ALU START

ALUMINIUM SYSTEM FOR THE CONNECTION OF BUILDINGS TO THE GROUND

THIRD-PARTY APPROVED
The profile transfers shear, tension, and compression forces into the foundation. Its strengths are tested, calculated, and verified by an independent third party.

ELEVATION FROM THE FOUNDATION
The profile allows to eliminates contact between the timber panels (CLT or TIMBER FRAME) and the concrete substructure. Excellent durability of the building connection to the ground.

BASE LEVELLING
Thanks to the special assembly templates, the supporting surface level is easy to adjust. The "leveling" of the entire building is simple, precise and fast.

VIDEO

CALCULATION TOOL

DESIGN REGISTERED

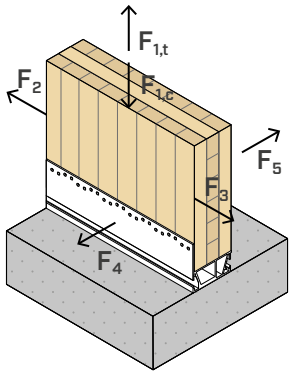
CE ETA-20/0835

SERVICE CONDITION DRY

MATERIAL

alu 6060 EN AW-6060 aluminium alloy

EXTERNAL LOADS



USA DESIGN VALUES
CANADA, EU and more design values available online.

VIDEO
Scan the QR Code and watch the video on our YouTube channel

FIELDS OF USE

Ground attachment system for timber walls.
The aluminium profiles are positioned and levelled before the walls are installed.
Fastening with LBA nails, LBS screws and concrete anchors.

Can be applied to:
- TIMBER FRAME walls
- CLT and LVL panel walls

DURABILITY

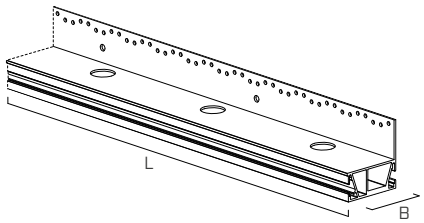
Thanks to the elevation from the foundation and the aluminium material, the building base is protected against capillary moisture. The ground connection improves durability and protects the structure.

CERTIFIED STRENGTH

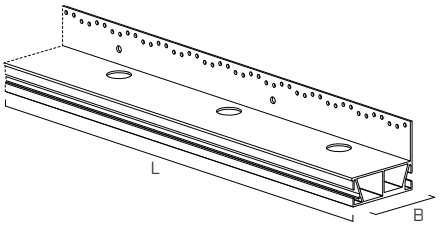
Thanks to the side flange, the profile can be fastened to the timber wall by means of nails or screws which guarantee excellent strength in all directions certified by CE marking according to ETA.

CODES AND DIMENSIONS

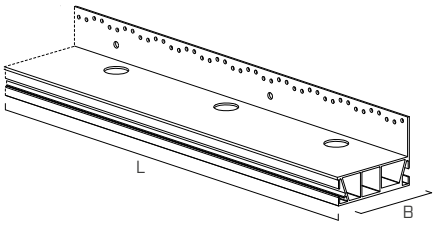
ALU START



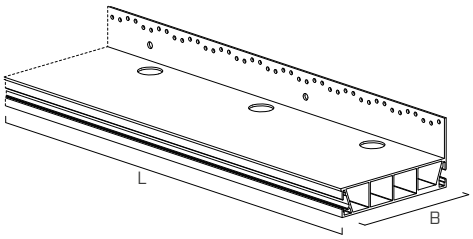
ALUSTART80



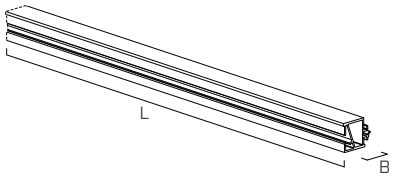
ALUSTART100



ALUSTART120



ALUSTART175



ALUSTART35

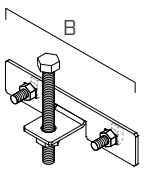
CODE	B [in]	L [in]		pcs
ALUSTART80	3 1/8	94 1/2	●	1
ALUSTART100	4	94 1/2	●	1
ALUSTART120	4 3/4	94 1/2	●	1
ALUSTART175	6 7/8	94 1/2	●	1
ALUSTART35 *	1 3/8	94 1/2	●	1

* Lateral extension for ALUSTART profiles.

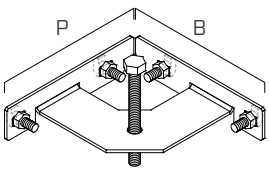
ASSEMBLY ACCESSORIES - JIG START TEMPLATES

CODE	description	B [in]	P [in]	pcs
JIGSTARTI	leveling template for linear joint	6 1/4	-	25
JIGSTARTL	leveling template for angle joint	6 1/4	6 1/4	10

The templates are supplied complete with M12 bolt for height adjustment, ALUSBOLT bolts and MUT93410 nuts.



JIGSTARTI

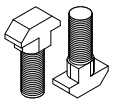


JIGSTARTL

COMPLEMENTARY PRODUCTS

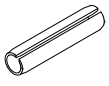
CODE	description	pcs
ALUSBOLT	hammer head bolt for template fastening	100
MUT93410	hammer bolt nut	500
ALUSPIN	ISO 8752 spring pins for ALUSTART35 assembly	50

ALUSBOLT and ALUSPIN can be ordered separately from the templates as spare parts.



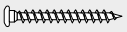
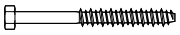
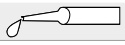
ALUSBOLT

MUT93410

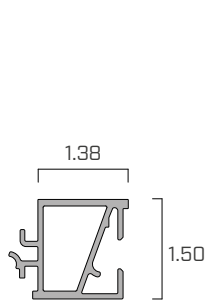


ALUSPIN

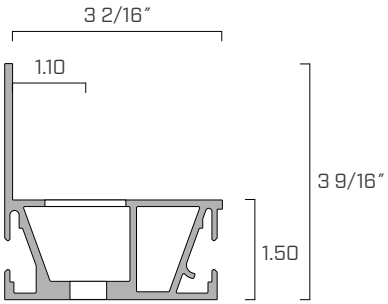
FASTENERS

type	description		d [in]	support
LBA	high bond nail		0.16	
LBS	round head screw		0.2	
SKR	screw-in anchor		0.48	
AB1	CE1 expansion anchor		0.48 (M12)	
VIN-FIX	vinyl ester chemical anchor		0.48 (M12)	
HYB-FIX	hybrid chemical anchor		0.48 (M12)	

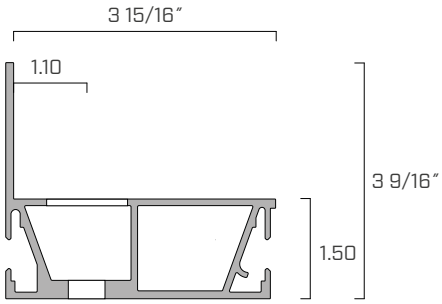
GEOMETRY



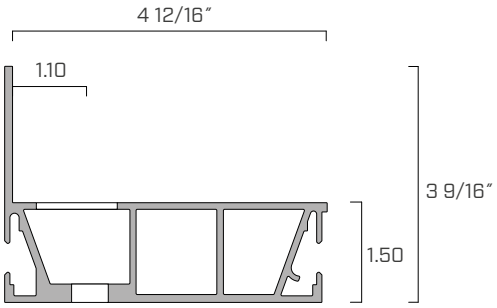
ALUSTART35



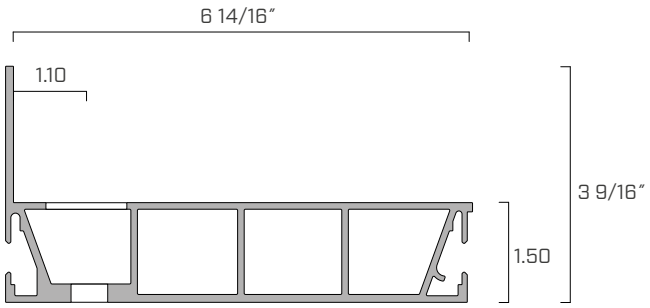
ALUSTART80



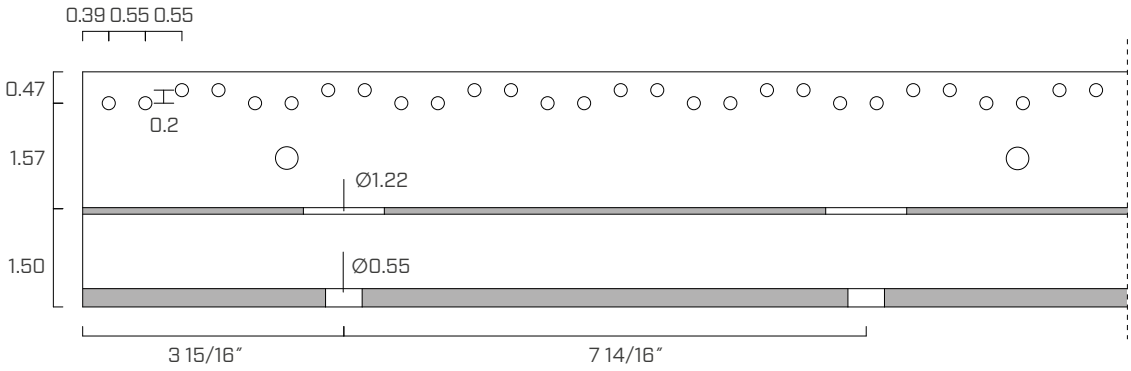
ALUSTART100



ALUSTART120



ALUSTART175

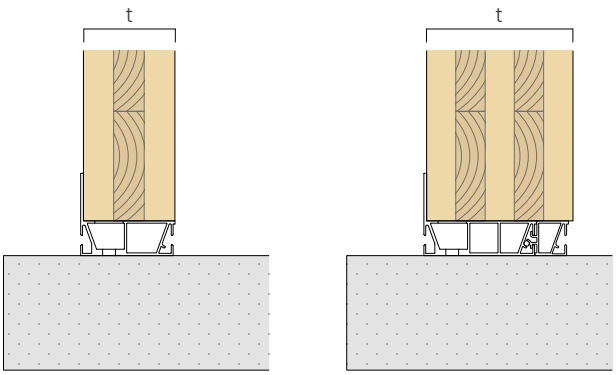


CODE	B [in]	H [in]	L [in]	n_V Ø0.2 [pcs]	n_H Ø0.55 [pcs]
ALUSTART80	3 1/8	3 9/16	94 1/2	171	12
ALUSTART100	3 15/16	3 9/16	94 1/2	171	12
ALUSTART120	4 3/4	3 9/16	94 1/2	171	12
ALUSTART175	6 7/8	3 9/16	94 1/2	171	12
ALUSTART35	1 3/8	1 1/2	94 1/2	-	-

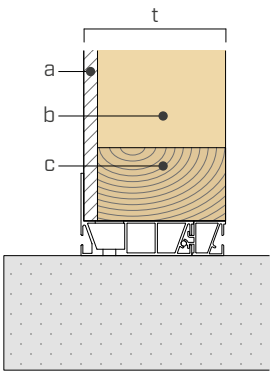
INSTALLATION

ALU START is an extruded aluminium profile designed to house the walls and to solve the foundation-to-wall interface in timber. The profile is certified to withstand all the stresses typical for a timber wall, i.e. F_1, $F_{2/3}$, F_4 and F_5. ALU START profiles are designed to fit both CLT and Timber Frame walls. The use of the lateral extension ALUSTART35 allows its use with CLT and Timber Frame walls having greater thickness.

INSTALLATION ON CLT

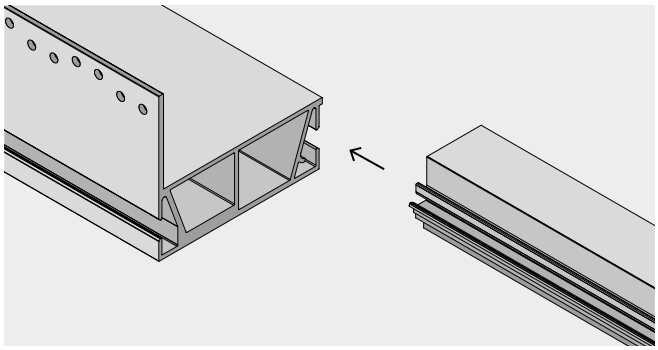


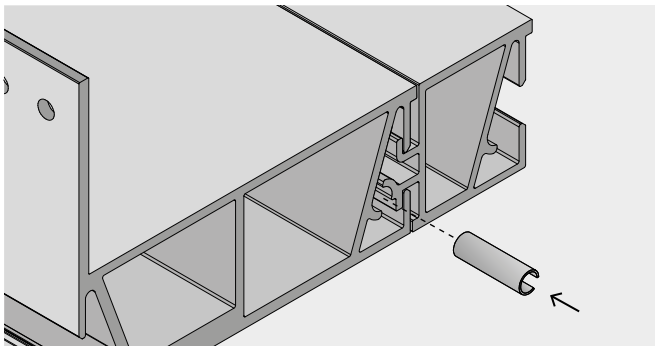
INSTALLATION ON TIMBER FRAME



a. bracing sheet
b. strut
c. beam

The ALUSTART35 side extension is easily inserted into the ALU START profiles. The compound profile is then secured in position by two ALUSPIN pins to be inserted at the ends. It is possible to install up to two ALUSTART35 profiles on a profile with a nailed flange.





PROFILE SELECTION

profile	reference width	recommended thickness t	
		minimum	maximum
	[in]	[in]	[in]
ALUSTART80	3 1/8	3	3 3/4
ALUSTART100	3 15/16	3 9/16	4 1/2
ALUSTART120	4 3/4	4 1/2	5 5/16
ALUSTART100 + ALUSTART35	5 5/16	5 5/16	6 1/8
ALUSTART120 + ALUSTART35	6 1/8	6 1/8	6 7/8
ALUSTART175	6 7/8	6 1/8	7 11/16
ALUSTART120 + 2x ALUSTART35	7 1/2	7 1/16	8 7/16
ALUSTART175 + ALUSTART35	8 1/4	7 11/16	9 1/4
ALUSTART175 + 2x ALUSTART35	9 5/8	9 1/4	10 5/8

INSTALLATION

NAILING

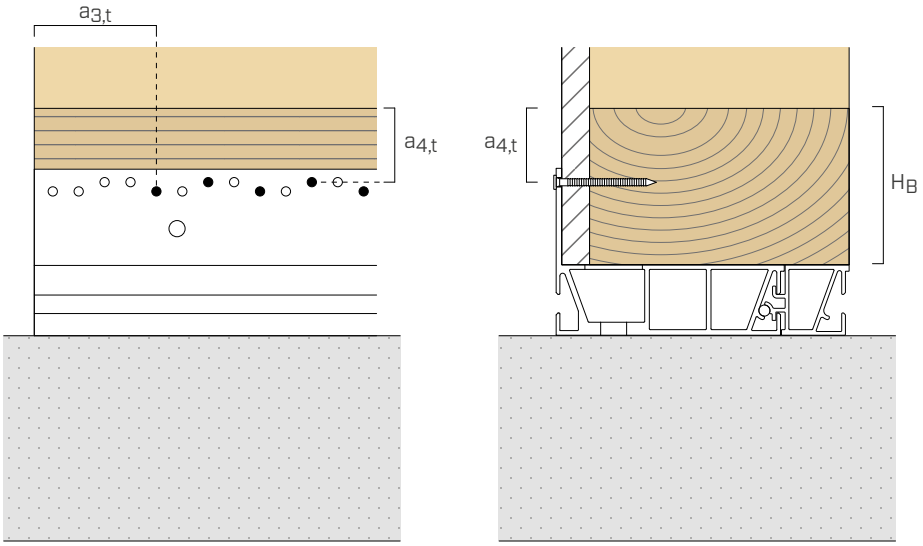
ALU START profiles can be used for different building systems (CLT / Timber Frame).
Depending on the construction technology, different nailings can be used in accordance with the minimum distances.

MINIMUM DISTANCES

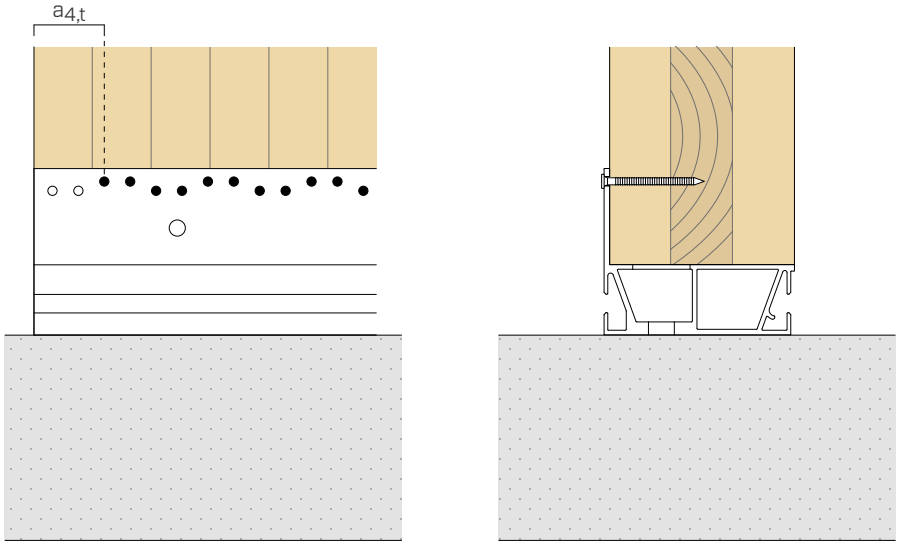
TIMBER minimum distances			nails LBA Ø0.16"	screws LBS Ø0.2"
C/GL	$a_{4,t}$	[in]	≥ 1 9/16	-
	H_B	[in]	≥ 3 5/8	-
	$a_{3,t}$	[in]	≥ 2 3/8	-
CLT	$a_{4,t}$	[in]	≥ 1 9/16	≥ 1 15/16

- C/GL: minimum distances for solid timber or glulam consistent with timber specific gravity < 0.55.

SOLID TIMBER (C) OR GLULAM (GL)



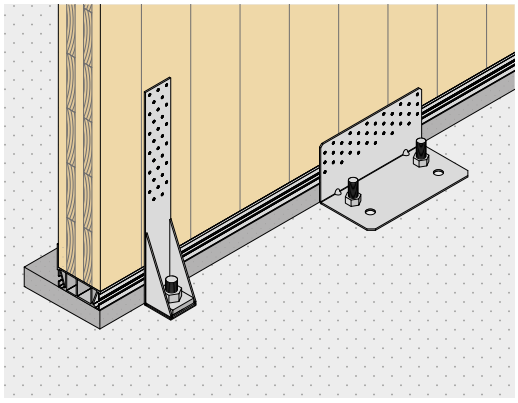
CLT



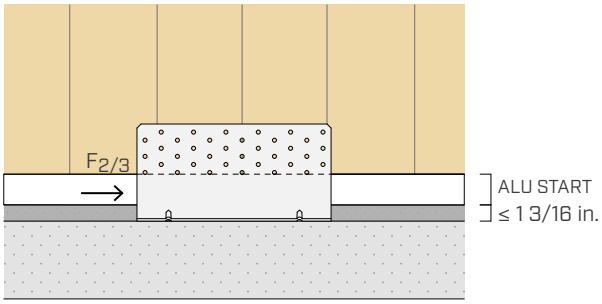
ADDITIONAL CONNECTION SYSTEMS

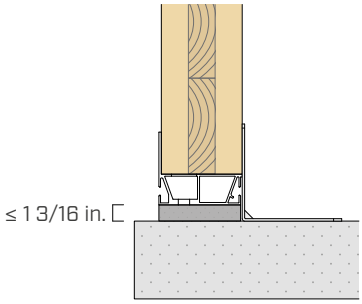
The ALU START geometry allows the use of additional connection systems such as TITAN TCN and WHT, even with a grout between the profile and the foundation.

Certified partial nailings are available for TITAN TCN installation which allow laying bedding grout with a thickness up to 1 3/16 in.



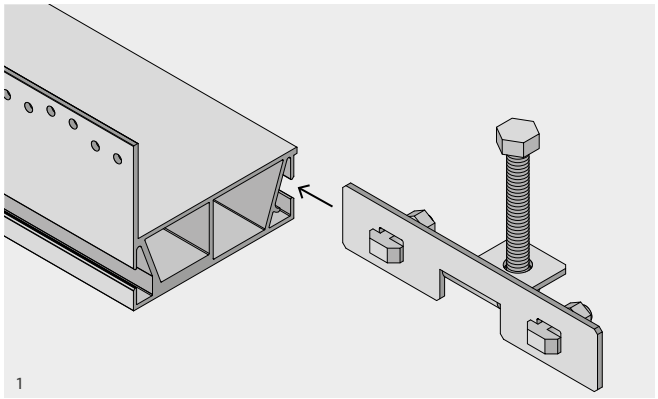
EXAMPLE OF INSTALLATION WITH TITAN TCN240

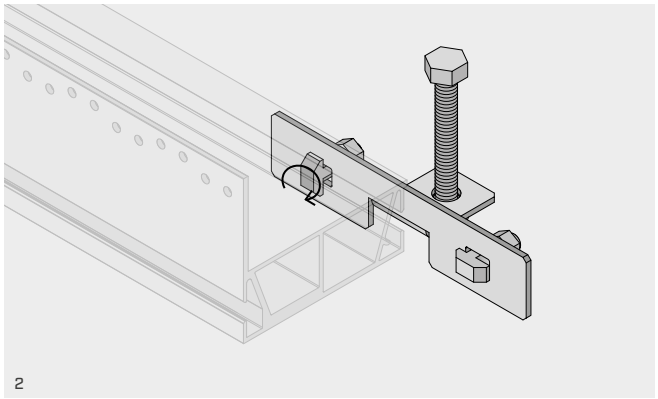


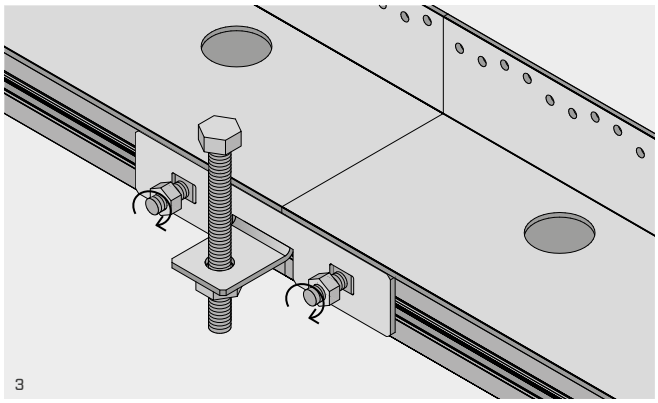


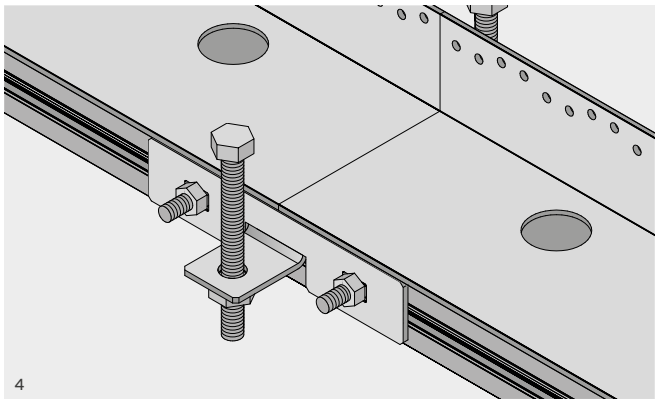
POSITIONING

Assembly includes the use of special JIG START templates for the height leveling of the profiles, for the linear joint and for creating 90° angles.



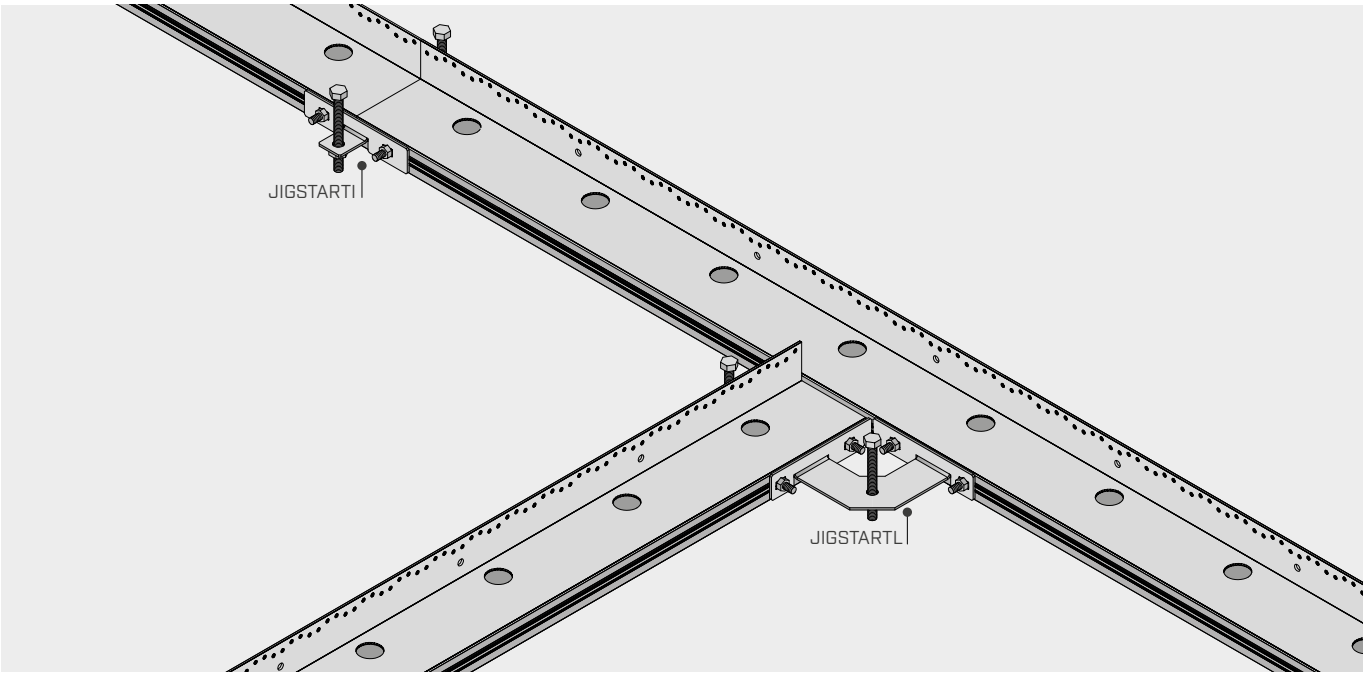






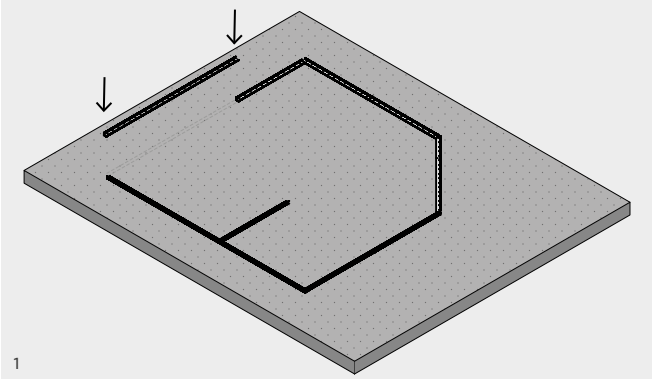
POSITIONING

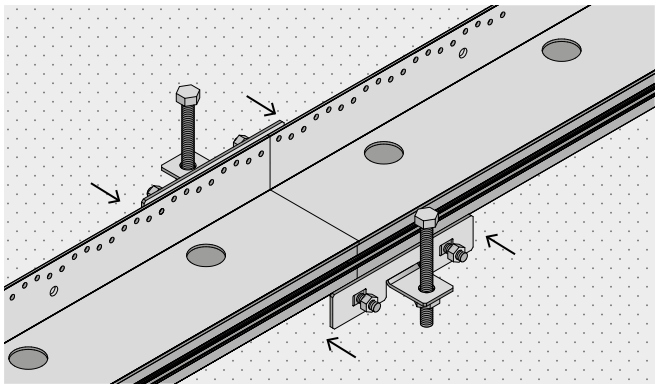
JIGSTARTI templates can connect two consecutive profiles and must be positioned on both sides of ALU START, without positioning constraints along the development.
The 90° angle bracket connection is carried out through the JIGSTARTL jigs.
On each template there is a hexagonal head bolt, which allows the height adjustment of the aluminium profiles.



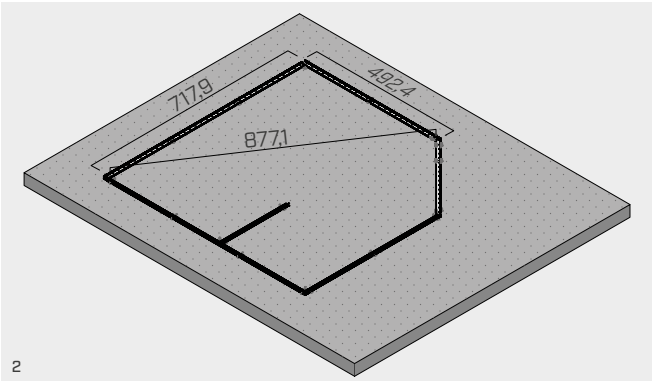
MOUNTING

VIDEO

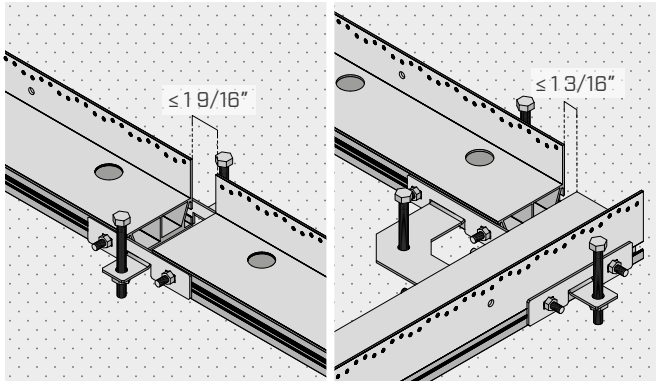




Preliminary positioning of the profiles on the laying surface using the templates and cutting the elements to size, if necessary.

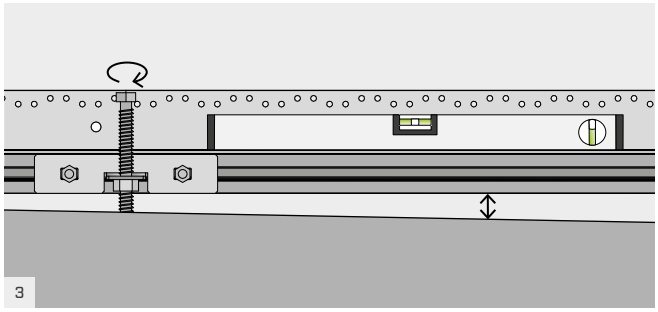


Finalize layout: verify overall dimensions and diagonals.

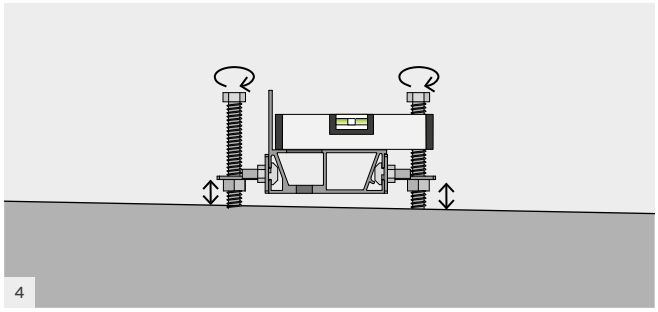


Fine adjustment with JIG START templates of the total length of the wall, compensating the tolerances of the profiles cut to size.

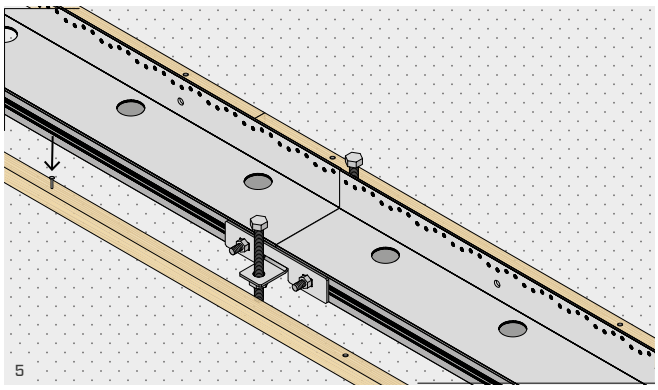
MOUNTING



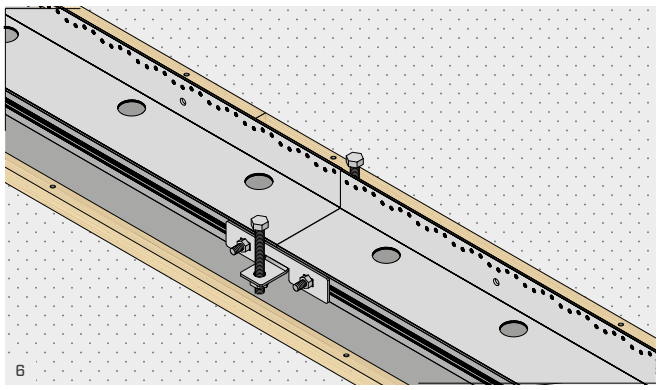
Longitudinal leveling of ALU START profile.



Lateral leveling of the ALUSTART profile.

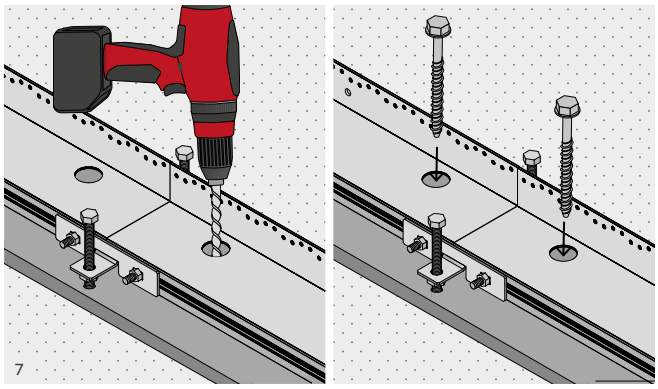


Construction of formwork with timber battens.

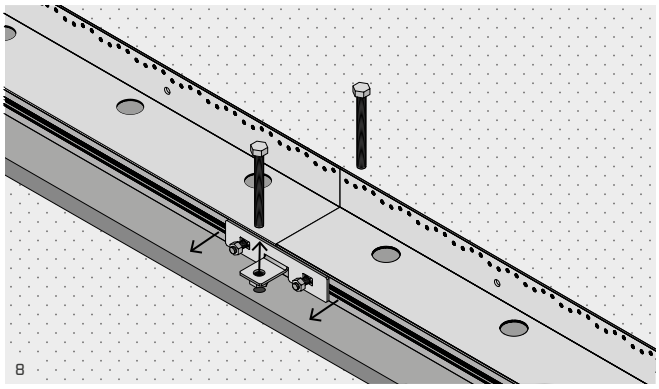


Pouring the grout between the profile and the concrete support.

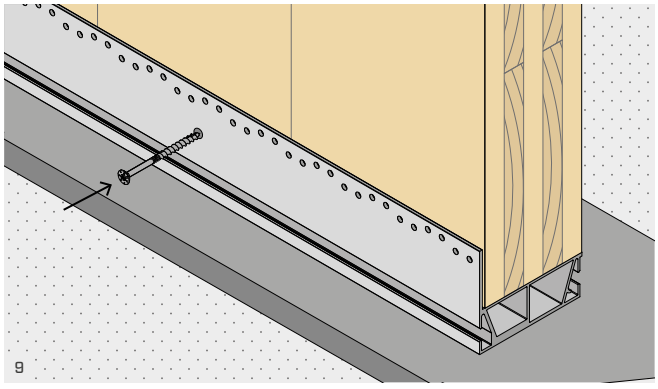
Before pouring grout between the profile and the concrete, always apply a moisture barrier such as STARTBAND, PROTECT, or a comparable separating membrane. This barrier prevents direct contact between the grout and the aluminium profile.



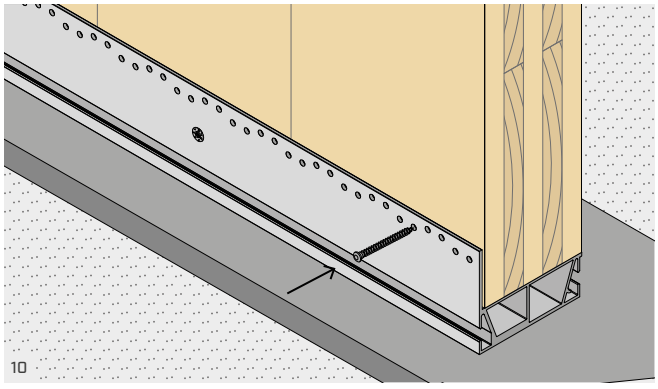
Insert the concrete anchors following the anchor installation instructions.



Removal of JIG START templates, which can be reused.



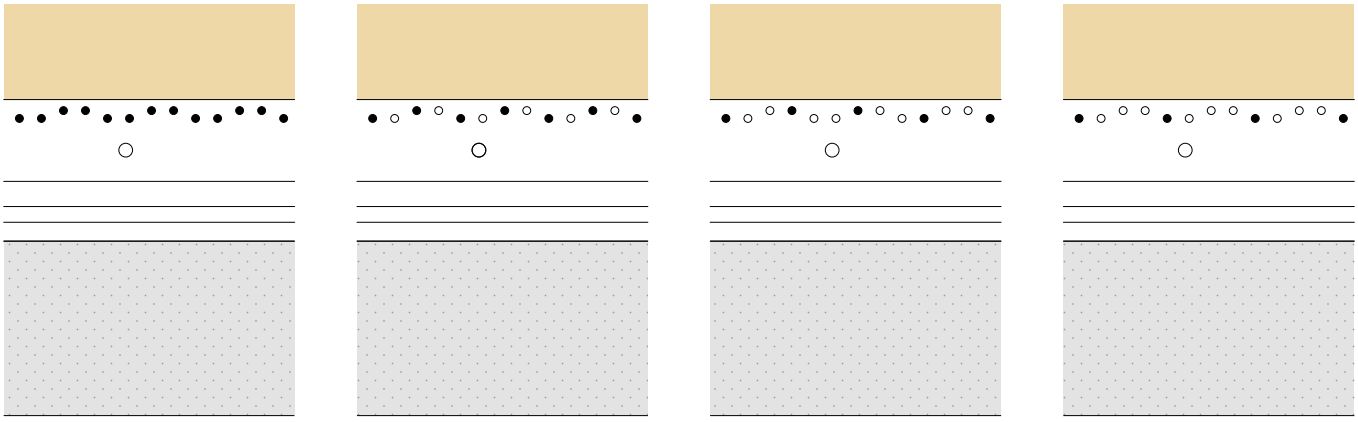
Positioning of the walls using Ø0.24 or Ø0.32 screws to pull the panel tight to the aluminium profile.



Profiles fastening with nails or screws.

PARTIAL FASTENING PATTERNS

It is possible to apply partial nailing patterns according to the design and installation requirements of the walls.



TOTAL FASTENING* | PATTERN 1 | PATTERN 2 | PATTERN 3

* This pattern is not suitable for solid timber/glulam in the presence of shear loads $F_{2/3}$.

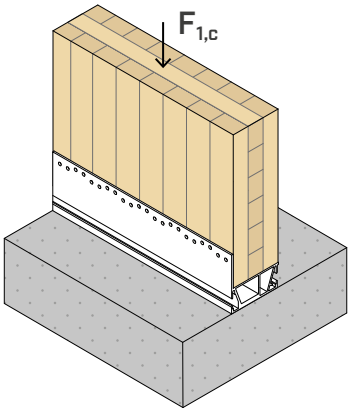
pattern	fastening holes Ø0.2		
	type	Ø x L [in]	n_v [pcs/ft]
total	LBA LBS	Ø0.16 x 2 3/8 Ø0.2 x 1 31/32	22
pattern 1			11
pattern 2			8
pattern 3			6

STRUCTURAL VALUES | TIMBER-TO-CONCRETE | $F_{1,c}$

It is possible to cut the profiles according to the design requirements; profiles with length less than 23 5/8" are to be considered for compressive strength only.

STRENGTH ON ALUMINIUM SIDE

		ALUMINIUM	
configuration	**reference width** [in]	$R_{1,c,ASD}$ [lbf/ft]	$\rho_{1,c,ASD}$ [psi]
ALUSTART35	1 3/8	**5087**	**308**
ALUSTART80	3 1/8	**15421**	**404**
ALUSTART100	3 15/16	**19225**	**404**
ALUSTART120	4 3/4	**23920**	**422**
ALUSTART100 + ALUSTART35	5 5/16	**24190**	**404**(1) + **308**(2)
ALUSTART120 + ALUSTART35	6 1/8	**29007**	**422**(1) + **308**(2)
ALUSTART175	6 7/8	**34543**	**439**
ALUSTART120 + 2x ALUSTART35	7 1/2	**32327**	**422**(1) + **308**(2)
ALUSTART175 + ALUSTART35	8 1/4	**38393**	**439**(1) + **308**(2)
ALUSTART175 + 2x ALUSTART35	9 5/8	**44692**	**439**(1) + **308**(2)



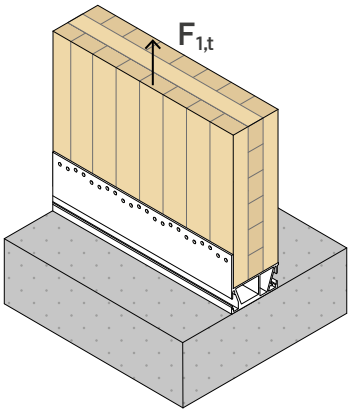
(1) Value referred to the main profile.
(2) Value referred to ALUSTART35 extension.

For walls of different widths to the reference width, the compression strength of the aluminium profile can be calculated by multiplying the parameter $F_{1,c,ASD}$ by the actual width of the wall.

STRUCTURAL VALUES | TIMBER-TO-CONCRETE | $F_{1,t}$

STRENGTH ON TIMBER-TO-ALUMINIUM SIDE

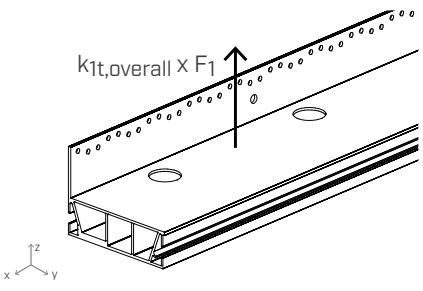
		TIMBER	ALUMINIUM	CONCRETE	
profile	**pattern**	$R_{1,t,ASD\ timber}$ (1) (2) [lbf/ft]	$R_{1,t,ASD\ alu}$ [lbf/ft]	$k_{t,\ overall}$ [lbf/ft]	$K_{1,t\ ser}$ [lbf/in-1/ft]
ALUSTART80	total	**3938**	3530	1,88	10780
	pattern 1	**1941**			
	pattern 2	**1275**			
	pattern 3	**942**			
ALUSTART100	total	**3938**		1,62	
	pattern 1	**1941**			
	pattern 2	**1275**			
	pattern 3	**942**			
ALUSTART120	total	**3938**		1,44	
	pattern 1	**1941**			
	pattern 2	**1275**			
	pattern 3	**942**			
ALUSTART175	total	**3938**		1,23	
	pattern 1	**1941**			
	pattern 2	**1275**			
	pattern 3	**942**			



(1) If a rotation of timber element can be avoided please refer to general notes at the bottom of this datasheet.
(2) Load duration factor C_d = 1.6 was considered in the calculations.
The installation of the ALUSTART35 extension, or the presence of a grout layer up to 1 3/16" with minimum class M10, do not affect the values in the table.

ANCHORS VERIFICATION FOR STRESS LOADING $F_{1,t}$

Fastening elements to the concrete through anchors shall be verified according to the load acting on the anchor, which can be evaluated through the tabulated geometric parameters (k_t).



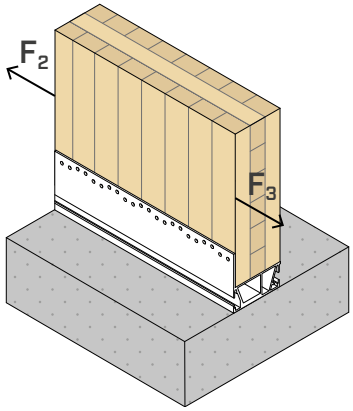
The anchor group must be verified for:

$N_{Ed,z,bolts} = F_{1,t} \times k_{1,t,overall}$

STRUCTURAL VALUES | TIMBER-TO-CONCRETE | $F_{2/3}$

STRENGTH ON TIMBER-TO-ALUMINIUM SIDE

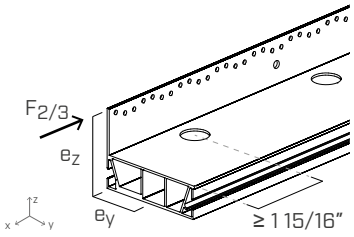
		TIMBER	CONCRETE		
profile	**pattern**	**$R_{2/3,ASD\ timber}$** [lbf/ft]	**e_y** [in]	**e_z** [in]	**$K_{2/3,ser}$** [lbf/in-1/ft]
ALUSTART80	total	**2015**	1 3/16	3 3/16	20900
	pattern 1	**997**			10790
	pattern 2	**655**			6960
	pattern 3	**484**			5220
ALUSTART100	total	**1818**			20900
	pattern 1	**900**			10790
	pattern 2	**591**			6960
	pattern 3	**437**			5220
ALUSTART120	total	**1622**			20900
	pattern 1	**803**			10790
	pattern 2	**528**			6960
	pattern 3	**390**			5220
ALUSTART175	total	**1177**			20900
	pattern 1	**584**			10790
	pattern 2	**384**			6960
	pattern 3	**284**			5220



The installation of the ALUSTART35 extension, or the presence of a grout layer up to 1 3/16" with minimum class M10, do not affect the values in the table.

ANCHORS VERIFICATION FOR STRESS LOADING $F_{2/3}$

Fastening to concrete using alternative anchors must be verified on the basis of the load acting on the anchors, which depend on the fastening configuration. In order to consider an anchor effective, the edge distance to the profile must be at least 1 15/16 in.



The anchor group must be verified for:

$V_{Ed,x,bolts} = F_{2/3}$
$M_{Ed,z,bolts} = F_{2/3,d} \times e_y$
$M_{Ed,x,bolts} = F_{2/3,d} \times e_z$

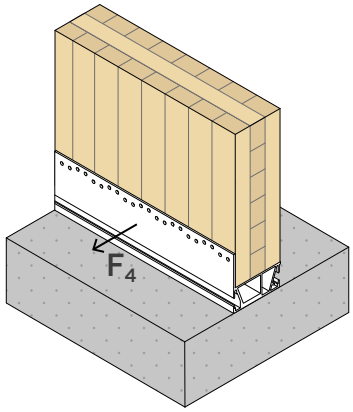
In which $F_{2/3,d}$ represents the shear stress acting on the ALU START connector. The check is satisfied if the design shear strength of the anchor group is greater than the design stress: $R_{2/3,d\ concrete} \geq F_{2/3,d.}$

STRUCTURAL VALUES | TIMBER-TO-CONCRETE | F_4

STRENGTH ON TIMBER-TO-ALUMINIUM SIDE

	ALUMINIUM	CONCRETE	
profile	**$R_{4,ASD\ alu}$** [lbf/ft]	**$k_{4t,\ overall}$**	**$K_{4,ser}$** [lbf/in-1/ft]
ALUSTART*	**3648**	1,84	47000

* Applies to all profiles.



The installation of the ALUSTART35 extension, or the presence of a grout layer up to 1 3/16" with minimum class M10, do not affect the values in the table.

ANCHORS VERIFICATION FOR STRESS LOADING F_4

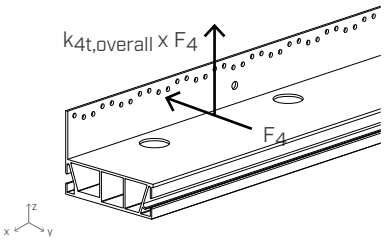
Fastening to concrete using alternative anchors must be verified on the basis of the load acting on the anchors, which depend on the fastening configuration.

The anchor group must be verified for:

$V_{Ed,y,bolts} = F_{4,Ed}$
$N_{Ed,z,bolts} = F_{4,Ed} \times k_{4t,overall}$

In which $F_{4,d}$ represents the shear stress acting on the ALU START connector.

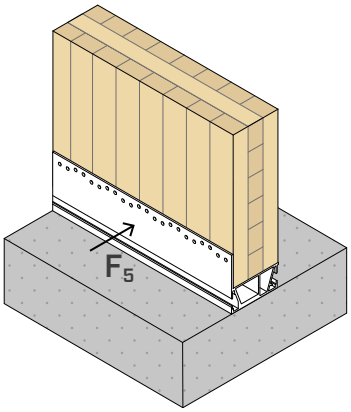
The check is satisfied if the design shear strength of the anchor group is greater than the design stress: $R_{4,d} \geq F_{4,d}$.



STRUCTURAL VALUES | TIMBER-TO-CONCRETE | F_5

STRENGTH ON TIMBER-TO-ALUMINIUM SIDE

		TIMBER	ALUMINIUM	CONCRETE	
profile	**pattern**	**$R_{5,ASD\ timber}$** [lbf/ft]	**$R_{5,ASD\ alu}$** [lbf/ft]	**$k_{5t,overall}$** [lbf/ft]	**$K_{5,ser}$** [lbf/in-1/ft]
ALUSTART80	total	**1987**	996	1,83	9570
	pattern 1	**980**			
	pattern 2	**640**			
	pattern 3	**470**			
ALUSTART100	total	**1987**		1,53	
	pattern 1	**980**			
	pattern 2	**640**			
	pattern 3	**470**			
ALUSTART120	total	**1987**		1,39	
	pattern 1	**980**			
	pattern 2	**640**			
	pattern 3	**470**			
ALUSTART175	total	**1987**		1,28	
	pattern 1	**980**			
	pattern 2	**640**			
	pattern 3	**470**			



The installation of the ALUSTART35 extension, or the presence of a grout layer up to 1 3/16" with minimum class M10, do not affect the values in the table.

ANCHORS VERIFICATION FOR STRESS LOADING F_5

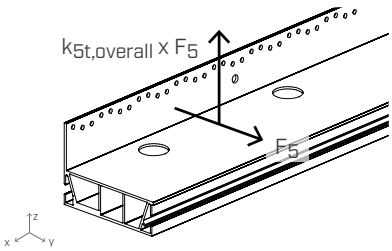
Fastening to concrete using alternative anchors must be verified on the basis of the load acting on the anchors, which depend on the fastening configuration.

The anchor group must be verified for:

$V_{Ed,y,bolts} = F_{5,Ed}$
$N_{Ed,z,bolts} = F_{5,Ed} \times k_{5t,overall}$

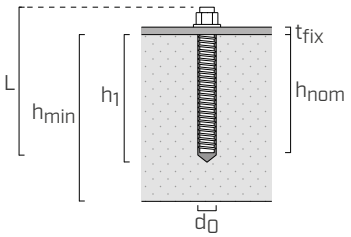
In which $F_{5,d}$ represents the shear stress acting on the ALU START connector.

The check is satisfied if the design shear strength of the anchor group is greater than the design stress: $R_{5,d} \geq F_{5,d}$.



ANCHOR INSTALLATION PARAMETERS

profile	anchor type		t_{fix}	h_{ef}	h_{nom}	h_1	d_0	h_{min}
	type	Ø x L [in]	[in]	[in]	[in]	[in]	[in]	[in]
ALU START*	VIN-FIX 5.8	M12 x 5 1/2	1/4	4 1/2	4 1/2	4 3/4	9/16	7 7/8
	VIN-FIX 8.8	M12 x 5 1/2	1/4	4 1/2	4 1/2	4 3/4	9/16	
	HYB-FIX 8.8	M12 x 5 1/2	1/4	4 1/2	4 1/2	4 3/4	9/16	
	SKR	12 x 3 9/16	1/4	2 1/2	3 1/4	4 1/8	3/8	
	AB1	M12 x 3 15/16	1/4	2 3/4	3 1/8	3 3/8	1/2	
	VIN-FIX 5.8	M12 x 7 11/16	1/4	6 1/2	6 1/2	6 11/16	9/16	
	VIN-FIX 8.8	M12 x 7 11/16	1/4	6 1/2	6 1/2	6 11/16	9/16	
	HYB-FIX 8.8	M12 x 7 11/16	1/4	6 1/2	6 1/2	6 11/16	9/16	
	EPO-FIX 8.8	M12 x 7 11/16	1/4	6 11/16	6 11/16	6 7/8	9/16	



t_{fix} fastened plate thickness
h_{nom} nominal anchoring depth
h_{ef} effective anchoring depth
h_1 minimum hole depth
d_0 hole diameter in the concrete support
h_{min} concrete minimum thickness

Precut INA threaded rod, with nut and washer.
MGS threaded rod class 8.8 to be cut to size.
For further details, see the **"PLATES AND CONNECTORS FOR TIMBER"** catalogue, available in the "Catalogues" section of the website www.rothoblaas.com.
* The values in the table are valid for all ALU START profiles.

ALUSTART | COMBINED STRESSES

With regard to timber and aluminium, it is possible to combine the effect of the different actions through the following expressions:

$$\left(\frac{F_{1,t,Ed}}{R_{1,t,d}}\right)^2 + \left(\frac{F_{2/3,Ed}}{R_{2/3,d}}\right)^2 + \left(\frac{F_{4,Ed}}{R_{4,d}}\right)^2 \leq 1$$

$$\left(\frac{F_{1,t,Ed}}{R_{1,t,d}}\right)^2 + \left(\frac{F_{2/3,Ed}}{F_{2/3,d}}\right)^2 + \left(\frac{F_{5,Ed}}{R_{5,d}}\right)^2 \leq 1$$

Regarding checks on the anchor side, the results of the loads must be applied to the group of anchors, following the indications of the diagrams relating to each load direction.

NOTES

(1) If rotation of timber element can't be avoided , the maximum applied tension load $F_{t,1}$ must fulfil the following equation according to ADM2020:

$$\frac{F_{t,1}}{\text{Ø}\left(\text{or}\ \frac{1}{\Omega}\right)\cdot t_w \cdot l \cdot F_{ty}} + \frac{3 \cdot F_{t,1} \cdot (t + t_w)}{\text{Ø}\left(\text{or}\ \frac{1}{\Omega}\right)\cdot t_w^2 \cdot l \cdot F_{ty}} \leq 1.0$$

t = timber width
t_w = vertical plate width
l = plate length
F_{ty} = aluminum yield strength

GENERAL PRINCIPLES

- The verification of the fastener-to-concrete connection must be carried out separately.
- The strength values are calculated individually. In case of combined loading the verification must be carried out separately.
- For the calculation process a timber with a specific gravity of 0.42 has been considered.
- For the Timber side : The values are calculated according to the NDS (2024). The tabulated reference design values are unfactored and should be multiplied by the adjustment factors to get the adjusted design values except for uplift that C_d = 1.6 was considered for load duration factor.
- For the aluminium side: calculations are based on ADM2020 and test-validated analysis.

INTELLECTUAL PROPERTY

- An ALU START model is protected by the Registered Community Design RCD 008254353-0002.