TITAN DIVE

ADVANCED HIGH-TOLERANCE ANGLE BRACKET

INNOVATIVE
The innovative system with special corrugated tubes and angle brackets represents a new method of ground fastening, with the reliability of an anchor pre-installed in concrete and the tolerance of a post-installed anchor.

FREEDOM OF INSTALLATION
It allows maximum freedom in the installation of timber walls by avoiding the need to drill holes in the concrete substrate, which saves considerable time on site.

TOLERANCE MANAGEMENT
The corrugated tube system allows a tolerance of 22 mm in each direction and an inclination of ±13°.

USA, Canada and more design values available online.

VIDEO

PATENTED

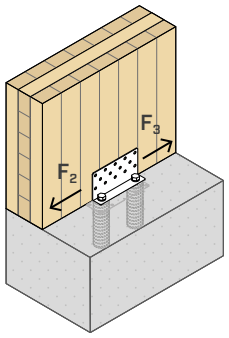
SERVICE CLASS SC1 SC2

MATERIAL

S235 Fe/Zn12c **TDN240**: S235 + Fe/Zn12c carbon steel

DX51D Z275 **TDS240**: DX51D + Z275 carbon steel

EXTERNAL LOADS



FIELDS OF USE

Fastening on concrete of timber walls, beams or columns.
The angle brackets are fastened inside corrugated pipes prepared in the casting.
Maximum installation tolerance.

Can be applied to:
- TIMBER FRAME walls
- CLT and LVL panel walls
- solid timber or glulam beams or columns

THIN KERBS

Installing the angle bracket in the wall thickness allows for the construction of walls on very thin reinforced concrete kerbs.

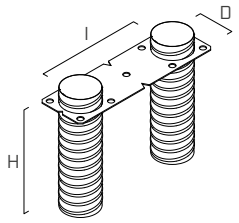
CLT AND TIMBER FRAME

The TDS240 model with 8 mm HBS PLATE screws is ideal for installation on CLT walls, while the TDN240 model can be used on any type of wall.

CODES AND DIMENSIONS

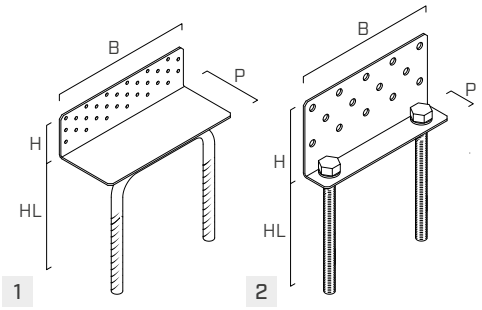
CORRUGATED PIPES

CODE	D [mm]	I [mm]	H [mm]	*D [in]*	*I [in]*	*H [in]*	pcs
CD60180	60	180	200	*2 3/8*	*7 1/8*	*8*	1



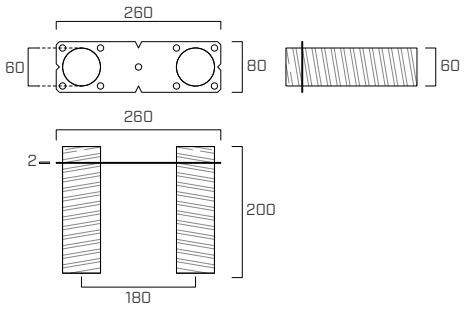
ANGLE BRACKETS

	CODE	B [mm]	P [mm]	H [mm]	HL [mm]	*B [in]*	*P [in]*	*H [in]*	*HL [in]*	pcs
1	**TDN240**	240	100	70	180	*9 1/2*	*4*	*2 3/4*	*8*	1
2	**TDS240**	240	50	125	180	*9 1/2*	*1 15/16*	*4 15/16*	*8*	1

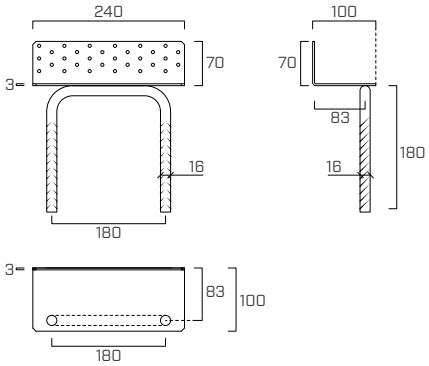


GEOMETRY

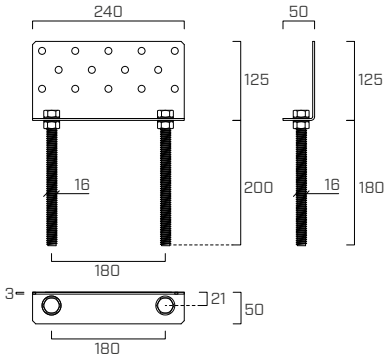
CD60180



TDN240



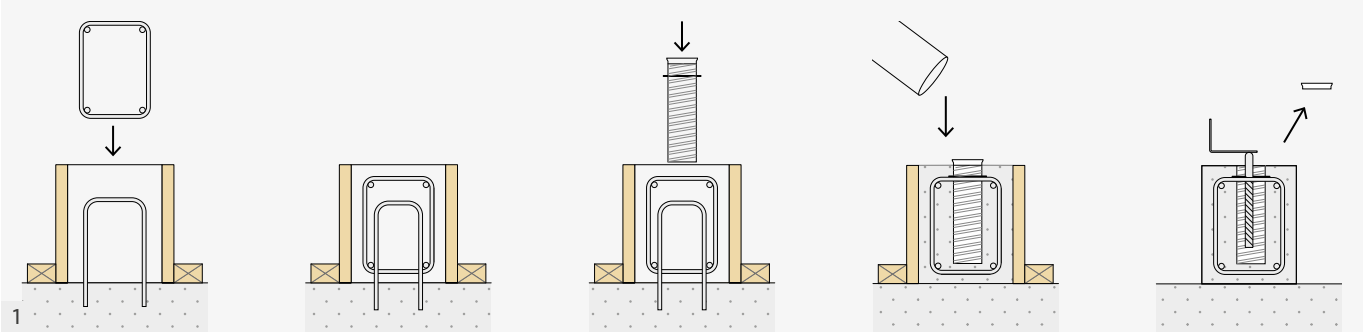
TDS240



FASTENERS

type	description		d [mm]	support	page
LBA	high bond nail		4		570
LBS	round head screw		5		571
HBS PLATE	pan head screw		8		573

PREPARATION OF THE CONCRETE KERB



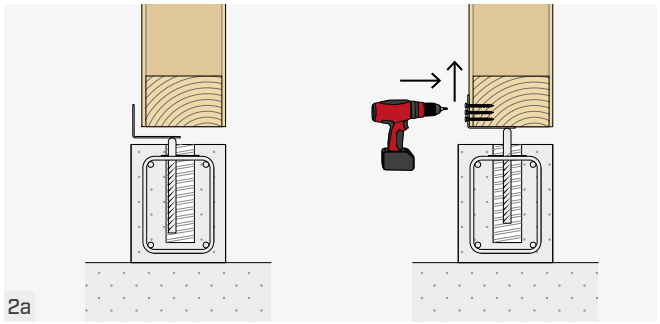
After preparing the formwork for casting and after positioning the reinforcement rods, the pipes (CD60180) are inserted, taking care to fasten them properly to the brackets or formwork to keep them in position during casting operations. Alignment of the centre of the system is facilitated by markings on the edges of the plate.

Concrete is poured into the formwork. After the casting has hardened, it is possible to proceed with the removal of formwork and positioning of the levelling shims. The angle bracket can be installed after removing the plugs.

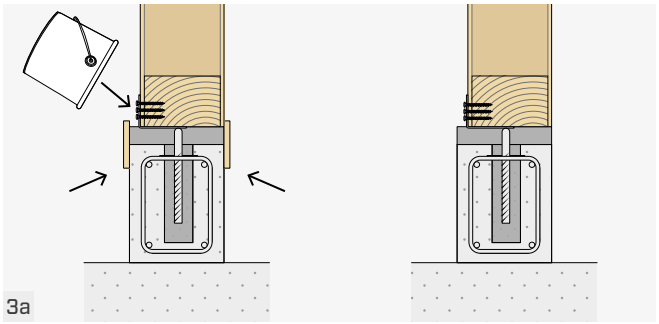
WALL INSTALLATION AND FASTENING

The walls can be installed in different ways:

VARIANT A: PRE-INSTALLED ANGLE-BRACKET WITH END CASTING

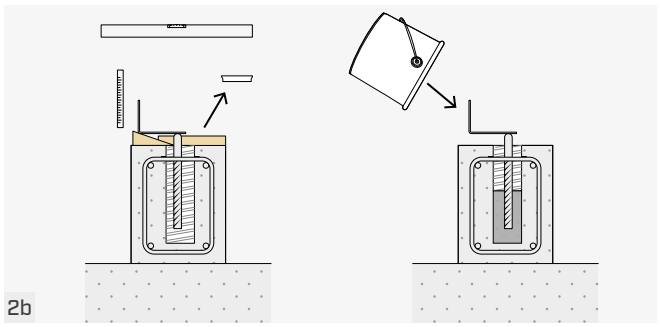


Wall installation using "SHIM" spacer elements. The plate is then fastened with nails or screws.

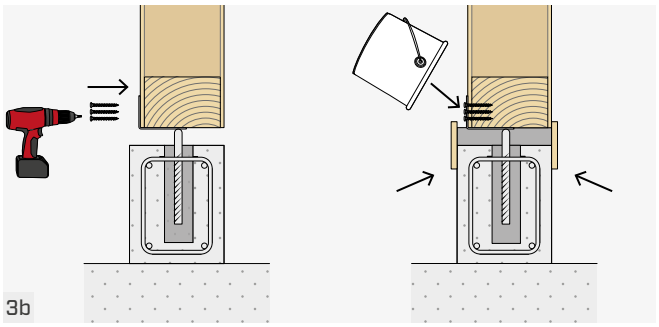


Preparation of the sides for pouring the compensated-shrinkage structural grout, taking care to start pouring in the vicinity of the corrugated pipes.

VARIANT B: PRE-INSTALLED ANGLE BRACKET WITH INTERMEDIATE CASTING

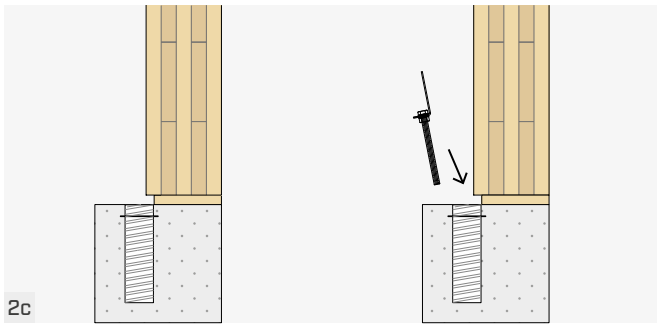


In this case, the angle brackets form the reference (planimetric and altimetric alignment) for installing the walls. After the angle brackets have been placed in their final position, the partial pouring of grout into the corrugated pipes is carried out.

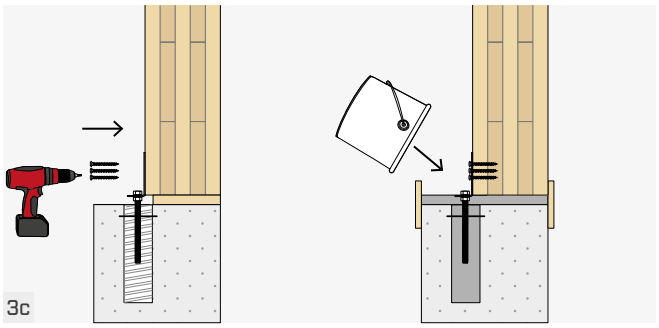


The wall is installed and the angle brackets are fastened following the of intermediate spacers (SHIM) pre-arrangement. The last operation is the completion of the levelling casting with non-shrinkage grout inside the corrugated pipes and below the wall.

VARIANT C: POST INSTALLED ANGLE BRACKET



After positioning and levelling the wall with shims (SHIM), the angle brackets are placed in the corrugated tubes.



The last step is the preparation of the sides for pouring the structural compensated shrinkage grout and the casting, taking care to start the casting in the vicinity of the corrugated pipes.

ADDITIONAL PRODUCTS

PROTECT
SELF-ADHESIVE BUTYL BAND, CAN BE PLASTERED

START BAND
WATERPROOFING PROFILE WITH HIGH MECHANICAL RESISTANCE

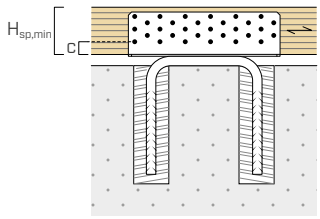
SHIM LARGE
LARGE BIOPLASTIC SPACERS

Find out more at www.rothoblaas.com.

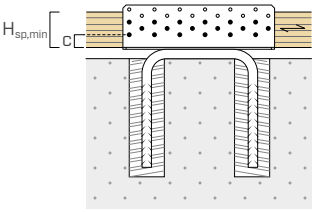
FASTENING PATTERNS

TDN240 | TIMBER-TO-CONCRETE

INSTALLATION ON TIMBER FRAME

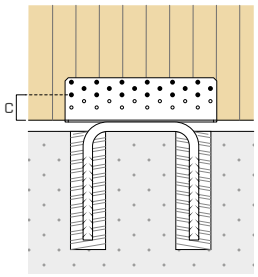


pattern 1



pattern 2

INSTALLATION ON CLT

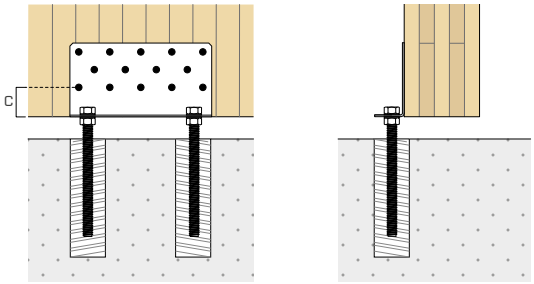


pattern 3

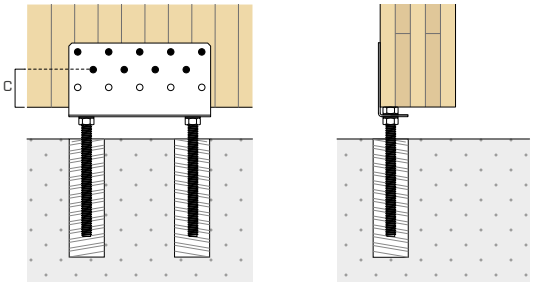
CODE	configuration	fastening holes Ø5			c	$H_{sp,min}$	$R_{2/3,K}$ [1]
		type	Ø x L [mm]	n_V [pcs]	[mm]	[mm]	[kN]
TDN240	pattern 1	LBA LBS	Ø4 x 60 Ø5 x 70	30	20	80	51,8
	pattern 2	LBA LBS	Ø4 x 60 Ø5 x 70	18	20	60	34,4
	pattern 3	LBA LBS	Ø4 x 60 Ø5 x 70	18	40	-	-

TDS240 | TIMBER-TO-CONCRETE

INSTALLATION ON CLT



pattern 1
POST INSTALLED



pattern 2
PRE INSTALLED

CODE	configuration	holes fixing Ø11			c	$R_{2/3,K}$ [1]
		type	Ø x L [mm]	n_V [pcs]	[mm]	[kN]
TDS240	pattern 1	HBS PLATE	Ø8,0 x 80	14	50	70,3
	pattern 2	HBS PLATE	Ø8,0 x 80	9	65	36,1

NOTES

- The complete filling of the space between the angle bracket and reinforced concrete is considered, using non-shrinkage grout or a suitable material of equal performance.
- The minimum distances of the connectors from the edge are determined according to:
  - ÖNORM EN 1995-1-1 (Annex k) for nails and ETA-11/0030 for screws applied on CLT panels
  - according to ETA considering a density of timber elements $\rho_k < 420$ kg/m^3 for applications on framed walls or on glulam or C/GL solid timber

[1] $R_{2/3,k}$ is a preliminary structural strength value; a complete data sheet with the structural values defined by ETA will be available at www.rothoblaas.com.

INTELLECTUAL PROPERTY

- TITAN DIVE system and method protected by patent IT102021000031790

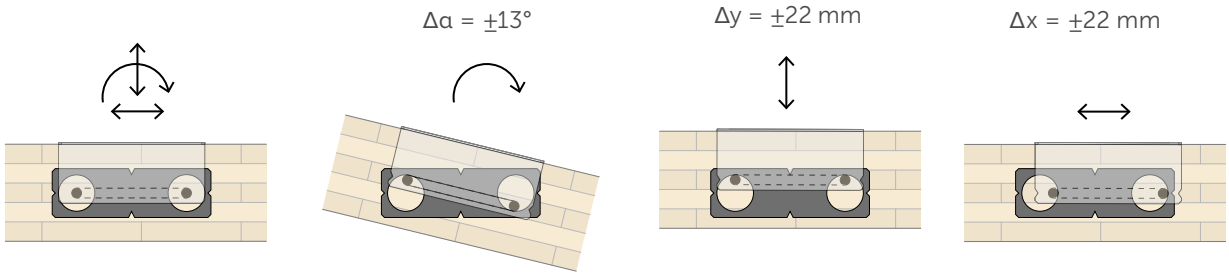
CONSTRUCTION TOLERANCES

The TDN/TDS angle bracket fastening to the corrugated pipes prepared in the concrete can be carried out according to two different methods depending on the kerb width and specific requirements.

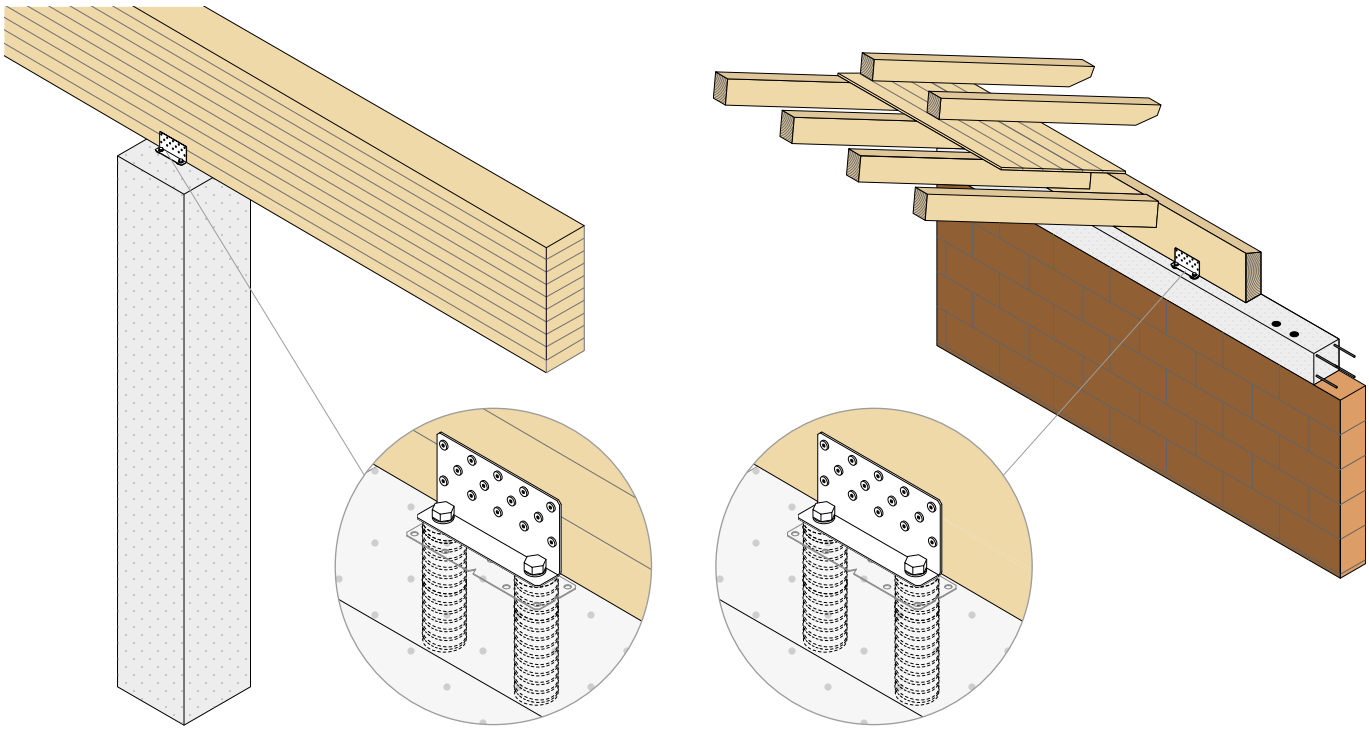
The first method, in which the angle bracket must be positioned inside the CD60180 element tubes before the wall is installed, allows reducing the concrete kerb dimensions by inserting the angle bracket under the timber wall.

The second, which involves the angle bracket installation after the wall has been installed, can be particularly advantageous if a continuous foundation or kerb with sufficient width is available.

With the TITAN DIVE system, in both cases, it is possible to achieve high mechanical strengths and high relative tolerances between concrete foundations along the three main axes (x,y,z) and rotations in the horizontal plane (α). The use of a universal anchoring system to the foundation, pre-installed in the concrete casting, provides an excellent compromise to reduce the risks associated with different construction tolerances. Possible problems of misalignment between foundation and timber frame are mitigated by allowing, as in most currently available applications, independence of construction phases.



Another advantage over current applications is the avoidance of interference between the reinforcement pre-arranged in the concrete and the anchoring system. This considerably speeds up installation and guarantees the result especially in the case of thick reinforcement layer and reduces noise and dust produced during installation.



The TITAN DIVE connection system also allows interesting advantages in different fields of application. For example, it can be used to transfer shear forces between timber beams and prefabricated or in-situ reinforced concrete columns. Similarly, it can be used if reinforced concrete brackets or walls are used.
Anchor positioning tolerances and uncertainties related to installation tolerances (out-of-square, alignment, height, etc.) can be easily resolved by reducing the need for customised plates.
Another example, in the field of new or existing construction, is the connection node between the platform beam and the top concrete kerb. With the TITAN DIVE system, effective connections with wide installation tolerances can be achieved which allow the different construction phases to be untied and achieve an effective connection between the horizontal diaphragm and walls.