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SAMPLE SUBMISSION AND APPROVAL FORM

Contract Title:	_____	Ref. No.:	_____
	_____	Date:	_____
		Ref. No. of Previous Submission:	_____
Contract No:	_____	(1)	_____
File Reference:	_____	(2)	_____

DETAILS OF SUBMISSION

To: Contract Manager's Representative Attention: _____

From: _____

The enclosed sample and catalogue* / certificate of origin* / technical data* / test report* / job reference* as described below have been checked for compliance with the Specifications and Drawings, and are submitted for approval.

1. General Information

a. Material Description: HKD / HKD-S / HKD-SHD / HKD-SR / HKD-E / HKD-ER / HKD-ST push-in anchor

b. Location: _____

c. Specification Ref. Page: _____ Item: _____

d. Drawing Ref. No. _____

e. B.Q. Ref.No.: _____

f. Anticipated date of approval: _____

2. Technical Information

The submitted sample has been checked against the specification and drawings as listed below:-

Specification Requirements	**Submitted Sample** (State details against each item)
a. **Brand** Not specified	Hilti
b. **Country of Origin** Not specified	Republic of China
c. **Manufacturer's Name & Address** Not specified	Hilti Corporation, FL-9494 Principality of Liechtenstein
d. **Factory's Name & Address(es)** Not specified	Hilti (China Zhangjiang) Co Ltd, Yongping Road South, Zhangjiang Development Zone, 524022 Zhangjiang, Guangdong Province, China
e. **Supplier (with Applicator, if any)**	

Not specified	Hilti (Hong Kong) Ltd
f. **Appearance** Not specified	According to the sample submitted
g. **Color +** Not specified	NIL
h. **Specification** Not specified	Attached
i. **Manufacturer's Catalogue** Not specified	Attached
j. **Test Report** (Original/Certificated True Copy) Not specified	Attached
k. **Previous Job Reference** Not specified	Attached
l. **Supplementary Information** Not specified	NIL

For and on behalf of the Contractor

_____
(Quality Control Manager)

CONTRACT MANAGER'S COMMENTS

To:
From: Contract Manager's Representative: _____

On the basis of the sample and information given, the above sample submitted is:

(1) * **Approved.**
(2) * **Not approved** because _____
_____
_____

Remarks: _____
_____
_____

Approval does not alter the requirements of the Contract

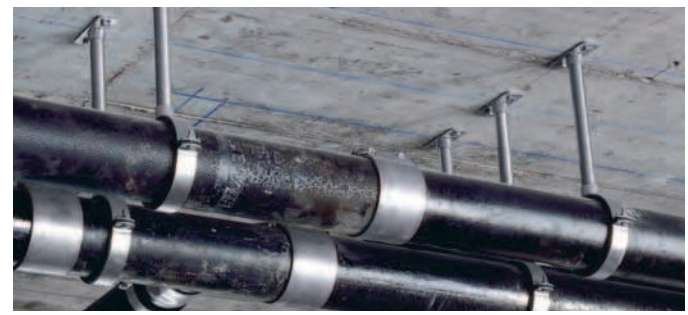
Contract Manager's Representative: _____

_____
Date:

cc. _____
_____
_____

(* Delete if appropriate)
(+ For glass or vitreous mosaic tiles, the contractor is required to confirm the colour range(s) of the submitted sample, i.e. a) light and or medium; or b) dark)

Push-in anchor HKD



Applications

- For medium load range; fastening with bolts and threaded rods for plumbing, heating, air duct and ventilation installation.
- For securing channels, rails, plates, bracket and suspension ceiling

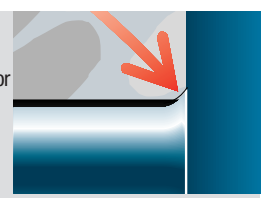
Base material

- non-cracked concrete
- Hard natural stone

Material

- Bright galvanized steel to min 5µm (M6-M20 / 1/4"-3/4")
- Sherardized steel to min 45µm (M8-M16)
- A4 stainless steel (M6-M20)

Advantages



- Flexible choice for customer to select the anchor with flare (HKD / HKD-SR) and without flare (HKD-ER)
- Setting independent of hole depth, better for standardization on accesories, hexagon bolt (HKD / HKD-SR)
- Ease of workmanship control by means of visual checking (HKD / HKD-SR)
- Easy setting at greater depth (HKD-ER)

Approvals

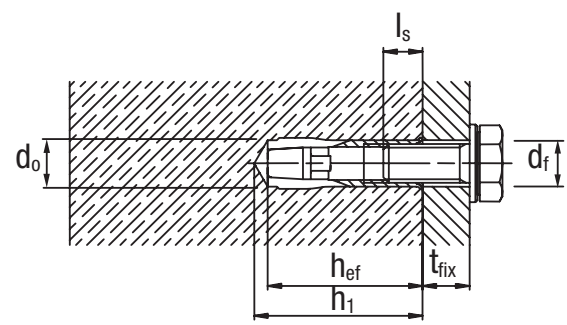
ETA DIBt VdS FM Factory Mutual Tested as per BS5080

Technical data

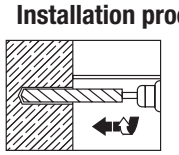
Recommended load (kN), non-cracked concrete at 25N/mm², safety factor(γ)=3

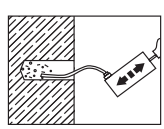
Model	Anchor size	M6x25/	M8x30/				M20x80
HKD	Tensile Load, N_{rec}	2.1	2.8	4.3	5.9	8.8	12.0
	Shear Load, V_{rec}	1.7	2.9	3.7	6.1	11.3	16.3
HKD-SR/ HKD-ER	Tensile Load, N_{rec}	2.1	2.8	4.3	5.9	8.8	12.0
	Shear Load, V_{rec}	2.1	2.8	3.5	6.2	10.7	17.0

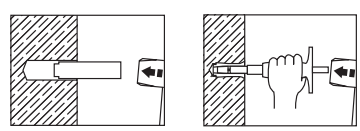
Remarks:
1) All the data applies to no edge distance, spacing and other influences
2) For detail design method, please refer to Fastening Technology Manual

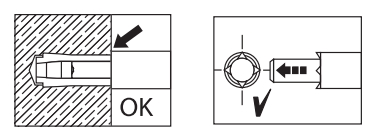


Installation procedures


Drill hole.


Blow out dust and fragments.


Install the anchor.



Push in until marking is visible.

HKD programme

HKD: internal thread (galv. to min. 5µm)

Drill bit nom. dia., d_o (mm)	Min. hole depth,h_1 (mm)	Anchorage depth, h_{ef} (mm)	Anchor length, l (mm)	Thread dia. (mm)	Tighten. torque T_{inst} (Nm)	Screw depth,. $l_{s\,(min/max)}$ (mm)	Clear-ance hole, d_f (mm)	Package (pcs)	Order designation	Item no.
8	27	25	25	M6	4	8 / 11	7	100	**HKD M6x25**	00376894
10	33	30	30	M8	8	10 / 13	9	100	**HKD M8x30**	00376959
12	43	40	40	M10	15	12 / 16	12	50	**HKD M10x40**	00376967
15	54	50	50	M12	35	14 / 22	14	50	**HKD M12x50**	00378544
20	70	65	65	M16	60	18 / 28	18	25	**HKD M16x65**	00382941
25	85	80	80	M20	120	23 / 34	22	25	**HKD M20x80**	00382955
8	27	25	25	1/4"	4	8 / 11	7	100	**HKD 1/4"x25**	00382980 ★
10	33	30	30	5/16"	8	10 / 13	9	100	**HKD 5/16"x30**	00383679 ★
12	43	40	40	3/8"	15	12 / 16	12	100	**HKD 3/8"x40**	00383960
16	54	50	50	1/2"	35	14 / 22	14	50	**HKD 1/2"x50**	00384021
20	70	65	65	5/8"	60	18 / 28	18	25	**HKD 5/8"x65**	00384023

★ Non-Stock Item in HK & Macau

HKD-SAC: internal thread (galv. to min. 45µm)

Drill bit nom. dia., d_o (mm)	Min. hole depth,h_1 (mm)	Anchorage depth, h_{ef} (mm)	Anchor length, l (mm)	Thread dia. (mm)	Tighten. torque T_{inst} (Nm)	Screw depth,. $l_{s\ (min/max)}$ (mm)	Clear-ance hole, d_f (mm)	Package (pcs)	Order designation	Item no.
10	33	30	30	M8	8	10 / 13	9	100	**HKD-SAC M8x30**	00336227 ★
12	43	40	40	M10	15	12 / 16	12	50	**HKD-SAC M10x40**	00336230 ★
15	54	50	50	M12	35	14 / 22	14	50	**HKD-SAC M12x50**	00336231 ★
20	70	65	65	M16	60	18 / 28	18	25	**HKD-SAC M16x65**	00352394 ★

HKD-SR: internal thread (A4 stainless steel)

8	27	25	25	M6	4	8 / 11	7	100	**HKD-SR M6x25**	00247951
10	33	30	30	M8	8	10 / 13	9	100	**HKD-SR M8x30**	00247952
12	43	40	40	M10	15	12 / 16	12	50	**HKD-SR M10x40**	00247953
15	54	50	50	M12	35	14 / 22	14	50	**HKD-SR M12x50**	00247954
20	70	65	65	M16	60	18 / 28	18	25	**HKD-SR M16x65**	00247955
25	85	80	80	M20	120	23 / 34	22	25	**HKD-SR M20x80**	00247956

HKD-ER: internal thread (A4 stainless steel)

10	33	30	30	M8	8	10 / 13	9	100	**HKD-ER M8x30**	00352293
12	43	40	40	M10	15	12 / 16	12	50	**HKD-ER M10x40**	00352294
15	54	50	50	M12	35	14 / 22	14	50	**HKD-ER M12x50**	00324548
20	70	65	65	M16	60	18 / 28	18	25	**HKD-ER M16x65**	00352295
10	33	30	30	5/16"	8	10 / 28	9	100	**HKD-ER 5/16"x30**	00272641 ★
12	43	40	40	3/8"	15	12 / 16	12	100	**HKD-ER 3/8"x40**	00271470
16	54	50	50	1/2"	35	14 / 22	14	50	**HKD-ER 1/2"x50**	00379642

Required tools

Anchor Anchor description	**Manual setting tool** Order designation	Package (pcs)	Item no.	**Mechanical setting tool** Order designation	Package (pcs)	Item no.
HKD-S / -E M6 / 1/4"x25	**HSD-G M6 1/4"x25**	1	00243738	**HSD-M M6 1/4"x25**	1	00243746 ★
HKD-S / -E M8 / 5/16"x30	**HSD-G M8 5/16"x30**	1	00243740	**HSD-M M8 5/16"x30**	1	00243748 ★
HKD-S / -E M10 / 3/8"x40	**HSD-G M10 3/8"x40**	1	00243742	**HSD-M M10 3/8"x40**	1	00243751 ★
HKD-S / -E M12 / 1/2"x50	**HSD-G M12 1/2"x50**	1	00243743	**HSD-M M12 1/2"x50**	1	00243752 ★
HKD-S / -E M16 / 5/8"x65	**HSD-G M16 5/8"x65**	1	00243744	**HSD-M M16 5/8"x65**	1	00243753 ★
HKD-S / -E M20 / 3/4"x80	**HSD-G M20 3/4"x80**	1	00243745	**HSD-M M20 3/4"x80**	1	00243754 ★

★ Non-Stock Item in HK & Macau

HKD Push-in anchor

Anchor version	Benefits
 HKD Carbon steel with lip HKD-SR stainless steel with lip HKD-ER stainless steel without lip	- 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


Concrete

Corrosion resistance


European Technical Approval


CE conformity

Hilti anchor design software


Fire resistance

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical approval [a)]	DIBt, Berlin	ETA-02/0032 / 2010-04-22 ETA-06/0047 / 2010-04-22 Refer HKD (Redundant)

Basic loading data (for a single anchor)

All data in this section applies to For details see Simplified design method

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Concrete as specified in the table
- *Steel* failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cube}$ = 25 N/mm²
- screw or rod with steel grade 5.8 (carbon steel) and/or A4-70 (stainless steel)

Mean Ultimate Resistance

Anchor size		M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
Tensile $N_{Ru,m}$							
HKD	[kN]	8,4	11,0	17,0	23,8	32,9	48,1
HKD-SR, HKD-ER	[kN]	8,2	10,8	16,6	23,3	34,5	47,1
Shear $V_{Ru,m}$							
HKD	[kN]	*5,5*	*9,4*	*12,2*	*20,1*	*37,1*	*53,9*
HKD-SR, HKD-ER	[kN]	*8,3*	*10,9*	*13,7*	*24,3*	*41,7*	*66,3*

Characteristic Resistance

Anchor size		M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
Tensile N_{Rk}							
HKD	[kN]	6,3	8,3	12,8	17,8	26,4	36,1
HKD-SR, HKD-ER	[kN]	6,3	8,3	12,8	17,8	26,4	36,1
Shear V_{Rk}							
HKD	[kN]	*5,0*	*8,6*	*11,0*	*18,3*	*33,8*	*49,0*
HKD-SR, HKD-ER	[kN]	*6,2*	*8,4*	*10,5*	*18,7*	*32,1*	*51,0*

Design Resistance

Anchor size		M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
Tensile N_{Rd}							
HKD	[kN]	4,2	5,5	8,5	11,9	17,6	24,0
HKD-SR, HKD-ER	[kN]	3,0	4,6	7,1	9,9	17,6	24,0
Shear V_{Rd}							
HKD	[kN]	*4,0*	*6,9*	*8,8*	*14,6*	*27,0*	*39,4*
HKD-SR, HKD-ER	[kN]	*4,1*	*5,5*	*6,9*	*12,3*	*21,1*	*33,6*

Recommended load

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
Tensile N_{rec} a)								
HKD		[kN]	2,1	2,8	4,3	5,9	8,8	12,0
HKD-SR, HKD-ER		[kN]	2,1	2,8	4,3	5,9	8,8	12,0
Shear V_{rec} a)								
HKD		[kN]	1,7	2,9	3,7	6,1	11,3	16,3
HKD-SR, HKD-ER		[kN]	2,1	2,8	3,5	6,2	10,7	17,0

a) With overall global safety factor γ = 3. The recommended loads vary according to the safety factor requirement from national regulations.

Materials

Mechanical properties of HKD, HKD-SR and HKD-ER

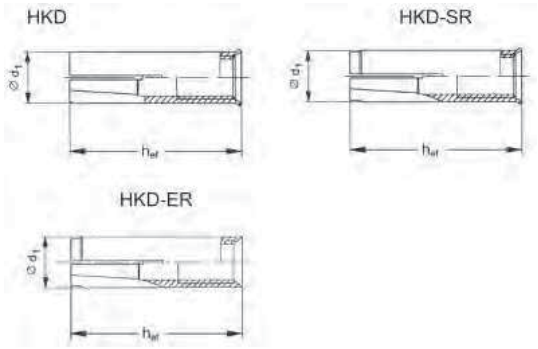
Anchor size			M6	M8	M10	M12	M16	M20
Nominal tensile strength f_{uk}	HKD	[N/mm²]	570	570	570	570	640	590
	HKD-SR HKD-ER	[N/mm²]	540	540	540	540	-	540
Yield strength f_{yk}	HKD	[N/mm²]	460	460	460	480	510	470
	HKD-SR HKD-ER	[N/mm²]	355	355	355	355	-	355
Stressed cross-section A_s	HKD	[mm²]	20,7	26,7	32,7	60,1	105	167
	HKD-S (R) HKD-E (R)	[mm²]	20,9	26,1	28,8	58,7	-	163
Moment of resistance W	HKD	[mm³]	32,3	54,6	82,9	184	431	850
	HKD-S (R) HKD-E (R)	[mm³]	50	79	110	264	602	1191
Char. bending resistance for rod or bolt $M^0_{Rk,s}$	With 5.8 Gr. Steel	[Nm]	7,6	18,7	37,4	65,5	167	325
	HKD-SR HKD-ER with A4-70	[Nm]	11	26	52	92	187	454

Material quality

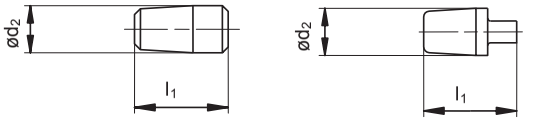
Part		Material
Anchor Body	HKD	Steel Fe/Zn5 galvanised to min. 5 µm
	HKD-SR HKD-ER	Stainless steel, 1.4401, 1.4404, 1.4571
Tapered expansion plug	HKD	Steel material
	HKD-SR HKD-ER	Stainless steel, 1.4401, 1.4404, 1.4571

Anchor size Anchor version HKD HKD-SR HKD-ER			M6x25 (1/4" x 25)	M8x30 (5/16" x 30)	M10x40 (3/8" x 40)	M12x50 (1/2" x 50)	M16x65 (5/8" x 65)	M20x80
Effective anchorage depth	h_{ef}	[mm]	25	30	40	50	60	80
Anchor diameter	d_1	[mm]	7,9	9,95	11,95	14,9	19,75	24,75
Plug diameter	d_2	[mm]	5,1	6,5	8,2	10,3	13,8	16,4
Plug length	l_1	[mm]	10	12	16	20	29	30

Anchor body



Expansions plugs

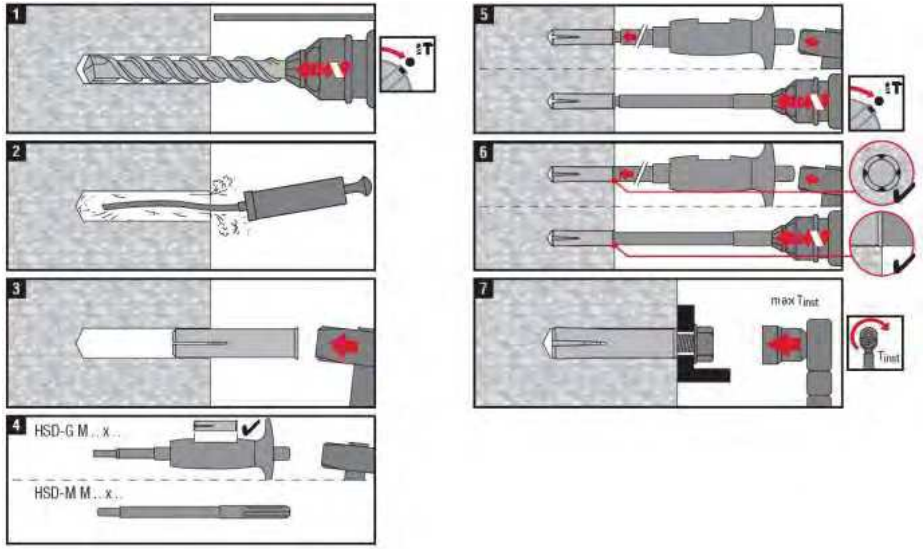


Setting

Installation equipment

Anchor size		M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
Rotary hammer		TE 2 – TE 16				TE 40 – 80	
Machine setting tool	HSD-M	6x25/30	8x25/30	10x40	12x25	16x65	20x80
Hand Setting tool	HSD-G						
Other tools		hammer, torque wrench, blow out pump					

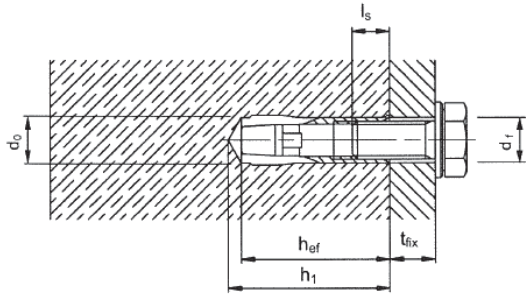
Setting instruction



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

For technical data for anchors in diamond drilled holes please contact the Hilti Technical advisory service.

Setting details: depth of drill hole h_1 and effective anchorage depth h_{ef}

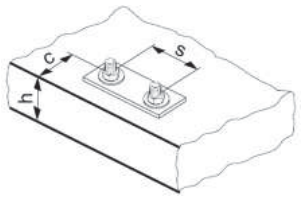


Anchor size				M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
Nominal diameter of drill bit	d_o		[mm]	8	10	12	15/16*	20	25
Cutting diameter of drill bit	$d_{cut} \leq$		[mm]	8,45	10,5	12,5	15,5/16,5*	20,5	25,5
Depth of drill hole	$h_1 \geq$		[mm]	27	33	43	54	70	85
Screwing depth	$l_{s,min}$		[mm]	6	8	10	12	16	20
	$l_{s,max}$		[mm]	12	14,5	18	22	30,5	42
Diameter of clearance hole in the fixture	$d_f \leq$		[mm]	7	9	12	14	18	22
Effective anchorage depth	h_{ef}		[mm]	25	30	40	50	65	80
Max. torque moment	T_{inst}		[Nm]	4	8	15	35	60	120

* Drill bit diameter for HKD ½" x 50 is 16 mm, for HKD M12x 50 is 15mm

Base material thickness, anchor spacing and edge distances

Anchor size				M6x25 (1/4"x25)	M10x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x30)	M20x80
Minimum base material thickness		h_{min}	[mm]	100	100	100	100	130	160
Minimum spacing and minimum edge distance HKD-SR HKD-ER		s_{min}	[mm]	60	60	80	125	130	160
		c_{min}	[mm]	88	105	140	175	230	280
Minimum spacing HKD		s_{min}	[mm]	80	60	80	125	130	160
		for c≥	[mm]	140	105	140	175	230	280
Minimum edge distance HKD		c_{min}	[mm]	100	80	140	175	230	280
		for s≥	[mm]	150	120	80	125	130	160
Critical spacing and edge distance for concrete cone failure HKD HKD-SR HKD-ER		$s_{cr,N}$	[mm]	80	90	120	150	200	240
		$c_{cr,N}$	[mm]	40	45	60	75	100	120
Critical spacing and edge distance for splitting failure	HKD	$s_{cr,sp}$	[mm]	200	210	280	350	455	560
		$c_{cr,sp}$	[mm]	100	105	140	175	227	280
	HKD-SR HKD-ER	$s_{cr,sp}$	[mm]	176	210	280	350	455	560
		$c_{cr,sp}$	[mm]	88	105	140	175	227	280



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

Simplified design method

Simplified version of the design method according ETAG 001, Annex C. Design resistance according data given in ETA-02/0032, issue 2010-04-22.

- Influence of concrete strength
- Influence of edge distance
- Influence of spacing
- Valid for a group of two anchors. (The method may also be applied for anchor groups with more than two anchors or more than one edge. The influencing factors must then be considered for each edge distance and spacing. The calculated design loads are then on the save side: They will be lower than the exact values according ETAG 001, Annex C. To avoid this, it is recommended to use the anchor design software PROFIS anchor)

The design method is based on the following simplification:

- No different loads are acting on individual anchors (no eccentricity)

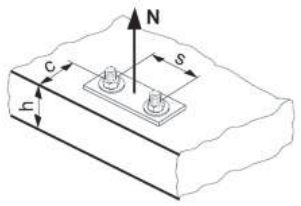
The values are valid for one anchor.

For more complex fastening applications please use the anchor design software PROFIS Anchor.

Tension loading

The design tensile resistance is the lower value of

- Steel resistance: $N_{Rd,s}$
- Concrete pull-out resistance: $N_{Rd,p} = N^0_{Rd,p} \cdot f_B$
- Concrete cone resistance: $N_{Rd,c} = N^0_{Rd,c} \cdot f_B \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{re,N}$
- Concrete splitting resistance (only non-cracked concrete): $N_{Rd,sp} = N^0_{Rd,c} \cdot f_B \cdot f_{1,sp} \cdot f_{2,sp} \cdot f_{3,sp} \cdot f_{h,sp} \cdot f_{re,N}$



Basic design tensile resistance

Design steel resistance $N_{Rd,s}$ for HKD Steel Grade 5.8 and for HKD-ER/SR A4-70

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$N_{Rd,s}$	HKD	[kN]	6,7	11,4	14,7	24,4	45,0	65,3
	HKD-SR, HKD-ER	[kN]	6,9	9,2	11,5	20,4	35,1	55,7

Design pull-out resistance $N_{Rd,p} = N^0_{Rd,p} \cdot f_B$

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$N^0_{Rd,p}$	HKD	[kN]	-	-	-	-	-	-
	HKD-SR, HKD-ER	[kN]	-	-	-	-	-	-

Design concrete cone resistance $N_{Rd,c} = N^0_{Rd,c} \cdot f_B \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{re,N}$
Design splitting resistance[a] $N_{Rd,sp} = N^0_{Rd,c} \cdot f_B \cdot f_{1,sp} \cdot f_{2,sp} \cdot f_{3,sp} \cdot f_{h,sp} \cdot f_{re,}$

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$N^0_{Rd,c}$	HKD	[kN]	4,2	5,5	8,5	11,9	17,6	24,0
	HKD-SR, HKD-ER	[kN]	3,0	4,6	7,1	9,9	17,6	24,0

a) Splitting resistance must only be considered for non-cracked concrete

Influencing factors

Influence of concrete strength

Concrete strength designation (ENV 206)	C 20/25	C 25/30	C 30/37	C 35/45	C 40/50	C 45/55	C 50/60
$f_B = (f_{ck,cube}/25N/mm^2)^{1/2}$ a) b)	1	1,1	1,22	1,34	1,41	1,48	1,55

a) $f_{ck,cube}$ = concrete compressive strength, measured on cubes with 150 mm side length
b) For design data of $f_{ck,cube}$ = 15 and 20, please contact Hilti Technical Advisory Service

Influence of edge distance [a]

$c/c_{cr,N}$ / $c/c_{cr,sp}$	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1
$f_{1,N} = 0,7 + 0,3 \cdot c/c_{cr,N} \le 1$	0,73	0,76	0,79	0,82	0,85	0,88	0,91	0,94	0,97	1
$f_{1,sp} = 0,7 + 0,3 \cdot c/c_{cr,sp} \le 1$										
$f_{2,N} = 0,5 \cdot (1 + c/c_{cr,N}) \le 1$	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90	0,95	1
$f_{2,sp} = 0,5 \cdot (1 + c/c_{cr,sp}) \le 1$										

a) The edge distance shall not be smaller than the minimum edge distance c_{min} given in the table with the setting details. These influencing factors must be considered for every edge distance.

Influence of anchor spacing [a]

$s/s_{cr,N}$ / $s/s_{cr,sp}$	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1
$f_{3,N} = 0,5 \cdot (1 + s/s_{cr,N}) \le 1$	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90	0,95	1
$f_{3,sp} = 0,5 \cdot (1 + s/s_{cr,sp}) \le 1$										

a) The anchor spacing shall not be smaller than the minimum anchor spacing s_{min} given in the table with the setting details. This influencing factor must be considered for every anchor spacing.

Influence of base material thickness

h/h_{ef}	2,0	2,2	2,4	2,6	2,8	3,0	3,2	3,4	3,6	≥ 3,68
$f_{h,sp} = [h/(2 \cdot h_{ef})]^{2/3}$	1	1,07	1,13	1,19	1,25	1,31	1,37	1,42	1,48	1,5

Influence of reinforcement

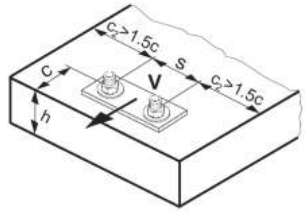
Anchor size	M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$f_{re,N} = 0,5 + h_{ef}/200mm \le 1$	0,63[a]	0,65[a]	0,7[a]	0,75[a]	0,83[a]	0,9[a]

a) This factor applies only for dense reinforcement. If in the area of anchorage there is reinforcement with a spacing ≥ 150 mm (any diameter) or with a diameter ≤ 10 mm and a spacing ≥ 100 mm, then a factor $f_{re,N}$ = 1 may be applied.

Shear loading

The design shear resistance is the lower value of

- Steel resistance: $V_{Rd,s}$
- Concrete pryout resistance: $V_{Rd,cp} = V^0_{Rd,cp} \cdot f_B \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{re,N}$
- Concrete edge resistance: $V_{Rd,c} = V^0_{Rd,c} \cdot f_B \cdot f_s \cdot f_h \cdot f_4$



Basic design shear resistance

Design steel resistance $V_{Rd,s}$ for HKD Steel Grade 5.8 and for HKD-ER/SR A4-70

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$V_{Rd,s}$	HKD	[kN]	4,0	6,9	8,8	14,6	27,0	39,6
	HKD-SR, HKD-ER	[kN]	4,1	5,5	6,9	12,3	21,1	33,6

Design concrete pryout resistance $V_{Rd,cp} = V^0_{Rd,cp} \cdot f_B \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{re,N}$

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$V^0_{Rd,cp}$	HKD	[kN]	4,2	11,0	17,0	23,8	35,2	48,1
	HKD-SR, HKD-ER	[kN]	4,2	11,0	17,0	23,8	35,2	48,1

Design concrete edge resistance[a] $V_{Rd,c} = V^0_{Rd,c} \cdot f_B \cdot f_{ß} \cdot f_h \cdot f_4$

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$V^0_{Rd,c}$	HKD	[kN]	0,9	1,4	2,3	3,7	6,2	8,9
	HKD-SR, HKD-ER	[kN]	0,9	1,4	2,3	3,7	6,2	9,5

a) For anchor groups only the anchors close to the edge must be considered

Influencing factors

Influence of concrete strength

Concrete strength designation (ENV 206)	C 20/25	C 25/30	C 30/37	C 35/45	C 40/50	C 45/55	C 50/60
$f_B = (f_{ck,cube}/25N/mm^2)^{1/2}$ a) b)	1	1,1	1,22	1,34	1,41	1,48	1,55

a) $f_{ck,cube}$ = concrete compressive strength, measured on cubes with 150 mm side length
b) For design data of $f_{ck,cube}$ = 15 and 20, please contact Hilti Technical Advisory Service

Influence of edge distance [a]

$c/c_{cr,N}$	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1
$f_{1,N} = 0,7 + 0,3 \cdot c/c_{cr,N} \le 1$	0,73	0,76	0,79	0,82	0,85	0,88	0,91	0,94	0,97	1
$f_{2,N} = 0,5 \cdot (1 + c/c_{cr,N}) \le 1$	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90	0,95	1

a) The edge distance shall not be smaller than the minimum edge distance c_{min} given in the table with the setting details. These influencing factors must be considered for every edge distance.

Influence of anchor spacing [a]

$s/s_{cr,N}$	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1
$f_{3,N} = 0,5 \cdot (1 + s/s_{cr,N}) \le 1$	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90	0,95	1

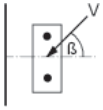
a) The anchor spacing shall not be smaller than the minimum anchor spacing s_{min} given in the table with the setting details. This influencing factor must be considered for every anchor spacing.

Influence of reinforcement

Anchor size	M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$f_{re,N} = 0,5 + h_{ef}/200mm \le 1$	0,63[a]	0,65[a]	0,7[a]	0,75[a]	0,83[a]	0,9[a]

a) This factor applies only for dense reinforcement. If in the area of anchorage there is reinforcement with a spacing ≥ 150 mm (any diameter) or with a diameter ≤ 10 mm and a spacing ≥ 100 mm, then a factor $f_{re,N}$ = 1 may be applied.

Influence of angle between load applied and the direction perpendicular to the free edge

Angle ß	0° - 55°	60°	65°	70°	75°	80°	85°	90° - 180°
$f_{ß}$ 	1,00	1,07	1,14	1,23	1,35	1,50	1,71	2,00

Influence of base material thickness

h/c	0,15	0,3	0,45	0,6	0,75	0,9	1,05	1,2	1,35	≥ 1,5
$f_h = \{h/(1,5 \cdot c)\}^{2/3} \le 1$	0,22	0,34	0,45	0,54	0,63	0,71	0,79	0,86	0,93	1,00

Influence of anchor spacing and edge distance [a] for concrete edge resistance: f_4

$f_4 = (c/h_{ef})^{1,5} \cdot (1 + s / [3 \cdot c]) \cdot 0,5$

c/h_{ef}	Single anchor	Group of two anchors s/h_{ef}														
		0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50	8.25	9.00	9.75	10.50	11.25
0,50	0,35	0,27	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35
0,75	0,65	0,43	0,54	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65
1,00	1,00	0,63	0,75	0,88	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
1,25	1,40	0,84	0,98	1,12	1,26	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40
1,50	1,84	1,07	1,22	1,38	1,53	1,68	1,84	1,84	1,84	1,84	1,84	1,84	1,84	1,84	1,84	1,84
1,75	2,32	1,32	1,49	1,65	1,82	1,98	2,15	2,32	2,32	2,32	2,32	2,32	2,32	2,32	2,32	2,32
2,00	2,83	1,59	1,77	1,94	2,12	2,30	2,47	2,65	2,83	2,83	2,83	2,83	2,83	2,83	2,83	2,83
2,25	3,38	1,88	2,06	2,25	2,44	2,63	2,81	3,00	3,19	3,38	3,38	3,38	3,38	3,38	3,38	3,38
2,50	3,95	2,17	2,37	2,57	2,77	2,96	3,16	3,36	3,56	3,76	3,95	3,95	3,95	3,95	3,95	3,95
2,75	4,56	2,49	2,69	2,90	3,11	3,32	3,52	3,73	3,94	4,15	4,35	4,56	4,56	4,56	4,56	4,56
3,00	5,20	2,81	3,03	3,25	3,46	3,68	3,90	4,11	4,33	4,55	4,76	4,98	5,20	5,20	5,20	5,20
3,25	5,86	3,15	3,38	3,61	3,83	4,06	4,28	4,51	4,73	4,96	5,18	5,41	5,63	5,86	5,86	5,86
3,50	6,55	3,51	3,74	3,98	4,21	4,44	4,68	4,91	5,14	5,38	5,61	5,85	6,08	6,31	6,55	6,55
3,75	7,26	3,87	4,12	4,36	4,60	4,84	5,08	5,33	5,57	5,81	6,05	6,29	6,54	6,78	7,02	7,26
4,00	8,00	4,25	4,50	4,75	5,00	5,25	5,50	5,75	6,00	6,25	6,50	6,75	7,00	7,25	7,50	7,75
4,25	8,76	4,64	4,90	5,15	5,41	5,67	5,93	6,18	6,44	6,70	6,96	7,22	7,47	7,73	7,99	8,25
4,50	9,55	5,04	5,30	5,57	5,83	6,10	6,36	6,63	6,89	7,16	7,42	7,69	7,95	8,22	8,49	8,75
4,75	10,35	5,45	5,72	5,99	6,27	6,54	6,81	7,08	7,36	7,63	7,90	8,17	8,45	8,72	8,99	9,26
5,00	11,18	5,87	6,15	6,43	6,71	6,99	7,27	7,55	7,83	8,11	8,39	8,66	8,94	9,22	9,50	9,78
5,25	12,03	6,30	6,59	6,87	7,16	7,45	7,73	8,02	8,31	8,59	8,88	9,17	9,45	9,74	10,02	10,31
5,50	12,90	6,74	7,04	7,33	7,62	7,92	8,21	8,50	8,79	9,09	9,38	9,67	9,97	10,26	10,55	10,85

a) The anchor spacing and the edge distance shall not be smaller than the minimum anchor spacing s_{min} and the minimum edge distance c_{min}.

Combined tension and shear loading

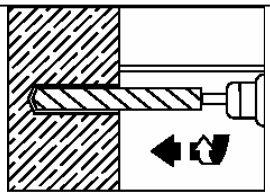
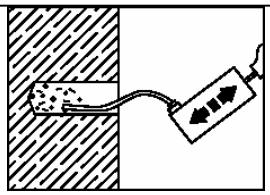
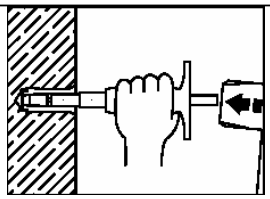
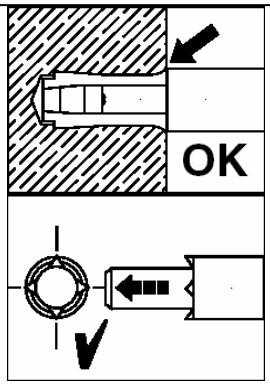
For combined tension and shear loading see section “Anchor Design”.

SETTING OPERATION

Hilti HKD Push-in Anchor

Versions : HKD /HKD-S / HKD-SHD / HKD-SR / HKD-E / HKD-ER

Accessories : Hilti HSD-G setting tool
Reference : Product Information / Fastening Technology Manual

Setting Operation:	
1. Drill the hole with drill bit	
2. Blow out dust and fragments	
3. Install the anchor by HSD-G setting tool	
4. Drive screw into anchor	

701-704, 7/F., Tower A,
Manulife Financial Centre,
223 Wai Yip Street, Kwun Tong,
Kowloon, Hong Kong.

Date : 29 Jun 2010
Ref : LE/TC/389/10

To Whom It May Concern

RE: Renaming of HKD-S push in anchors

We would like to confirm that HKD-S push in anchors has been renamed to HKD push in anchors as below.

New Description	Old Description
HKD M6x25	HKD-S M6x25
HKD M8x30	HKD-S M8x30
HKD M10x40	HKD-S M10x40
HKD M12x50	HKD-S M12x50
HKD M16x65	HKD-S M16x65
HKD M20x80	HKD-S M20x80
HKD 1/4"x25	HKD-S 1/4"x25
HKD 5/16"x30	HKD-S 5/16"x30
HKD 3/8"x40	HKD-S 3/8"x40
HKD 1/2"x50	HKD-S 1/2"x50
HKD 5/8"x65	HKD-S 5/8"x65

All the loading performances and mechanical properties remain unchanged.

Should you have any further questions, please feel free to contact our customer service hotline at 82288118.

Yours faithfully,
For and on behalf of
HILTI (HONG KONG) LTD.

Thomas Choy
Senior Marketing Manager
Hilti (Hong Kong) Ltd.

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Summary of Test result of Hilti HKD-S Push-in Anchor

Sample Description: [supplied by Hilti (Hong Kong) Ltd.]

Product: HKD

Size: M6 - M20

Material: Galvanized steel

Coating: min. 5 microns meter thick of zinc plating

Concrete Description: [supplied and tested by ETS Testconsult Ltd]

Concrete Strength: 30MPa at 26days

Mix Proportion: Grade 30/20

Laboratory Information:

Name of Laboratory: ETS-Testconsult Ltd (HOKLAS No. 022)

Test Method: BS 5080: Part 1: 1993
BS 5080: Part 2: 1986

Date Tested: Aug-05

Test Result:

Size	Type	Result 1 [kN]	Result 2 [kN]	Result 3 [kN]	Result 4 [kN]	Result 5 [kN]	Avg. Value [kN]	Std. Dev.	Charact. Load [kN]
HKD-S M6x25	Tensile	11.30	11.80	13.00	12.10	12.00	12.04	0.62	9.93
	Shear	9.80	10.20	8.80	8.70	9.60	9.42	0.65	7.20
HKD-S M8x30	Tensile	13.70	13.90	13.50	14.50	13.50	13.82	0.41	12.41
	Shear	9.47	9.90	10.40	9.70	11.30	10.15	0.73	7.68
HKD-S M10x40	Tensile	17.60	16.90	19.20	17.10	16.80	17.52	0.99	14.15
	Shear	22.00	23.20	21.20	23.00	19.30	21.74	1.58	16.34
HKD-S M12x50	Tensile	22.70	22.90	22.90	21.90	23.00	22.68	0.45	21.15
	Shear	21.00	23.10	24.20	22.80	24.30	23.08	1.34	18.52
HKD-S M16x65	Tensile	39.30	36.50	37.00	39.10	39.40	38.26	1.39	33.51
	Shear	50.30	59.30	57.32	58.21	55.20	56.07	3.56	43.93
HKD-S M20x80	Tensile	51.00	49.20	48.30	51.10	56.00	51.12	2.98	40.97
	Shear	89.30	87.40	82.90	82.30	70.00	82.38	7.53	56.71

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED
8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fotan, Hong Kong
Tel : 2695 8318 E-mail : etl@ets-testconsult.com
Fax : 2695 3944 Web site : www.ets-testconsult.com

TEST REPORT

Tensile Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50664
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 02-Aug-05
Project	-	Report Date	: 11-Aug-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M6, HKD-S Push-in Anchor Galv. Steel	Test Method	: BS 5080:Part 1:1993 Cl. 7.1
Amb.Temperature	24°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
0.82	0.00	0.00	0.00	0.00	0.00
1.64	0.00	0.00	0.00	0.00	0.00
2.46	0.01	0.00	0.01	0.01	0.00
3.28	0.02	0.01	0.01	0.03	0.01
4.10	0.06	0.04	0.01	0.03	0.03
4.92	0.10	0.06	0.02	0.04	0.05
5.74	0.11	0.08	0.03	0.05	0.06
6.56	0.14	0.11	0.03	0.07	0.09
7.38	0.15	0.13	0.04	0.10	0.11
8.20	0.20	0.17	0.06	0.12	0.13
9.02	0.27	0.21	0.08	0.13	0.16
9.84	0.36	0.23	0.12	0.16	0.19
10.66	-	0.29	0.17	0.19	0.24
11.48	-	0.39	0.21	0.25	0.31
12.30		-	0.26	-	-
13.12		-	-	-	-
Failure Load (kN)	11.3	11.8	13.0	12.1	12.0
Failure Mode	F4, F5	F4, F5	F4, F5	F4, F5	F4, F5
Average Failure Load (kN)	12.04				
Standard Deviation (kN)	0.62				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/07/01) (200kN)	S/N : 1000136752
	Load Cell Indicator :	AD813 (ET/930/07/02)	S/N : -
	Cylinder :	Enerpac RCH121 (ET/903/14)	S/N : -
	Digital Dail Gauge :	ET/430/02	
B) Structural member	Grade 35/20D		
C) Anchor installed date	-		
D) Failure Modes	P = No sign of failure in anchor and/or structural member		F1 = Failure of anchor or its accessories
	F2 = Failure in structural member		F3 = Pull out of anchor
	F4 = Failure of structural member in a shear cone		F5 = Failure by continuous displacement or decreasing load
	F6 = Failure in structural member with crack radiates outward from anchor		
	F7 = Other failure mode(s) : Anchor Breaking		
E) Span width(mm)	100		
F) Edge distance(mm)	100		
G) Drill hole size(mm)	8		
H) Drill hole depth (mm)	27		

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TEST REPORT

Shear Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50586A
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 15-Jul-05
Project	-	Report Date	: 20-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M6, HKD-S Push-in Anchor Galv. Steel	Test Method	: BS 5080:Part 2:1986 Cl 7.2
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
0.65	0.00	0.00	0.00	0.00	0.00
1.30	0.00	0.00	0.00	0.00	0.00
1.95	0.00	0.00	0.01	0.00	0.06
2.60	0.01	0.01	0.02	0.10	0.08
3.25	0.08	0.10	0.03	0.28	0.11
3.90	0.15	0.18	0.16	0.62	0.14
4.55	0.22	0.25	0.32	0.85	0.28
5.20	0.28	0.27	1.05	0.95	0.61
5.85	0.33	0.31	1.73	1.07	0.81
6.50	0.39	0.33	1.93	1.17	1.13
7.15	0.46	0.35	2.29	1.40	1.42
7.80	0.51	0.39	2.45	3.10	2.16
8.45	0.57	0.44	3.04	4.33	2.70
9.10	0.69	0.48	-	-	3.09
9.75	0.99	0.89	-	-	-
Failure Load (kN)	9.80	10.20	8.80	8.70	9.60
Failure Mode	F7	F7	F7	F7	F7
Average Failure Load (kN)	9.42				
Standard Deviation (kN)	0.65				

A) Test Appratus

Load Cell :	Maywood C3000 (ET/930/06/01) (500kN)	S/N : 174529
Load Cell Indicator :	AD813 (ET/930/06/02)	S/N : -
Cylinder :	Enerpac RCH302 (ET/903/07)	S/N : C3691C
Digital Dail Gauge :	ET/915/35	

B) Structural member Grade 35/20D

C) Anchor installed date -

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiatee outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm) 65mm

F) Edge distance(mm) 65

G) Drill hole size(mm) 8

H) Drill hole depth (mm) 27

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TEST REPORT

Tensile Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50666
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 02-Aug-05
Project	-	Report Date	: 11-Aug-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M8 HKD-S Push-in Anchor Galv. Steel	Test Method	: BS 5080:Part 1:1993 Cl. 7.1
Amb.Temperature	24°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
1.08	0.00	0.00	0.00	0.00	0.00
2.16	0.03	0.00	0.01	0.00	0.01
3.24	0.10	0.07	0.03	0.01	0.03
4.32	0.15	0.15	0.09	0.03	0.05
5.40	0.19	0.19	0.17	0.05	0.06
6.48	0.21	0.19	0.22	0.07	0.09
7.56	0.25	0.20	0.24	0.14	0.13
8.64	0.28	0.24	0.27	0.18	0.18
9.72	0.32	0.30	0.31	0.26	0.29
10.80	0.37	0.34	0.35	0.30	0.34
11.88	0.45	0.38	0.40	0.36	0.42
12.96	-	0.46	0.44	0.42	0.48
14.04	-	-	-	0.57	-
15.12	-	-	-	-	-
Failure Load (kN)	13.7	13.9	13.5	14.5	13.5
Failure Mode	F7	F7	F4, F5	F4, F5	F4, F5
Average Failure Load (kN)	13.82				
Standard Deviation (kN)	0.41				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/07/01) (200kN)	S/N : 1000136752
	Load Cell Indicator :	AD813 (ET/930/07/02)	S/N : -
	Cylinder :	Enerpac RCH121 (ET/903/14)	S/N : -
	Digital Dail Gauge :	ET/430/02	
B) Structural member	Grade 35/20D		
C) Anchor installed date	-		
D) Failure Modes	P = No sign of failure in anchor and/or structural member		F1 = Failure of anchor or its accessories
	F2 = Failure in structural member		F3 = Pull out of anchor
	F4 = Failure of structural member in a shear cone		F5 = Failure by continuous displacement or decreasing load
	F6 = Failure in structural member with crack radiates outward from anchor		
	F7 = Other failure mode(s) : Anchor Breaking		
E) Span width(mm)	120		
F) Edge distance(mm)	120		
G) Drill hole size(mm)	10		
H) Drill hole depth (mm)	33		

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TEST REPORT

Shear Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50587
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 15-Jul-05
Project	-	Report Date	: 29-Jul-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M8, HKD-S Push-in Anchor Galv. Steel	Test Method	: BS 5080:Part 2:1986 Cl 7.2
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
0.91	0.00	0.00	0.00	0.00	0.00
1.82	0.00	0.00	0.00	0.00	0.00
2.73	0.00	0.06	0.00	0.32	0.06
3.64	0.12	0.15	0.12	0.44	0.36
4.55	0.25	0.30	0.40	0.81	0.54
5.46	0.54	0.49	0.88	1.28	0.87
6.37	1.08	0.71	1.50	1.77	1.20
7.28	1.63	0.89	2.03	2.09	1.46
8.19	5.70	1.08	2.65	2.29	1.85
9.10	8.31	2.42	3.40	2.66	2.32
10.01	-	-	6.00	-	2.79
10.92	-	-	-	-	4.23
11.83	-	-	-	-	-
12.74	-	-	-	-	-
13.65	-	-	-	-	-
Failure Load (kN)	9.47	9.90	10.40	9.70	11.30
Failure Mode	F4, F5	F4, F5	F4, F5	F4, F5	Anchor Breaking
Average Failure Load (kN)	10.15				
Standard Deviation (kN)	0.73				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/06/01) (500kN)	S/N : 174529
	Load Cell Indicator :	AD813 (ET/930/06/02)	S/N : -
	Cylinder :	Enerpac RCH302 (ET/903/07)	S/N : C3691C
	Digital Dail Gauge :	ET/915/35	
B) Structural member	Grade 35/20D		
C) Anchor installed date	-		
D) Failure Modes	P = No sign of failure in anchor and/or structural member		F1 = Failure of anchor or its accessories
	F2 = Failure in structural member		F3 = Pull out of anchor
	F4 = Failure of structural member in a shear cone		F5 = Failure by continuous displacement or decreasing load
	F6 = Failure in structural member with crack radiates outward from anchor		
	F7 = Other failure mode(s) : Anchor Breaking		
E) Span width(mm)	80		
F) Edge distance(mm)	80		
G) Drill hole size(mm)	10		
H) Drill hole depth (mm)	33		

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TEST REPORT

Tensile Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50668
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 02-Aug-05
Project	-	Report Date	: 11-Aug-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M10 HKD-S Push-in Anchor Galv. Steel	Test Method	: BS 5080:Part 1:1993 Cl. 7.1
Amb.Temperature	24°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
1.66	0.00	0.00	0.00	0.00	0.00
3.32	0.00	0.00	0.00	0.00	0.00
4.98	0.00	0.00	0.00	0.00	0.00
6.64	0.00	0.04	0.00	0.00	0.00
8.30	0.01	0.05	0.00	0.00	0.00
9.96	0.02	0.08	0.00	0.01	0.01
11.62	0.12	0.10	0.00	0.01	0.02
13.28	0.42	0.11	0.00	0.01	0.03
14.94	0.86	0.12	0.01	0.01	0.14
16.60	1.38	0.16	0.02	0.02	0.22
18.26	-	-	0.03	-	-
19.92	-	-	-	-	-
21.58	-	-	-	-	-
23.24	-	-	-	-	-
Failure Load (kN)	17.6	16.9	19.2	17.1	16.8
Failure Mode	F5	F5	F5	F5	F5
Average Failure Load (kN)	17.52				
Standard Deviation (kN)	0.99				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/07/01) (200kN)	S/N : 1000136752
	Load Cell Indicator :	AD813 (ET/930/07/02)	S/N : -
	Cylinder :	Enerpac RCH121 (ET/903/14)	S/N : -
	Digital Dail Gauge :	ET/430/02	
B) Structural member	Grade 35/20D		
C) Anchor installed date	-		
D) Failure Modes	P = No sign of failure in anchor and/or structural member		F1 = Failure of anchor or its accessories
	F2 = Failure in structural member		F3 = Pull out of anchor
	F4 = Failure of structural member in a shear cone		F5 = Failure by continuous displacement or decreasing load
	F6 = Failure in structural member with crack radiates outward from anchor		
	F7 = Other failure mode(s) : Anchor Breaking		
E) Span width(mm)	145		
F) Edge distance(mm)	145		
G) Drill hole size(mm)	12		
H) Drill hole depth (mm)	43		

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TEST REPORT
Shear Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50588
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 15-Jul-05
Project	-	Report Date	: 29-Jul-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M10, HKD-S Push-in Anchor Galv. Steel	Test Method	: BS 5080:Part 2:1986 Cl 7.2
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
1.04	0.00	0.00	0.00	0.00	0.00
2.08	0.00	0.00	0.00	0.00	0.00
3.12	0.00	0.02	0.02	0.02	0.00
4.16	0.00	0.03	0.04	0.04	0.00
5.20	0.02	0.28	0.10	0.41	0.00
6.24	0.07	0.88	0.67	0.65	0.22
7.28	0.16	1.10	0.77	0.82	0.41
8.32	0.23	1.24	0.84	1.06	0.53
9.36	0.33	1.34	0.91	1.32	0.63
10.40	0.41	1.43	1.00	1.51	0.73
11.44	0.52	1.51	1.10	1.72	0.83
12.48	0.61	1.60	1.20	1.92	0.94
13.52	0.69	1.70	1.37	2.03	1.05
14.56	0.79	1.82	1.53	2.16	1.20
15.60	0.91	1.95	1.69	2.30	1.37
16.64	1.05	2.08	1.85	2.43	1.53
17.68	1.24	2.22	2.12	2.60	1.70
18.72	1.41	2.43	2.51	2.75	1.94
19.76	1.61	2.63	2.94	3.09	-
20.80	1.94	2.98	3.53	3.40	-
21.84	2.60	3.36	-	3.71	-
22.80	-	4.09	-	4.19	-
23.92	-	-	-	-	-
24.96	-	-	-	-	-
Failure Load (kN)	22.00	23.20	21.20	23.00	19.30
Failure Mode	F7	F4, F5	F7	F4, F5	F7
Average Failure Load (kN)	21.74				
Standard Deviation (kN)	1.58				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/06/01) (500kN)	S/N : 174529
	Load Cell Indicator :	AD813 (ET/930/06/02)	S/N : -
	Cylinder :	Enerpac RCH302 (ET/903/07)	S/N : C3691C
	Digital Dail Gauge :	ET/915/35	
B) Structural member	Grade 35/20D		
C) Anchor installed date	-		
D) Failure Modes	P = No sign of failure in anchor and/or structural member		F1 = Failure of anchor or its accessories
	F2 = Failure in structural member		F3 = Pull out of anchor
	F4 = Failure of structural member in a shear cone		F5 = Failure by continuous displacement or decreasing load
	F6 = Failure in structural member with crack radiates outward from anchor		
	F7 = Other failure mode(s) : Anchor Breaking		
E) Span width(mm)	100		
F) Edge distance(mm)	100		
G) Drill hole size(mm)	12		
H) Drill hole depth (mm)	43		

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TEST REPORT

Tensile Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50670
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 02-Aug-05
Project	-	Report Date	: 11-Aug-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M12 HKD-S Push-in Anchor Galv. Steel	Test Method	: BS 5080:Part 1:1993 Cl. 7.1
Amb.Temperature	24°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
2.33	0.00	0.00	0.00	0.00	0.00
4.66	0.00	0.00	0.00	0.00	0.00
6.99	0.00	0.00	0.00	0.00	0.00
9.32	0.00	0.00	0.00	0.00	0.00
11.65	0.00	0.00	0.00	0.00	0.00
13.98	0.00	0.00	0.00	0.00	0.00
16.31	0.01	0.00	0.00	0.00	0.00
18.64	0.03	0.04	0.04	0.04	0.01
20.97	0.31	0.47	0.42	0.48	0.03
23.30	-	-	-	-	-
25.63	-	-	-	-	-
27.96	-	-	-	-	-
30.29	-	-	-	-	-
32.62	-	-	-	-	-
Failure Load (kN)	22.7	22.9	22.9	21.9	23.0
Failure Mode	F5	F5	F5	F5	F5
Average Failure Load (kN)	22.68				
Standard Deviation (kN)	0.45				

A) Test Appratus

Load Cell :	Maywood C3000 (ET/930/07/01) (200kN)	S/N : 1000136752
Load Cell Indicator :	AD813 (ET/930/07/02)	S/N : -
Cylinder :	Enerpac RCH121 (ET/903/14)	S/N : -
Digital Dail Gauge :	ET/430/02	

B) Structural member Grade 35/20D

C) Anchor installed date -

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm) 180

F) Edge distance(mm) 180

G) Drill hole size(mm) 15

H) Drill hole depth (mm) 54

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TEST REPORT

Shear Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50589
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 14-Jul-05
Project	-	Report Date	: 29-Jul-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M12, HKD-S Push-in Anchor Galv. Steel	Test Method	: BS 5080:Part 2:1986 Cl 7.2
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
1.83	0.00	0.00	0.00	0.00	0.00
3.66	0.00	0.00	0.01	0.00	0.00
5.49	0.07	0.00	0.02	0.40	0.00
7.32	0.73	0.01	0.06	0.73	0.02
9.15	1.95	0.80	0.20	0.94	0.14
10.98	2.41	1.22	1.04	1.23	0.25
12.81	2.72	3.16	1.57	1.75	1.37
14.84	3.11	5.15	2.49	1.94	1.44
16.47	3.62	5.35	3.05	2.44	2.47
18.30	4.77	5.80	4.78	2.99	3.01
20.13	6.12	7.01	5.60	4.17	4.00
21.96	-	8.72	-	5.23	5.72
23.79	-	-	-	-	6.79
25.62	-	-	-	-	-
27.45	-	-	-	-	-
Failure Load (kN)	21.00	23.10	24.20	22.80	24.30
Failure Mode	Anchor Breaking	F7	F7	F7	F7
Average Failure Load (kN)	23.08				
Standard Deviation (kN)	1.34				

A) Test Appratus

Load Cell :	Maywood C3000 (ET/930/06/01) (500kN)	S/N : 174529
Load Cell Indicator :	AD813 (ET/930/06/02)	S/N : -
Cylinder :	Enerpac RCH302 (ET/903/07)	S/N : C3691C
Digital Dail Gauge :	ET/915/35	

B) Structural member Grade 35/20D

C) Anchor Installed date -

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm) 120

F) Edge distance(mm) 120

G) Drill hole size(mm) 15

H) Drill hole depth (mm) 54

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TEST REPORT

Tensile Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50672
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 03-Aug-05
Project	-	Report Date	: 11-Aug-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M16 HKD-S Push-in Anchor Galv. Steel	Test Method	: BS 5080:Part 1:1993 Cl. 7.1
Amb.Temperature	24°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
3.45	0.00	0.00	0.00	0.00	0.00
6.90	0.00	0.00	0.00	0.00	0.00
10.35	0.00	0.00	0.00	0.00	0.00
13.80	0.00	0.00	0.00	0.00	0.00
17.20	0.00	0.00	0.00	0.00	0.00
20.70	0.03	0.00	0.00	0.00	0.00
24.15	0.03	0.00	0.00	0.01	0.00
27.60	0.03	0.06	0.01	0.02	0.00
31.05	0.05	0.07	0.06	0.05	0.00
34.50	0.07	0.09	0.10	0.12	0.00
37.95	0.16	-	-	0.18	0.08
41.40	-	-	-	-	-
44.85	-	-	-	-	-
48.30	-	-	-	-	-
Failure Load (kN)	39.3	36.5	37.0	39.1	39.4
Failure Mode	F5	F5	F5	F5	F5
Average Failure Load (kN)	38.26				
Standard Deviation (kN)	1.39				

A) Test Appratus

Load Cell :	Maywood C3000 (ET/930/07/01) (200kN)	S/N : 1000136752
Load Cell Indicator :	AD813 (ET/930/07/02)	S/N : -
Cylinder :	Enerpac RCH121 (ET/903/14)	S/N : -
Digital Dail Gauge :	ET/430/02	

B) Structural member Grade 35/20D

C) Anchor installed date -

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm) 240

F) Edge distance(mm) 240

G) Drill hole size(mm) 20

H) Drill hole depth (mm) 70

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TEST REPORT
Shear Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50590
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 14-Jul-05
Project	-	Report Date	: 29-Jul-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M16, HKD-S Push-in Anchor Galv. Steel	Test Method	: BS 5080:Part 2:1986 Cl 7.2
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
2.85	0.00	0.00	0.00	0.00	0.00
5.70	0.00	0.00	0.00	0.00	0.01
8.55	0.02	0.01	0.00	0.01	0.03
11.40	0.06	0.03	0.00	0.02	0.07
14.25	0.31	0.15	0.05	0.04	0.09
17.10	0.58	0.58	0.24	0.09	0.19
19.95	0.80	0.95	0.52	0.14	0.23
22.80	0.99	1.20	0.84	0.34	0.37
25.65	1.16	1.38	1.14	0.49	0.53
28.50	1.30	1.55	1.46	0.72	0.70
31.35	1.46	1.69	1.73	0.92	0.86
34.20	1.65	1.85	1.97	1.10	1.10
37.05	1.89	2.01	2.19	1.32	1.32
39.90	2.05	2.20	2.37	1.43	1.52
42.75	2.24	2.31	2.58	1.63	1.77
45.42	2.46	2.45	2.80	1.79	2.02
48.27	2.70	2.65	3.08	1.99	2.35
51.12	-	2.98	3.46	2.10	2.78
53.97	-	3.30	3.89	2.34	3.54
56.82	-	4.07	4.52	2.89	-
59.67	-	-	5.49	-	-
62.52	-	-	-	-	-
Failure Load (kN)	50.30	59.30	57.32	58.21	55.20
Failure Mode	F4, F5	F4, F5	F4, F5	F4, F5	F4, F5
Average Failure Load (kN)	56.07				
Standard Deviation (kN)	3.56				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/06/01) (500kN)	S/N : 174529
	Load Cell Indicator :	AD813 (ET/930/06/02)	S/N : -
	Cylinder :	Enerpac RCH302 (ET/903/07)	S/N : C3691C
	Digital Dail Gauge :	ET/915/35	
B) Structural member	Grade 35/20D		
C) Anchor installed date	-		
D) Failure Modes	P = No sign of failure in anchor and/or structural member		F1 = Failure of anchor or its accessories
	F2 = Failure in structural member		F3 = Pull out of anchor
	F4 = Failure of structural member in a shear cone		F5 = Failure by continuous displacement or decreasing load
	F6 = Failure in structural member with crack radiates outward from anchor		
	F7 = Other failure mode(s) : Anchor Breaking		
E) Span width(mm)	160		
F) Edge distance(mm)	160		
G) Drill hole size(mm)	20		
H) Drill hole depth (mm)	70		

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TEST REPORT

Tensile Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50674A
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 03-Aug-05
Project	-	Report Date	: 20-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M20 HKD-S Push in Anchor Galv. Steel	Test Method	: BS 5080:Part 1:1993 Cl. 7.1
Amb.Temperature	24°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
4.71	0.00	0.00	0.00	0.00	0.00
9.42	0.00	0.01	0.00	0.00	0.04
14.13	0.00	0.03	0.00	0.00	0.07
18.84	0.00	0.04	0.00	0.00	0.10
23.55	0.00	0.06	0.01	0.01	0.13
28.26	0.02	0.09	0.02	0.05	0.14
32.97	0.04	0.13	0.05	0.07	0.16
37.68	0.08	0.23	0.08	0.09	0.24
42.39	0.10	0.36	0.16	0.13	0.26
47.10	0.14	0.45	0.21	0.30	0.28
51.81	-	-	-	-	0.33
56.52	-	-	-	-	-
61.23	-	-	-	-	-
65.94	-	-	-	-	-
Failure Load (kN)	51.00	49.20	48.30	51.10	56.00
Failure Mode	F4, F5	F5	F5	F5	F5
Average Failure Load (kN)	51.12				
Standard Deviation (kN)	2.98				

A) Test Appratus

Load Cell :	Maywood C3000 (ET/930/07/01) (200kN)	S/N : 1000136752
Load Cell Indicator :	AD813 (ET/930/07/02)	S/N : -
Cylinder :	Enerpac RCH121 (ET/903/14)	S/N : -
Digital Dail Gauge :	ET/430/02	

B) Structural member Grade 30/20D

C) Anchor installed date -

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm) 300

F) Edge distance(mm) 300

G) Drill hole size(mm) 25

H) Drill hole depth (mm) 85

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TEST REPORT

Shear Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50591
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 15-Jul-05
Project	-	Report Date	: 29-Jul-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M20, HKD-S Push-in Anchor Galv. Steel	Test Method	: BS 5080:Part 2:1986 Cl 7.2
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
6.63	0.00	0.00	0.00	0.00	0.01
13.26	0.00	0.09	0.11	0.06	0.04
19.89	0.27	0.21	1.12	0.51	0.56
26.52	0.73	1.40	3.44	1.37	1.62
33.15	1.32	1.81	4.31	1.97	1.78
39.78	1.64	2.30	4.86	2.31	2.24
46.41	1.86	2.63	5.21	2.51	2.55
53.04	2.43	3.31	6.14	2.81	3.25
59.67	2.77	3.89	6.66	3.12	4.58
66.30	3.55	4.35	7.32	3.56	5.39
72.93	4.00	5.14	7.77	3.84	-
79.56	5.50	6.33	9.38	6.97	-
86.19	7.08	7.70	-	-	-
92.82	-	-	-	-	-
99.45	-	-	-	-	-
Failure Load (kN)	89.30	87.40	82.90	82.30	70.00
Failure Mode	F4, F5	F4, F5	F4, F5	F4, F5, F6	F4
Average Failure Load (kN)	82.38				
Standard Deviation (kN)	7.53				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/06/01) (500kN)	S/N : 174529
	Load Cell Indicator :	AD813 (ET/930/06/02)	S/N : -
	Cylinder :	Enerpac RCH302 (ET/903/07)	S/N : C3691C
	Digital Dail Gauge :	ET/915/35	
B) Structural member	Grade 35/20D		
C) Anchor installed date	-		
D) Failure Modes	P = No sign of failure in anchor and/or structural member		F1 = Failure of anchor or its accessories
	F2 = Failure in structural member		F3 = Pull out of anchor
	F4 = Failure of structural member in a shear cone		F5 = Failure by continuous displacement or decreasing load
	F6 = Failure in structural member with crack radiates outward from anchor		
	F7 = Other failure mode(s) : Anchor Breaking		
E) Span width(mm)	200		
F) Edge distance(mm)	200		
G) Drill hole size(mm)	25		
H) Drill hole depth (mm)	85		

Summary of Test result of Hilti HKD-SR Push-in Anchor

Sample Description: [supplied by Hilti (Hong Kong) Ltd.]

Product: HKD

Size: M6 - M20

Material: A4 stainless steel

Coating: N/A

Concrete Description: [supplied and tested by ETS Testconsult Ltd]

Concrete Strength: 30MPa at 26days

Mix Proportion: Grade 30/20

Laboratory Information:

Name of Laboratory: ETS-Testconsult Ltd (HOKLAS No. 022)

Test Method: BS 5080: Part 1: 1993
BS 5080: Part 2: 1986

Date Tested: Aug-05

Test Result:

Size	Type	Result 1 [kN]	Result 2 [kN]	Result 3 [kN]	Result 4 [kN]	Result 5 [kN]	Avg. Value [kN]	Std. Dev.	Charact. Load [kN]
HKD-SR M6x25	Tensile	12.60	10.20	10.50	11.20	10.40	10.98	0.98	7.64
	Shear	8.70	8.60	9.50	8.40	8.80	8.80	0.42	7.37
HKD-SR M8x30	Tensile	19.70	16.70	13.60	16.30	15.30	16.32	2.24	8.69
	Shear	27.00	27.70	27.60	26.95	27.30	27.31	0.34	26.15
HKD-SR M10x40	Tensile	20.00	20.20	24.50	20.60	21.10	21.28	1.85	14.98
	Shear	16.10	15.50	17.70	15.60	17.00	16.38	0.95	13.15
HKD-SR M12x50	Tensile	26.00	23.80	28.60	24.00	25.20	25.52	1.94	18.90
	Shear	33.80	34.70	41.10	41.00	40.90	38.30	3.71	25.64
HKD-SR M16x65	Tensile	38.00	44.00	42.60	47.70	49.10	44.28	4.40	29.29
	Shear	71.20	73.40	73.30	77.30	78.70	74.78	3.11	64.18
HKD-SR M20x80	Tensile	63.50	58.40	49.20	51.80	55.10	55.60	5.61	36.47
	Shear	91.00	91.70	91.20	92.40	92.80	91.82	0.77	89.20

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TEST REPORT

Tensile Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50714A
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 09-Aug-05
Project	-	Report Date	: 09-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M6 HKD-SR push-in anchor A4 Stainless Steel	Test Method	: BS 5080:Part 1:1993 Cl. 7.1
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
0.82	0.00	0.00	0.00	0.00	0.00
1.64	0.00	0.00	0.00	0.00	0.00
2.46	0.00	0.00	0.00	0.00	0.00
3.28	0.00	0.00	0.00	0.00	0.00
4.10	0.00	0.00	0.00	0.00	0.00
4.92	0.00	0.00	0.00	0.00	0.00
5.74	0.03	0.00	0.00	0.00	0.01
6.56	0.06	0.00	0.01	0.00	0.02
7.38	0.09	0.00	0.03	0.00	0.03
8.20	0.11	0.02	0.08	0.02	0.04
9.02	0.14	0.05	0.11	0.06	0.05
9.84	0.16	0.08	0.15	0.11	0.07
10.66	0.21	-	-	0.18	-
11.48	0.25	-	-	-	-
12.30	0.33	-	-	-	-
13.12	-	-	-	-	-
13.94	-	-	-	-	-
14.76	-	-	-	-	-
Failure Load (kN)	12.6	10.2	10.5	11.2	10.4
Failure Mode	F4	F4	F4	F4	F5
Average Failure Load (kN)	10.98				
Standard Deviation (kN)	0.98				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/07/01) (200kN)	S/N : 1000136752
	Load Cell Indicator :	AD813 (ET/930/07/02)	S/N : -
	Cylinder :	Enerpac RCH121 (ET/903/14)	S/N : -
	Digital Dail Gauge :	ET/430/02	
B) Structural member	Grade 45/20D		
C) Anchor installed date	-		
D) Failure Modes	P = No sign of failure in anchor and/or structural member		F1 = Failure of anchor or its accessories
	F2 = Failure in structural member		F3 = Pull out of anchor
	F4 = Failure of structural member in a shear cone		F5 = Failure by continuous displacement or decreasing load
	F6 = Failure in structural member with crack radiates outward from anchor		
	F7 = Other failure mode(s) : Anchor Breaking		
E) Span width(mm)	100		
F) Edge distance(mm)	100		
G) Drill hole size(mm)	8		
H) Drill hole depth (mm)	27		

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TEST REPORT

Shear Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50786A
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 26-Jul-05
Project	-	Report Date	: 20-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M6 HKD-SR Push-in Anchor A4 Stainless Steel	Test Method	: BS 5080:Part 2:1986 Cl 7.2
Amb.Temperature	24°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
0.83	0.03	0.07	0.03	0.00	0.10
1.66	0.10	0.20	0.31	0.31	0.19
2.49	0.25	0.26	0.50	0.50	0.28
3.32	0.64	0.32	0.72	0.68	0.63
4.15	1.24	0.45	1.37	0.95	0.90
4.98	1.41	0.73	1.64	1.15	1.24
5.81	1.65	0.97	1.82	1.36	1.51
6.64	2.00	1.20	2.15	1.82	1.98
7.47	2.65	1.57	2.34	2.37	2.32
8.30	2.71	1.90	2.58	3.27	3.00
9.13	-	-	3.09	-	-
9.96	-	-	-	-	-
10.79	-	-	-	-	-
11.62	-	-	-	-	-
12.45	-	-	-	-	-
13.28	-	-	-	-	-
14.11	-	-	-	-	-
14.94	-	-	-	-	-
15.77	-	-	-	-	-
16.60	-	-	-	-	-
Failure Load (kN)	8.70	8.60	9.50	8.40	8.80
Failure Mode	Anchor Failure	F5	F5	F5	F5
Average Failure Load (kN	8.80				
Standard Deviation (kN)	0.42				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/06/01) (500kN)	S/N : 174529
	Load Cell Indicator :	AD813 (ET/930/06/02)	S/N : -
	Cylinder :	Enerpac RCH302 (ET/903/07)	S/N : C3691C
	Digital Dail Gauge :	ET/915/35	
B) Structural member	Grade 35/20D		
C) Anchor installed date	-		

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm)	65
F) Edge distance(mm)	65
G) Drill hole size(mm)	8
H) Drill hole depth (mm)	27

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TEST REPORT

Tensile Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50716A
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 09-Aug-05
Project	-	Report Date	: 09-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M8 HKD-SR push-in anchor A4 Stainless Steel	Test Method	: BS 5080:Part 1:1993 Cl. 7.1
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
1.08	0.00	0.00	0.00	0.00	0.00
2.16	0.00	0.00	0.00	0.00	0.00
3.24	0.00	0.00	0.00	0.00	0.00
4.32	0.00	0.00	0.02	0.00	0.00
5.40	0.00	0.00	0.03	0.00	0.01
6.48	0.00	0.00	0.04	0.00	0.02
7.56	0.00	0.00	0.06	0.00	0.04
8.64	0.00	0.00	0.09	0.00	0.07
9.72	0.00	0.00	0.12	0.00	0.09
10.80	0.03	0.00	0.20	0.00	0.11
11.88	0.08	0.00	0.29	0.00	0.14
12.96	0.33	0.01	0.45	0.00	0.17
14.04	0.49	0.05	-	0.00	0.21
15.12	0.63	0.11	-	0.00	0.27
16.20	0.80	0.16	-	0.02	-
17.28	0.97	-	-	-	-
18.36	1.18	-	-	-	-
19.44	1.49	-	-	-	-
Failure Load (kN)	19.7	16.7	13.6	16.3	15.3
Failure Mode	F4	F4	F4	F6	F4
Average Failure Load (kN)	16.32				
Standard Deviation (kN)	2.24				

A) Test Appratus

Load Cell :	Maywood C3000 (ET/930/07/01) (200kN)	S/N : 1000136752
Load Cell Indicator :	AD813 (ET/930/07/02)	S/N : -
Cylinder :	Enerpac RCH121 (ET/903/14)	S/N : -
Digital Dail Gauge :	ET/430/02	

B) Structural member Grade 45/20D

C) Anchor installed date -

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm) 120

F) Edge distance(mm) 120

G) Drill hole size(mm) 10

H) Drill hole depth (mm) 33

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TEST REPORT

Shear Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50788A
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 26-Jul-05
Project	-	Report Date	: 20-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M8 HKD-SR Push-in Anchor A4 Stainless Steel	Test Method	: BS 5080:Part 2:1986 Cl 7.2
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
1.09	0.00	0.00	0.01	0.00	0.00
2.18	0.00	0.04	0.05	0.02	0.01
3.27	0.01	0.07	0.09	0.08	0.05
4.36	0.04	0.08	0.14	0.13	0.11
5.45	0.07	0.10	0.26	0.20	0.19
6.54	0.12	0.17	0.40	0.34	0.31
7.63	0.35	0.40	0.61	0.48	0.42
8.72	0.59	0.68	0.95	0.84	0.71
9.81	0.88	1.01	1.45	1.31	1.05
10.90	1.15	1.26	1.89	1.52	1.46
11.99	1.54	1.79	2.10	1.94	1.86
13.08	1.84	2.08	2.28	2.11	2.17
14.17	2.34	2.55	2.51	2.47	2.52
15.26	4.73	5.10	2.81	3.81	3.08
16.35	-	-	3.10	-	3.33
17.44	-	-	3.65	-	-
18.53	-	-	-	-	-
19.62	-	-	-	-	-
20.71	-	-	-	-	-
21.80					
22.89					
23.98	-	-	-	-	-
Failure Load (kN)	16.10	15.50	17.70	15.60	17.00
Failure Mode	F5	F5	F5	F5	F5
Average Failure Load (kN)	16.38				
Standard Deviation (kN)	0.95				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/06/01) (500kN)	S/N : 174529
	Load Cell Indicator :	AD813 (ET/930/06/02)	S/N : -
	Cylinder :	Enerpac RCH302 (ET/903/07)	S/N : C3691C
	Digital Dail Gauge :	ET/915/35	
B) Structural member	Grade 35/20D		
C) Anchor installed date	-		

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm)	80
F) Edge distance(mm)	80
G) Drill hole size(mm)	10
H) Drill hole depth (mm)	33

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TEST REPORT

Tensile Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50718A
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 09-Aug-05
Project	-	Report Date	: 09-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M10 HKD-SR push-in anchor A4 Stainless Steel	Test Method	: BS 5080:Part 1:1993 Cl. 7.1
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
1.66	0.00	0.00	0.00	0.00	0.00
3.32	0.00	0.00	0.00	0.00	0.00
4.98	0.00	0.00	0.00	0.00	0.00
6.64	0.01	0.00	0.00	0.00	0.00
8.30	0.02	0.01	0.00	0.00	0.00
9.96	0.04	0.02	0.00	0.00	0.00
11.62	0.06	0.04	0.02	0.04	0.00
13.28	0.10	0.06	0.05	0.08	0.00
14.94	0.13	0.08	0.08	0.10	0.00
16.60	0.17	0.12	0.11	0.13	0.03
18.26	0.28	0.16	0.14	0.18	0.07
19.92	0.50	0.31	0.18	0.25	0.86
21.58	-	-	0.23	-	-
23.24	-	-	0.30	-	-
24.90	-	-	-	-	-
26.56	-	-	-	-	-
28.22	-	-	-	-	-
29.88	-	-	-	-	-
31.54	-	-	-	-	-
Failure Load (kN)	20.0	20.2	24.5	20.6	21.1
Failure Mode	F5	F5	F5	F5	F5
Average Failure Load (kN)	21.28				
Standard Deviation (kN)	1.85				

A) Test Appratus

Load Cell :	Maywood C3000 (ET/930/07/01) (200kN)	S/N : 1000136752
Load Cell Indicator :	AD813 (ET/930/07/02)	S/N : -
Cylinder :	Enerpac RCH121 (ET/903/14)	S/N : -
Digital Dail Gauge :	ET/430/02	

B) Structural member Grade 45/20D

C) Anchor installed date -

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm) 145

F) Edge distance(mm) 145

G) Drill hole size(mm) 12

H) Drill hole depth (mm) 43

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TEST REPORT

Shear Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50790A
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 26-Jul-05
Project	-	Report Date	: 20-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M10 HKD-SR Push-in Anchor A4 Stainless Steel	Test Method	: BS 5080:Part 2:1986 Cl 7.2
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
1.37	0.00	0.00	0.00	0.00	0.00
2.74	0.00	0.00	0.00	0.01	0.00
4.11	0.04	0.00	0.02	0.03	0.04
5.48	0.07	0.00	0.03	0.04	0.09
6.85	0.10	0.00	0.06	0.11	0.13
8.22	0.15	0.58	0.09	0.27	0.19
9.59	0.56	0.73	0.42	0.29	0.28
10.96	0.70	0.91	0.58	0.39	0.42
12.33	0.91	1.24	0.68	0.61	0.72
13.70	1.15	1.36	0.80	0.92	0.88
15.07	1.26	1.76	1.04	1.34	1.12
16.44	1.36	1.87	1.26	1.45	1.42
17.81	1.45	1.96	1.65	1.65	1.58
19.18	1.56	2.07	1.94	1.70	1.83
20.55	1.72	2.19	2.33	1.95	1.96
21.92	1.99	2.30	2.51	2.35	2.26
23.29	2.43	2.49	2.88	2.49	2.67
24.66	3.20	2.92	3.00	3.02	3.01
26.03	4.21	3.35	3.21	3.57	3.69
27.40	-	4.39	3.78	-	-
28.77	-	-	-	-	-
30.14	-	-	-	-	-
31.51	-	-	-	-	-
Failure Load (kN)	27.00	27.70	27.60	26.95	27.30
Failure Mode	F5	Anchor Failure	F5	F5	F5
Average Failure Load (kN	27.31				
Standard Deviation (kN)	0.34				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/06/01) (500kN)	S/N : 174529
	Load Cell Indicator :	AD813 (ET/930/06/02)	S/N : -
	Cylinder :	Enerpac RCH302 (ET/903/07)	S/N : C3691C
	Digital Dall Gauge :	ET/915/35	

B) Structural member Grade 35/20D

C) Anchor installed date -

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failura in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm) 80

F) Edge distance(mm) 80

G) Drill hole size(mm) 10

H) Drill hole depth (mm) 33

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TEST REPORT

Tensile Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50720B
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 09-Aug-05
Project	-	Report Date	: 28-Oct-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M12 HKD-SR push-in anchor A4 Stainless Steel	Test Method	: BS 5080:Part 1:1993 Cl. 7.1
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
2.33	0.00	0.00	0.00	0.00	0.00
4.66	0.00	0.00	0.00	0.00	0.00
6.99	0.00	0.00	0.00	0.00	0.00
9.32	0.00	0.00	0.00	0.00	0.00
11.65	0.00	0.00	0.00	0.00	0.00
13.98	0.00	0.00	0.00	0.02	0.00
16.31	0.00	0.00	0.00	0.04	0.00
18.64	0.00	0.02	0.01	0.10	0.06
20.97	0.00	0.14	0.03	0.15	0.11
23.30	0.00	0.58	0.06	0.70	0.66
25.63	0.02	-	0.11	-	-
27.96	-	-	0.28	-	-
30.29	-	-	-	-	-
32.62	-	-	-	-	-
34.95	-	-	-	-	-
37.28	-	-	-	-	-
39.61	-	-	-	-	-
41.94	-	-	-	-	-
44.27	-	-	-	-	-
Failure Load (kN)	26.0	23.8	28.6	24.0	25.2
Failure Mode	F4	F5	F6	F5	F5
Average Failure Load (kN)	25.52				
Standard Deviation (kN)	1.94				

A) Test Apprstus

Load Cell :	Maywood C3000 (ET/930/07/01) (200kN)	S/N : 1000136752
Load Cell Indicator :	AD813 (ET/930/07/02)	S/N : -
Cylinder :	Enerpac RCH121 (ET/903/14)	S/N : -
Digital Dail Gauge :	ET/430/02	

B) Structural member Grade 45/20D

C) Anchor installed date -

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm) 180

F) Edge distance(mm) 180

G) Drill hole size(mm) 15

H) Drill hole depth (mm) 54

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TEST REPORT

Shear Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50792A
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 26-Jul-05
Project	-	Report Date	: 20-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M12 HKD-SR Push-in Anchor A4 Stainless Steel	Test Method	: BS 5080:Part 2:1986 Cl 7.2
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
2.43	0.03	0.00	0.01	0.02	0.02
4.86	0.06	0.02	0.05	0.09	0.08
7.29	0.09	0.05	0.10	0.15	0.09
9.72	0.10	0.34	0.15	0.16	0.27
12.15	0.43	0.70	0.30	0.49	0.93
14.58	0.76	1.08	0.69	0.89	1.48
17.01	0.98	1.26	0.94	1.00	1.78
19.44	1.20	1.45	1.24	1.21	2.04
21.87	1.45	1.65	1.46	1.50	2.38
24.30	1.65	1.86	1.66	1.74	2.64
26.73	1.86	2.07	1.87	1.88	2.95
29.16	2.15	2.31	2.09	2.06	3.24
31.59	2.92	2.63	2.32	2.35	3.50
34.02	-	3.88	2.57	2.62	3.78
36.45	-	-	2.90	2.87	4.10
38.88	-	-	3.15	3.44	4.45
41.31	-	-	-	-	-
43.74	-	-	-	-	-
46.17	-	-	-	-	-
Failure Load (kN)	33.80	34.70	41.10	41.00	40.90
Failure Mode	Anchor Failure	Anchor Failure	F5	F5	F5
Average Failure Load (kN	38.30				
Standard Deviation (kN)	3.71				

A) Test Appratus

Load Cell :	Maywood C3000 (ET/930/06/01) (500kN)	S/N : 174529
Load Cell Indicator :	AD813 (ET/930/06/02)	S/N : -
Cylinder :	Enerpac RCH302 (ET/903/07)	S/N : C3691C
Digital Dail Gauge :	ET/915/35	

B) Structural member Grade 35/20D

C) Anchor installed date -

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm) 120

F) Edge distance(mm) 120

G) Drill hole size(mm) 15

H) Drill hole depth (mm) 54

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TEST REPORT

Tensile Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50722A
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 09-Aug-05
Project	-	Report Date	: 09-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M16 HKD-SR push-in anchor A4 Stainless Steel	Test Method	: BS 5080:Part 1:1993 Cl. 7.1
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
3.45	0.00	0.00	0.00	0.00	0.00
6.90	0.00	0.00	0.00	0.00	0.00
10.35	0.00	0.00	0.00	0.00	0.00
13.80	0.00	0.00	0.00	0.00	0.00
17.25	0.02	0.00	0.00	0.00	0.00
20.70	0.04	0.01	0.00	0.00	0.00
24.15	0.29	0.03	0.00	0.00	0.00
27.60	0.83	0.05	0.04	0.00	0.00
31.05	1.50	0.06	0.08	0.00	0.00
34.50	2.13	0.09	0.10	0.04	0.00
37.95	2.61	0.22	0.26	0.06	0.04
41.40	-	0.45	1.45	0.46	0.41
44.85	-	-	-	1.10	1.01
48.30	-	-	-	-	2.42
51.75	-	-	-	-	-
55.20	-	-	-	-	-
58.65	-	-	-	-	-
62.10	-	-	-	-	-
Failure Load (kN)	38.0	44.0	42.6	47.7	49.1
Failure Mode	F5	F5	F5	F5	F5
Average Failure Load (kN)	44.28				
Standard Deviation (kN)	4.40				

A) Test Appratus

Load Cell :	Maywood C3000 (ET/930/07/01) (200kN)	S/N : 1000136752
Load Cell Indicator :	AD813 (ET/930/07/02)	S/N : -
Cylinder :	Enerpac RCH121 (ET/903/14)	S/N : -
Digital Dail Gauge :	ET/430/02	

B) Structural member Grade 45/20D

C) Anchor installed date -

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm) 240

F) Edge distance(mm) 240

G) Drill hole size(mm) 20

H) Drill hole depth (mm) 70

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TEST REPORT

Shear Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50794A
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 26-Jul-05
Project	-	Report Date	: 20-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M16 HKD-SR Push-in Anchor A4 Stainless Steel	Test Method	: BS 5080:Part 2:1986 Cl 7.2
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
4.17	0.00	0.02	0.02	0.00	0.00
8.34	0.04	0.06	0.10	0.03	0.01
12.51	0.21	0.11	0.18	0.11	0.04
16.68	0.47	0.18	0.28	0.23	0.10
20.85	0.65	0.35	0.36	0.37	0.20
25.02	0.88	0.54	0.48	0.60	0.38
29.19	1.02	0.75	0.63	0.92	0.67
33.36	1.21	0.97	0.87	1.20	0.90
37.53	1.40	1.14	1.17	1.51	1.25
41.70	1.62	1.48	1.57	1.85	1.50
45.87	1.82	2.10	2.04	2.14	1.83
50.04	2.05	2.90	3.04	2.46	2.09
54.21	2.45	3.12	3.41	2.77	2.33
58.38	2.86	3.48	3.84	3.05	2.61
62.55	3.11	3.88	4.44	3.41	2.92
66.72	3.58	4.34	4.94	3.78	3.28
70.89	5.58	5.04	6.13	4.19	3.68
75.06	-	-	-	4.92	4.59
79.23	-	-	-	-	-
Failure Load (kN)	71.20	73.40	73.30	77.30	78.70
Failure Mode	F5	F5	F5	F5	F5
Average Failure Load (kN			74.78		
Standard Deviation (kN)			3.11		

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/06/01) (500kN)	S/N : 174529
	Load Cell Indicator :	AD813 (ET/930/06/02)	S/N : -
	Cylinder :	Enerpac RCH302 (ET/903/07)	S/N : C3691C
	Digital Dail Gauge :	ET/915/35	
B) Structural member	Grade 35/20D		
C) Anchor installed date	-		

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm)	160
F) Edge distance(mm)	160
G) Drill hole size(mm)	20
H) Drill hole depth (mm)	70

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TEST REPORT

Tensile Proof Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50725A
Address	17/F, Tower 6, China H K City, 33 Canton Rd, TST	Test Date	: 09-Aug-05
Project	-	Report Date	: 09-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M20 HKD-SR push-in anchor A4 Stainless Steel	Test Method	: BS 5080:Part 1:1993 Cl. 7.1
Amb.Temperature	23°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
4.71	0.00	0.00	0.00	0.00	0.00
9.42	0.00	0.00	0.00	0.00	0.00
14.13	0.00	0.00	0.00	0.00	0.00
18.84	0.00	0.00	0.00	0.00	0.00
23.55	0.00	0.00	0.00	0.00	0.02
28.26	0.00	0.00	0.00	0.01	0.04
32.97	0.00	0.00	0.00	0.02	0.06
37.68	0.00	0.00	0.02	0.21	0.10
42.39	0.00	0.15	0.10	0.55	0.24
47.10	0.04	0.22	2.24	1.06	0.66
51.81	-	-	-	-	-
56.52	-	-	-	-	-
61.23	-	-	-	-	-
65.94	-	-	-	-	-
70.65	-	-	-	-	-
75.36	-	-	-	-	-
80.07	-	-	-	-	-
84.78	-	-	-	-	-
Failure Load (kN)	N/A				
Failure Mode	N/A				
Average Failure Load (kN)	N/A				
Standard Deviation (kN)	N/A				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/07/01) (200kN)	S/N : 1000136752
	Load Cell Indicator :	AD813 (ET/930/07/02)	S/N : -
	Cylinder :	Enerpac RCH121(ET/903/14)	S/N : -
	Digital Dail Gauge :	ET/430/02	
B) Structural member	Grade 45/20D		
C) Anchor installed date	-		
D) Failure Modes	P = No sign of failure in anchor and/or structural member		F1 = Failure of anchor or its accessories
	F2 = Failure in structural member		F3 = Pull out of anchor
	F4 = Failure of structural member in a shear cone		F5 = Failure by continuous displacement or decreasing load
	F6 = Failure in structural member with crack radiates outward from anchor		
	F7 = Other failure mode(s) : -		
E) Span width(mm)	300		
F) Edge distance(mm)	300		
G) Drill hole size(mm)	25		
H) Drill hole depth (mm)	85		

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ETS-TESTCONSULT LIMITED
8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fotan, Hong Kong
Tel : 2695 8318 E-mail : etl@ets-testconsult.com
Fax : 2695 3944 Web site : www.ets-testconsult.com

TEST REPORT

Shear Load Test on Anchor Bolt

Client	Hilti (Hong Kong) Ltd	Report No.	: FDA50784A
Address	17/F, Tower 6, China HK City, 33 Canton Road, TST	Test Date	: 26-Jul-05
Project	-	Report Date	: 20-Sep-05
Test Location	ETL's Laboratory	Page No.	: 2 of 3
Anchor Type	M20 HKD-SR Push-in Anchor A4 Stainless Steel	Test Method	: BS 5080:Part 2:1986 Cl 7.2
Amb.Temperature	24°C		

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.00	0.00	0.00	0.00	0.00	0.00
4.51	0.06	0.01	0.05	0.00	0.02
9.02	0.19	0.10	0.09	0.04	0.09
13.53	0.29	0.21	0.11	0.17	0.13
18.04	0.35	0.31	0.23	0.23	0.21
22.55	0.46	0.43	0.29	0.28	0.26
27.06	0.58	0.62	0.35	0.39	0.31
31.57	0.82	0.81	0.50	0.48	0.41
36.08	1.04	1.01	1.44	0.61	0.58
40.59	1.20	1.18	1.59	0.73	0.76
45.10	1.48	1.39	1.82	0.88	0.94
49.61	1.79	1.60	1.96	1.02	1.15
54.12	2.13	1.84	2.15	1.17	1.37
58.63	2.52	2.18	2.31	1.35	1.59
63.14	2.90	2.63	2.53	1.58	1.94
67.65	3.24	3.24	2.68	1.75	2.14
72.16	3.72	3.60	2.85	1.99	2.42
76.67	4.11	3.90	2.99	2.23	2.65
81.18	4.50	4.28	3.21	2.54	2.64
85.69	4.81	4.78	3.40	2.81	3.99
90.20	5.40	5.37	3.72	3.10	4.47
94.71	-	-	-	-	-
Failure Load (kN)	91.00	91.70	91.20	92.40	92.80
Failure Mode	F5	F5	F5	F5	F5
Average Failure Load (kN)	91.82				
Standard Deviation (kN)	0.77				

A) Test Appratus	Load Cell :	Maywood C3000 (ET/930/06/01) (500kN)	S/N : 174529
	Load Cell Indicator :	AD813 (ET/930/06/02)	S/N : -
	Cylinder :	Enerpac RCH302 (ET/903/07)	S/N : C3691C
	Digital Dail Gauge :	ET/915/35	

B) Structural member Grade 35/20D

C) Anchor installed date -

D) Failure Modes

P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Anchor Breaking

E) Span width(mm) 200

F) Edge distance(mm) 200

G) Drill hole size(mm) 25

H) Drill hole depth (mm) 85

Deutsches Institut für Bautechnik

Anstalt des öffentlichen Rechts

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Authorised and notified according to Article 10 of the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products (89/106/EEC)

DIBt

Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-02/0032

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung *Trade name*	Hilti Kompaktdübel HKD *Hilti push-in anchor HKD*
Zulassungsinhaber *Holder of approval*	Hilti Aktiengesellschaft Business Unit Anchors 9494 Schaan FÜRSTENTUM LIECHTENSTEIN
Zulassungsgegenstand und Verwendungszweck *Generic type and use of construction product*	Wegkontrolliert spreizender Dübel aus galvanisch verzinktem oder nichtrostendem Stahl in den Größen M6, M8, M10, M12, M16 und M20 zur Verankerung im ungerissenen Beton *Deformation-controlled expansion anchor made of galvanised or stainless steel of sizes M6, M8, M10, M12, M16 and M20 for use in non-cracked concrete*
Geltungsdauer: vom *Validity: from* bis *to*	22 April 2010 17 October 2012
Herstellwerk *Manufacturing plant*	Hilti Aktiengesellschaft

Diese Zulassung umfasst *This Approval contains*	21 Seiten einschließlich 13 Anhänge *21 pages including 13 annexes*
Diese Zulassung ersetzt *This Approval replaces*	ETA-02/0032 mit Geltungsdauer vom 10.10.2007 bis 17.10.2012 *ETA-02/0032 with validity from 10.10.2007 to 17.10.2012*

EOTA — Europäische Organisation für Technische Zulassungen
European Organisation for Technical Approvals

I LEGAL BASES AND GENERAL CONDITIONS

1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], modified by Council Directive 93/68/EEC[2] and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council[3];
- Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998[4], as amended by law of 31 October 2006[5];
- Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC[6];
- Guideline for European technical approval of "Metal anchors for use in concrete - Part 4: Deformation controlled expansion anchors", ETAG 001-04.

2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.

3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.

4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.

5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.

6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

1 Official Journal of the European Communities L 40, 11 February 1989, p. 12
2 Official Journal of the European Communities L 220, 30 August 1993, p. 1
3 Official Journal of the European Union L 284, 31 October 2003, p. 25
4 *Bundesgesetzblatt Teil I 1998*, p. 812
5 *Bundesgesetzblatt Teil I 2006*, p. 2407, 2416
6 Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the construction product and intended use

1.1 Definition of the product

The Hilti-push-in anchor HKD of sizes M6, M8, M10, M12, M16 and M20 is an anchor made of galvanised or stainless steel which is placed into a drilled hole and anchored by deformation-controlled expansion.

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

An illustration of the product and intended use is given in Annex 1.

The fixture shall be anchored with a fastening screw or threaded rod according to Annex 5.

1.2 Intended use

The anchor is intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 of Council Directive 89/106 EEC shall be fulfilled and failure of anchorages made with these products would cause risk to human life and/or lead to considerable economic consequences. The anchor is to be used only for anchorages subject to static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength classes C20/25 at minimum and C50/60 at most according to EN 206-1:2000-12.

It may be anchored in non-cracked concrete only.

Anchor made of galvanised steel (Hilti HKD, HKD-woL, HKD-S, HKD-E):

The anchor made of galvanised steel may only be used in structures subject to dry internal conditions.

Anchor made of stainless steel (Hilti HKD-SR, HKD-ER):

The anchor made of stainless steel may be used in structures subject to dry internal conditions and also in structures subject to external atmospheric exposure (including industrial and marine environment), or exposure in permanently damp internal conditions, if no particular aggressive conditions exist. Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e. g. in desulphurization plants or road tunnels where de-icing materials are used).

The provisions made in this European technical approval are based on an assumed intended working life of the anchor of 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.

2 Characteristics of the product and methods of verification

2.1 Characteristics of the product

The anchor corresponds to the drawings and provisions given in Annexes 1 to 3. The characteristic material values, dimensions and tolerances of the anchor not indicated in Annexes 1 to 3 shall correspond to the respective values laid down in the technical documentation[7] of this European technical approval.

The characteristic values for the design of anchorages are given in Annexes 7 to 13.

The following designations are used for different anchor versions (see Annex 1):

- HKD cold formed anchor made of galvanised steel with lip
- HKD-woL cold formed anchor made of galvanised steel without lip
- HKD-S machined anchor made of galvanised steel with lip
- HKD-SR machined anchor made of stainless steel with lip
- HKD-E machined anchor made of galvanised steel without lip
- HKD-ER machined anchor made of stainless steel without lip

Each anchor is marked with the identifying mark of the producer, the anchor identity, the thread size, the effective anchorage depth (h_{ef}) and the outer diameter of the anchor body ($Ø\ d_1$) according to Annex 1. In addition, the anchor body for anchor size M8x40 and M10x40 are marked on the top of the anchor body according to Annex 2. The anchor made of stainless steel is marked with the additional letter "R".

The anchor shall only be packaged and supplied as a complete unit.

2.2 Methods of verification

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 has been made in accordance with the "Guideline for European technical approval of Metal Anchors for Use in Concrete", Part 1 "Anchors in general" and Part 4 "Deformation-controlled expansion anchors" on the basis of Option 7.

In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

7 The technical documentation of this European technical approval is deposited at the Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the Decision 89/106/EEC of the European Commission[8] system 2(i) (referred to as System 1) of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 1: Certification of the conformity of the product by an approved certification body on the basis of:

(a) Tasks for the manufacturer:
  (1) factory production control;
  (2) further testing of samples taken at the factory by the manufacturer in accordance with the control plan;

(b) Tasks for the approved body:
  (3) initial type-testing of the product;
  (4) initial inspection of factory and of factory production control;
  (5) continuous surveillance, assessment and approval of factory production control.

Note: Approved bodies are also referred to as "notified bodies".

3.2 Responsibilities

3.2.1 Tasks for the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use initial/raw/constituent materials stated in the technical documentation of this European technical approval.

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.[9]

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of anchors in order to undertake the actions laid down in section 3.2.2 For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

8 Official Journal of the European Communities L 254 of 08.10.1996

9 The control plan is a confidential part of the European technical approval and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.

3.2.2 Tasks for the approved bodies

The approved body shall perform the

- initial type-testing of the product,
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control

in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the product stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

3.3 CE marking

The CE marking shall be affixed on the ...(product itself - indicate where on the product, if necessary - or the label attached to it; packaging; accompanying commercial document, e.g. the EC declaration of conformity). The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate of conformity for the product,
- the number of the European technical approval,
- the number of the guideline for European technical approval,
- use category (ETAG 001-1, option 7),
- size.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

4.2 Design of anchorages

The fitness of the anchor for the intended use is given under the following conditions:

The anchorages are designed in accordance with the "Guideline for European technical approval of Metal Anchors for Use in Concrete", Annex C, Method A 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. position of the anchor relative to reinforcement or to supports).

The minimum strength class and the minimum screwing depth of the fastening screw or the threaded rod for installation of the fixture shall meet the requirements according to Annex 5. The length of the fastening screw shall be defined taking into account available thread length, the minimum screwing depth, the thickness of fixture and tolerances of member and fixture.

4.3 Installation of anchors

The fitness for use of the anchor can only be assumed if the anchor is installed as follows:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Use of the anchor only as supplied by the manufacturer without exchanging the components of an anchor.
- Checks before placing the anchor to ensure that the strength class of the concrete in which the anchor is to be placed is in the range given and is not lower than that of the concrete to which the characteristic loads apply.
- Check of concrete being well compacted, e. g. without significant voids.
- Positioning of the drill holes without damaging the reinforcement.
- Drill hole by hammer drilling only.
- Cleaning of the hole of drilling dust.
- Edge distance and spacing not less than the specified values without minus tolerances.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application.
- Anchor installation acc. to manufacturer's instructions given in Annex 6.
- Anchor expansion by impact on the plug using the setting tools given in Annex 4. The anchor is properly set if the stop of the pin reaches the anchor body, and the impression of the manual setting tool HSD-G is visible as illustrated in Annex 4.
- The fastening screw or threaded rod shall correspond to the requirements given in Annex 5.
- Installation torque moments are not required for functioning of the anchor. However, the torque moments given in Annex 5 must not be exceeded.

5 Indications to the manufacturer

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to and 4.2 and 4.3 is given to those who are concerned. This information may be made by reproduction of the respective parts of the European technical approval. In addition all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

The minimum data required are:

- drill bit diameter,
- thread diameter,
- minimum effective anchorage depth,

- available thread length and minimum screwing depth of the fastening screw or threaded rod,
- minimum strength class of the screw or threaded rod according to EN ISO 898-1
- minimum hole depth,
- torque moment,
- information on the installation procedure, including cleaning of the hole, preferably by means of an illustration,
- reference to any special installation equipment needed,
- identification of the manufacturing batch.

All data shall be presented in a clear and explicit form.

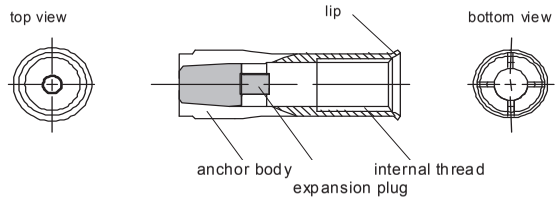
Dipl.-Ing. Georg Feistel
Head of Division Construction Engineering
of Deutsches Institut für Bautechnik

beglaubigt
Lange

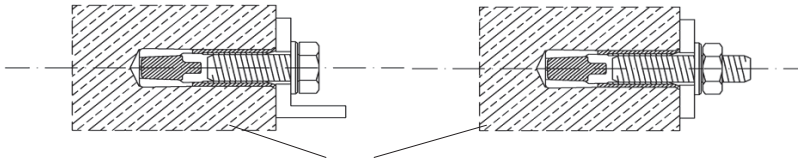
Berlin, 22 April 2010

Hilti push-in anchor HKD

for use in non-cracked concrete



Intended use:



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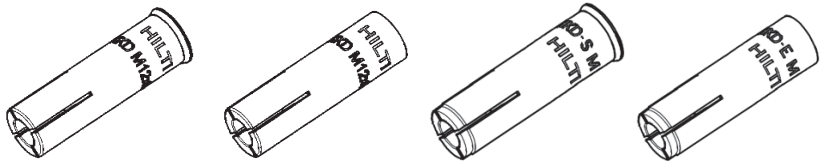


HKD	HKD-woL	HKD-S / HKD-SR	HKD-E / HKD-ER
HKD M8 x 30	HKD-woL M8 x 30	HKD-S M6 x 30 ø8	HKD-E M6 x 30 ø8
HKD M8 x 40	HKD-woL M8 x 40	HKD-S M8 x 30 ø10	HKD-E M8 x 30 ø10
HKD M10 x 30	HKD-woL M10 x 30	HKD-S M8 x 40 ø10	HKD-E M8 x 40 ø10
HKD M10 x 40	HKD-woL M10 x 40	HKD-S M10 x 30 ø12	HKD-E M10 x 30 ø12
HKD M12 x 50	HKD-woL M12 x 50	HKD-S M10 x 40 ø12	HKD-E M10 x 40 ø12
HKD M16 x 65	HKD-woL M16 x 65	HKD-S M12 x 50 ø15	HKD-E M12 x 50 ø15
HKD M20 x 80	HKD-woL M20 x 80	HKD-S M16 x 65 ø20	HKD-E M16 x 65 ø20
		HKD-S M20 x 80 ø25	HKD-E M20 x 80 ø25
		HKD-SR	HKD-ER
		HKD-SR M6 x 30 ø8	HKD-ER M6 x 30 ø 8
		HKD-SR M8 x 30 ø10	HKD-ER M8 x 30 ø 8
		HKD-SR M10 x 40 ø12	HKD-ER M10 x 40 ø12
		HKD-SR M12 x 50 ø15	HKD-ER M12 x 50 ø15

Hilti push-in anchor HKD	**Annex 1**
Product and intended use	of European technical approval **ETA-02/0032**

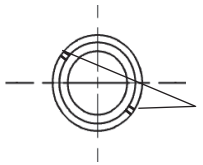
Identification after installation

Table 1: 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)

each anchor can be identified with setting tool after installation

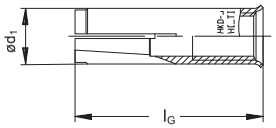


Hilti push-in anchor HKD	**Annex 2**
Identification after installation	of European technical approval **ETA-02/0032**

Table 2: Materials

HKD; HKD-woL		
designation		material
1	anchor body	cold formed steel – galvanised to ≥ 5 µm, EN 10084 or EN 10111
2	expansion plug	cold formed steel, EN 10084 or EN 10111
HKD-S; HKD-E		
designation		material
1	anchor body	steel Fe/Zn5 (galvanised to ≥ 5 µm), EN 10087, EN 10277-3
2	expansion plug	steel 1.0213, EN 10263-2 or steel 1.0204, DIN 17111
HKD-SR; HKD-ER		
designation		material
1	anchor body	stainless steel, 1.4401, 1.4404 or 1.4571 EN 10088-3
2	expansion plug	

(1) anchor body



(2) expansion plug

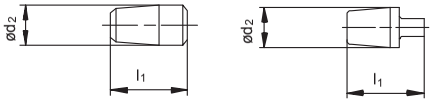
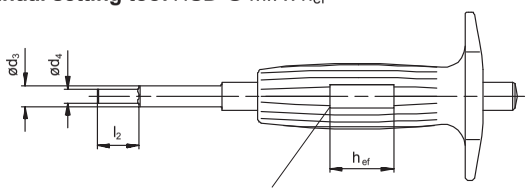


Table 3: Dimensions

anchor size	l_G [mm]	ød_1 [mm]	ød_2 [mm]	l_1 [mm]
M6x30	30	8	5	15
M8x30	30	9,95	6,5	12
M8x40	40	9,95	6,35	16
M10x30	30	11,80	8,2	12
M10x40	40	11,95	8,2	16
M12x50	50	14,90	10,3	20
M16x65	60	19,75	13,8	29
M20x80	80	24,75	16,4	30

Hilti push-in anchor HKD	**Annex 3**
Materials and dimensions	of European technical approval **ETA-02/0032**

Manual setting tool HSD-G M.. x h_{ef}



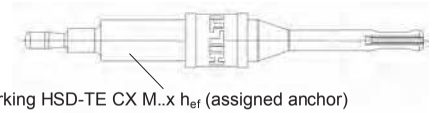
Installation control with manual setting tool

anchor gauge with imprint M..x h_{ef} (assigned anchor)
the recess length corresponds to the anchor length h_{ef}

Machine setting tool HSD-M M.. x h_{ef}

marking HSD-M M..x h_{ef} (assigned anchor)

Machine setting tool HSD-TE CX M.. x h_{ef}



marking HSD-TE CX M..x h_{ef} (assigned anchor)

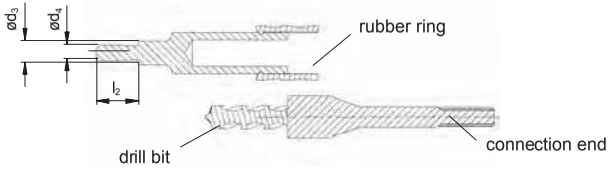


Table 4: Dimensions of the setting tools

setting tool HSD / HSG	ød_3 [mm]	ød_4 [mm]	l_2 [mm]
M6x30	7,5	5,0	15
M8x30	9,5	6,5	18
M8x40	9,5	6,5	28
M10x30	11,5	8,0	18
M10x40	11,5	8,0	24
M12x50	14,5	10,2	30
M16x65	18,0	13,5	36
M20x80	22,0	16,5	50

Hilti push-in anchor HKD	**Annex 4**
Setting tools	of European technical approval **ETA-02/0032**

Installation data

Fastening screw or threaded rod:
For anchor made of galvanised steel (HKD, HKD-woL, HKD-E and HKD-S) the property class is 4.6 / 5.6 / 5.8 or 8.8 according to EN ISO 898-1 to use.
For anchor made of stainless steel (HKD-ER and HKD-SR) the minimum property class is A4-70 according EN ISO 3506 to use.

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

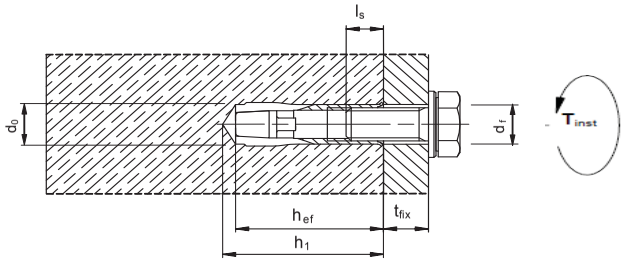
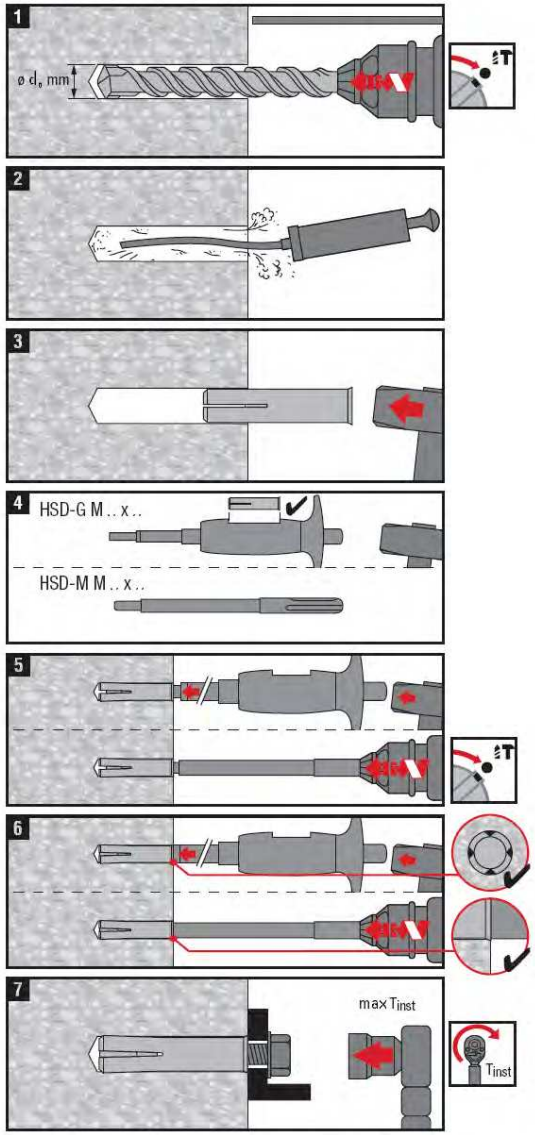


Table 5: Installation data

anchor size	drill hole diameter d_0 [mm]	thread diameter d [mm]	drill hole depth h_1 [mm]	effective anchorage depth h_{ef} [mm]	maximum-screwing depth $l_{s,max}$ [mm]	minimum-screwing depth $l_{s,min}$ [mm]	tightening torque max. T_{inst} [Nm]	clearance hole diameter d_f [mm]
M6x30	8	6	32	30	12,5	6	≤ 4	7
M8x30	10	8	33	30	14,5	8	≤ 8	9
M8x40	10	8	43	40	17,5	8	≤ 8	9
M10x30[1)]	12	10	33	30	12,7	10	≤ 15	12
M10x40	12	10	43	40	18,0	10	≤ 15	12
M12x50	15	12	54	50	23,5	12	≤ 35	14
M16x65	20	16	70	65	30,5	16	≤ 60	18
M20x80	25	20	85	80	42,0	20	≤ 100	22

[1)] with anchor size M10x30 **only** threaded rod is to be used

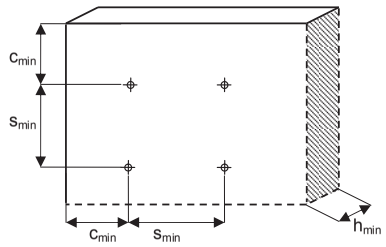
Hilti push-in anchor HKD	Annex 5
Installation data	of European technical approval **ETA-02/0032**



Hilti push-in anchor HKD	Annex 6
Instruction for use	of European technical approval **ETA-02/0032**

Table 6: Installation for minimum spacing and minimum edge distance

HKD-S, HKD-E, HKD-SR and HKD-ER			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
HKD, HKD-woL			**M8x30 M10x30**	**M8x40 M10x40**	**M12x50**	**M16x65**	**M20x80**
mMinimum thickness of concrete member	h_{min}	[mm]	100	100	100	130	160
minimum spacing	s_{min}	[mm]	60	80	125	130	160
	for c≥	[mm]	105	140	175	230	280
minimum edge distance	c_{min}	[mm]	120	140	175	230	280
	for s≥	[mm]	80	80	125	130	160



Hilti push-in anchor HKD	Annex 7
Minimum spacing and edge distance	of European technical approval **ETA-02/0032**

Table 7: Design method A - Characteristic resistance to tension loads

HKD-S (R) HKD-E (R)			M6x30 [4]	M8x30 [4]	M10x30 [4]	M8x40	M10x40	M12x50	M16x65	M20x80
Steel failure										
Characteristic resistance	$N_{Rk,s}$ [kN]	steel 4.6	8,0	14,6	23,2	14,6	23,2	33,7	62,8	98,0
Partial safety factor	γ_{Ms} [1]		2,0							
Characteristic resistance	$N_{Rk,s}$ [kN]	steel 5.6	10,1	18,3	18,5	18,3	19,9	42,2	54,7	86,9
Partial safety factor	γ_{Ms} [1]		2,0	2,0	1,49	2,0	1,49	2,0	1,47	1,47
Characteristic resistance	$N_{Rk,s}$ [kN]	steel 5.8	10,1	17,4	18,5	17,4	19,9	35,3	54,7	86,9
Partial safety factor	γ_{Ms} [1]		1,50	1,53	1,49	1,53	1,49	1,49	1,47	1,47
Characteristic resistance	$N_{Rk,s}$ [kN]	steel 8.8	13,4	17,4	18,5	17,4	19,9	35,3	54,7	86,9
Partial safety factor	γ_{Ms} [1]		1,53	1,53	1,49	1,53	1,49	1,49	1,47	1,47
Characteristic resistance	$N_{Rk,s}$ [kN]	A4-70	12,8	16,8	-	-	21,1	37,3	64,2	102,0
Partial safety factor	γ_{Ms} [1]		1,83							
Pull-out failure										
Characteristic resistance	$N_{Rk,p}$ [kN]	C20/25	-- [5]			9,0	-- [5]			
Partial safety factor in Non-cracked concrete	γ_{Mp} [1]					1,8 [2]				
Increasing factors for $N_{Rk,p}$	ψ_c	C30/37	1,22							
		C40/50	1,41							
		C50/60	1,55							
Concrete cone and splitting failure										
Effective anchorage depth	h_{ef}	[mm]	30 [4]	30 [4]	30 [4]	40	40	50	65	80
Partial safety factor in Non-cracked concrete	$\gamma_{Mc} = \gamma_{M,sp}$ [1]		1,8 [2]						1,5 [3]	
Spacing	$s_{cr,N}$	[mm]	90	90	90	120	120	150	195	240
Edge distance	$c_{cr,N}$	[mm]	45	45	45	60	60	75	97	120
Spacing	$s_{cr,sp}$	[mm]	210	210	210	280	280	350	455	560
Edge distance	$c_{cr,sp}$	[mm]	105	105	105	140	140	175	227	280

[1] In absence of other national regulations;
[2] γ_2 = 1,2 is included;
[3] γ_2 = 1,0 is included
[4] For application with statically indeterminate structural components only
[5] Pull-out failure mode is not decisive

Hilti push-in anchor HKD	Annex 8
Characteristic resistance to tension load HKD-S (R) and HKD-E (R)	of European technical approval **ETA-02/0032**

Tabelle 8: Design method A - Characteristic resistance to tension loads

HKD HKD wol			M8x30 [3]	M10x30 [3]	M8x40	M10x40	M12x50	M16x65	M20x80
Steel failure									
Characteristic resistance	$N_{Rk,s}$ [kN]	steel 4.6	14,6	19,9	14,6	22,1	33,7	62,8	98,0
Partial safety factor	γ_{Ms} [1]		2,0	1,5	2,0	1,5	2,0		
Characteristic resistance	$N_{Rk,s}$ [kN]	steel 5.6	17,1	19,9	19,4	22,1	36,6	67,5	99,0
Partial safety factor	γ_{Ms} [1]		1,5						
Characteristic resistance	$N_{Rk,s}$ [kN]	steel 5.8	17,1	19,9	19,4	22,1	36,6	67,5	99,0
Partial safety factor	γ_{Ms} [1]		1,5						
Characteristic resistance	$N_{Rk,s}$ [kN]	steel 8.8	17,1	19,9	19,4	22,1	36,6	67,5	99,0
Partial safety factor	γ_{Ms} [1]		1,5						
Pull-out failure									
Characteristic resistance	$N_{Rk,p}$ [kN]	C20/25	-- [4]		9,0	-- [4]			
Partial safety factor in Non-cracked concrete	γ_{Mp} [1]				1,5 [2]				
Increasing factors for $N_{Rk,p}$	ψ_c	C30/37	1,22						
		C40/50	1,41						
		C50/60	1,55						
Concrete cone and splitting failure									
Effective anchorage depth	h_{ef}	[mm]	30 [3]	30 [3]	40	40	50	65	80
Partial safety factor in Non-cracked concrete	$\gamma_{Mc} = \gamma_{M,sp}$ [1]		1,5 [2]						
Spacing	$s_{cr,N}$	[mm]	90	90	120	120	150	195	240
Edge distance	$c_{cr,N}$	[mm]	45	45	60	60	75	97	120
Spacing	$s_{cr,sp}$	[mm]	210	210	280	280	350	455	560
Edge distance	$c_{cr,sp}$	[mm]	105	105	140	140	175	227	280

[1] In absence of other national regulations;
[2] γ_2 = 1,0 is included;
[3] For application with statically indeterminate structural components only
[4] Pull-out failure mode is not decisive

Hilti push-in anchor HKD	Annex 9
Characteristic resistance to tension load **HKD and HKD-woL**	of European technical approval **ETA-02/0032**

Table 9: Displacements under tension loads

HKD-S (R) HKD-E (R)			M6x30	M8x30	M10x30	M8x40	M10x40	M12x50	M16x65	M20x80
Tension load in C20/25 to C50/60 non-cracked concrete	N	[kN]	3,3	3,3	3,3	3,6	5,1	7,1	12,6	17,2
Displacement	δ_{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 10: Displacements under tension loads

HKD HKD wol			M8x30	M10x30	M8x40	M10x40	M12x50	M16x65	M20x80
Tension load in C20/25 to C50/60 non-cracked concrete	N	[kN]	4,0	4,0	4,3	6,1	8,5	12,6	17,2
Displacement	δ_{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

Hilti push-in anchor HKD	Annex 10
Displacements under tension load	of European technical approval **ETA-02/0032**

Table 11: Design method A - Characteristic resistance to shear loads

HKD-S HKD-E			M6x30	M8x30	M10x30	M8x40	M10x40	M12x50	M16x65	M20x80
Steel failure without lever arm										
Characteristic resistance	$V_{Rk,s}$ [kN]	steel 4.6	4,0	7,3	7,4	7,3	8,0	16,9	21,9	34,7
Partial safety factor	γ_{Ms} 1)		1,67	1,67	1,25	1,67	1,25	1,67	1,25	1,25
Characteristic resistance	$V_{Rk,s}$ [kN]	steel 5.6	5,0	7,0	7,4	7,0	8,0	14,1	21,9	34,7
Partial safety factor	γ_{Ms} 1)		1,67	1,27	1,25	1,27	1,25	1,25	1,25	1,25
Characteristic resistance	$V_{Rk,s}$ [kN]	steell 5.8	5,0	7,0	7,4	7,0	8,0	14,1	21,9	34,7
Partial safety factor	γ_{Ms} 1)		1,25	1,27	1,25	1,27	1,25	1,25	1,25	1,25
Characteristic resistance	$V_{Rk,s}$ [kN]	steel 8.8	5,3	7,0	7,4	7,0	8,0	14,1	21,9	34,7
Partial safety factor	γ_{Ms} 1)		1,27	1,27	1,25	1,27	1,25	1,25	1,25	1,25
Characteristic resistance	$V_{Rk,s}$ [kN]	A4-70	6,4	8,4	-	-	10,5	18,7	32,1	51,0
Partial safety factor	γ_{Ms} 1)		1,52	1,52	-	-	1,52	1,52	1,52	1,52
Steel failure with lever arm										
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	steel 4.6	6	15	30	15	30	52	133	260
Partial safety factor	γ_{Ms} 1)		1,67							
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	steel 5.6	8	19	37	19	37	65	166	325
Partial safety factor	γ_{Ms} 1)		1,67							
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	steel 5.8	8	19	37	19	37	65	166	325
Partial safety factor	γ_{Ms} 1)		1,25							
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	steel 8.8	12	30	60	30	60	105	266	519
Partial safety factor	γ_{Ms} 1)		1,25							
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	A4-70	11	26	-	-	52	92	233	454
Partial safety factor	γ_{Ms} 1)		1,56		-		1,56			
Concrete pryout failure										
Factor in equation (5.6) ETAG Annex C, §5.2.3.3	k		2,0							
Partial safety factor	γ_{Mcp} 1)		1,5 2)							
Concrete edge failure										
Effective length of anchor	l_f	[mm]	30	30	30	40	40	50	65	80
External diameter of anchor	d_{nom}	[mm]	8	10	12	10	12	15	20	25
Partial safety factor	γ_{Mc} 1)		1,5 2)							

1) In absence of other national regulations
2) γ_2 = 1,0 is included

Hilti push-in anchor HKD	Annex 11
Characteristic resistance to shear load **HKD-S (R) and HKD-E (R)**	of European technical approval **ETA-02/0032**

Table 12: Design method A - Characteristic resistance to shear loads

HKD HKD-woL			M8x30	M10x30	M8x40	M10x40	M12x50	M16x65	M20x80
Steel failure without lever arm									
Characteristic resistance	$V_{Rk,s}$ [kN]	steel 4.6	7,3	10,0	7,3	11,0	16,9	31,4	49
Partial safety factor	γ_{Ms} 1)		1,67	1,25	1,67	1,25	1,67	1,67	1,67
Characteristic resistance	$V_{Rk,s}$ [kN]	steel 5.6	8,6	10,0	9,2	11,0	18,3	33,8	49,5
Partial safety factor	γ_{Ms} 1)		1,25	1,25	1,67	1,25	1,25	1,25	1,25
Characteristic resistance	$V_{Rk,s}$ [kN]	steell 5.8	8,6	10,0	9,2	11,0	18,3	33,8	49,5
Partial safety factor	γ_{Ms} 1)		1,25	1,25	1,25	1,25	1,25	1,25	1,25
Characteristic resistance	$V_{Rk,s}$ [kN]	steel 8.8	8,6	10,0	9,2	11,0	18,3	33,8	49,5
Partial safety factor	γ_{Ms} 1)		1,25	1,25	1,25	1,25	1,25	1,25	1,25
Steel failure with lever arm									
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	steel 4.6	15	30	15	30	52	133	260
Partial safety factor	γ_{Ms} 1)		1,67						
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	steel 5.6	19	37	19	37	65	166	325
Partial safety factor	γ_{Ms} 1)		1,67						
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	steel 5.8	19	37	19	37	65	166	325
Partial safety factor	γ_{Ms} 1)		1,25						
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	steel 8.8	30	60	30	60	105	266	519
Partial safety factor	γ_{Ms} 1)		1,25						
Concrete pryout failure									
Factor in equation (5.6) ETAG Annex C, §5.2.3.3	k		2,0						
Partial safety factor	γ_{Mcp} 1)		1,5 2)						
Concrete edge failure									
Effective length of anchor	l_f	[mm]	30	30	40	40	50	65	80
External diameter of anchor	d_{nom}	[mm]	10	12	10	120	15	20	25
Partial safety factor	γ_{Mc} 1)		1,5 2)						

1) In absence of other national regulations
3) γ_2 = 1,0 is included

Hilti push-in anchor HKD	Annex 12
Characteristic resistance to shear load **HKD and HKD-woL**	of European technical approval **ETA-02/0032**

Table 13: Displacement under shear load

HKD-S HKD-E			M6x30	M8x30	M10x30	M8x40	M10x40	M12x50	M16x65	M20x80
Shear load in C20/25 to C50/60 non-cracked concrete	V	[kN]	1,7	3,1	4,3	3,1	4,6	7,2	12,5	19,8
Displacement	δ_{V0}	[mm]	0,35	0,35	0,35	0,40	0,40	0,45	0,75	0,75
	$\delta_{V\infty}$	[mm]	0,50	0,50	0,50	0,60	0,60	0,70	1,1	1,1

Table 14: Displacement under shear load

HKD-SR HKD-ER			M6x30	M8x30	M10x40	M12x50	M16x65	M20x80
Shear load in C20/25 to C50/60 non-cracked concrete	V	[kN]	1,7	3,9	4,9	8,8	15,1	24,0
Displacement	δ_{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

Table 15: Displacement under shear load

HKD HKD wol			M8x30	M10x30	M8x40	M10x40	M12x50	M16x65	M20x80
Shear load in C20/25 to C50/60 non-cracked concrete	V	[kN]	3,1	4,3	3,1	4,6	7,2	12,5	19,8
Displacement	δ_{V0}	[mm]	0,35	0,35	0,40	0,40	0,45	0,75	0,75
	$\delta_{V\infty}$	[mm]	0,50	0,50	0,60	0,60	0,70	1,1	1,1

Hilti push-in anchor HKD	Annex 13
Displacements under shear load	of European technical approval **ETA-02/0032**

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Anstalt des öffentlichen Rechts

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Ermächtigt und notifiziert gemäß Artikel 10 der Richtlinie des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte (89/106/EWG)

DIBt

Mitglied der EOTA

European Technical Approval ETA-02/0033

Handelsbezeichnung *Trade name*	Hilti HKD-R
Zulassungsinhaber *Holder of approval*	Hilti Aktiengesellschaft Business Unit Anchors 9494 Schaan FÜRSTENTUM LIECHTENSTEIN
Zulassungsgegenstand und Verwendungszweck *Generic type and use of construction product*	Wegkontrolliert spreizender Dübel aus nichtrostendem Stahl in den Größen M8, M10, M12, M16 und M20 zur Verankerung im ungerissenen Beton *Deformation-controlled expansion anchor made of stainless steel of sizes M8, M10, M12, M16 and M20 for use in non-cracked concrete*
Geltungsdauer vom *Validity from* bis *to*	17. Oktober 2002 17. Oktober 2007
Herstellwerk *Manufacturing plant*	Herstellwerk 8
Diese europäische technische Zulassung umfasst *This European Technical Approval contains*	13 Seiten einschließlich 6 Anhängen *13 pages including 6 annexes*

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European Organisation for Technical Approvals

Europäische Organisation für Technische Zulassungen

I LEGAL BASES AND GENERAL CONDITIONS

1 This European Technical Approval is issued by the Deutsches Institut für Bautechnik in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], amended by the Council Directive 93/68/EEC of 22 July 1993[2];
- *Gesetz über das Inverkehrbringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998[3];*
- Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC[4];
- Guideline for European Technical Approval of of "Metal Anchors for Use in Concrete" ETAG 001, "Anchors in general", edition June 1997 and Part 4 "Deformation-controlled expansion anchors ", edition 1998.

2 The Deutsches Institut für Bautechnik is authorised to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.

3 This European Technical Approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European Technical Approval.

4 This European Technical Approval may be withdrawn by the Deutsches Institut für Bautechnik, in particular after information by the Commission on the basis of Article 5 (1) of Council Directive 89/106/EEC.

5 Reproduction of this European Technical Approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of the Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European Technical Approval.

6 The European Technical Approval is issued by the approval body in its official language. This version corresponds to the version circulated within EOTA. Translations into other languages have to be designated as such.

1 Official Journal of the European Communities N° L 40, 11.02.1989, p. 12
2 Official Journal of the European Communities N° L 220, 30.08.1993, p. 1
3 Bundesgesetzblatt Teil I Nr. 25, 08.05.1998, p. 812; last amended 15.12.2001, Bundesgesetzblatt Teil I Nr. 71, 21.12.2001, p. 3762
4 Official Journal of the European Communities N° L 17, 20.01.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1 Definition of product

The Hilti-push-in anchor HKD-R (types HKD-SR and HKD-ER) in the range of M8x30, M10x40, M12x50, M16x65 and M20x80 is an anchor made of stainless steel which is placed into a drilled hole and anchored by deformation-controlled expansion.

For the installed anchor see Figure given in Annex 1. The fixture shall be anchored with a fastening screw or threaded rod according to Annex 4.

1.2 Intended use

The anchor is intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 of Council Directive 89/106 EEC shall be fulfilled and failure of anchorages made with these products would cause risk to human life and/or lead to considerable economic consequences. The anchor is to be used only for anchorages subject to static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength classes C 20/25 at minimum and C 50/60 at most according to EN 206-1:2000-12. It may be anchored in non-cracked concrete only.

The anchor may be used in structures subject to dry internal conditions and also in structures subject to external atmospheric exposure (including industrial and marine environment), or exposure in permanently damp internal conditions, if no particular aggressive conditions exist. Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

The provisions made in this European Technical Approval are based on an assumed intended working life of the anchor of 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.

2 Characteristics of product and methods of verification

2.1 Characteristics of product

The anchor corresponds to the drawings and provisions given in Annex 2. The characteristic material values, dimensions and tolerances of the anchor not indicated in Annex 2 shall correspond to the respective values laid down in the technical documentation[5] of this European Technical Approval.

The fastening screw or threaded rod shall correspond at least to the strength class A4-70 according to EN ISO 3506.

The characteristic anchor values for the design of anchorages are given in Annexes 4 to 6.

Each anchor is marked with the identifying mark of the producer, the commercial name, the thread size and the effective anchorage depth according to Annex 1.

In addition, the expansion sleeve for anchor size M10x40 is marked on the top of the sleeve.

The anchor shall only be packaged and supplied as a complete unit.

[5] The technical documentation of this European Technical Approval is deposited at the Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

2.2 Methods of verification

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 has been made in accordance with the "Guideline for European Technical Approval of Metal Anchors for Use in Concrete", Part 1 "Anchors in general" and Part 4 "Deformation-controlled expansion anchors" on the basis of Option 7.

3 Evaluation of Conformity and CE marking

3.1 Attestation of Conformity system

The system of attestation of conformity 2 (i) (referred to as System 1) according to Council Directive 89/106/EEC Annex III laid down by the European Commission provides:

a) tasks for the manufacturer:
   (1) factory production control,
   (2) further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan.

b) tasks for the approved body:
   (3) initial type-testing of the product,
   (4) initial inspection of factory and of factory production control,
   (5) continuous surveillance, assessment and approval of factory production control.

3.2 Responsibilities

3.2.1 Tasks of the manufacturer; factory production control

The manufacturer has a factory production control system in the plant and exercises permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. The production control system ensures that the product is in conformity with the European Technical Approval.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the prescribed test plan[6]. The incoming raw materials shall be subject to controls and tests by the manufacturer before acceptance. Check of materials shall include control of the inspection documents presented by suppliers (comparison with nominal values) by verifying dimensions and determining material properties, e.g. tensile strength, hardness, surface finish.

The manufactured components of the anchor shall be subjected to the following tests:

- Dimensions of component parts:
  plug (diameter, length, angle of the tapering);
  expansion sleeve (length, thickness, diameters);
  setting tool (length and diameter of pin)
- Material properties:
  plug (hardness);
  expansion sleeve (hardness, tensile strength and yield limit of raw material);
- Coating of the plug
- Visual control of correct assemblage and of completeness of the anchor.

The frequency of controls and tests conducted during production and on the assembled anchor is laid down in the prescribed test plan taking account of the automated manufacturing process of the anchor.

[6] The prescribed test plan has been deposited at the Deutsches Institut für Bautechnik and is handed over only to the approved bodies involved in the conformity attestation procedure.

The results of factory production control are recorded and evaluated. The records include at least the following information:

- designation of the product, basic material and components;
- type of control or testing;
- date of manufacture of the product and date of testing of the product or basic material and components;
- result of control and testing and, if appropriate, comparison with requirements;
- signature of person responsible for factory production control.

The records shall be presented to the inspection body involved in the continuous surveillance. On request they shall be presented to the Deutsches Institut für Bautechnik.

Details of the extent, nature and frequency of testing and controls to be performed within the factory production control shall correspond to the prescribed test plan[6] which is part of the technical documentation of this European Technical Approval.

3.2.2 Tasks of approved bodies

3.2.2.1 Initial type-testing of the product

For initial type-testing the results of the tests performed as part of the assessment for the European Technical Approval shall be used unless there are changes in the production line or plant. In such cases the necessary initial type-testing has to be agreed between the Deutsches Institut für Bautechnik and the approved bodies involved.

3.2.2.2 Initial inspection of factory and of factory production control

The approved body shall ascertain that, in accordance with the prescribed test plan, the factory, in particular the staff and equipment, and the factory production control are suitable to ensure a continuous and orderly manufacturing of the anchor with the specifications mentioned in 2.1 as well as in the Annexes to the European Technical Approval, in accordance with the prescribed test plan.

3.2.2.3 Continuous surveillance

The approved body shall visit the factory at least once a year for surveillance. It has to be verified that the system of factory production control and the specified automated manufacturing process are maintained taking account of the prescribed test plan.

Continuous surveillance and assessment of factory production control have to be performed according to the prescribed test plan.

The results of product certification and continuous surveillance shall be made available on demand by the certification body or inspection body, respectively, to the Deutsches Institut für Bautechnik.

In cases where the provisions of the European Technical Approval and the prescribed test plan are no longer fulfilled the conformity certificate shall be withdrawn.

6 The prescribed test plan has been deposited at the Deutsches Institut für Bautechnik and is handed over only to the approved bodies involved in the conformity attestation procedure.

3.3 CE marking

The CE marking shall be affixed on each packaging of anchors. The symbol "CE" shall be accompanied by the following information:

- identification number of the certification body;
- name or identifying mark of holder of approval and manufacturing plant;
- the last two digits of the year in which the CE marking was affixed;
- number of the EC certificate of conformity;
- number of the European Technical Approval;
- use category (ETAG 001-1 Option 7);
- size.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The anchor is manufactured in accordance with the provisions of the European Technical Approval using the automated manufacturing process as identified in the inspection of the plant by the Deutsches Institut für Bautechnik and the approved body and laid down in the technical documentation.

4.2 Installation

4.2.1 Design of anchorages

The fitness of the anchor for the intended use is given under the following conditions:

The anchorages are designed in accordance with the "Guideline for European Technical Approval of Metal Anchors for Use in Concrete", Annex C, Method A, for deformation controlled expansion anchors 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. position of the anchor relative to reinforcement or to supports).

The minimum strength class and the minimum screwing depth of the fastening screw or the threaded rod for installation of the fixture shall be met the requirements according to Annex 4. The length of the fastening screw shall be defined according to the requirements given in Annex 4, taking into account the available thread length, the minimum screwing depth, the thickness of fixture and tolerances of member and fixture.

4.2.2 Installation of anchors

The fitness for use of the anchor can only be assumed if the anchor is installed as follows:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Use of the anchor only as supplied by the manufacturer without exchanging the components of an anchor.
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools;
- Checks before placing the anchor to ensure that the strength class of the concrete in which the anchor is to be placed is in the range given and is not lower than that of the concrete to which the characteristic loads apply.
- Check of concrete being well compacted, e.g. without significant voids.

- Clearing of the hole of drilling dust.
- Anchor installation such that the effective setting depth is complied with. This compliance is ensured, if the anchor is completely set into the drill hole.
- Anchor expansion by impact on the plug using the manual setting tools given in Annex 3. The anchor is properly set if the setting tool leaves a visible mark on the sleeve as illustrated in Annex 3.
- Keeping of the edge distance and spacing to the specified values without minus tolerances.
- Positioning of the drill holes without damaging the reinforcement.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application.
- The fastening screw or threaded rod shall correspond to the requirements given in Annex 4.
- Fixing the screw with the recommended torque moment given in Annex 4 using a calibrated torque wrench.

4.2.3 Responsibility of the manufacturer

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to and 4.2.1 and 4.2.2 is given to those who are concerned. This information may be made by reproduction of the respective parts of the European Technical Approval. In addition all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

The minimum data required are:

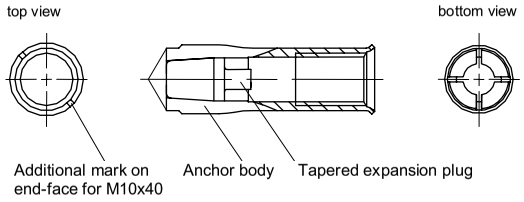
- drill bit diameter,
- thread diameter,
- minimum effective anchorage depth,
- available thread length and minimum screwing depth of the fastening screw
- minimum strength class of the fastening screw or threaded rod accord. to EN ISO 3506
- minimum hole depth,
- torque moment,
- information on the installation procedure, including cleaning of the hole, preferably by means of an illustration,
- reference to any special installation equipment needed,
- identification of the manufacturing batch.

All data shall be presented in a clear and explicit form.

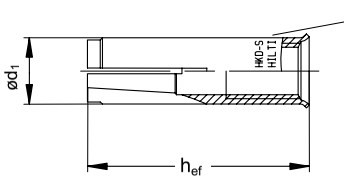
Prof. Dr.-Ing. Bossenmayer

Beglaubigt
Lange

HILTI push-in anchor HKD-SR and HKD-ER

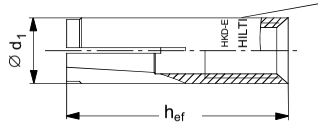


Anchor body HKD-SR



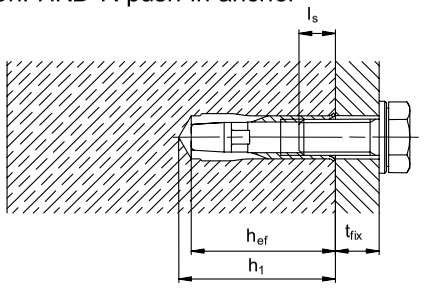
marking
HKD-SR M.. x h_{ef} ø..
H I L T I

Anchor body HKD-ER



marking
HKD-ER M.. x h_{ef} ø..
H I L T I

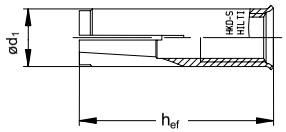
Installed condition: HKD-R push-in anchor



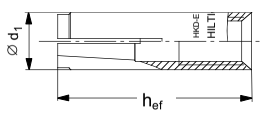
Hilti push-in anchor HKD-R	Annex 1
Product and intended use	of European Technical Approval **ETA-02/0033**

① HKD-R Anchor Body

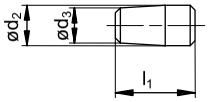
HKD-SR



HKD-ER



② Tapered HKD-R Expansion plug



Part	designation	**HKD-SR; HKD-ER**
1	Anchor body	Stainless steel, material 1.4401, EN 10088
2	Tapered expansion plug	Stainless steel, material 1.4401, EN 10088

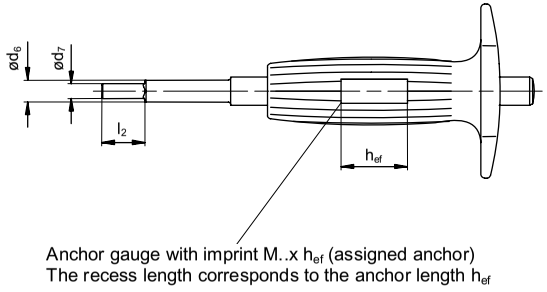
Table 1: Materials

Anchor type **HKD-SR** **HKD-ER**	**SR M8x30 ER M8x30**	**SR M10x40 ER M10x40**	**SR M12x50 ER M12x50**	**SR M16x65 ER M16x65**	**SR M20x80 ER M20x80**
h_{ef} [mm]	30	40	50	65	80
d_1 [mm]	9.95	11.95	14.9	19.8	24.8
d_2 [mm]	6.5	8.2	10.3	13.8	17.5
d_3 [mm]	5.3	7.1	9.3	12.9	16.4
l_1 [mm]	12	16	20	29	30

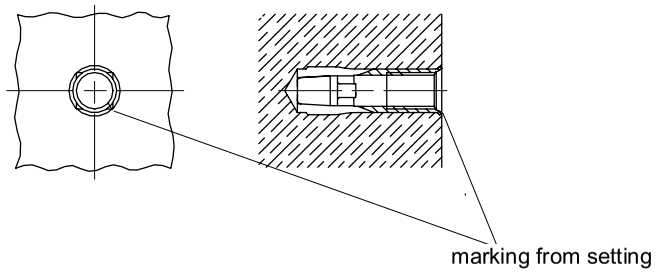
Table 2: Dimensions

Hilti push-in anchor HKD-R	**Annex 2**
Materials and dimensions	of European Technical Approval **ETA-02/0033**

Manual setting tool HSD-G M.. x h_{ef}



Installation control with manual setting tool HSD-G M.. x h_{ef}



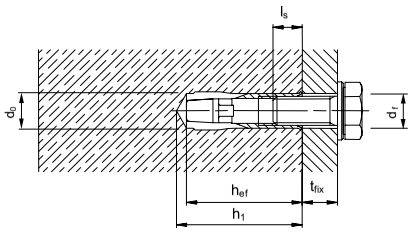
Manual setting tool	**Anchor size**	**d_6 [mm]**	**d_7 [mm]**	**l_2 [mm]**
HSD-G M 8x30	M 8x30	9.5	6.5	18
HSD-G M10x40	M10x40	11.5	8	24
HSD-G M12x50	M12x50	14.5	10.2	30
HSD-G M16x65	M16x65	18	13.5	36
HSD-G M20x80	M20x80	22	16.5	50

Table 3: Dimensions of setting tools

Hilti push-in anchor HKD-R	**Annex 3**
Manual setting tool	of European Technical Approval **ETA-02/0033**

Table 4:
HKD-R Installation data

fastening screw or threaded rod:
Minimum strength class A4-70 according to EN ISO 3506; minimum screwing depth $l_{s,min}$.
The length of the fastening screw shall be determined depending on thickness of fixture t_{fix}, admissible tolerances and available thread length $l_{s,max}$ as well as minimum screwing depth $l_{s,min}$



Anchor size **HKD-SR HKD-ER**	Drill hole diameter d_0 [mm]	Thread diameter d [mm]	Depth of drilled hole h_1 [mm]	Effective anchorage depth h_{ef} [mm]	Available thread length $l_{s,max}$ [mm]	Minimum screwing depth $l_{s,min}$ [mm]	Tightening torque T_{inst} [Nm]	Clearance hole diameter d_f [mm]
M 8x30	10	8	33	30	13	10	8	9
M10x40	12	10	43	40	16	12	15	12
M12x50	15	12	54	50	22	14	35	14
M16x65	20	16	70	65	28	18	60	18
M20x80	25	20	85	80	34	23	120	22

Table 5:
Minimum thickness of concrete member, minimum spacing and minimum edge distances of anchors

Anchor size **HKD-SR HKD-ER**	Minimum thickness of concrete member h_{min} [mm]	Minimum spacing s_{min} [mm]	Minimum edge distance c_{min} [mm]
M 8x30	100	60	105
M10x40	100	80	140
M12x50	100	125	175
M16x65	130	130	227
M20x80	160	160	280

Table 6:
Characteristic resistance to tension loads (design method A)

HKD-SR HKD-ER			**SR M8x30*) ER M8x30*)**	**SR M10x40 ER M10x40**	**SR M12x50 ER M12x50**	**SR M16x65 ER M16x65**	**SR M20x80 ER M20x80**
Steel failure							
Characteristic resistance	$N_{Rk,s}$ [kN]		16,8	21,1	37,3	64,2	102,0
Partial safety factor	γ_{Ms}		1,83				
Concrete cone and splitting failure)**							
Effective anchorage depth	h_{ef}	[mm]	30*)	40	50	65	80
Partial safety factor in non-cracked concrete	γ_2		1,2			1,0	
	$\gamma_{Mc} = \gamma_{M,sp}$		2,16			1,80	
Spacing	$s_{cr,N}$	[mm]	90	120	150	195	240
Edge distance	$c_{cr,N}$	[mm]	45	60	75	97	120
Spacing	$s_{cr,sp}$	[mm]	210	280	350	455	560
Edge distance	$c_{cr,sp}$	[mm]	105	140	175	227	280

*) for application with statically indeterminate structural components only
**) pull-out failure mode not determinating

Table 7:
Displacements under tension loads

HKD-SR HKD-ER			**SR M8x30 ER M8x30**	**SR M10x40 ER M10x40**	**SR M12x50 ER M12x50**	**SR M16x65 ER M16x65**	**SR M20x80 ER M20x80**
Tension load in C20/25 to C50/60 non-cracked concrete		[kN]	2,7	4,2	5,8	10,2	14,1
Displacement	δ_{N0}	[mm]	0,1	0,1	0,1	0,1	0,1
	$\delta_{N\infty}$	[mm]	0,17	0,17	0,17	0,17	0,17

Table 8: Characteristic resistance to shear loads (design method A)

HKD-SR HKD-ER			SR M8x30 ER M8x30	SR M10x40 ER M10x40	SR M12x50 ER M12x50	SR M16x65 ER M16x65	SR M20x80 ER M20x80
Steel failure without lever arm							
Characteristic resistance	$V_{Rk,s}$	[kN]	8,4	10,5	18,7	32,1	51,0
Partial safety factor	γ_{Ms}		1,52				
Steel failure with lever arm							
Characteristic resistance	$M_{Rk,s}$	[Nm] steel A4-70	26,2	52,3	91,6	232,7	454,4
Partial safety factor	γ_{Ms}		1,56				
Concrete pryout failure							
Factor in equation (5.6) of ETAG Annex C, §5.2.3.3	k		2,0				
Partial safety factor	γ_2		1,0				
	γ_{Mcp}		1,8				
Concrete edge failure							
Effective length of anchor in shear loading	l_f	[mm]	30	40	50	65	80
External diameter of anchor	d_{nom}	[mm]	10	12	15	20	25
Partial safety factor	γ_2		1,0				
	γ_{Mc}		1,8				

Table 9: Displacements under shear loads

HKD-SR HKD-ER			SR M8x30 ER M8x30	SR M10x40 ER M10x40	SR M12x50 ER M12x50	SR M16x65 ER M16x65	SR M20x80 ER M20x80
Shear load in C20/25 to C50/60 non-cracked concrete		[kN]	3,1	4,6	7,2	12,5	19,8
Displacement	δ_{V0}	[mm]	0,35	0,40	0,45	0,75	0,75
	$\delta_{V\infty}$	[mm]	0,50	0,60	0,70	1,1	1,1

Hilti push-in anchor HKD-R	**Annex 6**
Characteristic resistance to shear loads (design method A), displacement values	of European Technical Approval **ETA-02/0033**

Buildings Department
屋宇署

YOUR REF 來函檔號: 729-519
OUR REF 本署檔號 (3) in BD/GR/SEG/PPA(G)
FAX 圖文傳真: 2626 1762
TEL 電話: 2626 1583

Hilti (Hong Kong) Limited
17/F, Tower 6,
China Hong Kong City,
33 Canton Road,
Tsimshatsui,
Kowloon.

4 June, 1997

Attention: Mr. Denny Wu

Dear Sir,

Procedures for building materials submission

I refer to your letter dated 19 May, 1997 concerning the above.

2. Please be advised that there is no provision under the Buildings Ordinance for the Building Authority to approve any proprietary building products. Under the Buildings Ordinance, authorized persons and/or registered structural engineers are required to supervise building works including the selection and installation of proprietary building products and to certify compliance with the Buildings Ordinance upon completion of works. They are therefore responsible for ensuring the health and structural safety requirements, inter alia, of these building products in the building projects which they have been appointed by the developer to co-ordinate and supervise. It is also their responsibility to ensure these products have been installed in accordance with the manufacturers' specifications and complied with the Buildings Ordinance and Regulations.

3. In establishing the acceptability of the proprietary products in building works, reference may be made to the performance standards laid down in Building (Construction) Regulations 1990 and the current Practice Note for Authorized Persons and Registered Structural Engineers 140 in which performance requirements for compliance are given. Reliance may also be placed on the test/assessment report prepared by a recognized laboratory or an equivalent establishment.

4. Before the proprietary products are installed in a building project, the authorized person and/or registered structural engineer appointed for the project should be approached by the manufacturers or their agents for advice and guidance. **Prior approval/acceptance from the Buildings Department is not required.**

5. Generally, all relevant information supporting the use of the proprietary products in building works under the Buildings Ordinance should be submitted associated with the prescribed plans for approval on project basis.

/ Notwithstanding....

Buildings Department
屋宇署

YOUR REF 來函檔號: 729-519
OUR REF 本署檔號: (3) in BD/GR/SEG/PPA(G)
FAX 圖文傳真: 2626 1762
TEL 電話: 2626 1583

6. Notwithstanding the above, the proprietary building products to which 'No objection' letters have been given are still recognized as accepted constructional materials to be used in building works under the Buildings Ordinance provided that all conditions specified in the letters are satisfied. You are informed that the procedures currently adopted by the Building Authority for processing statutory approval of plans which involve the use of these proprietary building products remain unchanged.

7. It is a fact that the 'No objection' letter giving general acceptance to a proprietary building product is based on the technical information submitted to this Department at the time of its application. Should there be any significant modification to these technical information, the product will certainly be considered as 'new' product. The acceptability of such proprietary product in building works should be evaluated by the authorized person and/or registered structural engineer appointed for the project as mentioned above.

8. Should you have any further queries to the above, please feel free to contact the undersigned or Mr. T.C. Kan of this office at phone no. 2626 1583.

Yours faithfully,

(K.S. Chang)
Technical Secretary/Structural
for Building Authority

tck/

Attn. **: To whom it may concern**

Date : 12 January 2009
Ref. : LE/327/TC/09

Subject **: Hilti Push-in Anchor**

Dear Sirs / Madams,

Enclosed please find the information of Hilti Push-in Anchor.

Brand Name	: Hilti
Model Name	: Hilti HKD-S / HKD-SAC / HKD-SR / HKD-ST / HKD-E / HKD-ER / HKD-ET / HKV
Manufacturer	: Hilti Corporation
Address of Manufacturer	: FL-9494, Principality of Liechtenstein.
Supplier	: Hilti (Hong Kong) Ltd
Address of Supplier	: 17/F, Tower 6, China Hong Kong City, 33 Canton Road, Tsim Sha Tsui, Kowloon, Hong Kong.
Country of Origin	: China
Name of Factory	: Hilti (China Zhangjiang) Co. Ltd.
Address of Factory	: Yongping Road South, Zhangjiang Development Zone, 524022 Zhangjiang, Guangdong Province, China

Should you have further questions, please do not hesitate to contact our Technical Representatives or Customer Service Hotline at 8228-8118.

Yours sincerely,
Hilti (Hong Kong) Ltd.

Thomas Choy
Marketing Manager

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Job/Application Reference

20-Feb-10

Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
39543	12-09	Union Square 7, Kowloon Station	BESPARK TECHNOLOGIES ENGINEERING		Flush anchor HKD-ER M8X30	cable bracket / tray / trucking fixing
39540	12-09	PTM Projects - Sun Hung Kai	S'WAH ENGINEERING CO LTD		Flush anchor HKD-S 5/8"X65	Plumbing works fixing
39533	12-09	PTM Projects - Sun Hung Kai	HUNG LEE AIR-CON ENG CO LTD		Flush anchor HKD-S M12X50	MVAC fixing
39584	12-09	Wynn Macau Casino	HINGSKING BLDG MAT'L & ENG LTD		Flush anchor HKD-S M6X25	safety system fixing
39444	11-09	PTM Projects - Sun Hung Kai	SHING HING ENG CO LTD		Flush anchor HKD-ER M8X30	air duct fixing
39395	11-09	PTM Projects - Sun Hung Kai	CHUN LEE ENG CO LTD		Flush anchor HKD-ER M8X30	cable bracket / tray / trucking fixing
39396	11-09	PTM Projects - Sun Hung Kai	CHUN LEE ENG CO LTD		Flush anchor HKD-ER M16X65	cable bracket / tray / trucking fixing
39439	11-09	Airport	KING CHEUNG CONST (ENG) LTD		Flush anchor HKD-S M20X80	building services fixing
39445	11-09	PTM Projects - Sun Hung Kai	SHING HING ENG CO LTD		Flush anchor HKD-ER M10X40	MVAC fixing
39452	11-09	PTM Projects - Sun Hung Kai	SUN LICK AIR CONDITIONING ENG CO		Flush anchor HKD-ER M8X30	MVAC fixing
39453	11-09	PTM Projects - Sun Hung Kai	SUN LICK AIR CONDITIONING ENG CO		Flush anchor HKD-ER M10X40	MVAC fixing
39433	11-09	PTM Projects - Hsin Chong	ACME GONDOLA SYSTEMS LIMITED		Flush anchor HKD-ER M16X65	gondola fixing
39176	10-09	PTM Projects - Sun Hung Kai	KWONG KAM TIM CO LTD		Flush anchor HKD-ER M8X30	marble / granite fixing
39207	10-09	Union Square 7, Kowloon Station	TUNG LIK ENGINEERING CO		Flush anchor HKD-S 5/8"X65	water pipe / pipe duct fixing
39166	10-09	Union Square 7, Kowloon Station	DYNAMIC POWER (HONG KONG) LIMITED		Flush anchor HKD-ER M10X40	electrical services fixing
39189	10-09	PTM Projects - Gammon	HUNG LEE AIR-CON ENG CO LTD		Flush anchor HKD-S M12X50	electrical services fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
39205	10-09	Union Square 7, Kowloon Station	BESPARK TECHNOLOGIES ENGINEERING		Flush anchor HKD-SR M8X30	cable bracket / tray / trucking fixing
39243	10-09	PTM Projects - Sun Hung Kai	KAI CHUEN ENGINEERING HK CO LTD		Flush anchor HKD-ER M8X30	MVAC fixing
39267	10-09	Wynn Macau Casino	PERMASTEELISA MACAU LIMITED		Flush anchor HKD-E M16X65	window fixing
39301	10-09	Wynn Macau Casino	S M ENGINEERING LTD		Flush anchor HKD-SR M10X40	cladding / pre-cast panel fixing
39282	10-09	Le Royal Arc	GOLDEN RESOURCE ENG. LTD.		Flush anchor HKD-ER M10X40	steel hanger fixing
39152	10-09	PTM Projects - Sun Hung Kai	LEE YUEN CHAK KEE		Flush anchor HKD-E M16X65	fall arrest / safe ring system fixing
39236	10-09	PTM Projects - Gammon	PATWIN ENG CO LTD		Flush anchor HKD-ER M12X50	MVAC fixing
38960	09-09	SHK Development, Tseung Kwan O (Area 56)	WONG PO KEE LIMITED		Flush anchor HKD-ER M12X50	Plumbing works fixing
38942	09-09	PTM Projects - Sun Hung Kai	CHUN LEE ENG CO LTD		Flush anchor HKD-ER M10X40	Plumbing works fixing
38964	09-09	Tamar Development	KAVEN ENG		Flush anchor HKD-ER M10X40	electrical services fixing
38982	09-09	PTM Projects - Hsin Chong	LUEN FAT ENGINEERING CO		Flush anchor HKD-E M16X65	MVAC fixing
38986	09-09	PTM Projects - Sun Hung Kai	YICK WAH ENG CO		Flush anchor HKD-ER 1/2"x50	electrical services fixing
39082	09-09	Wynn Macau Casino	COMPANHIA DE ENGENHARIA LYCON		Flush anchor HKD-S M6X25	suspension ceiling fixing
38973	09-09	PTM Projects - Cheung Kong	NEW CITY GAS ENGINEERING CO LTD		Flush anchor HKD-ER 3/8"x40	hanger fixing
38941	09-09	PTM Projects - Sun Hung Kai	CHUN LEE ENG CO LTD		Flush anchor HKD-ER M12X50	Plumbing works fixing
38711	08-09	PTM Projects - Sun Hung Kai	NEW WELL CONSULTANTS		Flush anchor HKD-ER M8X30	water pipe / pipe duct fixing
38651	08-09	KCRC Tai Wai Depot	UNION MANOR LTD		Flush anchor HKD-ER M10X40	MVAC fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
38639	08-09	PTM Projects - Shui On	SHUI ON BUILDING CONTRACTORS LTD		Flush anchor HKD-S M10X40	steel hanger fixing
38359	07-09	PTM Projects - Hsin Chong	CHEONG FAT METALWARE CO		Flush anchor HKD-S M12X50	lift / escalator fixing
38323	07-09	PTM Projects - Shui On	SHUI ON BUILDING CONTRACTORS LTD		Flush anchor HKD-S M16X65	catch fence fixing
38293	07-09	Oceanus Entertainment Complex	SONWIN ENGINEERING SERVICES AND		Flush anchor HKD-S M8X30	decoration fixing
38264	07-09	The Venetian Casino Resort (Parcel 1)	SEN HUI ENGINEER CO. LTD.		Flush anchor HKD-S M10X40	suspension ceiling fixing
38255	07-09	Wynn Macau Casino	ON TOP CONSTRUCTION CO		Flush anchor HKD-S M10X40	hanger fixing
38410	07-09	PTM Projects - Shui On	NEW CITY GAS ENGINEERING CO LTD		Flush anchor HKD-ER 3/8"x40	hanger fixing
38373	07-09	PTM Projects - Sun Hung Kai	K & R ASSOCIATED LTD		Flush anchor HKD-ER M8X30	water pipe / pipe duct fixing
38249	07-09	Wynn Macau Casino	FUJI (CHINA) DECORATION		Flush anchor HKD-S M12X50	suspension ceiling fixing
38440	07-09	Airport	LEE YEE ENGINEERING CO LTD		Flush anchor HKD-ER M12X50	electrical services fixing
38381	07-09	PTM Projects - Sun Hung Kai	NEW WELL CONSULTANTS		Flush anchor HKD-ER M12X50	water pipe / pipe duct fixing
38382	07-09	PTM Projects - Sun Hung Kai	NEW WELL CONSULTANTS		Flush anchor HKD-ER M10X40	water pipe / pipe duct fixing
38383	07-09	PTM Projects - Sun Hung Kai	SAM WO ENGINEERING COMPANY		Flush anchor HKD-ER M12X50 assy	water pipe / pipe duct fixing
38384	07-09	PTM Projects - Sun Hung Kai	SAM WO ENGINEERING COMPANY		Flush anchor HKD-ER M12X50	water pipe / pipe duct fixing
38533	07-09	City of Dreams Resort	EASTBOUND CEILING AND RAISE		Flush anchor HKD-S M10X40	suspension ceiling fixing
38386	07-09	PTM Projects - Sun Hung Kai	SAM WO ENGINEERING COMPANY		Flush anchor HKD-ER M10X40	water pipe / pipe duct fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
38374	07-09	PTM Projects - Sun Hung Kai	K & R ASSOCIATED LTD		Flush anchor HKD-ER M10X40	water pipe / pipe duct fixing
38385	07-09	PTM Projects - Sun Hung Kai	SAM WO ENGINEERING COMPANY		Flush anchor HKD-ER M8X30	water pipe / pipe duct fixing
38042	06-09	Tung Ying Re-development, Nathan Road	WONG PO KEE LIMITED		Flush anchor HKD-ER 1/2"x50	Plumbing works fixing
38095	06-09	One Central Macau	LEUNG YAU IRON ENG CO		Flush anchor HKD-S M12X50	hand rail fixing
38064	06-09	City of Dreams Resort	TOU TAT CHONG SAU GONG CHING		Flush anchor HKD-S M10X40	roofing fixing
38007	05-09	KCRC Wu Kai Sa Depot - Lake W	SAINT GLAS LIMITED		Flush anchor HKD-S M10X40	kitchen cabinet fixing
37761	05-09	KCRC Tai Wai Depot	JACKSON (HK) ENGINEERING CO LTD		Flush anchor HKD-ER 1/2"x50	water pipe / pipe duct fixing
37762	05-09	KCRC Tai Wai Depot	JACKSON (HK) ENGINEERING CO LTD		Flush anchor HKD-ER M12X50	water pipe / pipe duct fixing
37844	05-09	One Central Macau	LEUNG YAU IRON ENG CO		Flush anchor HKD-S M10X40	hand rail fixing
37772	05-09	I-Square Development, Nathan Road	WONG PO KEE LIMITED		Flush anchor HKD-ER 1/2"x50	Plumbing works fixing
37773	05-09	Tung Ying Re-development, Nathan Road	WONG PO KEE LIMITED		Flush anchor HKD-ER 3/8"x40	Plumbing works fixing
37824	05-09	PTM Projects - Gammon	SOUTHERN ENGINEERING CO		Flush anchor HKD-S M12X50	u-channel fixing
37877	05-09	Union Square Phase 7	TRIUMPHANT ENG LTD	OAP / JRP	Flush anchor HKD-ER 3/8"x40	Air duct penetration through fire rated board
37910	05-09	PTM Projects - Gammon	AMEN CONSTRUCTION CO LTD		Flush anchor HKD-S M10X40	steel hanger fixing
37947	05-09	City of Dreams Resort	EASTBOUND CEILING AND RAISE		Flush anchor HKD-S M8X30	suspension ceiling fixing
37778	05-09	KCRC Fo Tan Depot - Ho Tung Lau	WAI HING IRON WORKS LTD		Flush anchor HKD-S M8X30	steel hanger fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
37528	04-09	City of Dreams Resort	DICKSON INTERIOR CONST CO LTD		Flush anchor HKD-S M8X30	roofing fixing
37487	04-09	Airport	BBY HK JOINT VENTURE		Flush anchor HKD-E M16X65	Plumbing works fixing
37488	04-09	Airport	BBY HK JOINT VENTURE		Flush anchor HKD-S 5/8"X65	Plumbing works fixing
37496	04-09	Tung Ying Re-development, Nathan Road	WONG PO KEE LIMITED		Flush anchor HKD-ER M12X50	Plumbing works fixing
37512	04-09	PTM Projects - Hip Hing	WAI HING IRON WORKS LTD		Flush anchor HKD-S M10X40	steel hanger fixing
37562	04-09	Le Royal Arc	GOLDEN RESOURCE ENG. LTD.		Flush anchor HKD-E M16X65	machine fixing
37538	04-09	One Central Macau	SAN WO DECORATION ENGINEERING LTD		Flush anchor HKD-S M8X30	decoration fixing
37700	04-09	Tung Ying Re-development, Nathan Road	PATWIN ENG CO LTD		Flush anchor HKD-ER M12X50	air duct fixing
37511	04-09	PTM Projects - Hip Hing	ST ENGINEERING (HK) LTD		Flush anchor HKD-E M16X65	machine fixing
37563	04-09	Le Royal Arc	GOLDEN RESOURCE ENG. LTD.		Flush anchor HKD-SR M16X65	machine fixing
37701	04-09	Tung Ying Re-development, Nathan Road	PATWIN ENG CO LTD		Flush anchor HKD-ER M16X65	air duct fixing
37697	04-09	Airport	BESTLINK TECHNICAL ADVANCE CO LTD		Flush anchor HKD-S M12X50	electrical services fixing
37674	04-09	One Central Macau	YAH SHUN COMPANY LIMITED		Flush anchor HKD-S M12X50	suspension ceiling fixing
37650	04-09	Le Royal Arc	TIN WUI ENGINEERING COMPANY		Flush anchor HKD-S M10X40	suspension ceiling fixing
37646	04-09	Le Royal Arc	GOLDEN RESOURCE ENG. LTD.		Flush anchor HKD-E M16X65	suspension ceiling fixing
37629	04-09	PTM Projects - Hsin Chong	KAM FUNG ENG LTD		Flush anchor HKD-S M10X40	steel hanger fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
37619	04-09	Lohas Park Phase 1 & Phase 2	MODERN AGE AIR CONDITIONING ENG LTD		Flush anchor HKD-ER 3/8"x40	MVAC fixing
37597	04-09	Four Seasons Hotel, Macau (Parcel 2)	OFIC FERRAGENS OU SON		Flush anchor HKD-S 3/8"X40	hand rail fixing
37293	03-09	PTM Projects - Sun Hung Kai	MEW FOOK KEE		Flush anchor HKD-ER M10X40	MVAC fixing
37190	03-09	Airport	YUEN CHEONG ENG CO LTD		Flush anchor HKD-ER 3/8"x40	Plumbing works fixing
37301	03-09	KCRC Tai Wai Depot	MAN FAI ENGINEERING CO		Flush anchor HKD-ER M12X50	cable bracket / tray / trucking fixing
37307	03-09	KCRC Fo Tan Depot - Ho Tung Lau	GOLDEN WAY ENG DEVELOPMENT LTD		Flush anchor HKD-SR M10X40	marble / granite fixing
37325	03-09	PTM Projects - Gammon	AMEN CONSTRUCTION CO LTD		Flush anchor HKD-S M16X65	hanger fixing
37281	03-09	KCRC Tai Wai Depot	FOU YING ENGINEERING CO LTD		Flush anchor HKD-ER M10X40	electrical services fixing
37246	03-09	City of Dreams Resort	SUN KOU NGAI CONST. MATERIAL & ENG.		Flush anchor HKD-S M10X40	steel hanger fixing
37119	03-09	Lohas Park Phase 1 & Phase 2	HING FAT LIGHTING INTERNATIONAL LTD		Flush anchor HKD-S M10X40	lighting euqipment fixing
37182	03-09	Lohas Park Phase 1 & Phase 2	REFRIGO ENG LTD		Flush anchor HKD-ER M12X50	cable bracket / tray / trucking fixing
37297	03-09	Lohas Park Phase 1 & Phase 2	HENCH (CHINA) BUILDING SERVICES		Flush anchor HKD-ER 1/2"x50	MVAC fixing
37180	03-09	Airport	CHUN LEE ENG CO LTD		Flush anchor HKD-E M16X65	cable bracket / tray / trucking fixing
37137	03-09	City of Dreams Resort	MERCURIO SERVICOS DE ENGENHARIA		Flush anchor HKD-E M12x50 bucket	Plumbing works fixing
37187	03-09	KCRC Tai Wai Depot	JACKSON (HK) ENGINEERING CO LTD		Flush anchor HKD-ER 3/8"x40	cable bracket / tray / trucking fixing
37282	03-09	KCRC Tai Wai Depot	FOU YING ENGINEERING CO LTD		Flush anchor HKD-ER M12X50	electrical services fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
37189	03-09	Airport	YUEN CHEONG ENG CO LTD		Flush anchor HKD-ER 1/2"x50	Plumbing works fixing
37102	03-09	PTM Projects - Paul Y	HANG YICK GATE ENG CO		Flush anchor HKD-S M8X30	steel bracket fixing
37233	03-09	Union Square 7, Kowloon Station	INDUSTRIAL ACOUSTICS CO (HK) LTD		Flush anchor HKD-S M8X30	safety system fixing
37235	03-09	Hong Kong Convention & Exhibition Centre Renovation	LISTO ENTERPRISE CO LTD	Maunsell	Flush anchor HKD-S 1/4"X25	safety system fixing
37397	03-09	Wynn Macau Casino	COMPANHIA DE ENGENHARIA LYCON		Flush anchor HKD-S M10X40	suspension ceiling fixing
37422	03-09	Tung Ying Re-development, Nathan Road	PATWIN ENG CO LTD		Flush anchor HKD-ER M10X40	MVAC fixing
37127	03-09	Le Royal Arc	MAJESTIC ENGINEERING (MACAO) CO LTD		Flush anchor HKD-ER M16X65	Plumbing works fixing
37188	03-09	Airport	KONE ELEVATOR (HK) LTD		Flush anchor HKD-S M10X40	lift / escalator fixing
36790	02-09	Wynn Macau Casino	YICK SZE REFRIGERATION SERVICE		Flush anchor HKD-ER 3/8"x40	MVAC fixing
36793	02-09	Wynn Macau Casino	YUNG KEE ELECTRICAL MECHANICAL &		Flush anchor HKD-E M12x50 bucket	Plumbing works fixing
36801	02-09	KCRC Wu Kai Sa Depot - Lake W	LUEN FAT CONDITIONING ENG CO		Flush anchor HKD-ER 3/8"x40	MVAC fixing
36822	02-09	PTM Projects - Sun Hung Kai	LONG NGAI STAINLESS STEEL		Flush anchor HKD-S M8X30	suspension ceiling fixing
36742	02-09	City of Dreams Resort	BIWATER MAN LEE LTD		Flush anchor HKD-ER M12X50	Plumbing works fixing
36830	02-09	Kowloon Southern Link (KSL - Link200, 300 & 400)	COMMANDING VIEW ENG CO LTD		Flush anchor HKD-E M12x50 bucket	hand rail fixing
36820	02-09	PTM Projects - Hsin Chong	ASSOCIATED ENGINEERS LTD		Flush anchor HKD-S M8X30	steel hanger fixing
36788	02-09	Wynn Macau Casino	PLOUGHTEK P & D ENGINEERING		Flush anchor HKD-E M12x50 bucket	Plumbing works fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
36831	02-09	Kowloon Southern Link (KSL - Link200, 300 & 400)	COMMANDING VIEW ENG CO LTD		Flush anchor HKD-ER M10X40	hand rail fixing
36748	02-09	City of Dreams Resort	LITTO (MACAU) ENGINEERING CO.LTD		Flush anchor HKD-S M20X80	MVAC fixing
36740	02-09	Le Royal Arc	MAJESTIC ENGINEERING (MACAO) CO LTD		Flush anchor HKD-ER M12X50	Plumbing works fixing
36739	02-09	Le Royal Arc	MAJESTIC ENGINEERING (MACAO) CO LTD		Flush anchor HKD-ER M10X40	Plumbing works fixing
36738	02-09	Le Royal Arc	MAJESTIC ENGINEERING (MACAO) CO LTD		Flush anchor HKD-E M10x40 bucket	Plumbing works fixing
36717	02-09	PTM Projects - Cheung Kong	KAN KI ENGINEERING LTD		Flush anchor HKD-S M10X40	steel bracket fixing
36763	02-09	Oceanus Entertainment Complex	CIA ENG KATSWING E&M (MACAU) LDA		Flush anchor HKD-E M16X65	MVAC fixing
37035	02-09	One Central Macau	VISON WEALTH ENGENHARIA COMPANHIA		Flush anchor HKD-S M8X30	suspension ceiling fixing
36929	02-09	KCRC Wu Kai Sa Depot - Lake W	YIP HING ENGRG CO		Flush anchor HKD-ER M12X50	electrical services fixing
36836	02-09	City of Dreams Resort	EASTBOUND CEILING AND RAISE		Flush anchor HKD-S M8X30	channel fixing for drywall
37074	02-09	PTM Projects - Hip Hing	CHI SHING AIR-CONDITIONING ENG OC		Flush anchor HKD-S 5/8"X65	MVAC fixing
37071	02-09	PTM Projects - Cheung Kong	CHI SHING AIR-CONDITIONING ENG OC		Flush anchor HKD-S 5/8"X65	MVAC fixing
36997	02-09	City of Dreams Resort	VAFORD CONTRACTING CO LTD		Flush anchor HKD-S M8X30	suspension ceiling fixing
36984	02-09	Le Royal Arc	CHONG SAN INTERIOR DESIGN &		Flush anchor HKD-S M8X30	suspension ceiling fixing
36849	02-09	PTM Projects - Hip Hing	LISTO ENTERPRISE CO LTD		Flush anchor HKD-S 3/8"X40	safety system fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
36933	02-09	Kowloon Southern Link (KSL - Link200, 300 & 400)	RIDGID PLUMBING LIMITED		Flush anchor HKD-E M16X65	water pipe / pipe duct fixing
36928	02-09	Tung Ying Re-development, Nathan Road	LEE KONG ENGINEERING CO		Flush anchor HKD-ER M10X40	electrical services fixing
36919	02-09	Airport	WING FUNG ENG (H.K.) LTD		Flush anchor HKD-S M20X80	building services fixing
36868	02-09	City of Dreams Resort	ENGENHARIA HUNG YIP		Flush anchor HKD-SR M8X30	machine fixing
36962	02-09	PTM Projects - E-man	FUK LAM ENGINEERING LTD		Flush anchor HKD-S M8X30	hanger fixing
37072	02-09	PTM Projects - Gammon	PATWIN ENG CO LTD		Flush anchor HKD-ER M10X40	MVAC fixing
36837	02-09	City of Dreams Resort	VAFORD CONTRACTING CO LTD		Flush anchor HKD-S M8X30	safety system fixing
36548	01-09	KCRC Tai Wai Depot	LUEN FAT CONDITIONING ENG CO		Flush anchor HKD-ER 3/8"x40	MVAC fixing
36547	01-09	KCRC Tai Wai Depot	LUEN FAT CONDITIONING ENG CO		Flush anchor HKD-ER 1/2"x50	MVAC fixing
36521	01-09	City of Dreams Resort	BIWATER MAN LEE LTD		Flush anchor HKD-E M12x50 bucket	Plumbing works fixing
36520	01-09	City of Dreams Resort	BESPARK TECHNOLOGIES ENGINEERING		Flush anchor HKD-ER M12X50	broadband equipment fixing
36518	01-09	City of Dreams Resort	AV PROFESSIONAL LIMITED		Flush anchor HKD-S M12X50	broadband equipment fixing
36549	01-09	Airport	CHEONG FAT METALWARE CO		Flush anchor HKD-S M12X50	lift / escalator fixing
36705	01-09	PTM Projects - Hip Hing	ALGA (FAR EAST) LTD		Flush anchor HKD-S M8X30	block work fixing
36519	01-09	City of Dreams Resort	AV PROFESSIONAL LIMITED		Flush anchor HKD-S M8X30	broadband equipment fixing
36575	01-09	PTM Projects - Cheung Kong	LISTO ENTERPRISE CO LTD		Flush anchor HKD-S M6X25	safety system fixing
36581	01-09	PTM Projects - Shui On	LISTO ENTERPRISE CO LTD		Flush anchor HKD-S 1/4"X25	safety system fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
36586	01-09	City of Dreams Resort	ENGENHARIA HUNG YIP		Flush anchor HKD-E M16X65	steel hanger fixing
36587	01-09	City of Dreams Resort	ENGENHARIA HUNG YIP		Flush anchor HKD-S M20X80	steel hanger fixing
36597	01-09	City of Dreams Resort	YAU LEE CONSTRUCTION (MACAU) CO LTD		Flush anchor HKD-S M12X50	steel hanger fixing
36625	01-09	Union Square 7, Kowloon Station	TRIUMPHANT ENG LTD		Flush anchor HKD-ER 1/2"x50	building services fixing
36636	01-09	Lohas Park Phase 1 & Phase 2	HUNS ENGINEERING CO LTD		Flush anchor HKD-ER M10X40	MVAC fixing
36510	01-09	PTM Projects - Hip Hing	KWOK FUNG INTERIOR DECORATION		Flush anchor HKD-E M10x40 bucket	suspension ceiling fixing
36635	01-09	Lohas Park Phase 1 & Phase 2	HENCH (CHINA) BUILDING SERVICES		Flush anchor HKD-ER 3/8"x40	MVAC fixing

Job/Application Reference

20-Jul-09

Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
33993	12-08	Airport	WING FUNG ENG (H.K.) LTD		Flush anchor HKD-ER M10X40	MVAC fixing
33586	12-08	PTM Projects - Hip Hing	LISTO ENTERPRISE CO LTD		Flush anchor HKD-S 1/4"X25	suspension ceiling fixing
33334	12-08	PTM Projects - Sun Hung Kai	SHUN TUNG ENG. CO. LTD.		Flush anchor HKD-ER M8X30	air duct fixing
33230	12-08	Galaxy Mega Resort	CHINA ZHONG JI MECHINA		Flush anchor HKD-E M16X65	electrical services fixing
33229	12-08	Galaxy Mega Resort	CHINA ZHONG JI MECHINA		Flush anchor HKD-E M12x50 bucket	electrical services fixing
33476	12-08	Airport	FAS ENGINEERING LTD		Flush anchor HKD-S M10X40	steel hanger fixing
33974	12-08	PTM Projects - Shui On	SHUI ON CONST CO LTD		Flush anchor HKD-S M16X65	steel bracket fixing
33991	12-08	Airport	SMARTPOWER M & E ENGINEERING LTD		Flush anchor HKD-S M20X80	electrical services fixing
33461	12-08	Union Square 7, Kowloon Station	SIMBEL LTD		Flush anchor HKD-SR M8X30	marble / granite fixing
33319	12-08	Airport	YAU LEE DESIGN ENGINEERING CO LTD		Flush anchor HKD-S M20X80	cable bracket / tray / trucking fixing
33481	12-08	PTM Projects - Hip Hing	FAS ENGINEERING LTD		Flush anchor HKD-S M10X40	steel hanger fixing
33315	12-08	Airport	CHUN LEE ENG CO LTD		Flush anchor HKD-ER M10X40	water pipe / pipe duct fixing
33994	12-08	Airport	WING FUNG ENG (H.K.) LTD		Flush anchor HKD-S M20X80	MVAC fixing
33254	12-08	One Central Macau	LEE TACK ENGINEERING (MACAU) CO LTD		Flush anchor HKD-ER M10X40	MVAC fixing
33959	12-08	PTM Projects - Hip Hing	PENTA-OCEAN CONST CO LTD		Flush anchor HKD-SR M16X65	steel bracket fixing
33372	12-08	PTM Projects - Yau Lee	YAU LEE CONST CO LTD		Flush anchor HKD-S M16X65	steel hanger fixing
33942	12-08	PTM Projects - China State	CHINA STATE CONST ENG COR		Flush anchor HKD-S M16X65	steel bracket fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
33551	12-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Flush anchor HKD-S 3/8"X40	building services fixing
33378	12-08	PTM Projects - Yau Lee	YAU LEE CONSTRUCTION MATERIALS &		Flush anchor HKD-E M8x30 bucket	steel hanger fixing
33520	12-08	PTM Projects - Gammon	HANG CHEONG BLDG MATERIALS SUPPLIES		Flush anchor HKD-S 5/16"X30	suspension ceiling fixing
33552	12-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Flush anchor HKD-S 5/8"X65	building services fixing
33553	12-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Flush anchor HKD-S M10X40	building services fixing
33302	12-08	Wynn Macau Casino	LITTO (MACAU) ENGINEERING CO.LTD		Flush anchor HKD-S 5/8"X65	steel bracket fixing
33943	12-08	PTM Projects - China State	CHINA STATE CONST ENG COR		Flush anchor HKD-SR M8X30	steel bracket fixing
33985	12-08	Airport	CHUBB HONG KONG LTD		Flush anchor HKD-E M16X65	fire services fixing
33358	12-08	PTM Projects - Sun Hung Kai	AEGIS ENG CO LTD		Flush anchor HKD-S 5/8"X65	steel hanger fixing
33589	12-08	PTM Projects - Sun Hung Kai	LISTO ENTERPRISE CO LTD		Flush anchor HKD-S M6X25	suspension ceiling fixing
33357	12-08	PTM Projects - Hsin Chong	HSIN CHONG CONSTRUCTION (ASIA) LTD		Flush anchor HKD-E M16X65	steel hanger fixing
34032	12-08	PTM Projects - Sun Hung Kai	SAINT GLAS LIMITED		Flush anchor HKD-S M10X40	suspension ceiling fixing
33313	12-08	Wynn Macau Casino	SUN SENG METALS & ELECTRICAL		Flush anchor HKD-S M16X65	electrical services fixing
33306	12-08	Wynn Macau Casino	PLOUGHTEK P & D ENGINEERING		Flush anchor HKD-E M16X65	Plumbing works fixing
34024	12-08	PTM Projects - China State	SAINT GLAS LIMITED		Flush anchor HKD-S M10X40	suspension ceiling fixing
33210	12-08	City of Dreams Resort	PATWIN ENG CO LTD		Flush anchor HKD-E M16X65	Plumbing works fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
33869	12-08	City of Dreams Resort	TAT SHING DECORATION ENG LTD		Flush anchor HKD-S M8X30	suspension ceiling fixing
33683	12-08	One Central Macau	SANWA SHUTTER (HK) LTD		Flush anchor HKD-S M10X40	metal gate fixing
33848	12-08	City of Dreams Resort	DAVID DECORATION (MACAU) LIMITED		Flush anchor HKD-S M16X65	suspension ceiling fixing
33338	12-08	Union Square Phase 7	TRIUMPHANT ENG LTD	OAP / JRP	Flush anchor HKD-E 1/2"X50 bucket	air duct fixing
33205	12-08	City of Dreams Resort	LITTO (MACAU) ENGINEERING CO.LTD		Flush anchor HKD-S 5/8"X65	Plumbing works fixing
33890	12-08	One Central Macau	SANWA SHUTTER (HK) LTD		Flush anchor HKD-S M10X40	suspension ceiling fixing
33339	12-08	Union Square Phase 7	TRIUMPHANT ENG LTD	OAP / JRP	Flush anchor HKD-E 3/8"X40 bucket	air duct fixing
33412	12-08	KCRC Tai Wai Depot	YUEN CHEONG ENG CO LTD		Flush anchor HKD-ER 1/2"x50	Plumbing works fixing
33611	12-08	City of Dreams Resort	ENGENHARIA HUNG YIP		Flush anchor HKD-S M10X40	hand rail fixing
33612	12-08	City of Dreams Resort	ENGENHARIA HUNG YIP		Flush anchor HKD-S M8X30	hand rail fixing
33413	12-08	KCRC Tai Wai Depot	YUEN CHEONG ENG CO LTD		Flush anchor HKD-ER 3/8"x40	Plumbing works fixing
33470	12-08	KCRC Tai Wai Depot	TSIEN WUI STONE CO LTD		Flush anchor HKD-SR M10X40	marble / granite fixing
33676	12-08	One Central Macau	MACAU WELDING ENGINEERING		Flush anchor HKD-S M8X30	steel hanger fixing
33522	12-08	KCRC Tai Wai Depot	LEUNG KIT KEE		Flush anchor HKD-S M16X65	steel hanger fixing
33414	12-08	KCRC Tai Wai Depot	YUEN CHEONG ENG CO LTD		Flush anchor HKD-ER 5/16X30	Plumbing works fixing
33986	12-08	Airport	CHUBB HONG KONG LTD		Flush anchor HKD-S M20X80	fire services fixing
32455	11-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	COMMANDING VIEW ENG CO LTD		Flush anchor HKD-SR M6X25	hand rail fixing

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32738	11-08	PTM Projects - Sun Hung Kai	KAM KEE STEEL WORKS LTD		Flush anchor HKD-E M10X40 bucket	steel hanger fixing
32535	11-08	PTM Projects - Sun Hung Kai	LISTO ENTERPRISE CO LTD		Flush anchor HKD-S M6X25	safety system fixing
32228	11-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	PATWIN ENG CO LTD		Flush anchor HKD-E M12X50 bucket	Plumbing works fixing
32733	11-08	PTM Projects - E-man	JUMBO ORIENT CONTRACTING LTD		Flush anchor HKD-ER M10X40	steel hanger fixing
32233	11-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	WINNING POWER INTERNATIONAL		Flush anchor HKD-S M10X40	fire services fixing
32496	11-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Flush anchor HKD-S M12X50	fixing the mesh in the slope
32389	11-08	KCRC	TSIEN WUI STONE CO LTD		Flush anchor HKD-SR M10X40	marble / granite fixing
32333	11-08	KCRC	YUEN CHEONG ENG CO LTD		Flush anchor HKD-ER 3/8"x40	Plumbing works fixing
32542	11-08	City of Dreams Resort	CHONG HING HONG		Flush anchor HKD-E M16X65	air duct fixing
32285	11-08	PTM Projects - Hsin Chong	HSIN CHONG CONSTRUCTION (ASIA) LTD		Flush anchor HKD-E M16X65	catch fence fixing
32332	11-08	KCRC	YUEN CHEONG ENG CO LTD		Flush anchor HKD-ER 1/2"x50	Plumbing works fixing
32229	11-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	PATWIN ENG CO LTD		Flush anchor HKD-E M16X65	Plumbing works fixing
32163	11-08	One Central Macau	LEE TACK ENGINEERING (MACAU) CO LTD		Flush anchor HKD-E M12X50 bucket	MVAC fixing
32992	11-08	PTM Projects - Gammon	HOI YEUNG MAN HO ENGINEERING LTD		Flush anchor HKD-S M8X30	suspension ceiling fixing
32495	11-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Flush anchor HKD-S M10X40	fixing the mesh in the slope

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
32494	11-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Flush anchor HKD-S 5/8"X65	fixing the mesh in the slope
32991	11-08	PTM Projects - Gammon	HOI YEUNG MAN HO ENGINEERING LTD		Flush anchor HKD-S M16X65	suspension ceiling fixing
32301	11-08	PTM Projects - Yau Lee	YAU LEE CONST CO LTD		Flush anchor HKD-S M16X65	catch fence fixing
32969	11-08	KCRC	YIP HING ENGRG CO		Flush anchor HKD-SR M20X80	MVAC fixing
32443	11-08	PTM Projects - Gammon	HANG CHEONG BLDG MATERIALS SUPPLIES		Flush anchor HKD-S 5/16"X30	suspension ceiling fixing
32479	11-08	PTM Projects - Gammon	GAMMON - HIP HING JOINT VENTURE		Flush anchor HKD-S M16X65	catch fence fixing
32795	11-08	City of Dreams Resort	SITU-MINSANG ENGINEERING LTD		Flush anchor HKD-ER M8X30	suspension ceiling fixing
32549	11-08	City of Dreams Resort	ENGENHARIA HUNG YIP		Flush anchor HKD-ER M10X40	steel hanger fixing
32578	11-08	City of Dreams Resort	YAU LEE CONSTRUCTION (MACAU) CO LTD		Flush anchor HKD-S M8X30	cladding / pre-cast panel fixing
32497	11-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Flush anchor HKD-S M20X80	fixing the mesh in the slope
32300	11-08	PTM Projects - Yau Lee	YAU LEE CONST CO LTD		Flush anchor HKD-S 3/8"X40	temporary M&E fixing
32058	11-08	Le Royal Arc	YUN KEE ENGINEERING		Flush anchor HKD-E M16X65	Plumbing works fixing
32066	11-08	City of Dreams Resort	BIWATER MAN LEE LTD		Flush anchor HKD-S M16X65	Plumbing works fixing
32683	11-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	YAU HO ENG CO		Flush anchor HKD-E M12X50 bucket	block work fixing
32855	11-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	MACAU CLEVER BUILDING MATERIALS		Flush anchor HKD-S M8X30	suspension ceiling fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
32955	11-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	PATWIN ENG CO LTD		Flush anchor HKD-E M16X65	air duct fixing
32061	11-08	City of Dreams Resort	BESPARK TECHNOLOGIES ENGINEERING		Flush anchor HKD-E M12X50 bucket	electrical services fixing
32126	11-08	City of Dreams Resort	YUNG KEE ELECTRICAL MECHANICAL &		Flush anchor HKD-E M12X50 bucket	Plumbing works fixing
32065	11-08	City of Dreams Resort	BIWATER MAN LEE LTD		Flush anchor HKD-S M12X50	Plumbing works fixing
32257	11-08	PTM Projects - Sun Hung Kai	SHUN TUNG ENG. CO. LTD.		Flush anchor HKD-ER M8X30	MVAC fixing
32107	11-08	City of Dreams Resort	SZE CHEONG (MACAU) ENGINEERING LTD		Flush anchor HKD-E M12X50 bucket	steel bracket fixing
32858	11-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	T J TECHNICAL SERVICES LTD		Flush anchor HKD-S M10X40	machine fixing
32966	11-08	KCRC	SUN HING ELECTRICAL ENGINEERING		Flush anchor HKD-ER M12X50	electrical services fixing
32822	11-08	One Central Macau	SANWA SHUTTER (HK) LTD		Flush anchor HKD-S M10X40	suspension ceiling fixing
32178	11-08	One Central Macau	TAK CHEONG E&M ENG. CO. LTD.		Flush anchor HKD-E M16X65	Plumbing works fixing
32913	11-08	KCRC	CHINA STATE CONST ENG COR		Flush anchor HKD-S M16X65	steel bracket fixing
32067	11-08	City of Dreams Resort	BIWATER MAN LEE LTD		Flush anchor HKD-S M8X30	Plumbing works fixing
32090	11-08	City of Dreams Resort	OCEAN ELECTRICAL ENGINEERING		Flush anchor HKD-E M12X50 bucket	electrical services fixing
32106	11-08	City of Dreams Resort	SZE CHEONG (MACAU) ENGINEERING LTD		Flush anchor HKD-E M10X40 bucket	steel bracket fixing
31986	11-08	Airport	FU SHING ENG CO LTD		Flush anchor HKD-S M20X80	steel hanger fixing
32997	11-08	KCRC	SAINT GLAS LIMITED		Flush anchor HKD-S M10X40	suspension ceiling fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
32803	11-08	City of Dreams Resort	TAT SHING DECORATION ENG LTD		Flush anchor HKD-S M12X50	suspension ceiling fixing
32887	11-08	PTM Projects - Paul Y	PAUL Y CONST CO LTD		Flush anchor HKD-ER M16X65	steel bracket fixing
32577	11-08	City of Dreams Resort	YAU LEE CONSTRUCTION (MACAU) CO LTD		Flush anchor HKD-S M10X40	cladding / pre-cast panel fixing
32907	11-08	PTM Projects - Shui On	SHUI ON CONST CO LTD		Flush anchor HKD-S M12X50	steel bracket fixing
32182	11-08	One Central Macau	WONG PO KEE (MACAU) LIMITED		Flush anchor HKD-E M12X50 bucket	Plumbing works fixing
32934	11-08	PTM Projects - Hip Hing	FAS ENGINEERING LTD		Flush anchor HKD-S M10X40	steel hanger fixing
32204	11-08	Four Seasons Hotel, Macau (Parcel 2)	HUNG FOOK AIR CONDITIONING		Flush anchor HKD-ER M10X40	MVAC fixing
32167	11-08	One Central Macau	READY ENGINEERING (MACAU) LIMITED		Flush anchor HKD-E M12X50 bucket	electrical services fixing
32590	11-08	MGM Grand Macau	MACAU WELDING ENGINEERING		Flush anchor HKD-S M8X30	steel hanger fixing
32320	11-08	PTM Projects - Paul Y	CHOI SUM WATERPIPE SERVICE CO LTD		Flush anchor HKD-E M12X50 bucket	Plumbing works fixing
30859	10-08	PTM Projects - Paul Y	WING YIP CEILING ENG CO		Flush anchor HKD-S M16X65	MVAC fixing
31002	10-08	Four Seasons Hotel, Macau (Parcel 2)	SHARP HING E & M LTD		Flush anchor HKD-E 3/8"X40 bucket	Plumbing works fixing
31754	10-08	PTM Projects - Shui On	SHUI ON PLANT - SOC		Flush anchor HKD-S M10X40	steel bracket fixing
31724	10-08	PTM Projects - China State	CHINA STATE CONST ENG COR		Flush anchor HKD-S M16X65	steel bracket fixing
31000	10-08	Four Seasons Hotel, Macau (Parcel 2)	ON LEE ENG CO		Flush anchor HKD-E M10X40 bucket	MVAC fixing
31923	10-08	PTM Projects - Paul Y	NICKEL ENG LTD		Flush anchor HKD-E 3/8"X40 bucket	electrical services fixing
31753	10-08	PTM Projects - Shui On	SHUI ON PLANT - SOBC		Flush anchor HKD-S M16X65	steel bracket fixing

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31098	10-08	PTM Projects - Paul Y	FORTRESS-A DIVISION OF A.S. WATSON		Flush anchor HKD-E 3/8"X40 bucket	MVAC fixing
31648	10-08	Four Seasons Hotel, Macau (Parcel 2)	GOOD PROFIT ENGINEERING LTD		Flush anchor HKD-S M10X40	suspension ceiling fixing
30983	10-08	One Central Macau	LEE TACK ENGINEERING (MACAU) CO LTD		Flush anchor HKD-ER M12X50	MVAC fixing
31521	10-08	Wynn Macau Casino	ENGENHARIA HUNG YIP		Flush anchor HKD-S 5/8"X65	steel hanger fixing
30947	10-08	Galaxy Mega Resort	CHINA ZHONG JI MECHINA		Flush anchor HKD-E M12X50 bucket	electrical services fixing
30963	10-08	Galaxy Mega Resort	YUNG KEE ELECTRICAL MECHANICAL &		Flush anchor HKD-E M12X50 bucket	Plumbing works fixing
31100	10-08	PTM Projects - Sun Hung Kai	CHIT TAT ELECTRICAL ENG LTD		Flush anchor HKD-E 3/8"X40 bucket	electrical services fixing
31614	10-08	City of Dreams Resort	SITU-MINSANG ENGINEERING LTD		Flush anchor HKD-ER M8X30	suspension ceiling fixing
31356	10-08	City of Dreams Resort	ENGENHARIA HUNG YIP		Flush anchor HKD-S 5/8"X65	glass fencing / balustrade fixing
30965	10-08	MGM Grand Macau	SOLAR EMPIRE ENG CO LTD		Flush anchor HKD-E 3/8"X40 bucket	Plumbing works fixing
31593	10-08	City of Dreams Resort	COMPANHIA DE ENGENHARIA LYCON		Flush anchor HKD-S M10X40	suspension ceiling fixing
31073	10-08	Wynn Macau Casino	SHARP HING E & M LTD		Flush anchor HKD-E 1/2"X50 bucket	Plumbing works fixing
31412	10-08	One Central Macau	MACAU WELDING ENGINEERING		Flush anchor HKD-S M8X30	steel hanger fixing
30982	10-08	One Central Macau	LEE TACK ENGINEERING (MACAU) CO LTD		Flush anchor HKD-ER M10X40	MVAC fixing
31828	10-08	One Central Macau	READY ENGINEERING (MACAU) LIMITED		Flush anchor HKD-E M12X50 bucket	cable bracket / tray / trucking fixing
31832	10-08	One Central Macau	TAK CHEONG E&M ENG. CO. LTD.		Flush anchor HKD-S M16X65	Plumbing works fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
30925	10-08	City of Dreams Resort	SUN CHUNG SUN E&M DECORATION		Flush anchor HKD-S M10X40	u-channel fixing
30942	10-08	City of Dreams Resort	YUNG KEE ELECTRICAL MECHANICAL &		Flush anchor HKD-E M12X50 bucket	Plumbing works fixing
31799	10-08	City of Dreams Resort	SZE CHEONG (MACAU) ENGINEERING LTD		Flush anchor HKD-S M12X50	glass rail fixing
31925	10-08	PTM Projects - Sun Hung Kai	MEW FOOK KEE		Flush anchor HKD-ER M8X30	MVAC fixing
31952	10-08	PTM Projects - Gammon	HOI YEUNG MAN HO ENGINEERING LTD		Flush anchor HKD-S M8X30	hand rail fixing
31150	10-08	PTM Projects - Gammon	WONG PO KEE LIMITED		Flush anchor HKD-E 3/8"X40 bucket	Plumbing works fixing
31314	10-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Flush anchor HKD-S M10X40	scaffolding fixing
31313	10-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Flush anchor HKD-S 5/8"X65	scaffolding fixing
31315	10-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Flush anchor HKD-S M12X50	scaffolding fixing
31645	10-08	The Venetian Casino Resort (Parcel 1)	CONSTRUCOES E OBRAS PUBLICAS		Flush anchor HKD-S M6X25	suspension ceiling fixing
30948	10-08	Galaxy Mega Resort	CHINA ZHONG JI MECHINA		Flush anchor HKD-E M16X65	electrical services fixing
31559	10-08	PTM Projects - Sun Hung Kai	JUMBO ORIENT CONTRACTING LTD		Flush anchor HKD-ER M10X40	steel hanger fixing
31138	10-08	PTM Projects - Yau Lee	YAU LEE CONST CO LTD		Flush anchor HKD-E M16X65	catch fence fixing
31771	10-08	Le Royal Arc	YUN KEE ENGINEERING		Flush anchor HKD-E M16X65	Plumbing works fixing
31077	10-08	Wynn Macau Casino	SUN SENG METALS & ELECTRICAL		Flush anchor HKD-S M16X65	steel bracket fixing
31871	10-08	Wynn Macau Casino	PLOUGHTEK P & D ENGINEERING		Flush anchor HKD-E M16X65	Plumbing works fixing

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31076	10-08	Wynn Macau Casino	SUN SENG METALS & ELECTRICAL		Flush anchor HKD-E M16X65	steel bracket fixing
31075	10-08	Wynn Macau Casino	SUN SENG METALS & ELECTRICAL		Flush anchor HKD-E 3/8"X40 bucket	steel bracket fixing
31074	10-08	Wynn Macau Casino	SHARP HING E & M LTD		Flush anchor HKD-E 3/8"X40 bucket	Plumbing works fixing
31644	10-08	The Venetian Casino Resort (Parcel 1)	CONSTRUCOES E OBRAS PUBLICAS		Flush anchor HKD-E M12X50 bucket	suspension ceiling fixing
31459	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	ENGENHARIA HUNG YIP		Flush anchor HKD-ER M10X40	steel hanger fixing
30837	10-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	KINGWOOD ENG LTD		Flush anchor HKD-S M8X30	steel hanger fixing
31008	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	ARTS BOUNDARY ENGINEERRING (MACAU)		Flush anchor HKD-E M16X65	electrical services fixing
31048	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	JIN LI ENGINEERING COMPANY LTD		Flush anchor HKD-E M16X65	Plumbing works fixing
31064	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	PCCW-HKT TECHNICAL SERVICES LTD		Flush anchor HKD-S M10X40	electrical services fixing
31866	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	YAU HO ENG CO		Flush anchor HKD-S M8X30	u-channel fixing
31858	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	MACAU CLEVER BUILDING MATERIALS		Flush anchor HKD-S 3/8"X40	suspension ceiling fixing
31040	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	GUARDIAN FIRE ENG & CONSULTANTS LTD		Flush anchor HKD-E M10X40 bucket	Metal pipe penetration sealing
31299	10-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	COMMANDING VIEW ENG CO LTD		Flush anchor HKD-SR M6X25	hand rail fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
31052	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	KIN LEONG CORPORATION LIMITED		Flush anchor HKD-E M10X40 bucket	electrical services fixing
31071	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	YUK KEE ENGINEERING COMPANY LTD		Flush anchor HKD-E M16X65	Plumbing works fixing
31145	10-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	SAN HING MECH & ELECT ENG LTD		Flush anchor HKD-S M10X40	water pipe / pipe duct fixing
31059	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	PATWIN ENG CO LTD		Flush anchor HKD-E M16X65	Plumbing works fixing
31058	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	PATWIN ENG CO LTD		Flush anchor HKD-E M12X50 bucket	Plumbing works fixing
31056	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	ON LEE ENG CO		Flush anchor HKD-E M8X30 bucket	MVAC fixing
31055	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	ON LEE ENG CO		Flush anchor HKD-E M10X40 bucket	MVAC fixing
31170	10-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	TSIEN WUI STONE CO LTD		Flush anchor HKD-S M8X30	marble / granite fixing
30829	10-08	KCRC	HONEST COMPLEX SCAFFOLDING CO LTD		Flush anchor HKD-S 5/8"X65	scaffolding fixing
31167	10-08	Chinese University Shatin Hotel Development	HUNG WAH ENGINEERING COMPANY	Wong Pak Lam / PBA	Flush anchor HKD-E 3/8"X40 bucket	fire services fixing
31926	10-08	KCRC	SUN HING ELECTRICAL ENGINEERING		Flush anchor HKD-ER M12X50	Plumbing works fixing
31929	10-08	KCRC	YIP HING ENGRG CO		Flush anchor HKD-ER M12X50	MVAC fixing
31963	10-08	KCRC	SAINT GLAS LIMITED		Flush anchor HKD-S M10X40	suspension ceiling fixing
31962	10-08	KCRC	PANG'S ENG LTD		Flush anchor HKD-S 3/8"X40	suspension ceiling fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
31158	10-08	KCRC	YUEN CHEONG ENG CO LTD		Flush anchor HKD-ER 1/2"x50	Plumbing works fixing
31906	10-08	Airport	LEE YEE ENGINEERING CO LTD		Flush anchor HKD-ER 1/2"x50	MVAC fixing
31232	10-08	KCRC	TSIEN WUI STONE CO LTD		Flush anchor HKD-SR M10X40	marble / granite fixing
31018	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	CHEUNG WAH ENGINEERING LTD		Flush anchor HKD-E M12X50 bucket	MVAC fixing
31106	10-08	KCRC	ABO (E&M) LIMITED		Flush anchor HKD-ER M10X40	electrical services fixing
30834	10-08	Airport	FU SHING ENG CO LTD		Flush anchor HKD-S M20X80	steel bracket fixing
30796	10-08	Airport	LINKA BLDG MATERIALS CO LTD		Flush anchor HKD-S M8X30	suspension ceiling fixing
31907	10-08	Airport	LEE YEE ENGINEERING CO LTD		Flush anchor HKD-ER M10X40	MVAC fixing
31913	10-08	Airport	WING FUNG ENG (H.K.) LTD		Flush anchor HKD-ER M10X40	MVAC fixing
31019	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	CHEUNG WAH ENGINEERING LTD		Flush anchor HKD-E M16X65	MVAC fixing
31159	10-08	KCRC	YUEN CHEONG ENG CO LTD		Flush anchor HKD-ER 3/8"x40	Plumbing works fixing
31240	10-08	Union Square 7, Kowloon Station	SIMBEL LTD		Flush anchor HKD-SR M8X30	marble / granite fixing
30558	09-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	VAFORD CONTRACTING CO LTD		Flush anchor HKD-E M12X50 bucket	suspension ceiling fixing
30784	09-08	PTM Projects - Sun Hung Kai	BOTH ARTS ENG CO		Flush anchor HKD-SR M10X40	cladding / pre-cast panel fixing
29911	09-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	KIN LEONG CORPORATION LIMITED		Flush anchor HKD-E M12X50 bucket	MVAC fixing