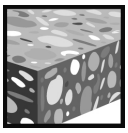
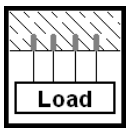
HKD Push-in anchor, Redundant fastening

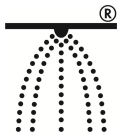
	Anchor version	Benefits
	HKD Carbon steel with lip	- simple and well proven - approved, tested and confirmed by everyday jobsite experience - reliable setting thanks to simple visual check - versatile - for medium-duty fastening with bolts or threaded rods - available in various materials and sizes for maximized coverage of possible applications
	HKD-S(R) Carbon steel, stainless steel with lip	
	HKD-E(R) Carbon steel, stainless steel without lip	


Concrete


Tensile zone [a)]



Redundant fastening


Sprinkler approved


Fire resistance

Corrosion resistance


European Technical Approval


CE conformity

a) Redundant fastening only

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical approval [a)]	DIBt, Berlin	ETA-06/0047 / 2011-03-14
Fire test report	DIBt, Berlin	ETA-06/0047 / 2011-03-14
Assessment report (fire)	warringtonfire	WF 166402 / 2007-10-26

a) All data given in this section for HKD-S(R) and HKD-E(R), according ETA-06/0047, issue 2011-03-14 . The anchor is to be used only for redundant fastening for non-structural applications.

Basic loading data for all load directions according design method B of ETAG 001

All data in this section applies to

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Concrete C 20/25 $f_{ck,cube}$ = 25 N/mm² to C50/60, $f_{ck,cube}$ = 60 N/mm²
- Minimum base material thickness
- Anchors in redundant fastening

Characteristic Resistance, all load directions

Anchor size		M6x25	M6x30	M8x25	M8x30	M8x40	M10x25	M10x30	M10x40	M12x25	M12x50	M16x65
Load F_{Rk}												
HKD	kN	2,0	-	3,0	5,0	5,0	4,0	5,0	7,5	4,0	9,0	16,0
HKD-S, HKD-E	kN	-	3,0	-	3,0	5,0	-	4,0	6,0	-	6,0	-
HKD-SR, HKD-ER	kN	-	3,0	-	3,0	-	-	-	6,0	-	6,0	-

Design Resistance, all load directions

Anchor size		M6x25	M6x30	M8x25	M8x30	M8x40	M10x25	M10x30	M10x40	M12x25	M12x50	M16x65
Load F_{Rd}												
HKD	kN	1,3	-	2,0	2,8	3,3	2,2	3,3	5,0	2,7	6,0	10,7
HKD-S, HKD-E	kN	-	2,0	-	2,0	3,3	-	2,7	4,0	-	4,0	-
HKD-SR, HKD-ER	kN	-	2,0	-	2,0	-	-	-	4,0	-	4,0	-

Recommended loads [a], all load directions

Anchor size		M6x25	M6x30	M8x25	M8x30	M8x40	M10x25	M10x30	M10x40	M12x25	M12x50	M16x65
Load F_{rec}												
HKD	kN	1,0	-	1,4	2,0	2,4	1,6	2,4	3,6	1,9	4,3	7,6
HKD-S, HKD-E	kN	-	1,4	-	1,4	2,4	-	1,9	2,9	-	2,9	-
HKD-SR, HKD-ER	kN	-	1,4	-	1,4	-	-	-	2,9	-	2,9	-

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

Requirements for redundant fastening

The definition of redundant fastening according to Member States is given in the ETAG 001 Part six, Annex 1. In Absence of a definition by a Member State the following default values may be taken

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

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

Materials

Mechanical properties of HKD, HKD-S, HKS-E, HKD-SR and HKD-ER

Anchor size			M6	M8	M10	M12	M16
Nominal tensile strength f_{uk}	HKD	[N/mm²]	570	570	570	570	640
	HKD-S HKD-E	[N/mm²]	560	560	510	510	-
	HKD-SR HKD-ER	[N/mm²]	540	540	540	540	-
Yield strength f_{yk}	HKD	[N/mm²]	460	460	460	480	510
	HKD-S HKD-E	[N/mm²]	440	440	410	410	-
	HKD-SR HKD-ER	[N/mm²]	355	355	355	355	-
Stressed cross-section A_s	HKD	[mm²]	20,7	26,7	32,7	60,1	105
	HKD-S (R) HKD-E (R)	[mm²]	20,9	26,1	28,8	58,7	-
Moment of resistance W	HKD	[mm³]	32,3	54,6	82,9	184	431
	HKD-S (R) HKD-E (R)	[mm³]	50	79	110	264	-
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
	HKD-SR HKD-ER with A4-70	[Nm]	11	26	52	92	-

Material quality

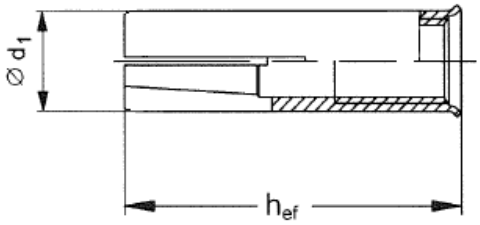
Part		Material
Anchor Body	HKD	Steel Fe/Zn5 galvanised to min. 5 µm
	HKD-S HKD-E	Steel Fe/Zn5 galvanised to min. 5 µm
	HKD-SR HKD-ER	Stainless steel, 1.4401, 1.4404, 1.4571
Tapered expansion plug	HKD	Steel material
	HKD-S HKD-E	Steel material
	HKD-SR HKD-ER	Stainless steel, 1.4401, 1.4404, 1.4571

Anchor dimensions

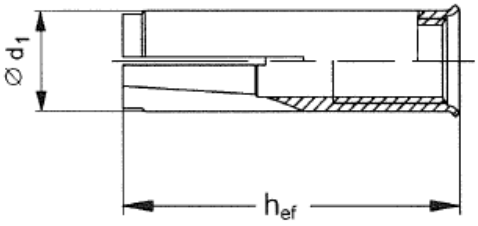
Anchor size **Anchor version** HKD HKD-S (R) HKD-E (R)			**M6x25**	**M6x30**	**M8x25**	**M8x30**	**M8x40**	**M10x25**	**M10x30**	**M10x40**	**M12x25**	**M12x50**	**M16x65**
Effective anchorage depth	h_{ef}	[mm]	25	30	25	30	40	25	30	40	25	50	65
Anchor diameter	d_1	[mm]	7,9	8	9,95	9,95	9,95	11,9	11,8	11,95	14,9	14,9	19,75
Plug diameter	d_2	[mm]	5,1	5	6,35	6,5	6,35	8,1	8,2	8,2	9,7	10,3	13,8
Plug length	l_1	[mm]	10	15	7	12	16	7	12	16	7,2	20	29

Anchor body

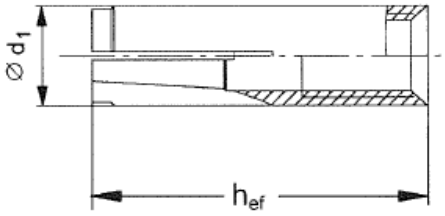
HKD



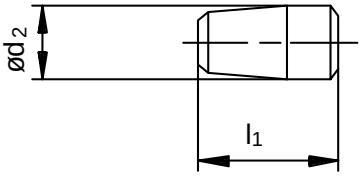
HKD-S and HKD-SR

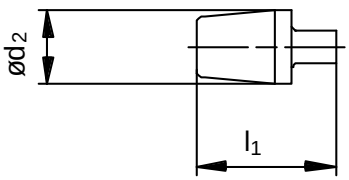


HKD-E and HKD ER



Expansions plugs



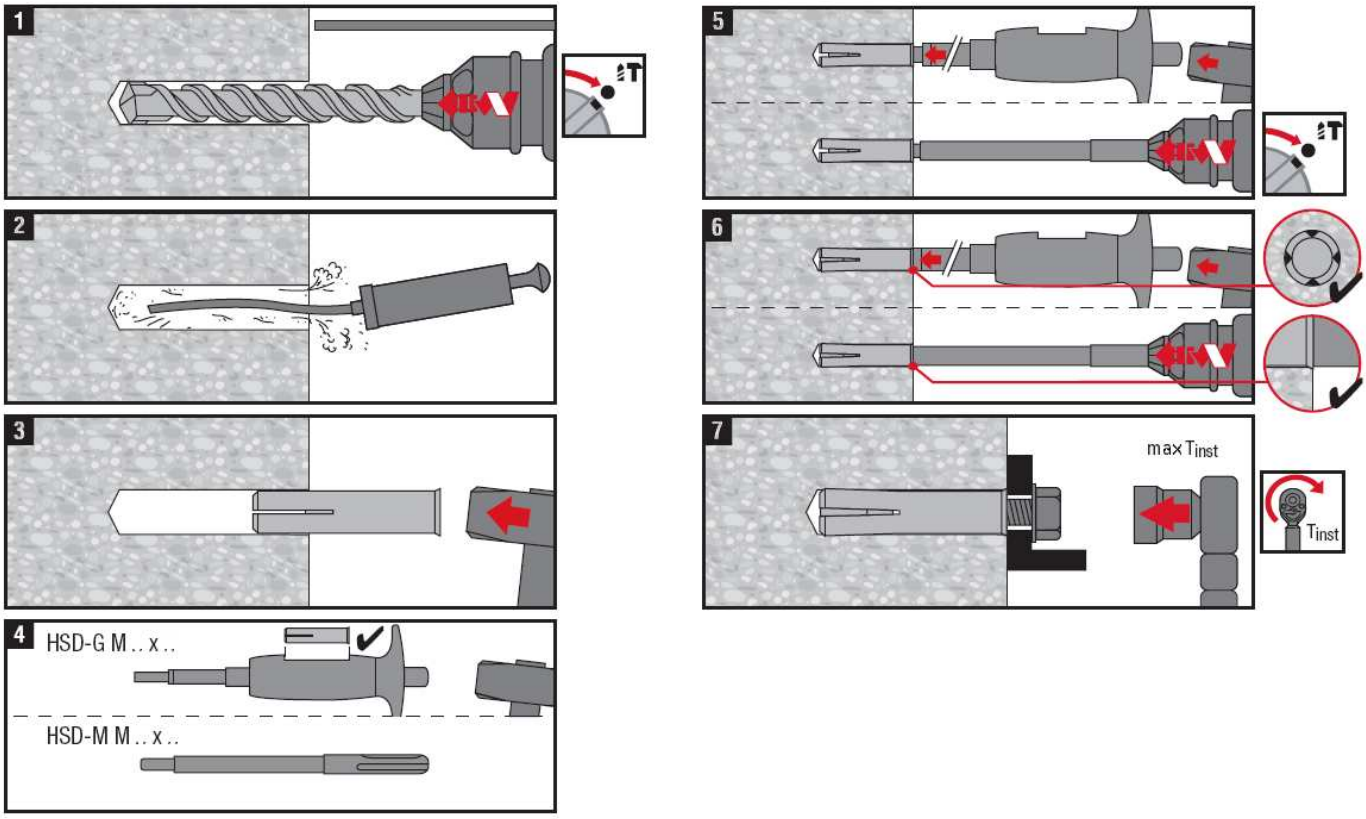


Setting

Installation equipment

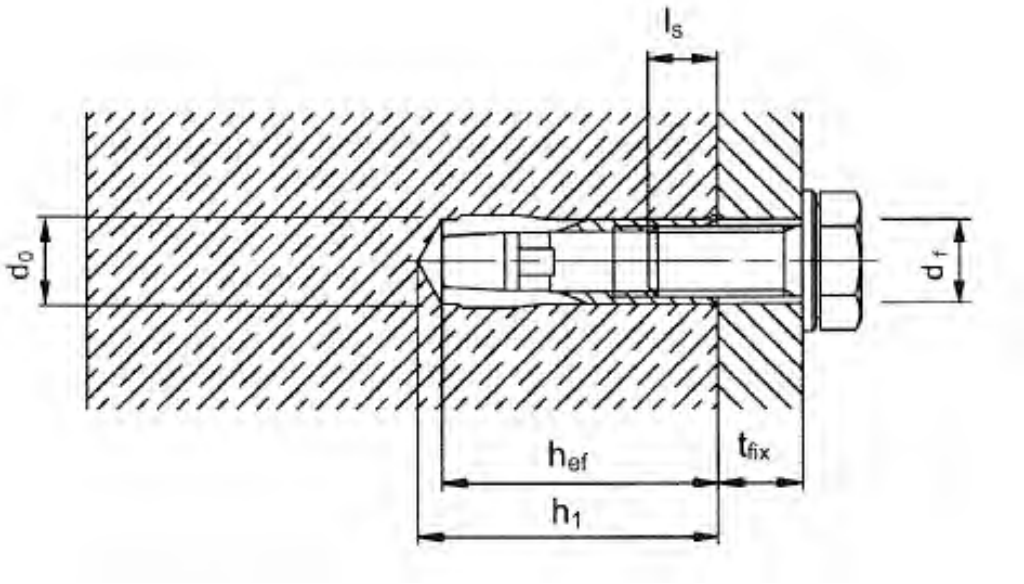
Anchor size		M6x25	M6x30	M8x25	M8x30	M8x40	M10x25	M10x30	M10x40	M12x25	M12x50	M16x65
Rotary hammer		TE 2 – TE 16									TE 16 – 50	
Machine setting tool	HSD-M	6x25/30		8x25/30		8x40	10x25/30		10x40	12x25	12x50	16x65
Hand Setting tool	HSD-G											
Other tools		hammer, torque wrench, blow out pump										

Setting instruction



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

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

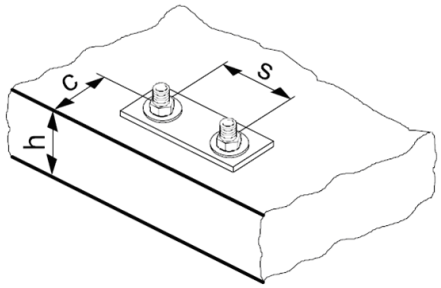


Setting details

Anchor size			M6x25	M6x30	M8x25	M8x30	M8x40	M10x25	M10x30	M10x40	M12x25	M12x50	M16x65
Nominal diameter of drill bit	d_o	[mm]	8	8	10	10	10	12	12	12	15	15	20
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45	8,45	10,5	10,5	10,5	12,5	12,5	12,5	15,5	15,5	20,5
Depth of drill hole	$h_1 \geq$	[mm]	27	32	27	33	43	27	33	43	27	54	70
Screwing depth	$l_{s,min}$	[mm]	6	6	8	8	8	10	10	10	12	12	16
	$l_{s,max}$	[mm]	12	12,5	11,5	14,5	17,5	12	13	18	12	22	30,5
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	7	9	9	9	12	12	12	14	14	18
Effective anchorage depth	h_{ef}	[mm]	25	30	25	30	40	25	30	40	25	50	65
Max. torque moment	T_{inst}	[Nm]	4	4	8	8	8	15	15	15	35	35	60

base material thickness, anchor spacing and edge distances

Anchor size			M6x25 M8x25 M10x25 M12x25	M6x30 M8x30 M10x30	M8x40 M10x40	M12x50	M16x65
Minimum base material thickness	h_{min}	[mm]	80	80	80	-	-
Minimum spacing and Minimum edge distance HKD HKD-S (R) HKD-E (R)	s_{min}	[mm]	200	200	200	-	-
	c_{min}	[mm]	150	150	150	-	-
Minimum base material thickness	h_{min}	[mm]	100	100	100	100	130
Minimum spacing and minimum edge distance HKD-S (R) HKD-E (R)	s_{min}	[mm]	80	60	80	125	130
	c_{min}	[mm]	140	105	140	175	230
Minimum spacing HKD	s_{min}	[mm]	80	60	80	125	130
	for c≥	[mm]	140	105	140	175	230
Minimum edge distance HKD	c_{min}	[mm]	100	80	140	175	230
	for s≥	[mm]	150	120	80	125	130



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