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Członek EOTA

European Technical Approval ETA-13/0088

English language translation - the original version is in Polish language

Nazwa handlowa *Trade name*	**FX** *FX*
Właściciel aprobaty *Holder of approval*	**RAWLPLUG S.A.** **ul. Kwidzyńska 6** **51-416 Wrocław, Poland**
Rodzaj i przeznaczenie wyrobu *Generic type and use of construction products*	**Łączniki tworzywowe do mocowania złożonych systemów izolacji cieplnej z wyprawami tynkarskimi i prefabrykowanych elementów izolacji cieplnej ścian zewnętrznych w podłożu betonowym i murowym** *Nailed-in plastic anchors for fixing of external thermal insulation composite systems with rendering and prefabricated units for external wall insulation in concrete and masonry*
Termin ważności *Valid* od *from* do *to*	**27. 06. 2013** **22. 02. 2018**
Zakład produkcyjny *Manufacturing plant*	**Zakład Produkcyjny nr 3** *Manufacturing Plant no. 3*
Niniejsza Europejska Aprobata Techniczna zawiera *This European Technical Approval contains*	**14 stron, w tym 5 Załączników** *14 pages including 5 Annexes*
Niniejsza Europejska Aprobata Techniczna zastępuje *This European Technical Approval replaces*	**ETA-13/0088 ważną od 22.02.2013 do 22.02.2018** *ETA-13/0088 with validity from 22.02.2013 to 22.02.2018*

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 „*Plastic anchors for fixing of external thermal insulation composite systems with rendering*", ETAG 014, Edition January 2002 (amended February 2011).

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 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 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.

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[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 product and intended use

1.1 Definition of product

The FX nailed-in plastic anchors consist of an expansion sleeve with a collar and metallic nail as an expansion pin. The nail is made of galvanized steel. The sleeve is made of polypropylene (PP).

The collar is made in three versions (FX-..L.., FX-..K.., FX-..C..) shown in Annex 2.

The plastic anchor sleeve is expanded by hammering in a nail which press the sleeve against the wall of the drilled hole.

The installed anchor is shown in Annex 1.

1.2 Intended use

The FX 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 failure of anchorages made with these products would cause low risk to human life.

The anchors are to be used only as multiple fixing for the anchorage of profiles for bonded external thermal insulation composite systems (ETICS) according to ETAG 004 and prefabricated units for external wall insulation (Veture Kits) according to ETAG 017, in concrete and masonry walls according to Table 5, Annex 5.

The anchor may only be used for transmission of wind suction loads and shall not be used for the transmission of dead loads of the thermal insulation composite system. The dead loads have to be transmitted by the bonding of the thermal insulation composite system.

The provisions made in this European Technical Approval are based on an assumed working life of the anchor of 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer or Approval Body, 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 product and methods of verification

2.1 Characteristics of product

The FX anchors correspond to the drawings and information given in Annexes 1 to 4. The characteristic material values, dimensions and tolerances of the anchors not

indicated in these Annexes shall correspond to the respective values laid down in the technical documentation[6] of this European Technical Approval.

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

Each anchor is to be marked with identification mark of the producer, the anchor type, the diameter and the length of the anchor sleeve. The marking is imprinted on each anchor sleeve.

The anchor shall only be packaged and supplied as a complete unit. Each package is to be marked with the type of the anchor and collar (e.g. FX-..L..).

2.2 Methods of verification

The assessment of the 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 compliance with the Guideline for European Technical Approval of „*Plastic Anchors for Fixing of External Thermal Insulation Composite Systems with Rendering*", ETAG 014, based on the use category A, B, C, D and E.

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 of conformity of the product and CE-marking

3.1 Attestation of conformity system

The system of attestation of conformity 2 (ii) (allocated to system 2+) according to Council Directive 89/106/EEC Annex III provides:

(a) Tasks of the manufacturer:

(1) initial type-testing of the product,

(2) factory production control,

(3) testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan.

(b) Tasks of 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.

[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.

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. This production control system shall insure that the product is in conformity with this European Technical Approval.

The manufacturer may 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[7] 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 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 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 of the approved body

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 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.

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[7] 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.

3.3 CE-marking

The CE-marking shall be affixed on each packaging of the anchor. The symbol „CE" shall be accompanied by the following information:

- name and address of the manufacturer,
- last two digits of the year in which the CE-marking was affixed,
- number of the EC certificate for the factory production control,
- number of the European Technical Approval,
- number of the guideline for European Technical Approval,
- identification number of the approved certification body,
- anchor size,
- use categories (A, B, C, D and E) according to ETAG 014.

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

4.1 Manufacturing

The anchors are manufactured in accordance with the provisions of the European Technical Approval using the manufacturing process as identified in the inspection of the plant by Instytut Techniki Budowlanej.

The ETA is issued on the basis of agreed data/information, deposited with 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 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 Installation

4.2.1 Design of anchorages

4.2.1.1 General

The ETA only applies to the manufacture and use of the anchors. Verification of stability of the external thermal insulation composite system including application of loads on the anchor is not subject of this European Technical Approval.

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

- the design of anchorages is carried out in compliance with Guideline for European Technical Approval of "*Plastic Anchors for Fixing of External Thermal Insulation Composite Systems with Rendering*", ETAG 014, under the responsibility of an engineer experienced in anchorages,
- verifiable calculation notes and drawings shall be prepared taking account of the loads to be anchored, the nature and strength of the base materials, the thickness of insulation and the dimensions of the anchorage members as well as of the relevant tolerances.

Proof of direct local application of load on the base material has been delivered.

4.2.1.2 Resistance

The characteristic values of the tension resistance of the anchors are given in Table 5, Annex 5. If there is a difference to the given characteristic values of the base material, the job-site tests according to 4.2.3 shall be carried out and the characteristic tension resistance shall be determined.

4.2.1.3 Characteristic values, spacing and dimensions of anchorage member

The minimum spacing and dimensions of anchorage member according to Annex 4 shall be observed.

4.2.1.4 Displacement behavior

When loaded to the design values of resistance the displacements δ are given in the following Table.

Anchor FX								
Base material	Bulk density [kg/dm^3]	Compressive strength [N/mm^2]	$\frac{N_{Rk}}{3}$, [kN]			$\delta\left(\frac{N_{Rk}}{3}\right)$, [mm]		
			FX-05	FX-06	FX-08	FX-05	FX-06	FX-08
Concrete C12/15 (EN 206-1)	-	-	0,03	0,06	0,10	0,1	0,26	0,25
Concrete C20/25 to C50/60 (EN 206-1)	-	-	0,06	0,13	0,16	0,12	0,35	0,38
Solid clay brick (EN 771-1)	≥ 1,7	≥ 30,0	0,06	0,06	0,20	0,24	0,24	0,57
Solid calcium silicate brick (EN 771-2)	≥ 2,0	≥ 20,0	0,06	0,10	0,25	0,39	0,24	0,68
Calcium silicate hollow block (EN 771-2)	≥ 1,6	≥ 12,0	0,10	0,10	-	0,27	0,23	-
Lightweight concrete hollow block Hbl (DIN 18151)	≥ 0,8	≥ 2,0	0,06	0,06	0,13	0,24	0,14	0,84
Lightweight concrete block LAC 20 (EN 771-3)	≥ 1,56	≥ 20,0	0,10	0,10	0,16	0,13	0,27	0,29
Autoclaved aerated concrete block AAC 2 (EN 771-4)	≥ 0,35	≥ 2,0	0,03	0,03	0,03	0,07	0,10	0,09

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,

- observation of the drill method (drill holes in concrete and in masonry made of clay bricks and calcium silicate bricks may be drilled using the hammer driller and drill holes in masonry made of calcium silicate hollow blocks, lightweight aggregate concrete blocks and autoclaved aerated concrete blocks may be drilled using the rotary driller),
- temperature during installation of the anchor ≥ 0°C.

4.2.3 Job site tests

The characteristic tension resistance of the anchor may be determined by means of job site pull-out tests carried out on the material actually used, if a characteristic resistance of the base material does not exist.

The characteristic resistance of the anchor shall be determined by carrying out at least 15 centric tension load pull-out tests on site. These tests are also possible under the same conditions in a laboratory.

Execution and evaluation of the tests as well as the issue of the test report and the determination of the characteristic resistance should be under the responsibility of approved testing laboratory or the supervision of the person responsible for the execution of the works on site.

Number and position of the anchors to be tested shall be adapted to the relevant special conditions of the site and, for example, to be increased in the case of hidden and larger areas, such that reliable information about the characteristic resistance of the anchor in the base material in question can be derived. The tests shall take into account the most unfavorable conditions of the practical execution.

4.2.3.1 Assembly

The anchor to be tested shall be installed and the spacing and the edge distances shall be in the same way as planned for the fixing of the external thermal insulation composite system.

Depending on the drilling tool and according to ISO 5468, hard metal hammer-drill bits or hard metal percussion drill bits, respectively, shall be used. The cutting diameter shall be at the upper tolerance limit.

4.2.3.2 Execution of test

The test rig used for the pull-out tests shall provide a continuous slow increase of the load, controlled by a calibrated load cell. The load shall be applied perpendicular to the surface of the base material and shall be transmitted to the anchor via a hinge. The reaction forces shall be transmitted into the base material at a distance

of at least 15 cm from the anchor. The load shall be increased continuously in a way, that the ultimate load is reached after about 1 minute. The load is measured when the ultimate load (N_1) is achieved.

4.2.3.3 Test report

The test report shall include all information necessary to assess the resistance of the tested anchor. It shall be included in the construction work dossier.

The minimum data required are:

- construction site, owner of building, date and location of the tests, air temperature, ETICS to be fixed,
- plastic sleeve and metal expansion pin, value of the cutting diameter of hard metal hammer-drill bits, measured before and after drilling,

- test rig, results of tests including the indication of value N_1,
- name and signature of person having performed or supervised the test.

4.2.3.4 Evaluation of test results

The characteristic resistance N_{Rk1} is derived from the measured values N_1 as follows:

$N_{Rk1} = 0{,}6 \cdot N_1 \leq 1{,}5$ kN,

N_1 = the mean value of the five smallest measured values at the ultimate load.

4.2.4 Responsibility of the manufacturer

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1, 2, 4.2.1, 4.2.2, 5 and Annexes 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,
- drill bit diameter,
- maximum thickness of the ETICS,
- 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 Recommendations for the manufacturer

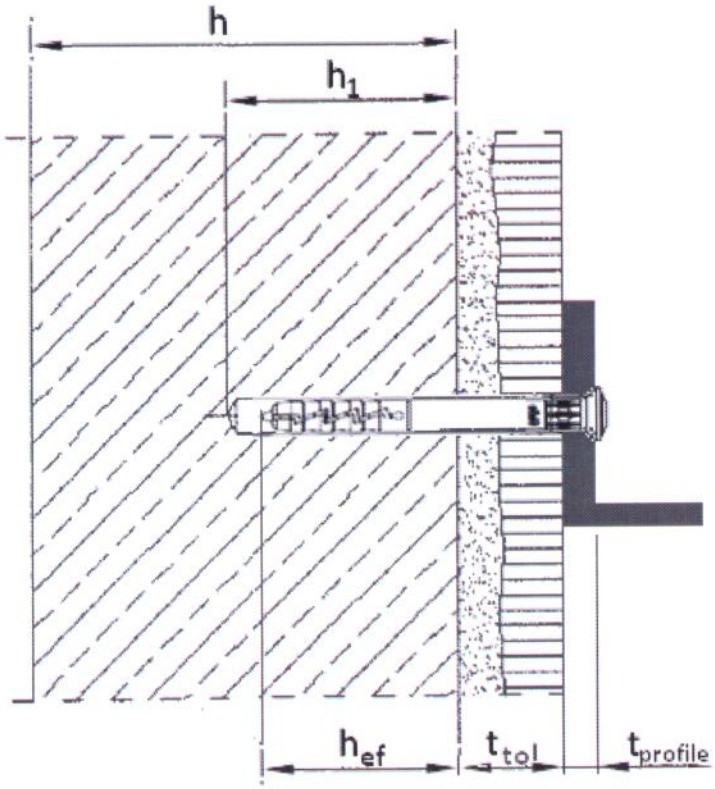
5.1 Recommendations on packaging, transport and storage

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

The anchor shall be stored under normal climatic conditions. Before installation, it shall not be extremely dried nor frozen.

On behalf of Instytut Techniki Budowlanej

Jan Bobrowicz
Director of ITB



Intended Use

Multiple fixing of profiles for external thermal insulation composite systems (ETICS) according to ETAG 004 or prefabricated units for external wall insulation (Veture Kits) according to ETAG 017, in concrete and masonry

Legend

h_{ef} = effective anchorage depth

h_1 = depth of drill hole in base material

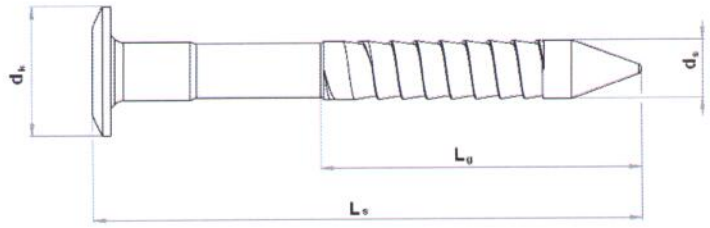
h = thickness of base material

t_{tol} = thickness of equalizing and/or non-load-bearing layer

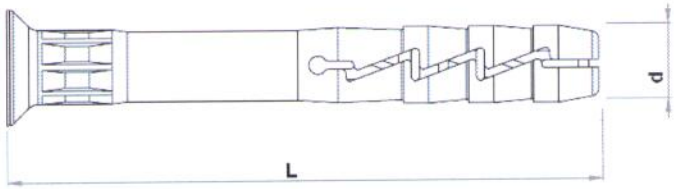
$t_{profile}$ = thickness of profile

t_{fix} = thickness of fixture ($t_{tol} + t_{profile}$)

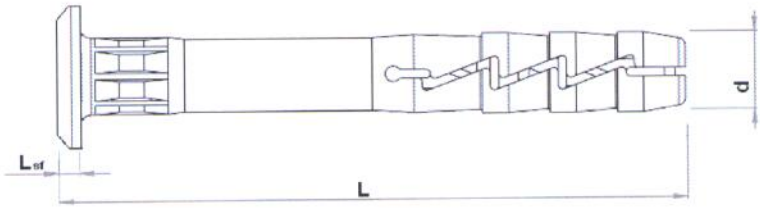
FX	**Annex 1** of European Technical Approval ETA-13/0088
Intended use	



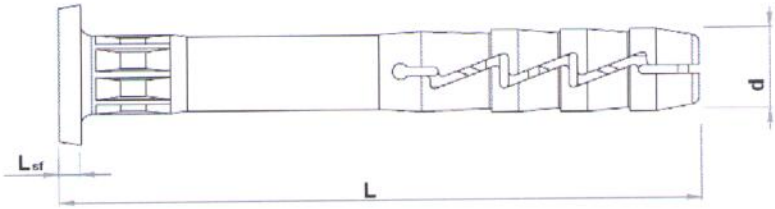
FX nail screw



FX-..L.. sleeve



FX-..K..sleeve



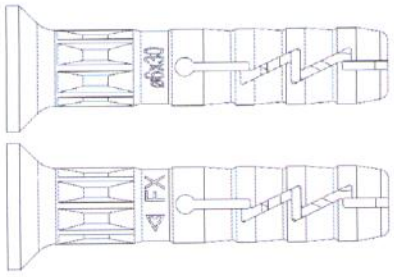
FX-..C..sleeve

FX	**Annex 2** of European Technical Approval ETA-13/0088
Anchor types	

Table 1: Dimensions

Anchor index			Anchor sleeve		Expansion nail			t_{fix}
FX-..L..	FX-..K..	FX-..C..	L	d	L_s	d_s	d_k	-
			mm	mm	mm	mm	mm	mm
FX-05L025	-	-	25	4,9	28	3,3	8,0	≤ 1
FX-05L030	FX-05K030	FX-05C030	30	4,9	33	3,3	8,0	≤ 5
FX-05L035	FX-05K035	FX-05C035	35	4,9	38	3,3	8,0	≤ 10
FX-05L040	FX-05K040	FX-05C040	40	4,9	43	3,3	8,0	≤ 15
FX-05L050	FX-05K050	FX-05C050	50	4,9	54	3,3	8,0	≤ 25
FX-06L030	FX-06K030	FX-06C030	30	5,9	34	3,8	9,0	≤ 1
FX-06L035	FX-06K035	FX-06C035	35	5,9	39	3,8	9,0	≤ 6
FX-06L040	FX-06K040	FX-06C040	40	5,9	44	3,8	9,0	≤ 11
FX-06L045	FX-06K045	FX-06C045	45	5,9	49	3,8	9,0	≤ 16
FX-06L050	FX-06K050	FX-06C050	50	5,9	54	3,8	9,0	≤ 21
FX-06L055	FX-06K055	FX-06C055	55	5,9	59	3,8	9,0	≤ 26
FX-06L060	FX-06K060	FX-06C060	60	5,9	64	3,8	9,0	≤ 31
FX-06L070	FX-06K070	FX-06C070	70	5,9	74	3,8	9,0	≤ 41
FX-06L080	FX-06K080	FX-06C080	80	5,9	84	3,8	9,0	≤ 51
FX-08L045	FX-08K045	FX-08C045	45	7,9	51	4,8	11,0	≤ 5
FX-08L060	FX-08K060	FX-08C060	60	7,9	66	4,8	11,0	≤ 20
FX-08L080	FX-08K080	FX-08C080	80	7,9	86	4,8	11,0	≤ 40
FX-08L100	FX-08K100	FX-08C100	100	7,9	106	4,8	11,0	≤ 60
FX-08L120	FX-08K120	FX-08C120	120	7,9	126	4,8	11,0	≤ 80
FX-08L140	FX-08K140	FX-08C140	140	7,9	146	4,8	11,0	≤ 100
FX-08L160	FX-08K160	FX-08C160	160	7,9	166	4,8	11,0	≤ 120

Marking:



KOELNER identifying mark

FX anchor trade name

ø6x30 diameter x length (e.g. Φ6 x 30 mm)

FX	**Annex 3** of European Technical Approval ETA-13/0088
Dimensions and marking	

Table 2: Materials

Designation	Material
Anchor sleeve	Polypropylene (PP) Tipplen K 499, grey
Expansion nail	Carbon steel ($f_{y,k} \geq 285$ MPa, $f_{u,k} \geq 330$ MPa) galvanized ≥ 5 µm acc. to EN ISO 4042

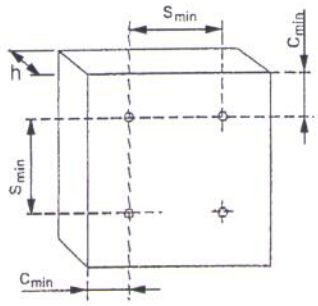
Table 3: Installation characteristics

Anchor type		FX-05	FX-06	FX-08
Nominal diameter	d_{nom} [mm]	5,0	6,0	8,0
Nominal diameter of drill bit	d_o [mm]	5,0	6,0	8,0
Cutting diameter of drill bit	d_{cut} [mm]	≤ 5,40	≤ 6,40	≤ 8,45
Depth of drill hole	h_1 [mm]	≥ 35	≥ 40	≥ 50
Effective anchorage depth	h_{ef} [mm]	25	29	40

Table 4: Minimum thickness of base material, anchor spacing and edge distance

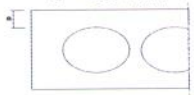
Anchor type		FX
Minimum thickness of base material	h [mm]	100
Minimum spacing	s_{min} [mm]	100
Minimum edge distance	c_{min} [mm]	100

Diagram of spacing:



FX	Annex 4 of European Technical Approval ETA-13/0088
Materials, installation characteristics, minimum thickness of base material, edge distance and spacing	

Table 5: Characteristic resistance to tension loads N_{Rk}, kN, in concrete and masonry for single anchor

Anchor FX							
Base material	**Reference standard**	**Bulk density [kg/dm³]**	**Compressive strength [N/mm²]**	**Drilling method**	**N_{Rk} [kN]**		
					FX-05	**FX-06**	**FX-08**
Concrete C12/15	EN 206-1	-	-	hammer drilling	0,1	0,2	0,3
Concrete C20/25 to C50/60	EN 206-1	-	-		0,2	0,4	0,5
Solid clay brick 	EN 771-1	≥ 1,7	≥ 30,0	hammer drilling	0,2	0,2	0,6
Solid calcium silicate brick (e.g. KS NF 20-2.0)	EN 771-2	≥ 2,0	≥ 20,0	hammer drilling	0,2	0,3	0,75
Calcium silicate hollow block (e.g. KS L-R(P) 8 DF) a = 30 mm 	EN 771-2	≥ 1,6	≥ 12,0	rotary drilling	0,3	0,3	-
Lightweight concrete hollow block Hbl a = 30 mm 	DIN 18151	≥ 0,8	≥ 2,0	rotary drilling	0,2	0,2	0,4
Lightweight concrete block LAC 20	EN 771-3	≥ 1,56	≥ 20,0	rotary drilling	0,3	0,3	0,5
Autoclaved aerated concrete block AAC 2	EN 771-4	≥ 0,35	≥ 2,0	rotary drilling	0,1	0,1	0,1
Partial safety factor γ_M [1)]	2,0						
[1)] in the absence of national regulation							