WHC Hollow Core Anchor

Expansion anchor for precast pre-stressed hollow core concrete slabs

Anchor types

WHC M8
WHC M10
WHC M12

- **WCH** is a torque-controlled expansion anchor made of galvanized steel for use in precast pre-stressed hollow core concrete slabs.

Features and benefits

- DIBt Technical Approval
- Designed specifically for use in precast pre-stressed hollow core concrete slabs
- Very high load capacity
- Fire resistance class R30-R120 for design of anchorages under exposure to fire
- Easy installation

Suitable base materials

Precast pre-stressed
hollow core concrete slabs

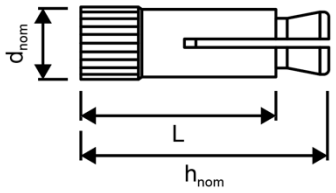
Approvals and certificates

DIBt Technical Approval	Z-21.1-1785, 11 September 2018
Fire Performance	Z-21.1-1785, 11 September 2018

Deutsches Institut für Bautechnik DIBt

1. Product details

Article	Description	Size	Length	External diameter
			L [mm]	d_{nom} [mm]
6096408	WHC	M8	35	12
6096410	WHC	M10	40	16
6096412	WHC	M12	45	18



2. Packaging details

Article	Description	Pack 1	
		[pcs]	EAN13
6096408	WHC M8	50	8719942032162
6096410	WHC M10	50	8719942032193
6096412	WHC M12	25	8719942032223

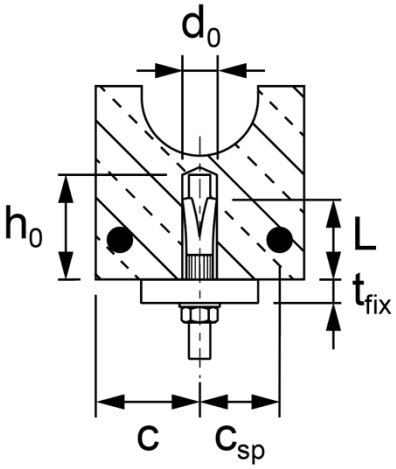
3. Mechanical properties

Property	DIBt Z-21.1-1785
	WHC
Material	Steel, according to DIN EN 10087:1998
Coating	Galvanized according to EN ISO 4042:1999

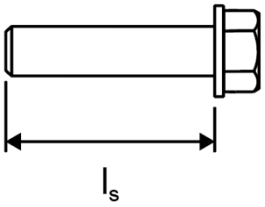
3. Installation data

3.1 Installation parameters for cracked and non-cracked concrete

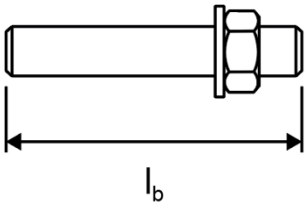
Anchor Type			WHC		
Anchor Size			M8	M10	M12
Nominal drill hole diameter	d_0	[mm]	12	16	18
Cutting diameter of drill bit	d_{cut}	[mm]	12.5	16.5	18.5
Depth of drill hole	h_0	[mm]	55	60	70
Diameter of clearing hole in the fixture	d_f	[mm]	9	12	15
Screw length (in solid material)	$l_{s,min}$	[mm]	47 + t_{fix}	55 + t_{fix}	61 + t_{fix}
	$l_{s,max}$	[mm]	55 + t_{fix}	60 + t_{fix}	70 + t_{fix}
Threaded rod length	$l_{b,min}$	[mm]	53 + t_{fix}	63 + t_{fix}	71 + t_{fix}
Min. Property class of screw / stud			5.8	5.8	5.8
Max fixture thickness	$t_{fix,max}$	[mm]	According to screw or threaded rod length		
Installation torque	T_{inst}	[Nm]	20	30	40



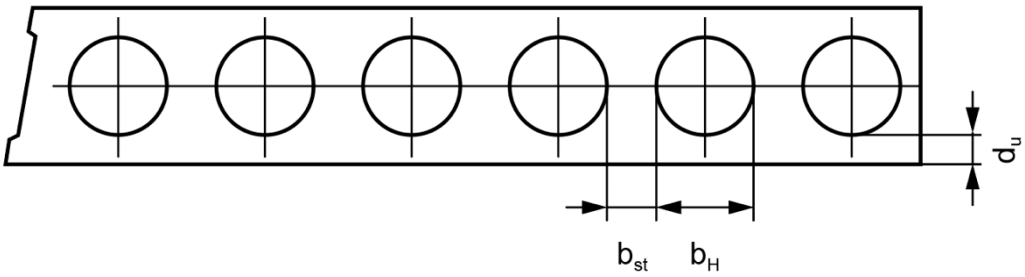
Screw length



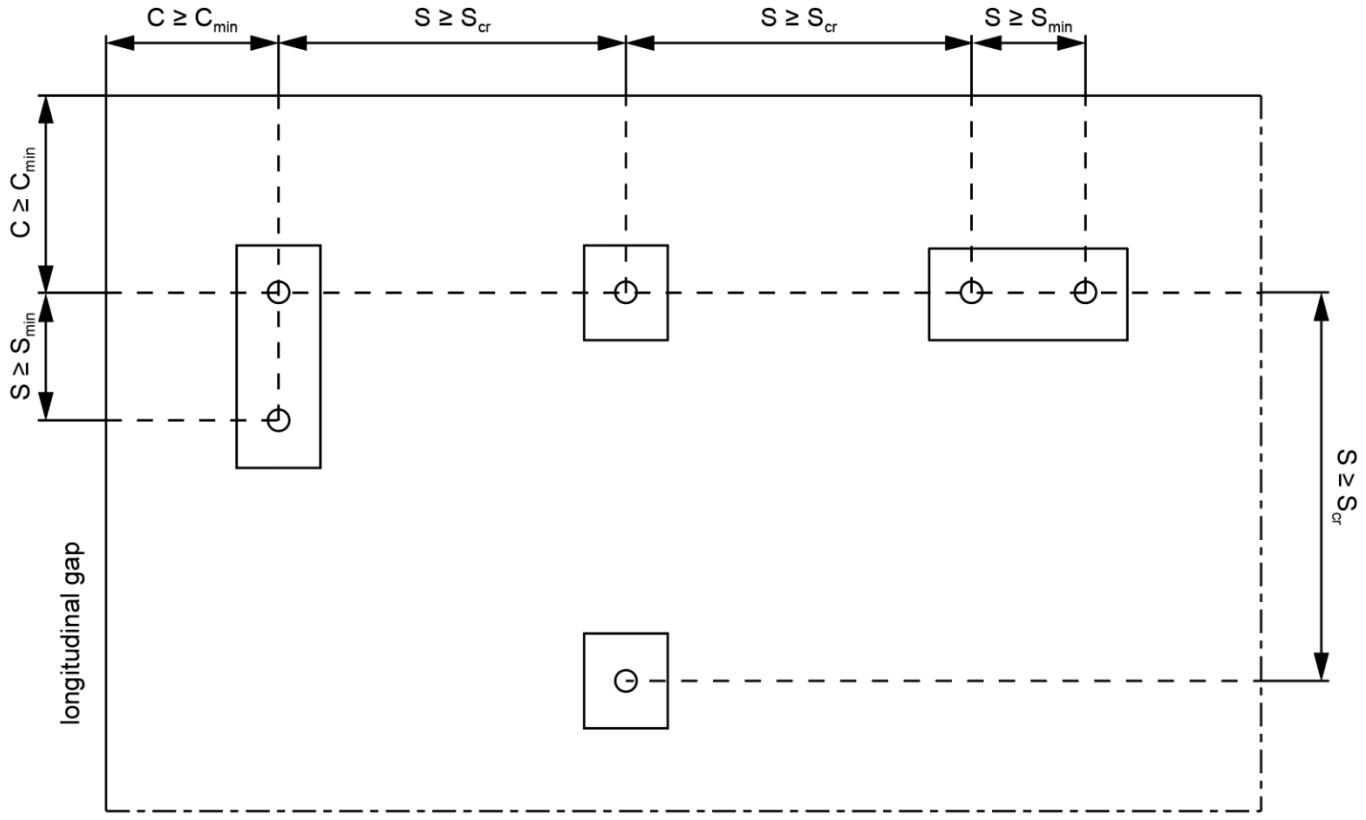
Threaded rod length



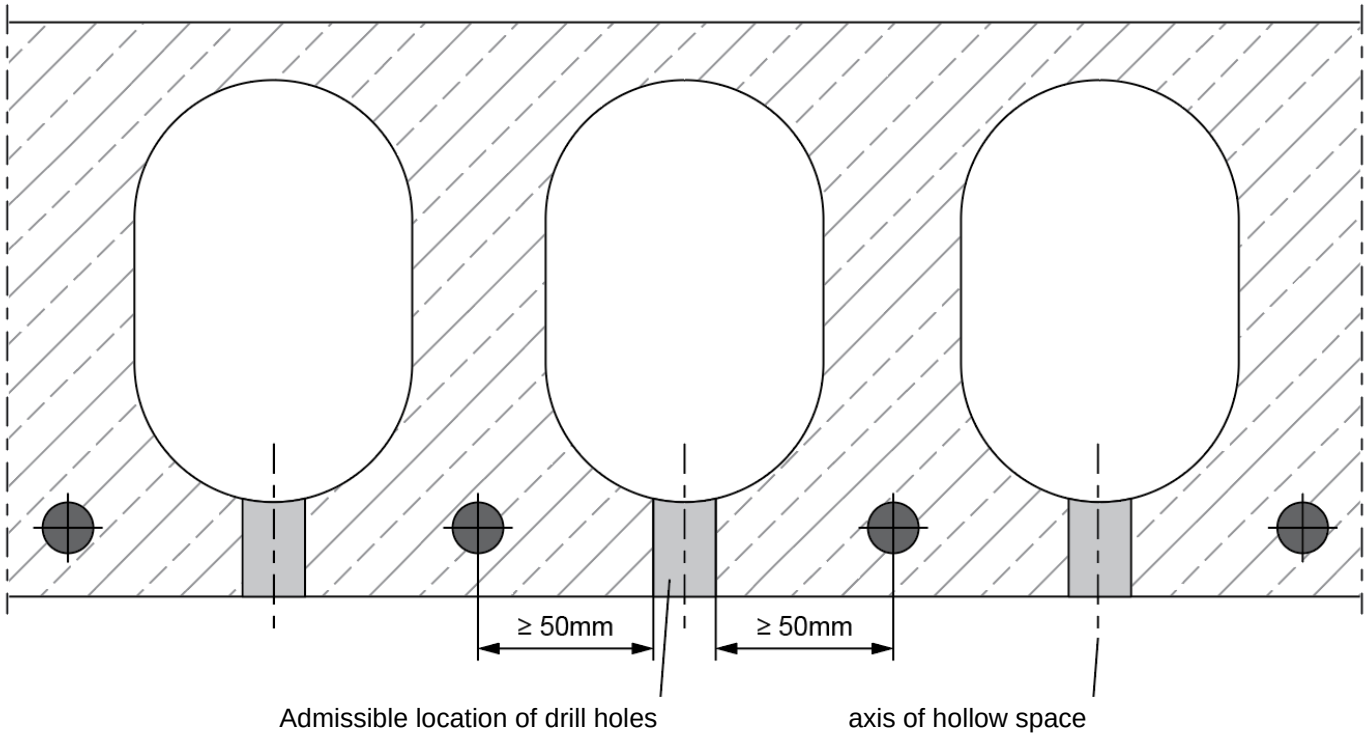
Necessary condition: $b_H < 4.2 \times b_{st}$

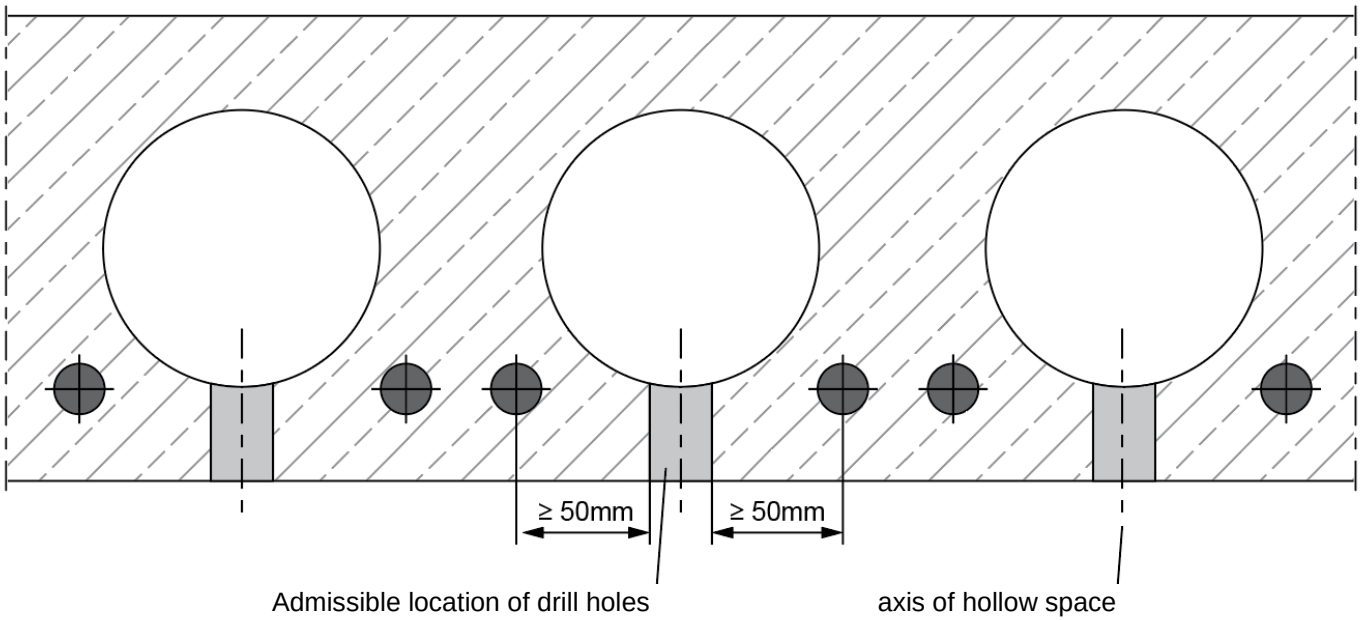


3.2 Distances between single fasteners and double fastener groups



3.3 Admissible location of drilled hole



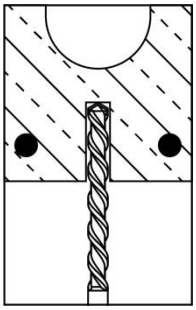


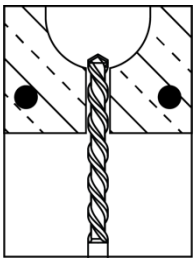
If the fastener is not installed centrally in the hollow-space axis, the distance between the fastener axis and the axis of the pre-stressed wire shall be at least 50 mm, in accordance with the drawing above. The fastener can either be installed into the solid material of the hollow slab or into the hollow slab from above.

3.4 Installation procedure

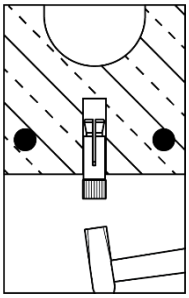
Installation in solid material

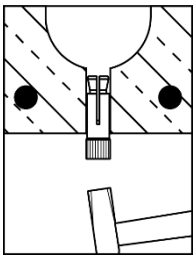
Installation in hollow space





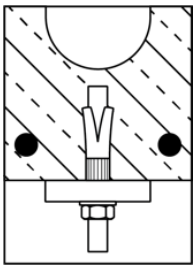
Drill hole to correct diameter d_0 and depth h_0 using hammer drilling mode.

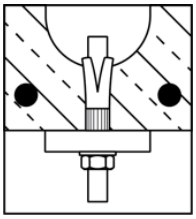


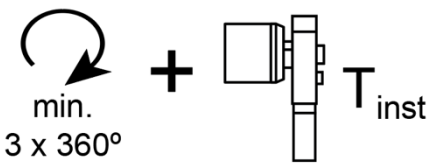


Hammer the WHC anchor into the hole.

Installation with a threaded rod

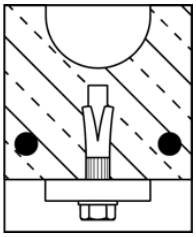


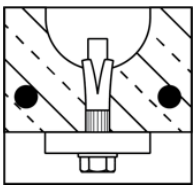


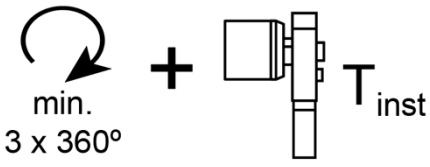


Apply the fixture, screw the threaded rod achieving at least three full turns of engagement and apply appropriate amount of torque T_{inst}.

Installation with a screw







Apply the fixture, screw in the screw achieving at least three full turns of engagement and apply appropriate amount of torque T_{inst}.

4. Performance information

4.1 Recommended loads in pre-stressed hollow core slabs of strength class ≥ C45/55[3)]

Anchor Type			WHC											
Anchor Size			M8				M10				M12			
Flange thickness	d_b	[mm]	25	30	40	50	25	30	40	50	25	30	40	50
Single WHC anchor														
Mean ultimate tension load	N_u	[kN]	7.0	9.3	11.7	11.7	9.1	12.0	18.4	18.4	9.40	12.3	19.0	22.7
Mean ultimate shear load	V_u	[kN]	7.3	8.7	9.2	9.2	8.0	9.4	12.2	14.5	8.3	9.8	12.7	15.5
Recommended load for $C \geq C_{cr}$	F_{rec}	[kN]	0.7	0.9	2.0	3.6	0.9	1.2	3.0	3.6	1.0	1.2	3.0	4.3
Edge distance	C_{cr}	[mm]	150				150				150			
Recommended load for $C \geq C_{min}$	F_{rec}	[kN]	0.35	0.8	1.8	3.0	0.8	1.0	2.7	3.0	0.8	1.0	2.7	3.6
Minimum edge distance	C_{min}	[kN]	100				100				100			
Anchor spacing	S_{cr}	[mm]	300				300				300			
Pair of WHC anchors														
Recommended load for $C \geq C_{cr}$	F_{rec}	[kN]	0.7	1.4	2.6	4.8	1.1	2.0	4.8	4.8	1.2	2.0	4.8	5.7
Minimum spacing	S_{min}	[mm]	70	80	100	100	70	80	100	100	70	80	100	100
Edge distance	C_{cr}	[mm]	150				150				150			
Recommended load for $C \geq C_{min}$	F_{rec}	[kN]	0.35	1.25	2.35	4.0	0.9	1.8	4.3	4.3	1.0	1.8	4.3	4.8
Minimum spacing	S_{min}	[mm]	70	80	100	100	70	80	100	100	70	80	100	100
Minimum edge distance	C_{min}	[mm]	100				100				100			
Bending resistance														
Threaded rod or screw class 5.8	M_{rec}	[Nm]	15.0				30.0				52.4			
Threaded rod of screw class 8.8	M_{rec}	[Nm]	23.9				47.9				83.7			

1) For edge distances $c_{min} \leq c \leq c_{cr}$ the admissible loads may be determined by linear interpolation
2) The design resistances apply to the double fastener group. The design resistance for the fastener with the highest load may not exceed the values specified for the single fastener. For double fastener groups with spacing of $s_{min} \leq s \leq s_{cr}$ the design resistance may be linearly interpolated, whereby, when $s = s_{cr}$ for the double fastener group twice the design resistance for single fastener may be applied for the double fastener group with uniformly applied loads for the limit value.
3) Recommended loads includes partial safety factor and an overall partial safety factor for action of 1.4. The partial safety factor for action depends on the type of loading and shall be taken from national regulations. All anchor failure modes and the entire relevant product European Technical Assessment must be considered for anchor design.

4.2 Design loads under fire exposure in pre-stressed hollow core slabs of strength class ≥ C45/55[1)]

Anchor Type				WHC				
Anchor Size				**M8**	**M10**		**M12**	
Single WHC anchor								
Flange thickness	$d_b \geq$		[mm]	30	30	40	30	30
Fire resistance duration [min]	30	F_{rd}	[kN]	0.9	1.2	1.5	1.2	1.5
	60	F_{rd}	[kN]	0.9	1.2	1.5	1.2	1.5
	90	F_{rd}	[kN]	0.7	1.2	1.2	1.2	1.5
	120	F_{rd}	[kN]	0.4	1.0	1.0	1.2	1.2
Spacing		$S_{cr} \geq$	[mm]	300	300		300	
Edge Distance		$C_{cr} \geq$ $C_{min} \geq$	[mm]	150	150		150	
Pair of WHC anchors								
Flange thickness	$d_b \geq$		[mm]	30	30	40	30	30
Fire resistance duration [min]	30	F_{rd}	[kN]	1.25	1.8	3.0	1.8	3.0
	60	F_{rd}	[kN]	1.25	1.8	3.0	1.8	3.0
	90	F_{rd}	[kN]	1.25	1.8	2.4	1.8	2.4
	120	F_{rd}	[kN]	0.8	1.8	2.0	1.8	2.0
Spacing and Edge distance				The minimum anchor spacing and edge distances in paragraph 4.1 should be adhered to depending upon flange thickness.				

1) The edge distance shall be ≥ 300mm, if the fire exposure applies from more than one side.