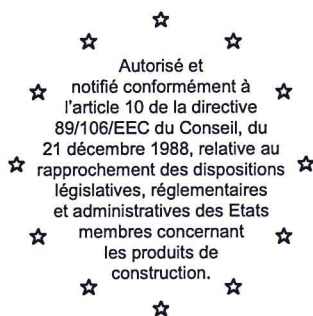


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CSTB
le futur en construction

MEMBRE DE L'EOTA

European Technical Approval **ETA-12/0293**

(English language translation, the original version is in French language)

Nom commercial :

Trade name:

Titulaire :

Holder of approval:

ESSVE façade plug grey extra long

ESSVE Produkter AB

BOX 770

SE-191 27 Sollentuna

Sidensvansvägen 10

Sweden

Type générique et utilisation prévue du
produit de construction :

**Generic type and use of
construction product:**

Cheville plastique pour usage multiple dans le béton et la
maçonnerie pour application non structurales

**Plastic anchor for multiple use in concrete and masonry for
non-structural applications**

Validité du / au :

Validity from / to:

14/06/2012

14/06/2017

Usine de fabrication :

Manufacturing plant:

Plant 403-1

Le présent Agrément technique
européen contient :

**This European Technical Approval
contains:**

19 pages incluant 8 annexes faisant partie intégrante du
document.

**19 pages including 8 annexes which form an integral part of
the document.**



Organisation pour l'Agrément Technique Européen
European Organisation for Technical Approvals

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European Technical Approval is issued by the Centre Scientifique et Technique du Bâtiment 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 the Council Directive 93/68/EEC of 22 July 1993² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - Décret n° 92-647 du 8 juillet 1992⁴ concernant l'aptitude à l'usage des produits de construction;
 - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC⁵;
 - Guideline for European Technical Approval of « Plastic anchors for Multiple use in Concrete and Masonry for Non-structural Applications – Part 1: General» ETAG 020, issued 2006.
- 2 The Centre Scientifique et Technique du Bâtiment is authorized to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant (for example concerning the fulfillment of assumptions made in this European Technical Approval with regard to manufacturing). Nevertheless, the responsibility for the conformity of the products with 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 manufacturer 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 Centre Scientifique et Technique du Bâtiment pursuant to Article 5 (1) of the 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 Centre Scientifique et Technique du Bâtiment. 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 n° L 40, 11.02.1989, p. 12

² Official Journal of the European Communities n° L 220, 30.08.1993, p. 1

³ Official Journal of the European Union n° L 284, 31.10.2003, p. 25

⁴ Journal officiel de la République française du 14 juillet 1992

⁵ Official Journal of the European Communities n° L 17, 20.1.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1 Definition of product

The "ESSVE façade plug grey extra long" is an anchor consisting of a special screw and a polymeric sleeve which passes through the fixture. The special screw is made of galvanized steel or stainless steel, whereas the sleeve consists of polyamide PA6. The polymeric sleeve is expanded by screwing in the expansion element 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 "ESSVE façade plug grey extra long" GX-L 10 may be used for anchorages of façade systems in concrete with requirements related to resistance to fire (see 4.2.2).

The anchor is to be used only for multiple fixing for non-structural applications in concrete and masonry. 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 neighboring anchors without significantly violating the requirements on the fixture in the serviceability and ultimate limit state.

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 and of masonry walls according to Annex 6. The anchor may be used in cracked and non-cracked concrete. The mortar strength class of the masonry has to be M 2,5 according to EN 998-2:2003 at minimum.

The specific screw made of galvanized steel may only be used in structures subject to dry internal conditions. These screws may also be used in structures subject to external atmospheric exposure, if the area of the head of the screw is protected against moisture and driving rain after mounting of the fixing unit in such 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 specific screw 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 deicing materials are used).

The anchor may be used in the following temperature range:

Temperature range: -20 °C to +40 °C

(max long term temperature +24 °C and max short term temperature +40 °C)

The provisions made in this European Technical Approval are based on an assumed intended 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 product and methods of verification

2.1 Characteristics of product

The anchor corresponds to the drawings and provisions 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 documentation⁶ of this European Technical Approval.

The characteristic values for the design of the anchorages are given in Annex 4 to 8.

Each anchor is to be marked with the identifying mark of the manufacturer, the type (GX-L), the diameter, the length of the anchor and the maximum fixture thickness according to Annex 3.

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 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 accordance with the Guideline for European Technical Approval of "Plastic Anchors for Plastic anchors for Multiple use in Concrete and Masonry for Non-structural Applications", ETAG020.

- Part 1: "General",
- Part 2: "Plastic Anchors for Use in Normal Weight Concrete",
- Part 3: "Plastic Anchors for Use in Solid Masonry " and
- Part 4: "Plastic Anchors for Use in Hollow or perforated Masonry "

based on the use categories a, b and c.

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.

⁶

The technical documentation of this European Technical Approval is deposited at the Centre Scientifique et Technique du Bâtiment 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 of Conformity and CE marking

3.1 Attestation of conformity system

According to the decision 97/463/EG of the European Commission ⁷ 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 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 CSTB⁸.

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 task of the 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.

⁷ Official Journal of the European Communities L 198 of 25.07.1997

⁸ The prescribed test plan has been deposited at the Centre Scientifique et Technique du Bâtiment and is only made available to the approved bodies involved in the conformity attestation procedure.

3.2.2 Tasks of approved bodies

3.2.2.1 Initial inspection of the factory and of factory production control

The approved body shall ascertain that, in accordance with the prescribed tests 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 mentioned in 2.1 as well as in the Annexes to the European technical Approval.

3.2.2.2 Continuous surveillance

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. The approved certification body shall visit the factory at least once a year for surveillance. It has to be verified that the system of factory production control and the specified automated manufacturing process 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 or inspection body, respectively, to the Centre Scientifique et Technique du Bâtiment.

In cases where the provisions of the European Technical Approval and the prescribed test plan are no longer fulfilled the conformity certificate shall be withdrawn and the CSTB must be informed without delay.

3.3 CE-Marking

The CE marking shall be affixed on each packaging of anchors. The "CE"-marking shall be accompanied by:

- identification number of FPC certification body;
- the name or identifying mark of the producer and manufacturing plant;
- the last two digits of the year in which the CE marking was affixed;
- the number of the European Technical Approval;
- the number of the relevant part of the ETAG 020 Plastic Anchor for use in concrete and masonry;
- size of the plastic anchor;
- use categories a, b and c.

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 automated manufacturing process as identified during inspection of the plant by the Centre Scientifique et Technique du Bâtiment and the approved body and laid down in the technical documentation. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to the Centre Scientifique et Technique du Bâtiment before the changes are introduced. The Centre Scientifique et Technique du Bâtiment 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

4.2.1 General

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.
- 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.
- The anchor is to be used only for multiple fixing for non-structural applications. 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 the design value of actions N_{Sd} on a fixing point to a value $\leq n_3$ (kN) is specified 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 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:
$$n_1 \geq 4; n_2 \geq 1 \text{ and } n_3 \leq 4,5 \text{ kN} \quad \text{or} \quad n_1 \geq 3; n_2 \geq 1 \text{ and } n_3 \leq 3,0 \text{ kN}.$$
- Shear loads acting on an anchor may be assumed to act without lever arm if both 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 4, Table 5.

4.2.2 Resistance in concrete (use category "a")

The characteristic values of resistance of the anchor for use in concrete are given in Annex 4, and Annex 5. 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 behavior of the "ESSVE façade plug" GX-L 10 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).

4.2.3 Resistance in solid masonry (use category "b")

The characteristic values of resistance of the anchor for use in solid masonry are given in Annex 6, 7 and 8. These values are independent of the load direction (tension, shear or combined tension and shear) and the mode of failure.

The characteristic resistances given in Annex 6, for use in solid masonry are only valid for the base material and the bricks according this tables or larger brick sizes and larger compressive strength of the masonry unit.

If smaller brick sizes are present on the construction site or if the mortar strength is smaller than the required value, the characteristic resistance of the anchor may be determined by job site tests according to 4.4.

4.2.4 Resistance in hollow or perforated masonry (use category "c")

The characteristic resistances for use in hollow or perforated masonry given in Annex 6 are only valid for the bricks and blocks according to this table regarding base material, size of the units, compressive strength and configuration of the voids.

These values are independent of the load direction (tension, shear or combined tension and shear) and the mode of failure and are valid for the given h_{nom} according Annex 3, Table 3.

The influence of larger embedment depths and/or different bricks and blocks (according Annex 6) regarding base material, size of the units, compressive strength and configuration of the voids) has to be detected by job site tests according to 4.4.

4.2.5 Specific conditions for the design in solid and hollow or perforated masonry

The mortar strength class of the masonry must be at least M 2,5 according to EN 998-2:2010.

The characteristic resistance F_{Rk} for a single plastic anchor may also be taken for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing s_{min} .

The distance between single plastic anchors or a group of anchors should be $s \geq 250$ mm.

If the vertical joints of the wall are designed not to be filled with mortar then the design resistance N_{Rd} has to be limited to 2,0 kN to ensure that a pull-out of one brick out of the wall will be prevented. This limitation can be omitted if interlocking units are used for the wall or when the joints are designed to be filled with mortar.

If the joints of the masonry are not visible the characteristic resistance F_{Rk} has to be reduced with the factor $\alpha_j = 0,5$.

If the joints of the masonry are visible (e.g. unplastered wall) the following conditions have to be taken into account:

- The characteristic resistance F_{Rk} may be used only, if the wall is designed such that the joints are to be filled with mortar.
- If the wall is designed such that the joints are not to be filled with mortar then the characteristic resistance F_{Rk} may be used only, if the minimum edge distance c_{min} to the vertical joints is observed. If this minimum edge distance c_{min} cannot be observed then the characteristic resistance F_{Rk} has to be reduced with the factor $\alpha_j = 0,5$.

No reduction factor α_j and no limitation of the design resistance N_{Rd} has to be considered for anchorages in vertical joints (butt joints) and horizontal joints (bed joints) in masonry made of vertically perforated clay bricks or made of interlocking units with thin bed joints.

4.2.6 Characteristic values, spacing and dimensions of anchorage member

The minimum spacing and dimensions of anchorage member according to Annex 5, and Annex 8 shall be observed depending on the base material.

4.2.7 Displacement behavior

The displacements under tension and shear loading in concrete and masonry are given in Annex 5, Table 8 and Annex 7, Table 11.

4.3 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 and under the supervision of the person responsible for technical matters on the site;
- Use of the anchor only as supplied by the manufacturer without exchanging the components of an anchor;
- Anchor installation in accordance with the manufacturer's specifications and drawings prepared for that purpose and using the appropriate 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 are identical to the values to which the characteristic loads apply;
- Observation of the drilling method using rotary drilling or hammer / impact drilling as given in Annex 6;
- Placing drilled 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 is impossible after the complete turn-in of the screw.
- Temperature during the installation of the anchor $\geq 0^{\circ}\text{C}$;
- Protection to UV exposure due to solar radiation of the anchor not protected.

4.4 Job site tests according to ETAG020, Annex B

4.4.1 General

In absence of national requirements, the characteristic tension resistance of the plastic anchor may be determined by means of job site pull-out tests if the base material present on the construction works are equivalent to the base materials (of the corresponding use category) given in Annex 6.

Furthermore job site tests for use in (different) solid masonry are possible only if the plastic anchor has already characteristic values given in Annex 6 for use in solid masonry.

Job site tests for use in (different) hollow or perforated masonry are possible only if the plastic anchor has already characteristic values given in Annex 6 for use in hollow or perforated masonry.

Job site tests are also possible, if another drill method is been used as it is given in Annex 6.

The characteristic resistance to be applied to a plastic anchor should be determined by means of at least 15 pull-out tests carried out on the construction work with a centric tension load acting on the plastic anchor. These tests may also performed in a laboratory under equivalent conditions as used on construction work

Execution and evaluation of the tests as well as issue of the test report and determination of the characteristic resistance shall be supervised by the person responsible for the execution of works on site and be carried out by a competent person.

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 unfavourable conditions of practical execution.

4.4.2 Assembly

The plastic anchor to be tested shall be installed (e.g. preparation of drilled hole, drilling tool to be used, drill bit, type of drilling hammer or rotation, thickness of fixture) and as far as the spacing and the edge distances are concerned be distributed in the same way as foreseen for the intended use.

Depending on the drilling tool hard metal hammer drill bits or hard metal rotation drill bits, according to ISO 5468 should be used. New drill bits should be used for one test series or drill bits with $8,25 \text{ mm} < d_{\text{cut}} \leq 8,45 \text{ mm}$ (ESSVE façade plug GX-L 8) or $10,25 \text{ mm} < d_{\text{cut}} \leq 10,45 \text{ mm}$ (ESSVE façade plug GX-L 10).

4.4.3 Execution of tests

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 apply perpendicular to the surface of the base material and shall be transmitted to the anchor via an hinge. The reaction forces shall be transmitted to the base material such that possible breakout of the masonry is not restricted. This condition is considered as fulfilled, if the support reaction forces are transmitted either in adjacent masonry units or at a distance of at least 150mm from the plastic anchors. 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. If no pull-out failure occurs, then other test methods are needed, e.g. proof-loading.

4.4.4 Test report

The test report shall include all information necessary to assess the resistance of the tested anchor. It shall be given to the person responsible for the design of the fastening and it shall be included in the construction dossier. The minimum data required are:

- Name of product
- Construction site, owner of building;
- Date and location of the tests, air temperature;
- Test rig
- Type of structure to be fixed
- Masonry (type of brick or block, strength class, all dimensions of bricks, mortar group if possible); visual assessment of masonry (flush joints, joint clearance, regularity)
- Plastic anchor and special screw
- Value of the cutting diameter of hard metal hammer-drill bits, measured before and after drilling if no new drill bits are used
- Results of tests including the indication of value N_1 ; mode of failure
- "Tests carried out or supervised by ..."; signature;

4.4.5 Evaluation of tests results

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

$$F_{Rk1} = 0,5 \cdot N_1$$

The characteristic resistance F_{Rk1} has to be equal or smaller than the characteristic resistance F_{Rk} which is given in the ETA for similar masonry (bricks or blocks)

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

In absence of national regulations the partial safety factors for the resistance of the plastic anchor may be taken as $\gamma_{Mm} = 2,5$ for use in masonry

5 Indications to the manufacturer

5.1 Responsibility of the manufacturer

It is the responsibility of the manufacturer to ensure that the information on the specific conditions according to sections 1, 2 and 4 including Annexes referred to 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 (d_{cut});
- overall anchor embedment depth in the base material (h_{nom});
- minimum hole depth (h_o);
- information on the installation procedure;
- identification of the manufacturing batch.

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

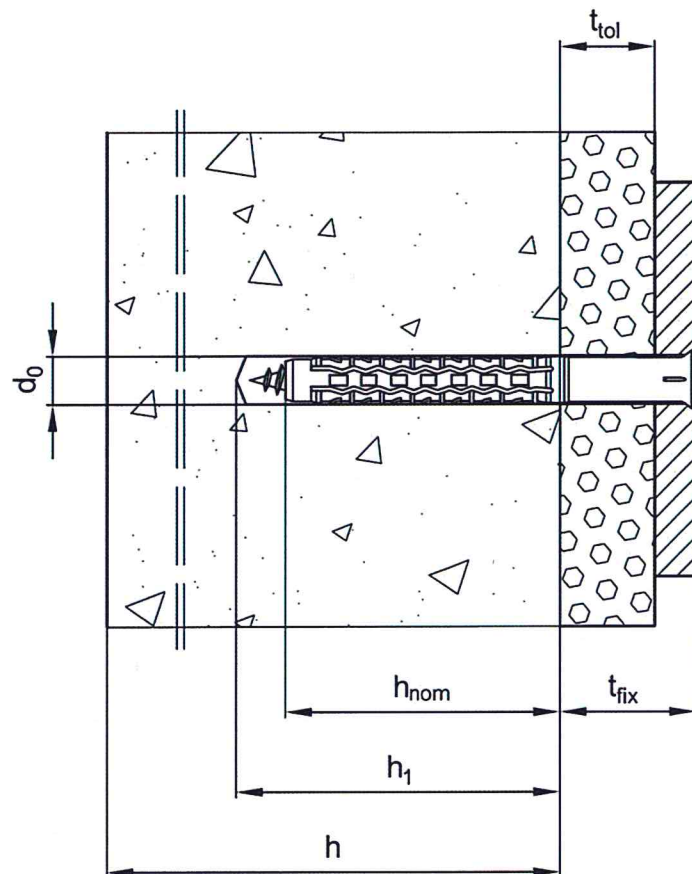
5.2 Recommendations on packaging, transport and storage.

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

The anchor shall be stored under normal climatic condition in its original light proof packaging. Before installation, it shall not be extremely dried or frozen.

The original French version is signed by

Le Directeur Technique
C. BALOCHE



Legend:

- d_0 = drill hole diameter
- h_{nom} = overall plastic anchor embedment depth in the base material
- h_1 = depth of the drilled hole to deepest point
- h = thickness of member
- t_{tol} = thickness of the nonstructural coating
- t_{fix} = thickness of the fixture

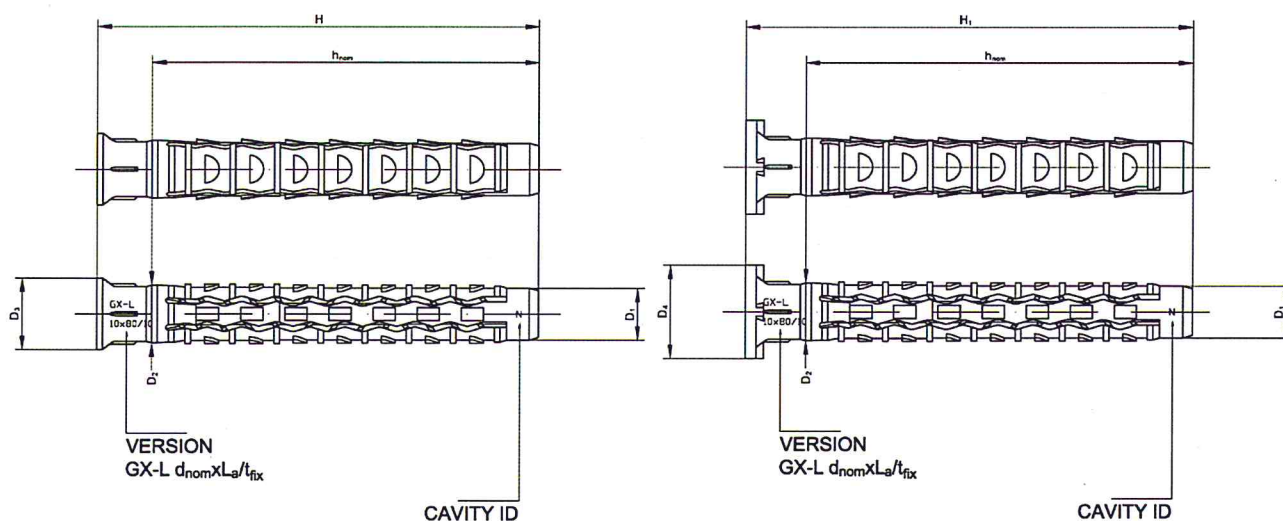
Intended use:

Fixing in cracked or non-cracked concrete and masonry for non structural applications
Temperature range: -20°C / + 40°C
Temperature during the installation of the anchor $\geq 0^\circ\text{C}$

ESSVE façade plug grey extra long	Annex 1 of the European Technical Approval ETA - 12/0293
Intended use	

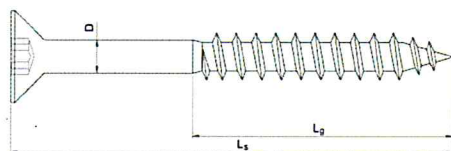
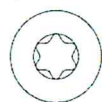
"ESSVE façade plug grey extra long" anchor sleeve

version with collar

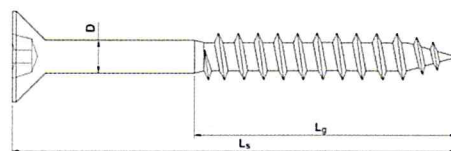
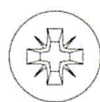


Version with collar for size $\phi 10$ only

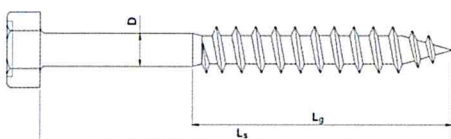
Special screws



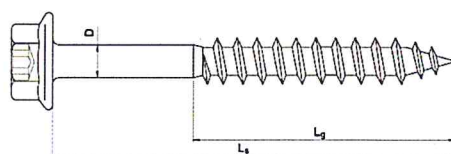
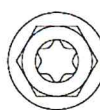
Torx



PZ



HEX



HEX Flanged head

ESSVE façade plug grey extra long

Anchor type, special screws

Annex 2

of the European
 Technical Approval
ETA - 12/0293

Table 1 : Materials

Designation	Material
Plastic sleeve	Polyamide PA6, Light grey
Special screw	Carbon steel, Grade 5.8, Galvanized acc. ISO 4042 Carbon steel, Grade 5.8, Hot dip galvanized acc. ISO 10684 Stainless steel AISI 316; 1.4401

Table 2: Dimensions

Anchor type	Plastic sleeve								Screw						
	d_{nom}	h_{nom}	D_1	D_2	D_3	D_4	$t_{fix,max}$	H	D	L_s	L_g	Torx	PZ	HEX	HEX Torx Flanged
8x80/10	8	70	7,8	8,5	10,5	-	10	80	5,5	85	55	x	x	x	-
8x100/30							30	100		105		x	x	x	-
8x120/50							50	120		125		x	x	x	-
8x140/70							70	140		145		x	x	x	-
10x80/10	10	70	9,5	10,5	13,0	17,0	10	80	7,0	85	58-85	x	x	x	x
10x100/30							30	100		105	63-85	x	x	x	x
10x120/50							50	120		125	63-85	x	x	x	x
10x140/70							70	140		145	63-85	x	x	x	x
10x160/90							90	160		165	63-85	x	x	x	x
10x200/130							130	200		205	63-85	x	x	x	x
10x240/170							170	240		245	80-85	x	x	x	x
10x260/190							190	260		260	80-85	x	x	x	x

Denomination (as per marking):

GX-L $d_{nom} \times L_a / t_{fix}$: GX-L 8x80/10

Table 3: Installation parameters

Designation		GX-L 8	GX-L 10
Drill hole diameter	$d_0 =$ [mm]	8	10
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	8,45	10,45
Depth of drill hole to deepest point	$h_1 \geq$ [mm]	80	80
Overall plastic anchor embedment depth in the base material	$h_{nom} \geq$ [mm]	70	70
Diameter of the clearance hole in the fixture	$d_f \leq$ [mm]	8,5	10,5

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Dimensions, Material, Installation parameters

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Table 4: Characteristic resistance of the screw for use in concrete and masonry

Designation			Galvanized steel		Stainless steel
			GX-L 8	GX-L 10	GX-L 10
Characteristic tension resistance	$N_{Rk,s}$	[kN]	9,6	12,8	12,3
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,50	1,49	2,86
Characteristic shear resistance	$V_{Rk,s}$	[kN]	4,8	6,4	6,2
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,25	1,50	2,38

¹⁾ In absence of other national regulations

Table 5: Characteristic bending resistance of the special screw in concrete and masonry

Designation			Galvanized steel		Stainless steel
			GX-L 8	GX-L 10	GX-L 10
Screw diameter	d_s	[mm]	5,5	7,0	7,0
Characteristic bending resistance	$M_{Rk,s}$	[Nm]	5,6	10,7	10,3
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,25	1,50	2,38

¹⁾ In absence of other national regulations

Table 6: Characteristic resistance of the plastic sleeve for use in concrete

Pull-out failure		GX-L 8	GX-L 10
Characteristic resistance, concrete \geq C16/20	$N_{Rk,p}$ [kN]	2,0	3,0
Characteristic resistance, concrete C12/15	$N_{Rk,p}$ [kN]	1,2	2,0
Partial safety factor	$\gamma_{Mc}^{1)}$ [-]	1,8	1,8

¹⁾ In absence of other national regulations

Table 7: Concrete cone failure and concrete edge failure for single anchor and anchor group

Tension load ²⁾	
$N_{Rk,c} = 7.2 \cdot \sqrt{f_{ck,cube}} \cdot h_{ef}^{1,5} \cdot \frac{c}{c_{cr,N}} = N_{Rk,p} \cdot \frac{c}{c_{cr,N}}$	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 ²⁾	
$V_{Rk,c} = 0,45 \cdot \sqrt{d_{nom}} \cdot (h_{nom} / d_{nom})^{0,2} \cdot \sqrt{f_{ck,cube}} \cdot c_1^{1,5} \cdot \left(\frac{c_2}{1,5c_1}\right)^{0,5} \cdot \left(\frac{h}{1,5c_1}\right)^{0,5}$	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 most	
Partial safety factor $\gamma_{Mc}^{1)}$	1,8

¹⁾ In absence of other national regulations

²⁾ The design according to ETAG020, Annex C is to be used

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Characteristic resistance in concrete

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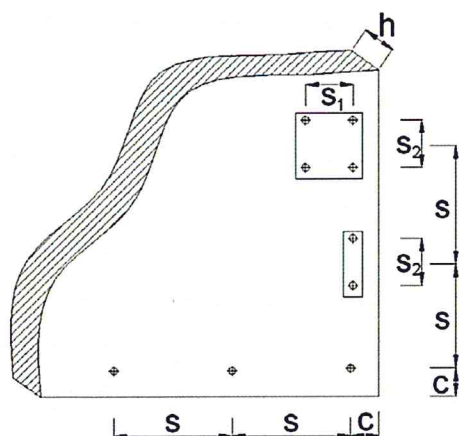
Table 8: Displacement under tension and shear loading in concrete

Anchor size	Tension load			Shear load		
	F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]
GX-L 8	0,79	0,46	0,21	1,14	0,74	1,11
GX-L 10	1,19	0,35	0,47	1,71	1,57	2,35

Table 9: Minimum thickness of member, edge distance and anchor spacing in concrete

Anchor size	Concrete	h_{min}	$C_{cr,N}$	C_{min}	S_{min}
		[mm]	[mm]	[mm]	[mm]
GX-L 8	Concrete C12/15	100	100	70	70
	Concrete \geq C16/20	100	70	50	50
GX-L 10	Concrete C12/15	100	140	70	85
	Concrete \geq C16/20	100	100	50	60

Scheme of distance and spacing



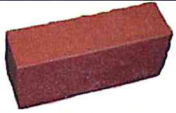

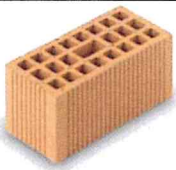



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Displacements, minimum thickness, edge distances and spacings in concrete

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Table 10: Characteristic resistance in masonry

Base material	Picture / Measures [mm]	Drill method ¹⁾	Density class [kg/dm ³]	Compressive strength class [N/mm ²]	F _{rk} ²⁾ [kN]	
					GX-L 8	GX-L 10
Solid clay brick EN 771-1	 247x118x73	H	>2,1	f _b ≥ 75 ³⁾	3,5	4,0
				f _b ≥ 20 ³⁾	1,5	1,2
Solid sand-lime brick EN 771-2	 240x114x71	H	>1,9	f _b ≥ 30 ³⁾	1,5	2,5
Vertically perforated clay brick EN 771-1 e.g.: Wienerberger Doppio Uni	 120x250x120	H	>0,91	15	0,5	0,75
Hollow clay brick EN 771-1 e.g.: Imerys Optibric PV	 560x200x274	R	>0,60	7,5	0,3	0,5
Vertically perforated clay brick EN 771-1 e.g.: Bergmann HLZ 12	 240 x115x113	H	>0,90	12	0,5	0,9
Sand-lime perforated brick KSL-R 8DF DIN 106 / EN 771-2	 250x240x238	H	>1,3	15	0,5	1,2
Partial safety factor	γ _{Mm} ⁴⁾	2,5				

¹⁾ H= Hammer drilling; R= Rotary drilling

²⁾ Characteristic resistance F_{rk} for tension, shear or combined tension and shear loading.

The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing s_{min} according to Table 12. The specific conditions for the design method have to be considered according to chapter 4.2.5 of the ETA.

³⁾ f_b = minimum mean compressive strength

⁴⁾ In absence of other national regulations

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Characteristic resistance in masonry

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Table 11: Displacements under tension and shear loading in masonry

Base material ¹⁾	Displacement									
	GX-L 8					GX-L 10				
	F [kN]	Tension load		Shear load		F [kN]	Tension load		Shear load	
		δ_{N0}	$\delta_{N\infty}$	δ_{V0}	$\delta_{V\infty}$		δ_{N0}	$\delta_{N\infty}$	δ_{V0}	$\delta_{V\infty}$
Solid clay brick EN 771-1	1,00	0,20	0,40	0,83	1,25	1,14	0,39	0,78	0,95	1,43
Solid sand-lime brick EN 771-2	0.43	0,17	0,34	0,35	0,54	0,71	0,13	0,26	0,59	0,88
Vertically perforated clay brick EN 771-1 e.g.: Wienerberger Doppio Uni	0.14	0,15	0,30	0,12	0,18	0,21	0,11	0,22	0,18	0,27
Hollow clay brick EN 771-1 e.g.: Imerys Optibric PV	0.09	0,09	0,18	0,07	0,11	0,14	0,10	0,20	0,12	0,18
Vertically perforated clay brick EN 771-1 e.g.: Bergmann HLZ 12	0.14	0,10	0,20	0,12	0,18	0,26	0,27	0,54	0,22	0,33
Sand-lime perforated brick KSL-R 8DF DIN 106 / EN 771-2	0.14	0,13	0,26	0,12	0,18	0,34	0,15	0,30	0,29	0,43

1) Information for base material masonry: see Annex 6, Table 10

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Displacements in masonry

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Table 12: Minimum thickness of member, edge distance and anchor spacing in masonry for "ESSVE façade plug grey extra long" GX-L 8 and GX-L 10

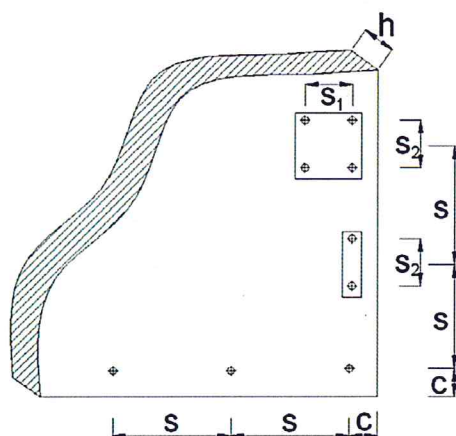
Base material ¹⁾	Minimum thickness of member h_{min} [mm]	Edge distance c_{min} [mm]	Spacing		
			Single anchor s_{min} [mm]	perpendicular to free edge $s_{1,min}$ [mm]	parallel to free edge $s_{2,min}$ [mm]
Solid clay brick EN 771-1	115	100	250	200	400
Solid sand-lime brick EN 771-2	115	100	250	200	400
Vertically perforated clay brick EN 771-1 <i>e.g.: Wienerberger Doppio Uni</i>	115	100	250	200	400
Hollow clay brick EN 771-1 <i>e.g.: Imerys Optibric PV</i>	200	100	250	200	400
Vertically perforated clay brick EN 771-1 <i>e.g.: Bergmann HLZ 12</i>	115	100	250	200	400
Sand-lime perforated brick KSL-R 8DF DIN 106 / EN 771-2	240	100	250	200	400

1) Information for base material masonry: see Annex 6, Table 10

2) The design method is valid for single anchors and anchor groups with two or four anchors.

3) For edge distance $c \geq 200$ mm in hollow or perforated masonry (use category "c") the values for spacing only may be reduced to $s_{1,min} = s_{2,min} = 100$ mm, if the characteristic resistance for an anchor group F_{Rk} according Annex 6, Table 10 is reduced with the factor 0,5. Intermediate values by linear interpolation.

Scheme of distances and spacing



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Minimum thickness, edge distances and spacings in masonry

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