

VB

Connector for wood-concrete floors

Burnished carbon steel

CE
ETA 13/0699

SFS intec



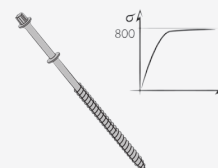
CONSULTING

Free software and personalised consultations to optimise fastenings



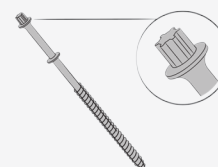
SPECIAL PERFORMANCE

Optimum static and noise performance, both for new projects and structural restoration



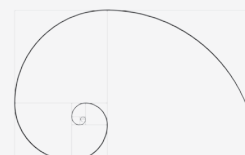
RAPID DRY SYSTEM

Approved system, self-perforating, reversible, extremely fast to install and minimally invasive



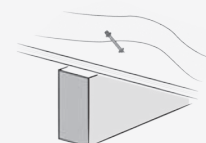
OPTIMISED GEOMETRY

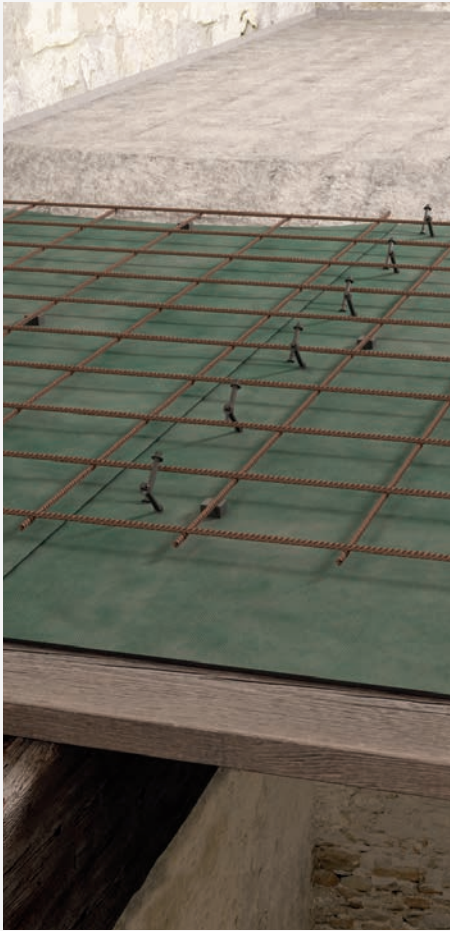
Self-perforating tip, hexagonal head and limiter ring to limit seepage



FIELDS OF USE

Screw connection system for wood-concrete floors, approved for solid wood, glulam, X-Lam, LVL, and wood-based panels. Service classes 1 and 2





FLOOR SLAB

The connectors placed at 45° in an "X" configuration make it possible to obtain perfect coupling and excellent static performance between the concrete slab and the wood beams



INSTALLATION

The connectors are installed with a simple screwdriver, without any pre-bored holes and without interrupting the wooden planking. Installation is extremely fast (between 200 and 300 connectors an hour, on average)



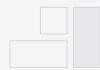
STRUCTURAL RESTORATION

The reduced diameter of the connector (7.5mm) and the dry installation (reversible) make the system minimally invasive and hence ideal for structural recovery and restoration

Applications



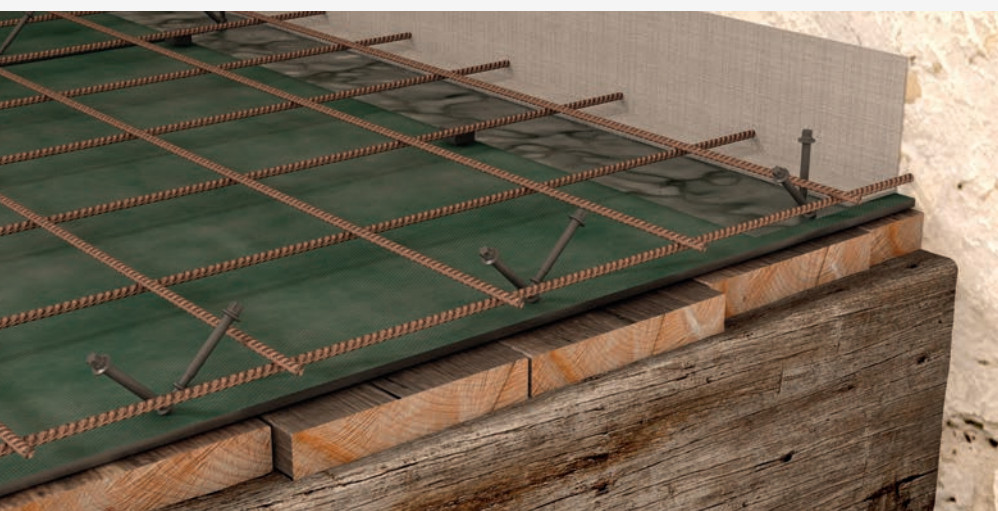
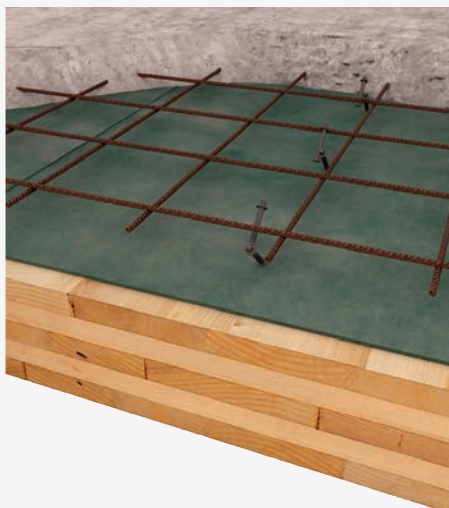
Rigid "knee" joint with double internal plate



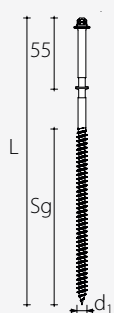
Floor slab on X-Lam panel



Alternative placement near the walls for structural recovery



Codes and dimensions



d ₁ [mm]	code	Type	L [mm]	s _g [mm]	s wooden planking [mm]	pcs/pkg
7,5	CS100900	7,5 x 100	155	95	0 - 28	100
	CS100905	7,5 x 165	220	135	0 - 50	

code	description	pcs/pkg
ATCS005	guiding slot E8 1/4 Torx	1
ATCS006	Connector 6.35 (1/4)	1

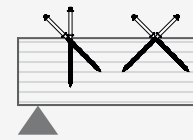
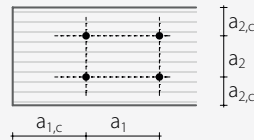
Geometry and minimum distances

GEOMETRY AND MECHANICAL CHARACTERISTICS*

VB CONNECTOR		① 7,5 x 100	② 7,5 x 165
Nominal diameter	d_1 [mm]	7,5	7,5
Head diameter	d_k [mm]	12,00	12,00
Tip diameter	d_2 [mm]	4,30	4,60
Shank diameter	d_3 [mm]	6,10	6,00
Thread length	s_g [mm]	95,0	135,0
Penetration length	L_1 [mm]	100,0	165,0
Upper length	L_2 [mm]	45,0	45,0
Characteristic tensile strength	$f_{tens,k}$ [kN]	16,0	17,0
Sliding module	$K_{ser\ 45^\circ/135^\circ}$ [N/mm]	$240 \cdot \ell_{ef}$	$240 \cdot \ell_{ef}$
	$K_{ser\ 45^\circ/90^\circ}$ [N/mm]	$100 \cdot \ell_{ef}$	$100 \cdot \ell_{ef}$

* Values in accordance with ETA-13/0699

MINIMUM DISTANCES FOR AXIAL STRESSES ⁽¹⁾

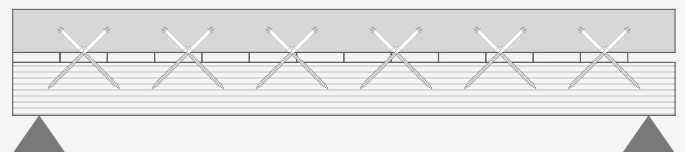


		7,5 x 100	7,5 x 165
a_1	[mm]	80	80
a_2	[mm]	20	20
$a_{1,c}$	[mm]	80	80
$a_{2,c}$	[mm]	30	30

RESISTANCE AS A FUNCTION OF THE PLANK THICKNESS*

Plank thickness t_p [mm]	Shear resistance (sliding) T_k for a pair of VB [kN]		Difference ΔT_k
	7,5 x 100	7,5 x 165	
0	16,6	18,1	9%
10	14,6	18,1	24%
20	12,6	18,1	44%
28	11,0	18,1	61%
40	-	17,1	-
50	-	15,1	-

* Values in accordance with Z-9.1-342.



NOTE

⁽¹⁾ The minimum distances for connectors stressed axially are independent of the insertion angle of the connector and the angle of the force with respect to the grain, in accordance with ETA-13/0699.

Preliminary sizing of VB connectors for wood - cement floors

ACCORDING TO
EN 1995:2008

Calculation example:

Distance between joists	= 660 mm
Concrete slab thickness C20/25	= 60 mm
Strain limit	$w_{ist} = \ell/400$ $w_{net,fin} = \ell/250$
Calculation standard	EN 1995:2008

Loads:

own weight (g_{k1})	= wood beam + wooden planking + cement slab
permanent non-structural load (g_{k2})	= 2 kN/m ²
variable overload (q_k)	= 2 kN/m ²

CONNECTOR VB 7,5 x 100 - Glulam GL 24h (EN 1194)

Plank thickness $t_s = 20$ mm

BEAM SECTION BxH [mm]		Beam length L [m]						
		3,5	4	4,5	5	5,5	6	6,5
120 x 160	no. pairs per beam	12	18	26				
	distance[mm]	250/350	150/250	140/200	-	-	-	-
	no. connectors/m²	10,4	13,6	17,5				
120 x 200	no. pairs		12	20	26	36		
	distance[mm]	-	250/350	180/260	140/220	120/180	-	-
	no. connectors/m²		9,1	13,5	15,8	19,8		
140 x 200	no. pairs		12	18	26	34		
	distance[mm]	-	260/380	200/280	160/220	120/200	-	-
	no. connectors/m²		9,1	12,1	15,8	18,7		
140 x 240	no. pairs				20	26	34	42
	distance[mm]	-	-	-	300/400	160/240	140/200	120/180
	no. connectors/m²				12,1	14,3	17,2	19,6

CONNECTOR VB 7,5 x 165 - Glulam GL 24h (EN 1194)

Plank thickness $t_s = 40$ mm

BEAM SECTION BxH [mm]		Beam length L [m]						
		3,5	4	4,5	5	5,5	6	6,5
120 x 160	no. pairs per beam	7	10	12				
	distance[mm]	500/500*	300/500*	260/360	-	-	-	-
	no. connectors/m²	6,1	7,6	8,1				
120 x 200	no. pairs		8	10	12	20		
	distance[mm]	-	500/500*	400/500*	300/400	200/400	-	-
	no. connectors/m²		6,1	6,7	7,3	11,0		
140 x 200	no. pairs		8	10	12	16		
	distance[mm]	-	500/500*	400/500*	300/460	240/340	-	-
	no. connectors/m²		6,1	6,7	7,3	8,8		
140 x 240	no. pairs				10	12	18	24
	distance[mm]	-	-	-	400/500*	300/500*	250/350	200/300
	no. connectors/m²				6,1	6,6	9,1	11,2

* For safety, a maximum distance of 500 mm is used.

CONNECTOR VB 7,5 x 100 - Solid wood C24 (EN 338)

Plank thickness $t_s = 20$ mm

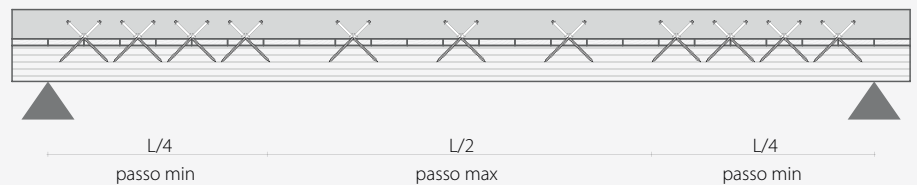
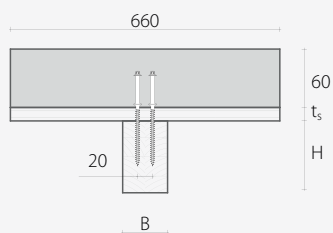
BEAM SECTION BxH [mm]		Beam length L [m]						
		3,5	4	4,5	5	5,5	6	6,5
130 x 130	no. pairs per beam	8	14	22				
	distance[mm]	300/400	180/280	140/200	-	-	-	-
	no. connectors/m²	6,9	10,6	14,8				
140 x 160	no. pairs		10	16	24	32		
	distance[mm]	-	260/380	180/260	140/200	120/180	-	-
	no. connectors/m²		7,6	10,8	14,5	17,6		
160 x 200	no. pairs		9	12	18	26	34	
	distance[mm]	-	400/400	300/400	200/300	160/220	120/200	-
	no. connectors/m²		6,8	8,1	10,9	14,3	17,2	
180 x 180	no. pairs		10	12	20	28	36	46
	distance[mm]	-	350/400	250/350	180/260	140/200	120/180	100/150
	no. connectors/m²		7,6	8,1	12,1	15,4	18,2	21,4

CONNECTOR VB 7,5 x 165 - Solid wood C24 (EN 338)

Plank thickness $t_s = 40$ mm

BEAM SECTION BxH [mm]		Beam length L [m]						
		3,5	4	4,5	5	5,5	6	6,5
130 x 130	no. pairs per beam	6	8	10				
	distance[mm]	500/500	400/500	280/400	-	-	-	-
	no. connectors/m²	5,2	6,1	6,7				
140 x 160	no. pairs		7	8	12	20		
	distance[mm]	-	500/500	400/500	280/400	180/260	-	-
	no. connectors/m²		5,3	5,4	7,3	11,0		
160 x 200	no. pairs		7	8	10	12	16	
	distance[mm]	-	500/500	500/500	450/500	340/460	250/350	-
	no. connectors/m²		5,3	5,4	6,1	6,6	8,1	
180 x 180	no. pairs		7	8	10	12	20	26 *
	distance[mm]	-	500/500	500/500	400/500	280/400	200/320	180/260
	no. connectors/m²		5,3	5,4	6,1	6,6	10,1	12,1

* Strain limit $w_{ist} = \ell/350$



NOTE

- Values obtained using HBV calculation software - Version 5.1.8 in accordance with Z-9.1-342 approval

Preliminary sizing of VB connectors for wood - cement floors

ACCORDING TO
NTC 2008

Calculation example:

Distance between joists	= 660 mm
Concrete slab thickness C20/25	= 60 mm
Strain limit	$w_{ist} = \ell/400$ $w_{net,fin} = \ell/250$
Calculation standard	NTC 2008

Loads:

own weight (g_{k1})	= wood beam + wooden planking + cement slab
permanent non-structural load (g_{k2})	= 2 kN/m ²
variable overload (q_k)	= 2 kN/m ²

CONNECTOR VB 7,5 x 100 - Glulam GL 24h (EN 1194)

Plank thickness $t_s = 20$ mm

BEAM SECTION BxH [mm]		Beam length L [m]						
		3,5	4	4,5	5	5,5	6	6,5
120 x 160	no. pairs per beam	14	22	28				
	distance[mm]	200/300	150/200	120/180	-	-	-	-
	no. connectors/m²	12,1	16,7	18,9				
120 x 200	no. pairs		16	24	32	42		
	distance[mm]	-	200/300	160/220	120/180	100/160	-	-
	no. connectors/m²		12,1	16,2	19,4	23,1		
140 x 200	no. pairs		14	22	30	42		
	distance[mm]	-	220/320	160/240	120/200	100/160	-	-
	no. connectors/m²		10,6	14,8	18,2	23,1		
140 x 240	no. pairs				22	30	38	48
	distance[mm]	-	-	-	180/260	140/200	120/180	100/160
	no. connectors/m²				13,3	16,5	19,2	22,4

CONNECTOR VB 7,5 x 165 - Glulam GL 24h (EN 1194)

Plank thickness $t_s = 40$ mm

BEAM SECTION BxH [mm]		Beam length L [m]						
		3,5	4	4,5	5	5,5	6	6,5
120 X 160	no. pairs per beam	8	10	16				
	distance[mm]	400/500*	300/400	200/300	-	-	-	-
	no. connectors/m²	6,9	7,6	10,8				
120 X 200	no. pairs		8	10	16	24		
	distance[mm]	-	450/500*	300/500*	240/340	180/260	-	-
	no. connectors/m²		6,1	6,7	9,7	13,2		
140 X 200	no. pairs		8	10	12	20		
	distance[mm]	-	500/500*	400/500*	280/400	200/300	-	-
	no. connectors/m²		6,1	6,7	7,3	11,0		
140 X 240	no. pairs				10	14	20	28
	distance[mm]	-	-	-	400/500*	280/400	220/320	180/260
	no. connectors/m²				6,1	7,7	10,1	13,1

* For safety, a maximum distance of 500 mm is used.

CONNECTOR VB 7,5 x 100 - Solid wood C24 (EN 338)

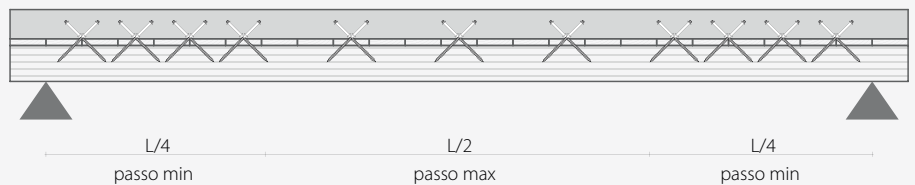
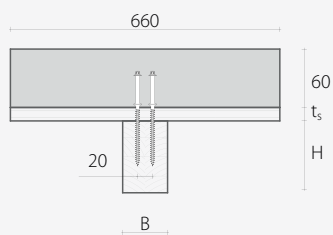
Plank thickness $t_s = 20$ mm

BEAM SECTION BxH [mm]		Beam length L [m]						
		3,5	4	4,5	5	5,5	6	6,5
130 x 130	no. pairs per beam	10	18	26				
	distance[mm]	250/350	150/200	120/180	-	-	-	-
	no. connectors/m²	10,1	15,6	19,7				
140 x 160	no. pairs		14	22	28	44		
	distance[mm]	-	200/300	150/200	120/180	100/120	-	-
	no. connectors/m²		12,1	16,7	18,9	26,7		
160 x 200	no. pairs		9	12	22	28	42	
	distance[mm]	-	400/400	240/340	160/240	140/200	100/160	-
	no. connectors/m²		7,8	9,1	14,8	17,0	23,1	
180 x 180	no. pairs		10	16	24	32	42	54
	distance[mm]	-	300/400	200/300	140/220	120/180	100/150	80/140
	no. connectors/m²		8,7	12,1	16,2	19,4	23,1	27,3

CONNECTOR VB 7,5 x 100 - Solid wood C24 (EN 338)

Plank thickness $t_s = 40$ mm

BEAM SECTION BxH [mm]		Beam length L [m]						
		3,5	4	4,5	5	5,5	6	6,5
130 x 130	no. pairs per beam	6	8	14				
	distance[mm]	500/500	360/500	200/300	-	-	-	-
	no. connectors/m²	6,1	6,9	10,6				
140 x 160	no. pairs		7	10	14	26		
	distance[mm]	-	500/500	300/400	220/340	150/200	-	-
	no. connectors/m²		6,1	7,6	9,4	15,8		
160 x 200	no. pairs		7	8	10	14	20	
	distance[mm]	-	500/500	500/500	400/500	250/400	200/300	-
	no. connectors/m²		6,1	6,1	6,7	8,5	11,0	
180 x 180	no. pairs		7	8	10	16	24	32
	distance[mm]	-	500/500	400/500	350/500	240/340	180/260	140/200
	no. connectors/m²		6,1	6,1	6,7	9,7	13,2	16,2



NOTE

- Values obtained using HBV calculation software - Version 5.1.8 in accordance with Z-9.1-342 approval