rothoblaas

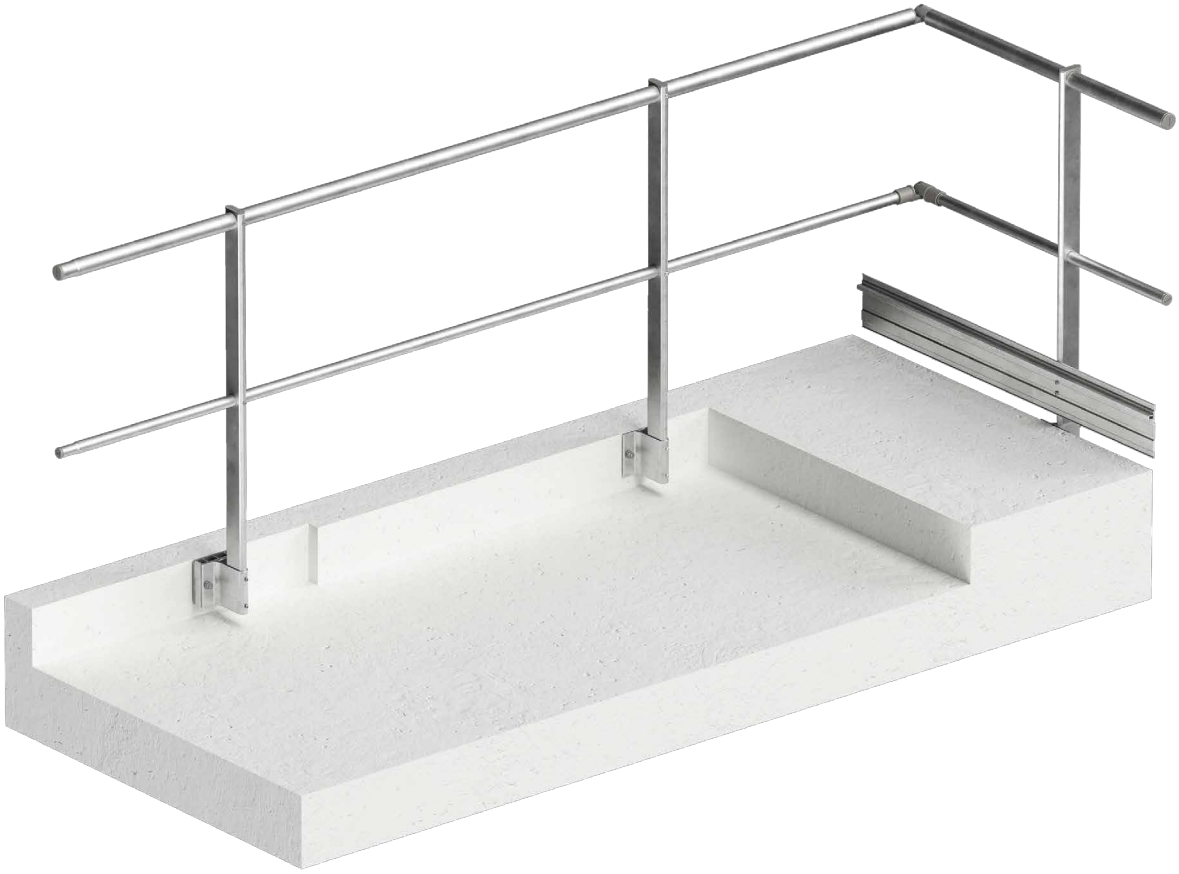
Solutions for Safety

BORDER V - BORDER VD

SAFETY REGULATIONS, INSTRUCTIONS FOR INSTALLATION AND USE

EN 14122-3: 2016 | EN 13374:2025 Cl.A | EN 13374:2013 +A1:2018-12 | NTC 2018 + D.Lgs. 81/08 | NF E85-015: 2019 | UNI 11996 A

C20/25



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NORME DI SICUREZZA, ISTRUZIONI DI UTILIZZO E INSTALLAZIONE

INTRODUZIONE

DEFINIZIONE

Il parapetto a fissaggio verticale **BORDER V / BORDER VD** è un sistema di protezione collettiva anticaduta, ideale per la sicurezza dei tetti, realizzato in lega di alluminio (**EN AW 6005A-T6 e EN AW 6063-T6**).

NORME

Il parapetto a fissaggio verticale **BORDER V/ BORDER VD** è conforme alle seguenti normative:

- **EN 14122-3:2016**
- **EN 13374:2025 Cl. A (eccetto punto 9)**
- **EN 13374:2013+A1:2018 Cl. A (eccetto punto 9)**
- **NTC (Tab.3.1.II - cat. A,B,C1,E1,F,G,H) e D. Lgs 81/08 (Italia)**
- **UNI 11996 - A (eccetto punto 10.4) (Italia)**
- **NF E 85-015:2019 (Francia)**

La tabella riporta i principali parametri geometrici previsti dalle normative di riferimento:

	EN 14122-3: 2016	EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl.A / UNI 11996 - A	NTC 2018	D.Lgs. 81/08	NF E85-015: 2019
Min. altezza dal piano di calpestio	1,1 m	1 m	1 m	1 m	1 - 1,1 m
Max. interasse tra i correnti	500 mm	470 mm	-	500 mm	500 mm
Max. interasse tra i montanti	1,5 m (suggerito)	-	-	-	1,5 m (suggerito)
Min. altezza tavola fermapiede	10 cm	15 cm	-	15 cm	10 cm

QUADRO NORMATIVO ITALIANO

Il parapetto BORDER V/VD è stato progettato e verificato in conformità alla norma UNI 11996:2025, "applicabile anche per le coperture di cui alla categoria H e alle coperture praticabili di ambienti di categoria d'uso A, B1, B2 e C1 di cui alla tabella 3.1.II di cui alla legislazione vigente."
I valori riportati nelle tabelle del presente manuale (quali interassi e configurazioni di installazione) derivano da prove sperimentali eseguite in laboratorio e rappresentano configurazioni standard conformi ai requisiti della UNI 11996:2025. Tali configurazioni identificano un insieme di soluzioni tipiche validate, per le quali sono garantite le prestazioni richieste in termini di resistenza e sicurezza.
Per configurazioni non riconducibili alle soluzioni standard indicate nel presente documento, o in presenza di condizioni progettuali particolari (richieste speciali), è necessario rivolgersi all'Ufficio Tecnico Rotho Blaas.

USO - MANUTENZIONE

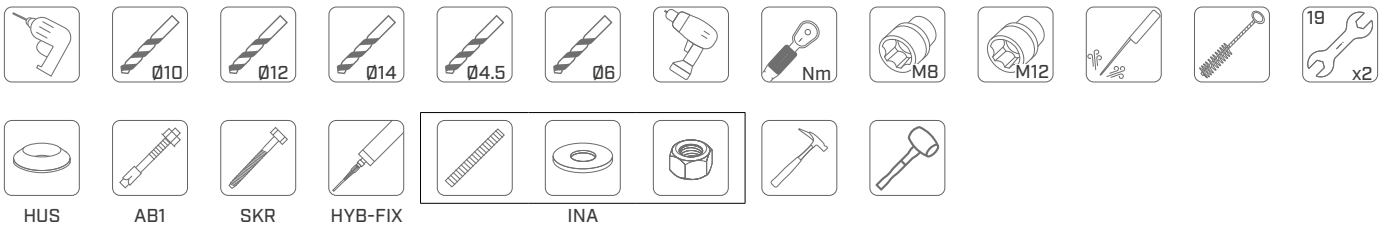
L'installazione del parapetto **BORDER** deve essere eseguita da personale qualificato, nel rispetto delle normative vigenti relative ai lavori in quota.
Prima dell'uso, l'operatore deve garantire la propria sicurezza utilizzando una linea vita temporanea, DPI e una piattaforma di lavoro idonea.

- Prima dell'uso, l'utente deve verificare, tramite ispezione visiva, che il parapetto **BORDER** non presenti anomalie, danni o deformazioni (urti, piegature, ecc.).
- Il parapetto **BORDER** non richiede interventi di manutenzione specifici. È tuttavia necessario eseguire almeno un controllo visivo annuale da parte di personale qualificato.
- Se il parapetto **BORDER** non è installato in modo corretto, risulta danneggiato o ha arrestato una caduta, il suo utilizzo deve essere immediatamente sospeso. Non deve essere riutilizzato fino a quando un tecnico qualificato non abbia eseguito l'ispezione e la verifica, rilasciando autorizzazione scritta.
- Se il prodotto è rivenduto al di fuori del Paese di destinazione, è essenziale per la sicurezza dell'utente che il rivenditore fornisca il manuale di istruzioni nella lingua del Paese in cui il prodotto viene utilizzato. I documenti possono essere forniti su richiesta contattando il produttore.
- Il parapetto **BORDER** è un dispositivo di protezione collettiva permanente, destinato esclusivamente a professionisti operanti su coperture non accessibili al pubblico.
- Se installato in ambienti industriali inquinati, petrolchimici, navali o costieri, il parapetto **BORDER** deve essere sottoposto a un trattamento superficiale adeguato, come verniciatura a polvere o anodizzazione.
- Se è stata fornita una planimetria, deve essere utilizzata come riferimento durante l'installazione.
- Se necessario, si consiglia di collegare il parapetto ad un sistema di protezione anti-fulmini secondo le normative locali. Non utilizzare come linea di messa a terra del parafulmine.

STOCCAGGIO

I componenti in alluminio grezzo sono imballati a contatto tra loro. L'esposizione alla pioggia della confezione chiusa può favorire l'ossidazione dei componenti, con la possibile formazione di macchie superficiali. Queste non compromettono la qualità dell'alluminio, ma possono danneggiare l'aspetto estetico del parapetto. Si consiglia di disimballare il pacco e mantenere i componenti separati, evitando il contatto diretto tra loro, oppure di conservare le confezioni imballate in un luogo asciutto.

ATTREZZATURA

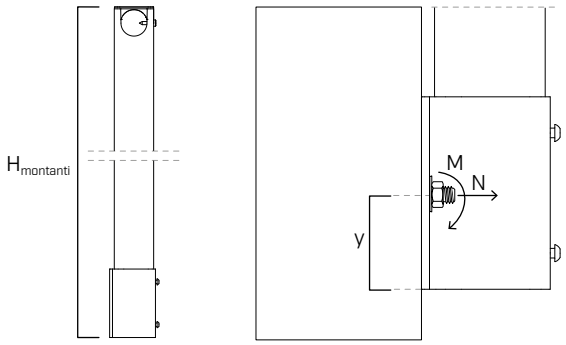


PRINCIPALI FORZE AGENTI SULL'ANCORAGGIO

Sul bullone più sollecitato agisce la combinazione delle forze e dei momenti risultanti:

$$M = F \cdot (H-y)$$

$$N = F_t = \frac{M \cdot y_i}{\Sigma n_i y_i^2} + \frac{F}{2}$$



I valori risultanti che agiscono sul singolo fissaggio sono definiti come segue:

$H_{montanti}$ [m]	EN 14122-3: 2016	EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl.A	UNI 11996 - A / NTC 2018 f=1,5	UNI 11996 - A / NTC 2018 f=1,0	NF E85-015: 2019
	N [N]	N [N]	N [N]	N [N]	N [N]
0,76	4988	3610	14630	11843	5878
1	6563	4750	13063	12833	7734
1,1	7219	5225	14369	14117	8508
1,18	7744	N/A	12980	12980	9127
1,3	8531	N/A	14300	14300	10055

SPECIFICHE DI INSTALLAZIONE

INTERASSI AMMISSIBILI

Tabella 1

		EN 14122-3: 2016		UNI 11996 - A NTC 2018 f=1,5 (2)		UNI 11996 - A NTC 2018 f=1,0 (3)		EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl.A		NF E85-015: 2019	
montante	**$H_{montanti}$**	**interasse** [cm]	**correnti**	**interasse** [cm]	**correnti**	**interasse** [cm]	**correnti**	**interasse** [cm]	**correnti**	**interasse** [cm]	**correnti**
dritto	76 cm	150(1)	BORBAR45	140	BORBAR45	170	BORBAR45	250(1)	BORBAR45SR	150(1)	BORBAR45
	118 cm	150(1)	BORBAR45 BORBAR32	80(1)	BORBAR45 BORBAR32	120(1)	BORBAR45 BORBAR32	-	-	150(1)	BORBAR45 BORBAR32
	130 cm	150	BORBAR45 BORBAR32	80	BORBAR45 BORBAR32	120	BORBAR45 BORBAR32	-	-	150	BORBAR45 BORBAR32
dritto + ribaltabile*	100 cm	150(1)	BORBAR45 BORBAR32	95(1)	BORBAR45 BORBAR32	140(1)	BORBAR45 BORBAR32	250(1)	BORBAR45SR BORBAR32SR	150(1)	BORBAR45 BORBAR32
	110 cm	150(1)	BORBAR45 BORBAR32	95	BORBAR45 BORBAR32	140	BORBAR45 BORBAR32	250	BORBAR45SR BORBAR32SR	150(1)	BORBAR45 BORBAR32
curvo	113 cm	150(1)	BORBAR45 BORBAR45	95(1)	BORBAR45 BORBAR45	140(1)	BORBAR45 BORBAR45	250(1)	BORBAR45SR BORBAR45SR	150(1)	BORBAR45 BORBAR45

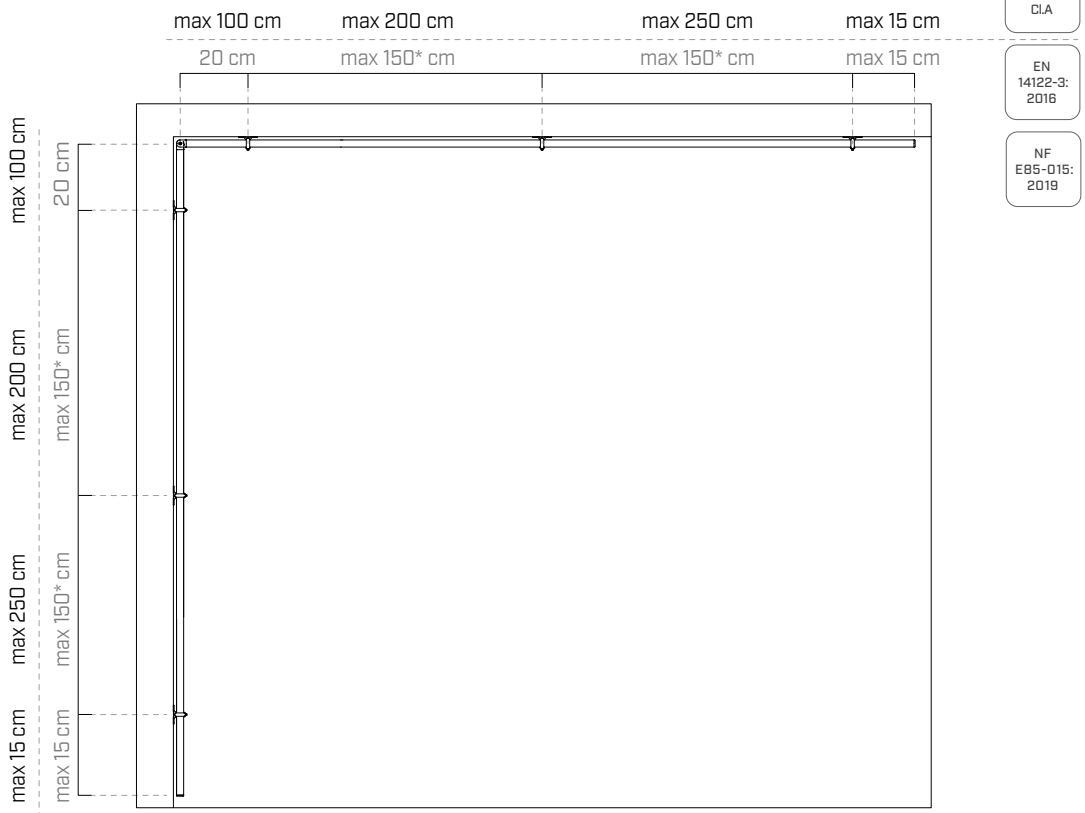
(1)Interassi ottenuti per interpolazione rispetto al caso più critico testato in laboratorio.
(2)Rispondente alla normativa UNI 11996, con coefficiente parziale delle azioni (variabili) f=1,5
(3)Testato secondo le prove di operatività descritte nella UNI 11996, con coefficiente parziale delle azioni (accidentali) f=1,0

⚠ È necessario rispettare le altezze minime dal piano di calpestio prescritte da normativa.
Per soluzioni secondo NTC non incluse nella presente tabella, è richiesta una valutazione specifica da effettuarsi in collaborazione con l'Ufficio Tecnico Rotho Blaas.

SPECIFICHE DI INSTALLAZIONE

VALORI MASSIMI DI INTERASSE

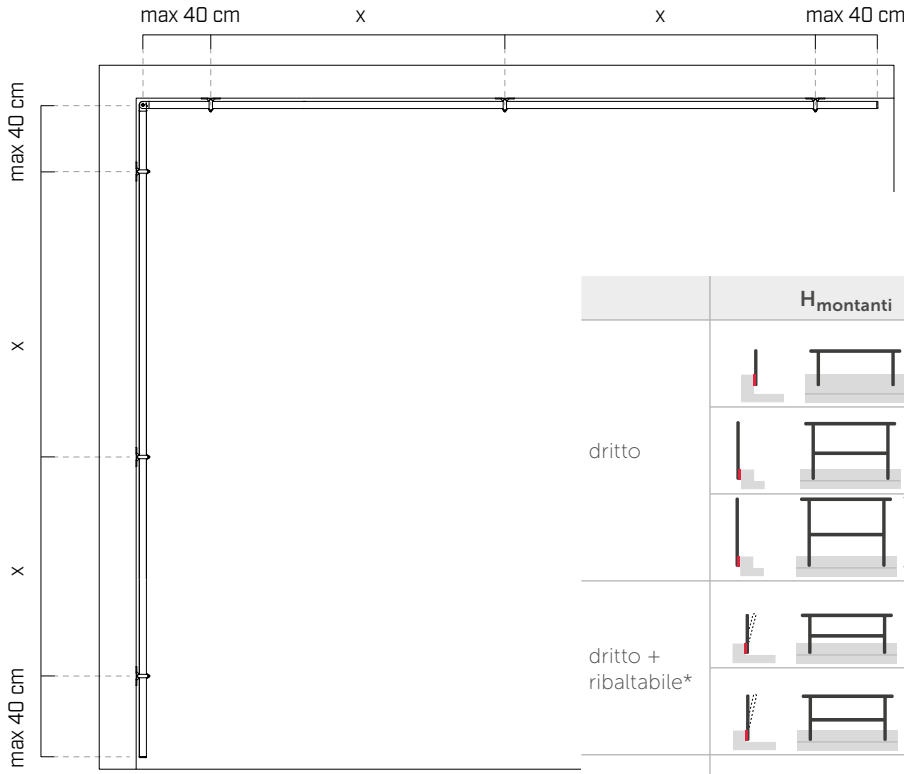
EN 13374:2013 +A1:2018 Cl.A
EN 13374:2025 Cl.A
EN 14122-3: 2016
NF E85-015: 2019



EN 13374:2013 +A1:2018 Cl.A
EN 13374:2025 Cl.A
EN 14122-3: 2016
NF E85-015: 2019

*Per montante curvo BORUP113C: distanza minima 30 cm

UNI 11996 - A NTC 2018 f=1,5
UNI 11996 - A NTC 2018 f=1,0



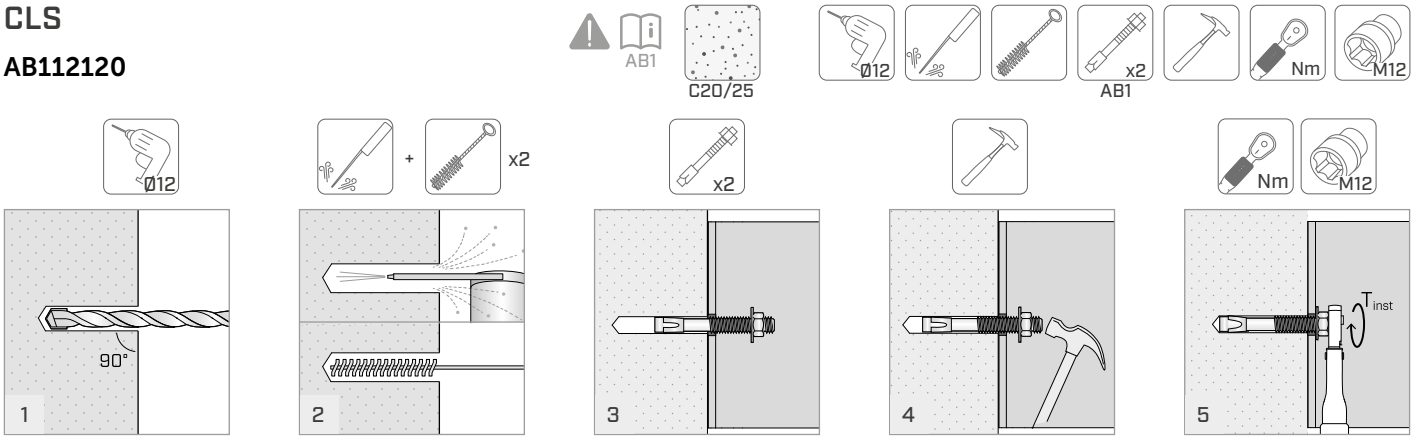
	$H_{montanti}$	UNI 11996 - A NTC 2018 f=1,5 interasse x [cm]	UNI 11996 - A NTC 2018 f=1,0 interasse x [cm]
dritto	76 cm	140	170
	118 cm	80	120
	130 cm	80	120
dritto + ribaltabile*	100 cm	95	140
	110 cm	95	140
curvo	113 cm	95	140

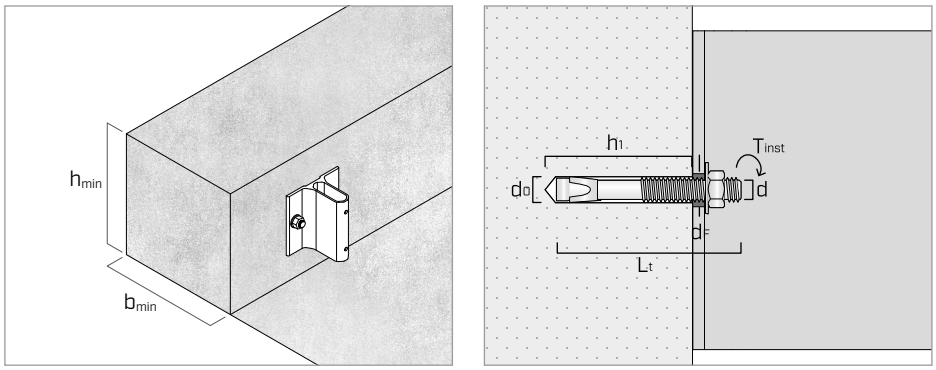
UNI 11996 - A NTC 2018 f=1,5
UNI 11996 - A NTC 2018 f=1,0

INSTALLAZIONE BASE V - BASE VD

CLS

AB112120





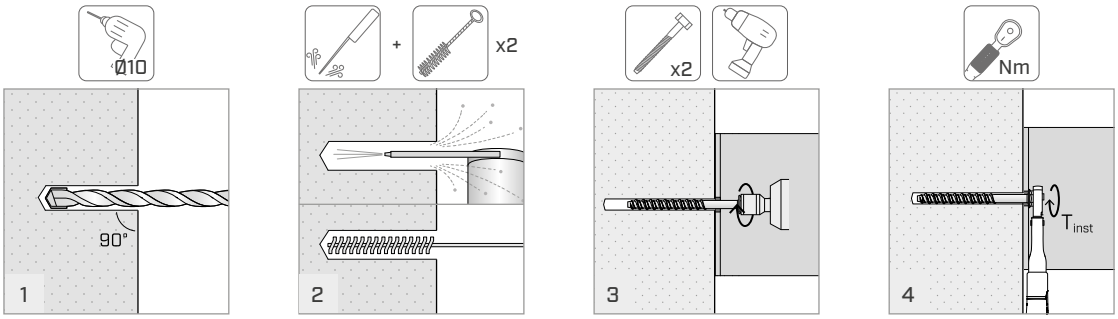
T_{inst}	=	60	Nm		
h_1	=	104	mm		
d	=	d_0	=	12	mm
d_F	=	14	mm		
L_t	=	120	mm		

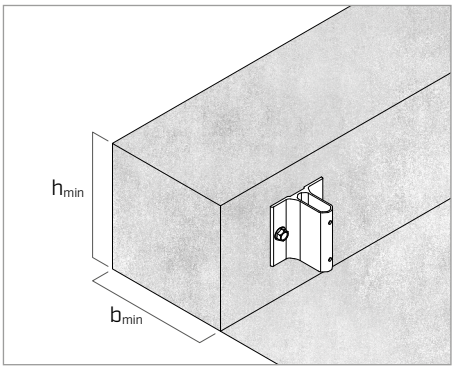
Consultare distanze minime dal bordo a pag. 11

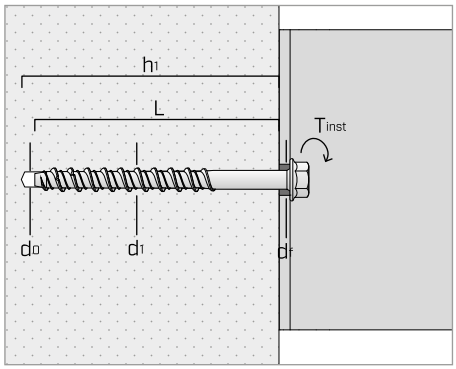
INSTALLAZIONE BASE V - BASE VD

CLS

SKR1290





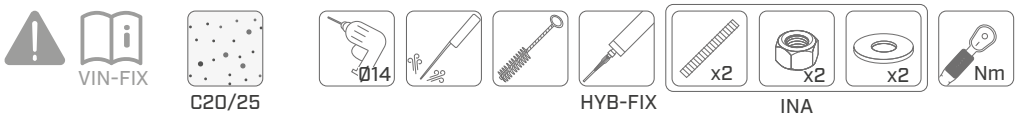


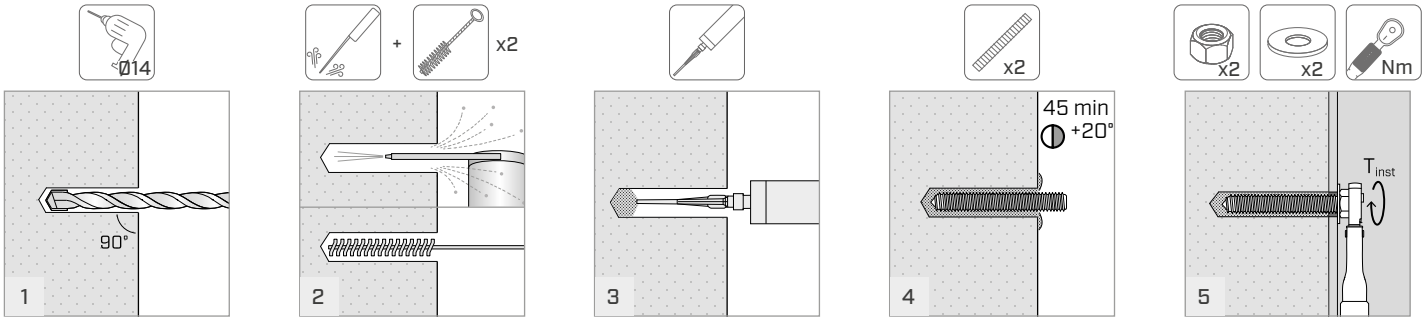
T_{inst}	=	80	Nm
h_1	=	100	mm
d_1	=	12	mm
d_0	=	10	mm
d_F	=	14	mm
L	=	85	mm

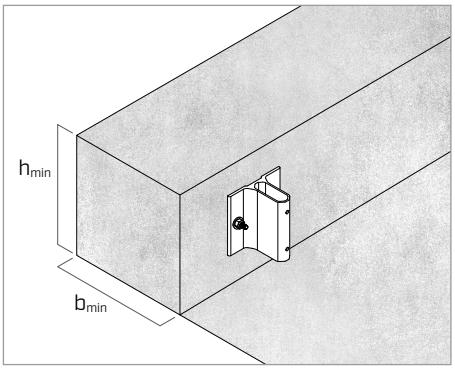
Consultare distanze minime dal bordo a pag. 11

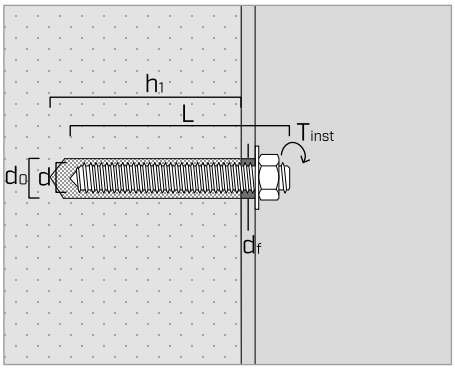
CLS

HYB-FIX + INA8812140





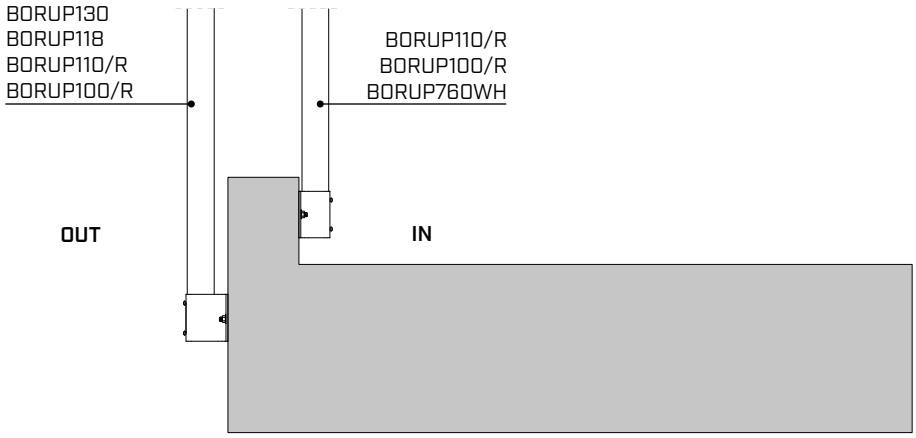


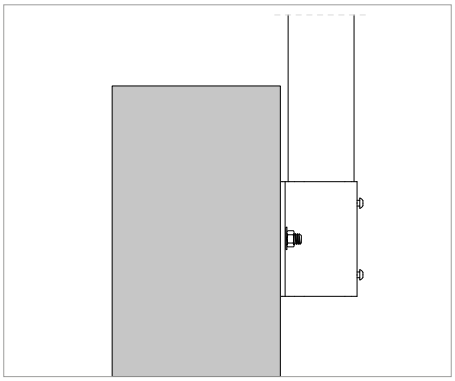


T_{inst}	=	40	Nm
h_1	=	140	mm
d	=	12	mm
d_0	=	14	mm
d_F	=	14	mm
L	=	140	mm

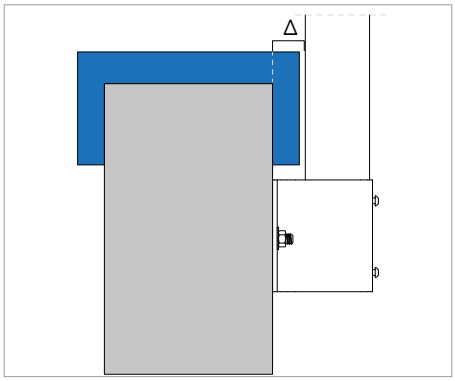
Consultare distanze minime dal bordo a pag. 11

APPLICAZIONI PARAPETTO BORDER V / BORDER VD

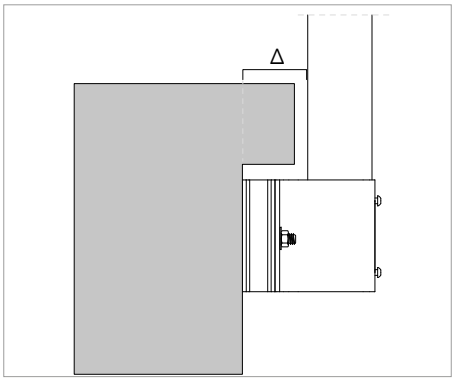




BORBASEV

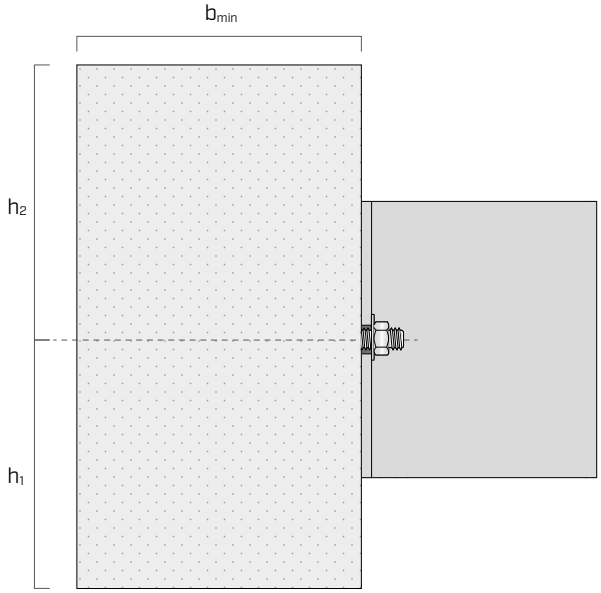


BORBASEVD
Δ = 35 mm



BORBASEVD + BORDIST
Δ = 70 mm
(con AB112150)

DISTANZE MINIME DAL BORDO



	EN 14122-3: 2016			UNI 11996 - A NTC 2018 f=1,5			UNI 11996 - A NTC 2018 f=1,0			EN 13374:2013 +A1:2018 Cl.A			EN 13374:2025 Cl.A			NF E85-015: 2019		
	d_1 [mm]	d_2 [mm]	H_{min} [mm]	d_1 [mm]	d_2 [mm]	H_{min} [mm]	d_1 [mm]	d_2 [mm]	H_{min} [mm]	d_1 [mm]	d_2 [mm]	H_{min} [mm]	d_1 [mm]	d_2 [mm]	H_{min} [mm]	d_1 [mm]	d_2 [mm]	H_{min} [mm]
AB112120	110	110	160	220*	220*	150*	100	100	150	130	130	150						
SKR1290	100	100	140	N/A	N/A	N/A	70	70	130	N/A	N/A	N/A						
HYB-FIX + INA8812140	100	100	140	200	200	130	70	70	130	100	100	150						

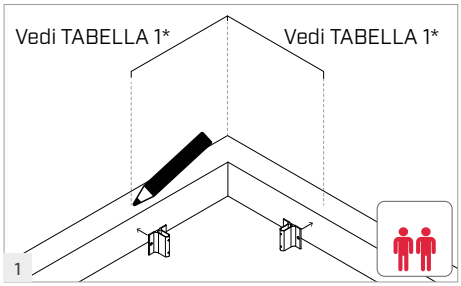
I valori in tabella rappresentano le distanze minime dal bordo necessarie per la verifica dei carichi puntuali sul montante.

Tali valori sono stati determinati in condizioni cautelative (calcestruzzo C20/25 e massima azione agente sull'ancorante); condizioni differenti comportano prestazioni migliorative rispetto al caso più gravoso.

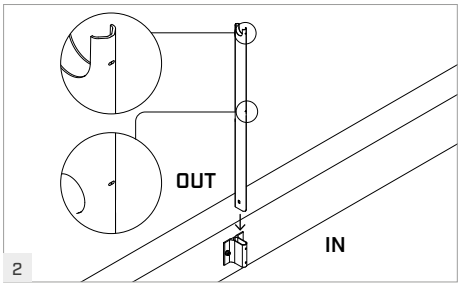
* L'utilizzo dell'AB112120 per UNI 11996 – A (NTC f=1,5 e NTC f=1,0) è consentito esclusivamente per montanti BORUP110 e BORUP530WH. Per BORUP100 si raccomanda l'impiego di ancoranti chimici

INSTALLAZIONE

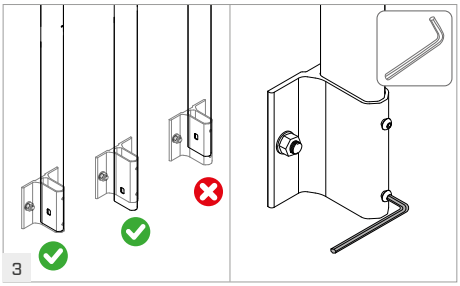
BORDER V / BORDER VD



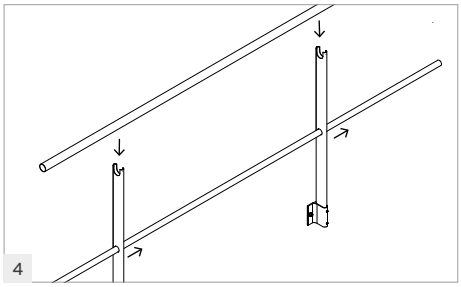
È necessaria la presenza di almeno due operatori qualificati. Per garantire una migliore riuscita, è consigliabile iniziare da un angolo. Installare le basi V-VD (vedi pag. 4-5).



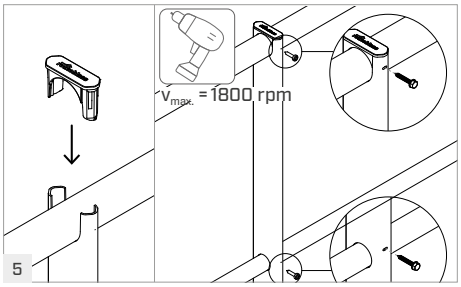
Inserire i montanti nelle basi **BORBASEV/BORBASEVD** con i segni rivolti verso l'operatore.



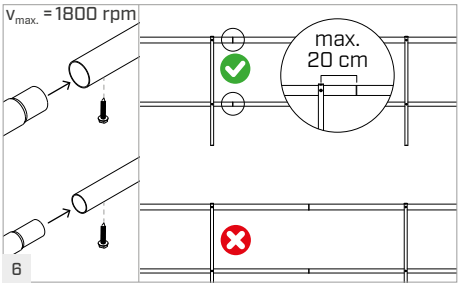
Regolare il montante affinché l'estremità non entri nella base e si allinei al limite inferiore. Fissare le due viti M6x6.



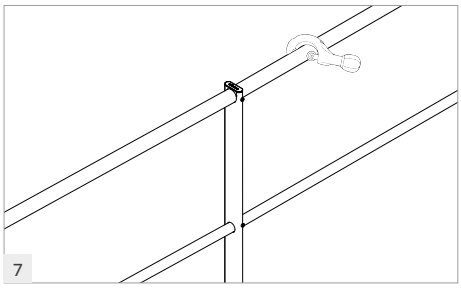
Inserire il corrente intermedio **BORBAR32** e successivamente il corrente superiore **BORBAR45.** In conformità alla norma EN 13374, è necessario installare i correnti maggiorati **BORBAR45R.**



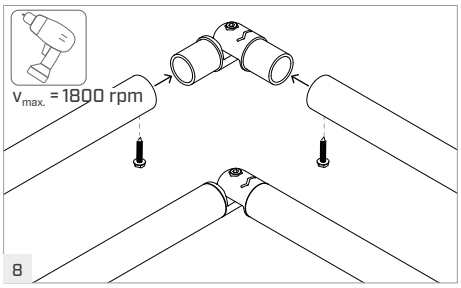
Inserire il tappo **BORCAP** sulla sommità del montante. Fissare i correnti ai montanti con vite **MMS5525A2** in corrispondenza dei due segni laterali.



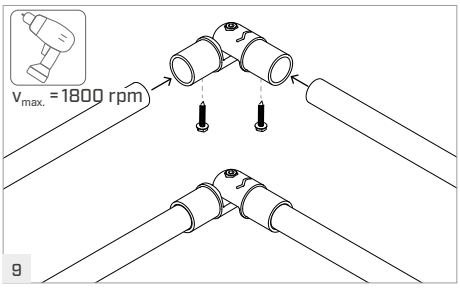
Collegare le estremità maschio/femmina di corrimano e correnti, fissandole con viti **MMS5525A2**. Secondo EN 14122, il corrimano deve terminare a non più di 20 cm dal montante più vicino. Posizionare le viti sotto i correnti.



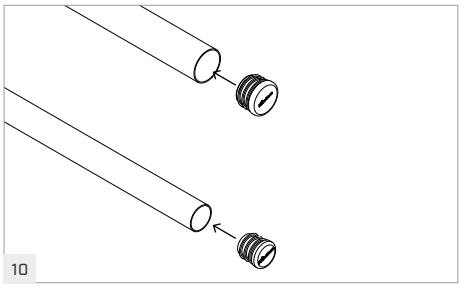
Adattare l'ultima sezione del parapetto tagliando la parte in eccesso dei correnti usando il tagliatubi.



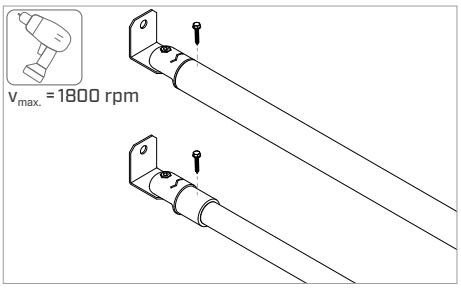
Inserire lo snodo angolare **BORCOR** nel corrimano e fissare con viti autofilettanti **MMS5525A2**.



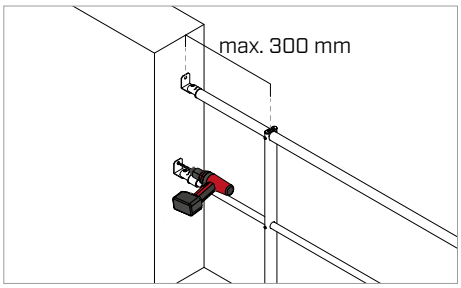
Inserire lo snodo angolare **BORCOR** nel corrente intermedio e fissare con viti autofilettanti **MMS5525A2**.



Inserire i tappi **BORCAP45** e **BORCAP32** nei corrimani o correnti intermedi.



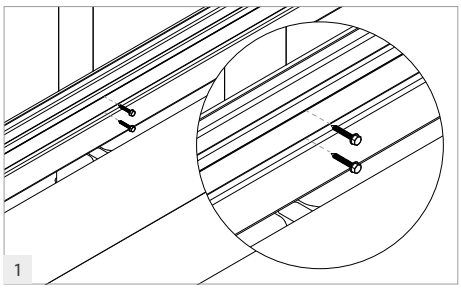
Inserire mancorrente e corrente intermedio nell'elemento terminale a muro **BORWALL** e fissare con vite autofilettante **MMS5525A2**.

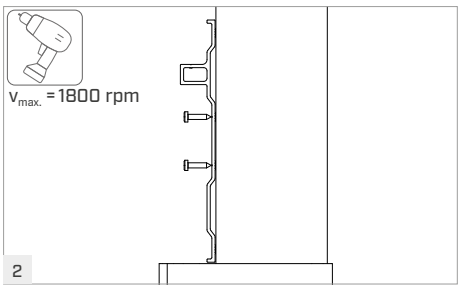


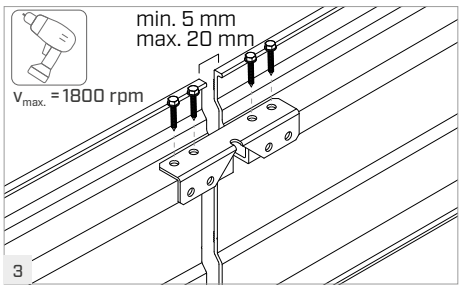
Rispettare la distanza massima di **300 mm** dal muro. Forare il muro con punta Ø10 mm e fissare l'elemento terminale con un tassello M10 (AB110115) o su legno con VGS Ø9 (VGS9100 + HUS8).

INSTALLAZIONE

BORTB

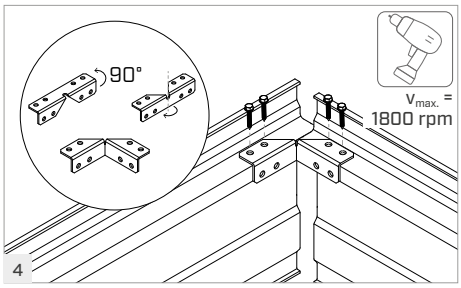


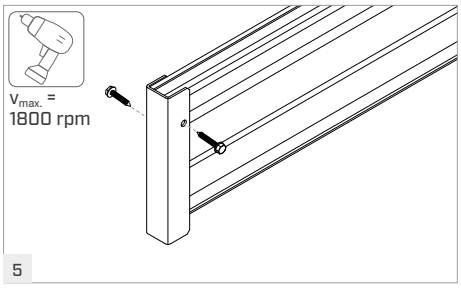




La tavola fermapiede **BORTB** deve essere posizionata sempre frontalmente, verso il lato interno, con l'appoggio inferiore a contatto con quello della base **BORBASEV/VD**. Una volta posizionata, fissare le viti 5.5x25mm vicino alle due scanalature.

Unire le estremità di **BORTB** con il connettore **BORTBJUN**. Fissare con 4 viti **MMS5525A2**, lasciando almeno 5mm tra le tavole per evitare deformazioni termiche.

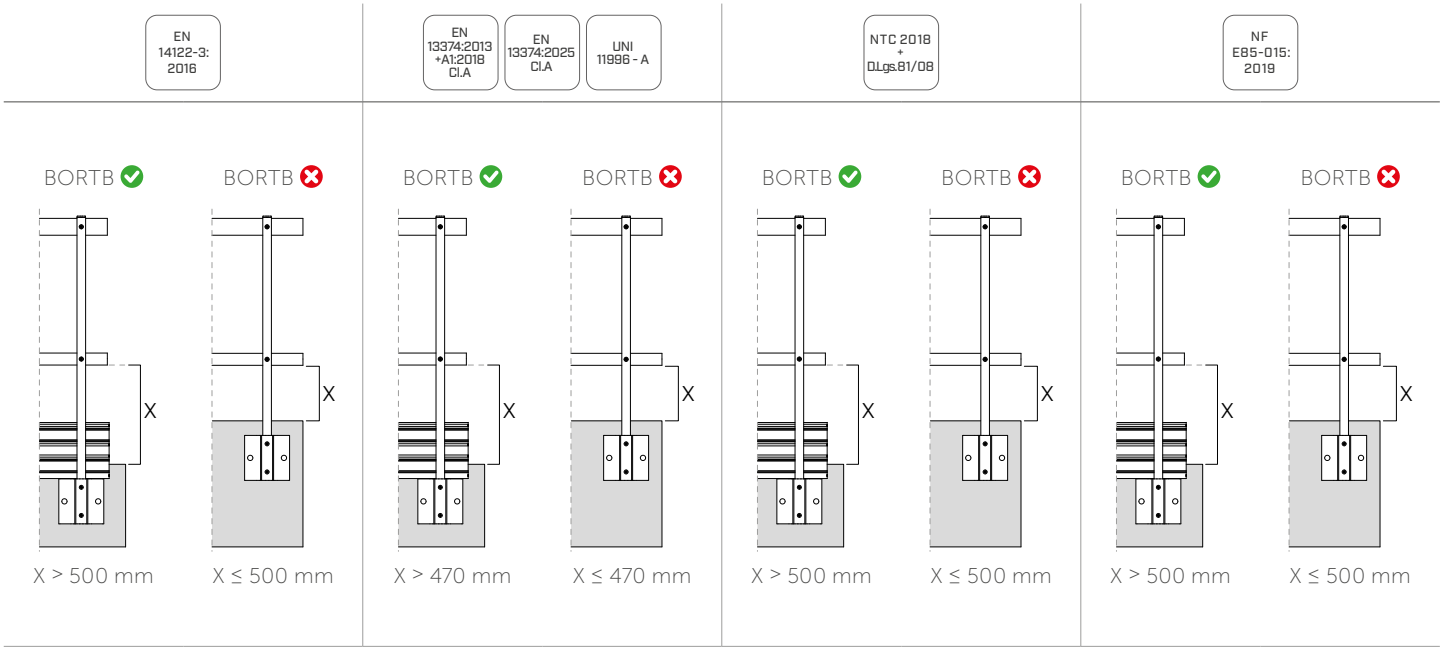




Negli angoli, ruotare e piegare a mano il connettore **BORTBJUN** fino a raggiungere l'angolo desiderato.. Fissare con 4 viti autofilettanti **MMS5525A2**.

Fissare i tappi terminali della tavola fermapiede con 2 viti autofilettanti **MMS5525A2**

SPECIFICHE DI UTILIZZO BORTB



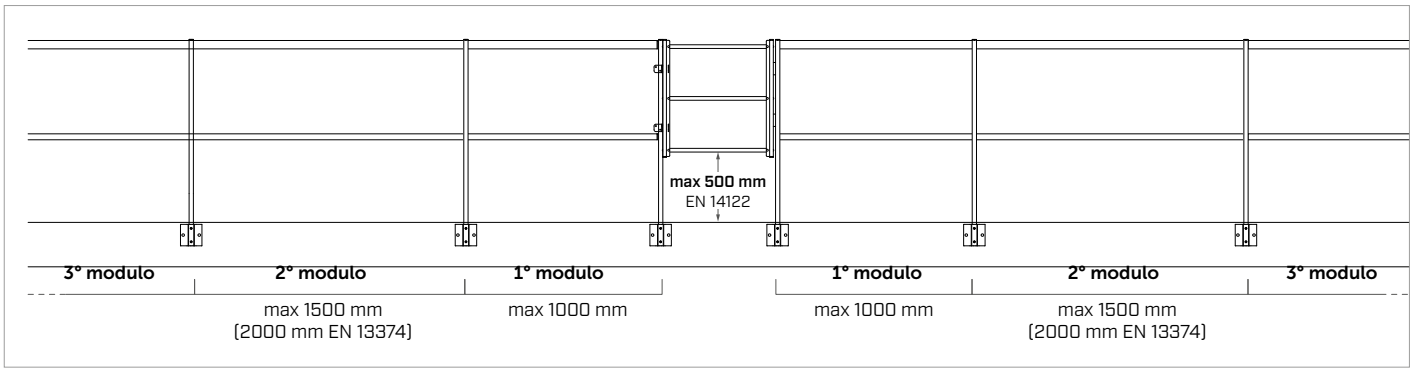
INSTALLAZIONE DEL CANCELLETTO

EN 14122-3: 2016 | EN 13374:2013 +A1:2018 Cl.A | EN 13374:2025 Cl.A | UNI 11996 - A NTC 2018 f=1,0 | UNI 11996 - A NTC 2018 f=1,5

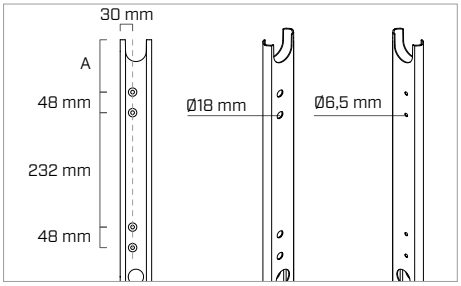
BORGATE600

L'installazione del cancelletto BORGATE600 deve essere eseguita rispettando i requisiti minimi di stabilità del sistema. È quindi necessario installare almeno tre montanti per lato, seguendo questa distribuzione massima degli interassi:

- **1° modulo**: 1000 mm max
- **2° modulo**:
  - 2000 mm max (per EN 13374)
  - secondo quanto riportato in Tabella 1 – Interassi (per EN 14122-3, NTC e UNI 11996 - A)
- **3° modulo**: secondo quanto riportato in Tabella 1 – Interassi



Il bordo inferiore del cancelletto deve trovarsi a una distanza inferiore a **500 mm** dal piano di calpestio, come definito secondo la EN 14122-3. Verificare la distanza massima consentita dalla normativa applicabile (es. EN 13374: spazio massimo 470 mm).

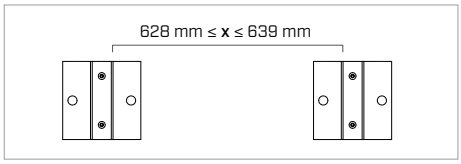


Riportare sul montante le misure indicate a disegno[1] e realizzare:

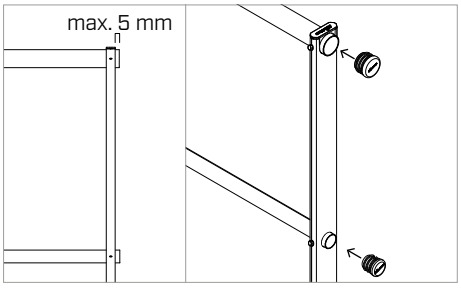
- **n. 4 fori Ø 6,5 mm** su un lato;
- **n. 4 fori Ø 18 mm** (min.) sull'altro lato.

[1]Il valore A è definito in funzione delle altezze di progetto richieste:

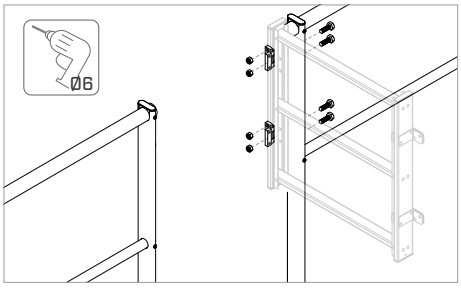
	$H_{montanti}$	EN 14122-3: 2016	UNI 11996 - A NTC 2018 f=1,5	UNI 11996 - A NTC 2018 f=1,0	EN 13374:2013 +A1:2018 Cl.A	EN 13374:2025 Cl.A	NF E85-015: 2019
		A [cm]	**A** [cm]		**A** [cm]		**A** [cm]
dritto + ribaltabile	110 cm	130	160		160		N/A
	100 cm	130	130		130		N/A
dritto	53 cm	N/A	N/A		N/A		N/A
curvo	113 cm	N/A	N/A		N/A		N/A



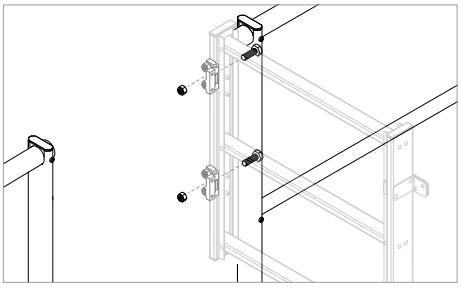
Fissare le piastre **BORBASEV/BORBASEVD** a terra assicurando una distanza x compresa tra 628 mm e 639 mm.



Per una corretta posa, posizionare i correnti in modo che non sporgano oltre **5 mm** rispetto al fianco del montante. Se necessario, tagliare la parte eccedente. Successivamente montare il tappo previsto per il tipo di **tubo** utilizzato.



Montare il cancelletto utilizzando le **viti M6** e i **dadi autobloccanti** forniti nel sacchetto in dotazione.

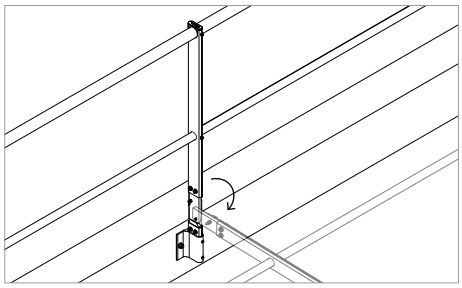


Per limitare **l'effetto vela** del cancelletto in presenza di vento o durante i periodi di non utilizzo, è possibile prevedere l'installazione di una **vite M10 aggiuntiva** (non inclusa in dotazione) al fine di bloccarne la chiusura in modo permanente.

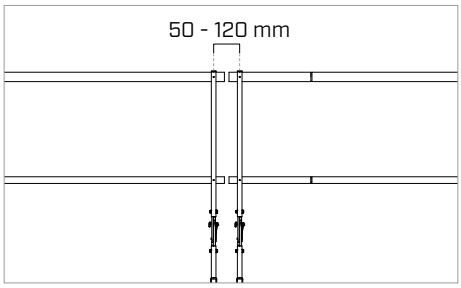
INSTALLAZIONE DEL PARAPETTO RIBALTABILE

BORUP100F - BORUP110F

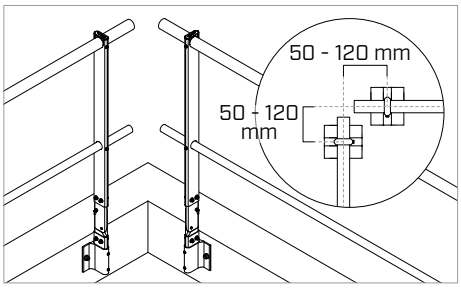
Per l'installazione dei parapetti ribaltabili, la procedura delineata fin qui rimane valida.
Tuttavia, è necessario prestare attenzione ad alcune istruzioni aggiuntive:



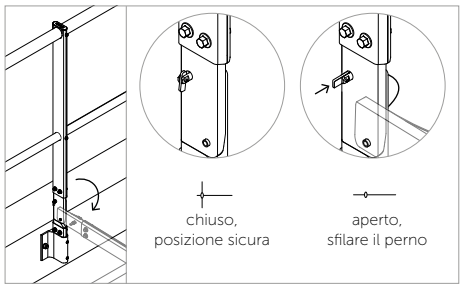
Installare i montanti ribaltabili BORUP100F/BORUP110F/BORUP110FR dal lato giunto (non lato perno), assicurando il ribaltamento verso l'interno della copertura e mai verso l'esterno.



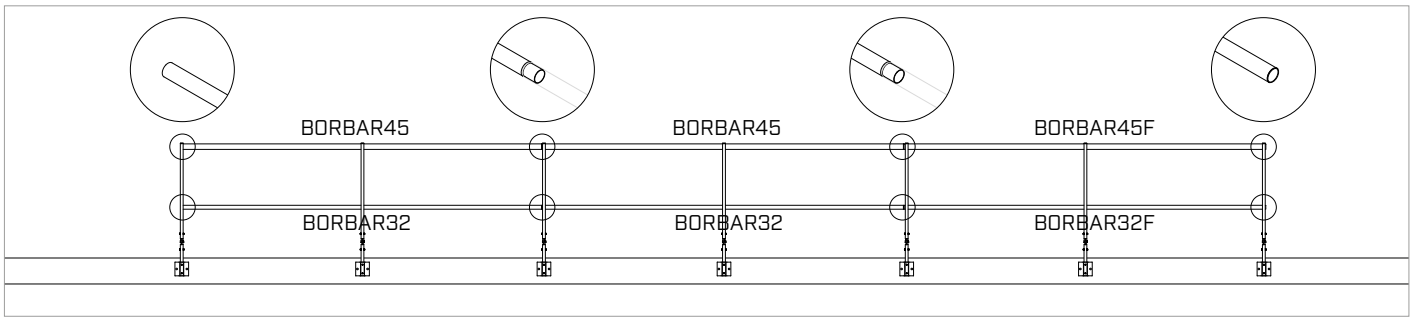
I parapetti ribaltabili **BORDER V / BORDER VD** si installano in moduli da 9 m (7 montanti), 12 m (9 montanti), 15 m (11 montanti) o 18 m (13 montanti). Montare due montanti terminali di due moduli adiacenti con distanza **minima 50 mm e massima 120 mm** tra loro, come raffigurato



Gli angoli dei parapetti ribaltabili non devono essere collegati tra loro per consentire il ribaltamento in entrambe le direzioni. La distanza tra due montanti terminali deve stare nell'intervallo **50 - 120 mm** da bordo.



Per il ribaltamento dell'intero modulo parapetto, è opportuno sfilare i perni dalle rispettive sedi.



I correnti principali da utilizzare sono il **BORBAR45** e il **BORBAR32**, tuttavia ciascun modulo deve terminare su un lato con il corrente specifico senza riduzione **BORBAR45F** e **BORBAR32F**.

	EN 14122-3: 2016	UNI 11996 - A NTC 2018 f=1,5 / UNI 11996 - A NTC 2018 f=1,0	EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl.A	NF E85-015: 2019
110 cm	BORUP110F	BORUP110F	BORUP110FR	BORUP110F
corrente superiore	BORBAR45/F	BORBAR45/F	BORBAR45R*	BORBAR45/F
corrente inferiore	BORBAR32/F	BORBAR32/F	BORBAR45R*	BORBAR32/F
100 cm	BORUP100F	BORUP100F	N/A	BORUP100F
corrente superiore	BORBAR45/F	BORBAR45/F	N/A	BORBAR45/F
corrente inferiore	BORBAR32/F	BORBAR32/F	N/A	BORBAR32/F

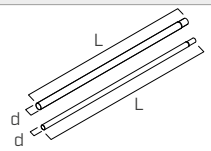
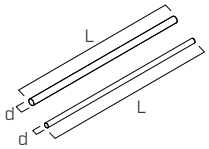
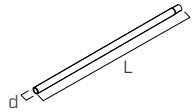
* Per correnti terminali in applicazione EN 13374 è necessario tagliare la parte con riduzione eccedente.

AVVERTENZE GENERALI PER L'USO

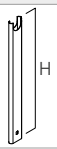
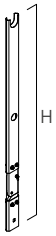
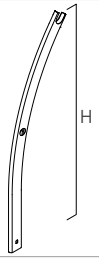
- Prima di procedere con il ribaltamento del parapetto, è obbligatorio assicurarsi che l'operatore sia posto in condizioni di sicurezza. L'utente deve essere ancorato a un dispositivo anticaduta, come una linea vita **PATROL** o un punto di ancoraggio **KITE**. Inoltre, è necessario verificare che tutti gli strumenti e le attrezzature siano in buone condizioni di funzionamento e che l'area di installazione sia libera da ostacoli.
- I moduli (9 m, 12 m, 15 m, 18 m) devono essere sempre maneggiati da due operatori per consentire il corretto ribaltamento.

CODICI E DIMENSIONI

CORRENTI

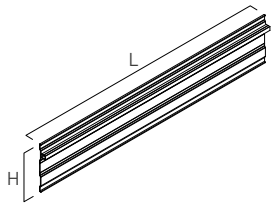
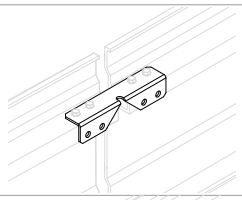
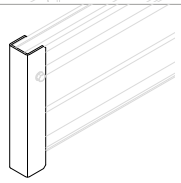
CODICE		d [mm]	L [mm]	
BORBAR45	EN AW 6063-T6	45	3000	
BORBAR32		32	3000	
BORBAR45F	EN AW 6063-T6	45	3000	
BORBAR32F		32	3000	
BORBAR45R	EN AW 6063-T6	45	3000	

MONTANTI

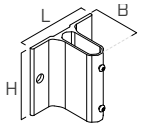
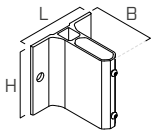
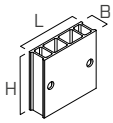
CODICE		H [mm]	
BORUP530WH	EN AW 6005A-T6	535	
BORUP760WH		765	
BORUP100	EN AW 6005A-T6	1005	
BORUP110		1105	
BORUP118		1185	
BORUP130		1305	
BORUP100F	EN AW 6005A-T6	1005	
BORUP110F		1105	
BORUP110FR		1105	
BORUP113C	EN AW 6005A-T6	1120	
BORUP100R	EN AW 6005A-T6	1005	
BORUP110R		1105	
BORUP100AS		1005	
BORUP107US		1075	

CODICI E DIMENSIONI

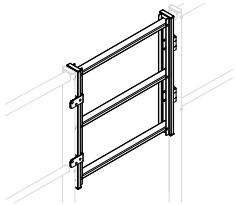
TAVOLA FERMAPIEDE

CODICE		H [mm]	L [mm]	
BORTB	EN AW 6063-T6	150	3000	
BORTBJUN	EN AW 5083 H111	-	-	
BORTBCAP	EN AW 5083 H111	-	-	

BASI

CODICE		B [mm]	H [mm]	L [mm]	
BORBASEV		80	120	120	
BORBASEVD	EN AW 6005A-T6	107	120	120	
BORDIST		35	120	120	

CANCELLETTO DI SICUREZZA

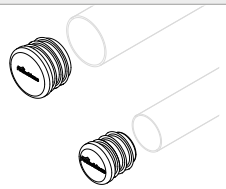
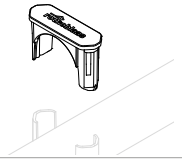
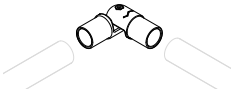
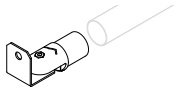
CODICE		L [mm]	H [mm]	
BORGATE600	EN AW 5083 H111	600	640	

CODICI E DIMENSIONI

FISSAGGI

CODICE		d [mm]	H [mm]	
MMS5525A2	1.4301 AISI304 INOX	5,5	25	

ACCESSORI

CODICE		
BORCAP45	LDPE	
BORCAP32		
BORCAP	PP RECYCLED	
BORCOR		
BORWALL	PP RECYCLED, 1.4301 AISI304 INOX	

SICHERHEITSHINWEISE, GEBRAUCHS- UND MONTAGEANLEITUNG

EINFÜHRUNG

DEFINITION

Das Geländer mit vertikaler Befestigung **BORDER V / BORDER VD** ist ein kollektives Absturzsicherungssystem. Es eignet sich hervorragend für die Dachsicherheit und ist aus Aluminiumlegierung hergestellt (**EN AW 6005A-T6 und EN AW 6063-T6**).

NORMEN

Das Geländer mit vertikaler Befestigung **BORDER V/ BORDER VD** entspricht den folgenden Vorschriften:

- **EN 14122-3:2016**
- **EN 13374:2025 Kl. A (außer Punkt 9)**
- **EN 13374:2013+A1:2018 Kl. A (außer Punkt 9)**
- **NTC (Tab. 3.1.II - Kat. A,B,C1,E1,F,G,H) und D. GvD 81/08 (Italien)**
- **NF E 85-015:2019 (Frankreich)**

Die Tabelle enthält die wichtigsten geometrischen Parameter, die in den Bezugsnormen gefordert werden:

	EN 14122-3: 2016	EN 13374:2013 +A1:2018 Kl. A / EN 13374:2025 Kl. A	NTC 2018	GvD 81/08	NF E85-015: 2019
Min. Höhe der begehbaren Fläche	1,1 m	1 m	1 m	1 m	1 - 1,1 m
Max. Achsabstand zwischen den Mittelläufen	500 mm	470 mm	-	500 mm	500 mm
Max. Achsabstand zwischen den Pfosten	1,5 m (empfohlen)	-	-	-	1,5 m (empfohlen)
Min. Höhe Fußleiste	10 cm	15 cm	-	15 cm	10 cm

VERWENDUNG - WARTUNG

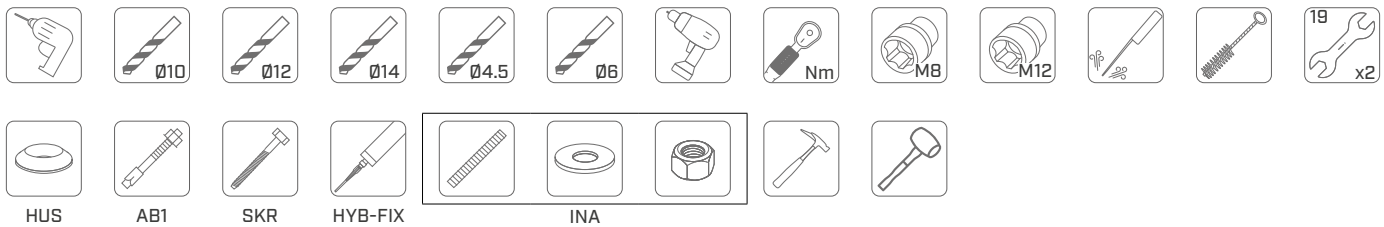
Das Schutzgeländer **BORDER** muss von qualifiziertem Personal unter Einhaltung der geltenden Vorschriften für Höhenarbeiten montiert werden. Vor der Nutzung muss der Anwender seine eigene Sicherheit gewährleisten. Hierzu verwendet er ein temporäres Seilsystem, PSA und eine geeignete Hubarbeitsbühne.

- Vor der Nutzung muss der Anwender per Sichtprüfung sicherstellen, dass das Schutzgeländer **BORDER** keine Mängel, Schäden oder Verformungen aufweist (Stöße, Verbiegungen usw.).
- Für das Geländer **BORDER** sind keine spezifischen Wartungseingriffe erforderlich. Jedoch muss mindestens einmal pro Jahr eine Sichtprüfung durch Fachpersonal vorgenommen werden.
- Wenn das Geländer **BORDER** nicht korrekt installiert wird, beschädigt ist oder einen Sturz abgefangen hat, muss die Verwendung sofort eingestellt werden. Erst nachdem ein qualifizierter Techniker die Inspektion und Überprüfung vorgenommen und eine schriftliche Genehmigung erteilt hat, darf es erneut eingesetzt werden.
- Wenn das Produkt außerhalb des Bestimmungslandes weiterverkauft wird, ist es für die Sicherheit des Anwenders unerlässlich, dass der Händler die Betriebsanleitung in der Sprache des Landes bereitstellt, in dem das Produkt verwendet wird. Die Unterlagen können auf Anfrage durch den Hersteller zur Verfügung gestellt werden.
- Das Geländer **BORDER** ist eine permanente kollektive Schutzeinrichtung, die ausschließlich von Fachleuten auf Dächern verwendet werden darf, die für die Öffentlichkeit nicht zugänglich sind.
- Bei der Montage in einer verschmutzten Industrie-, Petrochemie-, Marine- oder Meeresumgebung muss die Oberfläche des Geländers **BORDER** entsprechend behandelt, d. h. einer Pulverlackierung oder Eloxierung unterzogen werden.
- Wenn ein Grundriss vorhanden ist, muss er bei der Montage als Anhaltspunkt verwendet werden.

LAGERUNG

Die unbehandelten Aluminiumteile sind in der Verpackung nicht voneinander getrennt. Wenn die ungeöffnete Packung Regen ausgesetzt ist, kann dies eine Oxidation der Bestandteile begünstigen, wodurch Flecken auf der Oberfläche entstehen könnten. Sie beeinträchtigen zwar nicht die Qualität des Aluminiums, evtl. aber das Erscheinungsbild des Geländers. Es empfiehlt sich, die Verpackung zu öffnen und die Komponenten getrennt voneinander zu lagern (ohne dass sie sich berühren) oder die Verpackungen verschlossen an einem trockenen Ort aufzubewahren.

WERKZEUGE

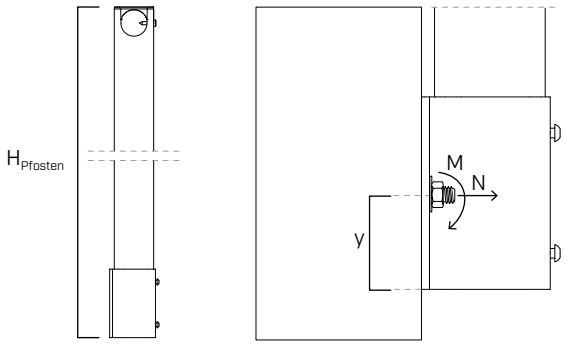


WICHTIGSTE AUF DEN ANSCHLAGPUNKT WIRKENDE KRÄFTE

Auf den am stärksten beanspruchten Bolzen wirkt die Kombination der Kräfte und der daraus resultierenden Momente:

$$M = F \cdot (H-y)$$

$$N = F_t = \frac{M \cdot y_i}{\Sigma n_i y_i^2} + \frac{F}{2}$$



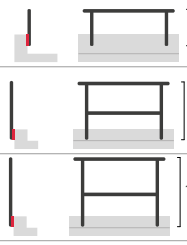
Die sich daraus ergebenden Werte, die auf die einzelne Befestigung wirken, sind wie folgt festgelegt:

$H_{Pfosten}$ [m]	EN 14122-3: 2016		EN 13374:2013 +A1:2018 Kl. A / EN 13374:2025 Kl. A		NTC 2018 + GvD 81/08		NF E85-015: 2019	
	M [Nm]	N [N]	M [Nm]	N [N]	M [Nm]	N [N]	M [Nm]	N [N]
0,76	551	4988	998	9025	1733	15675	689	6234
1	740	6563	1340	11875	2327	20625	925	8203
1,1	819	7219	1482	13063	2574	22688	1024	9023
1,18	882	7744	-	-	2772	24338	1103	9680
1,3	977	8531	-	-	3069	26813	1221	10664

MONTAGEANWEISUNGEN

ZULÄSSIGE ACHSABSTÄNDE

Tabelle 1

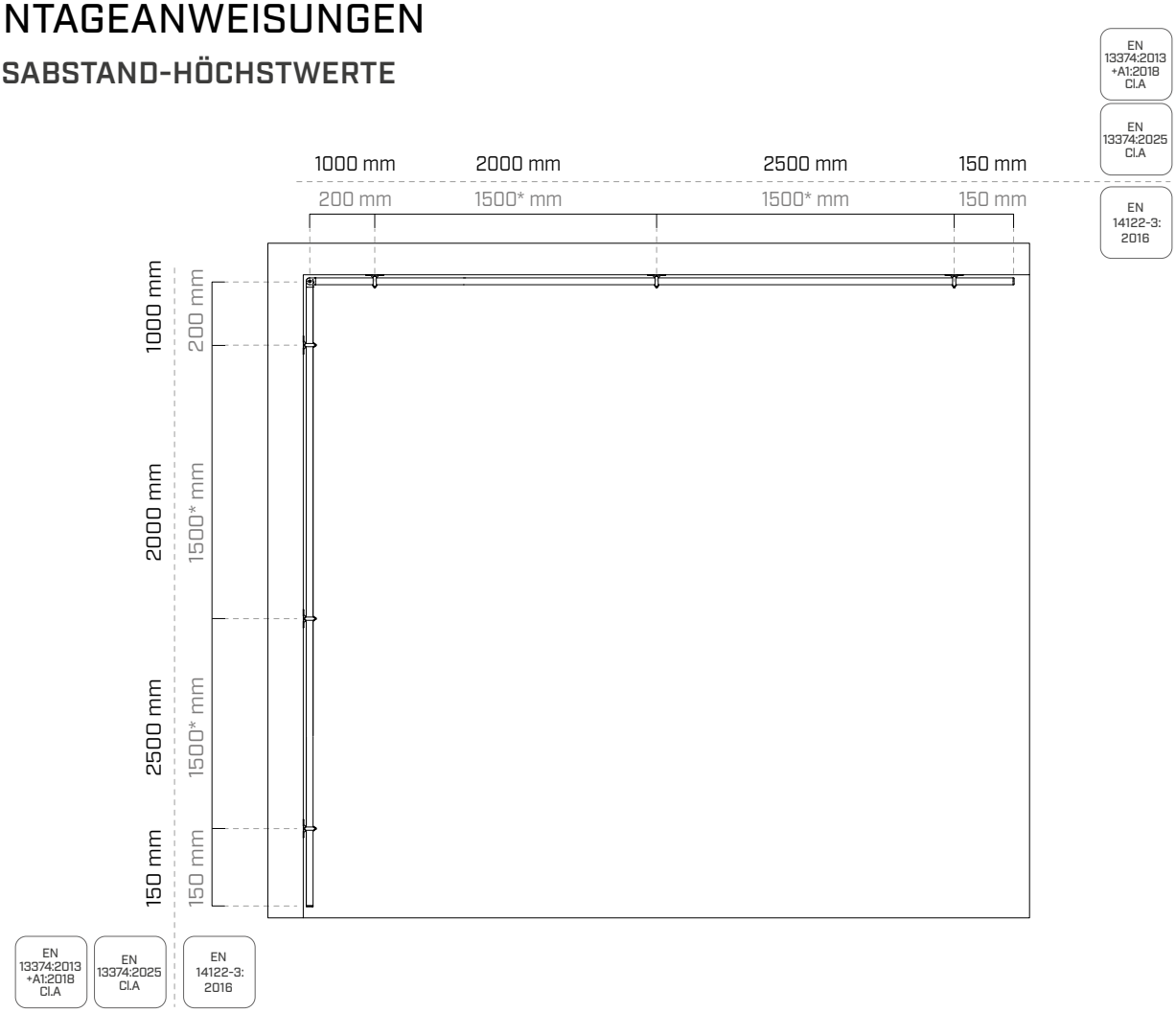
Pfosten	$H_{Pfosten}$	EN 14122-3: 2016	EN 13374:2013 +A1:2018 Kl. A / EN 13374:2025 Kl. A	NTC 2018 + GvD 81/08	NF E85-015: 2019
		Achsabstand für Pfosten [cm]			
Gerade	 76 cm	150	250**	150	150
	118 cm	150	-	150	150
	130 cm	150	-	150	150
gerade + klappbar*	100 cm	150	250	150	150
	110 cm	150	250	150	150
gebogen	110 cm	150	250	150	150

*Das Kippsystem ist derzeit nicht verfügbar

**System nur montierbar auf Schutzmauern mit Höhe $h_{min} \geq 250$ mm

MONTAGEANWEISUNGEN

ACHSABSTAND-HÖCHSTWERTE

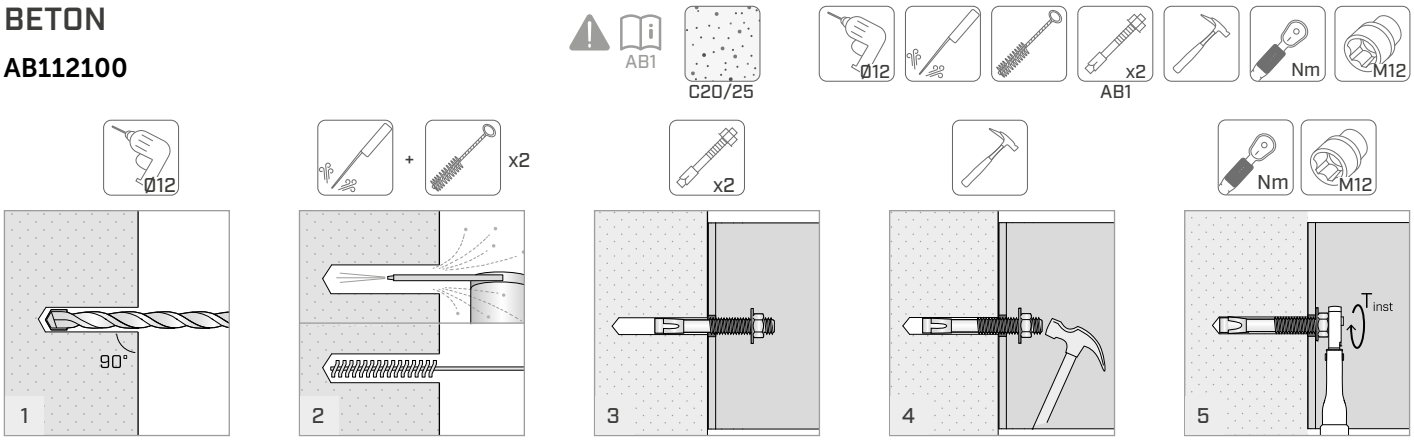


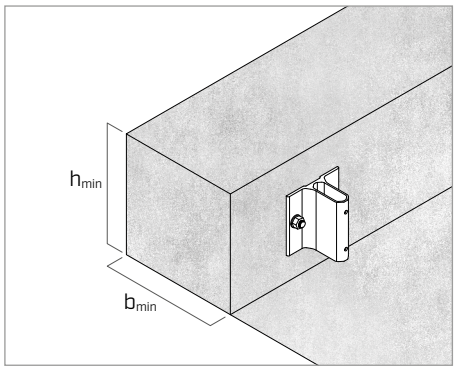
*Variabler max. Achsabstand, abhängig von der Norm und der Höhe des Postens (siehe Tab. 1).

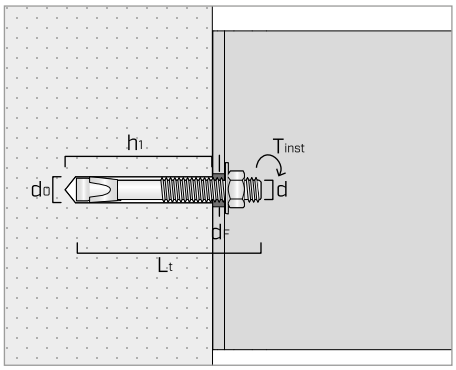
BASE V - BASE VD MONTAGE

BETON

AB112100





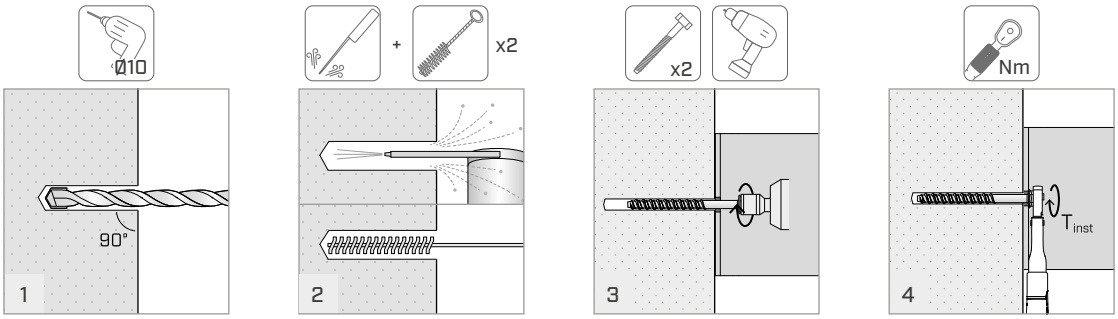


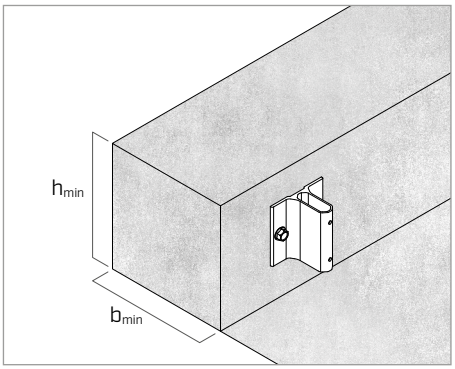
b_{min}	=	140	mm		
h_{min}	=	140	mm		
T_{inst}	=	60	Nm		
h_1	=	85	mm		
d	=	d_0	=	12	mm
d_F	=	14	mm		
L_t	=	100	mm		

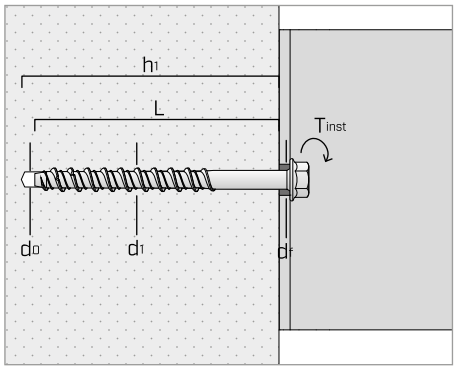
BASE V - BASE VD MONTAGE

BETON

SKR1290



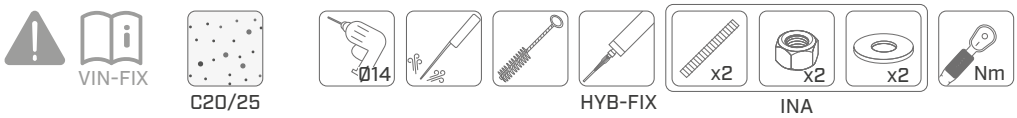


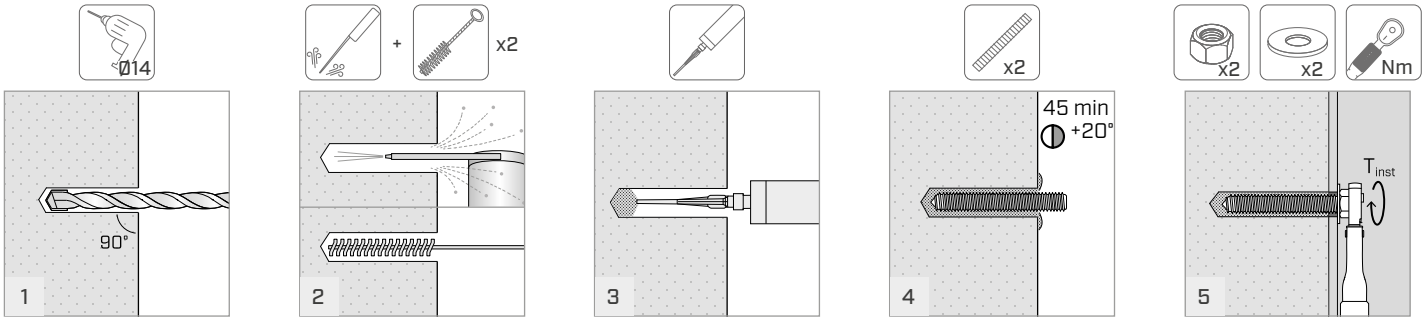


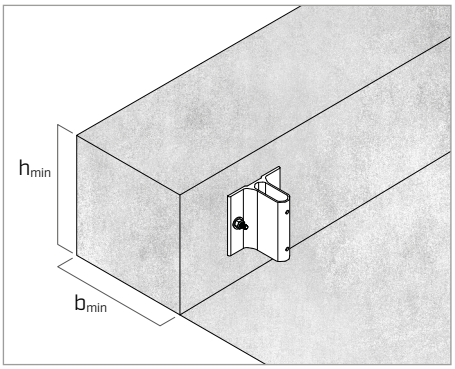
b_{min}	=	120	mm
h_{min}	=	120	mm
T_{inst}	=	80	Nm
h_1	=	100	mm
d_1	=	12	mm
d_0	=	10	mm
d_F	=	14	mm
L	=	90	mm

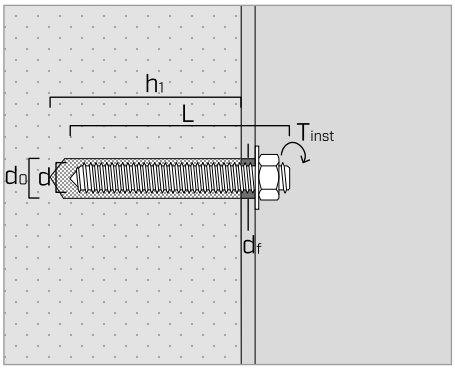
BETON

HYB-FIX + INA8812140



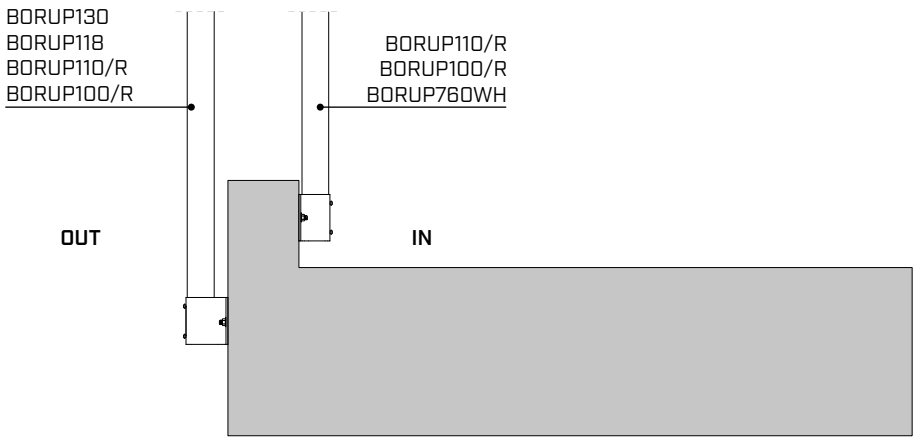


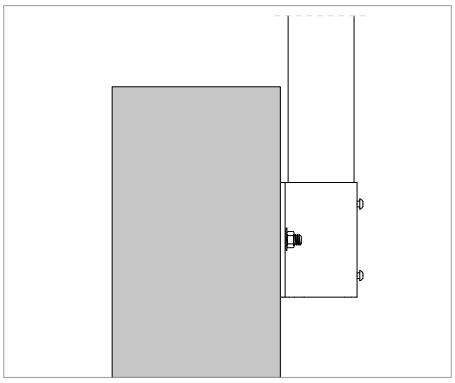




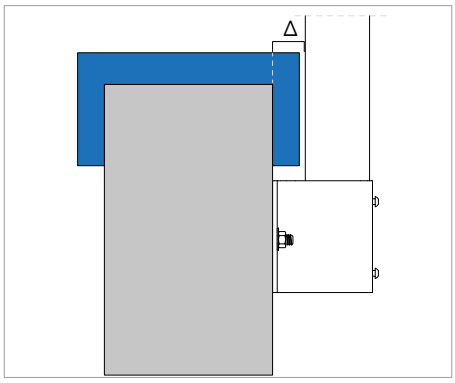
b_{min}	=	160	mm
h_{min}	=	140	mm
T_{inst}	=	40	Nm
h_1	=	140	mm
d	=	12	mm
d_0	=	14	mm
d_F	=	14	mm
L	=	140	mm

ANWENDUNGEN GELÄNDER BORDER V / BORDER VD



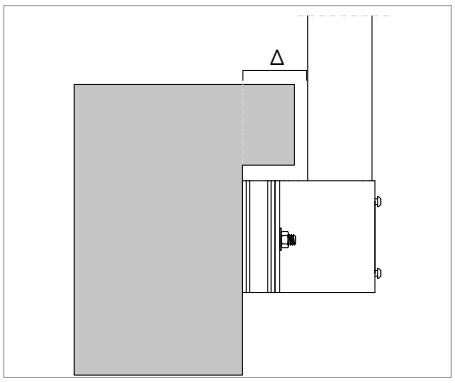


BORBASEV



BORBASEVD

Δ = 35 mm



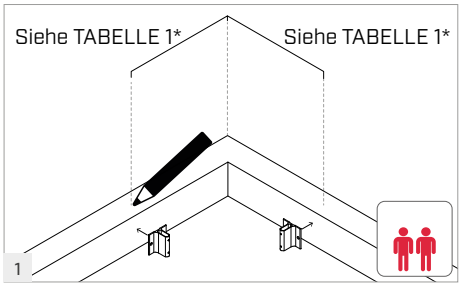
BORBASEVD + BORDIST

Δ = 70 mm

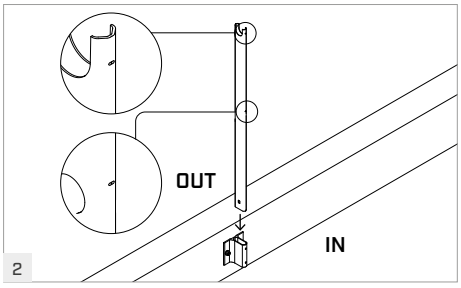
(mit AB112150)

MONTAGE

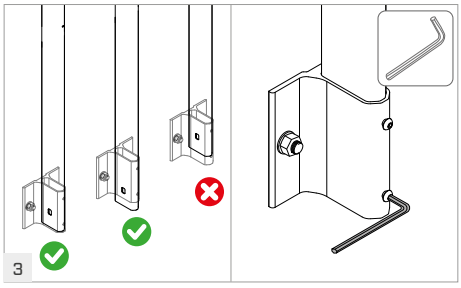
BORDER V / BORDER VD



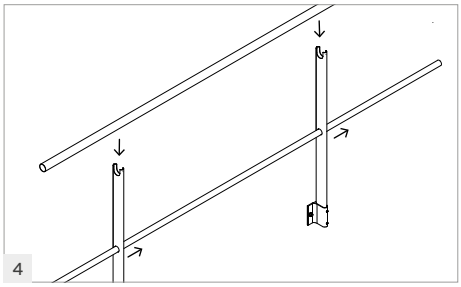
Mindestens zwei qualifizierte Anwender müssen anwesend sein. Um ein optimales Ergebnis zu gewährleisten, sollte in einer Ecke begonnen werden. Die Grundplatten V-VD montieren (siehe S. 4-5).



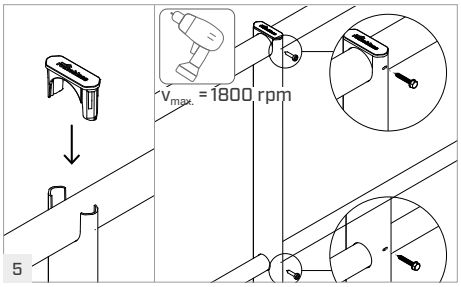
Die Pfosten mit den Markierungen zum Anwender in die Grundplatten **BORBASEV/BORBASEVD** einsetzen.



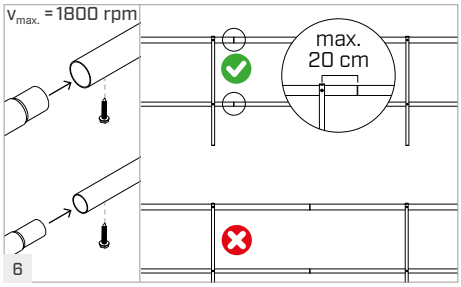
Den Pfosten einstellen, bis das Ende in die Grundplatte eintritt und sich an der unteren Grenze ausrichtet. Die beiden Schrauben M6x6 fixieren.



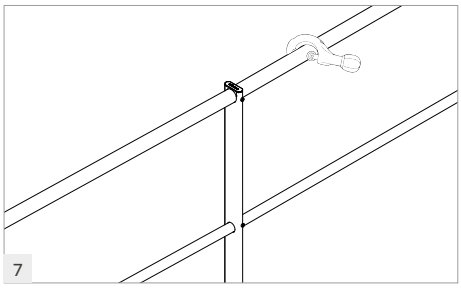
Den Mittellauf **BORBAR32** und daraufhin den oberen Handlauf **BORBAR45** einsetzen. Gemäß Norm EN 13374 müssen die verstärkten Handläufe **BORBAR45R** montiert werden.



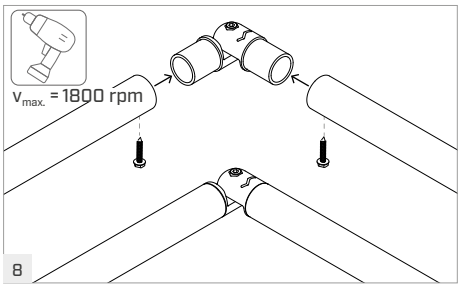
Die Klappe **BORCAP** oben am Pfosten einsetzen. Die Handläufe mit den Schrauben **MMS5525A2** auf der Höhe der beiden seitlichen Markierungen befestigen.



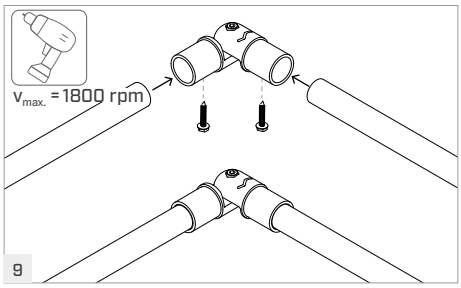
Die Außengewinde-/Innengewinde-Enden des Handlaufs und der Mittelläufe verbinden und mit Schrauben **MMS5525A2** befestigen. Gemäß EN 14122 darf der Handlauf nicht weiter als 20 cm vom nächsten Pfosten entfernt enden. Die Schrauben unter den Mittelläufen positionieren.



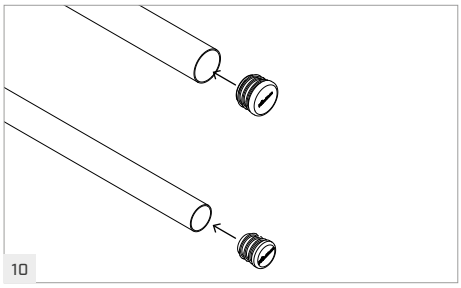
Den letzten Geländerabschnitt anpassen, indem der überstehende Teil der Läufe mit dem Rohrschneider abgetrennt wird.



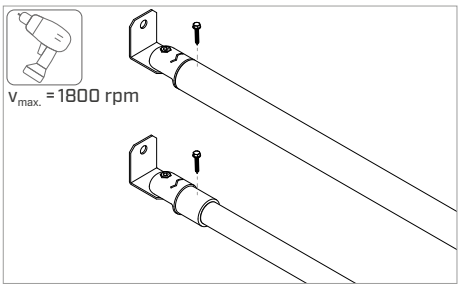
Das Winkelgelenk **BORCOR** in den Handlauf einsetzen und mit gewindeschneidenden Schrauben **MMS5525A2** befestigen.



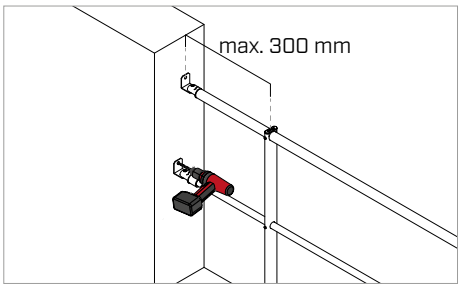
Das Winkelgelenk **BORCOR** in den Mittellauf einsetzen und mit gewindeschneidenden Schrauben **MMS5525A2** befestigen.



Die Kappen **BORCAP45** und **BORCAP32** in die Handläufe oder Mittelläufe einsetzen.



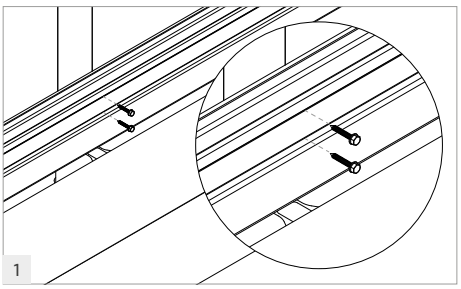
Handlauf und Mittellauf in das Wandabschlusselement **BORWALL** einsetzen und mit der gewindeschneidenden Schraube **MMS5525A2** befestigen.

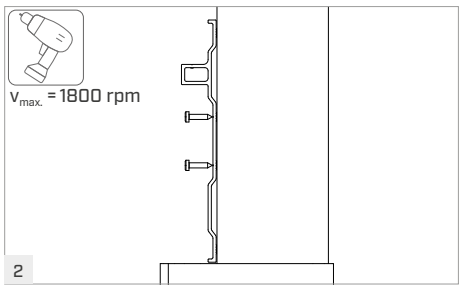


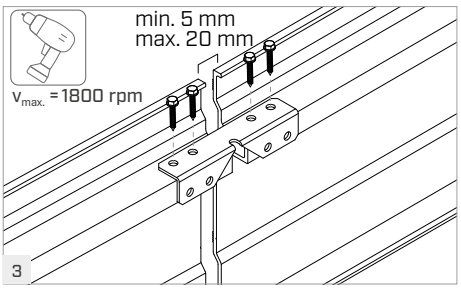
Den maximalen Abstand von **300 mm** zur Wand einhalten. Mit einer Spitze Ø10 mm ein Loch in die Wand bohren und das Abschlusselement mit einem Dübel M10 (AB110115) oder auf Holz mit VGS Ø9 (VGS9100 + HUS8) befestigen.

MONTAGE

BORTB

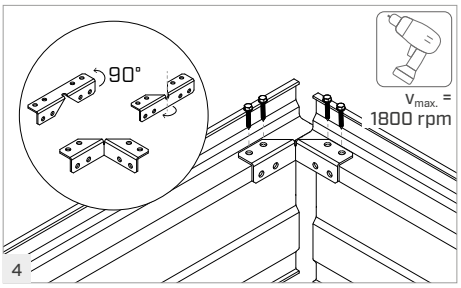


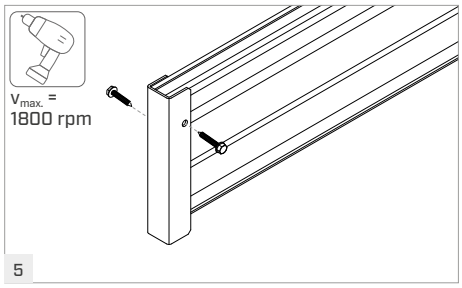




Die Fußleiste **BORTB** muss immer frontal zur Innenseite positioniert werden, wobei sich die untere Auflage in Kontakt mit jener der Grundplatte **BORBASEV/VD** befindet. Nach der Positionierung die Schrauben 5.5×25 mm in der Nähe der beiden Nuten befestigen.

Die Enden von **BORTB** mit dem Verbinder **BORTBJUN** verbinden. Mit 4 Schrauben **MMS5525A2** befestigen, wobei mindestens 5 mm zwischen den Platten liegen müssen, um eine thermische Verformung zu vermeiden.

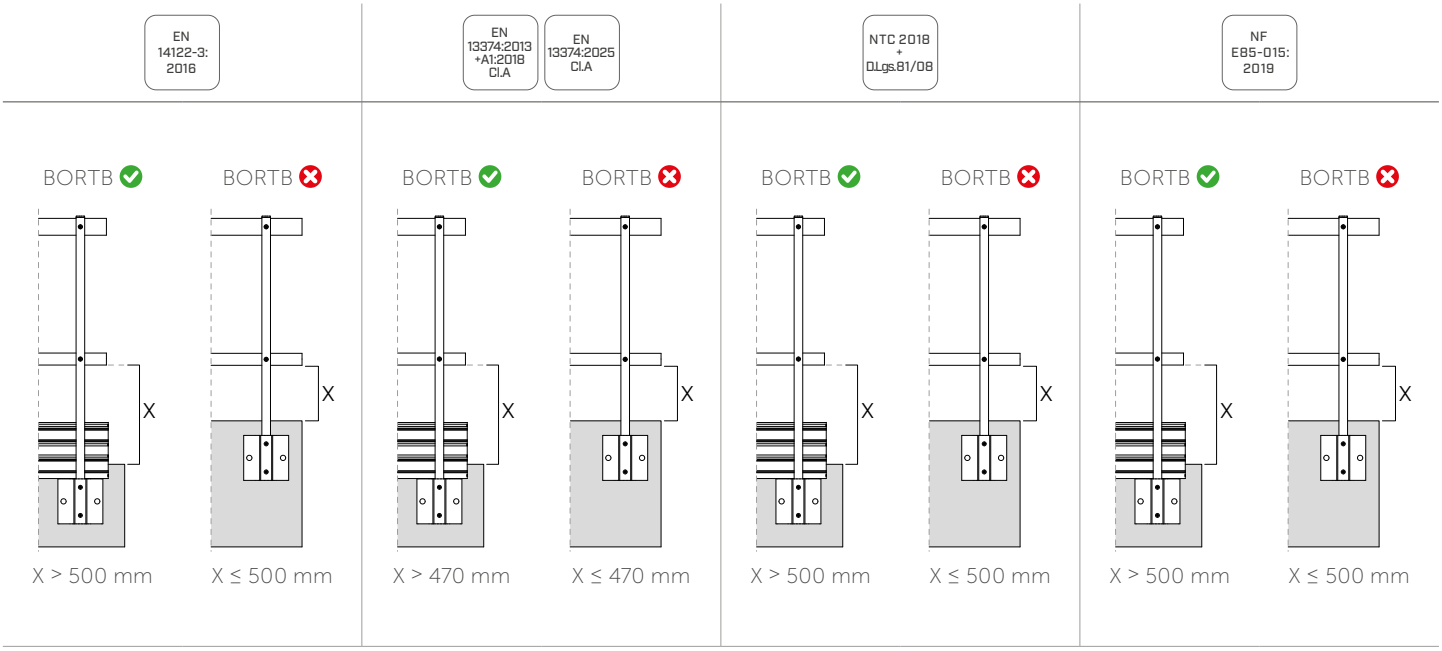




Den Verbinder **BORTBJUN** in den Ecken bis zum gewünschten Winkel von Hand drehen und biegen. Mit 4 gewindeschneidenden Schrauben **MMS5525A2** befestigen.

Die Endkappen der Fußleiste mit 2 gewindeschneidenden Schrauben **MMS5525A2** befestigen.

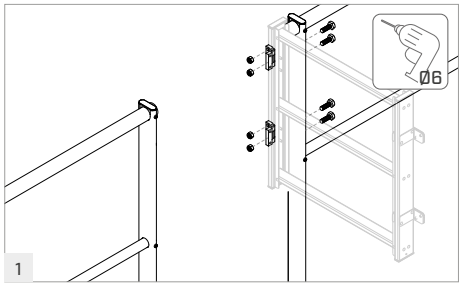
NUTZUNGSVORSCHRIFTEN BORTB



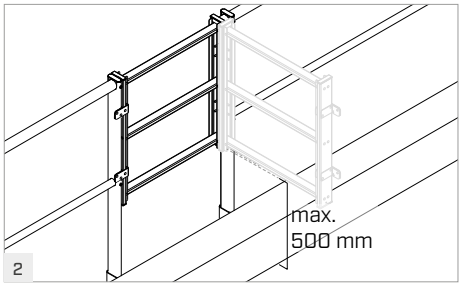
MONTAGE

BORGATE600

EN 14122-3: 2016



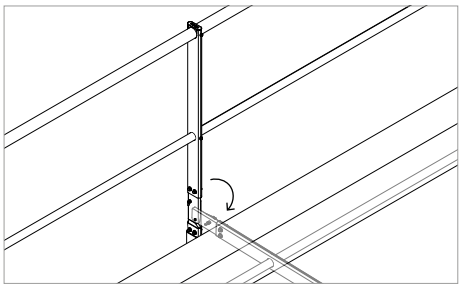
Die 2 Scharniere an der Seite des Tors mit 4 Schrauben **Ø6x35 ISO 4762** und den entsprechenden **selbstsichernden Muttern M6** im Lieferumfang des Tors befestigen.



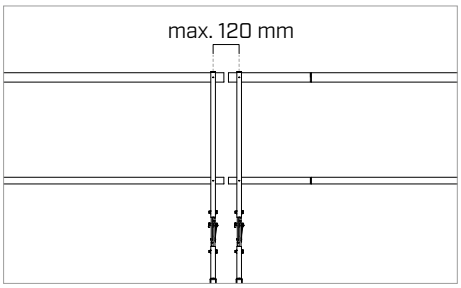
Sicherstellen, dass das Tor auf einer maximalen Höhe von **500 mm** zur begehbaren Fläche montiert ist und in geschlossene Position bleibt.

BORUP100F - BORUP110F

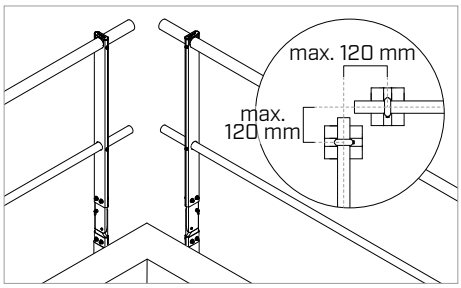
EN 14122-3: 2016 | NTC 2018 + D.Lgs.81/08 | NF E85-015: 2019



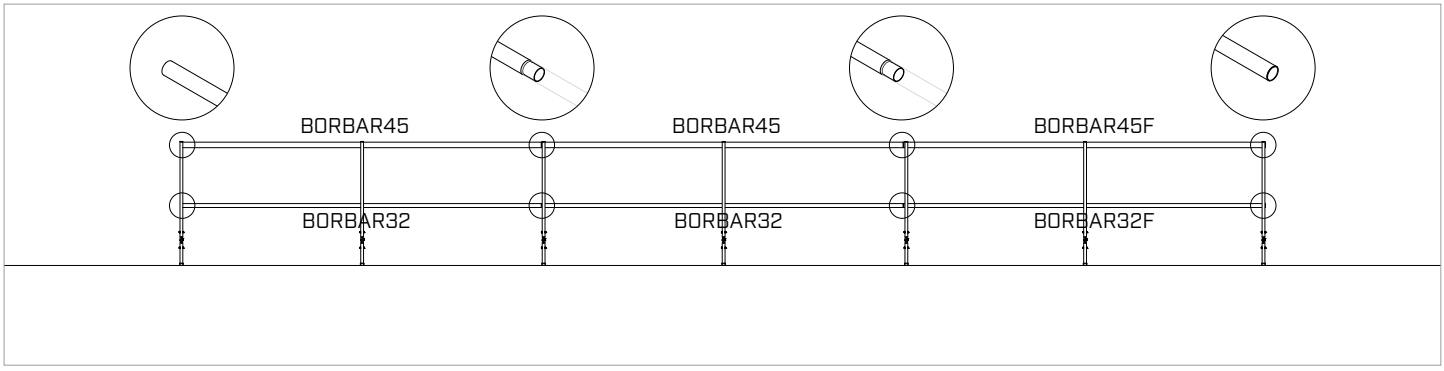
Die Klappgeländer **BORDER V / BORDER VD** von der Verbindungsseite (nicht Zapfenseite) montieren und sicherstellen, dass der Pfosten zum Dach hin und niemals nach außen aufgeklappt wird.



Die Klappgeländer **BORDER V / BORDER VD** werden in Modulen zu 9 m (7 Pfosten), 12 m (9 Pfosten), 15 m (11 Pfosten) oder 18 m (13 Pfosten) montiert. Zwei Endpfosten mit maximalem Abstand von **120 mm** zueinander montieren; siehe Abb.



Die Ecken der Klappgeländer dürfen nicht verbunden sein, damit ein Kippen in beide Richtungen möglich ist. Der Abstand zwischen zwei Endposten darf nicht mehr als **120 mm** vom Rand betragen.



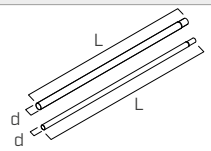
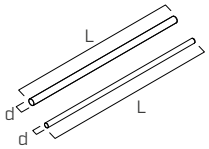
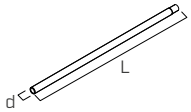
Hauptsächlich werden die Handläufe **BORBAR45** und **BORBAR32** verwendet, jedoch muss jedes Modul mit dem spezifischen, nicht verjüngten Mittellauf **BORBAR45F** und **BORBAR32F** abschließen.

AVVERTENZE GENERALI PER L'USO

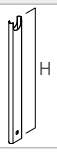
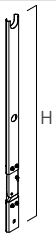
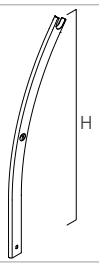
- Prima di procedere con il ribaltamento del parapetto, è obbligatorio assicurarsi che l'operatore sia posto in condizioni di sicurezza. L'utente deve essere ancorato a un dispositivo anticaduta, come una linea vita **PATROL** o un punto di ancoraggio **KITE**. Inoltre, è necessario verificare che tutti gli strumenti e le attrezzature siano in buone condizioni di funzionamento e che l'area di installazione sia libera da ostacoli.
- I moduli (9 m, 12 m, 15 m, 18 m) devono essere sempre maneggiati da due operatori per consentire il corretto ribaltamento.

ARTIKELNUMMERN UND ABMESSUNGEN

HAND- UND MITTELLÄUFE

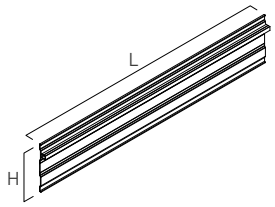
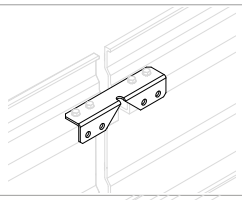
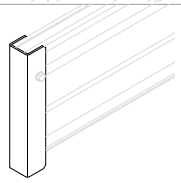
ART.-NR.		d [mm]	L [mm]	
BORBAR45		45	3000	
BORBAR32		32	3000	
BORBAR45F	EN AW 6063-T6	45	3000	
BORBAR32F		32	3000	
BORBAR45R		45	3000	

PFOSTEN

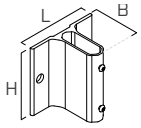
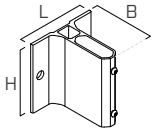
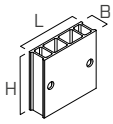
ART.-NR.		H [mm]	
BORUP530WH		535	
BORUP760WH		765	
BORUP100		1005	
BORUP110		1105	
BORUP118		1185	
BORUP130		1305	
BORUP100F		1005	
BORUP110F	EN AW 6005A-T6	1105	
BORUP113C		1120	
BORUP100R		1005	
BORUP110R		1105	
BORUP100AS		1005	
BORUP107US		1075	

ARTIKELNUMMERN UND ABMESSUNGEN

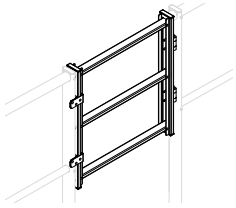
FUSSLEISTE

ART.-NR.		H [mm]	L [mm]	
BORTB	EN AW 6063-T6	150	3000	
BORTBJUN	EN AW 5083 H111	-	-	
BORTBCAP	EN AW 5083 H111	-	-	

BASIS

ART.-NR.		B [mm]	H [mm]	L [mm]	
BORBASEV		80	120	120	
BORBASEVD	EN AW 6005A-T6	107	120	120	
BORDIST		35	120	120	

SICHERHEITSTOR

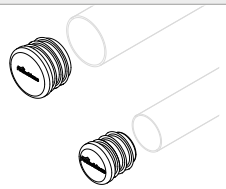
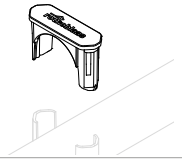
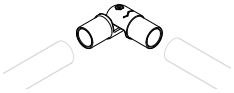
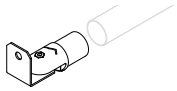
ART.-NR.		L [mm]	H [mm]	
BORGATE600	EN AW 5083 H111	600	640	

ARTIKELNUMMERN UND ABMESSUNGEN

BEFESTIGUNGEN

ART.-NR.		d [mm]	H [mm]	
MMS5525A2	1.4301 AISI304 INOX	5,5	25	

ZUBEHÖR

ART.-NR.		
BORCAP45	LDPE	
BORCAP32		
BORCAP	PP RECYCLED	
BORCOR		
BORWALL	PP RECYCLED, 1.4301 AISI304 INOX	

SAFETY REGULATIONS, INSTRUCTIONS FOR INSTALLATION AND USE

INTRODUCTION

DEFINITION

The **BORDER V / BORDER VD** railing with vertical fastening is a collective fall protection system designed for roof safety, made of aluminium alloy (**EN AW 6005A-T6 and EN AW 6063-T6**).

REGULATIONS

The **BORDER V/ BORDER VD** railing with vertical fastening complies with the following regulations:

- **EN 14122-3:2016**
- **EN 13374:2025 Cl. A (except point 9)**
- **EN 13374:2013+A1:2018 Cl. A (except point 9)**
- **NTC (Tab.3.1.II - cat. A,B,C1,E1,F,G,H) and Legislative Decree 81/08 (Italy)**
- **NF E 85-015:2019 (France)**

The table shows the main geometric parameters required by the applicable regulations:

	EN 14122-3: 2016	EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl.A	NTC 2018	Leg. Decree 81/08	NF E85-015: 2019
Min. height above walking surface	1,1 m	1 m	1 m	1 m	1 - 1,1 m
Max. spacing between rails	500 mm	470 mm	-	500 mm	500 mm
Max. spacing between uprights	1,5 m (suggested)	-	-	-	1,5 m (suggested)
Min. height of toe board	10 cm	15 cm	-	15 cm	10 cm

USE - MAINTENANCE

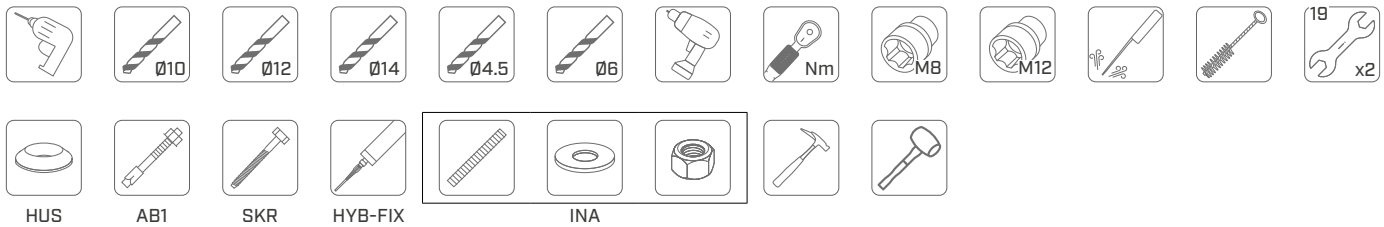
The **BORDER** railing must be installed by qualified personnel, in compliance with current regulations concerning work at height.
Before use, the operator must ensure their own safety by using a temporary lifeline, PPE and a suitable work platform.

- Before use, the user must perform a visual inspection of the **BORDER** railing to ensure the absence of irregularities, damage or deformations (knocks, bending, etc.).
- The **BORDER** railing does not require any specific maintenance. However, it must be visually inspected at least once per year by qualified personnel.
- If the **BORDER** railing is incorrectly installed, damaged or has arrested a fall, its use must be immediately suspended. It must not be reused until it has been inspected and tested by a qualified technician, who must provide written authorisation.
- If the product is resold outside the country of destination, it is essential for the user's safety that the reseller provides the instruction manual in the language of the country where the product will be used. The documents can be provided to you on request by contacting the manufacturer.
- The **BORDER** railing is a permanent collective protective device intended exclusively for professionals working on roofs that are not accessible to the public.
- If installed in polluted industrial, petrochemical, marine or coastal environments, the **BORDER** railing must undergo an appropriate surface treatment, such as powder coating or anodizing.
- If a site plan has been provided, it must be used as a reference during installation.

STORAGE

The raw aluminium components are packed in contact with each other. Exposure of the unopened package to rain may cause oxidation of the components, resulting in possible surface stains. These do not compromise the quality of the aluminium but can damage the aesthetic appearance of the railing. We recommend unpacking the packages and storing the components separately from each other (no contact between them), or storing the packages still packed in a dry place.

TOOLS

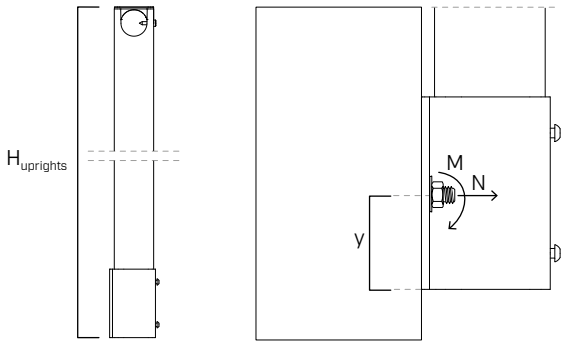


MAIN FORCES ACTING ON THE ANCHORAGE

The most heavily loaded bolt is subjected to the combined action of the forces and resulting moments:

$$M = F \cdot (H-y)$$

$$N = F_t = \frac{M \cdot y_i}{\Sigma n_i y_i^2} + \frac{F}{2}$$



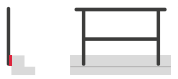
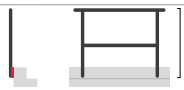
The resulting values acting on each individual fastening point are defined as follows:

$H_{uprights}$ [m]	EN 14122-3: 2016		EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl.A		NTC 2018 + Leg. Decree 81/08		NF E85-015: 2019	
	M [Nm]	N [N]	M [Nm]	N [N]	M [Nm]	N [N]	M [Nm]	N [N]
0,76	551	4988	998	9025	1733	15675	689	6234
1	740	6563	1340	11875	2327	20625	925	8203
1,1	819	7219	1482	13063	2574	22688	1024	9023
1,18	882	7744	-	-	2772	24338	1103	9680
1,3	977	8531	-	-	3069	26813	1221	10664

INSTALLATION VIDEO

PERMISSIBLE SPACING

Table 1

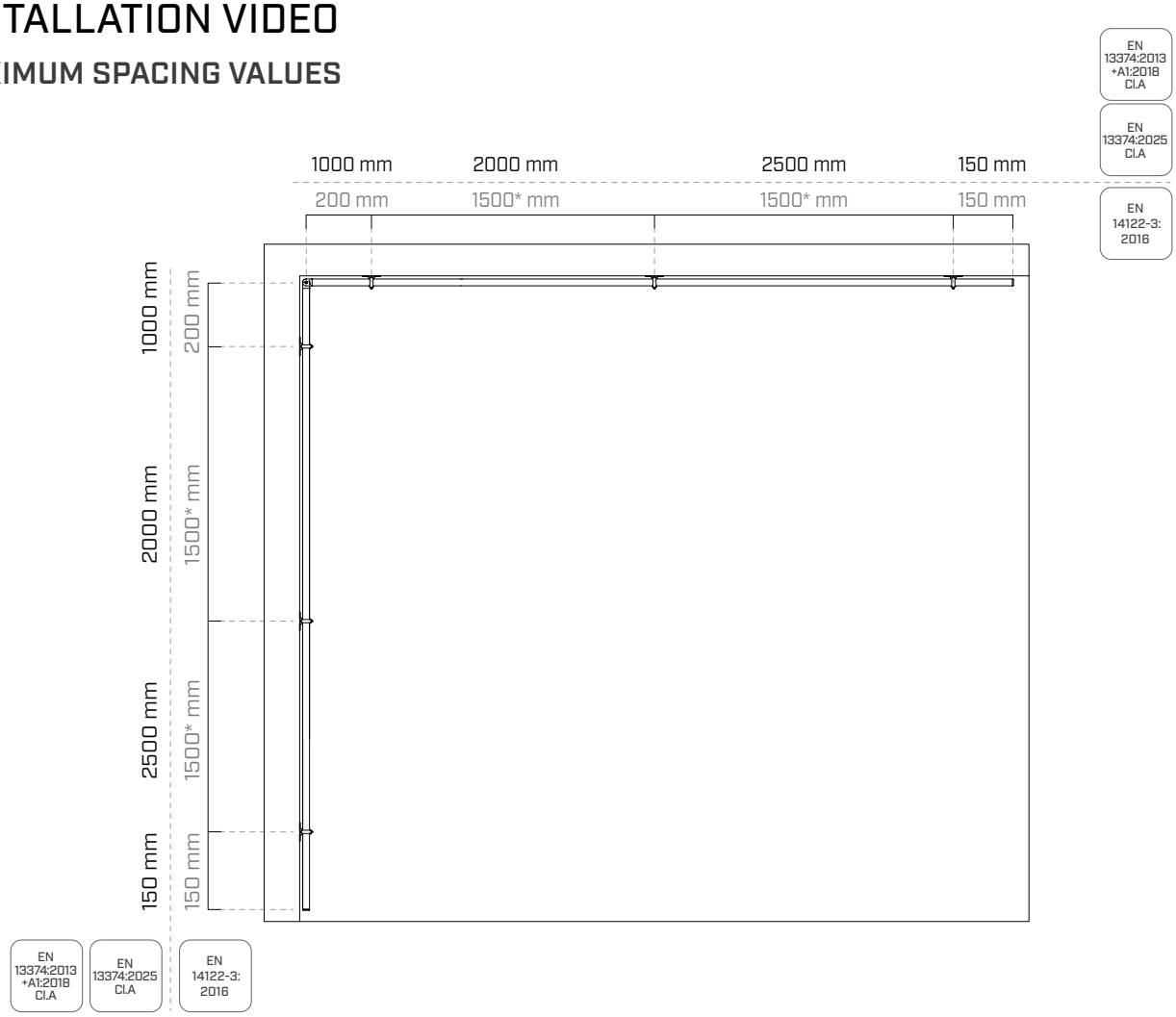
upright	$H_{uprights}$	EN 14122-3: 2016	EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl.A	NTC 2018 + Leg. Decree 81/08	NF E85-015: 2019
		spacing between uprights [cm]			
straight	76 cm	150	250**	150	150
	 118 cm	150	-	150	150
	 130 cm	150	-	150	150
straight + folding*	100 cm	150	250	150	150
	110 cm	150	250	150	150
curved	110 cm	150	250	150	150

*The folding system is not currently available

**System can only be installed on parapets with height $h_{min} \geq 250$ mm

INSTALLATION VIDEO

MAXIMUM SPACING VALUES

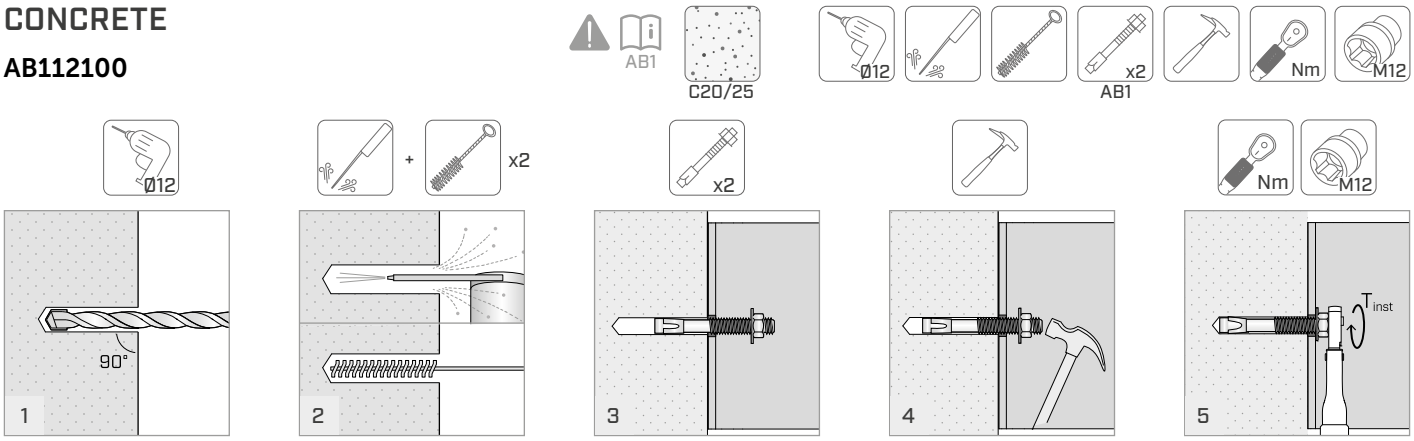


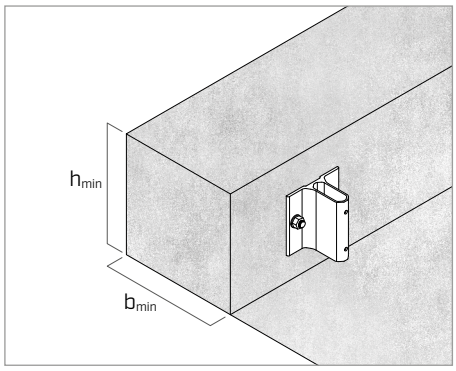
*Maximum spacing varies according to the applicable regulation and height of the upright (see table 1).

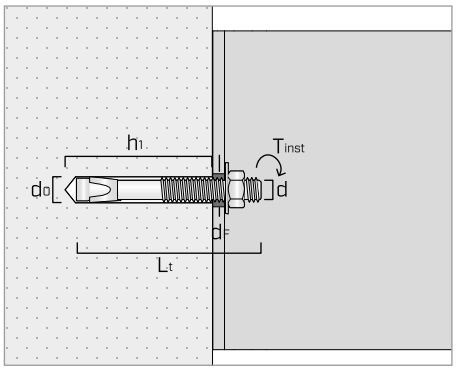
BASE V - BASE VD INSTALLATION

CONCRETE

AB112100





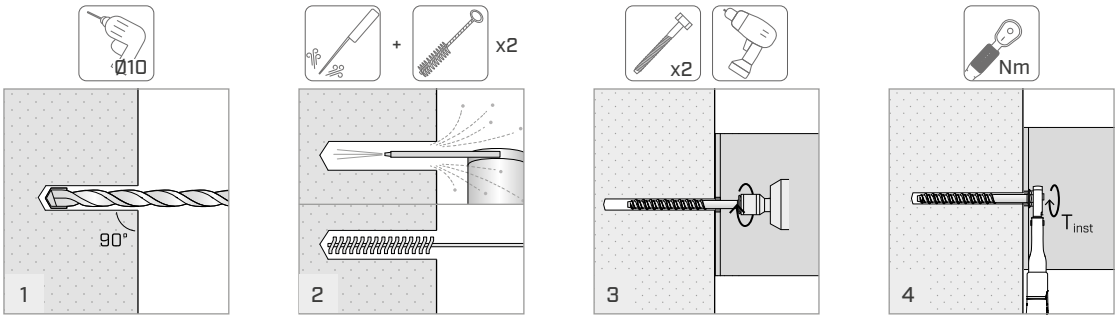


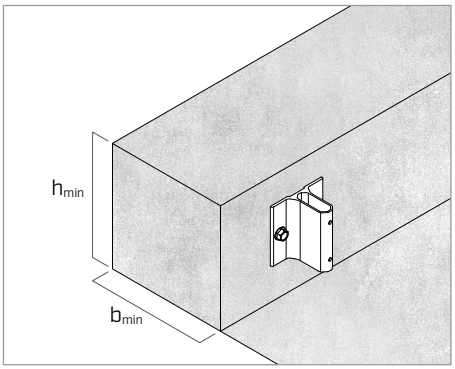
b_{min}	=	140	mm		
h_{min}	=	140	mm		
T_{inst}	=	60	Nm		
h_1	=	85	mm		
d	=	d_0	=	12	mm
d_F	=	14	mm		
L_t	=	100	mm		

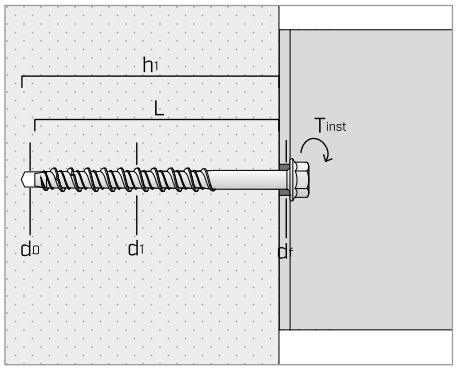
BASE V - BASE VD INSTALLATION

CONCRETE

SKR1290



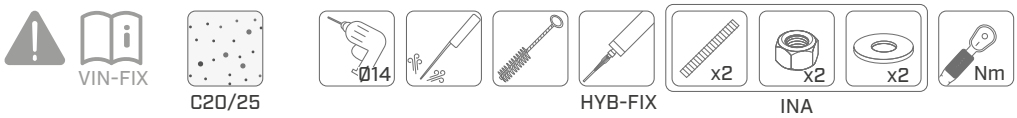


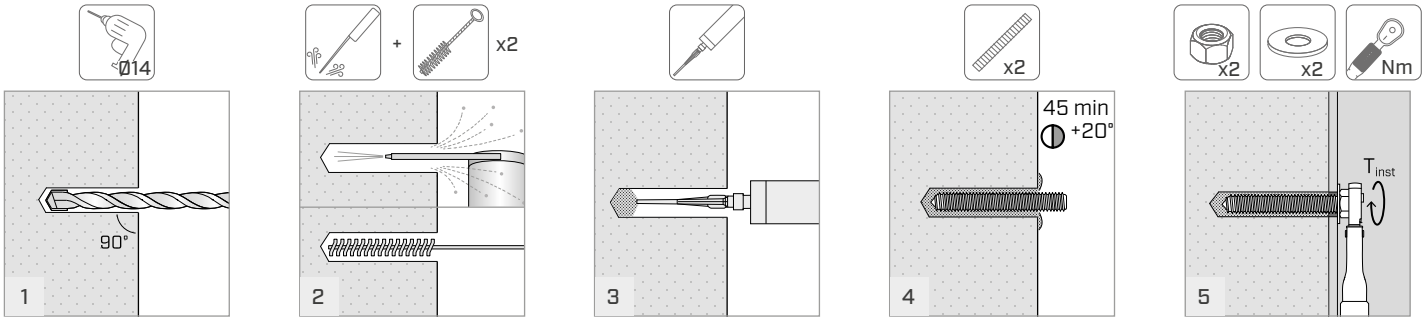


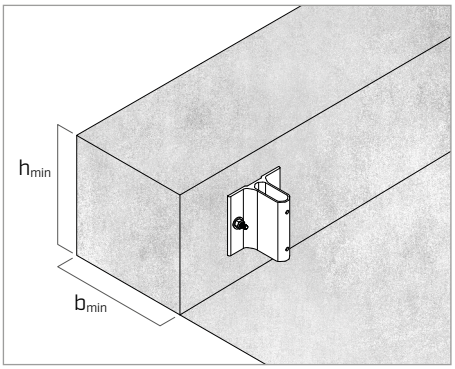
b_{min}	=	120	mm
h_{min}	=	120	mm
T_{inst}	=	80	Nm
h_1	=	100	mm
d_1	=	12	mm
d_0	=	10	mm
d_F	=	14	mm
L	=	90	mm

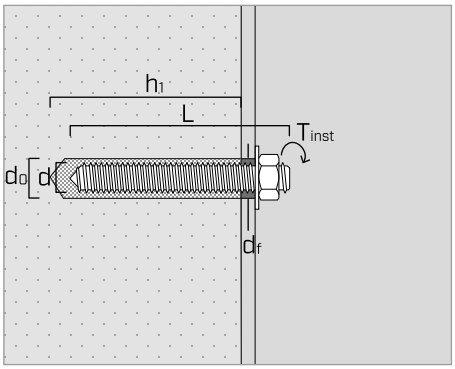
CONCRETE

HYB-FIX + INA8812140



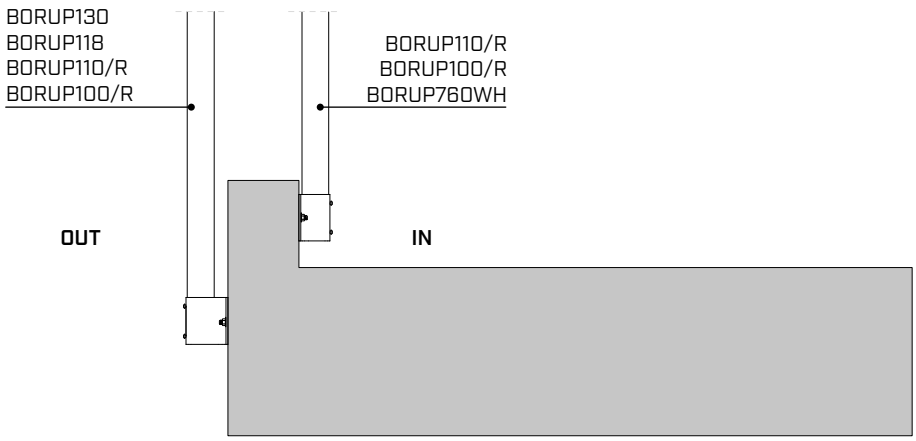


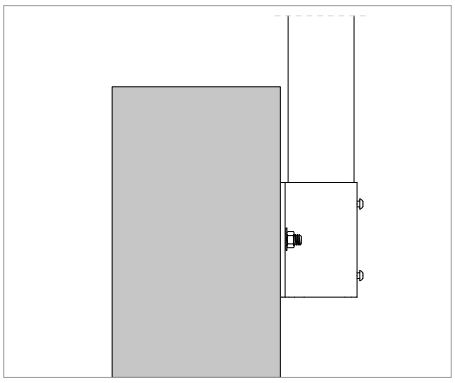




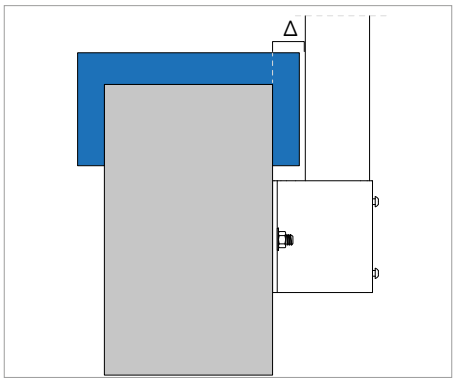
b_{min}	=	160	mm
h_{min}	=	140	mm
T_{inst}	=	40	Nm
h_1	=	140	mm
d	=	12	mm
d_0	=	14	mm
d_F	=	14	mm
L	=	140	mm

BORDER V / BORDER VD RAILING APPLICATIONS



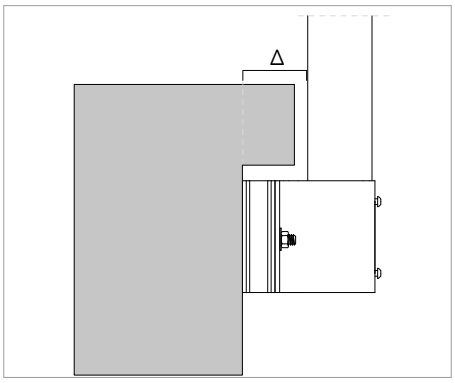


BORBASEV



BORBASEVD

Δ = 35 mm



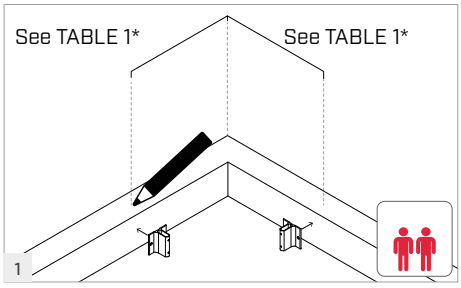
BORBASEVD + BORDIST

Δ = 70 mm

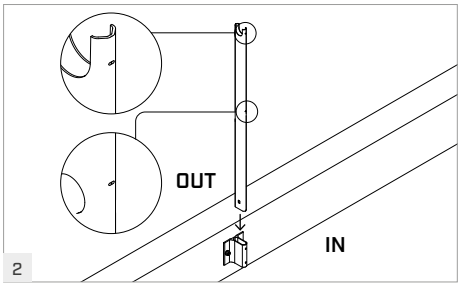
(with AB112150)

INSTALLATION

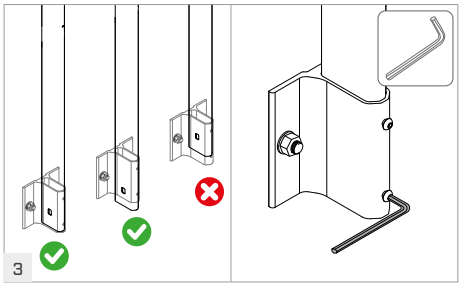
BORDER V / BORDER VD



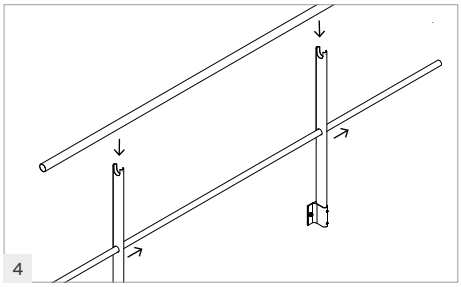
At least two qualified operators are required. For best results, it is advisable to start from a corner. Install the V-VD bases (see pages 4–5).



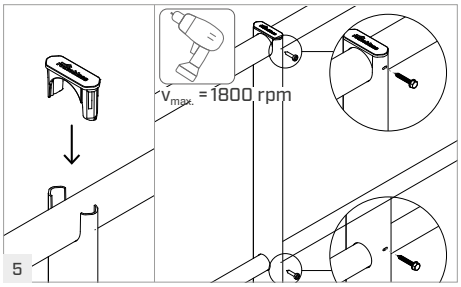
Insert the uprights into the **BORBASEV/BORBASEVD** bases with the markings facing the operator.



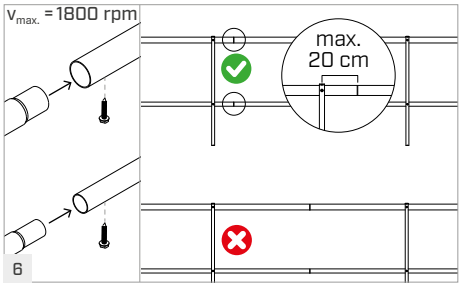
Adjust the upright so that its end does not enter the base and aligns with the bottom edge. Fasten the two M6x6 screws.



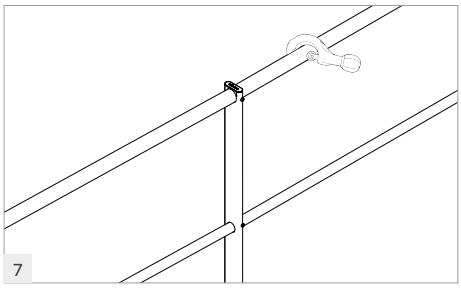
Insert the **BORBAR32** intermediate rail followed by the **BORBAR45** top rail. In compliance with EN 13374, the **BORBAR45R** reinforced rails must be installed.



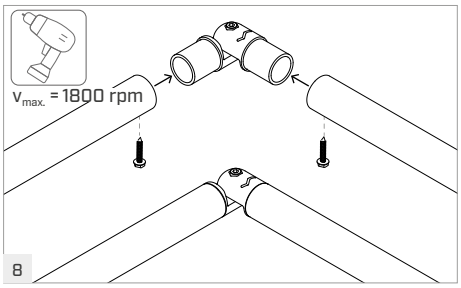
Insert the **BORCAP** cap on the top of each upright. Secure the rails to the uprights using screws **MMS5525A2** at the two side markings.



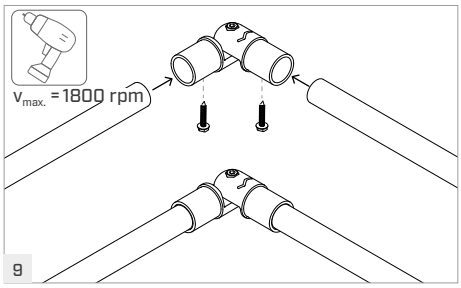
Connect the male/female ends of the handrail and rails, fastening them with screws **MMS5525A2**. In compliance with EN 14122, the handrail must end no more than 20 cm from the nearest upright. Position the screws under the rails.



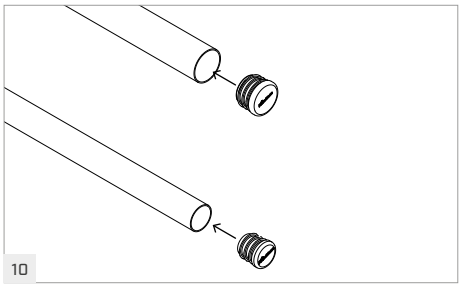
Adapt the final section of the railing by cutting off the excess length of the rails using the pipe cutter.



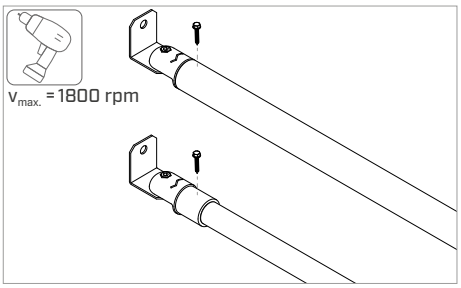
Insert the **BORCOR** corner joint into the handrail and fasten with self-tapping screws **MMS5525A2**.



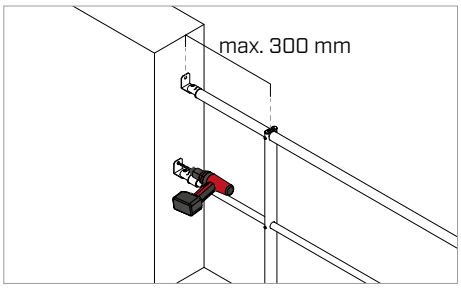
Insert the **BORCOR** corner joint into the intermediate rail and fasten with self-tapping screws **MMS5525A2**.



Insert the **BORCAP45** and **BORCAP32** caps into the handrails or intermediate rails.



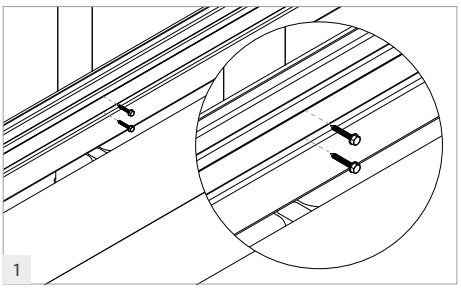
Insert the handrail and intermediate rail into the **BORWALL** wall end element and fasten with the self-tapping screw **MMS5525A2**.

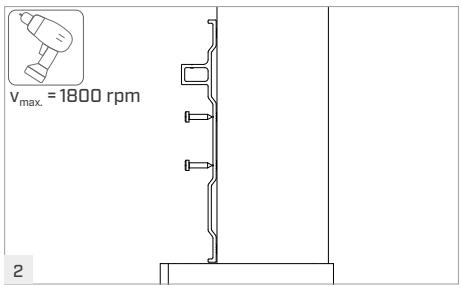


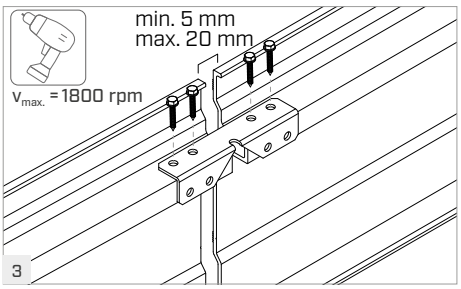
Ensure a maximum distance of **300 mm** from the wall. Drill the wall with a Ø10 mm bit and fasten the end element with an M10 anchor (AB110115), or on timber using VGS Ø9 (VGS9100 + HUS8).

INSTALLATION

BORTB

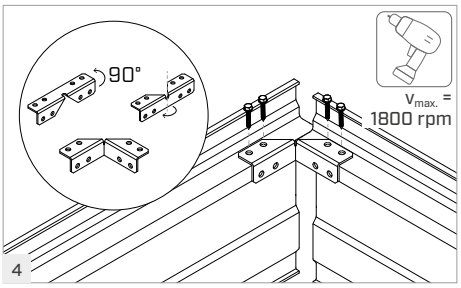


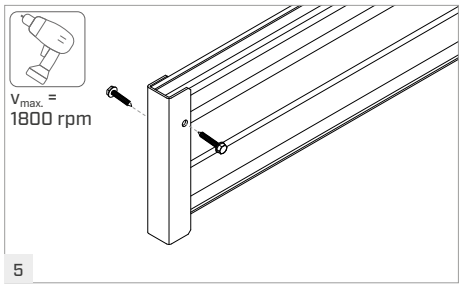




The **BORTB** toe board must always be positioned front-on, towards the inner side, with the bottom support in contact with the **BORBASEV/VD** base. Once positioned, fasten the 5.5x25mm screws near the two channels.

Join the ends of **BORTB** with the **BORTBJUN** connector. Fasten with 4 screws **MMS5525A2**, leaving at least 5 mm between boards to prevent thermal deformation.

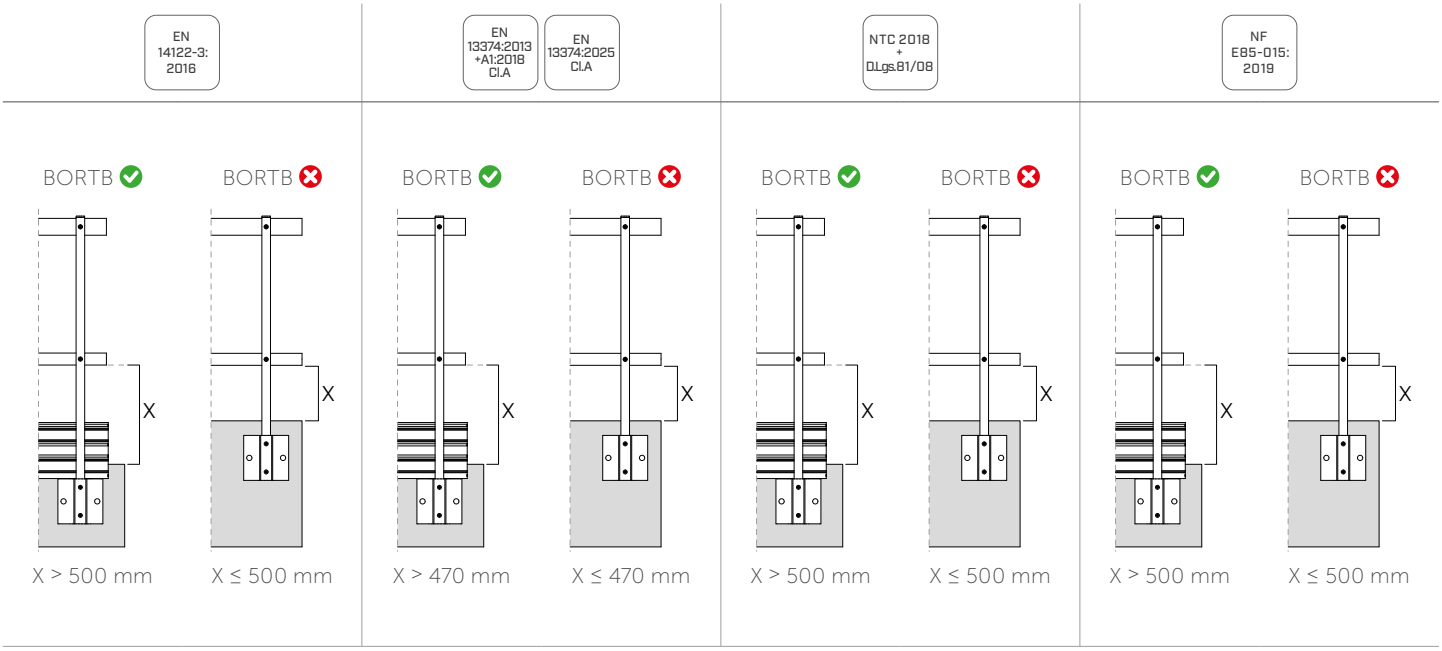




At the corners, manually rotate and bend the **BORTBJUN** connector until the desired angle is achieved. Fasten with 4 self-tapping screws **MMS5525A2**.

Fasten the toe board end caps with 2 self-tapping screws **MMS5525A2**

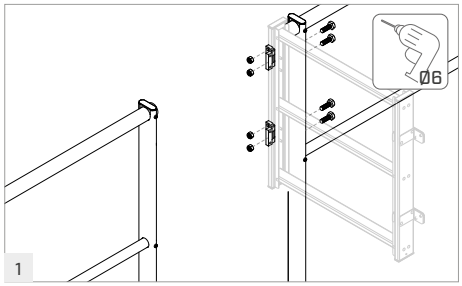
BORTB USE SPECIFICATIONS



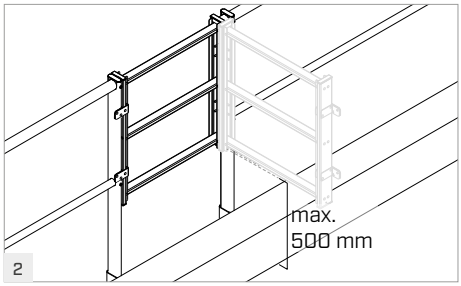
INSTALLATION

BORGATE600

EN 14122-3: 2016



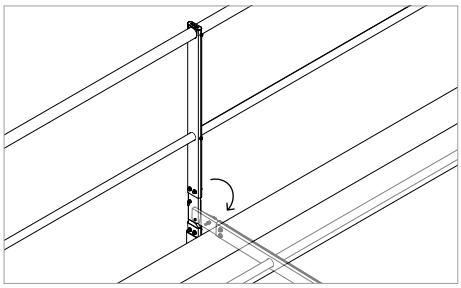
Fasten the 2 hinges to the gate using 4 **Ø6x35 ISO 4762** screws and their respective **M6 self-locking nuts** supplied with the gate.



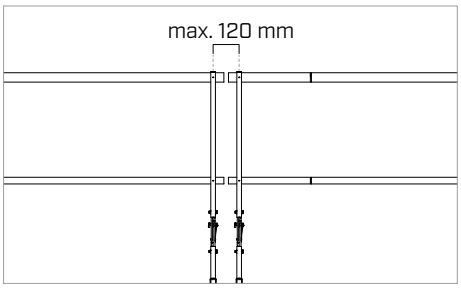
Check that the gate is installed at a maximum height of **500 mm** above the walking surface, keeping it in the closed position.

BORUP100F - BORUP110F

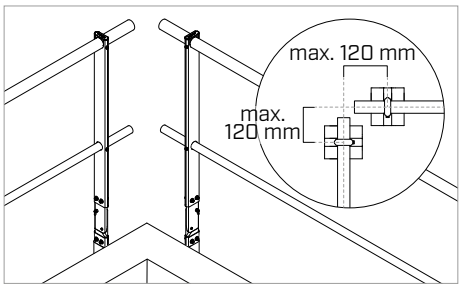
EN 14122-3: 2016 | NTC 2018 + D.Lgs.81/08 | NF E85-015: 2019



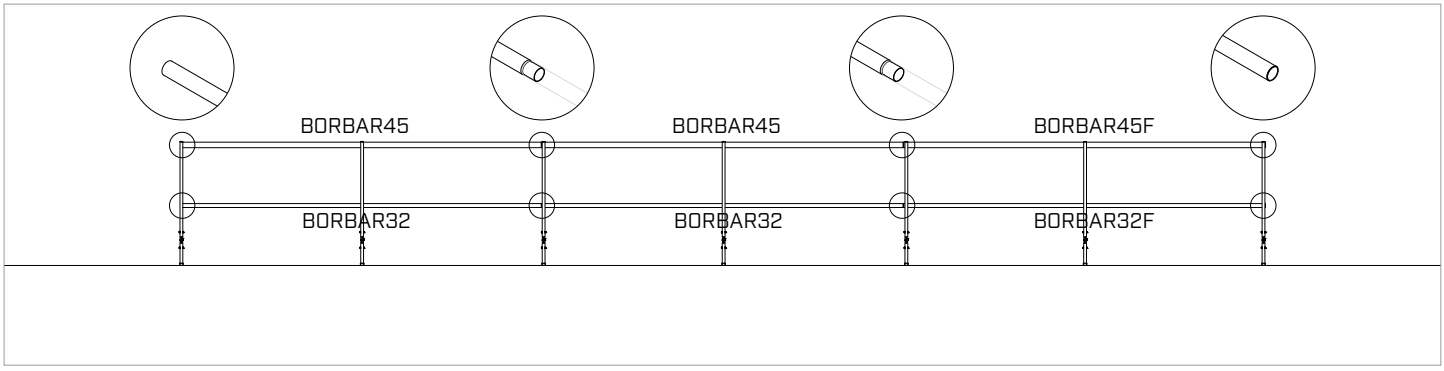
Install the **BORDER V / BORDER VD** folding railings on the joint side (not the hinge side), ensuring the upright folds towards the roof, never outwards.



The **BORDER V / BORDER VD** folding railings are installed in modules of 9 m (7 uprights), 12 m (9 uprights), 15 m (11 uprights) or 18 m (13 uprights). Install the two end uprights with a maximum spacing of **120 mm**, as shown.



The corners of the folding railings must not be connected to allow folding in either direction. The distance between two end uprights must never exceed **120 mm** from the edge.



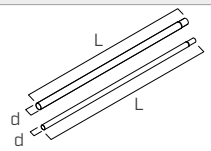
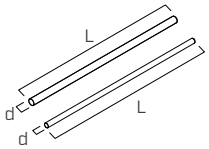
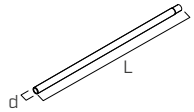
The main rails to be used are the **BORBAR45** and the **BORBAR32**; regardless, each module must end with the specific **BORBAR45F** and **BORBAR32F** rail with no reduction.

AVVERTENZE GENERALI PER L'USO

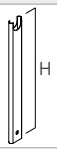
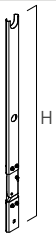
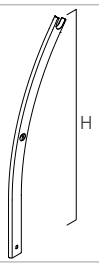
- Prima di procedere con il ribaltamento del parapetto, è obbligatorio assicurarsi che l'operatore sia posto in condizioni di sicurezza. L'utente deve essere ancorato a un dispositivo anticaduta, come una linea vita **PATROL** o un punto di ancoraggio **KITE**. Inoltre, è necessario verificare che tutti gli strumenti e le attrezzature siano in buone condizioni di funzionamento e che l'area di installazione sia libera da ostacoli.
- I moduli (9 m, 12 m, 15 m, 18 m) devono essere sempre maneggiati da due operatori per consentire il corretto ribaltamento.

CODES AND DIMENSIONS

RAILS

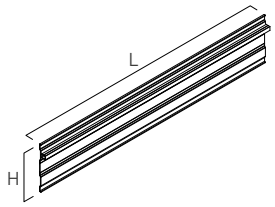
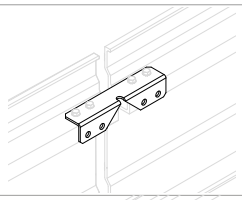
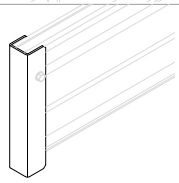
CODE		d [mm]	L [mm]	
BORBAR45	EN AW 6063-T6	45	3000	
BORBAR32		32	3000	
BORBAR45F		45	3000	
BORBAR32F		32	3000	
BORBAR45R		45	3000	

UPRIGHTS

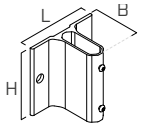
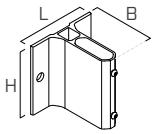
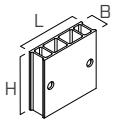
CODE		H [mm]	
BORUP530WH	EN AW 6005A-T6	535	
BORUP760WH		765	
BORUP100		1005	
BORUP110		1105	
BORUP118		1185	
BORUP130		1305	
BORUP100F		1005	
BORUP110F		1105	
BORUP113C		1120	
BORUP100R		1005	
BORUP110R		1105	
BORUP100AS		1005	
BORUP107US		1075	

CODES AND DIMENSIONS

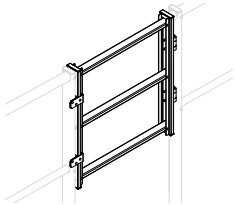
TOE BOARD

CODE		H [mm]	L [mm]	
BORTB	EN AW 6063-T6	150	3000	
BORTBJUN	EN AW 5083 H111	-	-	
BORTBCAP	EN AW 5083 H111	-	-	

BASES

CODE		B [mm]	H [mm]	L [mm]	
BORBASEV		80	120	120	
BORBASEVD	EN AW 6005A-T6	107	120	120	
BORDIST		35	120	120	

SAFETY GATE

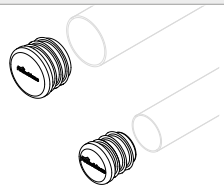
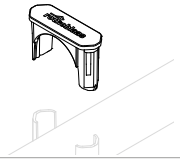
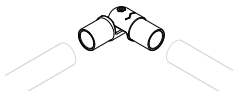
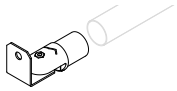
CODE		L [mm]	H [mm]	
BORGATE600	EN AW 5083 H111	600	640	

CODES AND DIMENSIONS

FASTENERS

CODE		d [mm]	H [mm]	
MMS5525A2	1.4301 AISI304 INOX	5,5	25	

ACCESSORIES

CODE		
BORCAP45	LDPE	
BORCAP32		
BORCAP	PP RECYCLED	
BORCOR		
BORWALL	PP RECYCLED; 1.4301 AISI304 INOX	

NORMAS DE SEGURIDAD, INSTRUCCIONES DE USO E INSTALACIÓN

INTRODUCCIÓN

DEFINICIÓN

La baranda de fijación vertical **BORDER V / BORDER VD** es un sistema de protección colectiva anticaída, ideal para garantizar la seguridad en las cubiertas, realizada en aleación de aluminio (**EN AW 6005A-T6 y EN AW 6063-T6**).

NORMAS

La baranda de fijación vertical **BORDER V / BORDER VD** es conforme a las siguientes normas:

- **EN 14122-3:2016**
- **EN 13374:2025 Cl. A (salvo punto 9)**
- **EN 13374:2013+A1:2018 Cl. A (salvo punto 9)**
- **NTC (Tabla 3.1.II - cat. A, B, C1, E1, F, G y H) y D. Leg. 81/08 (Italia)**
- **NF E 85-015:2019 (Francia)**

En la siguiente tabla se indican los principales parámetros geométricos previstos por las normativas de referencia:

	EN 14122-3: 2016	EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl.A	NTC 2018	D. Leg. 81/08	NF E85-015: 2019
Altura mínima desde la superficie de pisoteo	1,1 m	1 m	1 m	1 m	1 - 1,1 m
Intereje máximo entre barras	500 mm	470 mm	-	500 mm	500 mm
Intereje máximo entre montantes	1,5 m (recomendado)	-	-	-	1,5 m (recomendado)
Altura mínima del rodapié	10 cm	15 cm	-	15 cm	10 cm

USO - MANTENIMIENTO

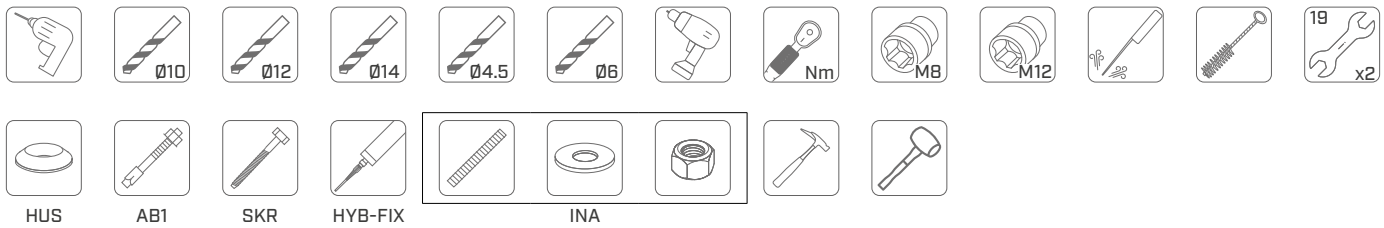
La baranda **BORDER** debe ser instalada por personal cualificado, respetando las normativas vigentes relativas a los trabajos en altura.
Antes del uso, el operario debe garantizar su propia seguridad utilizando una línea de vida temporal, equipos de protección individual y una plataforma de trabajo adecuada.

- Antes de empezar a usar la baranda **BORDER**, el usuario debe inspeccionarla visualmente para asegurarse de que no presente anomalías, daños o deformaciones (golpes, dobleces, etc.).
- La baranda **BORDER** no requiere intervenciones de mantenimiento específicas. Sin embargo, es necesario que, al menos una vez al año, personal cualificado realice un control visual.
- Si la baranda **BORDER** no está bien instalada, está dañada o se ha utilizado para detener una caída, se debe dejar de usar de inmediato. No se puede volver a utilizarla hasta que un técnico cualificado haya realizado las debidas inspecciones y comprobaciones y haya autorizado su uso por escrito.
- Si el producto se revende fuera del país de destino, para garantizar la seguridad del usuario es esencial que el distribuidor suministre el manual de instrucciones en el idioma del país donde vaya a usarse el producto. Si se solicita, estos documentos los puede proporcionar el fabricante.
- La baranda **BORDER** es un equipo de protección colectiva permanente, destinado exclusivamente a profesionales que trabajen en cubiertas no accesibles al público.
- Si se instala en ambientes industriales contaminados, petroquímicos, navales o costeros, la baranda **BORDER** debe someterse a un tratamiento superficial adecuado, como pintado con pintura en polvo o anodizado.
- Si se proporciona un esquema de montaje, se debe utilizar como referencia durante la instalación.

ALMACENAMIENTO

Los componentes de aluminio bruto se empaquetan en contacto entre sí. Si el paquete cerrado queda expuesto a la lluvia, es posible que los componentes se oxiden y, por lo tanto, se formen manchas superficiales. Estas manchas no afectan la calidad del aluminio, pero pueden perjudicar el aspecto estético de la baranda. Se aconseja desembalar los productos y mantener los componentes separados, sin contacto entre sí, o bien guardar los componentes empaquetados en un lugar seco.

HERRAMIENTAS

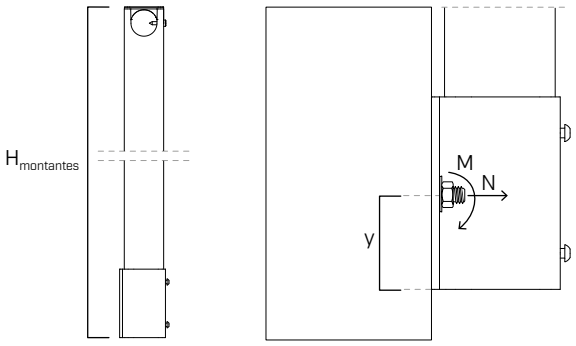


PRINCIPALES FUERZAS QUE ACTÚAN EN EL ANCLAJE

En el perno más solicitado, actúa la combinación de las siguientes fuerzas y momentos:

$$M = F \cdot (H-y)$$

$$N = F_t = \frac{M \cdot y_i}{\Sigma n_i y_i^2} + \frac{F}{2}$$



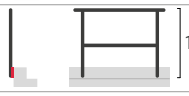
Los valores resultantes que actúan en cada fijación se definen de la siguiente manera:

$H_{montantes}$ [m]	EN 14122-3: 2016		EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl.A		NTC 2018 + D.Leg. 81/08		NF E85-015: 2019	
	M [Nm]	N [N]	M [Nm]	N [N]	M [Nm]	N [N]	M [Nm]	N [N]
0,76	551	4988	998	9025	1733	15675	689	6234
1	740	6563	1340	11875	2327	20625	925	8203
1,1	819	7219	1482	13063	2574	22688	1024	9023
1,18	882	7744	-	-	2772	24338	1103	9680
1,3	977	8531	-	-	3069	26813	1221	10664

ESPECIFICACIONES DE INSTALACIÓN

INTEREJES ADMISIBLES

Tabla 1

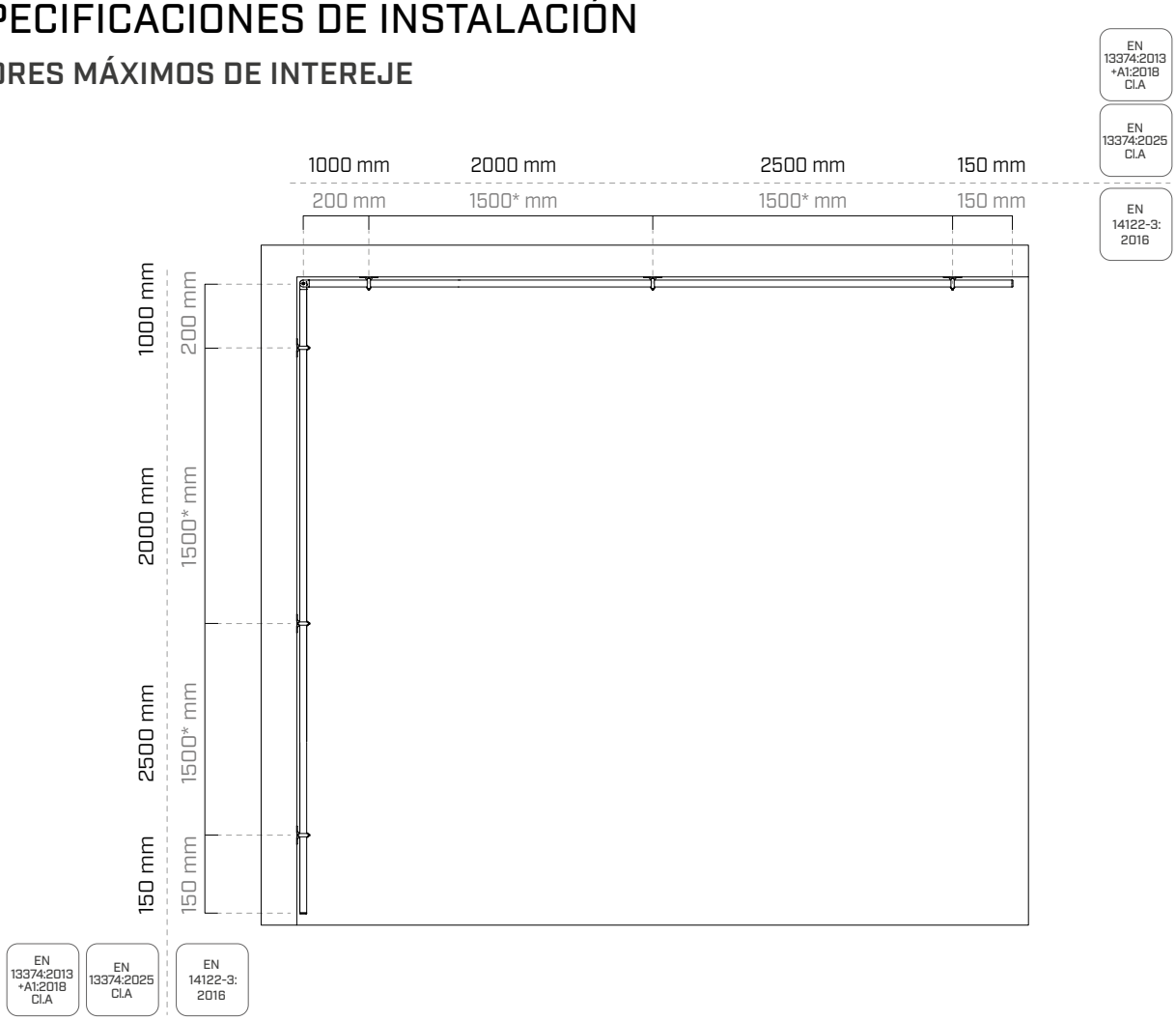
larguero	$H_{montantes}$	EN 14122-3: 2016	EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl.A	NTC 2018 + D.Leg. 81/08	NF E85-015: 2019
		intereje para montantes [cm]			
recto	76 cm	150	250**	150	150
	118 cm	150	-	150	150
	 130 cm	150	-	150	150
recto + abatible*	100 cm	150	250	150	150
	110 cm	150	250	150	150
curvado	110 cm	150	250	150	150

*El sistema abatible todavía no está disponible

**Sistema instalable solo en muretes perimetrales de $h_{min.} \geq 250$ mm

ESPECIFICACIONES DE INSTALACIÓN

VALORES MÁXIMOS DE INTEREJE

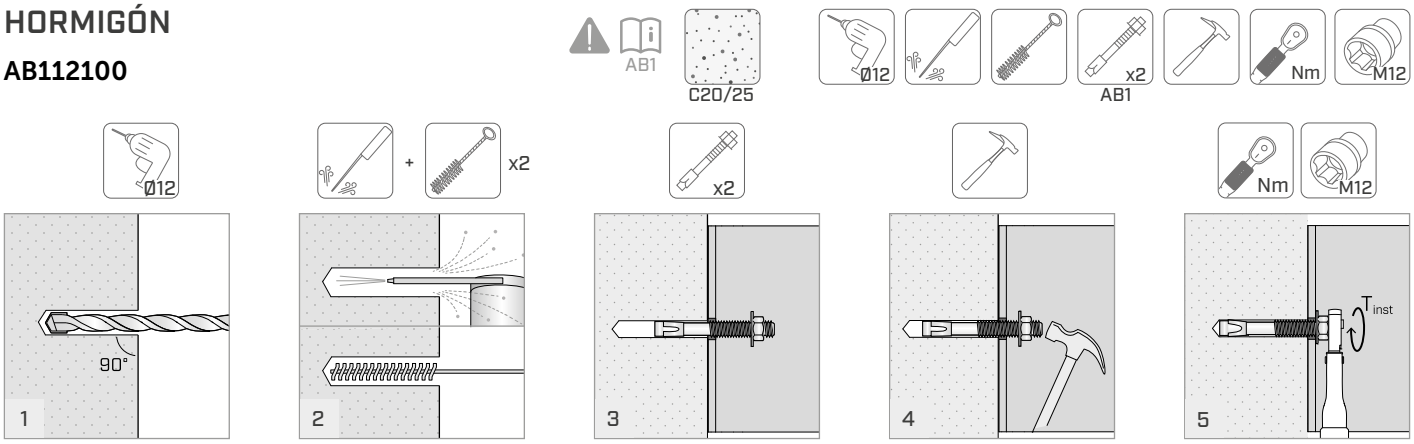


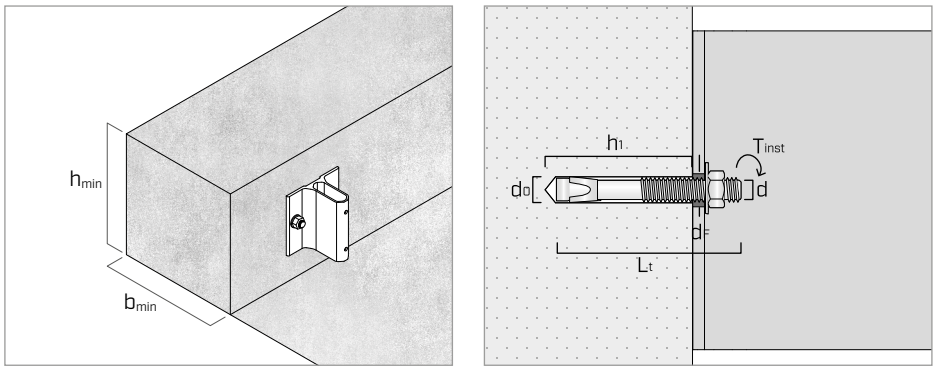
*Intereje máximo variable según la normativa y la altura del montante (véase tabla 1).

INSTALACIÓN DE BASE V - BASE VD

HORMIGÓN

AB112100



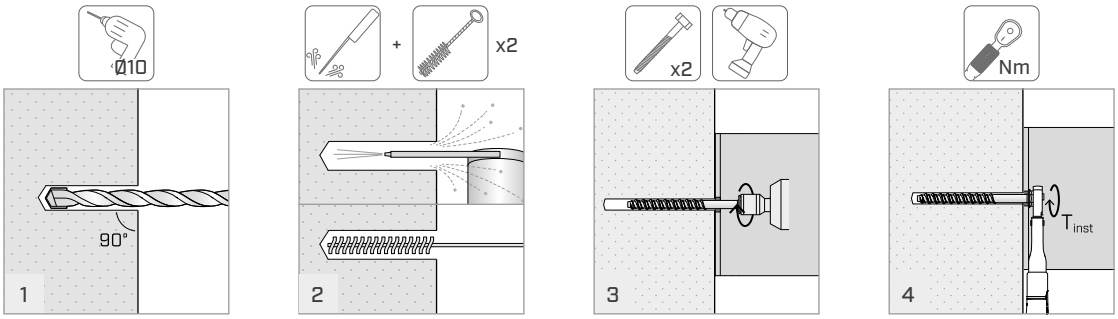


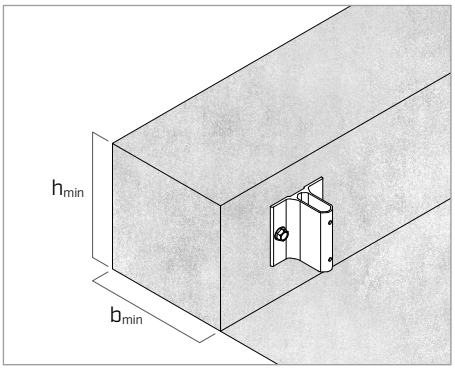
b_{min}	=	140	mm	
h_{min}	=	140	mm	
T_{inst}	=	60	Nm	
h_1	=	85	mm	
d	=	d_0 =	12	mm
d_F	=	14	mm	
L_t	=	100	mm	

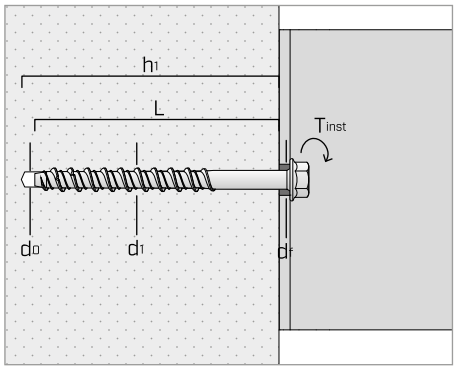
INSTALACIÓN DE BASE V - BASE VD

HORMIGÓN

SKR1290



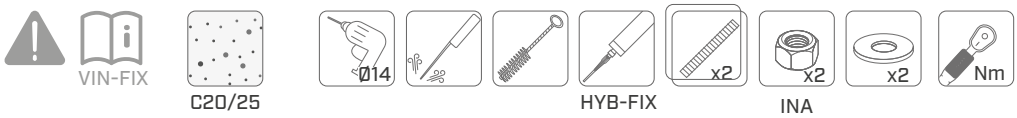


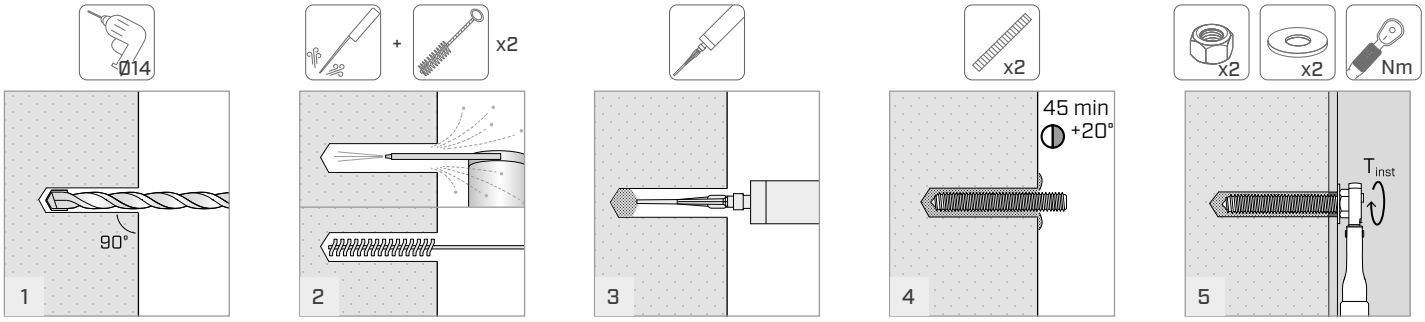


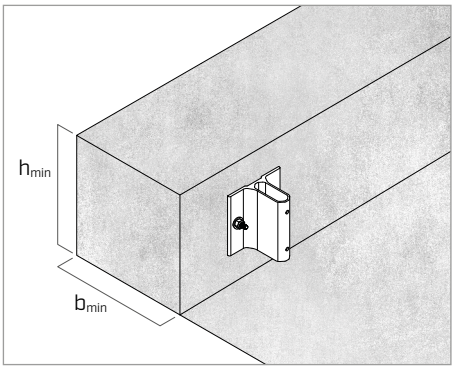
b_{min}	=	120	mm
h_{min}	=	120	mm
T_{inst}	=	80	Nm
h_1	=	100	mm
d_1	=	12	mm
d_0	=	10	mm
d_F	=	14	mm
L	=	90	mm

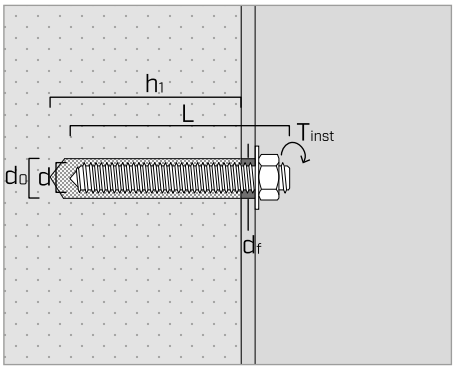
HORMIGÓN

HYB-FIX + INA8812140



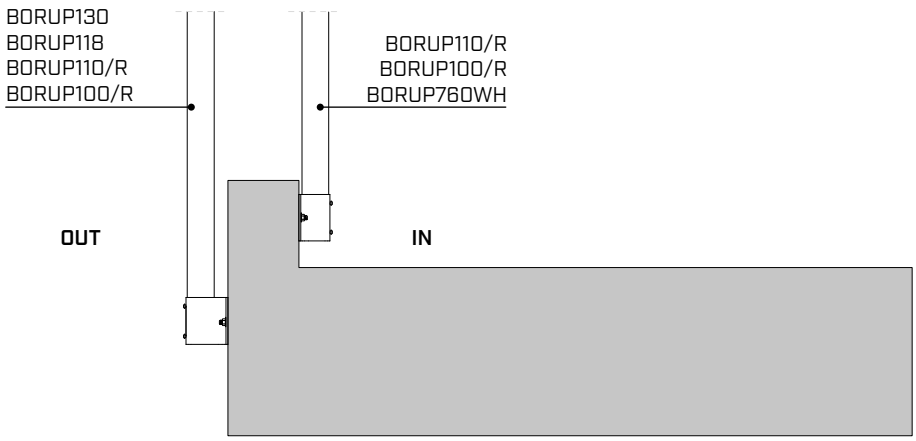


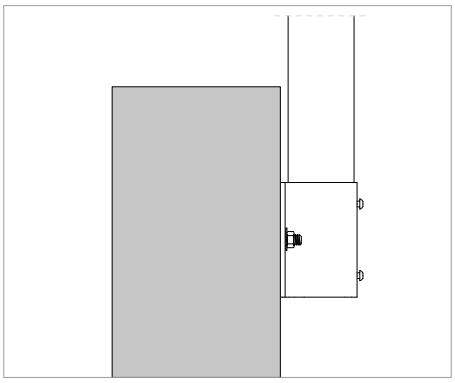




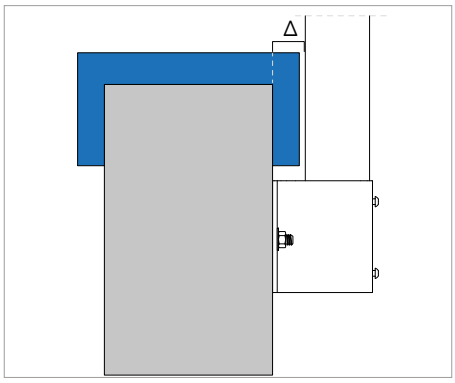
b_{min}	=	160	mm
h_{min}	=	140	mm
T_{inst}	=	40	Nm
h_1	=	140	mm
d	=	12	mm
d_0	=	14	mm
d_F	=	14	mm
L	=	140	mm

APLICACIONES DE LA BARANDA BORDER V / BORDER VD



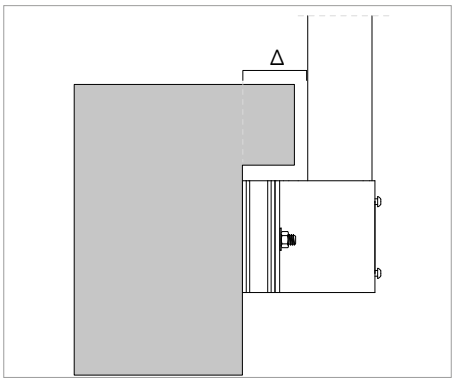


BORBASEV



BORBASEVD

Δ = 35 mm



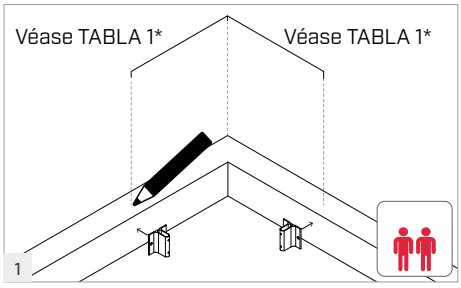
BORBASEVD + BORDIST

Δ = 70 mm

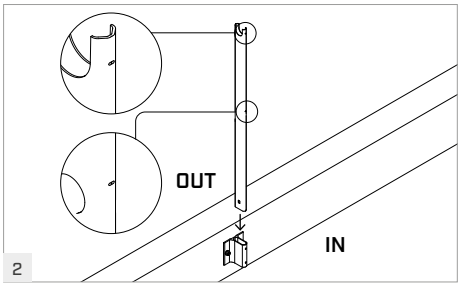
(con AB112150)

INSTALACIÓN

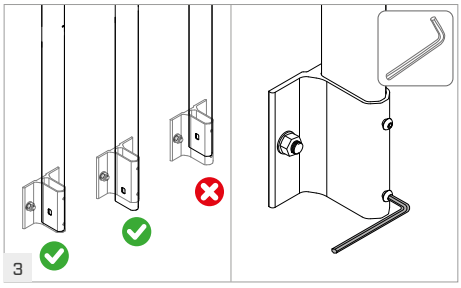
BORDER V / BORDER VD



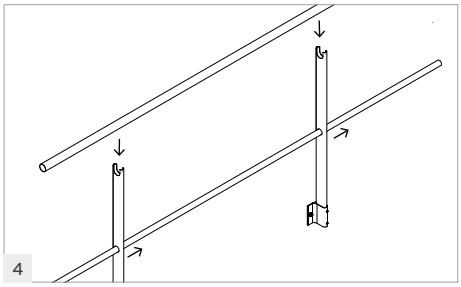
Se requiere la presencia de al menos dos operarios cualificados. Para garantizar un buen resultado, se recomienda empezar por una esquina. Instalar las bases V-VD (véanse págs. 4-5).



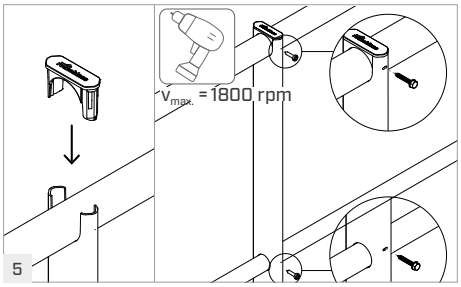
Introducir los montantes en las bases **BORBASEV/BORBASEVD** con las marcas orientadas hacia el operario.



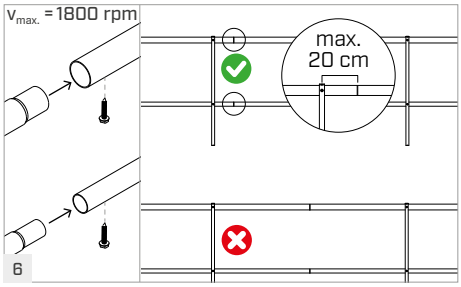
Ajustar el montante de manera que el extremo no entre en la base y quede alineado con el borde inferior. Fijarlo con dos tornillos M6x6.



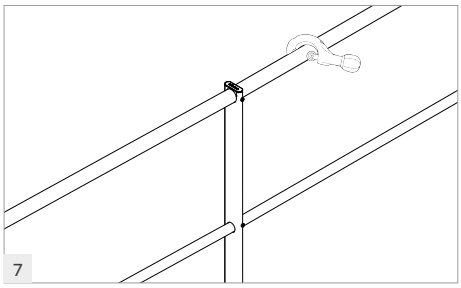
Introducir la barra intermedia **BORBAR32** y, luego, el pasamanos **BORBAR45.** Según la norma EN 13374, es necesario instalar los pasamanos reforzados **BORBAR45R.**



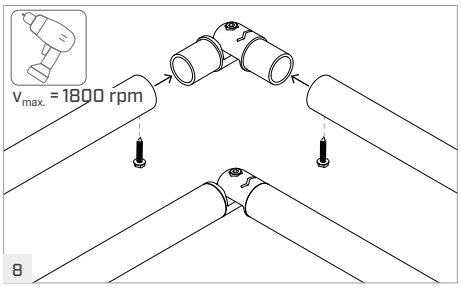
Introducir el tapón **BORCAP** en el extremo superior del montante. Fijar las barras a los montantes con los tornillos **MMS5525A2** en correspondencia de las dos marcas laterales.



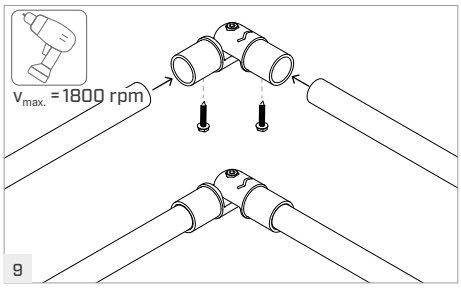
Conectar los extremos macho/hembra de los pasamanos y de las barras y fijarlos con los tornillos **MMS5525A2**. Según la norma EN 14122, la conexión del pasamanos debe quedar a no más de 20 cm del montante más cercano. Colocar los tornillos debajo de las barras.



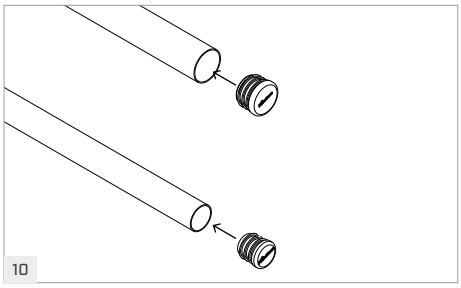
Adaptar la última sección de la baranda, cortando la parte sobrante de las barras con un cortador de tubos.



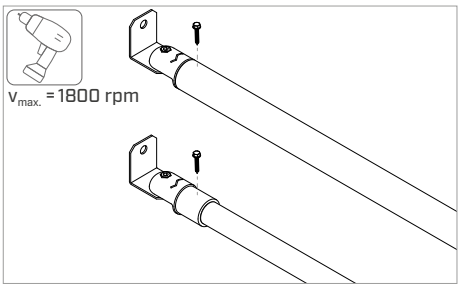
Introducir la articulación angular **BORCOR** en el pasamanos y fijarla con los tornillos autorroscantes **MMS5525A2**.



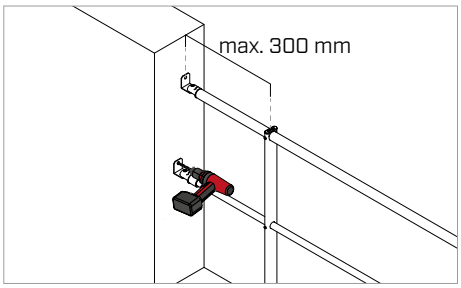
Introducir la articulación angular **BORCOR** en la barra intermedia y fijarla con los tornillos autorroscantes **MMS5525A2**.



Poner los tapones **BORCAP45** y **BORCAP32** en los pasamanos y las barras intermedias.



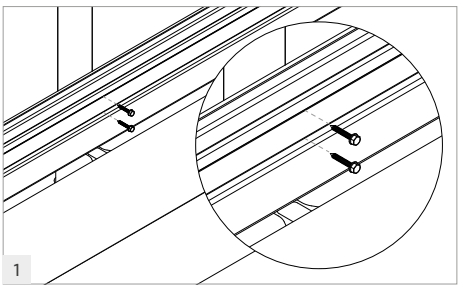
Introducir el pasamanos y la barra intermedia en el elemento terminal de pared **BORWALL** y fijarlos con los tornillos autorroscantes **MMS5525A2**.

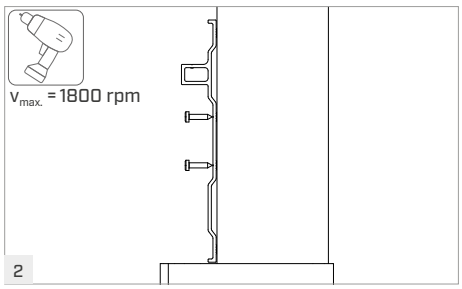


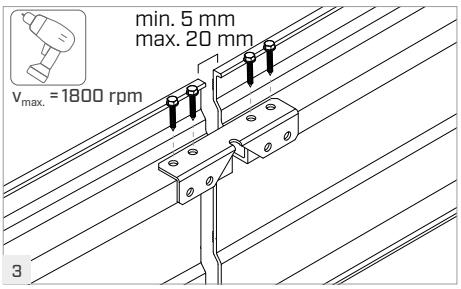
Respetar la distancia máxima de **300 mm** desde la pared. Taladrar la pared con una broca Ø10 mm y fijar el elemento terminal con un taco M10 (AB110115) o, en caso de madera, con VGS Ø9 (VGS9100 + HUS8).

INSTALACIÓN

BORTB

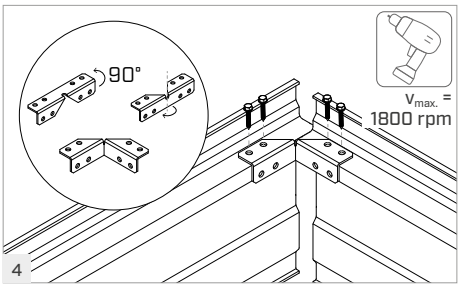


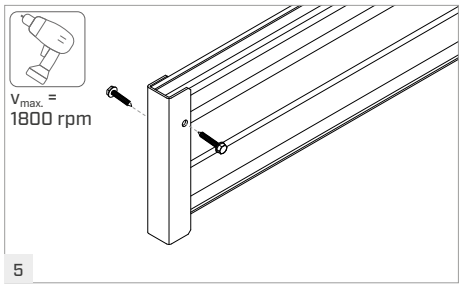




El rodapié **BORTB** se debe colocar siempre frontalmente, hacia el lado interior, con el apoyo inferior tocando el de la base **BORBASEV/VD**. Una vez colocado, fijarlo con tornillos 5,5x25mm cerca de las dos ranuras.

Unir los extremos de **BORTB** con el conector **BORTBJUN**. Fijar con 4 tornillos **MMS5525A2**, dejando al menos 5 mm entre los rodapies para evitar deformaciones térmicas.

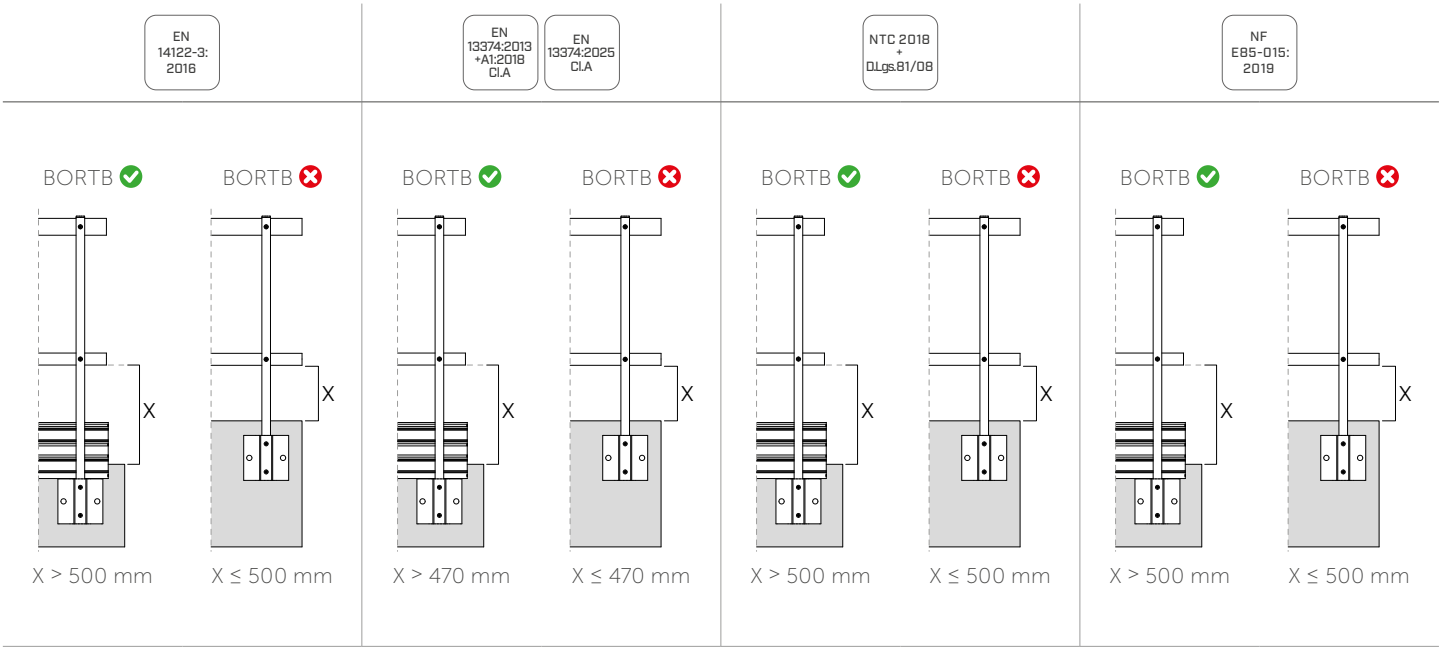




En las esquinas, girar y doblar manualmente el conector **BORTBJUN** hasta alcanzar el ángulo deseado. Fijarlo con 4 tornillos autorroscantes **MMS5525A2**.

Fijar los tapones terminales del rodapié con 2 tornillos autorroscantes **MMS5525A2**.

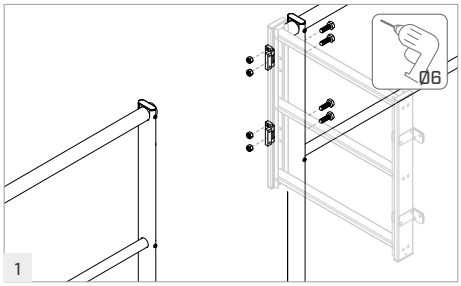
ESPECIFICACIONES DE USO DE BORTB

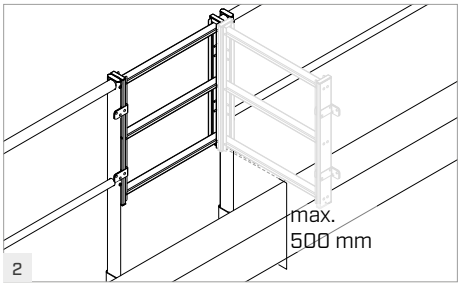


INSTALACIÓN

BORGATE600

EN 14122-3: 2016



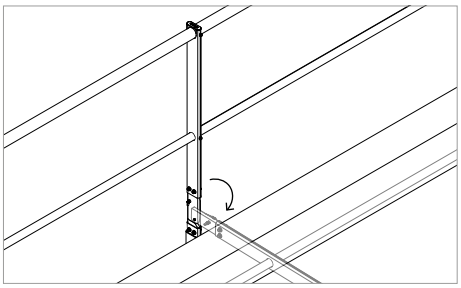


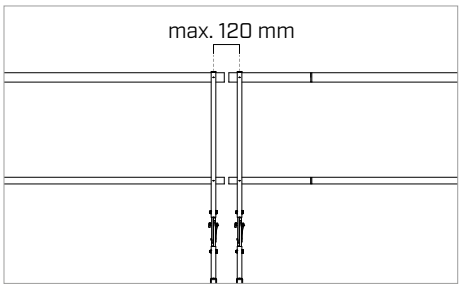
Fijar las 2 bisagras en el lado de la cancela con los 4 tornillos **Ø6x35 ISO 4762** y las correspondientes **tuercas autoblocantes M6** suministradas con la cancela.

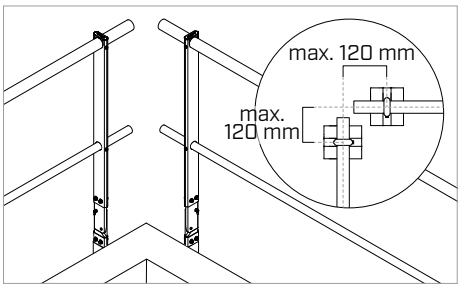
Asegurarse de que la cancela esté instalada a una altura máxima de **500 mm** de la superficie de pisoteo, manteniéndola cerrada.

BORUP100F - BORUP110F

EN 14122-3: 2016 | NTC 2018 + D.Lgs.81/08 | NF E85-015: 2019



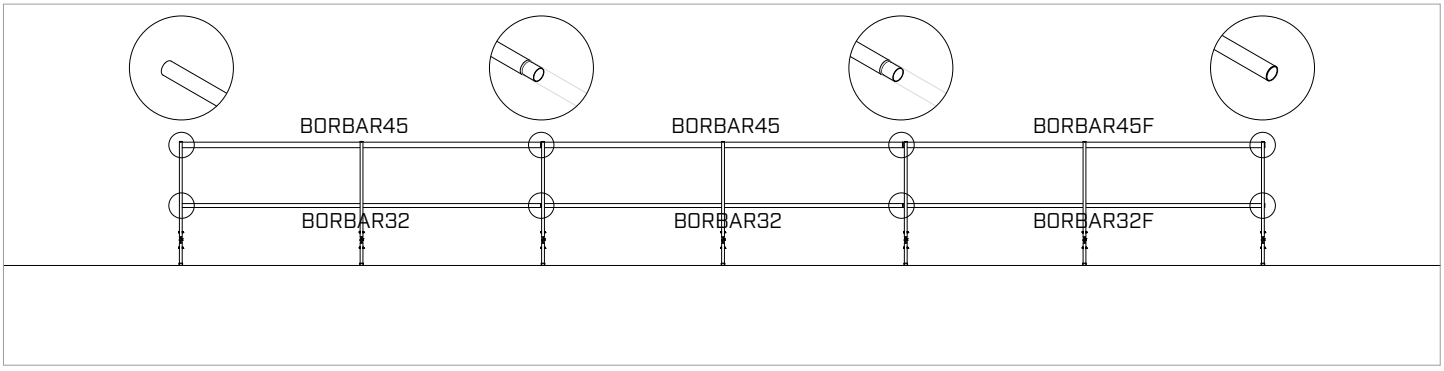




Instalar las barandas abatibles **BORDER V / BORDER VD** por el lado de la junta (no por el lado del perno), asegurándose de que el montante se incline hacia la cubierta, nunca hacia el exterior.

Las barandas abatibles **BORDER V / BORDER VD** se instalan en módulos de 9 m (7 montantes), 12 m (9 montantes), 15 m (11 montantes) o 18 m (13 montantes). Montar los dos montantes terminales con una distancia máxima de **120 mm** entre sí, tal como se ilustra en la figura.

Las esquinas de las barandas abatibles no deben estar unidas para poder abatirse en ambos sentidos. La distancia entre dos montantes terminales no debe ser superior a **120 mm** desde el borde.



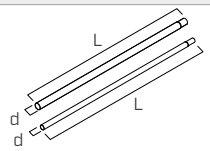
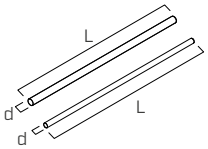
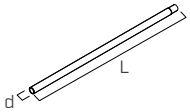
Las barras principales que se deben usar son la **BORBAR45** y la **BORBAR32**; sin embargo, cada módulo debe terminar con la barra específica sin reducción **BORBAR45F** y **BORBAR32F**.

AVVERTENZE GENERALI PER L'USO

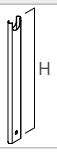
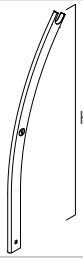
- Prima di procedere con il ribaltamento del parapetto, è obbligatorio assicurarsi che l'operatore sia posto in condizioni di sicurezza. L'utente deve essere ancorato a un dispositivo anticaduta, come una linea vita **PATROL** o un punto di ancoraggio **KITE**. Inoltre, è necessario verificare che tutti gli strumenti e le attrezzature siano in buone condizioni di funzionamento e che l'area di installazione sia libera da ostacoli.
- I moduli (9 m, 12 m, 15 m, 18 m) devono essere sempre maneggiati da due operatori per consentire il corretto ribaltamento.

CÓDIGOS Y DIMENSIONES

LARGUEROS

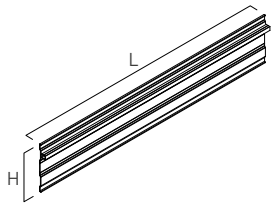
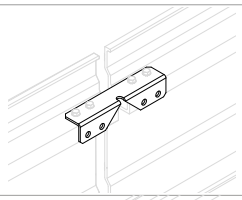
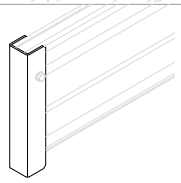
CÓDIGO		d [mm]	L [mm]	
BORBAR45		45	3000	
BORBAR32		32	3000	
BORBAR45F	EN AW 6063-T6	45	3000	
BORBAR32F		32	3000	
BORBAR45R		45	3000	

MONTANTES

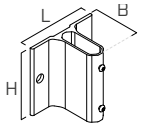
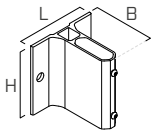
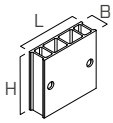
CÓDIGO		H [mm]	
BORUP530WH		535	
BORUP760WH		765	
BORUP100		1005	
BORUP110		1105	
BORUP118		1185	
BORUP130		1305	
BORUP100F		1005	
BORUP110F	EN AW 6005A-T6	1105	
BORUP113C		1120	
BORUP100R		1005	
BORUP110R		1105	
BORUP100AS		1005	
BORUP107US		1075	

CÓDIGOS Y DIMENSIONES

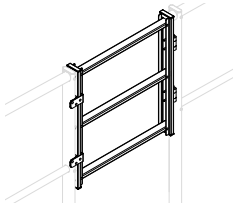
RODAPIÉ

CÓDIGO		H [mm]	L [mm]	
BORTB	EN AW 6063-T6	150	3000	
BORTBJUN	EN AW 5083 H111	-	-	
BORTBCAP	EN AW 5083 H111	-	-	

BASES

CÓDIGO		B [mm]	H [mm]	L [mm]	
BORBASEV		80	120	120	
BORBASEVD	EN AW 6005A-T6	107	120	120	
BORDIST		35	120	120	

CANCELA DE SEGURIDAD

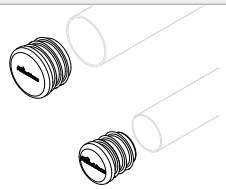
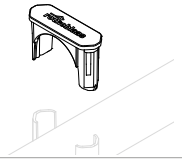
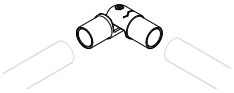
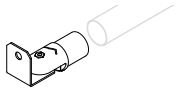
CÓDIGO		L [mm]	H [mm]	
BORGATE600	EN AW 5083 H111	600	640	

CÓDIGOS Y DIMENSIONES

FIJACIONES

CÓDIGO		d [mm]	H [mm]	
MMS5525A2	1.4301 AISI304 INOX	5,5	25	

ACCESORIOS

CÓDIGO		
BORCAP45	LDPE	
BORCAP32		
BORCAP	PP RECYCLED	
BORCOR		
BORWALL	PP RECYCLED / 1.4301 AISI304 INOX	

CONSIGNES DE SÉCURITÉ, MODE D'EMPLOI ET INSTALLATION

INTRODUCTION

DÉFINITION

Le garde-corps à fixation verticale **BORDER V / BORDER VD** est un système de protection collective anti-chute, idéal pour la sécurité des toitures, réalisé en alliage d'aluminium (**EN AW 6005A-T6 et EN AW 6063-T6**).

NORMES

Le garde-corps à fixation verticale **BORDER V/ BORDER VD** est conforme aux normes suivantes :

- **EN 14122-3:2016**
- **EN 13374:2025 Cl. A (sauf le point 9)**
- **EN 13374:2013+A1:2018 Cl. A (sauf le point 9)**
- **NTC (Tab.3.1.II - cat. A,B,C1,E1,F,G,H) et D. Lgs 81/08 (Italie)**
- **NF E 85-015:2019 (France)**

Le tableau présente les principaux paramètres géométriques requis par les normes de référence :

	EN 14122-3: 2016	EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl. A	NTC 2018	Décret-loi 81/08	NF E85-015: 2019
Hauteur min. par rapport au niveau du sol	1,1 m	1 m	1 m	1 m	1 - 1,1 m
Entraxe max. entre les sous-lisses	500 mm	470 mm	-	500 mm	500 mm
Entraxe max. entre les montants	1,5 m (conseillé)	-	-	-	1,5 m (conseillé)
Hauteur min. plinthe garde-pieds	10 cm	15 cm	-	15 cm	10 cm

UTILISATION - ENTRETIEN

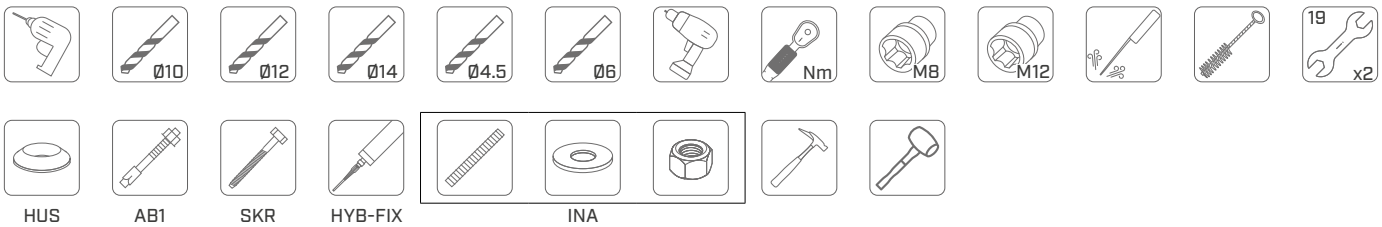
Le garde-corps **BORDER** doit être installé par du personnel qualifié, conformément aux réglementations en vigueur relatives aux travaux en hauteur. Avant l'utilisation, l'opérateur doit s'assurer de sa propre sécurité en utilisant une ligne de vie temporaire, des EPI et une plateforme de travail adaptée.

- Avant l'utilisation, l'utilisateur doit inspecter visuellement que le garde-corps **BORDER** ne présente pas d'anomalie, de dommage ou de déformation (impacts, pliures, etc.).
- Le garde-corps **BORDER** ne nécessite aucun entretien particulier. Toutefois, une inspection visuelle annuelle par un personnel qualifié est indispensable.
- Si le garde-corps **BORDER** est mal installé, endommagé ou a déjà permis d'arrêter une chute, son utilisation doit être immédiatement suspendue. Il ne doit pas être réutilisé avant qu'un technicien qualifié n'ait procédé à une inspection et à une vérification, en délivrant une autorisation écrite.
- Si le produit est revendu hors du pays de destination, il est essentiel, pour la sécurité de l'utilisateur que le revendeur fournisse le manuel d'instruction dans la langue du pays d'utilisation du produit. Les documents pourront être fournis sur demande en contactant le fabricant.
- Le garde-corps **BORDER** est un dispositif de protection collective permanent, destiné exclusivement aux professionnels travaillant sur des toitures non accessibles au public.
- Si le garde-corps **BORDER** est installé dans un milieu industriel pollué, pétrochimique, naval, ou en bord de mer, il devra nécessairement être soumis à un traitement de surface approprié comme le revêtement par poudre ou l'anodisation.
- Si un plan est fourni, il doit servir de référence lors de l'installation.

STOCKAGE

Les composants en aluminium brut sont conditionnés en contact les uns avec les autres. L'exposition de l'emballage fermé à la pluie peut favoriser l'oxydation des composants, avec la possibilité de formation de taches à la surface. Celles-ci ne compromettent pas la qualité de l'aluminium mais peuvent nuire à l'aspect esthétique du garde-corps. Il est conseillé de déballer le paquet et de conserver les composants séparés, en évitant le contact direct les uns avec les autres ou de conserver les paquets encore emballés dans un endroit sec.

ÉQUIPEMENT

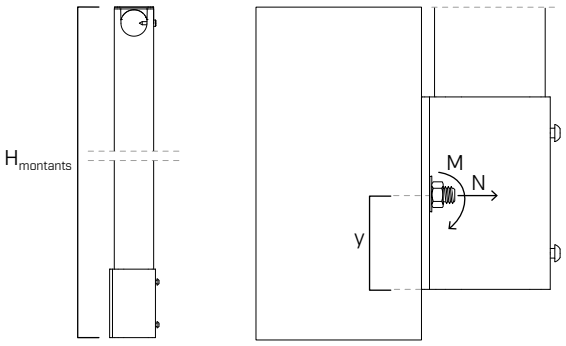


PRINCIPALES FORCES AGISSANT SUR L'ANCRAGE

La combinaison des forces et des moments résultants agit sur le boulon le plus sollicité :

$$M = F \cdot (H-y)$$

$$N = F_t = \frac{M \cdot y_i}{\Sigma n_i y_i^2} + \frac{F}{2}$$



Les valeurs résultantes agissant sur chaque fixation sont définies comme suit :

$H_{montants}$[m]	EN 14122-3: 2016		EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl. A		NTC 2018 + Décret-loi 81/08		NF E85-015: 2019	
	M [Nm]	N [N]	M [Nm]	N [N]	M [Nm]	N [N]	M [Nm]	N [N]
0,76	551	4988	998	9025	1733	15675	689	6234
1	740	6563	1340	11875	2327	20625	925	8203
1,1	819	7219	1482	13063	2574	22688	1024	9023
1,18	882	7744	-	-	2772	24338	1103	9680
1,3	977	8531	-	-	3069	26813	1221	10664

INDICATIONS D'INSTALLATION

ENTRAXES AUTORISÉS

Tableau 1

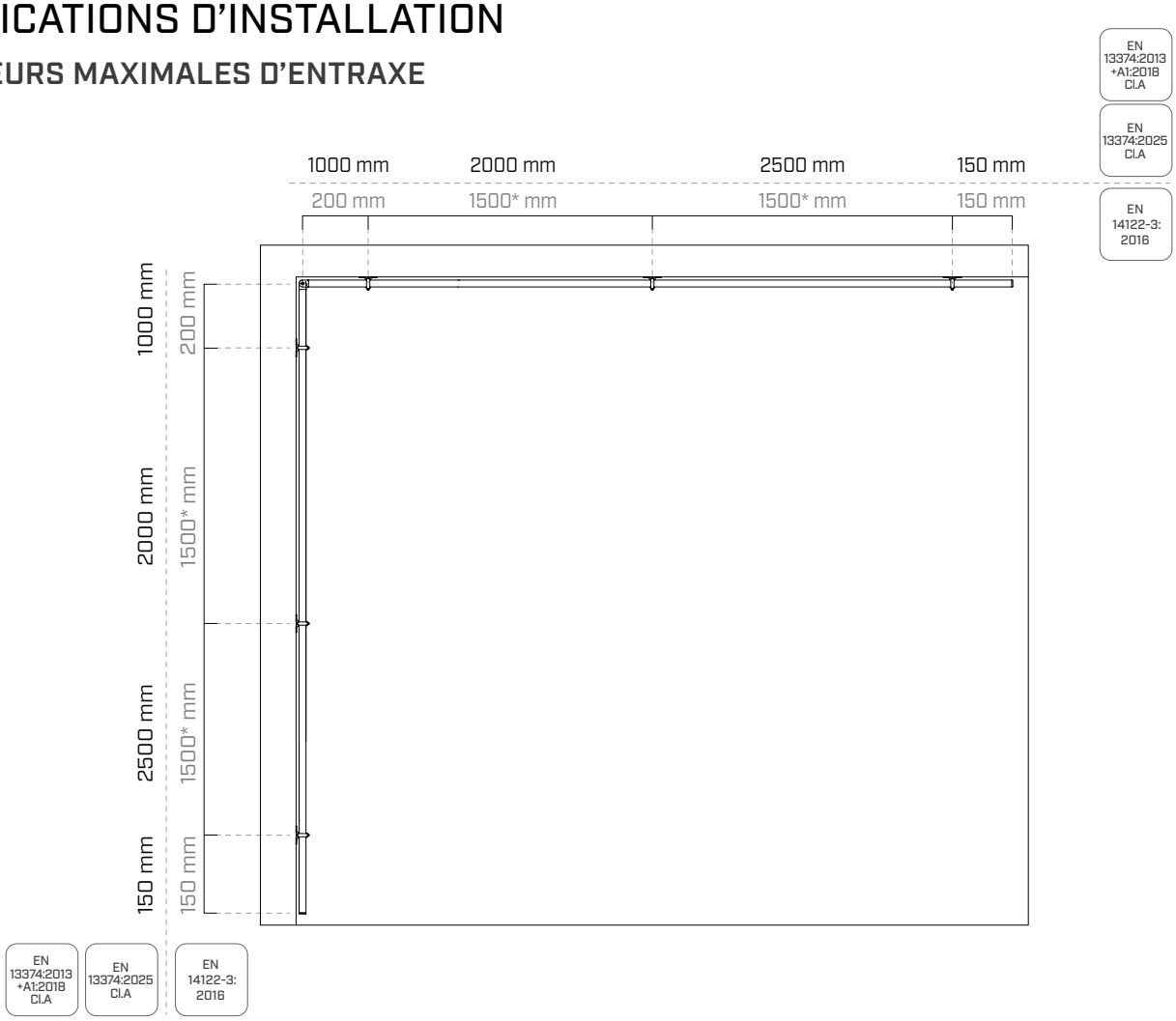
montant	$H_{montants}$	EN 14122-3: 2016	EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl. A	NTC 2018 + Décret-loi 81/08	NF E85-015: 2019
		entraxe pour montants [cm]			
droit	76 cm	150	250**	150	150
	118 cm	150	-	150	150
	130 cm	150	-	150	150
droit + rabattable*	100 cm	150	250	150	150
	110 cm	150	250	150	150
courbé	110 cm	150	250	150	150

*Le système rabattable n'est pas actuellement disponible

**système installable seulement sur un rebord d'une hauteur de $h_{min} \geq 250$ mm

INDICATIONS D'INSTALLATION

VALEURS MAXIMALES D'ENTRAXE

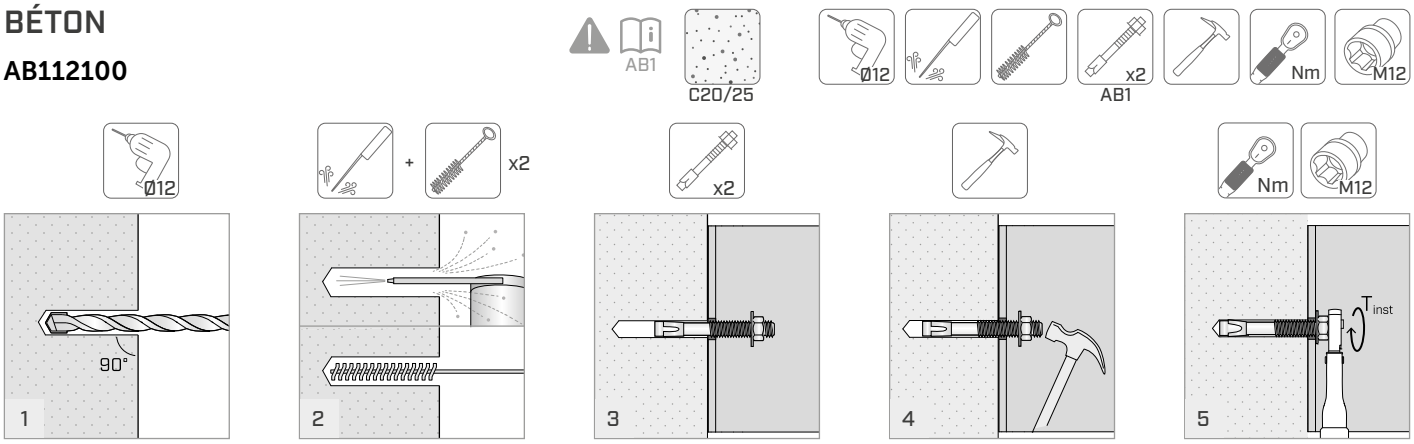


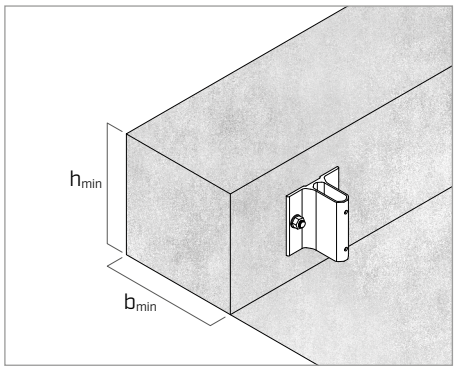
*Entraxe maximal variable selon la réglementation et la hauteur du montant (voir tableau 1).

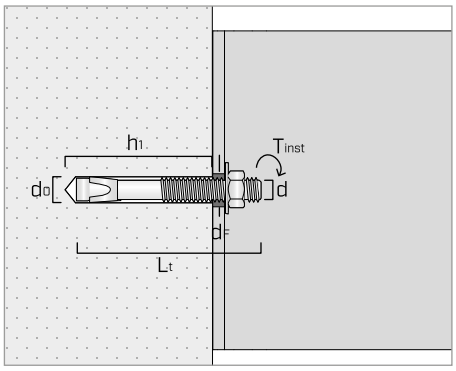
INSTALLATION BASE V - BASE VD

BÉTON

AB112100





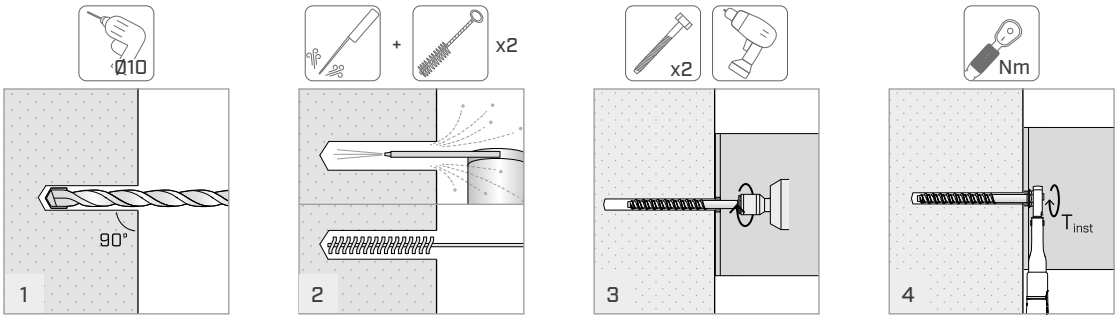


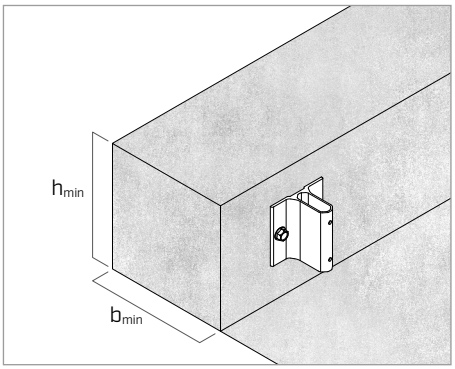
b_{min}	=	140	mm	
h_{min}	=	140	mm	
T_{inst}	=	60	Nm	
h_1	=	85	mm	
d	=	d_0 =	12	mm
d_F	=	14	mm	
L_t	=	100	mm	

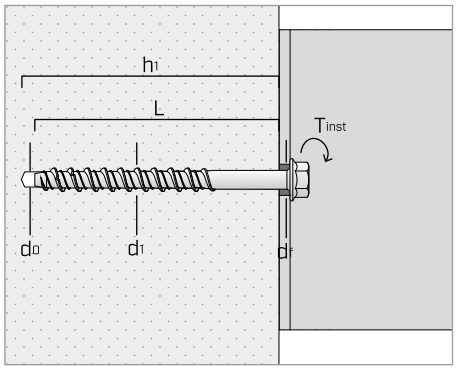
INSTALLATION BASE V - BASE VD

BÉTON

SKR1290



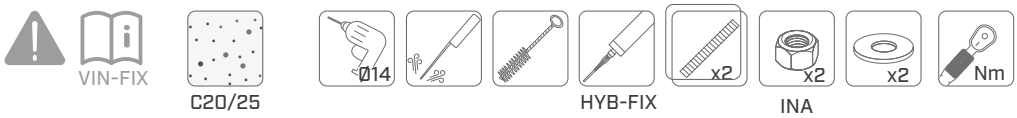


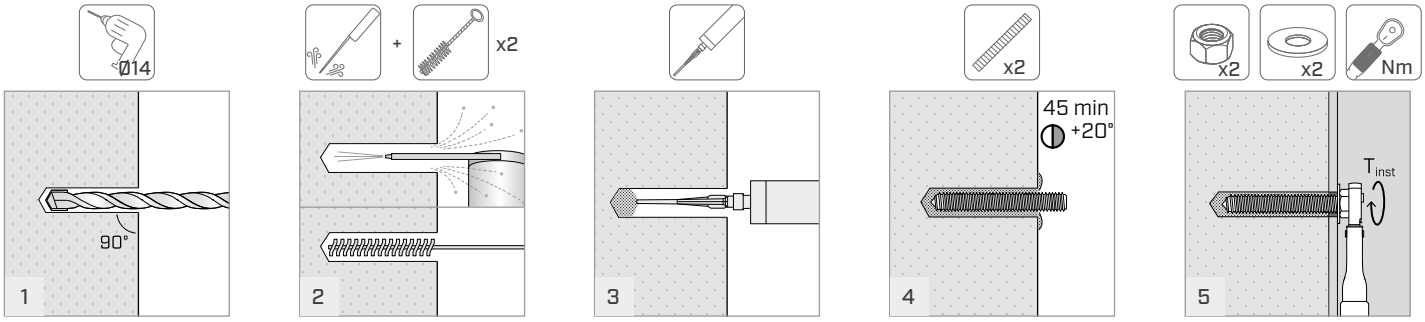


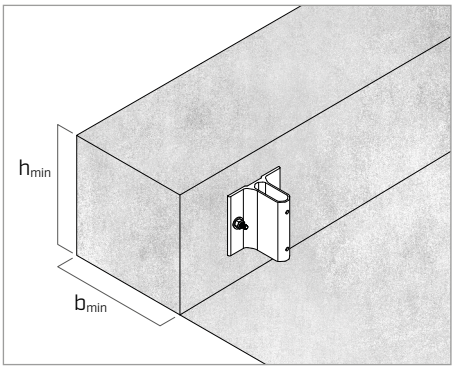
b_{min}	=	120	mm
h_{min}	=	120	mm
T_{inst}	=	80	Nm
h_1	=	100	mm
d_1	=	12	mm
d_0	=	10	mm
d_F	=	14	mm
L	=	90	mm

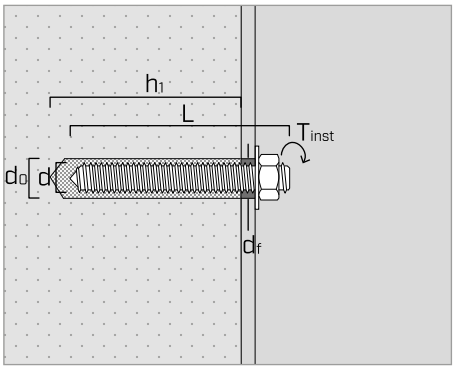
BÉTON

HYB-FIX + INA8812140



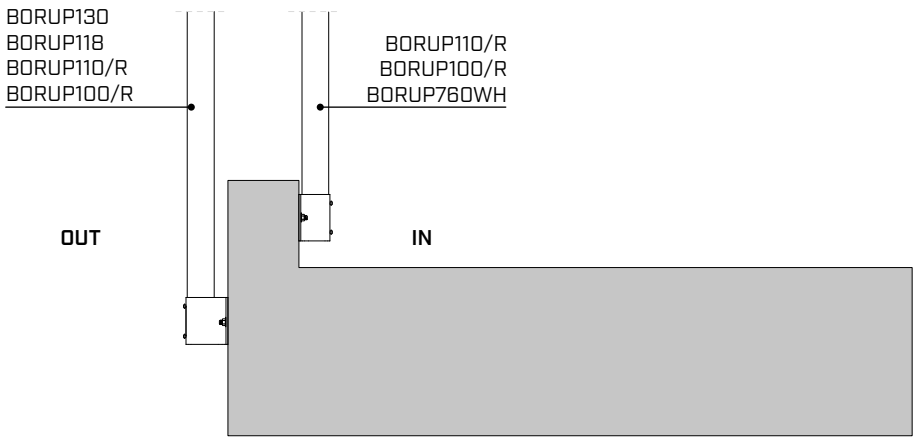


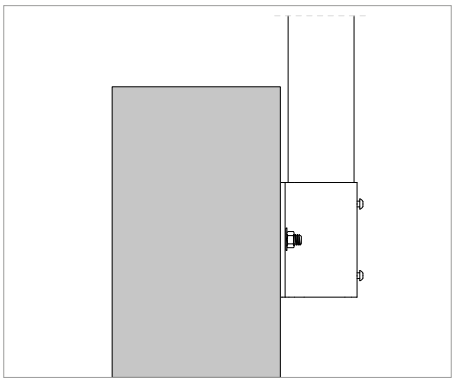




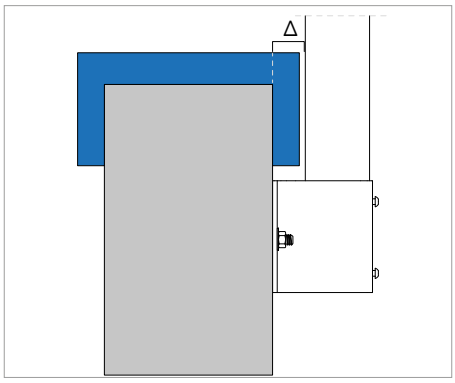
b_{min}	=	160	mm
h_{min}	=	140	mm
T_{inst}	=	40	Nm
h_1	=	140	mm
d	=	12	mm
d_0	=	14	mm
d_F	=	14	mm
L	=	140	mm

APPLICATIONS DU GARDE-CORPS BORDER V / BORDER VD



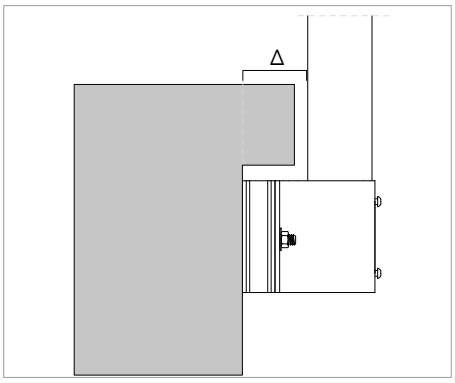


BORBASEV



BORBASEVD

Δ = 35 mm



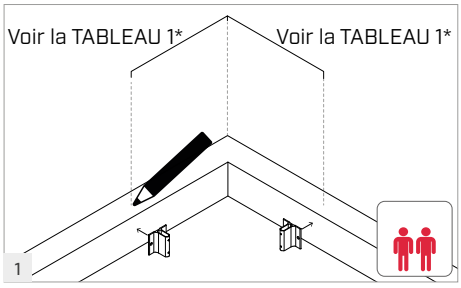
BORBASEVD + BORDIST

Δ = 70 mm

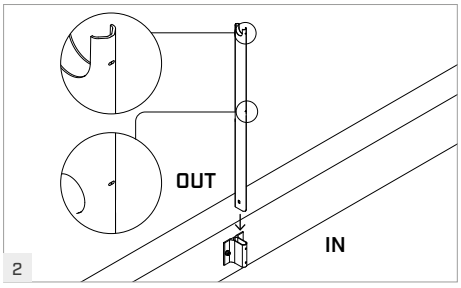
(avec AB112150)

INSTALLATION

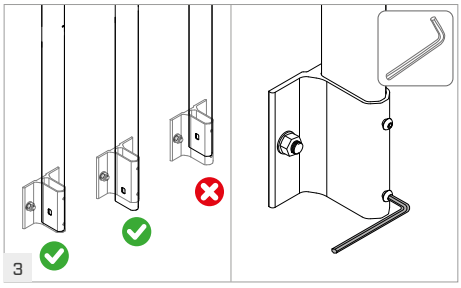
BORDER V / BORDER VD



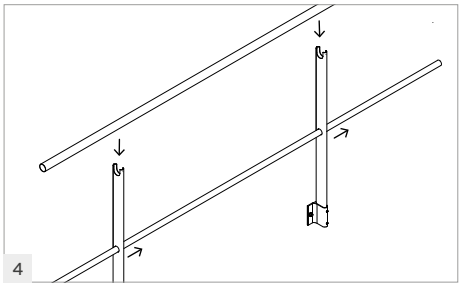
La présence d'au moins deux opérateurs qualifiés est requise. Pour un résultat optimal, il est conseillé de commencer par un angle. Installer les bases V-VD (voir les pages 4-5).



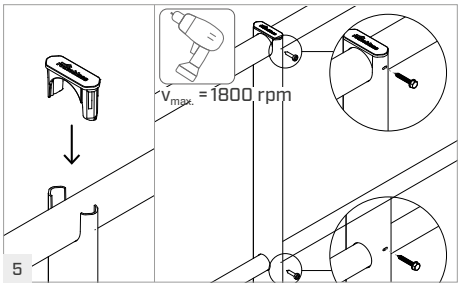
Insérer les montants dans les bases **BORBASEV/BORBASEVD** en orientant les marques vers l'opérateur.



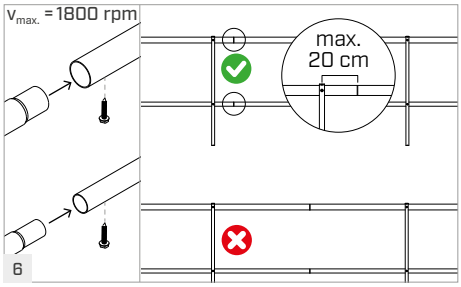
Ajuster le montant de manière à ce que l'extrémité ne pénètre pas dans la base et s'aligne avec la limite inférieure. Fixer avec les deux vis M6x6.



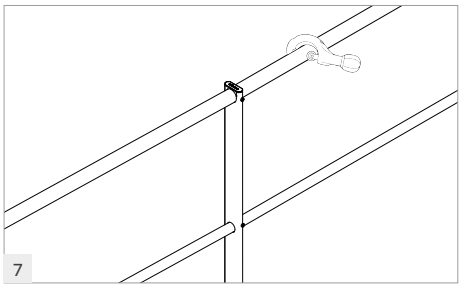
Insérer la sous-lisse intermédiaire **BORBAR32** puis la sous-lisse supérieure **BORBAR45**. Conformément à la norme EN 13374, il est nécessaire d'installer des sous-lisses plus grandes **BORBAR45R**.



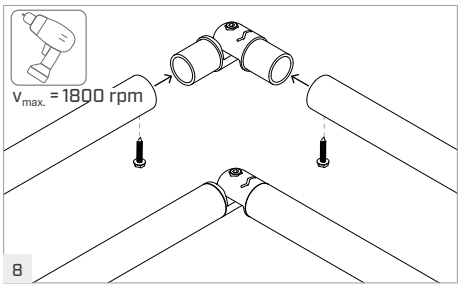
Insérer le capuchon **BORCAP** au sommet du montant. Fixer les sous-lisses aux montants avec des vis **MMS5525A2** au niveau des deux marques latérales.



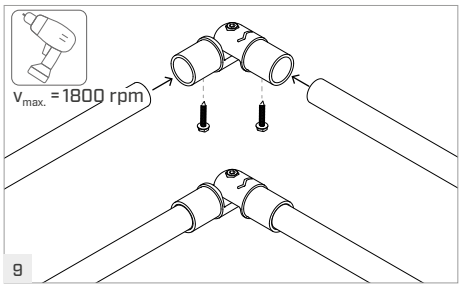
Raccorder les extrémités mâle/femelle de la lisse et sous-lisses, en les fixant avec des vis **MMS5525A2**. Conformément à la norme EN 14122, la sous-lisse doit s'arrêter à moins de 20 cm du montant le plus proche. Placer les vis sous les sous-lisses.



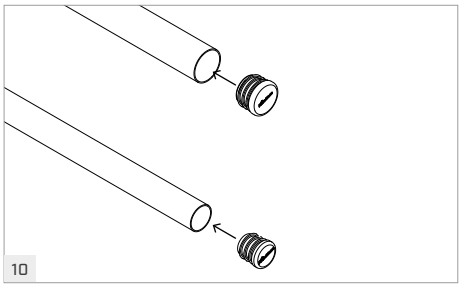
Adapter la dernière section du garde-corps en coupant la partie excédentaire des sous-lisses à l'aide du coupe-tube.



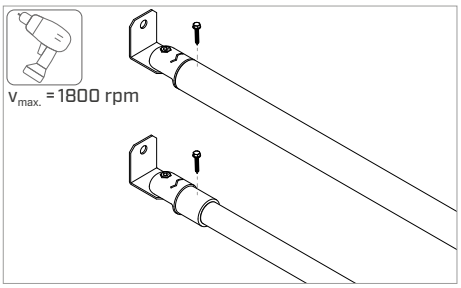
Insérer l'articulation angulaire **BORCOR** dans la sous-lisse et fixer avec des vis autotaraudeuses **MMS5525A2**.



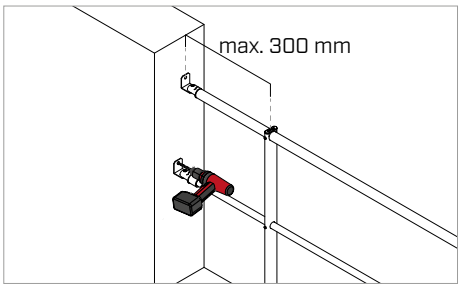
Insérer l'articulation angulaire **BORCOR** dans la sous-lisse intermédiaire et fixer avec des vis autotaraudeuses **MMS5525A2**.



Insérer les capuchons **BORCAP45** et **BORCAP32** dans les lisses ou sous-lisses intermédiaires.



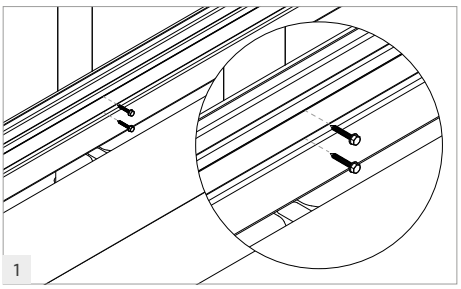
Insérer la lisse et la lisse intermédiaire dans l'élément terminal mural **BORWALL** et fixer avec des vis autotaraudeuses **MMS5525A2**.

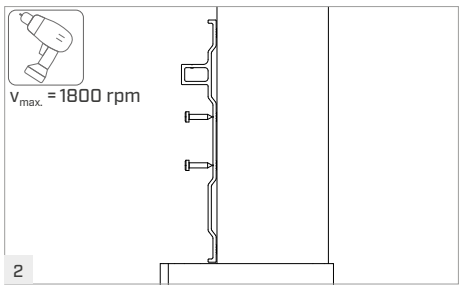


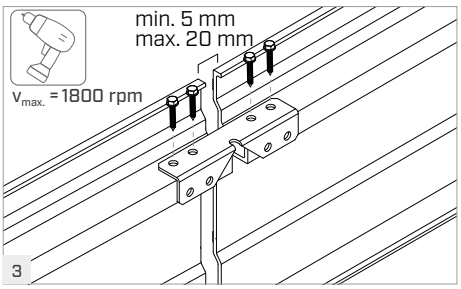
Respecter la distance maximale de **300 mm** par rapport au mur. Percer le mur avec une mèche de Ø10 mm et fixer l'élément terminal avec une cheville M10 (AB110115) ou sur du bois avec VGS Ø9 (VGS9100 + HUS8).

INSTALLATION

BORTB

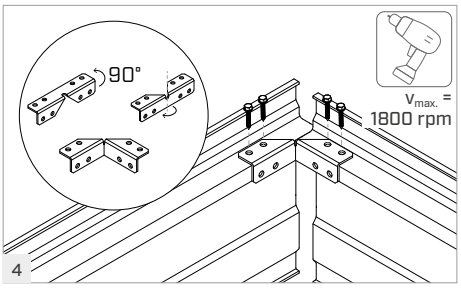


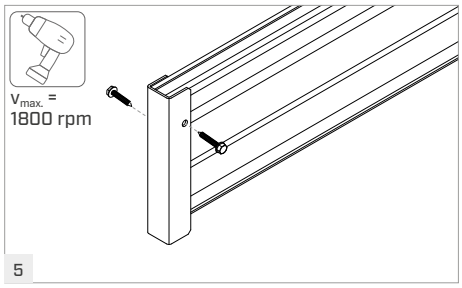




La plinthe garde-pieds **BORTB** doit toujours être positionnée frontalement, vers l'intérieur, avec le support inférieur en contact avec celui de la base **BORBASEV/VD**. Une fois positionnée, fixer les vis 5.5×25mm à côté des deux rainures.

Unir les extrémités de **BORTB** avec le connecteur **BORTBJUN**. Fixer avec les 4 vis **MMS5525A2**, en laissant au moins 5 mm entre les plinthes pour éviter toute déformation thermique.

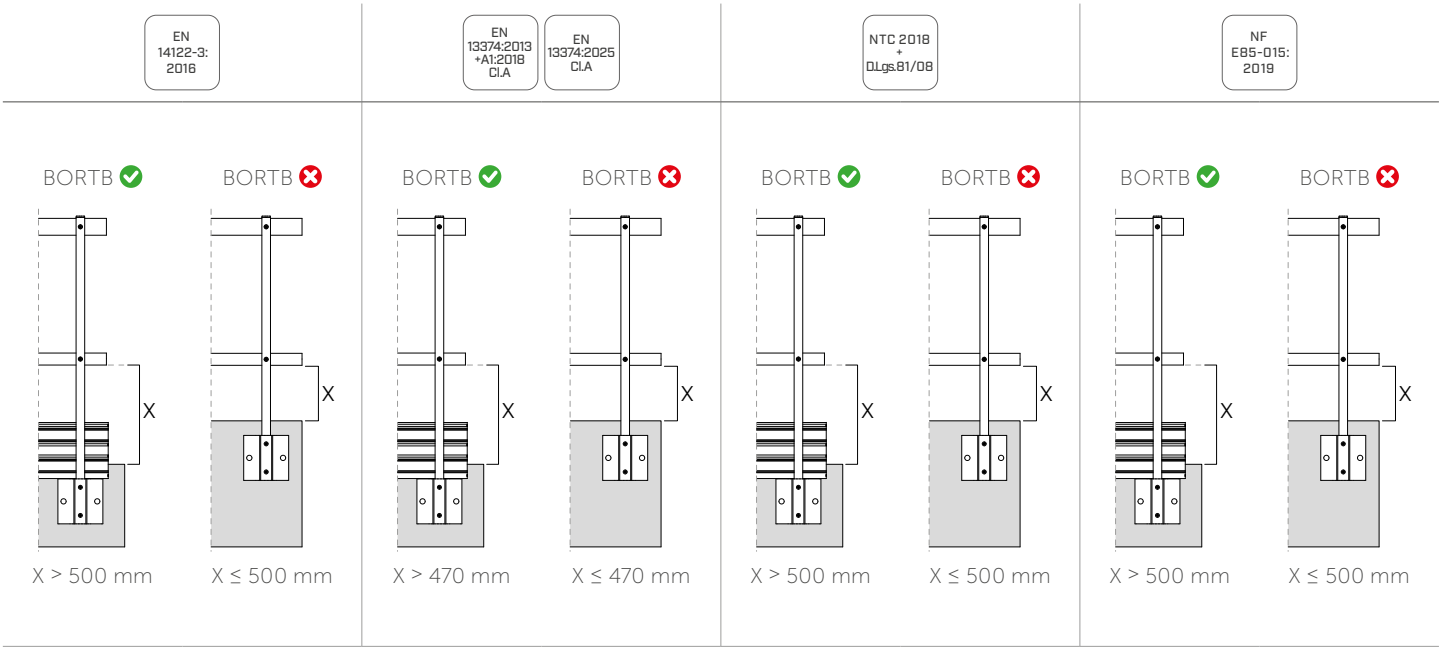




Dans les angles, tourner et plier manuellement le connecteur **BORTBJUN** jusqu'à obtenir l'angle souhaité. Fixer avec 4 vis autotaraudeuses **MMS5525A2**.

Fixer les capuchons de la plinthe garde-pieds avec 2 vis autotaraudeuses **MMS5525A2**

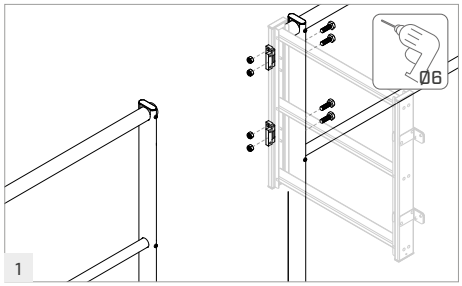
INDICATIONS POUR L'UTILISATION DE BORTB



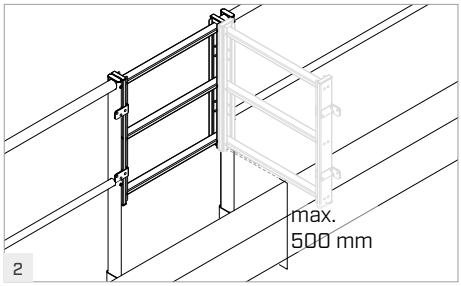
INSTALLATION

BORGATE600

EN 14122-3: 2016



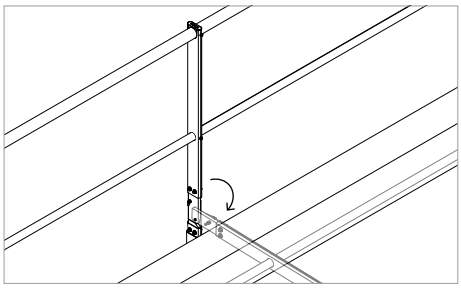
Fixer les 2 charnières sur le côté du portail à l'aide de 4 vis **Ø6x35 ISO 4762** et des **écrous autobloquants M6 respectifs** fournis avec le portail.



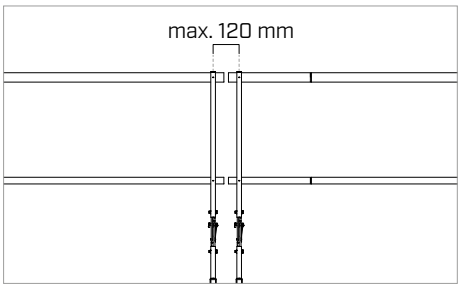
S'assurer que le portail soit installé à une hauteur maximale de **500 mm** du sol, en le maintenant en position fermée.

BORUP100F - BORUP110F

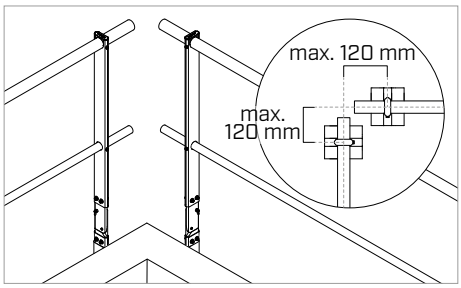
EN 14122-3: 2016 | NTC 2018 + D.Lgs.81/08 | NF E85-015: 2019



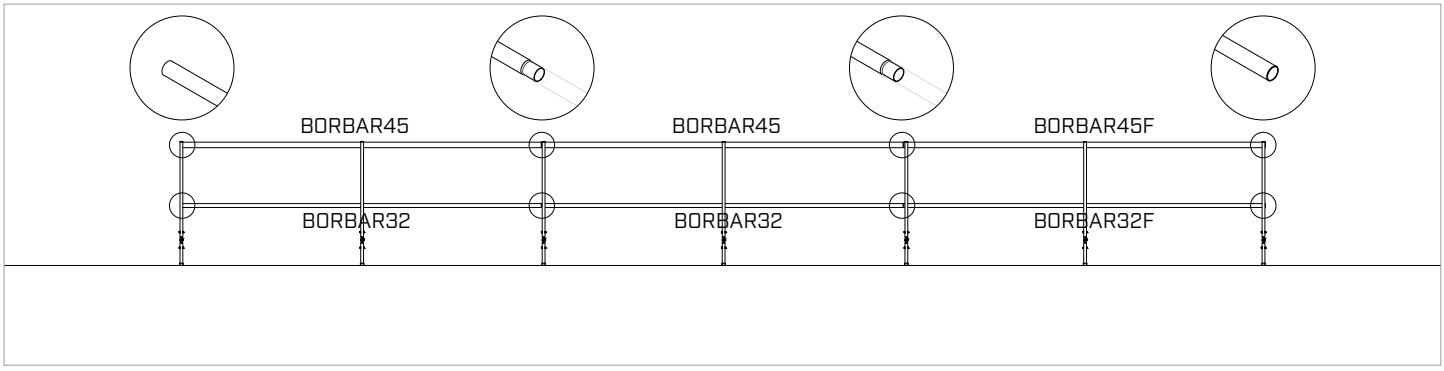
Installer les garde-corps rabattables **BORDER V / BORDER VD** du côté de l'articulation (et non du pivot), en veillant à ce que le montant s'incline vers la toiture, et jamais vers l'extérieur.



Les garde-corps rabattables **BORDER V / BORDER VD** s'installent dans des modules de 9 m (7 montants), 12 m (9 montants), 15 m (11 montants) ou 18 m (13 montants). Monter deux montants d'extrémité à une distance maximale de **120 mm** l'un de l'autre, comme illustré.



Les angles des garde-corps rabattables ne doivent pas être reliés, afin de permettre une inclinaison dans les deux sens. La distance entre deux montants d'extrémité ne doit pas dépasser **120 mm** par rapport au bord.



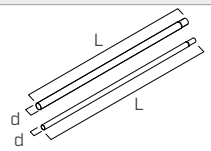
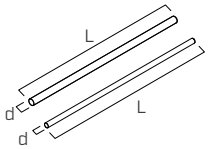
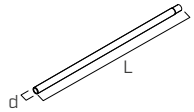
Les sous-lisses principales à utiliser sont **BORBAR45** et **BORBAR32**, toutefois chaque module doit se terminer avec la sous-lisse spécifique sans réduction **BORBAR45F** et **BORBAR32F**.

AVVERTENZE GENERALI PER L'USO

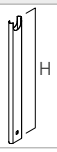
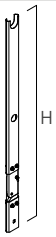
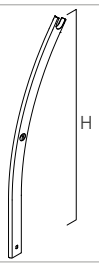
- Prima di procedere con il ribaltamento del parapetto, è obbligatorio assicurarsi che l'operatore sia posto in condizioni di sicurezza. L'utente deve essere ancorato a un dispositivo anticaduta, come una linea vita **PATROL** o un punto di ancoraggio **KITE**. Inoltre, è necessario verificare che tutti gli strumenti e le attrezzature siano in buone condizioni di funzionamento e che l'area di installazione sia libera da ostacoli.
- I moduli (9 m, 12 m, 15 m, 18 m) devono essere sempre maneggiati da due operatori per consentire il corretto ribaltamento.

CODES ET DIMENSIONS

SOUS-LISSES

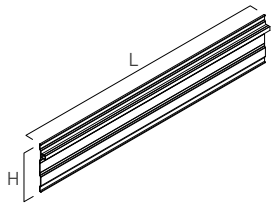
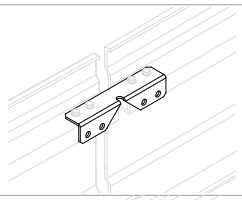
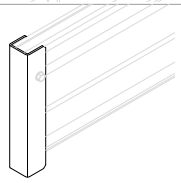
CODE		d [mm]	L [mm]	
BORBAR45	EN AW 6063-T6	45	3000	
BORBAR32		32	3000	
BORBAR45F		45	3000	
BORBAR32F		32	3000	
BORBAR45R		45	3000	

MONTANTS

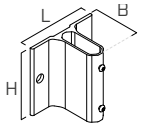
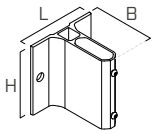
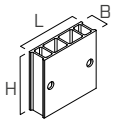
CODE		H [mm]	
BORUP530WH	EN AW 6005A-T6	535	
BORUP760WH		765	
BORUP100		1005	
BORUP110		1105	
BORUP118		1185	
BORUP130		1305	
BORUP100F		1005	
BORUP110F		1105	
BORUP113C		1120	
BORUP100R		1005	
BORUP110R		1105	
BORUP100AS		1005	
BORUP107US		1075	

CODES ET DIMENSIONS

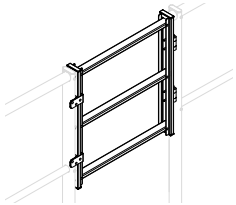
PLINTHE GARDE-PIEDS

CODE		H [mm]	L [mm]	
BORTB	EN AW 6063-T6	150	3000	
BORTBJUN	EN AW 5083 H111	-	-	
BORTBCAP	EN AW 5083 H111	-	-	

BASES

CODE		B [mm]	H [mm]	L [mm]	
BORBASEV		80	120	120	
BORBASEVD	EN AW 6005A-T6	107	120	120	
BORDIST		35	120	120	

PORTILLON DE SÉCURITÉ

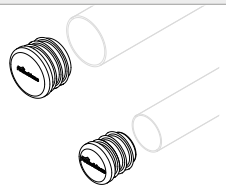
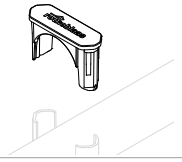
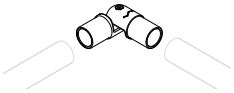
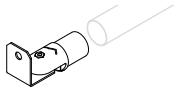
CODE		L [mm]	H [mm]	
BORGATE600	EN AW 5083 H111	600	640	

CODES ET DIMENSIONS

FIXATIONS

CODE		d [mm]	H [mm]	
MMS5525A2	1.4301 AISI304 INOX	5,5	25	

ACCESSOIRES

CODE		
BORCAP45	LDPE	
BORCAP32		
BORCAP	PP RECYCLED	
BORCOR		
BORWALL	PP RECYCLED, 1.4301 AISI304 INOX	

NORMAS DE SEGURANÇA, INSTRUÇÕES DE UTILIZAÇÃO E INSTALAÇÃO

INTRODUÇÃO

DEFINIÇÕES

O parapeito de fixação vertical **BORDER V / BORDER VD** é um sistema de proteção coletiva antiqueda, ideal para a segurança em coberturas, realizado em liga de alumínio (**EN AW 6005A-T6 e EN AW 6063-T6**).

NORMAS

O parapeito de fixação vertical **BORDER V/ BORDER VD** cumpre as seguintes normas:

- **EN 14122-3:2016**
- **EN 13374:2025 Cl. A (exceto ponto 9)**
- **EN 13374:2013+A1:2018 Cl. A (exceto ponto 9)**
- **NTC (Tab.3.1.II - cat. A,B,C1,E1,F,G,H) e Decreto Legislativo 81/08 (Itália)**
- **NF E 85-015:2019 (França)**

A tabela mostra os principais parâmetros geométricos exigidos pelas normas de referência:

	EN 14122-3: 2016	EN 13374:2013 +A1:2018 Cl.A	EN 13374:2025 Cl.A	NTC 2018	D.Lgs. 81/08	NF E85-015: 2019
Altura mín. da superfície de passagem	1,1 m	1 m		1 m	1 m	1 - 1,1 m
Entre-eixo máx. entre as correntes	500 mm	470 mm		-	500 mm	500 mm
Entre-eixo máx. entre os montantes	1,5 m (recomendado)	-		-	-	1,5 m (recomendado)
Altura mín. do rodapé	10 cm	15 cm		-	15 cm	10 cm

USO - MANUTENÇÃO

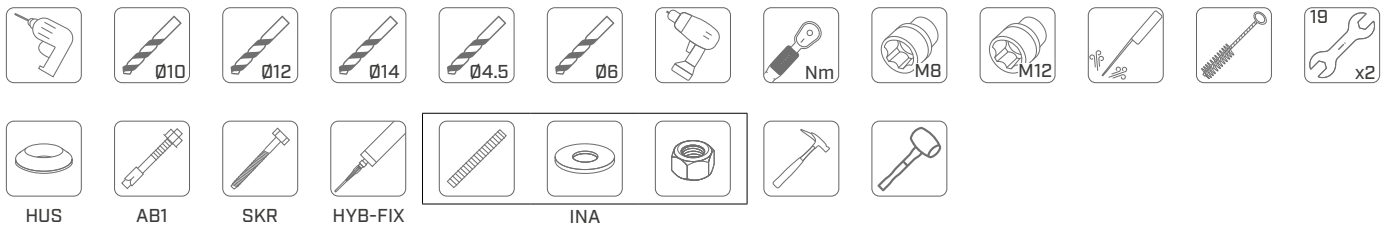
A instalação do parapeito **BORDER** deve ser efetuada por pessoal qualificado, em conformidade com as normas em vigor relativas a trabalhos em altura.
Antes da utilização, o operador deve garantir a sua própria segurança, utilizando uma linha de vida temporária, EPI e uma plataforma de trabalho adequada.

- Antes da utilização, o utilizador deve verificar, por inspeção visual, se o parapeito **BORDER** apresenta anomalias, danos ou deformações (choques, dobras, etc.).
- O parapeito **BORDER** não requer intervenções de manutenção específicas. No entanto, é necessária, pelo menos, uma inspeção visual anual por pessoal qualificado.
- Se o parapeito **BORDER** não estiver corretamente instalado, estiver danificado ou tiver travado uma queda, a sua utilização deve ser imediatamente interrompida. A sua utilização só deve ser retomada depois de um técnico qualificado ter efetuado a inspeção e a verificação e ter emitido uma autorização por escrito.
- Se o produto for revendido fora do país de destino, é essencial para a segurança do utilizador que o revendedor forneça o manual de instruções na língua do país em que o produto é utilizado. Os documentos podem ser fornecidos a pedido, contactando o fabricante.
- O parapeito **BORDER** é um dispositivo de proteção coletiva permanente, destinado exclusivamente aos profissionais que trabalham em coberturas não acessíveis ao público.
- Se for instalado em ambientes industriais poluídos, petroquímicos, navais ou costeiros, o parapeito **BORDER** deve ser submetido a um tratamento de superfície adequado, como a pintura a pó ou a anodização.
- Se tiver sido fornecida uma planimetria, esta deve ser utilizada como referência durante a instalação.

ARMAZENAMENTO

Os componentes de alumínio em bruto são embalados em contacto uns com os outros. A exposição da embalagem fechada à chuva pode provocar a oxidação dos componentes, podendo resultar em manchas na superfície. Estas manchas não comprometem a qualidade do alumínio, mas podem prejudicar o aspeto estético do parapeito. É aconselhável desembalar a embalagem e manter os componentes separados, evitando o contacto direto entre si, ou armazenar as embalagens num local seco.

EQUIPAMENTO

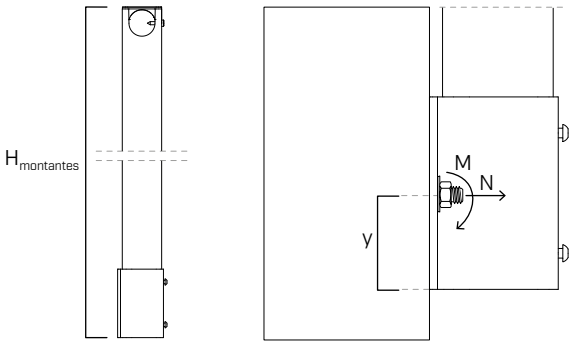


PRINCIPAIS FORÇAS QUE ATUAM NA ANCORAGEM

A combinação das forças e momentos resultantes atua sobre o parafuso mais sujeito a tensão:

$$M = F \cdot (H-y)$$

$$N = F_t = \frac{M \cdot y_i}{\Sigma n_i y_i^2} + \frac{F}{2}$$



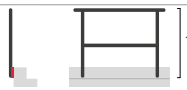
Os valores resultantes que atuam sobre cada elemento de fixação são definidos da seguinte forma:

$H_{montantes}$ [m]	EN 14122-3: 2016		EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl.A		NTC 2018 + Dec. Legislativo 81/08		NF E85-015: 2019	
	M [Nm]	N [N]	M [Nm]	N [N]	M [Nm]	N [N]	M [Nm]	N [N]
0,76	551	4988	998	9025	1733	15675	689	6234
1	740	6563	1340	11875	2327	20625	925	8203
1,1	819	7219	1482	13063	2574	22688	1024	9023
1,18	882	7744	-	-	2772	24338	1103	9680
1,3	977	8531	-	-	3069	26813	1221	10664

ESPECIFICAÇÕES DE INSTALAÇÃO

ENTRE-EIXOS ADMISSÍVEIS

Tabela 1

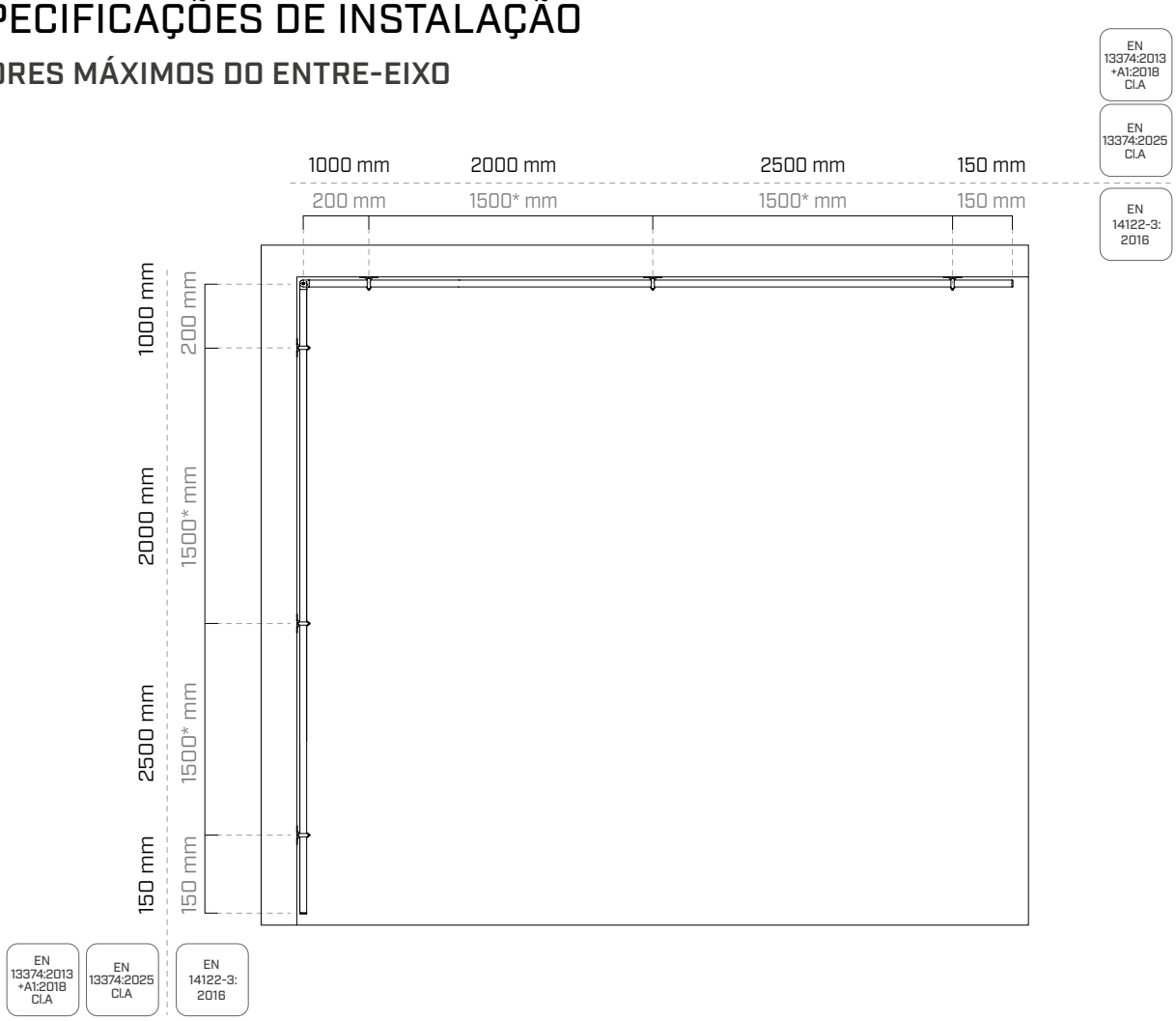
montante	$H_{montantes}$	EN 14122-3: 2016	EN 13374:2013 +A1:2018 Cl.A / EN 13374:2025 Cl.A	NTC 2018 + Dec. Legislativo 81/08	NF E85-015: 2019
		entre-eixo para montantes [cm]			
reto	76 cm	150	250**	150	150
	118 cm	150	-	150	150
	 130 cm	150	-	150	150
reto + rebatível*	100 cm	150	250	150	150
	110 cm	150	250	150	150
curvo	110 cm	150	250	150	150

*O sistema rebatível não se encontra atualmente disponível

**o sistema só pode ser instalado em véus com altura $h_{min} \geq 250$ mm

ESPECIFICAÇÕES DE INSTALAÇÃO

VALORES MÁXIMOS DO ENTRE-EIXO

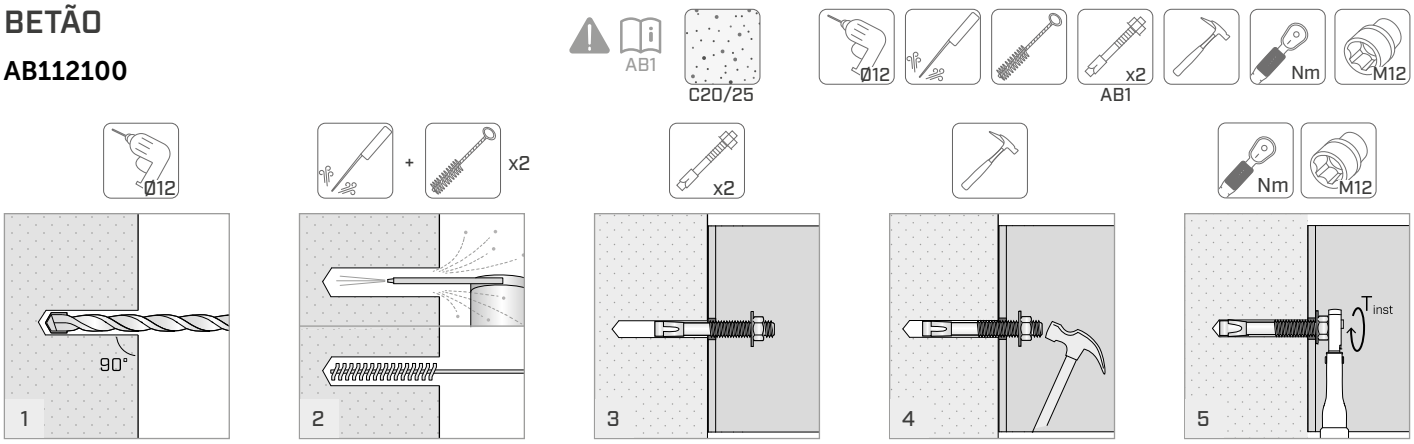


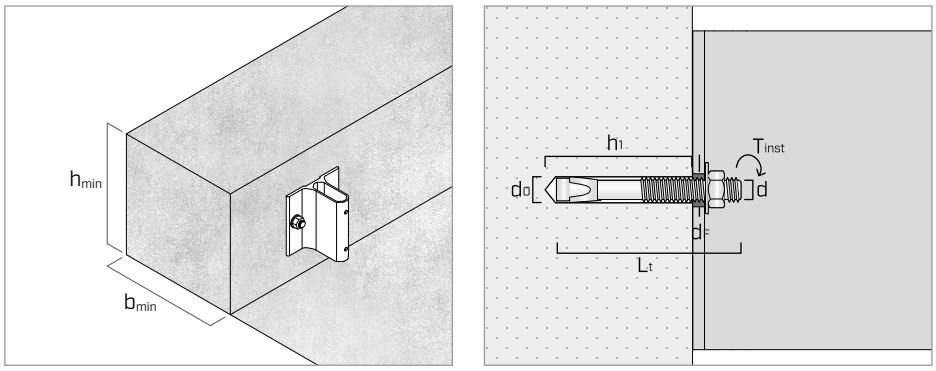
*O entre-eixo máximo varia consoante a regulamentação e a altura do montante (ver tabela 1).

INSTALAÇÃO BASE V - BASE VD

BETÃO

AB112100



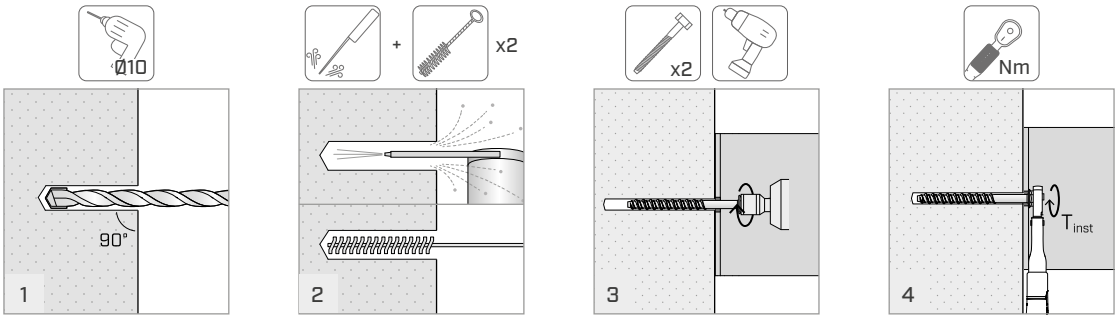


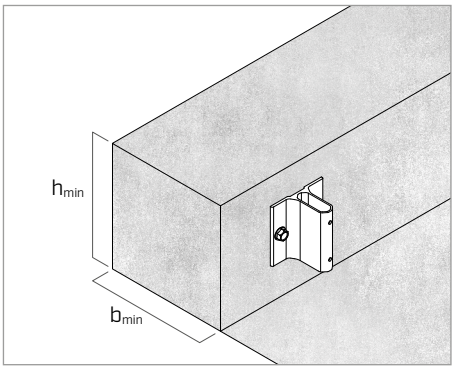
b_{min}	=	140	mm	
h_{min}	=	140	mm	
T_{inst}	=	60	Nm	
h_1	=	85	mm	
d	=	d_0 =	12	mm
d_F	=	14	mm	
L_t	=	100	mm	

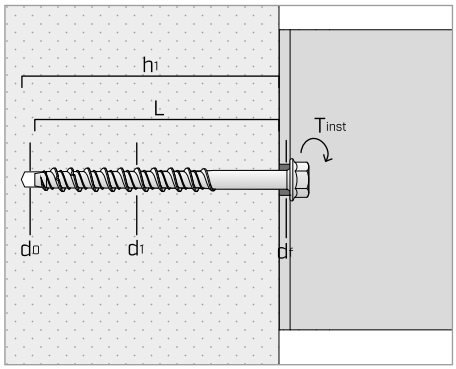
INSTALAÇÃO BASE V - BASE VD

BETÃO

SKR1290



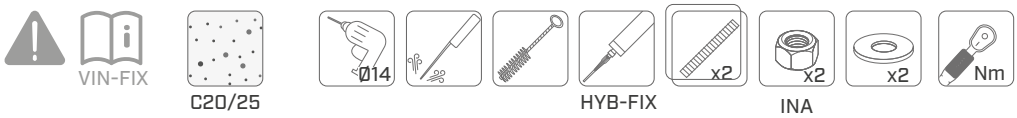


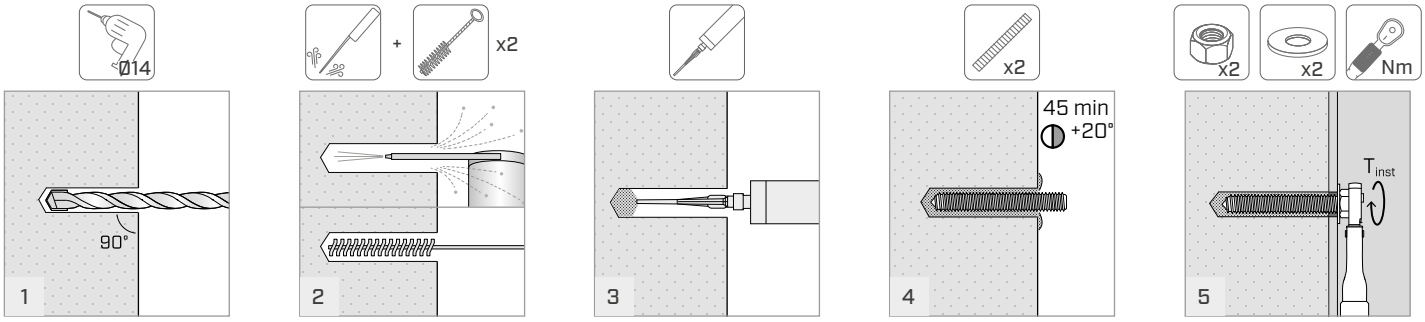


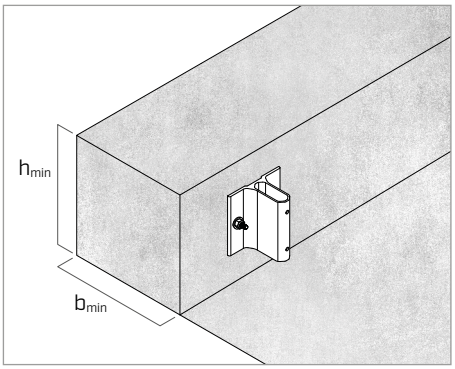
b_{min}	=	120	mm
h_{min}	=	120	mm
T_{inst}	=	80	Nm
h_1	=	100	mm
d_1	=	12	mm
d_0	=	10	mm
d_F	=	14	mm
L	=	90	mm

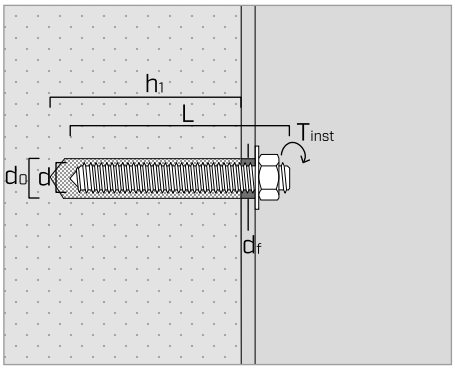
BETÃO

HYB-FIX + INA8812140



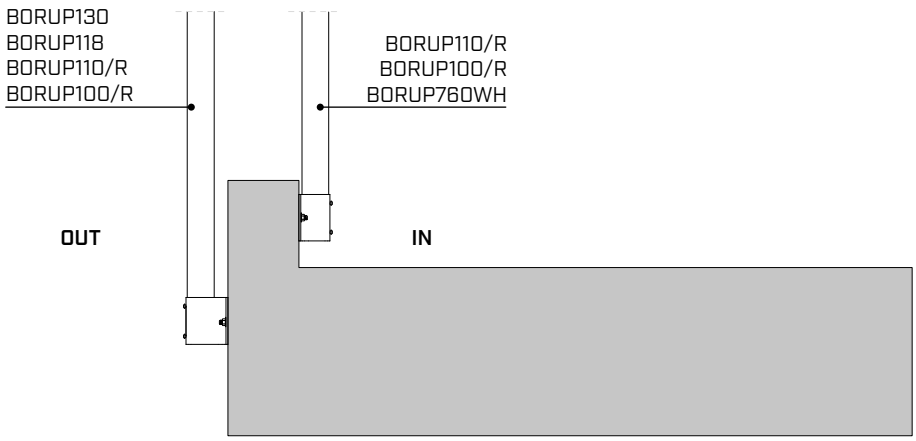


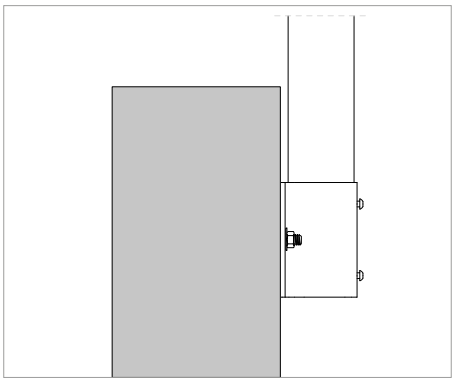




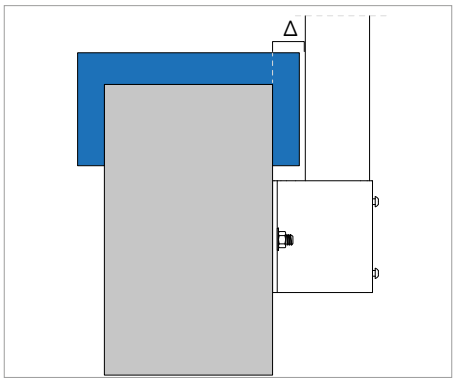
b_{min}	=	160	mm
h_{min}	=	140	mm
T_{inst}	=	40	Nm
h_1	=	140	mm
d	=	12	mm
d_0	=	14	mm
d_F	=	14	mm
L	=	140	mm

APLICAÇÕES PARAPEITO BORDER V/BORDER VD



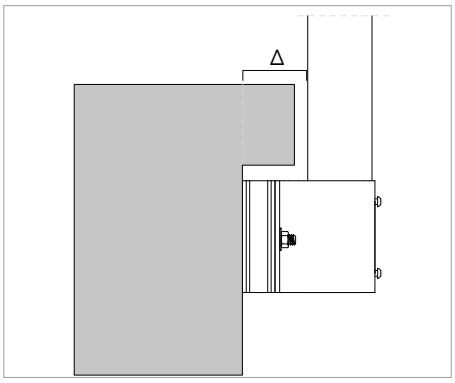


BORBASEV



BORBASEVD

Δ = 35 mm



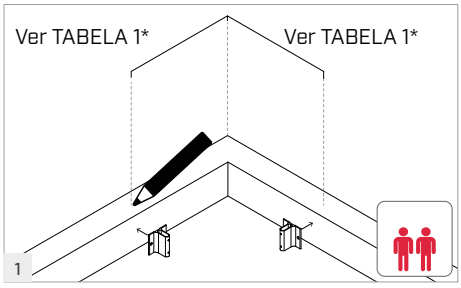
BORBASEVD + BORDIST

Δ = 70 mm

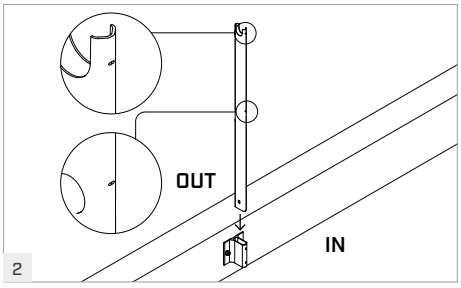
(com AB112150)

INSTALAÇÃO

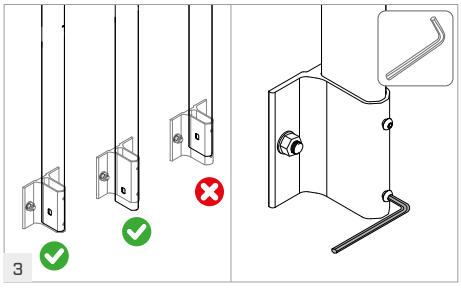
BORDER V / BORDER VD



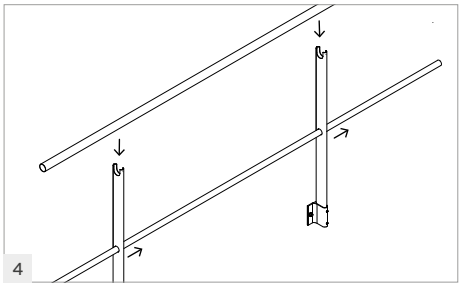
É necessária a presença de, pelo menos, dois operadores qualificados. Para obter melhores resultados, é recomendável começar num canto. Instalar as bases V-VD (ver pág. 4-5).



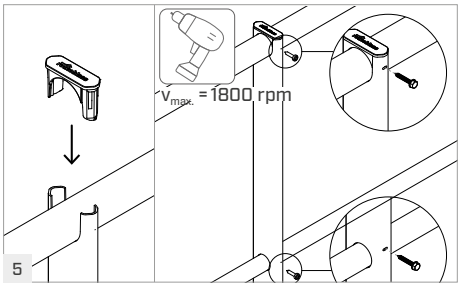
Inserir os montantes nas bases **BORBASEV/ BORBASEVD** com as marcas viradas para o operador.



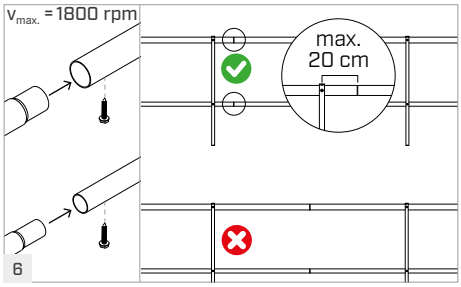
Regular o montante de modo a que a extremidade não entre na base e fique alinhada com o limite inferior. Fixar os dois parafusos M6x6.



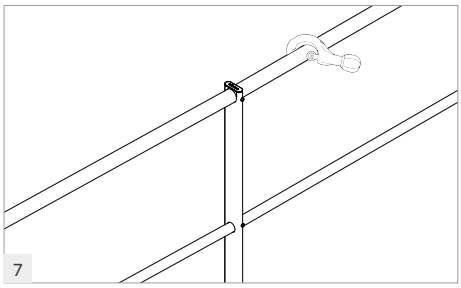
Inserir a corrente intermédia **BORBAR32** e, em seguida, a corrente superior **BORBAR45.** Em conformidade com a norma EN 13374, é necessário instalar as correntes aumentadas **BORBAR45R.**



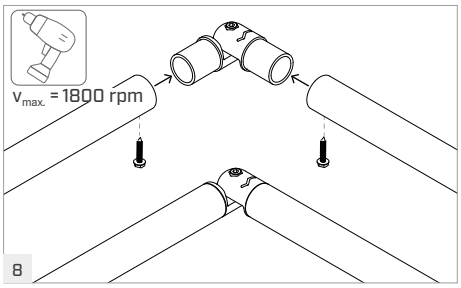
Inserir a tampa **BORCAP** no topo do montante. Fixar as correntes aos montantes com o parafuso **MMS5525A2** nas duas marcas laterais.



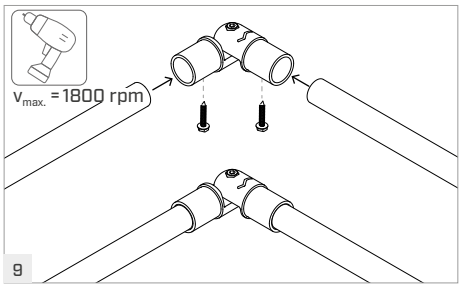
Ligar as extremidades macho/fêmea do corrimão e das correntes, fixando-as com parafusos **MMS5525A2**. De acordo com a EN 14122, o corrimão não deve terminar a mais de 20 cm do montante mais próximo. Colocar os parafusos sob as correntes.



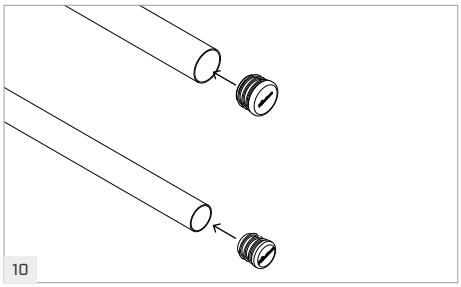
Adaptar a última secção do parapeito cortando a parte excedente das correntes com o corta-tubos.



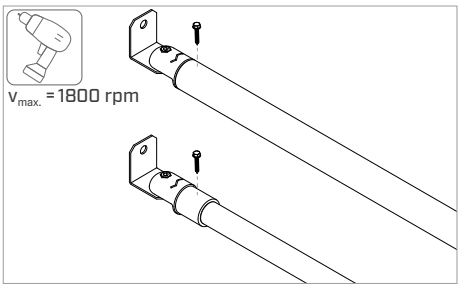
Inserir a articulação angular **BORCOR** no corrimão e fixar com parafusos autorroscantes **MMS5525A2**.



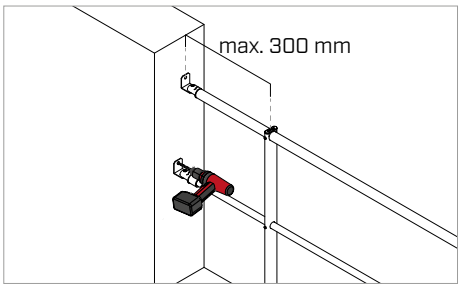
Inserir a articulação angular **BORCOR** na corrente intermédia e fixar com os parafusos autorroscantes **MMS5525A2**.



Inserir as tampas **BORCAP45** e **BORCAP32** nos corrimãos ou correntes intermédias.



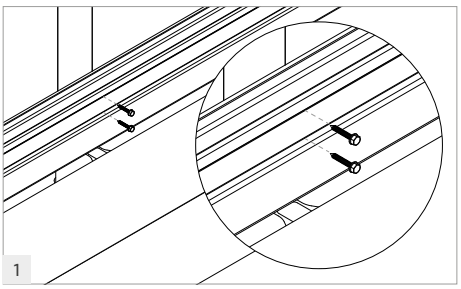
Inserir o corrimão e a corrente intermédia no elemento terminal de parede **BORWALL** e fixar com o parafuso autorroscante **MMS5525A2**.

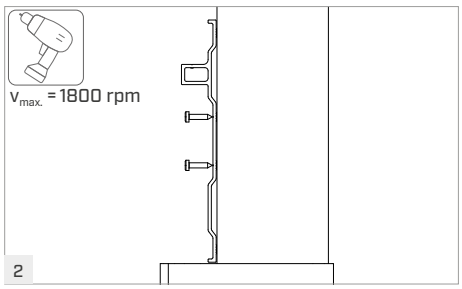


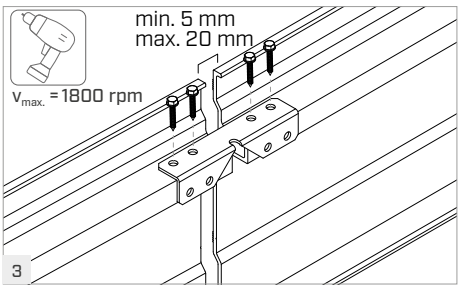
Respeitar a distância máxima de **300 mm** da parede. Furar a parede com a broca Ø10 mm e fixar o elemento terminal com uma bucha M10 (AB110115) ou em madeira com VGS Ø9 (VGS9100 + HUS8).

INSTALAÇÃO

BORTB

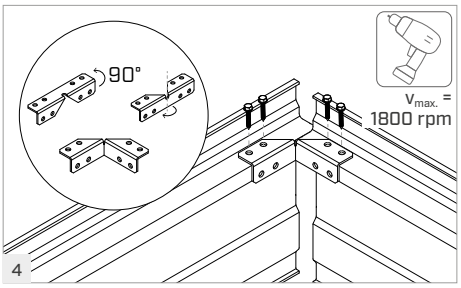


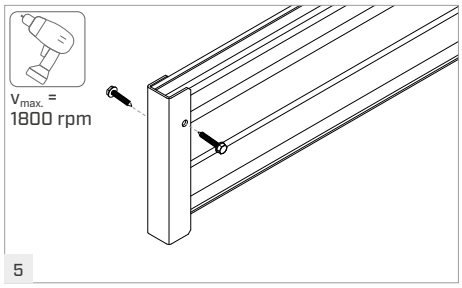




O rodapé **BORTB** deve ser sempre posicionado frontalmente, para a parte interna, com o suporte inferior em contacto com o da base **BORBASEV/VD**. Uma vez posicionado, fixar os parafusos 5,5×25 mm perto das duas ranhuras.

Unir as extremidades do **BORTB** com o conector **BORTBJUN**. Fixar com 4 parafusos **MMS5525A2**, deixando, pelo menos, 5 mm entre as tábuas para evitar deformações térmicas.

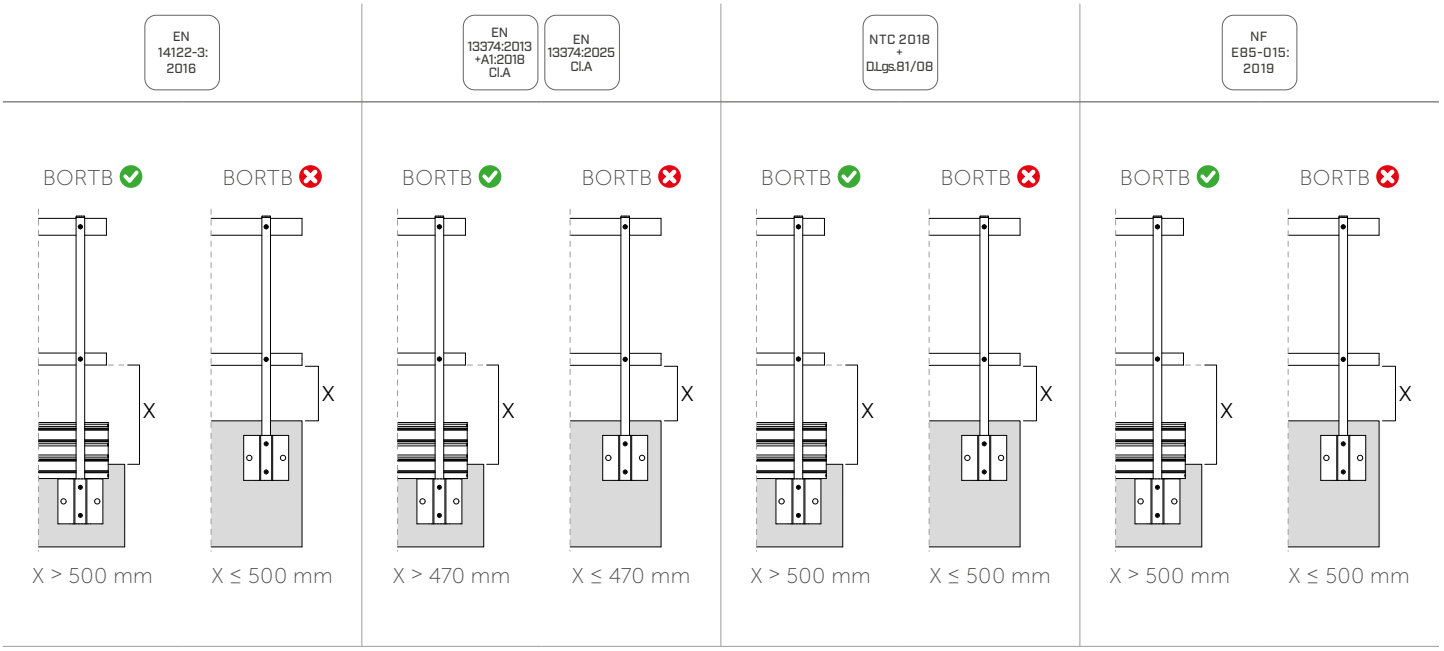




Nos cantos, rodar e dobrar o conector **BORTBJUN** à mão até atingir o ângulo desejado. Fixar com 4 parafusos autorroscantes **MMS5525A2**.

Fixar as tampas terminais do rodapé com 2 parafusos autorroscantes **MMS5525A2**

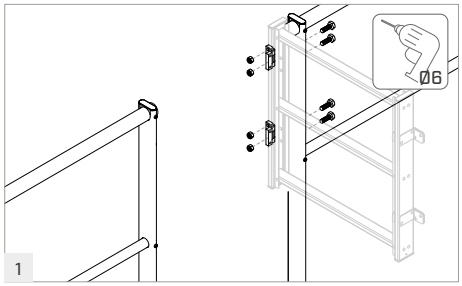
ESPECIFICAÇÕES DE UTILIZAÇÃO BORTB

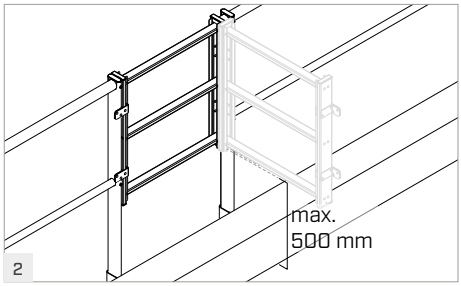


INSTALAÇÃO

BORGATE600

EN 14122-3: 2016



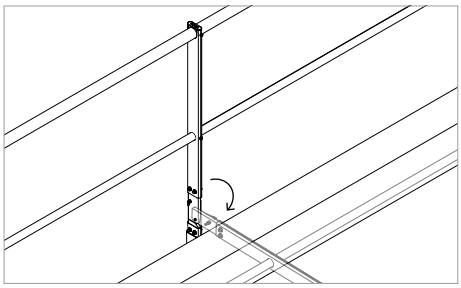


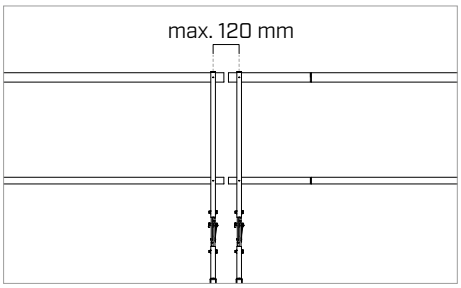
Fixar as 2 dobradiças na parte lateral do portão utilizando os 4 parafusos **Ø6x35 ISO 4762** e as respetivas **porcas autoblocantes M6** fornecidas com o portão.

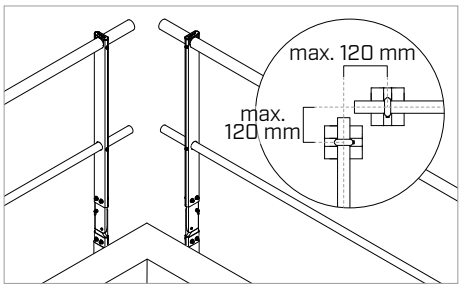
Certificar-se de que o portão é instalado a uma altura máxima de **500 mm** da superfície de passagem, mantendo-o na posição fechada.

EN 14122-3: 2016 | NTC 2018 + D.Lgs.81/08 | NF E85-015: 2019

BORUP100F - BORUP110F



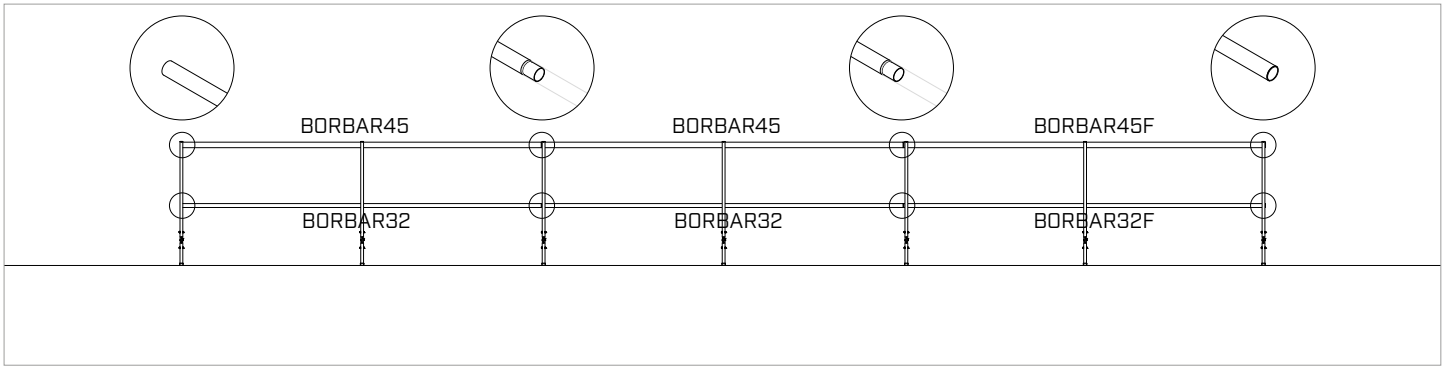




Instalar os parapeitos rebatíveis **BORDER V/ BORDER VD** do lado da junta (não do perno), certificando-se de que o montante é rebatido na direção da cobertura, nunca para fora.

Os parapeitos rebatíveis **BORDER V / BORDER VD** são instalados em módulos de 9 m (7 montantes), 12 m (9 montantes), 15 m (11 montantes) ou 18 m (13 montantes). Montar os dois montantes terminais com uma distância máxima de **120 mm** entre eles, como mostrado.

Os cantos dos parapeitos rebatíveis não devem ser ligados para permitir o rebatimento em ambas as direções. A distância entre os dois montantes terminais não deve exceder **120 mm** do bordo.



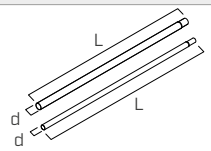
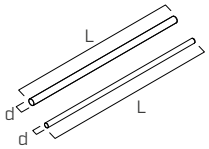
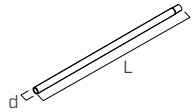
As correntes principais a utilizar são **BORBAR45** e **BORBAR32**, no entanto, cada módulo deve terminar com a corrente específica sem redução **BORBAR45F** e **BORBAR32F**.

AVVERTENZE GENERALI PER L'USO

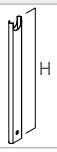
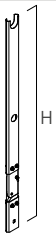
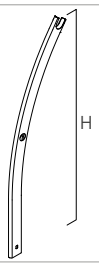
- Prima di procedere con il ribaltamento del parapetto, è obbligatorio assicurarsi che l'operatore sia posto in condizioni di sicurezza. L'utente deve essere ancorato a un dispositivo anticaduta, come una linea vita **PATROL** o un punto di ancoraggio **KITE**. Inoltre, è necessario verificare che tutti gli strumenti e le attrezzature siano in buone condizioni di funzionamento e che l'area di installazione sia libera da ostacoli.
- I moduli (9 m, 12 m, 15 m, 18 m) devono essere sempre maneggiati da due operatori per consentire il corretto ribaltamento.

CÓDIGOS E DIMENSÕES

CORRENTES

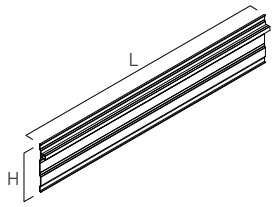
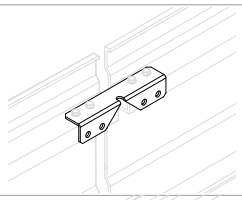
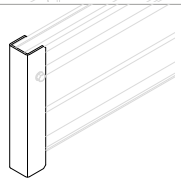
CÓDIGO		d [mm]	L [mm]	
BORBAR45		45	3000	
BORBAR32		32	3000	
BORBAR45F	EN AW 6063-T6	45	3000	
BORBAR32F		32	3000	
BORBAR45R		45	3000	

MONTANTES

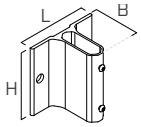
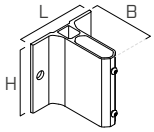
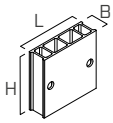
CÓDIGO		H [mm]	
BORUP530WH		535	
BORUP760WH		765	
BORUP100		1005	
BORUP110		1105	
BORUP118		1185	
BORUP130		1305	
BORUP100F		1005	
BORUP110F	EN AW 6005A-T6	1105	
BORUP113C		1120	
BORUP100R		1005	
BORUP110R		1105	
BORUP100AS		1005	
BORUP107US		1075	

CÓDIGOS E DIMENSÕES

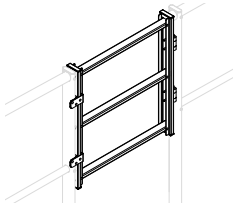
RODAPÉ

CÓDIGO		H [mm]	L [mm]	
BORTB	EN AW 6063-T6	150	3000	
BORTBJUN	EN AW 5083 H111	-	-	
BORTBCAP	EN AW 5083 H111	-	-	

BASES

CÓDIGO		B [mm]	H [mm]	L [mm]	
BORBASEV		80	120	120	
BORBASEVD	EN AW 6005A-T6	107	120	120	
BORDIST		35	120	120	

PORTÃO DE SEGURANÇA

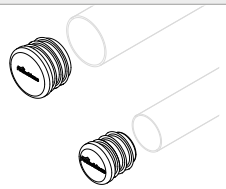
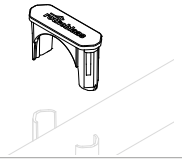
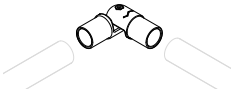
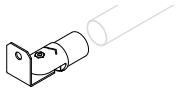
CÓDIGO		L [mm]	H [mm]	
BORGATE600	EN AW 5083 H111	600	640	

CÓDIGOS E DIMENSÕES

FIXAÇÕES

CÓDIGO		d [mm]	H [mm]	
MMS5525A2	1.4301 AISI304 INOX	5,5	25	

ACESSÓRIOS

CÓDIGO		
BORCAP45	LDPE	
BORCAP32		
BORCAP	PP RECYCLED	
BORCOR		
BORWALL	PP RECYCLED / 1.4301 AISI304 INOX	

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