

Connection systems

for smart structural engineering

A great reliable connection.



CE ETA



knapp-connectors.com

KNAPP®
connectors.com

WALCO® V | The connector for prefab wall up to 8,3 kN

System advantages:

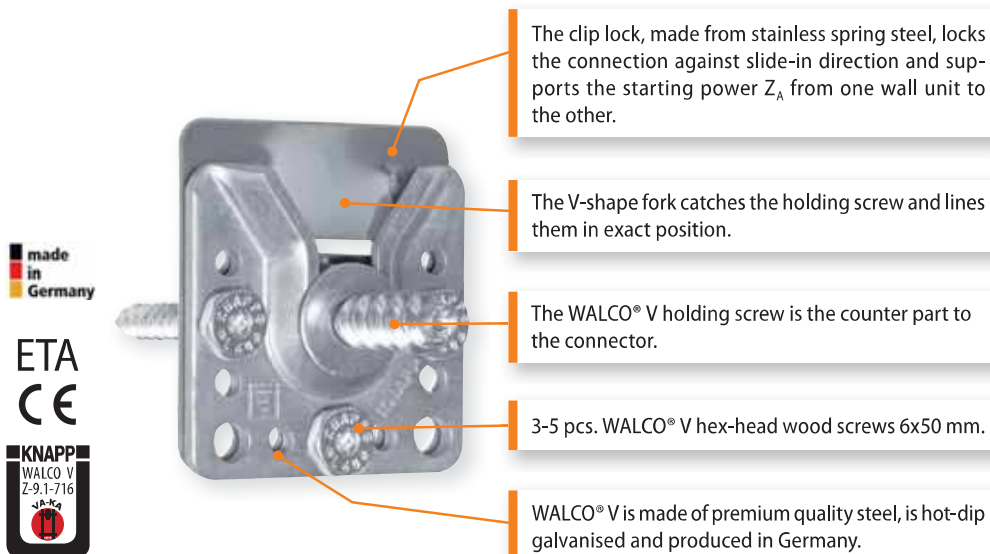
- Fast and accurate – stable connection after hook-in
- Assemble of prefabricated walls without screwing on site
- Connections for wood to wood, wood to steel and wood to concrete
- Connector thickness 13/15 mm
- Easy installation through tapered V-notch and holding screw
- Adjustment of joint spacing
e.g. for seals and readjustment of building tolerances
- Screwed directly onto studs or with interlayer (e.g. OSB)
- Minimum required timber width only 80 mm (3-1/8")



WALCO® V60
60x60x13
2-3/8"x2-3/8"x1/2"



WALCO® V80
80x80x15
3-1/8"x3-1/8"x5/8"



Installation example:
Mounted on the wall with
double-sided element seals.



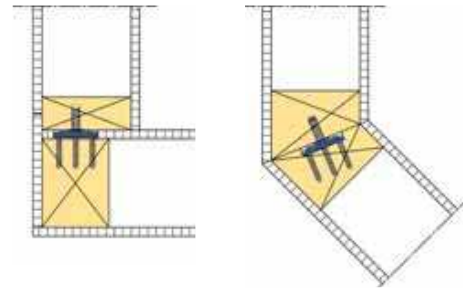
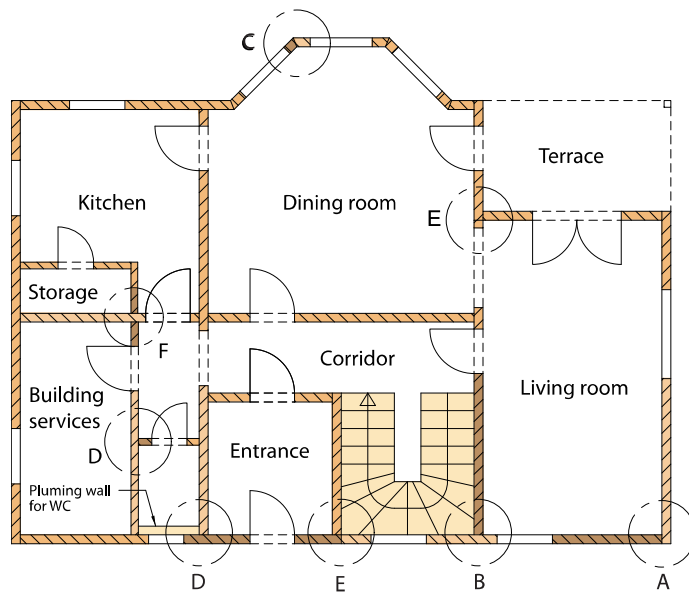
Installation example:
Mounted on the wall element.



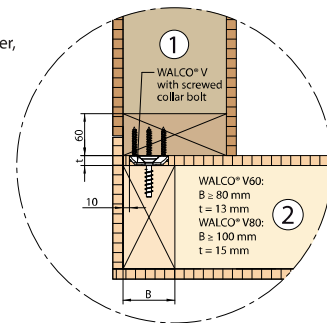
Boat House | Water-Holiday-World „Im Jaich“ | Rügen (DE)

WALCO® V60 / V80

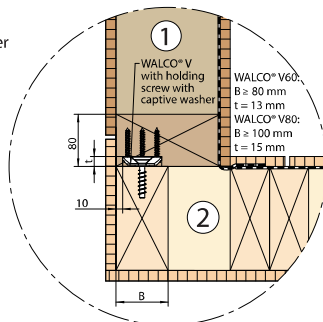
Application examples and connection details



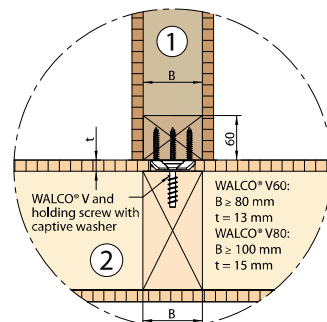
Detail A:
External wall corner,
planked with
wood-based
panel



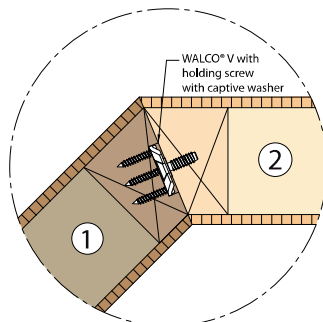
Detail A:
External wall corner
with vapor barrier
(PE-Im)



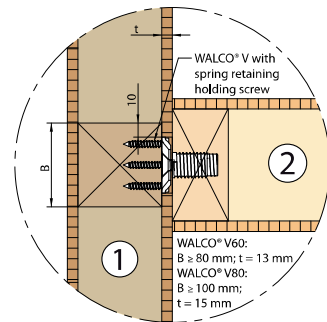
Detail B:
External wall
connection
Internal wall
connection



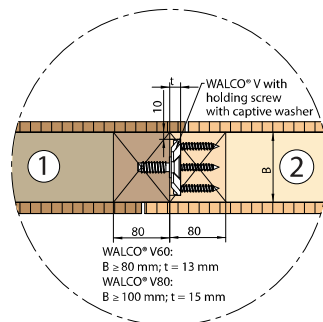
Detail C:
External wall
mitre corner



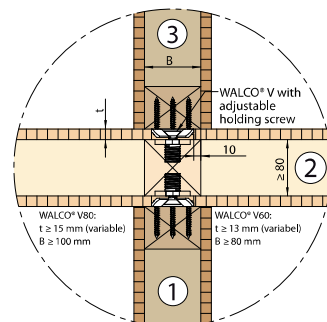
Detail D:
Internal wall
connection (e.g.
plumbing wall)



Detail E:
External wall
straight joint
Internal wall
straight joint



Detail F:
Internal wall
crossing



(All Dimensions in mm)

Overview WALCO® V – design values

Dimensioning according to ETA 10/0189 and O 86

WALCO® V60 - design values

Min. 80 mm timber width of stud

Art.-No.	Connector	Wood types	Tension resistance [kN]		Capacity in insert direction [kN]		Capacity perpendicular to insert direction [kN]	
			5 th % fractile $F_{1,Rk}$ (unfactored)	Factored resistance $F_{1,Rd}$ (factored)	5 th % fractile $F_{2,Rk}$ (unfactored)	Factored resistance $F_{2,Rd}$ (factored)	5 th % fractile $F_{45,Rk}$ (unfactored)	Factored resistance $F_{45,Rd}$ (factored)
K102	WALCO® V60	SPF	5,9	3,5	5,0	3,0	3,9	2,3
		CLT	5,9	3,5			3,9	2,3
		Glulam spruce pine	6,3	3,8			4,1	2,5
		D Fir-Larch	6,9	4,1			4,6	2,8

WALCO® V80 - design values

Min. 100 mm timber width of stud

Art.-No.	Connector	Wood types	Tension resistance [kN]		Capacity in insert direction [kN]		Capacity perpendicular to insert direction [kN]	
			5 th % fractile $F_{1,Rk}$ (unfactored)	Factored resistance $F_{1,Rd}$ (factored)	5 th % fractile $F_{2,Rk}$ (unfactored)	Factored resistance $F_{2,Rd}$ (factored)	5 th % fractile $F_{45,Rk}$ (unfactored)	Factored resistance $F_{45,Rd}$ (factored)
K103	WALCO® V80	SPF	7,1	4,3	5,0	3,0	4,5	2,7
		CLT	7,1	4,3			4,5	2,7
		Glulam spruce pine	7,5	4,5			4,8	2,9
		D Fir-Larch	8,3	5,0			5,3	3,2

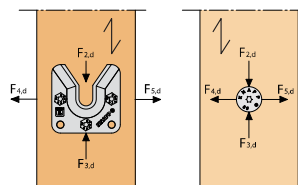
The factored values are based on load duration $KD = 1,0$ (standard terms), service condition $KSF = 1,0$ and treatment $KT = 1,0$ and material resistance factor $\phi = 0,6$.

$F_{1,Rk}$ (unfactored)	unfactored tension capacity (parallel to beam)
$F_{1,Rd}$ (factored)	factored tension capacity (parallel to beam)
$F_{2,Rk}$ (unfactored)	unfactored capacity in insert direction
$F_{2,Rd}$ (factored)	factored capacity in insert direction
$F_{45,Rk}$ (unfactored)	unfactored capacity perpendicular insert direction
$F_{45,Rd}$ (factored)	factored capacity perpendicular insert direction

Contact your local technical support for assistance.

Correction Factor f for other wood types

See page 5.



Practical example

Wind Load Canada:

$w_d = 0,6 \text{ kN/m}^2$ ($q = 0,5 \text{ kN/m}^2$, $c_{pe} = 0,8$, $v = 102 \text{ km/h}$)

$w_d = 1,0 \text{ kN/m}^2$ ($q = 0,8 \text{ kN/m}^2$, $c_{pe} = 0,8$, $v = 129 \text{ km/h}$)

$w_d = 1,5 \text{ kN/m}^2$ ($q = 1,25 \text{ kN/m}^2$, $c_{pe} = 0,8$, $v = 160 \text{ km/h}$)

$w_d = 1,9 \text{ kN/m}^2$ ($q = 1,55 \text{ kN/m}^2$, $c_{pe} = 0,8$, $v = 179 \text{ km/h}$)

$$w_d = \gamma_Q \cdot c_{pe} \cdot q = 1,5 \cdot c_{pe} \cdot q$$

Table 1: Wall width B in dependence of the number of connectors and wind load
We recommend min. 3 WALCO® V connectors for external wall corner.

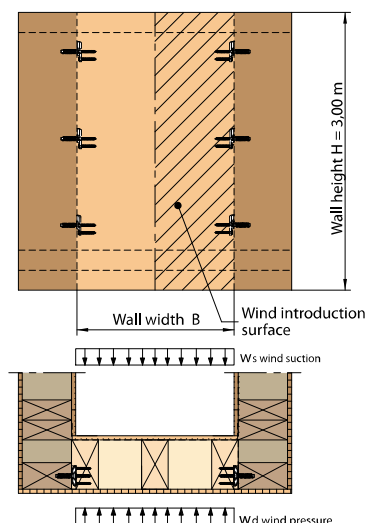
Qty/joint	Connector	Max. length of wall B [m]			
		Designed wind load [kN/m²]			
		$w_d = 0,6$	$w_d = 1,0$	$w_d = 1,5$	$w_d = 1,9$
3	WALCO® V60	7,7	4,6	3,1	2,4
4	3 scr. 6x50	10,2	6,1	4,1	3,2
5	1 scr. 12x60	12,8	7,7	5,1	4,0
3	WALCO® V80	9,0	5,4	3,6	2,8
4	3 scr. 10x60	12,0	7,2	4,8	3,8
5	1 scr. 16x60	15,0	9,0	6,0	4,7

Factor $f = 100\%$, Wall height $H = 3,00 \text{ m}$

F_{45} (factored) = **2,30 kN** (WALCO® V60 Connection)

F_{45} (factored) = **2,70 kN** (WALCO® V80 Connection)

$$B = \frac{2 \cdot f \cdot n \cdot F_{45} \text{ (factored)}}{H \cdot w_d}$$



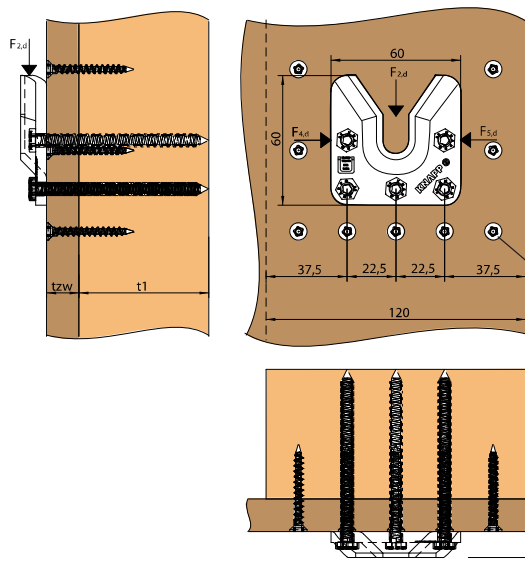
The graph shows the load directions and installation. Design values given in the table below should be used for structural analysis according to EC5 (EN1995-1-1).

WALCO® V60 / V80

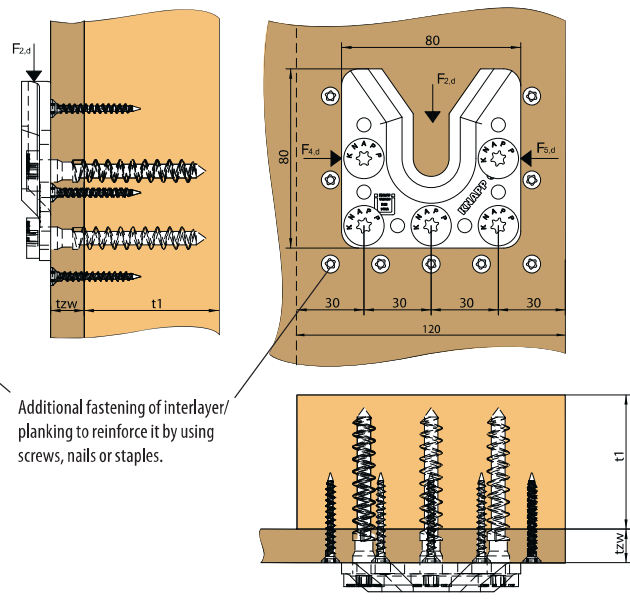
Design values in and perpendicular to insert direction with interlayer according to ETA 10/0189 and EN 1995

Thickness t_{zw} [mm]	Interlayer/ Stud	WALCO® V60 5 screws 6x80 1 screw 12x60				WALCO® V80 5 screws 10x80 1 screw 16x60			
		Design values of load-bearing capacity F_{Rd} [kN]				Design values of load-bearing capacity F_{Rd} [kN]			
		$F_{2,Rd}$ [[permanent]	$F_{2,Rd}$ [medium]	$F_{2,Rd}$ [short]	$F_{45,Rd}$ [short]	$F_{2,Rd}$ [[permanent]	$F_{2,Rd}$ [medium]	$F_{2,Rd}$ [short]	$F_{45,Rd}$ [short]
18	Gypsum Board / SPF	2,1	3,7	4,1	2,7	3,0	4,4	4,9	3,1
15		1,6	3,3	4,0		2,8			
22	OSB / SPF	2,2	3,7	4,1	2,7	3,3	4,4	4,9	3,1
15		2,3	3,9	4,1		2,9			
19	Particleboard / SPF	2,4	3,7	4,1	2,7	2,9	4,4	4,9	3,1
15		1,9	3,3	4,0		2,8			
19	Plywood / SPF	2,7	3,7	4,1	2,7	3,3	4,4	4,9	3,1
15		2,7	3,7	4,1		3,3			

WALCO® V60



WALCO® V80



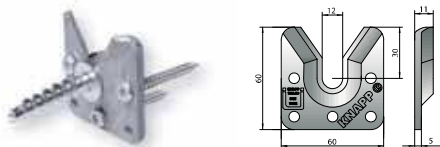
Additional fastening of interlayer/
planking to reinforce it by using
screws, nails or staples.

WALCO® V directly to intermediate layer (cladding) attached:

When screwing the WALCO® V connector directly to an intermediate layer, the design values listed below come into force, these relate to the European Technical Approval ETA-10/0189 and on DIN 1052/EN 1995-1-1 (2010). The values in the different load duration classes and the action directions are divided. Additionally, note that the interlayer force-fits with screws, nails or staples is fastened with a wooden stand (see picture above: auxiliary screwed).

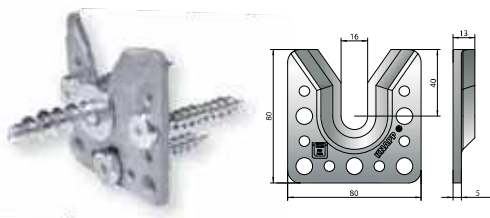
WALCO® V60 incl. holding screw and hex-head wood screws

Art.-Nr. KS: K102



Holding screw	Hex-head wood screws	5 th % fractile [SPF, CLT]		
		$F_{2,Rk}$ [kN] (unfactored)	$F_{45,Rk}$ [kN] (unfactored)	$F_{1,Rk}$ [kN] (unfactored)
KS 12x60	3 pcs. 6x50	5,9	3,9	6,5

WALCO® V80 incl. holding screws and hex-head wood screws

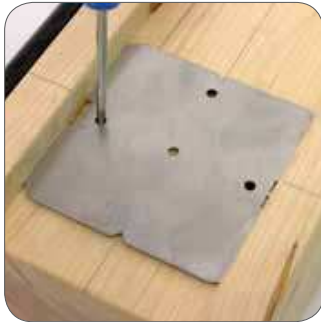


Holding screw	Hex-head wood screws	5 th % fractile [SPF, CLT]		
		$F_{2,Rk}$ [kN] (unfactored)	$F_{45,Rk}$ [kN] (unfactored)	$F_{1,Rk}$ [kN] (unfactored)
KS 16x60	3 pcs. 10x60	7,1	4,5	7,1

WALCO® V

Installation

- Simple and fast installation with routing machine and optional KNAPP® template.
- Installation with CNC joinery machine possible – all data for the standard CNC joinery machine programmes are included.



- 1) If necessary make milling, mark drilling.

Milling with routing machine



- 2) Pre-drill screws (see installation instructions).



- 3) Screw on WALCO® V with the provided screws and retaining screw in counterpart.



Helicopter assembly of a house on the Rigi mountain (Switzerland)



Construction manuals, .DXF drawings for WALCO® V-System as well as your personal consultant in your area, please visit:
www.knapp-connectors.com/download