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Expert´s Opinion
Tension load capacity of MKT anchors in hollow core slabs
-
condensed version

Employer: MKT Metall - Kunststoff - Technik GmbH & Co.KG
Auf dem Immel 2
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Rev. 1: 23.1.2016 ES M8 x 30 A4 and N6x25 A4 + N6x30 A4 added
Rev. 2: 4.3.2017 ES M6x25, M8x25, M10x25 nd M12x25 added
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Annex: -

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MKT GmbH & Co. KG commissioned Ingenieurbüro Thiele GmbH to examine the usability of MKT-anchors in hollow core slabs (e.g. Cobiax)

For that purpose tension tests on various anchor types have been performed in thin concrete slabs.

The evaluation of these tests and a recommendation for the praxis is substance of the expert opinion 1008/15_21529 [1]. In this condensed version, the essential contents of the named expert opinion were summarized.

In this document the following products were considered.

- MKT Drop – in anchor ES M8 x 30
- MKT Drop – in anchor ES M10 x 30
- MKT Nail anchor N 6 x 25 (all types)
- MKT Nail anchor N 6 x 30 (all types)
- MKT Hollow Core Anchor EASY M8
- MKT Drop – in anchor ES M6x25, M8x25, M10x25 und M12x25

In the following table the residual tension capacities of the investigated anchors were given.

A residual flange thickness of 30 mm (25mm) is given for a 60 mm concrete flange between hollow core and surface of the concrete member [60 mm (55mm) – 10 mm position tolerance of the hollow core - 20 mm concrete breakout caused by the drilling of the borehole = 30 mm (25 mm) residual flange thickness].

Table 1: Summary of the results

anchor	approval/assessment	characteristic tension resistance for C20/25 to C50/60 [kN]	required residual flange thickness [mm]
ES M6x25	ETA 05/0116 [2]	3,50	25
ES M8x25	ETA 05/0116 [2]	4,00	25
ES M10x25, ES M12x25	ETA 05/0116 [2]	4,50	25
ES M8 x 30/ES M8x30 A4	ETA 05/0116 [2]	5,00	30
ES M10 x 30	ETA 05/0116 [2]	6,00	30
N / NA4 h_{ef}= 25 mm	ETA 11/0240 [3]	2,94	25
N / NA4 h_{ef}= 30 mm	ETA 11/0240 [3]	5,90	30
anchor	approval	tension resistance for C20/25 to C50/60 [kN]	required residual flange thickness [mm]
EASY M8	Z-21.1-1785 [4]	1,4	30

Diagonal loads and shear loads are to be excluded .

The maximum grain size of the concrete ceiling may not exceed 16 mm.

The transmission of the introduced loads into the hollow core ceiling is not the subject of this report.

Because of the locally poorer concrete situation below the hollow bodies and therefore possibly poorer concrete quality (voids, gravel nests, etc) special care is necessary during assembly. If

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the required concrete quality is not present in the region of the anchorage point, the fastening point must be discarded.

Special instructions:

ES M8 x 30 / ES M8 x 30 A4:

When installing the anchor it must be ensured that the anchor is located less than 3 mm below the concrete surface, otherwise uncontrolled slip can occur.

For ES M8 x 30 the residual flange thickness must be ≥ 30 mm.

All other details of the approval/assessment including the partial safety factors have to be considered.

ES M10 x 30

When installing the anchor must be ensured that the anchor is located less than 3 mm below the concrete surface, otherwise uncontrolled slip can occur.

For ES M10 x 30 the residual flange thickness must be ≥ 30 mm.

All other details of the approval/assessment including the partial safety factors have to be considered.

Nail anchor N / NA4 h_{ef} = 25 mm

A residual flange thickness of 25 mm is given for a 55 mm concrete flange between hollow core an surface of the concrete member [55 mm (nominal flange thickness – 10 mm position tolerance of the hollow core - 20 mm concrete breakout caused by the drilling of the borehole = 35 mm residual flange thickness].

If there are lower capacities in the assessment (e.g. hook type), these have to be used for design. All other details of the assessment including the partial safety factors have to be considered.

Nail anchor N / NA4 h_{ef} = 30 mm

If there are lower capacities in the assessment (e.g. hook type), these have to be used for design. All other details of the assessment including the partial safety factors have to be considered.

EASY M8

All other details of the approval have to be considered.

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ES M6x25, M8x25, M10x25 und M12x25:

When installing the anchor it must be ensured that the anchor is not located below the concrete surface, otherwise uncontrolled slip can occur.

For the drop in anchors the residual flange thickness must be ≥ 25 mm.

All other details of the approval/assessment including the partial safety factors have to be considered.

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Literature

[1] Gutachterliche Stellungnahme 1008/15 _21529 zur Zugtragfähigkeit von MKT Dübeln in Hohlkörperdecken vom 4.3.2017, Ingenieurbüro Thiele Pirmasens

[2] Europäisch Technische Zulassung ETA -05/0116, MKT Einschlaganker E/ES vom 4.1.2017

[3] Europäisch Technische Zulassung ETA -11/0240, MKT Nagelanker N vom 7. Mai 2015.

[4] Z – 21.1-1785, Allgemeine bauaufsichtliche Zulassung, MKT Easy zur Verankerung in Spannbeton- Hohldeckenplatten;18.8.2016.