



HKD redundant FLUSH ANCHOR

Technical Datasheet





Update: Jan-23



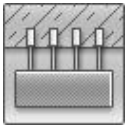

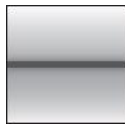









HKD Flush anchor

Everyday standard manual set flush anchor for redundant fastening applications

Anchor version	Benefits
 HKD (M6-M16)	<ul style="list-style-type: none"> - Simple and well proven - Approved, tested and confirmed by everyday jobsite experience - Reliable setting thanks to simple visual check - Versatile - For medium-duty fastening with bolts or threaded rods - Available in various materials and sizes for maximized coverage of possible applications
 HKD-woL (M6-M16)	
 HKD-S(R) (M6-M12)	
 HKD-E(R) (M6-M12)	

Base material	Load conditions
 Concrete (non-cracked)	 Concrete (cracked)
 Redundant fastening	
 Pre-stressed hollow core slabs	
 Static/quasi-static	
 Fire resistance	

Other information			
 European Technical Assessment	 CE conformity	 Sprinkler approved	 Corrosion resistance

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European Technical Assessment ^{a)}	DIBt, Berlin	ETA-06/0047 / 2016-02-08
Fire test report	DIBt, Berlin	ETA-06/0047 / 2016-02-08
Assessment report fire	Warringtonfire	WF 327804/A / 2013-07-10

a) All data given in this section according to ETA-06/0047, issue 2016-02-08.

Static and quasi-static resistance

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Minimum base material thickness
- Concrete C20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$
- Anchors in redundant fastening

Effective anchorage depth for static

Anchor size	M6	M6	M8	M8	M8	M10	M10	M10	M12	M12	M16
Effective anchorage depth h_{ef} [mm]	25	30	25	30	40	25	30	40	25	50	65

Characteristic resistance

Anchor size	M6x25	M6x30	M8x25	M8x30	M8x40	M10x25	M10x30	M10x40	M12x25	M12x50	M16x65
Resistance, F_{Rk} [kN]	2,0	-	3,0	5,0	5,0	4,0	5,0	7,5	4,0	9,0	16,0
all load directions	-	3,0	-	3,0	5,0	-	4,0	6,0	-	6,0	-
	-	3,0	-	3,0	-	-	-	6,0	-	6,0	-

Design resistance

Anchor size	M6x25	M6x30	M8x25	M8x30	M8x40	M10x25	M10x30	M10x40	M12x25	M12x50	M16x65
Resistance, F_{Rd} [kN]	1,3	-	2,0	2,8	3,3	2,2	3,3	5,0	2,7	6,0	10,7
all load directions	-	2,0	-	2,0	3,3	-	2,7	4,0	-	4,0	-
	-	2,0	-	2,0	-	-	-	4,0	-	4,0	-

Recommended loads ^{a)}

Anchor size	M6x25	M6x30	M8x25	M8x30	M8x40	M10x25	M10x30	M10x40	M12x25	M12x50	M16x65
Resistance, F_{Rec} [kN]	1,0	-	1,4	2,0	2,4	1,6	2,4	3,6	1,9	4,3	7,6
all load directions	-	1,4	-	1,4	2,4	-	1,9	2,9	-	2,9	-
	-	1,4	-	1,4	-	-	-	2,9	-	2,9	-

- a) With overall partial safety factor for action $\gamma = 1,4$. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.



Fire resistance

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Steel failure
- Minimum base material thickness
- Concrete C 20/25 to C50/60
- Partial safety factor for resistance under fire exposure $\gamma_{M,fi} = 1,0$ (in absence of other national regulations)

Effective anchorage depth for fire

Anchor size	M6	M6	M8	M8	M8	M10	M10	M10	M12	M12	M16
Effective anchorage depth h_{ef} [mm]	25	30	25	30	40	25	30	40	25	50	65

Characteristic resistance

Anchor size	M6x25	M6x30	M8x25	M8x30	M8x40	M10x25	M10x30	M10x40	M12x25	M12x50	M16x65	
Fire exposure R30												
Resistance, all load directions	HKD / HKD-woL	0,5	-	0,6	0,9	1,3	0,6	0,9	1,8	0,6	2,3	4,0
	HKD-SR/ HKD-ER	-	0,5	-	0,9	-	-	-	1,8	-	2,3	-
Fire exposure R120												
Resistance, all load directions	HKD / HKD-woL	0,2	-	0,5	0,7	0,7	0,5	0,7	1,5	0,5	1,8	3,2
	HKD-SR/ HKD-ER	-	0,3	-	0,7	-	-	-	1,5	-	1,8	-

Design resistance

Anchor size	M6x25	M6x30	M8x25	M8x30	M8x40	M10x25	M10x30	M10x40	M12x25	M12x50	M16x65	
Fire exposure R30												
Resistance, all load directions	HKD / HKD-woL	0,5	-	0,6	0,9	1,3	0,6	0,9	1,8	0,6	2,3	4,0
	HKD-SR/ HKD-ER	-	0,5	-	0,9	-	-	-	1,8	-	2,3	-
Fire exposure R120												
Resistance, all load directions	HKD / HKD-woL	0,2	-	0,5	0,7	0,7	0,5	0,7	1,5	0,5	1,8	3,2
	HKD-SR/ HKD-ER	-	0,3	-	0,7	-	-	-	1,5	-	1,8	-

For more information about different failure modes and fire resistance times please see the full ETA-06/0047 report.

Requirements for redundant fastening

The definition of redundant fastening according to Member States is given in EN 1992-4 and CEN/TR 17079. In absence of a definition by a Member State the following default values may be taken.

Minimum number of fixing points	Minimum number of anchors per fixing point	Maximum design load of action N_{Sd} per fixing point ^{a)}
3	1	2 kN
4	1	3kN

- a) The value for maximum design load of actions per fastening point N_{Sd} is valid in general that means all fastening points are considered in the design of the redundant structural system. The value N_{Sd} may be increased if the failure of one (=most unfavorable) fixing point is taken into account in the design (serviceability and ultimate limit state) of the structural system e.g. suspended ceiling.

Materials

Mechanical properties

Anchor size		M6	M8	M10	M10	M12
Nominal tensile strength	HKD / HKD-woL	570	570	570	570	640
	HKD-S, HKD-E	560	560	510	510	-
	HKD-SR, HKD-ER	540	540	540	540	-
Yield strength	HKD / HKD-woL	460	460	460	480	510
	HKD-S, HKD-E	440	440	410	410	-
	HKD-SR, HKD-ER	355	355	355	355	-
Stressed cross-section	HKD / HKD-woL	20,7	26,7	32,7	60,1	105
	HKD-S, HKD-E	20,9	26,1	28,8	58,7	-
	HKD-SR, HKD-ER					
Moment of resistance	HKD / HKD-woL	32,3	54,6	82,9	184	431
	HKD-S, HKD-E	50	79	110	264	-
	HKD-SR, HKD-ER					
Characteristic bending resistance for rod or bolt	With 5.8 Gr. Steel	7,6	18,7	37,4	65,5	167
	HKD-SR HKD-ER with A4-70	11	26	52	92	-

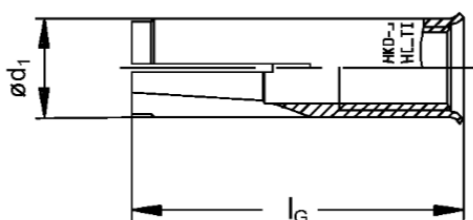
Material quality

Part	Material	
Anchor body	HKD / HKD-woL	Cold formed steel-galvanized to $\geq 5 \mu\text{m}$
	HKD-S, HKD-E	Steel Fe/Zn5, galvanized to $\geq 5 \mu\text{m}$
	HKD-SR, HKD-ER	Stainless steel, 1.4401, 1.4404, 1.4571 EN 10088-3:2014
Expansion plug	HKD / HKD-woL	Cold formed steel
	HKD-S, HKD-E	Cold formed steel
	HKD-SR, HKD-ER	Stainless steel, 1.4401, 1.4404, 1.4571 EN 10088-3:2014

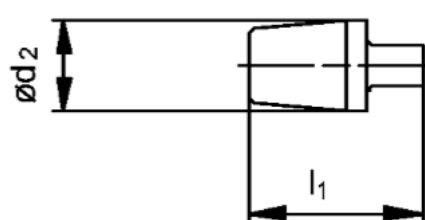
Anchor dimensions of HKD, HKD-S, HKD-E, HKD-SR, HKD-ER

Anchor size		M6x25	M8x25	M10x25	M12x25	M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M16x65
Anchor length	l_G [mm]	25	30	25	30	40	25	30	40	25	50	65
Anchor diameter	\varnothing_{d1} [mm]	7,9	8	9,95	9,95	9,95	11,9	11,8	11,95	14,9	14,9	19,75
Plug diameter	\varnothing_{d2} [mm]	5,1	5	6,35	6,5	6,35	8,1	8,2	8,2	9,7	10,3	13,8
Plug length	l_1 [mm]	10	15	7	12	16	7	12	16	7,2	20	29

Anchor body



Expansions plugs

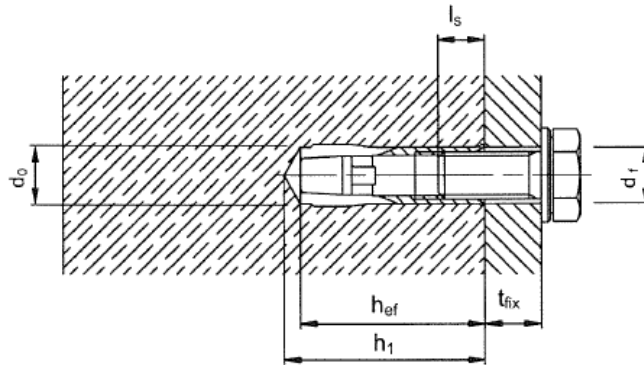


Setting information

Setting details

Anchor size		M6x25	M6x30	M8x25 ^{a)}	M8x30	M8x40	M10x25 ^{a)}	M10x30 ^{a)}	M10x40	M12x25 ^{a)}	M12x50	M16x65
Effective anchorage depth	h_{ef} [mm]	25	30	25	30	40	25	30	40	25	50	65
Nominal diameter of drill bit	d_0 [mm]	8	8	10	10	10	12	12	12	15	15	20
Thread diameter	d [mm]	6	6	8	8	8	10	10	10	12	12	16
Depth of drill hole	h_1 [mm]	27	32	27	33	43	27	33	43	27	54	70
Diameter of clearance hole in the fixture	d_f [mm]	7	7	9	9	9	12	12	12	14	14	18
Torque moment	T_{inst} [mm]	4	4	8	8	8	15	15	15	35	35	60
Screwing depth	$l_{s,min}$ [mm]	6	6	8	8	8	10	10	10	12	12	16
	$l_{s,max}$ [mm]	12	12,5	11,5	14,5	17,5	12	12,7	18	12	23,5	30,5

a) With anchor size M8x25, M10x25, M10x30 and M12x25 only threaded rod are to be used.



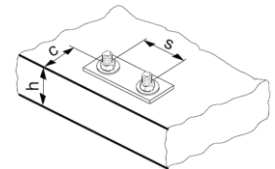
Installation equipment

Anchor size		M6x25	M8x25	M10x25	M12x25	M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M16x65
Rotary hammer for setting		TE 2 – TE 16									TE16–TE50	
Machine setting tool	HSD-M	6x25/30	8x25/30	8x40	10x25/30	10x40	12x25	12x50	16x65			
Hand setting tool	HSD-G											
Other tools		Hammer, torque wrench, blow out pump										

Setting parameters

Anchor size		M6x25	M6x30	M8x25 ^{a)}	M8x30	M8x40	M10x25 ^{a)}	M10x30 ^{a)}	M10x40	M12x25 ^{a)}	M12x50	M16x65
Minimum spacing and minimum edge distance for HKD / HKD-woL												
Minimum thickness of concrete member	h_{min} [mm]	100	-	100	100	100	100	100	100	100	100	120
Minimum spacing	s_{min} [mm]	80	-	80	60	80	80	60	80	80	125	130
	$c \geq$ [mm]	140	-	140	105	140	140	105	140	140	175	230
Minimum edge distance	c_{min} [mm]	100	-	100	80	140	100	80	140	100	175	230
	$s \geq$ [mm]	150	-	150	120	80	150	120	80	150	125	130
Minimum thickness of concrete member for HKD / HKD-woL												
Minimum thickness of concrete member	h_{min} [mm]	80	-	80	80	80	80	80	80	80	-	-
Minimum spacing	s_{min} [mm]	200	-	200	200	200	200	200	200	200	-	-
Minimum edge distance	c_{min} [mm]	150	-	150	150	150	150	150	150	150	-	-
Minimum spacing and minimum edge distance for HKD-S(R) / HKD-S(R)												
Minimum thickness of concrete member	h_{min} [mm]	-	100	-	100	100	-	100	100	-	100	-
Minimum spacing	s_{min} [mm]	-	60	-	60	80	-	60	80	-	125	-
Minimum edge distance	c_{min} [mm]	-	105	-	105	140	-	105	140	-	175	-
Minimum thickness of concrete member for HKD-S(R) / HKD-S(R)												
Minimum thickness of concrete member	h_{min} [mm]	-	80	-	80	80	-	80	80	-	-	-
Diameter of clearance hole in the fixture	s_{min} [mm]	-	200	-	200	200	-	200	200	-	-	-
Torque moment	c_{min} [mm]	-	150	-	150	150	-	150	150	-	-	-

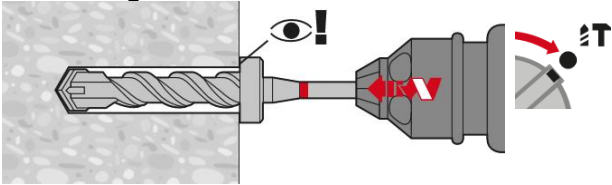
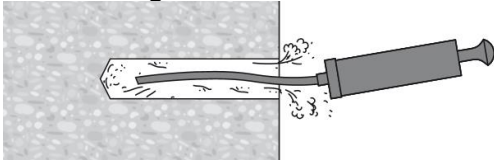
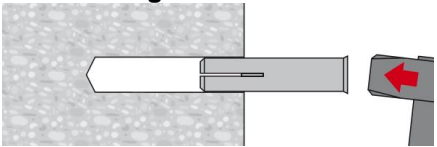
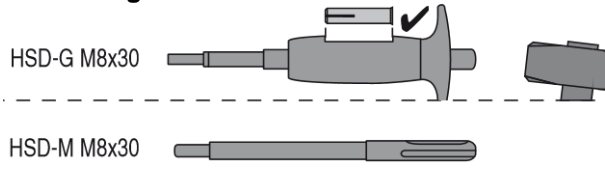
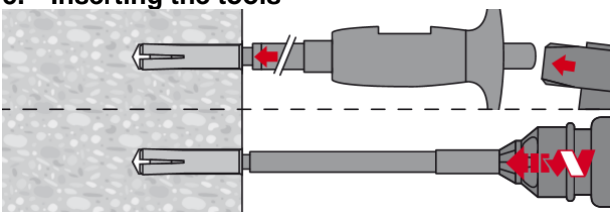
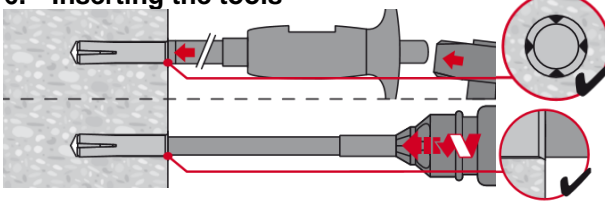
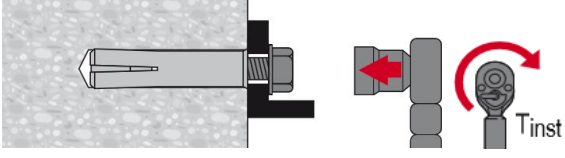
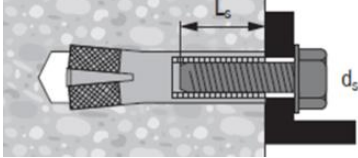
For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.





Setting instruction

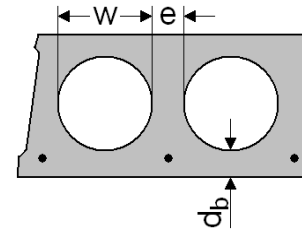
*For detailed information on installation see instruction for use given with the package of the product.

Setting instruction	
1. Drilling 	2. Cleaning 
3. Inserting the anchor 	4. Setting tools HSD-G M8x30 
5. Inserting the tools 	6. Inserting the tools 
7. Attaching the belonging washer 	8. 

Basic loading data for redundant fastening in prestressed hollow core slabs

All data in this section applies to:

- Correct anchor setting (See setting instruction)
- No edge distance and spacing influence
- Ratio core width/web thickness $w/e \leq 4,2$
- Concrete C 30/37 to C50/56
- Data is according to ETA-06/0047



Characteristic resistance

Anchor size			M6x25	M8x25	M10x25
Bottom flange thickness	d_b [mm]		≥ 35 (30 ^a)	≥ 35	≥ 40
Resistance, all load directions	HKD / HKD-wol	F_{Rk} [kN]	2	3	4

- a) The anchor may be used in a flange thickness of 30 mm with the same resistance but the drill hole is not allowed to cut cavity

Design resistance

Anchor size			M6x25	M8x25	M10x25
Bottom flange thickness	d_b [mm]		≥ 35 (30 ^a)	≥ 35	≥ 40
Resistance, all load directions	HKD / HKD-wol	F_{Rd} [kN]	1,3	2,0	2,2

- a) The anchor may be used in a flange thickness of 30 mm with the same resistance but the drill hole is not allowed to cut cavity

Recommended loads ^{b)}

Anchor size			M6x25	M8x25	M10x25
Bottom flange thickness	d_b [mm]		≥ 35 (30 ^a)	≥ 35	≥ 40
Resistance, all load directions	HKD / HKD-wol	F_{Rec} [kN]	1,0	1,4	1,6

- a) The anchor may be used in a flange thickness of 30 mm with the same resistance but the drill hole is not allowed to cut cavity

- b) With overall partial safety factor for action $\gamma = 1,4$. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

Requirements for redundant fastening

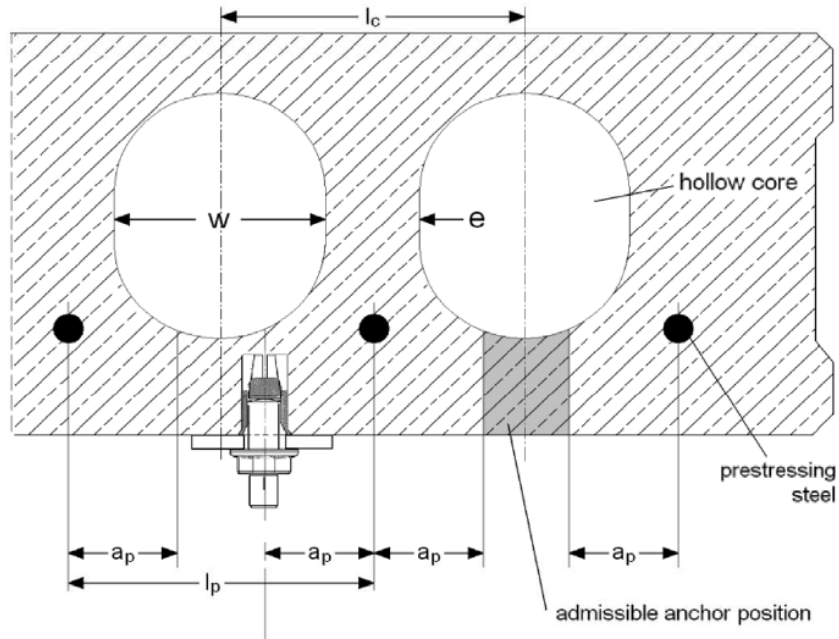
The definition of redundant fastening according to Member States is given in EN 1992-4 and CEN/TR 17079. In Absence of a definition by a Member State the following default values may be taken.

Minimum number of fixing points	Minimum number of anchors per fixing point	Maximum design load of action N_{Sd} per fixing point ^{a)}
3	1	2 kN
4	1	3kN

- a) The value for maximum design load of actions per fastening point N_{Sd} is valid in general that means all fastening points are considered in the design of the redundant structural system. The value N_{Sd} may be increased if the failure of one (=most unfavorable) fixing point is taken into account in the design (serviceability and ultimate limit state) of the structural system e.g. suspended ceiling.

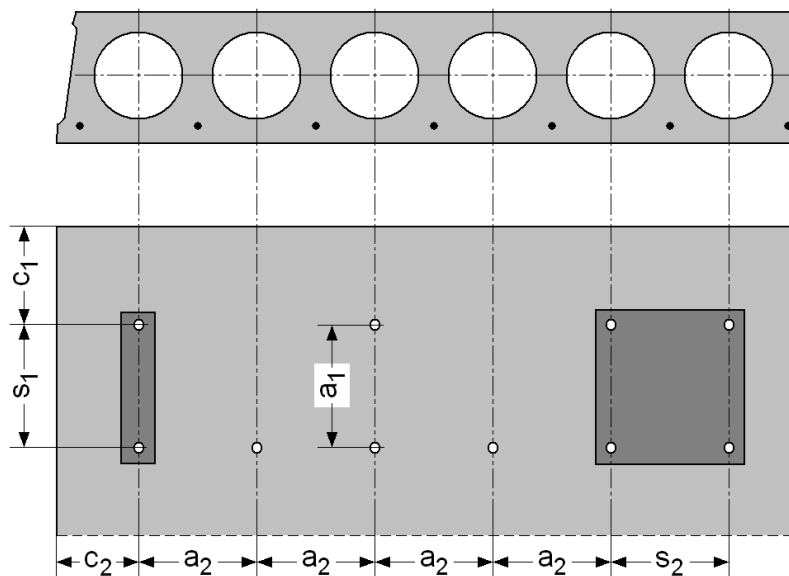
Admissible anchor positions in precast pre-stressed hollow core slabs

Type		HKD / HKD-wol
Core distance	$l_c \geq$ [mm]	100
Pre-stressing steel distance	$l_p \geq$ [mm]	100
Distance between anchor position and pre-stressed steel	$a_p \geq$ [mm]	50



Anchor spacing and edge distance

Type		HKD / HKD-wol
Minimum edge distance	$c_{min} \geq$ [mm]	200
Minimum anchor spacing	$s_{min} \geq$ [mm]	400
Minimum distance between anchor groups	$a_{min} \geq$ [mm]	400



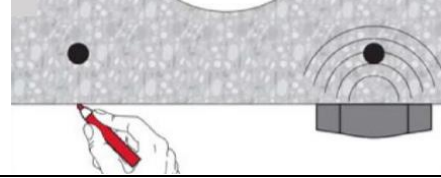
- c_1, c_2 edge distance
- s_1, s_2 anchor spacing
- a_1, a_2 distances between anchor groups

Setting instruction with the stop drill bit TE-CX-HKD only

1. Positioning pre-stressed steel



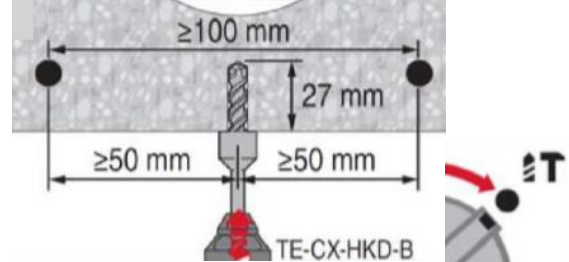
2. Marking pre-stressed steel position



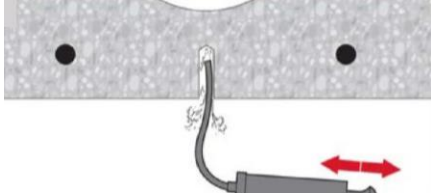
3. Marking pre-stressed steel position



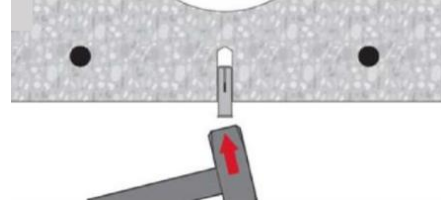
4. Drilling



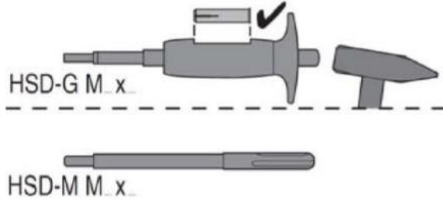
5. Cleaning



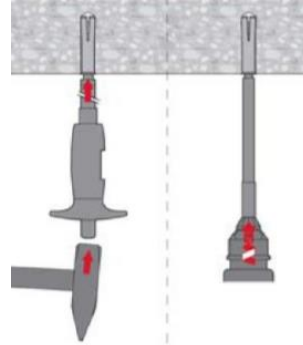
6. Inserting the anchor



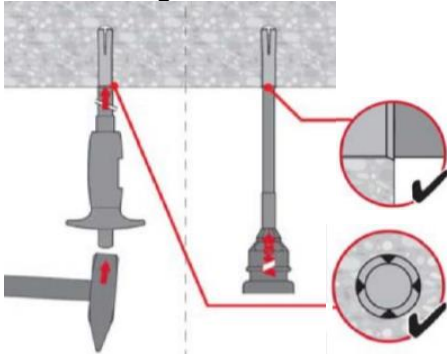
7. Setting tools



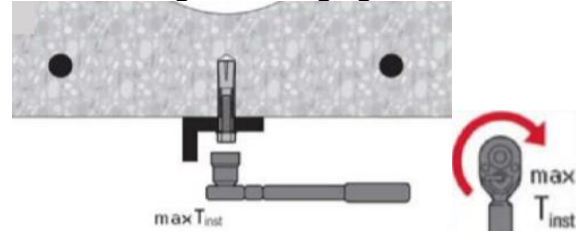
8. Inserting the tools



9. Inserting the tools



10. Attaching the belonging washer



11.

