



**BUILDING RESEARCH INSTITUTE**

**(Instytut Techniki Budowlanej)**

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# NATIONAL TECHNICAL ASSESSMENT

## ITB-KOT-2017/0073 edition 1

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:

**Ebea Polska Spółka Akcyjna**  
**2c Pawła Włodkowica Str., 03-262 Warsaw**

The National Technical Assessment ITB-KOT-2017/0073 edition 1 is a positive assessment of performance of the following construction products for the intended use:

**Steel sealing elements**

**ErFlex**

National Technical Assessment expiration date:

**June 21, 2022**



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of the Building Research  
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## 1. TECHNICAL PRODUCT DESCRIPTION

The subject of this National Technical Assessment are ErFlex steel sealing elements, manufactured by Ebea Polska Spółka Akcyjna, 2c Pawła Włodkowica Str., 03-262 Warsaw, in a production plant in Germany.

The National Technical Assessment covers the following types of ErFlex steel sealing elements:

- 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,
- ErFlex BV sealing elements,
- RecoMax 3000B sealing elements.

Sealing strips: ErFlex BS, ErFlex BS+, ErFlex BR, ErFlex BR+ (fig. A1) are made of galvanized steel sheet 0.7 mm, 1.2 mm or 1.5 mm thick, covered with a bituminous mass layer. The steel sheet is made of ordinary carbon steel, with the yield strength  $R_e$  not lower than 210 MPa and tensile strength  $R_m$  not lower than 270 MPa, covered with a zinc layer with a thickness of 4.3  $\mu\text{m}$  according to PN-EN 10152: 2017 standard.

ErFlex BS 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. 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 smooth 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 with a width of  $H = 120, 125, 150, 160, 165, 200$  or 250 mm, they are delivered in a roll.

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 with a width of  $H = 120, 125, 150, 160, 165, 200$  or 250 mm, they are delivered in a roll.

RecoMax 1000B, RecoMax 1000BV, RecoMax 2000B and RecoMax 5000B formwork and sealing elements (fig. 2) consist of cut and expanded metal 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 has additionally a reinforcing truss.

Sealing elements ErFlex BV (fig. A3) and RecoMax 3000B (fig. A4) 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 sheet.

The ErFlex steel sealing elements are delivered with steel wire mounting elements - clamps, marked KA 18/3, MBA 18/3, KA 8/18, K17 and KS (fig. A5).

ErFlex sealing strips are delivered in rolls or slats.

On request, ErFlex BS, ErFlex BS+, ErFlex BR, ErFlex BR+ strips with other widths (e.g. 300, 350, 400 mm, etc.) can be delivered.

The shape of the steel ErFlex sealing elements is given in Annex A, while the identification features of ErFlex profiles and the methods of checking them are given in Annex B.

## **2. INTENDED PRODUCT USE**

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.

RecoMax 1000BV sealing and formwork elements are designed to seal vertical working joints in walls, while RecoMax 1000B, RecoMax 2000B and RecoMax 5000B are used to seal working joints in foundation and ceiling slabs.

The ErFlex BV sealing element is designed to seal forced cracks in concrete and reinforced concrete walls.

The RecoMax 3000B sealing element is designed to seal forced cracks in concrete and reinforced concrete slabs and ceilings.

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.

The steel ErFlex sealing elements should be used in accordance with the technical design, developed taking into account Polish standards and construction regulations, the provisions of this National Technical Assessment and in accordance with the instructions for use prepared by the manufacturer.

## **3. PRODUCT PERFORMANCE AND METHODS USED FOR THEIR ASSESSMENT**

### **3.1. Product performance**

The performance properties of the ErFlex BS, ErFlex BS+, ErFlex BR and ErFlex BR+ sealing strips and the RecoMax 1000B, RecoMax 1000BV, RecoMax 200B and RecoMax 5000B sealing and formwork elements, as well as the ErFlex BV and RecoMax 3000B sealing elements are given in Table 1.

**Table 1**

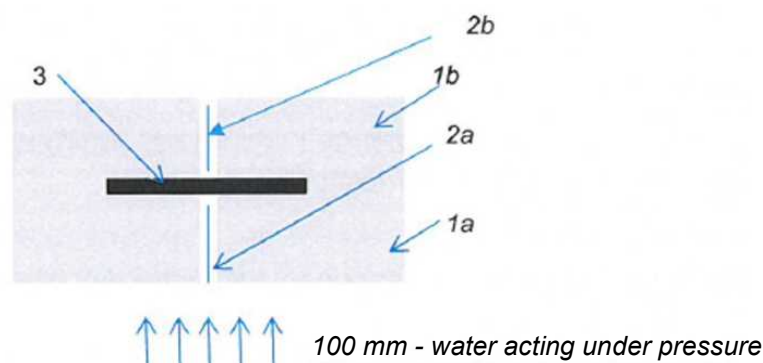
Item	Basic characteristics	Product performance	Assessment methods
1	2	3	4
<b>Properties of the zinc coating</b>			
1	Adhesion of the zinc coating to steel	no visible cracks and flaking of the zinc coating	PN-EN 7438:2006
<b>Properties of ErFlex strips</b>			
2	Adhesion of the bituminous coating to the substrate made of galvanized steel sheet, MPa	≥ 0.5	PN-EN 1542:2000
3	Sealing efficiency	no leakage with water at a pressure of 0.5 MPa	sec. 3.2.1

### 3.2. Methods used to the performance assessment

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

**3.2.1. Checking the sealing effectiveness.** The test consists in subjecting the sealing sheet placed in the working gap of the concrete slab to water pressure for a specified time. They should be performed on concrete samples of W8 class, each with surface dimensions that enable anchoring of at least 20 cm of a sheet section (fig. 1).

Test samples should be seasoned for 28 days in standard conditions. The test should be performed in a device that enables the sample to be placed in such a way that the water pressure acts on the sample from the bottom and enables the change of pressure from 0.01 MPa to 0.5 MPa. After the completion of the seasoning, the samples shall be mounted in the device for water-tightness testing and subjected to the pressure of 0.1 MPa and held for 7 days. In the following week, the pressure should be increased every 24 hours by another 0.1 MPa, until a water leakage is found on the upper side of the sample. If no leakage is found, up to the pressure of 0.5 MPa, the test pressure should not be increased and this value should be maintained for the next 14 days. Then, remove the sample from the device and assess any leakage. The test should be stopped each time a drop of water or any other moisture is found on the top side of the sample and the pressure value at which the leak was found should be noted.



**Fig. A.** Scheme of the sealing efficiency test

1a - lower fragment of the concrete sleeper (W-8); 1b - upper fragment of a concrete sample (W-8); 2a - the lower fragment of a plastic foil, approx. 0.2 mm thick, profiling the working gap in the concrete structure; 2b - the upper fragment of a plastic foil, approx. 0.2 mm thick, profiling the working gap in the concrete structure; 3 - tested sealing element

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

Products covered by the National Technical Assessment should be stored and transported in a manner ensuring that their technical properties remain unchanged.

The method of marking a product with a construction mark should comply 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 a construction mark (Journal of Laws of 2016, item 1966).

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 the performance was declared (ITB-KOT-2017/0073 edition 1),
- 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 the Regulation of the Minister of Health of April 20, 2012 on the labelling of packaging of hazardous substances and hazardous mixtures and some mixtures (consolidated text: Journal of Laws, item 450) and Regulation (EC) No 1272/2008 of the European Parliament and 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 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 to assessment and verification of performance constancy.

## 5.2. Type test

Performance, assessed in p. 3, is a product type 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.

**5.4.3. Periodic examinations.** Periodic examinations include checking of:

- a) zinc coating thickness,
- b) adhesion of the coating to steel,
- c) surface mass of the strip,
- d) softening point,
- e) bitumen coating penetration,
- f) adhesion of the bitumen coating to the steel sheet substrate,
- g) sealing efficiency.

## 5.5. Tests 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 examinations should be performed at least once every 3 years.

## **6. INSTRUCTION**

**6.1.** The National Technical Assessment ITB-KOT-2017/0073 edition 1 is a positive assessment of performance of the basic characteristics of ErFlex steel 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.

**6.2.** The National Technical Assessment ITB-KOT-2017/0073 edition 1 is not a document authorizing the marking of a construction product with a construction mark.

Pursuant to the Act on Construction Products of April 16, 2004, with later changes (consolidated text: Journal of Laws of 2016, item 1570), 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 edition 1 and marked the products with a construction mark in accordance with applicable regulations.

**6.3.** The National Technical Assessment ITB-KOT-2017/0073 1 edition does not violate rights resulting from provisions on the industrial property protection, in particular the Act of 30 June 2000 – Industrial Property Law (consolidated text: Journal of Laws of 2013, item 1410, with later changes). Providing these rights is the responsibility of the users of this ITB National Technical Assessment.

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

**6.5.** 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.

**6.6.** 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, classifications**

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



## 7.2. Related standards and documents

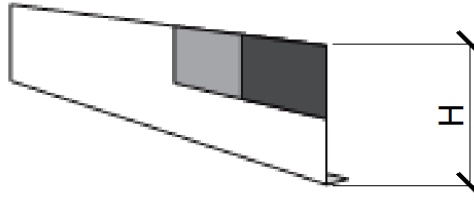
PN-EN 1427:2015-08	<i>Bitumen and asphalt binders. Determination of the softening point. Ring and Ball method</i>
PN-EN 1426:2015-08	<i>Bitumen and asphalt binders. Determination of needle penetration</i>
PN-EN 10346:2015-09	<i>Continuously hot-dip coated steel flat products for cold forming. Technical conditions of delivery</i>
PN-EN ISO 2178:1998	<i>Non-magnetic coatings on a magnetic substrate. Coating thickness measurement. Magnetic method</i>
PN-EN ISO 7438:2006	<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 10152:2017-03	<i>Cold-rolled, electro-galvanized, flat steel products for cold forming. Technical conditions of delivery</i>

## ANNEXES

<b>Annex A.</b> ErFlex steel sealing elements.....	10
<b>Annex B.</b> Identification features of the strips.....	14

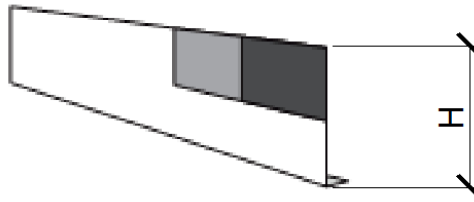
a) ErFlex BS ,

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



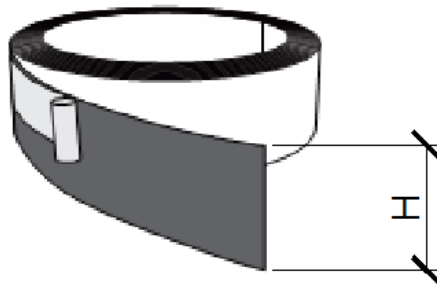
b) ErFlex BS+

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



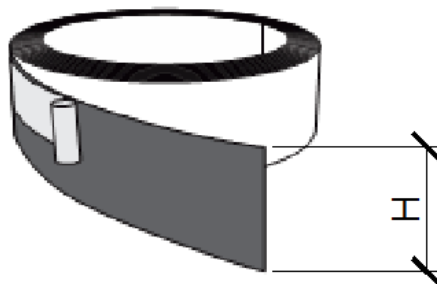
c) ErFlex BR

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

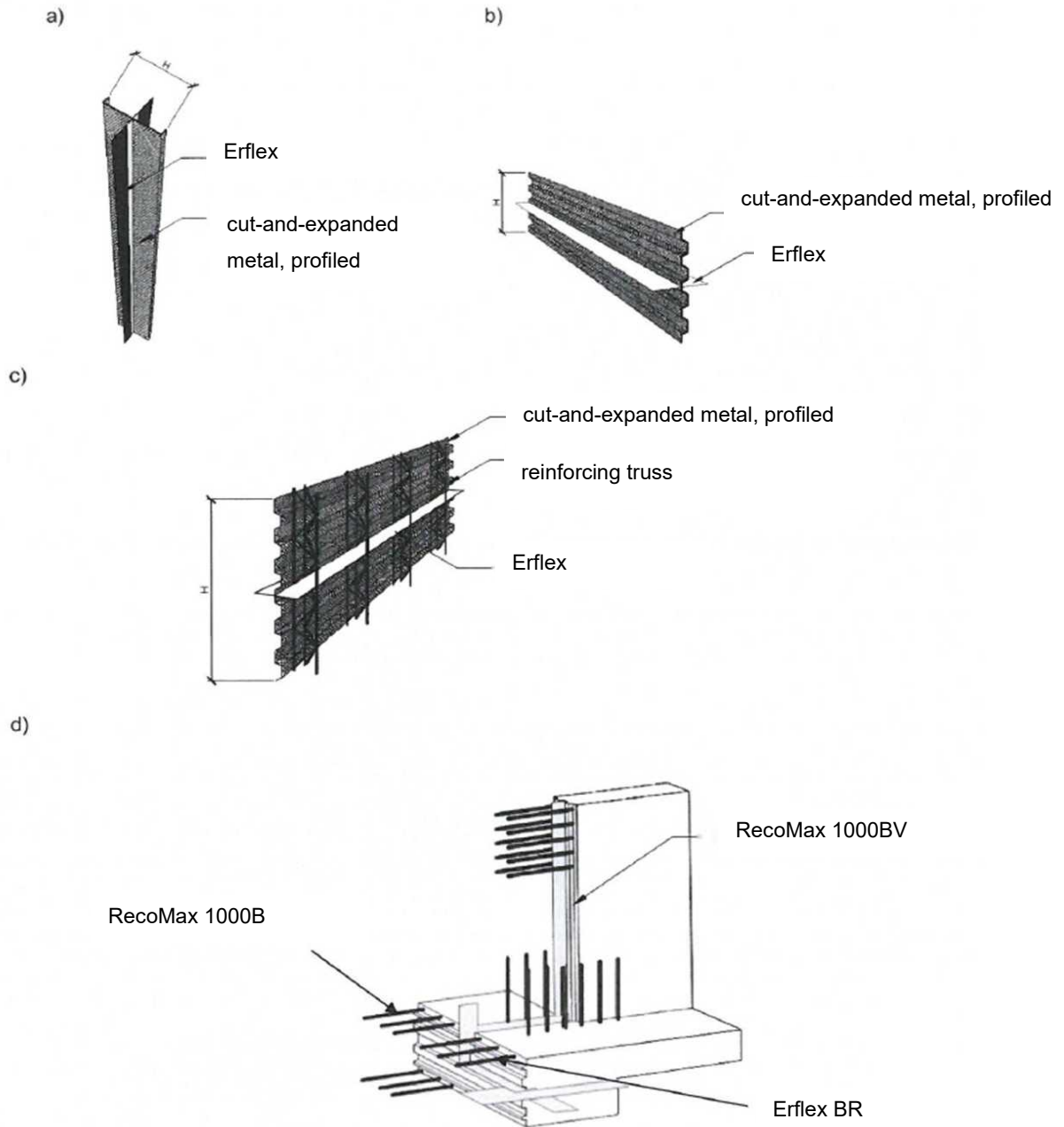


d) ErFlex BR+

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

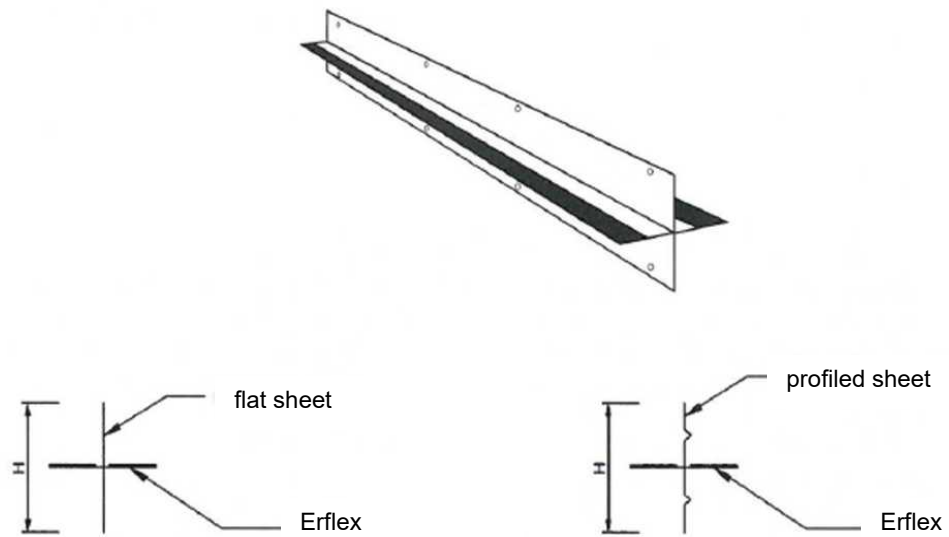


**Figure A1.** Sealing strips: ErFlex BS (a), ErFlex BS+(b), ErFlex BR (c) and ErFlex BR+ (d)

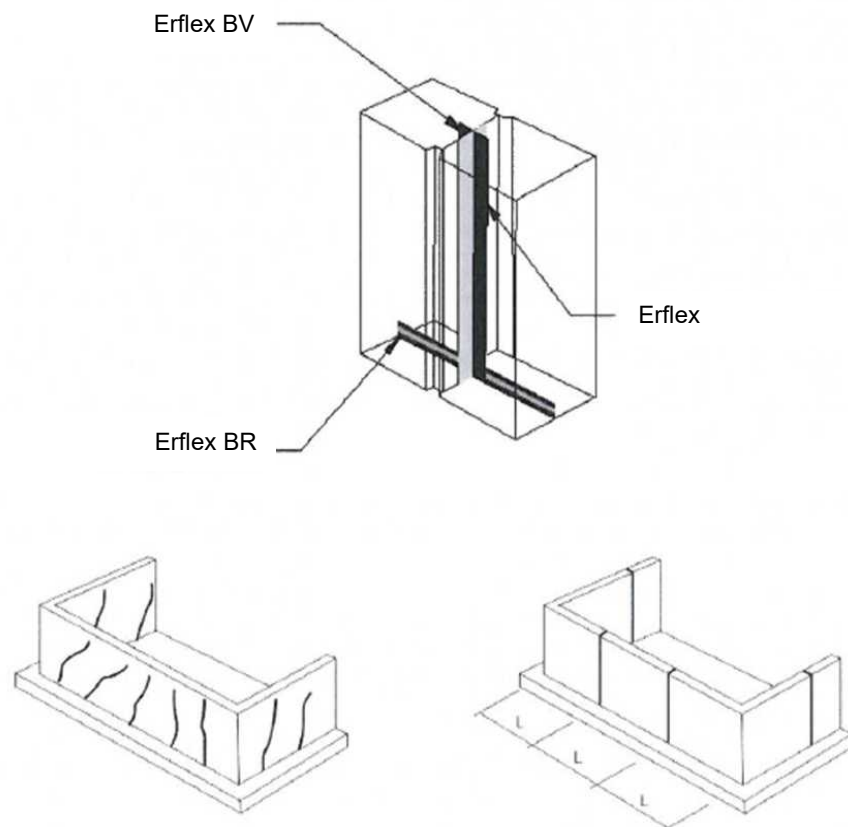


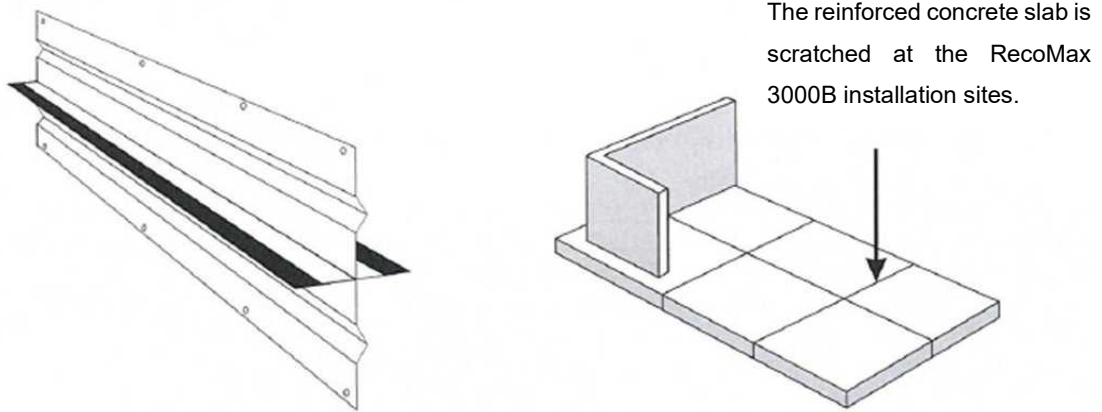
**Figure A2.** Sealing and formwork elements:

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

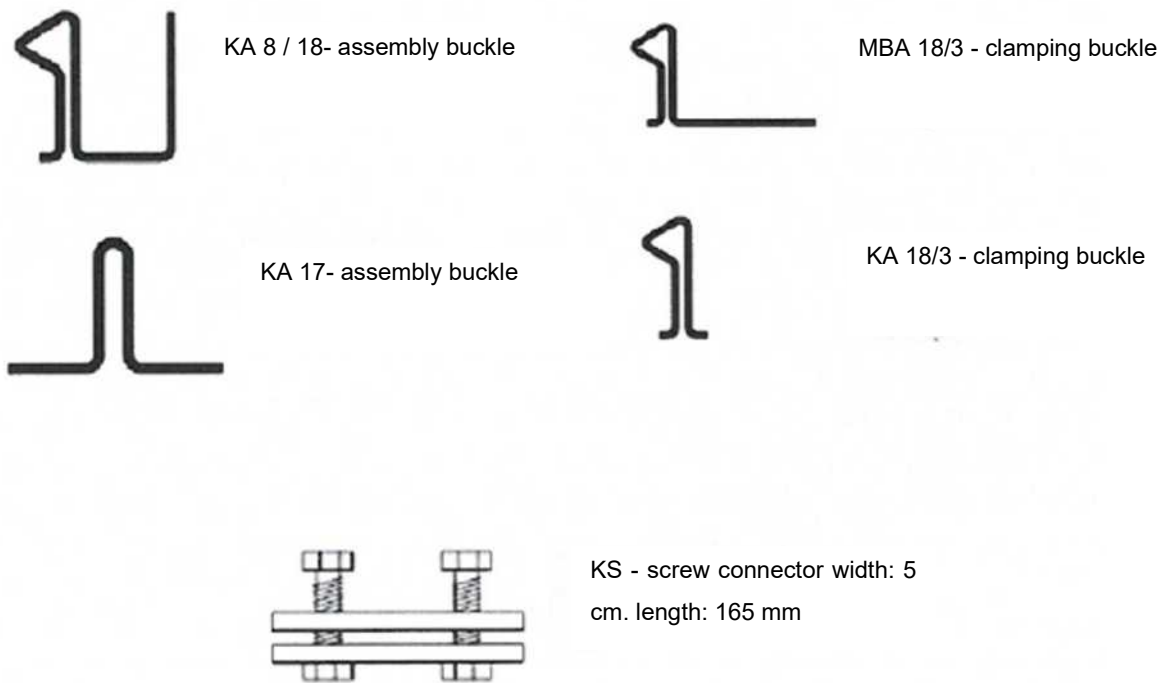


Assembly scheme

**Figure A3.** ErFlex BV sealing element



**Figure A4.** RecoMax 3000B sealing element



**Figure A5.** Fitting elements

## Annex B. Identification features of ErFlex strips

Table B1

Item	Identification features	Requirements	Test methods
1	2	3	4
<b>Properties of the zinc coating</b>			
1	Coating mass, g / m <sup>2</sup>	≥ 25	PN-EN 10346:2015
2	Coating thickness, μm	4,3 ± 10%	PN-EN ISO 2178:1998
<b>Properties of ErFlex strips</b>			
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	Sheet dimensions - sheet thickness, mm - allowable thickness deviations	0.7;1.2;1.5 PN-EN 1849-1:2002	PN-EN 1849-1:2002
5	Thickness of the bituminous coating	0,16 ± 15%	
6	The surface weight of the strip (one side covered with a bitumen coating), g / m <sup>2</sup>	4600 ± 10%	
7	Softening point of bituminous coating, °C	≥ 90	PN-EN 1427:2015
8	Penetration of the bitumen coating, mm	56 ± 10%	PN-EN 1426:2015