EJOT®

EJOT® Concrete screws

ETA-approved concrete screws for cracked and non-cracked concrete

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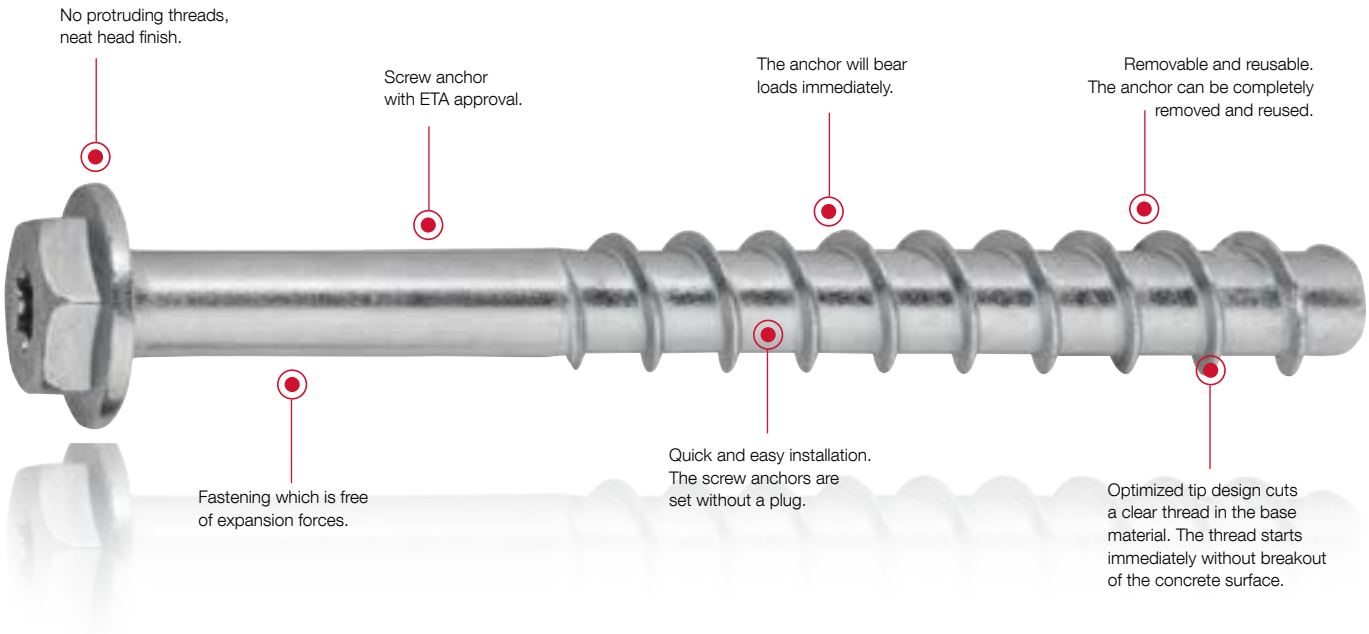
Self-tapping, approved for push-through installations.



Concrete screw JC2

The JC2 concrete screw is very easy and quick to install. Requires neither additional tools nor operations. It is able to take high loads even with small spacings and edge distances. It is removable and therefore fits well for temporary fixings.

Description

- Self-tapping, approved screw anchors for push-through installations.
- No expansion forces allow for small edge distances and spacings.
- Zinc electroplated for dry indoor use.
- Zinc alloy (C1000-ZA) corrosion resistant coating. JC2 C1000-ZA has been neutral salt spray tested according to DIN EN ISO 9227 (prevention of red rust for more than 1000 h)
- Combines the benefits of undercut and chemical anchors, requiring neither additional tools and operations nor hardening time.
- JC2-KB: Hexagon head with combined washer
- JC2-ST: Countersunk head
- JC2-IT: With combined internal thread M8/M10
- JC2-FR: Pan head
- The concrete screw is installed directly through the fixture into the bore hole only by screwing. By doing so, the thread is cutting itself into the concrete and that way creating a mechanical interlock over the total anchorage depth.

Benefits

- Economic installation
- Quick and easy installation
- No expansion forces
- Small spacings and edge distances possible
- Removable

JC2-KB

Carbon steel concrete screw with
- hexagonal head and TX-drive (6, 8 mm)
- hexagonal head (10 mm)

JC2-FR

Carbon steel concrete screw
with pan head and TX-drive

JC2-ST

Carbon steel concrete screw
with countersunk head and TX-drive

JC2-IT

Carbon steel concrete screw
with combined internal thread M8 / M10

Base materials

Approved for

- Cracked concrete
- Non-cracked concrete
- Hollow concrete slab

Also suitable for

- Solid clay brick
- Solid sand-lime brick
- Perforated clay brick
- Natural stone

Approvals / Cerfications / Applications

Description of document		Authority/ Laboratory	ETA	Additional info
European Technical Assessment		ZAG -National Building and Civil Engineering Institute, Slovenia	ETA-17/0835	EAD 330232-00-0601, Option 1
European Technical Assessment		ZAG -National Building and Civil Engineering Institute, Slovenia	ETA-18/0221	ETAG 001 – part 1 and 6, edition 2013
Fire resistance		ZAG -National Building and Civil Engineering Institute, Slovenia	ETA-17/0835 ETA-18/0221	EOTA TR 020 EAD 330232-00-0601, Option 1 / CEN/TS 1992-4
EJOT Anchor Fix calculation software		EJOT software	-	Free download: www.ejot.com/construction/anchorfix

Additional information concerning all given data in the product data sheet

1. Load figures apply for a rebar spacing s ≥ 15 cm or alternatively for a rebar spacing s ≥ 10 cm in combination with a rebar diameter of $d_s \leq 10$ mm. If spacings or edge distances become smaller than the characteristic figures ($s_{cr,N}$ / $c_{cr,N}$) a calculation as per ETAG, Annex C, design method A needs to be carried out. For more details, see ETA-17/0835 and ETA18/0221.

2. Concrete is considered non-cracked when the value of tension within the concrete is $\sigma L + \sigma R \leq 0$. In the absence of detailed verification $\sigma R = 3$ N/mm² can be assumed (σL equals the tension within the concrete as a result of external loads, forces on anchor included; σR equals the tension coming from shrinkage or creep of the concrete, as well as displacements of supports or temperature variations).

3. Shear load figures apply for an anchor without influence of a concrete edge. For shear loads close to an edge ($c \leq 10 \times h_{ef}$), concrete edge failure has to be checked as per ETAG, Annex C, Design Method A.

Static and quasi-static loads

The data of these tables is based on:

- Concrete C20/25, $f_{ck,cube}$ = 25 N/mm².
- Installation has been done correctly.
- No influence of edge distances and spacings.
- Respect of minimum base material thickness.
- JC2 6 h_{nom} = 40 mm for multiple use according to PART 6

Characteristic resistances

Anchor size		JC2 6		JC2 8		JC2 10	
Approval		PART6	OPT1	-	OPT1	-	OPT1
Effective anchorage depth h_{ef}	[mm]	31.9	42.5	40.0	48.5	48.8	61.5
Nominal anchorage depth h_{nom}	[mm]	40	55	55	65	70	85
Non-cracked concrete							
Tensile N_{Rk}	[kN]	3.0	9.5	12.5	16.0	16.4	22.0
Shear V_{Rk}	[kN]	6.5	9.8*	12.5	16.6*	16.8	29.1*
Cracked concrete							
Tensile N_{Rk}	[kN]	3.0	4.5	6.2	8.0	10.5	14.0
Shear V_{Rk}	[kN]	6.5	9.5	8.7	11.6	11.7	33.2

* Failure mode = steel

Design resistances

Anchor size		JC2 6		JC2 8		JC2 10	
Approval		PART6	OPT1	-	OPT1	-	OPT1
Effective anchorage depth h_{ef}	[mm]	31.9	42.5	40.0	48.5	48.8	61.5
Nominal anchorage depth h_{nom}	[mm]	40	55	55	65	70	85
Non-cracked concrete							
Tensile N_{Rd}	[kN]	2.0	6.3	8.3	10.7	10.9	14.7
Shear V_{Rd}	[kN]	4.3	7.8*	8.3	11.1	11.2	23.3*
Cracked concrete							
Tensile N_{Rd}	[kN]	2.0	3.0	4.2	5.3	7.0	9.3
Shear V_{Rd}	[kN]	4.3	6.3	5.8	7.7	7.8	22.1

* Failure mode = steel

Recommended loads

Anchor size		JC2 6		JC2 8		JC2 10	
Approval		PART6	OPT1	-	OPT1	-	OPT1
Effective anchorage depth h_{ef}	[mm]	31.9	42.5	40.0	48.5	48.8	61.5
Nominal anchorage depth h_{nom}	[mm]	40	55	55	65	70	85
Non-cracked concrete							
Tensile N_{Rec}	[kN]	1.4	4.5	5.9	7.6	7.8	10.5
Shear V_{Rec}	[kN]	3.1	5.6*	5.9	7.9	8.0	16.6*
Cracked concrete							
Tensile N_{Rec}	[kN]	1.4	2.1	3.0	3.8	5.0	6.7
Shear V_{Rec}	[kN]	3.1	4.5	4.2	5.5	5.6	15.8

* Failure mode = steel

The partial safety factor for action is $\gamma = 1.4$.

Basic loading data for precast pre-stressed hollow core slabs

The data of these tables is based on:

- Concrete C30/37 to C50/60
- Installation has been done correctly.
- Edge distances and spacings
- The data of these tables is based on ETA-18/0221

Characteristic resistances

Anchor size			JC2 6		
Flange thickness	d_b	[mm]	≥ 25	≥ 30	≥ 40
Loading for all directions	F_{Rk}	[kN]	1.0	2.0	3.0
Char. bending resistance	$M^0_{Rk,s}$	[Nm]		16.0	
Edge distance	$c_{cr} = c_{min}$	[mm]		100	
Spacing	$s_{cr} = s_{min}$	[mm]		100	

Design resistances

Anchor size			JC2 6		
Flange thickness	d_b	[mm]	≥ 25	≥ 30	≥ 40
Loading for all directions	F_{Rd}	[kN]	0.7	1.3	2.0
Design bending resistance	$M_{Rd,s}$	[Nm]		12.8	
Edge distance	$c_{cr} = c_{min}$	[mm]		100	
Spacing	$s_{cr} = s_{min}$	[mm]		100	

Recommended loads

Anchor size			JC2 6		
Flange thickness	d_b	[mm]	≥ 25	≥ 30	≥ 40
Loading for all directions	F_{Rec}	[kN]	0.5	1.0	1.4
Rec. bending load	M_{Rec}	[Nm]		9.1	
Edge distance	$c_{cr} = c_{min}$	[mm]		100	
Spacing	$s_{cr} = s_{min}$	[mm]		100	

The partial safety factor for action is $\gamma = 1.4$.

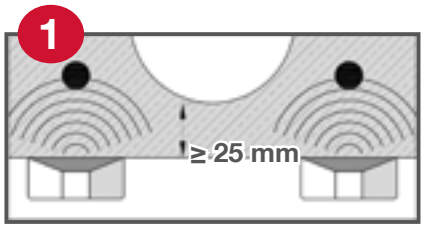
Requirements for multiple anchoring

The definition of multiple use according to the Member States is given in annex of the ETAG 001 Part 6.

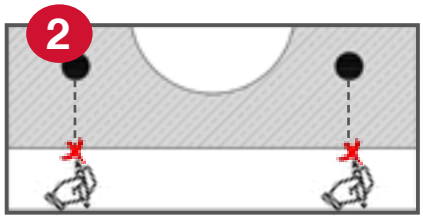
Minimum number of fixing points	Minimum number of anchors per fixing point	Maximum design load of action NSd
3	1	2 kN
4	1	3 kN

The value NSd migth be increased if in the design it is shown that the requirements on the strength and stiffness of the fixture in the serviceability and ultimate states after the failure of one anchor are fulfilled.

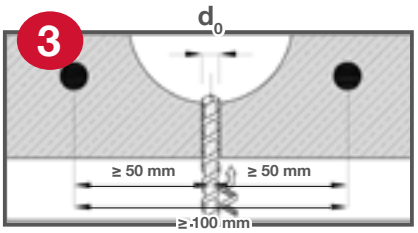
Installation instructions in pre-stressed hollow core slabs



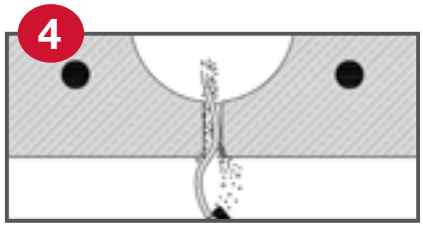
1. Locate rebars by means of suitable detector



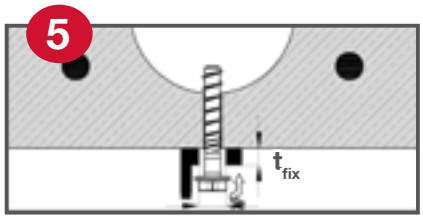
2. Mark rebar location



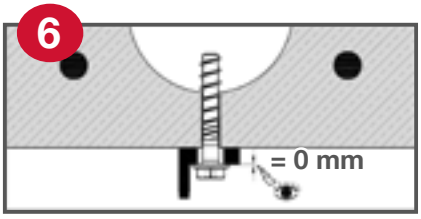
3. Make a cylindrical hole



4. Clean the hole

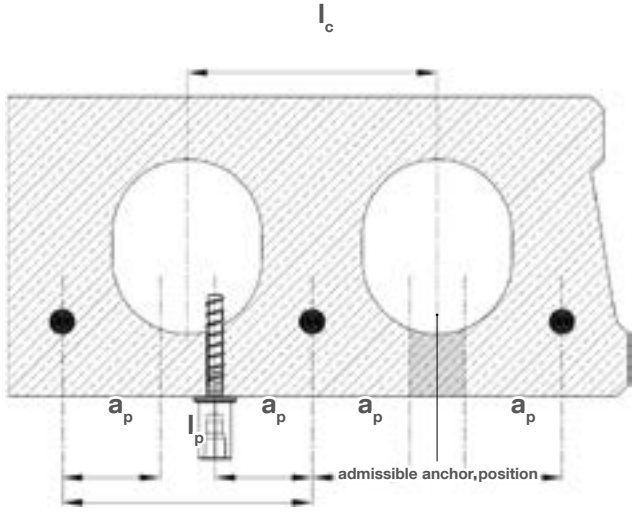


5. Install the screw anchor by impact screwdriver or torque wrench



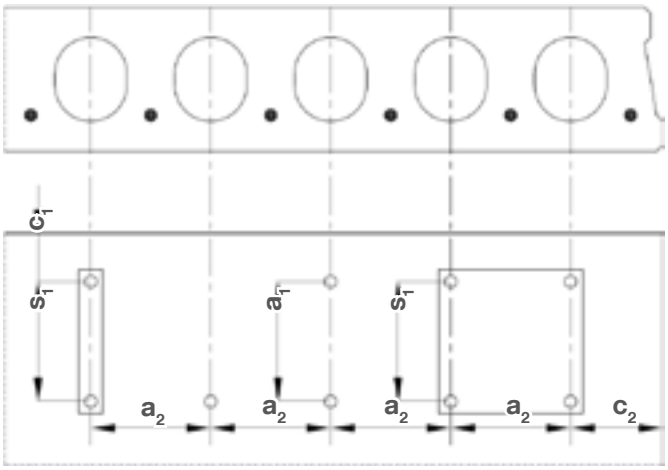
6. Ensure that the screw anchor head fully rests without any gap on the fixture and is not damaged

Admissible anchor position in pre-stressed hollow core slabs



Core distance	$l_c \geq 100$ mm
Pre-stressing steel distance	$l_p \geq 100$ mm
Distance between anchor position and prestressing steel	$a_p \geq 50$ mm

Minimum spacing and edge distance of anchors and distance between anchor groups in pre-stressed hollow core slabs



Minimum edge distance	$c_{min} \geq 100$ mm
Minimum anchor spacing	$s_{min} \geq 100$ mm
Minimum distance between anchor groups	$a_{min} \geq 100$ mm

c1, c2 = edge distance
s1, s2 = anchor spacing
a1, a2 = distance between anchor groups

Fire resistance

Design under fire exposure is performed according to the design method given in EOTA TR 020.
The data of these tables is based on ETA-17/0835 and ETA-18/0221.

- Concrete C20/25, $f_{ck,cube}$ = 25 N/mm²
- Values cannot be used with hollow core slabs
- Installation has been done correctly
- No influence on edge distances and spacings
- Respect of minimum base material thickness

Characteristic resistances

Anchor size		JC2 6		JC2 8	JC2 10
Approval		PART 6	OPT 1	OPT 1	OPT 1
Effective anchorage depth h_{ef}	[mm]	31.9	42.5	48.5	61.5
Nominal anchorage depth h_{nom}	[mm]	40	55	65	85
Fire Exposure R30					
Tensile $N_{Rk,S,fi}$	[kN]	0.24	0.24	0.42	1.02
Shear (steel failure) $V_{Rk,S,fi}$	[kN]	0.24	0.24	0.42	1.02
Fire Exposure R120					
Tensile $N_{Rk,S,fi}$	[kN]	0.12	0.12	0.21	0.54
Shear (steel failure) $V_{Rk,S,fi}$	[kN]	0.12	0.12	0.21	0.54

Design resistances

Anchor size		JC2 6		JC2 8	JC2 10
Approval		PART 6	OPT 1	OPT 1	OPT 1
Effective anchorage depth h_{ef}	[mm]	31.9	42.5	48.5	61.5
Nominal anchorage depth h_{nom}	[mm]	40	55	65	85
Fire Exposure R30					
Tensile N_{Rd}	[kN]	0.24	0.24	0.42	1.02
Shear V_{Rd}	[kN]	0.24	0.24	0.42	1.02
Fire Exposure R120					
Tensile N_{Rd}	[kN]	0.12	0.12	0.21	0.54
Shear V_{Rd}	[kN]	0.12	0.12	0.21	0.54

Recommended loads

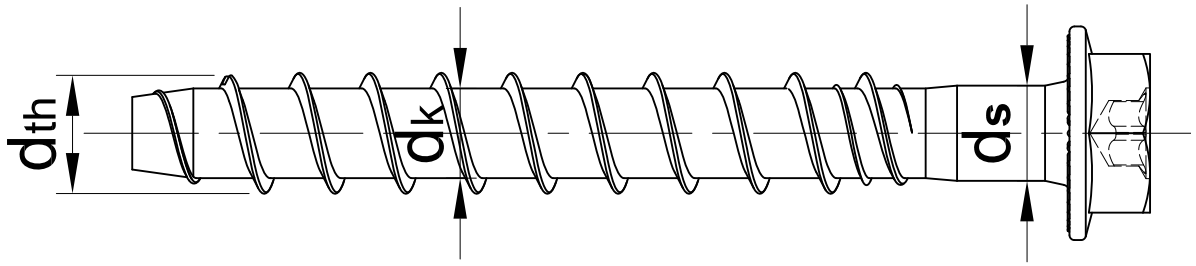
Anchor size		JC2 6		JC2 8	JC2 10
Approval		PART 6	OPT 1	OPT 1	OPT 1
Effective anchorage depth h_{ef}	[mm]	31.9	42.5	48.5	61.5
Nominal anchorage depth h_{nom}	[mm]	40	55	65	85
Fire Exposure R30					
Tensile N_{Rec}	[kN]	0.24	0.24	0.42	1.02
Shear V_{Rec}	[kN]	0.24	0.24	0.42	1.02
Fire Exposure R120					
Tensile N_{Rec}	[kN]	0.12	0.12	0.21	0.54
Shear V_{Rec}	[kN]	0.12	0.12	0.21	0.54

The recommended loads under fire exposure include a safety factor for resistance under fire exposure $\gamma_{M,fi}$ = 1.0 and the partial safety factor for action $\gamma_{F,fi}$ = 1.0.

Materials and dimensions

Material quality and coating

Part	
Material	Cold forged carbon steel
Coating	Zinc electroplated according to EN ISO 4042 ≥ 5 µm or zinc alloy coating ≥ 8 µm



Mechanical properties

Specification		JC2 6	JC2 8	JC2 10
Nominal tensile strength F_{uk}	[N/mm²]	800	800	800
Char. bending resistance $M^0_{Rk,s}$	[Nm]	16	37	76
Design bending resistance $M_{Rd,s}$	[Nm]	12.8	29.6	60.8
Recommended bending resistance M_{Rec}	[Nm]	9.1	21.1	43.4

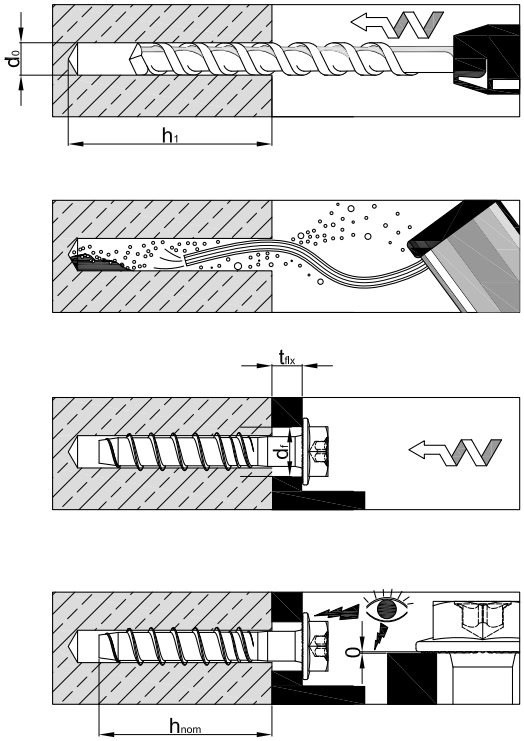
Specification			JC2 6	JC2 8	JC2 10
Nominal diameter	d_{nom}	[mm]	6.0	8.0	10.0
Thread outer diameter	d_{th}	[mm]	7.45	9.9	11.9
Core diameter	d_k	[mm]	5.55	7.35	9.3
Shaft diameter	d_s	[mm]	5.88	7.8	9.6
Stressed section	A_s	[mm]	23.76	41.85	67.9

Installation instructions

Installation equipment

Specification	JC2 6	JC2 8	JC2 10
Rotary hammer	750…1200 r.p.m / 1.8 …3.3 J		
Drill bit	SDS+ 2-CUT or 4-CUT sizes 5, 6, 8, 10 mm		
Socket (AF)	11 and 13 mm	13 mm	15 mm
Additional tools	air pump/compressor, torque wrench, impact screw driver*		

*Installation torque for impact screwdriver T_{SD} max. 90 Nm



Notes:

Concrete and hollow core slab

- Concrete strenght is C20/25 to C50/60 Hollow core slabs C30/37 to C50/60
- No significant voids in concrete.
- Concrete is well compacted.
- Thickness of concrete is according PDS installation data.

Installation

- Edge distances and spacing are according PDS installation data.
- Use proper air pump or compressor.
- Drill hole is deep enough (mentioned h1 in PDS installation data).
- All dust should be cleaned from the hole to avoid screw jamming during installation.
- Pay special attention to cleaning, especially when installing downwards.
- In case of aborted hole, drilling of new hole at a minimum distance of twice the depth of the aborted hole, or smaller distance provided the aborted drill hole is filled with high strength non-shrinkage mortar. No shear or oblique tension loads are allowed in the direction of a not filled aborted hole.

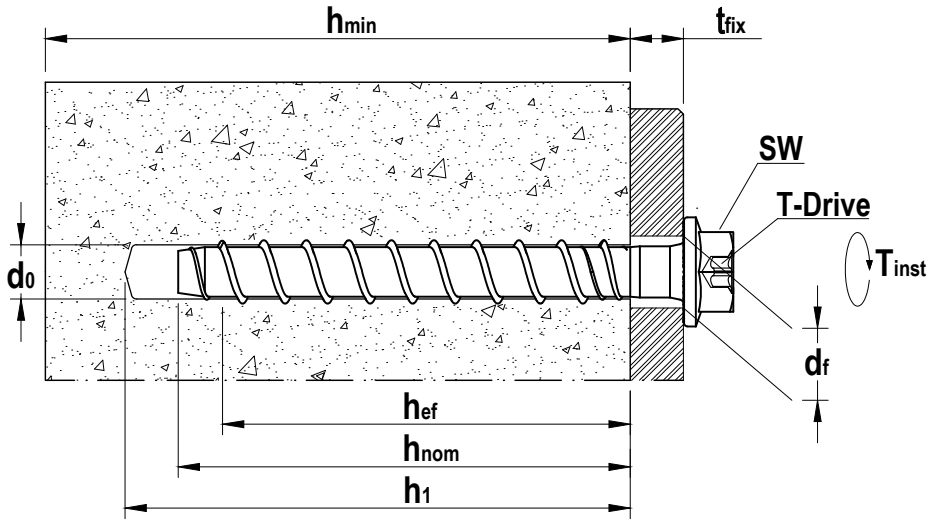
Other base materials

- Concrete screw can be used also in other base materials such as clay brick, natural stone, perforated clay brick, solid sand-lime brick.

Installation data

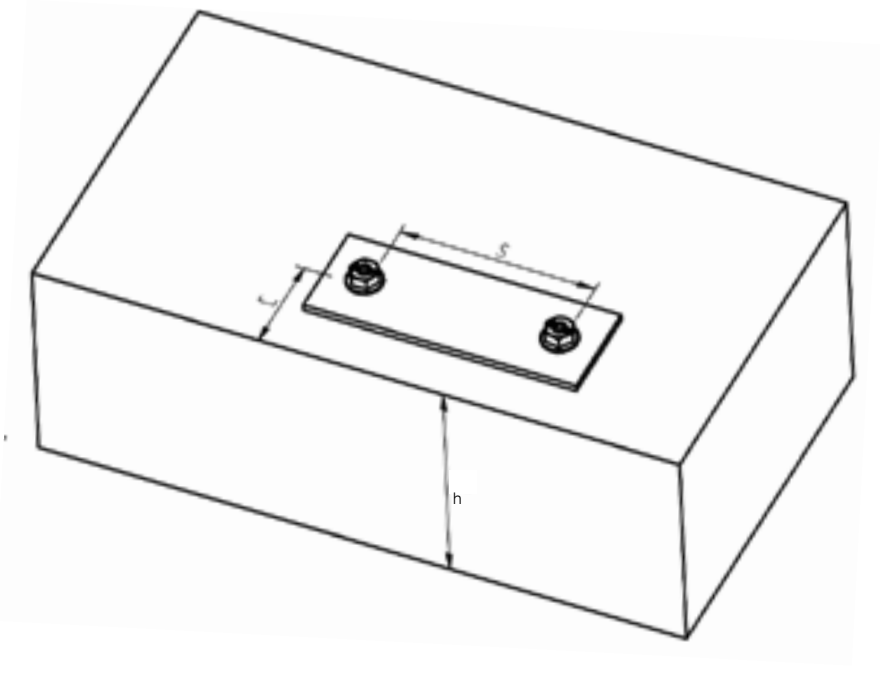
Specification			JC2 6		JC2 8		JC2 10	
Approval			PART 6	OPT 1	-	OPT 1	-	OPT1
Drill hole diameter	d_0	[mm]	6		8		10	
Cutting diameter at the upper tolerance limit (max. diam. bit)	$d_{cut,max \leq}$	[mm]	6.40		8.45		10.45	
Depth of drilled hole to deepest point	$h_{1 \geq}$	[mm]	50	65	65	75	80	95
Effective anchorage depth	h_{ef}	[mm]	31.9	42.5	40.0	48.5	48.8	61.5
Nominal anchorage depth	h_{nom}	[mm]	40	55	55	65	70	85
Diameter of clearance hole in the fixture	$d_{f \geq}$	[mm]	9		12		14	
Required torque	T_{inst}	[Nm]	14		40		90	
Width across flats	AF	[mm]	11 and 13		13		15	
TX-drive (in types KB, ST and FR)	TX-		TX30		TX40		NA	

JC2 anchor installation



Minimum thickness of concrete member, spacing and edge distance

Cracked and non-cracked concrete			JC2 6		JC2 8		JC2 10	
Approval			PART 6	OPT 1	-	OPT 1	-	OPT1
Effective anchorage depth	h_{ef}	[mm]	31.9	42.5	40.0	48.5	48.8	61.5
Nominal anchorage depth	h_{nom}	[mm]	40	55	55	65	70	85
Minimum thickness of base material	h_{min}	[mm]	100	100	110	110	125	125
Minimum spacing	s_{min}	[mm]	35	35	50	50	50	50
Minimum edge distance	c_{min}	[mm]	35	35	50	50	50	50
Critical spacing for splitting failure and concrete cone failure (in case characteristic loading affects)	$s_{cr.sp}$	[mm]	96	128	120	146	146	184
	$s_{cr.N}$	[mm]	96	128	120	146	146	184
Critical edge distance for splitting failure and concrete cone failure (in case characteristic loading affects)	$c_{cr.sp}$	[mm]	48	64	60	73	73	92
	$c_{cr.N}$	[mm]	48	64	60	73	73	92



Delivery program

				JC2-KB	JC2-ST	JC2-FR	JC2-IT
							
Size	Type	T_{fix} [mm]	Length [mm]	zinc electroplated/ zinc alloy (C1000-ZA)	zinc electroplated/ zinc alloy (C1000-ZA)	zinc electroplated	zinc electroplated
JC2 6	6x45/5	5	45	●		●	
	6x45 M8/M10		45				●
	6x50/10	10	50	●			
	6x60/5/20	5/20	60	● ●	● ●	● ●	
	6x60 M8/M10		60				● ●
	6x80/25/40	25/40	80	● ●	● ●		
	6x100/45/60	45/60	100	● ●	● ●		
JC2 8	8x60/5	5	60	■			
	8x70/5(15)	5(15)	70	●			
	8x80/15(25)	15(25)	80	●			
	8x100/35(45)	35(45)	100	●			
	8x120/55(65)	55(65)	120	●			
JC2 10	10x80/10	10	80	■			
	10X90/5(20)	5(20)	90	●			
	10X100/15(30)	15(30)	100	●			
	10X120/35(50)	35(50)	120	●			
	10X140/55(70)	55(70)	140	●			

● Option 1
● Part 6
■ No ETA

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