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Członek EOTA

European Technical Approval ETA-13/0929

English language translation - the original version is in Polish language

Nazwa handlowa *Trade name*	**SCREWBOLT SB2-PLUS** *SCREWBOLT SB2-PLUS*
Rodzaj i przeznaczenie wyrobu *Generic type and use of construction products*	**Kotwy śrubowe ze stali ocynkowanej o wymiarach M10, M12, M14 i M16 do stosowania w betonie** *Concrete screw made of galvanized steel of sizes M10, M12, M14 and M16 for use in concrete*
Termin ważności **od** *Valid from*	**25. 06. 2013**
do *to*	**12. 06. 2018**
Zakład produkcyjny *Manufacturing plant*	**Zakład Produkcyjny 9** *Manufacturing Plant 9*
Niniejsza Europejska Aprobata Techniczna zawiera *This European Technical Approval contains*	**12 stron, w tym 5 Załączników** *12 pages including 5 Annexes*

I LEGAL BASES AND GENERAL CONDITIONS

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

   - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], amended by the Council Directive 93/68/EEC of 22 July 1993[2];
   - ustawa z dnia 16 kwietnia 2004 r. o wyrobach budowlanych (law on construction products from 16th April 2004)[3];
   - rozporządzenie Ministra Infrastruktury z dnia 14 października 2004 r. w sprawie europejskich aprobat technicznych oraz polskich jednostek organizacyjnych upoważnionych do ich wydawania (regulation of Ministry of Infrastructure of 14th October 2004 on the European Technical Approvals and Polish bodies entitled to issue them)[4];
   - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC[5];
   - Guideline for European Technical Approval of *"Metal anchors for use in concrete - Part 3: Undercut anchors"*, ETAG 001-03.

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

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

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

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

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

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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 the product and intended use

1.1 Definition of the product

The subject of this approval is SCREWBOLT SB2-PLUS concrete screw anchor of sizes M10, M12, M14 and M16 made of heat treated carbon steel. The anchor is screwed into a predrilled cylindrical hole. The special thread of the anchor cuts an internal thread into a concrete member while setting. The anchorage is characterized by mechanical interlock in the special thread.

An illustration of the product and intended use is given in Annexes 1 and 2.

1.2 Intended use

SCREWBOLT SB2-PLUS is intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 of Council Directive 89/106/EEC shall be fulfilled and failure of anchorages made with these products would cause risk to human life and/or lead to considerable economic consequences.

The anchor is to be used only for anchorages subject to static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength classes C20/25 at minimum and C50/60 at most according to EN 206-1:2000-12.

The anchor may be anchored in cracked or non-cracked concrete.

The anchor may only be used in structures subjected to dry internal conditions.

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 provisions given in Annexes 1 to 5. The characteristic of the material, dimensions and tolerances of the anchor not given in 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 Annexes 4 and 5.

Each anchor shall be marked with identifying mark of the manufacturer, the anchor type, the anchor diameter and length according to Annex 1.

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

2.2 Methods of verification

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirement 1 and 4 has been made in accordance with the ETAG 001 Guideline for European Technical Approval of *"Metal Anchors for Use in Concrete"*, Part 1: *"Anchors in general"* and Part 3: *"Undercut anchors"*, on the basis of Option 1.

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.

3 Evaluation and attestation of conformity and CE-marking

3.1 Attestation of conformity system

The system of attestation of conformity 2 (i) (referred to as system 1) according to Council Directive 89/106/EEC Annex III laid down by the European Commission provides:

(a) Tasks of the manufacturer:

1. factory production control,
2. further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan;

(b) Tasks of the approved body:

3. initial type-testing of the product,
4. initial inspection of factory and of factory production control,
5. 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 have a factory production control system in the plant and 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 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 approved body

The approved body shall perform the:

- initial type-testing of the product,
- 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 product stating the conformity with the provision of this European Technical Approval.

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

3.3 CE-marking

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

- name and address of the holder of the approval and manufacturing plant,
- identification number of the approved certification body,
- last two digits of the year in which the CE-marking was affixed,
- number of the EC certificate of conformity,
- number of the European Technical Approval,
- number of the guideline for European Technical Approval,
- use category (ETAG 001-1, Option 1),
- anchor size.

[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.

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

4.1 Manufacturing

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

4.2 Design of anchorages

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

- the anchorages are designed in accordance with ETAG 001 Guideline for European Technical Approval of "*Metal Anchors for Use in Concrete*", Annex C, Method A, under the responsibility of an engineer experienced in anchorages and concrete work,
- verifiable calculation notes and drawings are prepared taking account of the loads to be anchored,
- the position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, in cracked or non-cracked concrete).

4.3 Installation of anchors

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

- anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site,
- use of the anchor only as supplied by the manufacturer,
- anchor installation in accordance with the manufacturer's specifications and drawings,
- check before placing the anchor to ensure that the strength class of the concrete, in which the anchor is to be placed, is identical with the values which the characteristic loads apply,
- check of concrete being well compacted, e.g. without significant voids,
- edge distances and spacings not less than the specified values without minus tolerances,
- positioning of the drill holes without damaging the reinforcement,
- in case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of load application,
- cleaning of the hole of drilling dust (at least 3 times) according to Annex 3,
- anchor installation such that the embedment anchorage depth in the concrete is in accordance with the values given in Annex 2,

- fixture fully pressed on the concrete surface without intermediate layers,
- head of the installed anchor fully supported on the fixture and not damaged.

5 Responsibility of the manufacturer

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

The minimum data required are:

- diameter of drill bit,
- anchor size,
- maximum thickness of the fixture,
- minimum embedment depth,
- minimum hole depth,
- information on the installation procedure, including cleaning of the hole, preferably by means of an illustration,
- reference to any special installation equipment needed,
- identification of the manufacturing batch.

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

On behalf of Instytut Techniki Budowlanej

Jan Bobrowicz
Director of ITB

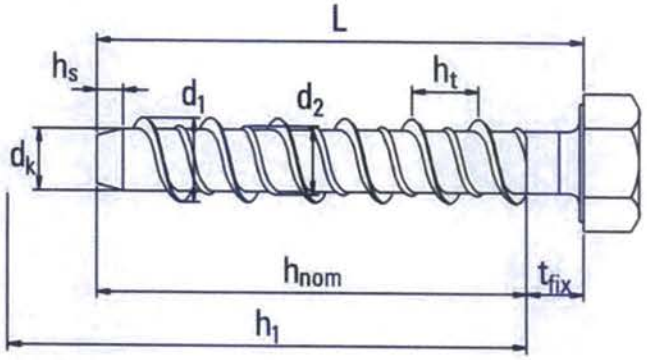
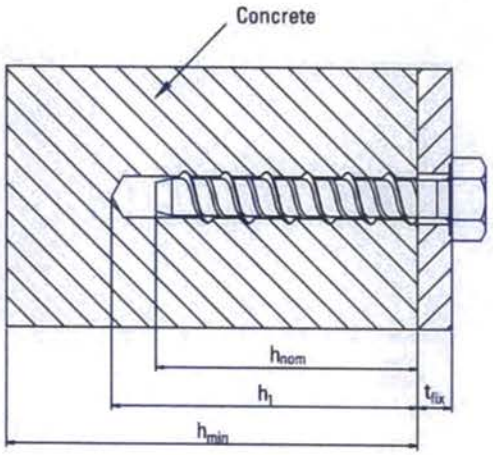


Table 1: Dimensions and material

Anchor size			**SB2-PLUS 8/10**	**SB2-PLUS 10/12**	**SB2-PLUS 12/14**	**SB2-PLUS 14/16**
Length of anchor L	L_{min}	mm	70	80	100	120
	L_{max}	mm	250	350	350	350
Bolt diameter $Ød_k$		mm	7.50	9.37	11.35	13.20
Higher thread diameter $Ød_1$		mm	9.85	11.95	14.08	16.23
Lower thread diameter $Ød_2$		mm	8.13	10.25	12.15	14.18
Thread pitch h_t		mm	10	12	12	17
h_s		mm	5	5	5	5
Material			Steel 10B21 acc. to SAE-J403 Electroplated zinc coating (≥ 5 µm)			



SCREWBOLT SB2-PLUS	**Annex 1** of European Technical Approval ETA-13/0929
Product and intended use	

Head types and marking:

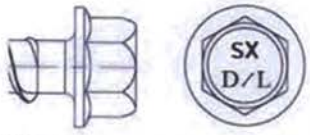
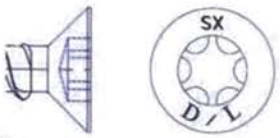
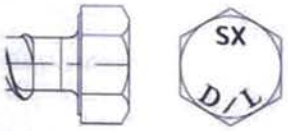
Hex Flange Head	Countersunk Torx Head	Hex Head
		
Marking: Identifying mark of the producer: **SX** D / L where: D = drill size [mm] e.g. 10 L = length of anchor [mm] e.g. 100	**Marking:** Identifying mark of the producer: **SX** D / L where: D = drill size [mm] e.g. 12 L = length of anchor [mm] e.g. 120	**Marking:** Identifying mark of the producer: **SX** D / L where: D = drill size [mm] e.g. 14 L = length of anchor [mm] e.g. 130

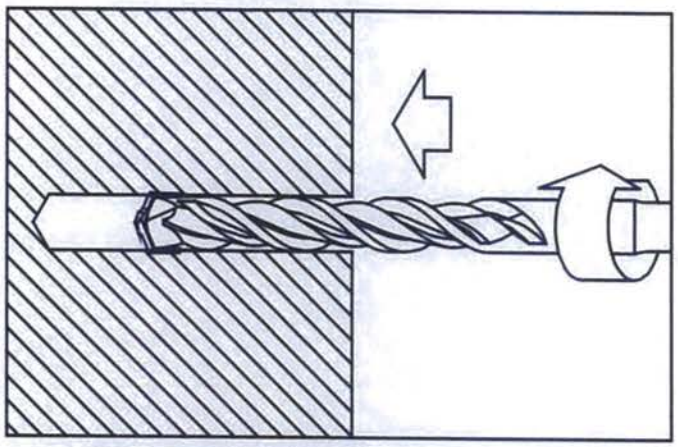
Table 2: Installation parameters

Anchor size			SB2-PLUS 8/10	SB2-PLUS 10/12	SB2-PLUS 12/14	SB2-PLUS 14/16
Nominal drill bit diameter	$Ød_0$	mm	8	10	12	14
Cutting diameter of drill bit	$Ød_{cut} \leq$	mm	8.45	10.45	12.50	14.50
Depth of drill hole	$h_1 \geq$	mm	75	85	105	125
Diameter of clearance hole in the fixture	$Ød_f \geq$	mm	12	14	16	18
Embedment depth of anchor	h_{nom}	mm	65	75	95	115
Installation torque	T_{inst}	N·m	30	40	50	60

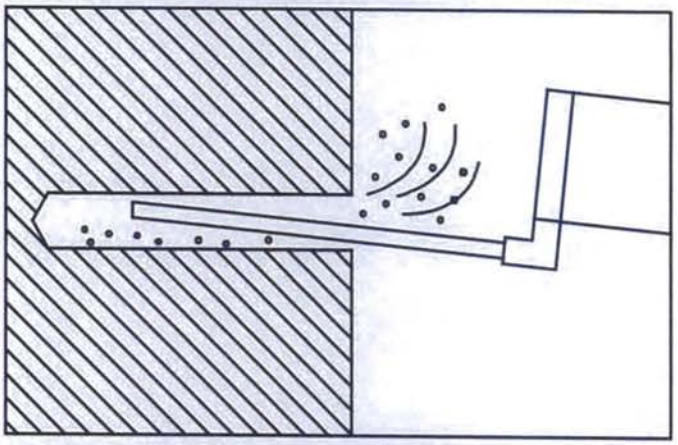
Table 3: Minimum thickness of concrete member, minimum spacing and minimum edge distance

Anchor size			SB2-PLUS 8/10	SB2-PLUS 10/12	SB2-PLUS 12/14	SB2-PLUS 14/16
Minimum thickness of member	h_{min}	mm	110	110	130	150
Minimum edge distance	c_{min}	mm	60	70	80	90
Minimum spacing	s_{min}	mm	60	70	80	90

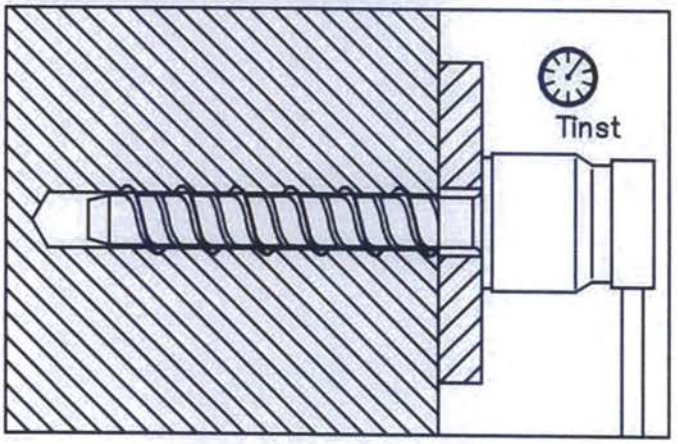
SCREWBOLT SB2-PLUS	**Annex 2** of European Technical Approval ETA-13/0929
Marking and installation parameters	



Drill hole with rotary percussive machine. Drill to a required depth.



Blow out dust at least 3 times with a hand pump.



Screw the anchor with suitable impact screw driver (BOSCH GDS 18 E).

SCREWBOLT SB2-PLUS

Installation instruction

Annex 3

of European Technical Approval ETA-13/0929

Table 4: Design method A, characteristic values for tension loads

Anchor size				**SB2-PLUS 8/10**	**SB2-PLUS 10/12**	**SB2-PLUS 12/14**	**SB2-PLUS 14/16**
Steel failure							
Characteristic resistance	$N_{Rk,s}$	kN		42,4	67,2	99,4	134,0
Partial safety factor	γ_{Ms} [1]	-		1,4			
Pullout failure							
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	kN		7,5	9,0	16	20
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	kN		12	16	25	35
Increasing factors for cracked and non-cracked concrete	ψ_c		C30/37	1,17	1,17	1,17	1,22
			C40/50	1,32	1,32	1,32	1,41
			C50/60	1,42	1,42	1,42	1,55
Partial safety factor for cracked concrete	γ_{Mp} [1]	-		1,8			
Partial safety factor for non-cracked concrete	γ_{Mp} [1]	-		1,8			
Effective anchorage depth	h_{ef}	mm		47	54	71	86
Edge distance	$c_{cr,sp}$	mm		71	81	107	129
Spacing	$s_{cr,sp}$	mm		141	162	213	258
Edge distance	$c_{cr,N}$	mm		71	81	107	129
Spacing	$s_{cr,N}$	mm		141	162	213	258

[1] in the absence of other national regulations

Table 5a: Displacement under tension loads for non-cracked concrete

Anchor size			**SB2-PLUS 8/10**	**SB2-PLUS 10/12**	**SB2-PLUS 12/14**	**SB2-PLUS 14/16**
Tension load	N	kN	5,8	8,5	12,6	15,6
Displacement	δ_{N0}	mm	0,3	0,4	0,4	0,6
	$\delta_{N\infty}$	mm	1,4	1,5	1,8	1,9

Table 5b: Displacement under tension loads for cracked concrete

Anchor size			**SB2-PLUS 8/10**	**SB2-PLUS 10/12**	**SB2-PLUS 12/14**	**SB2-PLUS 14/16**
Tension load	N	kN	3,2	4,0	6,9	9,6
Displacement	δ_{N0}	mm	0,4	0,5	0,5	0,6
	$\delta_{N\infty}$	mm	2,0	2,0	2,0	2,0

SCREWBOLT SB2-PLUS	**Annex 4** of European Technical Approval ETA-13/0929
Design method A, characteristic values for tension load; displacement	

Table 6: Design method A, characteristic values for shear loads

Anchor size			**SB2-PLUS 8/10**	**SB2-PLUS 10/12**	**SB2-PLUS 12/14**	**SB2-PLUS 14/16**
Steel failure without lever arm						
Characteristic resistance	$V_{Rk,s}$	kN	17,0	26,9	39,8	53,5
Partial safety factor	γ_{Ms} [1]	-	1,5			
Steel failure with lever arm						
Characteristic resistance	$M^0_{Rk,s}$	Nm	46,8	93,2	167,7	261,8
Partial safety factor	γ_{Ms} [1]	-	1,5			
Pryout failure						
Factor k, ETAG 001, Annex C, equation 5.6		-	1,0		2,0	
Concrete edge failure						
Effective length of anchor	l_f	mm	47	54	71	86
Partial safety factor	γ_{Mc} [1]	-	1,8			

[1] in the absence of other national regulations

Remark for design of anchorage under shear load:
In general, the conditions given in ETAG 001, Annex C, section 4.2.2.1 a) and 4.2.2.2 b) are not fulfilled because the diameter of the clearance hole in the fixture acc. to Annex 2, Table 2 is greater than the values given in Annex C, Table 4.1 for the corresponding diameter of the anchor.

Table 7: Displacement under shear loads

Anchor size			**SB2-PLUS 8/10**	**SB2-PLUS 10/12**	**SB2-PLUS 12/14**	**SB2-PLUS 14/16**
Shear load	V	kN	6,9	11,0	15,0	15,5
Displacement	δ_{V0}	mm	1,5	1,7	2,0	2,7
	$\delta_{V\infty}$	mm	2,3	2,6	3,0	4,1

SCREWBOLT SB2-PLUS	**Annex 5** of European Technical Approval ETA-13/0929
Design method A, characteristic values under shear load; displacement	