



Instytut Techniki Budowlanej

GROUP OF TESTING LABORATORIES
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accreditation certificate
N° AB 023



AB 023

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Building Structures, Geotechnics and Concrete Department

LZK Building Structures and Geotechnics Laboratory

TEST REPORT N° LZK01-02232/18/Z00NZK

This research report presents the results of research within the scope of accreditation and non-accredited results.

This report was issued in triplicate, two of which was received by the Client and one remained at the ITB.

Client: ITW Befestigungssysteme GmbH
Client address: 30966 Hemmingen, Carl-Zeiss Straße 19, Germany

INFORMATION ABOUT PRODUCT

Manufacturer: ITW Befestigungssysteme GmbH
30966 Hemmingen, Carl-Zeiss Straße 19, Germany

Name and address of factory: not specified

Product: Poder-actuated fastener for use in concrete

Technical specification EAD 330083-01-0601

Information about product, intended use, and the number of the applicable system of assessment and verification of constancy of performance Power-actuated fastener for multiple use in concrete for non-structural applications, system 2+

Unique identification code of the product-type: C6, HC6, CG6, HCG6, C9, CR9, CR9P, CR9TP

INFORMATION ABOUT TEST ITEM

Test item: name, description, condition, identification Poder-actuated fastener for use in concrete C6, HC6, CG6, HCG6, C9, CR9, CR9P, CR9TP
(Detailed information about the test object obtained from the point. no. 1 report)

Date of receipt /sampling: 28.08.2018

N° of receipt /sampling protocol: LZK00-02232/18/Z00NZK
Management procedure PZ ZLB 18 – samples delivered to the laboratory by the client (for details see the point no. 1 of this report)

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INFORMATION ABOUT TESTS

Test commencement date: 13.09.2018

Test completion date: 20.09.2018

TESTED CHARACTERISTIC

TEST METHOD

REMARKS

Characteristic load

EAD 330083-01-0601, test F3

Outside the scope of accreditation

Zinc plating

PB LOK-B52/2/11-2004

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1. The subject of laboratory tests

1.1. Specification of anchors

Specification of samples delivered to ITB LZK Lab (Katowice, Poland).

Table 1: Specification of samples and materials

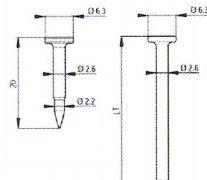
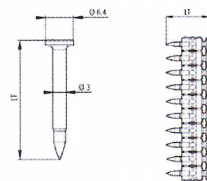
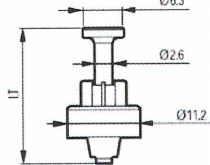
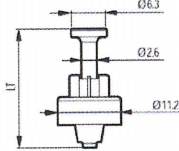
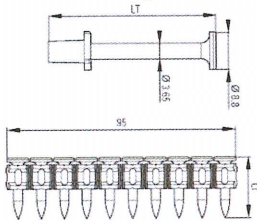
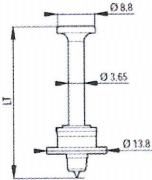
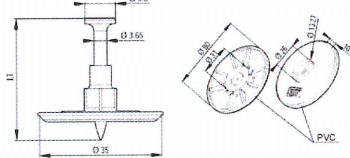
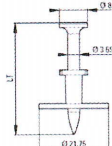
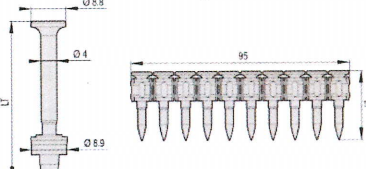
Item	Name	Date of receipt sampling
1	C6-20	28.08.2018 (x100 pieces)
2	C6-35	
3	C6-30	
4	C6-35	
5	HC6-15	
6	HC6-17	
7	HC6-22	
8	HC6-27	
9	CG6-25	
10	CG6-30	
11	HCG6-15	
12	HCG6-22	
13	C9-25C	
14	C9-35C	
15	C9-50C	
16	C9-60C	
17	CR9-25	
18	CR9-30	
19	CR9P-30	
20	CR9TP-35	
21	Tool P800E/P/P+	28.08.2018 (1 piece)
22	Tool P800E	
Anchor		Materials (manufacturer's declaration)
C6-20 C6-35 C6-30 C6-35		carbon steel o $R_m \geq 600$ MPa 
HC6-15 HC6-17 HC6-22 HC6-27		carbon steel o $R_m \geq 600$ MPa 

Table 2: Materials

Anchor	Materials (manufacturer's declaration)
CG6-25 CG6-30	carbon steel o $R_m \geq 600$ MPa 
HCG6-15 HCG6-22	carbon steel o $R_m \geq 600$ MPa 
C9-25C C9-35C C9-50C C9-60C	carbon steel o $R_m \geq 600$ MPa 
CR9-25 CR9-30	carbon steel o $R_m \geq 600$ MPa 
CR9P-30	carbon steel o $R_m \geq 600$ MPa 
CR9TP-35	carbon steel o $R_m \geq 600$ MPa 
SC9	carbon steel o $R_m \geq 600$ MPa 

1.2. Specification of base materials

The base material is presented in Table 3.

Table 3: Dimensions, compressive strengths and bulk densities of the materials

Material	Min. density / strength	Density / strength
Concrete C20/25	f_c [Mpa] ≥ 28 ¹⁾	ρ [kg/dm ³] $\geq 2,25$ ²⁾
Steel member S280GD	R_m [MPa] ≥ 360 ³⁾	$R_{m, test}$ [MPa] ≥ 420 ⁴⁾

¹⁾²⁾ on the basis of own research (card PB-106)
³⁾⁴⁾ on the basis of the manufacturer's declaration

2. Test results of the anchor

2.1. Tests results

The installation characteristics are given in the Table 4. The test results are given in the Table 5 + 6.

Table 4: Installation characteristics

Anchor	C6	HC6	CG6	HCG6	C9	CR9	CR9P	CR9TP	SC9
Tool	P800E/P/P+		P800E		P370				
Overall anchor embedment depth h_{ef} [mm]	15				25				

Table 5: Test results - characteristic load – acc. EAD 330083-01-0601, test F3

Anchor	Fixture	Base material	n	F_u [kN] ¹⁾	$F_{u,m}$ [kN] ²⁾	$F_{u5\%}$ [kN] ³⁾	s [kN] ⁴⁾	v [%] ⁵⁾	U [kN] ⁶⁾	$f_{c,test}$ [MPa] ⁷⁾	Failure
C6 / HC6	steel member 0,50 mm	concrete C20/25 crack $\Delta = 0,35$ mm	5	0,47 0,50 0,43 0,40 0,50	0,46	0,26	0,04	10	0,05	34,5	5 x pull-out
CG6 / HCG6			5	0,42 0,47 0,50 0,56 0,54	0,50	0,26	0,06	11	0,07	34,5	5 x pull-out
C9			5	0,72 0,67 0,77 0,60 0,90	0,73	0,30	0,11	15	0,14	34,5	5 x pull-out
CR9 / CR9TP			5	0,67 0,55 0,80 0,72 0,62	0,67	0,30	0,10	14	0,12	34,5	5 x pull-out
CR9P			5	0,60 0,51 0,60 0,61 0,72	0,61	0,30	0,08	12	0,11	34,5	5 x pull-out

¹⁾ F_u - ultimate load in a test [kN]

²⁾ $F_{u,m}$ - mean ultimate load in a test series [kN]

³⁾ $F_{u5\%}$ - 5%-fractile of the ultimate load in a test series [kN] acc. EAD 330083-01-0601

⁴⁾ s - standard deviation [kN]

⁵⁾ v - coefficient of variation [%]

⁶⁾ The uncertainty of the measurement is for a confidence level of 95 % and uncertainty factor $k=2,78$ ($n=5$ tests in series) acc. card LOK-ETAG001-2346-W (related to the accuracy of the devices used)

⁷⁾ $f_{c,test}$ - test compressive strength of concrete [MPa]

Table 6: Zinc plating

Anchor	Ultimate zinc plating			Mean zinc plating	Standard deviation s	Coefficient of variation v	Uncertainty of the measurement
	[μm]			[μm]	[μm]	[%]	[μm]
C6 / HC6 / CG6 / HCG6 / C9 / CR9 / CR9P / CR9T	6,38	6,60	6,67	6,47	0,34	5	0,67
	7,10	6,45	6,31				
	6,16	6,44	6,68				
	5,51	6,73	6,71				
	6,71	6,50	5,84				
	6,36	6,48	6,88				
	6,47	6,74	5,82				
	6,57	6,23	6,75				
	6,63	6,71	6,40				

The uncertainty of the measurement is for a confidence level of 95 % and uncertainty factor 2,00 ($n=27$ tests in series) acc. to card LOK-B52STAL (related to the accuracy of the devices used)

3. Results summary (outside of accreditation)

The results summary is given in the Table 7.

Table 7: Results summary

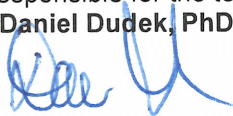
Tool	Anchor	Base material	Fixture	h_{ef} [mm] ¹⁾	h_{min} [mm] ²⁾	s_{min} [mm] ³⁾	c_{min} [mm] ⁴⁾	N_{Rk} [kN] ⁵⁾	V_{Rk} [kN] ⁶⁾
P800E/P/P+	C6-20 C6-35 C6-30 C6-35	Multiple use for non-structural applications concrete C20/25 + C50/60	Steel member S280GD gr. 0,50 + 1,00 mm	15	80	200	150	0,25	
	HC6-15 HC6-17 HC6-22 HC6-27			15	80	200	150	0,25	
P800	CG6-25 CG6-30		Steel member S280GD gr. 0,50 + 1,50 mm	15	80	200	150	0,25	
	HCG6-15 HCG6-22			15	80	200	150	0,25	
P370	C9-25C C9-35C C9-50C C9-60C		Steel member S280GD gr. 0,50 + 2,00 mm	25	80	200	150	0,30	
	CR9-25 CR9-30			25	80	200	150	0,30	
	CR9P-30			25	80	200	150	0,30	
	CR9TP-35			25	80	200	150	0,30	
	SC9-30 SC9-35 SC9-40 SC9-50 SC9-60 SC9-70			25	80	200	150	0,30	

¹⁾ h_{ef} - overall anchor embedment depth [mm]
²⁾ h_{min} - min. concrete thickness [mm]
³⁾ s_{min} - min. spacing [mm]
⁴⁾ c_{min} - min. edge distance [mm]
⁵⁾ N_{Rk} - tension characteristic resistance (5%-fractile of the ultimate load) [kN] for KOT
⁶⁾ V_{Rk} - shear characteristic resistance (5%-fractile of the ultimate load) [kN] for KOT

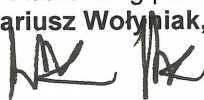
To calculate the design resistance, the following factor is assumed: pull-out/pull-through $\gamma_m = 2,52$ acc. to ETAG 001 part C and Eurocode 2

and shear $\gamma_m = 1,25$ acc. to ETAG 001, part C.

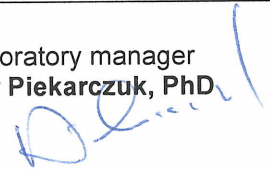
Responsible for the test
Daniel Dudek, PhD



Authorizing person
Mariusz Wołyński, MSc



Laboratory manager
Artur Piekarczyk, PhD



Katowice, Poland, 17.10.2018

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