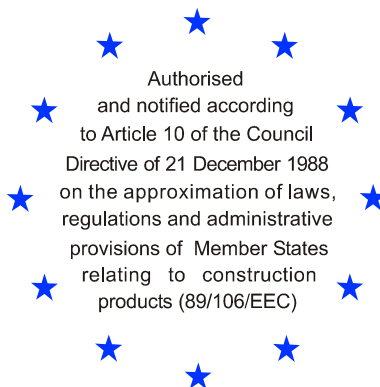


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Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-08/0189

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung
Trade name

alfa AUR 10 Universal-Rahmendübel
alfa AUR 10 universal frame anchor

Zulassungsinhaber
Holder of approval

alfa Dübel GmbH
Braukämperstraße 101
45899 Gelsenkirchen
DEUTSCHLAND

Zulassungsgegenstand
und Verwendungszweck
*Generic type and use
of construction product*

Kunststoffdübel als Mehrfachbefestigung von nichttragenden
Systemen zur Verankerung im Beton
Plastic anchor for multiple use in concrete for non-structural applications

Geltungsdauer: vom
Validity: from
bis
to

15 September 2008
15 September 2013

Herstellwerk
Manufacturing plant

alfa Dübel GmbH
Braukämperstraße 101
45899 Gelsenkirchen
DEUTSCHLAND

Diese Zulassung umfasst
This Approval contains

14 Seiten einschließlich 5 Anhänge
14 pages including 5 annexes



Europäische Organisation für Technische Zulassungen
European Organisation for Technical Approvals

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik 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 products¹, modified by Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998⁴, zuletzt geändert durch Gesetz vom 06.01.2004⁵;
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁶;
 - Guideline for European technical approval of "Plastic Anchors for Multiple Use in Concrete and Masonry for Non-structural Applications - Part 1: General", ETAG 020-01.
- 2 Deutsches Institut für Bautechnik 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 Deutsches Institut für Bautechnik, in particular pursuant to 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 Deutsches Institut für Bautechnik. 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 fully 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 the European Union L 284, 31.10.2003, p. 25
4 Bundesgesetzblatt I, p. 812
5 Bundesgesetzblatt I, p.2, 15
6 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 construction product

The allfa AUR 10 universal frame anchor is a plastic anchor consisting of a plastic sleeve made of polyamide and an accompanying specific screw of galvanised steel.

The plastic sleeve is expanded by screwing in the specific screw which presses the sleeve against the wall of the drilled hole.

The installed anchor is shown in Annex 1.

1.2 Intended use

The anchor is 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 failure of the fixture represents an immediate risk to human life.

The anchor is to be used only for multiple fixing for non-structural applications in concrete. The base material shall consist of reinforced or unreinforced normal weight concrete of strength class C12/15 at minimum according to EN 206-1:2000-12. The anchor may be used in cracked and non-cracked concrete.

By multiple anchor use it is assumed that in the case of excessive slip or failure of one anchor the load can be transmitted to neighbouring anchors without significantly violating the requirements on the fixture in the serviceability and ultimate limit state.

Therefore the design of the fixture may specify the number n_1 of fixing points to fasten the fixture and the number n_2 of anchors per fixing point. Furthermore by specifying the design value of actions N_{Sd} on a fixing point to a value $\leq n_3$ (kN) up to which the strength and stiffness of the fixture are fulfilled and the load transfer in the case of excessive slip or failure of one anchor need not to be taken into account in the design of the fixture.

The following default values for n_1 , n_2 and n_3 may be taken:

$$\begin{array}{l} n_1 \geq 4; \quad n_2 \geq 1 \quad \text{and} \quad n_3 \leq 4,5 \text{ kN} \quad \text{or} \\ n_1 \geq 3; \quad n_2 \geq 1 \quad \text{and} \quad n_3 \leq 3,0 \text{ kN.} \end{array}$$

The anchor may also be used in concrete with requirements related to resistance to fire according 4.2.1.2.

The specific screw made of galvanised steel may only be used in structures subject to dry internal conditions.

The specific screw made of galvanised steel may also be used in structures subject to external atmospheric exposure or exposure in permanently damp internal conditions, if the area of the head of the screw is protected against moisture and driving rain after mounting of the fixing unit in this way, that intrusion of moisture into the anchor shaft is prevented. Therefore there shall be an external cladding or a ventilated rainscreen mounted in front of the head of the screw and the head of the screw itself shall be coated with a soft plastic, permanently elastic bitumen-oil-combination coating (e. g. undercoating or body cavity protection for cars).

The anchor may be used in the following temperature range:

Temperature range a): -40 °C to +40 °C (max long term temperature +24 °C and max short term temperature +40 °C)

Temperature range b): -40 °C to +80 °C (max long term temperature +50 °C and max short term temperature +80 °C)

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 anchor corresponds to the drawings and information given in Annex 2 and 3. The characteristic material values, dimensions and tolerances of the anchor not given in these Annexes shall correspond to the respective values laid down in the technical documentation⁷ of this European Technical Approval.

The characteristic values for the design of the anchorages are given in Annex 3 to 5.

Each anchor is to be marked with the identifying mark, the type, the diameter and the length of the anchor according to Annex 2.

The minimum embedment depth shall be marked.

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

2.2 Methods of verification

The assessment of the fitness of the anchor 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 compliance with the Guideline for European Technical Approval of "Plastic Anchors for Multiple Use in Concrete and Masonry for Non-structural Applications", ETAG 020,

- Part 1: "General" and
- Part 2: "Plastic Anchors for Use in Normal Weight Concrete"

based on the use category a.

In addition to the specific clauses relating to dangerous substances contained in this European Technical Approval, 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.

⁷ The technical documentation of this European Technical Approval is deposited at the Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the decision 97/463/EG of the European Commission⁸ the system 2(ii) (referred to as system 2+) of 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:

(a) Tasks for the manufacturer:

- (1) initial type-testing of the product;
- (2) factory production control;
- (3) 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 of 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, including records of results performed. This production control system shall insure that the product is in conformity with this European Technical Approval.

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

The factory production control shall be in accordance with the control plan of 15 September 2008 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 Deutsches Institut für Bautechnik.⁹

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 of 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 sections 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.

⁸ Official Journal of the European Communities L 198 of 25.07.1997.

⁹ The control plan is a confidential part of the documentation of the European Technical Approval, but not published together with the ETA and only handed over to the approved body involved in the procedure of attestation of conformity.
See section 3.2.2.

3.2.2 Tasks of approved bodies

The approved body shall perform the

- initial inspection of factory and of factory production control,
 - 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 factory production control 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 Deutsches Institut für Bautechnik without delay.

3.3 CE marking

The CE marking shall be affixed on each packaging of the anchor. The letters "CE" shall be followed by the identification number of the approved certification body and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacturer),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate for the factory production control,
- the number of the European Technical Approval,
- the number of the guideline for European Technical Approval
- use category a.

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

4.1 Manufacturing

The European Technical Approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, 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 Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik 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 Installation

4.2.1 Design of anchorages

4.2.1.1 General

The anchor is to be used only for multiple fixing for non-structural applications.

By multiple anchor use it is assumed that in the case of excessive slip or failure of one anchor the load can be transmitted to neighbouring anchors without significantly violating the requirements on the fixture in the serviceability and ultimate limit state.

Therefore the design of the fixture may specify the number n_1 of fixing points to fasten the fixture and the number n_2 of anchors per fixing point. Furthermore by specifying the design value of actions N_{sd} on a fixing point to a value $\leq n_3$ (kN) up to which the strength and stiffness of the fixture are fulfilled and the load transfer in the case of excessive slip or failure of one anchor need not to be taken into account in the design of the fixture.

The following default values for n_1 , n_2 and n_3 may be taken:

$$n_1 \geq 4; \quad n_2 \geq 1 \quad \text{and} \quad n_3 \leq 4,5 \text{ kN} \quad \text{or} \\ n_1 \geq 3; \quad n_2 \geq 1 \quad \text{and} \quad n_3 \leq 3,0 \text{ kN.}$$

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

- The design of anchorages is carried out in compliance with ETAG 020, Guideline for European Technical Approval of "Plastic Anchors for Multiple Use in Concrete and Masonry for Non-structural Applications", Annex C under the responsibility of an engineer experienced in anchorages. This design method applies to plastic anchors subject to static or quasi-static actions in tension, shear or combined tension and shear or bending; it is not applicable to plastic anchors loaded in compression or subject to fatigue, impact, or seismic actions.
- Verifiable calculation notes and drawings shall be prepared taking account of the loads to be anchored, the nature and strength of the base materials and the dimensions of the anchorage members as well as of the relevant tolerances.

Shear loads acting on an anchor may be assumed to act without lever arm if both of the following conditions are fulfilled:

- The fixture shall be made of metal and in the area of the anchorage be fixed directly to the base material either without an intermediate layer or with a levelling layer of mortar with a thickness ≤ 3 mm.
- The fixture shall be in contact with the anchor over its entire thickness. (Therefore the diameter of clearance hole in the fixture d_f has to be equal or smaller than the value given in Annex 3, Table 3.)

If these two conditions are not fulfilled the lever arm is calculated according to ETAG 020, Annex C. The characteristic bending moment is given in Annex 3, Table 4.

4.2.1.2 Resistance in concrete (use category "a")

The characteristic values of resistance of the anchor for use in concrete are given in Annex 3, Table 4 and Annex 4, Table 5 and 6. The design method is valid for cracked and non-cracked concrete.

According to the Technical Report TR 020 "Evaluation of anchorages in concrete concerning resistance to fire" it can be assumed that for fastening of facade systems the load bearing behaviour of the allfa AUR 10 universal frame anchor has a sufficient resistance to fire at least 90 minutes (R90) if the admissible load $[F_{Rk} / (\gamma_M \cdot \gamma_F)]$ is $\leq 0,8$ kN (no permanent centric tension load).

4.2.1.3 Characteristic values, spacing and dimensions of anchorage member

The minimum spacing and dimensions of anchorage member according to Annex 5, Table 8 shall be observed.

4.2.1.4 Displacement behaviour

The displacements under tension and shear loading in concrete are given in Annex 5, Table 7.

4.2.2 Installation of anchor

The fitness for use of the anchor can only be assumed if the following conditions of installation are met:

- Anchor installation carried out by appropriately qualified personnel under the supervision of the person responsible for technical matters on site.
- Use of the anchor only as supplied by the manufacturer without exchanging any component of the anchor.
- Anchor installation in accordance with the manufacturer's specifications and drawings using the tools indicated in this European Technical Approval:
- Checks before placing the anchor, to ensure that the characteristic values of the base material in which the anchor is to be placed, is identical with the values, which the characteristic loads apply for.
- Placing drill holes without damaging the reinforcement.
- Holes to be cleaned 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.
- The plastic sleeve is inserted through the fixture by slight hammer blows and the special screw is screwed in until the head of the screw touches the sleeve. The anchor is correct mounted, if there is no turn-through of the plastic sleeve in the drill hole and if slightly move on turning of the screw is impossible after the complete turn-in of the screw.
- Temperature during installation of the anchor ≥ -40 °C (plastic sleeve and base material).
- Exposure to UV due to solar radiation of the anchor not protected ≤ 6 weeks.

4.2.3 Responsibility of the manufacturer

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to 4.2.1, 4.2.2 and 5 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 packaging and/or on an enclosed instruction sheet, preferably using illustrations.

The minimum data required are:

- base material for the intended use,
- ambient temperature of the base material during installation of the anchor,
- drill bit diameter,
- minimum effective anchorage depth,
- minimum hole depth,
- information on the installation procedure,
- identification of the manufacturing batch.

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

5 Indications to the manufacturer

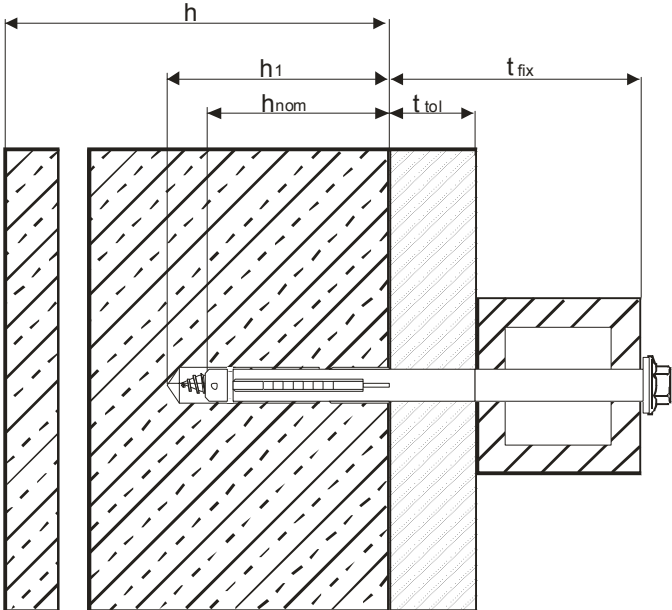
5.1 Packaging, transport and storage

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

The anchor shall be stored under normal climatic conditions in its original light-proof packaging. Before installation, it shall not be extremely dried nor frozen.

Dipl.-Ing. E. Jasch
President of Deutsches Institut für Bautechnik
Berlin, 15 September 2008

beglaubigt:
Scheller



Intended Use

Fixing in cracked and non-cracked concrete

Legend

- h_{nom} = overall plastic anchor embedment depth in the base material
- h_1 = depth of drill hole to deepest point
- h = thickness of member (wall)
- t_{fix} = thickness of fixture
- t_{tol} = thickness of layer or non-load bearing coating

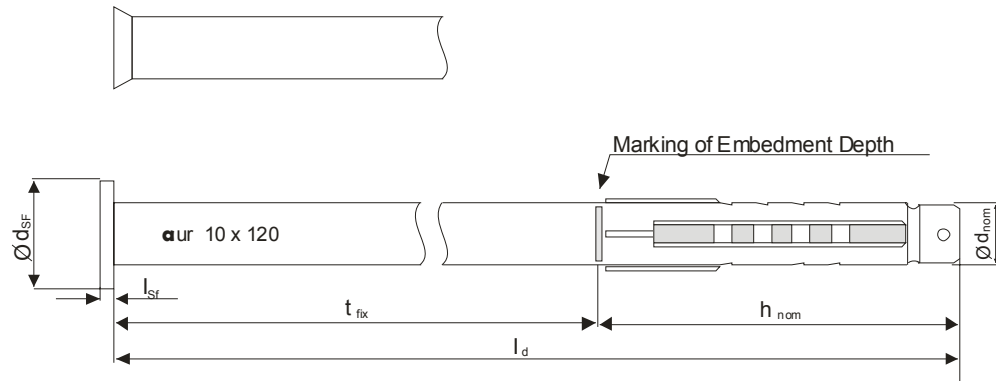
alfa AUR 10 universal frame anchor	Annex 1 of European Technical Approval ETA-08/0189
Intended use	

AUR

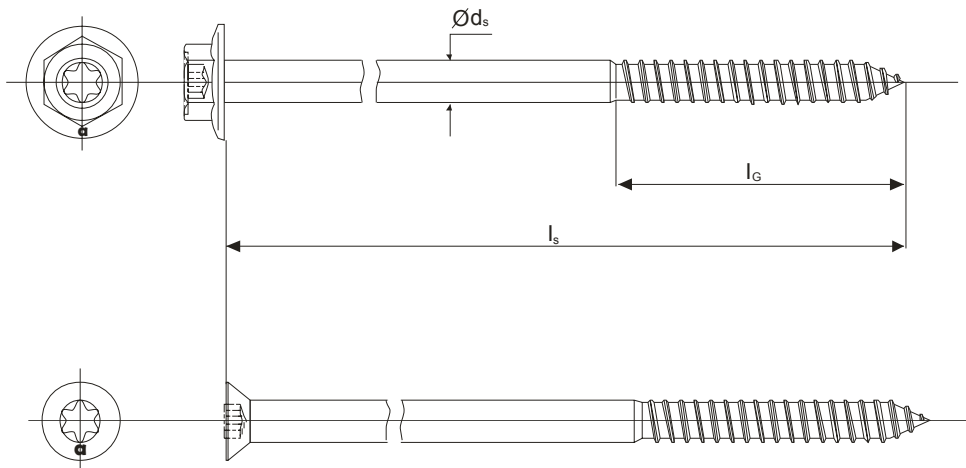
Marking:
type and dimension

example : **aur** 10x120

Anchor sleeve



Special screw



allfa AUR 10 universal frame anchor

Anchor type, special screws, dimensions

Annex 2

of European
Technical Approval

ETA-08/0189

Table 1: Dimensions [mm]

	Anchor sleeve						Special screw		
	h_{nom} [mm]	$\varnothing d_{nom}$ [mm]	t_{fix} [mm]	l_d [mm]	l_{sf} [mm]	$\varnothing d_{sf}$ [mm]	$\varnothing d_s$ [mm]	l_G [mm]	$l_s^{1)}$ [mm]
AUR 10	60	10	20 - 120	80 - 180	2	18	7	50	90 - 190

- 1) To insure that the screw penetrates the anchor sleeve, l_s must be $l_d + l_{sf}^{2)} + 7$ mm
 2) Only valid for flat collar version

Table 2: Materials

Name	Material
Anchor sleeve	Polyamide PA6, colour: grey
Special screw	carbon steel strength class 4.8 ($f_{yk} \geq 320$ N/mm ² , $f_{uk} \geq 400$ N/mm ²), zinc coated 5 μ m

Table 3: Installation parameters

Anchor type		AUR 10
Drill hole diameter	$d_0 =$ [mm]	10
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	10,45
Depth of drill hole to deepest point ¹⁾	$h_1 \geq$ [mm]	70
Overall plastic anchor embedment depth ¹⁾	$h_{nom} \geq$ [mm]	60
Diameter of clearance hole in the fixture	$d_f \leq$ [mm]	10,5

- 1) See Annex 1

Table 4: Characteristic bending resistance of the screw in concrete

		galvanised steel
Characteristic bending resistance	$M_{RK,s}$ [Nm]	9,2
Partial safety factor	$\gamma_{Ms}^{1)}$	1,25

- 1) In absence of other national regulations

alfa AUR 10 universal frame anchor

Dimensions, materials,
Installation parameters,
Characteristic bending resistance

Annex 3

of European
Technical Approval

ETA-08/0189

Table 5: Characteristic resistance of the screw for use in concrete

Failure of expansion element (special screw)			galvanised steel
Characteristic tension resistance	$N_{Rk,s}$	[kN]	10,6
Partial safety factor	γ_{Ms} ¹⁾		1,5
Characteristic shear resistance	$V_{Rk,s}$	[kN]	5,3
Partial safety factor	γ_{Ms} ¹⁾		1,25

1) In absence of other national regulations

Table 6: Characteristic resistance for use in concrete

Pull-out failure (plastic sleeve)		24 °C ²⁾ /40 °C ³⁾	50 °C ²⁾ /80 °C ³⁾
• Concrete ≥ C16/20			
Characteristic resistance	$N_{Rk,p}$ [kN]	4,5	4,0
Partial safety factor	γ_{Mc} ¹⁾	1,8	
• Concrete C12/15			
Characteristic resistance	$N_{Rk,p}$ [kN]	3,0	3,0
Partial safety factor	γ_{Mc} ¹⁾	1,8	
Concrete cone failure and concrete edge failure for single anchor and anchor group			
Tension load ⁴⁾			
$N_{Rk,c} = 7,2 \cdot \sqrt{f_{ck,cube}} \cdot h_{ef}^{1,5} \cdot \frac{c}{c_{cr,N}} = N_{Rk,p} \cdot \frac{c}{c_{cr,N}}$		with: $h_{ef}^{1,5} = \frac{N_{Rk,p}}{7,2 \cdot \sqrt{f_{ck,cube}}}$ $\frac{c}{c_{cr,N}} \leq 1$	
Shear load ⁴⁾			
$V_{Rk,c} = 0,45 \cdot \sqrt{d_{nom}} \cdot (h_{nom}/d_{nom})^{0,2} \cdot \sqrt{f_{ck,cube}} \cdot c_1^{1,5} \cdot \left(\frac{c_2}{1,5c_1}\right)^{0,5} \cdot \left(\frac{h}{1,5c_1}\right)^{0,5}$		with: $\left(\frac{c_2}{1,5c_1}\right)^{0,5} \leq 1$ $\left(\frac{h}{1,5c_1}\right)^{0,5} \leq 1$	
c_1	Edge distance closest to the edge in loading direction		
c_2	Edge distance perpendicular to direction 1		
$f_{ck,cube}$	Nominal characteristic concrete compression strength (based on cubes), value for C50/60 at maximum		
Partial safety factor	γ_{Mc} ¹⁾	1,8	

1) In absence of other national regulations

2) Maximum long term temperature

3) Maximum short term temperature

2) The design method according to ETAG 020, Annex C is to be used

alfa AUR 10 universal frame anchor

Characteristic resistance in concrete
(Use category "a")

Annex 4

of European
Technical Approval

ETA-08/0189

Table 7: Displacements under tension und shear loading in concrete ¹⁾

Tension load			Shear load		
F ²⁾ [kN]	δ _{NO} [mm]	δ _{N∞} [mm]	F ²⁾ [kN]	δ _{vo} [mm]	δ _{v∞} [mm]
1,8	0,86	1,71	1,8	3,36	5,04

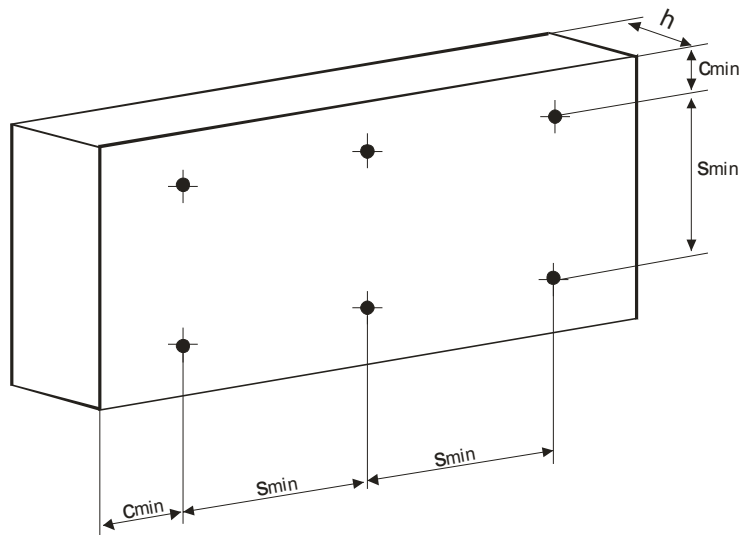
- 1) Valid for all ranges of temperatures
- 2) Intermediate values by linear interpolation

Table 8: Minimum thickness of member, edge distance and spacing in concrete

Fixing points with a spacing $s \leq 90$ mm are considered as a group with a max. characteristic resistance $N_{Rk,p}$ according to Table 6. For $s > 90$ mm, the anchors are considered as single anchors, each with a characteristic resistance $N_{Rk,p}$ according to Table 6.

	h_{min} [mm]	c_{cr,N} [mm]	c_{min} [mm]	s_{min} [mm]
Concrete ≥ C16/20	100	100	100	80
Concrete C12/15		140	140	110

Scheme of distance and spacing in concrete



alfa AUR 10 universal frame anchor

Displacements,
minimum thickness of member, edge distance and spacing
in concrete (Use category "a")

Annex 5

of European
Technical Approval

ETA-08/0189