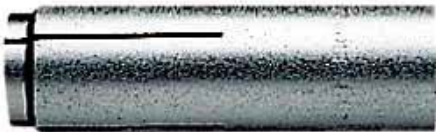


## HKD Push-in anchor, Redundant fastening

| Anchor version                                                                    |                                                             | Benefits                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | HKD<br>Carbon steel<br>with lip                             | <ul style="list-style-type: none"> <li>- simple and well proven</li> <li>- approved, tested and confirmed by everyday jobsite experience</li> <li>- reliable setting thanks to simple visual check</li> <li>- versatile</li> <li>- for medium-duty fastening with bolts or threaded rods</li> <li>- available in various materials and sizes for maximized coverage of possible applications</li> </ul> |
|  | HKD-S(R)<br>Carbon steel,<br>stainless steel with lip       |                                                                                                                                                                                                                                                                                                                                                                                                         |
|  | HKD-E(R)<br>Carbon steel,<br>stainless steel<br>without lip |                                                                                                                                                                                                                                                                                                                                                                                                         |



Concrete



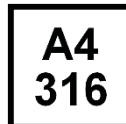
Tensile  
zone



Redundant  
fastening



Fire  
resistance



Corrosion  
resistance



Sprinkler  
approved



European  
Technical  
Approval



CE  
conformity

a) Redundant fastening only

### Approvals / certificates

| Description                               | Authority / Laboratory | No. / date of issue      |
|-------------------------------------------|------------------------|--------------------------|
| European technical approval <sup>a)</sup> | DIBt, Berlin           | ETA-06/0047 / 2012-23-28 |
| Fire test report                          | DIBt, Berlin           | ETA-06/0047 / 2012-23-28 |
| Assessment report (fire)                  | warringtonfire         | WF 327804/A / 2013-07-10 |

a) All data given in this section for HKD-S(R) and HKD-E(R), according ETA-06/0047, issue 2012-09-28. 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  $f_{ck,cube} = 25 \text{ N/mm}^2$  to C50/60,  $f_{ck,cube} = 60 \text{ N/mm}^2$
- 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 <sup>a)</sup>, 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  $\gamma = 1,4$ . The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

**Requirements for redundant fastening**

The definition of redundant fastening according to Member States is given in 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 <sup>a)</sup> |
|---------------------------------|--------------------------------------------|-----------------------------------------------------------------------|
| 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/mm <sup>2</sup> ] | 570  | 570  | 570  | 570  | 640 |
|                                                       | HKD-S                       | [N/mm <sup>2</sup> ] | 560  | 560  | 510  | 510  | -   |
|                                                       | HKD-E                       | [N/mm <sup>2</sup> ] | 560  | 560  | 510  | 510  | -   |
|                                                       | HKD-SR<br>HKD-ER            | [N/mm <sup>2</sup> ] | 540  | 540  | 540  | 540  | -   |
| Yield strength $f_{yk}$                               | HKD                         | [N/mm <sup>2</sup> ] | 460  | 460  | 460  | 480  | 510 |
|                                                       | HKD-S                       | [N/mm <sup>2</sup> ] | 440  | 440  | 410  | 410  | -   |
|                                                       | HKD-E                       | [N/mm <sup>2</sup> ] | 440  | 440  | 410  | 410  | -   |
|                                                       | HKD-SR<br>HKD-ER            | [N/mm <sup>2</sup> ] | 355  | 355  | 355  | 355  | -   |
| Stressed cross-section $A_s$                          | HKD                         | [mm <sup>2</sup> ]   | 20,7 | 26,7 | 32,7 | 60,1 | 105 |
|                                                       | HKD-S (R)<br>HKD-E (R)      | [mm <sup>2</sup> ]   | 20,9 | 26,1 | 28,8 | 58,7 | -   |
| Moment of resistance $W$                              | HKD                         | [mm <sup>3</sup> ]   | 32,3 | 54,6 | 82,9 | 184  | 431 |
|                                                       | HKD-S (R)<br>HKD-E (R)      | [mm <sup>3</sup> ]   | 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<br>HKD-ER with A4-70 | [Nm]                 | 11   | 26   | 52   | 92   | -   |

### Material quality

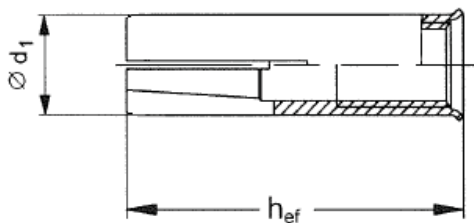
| Part                   |                  | Material                                |
|------------------------|------------------|-----------------------------------------|
| Anchor Body            | HKD              | Steel Fe/Zn5 galvanised to min. 5 µm    |
|                        | HKD-S<br>HKD-E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

### Anchor dimensions

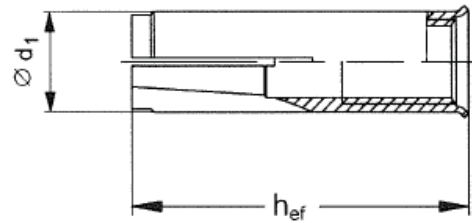
| Anchor size<br>Anchor version<br>HKD<br>HKD-S (R)<br>HKD-E (R) |          |      | M6x25 | M6x30 | M8x25 | M8x30 | M8x40 | M10x25 | M10x30 | M10x40 | M12x25 | M12x50 | M16x65 |
|----------------------------------------------------------------|----------|------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| 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

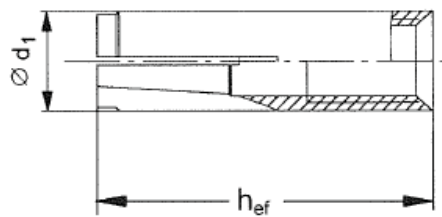
HKD



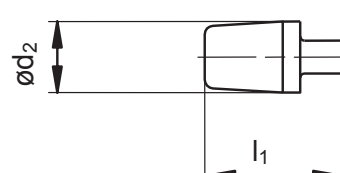
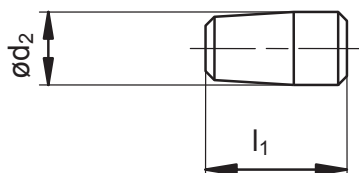
HKD-S and HKD-SR



HKD-E and HKD ER



### Expansions plugs

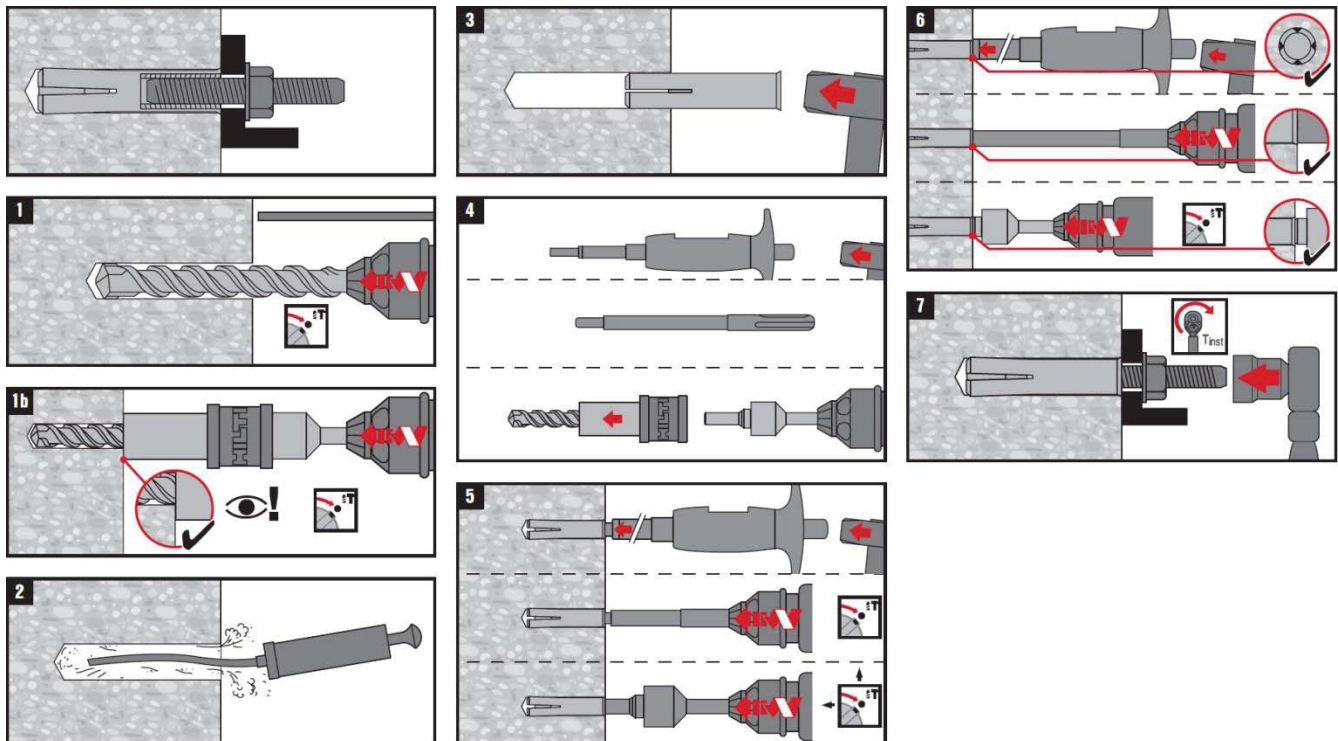


## Setting

### Installation equipment

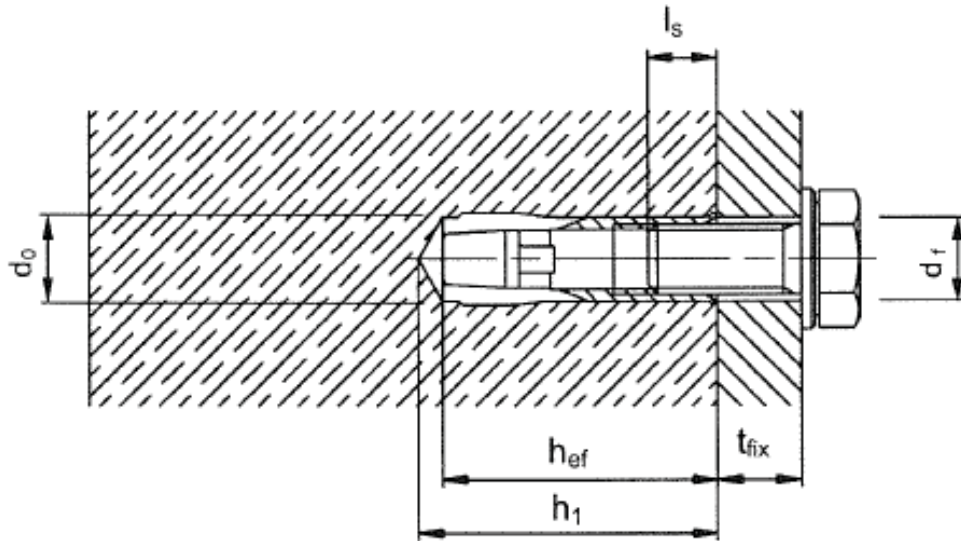
| Anchor size          |       | M6x25                                | M6x30   | M8x25 | M8x30    | M8x40 | M10x25 | M10x30 | M10x40 | M12x25 | M12x50     | M16x65 |
|----------------------|-------|--------------------------------------|---------|-------|----------|-------|--------|--------|--------|--------|------------|--------|
| 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  $h_{ef}$

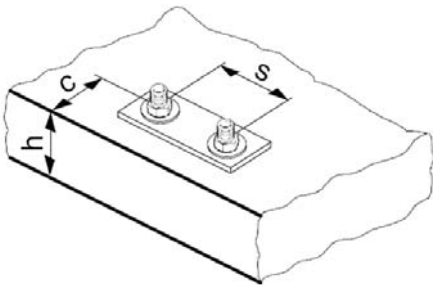


### Setting details

| Anchor size                               |                     | M6x25 | M6x30 | M8x25 | M8x30 | M8x40 | M10x25 | M10x30 | M10x40 | M12x25 | M12x50 | M16x65 |
|-------------------------------------------|---------------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| Nominal diameter of drill bit             | $d_0$ [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<br>M8x25<br>M10x25<br>M12x25 | M6x30<br>M8x30<br>M10x30 | M8x40<br>M10x40 | M12x50 | M16x65 |
|-------------------------------------------|-------------------|------------------------------------|--------------------------|-----------------|--------|--------|
| Minimum base material thickness           | $h_{\min}$ [mm]   | 80                                 | 80                       | 80              | -      | -      |
| Minimum spacing and Minimum edge distance | $s_{\min}$ [mm]   | 200                                | 200                      | 200             | -      | -      |
| HKD<br>HKD-S (R)<br>HKD-E (R)             | $c_{\min}$ [mm]   | 150                                | 150                      | 150             | -      | -      |
|                                           |                   |                                    |                          |                 |        |        |
| Minimum base material thickness           | $h_{\min}$ [mm]   | 100                                | 100                      | 100             | 100    | 130    |
| Minimum spacing and minimum edge distance | $s_{\min}$ [mm]   | 80                                 | 60                       | 80              | 125    | 130    |
| HKD-S (R)<br>HKD-E (R)                    | $c_{\min}$ [mm]   | 140                                | 105                      | 140             | 175    | 230    |
| Minimum spacing                           | $s_{\min}$ [mm]   | 80                                 | 60                       | 80              | 125    | 130    |
| HKD                                       | for $c \geq$ [mm] | 140                                | 105                      | 140             | 175    | 230    |
| Minimum edge distance                     | $c_{\min}$ [mm]   | 100                                | 80                       | 140             | 175    | 230    |
| HKD                                       | for $s \geq$ [mm] | 150                                | 120                      | 80              | 125    | 130    |



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