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NATIONAL TECHNICAL ASSESSMENT ITB-KOT-2023/2392 Issue 1

This National Technical Assessment was issued in accordance with the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on National Technical Assessments (Journal of Laws 2016, item 1968) by the Building Research Institute in Warsaw, at the request of:

Trutek Fasteners Polska Sp. z o.o.
Al. Krakowska 38, Janki, 05-090 Raszyn

The National Technical Assessment ITB-KOT-2023/2392 edition 1 is a positive assessment of the performance of the following construction products for the intended use:

**MIA and MIA SS steel fasteners
for fixing thermal insulation**

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1. TECHNICAL DESCRIPTION OF THE PRODUCT

The subject of this National Technical Assessment is MIA and MIA SS steel fasteners for fixing thermal insulation, manufactured by Trutek Fasteners Polska Sp. z o.o., Al. Krakowska 38, Janki, 05-090 Raszyn, at its production plant in China.

The National Technical Assessment covers the product types specified by the manufacturer and resulting from the performance characteristics given in section 3 and the combination of materials used.

The National Technical Assessment covers the MIA and MIA SS couplings, consisting of a sleeve with a nominal diameter of \varnothing 8 mm and a pressure plate integrated into the sleeve, with a nominal diameter of \varnothing 35 mm and additional pressure plates, with the designations respectively: MIA85W or MIA85WSS, with a nominal diameter of \varnothing 85 mm.

The MIA fastener bushings and MIA85W pressure plates are made of steel sheet, grade DX51D according to PN-EN 10346:2015, coated with a zinc coating with a thickness of not less than 5 μ m, according to PN-EN ISO 4042:2018 or PN-EN ISO 2081:2018.

MIA SS connector bushings and MIA85WSS pressure plates made of F1-45 corrosion-resistant steel to EN ISO 3506-1:2020 standard.

The shape and dimensions of the fasteners covered by this National Technical Assessment are given in Annex A.

2. INTENDED USE OF THE PRODUCT

MIA and MIA SS steel connectors are intended for the mechanical fixing of thermal insulation panels Styrofoam (EPS), mineral wool (MW), polyurethane (PUR) or polyisocyanurate (PIR) foam insulation panels to substrates:

- normal, non-cracked concrete, class C20/25 ÷ C50/60 according to EN 206+A2:2021,
- ceramic, solid bricks, according to EN 771-1+A1:2015, with a compressive strength of not less than 15 N/mm² (class not lower than 15) and a volume density of not less than 1600 kg/m³,
- silicate bricks, solid, according to EN 771-2+A1:2015, with a compressive strength of not less than 15 N/mm² (class not lower than 15) and a volume density of not less than 1600 kg/m³,
- hollow (hollow) ceramic hollow bricks, according to EN 771-1+A1:2015, with a wall thickness of not less than 10 mm, a compressive strength of not less than 15 N/mm² (class not lower than 15) and a volume density of not less than 1600 kg/m³,
- hollow (hollow) silicate blocks, according to EN 771-2+A1:2015, with a wall thickness of not less than 40 mm, a compressive strength of not less than 15 N/mm² (class not lower than 15) and a volume density of not less than 1600 kg/m³,
- autoclaved cellular concrete (aerated concrete) PP6, with a gross dry density of not less than 650 kg/m³ (density class not lower than 650) and an average compressive strength of not less than 4 N/mm² (compressive strength class not lower than 4) according to EN 771-4+A1:2015.

Due to the corrosive aggressiveness of the environment, MIA connectors made of galvanised steel should be used in accordance with PN-EN ISO 14713-1:2017 and PN-EN ISO 9223:2012, and connectors

MIA SS connectors made of corrosion-resistant steel, in accordance with PN-EN 1993-1-4:2007/A1:2015.

The characteristic pull-out and shear resistances of the fixings and the characteristic resistances of the fixings under fire action are given in Annex C.

The parameters for the installation and positioning of the fasteners in the substrate are given in Appendix B.

The characteristic resistance of the MIA and MIA SS fasteners is given in Annex C. The design resistances of the fastener pull-out capacities must be determined taking into account the characteristic resistances given in Annex C and the partial safety factors equal to:

- for pulling out - 1.8 for concrete substrates and 2.5 for ceramic, calcium-silicate and autoclaved aerated concrete substrates
- shear resistance of 1.25 for concrete substrates and 2.5 for ceramic, silicate and autoclaved aerated concrete substrates.

The number of fasteners must be determined on the basis of a static calculation, taking into account the aforementioned design resistances, and the number of fasteners per 1 m² of insulating material must not be less than 4.

Installation of the anchor is carried out by manually inserting the sleeve into a pre-drilled hole in the substrate (for substrates of concrete, solid ceramic or calcium-silicate bricks, and ceramic and calcium-silicate hollow bricks) and then driving the anchor into the substrate with a hammer, which results in permanent anchoring of the anchor in the substrate. For autoclaved aerated concrete (aerated concrete) substrates, no pre-drilling takes place; the connector sleeve is driven into the substrate with a hammer.

MIA and MIA SS steel fasteners should be used in accordance with the technical design developed for the specific object taking into account:

- polish standards and technical and construction regulations, in particular the Regulation of the Minister of Infrastructure of 12 April 2002 on the technical conditions to be met by buildings and their location (Journal of Laws of 2022, item 1225),
- the provisions of this National Technical Assessment,
- the manufacturer's instructions concerning the conditions for fixing with the above-mentioned fasteners, supplied to the customers.

3. THE PERFORMANCE OF THE PRODUCT AND THE METHODS USED TO ASSESS IT

3.1. Product performance

3.1.1. Characteristic resistance of fastener fixings. The characteristic resistance of fastener fixings to pull-out and shear is given in Annex C.

3.1.2. Characteristic resistance of fastener fixings in the event of fire. The characteristic resistance of the fasteners to pull-out from the concrete substrate in the event of fire is given in Annex B.

3.1.3. Durability of fasteners. For MIA fasteners and MIA85W discs, made of galvanised steel, a zinc coating of not less than 5 µm ensures the durability of the fasteners within the scope of section 2.

In the case of MIA SS fasteners and MIA85WSS discs, which are made of corrosion-resistant steel, the steel grade used ensures the durability of the fasteners within the range indicated in point 2.

3.2. Methods used to assess performance

3.2.1. Characteristic resistance of fastener fixings. The test of characteristic resistance of fastener fixings is carried out on fasteners embedded in substrates according to Annex C. The forces are to be measured using a device with a range selected according to the expected value of the failure force, allowing the force to increase steadily and slowly until failure.

3.2.2. Characteristic resistance of the anchorages in the event of fire. The characteristic resistance test for the anchorages in the event of fire shall be carried out according to EOTA TR 020.

3.2.3. Durability of fasteners. Testing the thickness of the zinc coating is carried out according to the standard PN-EN ISO 2178:2016 or PN-EN ISO 3497:2004.

4. PACKAGING, TRANSPORT AND STORAGE, AND LABELLING OF THE PRODUCT

MIA and MIA SS steel fasteners should be supplied in the manufacturer's packaging and stored and transported in such a way as to ensure that their technical properties remain unchanged.

The method of marking products with the construction mark should be in accordance with the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the method of declaring the performance of construction products and the method of marking them with the construction mark (Journal of Laws 2016, item 1966, as amended).

The marking of the product with the construction mark should be accompanied by the following information:

- the last two digits of the year in which the construction mark was first affixed to the construction product,
- the name and address of the registered office of the manufacturer or an identification mark enabling the name and address of the registered office of the manufacturer to be unequivocally identified,
- name and designation of the construction product type,
- the number and year of issue of the national technical assessment according to which the performance was declared (ITB-KOT-2023/2392 Issue 1),
- number of the national declaration of performance,
- the level or class of performance declared,
- name of the certification body involved in the assessment and verification of constancy of performance of the construction product,
- the address of the manufacturer's website if the national declaration of performance is made available there.

A safety data sheet and/or information on hazardous substances contained in a construction product, as referred to in Article 31 or 33 of Regulation (EC) No 1907/2006 of the European Parliament

and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and establishing a European Chemicals Agency, should be provided or made available, as appropriate, together with the national declaration of performance.

In addition, the labelling of a construction product that is a hazardous mixture according to REACH should comply with the requirements of 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 Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

5. ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

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

According to the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the manner of declaring the performance of construction products and the manner of marking them with the construction mark (Journal of Laws 2016, item 1966, as amended), the 2+ system of assessment and verification of constancy of performance applies.

5.2. Type testing

The performance characteristics assessed in point 3 are type testing of the product as long as there are no changes to raw materials, components, production line or plant.

5.3. Factory production control

The manufacturer shall have a factory production control system in place at the manufacturing site. All the elements of this system, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of policies and procedures, including records of testing. The factory production control shall be adapted to the production technology and ensure that the declared performance of the product is maintained in series production.

The factory production control includes the specification and testing of raw materials and components, in-process inspection and testing (according to point 5.4), carried out by the manufacturer in accordance with an established test plan and according to the principles and procedures laid down in the factory production control documentation.

The results of the production control should be systematically recorded. The records of the register should confirm that the products meet the criteria for assessment and verification of constancy of performance. Individual products or batches of products and their associated manufacturing details must be fully identifiable and reproducible.

5.4. Control tests

5.4.1. Research programme. The research programme includes:

- a) current research,
- b) periodic examinations.

5.4.2. Ongoing research. Ongoing research includes checking:

- a) shape and dimensions,
- b) the thickness of the zinc coating (for galvanised steel fasteners).

5.4.3. Periodic testing. Periodic testing includes checking the load bearing capacity of the characteristic fastenings of the connectors.

5.5. Frequency of testing

Ongoing tests should be carried out in accordance with the agreed test plan, but not less frequently than for each batch of products. The batch size of the products should be specified in the factory production control documentation.

Periodic examinations should be carried out at least once every three years.

6. COMMENT

6.1 The National Technical Assessment ITB-KOT-2023/2392 edition 1 is a positive assessment of the performance of those essential characteristics of MIA and MIA SS steel fasteners which, in accordance with the intended use resulting from the provisions of the Assessment, affect the fulfilment of the basic requirements by the construction works in which the product will be used.

6.2 The National Technical Assessment ITB-KOT-2023/2392 edition 1 is not a document authorising the marking of a construction product with a construction mark.

Pursuant to the Act of 16 April 2004 on construction products (Journal of Laws of 2021, item 1213), products covered by this National Technical Assessment may be placed on the market or made available on the domestic market if the manufacturer has assessed and verified the constancy of performance, prepared a national declaration of performance in accordance with the National Technical Assessment ITB-KOT-2023/2392 edition 1, and labelled the products with the construction mark, in accordance with applicable regulations.

6.3 The National Technical Assessment ITB-KOT-2023/2392 edition 1 does not infringe the rights arising from the provisions on industrial property protection, in particular the Act of 30 June 2000. - Industrial Property Law (Journal of Laws 2021, item 324, as amended). It is the responsibility of the users of this National Technical Assessment ITB to ensure these rights.

6.4 By issuing a National Technical Assessment, ITB assumes no liability for possible infringement of exclusive and acquired rights.

6.5 The National Technical Assessment does not relieve the manufacturer of the products from the responsibility for their correct quality and the building contractors from the responsibility for their correct application.

6.6 The validity of a National Technical Assessment may be renewed for successive periods not exceeding 5 years.

7. LIST OF DOCUMENTS USED IN THE PROCEEDINGS

7.1. Reports, research reports, evaluations, classifications

LZK00-02844/22/R38NZK. Test report on MIA connectors, Department of Building Structures, Geotechnics and Concrete ITB, Katowice, 2022.

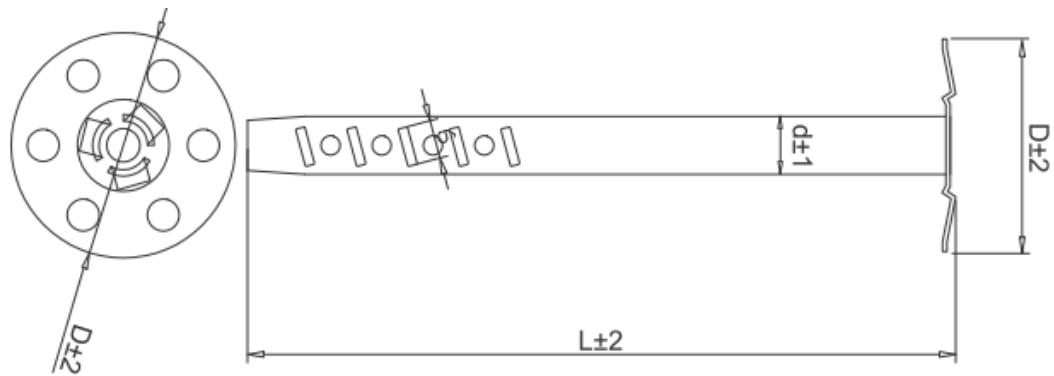
7.2. Standards and related documents

PN-EN 206+A2:2021	<i>Concrete. Requirements, properties, production and conformity</i>
PN-EN 771-1+A1:2015	<i>Requirements for masonry units. Part 1: Clay masonry units</i>
PN-EN 771-2+A1:2015	<i>Requirements for masonry units. Part 2: Silicate masonry units</i>
PN-EN 771-4+A1:2015	<i>Requirements for masonry units. Part 4: Autoclaved aerated concrete masonry units</i>
PN-EN 10025-1:2007	<i>Hot rolled products of structural steels. Part 1: General technical delivery conditions</i>
PN-EN ISO 4042:2018	<i>Fasteners Electrolytic coatings</i>
PN-EN ISO 2081:2018	<i>Metallic and other inorganic coatings. Electrolytic zinc coatings with additional treatment on iron or steel</i>
PN-EN 10088-1:2014	<i>Corrosion resistant steels. Part 1: List of corrosion resistant steels</i>
PN-EN ISO 2178:2016	<i>Non-magnetic coatings on magnetic substrates. Measurement of coating thickness. Magnetic steel method</i>
PN-EN ISO 3497:2004	<i>Metal coatings. Thickness measurements of coatings. X-ray spectrometry methods.</i>
PN-EN ISO 9223:2012	<i>Corrosion of metals and alloys. Corrosivity of atmospheres. Classification, determination and evaluation</i>
PN-EN ISO 12944-2:2018	<i>Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 2: Classification of environments</i>
EAD 330232-01-0601	<i>Mechanical fasteners for use in concrete</i>
TR 020	<i>Evaluation of Anchorages in Concrete concerning Resistance to Fire</i>

ANNEXES

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Appendix A.



Pos.	Connector designation		Dimensions, mm		
			Ø d	L	Ø D
1	2	3	4	5	6
1	MIA08090	MIA08090SS	9,0	90	35
2	MIA08110	MIA08110SS	9,0	110	35
3	MIA08140	MIA08140SS	9,0	140	35
4	MIA08170	MIA08170SS	9,0	170	35
5	MIA08200	MIA08200SS	9,0	200	35
6	MIA08250	MIA08250SS	9,0	250	35
7	MIA08300	MIA08300SS	9,0	300	35

Figure A1. MIA and MIA SS steel connectors

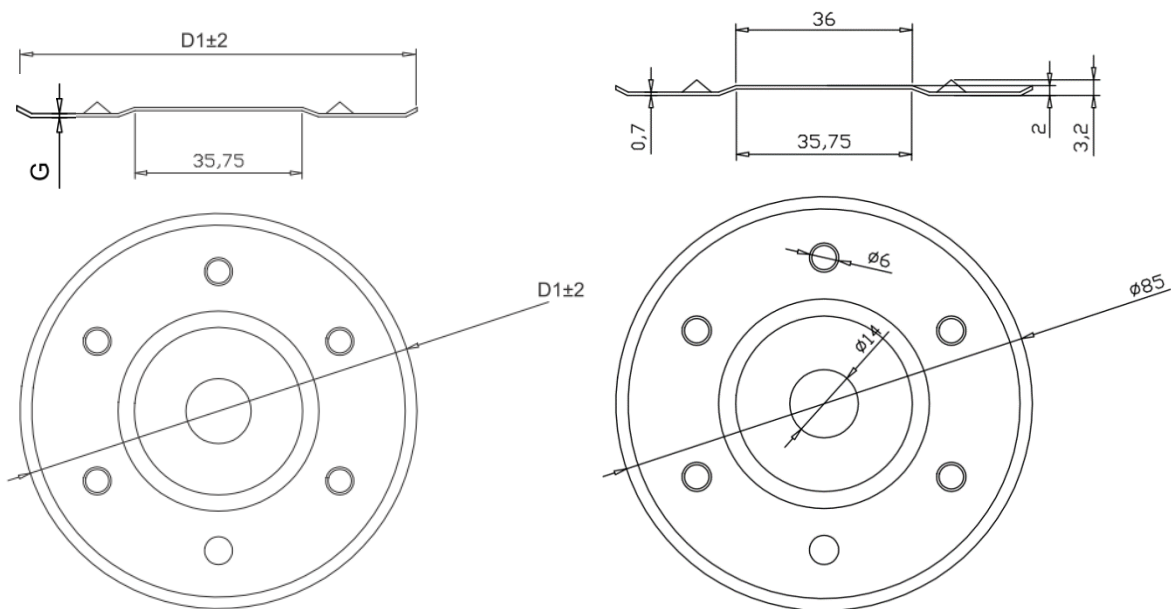


Plate marking	Ø D ₁ , mm	G, mm
1	2	3
MIA85W	85	0,70
MIA85WSS		

Figure A2. Pressure plates MIA85W and MIA85WSS.

Annex B.

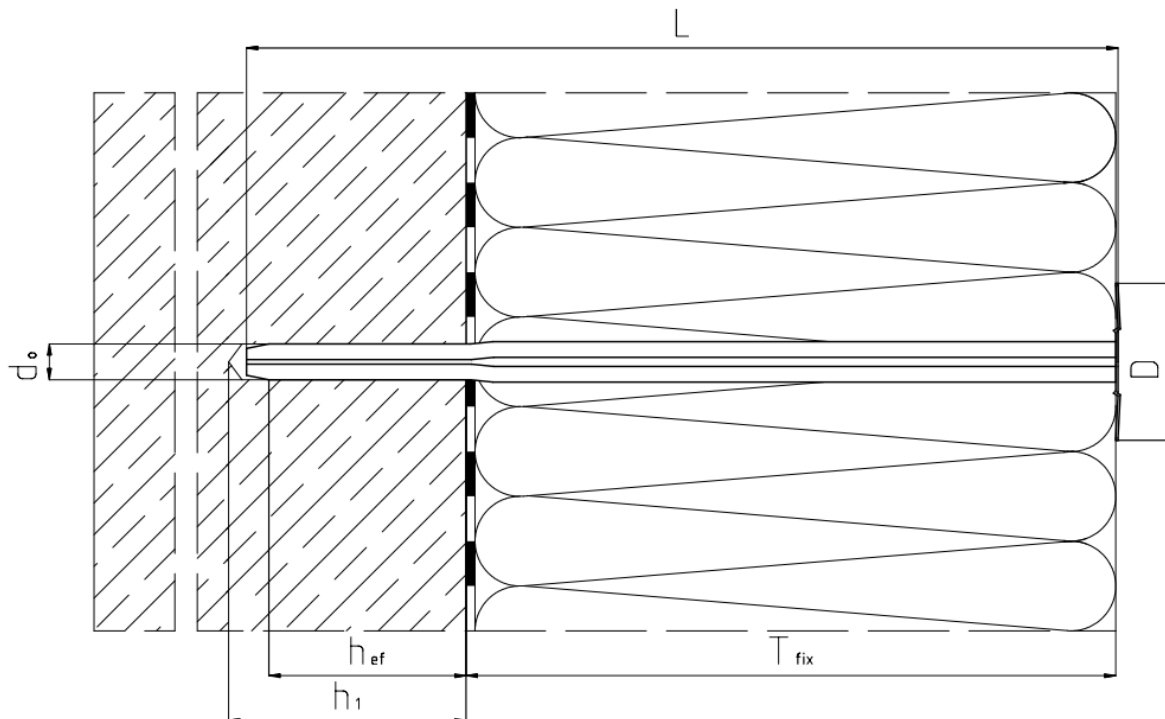


Figure B. Installation parameters for MIA and MIA SS steel connectors

Table B. Parameters of assembly and arrangement of MIA and MIA SS steel fasteners

Pos.	Parameters	Substrate type			
		Plain concrete C20/25	cl. 15 ceramic brick silicate brick cl. 15	hollow ceramic block cl. 15 hollow silicate block cl. 15	autoclaved cellular concrete PP6 (cl. 4, density 650 kg/m ³)
1	2	3	4	5	6
1	Nominal drill diameter d_{nom} (equal to nominal bore diameter d_0), mm	8	8	8	- ¹⁾
2	Minimum bore depth h_1 , mm	50	60	60	- ¹⁾
3	Effective anchorage depth h_{ef} , mm	40	50	50	50
4	Minimum substrate thickness h_{min} , mm	80	80	40	80
5	Minimum spacing of connectors s , mm	60	75	75	75
6	Minimum distance from the edge of the substrate c , mm	120	150	150	150

¹⁾ for autoclaved aerated concrete bases, no pre-drilling is carried out (direct assembly)

Appendix C.

Table C1. Characteristic fastening resistances of MIA and MIA SS steel anchors for pull-out from the substrate N_{Rk} and shear V_{Rk}

Pos.	Substrate type	Effective anchorage depth h_{ef} , mm	Drill hole diameter d_0 , mm	Drilling method	Specific pull-out resistance N_{Rk} and shear resistance V_{Rk} ($N_{Rk} = V_{Rk}$), kN	
					MIA	MIA SS
1	2	3	4	5	6	7
1	Plain, non-cracked concrete, class C20/25 ÷ C50/60 ¹⁾	40	8,0	impact	1,00	1,10
2	Clay bricks, solid, class 15 and density $\geq 1600 \text{ kg/m}^3$ ²⁾	50			0,95	1,00
3	Silicate brick, solid, class 15 and density $\geq 1600 \text{ kg/m}^3$ ³⁾	50			0,95	1,00
4	Ceramic hollow block, expanded clay, class 15 and density $\geq 1600 \text{ kg/m}^3$ (wall thickness $\geq 10 \text{ mm}$) ²⁾	50			0,20	0,30
5	Silicate block, with openings, class 15 and density $\geq 1600 \text{ kg/m}^3$ (wall thickness $\geq 40 \text{ mm}$) ³⁾	50			0,45	0,55
6	Autoclaved cellular concrete PP6, class 4 with a density of 650 kg/m^3 ⁴⁾	50	-	-	0,95	1,00

¹⁾ according to EN 206+A2:2021
²⁾ according to EN 771-1+A1:2015
³⁾ according to EN 771-2+A1:2015
⁴⁾ according to EN 771-4+A1:2015

Table C2. Characteristic fastening resistances of MIA and MIA SS steel fasteners for pull-out from concrete substrate under fire action

Fire resistance class				Pull-out resistance of MIA and MIA SS anchors ¹⁾	
R30	Concrete foundation: normal, non-cracked concrete of class C20/55 ÷ C50/60 ³⁾	$F_{Rk,fi}$	[kN].	0,2	
R60				0,2	
R90				0,2	
R120				0,2	
Fastener spacing		$s_{cr,fi}$	[mm].	4 x h_{ef}	
Distance from the edge ²⁾		$c_{cr,fi}$	[mm].	2 x h_{ef}	
Effective anchorage depth		h_{ef}	[mm].	≥ 40	
Minimum substrate thickness		h_{min}	[mm].	80	

¹⁾ recommended partial safety factor $\gamma_{m,fi} = 1,0$
²⁾ in the event of fire on more than one side the distance from the edge shall be $\geq 300 \text{ mm}$
³⁾ according to EN 206+A2:2021