



## Designated according to The Construction Products (Amendment etc.) (EU Exit) Regulations 2020

UK Technical Assessment	UKTA-0836-23/6851 - of 05/07/2023
Technical Assessment Body issuing the UK Technical Assessment:	British Board of Agrément
Trade name of the construction product:	Hilti push-in anchor HKD
Product family to which the construction product belongs:	Deformation-controlled expansion anchor made of galvanized or stainless steel of sizes M6, M8, M10, M12, M16 and M20 for use in non-cracked concrete.
Manufacturer:	Hilti Aktiengesellschaft 9494 SCHAAN Principality of Liechtensten
Manufacturing plant(s):	Hilti Plants
This UK Technical Assessment contains:	20 pages including 3 Annexes which form an integral part of this assessment.
This UK Technical Assessment is issued in accordance with The Construction Products (Amendment etc.) (EU Exit) Regulations 2020 on the basis of:	UKAD 330232-00-0601 Mechanical fasteners for use in concrete

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**1. Technical description of the product**

The Hilti push-in anchor HKD is a fastener made of galvanized or stainless steel which is placed into a drilled hole and anchored by deformation-controlled expansion.

The fastener consists of an anchor body and an internal plug.

The fixture must be anchored with a fastening screw or threaded rod according to Annex B2.

The product description is given in Annex A.

**2. Specification of the intended use(s) in accordance with the applicable UK Assessment Document (hereinafter UKAD)**

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this UK Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

**3. Performance of the product and references to the methods used for its assessment.**

**3.1. Mechanical resistance and stability (BWR 1)**

<b>Essential characteristic</b>	<b>Performance</b>
Characteristic resistance to tension load (static and quasi static action) Method A	See Annexes B3, C1 and C4
Characteristic resistance to shear load (static and quasi static action)	See Annexes C2 and C5
Displacements and Durability	See Annexes C3, C6 and B1
Characteristic resistance and displacements for seismic performance categories C1 and C2	No performance assessed

**3.2. Safety in case of fire (BWR 2)**

<b>Essential characteristic</b>	<b>Performance</b>
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	No performance assessed

**3.3. Health, hygiene and the environment (BWR 3)**

Not relevant.

**3.4. Safety and accessibility in use (BWR 4)**

Not relevant.

### **3.5. Protection against noise (BWR 5)**

Not relevant.

### **3.6. Energy economy and heat retention (BWR 6)**

Not relevant.

### **3.7. Sustainable use of natural resources (BWR 7)**

No performance assessed.

## **4. Assessment and verification of constancy of performance (hereinafter AVCP) system applied**

### **4.1. System of assessment and verification of constancy of performance**

According to UKAD No. 330232-00-0601 and Annex V of the Construction Products Regulation (Regulation (EU) 305/2011) as brought into UK law and amended, the system of assessment and verification of constancy of performance (AVCP) 1 applies.

## **5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable UKAD**

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with the British Board of Agrément and made available to the UK Approved Bodies involved in the conformity attestation process.

### **5.1. UKCA marking for the product/ system must contain the following information:**

- Identification number of the Approved Body
- Name/registered address of the manufacturer of the product/ system
- Marking including date of Marking and the intended use as stated in the Designated technical specification
- Unique identification code of the product type
- The reference number of the Declaration of Performance
- The level or class of the performance declared
- The reference to the Designated technical specification applied
- UKTA number

On behalf of the British Board of Agrément



Date of Issue: 5 July 2023

**Hardy Giesler**  
Chief Executive Officer



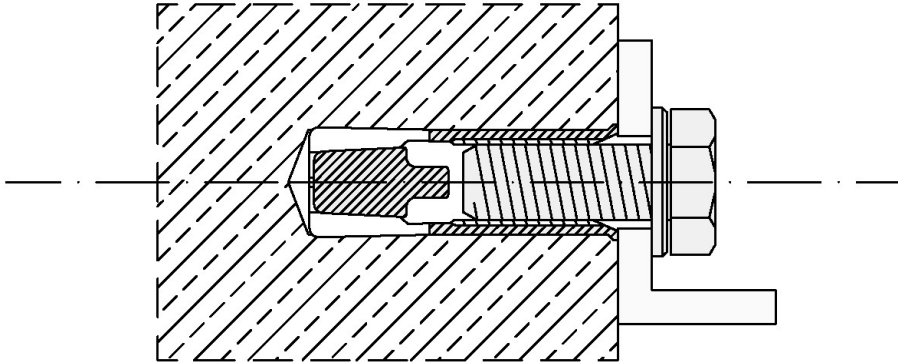
**British Board of Agrément,**  
1<sup>st</sup> Floor Building 3,  
Hatters Lane,  
Croxley Park  
Watford  
WD18 8YG

**ANNEX A1**  
**Product description**  
**Installed condition.**

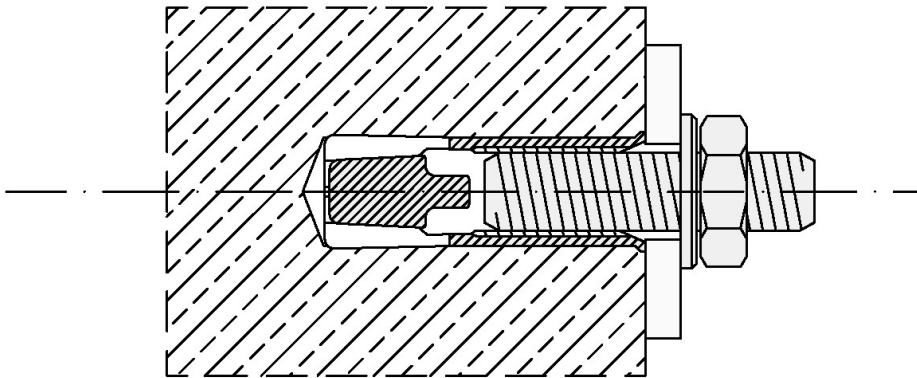
This annex applies to the product described in the main body of the UK Technical Assessment.

**Installed condition.**

**Figure A1:**  
**Hilti push-in anchor HKD with screw**



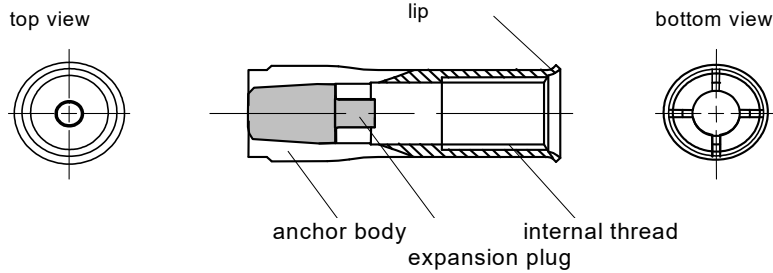
**Figure A2:**  
**Hilti push-in anchor HKD with threaded rod, washer and nut**



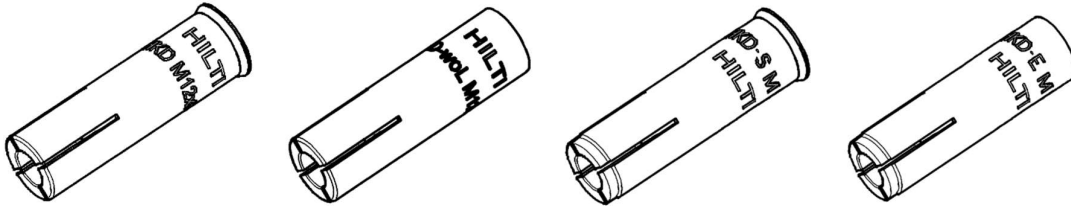
**ANNEX A2**  
**Product description**  
**Anchor types / Marking**

This annex applies to the product described in the main body of the UK Technical Assessment.

**Product description: Hilti push-in anchor HKD**



**Marking:**



**HKD**

- HKD
- HKD M8 x 30
- HKD M8 x 40
- HKD M10 x 30
- HKD M10 x 40
- HKD M12 x 50
- HKD M16 x 65
- HKD M20 x 80

**HKD-woL**

- HKD-woL
- HKD-woL M8 x 30
- HKD-woL M8 x 40
- HKD-woL M10 x 30
- HKD-woL M10 x 40
- HKD-woL M12 x 50
- HKD-woL M16 x 65
- HKD-woL M20 x 80

**HKD-S /  
HKD-SR**

- HKD-S
- HKD-S M6 x 30 ø8
- HKD-S M8 x 30 ø10
- HKD-S M8 x 40 ø10
- HKD-S M10 x 30 ø12
- HKD-S M10 x 40 ø12
- HKD-S M12 x 50 ø15
- HKD-S M16 x 65 ø20
- HKD-S M20 x 80 ø25

HKD-SR

- HKD-SR M6 x 30 ø8
- HKD-SR M8 x 30 ø10
- HKD-SR M10 x 40 ø12
- HKD-SR M12 x 50 ø15
- HKD-SR M16 x 65 ø20
- HKD-SR M20 x 80 ø25

**HKD-E /  
HKD-ER**

- HKD-E
- HKD-E M6 x 30 ø8
- HKD-E M8 x 30 ø10
- HKD-E M8 x 40 ø10
- HKD-E M10 x 30 ø12
- HKD-E M10 x 40 ø12
- HKD-E M12 x 50 ø15
- HKD-E M16 x 65 ø20
- HKD-E M20 x 80 ø25

HKD-ER

- HKD-ER M6 x 30 ø8
- HKD-ER M8 x 30 ø10
- HKD-ER M10 x 40 ø12
- HKD-ER M12 x 50 ø15
- HKD-ER M16 x 65 ø20
- HKD-ER M20 x 80 ø25



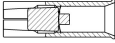



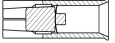

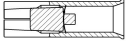





**ANNEX A3**  
**Product description**  
**Identification after installation**

This annex applies to the product described in the main body of the UK Technical Assessment.

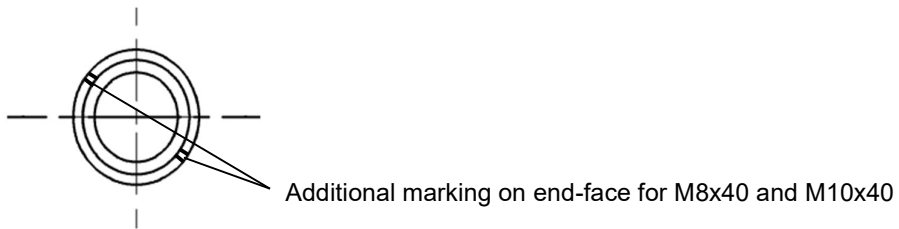
**Identification after installation**

Each anchor can be identified with setting tool after installation.

**Table A1: Identification HKD and HKD-woL**

Size		Setting tool	Top view
HKD M8x30		HSD-G M8 x 25/30	
HKD M8x40		HSD-G M8 x 40	
HKD M10x30		HSD-G M10 x 25/30	
HKD M10x40		HSD-G M10 x 40	
HKD M12x50		HSD-G M12 x 50	
HKD M16x65		HSD-G M16 x 65	
HKD M20x80		HSD-G M20 x 80	

**Identification HKD-E(R) and HKD-S(R)**



**ANNEX A4**  
**Product description**  
**Materials and dimensions**

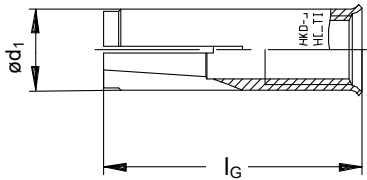
This annex applies to the product described in the main body of the UK Technical Assessment.

**Materials and dimensions**

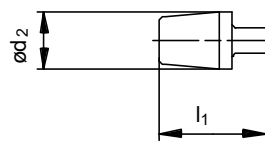
**Table A2: Materials**

designation	material
<b>HKD; HKD-woL</b>	
Anchor body	Cold-formed steel – galvanized to $\geq 5 \mu\text{m}$
Expansion plug	Cold-formed steel
<b>HKD-S; HKD-E</b>	
Anchor body	Steel Fe/Zn5 (galvanized $\geq 5 \mu\text{m}$ )
Expansion plug	Cold formed steel
<b>HKD-SR; HKD-ER</b>	
Anchor body	Stainless steel of corrosion resistance class III according to EN 1993-1-4:2006 + A1 : 2015 1.4401, 1.4404 or 1.4571 according to EN 10088-1 : 2014
Expansion plug	

Anchor body



Expansion plug



**Table A3: Dimensions**

Anchor size		M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M16x65	M20x80
Anchor length	$l_G$ [mm]	30	30	40	30	40	50	65	80
Anchor diameter	$\text{Ø}d_1$ [mm]	8	9.95	9.95	11.8	12	14.9	19.8	24.8
Plug diameter	$\text{Ø}d_2$ [mm]	5	6.5	6.35	8.2	8.2	10.3	13.8	16.4
Plug length	$l_1$ [mm]	15	12	16	12	16	20	29	30



**ANNEX B1**  
**Intended use.**  
**Specifications**

This annex applies to the product described in the main body of the UK Technical Assessment.

**Specifications of intended use**


**Anchorage subject to:**

- Static and quasi-static loading.

**Base materials:**

- Compacted, reinforced or unreinforced normal weight concrete without fibres in accordance with EN 206 : 2013 + A1 : 2016.
- Strength classes C20/25 to C50/60 according to EN 206 : 2013 + A1 : 2016.
- Uncracked concrete only.

- **Table B1: Overview use categories and performance categories**

Anchorage subject to:	HKD / HKD-woL / HKD-E(R) and HKD-S(R) with ...
	Threaded rod or screw
Hammer drilling 	✓
Static and quasi-static loading in uncracked concrete	M6 to M20 Tables : C1, C2, C3, C4, C5 and C6

**Use conditions (Environmental conditions):**

- Structures subject to dry internal conditions (zinc coated steel or stainless steel).
- For all other conditions according to EN 1993-1-4 : 2006 + A1 : 2015 corresponding to corrosion resistance classes Annex A4 Table A2 (stainless steels).

**Design:**

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. the position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages under static or quasi-static actions are designed in accordance with: EN 1992-4 : 2018.

**Installation:**

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- The anchor may only be set once.
- Overhead applications are permitted.

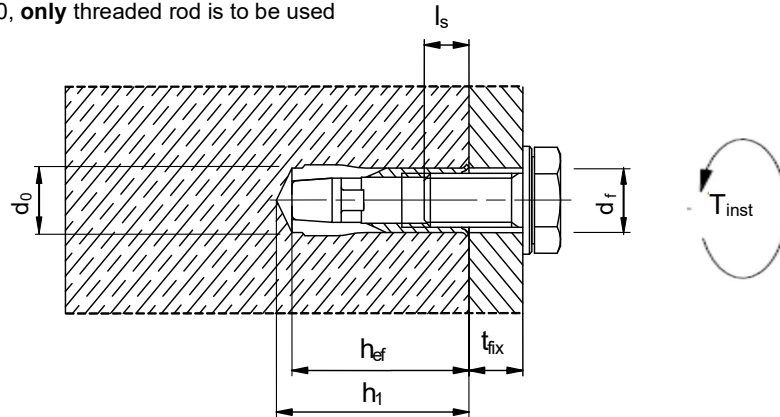
**ANNEX B2**  
**Intended Use**  
**Installation parameters**

This annex applies to the product described in the main body of the UK Technical Assessment.

**Table B2: Installation parameters for HKD-S(R), HKD-E(R), HKD and HKD-woL**

HKD		M6x30	M8x30	M8x40	M10x30 <sup>(1)</sup>	M10x40	M12x50	M16x65	M20x80
Nominal diameter of drill bit	$d_0$ [mm]	8	10	10	12	12	15	20	25
Diameter of thread	$d$ [mm]	6	8	8	10	10	12	16	20
Drill hole depth	$h_1$ [mm]	32	33	43	33	43	54	70	85
Effective embedment depth	$h_{ef}$ [mm]	30	30	40	30	40	50	65	80
Thread engagement length	$l_{s,max}$ [mm]	12.5	14.5	17.5	12.7	18	23.5	30.5	42
Minimum screwing depth <sup>(1)</sup>	$l_{s,min}$ [mm]	6	8	8	10	10	12	16	20
Maximum torque moment	$T_{inst}$ [Nm]	4	8	8	15	15	35	60	100
Maximum diameter of clearance hole in the fixture	$d_r$ [mm]	7	9	9	12	12	14	18	22

<sup>(1)</sup> With anchor size M10x30, **only** threaded rod is to be used



**Requirements for fastening screw or threaded rod:**

For anchors made of galvanized steel (HKD, HKD-woL, HKD-E and HKD-S) fastening screws or threaded rods of steel grade 4.6 / 5.6 / 5.8 or 8.8 according to EN ISO 898-1 : 2013 must be specified.

For anchors made of stainless steel (HKD-ER and HKD-SR) fastening screw or threaded rod of steel grade 70 according to EN ISO 3506 : 2020 must be specified.

**Minimum screw depth  $l_{s,min}$ :** The length of the screw must be determined depending on thickness of fixture  $t_{fix}$ , admissible tolerances and available thread length  $l_{s,max}$  as well as minimum screw depth  $l_{s,min}$  according to Table B2

**ANNEX B3**  
**Intended Use**  
**Minimum spacing and minimum edge distance**

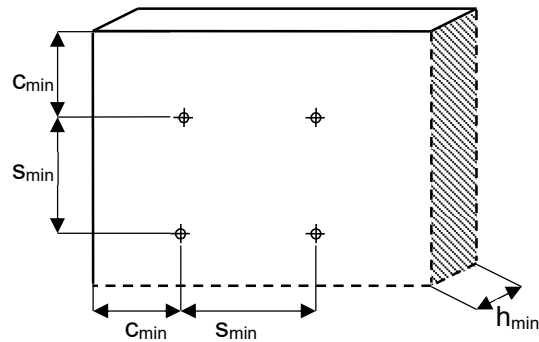
This annex applies to the product described in the main body of the UK Technical Assessment.

**Table B3: Minimum spacing and minimum edge distance for HKD-S(R) and HKD-E(R)**

HKD-S(R), HKD-E(R)			M6x30 M8x30 M10x30	M8x40 M10x40	M12x50	M16x65	M20x80
Minimum thickness of concrete member	$h_{min}$	[mm]	100	100	100	130	160
Minimum spacing	$s_{min}$	[mm]	60	80	125	130	160
Minimum edge distance	$c_{min}$	[mm]	105	140	175	230	280

**Table B4: Minimum spacing and minimum edge distance for HKD and HKD-woL**

HKD, HKD-woL			M8x30 M10x30	M8x40 M10x40	M12x50	M16x65	M20x80
Minimum thickness of concrete member	$h_{min}$	[mm]	100	100	100	130	160
Minimum spacing	$s_{min}$	[mm]	60	80	125	130	160
	for $c \geq$	[mm]	105	140	175	230	280
Minimum edge distance	$c_{min}$	[mm]	80	140	175	230	280
	for $s \geq$	[mm]	120	80	125	130	160



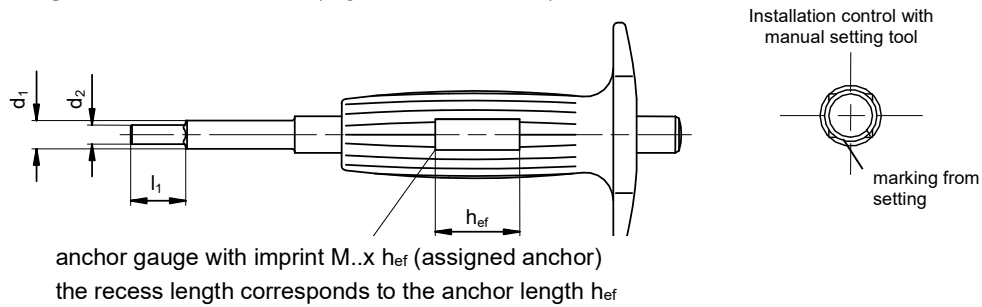
**ANNEX B4**  
**Intended Use**  
**Setting tools**

This annex applies to the product described in the main body of the UK Technical Assessment.

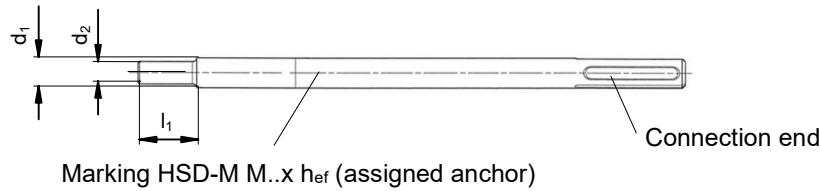
**Table B5: Dimensions of the setting tools**

Setting tools HSD			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M16x65	M20x80
Diameter	$d_1$	[mm]	7,5	9,5	9,5	11,5	11,5	14,5	18	22
Diameter	$d_2$	[mm]	5	6,5	6,5	8	8	10,2	13,5	16,5
Length	$l_1$	[mm]	15	18	28	18	24	30	36	50

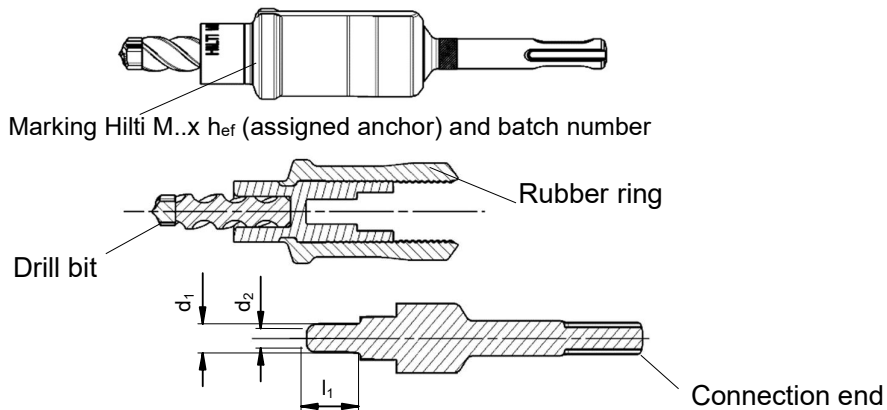
**Manual setting tool HSD-G M.. x hef (e.g. HSD-G M8 x 30)**



**Machine setting tool HSD-M M.. x hef (e.g. HSD-M M8 x 30)**



**Machine setting tool HSD-TE CX M.. x hef (e.g. HSD-TE-CX M8 x 30)**

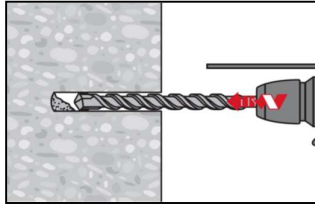


**ANNEX B5**  
**Intended Use**  
**Installation instructions**

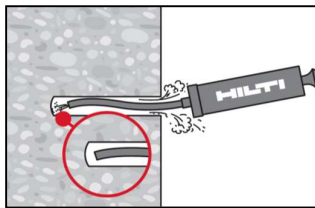
This annex applies to the product described in the main body of the UK Technical Assessment.

**Installation instructions**

**Hole drilling and cleaning**

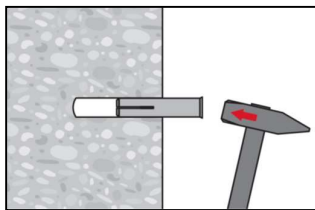


Make a cylindrical hole.

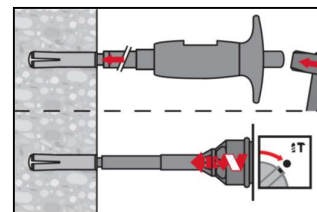
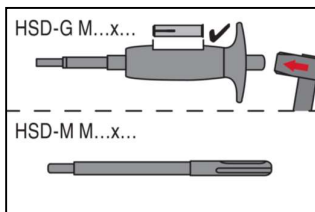


Clean the drill hole.

**Fastener setting**

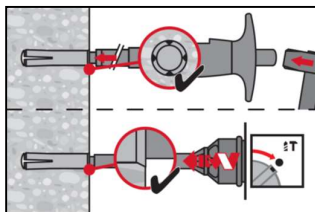


Install the anchor by hammering.



Choose the setting tool and confirm the size of setting tool according to the size of the anchor.

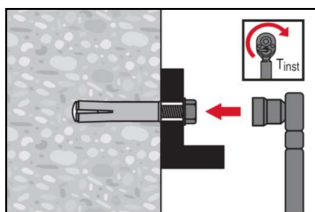
**Setting check**



HSD-G M...x...: Hammer on the top of setting tool until the four marks are visible on the lips of the anchor.

HSD-M M...x...: Set the anchor until the setting tool touches the rim of the anchor.

**Loading the anchor**



Apply the torque (check the values for  $T_{inst}$ ) using a torque wrench.

## ANNEX C1

### Performances

Characteristic resistance for Hilti push-in anchor HKD S(R) and HKD-E(R) under tension loads in uncracked concrete.

This annex applies to the product described in the main body of the UK Technical Assessment.

• **Table C1: Characteristic resistance for Hilti push-in anchor HKD-S(R) and HKD-E(R) under tension loads in uncracked concrete**

HKD-S (R) HKD-E (R)		M6x30(2)	M8x30(2)	M8x40	M10x30(2)	M10x40	M12x50	M16x65	M20x80
Installation safety factor	$\gamma_{inst}$	1.0		1.2	1.0				
<b>Steel failure</b>									
Steel grade 4.6	$N_{Rk,s}$ [kN]	8.0	14.6	14.6	23.2	23.2	33.7	62.8	98,0
Partial safety factor	$\gamma_{Ms}^{(1)}$	2.0							
Steel grade 5.6	$N_{Rk,s}$ [kN]	10.1	18.3	18.3	18.5	19.9	42.2	54.7	86,9
Partial safety factor	$\gamma_{Ms}^{(1)}$	2.0			1.49		2.0	1.47	
Steel grade 5.8	$N_{Rk,s}$ [kN]	10.1	17.4	17.4	18.5	19.9	35.3	54.7	86,9
Partial safety factor	$\gamma_{Ms}^{(1)}$	1.50	1.53		1.49		1.47		
Steel grade 8.8	$N_{Rk,s}$ [kN]	13.4	17.4	17.4	18.5	19.9	35.3	54.7	86,9
Partial safety factor	$\gamma_{Ms}^{(1)}$	1.53			1.49		1.47		
Steel grade 70	$N_{Rk,s}$ [kN]	12.8	16.8	Version not available		21.1	37.3	64.2	102.0
Partial safety factor	$\gamma_{Ms}^{(1)}$	1.83		Version not available		1.83			
<b>Pullout failure</b>									
Characteristic resistance C20/25	$N_{Rk,p}$ [kN]	8.1	8.1	9.0	8.1	12.4	17.4	25.8	35.2
Increasing factors for $N_{Rk,p}$	$\psi_c$ C30/37	1.22							
	C40/50	1.41							
	C50/60	1.58							
<b>Concrete cone and splitting failure</b>									
Characteristic resistance to prevent splitting	$N^0_{Rk,sp}$ [kN]	8.1	8.1	9.0	8.1	12.4	17.4	25.8	35.2
Factor	$k_{ucr}$ [-]	11.0							
Factor	$k_{cr}$ [-]	No performance assessed							
Effective embedment depth	$h_{ef}$ [mm]	30(2)	30(2)	40	30(2)	40	50	65	80
Spacing	$s_{cr,N}$ [mm]	90	90	120	90	120	150	195	240
Edge distance	$c_{cr,N}$ [mm]	45	45	60	45	60	75	97	120
Spacing	$s_{cr,sp}$ [mm]	210	210	280	210	280	350	455	560
Edge distance	$c_{cr,sp}$ [mm]	105	105	140	105	140	175	227	280

<sup>(1)</sup> In the absence of other national regulations.

<sup>(2)</sup> For application with dry internal exposure only and statically indeterminate structural components only.

## ANNEX C2

### Performances

#### Characteristic resistance for Hilti push-in anchor HKD S(R) and HKD-E(R) under shear loads in uncracked concrete.

This annex applies to the product described in the main body of the UK Technical Assessment.

**Table C2: Characteristic resistance for Hilti push-in anchor HKD-S(R) and HKD-E(R) under shear loads in uncracked concrete**

HKD-S (R) HKD-E (R)			M6x30 <sup>(2)</sup>	M8x30 <sup>(2)</sup>	M8x40	M10x30 <sup>(2)</sup>	M10x40	M12x50	M16x65	M20x80
<b>Steel failure without lever arm</b>										
Steel grade 4.6	$V_{Rk,s}^0$	[kN]	4.0	7.3	7.3	7.4	8.0	16.9	21.9	34.7
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.67			1.25		1.67	1.25	
Steel grade 5.6	$V_{Rk,s}^0$	[kN]	5.0	7.0	7.0	7.4	8.0	14.1	21.9	34.7
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.67	1.27		1.25				
Steel grade 5.8	$V_{Rk,s}^0$	[kN]	5.0	7.0	7.0	7.4	8.0	14.1	21.9	34.7
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.25	1.27		1.25				
Steel grade 8.8	$V_{Rk,s}^0$	[kN]	5.3	7.0	7.0	7.4	8.0	14.1	21.9	34.7
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.27			1.25				
Steel grade 70	$V_{Rk,s}^0$	[kN]	6.4	8.4	Version not available		10.5	18.7	32.1	51.0
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.52		Version not available		1.52			
Ductility factor	$k_7$	[-]	1.0							
<b>Steel failure with lever arm</b>										
Steel grade 4.6	$M_{Rk,s}^0$	[Nm]	6	15	15	30	30	52	133	260
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.67							
Steel grade 5.6	$M_{Rk,s}^0$	[Nm]	8	19	19	37	37	65	166	325
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.67							
Steel grade 5.8	$M_{Rk,s}^0$	[Nm]	8	19	19	37	37	65	166	325
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.25							
Steel grade 8.8	$M_{Rk,s}^0$	[Nm]	12	30	30	60	60	105	266	519
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.25							
Steel grade 70	$M_{Rk,s}^0$	[Nm]	11	26	Version not available		52	92	233	454
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.56		Version not available		1.56			
Ductility factor	$k_7$	[-]	1.0							
<b>Concrete pry-out failure</b>										
Pry-out factor	$k_8$	[-]	2.0							
<b>Concrete edge failure</b>										
Effective length of anchor	$l_f$	[mm]	30	30	40	30	40	50	65	80
External diameter of anchor	$d_{nom}$	[mm]	8	10	10	12	12	15	20	25

<sup>(1)</sup> In the absence of other national regulations.

<sup>(2)</sup> For application with dry internal exposure only and statically indeterminate structural components only.

**ANNEX C3****Performance****Displacements under tension load and under shear load for HKD-S(R) and HKD-E(R)**

This annex applies to the product described in the main body of the UK Technical Assessment.

**Table C3: Displacements under tension load for HKD-S(R) and HKD-E(R)**

HKD-S(R) HKD-E(R)			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M16x65	M20x80
Tension load in C20/25 to C50/60 uncracked concrete	N	[kN]	3.3	3.3	3.6	3.3	5.1	7.1	12.6	17.2
Displacement	$\delta_{N0}$	[mm]	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	$\delta_{N\infty}$	[mm]	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

**Table C4: Displacements under shear load for HKD-S and HKD-E**

HKD-S HKD-E			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M16x65	M20x80
Shear load in C20/25 to C50/60 uncracked concrete	V	[kN]	1.7	3.1	3.1	4.3	4.6	7.2	12.5	19.8
Displacement	$\delta_{V0}$	[mm]	0.35	0.35	0.40	0.35	0.40	0.45	0.75	0.75
	$\delta_{V\infty}$	[mm]	0.50	0.50	0.60	0.50	0.60	0.70	1.1	1.1

**Table C5: Displacements under shear load for HKD-SR and HKD-ER**

HKD-SR HKD-ER			M6x30	M8x30	M10x40	M12x50	M16x65	M20x80
Shear load in C20/25 to C50/60 uncracked concrete	V	[kN]	1.7	3.9	4.9	8.8	15.1	24.0
Displacement	$\delta_{V0}$	[mm]	0.35	0.45	0.45	0.55	0.9	0.9
	$\delta_{V\infty}$	[mm]	0.50	0.65	0.65	0.85	1.3	1.3



## ANNEX C4

### Performances

#### Characteristic resistance for Hilti push-in anchor HKD and HKD-woL under tension loads in uncracked concrete.

This annex applies to the product described in the main body of the UK Technical Assessment.

**Table C6: Characteristic resistance for Hilti push-in anchor HKD and HKD-woL under tension loads in uncracked concrete.**

HKD HKD-woL		M8x30 <sup>(2)</sup>	M8x40	M10x30 <sup>(2)</sup>	M10x40	M12x50	M16x65	M20x80
Installation safety factor	$\gamma_{inst}$	1.0	1.2	1.0				
<b>Steel failure</b>								
Steel grade 4.6	$N_{Rk,s}$ [kN]	14.6	14.6	19.9	22.1	33.7	62.8	98.0
Partial safety factor	$\gamma_{Ms}^{1)}$	2.0		1.5		2.0		
Steel grade 5.6	$N_{Rk,s}$ [kN]	17.1	19.4	19.9	22.1	36.6	67.5	99.0
Partial safety factor	$\gamma_{Ms}^{1)}$	1.5						
Steel grade 5.8	$N_{Rk,s}$ [kN]	17.1	19.4	19.9	22.1	36.6	67.5	99.0
Partial safety factor	$\gamma_{Ms}^{1)}$	1.5						
Steel grade 8.8	$N_{Rk,s}$ [kN]	17.1	19.4	19.9	22.1	36.6	67.5	99.0
Partial safety factor	$\gamma_{Ms}^{1)}$	1.5						
<b>Pullout failure</b>								
Characteristic resistance C20/25	$N_{Rk,p}$ [kN]	8.1	9.0	8.1	12.4	17.4	25.8	35.2
Increasing factors for $N_{Rk,p}$	C30/37	1.22						
	$\psi/C$ C40/50	1.41						
	C50/60	1.58						
<b>Concrete cone and splitting failure</b>								
Characteristic resistance to prevent splitting	$N^0_{Rk,sp}$ [kN]	8.1	9.0	8.1	12.4	17.4	25.8	35.2
Factor	$k_{ucr}$ [-]	11.0						
Factor	$k_{cr}$ [-]	No performance assessed						
Effective embedment depth	$h_{ef}$ [mm]	30 <sup>(2)</sup>	40	30 <sup>(2)</sup>	40	50	65	80
Spacing	$s_{cr,N}$ [mm]	90	120	90	120	150	195	240
Edge distance	$c_{cr,N}$ [mm]	45	60	45	60	75	97	120
Spacing	$s_{cr,sp}$ [mm]	210	280	210	280	350	455	560
Edge distance	$c_{cr,sp}$ [mm]	105	140	105	140	175	227	280

<sup>(1)</sup> In the absence of other national regulations.

<sup>(2)</sup> For application with dry internal exposure only and statically indeterminate structural components only.

## ANNEX C5

### Performances

#### Characteristic resistance for Hilti push-in anchor HKD and HKD-woL under shear loads in uncracked concrete.

This annex applies to the product described in the main body of the UK Technical Assessment.

**Table C7: Characteristic resistance for Hilti push-in anchor HKD and HKD-woL under shear loads in uncracked concrete**

HKD HKD-woL			M8x30 <sup>(2)</sup>	M8x40	M10x30 <sup>(2)</sup>	M10x40	M12x50	M16x65	M20x80
<b>Steel failure without lever arm</b>									
Steel grade 4.6	$V_{Rk,s}^0$	[kN]	7.3	7.3	10.0	11.0	16.9	31.4	49
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.67		1.25		1.67		
Steel grade 5.6	$V_{Rk,s}^0$	[kN]	8.6	9.2	10.0	11.0	18.3	33.8	49.5
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.25	1.67	1.25				
Steel grade 5.8	$V_{Rk,s}^0$	[kN]	8.6	9.2	10.0	11.0	18.3	33.8	49.5
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.25						
Steel grade 8.8	$V_{Rk,s}^0$	[kN]	8.6	9.2	10.0	11.0	18.3	33.8	49.5
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.25						
Ductility factor	$k_7$	[-]	1.0						
<b>Steel failure with lever arm</b>									
Steel grade 4.6	$M_{Rk,s}^0$	[Nm]	15	15	30	30	52	133	260
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.67						
Steel grade 5.6	$M_{Rk,s}^0$	[Nm]	19	19	37	37	65	166	325
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.67						
Steel grade 5.8	$M_{Rk,s}^0$	[Nm]	19	19	37	37	65	166	325
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.25						
Steel grade 8.8	$M_{Rk,s}^0$	[Nm]	30	30	60	60	105	266	519
Partial safety factor	$\gamma_{Ms}^{(1)}$		1.25						
Ductility factor	$k_7$	[-]	1.0						
<b>Concrete pry-out failure</b>									
Pry-out factor	$k_8$	[-]	2,0						
<b>Concrete edge failure</b>									
Effective length of anchor	$l_f$	[mm]	30	40	30	40	50	65	80
External diameter of anchor	$d_{nom}$	[mm]	10	10	12	12	15	20	25

<sup>(1)</sup> In the absence of other national regulations.

<sup>(2)</sup> For application with dry internal exposure only and statically indeterminate structural components only.

**ANNEX C6****Performance****Displacements under tension load and under shear load for HKD and HKD-woL**

This annex applies to the product described in the main body of the UK Technical Assessment.

**Table C8: Displacements under tension load for HKD and HKD-woL**

HKD HKD-woL			M8x30	M8x40	M10x30	M10x40	M12x50	M16x65	M20x80
Tension load in C20/25 to C50/60 uncracked concrete	N	[kN]	4.0	4.3	4.0	6.1	8.5	12.6	17.2
Displacement	$\delta_{N0}$	[mm]	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	$\delta_{N\infty}$	[mm]	0.3	0.3	0.3	0.3	0.3	0.2	0.2

**Table C9: Displacements under shear load for HKD and HKD-woL**

HKD HKD-woL			M8x30	M8x40	M10x30	M10x40	M12x50	M16x65	M20x80
Shear load in C20/25 to C50/60 uncracked concrete	N	[kN]	3.1	3.1	4.3	4.6	7.2	12.5	19.8
Displacement	$\delta_{V0}$	[mm]	0.35	0.40	0.35	0.40	0.45	0.75	0.75
	$\delta_{V\infty}$	[mm]	0.50	0.60	0.50	0.60	0.70	1.1	1.1



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