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Authorised and notified according to Article 10 of the 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.

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Designated by Government to issue European Technical Approvals

Member of EOTA

European Technical Approval ETA-08/0339

Trade name:	Rawl R-XPT Anchor
Holder of approval:	Rawlplug Limited Skibo Drive Thornliebank Industrial Estate Glasgow G46 8JR United Kingdom Tel: + 44 (0)141-638 7961 Fax: + 44 (0)141-638 7397
Generic type and use of construction product:	Zinc-plated torque-controlled expansion anchor in sizes of M8, M10, M12, M16 and M20 for use in non-cracked concrete
Valid from: to:	18th December 2008 31st December 2013
Manufacturing plant:	Rawlplug Limited Skibo Drive Thornliebank Industrial Estate Glasgow G46 8JR United Kingdom Manufacturing Plant No 2
This European Technical Approval contains:	12 pages including three Annexes which form an integral part of the document

I LEGAL BASES AND GENERAL CONDITIONS

1 This European Technical Approval is issued by the British Board of Agrément in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 [Construction Products Directive (CPD)] on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], modified by the Council Directive 93/68/EEC of 22 July 1993[2].
- UK implementation of CPD Statutory Instruments 1991, No 1620. The Building and Building Construction Products Regulations 1991 — made 15 July 1991, laid before Parliament 22 July 1991, coming into force 27 December 1991, and amended by the Construction Products (Amendment) Regulations 1994 (Statutory Instruments 1994, No 3051).
- Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex to Commission Decision 94/23/EC[3].
- Guideline for European Technical Approval of *Metal Anchors for Use in Concrete* ETAG 001, Edition 1997, Part 1 *Anchors in general* and Part 2 *Torque-controlled expansion anchors*.

2 The British Board of Agrément is authorised 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 the British Board of Agrément, in particular after information by the Commission on the basis of 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 the British Board of Agrément. 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 should correspond to the version circulated within EOTA. Translations into other languages have to be designated as such.

(1) Official Journal of the European Communities No L40, 11.2.1989, p12.
(2) Official Journal of the European Communities No L220, 30.8.1993, p1.
(3) Official Journal of the European Communities No L17, 20.1.1994, p34.

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

The Rawl R-XPT Anchors are through-fixing torque-controlled expansion anchors in sizes of M8, M10, M12, M16 and M20 (see Annex 1, Figure 1). Each type comprises a nut, bolt, washer and expansion sleeve. The anchors are made from zinc-plated and passivated steel (see Annex 1, Table 1).

The anchor is installed in a drilled hole – tightening the nut draws the cone into the sleeve. The expansion of this sleeve applies the anchorage (see Annex 2, Figure 1 and Table 1).

The product is intended for use in making structural fixings to normal-weight concrete where Essential Requirements 1 and 4 *Mechanical resistance and stability* and *Safety in use*, respectively (CPD, Annex 1), apply.

The product is for use only in structures of reinforced or unreinforced, non-cracked concrete with a strength class in the range of C 20/25 to C 50/60 (in accordance with ENV 206 : 1990 *Concrete. Performance, production, placing and compliance criteria)* in dry, internal conditions, and for anchorages subject to static or quasi-static loading.

The provisions made in this ETA are based on an assumed intended working life for 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 used as a means for selecting the appropriate product in relation to the expected economically reasonable working life of the works.

2 Characteristics of product and methods of verification

The product is available in the range given in part II, section 1, and has the characteristics listed in Annex 3, Tables 1 to 4.

Each anchor is marked with the anchor type, size and thread diameter.

The assessment of fitness for the intended use (see part II, section 1, third and fourth paragraphs) has been made in accordance with EOTA ETAG 001 : 1997, Part 1 *Anchors in general* and Part 2 *Torque-controlled expansion anchors*.

The characteristics of the product given in Annex 3, Tables 3 and 4 in have been derived from ETAG 001 : 1997, Annex B, Option 7, and should be used for designs in accordance with the same ETAG, Annex C, Method A.

The anchors shall only be packaged and supplied as complete units.

3 Evaluation of Conformity and CE marking

3.1 Attestation of Conformity system

The system of attestation of conformity applied to this product shall be that laid down in the CPD, Annex III, 2(i) (referred to as System 1).

3.2 Responsibilities

3.2.1 Tasks for the manufacturer, Factory production control

The manufacturer continues to operate a factory production control system. All elements, requirements and provisions adopted by the manufacturer are documented. This ensures the product conforms with this ETA.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the prescribed test plan[4]. The raw materials shall be subject to controls and tests by the manufacturer before acceptance. Checks on incoming materials shall include control of the Certificates of Conformity presented by suppliers (comparison with nominal values) by verifying dimensions and determining material properties, eg chemical composition and mechanical properties.

The manufactured components of the anchor are checked for:

all components
dimensions (eg diameter, length, thickness)
thickness of zinc coating
material properties (eg hardness, yield and ultimate tensile strengths)

anchor body
thread
surface finish

expansion sleeve
surface finish

assembled anchor
assembly (visual)
completeness.

The frequency of controls and tests conducted during production and on the assembled anchor is laid down in the prescribed test plan, taking account of the manufacturing process of the anchor.

The results of factory production control are recorded and evaluated. The records include at least:

- designation of the product, basic material and components
- type of control or testing
- date of manufacture of the product and date of testing of the product or basic material and components
- result of control and testing and, if appropriate, comparison with requirements
- signature of person responsible for factory production control.

The records shall be presented to the inspection body involved in the continuous surveillance.

(4) The prescribed test plan is deposited with the British Board of Agrément and is made available to the approved bodies involved in the conformity attestation process.

Details of the extent, nature and frequency of testing and controls to be performed within the factory production control shall correspond to the prescribed test plan included in the technical documentation of this European Technical Approval.

3.2.2 Tasks for approved bodies

3.2.2.1 Initial type-testing of the product

For initial type-testing the results of the tests performed as part of the assessment for the European Technical Approval shall be used unless there are changes in the production line or plant. In such cases the necessary type-testing has to be agreed between the British Board of Agrément and the approved body involved.

3.2.2.2 Initial inspection of factory and of factory production control

The approved body shall ascertain that, in accordance with the prescribed test plan, the factory, in particular the staff and equipment, and the factory production control, are suitable to ensure a continuous and orderly manufacturing of the anchor with the specifications given in part II, section 2.

3.2.2.3 Continuous surveillance

The approved body shall visit the factory at least twice per year for routine inspections. It shall be verified that the system of factory production control and the specified manufacturing processes are maintained, taking account of the prescribed test plan.

The results of product certification and continuous surveillance shall be made available on demand by the certification body to the British Board of Agrément. Where the provisions of the European Technical Approval and the prescribed test plan are no longer fulfilled, the Certificate of Conformity shall be withdrawn by the certification body.

3.3 CE marking

The CE marking shall be affixed to each package of anchors. The CE symbol shall be accompanied by the following information:

- identification number of the certification body
- identification of the product
- name or identification mark of producer and manufacturing plant
- the last two digits of the year in which the CE marking was affixed
- number of the European Technical Approval
- number of the EC Certificate of Conformity
- use category (ETAG 001, Option 7).

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

4.1 Manufacturing

The anchor is manufactured in accordance with the provisions of the European Technical Approval using the manufacturing processes as identified in the inspection of the plant by the British Board of Agrément and the approved body and laid down in the technical documentation.

4.2 Installation

4.2.1 Design of anchorages

An anchor is deemed fit for its intended use provided:

- anchorages are designed in accordance with ETAG 001 : 1997, Annex C, Design method A, for torque-controlled expansion anchors, under the responsibility of an engineer experienced in anchorages and concrete structures
- verifiable calculation, notes and drawings are prepared taking account of the loads to be resisted
- it is positioned in accordance with the design drawings (eg it is correctly positioned relative to reinforcement or supports, etc)
- it is installed correctly (see Annex 2, Figure 1 and Table 1).

4.2.2 Installation of anchors

The fitness for use of the anchorage can be assumed if the anchor is installed correctly in accordance with the following requirements:

- installation is carried out by personnel under the direction of supervisors, all of whom are appropriately qualified for this work
- the anchor used is that supplied by the manufacturer (ie components shall not be exchanged)
- installation is in accordance with the manufacturer's specifications and drawings prepared for that purpose, and the appropriate tools are used
- before placing the anchor, checks are made to ensure that the strength class of the concrete is in the range given, and is not lower than that of the concrete to which the characteristic loads apply
- checks are made to ensure the concrete has been well compacted, eg significant voids are not present
- the hole is cleared of drilling dust
- the effective anchorage depth is achieved (ie the approximate embedment mark on the anchor is below the concrete surface)
- the edge distance and spacing are within the specified values, without minus tolerances
- the drill holes are positioned without damaging the reinforcement
- if a hole is aborted, the new hole is located a minimum distance away of twice the depth of the aborted hole or, if the aborted drill hole is filled with high-strength mortar and if shear or oblique tension loads are not in the direction of load application, a smaller distance may be used
- the specified torque moment is applied using a calibrated torque wrench.

4.2.3 Responsibility of the manufacturer

It is the responsibility of the manufacturer to ensure that the information on the specific conditions given in part II, sections 1, 2, 4.2.1 and 4.2.2, is given to those concerned. This information may be made by replicating 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 information(5) required is:

- drill bit diameter
- thread diameter
- maximum thickness of the fixture
- minimum effective anchorage depth
- minimum hole depth
- torque moment
- information on the installation procedure, including cleaning of the hole, preferably by illustration
- reference to any special installation equipment needed
- identification of the manufacturing batch.

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

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

On behalf of the British Board of Agrément

Date: 18 December 2008

Brian Chamberlain
Head of Approvals— Engineering

Greg Cooper
Chief Executive

ANNEX 1 PRODUCT DETAILS

Figure 1 Typical Rawl R-XPT Throughbolt

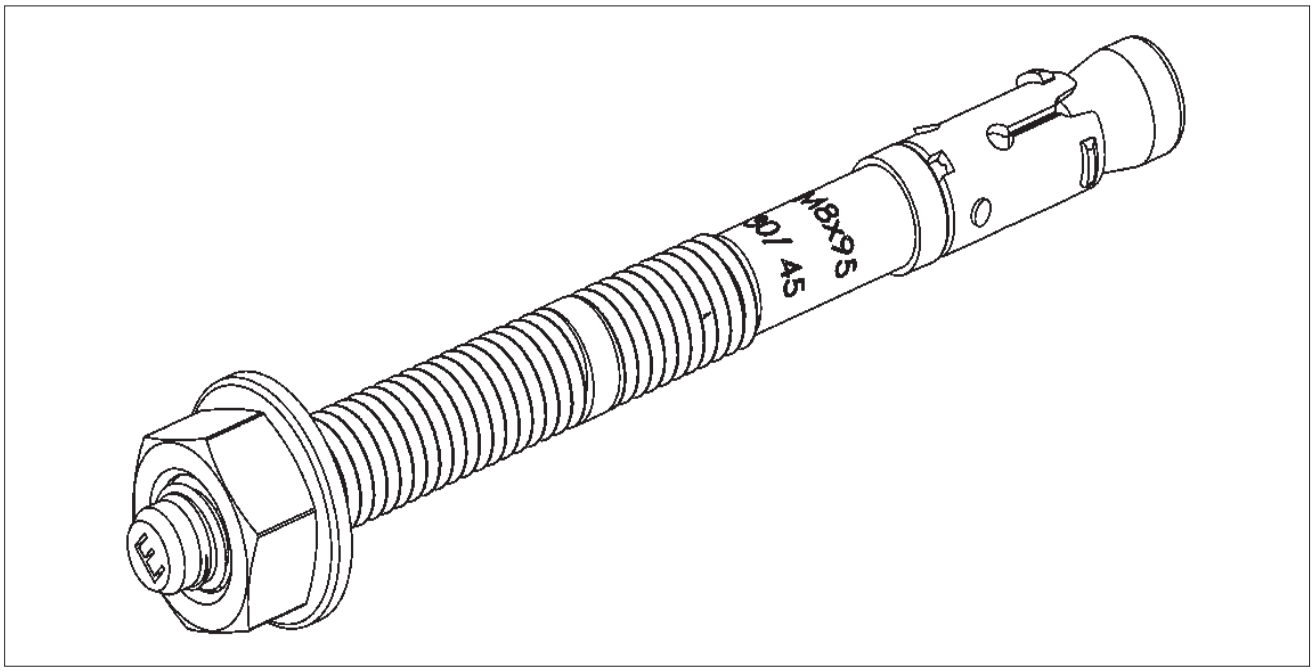

Table 1 Materials

Part	Raw material	Characteristic	Coating
Anchor body	BS 3111-1 : 1987 Grade 0/3		EN 12329, Fe/Zn 5/A/Cr3 Electroplated ⩾ 5µm and clear chromate film Cr3
	M8–M16 Condition B	Ultimate tensile strength: 430 – 480 Nmm^{-2}	
	M20 Condition C	Ultimate tensile strength: 480 – 530 Nmm^{-2}	
	OR		
	EN10263-2: 2001 Grade C17C		
	M8–M16 +U+C+AC+LC	Ultimate tensile strength: 430 – 480 Nmm^{-2}	
	M20 +AC+C	Ultimate tensile strength: 480 – 530 Nmm^{-2}	
Expansion sleeve	BS EN 10139 DC03		
	M8–M12 C590	Hardness: 185 – 215 HV	
	M16–M20 C490	Hardness: 155 – 185 HV	
Nut	Hexagonal nuts	BS 3692 or DIN 934	
Washer	Flat washers	BS 4320 or DIN 125	

ANNEX 2 INSTALLATION DETAILS

Figure 2 Typical installation

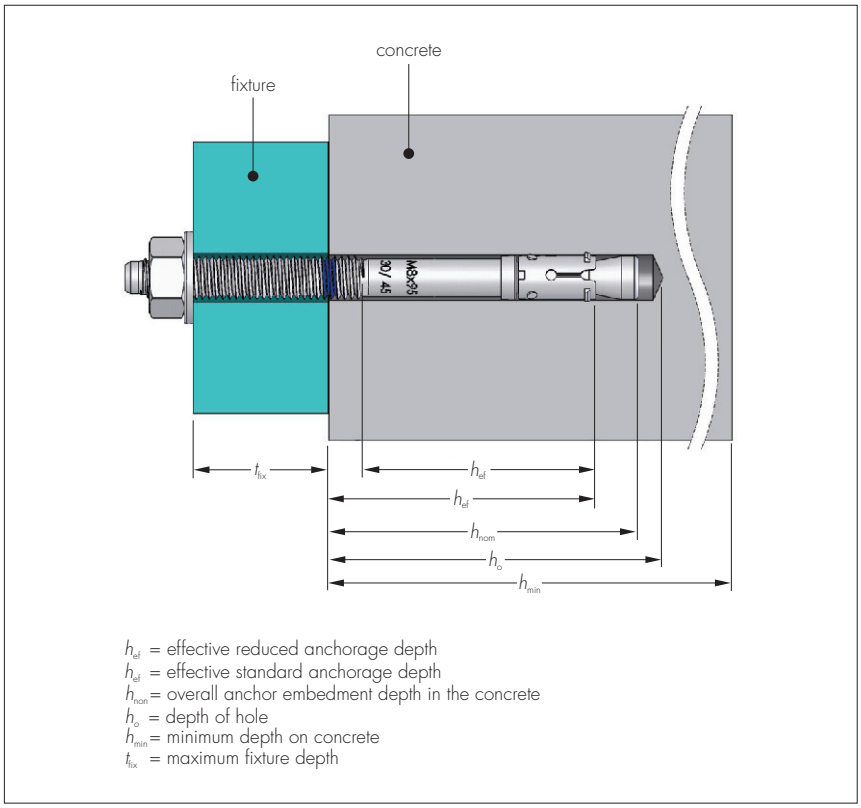

Table 2 Minimum installation dimensions

	Standard embedment				Reduced embedment			
Size	Effective anchorage depth h_{ef} (mm)	Minimum allowable spacing s_{min} (mm)	Minimum allowable edge distance c_{min} (mm)	Thickness of concrete member h_{min} (mm)	Effective anchorage depth h_{ef} (mm)	Minimum allowable spacing s_{min} (mm)	Minimum allowable edge distance c_{min} (mm)	Thickness of concrete member h_{min} (mm)
M8	47	50	55	100	32	45	50	100
M10	49	55	65	100	39	55	65	100
M12	68	75	90	136	48	100	100	100
M16	85	90	105	170	65	100	100	130
M20	99	140	160	198	79	125	125	158

ANNEX 2 INSTALLATION DETAILS (continued)

Table 1 Installation details

Thread size/ hole diameter in concrete	Bolt length	Head marking	Bolt marking	Hole diameter in fixture	Standard embedment			Reduced embedment			Recommended torque	Product code (zinc plated)
					min hole depth	effective embedment depth	max fixture thickness	min hole depth	effective embedment depth	max fixture thickness		
$(d)/(d_0)$ (mm)	(l) (mm)			(d_f) (mm)	(h_{nom}) (mm)	(h_{ef}) (mm)	(t_{fix}) (mm)	(h_{nom}) (mm)	(h_{ef}) (mm)	(t_{fix}) (mm)	(T_{inst}) (Nm)	
M8/8	60	B	M8 x 60/10	9	—	—	—	40	32	10	15	XPT-08060/10
	75	C	M8 x 75 10/25		55	47	10	40	32	25		XPT-08075/10
	95	E	M8 x 95 30/45		55	47	30	40	32	45		XPT-08095/30
	115	G	M8 x 115 50/65		55	47	50	40	32	65		XPT-08115/50
	140	K	M8 x 140 75/90		55	47	75	40	32	90		XPT-08140/75
M10/10	65	B	M10 x 65/5	11	—	—	—	49	39	5	30	XPT-10065/5
	80	D	M10 x 80 10/20		59	49	10	49	39	20		XPT-10080/10
	95	E	M10 x 95 25/35		59	49	25	49	39	35		XPT-10095/25
	115	G	M10 x 115 45/55		59	49	45	49	39	55		XPT-10115/45
	140	K	M10 x 140 70/80		59	49	70	49	39	80		XPT-10140/70
M12/12	80	D	M12 x 80/5	13	—	—	—	60	48	5	50	XPT-12080/5
	100	F	M12 x 100 5/25		80	68	5	60	48	25		XPT-12100/5
	125	H	M12 x 125 30/50		80	68	30	60	48	50		XPT-12125/30
	150	L	M12 x 150 55/75		80	68	55	60	48	75		XPT-12150/55
	180	P	M12 x 180 85/105		80	68	85	60	48	105		XPT-12180/85
M16/16	100	F	M16 x 100/5	18	—	—	—	80	65	5	100	XPT-16100/5
	125	H	M16 x 125 5/25		100	85	5	80	65	25		XPT-16125/5
	150	L	M16 x 150 30/50		100	85	30	80	65	50		XPT-16150/30
	180	P	M16 x 180 60/80		100	85	60	80	65	80		XPT-16180/60
M20/20	125	H	M20 x 125/5	22	—	—	—	99	79	5	200	XPT-20125/5
	160	O	M20 x 160 20/40		119	99	20	99	79	40		XPT-20160/20

ANNEX 3 CHARACTERISTICS

Table 1 Characteristic resistances under tension loads without the influence of spacing or edge distances

	M8		M10		M12		M16		M20	
	Reduced[1]	Standard	Reduced[1]	Standard	Reduced	Standard	Reduced	Standard	Reduced	Standard
Steel failure										
Characteristic resistance in non-cracked concrete $N_{Rk,s}$ (kN)	15.8		25.2		37.3		66.1		101.0	
Design resistance in non-cracked concrete N_{Rd} (kN)	11.3		18.0		26.6		47.2		72.1	
Partial safety factor γ_{Ms}	1.4		1.4		1.4		1.4		1.4	
Pull-out failure										
Characteristic resistance in non-cracked concrete $N_{Rk,p}$ (C20/25) (kN)	9.0	12.0	9.0	12.0	16.0	25.0	30.0	40.0	35.0	40.0
Design resistance in non-cracked concrete N_{Rd} (C20/25) (kN)	5.0	6.7	5.0	6.7	8.9	13.9	16.7	22.2	19.4	22.2
Increasing factor for $N_{Rk,p}$ in non-cracked concrete Ψc										
(C30/37)	1.25	1.10	1.36	1.37	1.20	1.16	1.12	1.17	1.18	1.30
(C40/50)	1.50	1.21	1.72	1.74	1.40	1.33	1.23	1.34	1.36	1.59
(C50/60)	1.76	1.32	2.08	2.10	1.60	1.49	1.34	1.50	1.54	1.89
Partial safety factor γ_{Mp}	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]
Concrete cone failure										
Effective anchorage depth h_{ef} (mm)	32	47	39	49	48	68	65	85	79	99
Spacing $S_{cr,N}$ (mm)	96	141	117	147	144	204	195	255	237	297
Edge distance $C_{cr,N}$ (mm)	48	71	59	74	72	102	98	128	119	149
Partial safety factor γ_{Mc}	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]
Splitting failure										
Spacing $S_{cr,sp}$ (mm)	160	240	200	260	250	370	360	430	410	530
Edge distance $C_{cr,sp}$ (mm)	80	120	100	130	125	185	180	215	205	265
Partial safety factor γ_{Mc}	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]

(1) Use restricted to anchoring statically indeterminate structural components.

(2) Includes γ_2 factor 1.2.

ANNEX 3 CHARACTERISTICS ((continued)

Table 2 Characteristic resistances under shear loads without the influence of spacing or edge distances

	M8		M10		M12		M16		M20	
	Reduced[1]	Standard	Reduced[1]	Standard	Reduced	Standard	Reduced	Standard	Reduced	Standard
Steel failure without lever arm										
Characteristic resistance in non-cracked concrete $V_{Rk,s}$ (kN)	10.1		16.0		23.3		43.0		67.4	
Characteristic resistance in non-cracked concrete V_{Rd} (kN)	8.1		12.8		18.6		34.4		53.9	
Partial safety factor γ_{Ms}	1.25		1.25		1.25		1.25		1.25	
Steel failure with lever arm										
Characteristic resistance in non-cracked concrete $M_{Rk,s}$ (Nm)	17		35		61		154		301	
Partial safety factor γ_{Ms}	1.25		1.25		1.25		1.25		1.25	
Concrete pry-out failure										
Characteristic resistance in non-cracked concrete $V_{Rk,cp}$ C20/25 (kN)	—	—	12.0	—	—	—	—	—	68.7	—
Characteristic resistance in non-cracked concrete V_{Rd} C20/25 (kN)	—	—	6.7	—	—	—	—	—	38.2	—
Factor for equation (5.6) ETAG, Annex C, 5.2.3.3 k	—		1.0	—	—	—	—	—	2.0	—
Partial safety factor γ_{Mcp}	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]
Concrete edge failure										
Effective length of anchor l_f (mm)	32	47	39	49	48	68	65	85	79	99
Edge distance d_{nom} (mm)	8		10		12		16		20	
Partial safety factor γ_{Mc}	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]

(1) Use restricted to anchoring statically indeterminate structural components.

(2) Includes γ_2 factor 1.2.

Table 3 Displacements under tension loading

	M8		M10		M12		M16		M20	
Size	Reduced	Standard	Reduced	Standard	Reduced	Standard	Reduced	Standard	Reduced	Standard
N (kN)	3.6	4.8	3.6	4.8	6.3	9.9	11.9	15.9	13.9	15.9
δ_{NO} Short term (mm)	0.20		0.20		0.20		0.20		0.20	
$\delta_{N\infty}$ Long term (mm)	0.35		0.35		0.35		0.35		0.35	

Table 4 Displacements under shear loading

	M8		M10		M12		M16		M20	
Size	Reduced	Standard	Reduced	Standard	Reduced	Standard	Reduced	Standard	Reduced	Standard
V (kN)	4.0	4.0	4.8	6.3	9.2	9.2	17.1	17.1	27.4	26.7
δ_{VO} Short term (mm)	1.8		1.8		2.4		3.0		3.0	
$\delta_{V\infty}$ Long term (mm)	2.7		2.7		3.6		4.5		4.5	

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