

TOGE TSM BS VS

Bridge cap anchor for existing or prefabricated caps of road bridges or subsequent fastening

Approval

Approved by building authorities as shear-connector.

Impermeability

Verification of the impermeability of the system without or after alternating load.

Cost saving

Application as subsequent anchoring of the bridge cap to the superstructure – enormous cost saving by retaining the existing cap.



Installation

Fast and safe installation.

Force Transmission

Transmission of forces in existing concrete by the undercutting technique in combination with chemical mortar.

Force transmission in new concrete via shear studs (hexagonal head or shear stud washer).

Approval

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General type approval / General technical approval Z-21.1-1799.

General type approval / General technical approval Z-21.1-1880.

Base Materials

Application in cracked and non-cracked concrete of strength classes from C20/25 to C50/60.



Headshapes & materials

Steel,
zinc-plated

Steel,
anti-corrosion
coated

Steel,
stainless A4

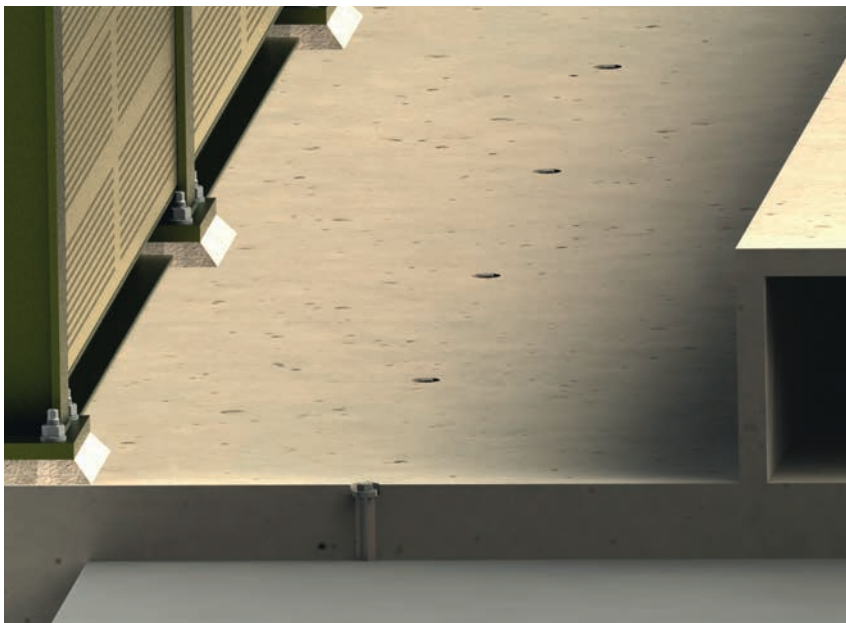


Bridge cap anchor with backfill disc TSM BS 16 SW 27



Injection mortar and accessories

Application Examples



Subsequent fastening of bridge caps on road bridges with the TOGE TSM VS

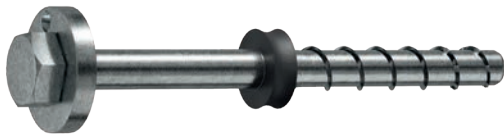


Detail



Product Overview

Steel, stainless A4



Item nr.	Designation	Depth of drill hole h_0	Embedment depth of anchor h_{nom}	Max. thickness of fixture t_{fix}	Packing Unit
741 162 301	TSM BS 16x230 SW27 VS	110 - 170 mm	100 - 160 mm	-	25
741 162 751	TSM BS 16x275 SW27 VS	110 - 170 mm	100 - 160 mm	-	25
741 222 901	TSM BS 22x290 SW15 VS M24	110 - 210 mm	100 - 200 mm	-	20

Composite Mortar CF-T 300V

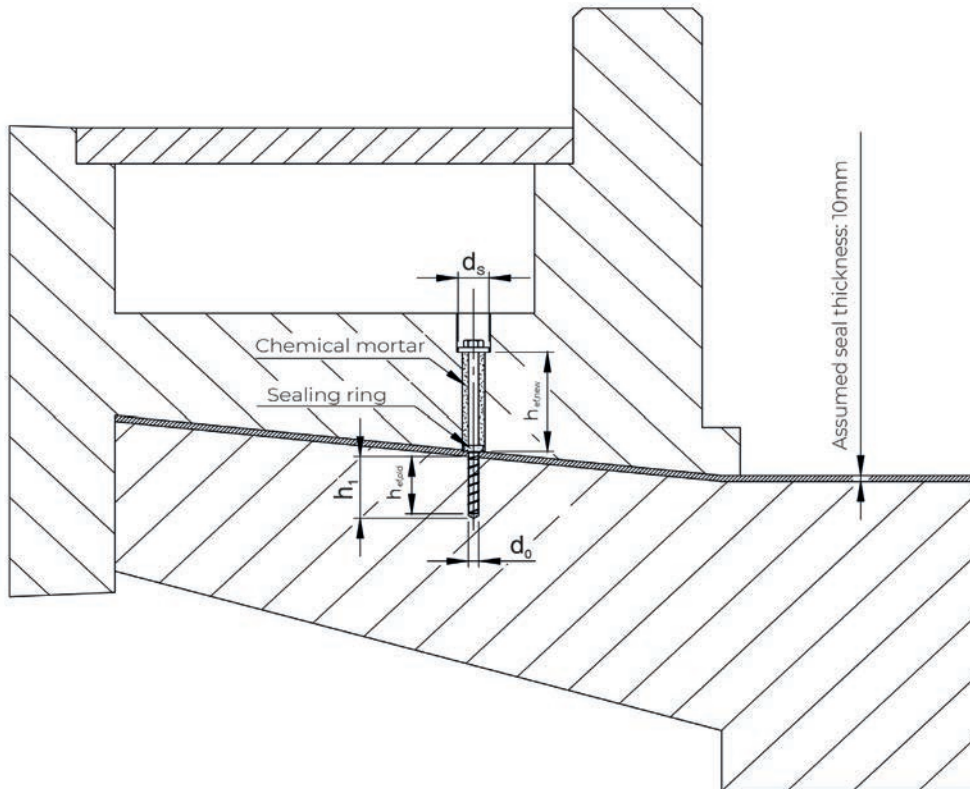
Chemical special mortar
Vinylester styrene-free, suitable for concrete screws



Item nr.	Designation	Packing Unit
222 222 003	Cartridge CF-T 300 V	1
222 223 001	Mixing nozzle CF-T 300 V	1
222 222 004	Squeezing pistol for CF-T 300 V	1

Processing instructions composite mortar

Temperature in ground	Processing time	Mind. curing time in dry borehole	Mind. curing time in wet borehole
$\geq -5^{\circ}\text{C}$	60 min	360 min	720 min
$\geq 0^{\circ}\text{C}$	60 min	180 min	360 min
$\geq 5^{\circ}\text{C}$	60 min	120 min	240 min
$\geq 10^{\circ}\text{C}$	45 min	80 min	160 min
$\geq 20^{\circ}\text{C}$	15 min	45 min	90 min
$\geq 30^{\circ}\text{C}$	5 min	25 min	50 min
$\geq 35^{\circ}\text{C}$	4 min	20 min	40 min



Anchoring in the superstructure for subsequent fastening cap anchor TSM BS VS

Anchor size			TSM BS 16 VS		TSM BS 22 VS
	L	[mm]	230	275	290
Screw length	L	[mm]	230	275	290
Nominal diameter of drill bit	d_0	[mm]	16		22
Depth of drill hole	$h_0 \geq$	[mm]	110		110
Effective anchorage depth	$h_{nom} = h_{ef} \geq$	[mm]	100		100
Minimum edge distance	$c_{min} \geq$	[mm]	70		80
Minimum spacing	$s_{min} \geq$	[mm]	70		80
Minimum base material thickness	$h_{min,alt} \geq$	[mm]	$h_{nom} + 70$		$h_{nom} + 80$
Hexagonal drive	SW	[mm]	27		17
Design value of tension load in cracked and non-cracked concrete C20/25 ^{1) 2)}	$N_{Rd,c} \geq$	[kN]	26,5		26,5
Design value of shear force for steel failure without lever arm ^{1) 2)}	$V_{Rd,s}$	[kN]	76,8		85,6
Design value of shear force for steel failure with lever arm ^{1) 2) 3)}	$V_{Rd,s,M} \leq$	[kN]	46,3		77,9
Nominal torque of tangential screwdriver		[Nm]	≤ 650		≤ 1000

¹⁾ For the determination of the design values, the partial safety factor from the approval was taken into account on the resistance side.

²⁾ The specified values apply regardless of center distances and edge distances.

³⁾ For the determination of the shear force with lever arm bituminous waterproofing membrane of 8mm was applied.

Anchoring in the cap for subsequent fastening cap anchor TSM BS VS

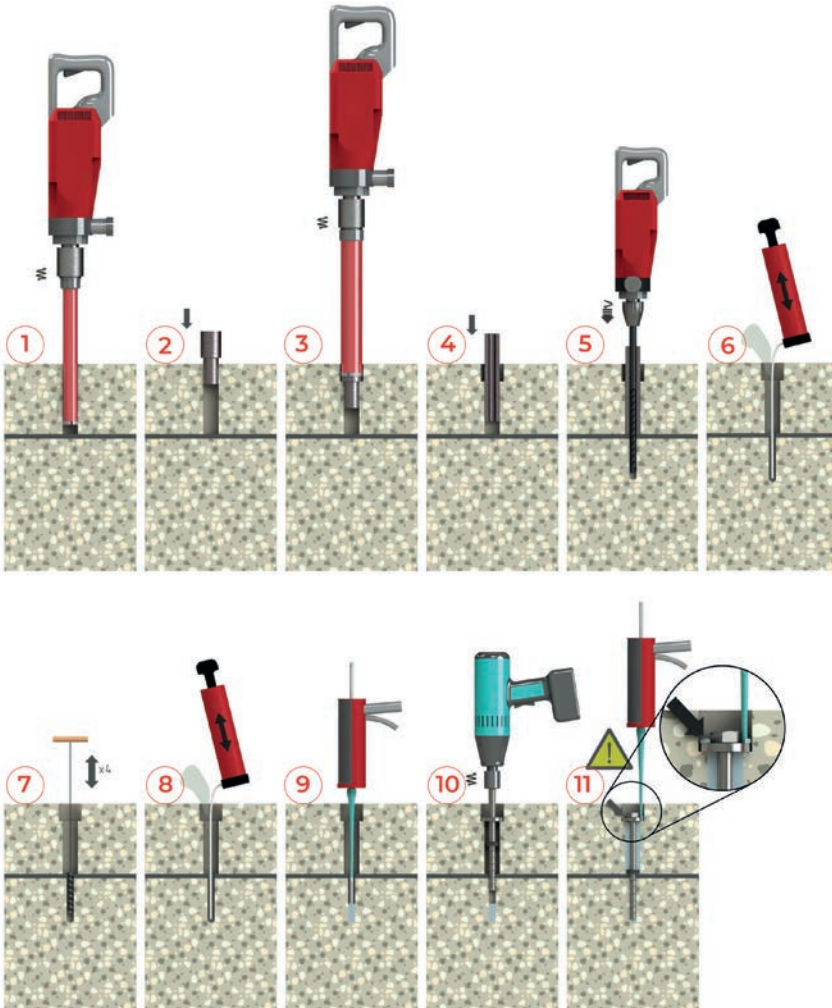
Anchor size			TSM BS 16 VS		TSM BS 22 VS
Screw length	L	[mm]	230	275	290
Effective anchorage depth	$h_{ef,neu}$	[mm]	40 - 205		
Minimum edge distance	$C_{min} \geq$	[mm]	$1,5 \times h_{ef,neu}$		
Minimum spacing	$S_{min} \geq$	[mm]	$3 \times h_{ef,neu}$		
Minimum base material thickness	$h_{min,neu} \geq$	[mm]	$h_{ef,neu} + \text{Betondeckung}$		
Hexagonal drive	SW	[mm]	27	17	
Diameter head bolt	d2	[mm]	48	60	
Design value of tension load in cracked and non-cracked concrete C20/25 ^{1) 2)}	$N_{Rd,c} \geq$	[kN]	6,7	6,7	
Design value of shear force for steel failure without lever arm ^{1) 2)}	$V_{Rd,s}$	[kN]	64,0	71,3	
Design value of shear force for steel failure with lever arm ^{1) 2) 3)}	$V_{Rd,sM} \leq$	[kN]	38,6	64,9	

¹⁾ For the determination of the design values, the partial safety factor from the approval was taken into account on the resistance side.

²⁾ The specified values apply regardless of center distances and edge distances.

³⁾ For the determination of the shear force with lever arm bituminous waterproofing membrane of 8mm was applied.





- 1) Create hole with 35 mm diameter.
- 2) Insert drilling aid for 52 mm diameter hole into the 35 mm h
- 3) Create a 52 mm diameter hole concentric to the 35 mm hole.
- 4) Insert the guide sleeve for the 16 mm hole into the 35 mm hole.
- 5) Drill a 16 mm hole concentrically to the 35 mm hole.
- 6) Thoroughly blow out the borehole.
- 7) Brush the borehole 4x.
- 8) Thoroughly clean the 16 mm borehole again.
- 9) Discard three full strokes of composite mortar – then inject composite mortar into 16 mm hole.
- 10) Screw in the concrete screw until the backfill disc rests on the edges of the 52 borehole.
- 11) Fill the 35 mm hole over the backfill disc with composite mortar and fill the 52 mm hole with suitable mortar.