



INSTYTUT TECHNIKI BUDOWLANEJ
PL 00-611 WARSZAWA
ul. Filtrowa 1
tel.: (+48 22) 825-04-71
(+48 22) 825-76-55
fax: (+48 22) 825-52-86
www.itb.pl



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European Technical Assessment

**ETA-15/0122
of 24/03/2015**

General Part

Technical Assessment Body issuing the European Technical Assessment

Instytut Techniki Budowlanej

Trade name of the construction product

SMOIA, SMIAD, SMIAL and SMIAI

Product family to which the construction product belongs

Deformation-controlled expansion anchors for multiple use for non-structural applications in concrete

Manufacturer

PGB – Polska sp. z o.o.
ul. Jondy 5
44-100 Gliwice
Poland

Manufacturing plant(s)

Manufacturing Plants no. 5a and 5b

This European Technical Assessment contains

10 pages including 3 Annexes which form an integral part of this assessment

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of

Guideline for European Technical Approval ETAG 001, Edition April 2013 “Metal anchors for use in concrete – Part 1: Anchors in general and Part 6: Anchors for multiple use for non-structural applications”, used as European Assessment Document (EAD)

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Specific Part

1 Technical description of the product

The SM0IA, SMIAD, SMIAL and SMIAI are deformation-controlled expansion anchors. The anchors SM0IA, SMIAD and SMIAL are made of zinc plated steel and SMIAI are made of stainless steel.

The anchor is installed in a drilled hole and anchored by deformation-controlled expansion.

The description of the product is given in Annex A1.

2 Specification of the intended use in accordance with the applicable European Assessment Document (EAD)

The performances given in Section 3 are only valid if the anchors are used in compliance with the specifications and conditions given in Annex B1 to B3.

The performances given in this European Technical Assessment 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 or the Technical Assessment 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.

3 Performance of the product and references to the methods used for its assessment

3.1 Performance of the product

3.1.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for all load directions	See Annex C1
Edge distances and spacing	See Annex C1

3.1.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchors satisfy requirements for Class A1
Resistance to fire	See Annex C2

3.1.3 Hygiene, health and the environment (BWR 3)

Regarding the dangerous substances clauses contained in this European Technical Assessment, there may be 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 Regulation, these requirements need also to be complied with, when and where they apply.

3.1.4 Safety in use (BWR 4)

For Basic Requirement Safety in use the same criteria are valid as for Basic Requirement Mechanical resistance and stability (BWR 1).

3.1.5 Sustainable use of natural resources (BWR 7)

No performance determined.

3.1.6 General aspects relating to fitness for use

Durability and serviceability are only ensured if the specifications of intended use according to Annex B1 are kept.

3.2 Methods used for the assessment

The assessment of fitness of the anchors for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Basic Requirements 1 and 4 has been made in accordance with the ETAG 001 "Metal anchors for use in concrete", Part 1: "Anchors in general" and Part 6: "Anchors for multiple use for non-structural applications".

The assessment of the anchor for the intended use in relation to the requirements for resistance to fire has been made in accordance with the EOTA Technical Report TR 020 "Evaluation of anchorages in concrete concerning resistance to fire".

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

According to Decision 97/161/EC of the European Commission the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table applies.

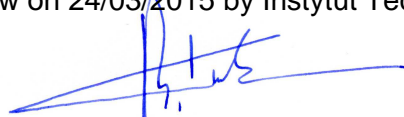
Product	Intended use	Level or class	System
Metal anchors for use in concrete (light-duty type)	For use in redundant systems for fixing and/or supporting to concrete elements such as lightweight suspended ceilings, as well as installations	–	2+

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document (EAD)

Technical details necessary for the implementation of the AVCP system are laid down in the Control Plan which is deposited at Instytut Techniki Budowlanej.

For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 24/03/2015 by Instytut Techniki Budowlanej



Marcin M. Kruk, Dr. Eng.
Director of ITB

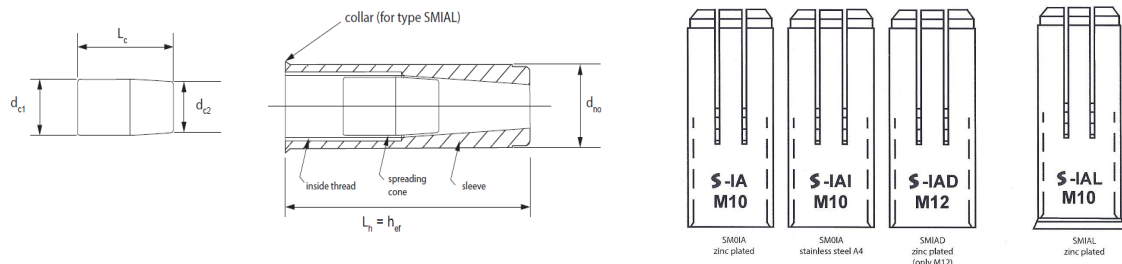


Table A1. Anchors SMOIA, SMIAL, SMIAD – dimensions and materials

Anchor type		SMOIA, SMIAL							SMIAD
Anchor size		M6	M8	M10	M10*	M12	M16	M20	M12
Anchor length L_H	[mm]	25	30	30	40	50	65	80	50
Thread inside	[mm]	6	8	10	10	12	16	20	12
External diameter d_{nom}	[mm]	8	10	12	12	15	20	25	16
Anchor material	cold forming steel C1008 or EN 10277; thickness of zinc coating $\geq 5 \mu\text{m}$ acc. to EN ISO 4042 $f_{uk} \geq 450 \text{ N/mm}^2$ and $f_{yk} \geq 360 \text{ N/mm}^2$ *cold forming steel C1015 or EN 10277; thickness of zinc coating $\geq 5 \mu\text{m}$ acc. to EN ISO 4042 $f_{uk} \geq 450 \text{ N/mm}^2$ and $f_{yk} \geq 360 \text{ N/mm}^2$								

Table A2. Anchor SMIAI – dimensions and materials

Anchor type		SMIAI					
Anchor size		M6	M8	M10	M12	M16	M20
Anchor length L_H	[mm]	25	30	40	50	65	80
Thread inside	[mm]	6	8	10	12	16	20
External diameter d_{nom}	[mm]	8	10	12	15	20	25
Anchor material	stainless steel 1.4401 acc. to EN 10088 (AISI 316) $f_{uk} \geq 500 \text{ N/mm}^2$ and $f_{yk} \geq 210 \text{ N/mm}^2$						

Table A3. Spreading cone – dimensions and materials

Spreading cone		M6	M8	M10	M12	M16	M20
Rear diameter d_{c1}	[mm]	5,0	6,4	8,0	10,3	13,5	16,8
Front diameter d_{c2}	[mm]	4,3	5,1	6,8	7,8	13,0	15,2
Length l_c	[mm]	9,8	11,4	16,0	20,8	29,2	30,0
Spreading cone material	cold forming steel C1008; thickness of zinc coating $> 5 \mu\text{m}$ or stainless steel 1.4401, 1.4404 acc. to EN 10088						

SMOIA, SMIAD, SMIAL and SMIAI

Product description
 Characteristic of the product

Annex A1
 of European
 Technical Assessment
 ETA-15/0122

SPECIFICATION OF INTENDED USE

Anchorage subject to:

- Multiple use for non-structural applications: sizes from M6 to M20. The definition of multiple use according to the Member States is given on the informative Annex 1 of ETAG 001, Part 6.
- Static and quasi-static loads: sizes from M6 to M20.
- Anchorages with requirements related to resistance to fire: sizes from M8 to M20.

Base material:

- Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum to C50/60 at maximum according to EN 206.
- Non-cracked concrete.

Use conditions (environmental conditions):

- Structures subject to dry internal conditions: zinc coated steel (all the sizes) and stainless steel (size M6).
- Structures subject to dry internal conditions and also external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions if no particular aggressive conditions exist:
stainless steel (sizes M8 to M20)

Note: 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 de-icing materials are used).

Design:

- Anchorages are designed 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 transmitted. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages under static and quasi-static loads are designed in accordance with ETAG 001, Annex C, design method C, Edition August 2010.
- The design of anchorages under fire exposure has to consider the conditions given in the EOTA Technical Report TR 020.

Installation:

- 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 without exchanging any component of the anchor.
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools.
- Check of concrete being well compacted, e.g. without significant voids.
- 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 in the direction of load application.
- Anchor installation such that the effective anchorage depth is complied with.

SM0IA, SMIAD, SMIAL and SMIAI	Annex B1 of European Technical Assessment ETA-15/0122
Intended use Specification	

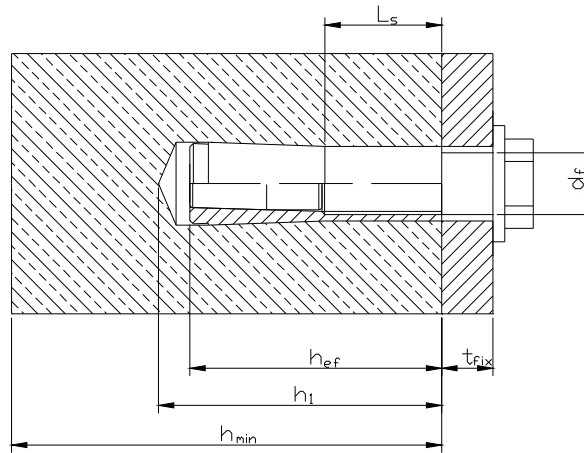


Table B1: Installation parameters

Anchor size	Effective anchorage depth	Drill hole depth	Drill hole diameter	Installation torque (max)	Thickness of concrete member (min)	Screwing depth (min)	Screwing depth (max)	Diameter of clearance hole in the fixture
	[mm]	[mm]	[mm]	[Nm]	[mm]	[mm]	[mm]	[mm]
	h_{ef}	h_1	d_0	max T_{inst}	h_{min}	$L_{s, min}$	$L_{s, max}$	d_f
M6	25	27	8	4,5	80	6	11	7
M8	30	33	10	11	80	8	13	9
M10	30	33	12	22	80	8	13	12
M10	40	43	12	22	80	10	15	12
M12	50	54	15	38	100	12	20	14
M12*	50	54	16	38	100	12	20	14
M16	65	70	20	98	130	16	25	18
M20	80	86	25	130	160	20	35	22

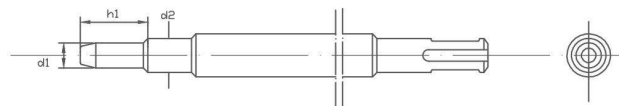
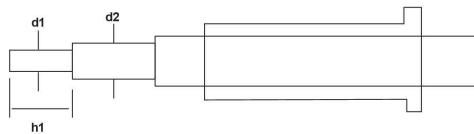
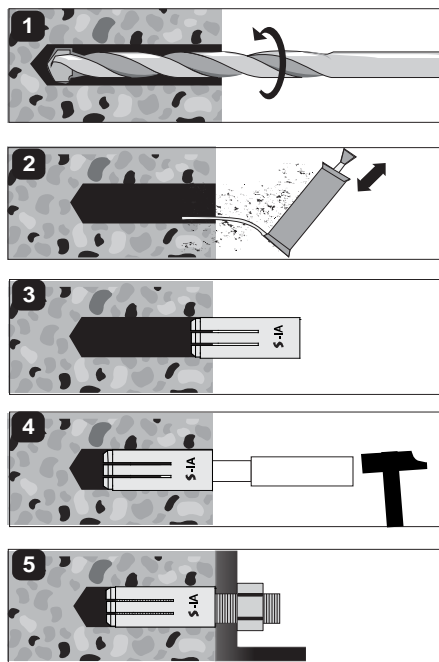
* SMIAD only

Fastening screws or anchor threaded rods:

Steel, property class ≥ 4.8 according to EN-ISO 898-1; thickness of galvanizing $\geq 5 \mu\text{m}$ (for SM0IA, SMIAD, SMIAL)

Stainless steel 1.4401 according to EN 10088, property class ≥ 70 according to EN ISO 3506 (for SMIAI)

SM0IA, SMIAD, SMIAL and SMIAI	Annex B2 of European Technical Assessment ETA-15/0122
Intended use Installation parameters	



Size	d1	d2	h1
M6	5,0	7,5	15,0
M8	6,5	9,5	18,0
M10	8,0	11,5	24,0
M12	10,2	14,5	30,0
M16	13,5	18,0	36,0
M20	16,5	22,0	50,0

SM01A, SMIAD, SMIAL and SMIAI

Intended use
Installation instruction and tools

Annex B3
of European
Technical Assessment
ETA-15/0122

Table C1: Characteristic resistance – SM0IA, SMIAL, SMIAD (design acc. to ETAG 001, Annex C, method C)

Anchor type:			Property class	SM0IA and SMIAL							SMIAD
				6x26	8x30	10x30	10x40	12x50	16x65	20x80	12x50
All load directions (fastening screw or threaded rod property class ≥ 4.8)											
Characteristic resistance in concrete C20/25 to C50/60	F_{Rk}^0	[kN]	≥ 4.8	1,56	2,87	4,79	5,75	5,87	12,59	15,43	6,33
Partial safety factor	γ_2	[-]	-	1,4							
Spacing	s_{cr}	[mm]		200				260	320	200	
Edge distance	c_{cr}	[mm]		150				195	240	150	
Shear load: steel failure with lever arm											
Characteristic bending moment	$M_{Rk,S}^0$	[Nm]	4.8	6	15	30	30	52	133	260	52
Characteristic bending moment	$M_{Rk,S}^0$	[Nm]	5.8	8	19	37	37	66	167	325	66
Characteristic bending moment	$M_{Rk,S}^0$	[Nm]	6.8	9	23	45	45	79	200	390	79
Characteristic bending moment	$M_{Rk,S}^0$	[Nm]	8.8	12	30	60	60	105	267	520	105

Table C2: Characteristic resistance – SMIAI (design acc. to ETAG 001, Annex C, method C)

SMIAI			Property class	6x26	8x30	10x40	12x50	16x65	20x80
All load directions (fastening screw or threaded rod property class A4-70)									
Characteristic resistance in concrete C20/25 to C50/60	F_{Rk}^0	[kN]	A4-70	0,84	1,59	2,58	4,02	9,05	12,26
Partial safety factor	γ_2	[-]	-	1,4					
Spacing	s_{cr}	[mm]		200				260	320
Edge distance	c_{cr}	[mm]		150				195	240
Shear load: steel failure with lever arm									
Characteristic bending moment	$M_{Rk,S}^0$	[Nm]	A4-70	11	26	52	92	233	454

SM0IA, SMIAD, SMIAL and SMIAI

Performances
Characteristic resistanceAnnex C1
of European
Technical Assessment
ETA-15/0122

Table C3: Characteristic resistance under fire exposure in concrete C20/25 to C50/60 – SM0IA, SMIAL and SMIAD (design acc. to ETAG 001, Annex C, method C)

Fire resistance class	SM0IA, SMIAL and SMIAD*	M8	M10	M12 M12*	M16	M20
All load directions (fastening screw or threaded rod property class 4.8)						
R30	Characteristic resistance $F_{Rk,fi}^1$	[kN]	0,4	0,9	1,5	3,1
R60		[kN]	0,3	0,8	1,3	3,7
R90		[kN]	0,3	0,6	1,1	2,0
R120		[kN]	0,2	0,5	0,8	1,6
Spacing	$S_{cr,fi}$	[mm]	4 x h_{ef}			
Edge distance	$C_{cr,fi}$	[mm]	2 x h_{ef}			
The design method covers anchors with a fire attack from one side only. In case of fire attack from more than one side, the edge distance shall be ≥ 300 mm.						

Table C4: Characteristic resistance under fire exposure in concrete C20/25 to C50/60 – SMIAI (design acc. to ETAG 001, Annex C, method C)

Fire resistance class	SMIAI	M8	M10	M12	M16	M20
All load directions (fastening screw or threaded rod property class A4-70)						
R30	Characteristic resistance $F_{Rk,fi}^1$	[kN]	0,4	0,6	1,0	2,3
R60		[kN]	0,4	0,6	1,0	2,3
R90		[kN]	0,4	0,6	1,0	2,3
R120		[kN]	0,3	0,5	0,8	1,8
Spacing	$S_{cr,fi}$	[mm]	4 x h_{ef}			
Edge distance	$C_{cr,fi}$	[mm]	2 x h_{ef}			
The design method covers anchors with a fire attack from one side only. In case of fire attack from more than one side, the edge distance shall be ≥ 300 mm.						

SM0IA, SMIAD, SMIAL and SMIAI

Performances
Characteristic resistance under fire exposure

Annex C2
of European
Technical Assessment
ETA-15/0122