



KÖSTER ECB 1.5 U S

Technical Data Sheet RE 815 U S

Issued: 2019-10-07

Test Report 1200/676/17 EN 13967 MPA Braunschweig

Homogenous Ethylene Copolymer Bitumen based waterproofing membrane (ECB) for basement and underground structures

Features

The KÖSTER ECB 1.5 U S is a single layer homogenous (unreinforced) waterproofing membrane with a silver signal layer, produced in Germany with the highest quality compounds. This robust waterproofing membrane is conformed to DIN EN 13967:2012 and it is a moisture barrier Type T. This ECB based membrane is highly tear resistant and provides a very high flexibility, so that even large cracks are bridged securely. It is highly resistant to attack by microorganisms and also resistant to perforation by roots. Overlaps are easily connected together only by hot air welding. The KÖSTER ECB 1.5 U S is not UV resistant.

- Color: black, upper side silver
- homogeneous seam bonding with hot air welding
- immediate waterproofing effect
- temperature resistant
- aging and rot resistant
- high cold flexibility ($\leq -50^\circ\text{C}$)
- root resistant
- compatible with bitumen
- compatible with polystyrene
- No substrate preparation needed
- suitable for all types of insulation
- resistant against normal mechanical stresses
- resistant to microorganisms
- environmentally friendly
- free of softeners and chlorine
- do not become brittle over time
- safe for health, water, soil, and plants
- recyclable

Technical Data

Refer to last page.

Fields of Application

KÖSTER ECB 1.5 U S is a homogenous waterproofing membrane for use in structural waterproofing and all construction methods.

The main fields of application special for these membranes are basement and below grade structures, but also the secure waterproofing of:

- Rafts or mat foundations
- Retaining walls (positive side)
- Underground car parks
- Contiguous piling & diaphragm walls
- Embankments
- On grade and below grade constructions
- Commercial and industrial buildings
- Prefabricated structural panels

This high performance membrane can be used on secant pile and contiguous bored pile walls, prefabricated concrete panels, lost formwork method, In situ retaining walls or diaphragm walls.

Application

General installation

Every membrane has markings printed onto it to ease positioning and orientation of the membrane during application. The top layer has a silver cover that acts as a signal layer to show eventual mechanical damages during the application.

KÖSTER ECB 1.5 U S can be welded within a wide temperature window between $+350^\circ\text{C}$ to $+650^\circ\text{C}$. This will depend on the local environment parameters. Always do test welding before initiating the application. No chamfering of overlap seams to prevent capillary action is necessary. The KÖSTER ECB 1.5 U S can be securely welded at 0°C air temperature. Test welds are performed on site to determine the proper temperature and speed settings. During changing conditions this may have to be adjusted during work. The welds are tested at earliest 24 hours after completion and can be tested with a test needle or through a peel test. Membrane testing temperature must be less than $+20^\circ\text{C}$.

On vertical application with mechanically fixating the membrane overlap is 11 cm, when loose laying on the bottom the overlap is 5 cm. When applying over geotextile layer, the overlap is increased to 8 cm. When manually welding the membranes, the top layer is first spot welded. The hot air pistol is held in one hand and with the other the membrane is pressed down and affixed. After the initial spot welding, the hot air pistol is uniformly pulled through the overlap. A silicone roller is used to press the membranes evenly together. Do not press the membranes together too firmly. A slight bead of ECB material exiting the weld serves as an optical quality control. The bead should have a diameter of approximately 1 mm. During manual welding make sure that the silicone roller is held parallel to the seam edge and a uniform pressure is applied. Avoid too much material exiting the seam. When installing on horizontal larger areas, an automatic welding machine is recommended. These machines combine spot and final seam welding into one work step, and the advancement drive speed can be regulated.

To insure a flawless installation, all corners (such as at the membrane ends) are rounded off with scissors. This step applies to both the lower and upper membrane, in the overlapped areas. It is not necessary to taper the membrane edge. T connections must be homogeneously welded to avoid capillary active defects and should be tested 24 hours after completion with a test needle. Cross joints are vulnerable to failure and should be absolutely avoided. It is better to stagger the overlaps or to attach a cover strip to avoid a crossed joint. If a crossed joint is unavoidable all four T corners are to be covered with a welded round patch with a minimum diameter of 20 cm.

Pipe penetrations are waterproofed with a flange, 50 cm x 50 cm and a sleeve. A hole is cut into the flange 4 cm smaller than the pipe diameter. The flange is pulled over the pipe. The sleeve is then welded

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around the pipe overlapping the flange. KÖSTER ECB 1.5 U S is used for this since it is a homogenous membrane. When waterproofing corners, manually formed corners can be used using also the KÖSTER ECB 1.5 U S. Before installing the corners, the ECB membranes beneath must be creased over the corners and welded. Exterior corners can also be prepared from KÖSTER ECB 1.5 U S. For an exterior corner a diamond shaped piece of membrane is cut and the corners rounded. Interior corners are manually prepared from a circular piece of KÖSTER ECB 1.5 U S with a diameter of 20 cm. A cross with right angles is drawn centered on the prepared circle and cut once to the center. The cut is pulled to the next quadrant of the cross to create an inside corner. The overlap should be then carefully welded. The inside corner is finally waterproofed and reinforced with a circular corner plug with a diameter of 5 cm.

The equipment used for the application is manual hot-air hand tool with 40 mm nozzle, automatic hot air machines with 40 mm nozzle wire brush, the KÖSTER Hand Pressure Roller 40 mm, scissors, folding ruler, seam tester and temperature meter. On the mechanical fastening application, the chosen fasteners are according to the project and site conditions.

Underground structures

A) The Köster Method

Horizontal areas

Over the prepared and compacted soil, a stable substrate must be provided before installing the waterproofing membranes. As an appropriate substrate a blinding concrete layer is recommended. The initial blinding concrete must be as smooth as possible and free of edges, depressions, and other defects that can mechanically damage the membrane. To allow the subsequent connection of the horizontal to the vertical waterproofing, a stripe of membrane is vertically placed on the foundation slab formwork. To increase the mechanical protection of the membranes, a geotextile protection layer with a weight of 150 g/m² should be installed over the substrate. The KÖSTER ECB Membranes are placed over the horizontal surface and the overlaps are connected by hot air welding, which creates a homogenous, watertight and durable connection. The horizontal waterproofing is welded to the stripe and then protected with a 5 cm blinding concrete slab to reduce mechanical stresses on the membranes and facilitate the placement of the foundation reinforcement as well as the concrete casting.

Vertical areas

The vertical waterproofing membranes are mechanically fastened on the upper end and secured with a finishing profile to avoid water infiltration behind the membrane. To increase the protection from water infiltrating behind the membrane, the profile is sealed on the top with KÖSTER PU-907. For the installation on vertical surfaces, the seam welding is done with a lightweight automatic welder. The vertical and horizontal waterproofing membranes are then connected by hot air welding, on the front side of the first blinding concrete layer, to finish the waterproofing envelope.

B) Lost Formwork

Horizontal areas

Similar to The KÖSTER Method, the KÖSTER ECB Waterproofing Membranes are laid loose on the clean substrate and welded with hot air. For extra mechanical protection it is recommended to install a geotextile separation layer underneath (150 gr/m²) and on top (250

gr/m²) of the membrane before building a 50 mm protection screed.

Vertical areas

Before installing the membranes, the formwork is properly placed and mechanically fastened on the previously prepared substrate. To protect the membrane from mechanical stresses or irregularities on the formwork during the installation process, a geotextile protection layer with a weight of 250 g/m² is attached. The KÖSTER ECB Waterproofing Membranes are then mechanically fastened to the formwork and the seams are welded with hot air using the light weight Leister Automatic Welder Twinny S. The installed membrane is finally protected with the KÖSTER SD Protection Sheet 3-400 to avoid damage of the membrane while placement of reinforcement steel, casting and compacting of the concrete. The membranes are mechanically fastened on the upper end with a finishing profile to avoid water infiltration behind the membrane and sealed on the top with KÖSTER PU-907.

For further instructions please consult our technical guidelines or contact the technical department.

Packaging

RE 815 210 U S	1.5 mm x 2.10 m x 20 m
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Safety

Adhere to all governmental, state, and local safety regulations when installing the membranes.

Related products

KÖSTER Contact Adhesive	Prod. code RT 102
KÖSTER External Corner black 90 degrees	Prod. code RT 901 001 B
KÖSTER Internal Corner black 90 degrees	Prod. code RT 902 001 B
KÖSTER TPO Metal Composite Sheet	Prod. code RT 910 002 B

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 0761 15	KÖSTER BAUCHEMIE AG Dieselstraße 1-10, 26607 Aurich KÖSTER ECB 1.5 U S EN 13967 0761-CPR-0423 Waterproofing membrane made from Ethylene Copolymer Bitumen
Length according to DIN EN 1848-2	20 m ¹⁾
Width according to DIN EN 1848-2	2.10 m ²⁾
Effective thickness according to DIN EN 1849-2	1.5 mm
Designation according to SPEC 20000-202 Color Visible flaws according to DIN EN 1850-2 Straightness according to DIN EN 1848-2 Area weight according to DIN EN 1849-2 Watertightness according to DIN EN 1928 Method A Watertightness according to DIN EN 1928 Method B Exposure to liquid chemicals including water according to DIN EN 1847 Fire behavior according to EN 13501-1 Shear resistance of the joining seam according to DIN EN 12317-2 Water vapor permeability according to DIN EN 1931 Tensile elongation according to DIN EN 12311-2 Tensile strength longitudinal / transverse Elongation at break / cross Resistance to impact according to DIN EN 12691 Method A Method B Resistance to static load according to DIN EN 12730 Method A Method B Behavior to folding at low temperatures according to DIN EN 495-5 Behavior to exposure to bitumen according to DIN EN 1548 Durability against warm storage according to DIN EN 1296, DIN EN 1928 (Verf. A) Tear resistance (nail shaft) according to DIN EN 12310-1	DIN EN 13967:2012 Moisture barrier Type T BA-ECB-BV-1.5 black with silver foil free of visible flaws ≤ 50 mm 1450 g/m^2 $\geq 60 \text{ kPa/24h}$ tight $\geq 400 \text{ kPa/72h}$ tight tight Class E $> 500 \text{ N/50 mm}$ Failure outside the overlapped joint $\mu = 100,000$ $\geq 9 \text{ N/mm}^2$ (Method B) $\geq 700 \%$ (Method B) ≥ 600 mm ≥ 1750 mm ≥ 20 kg ≥ 20 kg $\leq -50 \text{ }^\circ\text{C}$ tight tight $\geq 400 \text{ N}$

1) Special lengths on request 2) Special widths on request

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