Evaluation

Project **21725_2**

MKT drop in anchor E/ES
Fire resistance in non -cracked concrete
Condensed version

Employer **MKT**
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Auf dem Immel 2
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1 General

MKT GmbH & Co. KG has assigned the Ingenieurbüro Thiele to evaluate the fire resistance of the Drop-in Anchor E/ES. This evaluation is based on inspection reports of the MPA Braunschweig. The fire tests and evaluations described in the inspection reports were conducted with regard to DIN EN 1363-1:2012 [2] and referring to [1].

All fire resistances mentioned below consider solely a one-sided fire exposure. The assessment in this evaluation followed the TR 020 [1]. However, the premise for the application of the design concept following TR 020 is the use of an anchor which is suitable for cracked concrete. This premise is not fulfilled by the Drop-in Anchor E/ES. Depending on the design situation, the application of the design procedure following TR 020 must be verified and appraised.

2 Literature

[1] Evaluation of Anchorages in Concrete Concerning Resistance to fire, EOTA TR 020, Edition May 2004

[2] Feuerwiderstandsprüfungen – Teil 1: Allgemeine Anforderungen, DIN EN 1363-1; Edition Oktober 2012

[3] ETA-02/0020 from 1 June 2021, MKT Einschlaganker E/ES

[4] Gutachten 21725, Ingenieurbüro Thiele vom 20.6.2017

3 Product description

The product is described in [3].

4 Summary

The following tables show the decisive fire resistances $N_{Rk,fi}$ for a one-sided fire exposure for tension in non-cracked concrete. The listed fire resistances are valid for single anchors with an edge distance of more than c_{cr}=2 h_{ef} and a spacing to the adjacent anchor of s= 2 c_{cr}= 4 h_{ef}.

For edge distances that result in steel failure, the following fire resistances can also be transferred to anchor under shear loading.

Additionally the strength class of the treaded rods (or screws) must be at least the value given in the table headings.

The failure loads were capped with the calculated sleeve failure value.

Table 4-1: Fire resistance $N_{Rk,fi}$ for Drop-in Anchor E/ES with threaded rod and screw 4.6

thread	hef	fire resistance $N_{Rk,fi}$			
[mm]	[mm]	R30	R60	R90	R120
6	30	0,5	0,4	0,3	0,3
8	30	0,9	0,8	0,6	0,5
10	30	0,9	0,9	0,9	0,7
8	40	1,0	0,8	0,6	0,5
10	40	1,6	1,3	1,0	0,8
12	50	2,3	1,9	1,4	1,2
12	80	2,3	1,9	1,4	1,2
16	65	4,3	3,5	2,7	2,3
16	80	4,3	3,5	2,7	2,3
20	80	6,4	5,4	4,2	3,5

Table 4-2: Fire resistance $N_{Rk,fi}$ for Drop-in Anchor E/ES with threaded rod and screw 4.8

thread	hef	fire resistance $N_{Rk,fi}$			
[mm]	[mm]	R30	R60	R90	R120
6	30	0,4	0,3	0,3	0,3
8	30	0,9	0,9	0,6	0,5
10	30	0,9	0,9	0,9	0,7
8	40	1,1	0,9	0,6	0,5
10	40	1,8	1,5	1,1	0,9
12	50	2,8	2,2	1,6	1,3
12	80	2,8	2,2	1,6	1,3
16	65	4,7	4,1	3,0	2,4
16	80	5,3	4,1	3,0	2,4
20	80	6,4	6,4	4,6	3,7

Table 4-3: Fire resistance $N_{Rk,fi}$ for Drop-in Anchor E/ES with threaded rod and screw 5.6 and stainless steel A4 (70)

thread	hef	fire resistance $N_{Rk,fi}$			
[mm]	[mm]	R30	R60	R90	R120
6	30	0,9	0,7	0,4	0,3
8	30	0,9	0,9	0,8	0,5
10	30	0,9	0,9	0,9	0,7
8	40	1,8	1,3	0,8	0,5
10	40	1,8	1,8	1,2	0,8
12	50	3,2	3,1	1,8	1,2
12	80	4,3	3,1	1,8	1,2
16	65	4,7	4,7	3,3	2,2
16	80	6,4	5,7	3,3	2,2
20	80	6,4	6,4	5,2	3,4

Pirmasens, 12. August 2017

C. Thiele

Jun.-Prof. Dr.-Ing. Catherina Thiele