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Członek EOTA

European Technical Approval ETA-13/0584

English language translation - the original version is in Polish language

Nazwa handlowa *Trade name*	**R-DCA, R-DCA-A4 i R-DCL Wedge Anchors** *R-DCA, R-DCA-A4 and R-DCL Wedge Anchors*
Właściciel aprobaty *Holder of approval*	**RAWLPLUG S.A** **ul. Kwidzyńska 6** **51-416 Wrocław** **Polska**
Rodzaj i przeznaczenie wyrobu *Generic type and use of construction products*	**Stalowe kotwy rozporowe o kontrolowanej deformacji, w rozmiarach M6, M8, M10, M12, M16 i M20, do wielopunktowych zamocowań niekonstrukcyjnych w betonie** *Steel deformation-controlled expansion anchors in sizes of M6, M8, M10, M12, M16 and M20 for multiple use for non-structural applications in concrete*
Termin ważności **od** *Valid from* **do** *to*	**27. 06. 2013** **19. 06. 2018**
Zakład produkcyjny *Manufacturing plant*	**Zakłady Produkcyjne nr 6 i 7** *Manufacturing Plants no. 6 and 7*
Niniejsza Europejska Aprobata Techniczna zawiera *This European Technical Approval contains*	**13 stron, w tym 5 Załączników** *13 pages including 5 Annexes*
Niniejsza Europejska Aprobata Techniczna zastępuje *This European Technical Approval replaces*	**ETA-13/0584 ważną od 19.06.2013 do 19.06.2018** *ETA-10/0584 with validity from 19.06.2013 to 19.06.2018*

I LEGAL BASES AND GENERAL CONDITIONS

1. This European Technical Approval is issued by Instytut Techniki Budowlanej in accordance with:

   - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], amended by the Council Directive 93/68/EEC of 22 July 1993[2];
   - ustawa z dnia 16 kwietnia 2004 r. o wyrobach budowlanych (law on construction products from 16th April 2004)[3];
   - rozporządzenie Ministra Infrastruktury z dnia 14 października 2004 r. w sprawie europejskich aprobat technicznych oraz polskich jednostek organizacyjnych upoważnionych do ich wydawania (regulation of Ministry of Infrastructure of 14th October 2004 on the European Technical Approvals and Polish bodies entitled to issue them)[4];
   - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC[5];
   - Guideline for European Technical Approval of *"Metal anchors for use in concrete – Part 6: Anchors for multiple use for non-structural applications*", ETAG 001-06.

2. Instytut Techniki Budowlanej is authorized to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.

3. This European Technical Approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European Technical Approval.

4. This European Technical Approval may be withdrawn by Instytut Techniki Budowlanej, in particular after information by the Commission according to Article 5 (1) of Council Directive 89/106/EEC.

5. Reproduction of this European Technical Approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Instytut Techniki Budowlanej. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European Technical Approval.

6. The European Technical Approval is issued by the approval body in its official language. This version corresponds to the version circulated within EOTA. Translations into other languages have to be designated as such.

[1] Official Journal of the European Communities № L 40, 11.02.1989, p. 12
[2] Official Journal of the European Communities № L 220, 30.08.1993, p. 1
[3] Official Journal of Polish Republic № 92/2004, pos. 881
[4] Official Journal of Polish Republic № 237/2004, pos. 2375
[5] Official Journal of the European Communities № L 17, 20.01.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the product and intended use

1.1 Definition of the product

The R-DCA, R-DCA-A4 and R-DCL Wedge Anchors are deformation-controlled expansion anchors in sizes of M6, M8, M10, M12, M16 and M20. The anchors R-DCA and R-DCL are made from galvanized steel and R-DCA-A4 are made from stainless steel (see Annex 1).

The anchor is installed in a drilled hole and anchored by deformation-controlled expansion. An illustration of the installed anchor is given in Annex 2.

The fixture shall be anchored with a fastening screw or threaded rod according to Annex 1.

1.2 Intended use

The R-DCA, R-DCA-A4 and R-DCL Wedge Anchors are intended to be used for anchorages for which requirements for safety in use in the sense of the Essential Requirement 4 of Council Directive 89/106/EEC shall be fulfilled and the failure of fixture would cause an immediate risk to human life.

The anchors are to be used only for multiple use for non-structural applications. The definition of multiple use according to the Member States is given in the informative Annex 1 of ETAG 001, Part 6.

The anchors may be used for anchorages with requirements related to resistance to fire.

The anchors are to be used only for anchorages subject to static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength classes C20/25 at minimum and C50/60 at most according to EN 206-1. The anchor may be anchored in cracked or non-cracked concrete.

The anchors R-DCA and R-DCL made of galvanized steel and R-DCA-A4 in size M6 made of stainless steel may only be used in structures subjected to dry internal conditions.

The anchors R-DCA-A4 in sizes M8, M10, M12, M16 and M20 made of stainless steel may be used in structures subject to dry internal conditions and also in structures subject to external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions if no particular aggressive conditions exist. Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

The provisions made in this European Technical Approval are based on an assumed working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

2 Characteristics of the product and methods of verification

2.1 Characteristics of the product

The anchors corresponds to the drawings and provisions given in Annexes 1 and 2. The characteristic of the material, dimensions and tolerances of the anchors not given in Annexes shall correspond to the respective values laid down in the technical documentation[6] of this European Technical Approval.

Regarding the requirements concerning safety in the case of fire it is assumed that the anchor meets the requirements of class A1 in relation to reaction to fire in accordance with the Commission decision 96/603/EC, amended by 2000/605/EC and 2003/424/EC.

Characteristic values for the design of the anchorages are given in Annex 4.

The characteristic values for the design of anchorages regarding resistance to fire are given in Annex 5. They are valid for use in a system that is required to provide a specific fire resistance class.

Each anchor is to be marked with identifying mark according to Annex 1.

The anchor shall only be packaged and supplied as a complete unit.

2.2 Methods of verification

The assessment of fitness of the anchors for the intended use in relation to the requirements for safety in use in the sense of the Essential Requirement 4 has been made in accordance with the ETAG 001 Guideline for European Technical Approval of *"Metal Anchors for Use in Concrete",* Part 1: *"Anchors in general"* and Part 6: *"Anchors for multiple use for non-structural applications"*.

The assessment of the anchor for the intended use in relation to the requirements for resistance to fire has been made in accordance with the Technical Report TR 020 "*Evaluation of anchorages in concrete concerning resistance to fire*".

In addition to the specific clauses relating to dangerous substances contained in this ETA, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

3 Evaluation and attestation of conformity and CE-marking

3.1 Attestation of conformity system

According to the Decision 97/161/EG of the European Commission[7] system 2 (ii) (referred to as system 2+) of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

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[6] The technical documentation of this European Technical Approval is deposited at Instytut Techniki Budowlanej and, as far as relevant for the tasks of the approved body involved in the attestation of conformity procedure, may be handed over only to the approved body involved.

[7] Official Journal of the European Communities L 67 of 03.02.1997

a) Tasks for the manufacturer:

(1) initial type-testing of the product,

(2) factory production control,

(3) further testing of samples taken at the factory in accordance with a prescribed test plan;

b) Tasks for the approved body:

(4) certification of factory production control on the basis of:

- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control.

3.2 Responsibilities

3.2.1 Tasks for the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures. This production control system shall insure that the product is in conformity with this European Technical Approval.

The manufacturer shall only use raw/constituent materials stated in the technical documentation of this European Technical Approval.

The factory production control shall be in accordance with the control plan[8] which is part of the technical documentation of this European Technical Approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at Instytut Techniki Budowlanej.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

3.2.1.2 Other tasks for manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of anchors in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in section 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European Technical Approval.

3.2.2 Tasks for approved body

The approved body shall perform the:

- initial inspection of factory and of factory production control,

[8] The control plan has been deposited at Instytut Techniki Budowlanej and may be handed over only to the approved body involved in the conformity attestation procedure.

– continuous surveillance, assessment and approval of factory production control,

in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the factory production control stating the conformity with the provision of this European Technical Approval.

In cases where the provisions of the European Technical Approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Instytut Techniki Budowlanej without delay.

3.3 CE-marking

The CE marking shall be affixed on each packaging of the anchors. The letters „CE" shall be accompanied by the following additional information:

– the name or identification mark of the producer and address of the producer (legal entity responsible for the manufacture),
– identification number of the approved certification body,
– the last two digits of the year in which the CE-marking was affixed,
– number of the EC certificate of the factory production control,
– number of the European Technical Approval,
– number of the guideline for European Technical Approval,
– use category (ETAG 001-06),
– anchor size.

4 Assumptions under which the fitness of the product for the intended use was favorably assessed

4.1 Manufacturing

The European Technical Approval is issued for the product on the basis of agreed data/information, deposited in Instytut Techniki Budowlanej, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to the Instytut Techniki Budowlanej before the changes are introduced. Instytut Techniki Budowlanej will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

4.2 Design of anchorages

The fitness of the anchor for the intended use is given under the following conditions:

– the anchorages are designed in accordance with ETAG 001 "*Guideline for European Technical Approval of Metal Anchors for Use in Concrete*", Annex C, Method C, under the responsibility of an engineer experienced in anchorages and concrete work,

- the anchor is to be used only for multiple use for non-structural applications, the definition of multiple use according to the Member States is given in the informative Annex 1 of ETAG 001, Part 6.
- verifiable calculation notes and drawings are prepared taking account of the loads to be anchored,
- the position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports),
- the minimum strength class and the minimum screwing depth of the fastening screw or threaded rod for installation of the fixture shall meet the requirements according to Annex 1, taking into account installation parameters according to Annex 2.

The design of anchorages under fire exposure has to consider the conditions given in the Technical Report TR 020 "*Evaluation of anchorages in concrete concerning resistance to fire"*. The relevant characteristic anchor values are given in Annex 5. The design method covers anchors with a fire attack from one side only. If the fire attack is from more than one side, the design method may be taken only, if the edge distance of the anchor is $c \geq 300$ mm.

4.3 Installation of anchors

The fitness for use of the anchor can only be assumed if the anchor is installed as follows:

- anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site,
- use of the anchor only as supplied by the manufacturer,
- anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools,
- check before placing the anchor to ensure that the strength class of the concrete, in which the anchor is to be placed, is identical with the values which the characteristic loads apply,
- check of concrete being well compacted, e.g. without significant voids,
- edge distances and spacings not less than the specified values without minus tolerances,
- positioning of the drill holes without damaging the reinforcement,
- cleaning of the hole of drilling dust,
- in case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of load application,
- anchor installation such that the effective anchorage depth is complied with; the compliance is ensured if the anchor is completely set into the drill hole,
- anchor expansion by impact on the cone (expansion pin) of the anchor; the anchor is properly set if the stop of the setting tool reaches the expansion sleeve,
- the fastening screws or threaded rods shall correspond to the requirements given in Annex 1,
- installation torque moments are not required for functioning of the anchor; however the torque moments given in Annex 2 must not be exceeded.

5 Responsibility of the manufacturer

The manufacturer is responsible to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to 4.2 and 4.3 is given to those who are concerned. This information may be made by reproduction of the respective parts of the European Technical Approval. In addition all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

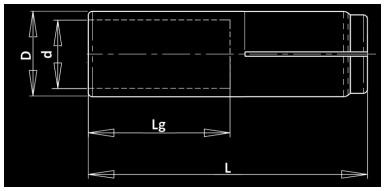
The minimum data required are:

- drill bit diameter,
- thread diameter,
- effective anchorage depth,
- available thread length and minimum screwing depth of the fastening screw or threaded rod,
- material and required strength class of the fastening screw of threaded rod according to Annex 1,
- minimum hole depth,
- information on the installation procedure, preferably by means of an illustration,
- reference to any special installation equipment needed,
- identification of the manufacturing batch.

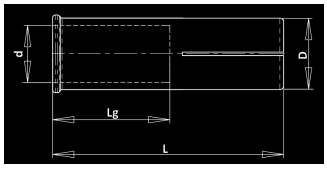
All data shall be presented in a clear and explicit form.

On behalf of Instytut Techniki Budowlanej

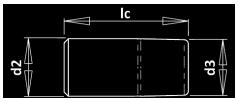
Jan Bobrowicz
Director of ITB



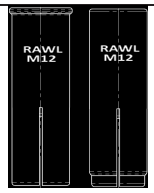
R-DCA and R-DCA-A4 sleeve



R-DCL sleeve



expansion plug



Marking:

Identifying mark – **RAWL**
Size: Mxx (A4)
xx – thread size
A4 – for stainless steel

Table 1. Anchors R-DCA and R-DCL material and dimensions

R-DCA / R-DCL		**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Anchor length L	**[mm]**	25	30	40	50	65	80
Inner diameter d	**[mm]**	6	8	10	12	16	20
External diameter D	**[mm]**	8	10	12	15	20	25
Thread length Lg	**[mm]**	11	13	15	20	25	35
Anchor material	Steel in accordance with ASTM A510, SAE 1008 or SAE 1010; thickness of galvanizing > 5 μm. $f_{uk} \geq 450$ N/mm^2 and $f_{yk} \geq 360$ N/mm^2						
Fastening screw or threaded rod material	Steel, property class ≥ 4.8 according to EN-ISO 898-1; thickness of galvanizing > 5 μm.						

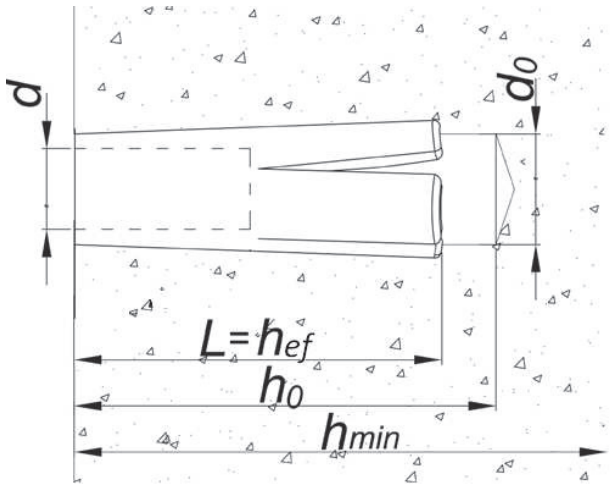
Table 2. Anchor R-DCA-A4 material and dimensions

R-DCA A4		**M6**	**M8**	**M10**	**M12**	**M16**
Anchor length L	**[mm]**	25	30	40	50	65
Inner diameter d	**[mm]**	6	8	10	12	16
External diameter D	**[mm]**	8	10	12	15	20
Thread length Lg	**[mm]**	11	13	15	20	25
Anchor material	Stainless steel 1.4401 according to EN 10088 (AISI 316) $f_{uk} \geq 500$ N/mm^2 and $f_{yk} \geq 210$ N/mm^2					
Fastening screw or threaded rod material	Stainless steel 1.4401 in accordance with EN 10088, property class ≥ 70 according to EN ISO 3506.					

Table 3. Expansion plug materials and dimensions

Expansion plug		**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Rear diameter d_2	**[mm]**	5,0	6,4	8,0	10,3	13,5	16,8
Front diameter d_3	**[mm]**	4,3	5,1	6,8	7,8	13,0	15,2
Length l_c	**[mm]**	9,8	11,4	16,0	20,8	29,2	30,0
Plug material	Steel in accordance with JISG3505, SWRM8K or SWRM10K; thickness of galvanizing > 5 μm or stainless steel 1.4401 according to EN 10088 (AISI 316).						

R-DCA, R-DCA-A4 and R-DCL Wedge Anchors	**Annex 1** of European Technical Approval ETA-13/0584
Products and materials	



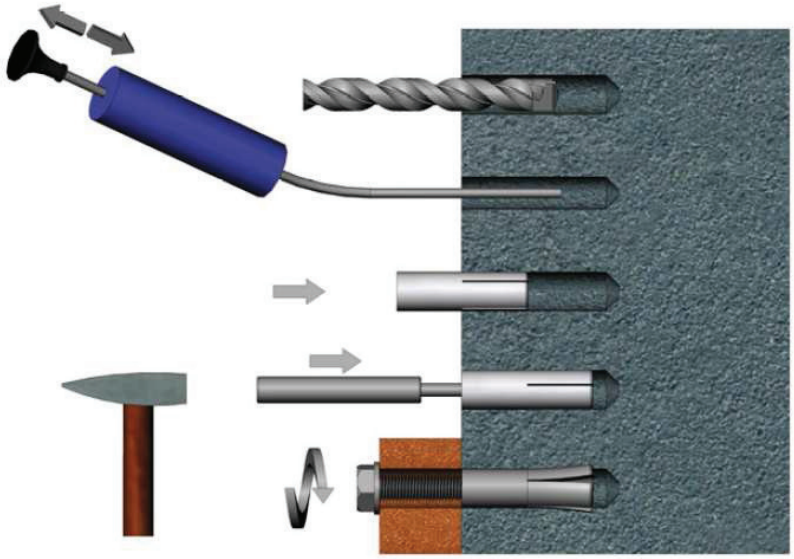
The anchors for multiple use for non-structural applications according to ETAG 001, part 6, Annex 1.

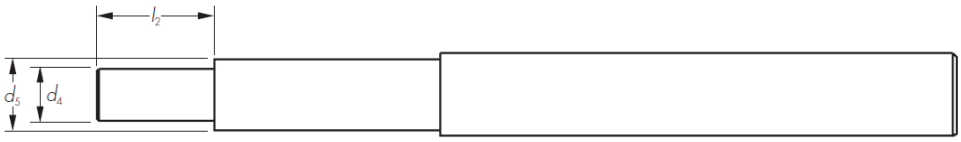
Installation in cracked or non-cracked concrete C20/25 to C50/60.

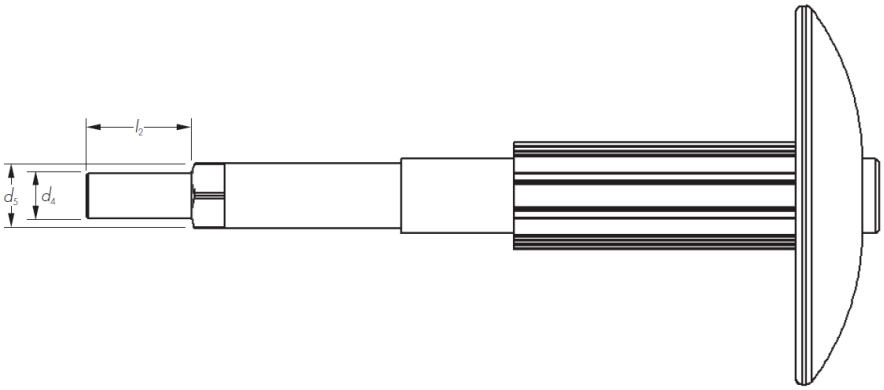
Table 4. Installation parameters

Anchor size	Effective anchorage depth	Drill hole depth	Drill hole diameter	Installation torque (max)	Thickness of concrete member (min)	Screwing depth (min)	Screwing depth (max)	Diameter of clearance hole in the fixture
	[mm]	[mm]	[mm]	[Nm]	[mm]	[mm]	[mm]	[mm]
	h_{ef}	h_1	d_0	max T_{inst}	h_{min}	$l_{s,min}$	$l_{s,max}$	d_f
M6	25	30	8	4,5	80	6	11	7
M8	30	32	10	11	80	8	13	9
M10	40	42	12	22	80	10	15	12
M12	50	53	15	38	100	12	20	14
M16	65	70	20	98	130	16	25	18
M20	80	85	25	130	160	20	35	22

R-DCA, R-DCA-A4 and R-DCL Wedge Anchors	**Annex 2** of European Technical Approval ETA-13/0584
Installation parameters and intended use	







Installation tools		M6	M8	M10	M12	M16	M20
Diameter d_4	[mm]	5,0	6,6	8,3	10,2	13,5	16,8
Diameter d_5	[mm]	7,5	9,5	11,5	14,5	19,5	24,5
Length l_2	[mm]	14,8	18	23	28	33	47

R-DCA, R-DCA-A4 and R-DCL Wedge Anchors

Installation instruction. Tools for installation

Annex 3

of European Technical Approval ETA-13/0584

Table 5: Design method C: Characteristic resistance - R-DCA and R-DCL

R-DCA and R-DCL			Property class	M6	M8	M10	M12	M16	M20
All load directions (fastening screw or threaded rod property class ≥ 4.8)									
Characteristic resistance in cracked and non-cracked concrete C20/25 to C50/60	F_{Rk}	[kN]	≥ 4.8	**1,52**	**3,01**	**4,57**	**6,43**	**13,31**	**17,38**
Partial safety factor (installation safety factor γ_2 = 1,4 included)	γ_M [1]	[-]	-	**2,1**					
Spacing	s_{cr}	[mm]		**200**				**260**	**320**
Edge distance	c_{cr}	[mm]		**150**				**195**	**240**
Shear load with lever arm									
Characteristic resistance	$M^0_{Rk,S}$ [2]	[Nm]	4.8	**6**	**15**	**30**	**52**	**133**	**260**
Characteristic resistance	$M^0_{Rk,S}$ [2]	[Nm]	5.8	**8**	**19**	**37**	**66**	**167**	**325**
Characteristic resistance	$M^0_{Rk,S}$ [2]	[Nm]	6.8	**9**	**23**	**45**	**79**	**200**	**390**
Characteristic resistance	$M^0_{Rk,S}$ [2]	[Nm]	8.8	**12**	**30**	**60**	**105**	**267**	**520**
Partial safety factor	γ_{Ms} [1]	[-]	-	**1,25**					

[1] in the absence of other national regulations
[2] characteristic bending moment $M^0_{Rk,S}$ for the equation (5.5) in ETAG 001, Annex C

Table 6: Design method C: Characteristic resistance - R-DCA-A4

R-DCA-A4			Property class	M6	M8	M10	M12	M16
All load directions (fastening screw or threaded rod property class A4-70)								
Characteristic resistance in cracked and non-cracked concrete C20/25 to C50/60	F_{Rk}	[kN]	A4-70	**1,00**	**2,01**	**3,20**	**4,59**	**8,27**
Partial safety factor (installation safety factor γ_2 = 1,4 included)	γ_M [1]	[-]	-	**2,1**				
Spacing	s_{cr}	[mm]		**200**				**260**
Edge distance	c_{cr}	[mm]		**150**				**195**
Shear load with lever arm								
Characteristic resistance	$M^0_{Rk,S}$ [2]	[Nm]	A4-70	**11**	**26**	**52**	**92**	**233**
Partial safety factor	γ_{Ms} [1]	[-]	-	**1,25**				

[1] in the absence of other national regulations
[2] characteristic bending moment $M^0_{Rk,S}$ for the equation (5.5) in ETAG 001, Annex C

The anchors are to be used only for multiple use for non-structural applications; the definition of multiple use according to the Member States is given in the informative Annex 1 of ETAG 001, Part 6.

R-DCA, R-DCA-A4 and R-DCL Wedge Anchors	**Annex 4** of European Technical Approval ETA-13/0584
Design method C – Characteristic resistance	

Table 7: Characteristic resistance under fire exposure in concrete C20/25 to C50/60

Fire resistance class	**R-DCA and R-DCL**		**M8**	**M10**	**M12**	**M16**	**M20**
All load directions (fastening screw or threaded rod property class 4.8)							
R30	Characteristic resistance $F_{Rk,fi}$[1]	[kN]	**0,4**	**0,9**	**1,6**	**3,1**	**4,3**
R60		[kN]	**0,3**	**0,8**	**1,3**	**2,4**	**3,7**
R90		[kN]	**0,3**	**0,6**	**1,1**	**2,0**	**3,2**
R120		[kN]	**0,2**	**0,5**	**0,8**	**1,6**	**2,5**
Spacing	$s_{cr,fi}$	[mm]	**4 x h_{ef}**				
Edge distance	$c_{cr,fi}$	[mm]	**2 x h_{ef}**				
In case of fire attack from more than one side, the edge distance shall be ≥ 300 mm.							

[1] in the absence of other national regulations a partial safety factor $\gamma_{m,fi}$ = 1,0 is recommended

Table 8: Characteristic resistance under fire exposure in concrete C20/25 to C50/60

Fire resistance class	**R-DCA-A4**		**M8**	**M10**	**M12**	**M16**
All load directions (fastening screw or threaded rod property class A4-70)						
R30	Characteristic resistance $F_{Rk,fi}$[1]	[kN]	**0,5**	**0,8**	**1,1**	**2,1**
R60		[kN]	**0,5**	**0,8**	**1,1**	**2,1**
R90		[kN]	**0,5**	**0,8**	**1,1**	**2,1**
R120		[kN]	**0,4**	**0,6**	**0,9**	**1,6**
Spacing	$s_{cr,fi}$	[mm]	**4 x h_{ef}**			
Edge distance	$c_{cr,fi}$	[mm]	**2 x h_{ef}**			
In case of fire attack from more than one side, the edge distance shall be ≥ 300 mm.						

[1] in the absence of other national regulations a partial safety factor $\gamma_{m,fi}$ = 1,0 is recommended

R-DCA, R-DCA-A4 and R-DCL Wedge Anchors	**Annex 5** of European Technical Approval ETA-13/0584
Characteristic resistance under fire exposure	