



BUILDING RESEARCH INSTITUTE

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NATIONAL TECHNICAL ASSESSMENT ITB-KOT-2017/0073, 2-nd edition

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

EXTREA Sp. z o.o.

ul. Pawła Włodkowica 2C, 03-262 Warszawa

The National Technical Assessment ITB-KOT-2017/0073 2-nd edition is a positive assessment of performance of the following construction products for the intended use:

ErFlex sealing strips and components

National Technical Assessment expiration date:

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1. TECHNICAL PRODUCT DESCRIPTION

This National Technical Assessment covers ErFlex sealing strips and components manufactured by EXTREA Sp. z o.o., ul. Pawła Włodkowica 2C, 03-262 Warszawa, in a production plant in Poland.

The National Technical Assessment covers the following types of ErFlex products:

- ErFlex BS sealing strips,
- ErFlex BS+ sealing strips,
- ErFlex BR sealing strips,
- ErFlex BR+ sealing strips,
- RecoMax 1000B sealing and formwork elements,
- RecoMax 1000BV sealing and formwork elements,
- RecoMax 2000B sealing and formwork elements,
- RecoMax 5000B sealing and formwork elements,
- RecoMax 3000B sealing and formwork elements,
- ErFlex BV sealing and formwork elements,
- ErBox BR sealing elements.

Sealing strips: ErFlex BS, ErFlex BS+, ErFlex BR, ErFlex BR+ (fig. 1) are made of galvanized steel sheet 0.52; 0.60; 0.70; 1.20 or 1.50 mm thick, covered with a bituminous mass layer. The steel sheet is made of regular carbon steel with a tensile strength (R_m) of not less than 270 MPa, coated with a 5 μ m thick layer of zinc.

ErFlex BS sealing strips are made of flat sheet metal, one side covered with a bituminous mass layer surface-protected against sticking together with a layer of thin plastic foil. They are 2.25 or 2.50 m long and $H = 120, 125, 150, 160, 165, 200$ or 250 mm wide, with a mounting foot.

ErFlex BS+ sealing strips are made of flat sheet metal, both side covered with a bituminous mass layer, surface protected against sticking together with a layer of thin plastic foil. They are 2.25 or 2.50 m long and $H = 120, 125, 150, 160, 165, 200$ or 250 mm wide, with a mounting foot.

ErFlex BR sealing strips are made of smooth sheet metal, one side covered with a bituminous mass layer surface-protected against sticking together with a layer of thin plastic foil. Their width is $H = 120, 125, 150, 160, 165, 200$ or 250 mm

ErFlex BR+ sealing strips are made of smooth sheet metal, both side covered with a bituminous mass layer, surface protected against sticking together with a layer of thin plastic foil. Their width is $H = 120, 125, 150, 160, 165, 200$ or 250 mm

RecoMax 1000B, RecoMax 1000BV, RecoMax 2000B and RecoMax 5000B formwork and sealing elements (Fig. 2) consist of cut and expanded metal made of DC01 grade steel, in accordance with the PN-EN 10130:2009 standard, with perpendicularly built-in ErFlex BR or Erflex BR+ sealing strip with a width of 120, 125, 150, 165, 200 or 250 mm. The RecoMax 5000B element also features a reinforcing truss made of B500A reinforcing steel, ductility class A, in accordance with the PN-EN 1992-1-1:2008 standard.

The formwork and sealing elements ErFlex BV (fig. 3) and RecoMax 3000B (fig. 4) consist of an ErFlex BR or ErFlex BR+ strip with a width of 120, 125, 150, 160, 165, 200 or 250 mm and a flat or perforated DX51D+Z100 grade sheet, in accordance with the PN-EN 10346:2015 standard.

The ExBox BR sealing element consists of ExBox anchor strips, covered by National Technical Assessment ITB-KOT-2017/0331, 2-nd edition, coated on one or both sides with a layer of bituminous compound.

The ErFlex sealing components are supplied with mounting fittings (clamps), designated as KA 18/3, MBA 18/3, KA 8/18, K17 and KS (Fig. A6), made from S235JR steel in accordance with the PN-EN 10025-2:2019 standard.

ErFlex sealing strips are delivered in rolls or slats. It is possible to produce ErFlex BS, ErFlex BS+, ErFlex BR, ErFlex BR+ strips with other widths (e.g. 300, 350, 400 mm, etc.).

The shape of the ErFlex sealing strips and components is given in Annex A, and the identification features of ErFlex sealing strips are given in Annex B..

2. INTENDED USE OF THE PRODUCT

The ErFlex BS, ErFlex BS+, ErFlex BR and ErFlex BR+ sealing strips are intended for sealing of working joints in foundation slabs, walls and concrete and reinforced concrete ceilings. Sealing joints of prefabricated elements (so-called poured joints) can also be used.

ErFlex strips cannot be used as an independent sealing of expansion joints.

ErFlex strips should be fixed to the reinforcement using specially shaped reinforcement bars, which ensure they remain securely in place before concreting, or using carpentry methods in areas where it is not possible to use the system's mounting stirrups.

The surface of the sealing element covered with bituminous mass should face the flowing water. Fixing the sealing tape in the middle of the working joint should ensure its position unchanged during concrete pouring.

RecoMax 1000BV sealing and formwork elements are designed for sealing vertical construction joints in concrete and reinforced concrete walls, while RecoMax 1000B, RecoMax 2000B and RecoMax 5000B are designed for sealing construction joints in concrete and reinforced concrete foundation slabs and floor slabs.

The RecoMax 3000B sealing and formwork elements are designed for sealing forced cracks in concrete and reinforced concrete slabs and ceilings.

ErFlex BV sealing and formwork elements are designed to seal forced cracks in concrete and reinforced concrete walls at the points where such cracks occur. ErFlex BV elements feature holes in their strips, allowing them to be secured in position between the reinforcement.

ExBox BR sealing elements are designed to seal construction joints in monolithic structures, which are concreted in sections.

Products covered by this National Technical Assessment should be used in accordance with:

- a technical design drawn up for a specific building, taking into account Polish standards and technical and building regulations, in particular the Regulation of the Minister

of Infrastructure of 12 April 2002 on the technical requirements to be met by buildings and their siting (Journal of Laws of 2022, item 1225).

- requirements of this National Technical Assessment,
- the instructions drawn up by the manufacturer and supplied to customers.

3. PRODUCT PERFORMANCE AND METHODS USED FOR THEIR ASSESSMENT

3.1. Product performance

The performance data of ErFlex strips and sealing elements are set out in Table 1.

Table 1

Item	Basic characteristics	Product performance	Assessment methods
1	2	3	4
Properties of the zinc coating			
1	Adhesion of the zinc coating	no visible cracks or flaking of the zinc coating	PN-EN 7438:2021
Properties of strips and sealing elements			
2	Adhesion of the bituminous coating to the zinc-coated steel sheet, MPa	≥ 0.5	PN-EN 1542:2000
3	Functional capacity of the strips	no leakage with water at a pressure of 0.5 MPa	sec. 3.2.1

3.2. Methods used to the assessment of performance

The methods of assessment of the performance are given in Table 1 and in section 3.2.1.

3.2.3. Checking functional capacity of the strips. The test consists in subjecting the sealing strip anchored in the working gap of the concrete slab to water pressure for a specified time. Test samples should be seasoned for 28 days in standard conditions. The test must be carried out in a water tightness testing apparatus. The samples must be subjected to the following testing cycle:

- subjected to a pressure of 0.1 MPa, maintained at that level for 7 days,
- increasing the pressure by a further 0.1 MPa each week, up to 0.5 MPa.

The samples should then be removed from the device and checked for any leaks on the side opposite to the action of water.

4. PACKING, TRANSPORT AND STORAGE AND THE METHOD OF MARKING THE PRODUCT

Products covered by this National Technical Assessment should be supplied in the manufacturer's original packaging and stored and transported in accordance with the manufacturer's instructions.

The manner of marking the 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 methods of declaring conformity of construction products and marking them with the construction mark (Journal of Laws of 2016, item 1966, with later changes).

Marking 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 placed on the construction product,
- the name and address of the manufacturer's registered office or an identification mark allowing to clearly identify the name and address of the manufacturer's registered office,
- the name and designation of the construction product type,
- the number and year of issue of the national technical assessment according to which performance was declared (ITB-KOT-2017/0073, 2-nd edition),
- the number of the national declaration of performance,
- the level or class of the declared performance,
- the manufacturer's website address, if the national declaration of performance is available on it.

Along with the national declaration of performance, a safety data sheet and/or information on hazardous substances contained in a construction product, referred to in Art. 31 or 33 of Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) and establishing a European Chemicals Agency should be delivered or made available.

In addition, the marking of a construction product, which is a hazardous mixture according to the REACH Regulation, 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 Directive 67/548/EEC and 1999/45/EC and amending the Regulation (EC) No 1907/2006.

5. ASSESSMENT AND VERIFICATION OF PERFORMANCE CONSTANCY

5.1. The national system of assessment and verification of performance constancy

Pursuant to the Regulation of the Minister of Infrastructure and Construction of November 17, 2016 on the method of declaring the performance of construction products and the method of marking them with a construction mark (Journal of Laws of 2016, item 1966, with later changes), system 3 applies for assessment and verification of constancy of performance.

5.2. Type test

Performance, assessed in p. 3, is a product test, until there are no changes to raw materials, components, production line or production plant.

5.3. Factory production control

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

The factory production control includes specification and checking of raw materials and components, control and testing in the manufacturing process as well as control tests (according to section 5.4), carried out by the manufacturer in accordance with the prescribed test plan and according to the rules and procedures specified in the documentation of the factory production control.

Results of the production control should be recorded systematically. The entries in the register should confirm that products meet the criteria of assessment and verification of constancy of performance. Individual products or product batches and related production details must be fully identifiable and traceable.

5.4. Control tests

5.4 1. Test program. The test program includes:

- a) ongoing tests,
- b) periodic examinations.

5.4 2. Ongoing tests. Ongoing tests include checking of:

- a) external appearance,
- b) sheet thickness,
- c) bituminous layer thickness,
- d) zinc coating thickness or weight,
- e) width of strips.

5.4 3. Periodic tests. Periodic examinations include checking of:

- a) zinc coating adherence,
- b) surface mass of the strips,
- c) softening point of bituminous coating,
- d) adhesion of the bitumen coating to the steel sheet substrate,
- e) functional capacity of the strips.

5.5. Test frequency

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

Periodic tests should be performed at least once every 3 years.

6. INSTRUCTION

6.1. The National Technical Assessment ITB-KOT-2017/0073, 2-nd edition replaces the National Technical Assessment ITB-KOT-2017/0073, 1-st edition.

6.2. The National Technical Assessment ITB-KOT-2017/0073, 2-nd edition is a positive assessment of performance of the basic characteristics of ErFlex strips and sealing elements, which, in accordance with the intended use, resulting from provisions of the Assessment, have an impact on meeting the basic requirements by construction objects, in which the product will be used.

6.3. The National Technical Assessment ITB-KOT-2017/0073, 2-nd edition is not a document authorizing the marking of a construction product with a construction mark.

In accordance with 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 marketed or made available on the domestic market, if the manufacturer has assessed and verified the constancy of performance, he prepared a national declaration of performance in accordance with the National Technical Assessment ITB-KOT-2017/0073, 2-nd edition and marked the products with a construction mark in accordance with applicable regulations.

6.4. The National Technical Assessment ITB-KOT-2017/0073, 2-nd edition does not violate rights resulting from provisions on the industrial property protection, in particular the Act of 30 June 2000 - Industrial Property Law (Journal of Laws of 2021, item 324). Providing these rights is the responsibility of the users of this ITB National Technical Assessment.

6.5 By issuing the National Technical Assessment, ITB shall not be liable for any infringement of exclusive and acquired rights.

6.6. The National Technical Assessment does not release the manufacturer of products from responsibility for their proper quality, and contractors of construction works from the responsibility for their proper use.

6.7. The validity of the National Technical Assessment may be extended for subsequent periods, not longer than 5 years.

7. LIST OF DOCUMENTS USED IN THE PROCEEDINGS

7.1. Reports, test reports, assessments and classifications

1. LZM00-01741/22/Z00NZM. Test report on ErFlex elements, Department of Building Materials Engineering of ITB, 2022.

2. LZM00-02642/16/Z00NZM. Test report Department of Building Materials Engineering ITB, Warsaw, 2016
3. PB 5.1/14-423-3. Test report MFPA, Lipsk, 2015

7.2. Related standards and documents

PN-EN 1427:2015	<i>Bitumen and asphalt binders. Determination of the softening point. Ring and Ball method</i>
PN-EN 1426:2015	<i>Bitumen and asphalt binders. Determination of needle penetration</i>
PN-EN 10346:2015	<i>Continuously hot-dip coated steel flat products for cold forming. Technical conditions of delivery</i>
PN-EN ISO 2178:2016	<i>Non-magnetic coatings on a magnetic substrate. Coating thickness measurement. Magnetic method</i>
PN-EN 10130:2009	<i>Cold-rolled flat products made of low-carbon steel for cold forming. Technical conditions of delivery</i>
PN-EN ISO 7438:2021	<i>Metals. Bending test</i>
PN-EN 1542:2000	<i>Products and systems for the protection and repair of concrete structures. Test methods Measurement of adhesion by unsticking</i>
PN-EN 1849-1:2002	<i>Flexible waterproofing products. Thickness and grammage determining. Part 1: Asphalt products for waterproofing roofs</i>
PN-EN 10143:2008	<i>Continuously hot-dip galvanised steel sheets and strips. Dimensional and shape tolerances</i>
PN-EN 10152:2017	<i>Cold-rolled, electro-galvanized, flat steel products for cold forming. Technical conditions of delivery</i>
PN-EN 1992-1-1:2008	<i>Eurocode 2. Design of concrete structures. Part 1-1: General rules and rules for buildings</i>
PN-EN 10025-2:2019	<i>Hot-rolled products made from non-alloy structural steels. Part 2. Technical conditions of supply for non-alloy structural steels</i>
ITB-KOT-2017/0331, 2-nd edition	<i>ExBox rod connection kits</i>
ITB-KOT-2017/0073, 1-st edition	<i>ErFlex steel sealing elements</i>

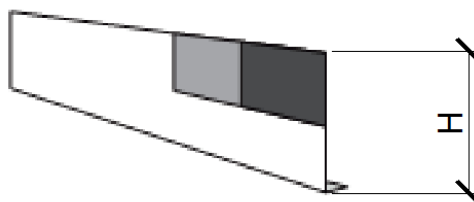
ANNEXES

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Annex A

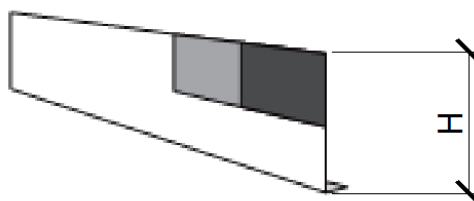
a) ErFlex BS

H = 120, 125, 150, 160, 165, 200 and 250 mm



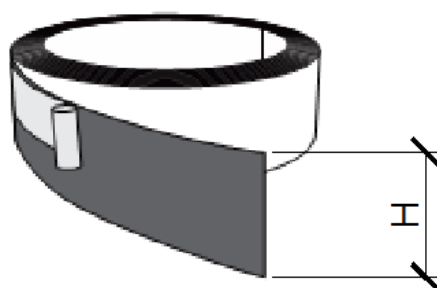
b) ErFlex BS+

H = 120, 125, 150, 160, 165, 200 and 250 mm



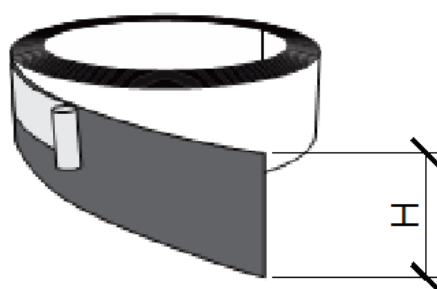
c) ErFlex BR

H = 120, 125, 150, 160, 165, 200 and 250 mm



d) ErFlex BR+

H = 120, 125, 150, 160, 165, 200 and 250 mm

**Fig. A1** Sealing strips ErFlex BS (a), ErFlex BS+ (b), ErFlex BR (c) and ErFlex BR+ (d)

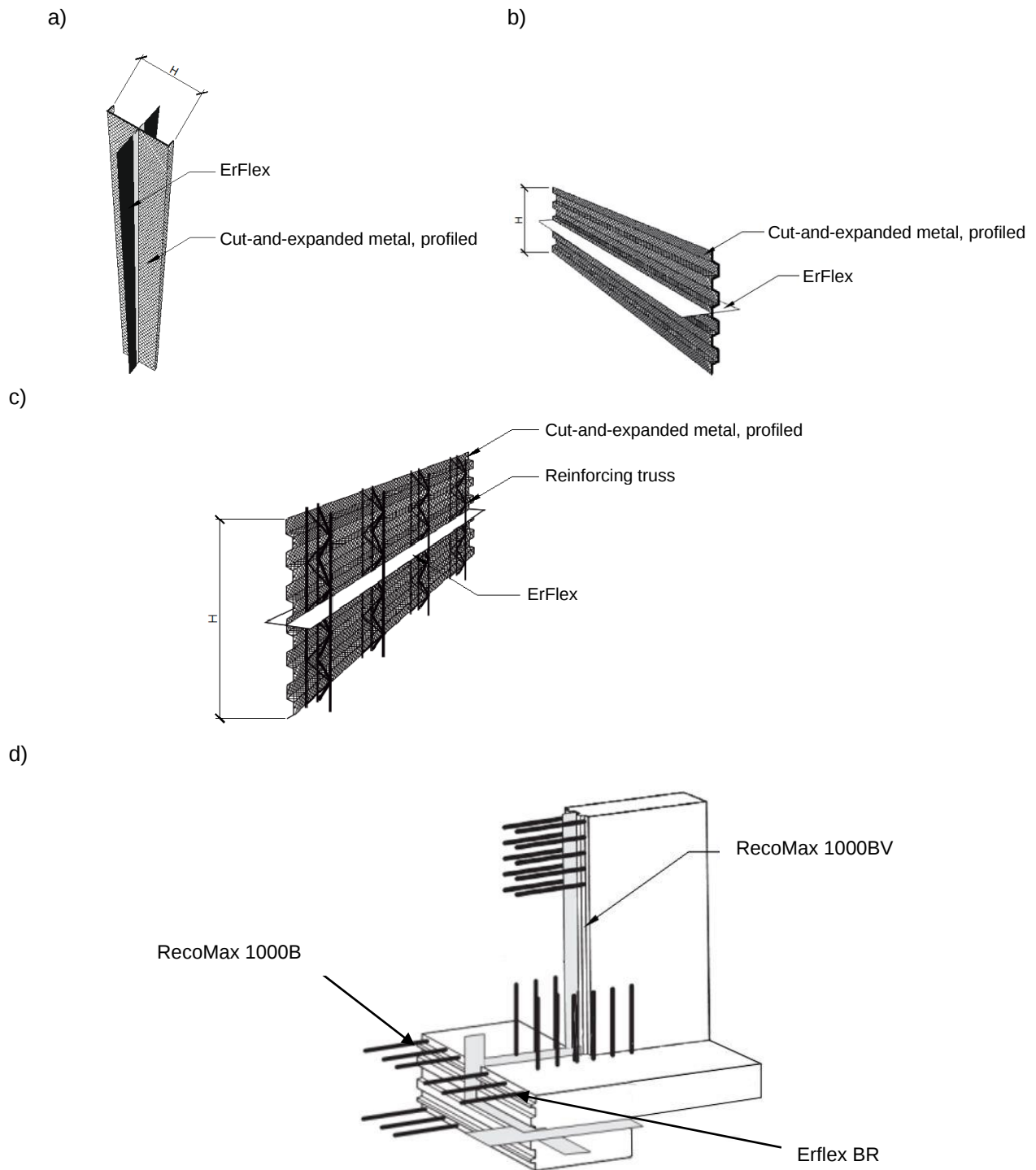


Fig. A2 Sealing and formwork elements:

- a) RecoMax 1000BV, b) RecoMax 1000B and RecoMax 2000B, c) RecoMax 5000B,
 d) assembly diagram of sealing and formwork elements

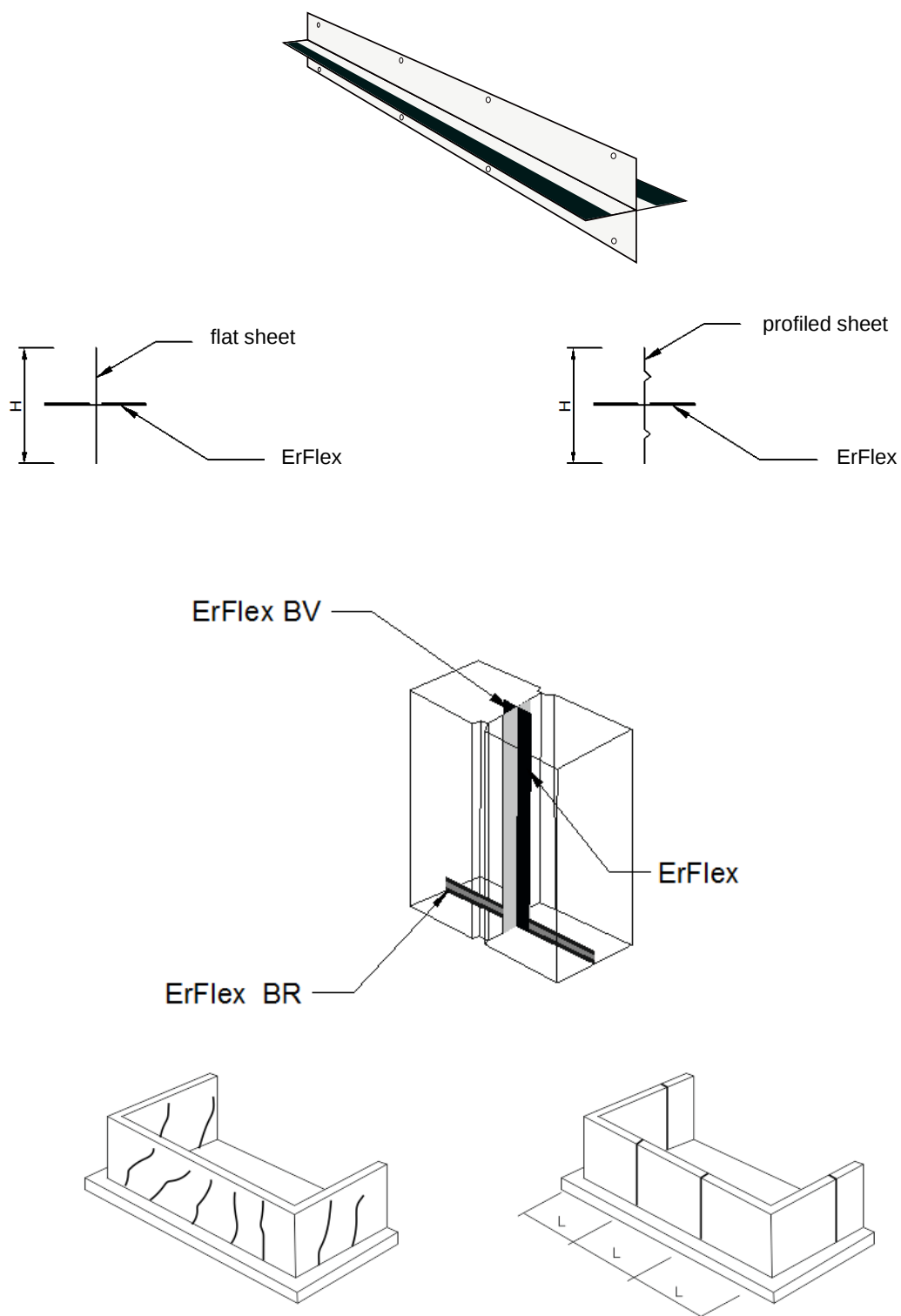


Fig. A3 ErFlex BV sealing element

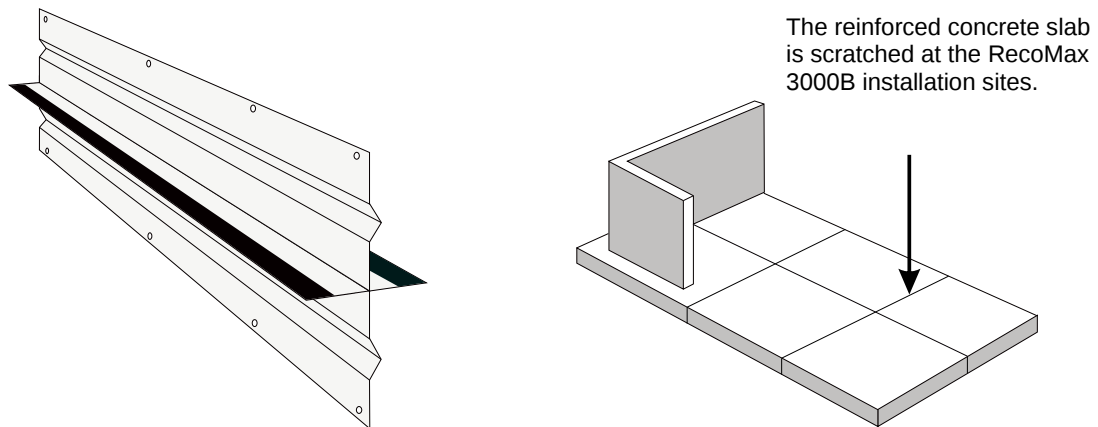


Fig. A4 RecoMax 3000B sealing element

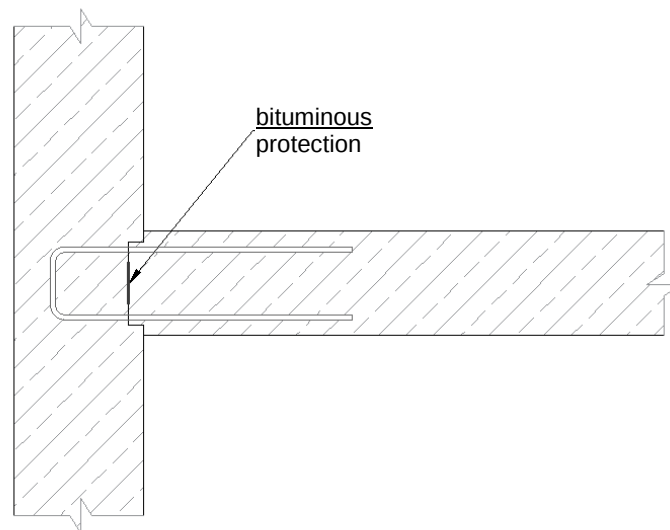
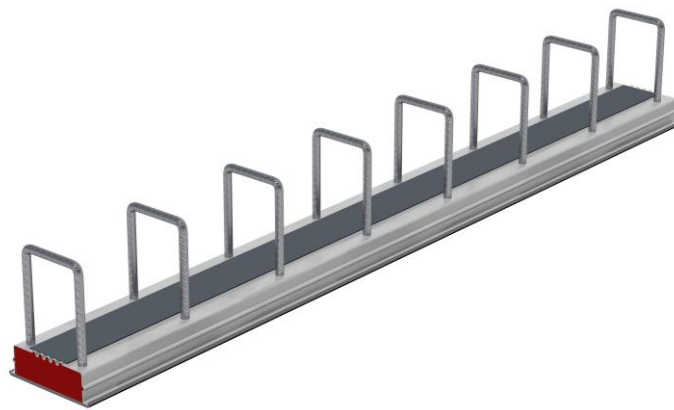


Fig. A5 ErBox BR sealing element



KA 8/18 –
assembly buckle



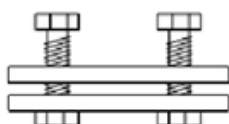
MBA 18/3 –
clamping buckle



KA 17 – mounting
clamp



KA 18/3 –
clamping buckle



KS - screw connector;
width: 5 cm, length:
165 mm

Fig. A6. Fitting elements

Annex B.

Table B1

Item	Identification features	Requirements	Test methods
1	2	3	4
Properties of the zinc coating			
1	Coating mass, g / m ²	≥ 130	PN-EN 10346:2015
2	Coating thickness, μm	≥ 5	PN-EN ISO 2178:2016
Properties of ErFlex strips and sealing elements			
3	Appearance	a strip made of galvanized steel sheet covered on one or both sides with a layer of self-adhesive bituminous mass, surface protected against sticking with a layer of thin plastic foil	visual assessment
4	Strip width, mm	see section 1 ± 5%	measurement using measuring instruments with the required accuracy
5	Sheet dimensions: - sheet thickness, mm - allowable thickness deviations	0.52; 0.60; 0.70; 1.20; 1.50 according to PN-EN 10143:2008	PN-EN 1849-1:2002
6	Thickness of the bituminous coating, mm	0,73 ± 15%	
7	The surface weight of the strip (one side covered with a bitumen coating), g / m ²	5700 ± 10%	
8	Softening point of bituminous coatings according to the ring-and-ball method, °C	≥ 120	PN-EN 1427:2015