MHDA Hollow Ceiling Anchor

Mungo MHDA torque controlled anchor with internal thread for use in prestressed hollow core concrete slabs

1 APLICATIONS AND INTENDED USE

Intended use:
-All purpose expansion anchor for use in prestressed hollow core concrete slabs

Approvals:
-Institute of Construction Materials (IEA) Stuttgart
-Resistance under fire exposure
-Mungo Lab Testing

Base materials:
-Hollow concrete prestressed slabs strength classes C30/37 to C50/60

Futures:
-Torque controlled expansion
-No cleaning of the hole required
-Zinc plated > 5 µm
-Pre installation
-Application with pipes, ventilation systems, cable trays, substructures, gates

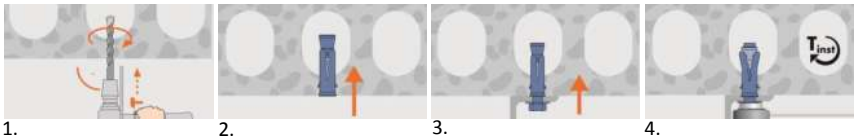
Applications:
-Force-controlled anchor with internally metric thread without screw or bolt allow user specific applications
-Expansion corpus and cone made of steel
-Expansion in prestressed hollow core slab
-Possible complete disassembling

Installation:
-Drilling the hole by hammer drilling
-Drive in the plug
-Position the building material
-Tighten with a torque spanner
-The fastener may only be set once

1.1 INSTALATION INSTRUCTIONS

1. Drilling the hole by hammer drilling in concrete or solid wall
2. Insert the Hollow Ceiling Anchor into the building material (no hole cleaning is required)
3. Position the building materials and fix it with a screw or threaded rod and corresponding nut
4. Tighten the screw with a torque spanner to the predetermined value (Tinst)

Graphic installation instruction for MHDA Hollow Ceiling Anchor



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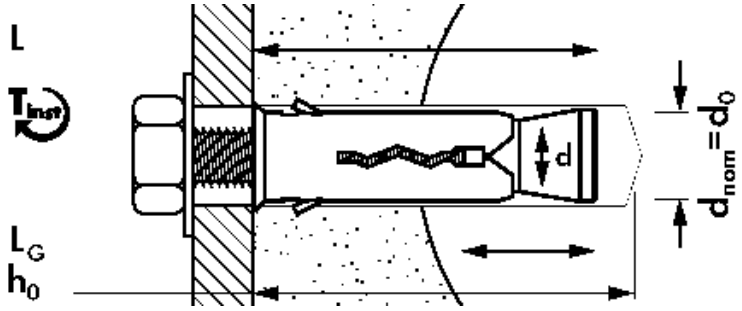
2 PRODUCT INFORMATION

MHDA Hollow Ceiling Anchor

Article code	Dimensions [mm]	Internal metric thread d_s	Length of fastener in building material [mm] h_{nom}	Drill depth [mm] h_0	Drill hole diameter in substrate [mm] d_0	Diameter of clearence hole in fixture [mm] d_f
1300006	M6 x 37	M6	37	50	10	37
1300008	M8 x 43	M8	43	60	12	42
1300010	M10 x 52	M10	52	65	16	50

3 INSTALLATION DATA MSS



FASTENER SIZE MHDA			M6	M8	M10	M12
Fastener length	L	[mm]	37	43	52	52
Internal metric thread diameter	d_s	[mm]	6	8	10	12
Nominal diameter of shaft	d_{nom}	[mm]	10	12	16	18
Diameter of clearence hole in fixture	d_f	[mm]	7	9	12	14
Internal metric thread length	L_g	[mm]	11	14	19	19
INSTALLATION PARAMETERS						
Drill hole diameter in substrate	d_0	[mm]	10	12	16	18
Dept of drill hole in substrate	h_0	[mm]	50	60	65	65
Effective anchorage depth	h_{ef}	[mm]	30	30	30	30
Installation torque	T_{inst}	[Nm]	10	10	20	20
Minimum thickness of a hollow concrete prestressed slab	h_{min}	[mm]	30	30	30	30
Minimum edge distance	c_{min}	[mm]	200	200	200	200
Min. spacing parallel to prestressed reinforcement	s_{min}	[mm]	400	400	400	400
Min. spacing orthogonal to prestressed reinforcement	s_{min}	[mm]	200	200	200	200

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3.1 BASIC PERFORMANCE DATA

Basic performance data for MHDA in cracked and non-cracked hollow prestressed concrete slabs without influence of edge distance, spacing and splitting failure due to dimensions of concrete member

Mungo MHDA (Hollow ceiling Anchor) in combination with metric threaded rod or screw with a steel quality ≥ 8.8

FASTENER SIZE MHDA				M6	M8	M10	M12
Minimum thickness of a hollow concrete slab		h_{min}	[mm]	30	30	30	30
CHARACTERISTIC RESISTANCE							
Tension load concrete C30/37 to C50/60	non-cracked	$N_{Rk,ucr}$ [2]	[kN]	3.90	3.90	3.90	3.90
	cracked	$N_{Rk,cr}$ [2]	[kN]	2.70	2.70	2.70	2.70
Shear load concrete C30/37 to C50/60	non-cracked	$V_{Rk,ucr}$ [3]	[kN]	8.00 [1]	10.10	10.10	10.10
	cracked	$V_{Rk,cr}$ [3]	[kN]	7.20	7.20	7.20	7.20
Bending moment (threaded rod steel failure)		M_{Rk}	[Nm]	12.2	30.0	59.8	104.8
DESIGN RESISTANCE							
Tension load concrete C30/37 to C50/60	non-cracked	$N_{Rd,ucr}$ [2]	[kN]	2.60	2.60	2.60	2.60
	cracked	$N_{Rd,cr}$ [2]	[kN]	1.80	1.80	1.80	1.80
Shear load concrete C30/37 to C50/60	non-cracked	$V_{Rd,ucr}$ [3]	[kN]	5.33 [1]	6.73	6.73	6.73
	cracked	$V_{Rd,cr}$ [3]	[kN]	4.80	4.80	4.80	4.80
Bending moment (threaded rod steel failure)		M_{Rd}	[Nm]	9.76	24.00	47.84	83.84
RECOMMENDED RESISTANCE							
Tension load concrete C30/37 to C50/60	non-cracked	$N_{rec,ucr}$ [2]	[kN]	1.86	1.86	1.86	1.86
	cracked	$N_{rec,cr}$ [2]	[kN]	1.29	1.29	1.29	1.29
Shear load concrete C30/37 to C50/60	non-cracked	$V_{rec,ucr}$ [3]	[kN]	3.81 [1]	4.81	4.81	4.81
	cracked	$V_{rec,cr}$ [3]	[kN]	3.43	3.43	3.43	3.43
Bending moment (threaded rod steel failure)		M_{rec}	[Nm]	6.97	17.14	34.17	59.89

[1] Steel failure

[2] Pull-out failure

[3] Concrete pry-out failure

4 RESISTANCE FOR HOLLOW PRESTRESSED CONCRETE SLABS IN CASE OF FIRE

Resistance for hollow prestressed concrete slabs with a concrete strength class between C30/37 and C50/60 with thickness of the concrete ≥ 30 mm and one side fire attack.

FASTENER SIZE MHDA			M6	M8	M10	M12
Minimum thickness of a hollow concrete slab	h_{min}	[mm]	30	30	30	30
CHARACTERISTIC RESISTANCE UNDER FIRE EXPOSURE						
Tension/Shear load, fire exposure 30 minutes	$F_{Rk,fi\,(30)}$	[kN]	0.05	0.10	0.50	0.70
Tension/Shear load, fire exposure 60 minutes	$F_{Rk,fi\,(60)}$	[kN]	0.05	0.10	0.40	0.70
Tension/Shear load, fire exposure 90 minutes	$F_{Rk,fi\,(90)}$	[kN]	0.05	0.08	0.30	0.70
Tension/Shear load, fire exposure 120 minutes	$F_{Rk,fi\,(120)}$	[kN]	0.03	0.05	0.25	0.55
DESIGN RESISTANCE UNDER FIRE EXPOSURE						
Tension/Shear load, fire exposure 30 minutes	$F_{Rd,fi\,(30)}$	[kN]	0.03	0.07	0.33	0.47
Tension/Shear load, fire exposure 60 minutes	$F_{Rd,fi\,(60)}$	[kN]	0.03	0.07	0.27	0.47
Tension/Shear load, fire exposure 90 minutes	$F_{Rd,fi\,(90)}$	[kN]	0.03	0.05	0.20	0.47
Tension/Shear load, fire exposure 120 minutes	$F_{Rd,fi\,(120)}$	[kN]	0.02	0.03	0.17	0.37
RECOMMENDED RESISTANCE UNDER FIRE EXPOSURE						
Tension/Shear load, fire exposure 30 minutes	$F_{rec,fi\,(30)}$	[kN]	0.02	0.05	0.24	0.33
Tension/Shear load, fire exposure 60 minutes	$F_{rec,fi\,(60)}$	[kN]	0.02	0.05	0.19	0.33
Tension/Shear load, fire exposure 90 minutes	$F_{rec,fi\,(90)}$	[kN]	0.02	0.04	0.14	0.33
Tension/Shear load, fire exposure 120 minutes	$F_{rec,fi\,(120)}$	[kN]	0.01	0.02	0.12	0.26

Resistance in above given table "4 Resistance for hollow prestressed concrete slabs in case of fire", can be taken as relevant resistance under fire conditions for all loading directions and failure modes (beside bending).

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5 IMPORTANT NOTICE

Values given above are valid under the assumptions of anchoring in hollow prestressed concrete slabs strength class between C30/37 and C50/60 with a flange thickness of at least 30 mm. The anchors are allowed to be installed in hollow slabs, if the distance of the hollow areas and the prestressed reinforcement is more than 100 mm (from axis to axis) and the distance of the anchor to the prestressed reinforcement shall be larger than 50 mm (based on IEA report No. 14_61-1 from 14.07.2014). Values in this document are only valued for Mungo MHDA (Hollow ceiling Anchor) in combination with metric threaded rod or screw with a steel quality ≥ 8.8. For the design in non-fire condition as well us under fire exposure, complete IEA report No. 14_61-1 from 14.07.2014 has to be considered. In recommended resistance the partial safety factor for material γ_{Mc} = 1.5 as well as a partial safety factor for load action γ_L = 1.4 are considered. Design resistance and recommended resistance are in absence of national regulations. Bending moment resistance is only valued for metric threaded rod with the steel quality 8.8. For combination of tensile loads, shear loads, bending moments as well as reduced edge distances or spacing's (anchor groups) above given values needs to be reduced. The data must be checked by the user under the responsibility of an engineer experienced in anchorage and concrete work. This is to ensure there are no errors and all data is complete and accurate and complies with all rules and regulations for the actual conditions and application. Anchor design is performed according to the ETAG 001, Annex C and EOTA TR020 in combination with IEA report No. 14_61-1 from 14.07.2014.

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