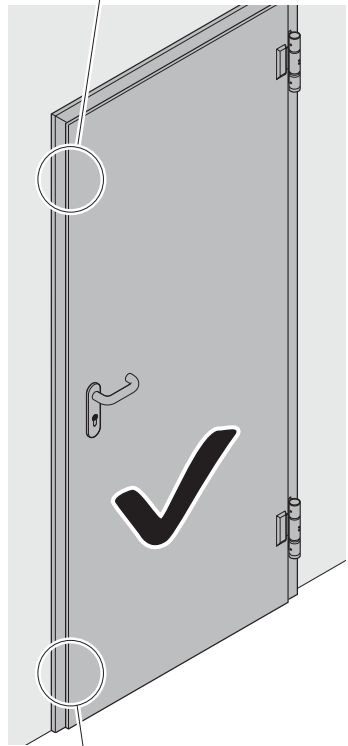
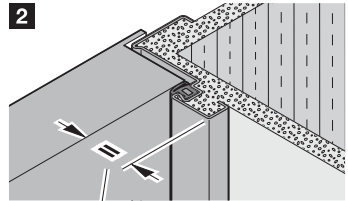
X=10±<sup>5</sup>/<sub>5</sub>



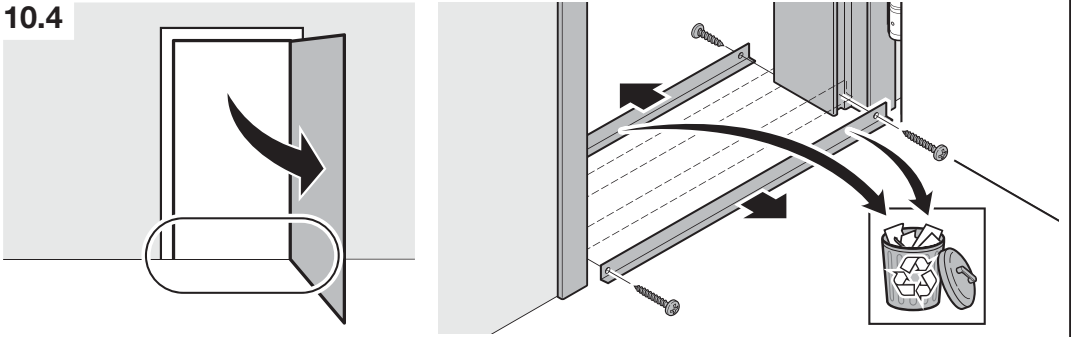
X=10-5



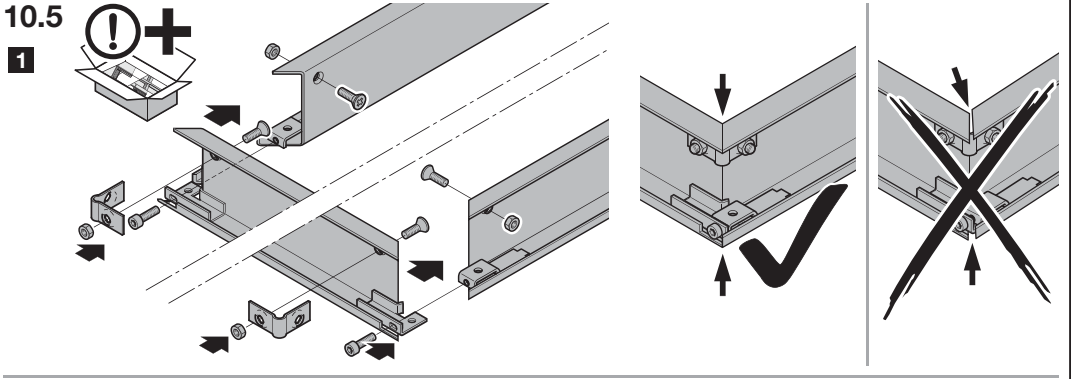
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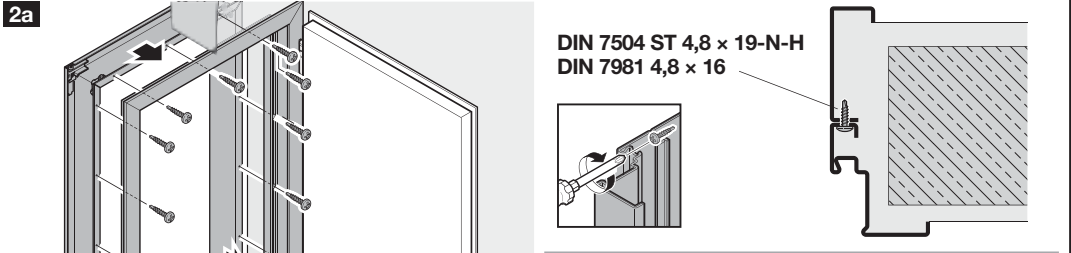
10.4



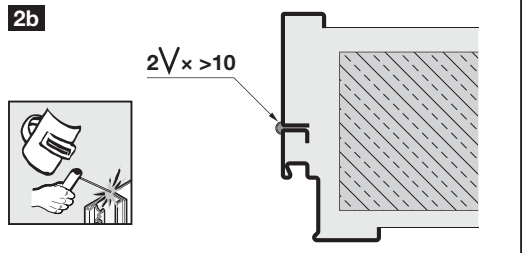
10.5



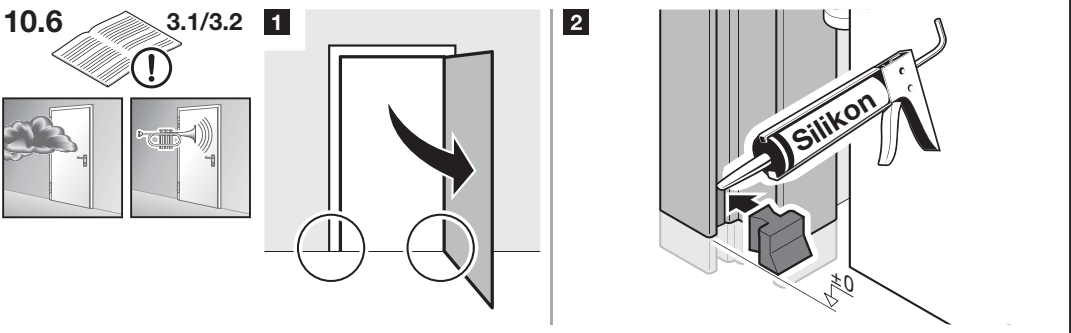
2a



2b

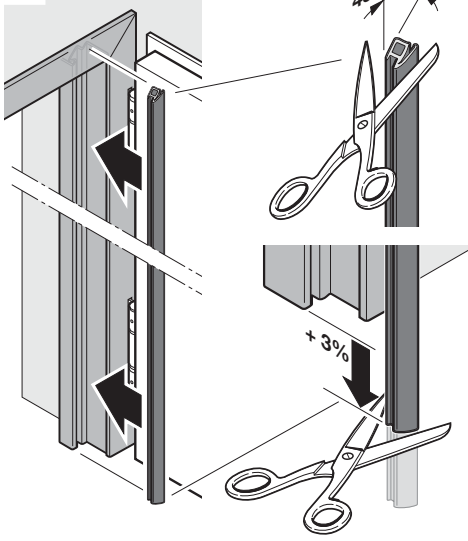


10.6

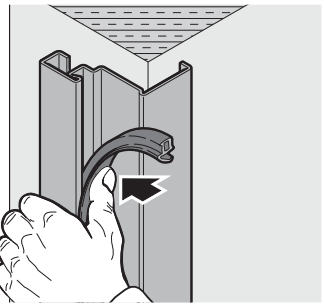


10.7a

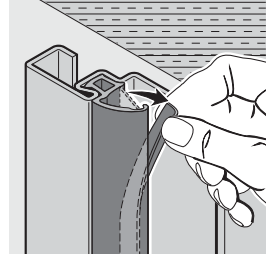
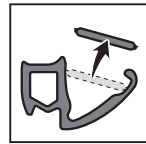
1



2



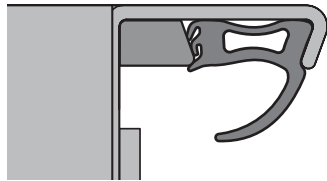
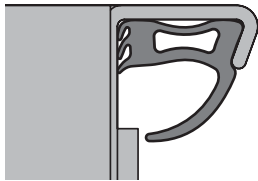
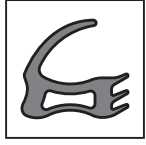
3



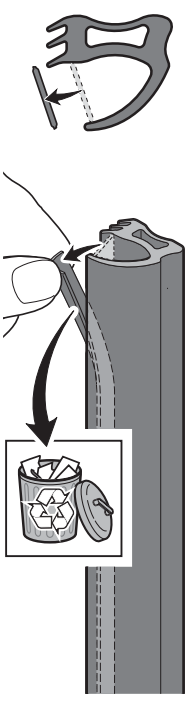
10.7b

A

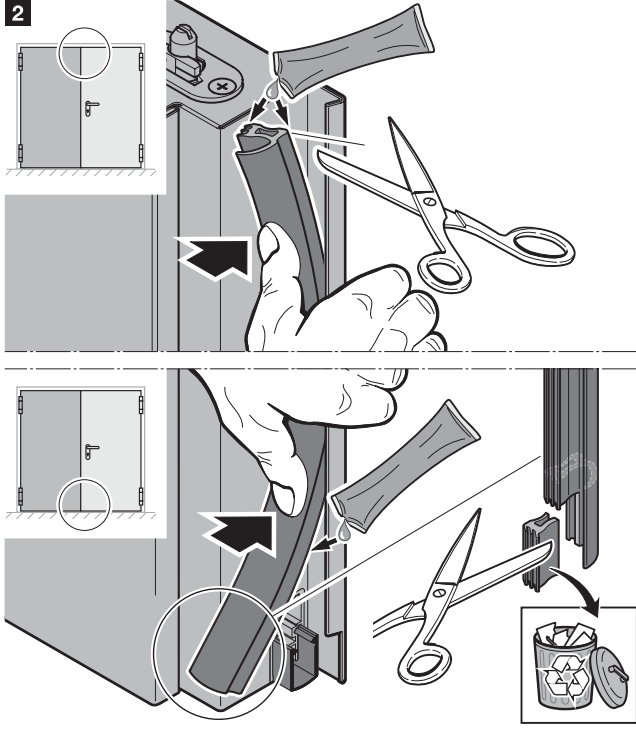
B



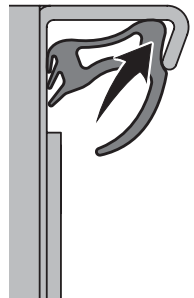
1



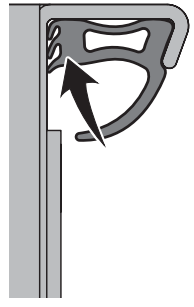
2



1.

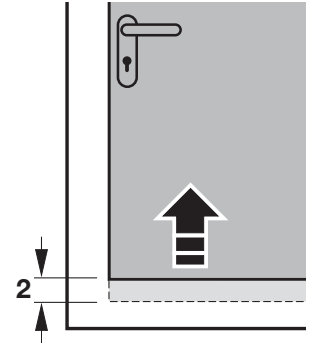
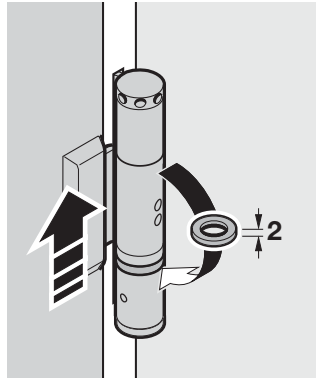
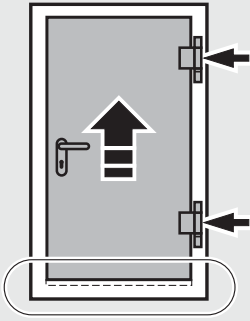


2.

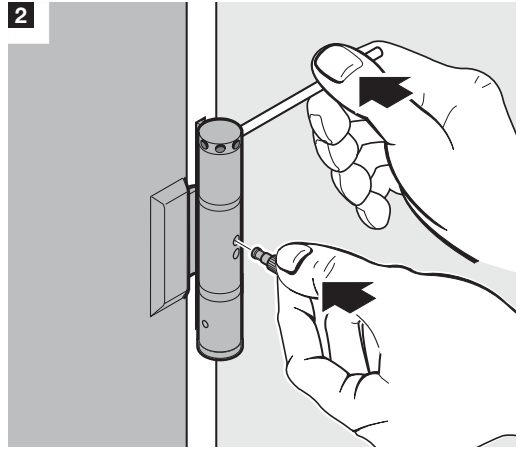
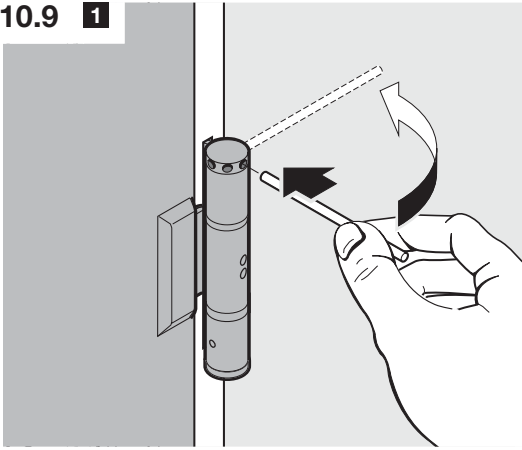




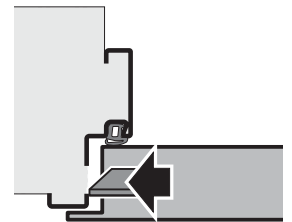
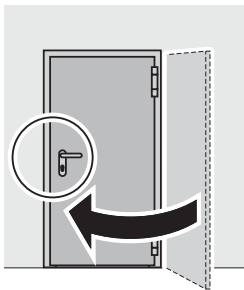
10.8



10.9 1

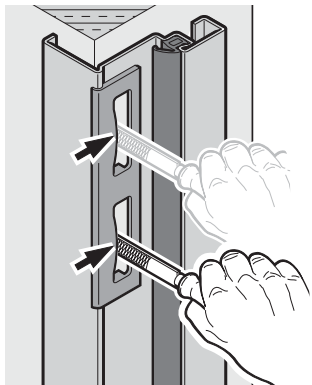


10.10a

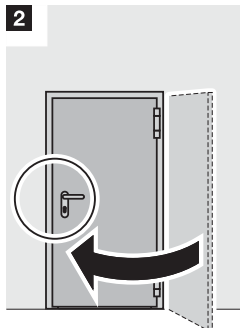


→ 1 2

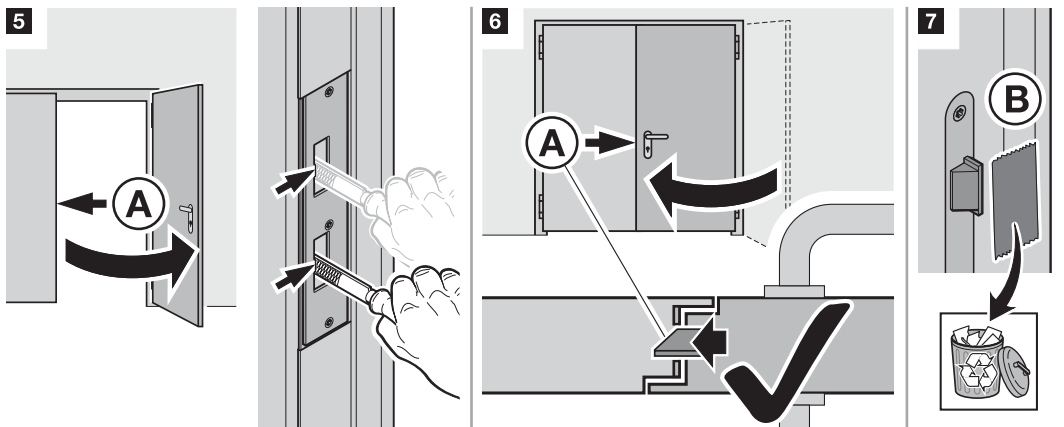
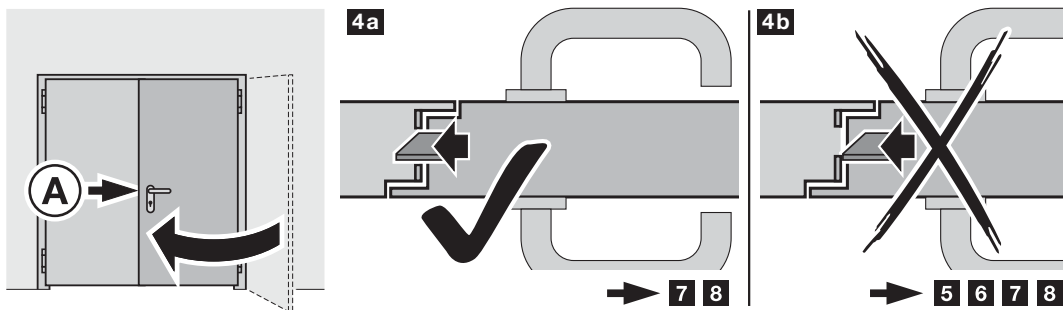
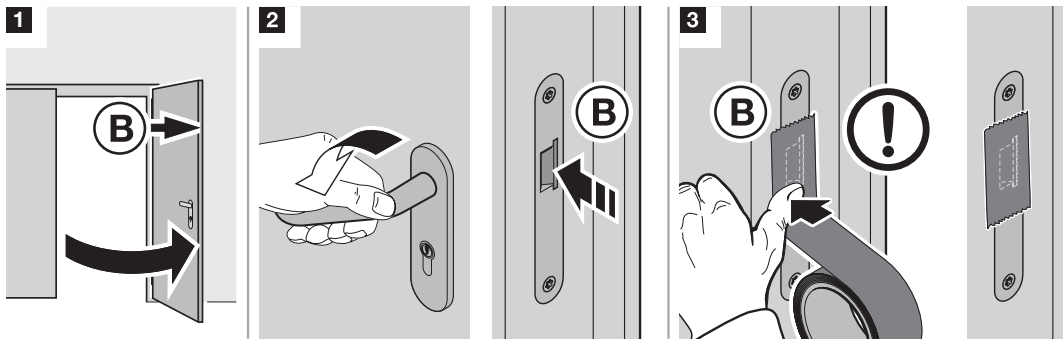
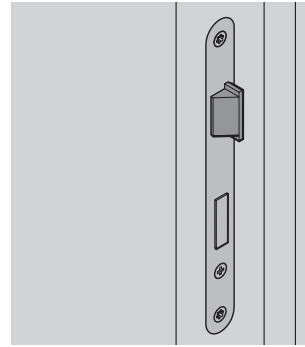
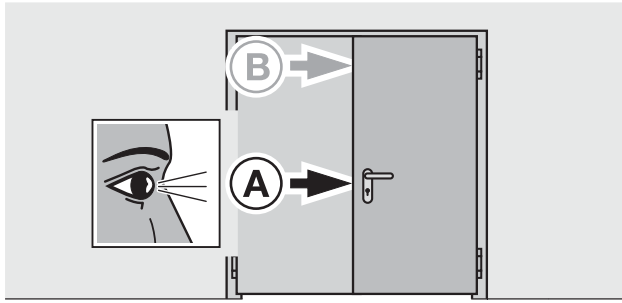
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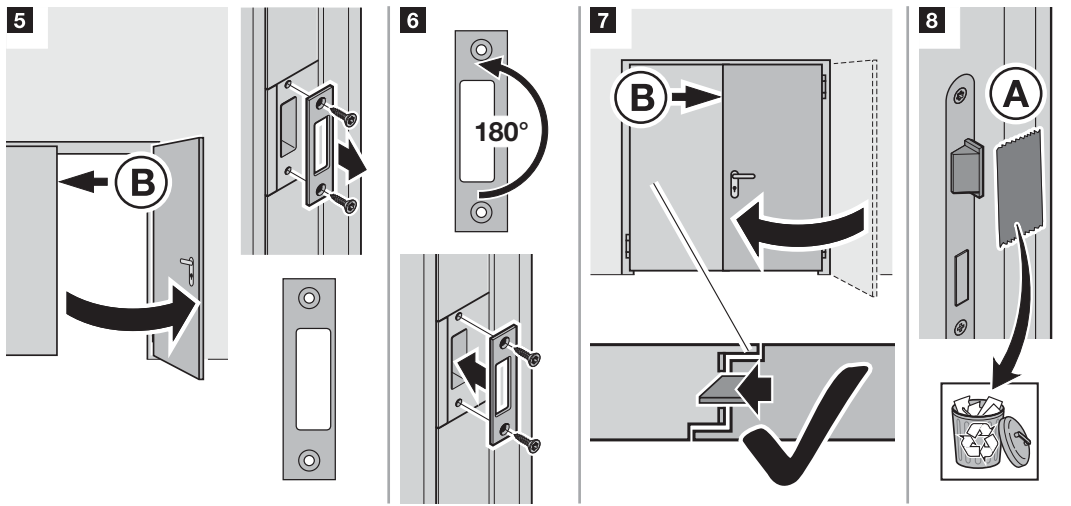
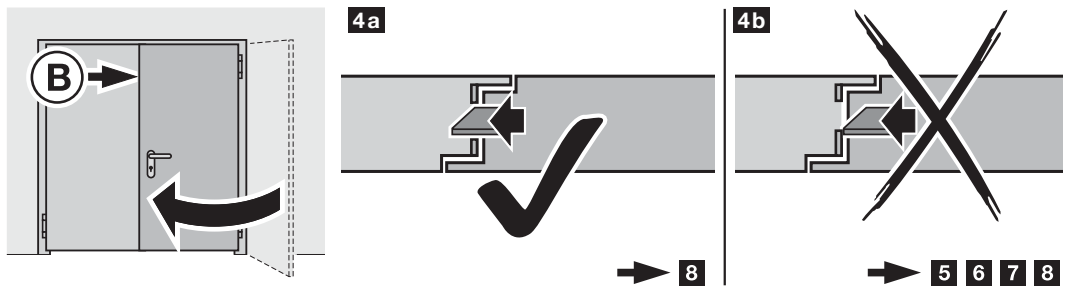
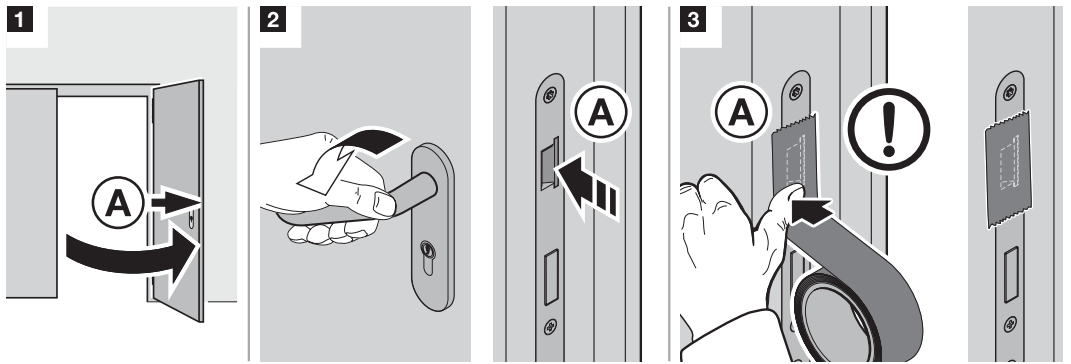
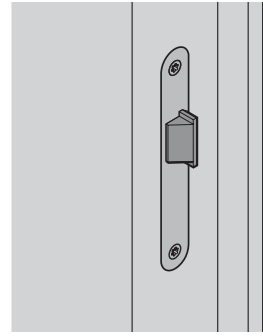
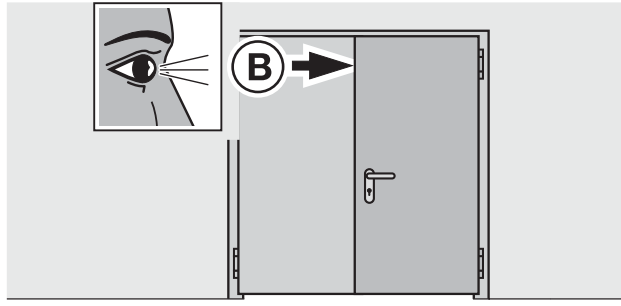
2



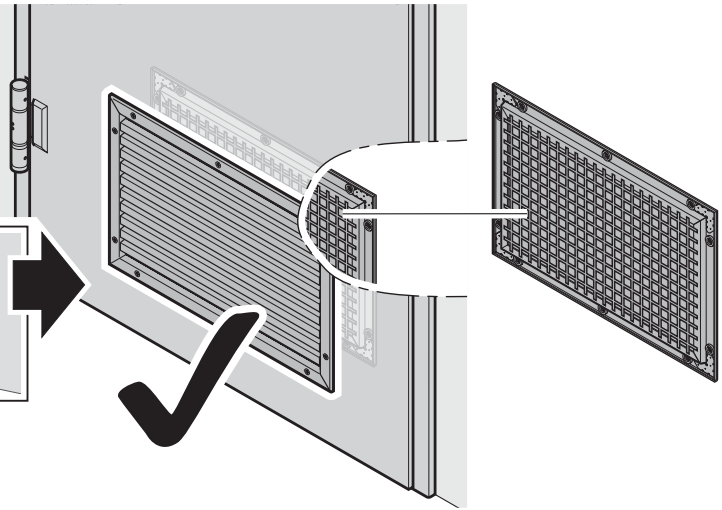
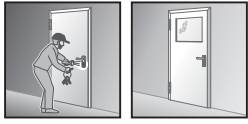
10.10b H16-2 G / H\_90 F-2



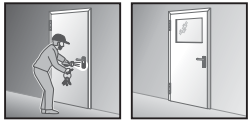
10.10c H16-2 G / H\_90 F-2



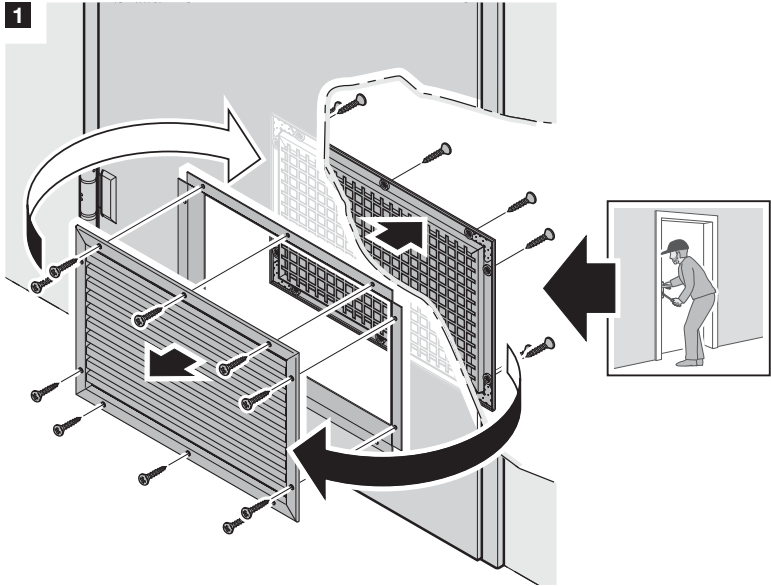
### 10.11a



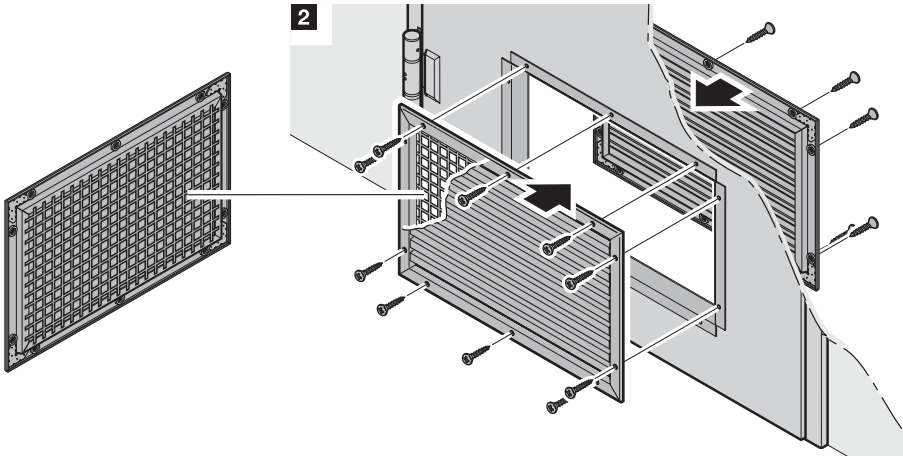
### 10.11b



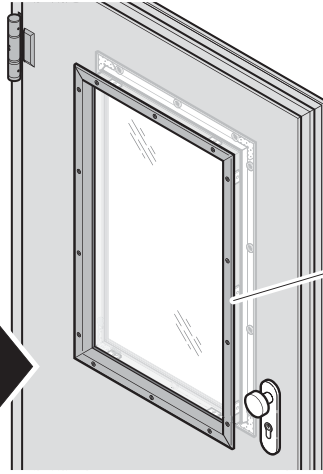
1



2

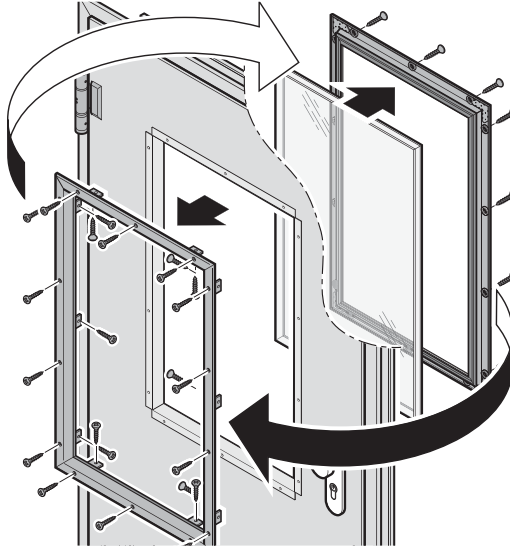


### 10.12a

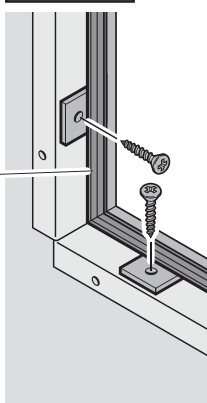
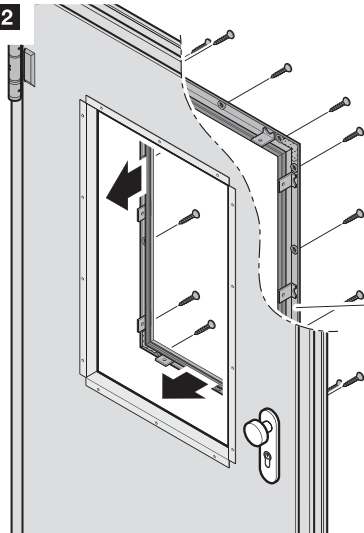


### 10.12b

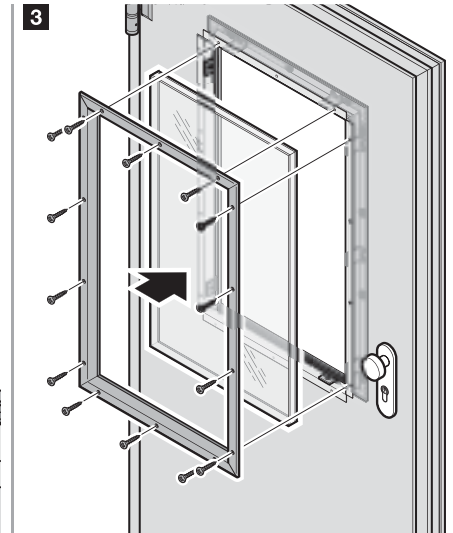
1



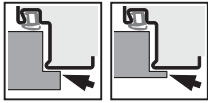
2



3



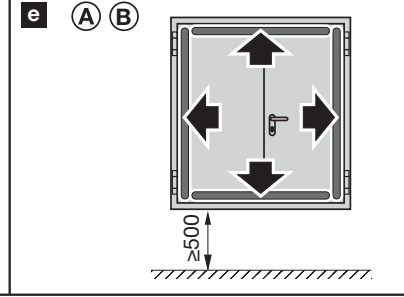
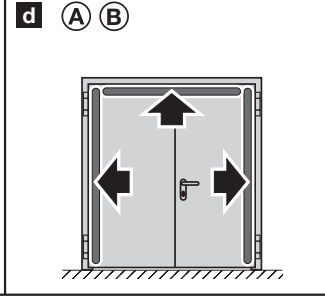
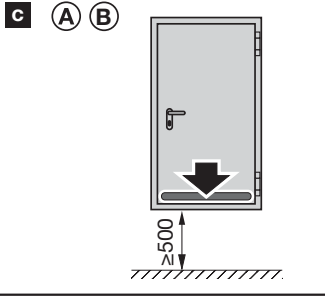
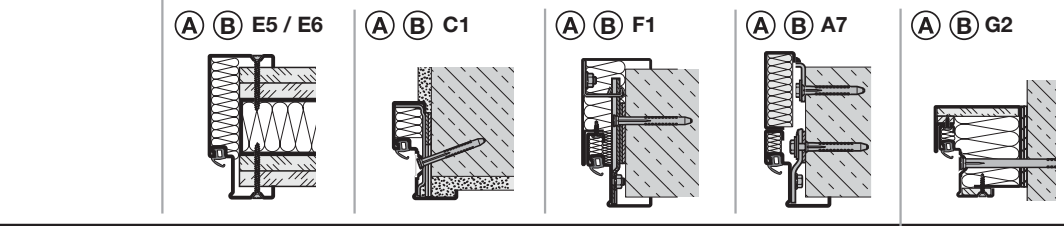
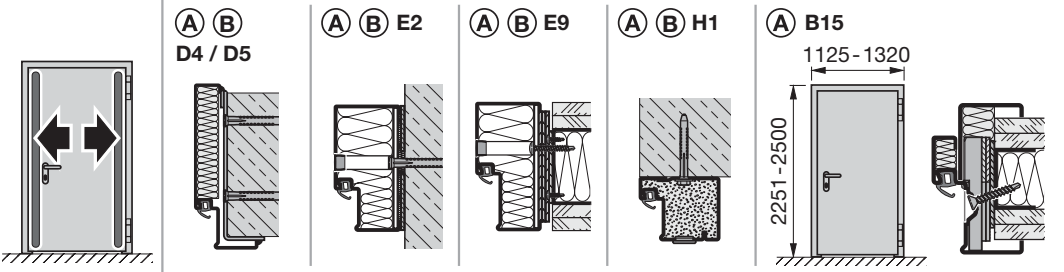
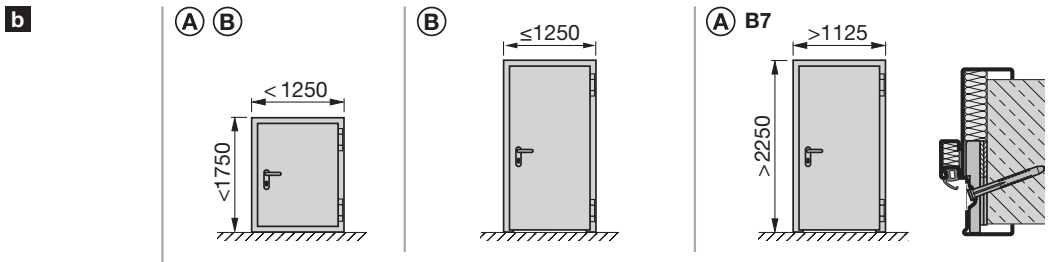
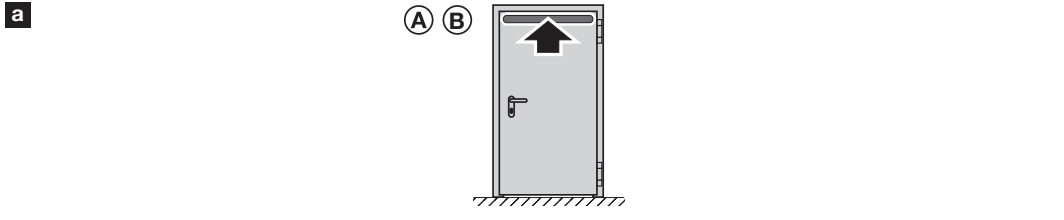
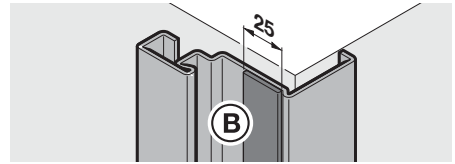
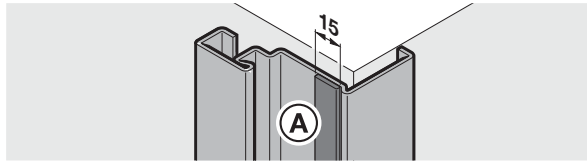
10.13a

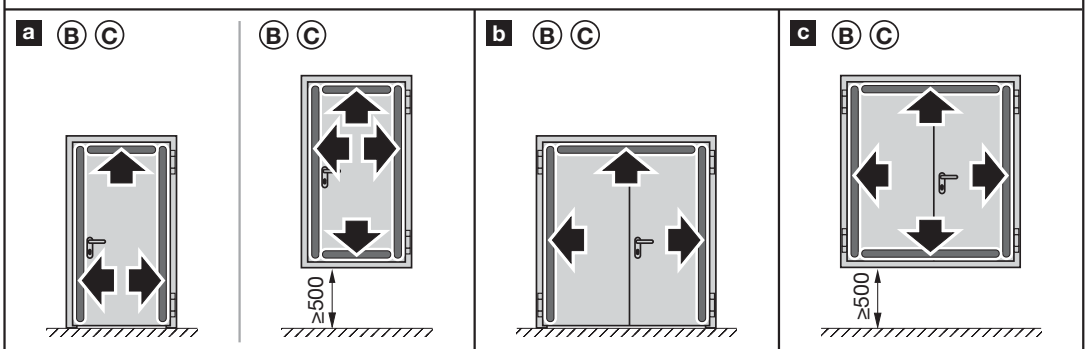
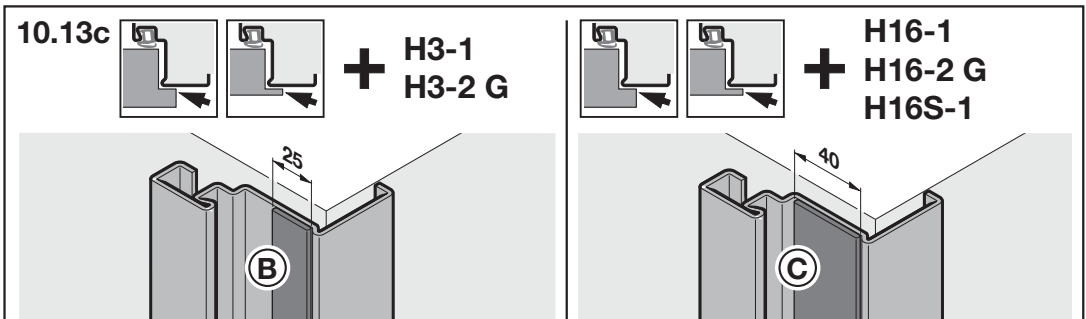
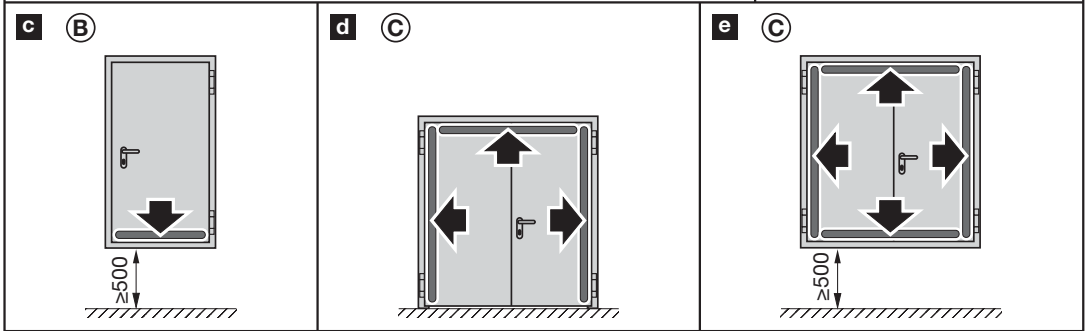
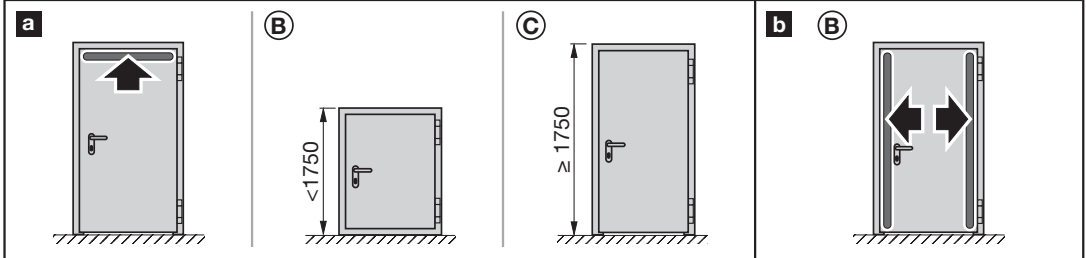
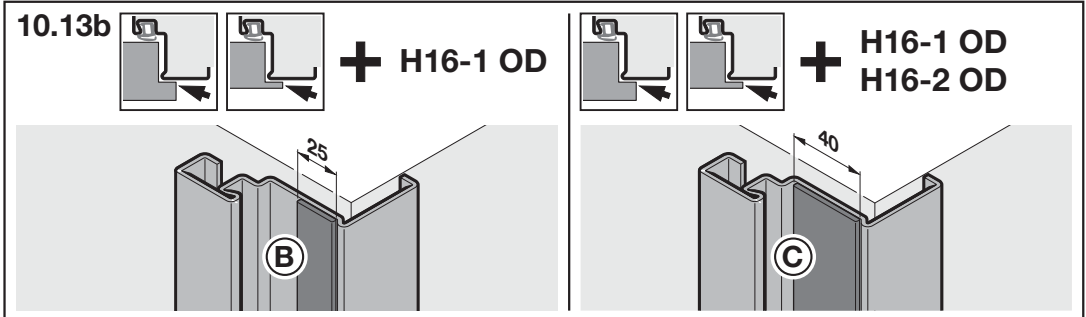


+ H3-1 OD  
+ H3-2 OD

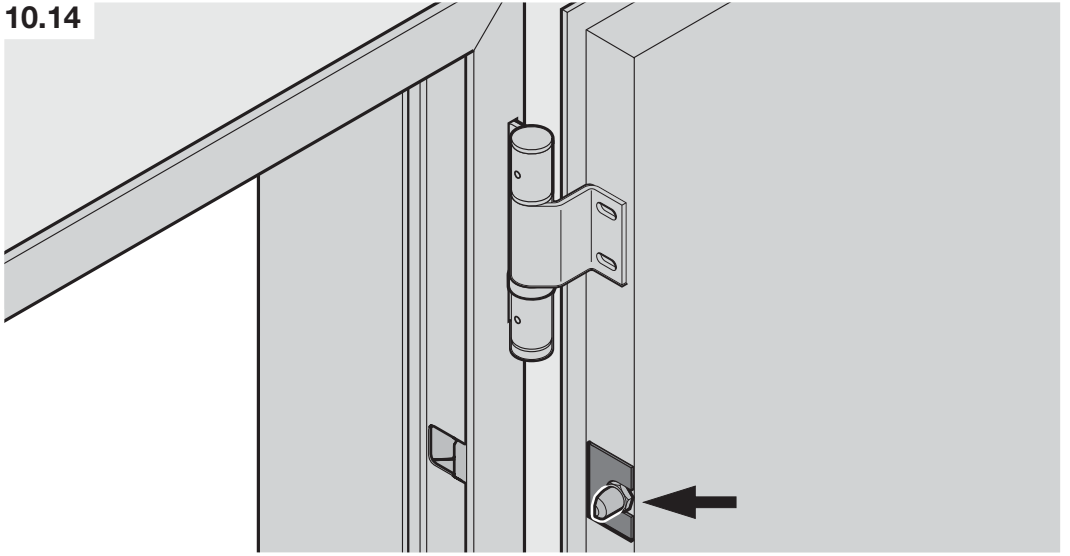


+ H3-1 OD  
+ H3-2 OD

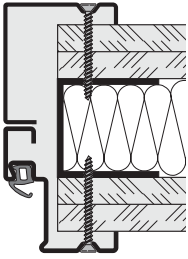




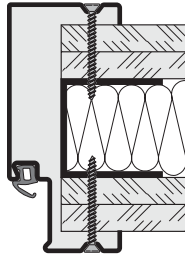
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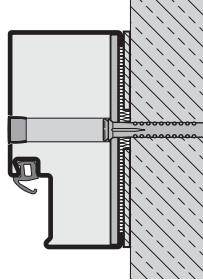
A10-A13



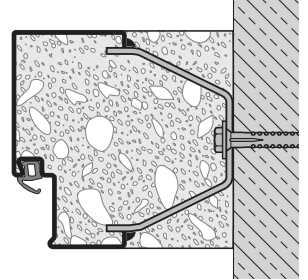
E5-E8



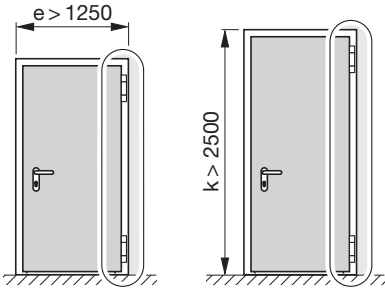
E1, E2



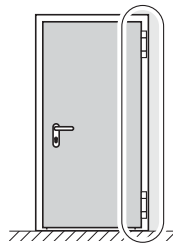
E3



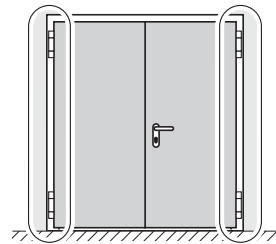
T30-1 / H\_30-1



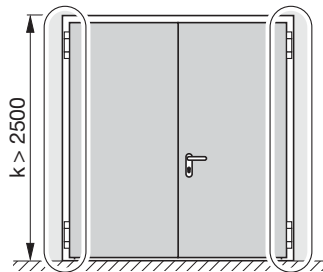
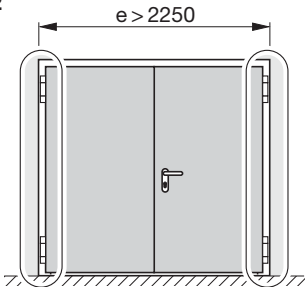
T90-1 / H\_90-1



T30-2 RC3 / H\_30-2 RC3

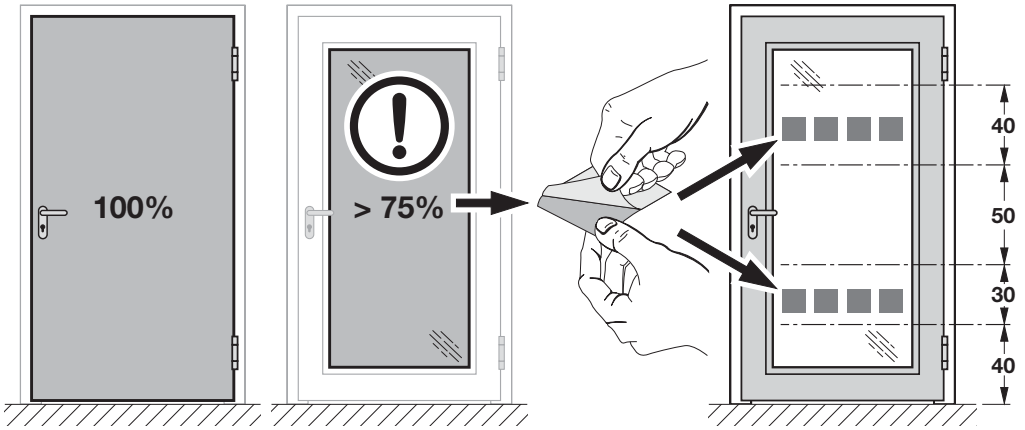


T90-2 / H\_90-2

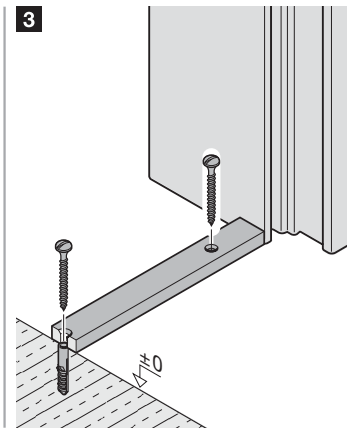
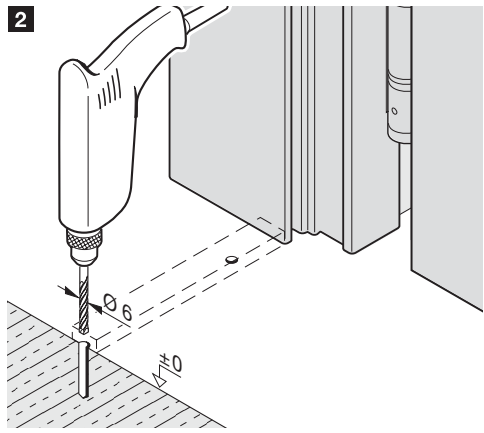
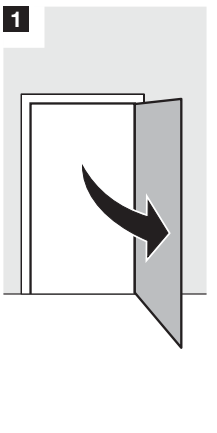
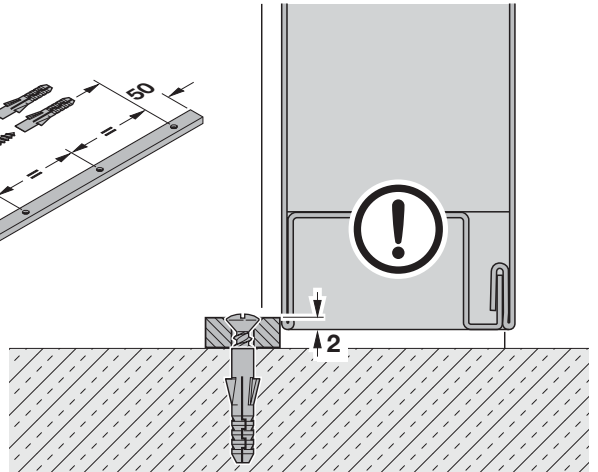
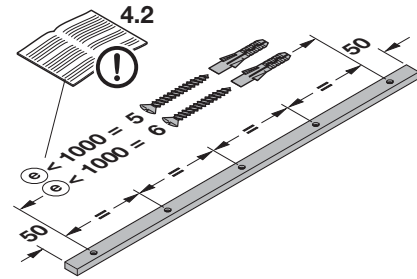
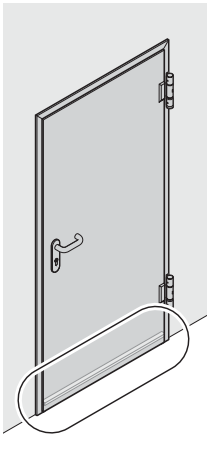




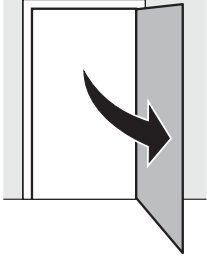
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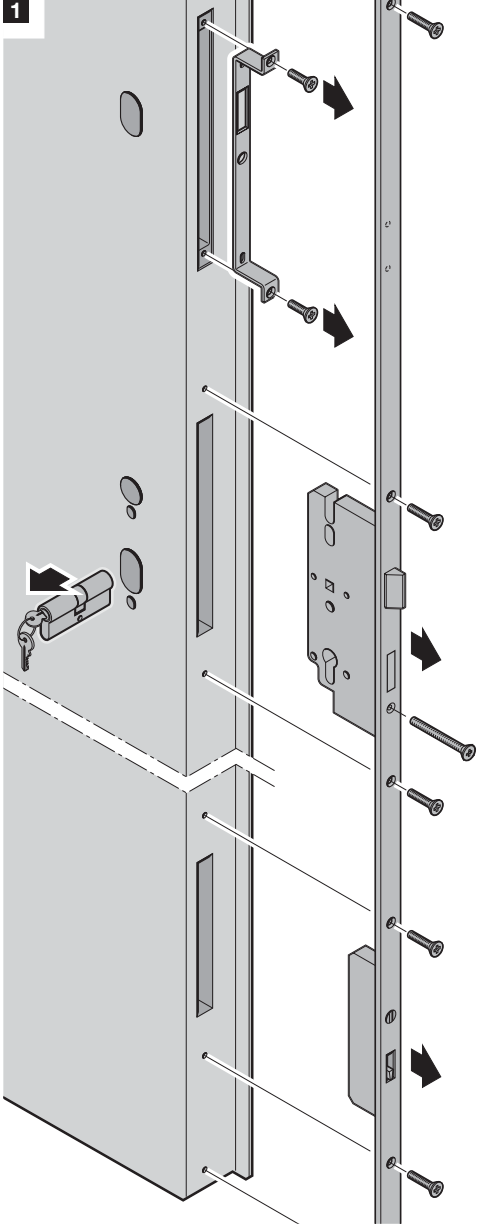
10.16



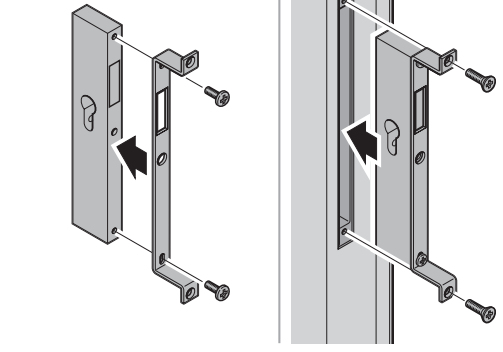
10.17



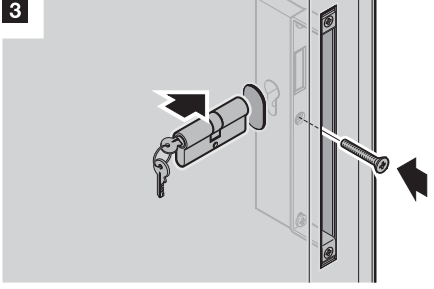
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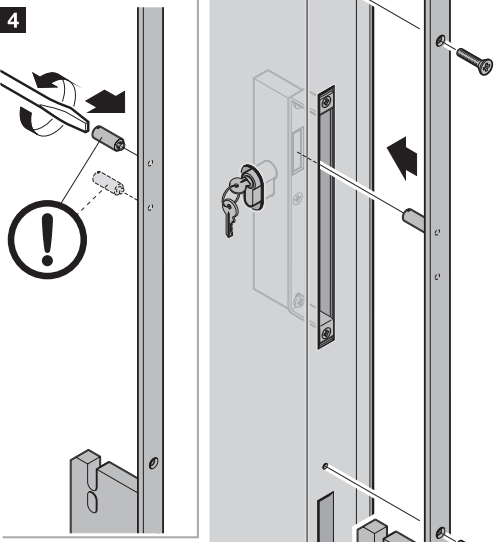
2



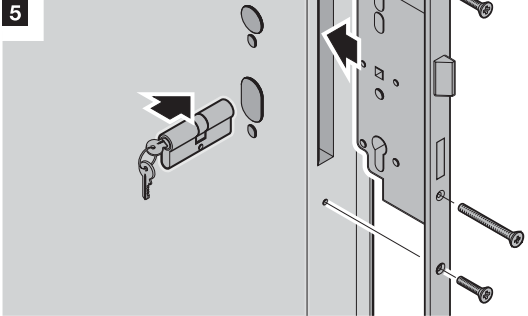
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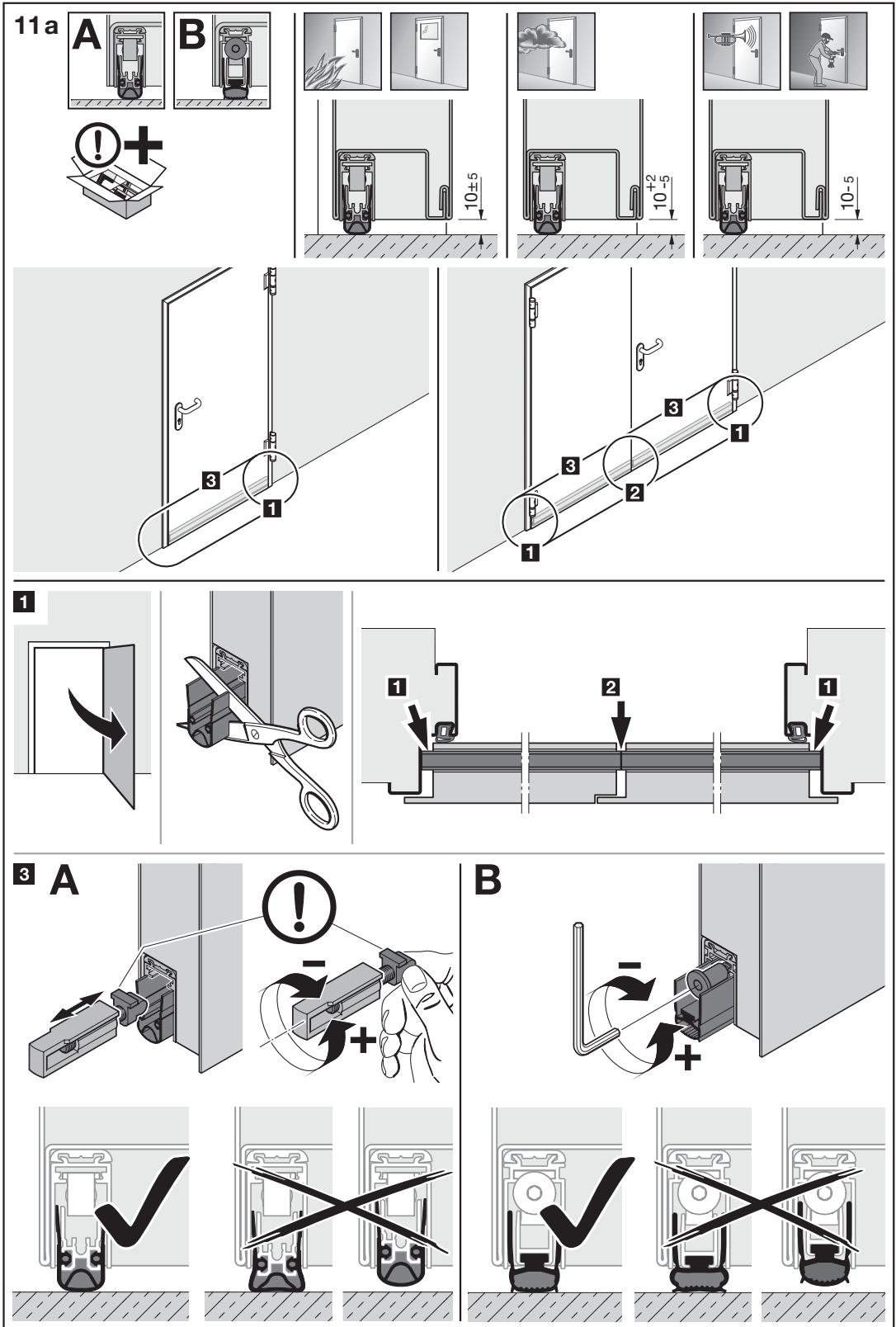


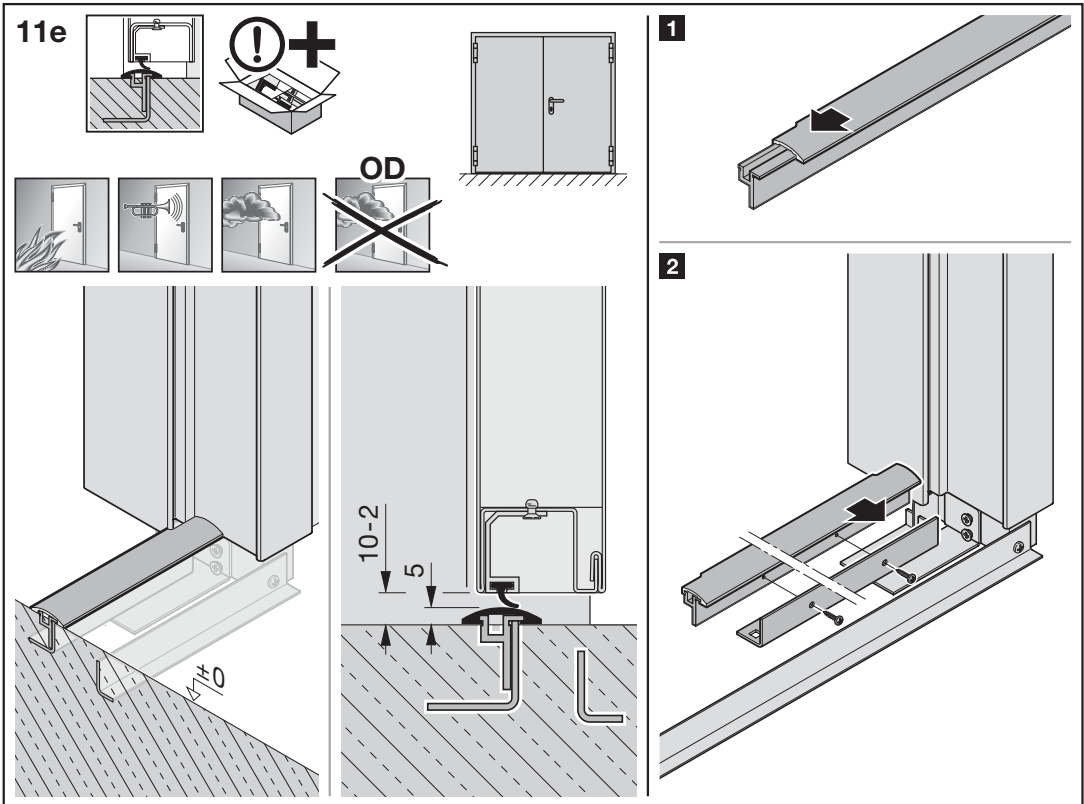
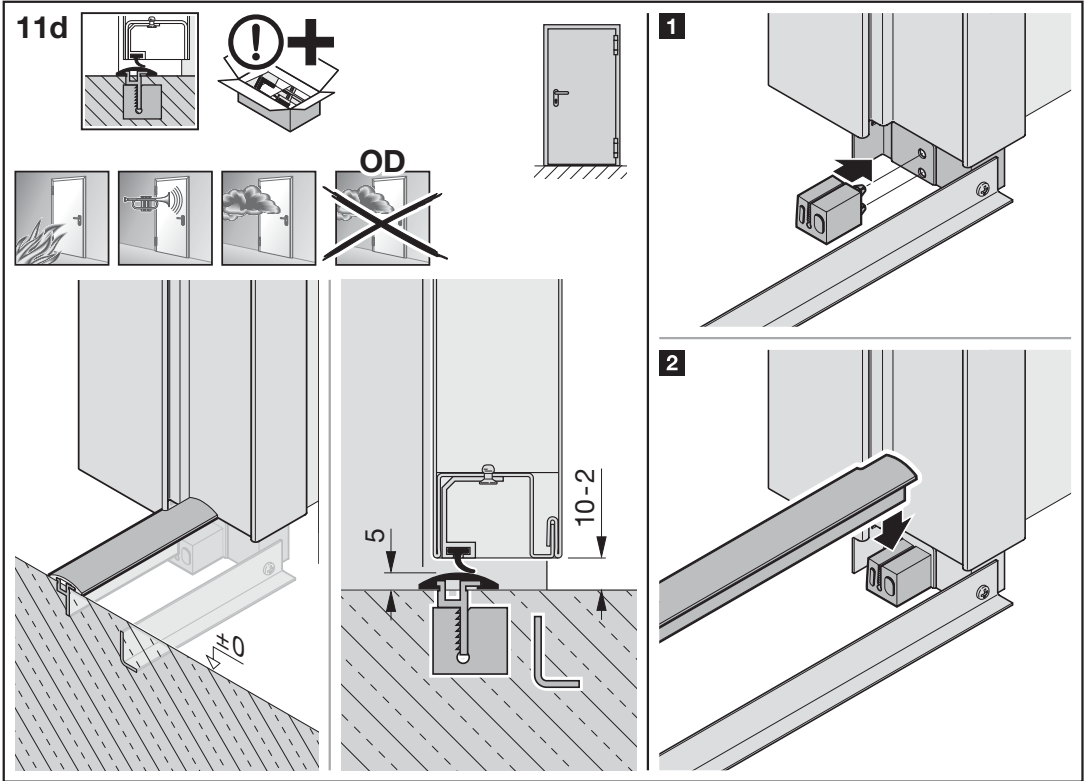
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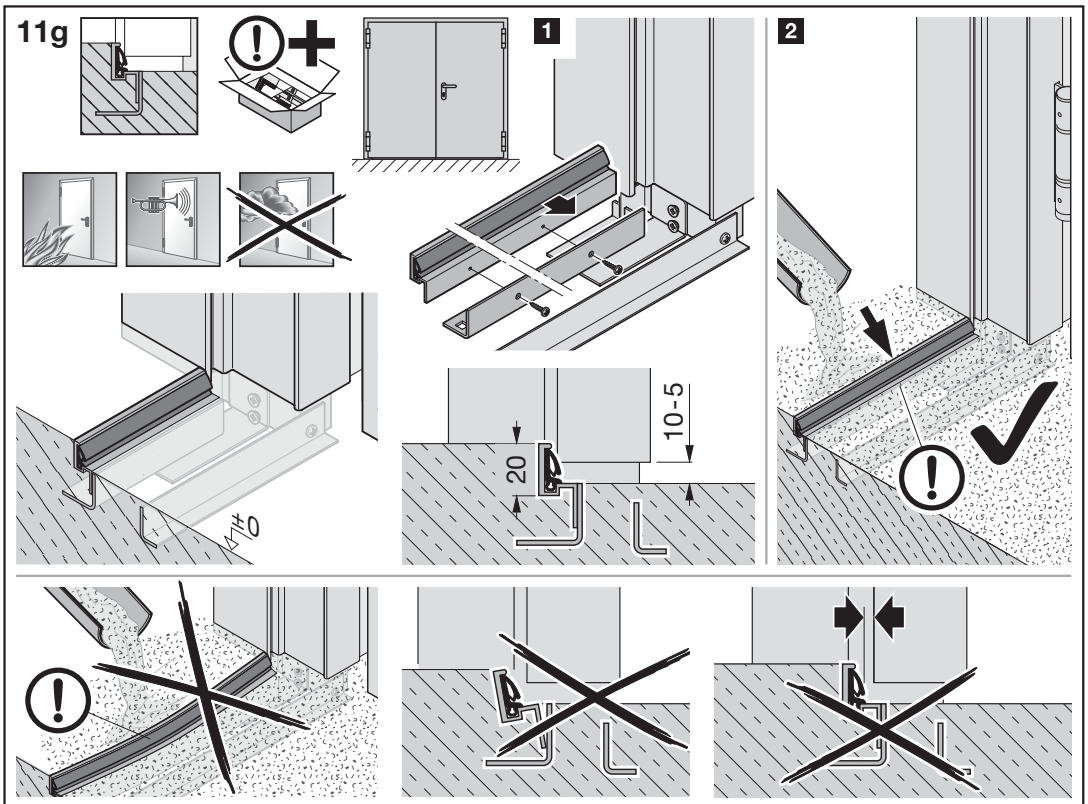
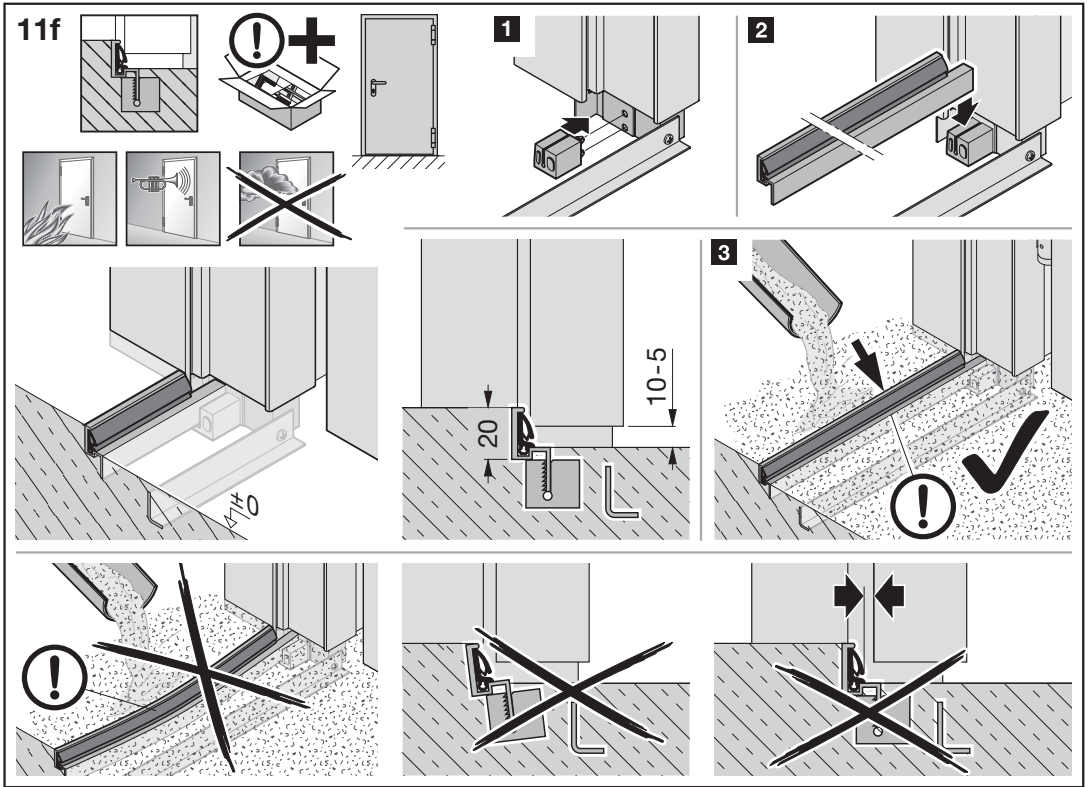


5

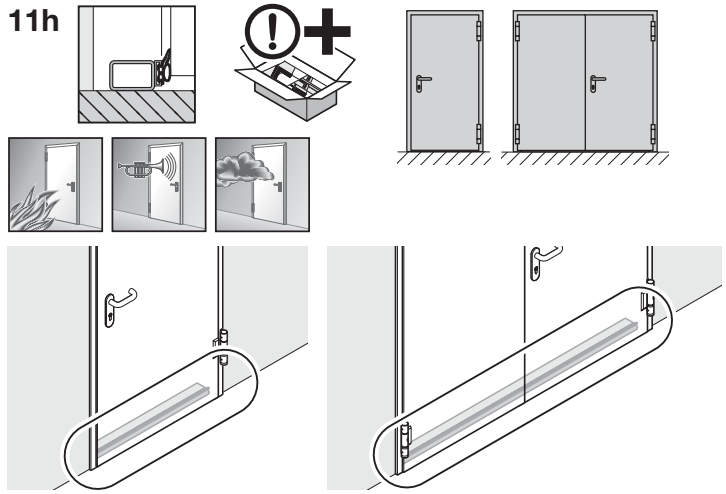




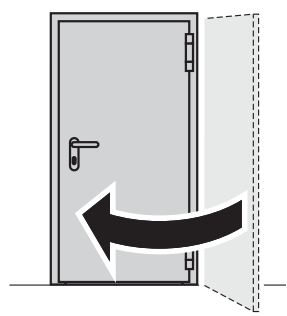




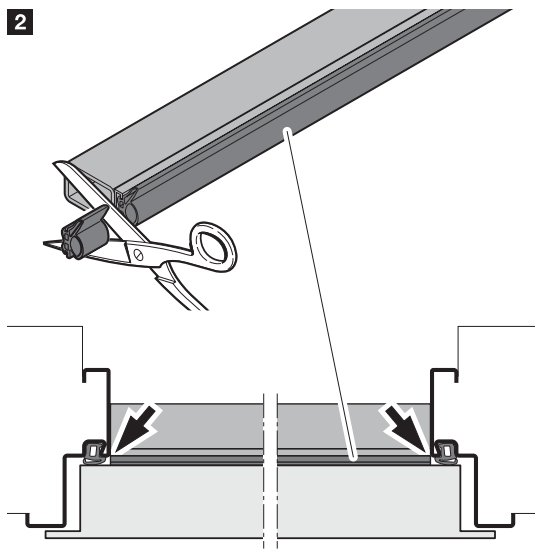
11h



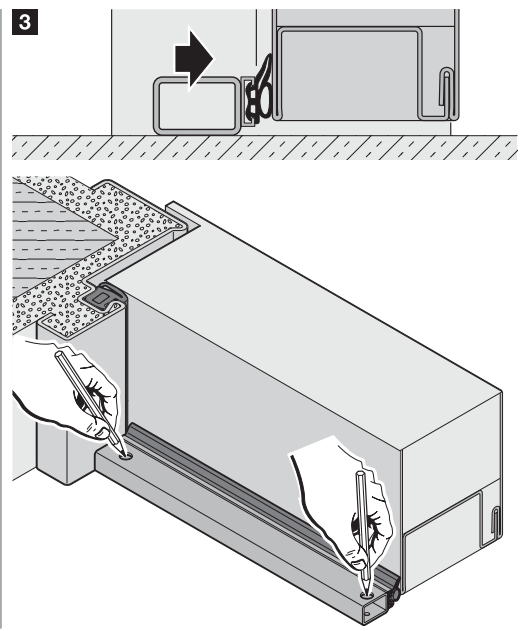
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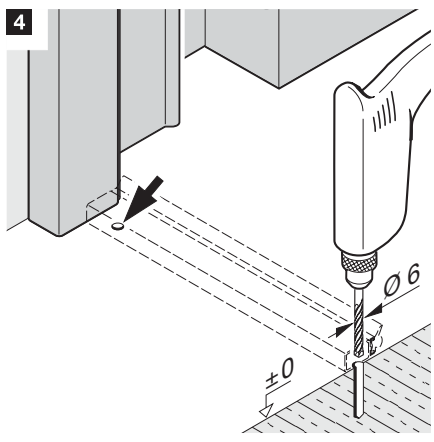
2



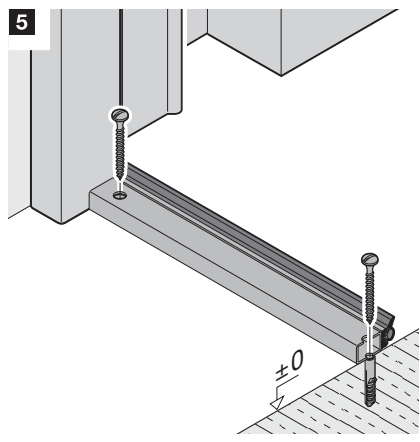
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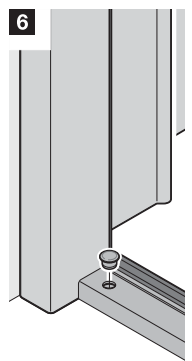
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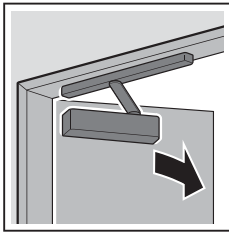
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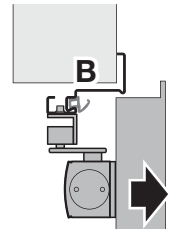
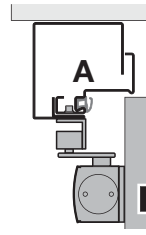
6



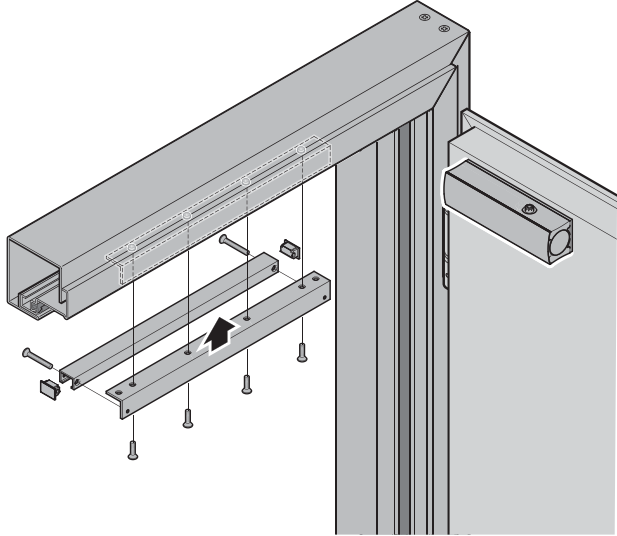
12a



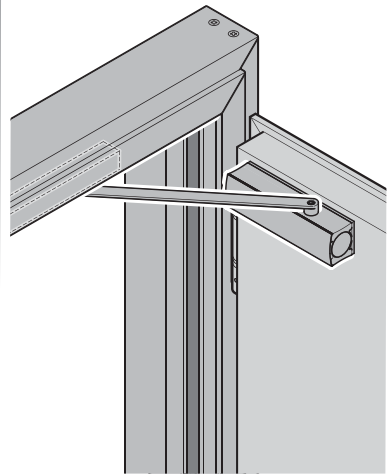
# HDC 35 BG



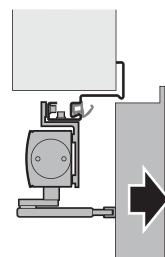
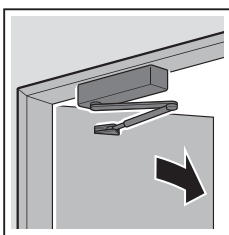
1



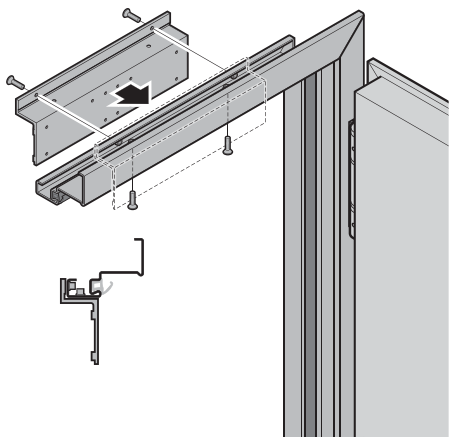
2



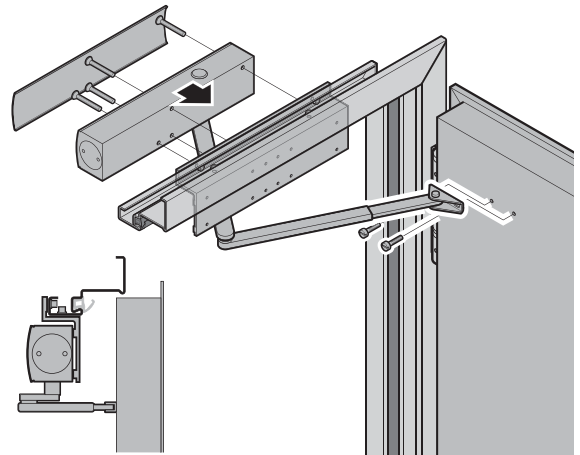
12b

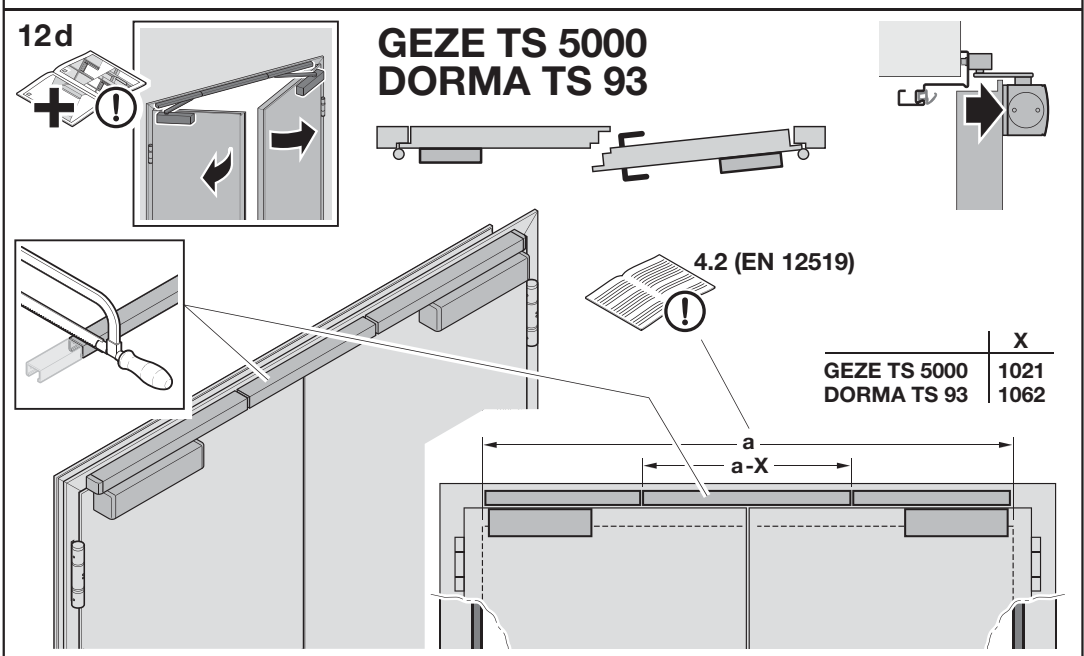
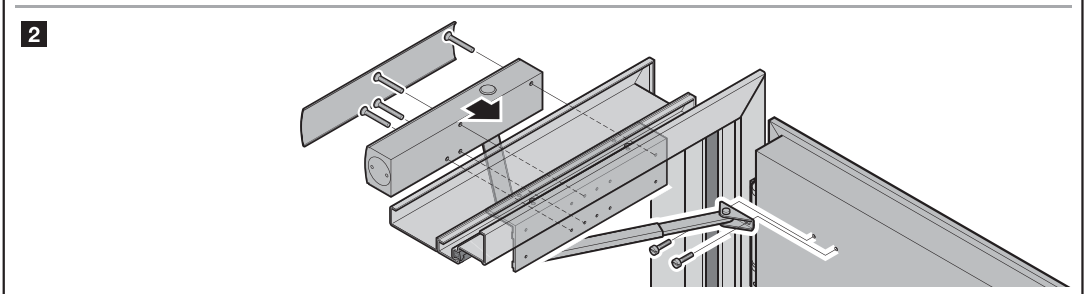
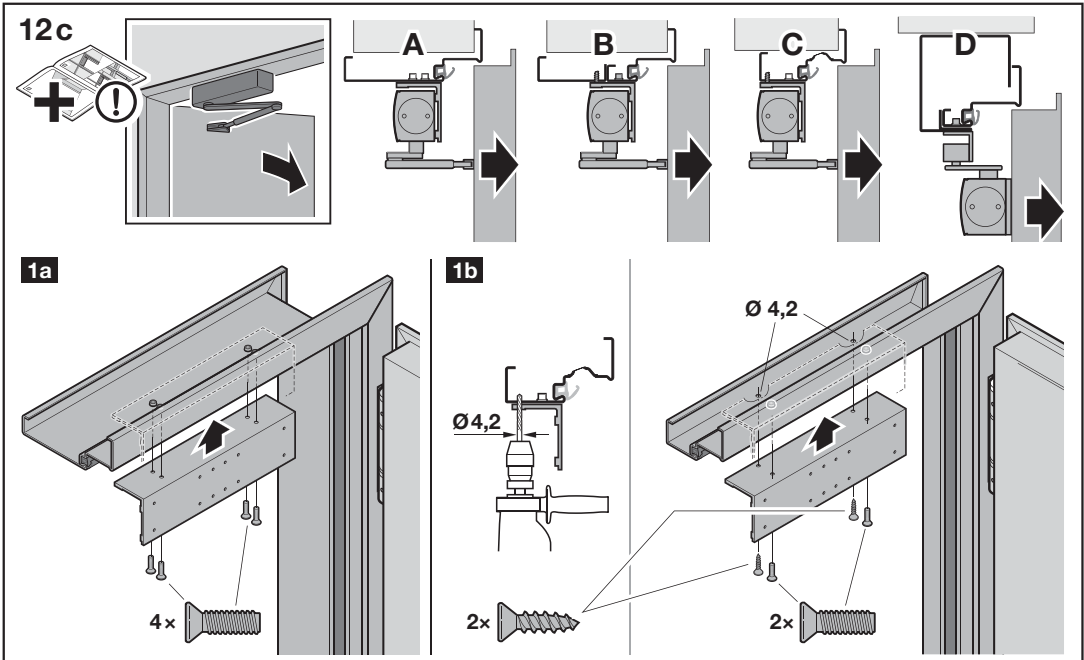


1



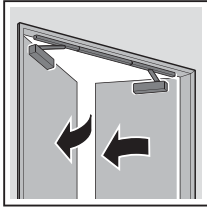
2



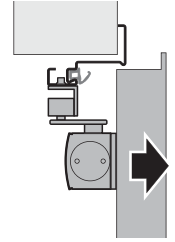
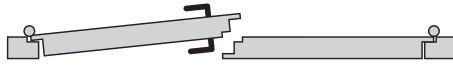




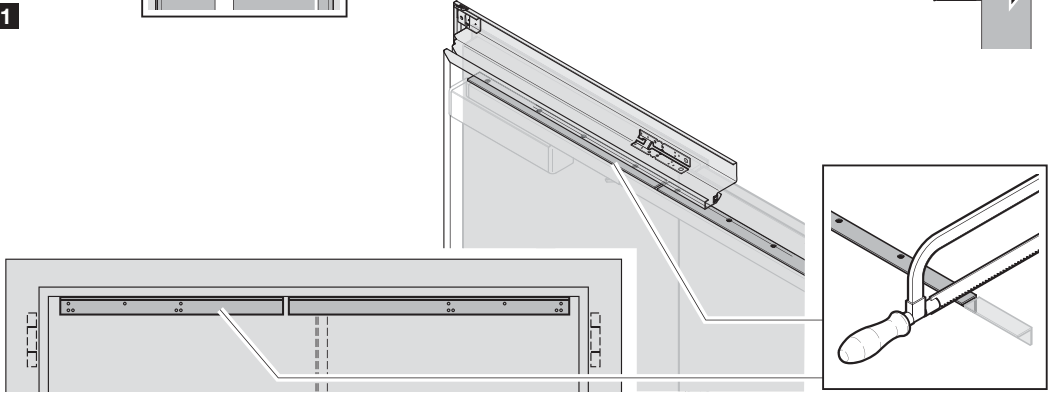
12e



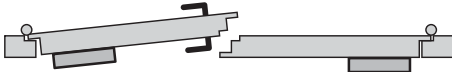
**GEZE TS 5000  
DORMA TS 93**



**1**

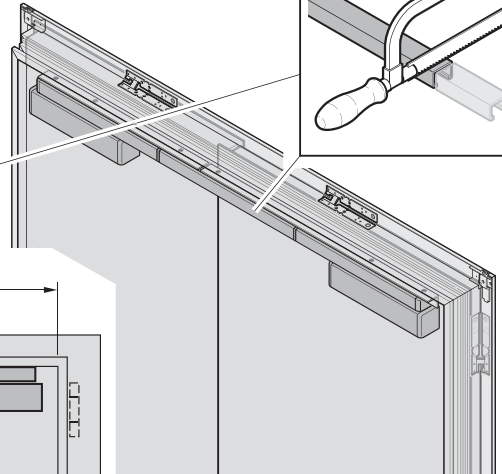
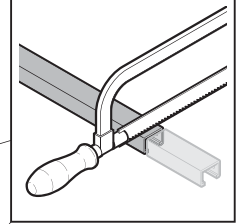
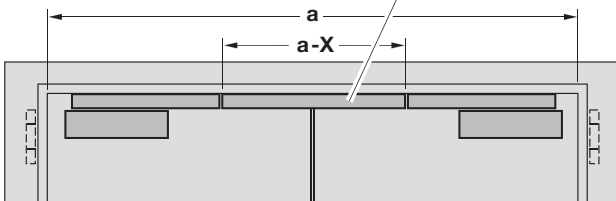


**2**

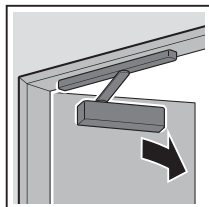


4.2 (EN 12519)

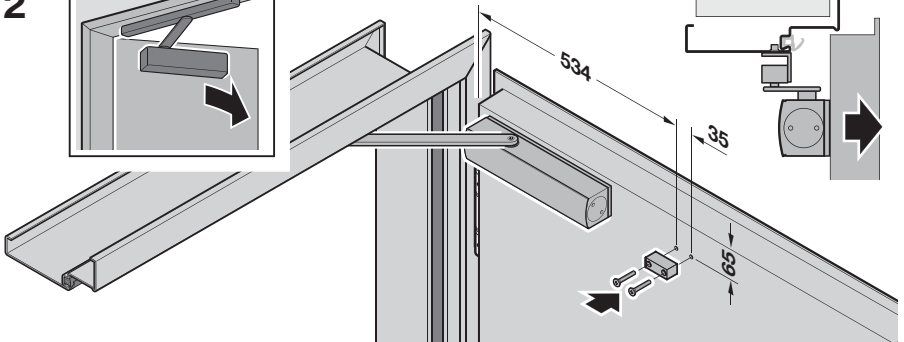
	X
GEZE TS 5000	1130
DORMA TS 93	1179



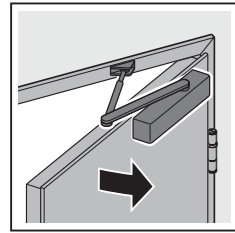
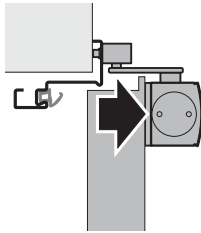
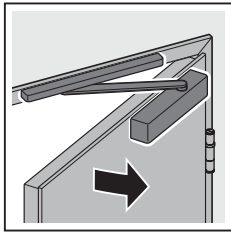
12f **H16-2  
H3-2**



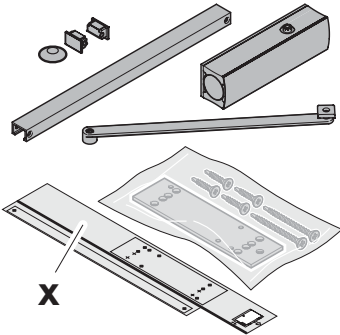
**TS 93 GSR BG**



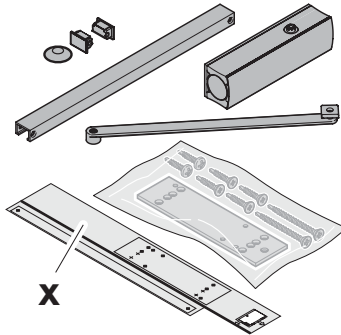
12g



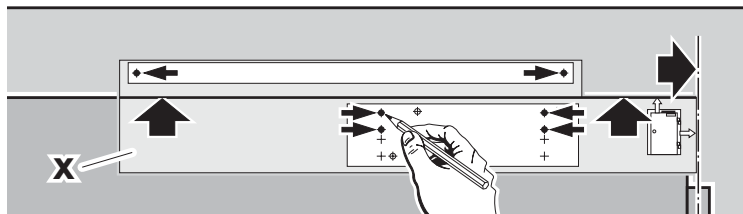
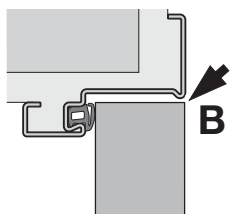
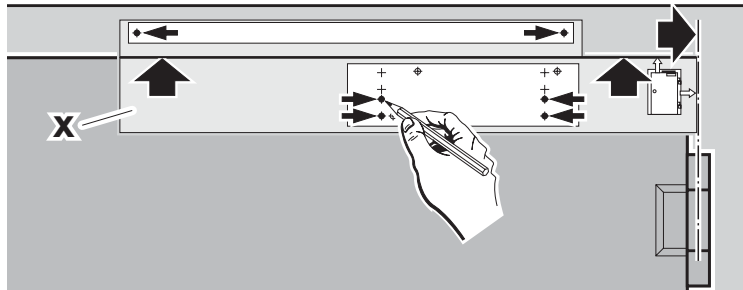
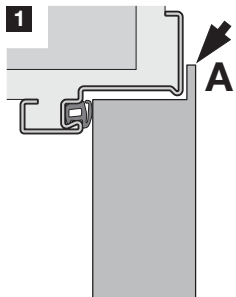
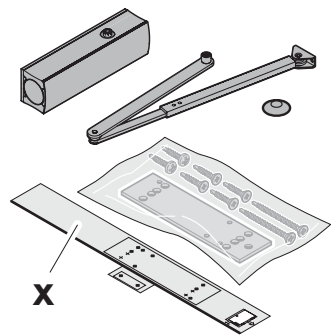
### HDC 35



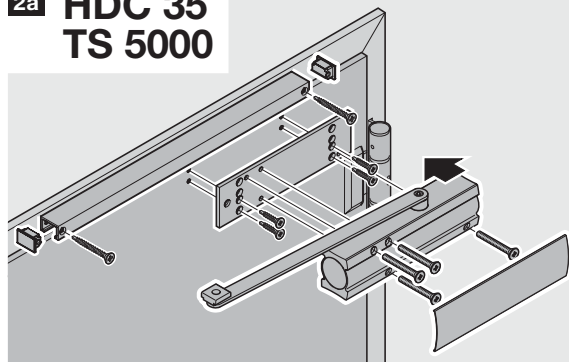
### TS 5000



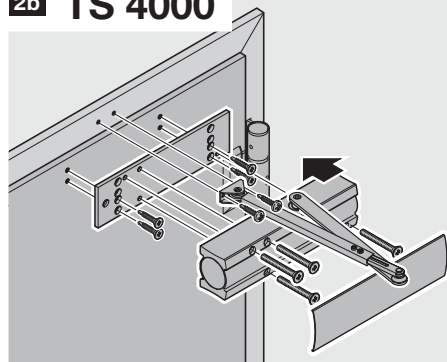
### TS 4000



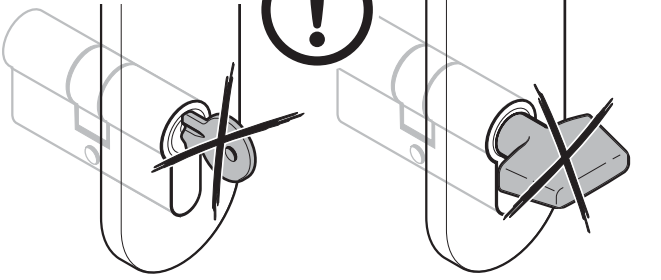
### 2a HDC 35 TS 5000



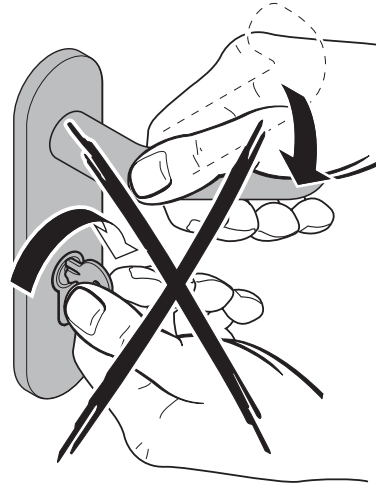
### 2b TS 4000



13.1a



13.1b



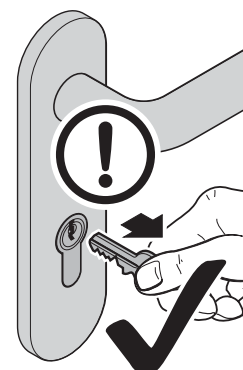
1



2

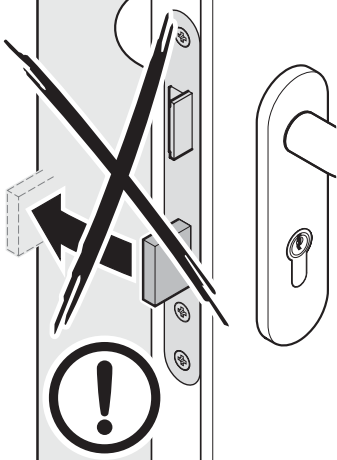


3

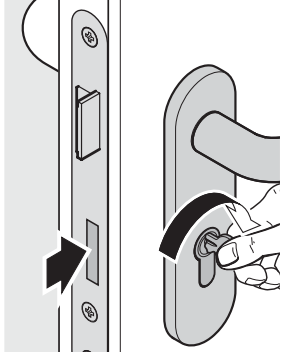


13.2

1



2



3

