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NATIONAL TECHNICAL ASSESSMENT ITB-KOT-2019/0989 1st Edition

This National Technical Assessment has been issued in accordance with the Regulation of the Minister of Infrastructure and Construction of November 17, 2016 on national technical assessments (Official Journal of the Republic of Poland (Dz. U.) of 2016, item 1968) by Instytut Techniki Budowlanej (the Building Research Institute (ITB)) in Warsaw, upon a request of

pgb-Polska Sp. z o.o.
ul. Fryderyka Wilhelma Redena 3, 41-807 Zabrze

National Technical Assessment ITB-KOT-2019/0989 1st Edition is a favourable assessment of the performance properties of the following construction products for their intended use:

Steel anchors SMMKP, SMC and SMP for fixing window and door frames

Date of validity of the National Technical Assessment:

September 17, 2024.

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1. TECHNICAL DESCRIPTION OF THE PRODUCT

This National Technical Assessment covers steel anchors SMMKP, SMC and SMP (designation of the product type) for fixing window or door frames produced by pgb-Polska Sp. z o.o., ul. Fryderyka Wilhelma Redena 3, 41-807 Zabrze, in manufacturing plants in China and Vietnam.

The anchors SMMKP are steel expansion anchors, composed of a steel screw with a recess Pozidriv type (Ø8 mm screw with cylindrical head or Ø10 mm screw with flat tapered head), an expansion taper and an expansion sleeve. The anchors are shown in Figure A1 and their dimensions are given in Table A1.

The anchors SMC and SMP are steel self-tapping screws. The anchors SMP are ended with a tapered, flat head, while the anchors SMC are ended with a cylindrical head; in both cases with recess TORX type. The anchors are shown in Figure A2, and the dimensions of the anchors are shown in Table A2.

An example of fixing with anchors is provided in Figure B1.

The anchors SMMKP are made of carbon steel with a mechanical property class of not less than 4.8 according to the standard PN-EN ISO 898-1:2013 and electrolytically coated with a zinc protective layer with a thickness of not less than 5 µm, according to the standard PN-EN ISO 4042:2001.

The anchors SMC and SMP are made of carbon steel, with a mechanical property class of not less than 4.6 according to the standard PN-EN ISO 898-1:2013 (designated as 10B21 or C1022) and a surface hardness of at least 450HV and a core hardness amounting to 240 ÷ 450HV. The anchors are electrolytically coated with a protective layer of zinc with a thickness of not less than 5 µm, according to the standard PN-EN ISO 4042:2001.

2. SPECIFICATION OF THE INTENDED USE OF THE PRODUCT

The steel anchors SMMKP, SMC and SMP are designed for multi-point, non-structural fixings of window or door frames in substrates made of:

- non-cracked, reinforced or non-reinforced concrete, class C20/25 ÷ C50/60 according to the standard PN-EN 206+A1:2016,
- ceramic bricks, full, with a compressive strength of not less than 15 N/m^2 (class not less than 15) according to the standard PN-EN 771-1+A1: 2015.

Due to the corrosion aggressiveness of the environment, the steel anchors SMMKP, SMC and SMP shall be used in accordance with the standard PN-EN ISO 12944-2:2018 and PN-EN ISO 9223:2012.

In order to determine the design characteristic resistance values of fixings with the steel anchors SMMKP, SMC and SMP, the characteristic resistance values provided in Annex C shall be divided by the partial safety factor equal to 2,5 in the case of tearing out from the substrate and 1,25 in the case of shearing.

The parameters for the installation and arrangement of the steel anchors SMMKP, SMC and SMP in the substrate are given in Annex B.

In order to provide the fixing:

- with the expansion anchors SMMKP, drill a hole in the substrate, next insert the anchor into the hole and tighten the steel screw to cause unclenching of the expansion sleeve on the side surface of the expansion taper what will result in permanent anchorage,
- with the screws SMC and SMP, drill a hole (cylindrical) in the substrate, next screw-in the screw into the hole that, by tapping the hole, will create a permanent anchorage.

Making holes in the substrate needs the use of a rotary hammer drill, and for screwing screws - screwdrivers with adjustable tightening torque.

The steel anchors SMMKP, SMC and SMP shall be used according to a technical design developed for a specific facility taking into account:

- the Polish technical and construction standards and regulations, in particular the Regulation of the Minister of Infrastructure of April 12, 2002 on the technical conditions to be met by buildings and their location (Journal of Laws of the Republic of Poland: Dz. U. of 2019 item 1065),
- the provisions of this National Technical Assessment,
- the manufacturer's instructions concerning the conditions for providing the fixings using the above mentioned anchors, supplied to the recipients.

3. PERFORMANCE PROPERTIES OF THE PRODUCT AND METHODS APPLIED TO ASSESS THE PROPERTIES

3.1 Performance properties of the product

3.1.1. Characteristic resistance of fixings with steel anchors SMMKP, SMC and SMP. Characteristic tension and shear resistance of fixings with the steel anchors SMMKP, SMC and SMP are provided in Annex C.

3.1.2. Working life of steel anchors SMMKP, SMC and SMP. Zinc coating with a thickness not less than 5 μm ensures the working life of the anchors to the extent resulting from article 2.

3.2. Methods used to assess performance properties

3.2.1. Characteristic resistance of fixings with steel anchors SMMKP, SMC and SMP. Characteristic resistance of fixings with the anchors shall be tested on the anchors seated in the substrates according to article 2. The force shall be measured by means of a device with a range chosen to match the expected value of the destructive force, enabling a constant and gradual increase in force until the destruction occurs. The measurement error shall not exceed 3 % over the entire measuring range.

3.2.2. Working life of the steel anchors SMMKP, SMC and SMP. Thickness of the zinc coating shall be tested according to the standard: PN-EN ISO 2178:2016 or PN-EN ISO 3497:2004.

4. PACKAGING, TRANSPORT AND STORAGE AND THE WAY OF PRODUCT MARKING

The steel anchors SMMKP, SMC and SMP shall be delivered in original manufacturer's packaging and stored and transported in such a way as to ensure that their performance properties remain unchanged.

The manner of marking the products with the construction mark shall be in accordance with the Regulation of the Minister of Infrastructure and Construction of November 17, 2016 on the way of declaring the performance properties of construction products and the manner of marking them with the construction mark (Journal of Laws of the Republic of Poland (Dz. U.) of 2016, item 1966, as later amended).

Product marking with a construction mark shall be accompanied by the following information:

- the last two digits of the year in which the construction mark was first placed on the construction product;
- the name and address of the manufacturer's registered office or the identification mark allowing explicit identification of the name and address of the manufacturer's registered office;
- the name and type designation of the construction product;
- the number and year of issue of the National Technical Assessment, which served as the basis for the declaration of performance properties; (ITB-KOT-2019/0989 1st edition);
- the number of the national declaration of performance properties;
- the level or class of the declared performance properties;
- the name of the certification body which participated in the assessment and verification of the constancy of performance properties of the construction product;
- the address of the manufacturer's website, if the national declaration of performance properties is made available on that website.

A safety data sheet and/or information on hazardous substances contained in a construction product referred to in the Article 31 or 33 of the Regulation (EC) No. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and establishing the European Chemicals Agency shall be provided or made available together with the national declaration of performance properties, as appropriate.

Moreover, the marking of a construction product, being a hazardous mixture according to the REACH regulation, shall comply with the requirements of the Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on Classification, Labelling and Packaging of Substances and Mixtures (CLP), amending and repealing the Directives 67/548/EEC and 1999/45/EC, and amending the Regulation (EC) No. 1907/2006.

5. ASSESSMENT AND VERIFICATION OF THE CONSTANCY OF PERFORMANCE (AVCP)

5.1. National system for the assessment and verification of the constancy of performance

In accordance with the Regulation of the Minister of Infrastructure and Construction of November 17, 2016 on the manner of declaring the performance properties of construction products and the manner of marking them with construction mark (Official Journal of the Republic of Poland (Dz. U.) of 2016, item 1966, as later amended), the system for the assessment and verification of the constancy of performance: 2+ shall be applicable.

5.2. Type testing

The performance properties assessed in article 3 shall constitute the product type testing unless the changes in raw materials, components, production line or manufacturing plant have been introduced.

5.3. Factory production control

At the manufacturing plant the manufacturer shall have implemented a factory production control system. All the elements, requirements and provisions adopted by the manufacturer for the system shall be documented in a systematic manner in the form of written policies and procedures, including test records. The factory production control shall be adapted to the manufacturing processes and ensure the achievement of the declared performance properties of the product in serial production.

The factory production control includes the specification and verification of raw materials and components, inspections and tests to be carried out during manufacture process and control tests (according to article 5.4), conducted by the manufacturer in accordance with the established test plan and according to the principles and procedures specified in the documentation of the factory production control.

The results of production control shall be recorded on a regular basis. The records of the register shall confirm whether the products have satisfied the criteria of the assessment and verification of the constancy of performance properties. Individual products or batches of products and related manufacturing details shall be fully identifiable and traceable.

5.4. Control tests

5.4.1. Test plan. The test plan shall include:

a) ongoing tests,
b) periodic tests.

5.4.2. Ongoing tests. The ongoing tests shall include verification of:

a) the shape and dimensions,
b) the thickness of zinc coating.

5.4.3. Periodic tests. The periodic tests shall include verification of characteristic resistance of fixings with the anchors.

5.5. Frequency of tests

The ongoing tests shall be conducted in accordance with the prescribed test plan, but not less frequently than for each batch of the products. The size of a batch of products shall be specified in the documentation of factory production control.

The periodic tests shall be performed at least once every 3 years.

6. INSTRUCTIONS

6.1. The National Technical Assessment ITB-KOT-2019/0989 1st edition is a favourable assessment of the performance properties of those essential characteristics of the steel anchors SMMKP, SMC and SMP which, in accordance with the intended use, resulting from the provisions of the Assessment, influence the fulfilment of basic requirements by the construction objects in which the product will be applied.

6.2. The National Technical Assessment ITB-KOT-2019/0989 1st edition is not a document authorizing to mark a construction product with a construction mark.

Pursuant to the Act on Construction Products of April 16, 2004 (Journal of Laws of the Republic of Poland (Dz. U.) of 2019, item 266, as later amended), the products to which this National Technical Assessment applies may be marketed or made available on the domestic market, if the manufacturer has assessed and verified the constancy of performance properties, drawn up a national declaration of performance properties in accordance with the National Technical Assessment ITB-KOT-2019/0989 1st edition and marked the products with a construction mark in compliance with the applicable regulations.

6.3. The National Technical Assessment ITB-KOT-2019/0989 1st edition does not infringe the rights resulting from the provisions on industrial property protection, and in particular from the Act of June 30, 2000 – Industrial Property Law (consolidated text: Journal of Laws of the Republic of Poland (Dz. U.) of 2017, item 776). Ensuring these rights shall be the responsibility of the users of this ITB National Technical Assessment.

6.4. When issuing the National Technical Assessment, ITB shall not be held responsible for any possible infringement of exclusive and acquired rights.

6.5. The National Technical Assessment shall not release the manufacturer of products from responsibility for their proper quality, while the contractors of construction works from responsibility for their proper use.

6.6. The validity of this National Technical Assessment may be extended for further periods not exceeding 5 years.

7. LIST OF DOCUMENTS USED IN THE PROCEEDINGS

7.1. Reports, test reports, evaluations, classifications

1) LZK00-06026/17/R35NZK. Test report concerning resistance of anchors. Department of Building Constructions and Geotechnics of the Building Research Institute (ITB), Katowice, 2017.
2) LZK00-06026/17/R37NZK. Test report of zinc coating. Department of Building Constructions and Geotechnics of the Building Research Institute (ITB), Katowice, 2017.
3) LOK00-06026/14/R20OSK. Test report and supplementary information concerning steel anchors for fixing window and door frames. Department of Elements for Building Constructions and Structures Sited in Mining Areas of the Building Research Institute (ITB), Katowice, 2014.
4) LOK-893/A/07/1. Test report and technical assessment concerning anchors for fixing window and door frames. Department of Elements for Building Constructions of the Silesian Branch of the Building Research Institute in Warsaw, Katowice, 2007.

7.2. Related standards and documents

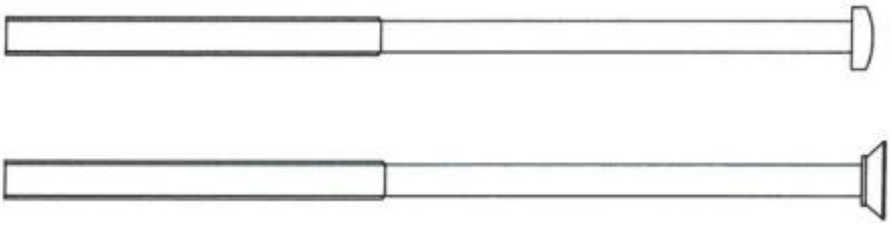
PN-EN 206+A1:2016	*Beton – Wymagania, właściwości, produkcja i zgodność* *(Concrete – Requirements, properties, production and compliance)*
PN-EN 771-1+A1:2015	*Wymagania dotyczące elementów murowych – Część 1: Elementy murowe ceramiczne* *(Requirements relating to masonry units – Part 1: Ceramic masonry units)*

PN-EN ISO 898-1:2013	*Własności mechaniczne części złącznych wykonanych ze stali węglowej i stopowej - Śruby i śruby dwustronne* *(Mechanical properties of fasteners made of carbon steel and alloy steel. - The anchors and studs)*
PN-EN ISO 2178:2016	*Powłoki niemagnetyczne na podłożu magnetycznym - Pomiar grubości powłok - Metoda magnetyczna* *(Non-magnetic coatings on magnetic substrate - Measurement of coating thickness - Magnetic method)*
PN-EN ISO 3497:2004	*Powłoki metalowe. Pomiary grubości powłok. Metody spektrometrii rentgenowskiej* *(Metallic coatings. Measurement of coating thickness. X-ray spectrometric methods)*
PN-EN ISO 4042:2001	*Części złączne - Powłoki elektrolityczne* *(Fasteners - Electrolitycal coatings)*
PN-EN ISO 9223:2012	*Korozja metali i stopów - Korozyjność atmosfer - Klasyfikacja, określenie i ocena* *(Corrosion of metals and alloys - Corrosivity of atmospheres - Classification, determination and estimation)*
PN-EN ISO 12944-2:2018	*Farby i lakiery. Ochrona przed korozją konstrukcji stalowych za pomocą ochronnych systemów malarskich. Część 2: Klasyfikacja środowisk* *(Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 2: Classification of environments)*
AT-15-7572/2014	*Łączniki stalowe ŁMO, FHD i CHD do mocowania ościeżnic okiennych i drzwiowych* *(Steel fasteners ŁMO, FHD and CHD for fixing window and door frames)*

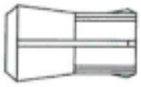
ANNEXES

Annex A.

a) steel screws



b) expansion taper



c) expansion sleeve

d) complete anchors

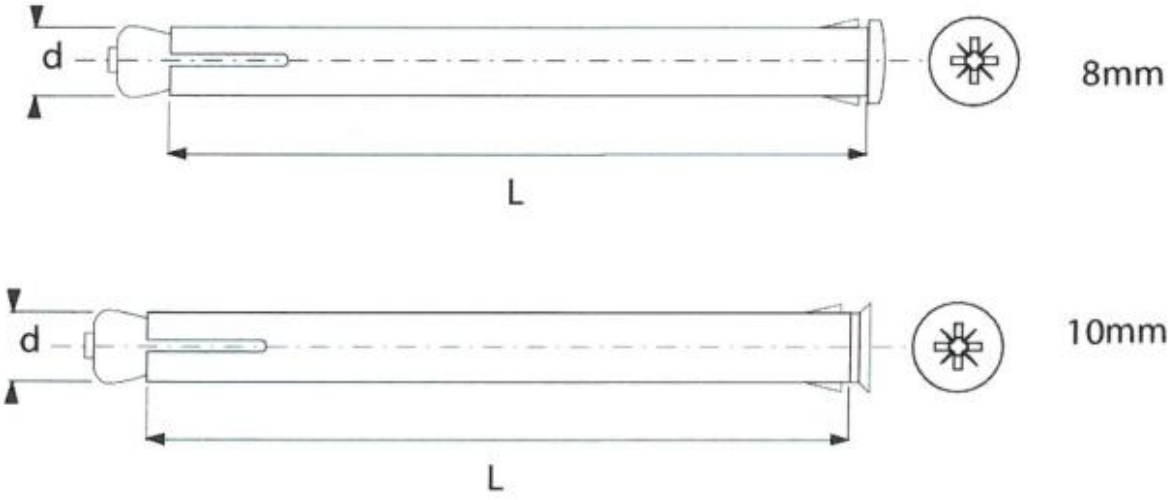
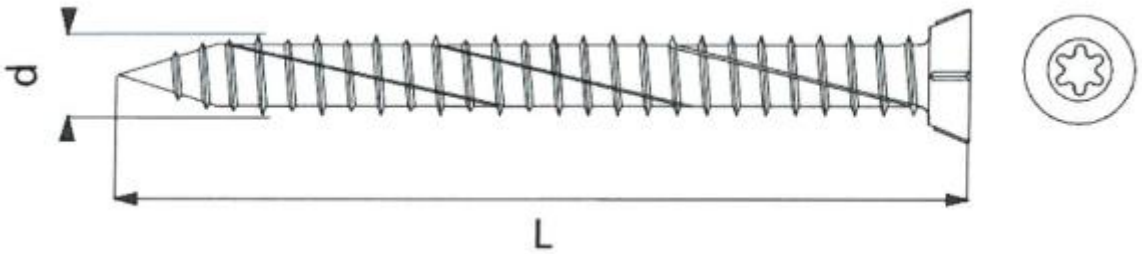


Figure A1. Steel anchors SMMKP

Table A1. Dimensions of the steel anchors SMMKP

Item	Designation of the anchor	Ø, mm	L, mm
1	*2*	*3*	*4*
1	SMMKPØ8 x 72	8,0 $^{-0,3}$	72 ± 0,5
2	SMMKPØ8 x 92		92 ± 0,5
3	SMMKPØ8 x 112		112 ± 0,5
4	SMMKPØ8 x 132		132 ± 0,5
5	SMMKPØ8 x 172		172 ± 0,5
6	SMMKPØ10 x 72	10,0 $^{-0,3}$	72 ± 0,5
7	SMMKPØ10 x 92		92 ± 0,5
8	SMMKPØ10 x 112		112 ± 0,5
9	SMMKPØ10 x 132		132 ± 0,5
10	SMMKPØ10 x 152		152 ± 0,5
11	SMMKPØ10 x 182		182 ± 0,5
12	SMMKPØ10 x 202		202 ± 0,5

a) the screw SMP



b) the screw SMC

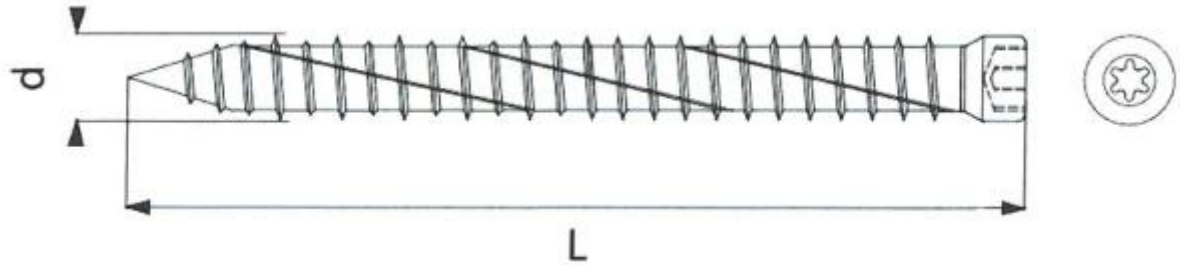


Figure A2. The steel screws SMC and SMP

Table A2. Dimensions of the steel anchors SMC and SMP

Item	Designation of the anchor	Ø, mm	L, mm
1	*2*	*3*	*4*
1	SMPØ7,5 x 72	$7,5^{-0,3}$	72 ± 3,0
2	SMPØ7,5 x 82		82 ± 3,0
3	SMPØ7,5 x 92		92 ± 3,0
4	SMPØ7,5 x 102		102 ± 3,0
5	SMPØ7,5 x 112		112 ± 3,0
6	SMPØ7,5 x 122		122 ± 3,0
7	SMPØ7,5 x 132		132 ± 3,0
8	SMPØ7,5 x 142		142 ± 3,0
9	SMPØ7,5 x 152		152 ± 3,0
10	SMPØ7,5 x 162		162 ± 3,0
11	SMPØ7,5 x 182		182 ± 3,0
12	SMPØ7,5 x 202		202 ± 3,0
13	SMPØ7,5 x 212		212 ± 3,0
14	SMPØ7,5 x 252		252 ± 3,0
15	SMPØ7,5 x 302		302 ± 3,0
16	SMCØ7,5 x 72	$7,5^{-0,3}$	72 ± 3,0
17	SMCØ7,5 x 82		82 ± 3,0
18	SMCØ7,5 x 92		92 ± 3,0
19	SMCØ7,5 x 102		102 ± 3,0
20	SMCØ7,5 x 112		112 ± 3,0
21	SMCØ7,5 x 122		122 ± 3,0
22	SMCØ7,5 x 132		132 ± 3,0
23	SMCØ7,5 x 142		142 ± 3,0
24	SMCØ7,5 x 152		152 ± 3,0
25	SMCØ7,5 x 162		162 ± 3,0
26	SMCØ7,5 x 182		182 ± 3,0
27	SMCØ7,5 x 202		202 ± 3,0
28	SMCØ7,5 x 212		212 ± 3,0
29	SMPØ7,5 x 252		252 ± 3,0
30	SMPØ7,5 x 302		302 ± 3,0

Annex B.

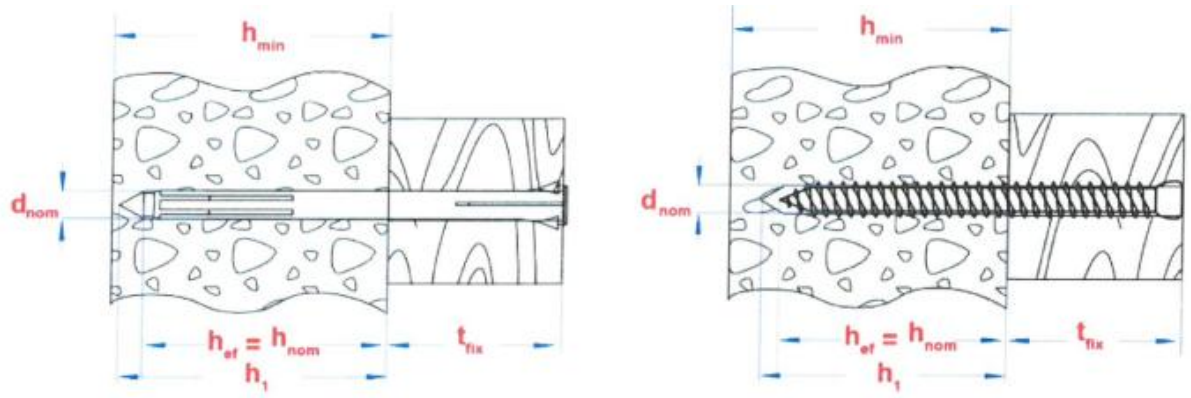
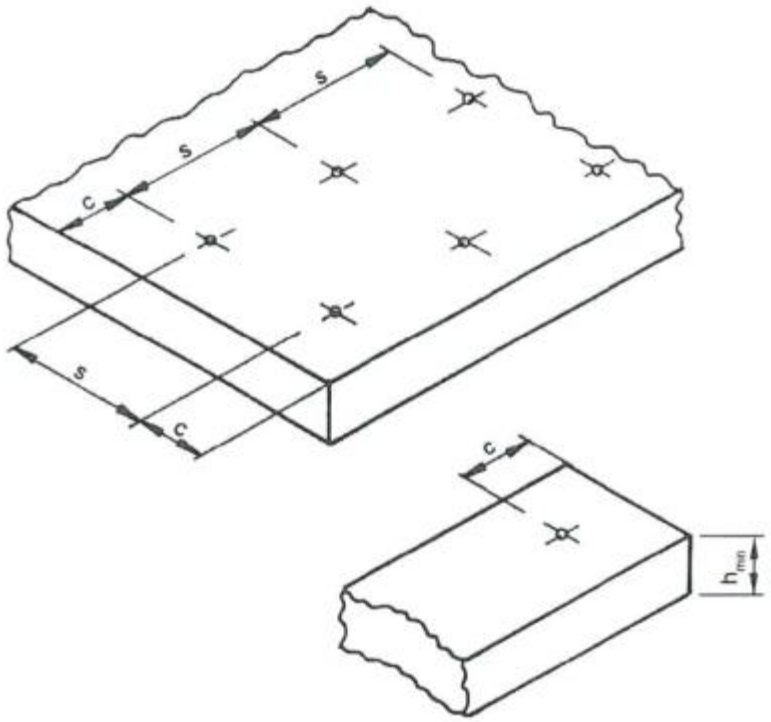


Figure B1. Example of fixing and installation parameters of the steel anchors SMMKP, SMC and SMP



s – axial spacing of the anchors, c – anchor distance from the substrate edge,
h_{min} – minimum thickness of the substrate

Figure B2. Parameters for arrangement of the steel anchors SMMKP, SMC and SMP in the substrate

Table B1. Parameters of installation of the steel anchors SMMKP, SMC and SMP

Item	Parameter	SMKKP Ø8		SMKKP Ø10		SMC and SMP Ø7,5	
		concrete[1)]	solid brick[1)]	concrete[1)]	solid brick[1)]	concrete[1)]	solid brick[1)]
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Hole diameter d_o equal to nominal diameter of a drill d_{nom}, mm	8,0	8,0	10,0	10,0	6,5	6,0
2	Minimum depth of a hole h_1, mm	50	50	50	50	40	50
3	Effective depth of anchorage h_{ef}, mm	30	30	30	30	30	40
4	Total insertion depth h_{nom}, mm	30	30	30	30	30	40
5	Minimum thickness of the substrate h_{min}, mm	100	100	100	100	100	100
6	Minimum axial spacing of the anchors s, mm	120	120	120	120	120	120
7	Minimum distance of the anchors from the substrate edge c, mm	60	60	60	60	60	60

[1)] concrete, non-cracked, reinforced or non-reinforced, class C20/25 ÷ C50/60 according to the standard PN-EN 206+A1:2016

[2)] ceramic brick, full, class 15 according to the standard PN-EN 771-1+A1: 2015

Annex C.

Table C1. Characteristic tension ($N_{R,k}$) and shear ($V_{R,k}$) resistance of the steel anchors SMMKP, SMC and SMP

Item	Designation of the anchor	Type of the substrate	Effective depth of anchorage h_{ef}, mm	Characteristic resistance $N_{R,k}$, $V_{R,k}$ kN
1	*2*	*3*	*4*	*5*
1	SMMKP Ø8	concrete, class C20/25[1)]	30	1,6
2		concrete, class C50/60[1)]	30	4,0
3		ceramic brick, full[2)]	30	1,3
4	SMMKP Ø10	concrete, class C20/25[1)]	30	2,4
5		concrete, class C50/60[1)]	30	4,0
6		ceramic brick, full[2)]	30	1,8
7	SMC Ø7,5 SMP Ø7,5	concrete, class C20/25[1)]	30	1,9
8		concrete, class C50/60[1)]	30	4,0
9		ceramic brick, full[2)]	40	1,8

[1)] concrete, non-cracked, reinforced or non-reinforced according to the standard PN-EN 206+A1:2016
[2)] ceramic brick, full, class 15 according to the standard PN-EN 771-1+A1: 2015