Deutsches
Institut
für
Bautechnik

DIBt

# General Building Approval

**Registration office for building products and building types**

**Construction authority**

A public law institute jointly operated by federal and state governments

Member of EOTA, UEAtc and WFTAO

| Date: | Business reference: |
|---|---|
| 26.05.2023 | II 74-1.59.21-53/22 |

**Approval number:**
**Z-59.21-435**

**Period of validity**
from: **26. Mai 2023**
to: **26. Mai 2028**

**Applicant:**
**STEULER-KCH GmbH**
Berggarten 1
56427 Siershahn

**Object of approval:**
**Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water**

The object of approval specified above is hereby generally technically approved.
This General Building Approval comprises twelve pages and 22 Annexures.

## I GENERAL REGULATIONS

1 The usability of the object of approval is verified in terms of the state construction ordinance with the General Building Approval.

2 The General Building Approval does not replace the statutorily prescribed approvals, consents and certificates required for the execution of the building project.

3 The General Building Approval is granted regardless of third party rights, particularly private protective rights.

4 Manufacturer and distributor of the object of approval have, regardless of further regulations in the "Special Conditions", have to provide the user of the object of approval with copies of the General Building Approval and inform him that the General Building Approval must have been granted. Upon request, the associated authorities have to be provided with copies of the General Building Approval as well.

5 The General Building Approval may only be copied in its entirety. The publication of excerpts requires the consent of the Deutsches Institut für Bautechnik. Texts and drawings of promotional material may not contradict the General Building Approval. Translations of the General Building Approval must contain the information "This translation of the German original is not verified by the Deutsches Institut für Bautechnik".

6 The General Building Approval is granted revocable. The regulations of the General Building Approval can be subsequently supplemented and amended, particularly if required by new technical findings.

7 This notification refers to the information and documentation pertaining to the object of approval supplied by the applicant during the approval process. This notification does not cover a change of these basics for the approval and must be disclosed to the Deutsches Institut for Bautechnik without undue delay.

## II SPECIAL CONDITIONS

### 1 Object of approval and scope of use

(1) The object of this General Building Approval is the sealing system "Bekaplast PE100".

(2) The sealing system is produced from welded plastic plates equipped with anchoring elements (anchor nubs). The concrete protection sheets are thus mechanically anchored in the concrete via these anchoring elements.

The concrete protection sheets are installed/laid as lost formwork and subsequently concreted in. Alternatively, also the subsequent mechanical anchoring of the concrete protection sheets using a certain mortar / screed is admissible. Following the removal of the formwork, the concrete protection sheets are welded into a walk-on catchment space seal by way of warm-gas-extrusion-welding according to DVS 2227-1[2].

(3) The concrete protection sheets to be mechanically anchored in the concrete are manufactured with a smooth surface in a thickness of 3.0 mm, 4.0 mm and 5.0 mm. The concrete protection sheets are manufactured in the sizes 1.0 m x 2.0 m, 1.50 m x 3.0 m and 2.0 m x 4.0 m. Special dimensions are possible for structural designs.

(4) The concrete protection sheets may be used to seal off catchment basins and catchment spaces within buildings and outside for the storage of liquids according to Annexure 1.

(5) In the event of storing flammable liquids, the object of the approval may only be used if the technical regulations for the prevention of ignition risks for facilities and the operation of the storage, filling or handling systems (TRGS 727[3]) have been met.

(6) This General Building Approval renders the suitability determination under the Water Act according to § 63 of the German Water Resources Act (WHG) dated 31 July 2009 (BGBl. I S. 2585) superfluous.

(7) The General Building Approval is granted regardless of the test and approval reservations of other legal sectors.

### 2 Regulations for the building product

### 2.1 Characteristics and composition

(1) The concrete protection sheets have to have the following characteristics. They have to be

- impermeable to liquid in terms of the water-hazardous liquids specified in Annexure 1 and 2;
- withstand ageing;
- be weather resistant according to class W 1 for internal application and external application / free weathering;
- be resistant to microorganisms and roots

1 DVS 2227-1:2004-08 Schweißen von Halbzeugen aus Polyethylen hoher Dichte (PE-HD) für die Abdichtung von Betonbauwerken im Bereich des Grundwasserschutzes und zum Korrosionsschutz
2 TRGS 727 Technische Regeln für Gefahrstoffe, Vermeidung von Zündgefahren infolge elektrostatischer Aufladungen – Fassung Januar 2016
3 TRGS 509 Technische Regeln für Gefahrstoffe (TRGS) 509: "Lagern von flüssigen und festen Gefahrstoffen in ortsfesten Behältern, sowie Füll- und Entleer-Stellen für orts-bewegliche Behälter, Ausgabe: September 2014, zuletzt berichtigt, geändert und ergänzt gemäß GMBl 2020 vom 2. Oktober 2020
4 WHG Gesetz zur Ordnung des Wasserhaushalts (Wasserhausgehalts – WHG), 31. Juli 2009 (BGBl. I S. 2585), zuletzt geändert durch Artikel 1 des Gesetzes vom 4. Januar 2023 (BGBl. I Nr. 5)

– comply with the requirements of construction material class B 2 according to DIN 4102-1[4] in terms of the spreading of fire.

(2) The characteristics according to section 2.1 (1) were verified to the DIBt (German institute for building technology).

(3) The materials of the source materials (plastic plates and nubs) for the production of the concrete protection sheets are deposited at the DIBt.

(4) The mechanic-physical character of the concrete protection sheets incl. the associated verification certificates are specified in Annexure 2.

(5) The plastic sheets are manufactured from polyethylene granules by extrusion. The anchoring elements (studs) are applied by ultrasonic welding in accordance with DVS 2216-16.

## 2.2 Manufacturing, packaging, transport, storage and labelling

### 2.2.1 Manufacturing

(1) The plastic plates from the formwork measurements "PE 100" as well as nubs of "Borstar ME 3440" are manufactured by company A (the information is deposited at DIBt), which confirm the quality of the extruded plastic plates with approval certificate 3.1 according to DIN EN 10204[5].

(2) The further processing of the plastic plates into the concrete protection sheets "Bekaplast PE100" has to occur at the factory of Steuler-KCH GmbH in 56203 Höhr-Grenzhausen of the applicant (hereinafter referred to as authorisation holder).

The nubs are welded onto the plastic plates via ultrasound welding according to DVS 2216-1[1]. The plate and nub geometry is according to Annexure 21.

(3) Changes in the respective formula of the source materials (plastic plates and nubs) require the prior approval of the Deutsches Institut für Bautechnik.

(4) Information regarding the production processes are deposited at DIBt. Changes require the prior approval of the Deutsches Institut für Bautechnik.

(5) The prefabrication of the plastic plates in the factory occurs via heating element shrink welding according to DVS 2207-1[6], warm-gas extrusion welding according to DVS 2207-3[7] and warm-gas extrusion welding according to DVS 2207-4[8], process variation II. Only personnel with a valid test certificate according to DVS 2212-1[9], subgroup I-6, I-6.1 and II-1.1 may perform the welding tasks.

### 2.2.2 Packaging, transport and storage

Packaging, transport and storage of the concrete protection sheets has to occur in a manner so that the usability is not impaired. The concrete protection sheets have to be transported and stored according to the information of the authorisation holder (see section 3.2.1 (2)). The concrete protection sheets have to be protected from direct sunlight.

5 DIN 4102-1:1998-05 Brandverhalten von Baustoffen und Bauteilen; Teil 1: Baustoffe; Begriffe, Anforderungen und Prüfungen
6 DVS 2216-1:2007-04 Ultraschallschweißen von Kunststoffserienteilen – Prozessbeschreibung, Maschinen und Geräte, Einflussgrößen, Konstruktion, Qualitätssicherung
7 DIN 10204:2005-01 Metallische Erzeugnisse - Arten von Prüfbescheinigungen
8 DVS 2207-1:2015-08 Schweißen von thermoplastischen Kunststoffen; Heizelementschweißen von Rohren, Rohrleitungsstellen und Tafeln aus PE
9 DVS 2207-3:2005-04 Schweißen von thermoplastischen Kunststoffen; Warmgaszieh- und Warmgasfächelschweißen von Rohren, Rohrleitungsstellen und Tafeln
10 DVS 2207-4:2005-04 Schweißen von thermoplastischen Kunststoffen; Extrusionsschweißen von Rohren, Rohrleitungsstellen und Tafeln
11 DVS 2212-1:2015-12 Prüfungen von Kunststoffschweißern; Prüfgruppen I und II

### 2.2.3 Labelling

(1) The construction product and/or the packaging of the construction product and/or the instruction leaflet of the construction product of the construction product and/or the delivery bill of the construction product shall be marked by the manufacturer with the mark of conformity (Ü mark) in accordance with the conformity mark ordinances of the of the federal states. The marking may only be carried out if the prerequisites according to Section 2.3 are fulfilled.

(2) The components of the construction product shall be clearly identifiable prior to installation.prior to installation.

(3) The certification number shall be easily recognizable and permanently marked with the name of the applicant and the date of manufacture on the packaging (instruction leaflet) and on the concrete protection slabs (at least once per concrete protection panel).

## 2.3 Compliance confirmation for the building product

### 2.3.1 General information

(1) The confirmation of the conformity of the concrete protection slab with the provisions of the general of the general technical approval covered by this safety standard shall be confirmed for the manufacturing plant specified in Section 2.2.1 (1) with a manufacturer's declaration of conformity based on factory manufacturer's declaration of conformity on the basis of factory production control and a certificate of conformity certificate of conformity issued by a certification body recognized for this purpose and a regular external monitoring by a recognized monitoring body in accordance with the following provisions.

(2) For the issuance of the certificate of conformity and the external surveillance including the product tests to be carried out, the manufacturer of the concrete protective slab shall a certification body recognized for this purpose and a surveillance body recognized for this purpose shall be involved.

(3) The manufacturer shall provide the declaration of conformity by marking the construction products with the mark of conformity (Ü mark) with reference to the intended use intended use.

(4) A copy of the certificate of conformity issued by the certification body shall be submitted to Deutsches Institut für Bautechnik.of the certificate of conformity issued by it. The Deutsches Institut für Bautechnik shall also be informed of a copy of the initial inspection report.

### 2.3.2 Factory-own production control

(1) A factory production control shall be established and performed in each manufacturing plant.

(2) Factory production control means the continuous surveillance of production to be carried out by the manufacturer production to be carried out by the manufacturer in order to ensure that the concrete that the concrete safety slabs manufactured by the manufacturer comply with the provisions of the general general building approval covered by this notice.

(3) The factory production control shall at least include the measures specified in Annex 4. listed in Annex 4.

(4) The results of factory production control shall be recorded and evaluated.

The records shall contain at least the following information:

- Concrete protection slab "Bekaplast PE100", Z-59.21-435,

- Assignment of the manufactured concrete protection slabs to the batch of the molding compound used,

- type of inspection or test,

- Date of production and testing of the concrete protection slabs,

- result of the inspections and tests as well as comparison with the requirements according to Appendices 3 and 4

- Quality of joint seams of prefabricated concrete protection slabs according to acceptance test certificate 3.1 according to DIN EN 102047 and

- signature of the person responsible for factory production control.

(5) The records shall be kept for at least five years and shall be submitted to the surveillance agency for the external surveillance. They shall be submitted to the Institut für Bautechnik and the competent supreme building supervisory authority upon request. upon request.

(6) In the case of unsatisfactory test results, the person responsible for the factory production control shall immediately production control shall immediately take the necessary measures to remedy the defect. take the necessary measures. Construction products which do not meet the requirements shall be handled in such a way that confusion with matching construction products is excluded. After the defect has been rectified, the test in question must be carried out without delay - insofar as technically possible and the test in question must be repeated without delay.

### 2.3.3 External monitoring

(1) In each manufacturing plant, the factory production control shall be inspected by an external surveillance at least twice a year.

(2) Within the scope of the external surveillance an initial test of the construction product shall be performed, test specimens shall be taken and tested in accordance with the test plan specified in Annex 4, and samples may also be taken for random tests. The sampling and tests shall be the responsibility of the respective recognized inspection body.

(3) The external surveillance of the manufacture of the concrete protection slab shall be performed in accordance with Annex 4. The identity shall be determined by comparing the data of Annex 3 "Surveillance values" with the data determined within the scope of the external surveillance with the values determined within the scope of the external surveillance

a. the molding compound (density, melt mass flow rate) and

b. the molding material (density, melt mass flow rate and behavior under tensile load (σy and εy))
to be determined.

(4) Within the scope of the external surveillance, an initial test of the concrete protection slab shall be carried out with the following scope of testing:

- Identity of materials (see Section 2.3.3 (3)),
- composition,
- thickness,
- behavior with respect to test liquids (testing with at least three test liquids or selected by the inspection body or group of liquids - test liquids of appendices 1 and 2) as well as
- Behavior after heating (dimensional change),
- dimensional stability of the anchoring elements and
- determination of the pull-off force.

(5) Sampling and testing shall be the responsibility of the recognized inspection body. If the tests on which the general building approval is based were carried out on specimens which were samples taken by an independent third party representative of the production in progress, the production, the initial test may be omitted.

(6) The results of certification and external surveillance shall be kept for at least five years. for at least five years. They shall be submitted by the certification body or the surveillance body to the German Institute for Structual Engineering (Deutsches Institut für Bautechnik) and the responsible supreme authority upon request.

## 3 Regulations for the application of the object of approval

### 3.1 Planning and assessment

(1) The stability of the catch basin/rooms shall be verified prior to the installation of the concrete protection slabs. prior to installation of the concrete protection slabs.

(2) The substrate for the concrete protection slabs shall already have the intended bottom slope. slope.

(3) If soil moisture, groundwater, seepage water or other waters from the rear side can penetrate into the structure from the rear, it shall be sealed in accordance with DIN 18533-1 to -312.

(4) The subgrade for the installation of the concrete protection slabs and their fastening shall be determined before shall be assessed and approved by the company in accordance with Section 3.2.1 prior to the approved.

(5) It may be necessary to bridge cracks in the substrate that are wider than 0.5 mm. In this case, the permanent deformation shall not exceed 3 % of the distance between the anchoring elements to avoid stress cracking of the lining. If welds are present within the affected area, the maximum allowable deformation is reduced to 2% of the distance between the anchoring elements, from which the width of the weld shall be deducted.

(6) When restoring the impermeability to liquids of catch basins and catch chambers, the requirements of the DAfStb guideline "Protection and Repair of Concrete Structures "13 shall be met mutatis mutandis. Crack widths of up to 1.5 mm are permissible for catch basins and rooms to be repaired, provided that the stability is not endangered. Wider cracks shall be filled properly.[10]

(7) The maximum permissible liquid level for the respective object in relation to the high point of the sealing plane (not any superstructures) shall be observed, e.g. taking into account the wave impact. The height of the liquid level of the water-polluting liquid in the tank shall be at least 10 cm below the upper end of the concrete protection slab.

### 3.2 Ausführung

#### 3.2.1 Allgemeines

(1) The executing company (according to the regulations of the AwSV14), including its skilled workers, shall be trained and authorized by the applicant for the activities specified in this notice. authorized by the applicant.

(2) The waterproofing system shall be installed in accordance with the provisions of this notice, in accordance with the construction drawings and the installation and processing instructions of the applicant. installed. The processing and after-treatment instructions specified in the installation and processing and after-treatment instructions specified in the installation and processing instructions.

12 DIN 18533-1:2017-07 Abdichtung von erdberührten Bauteilen – Teil 1:Anforderungen, Planungs- und Ausführungsgrundsätze
DIN 18533-2:2017-07 Abdichtung von erdberührten Bauteilen – Teil 2: Abdichtung mit bahnenförmigen Abdichtungsstoffen
DIN 18533-3:2017-07 Abdichtung von erdberührten Bauteilen – Teil 3: Abdichtung mit flüssig zu verarbeitenden Abdichtungsstoffen

13 Instandsetzungsrichtlinie DAfStb-Richtlinie "Schutz und Instandsetzen von Betonbauteilen (Instandsetzungsrichtlinie)",
Deutscher Ausschuss für Stahlbeton, Ausgabe Oktober 2001

14 AwSV Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen (AwSV)
vom 18. April 2017 (BGBl. Teil I S. 905 ff), zuletzt

(3) For the proper installation of the concrete protection slab, the applicant shall draw up

installation and processing instructions, in which, in addition to the provisions of this of this notice, in particular with regard to the following points, detailed descriptions shall be included. shall be included.

- Storage, transportation and packaging,
- subsoil preparation and condition of new installations and installations to be repaired,
- operations required to seal containment areas (e.g., for sealing of partial surfaces),
- information on the method of fixing the concrete protection slabs to the formwork,
- information on the quality of the floor screed or grouting mortar,
- type of joining of concrete protection slabs including preparation, treatment and protection of the joining zones,
- inspection of joining seams,
- touching up of hollow spots,
- reworking and repairing the waterproofing.

(4) The installation of the concrete protection slabs can be carried out either simultaneously with the production of the concrete structure as permanent formwork or subsequently using a mortar or screed. or screed.

Upon installation on the ground, the concrete protection sheets has to be affixed either on cement screed with a thickness of at least 50 mm and a strength category of at least CT 30 according to DIN EN 13813[13] or mortar has to poured underneath. If the lining is exposed to hydrostatic pressure, it has to be installed directly on the base as long as the concrete is still fresh. If the lining is applied after the establishment of the concrete component, a lasting connection has to be ensured between the concrete base and the screed.

In case of walls, the concrete protection sheets have to be closely connected with the base. The maximum grain size of the concrete addition is to be coordinated with the geometry and arrangement of the fixation elements. Unless specified otherwise by the authorisation holder, the maximum grain size has to equate to half of the shortest distance between the fastening elements.

The concrete protection sheets have to be firmly connected with the formwork. The number of penetrations (e.g. for spacers) has to be kept to a minimum. The attachments have to be observed when using nails; the use of bolts in the respective area is not admissible. Temperature-related movements (expansion and compression) have to be absorbed with the use of suitable profiles so that the lining lies flat and tension-free on the formwork.

(5) The guidelines of the Deutscher Verband für Schweißen und verwandte Verfahren e.V. (DVS-guidelines) have to be applied for the execution of the joint works. Welding of concrete protection sheets at the construction site occurs according to the Directives DVS 2207-4[8] by way of warm-gas-extrusion welding. Tacking/welding can be executed by way of warm-gas-draw welding according to directive DVS 2207-3[7]. Only personnel with a valid test certificate according to DVS 2212-1[9], sub-group I-5 / II-1 may perform welding works. The welding seams have to be checked and recorded according DVS Directive 2227-1[2]. Only welding additives of the material identical to the concrete protection sheets may be used.

(6) Construction details have to comply with Annexures 5 - 20.

(7) The concrete protection slabs can only be walked on; driving on them is not permitted.

15 DIN EN 13813:2003-01 Screed mortars, screed mixes and screeds - Screed mortars and screed mixes - Properties and requirements Properties and requirements

(8) The records shall be handed over to the operator for inclusion in the construction files and shall be submitted to Deutsches Institut für Bautechnik, to the competent supreme supervisory authority and to the the authorized inspector (in accordance with the provisions of the AwSV) upon request.

(10) The on-site operation trained and authorized by the applicant in accordance with Section 3.2.1 (1) shall be obligated to attach a clearly visible sign to each installed waterproofing system on site. Signs supplied with the waterproofing system by the applicant shall be used and shall contain at least the following information:

The following was used to waterproof this catch basin.

Concrete protection plate: "Bekaplast PE100".

Decision number: Z-59.21-435

Applicant: Steuler-KCH GmbH

Berggarten 1

56427 Siershahn

executed on:

carried out by: (for executing company see section 3.2.1 (1))

For damage repair, only the materials specified in the notice may be used in accordance with according to the specifications of the applicant!

### 3.2.2 Inspections of the executing company

(1) The inspection of the sealing system shall be performed prior to the commissioning of the containment basin or area. This shall be done in the presence of a competent representative of the executing plant in accordance with Section 3.2.1 (1) and of the plant operator.

(2) The thickness of the concrete protection slabs to be laid shall be randomly checked prior to the start of the installation or laying work. If a thickness is consistently found which does not meet the requirements of Annex 3 - Surveillance Values - the respective concrete protection slab shall be discarded and replaced by a new one which meets the requirements, with the requirements.

(3) Insofar as partial inspections of individual installation sections were not planned or possible by a or possible by a competent person, the competent person shall inspect the waterproofing system by randomly inspects the waterproofing system by visual inspection for obvious defects and damages defects and damages, flawless execution of the joints, securing of the edges and their connections to other components of the containment space. The records shall be submitted to the operator for inclusion in the construction file on request (see Annex 6).

### 3.2.3 Declaration of conformity for the type of construction

(1) The confirmation of conformity of the type of construction (installed waterproofing system) with with the provisions of this safety standard shall be confirmed by the executing company in accordance with Section Section 3.2.1 (1) with a declaration of conformity on the basis of the provisions for the designs according to Section 3.1 and Sections 3.2.1 and 3.2.2 (see Annex 6).

(2) During execution, records of the proof of execution shall be kept by the construction supervisor or his representative.

(3) The declaration of conformity shall be submitted to the operator of the storage facility together with a copy of this notice and a copy of the applicant's installation and processing instructions. applicant.

(4) The records in accordance with Sec. 3.2.3 (2) shall be available on site during the construction period. be available. They shall be kept by the company for at least 5 years after completion of the work. for at least 5 years after completion of the work. Copies of the records as well as proofs of stability in accordance with 3.1.1 (1) and 3.1.2 (1) shall be submitted to Deutsches Institut für Bautechnik, the responsible supreme authority and the expert (in accordance with the regulations of the AwSV) on request. upon request.

## 4 Regulations for the usage, maintenance and repair

### 4.1 General information

(1) The specifications of the authorisation holder for the proper cleaning and maintenance of the object of approval have to be considered by the operator of the system.

(2) The operator has to organise the control intervals specified in the respective storage system depending on the admissible usage period according to this General Building approval. The results of the regular checks and all results deviating from these operating instructions. These recordings have to be presented to the expert (according to the regulations of AwSV) upon demand.

(3) Escaped water-hazardous liquids have to be recognised and removed from the sealing system as quickly as possible, however at the latest within the admissible usage period specified in Annexure 1. In case of utilisation according to the "medium" loading level, escaped water-hazardous liquids have to be removed from the sealing system within 72 hours.

(4) The maximum permissible liquid level for the respective object, referred to the high point of the sealing plane (not any superstructures), shall be observed, e.g., taking into account the of the wave impact.

### 3.3.2.2 Checks by experts according to the regulations of AwSV

(1) Start-up test

- The expert has to be kept permanently informed of the progress of the works. He must be given the opportunity to participate in controls prior to and after the installation of the sealing system according to section 3.2.1 and to evaluate the results of the controls.
- The final test regarding the quality of the surface of the sealing system occurs by way of visual inspection of the surface of all areas of the respective sealing construction.
- The thickness of the concrete protection sheets to be installed has to be randomly verified by the expert prior to the start of the installation/laying. If the average thickness does not comply with the requirements of Annexure 2 - Monitoring Values -, the respective concrete protection sheets has to be discarded and replaced by a new concrete protection sheets which complies with the requirements.
- The expert checks the execution of the sealing system according to plan for compliance with the requirements of the General Building Approval and official stipulations and conditions. He checks the necessary verifications and the recording regarding type, extent and result of the tests according to the building execution.
- The expert checks the control intervals specified in the operating instructions of the operator (according to section 3.3.1) and compares these with the admissible load period according to this General Building Approval.
- If partial tests of individual laying sections were not envisaged or possible during the execution of the construction by the expert, he shall perform random tests of the sealing system by visually checking for obvious defects and damages, correct execution of the joints, securing of edges, cover as well as connections to other building components of the catchment space.

(2) Recurring tests

- The sealing system has to be subjected to recurring tests to ascertain its compliance with the prerequisites of its usage.
- The sealing system has to be checked visually and randomly regarding its condition. The specifications of section 3.3.2.1 (3) apply analogously.

- If damages are detected on the sealing system during the recurring tests, respective measures have to be taken to remedy the defects.

### 4.3 Defect remedy

(1) According to the specifications of AwSV, defects determined during the tests and controls have to be remedied.

An operation according to section 3.2.1 (1) has to be commissioned with the remedy of defects, which is only permitted to use materials specified in this notification according to the processing instructions of the authorisation holder, and must comply with the requirements of section 3.2.1 and 3.2.2.

(2) Damaged surfaces have to be covered with cuts of the respective concrete protection sheets. The cuts have to be professionally joined throughout the entire seam area. Missing welding seams have to be professionally repaired. The impermeable, repaired areas have to be tested according to section 3.2.1 (4).

(3) If the entire area of the defects to be repaired exceeds 30%, the expert decides (according to the regulations of AwSV) whether a repair is still admissible. The recurring test has to be repeated by an expert in case of subsequent repairs on a larger scale.

### 44 Restoration of impermeability in existing facilities

(1) According to the regulations of AwSV, during the repair of sealing systems (restoration of impermeability) in existing storage systems, the operator has to arrange

- the building condition inspection and the coordinated repair concept by an expert planner and
- the verification of the proper condition of the restored section. The expert has to be provided with the option to acknowledge the building condition inspection and the repair concept.

(2) The conditions of this General Building Approval, section 3, have to be observed during the restoration of the impermeability.

Dr.-Ing. Ullrich Kluge
Head of Division

Certified
Wolf

| Liquids | Media groups | Load level* |
|---|---|---|
| Otto fuels according to DIN EN 228 with a maximum (bio) ethanol content of 5 Vol.-% according to DIN EN 15376 | 1 | high |
| Otto fuels according to DIN EN 228 with the additive of bio fuel components according to RL 2009/28/EC up to a total content of max. 20 Vol.-% | 1a | |
| Aviation fuels | 2 | |
| Hydrocarbons as well as benzene-containing mixes with max. 5 Vol.-% Benzoyl, except fuels | 4 | |
| Benzoyl and benzoyl-containing mixes | 4a | |
| Raw oils | 4b | |
| Used combustion engine oils and used MV gear oils with a flash point of > 60°C | 4c | |
| Single and multiple value alcohols with a max. of 48 Vol.-% methanol and ethanol (in sum), glycol, poly-glycol, their mono-ether as well as their watery mixtures | 5 | |
| Alcohols and glycol ether as well as their watery mixtures | 5a | |
| Single and multiple value alcohols > C2 with a max. of 48 Vol.-% methanol and ethanol as well as their watery mixtures | 5b | |
| Ethanol incl. ethanol according to DIN EN 15376 (regardless of manufacturing process) as well as their watery solutions | 5c | |
| All aliphatic halogen-hydrocarbons ≥ $C_2$ | 6 | |
| Halogen-hydrocarbons = $C_1$ | 6a | |
| Aromatic Halogen-hydrocarbons | 6b | |
| Bio diesel according to DIN EN 14214 | 7b | |
| Watery solutions of organic acids (carbon acids) to 10% as well as their salts (in watery solution) | 9 | |
| Organic acids (carbon acids, except formic acid) as well as their salts (in watery solution) | 9a | |
| Organic acids (mineral acids) up to 20% as well as sour hydrolyzing, inorganic salt in watery solution (pH < 6), except hydrofluoric acid and acids with an oxidising acids and their salts | 10 | |
| Inorganic bases as well as alkaline hydrolyzing, inorganic salts in watery solution (pH > 8), except ammoniac solutions and oxidising solutions of salts (e.g. hypochlorit) | 11 | |
| Watery solutions of organic non-oxidising salts with a ph value between 6 and 8 | 12 | |
| Amines as well as their salts (in watery solution) | 13 | |
| watery solutions of organic tenside | 14 | |
| Cyclic and acyclic ether | 15 | |
| Acyclic ether | 15a | |
| - Heating oil EL according to DIN 51603-1<br>- unused combustion engine oils and unused MV gear oil<br>- Mixtures from saturated and aromatic hydrocarbons with an aromatic content of ≤ 20 Ma.-% and a flash point of > 60 °C | 3 | medium |
| Diesel fuels according to DIN EN 590 with the additive of bio diesel according to DIN EN 14214 up to a total volume of max. 20 Vol.-% | 3b | |

* Work sheet DWA-A 786, Technical regulations of water-hazardous substances (TRwS) Execution of sealing areas; Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e.V. (DWA) Regulations, Oct. 2005

** DIBt-Homepage, Specialty II 7

The liquids listed are technically pure substances or mixtures of technically pure substances of the respective group.substances of the respective group. This also applies to mixtures with water (e.g. alcohols) unless this is specifically stated. is not specifically stated.

| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 1 + 2 |
| List of liquids against which the sealing sheet for the specified load levels is impermeable and resistant | |

| Liste der Einzelflüssigkeiten | | | | |
|---|---|---|---|---|
| **Nummer** | **Lagermedium** | **Chem. Bezeichnung** | **Konzentration** | **Beanspruchungsstufe[a)]** |
| 1 | Acrylnitril | $CH_2CHCN$ | TR | hoch |
| 2 | Ameisensäure | HCOOH | ≤ 85 % | |
| 3 | Ammoniumsulfid | $(NH_4)_2S$ | ≤ GL | |
| 4 | Bariumsulfid | BaS | S | |
| 5 | Calciumsulfid | CaS | S | |
| 6 | Eisen(III)-Aluminiumchloridmischung (Flockungsmittel) wie z. B. Südflock K2 (Handelsbezeichnung der Süd-Chemie AG, Mosburg) | | H | |
| 7 | Flusssäure | HF | ≤ 75 % | |
| 8 | Glykolsäure | $HOCH_2COOH$ | ≤ GL | |
| 9 | Hydrazinhydrat | $N_2H_4 \cdot H_2O$ | ≤ 24 % | |
| 10 | Kaliumbromat | $KBrO_3$ | ≤ GL | |
| 11 | Kaliumchlorat | $KClO_3$ | ≤ GL | |
| 12 | Kaliumhypochlorit (Gehalt an Aktivchlor 150 g/l) | KOCl | | |
| 13 | Natriumchlorat | $NaClO_3$ | ≤ GL | |
| 14 | Natriumchlorit | $NaClO_2$ | ≤ GL | |
| 15 | Natriumdichromat | $Na_2Cr_2O_7$ | ≤ GL | |
| 16 | Natriumhypochlorit (Gehalt an Aktivchlor ≤ 150 g/l) | NaOCl | | |
| 17 | Natriumsulfid | $Na_2S$ | ≤ GL | |
| 18 | Phosphorsäure | $H_3PO_4$ | ≤ 95 % | |
| 19 | Salpetersäure | $HNO_3$ | ≤ GL | |
| 20 | Salzsäure | HCl | ≤ 37 % | |
| 21 | Schwefelsäure | $H_2SO_4$ | ≤ 98 % | |
| 22 | Silbernitrat | $AgNO_3$ | ≤ GL | |
| 23 | Tetrafluoroborsäure | $HBF_4$ | ≤ 50 % | |
| 24 | Wasserstoffperoxid | $H_2O_2$ | ≤ 70 % | |
| 25 | Zinn(IV)-chlorid (heftige Zersetzung mit Wasser oder Feuchtigkeit unter HCl-Bildung!) | $SnCl_4$ | ≤ GL | |

Konzentration:
% = Gewichtsprozent
GL = gesättigte Lösung
TR = technisch rein
H = handelsüblich
S = Suspension

| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 1 + 2 |
| List of liquids against which the sealing sheet for the specified load levels is impermeable and resistant | |

| Test object | Characteristics | Unit | Test basis | Monitoring values |
|---|---|---|---|---|
| Formwork measurements "PE 100" | Formwork measurements specification | --- | DIN EN ISO 17855-1[16] | PE, EACH, 50-T003 |
| | Melting index MFR 190/5 | g/10 min | DIN EN ISO 1133-1[17] | 0.22 ± 0.06 |
| | Density ($d_R$) | g/cm³ | DIN EN ISO 1183-1[18] | 0.958 ± 0.004 |
| Plastic plate (moulding material) "PE 100" | Thickness | mm | DIN EN 1849-2[19] | 3.0<br>4.0<br>5.0 } +10 % / -5 % (Individual values ± 10 %) |
| | Melting index MFR 190/5 | g/10 min | DIN EN ISO 1133-1[17] | 0.24 ± 0.15 |
| | Density ($d_R$) | g/cm³ | DIN EN ISO 1183-1[18] | 0.958 ± 0.004 |
| | Tensile yield ($\sigma_y$) | N/mm² | DIN EN ISO 527-2[20] Test specimen 1B, Test speed v = 50 mm/min | 25.5 ± 15 % |
| | Dilation in case of tensile yield ($\varepsilon_y$) | % | | 9.0 ±15 % (relative) |
| | Behaviour after heating | % | DIN EN 1107-2[21] (120°C, 60 min) | Measurement change ≤ 3 % |
| Anchoring element (anchor nubs) "Borstar ME3440" | Formwork measurement dimensions | --- | DIN EN ISO 1872-1[16] | PE, EACGL 50 T 012 CD |
| | Melting index MFR 190/5 | g/10 min | DIN EN ISO 1133-1[17] | 0.85 ± 0.3 |
| | Density ($d_R$) | g/cm³ | DIN EN ISO 1183-1[18] | 0.951 ± 0.004 |
| | Dimensional stability of anchor elements | --- | Company-own process in compliance with the test authority | see Annexure 5/17 |
| Concrete protection sheet "Bekaplast PE100" | Nub stability Tensile strength | N/nub | According to deposited test plan | > 2,100 |

[15] DIN EN ISO 17855-1:2015-01 Plastics - Polyethylene (PE)-formwork measurements - Part 1: Specification system and basis for specifications

[16] DIN EN ISO 1133-1:2012-03 Plastics - Determination of melting mass flow rate (MFR) and melting volume flow rate (MVR) of thermoplast - Part 1: General test procedure

[17] DIN EN ISO 1183-1:2019-09 Plastics - Process to determine the density of non-foamed plastics - Part 1: dipping process, process with liquid pycnometer and titration process

[18] DIN EN 1849-2:2019-09 Sealing panels - Determination of thickness and the surface-related mass - Part 2: Plastic and elastomer panels for roof sealing

[19] DIN EN ISO 527-2:2019-02 Plastics - Determination of tensile characteristics -Part 2: Test conditions for formwork and extrusion masses

[20] DIN EN 1107-2:2001-04 Sealing panels - Determination of dimensional stability - Part 2: Plastic and elastomer panels for roof sealing

| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 3 |
| Monitoring value / mechanic-physical characteristics | |

| Monitoring object | Characteristics | | Test basis | Documentation | Frequency of | |
|---|---|---|---|---|---|---|
| | | | | | factory-own production control | External monitoring |
| Formwork measurements "PE 100" | Trade goods, Type specification, formwork measurement specification according to DIN EN ISO 1872-1[15] | | --- | Factory certificate 2.1 according to DIN EN 10204[5] | Each delivery | 2 x per annum |
| | Melting index [a)] | | DIN EN ISO 1133-1[16] MFR 190/5 (Code T) | Approval certificate 3.1 according to DIN EN 10204[5] or record | | |
| | Density [a)] | | DIN EN ISO 1183-1[17] | | | |
| Plastic plate (moulding material) "PE 100" | Thickness | | DIN EN 1849-2[18] | Approval certificate 3.1 according to DIN EN 10204[5] labelling with compliance sign | Each delivery | 2 x per annum |
| | Quality | | Paragraph 4.3 ZG[4] | | | 2 x per annum |
| | Melting index [a)] | | DIN EN ISO 1133-1[16] MFR 190/5 (Code T) | | | 2 x per annum |
| | Density [a)] | | DIN EN ISO 1183-1[17] | | | --- |
| | Tensile yield [a)] | lengthwise | DIN EN ISO 527-2[19] Test specimen 1B, test speed v = 50 mm/min | | | 2 x per annum |
| | | across | | | | --- |
| | Dilation by tensile force [a)] | lengthwise | | | | 2 x per annum |
| | | across | | | | 2 x per annum |
| | Behaviour after heating | lengthwise | DIN EN 1107-2[20] (120 °C, 60 min) | | | 2 x per annum |
| | | across | | | | |
| Anchoring element (anchor nubs) "Borstar ME3440" | formwork measurement specification | | --- | Factory certificate 2.1 according to DIN EN 10204[5] | Each delivery | 2 x per annum |
| | Melting index [a)] | | DIN EN ISO 1133-1[16] MFR 190/5 (Code T) | Approval certificate 3.1 according to DIN EN 10204[5] or record | | |
| | Density [a)] | | DIN EN ISO 1183-1[17] | | | |
| | Dimensional stability of anchor elements | | Company-own process in compliance with the test authority | Record | Continuous visual control and measurement of 5 nubs per batch | 2 x per annum |
| Concrete protection sheet "Bekaplast PE100" | Nub stability tensile force | | According to deposited test plan | Record | Daily, see section 2.3.2(5) of special conditions | 2 x per annum |

[a)] Determination of identity according to section 2.3.3(2) of the special conditions

| Serial no. | **Confirmation of executing company** | |
|---|---|---|

1. Project: .....

2. Storage products: .....

3. Sealing with ..... / ..... / ..... (trade name/type/thickness)

4. Approval: Z-59.21-435 dated .....

5.a Authorisation holder:

Steuler-KCH GmbH
Berggarten 1
56427 Siershahn
Phone: +49 (0)2623 600 402

5.b Executing operation for the installation of the concrete protection sheets:
.....
.....

5.c Construction time: .....

| | Confirmation |
|---|---|
| 6. The specialised personnel of the executing company was professionally instructed by the authorisation holder of the sealing sheets regarding the correct installation. | |
| 7. Assessment of the production of the seal<br>Base quality according to the references of the General Building Certificate is provided | |
| 8. Control of installation<br>a) Test certificates [22] of the welders according to DVS Guidelines 2212 were provided<br>b) Welding protocols [22] were provided<br>- Workshop<br>- Building site<br>c) if applicable, measures to prevent the risk of inflammation were implemented [23] | |
| Comments: | |

Date:

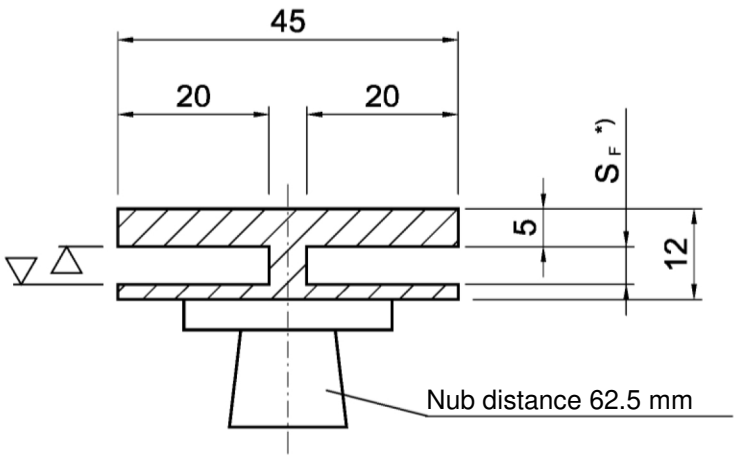
.....
(Company)

---

[22] The test certificates and welding protocols are attached to the confirmation
[23] The description of measures has to be attached to the confirmation

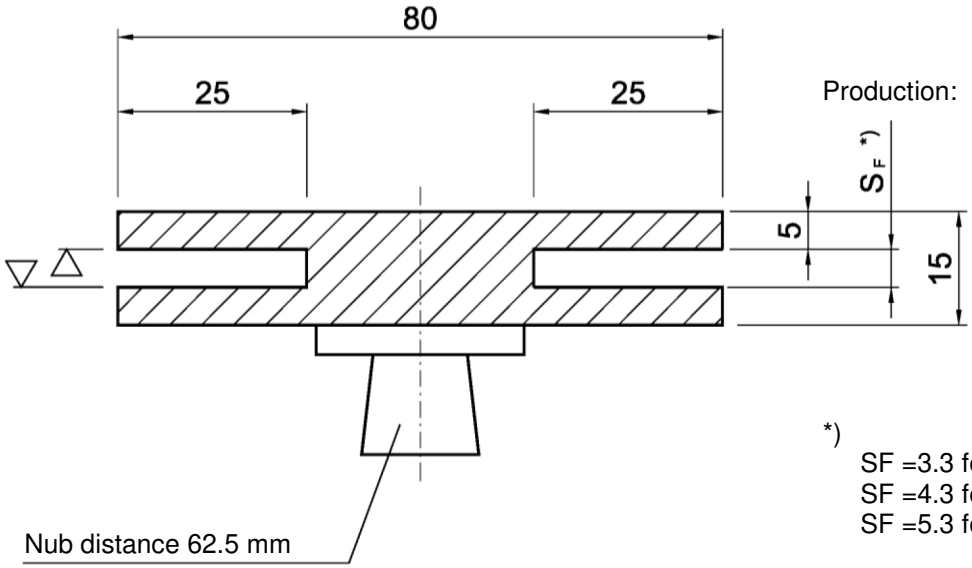
| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 5 |
| Confirmation of the executing company | |

# Standard H profile




Material: PE100
Weight: 0.45 kg/m ($S_F$ = 3.3 mm)
0.41 kg/m($S_F$ = 4.3 mm)
0.38 kg/m ($S_F$ = 5.3 mm)
Production length: a) 2000 mm
b) 3000 mm
c) 4000 mm
d) fixed lengths
Production: of Bekaplast PE100 storage sheets

# Special H profile




Material: PE100
Weight: 1.05 kg/m ($S_F$ = 3.3 mm)
1.00 kg/m($S_F$ = 4.3 mm)
0.95 kg/m ($S_F$ = 5.3 mm)
Production length: a) 2000 mm
b) 3000 mm
c) 4000 mm
d) fixed lengths
Production: of Bekaplast PE100 storage sheets

*)
SF =3.3 for S=3 (sheet thickness)
SF =4.3 for S=4 (sheet thickness)
SF =5.3 for S=5 (sheet thickness)

Measurements in mm

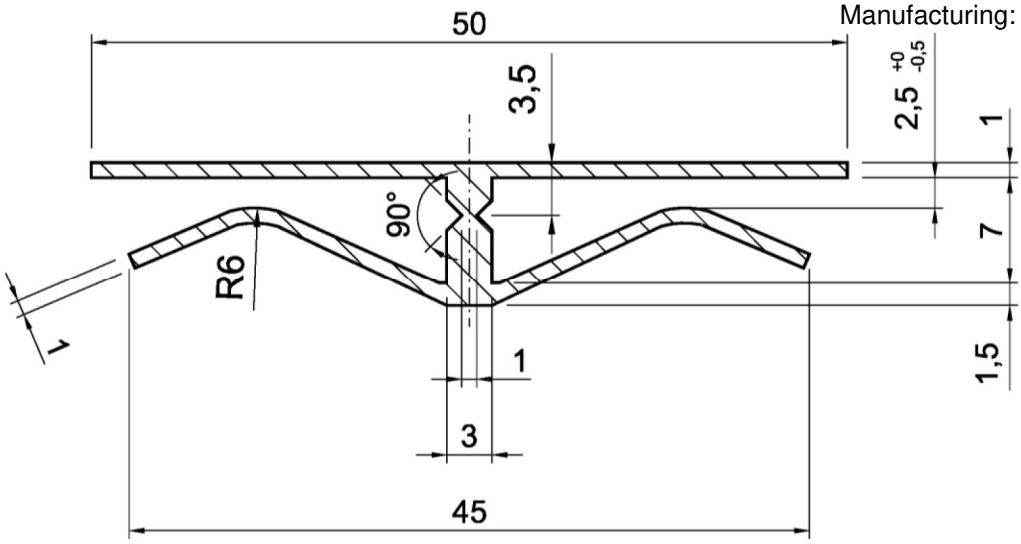
| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 6 |
| H profile | |

# Conductive tear-off H profile

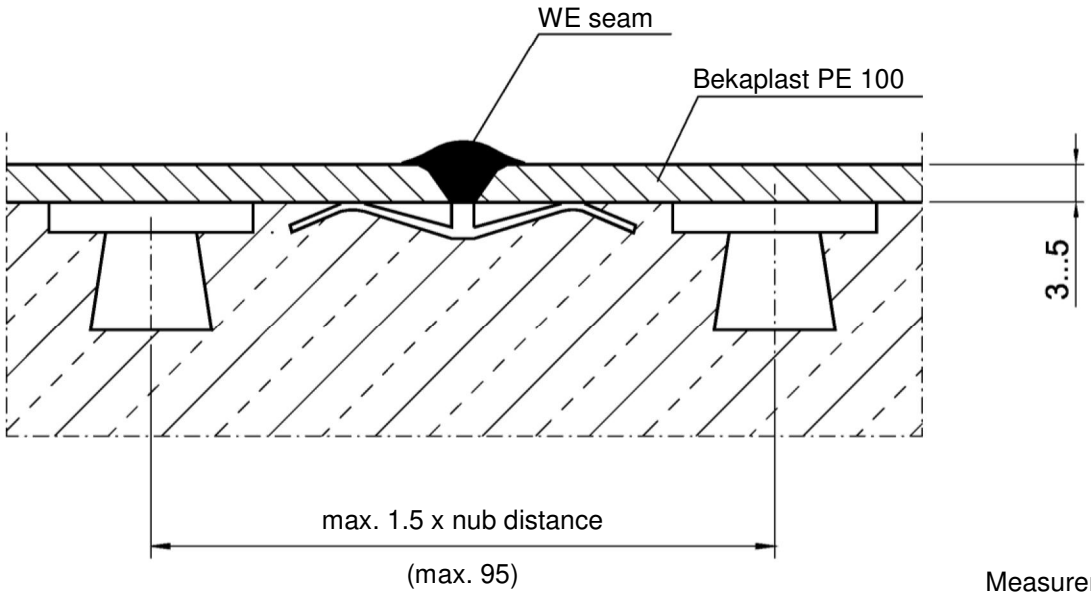
$R<10^6\ \Omega$

Material: PE-HD GM9350C electrical conductor
Weight: 0.12 kg/m

Manufacturing length: continuous on roll
Manufacturing: profile extrusion



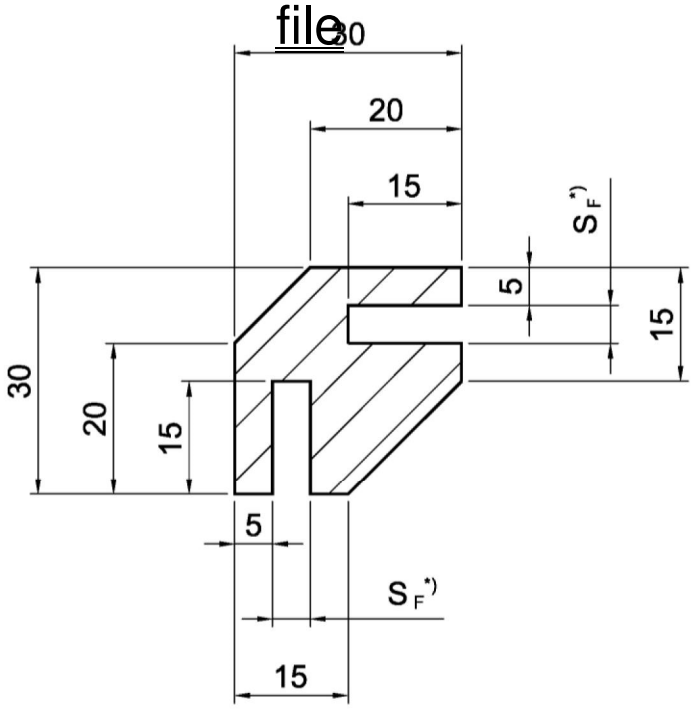

# Welding seam execution after tearing off internal profile part




Measurements in mm

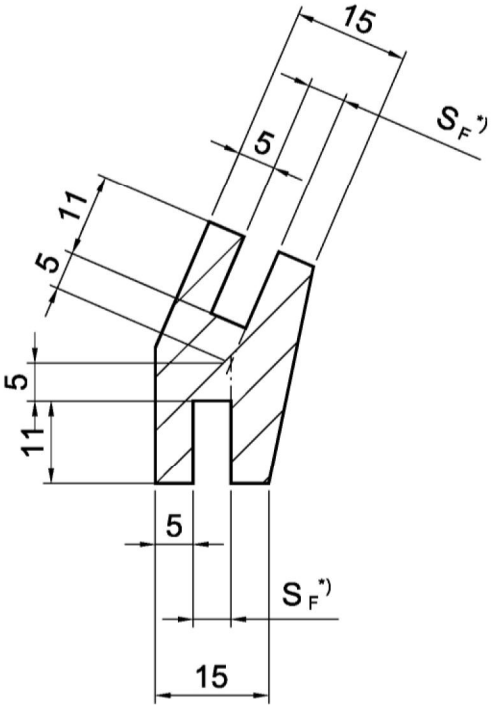
| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 7 |
| Tear-off H profile | |

# 90° Corner connection profile




Material: PE100
Weight: 0.65 kg/m ($S_F$ = 3.3 mm)
0.64 kg/m($S_F$ = 4.3 mm)
0.63 kg/m ($S_F$ = 5.3 mm)
Production length: a) 2000 mm
b) 3000 mm
c) 4000 mm
d) fixed lengths
Production: of Bekaplast PE100 storage sheets

# Corner connection profile (random angle)




Material: PE100
Weight: 0.44 kg/m ($S_F$ = 3.3 mm)
0.42 kg/m($S_F$ = 4.3 mm)
0.40 kg/m ($S_F$ = 5.3 mm)
Production length: a) 2000 mm
b) 3000 mm
c) 4000 mm
d) fixed lengths
Production: of Bekaplast PE100 storage sheets

*)
SF =3.3 for S=3 (sheet thickness)
SF =4.3 for S=4 (sheet thickness)
SF =5.3 for S=5 (sheet thickness)

Measurements in mm

| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 8 |
| Corner connection profile | |

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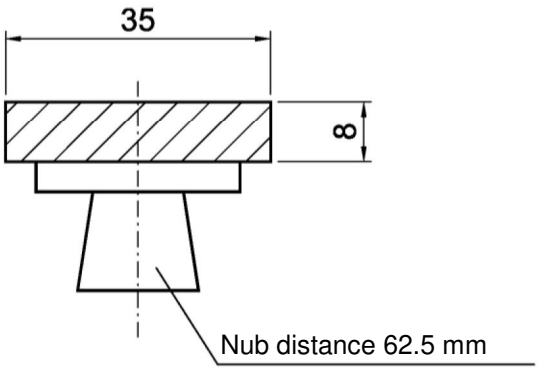
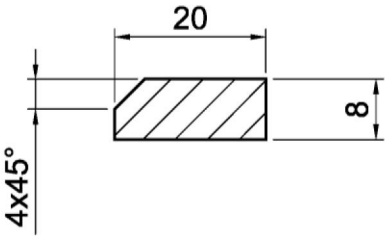
# a) Floor support panels



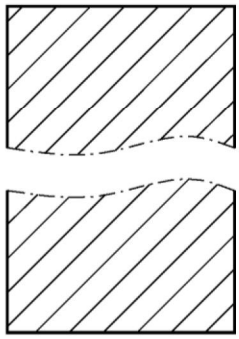

Material: a) PE100
b) PE-HD GM9310C
el. conductive R<$10^6$ Ω
Weight: 0.33 kg/m
Production length: a) 2000 mm
b) 3000 mm
c) 4000 mm
d) fixed lengths
Production: of Bekaplast
PE100 storage sheets

# b) Edge support panels




Material: a) PE100
b) PE-HD GM9310C
el. conductive R<$10^6$ Ω
Weight: 0.15 kg/m
Production length: a) 2000 mm
b) 3000 mm
c) 4000 mm
d) fixed lengths
Production: of Bekaplast
PE100 storage sheets

# c) Nail strip 30 x 50



Material: a) PE100
b) PE-HD GM9310C
el. conductive
Weight: 1.50 kg/m
Production length: a) 2000 mm
b) 3000 mm
c) 4000 mm
d) fixed lengths
Production: of PE100 storage sheets

Measurements in mm

| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 9 |
| Panels | |

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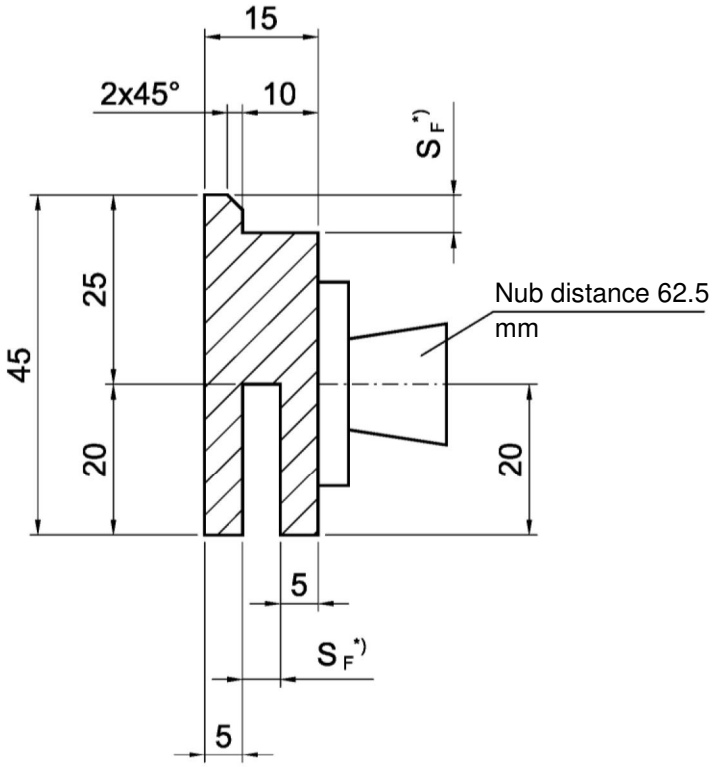
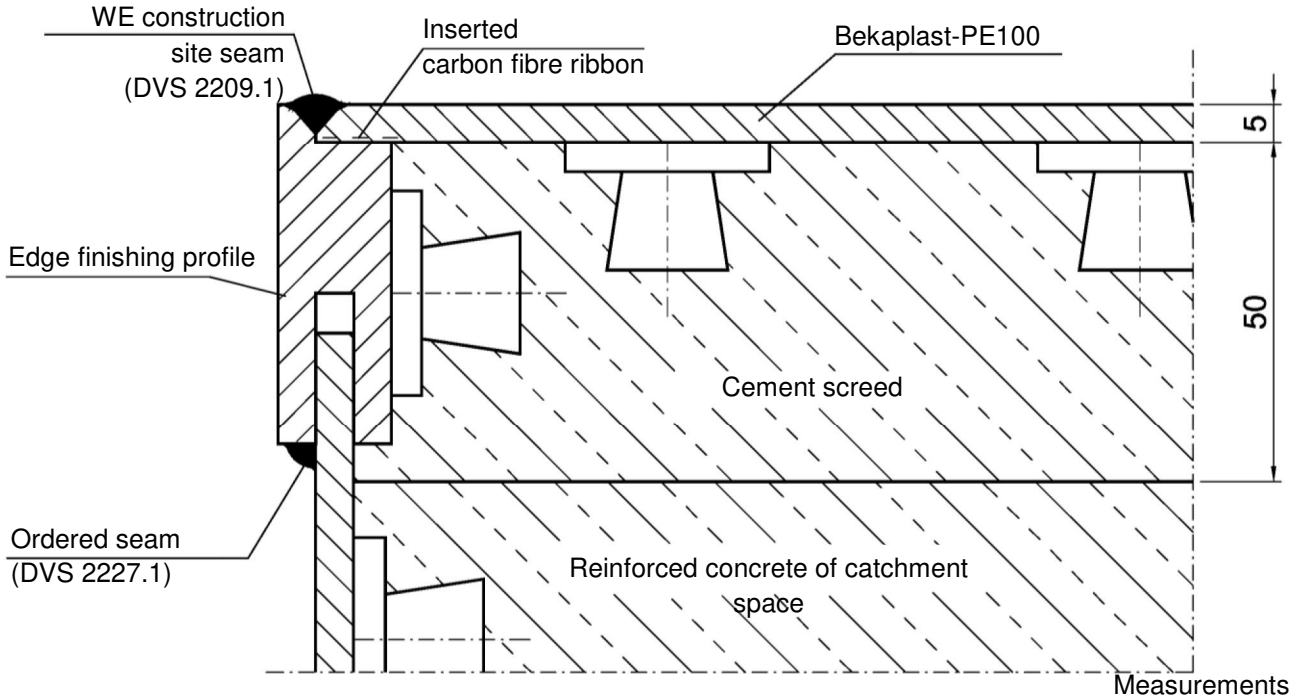
# Edge finishing profile




Material: PE100
Weight: 0.61 kg/m ($S_F$ = 3.3 mm)
0.58 kg/m($S_F$ = 4.3 mm)
0.55 kg/m ($S_F$ = 5.3 mm)
Production length: a) 2000 mm
b) 3000 mm
c) 4000 mm
d) fixed lengths
Production: of Bekaplast PE100 storage sheets

*)
SF =3.3 for S=3 (sheet thickness)
SF =4.3 for S=4 (sheet thickness)
SF =5.3 for S=5 (sheet thickness)

# Edge connection with edge finishing profile




Measurements in mm

| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 10 |
| Edge finish | |

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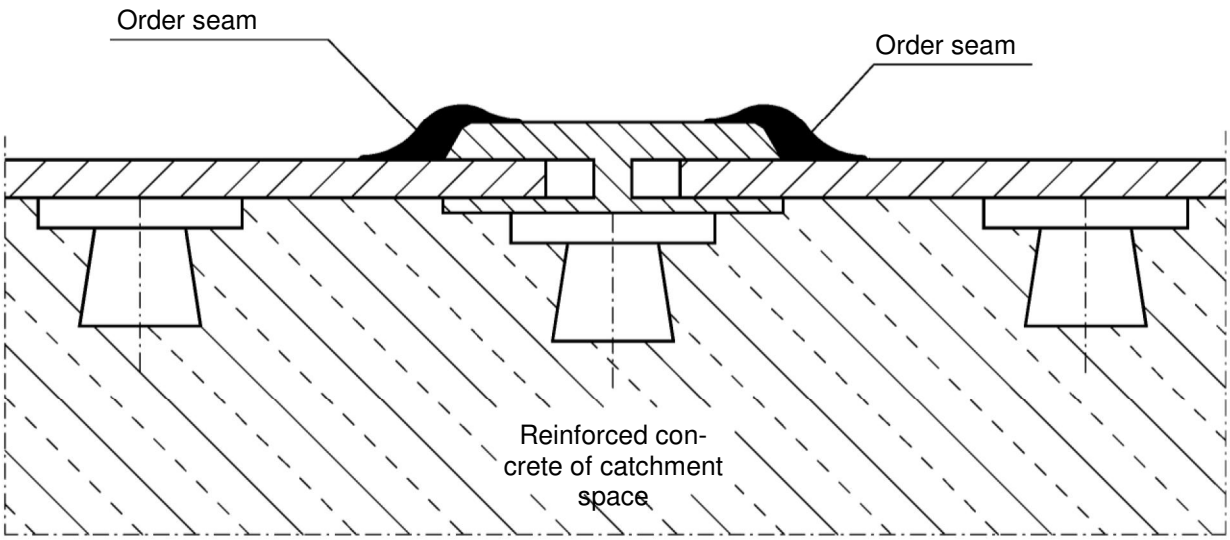
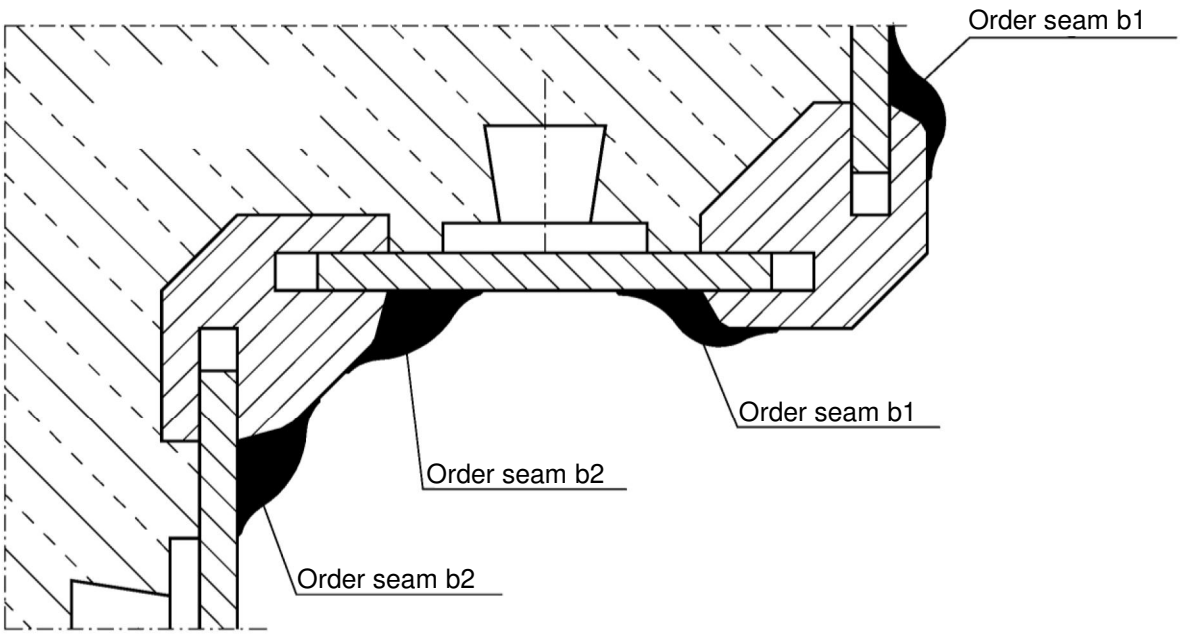
# a) Butt joint with H profile and order seams

(Welding seam execution / measurement according to DVS 2227-1)




# b) Corner joint with corner profile

(Order seam b1 and b2 according to DVS 2227-1)




| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 11 |
| Blunt joint with H profile and corner joint with corner profile | |

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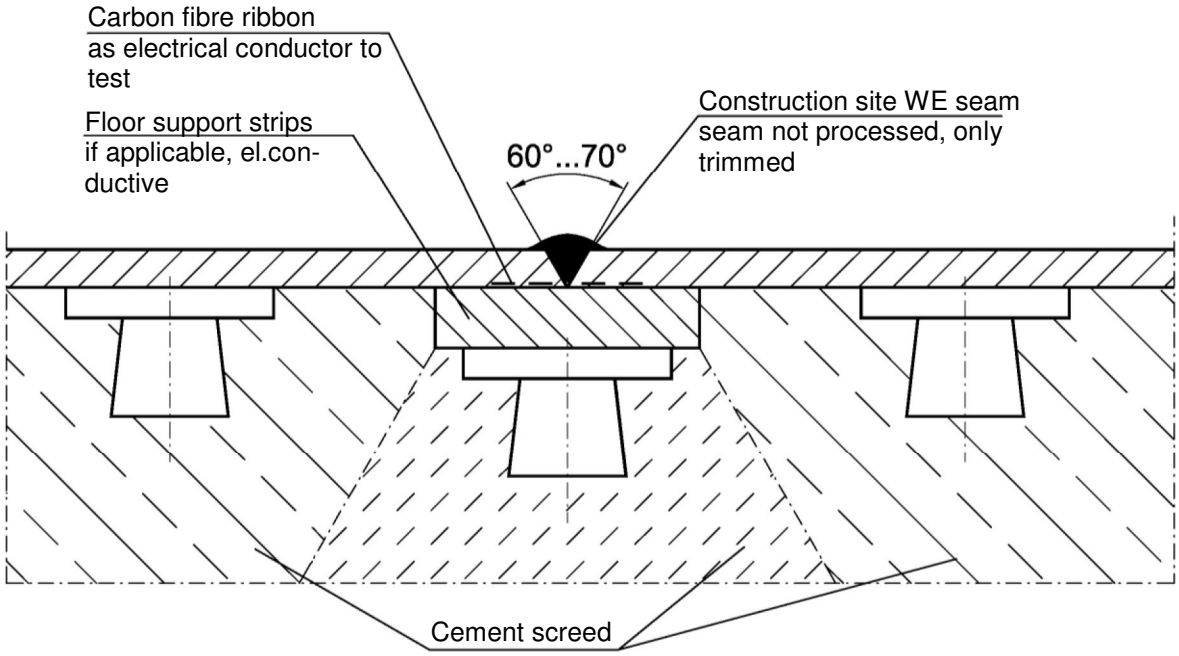
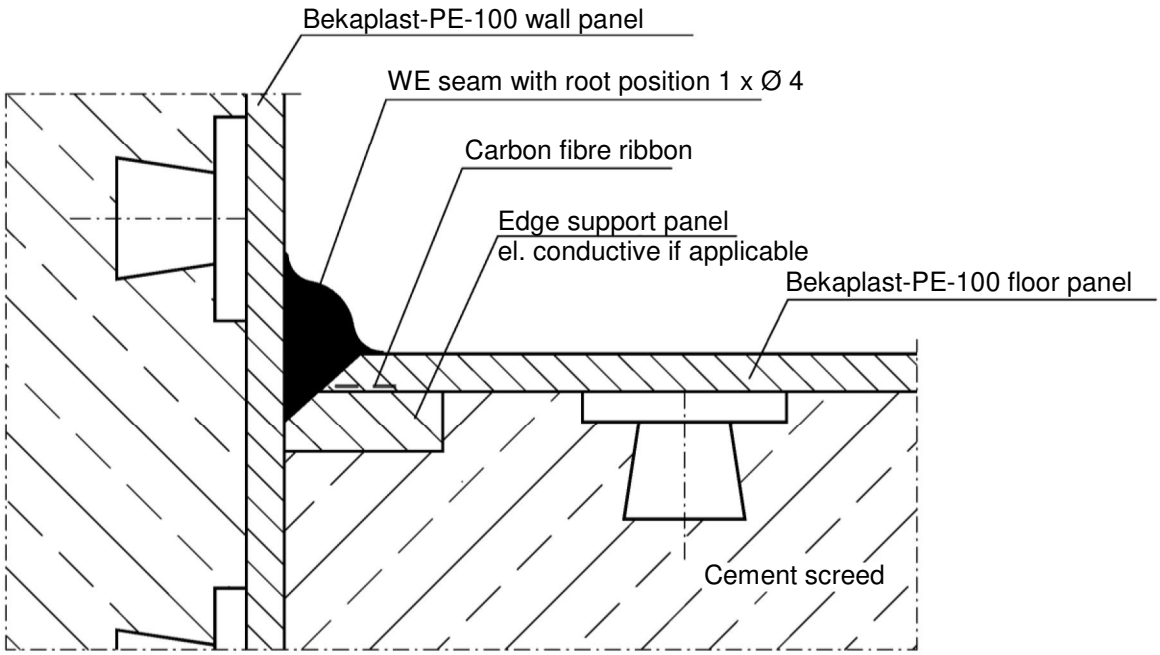
# a) Floor board connection




# b) Corner joint with internal fillet weld




| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 12 |
| Floor panel connection and corner joint with internal fillet weld | |

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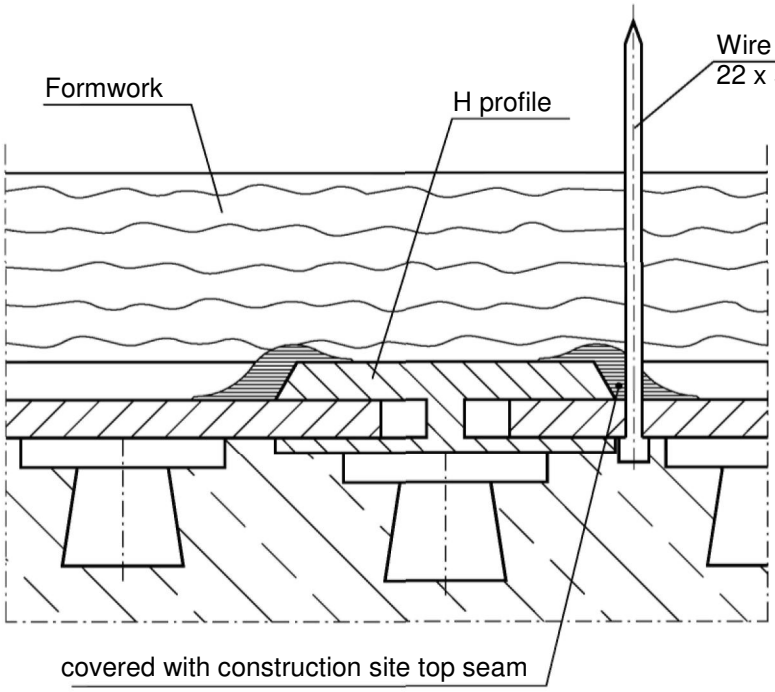
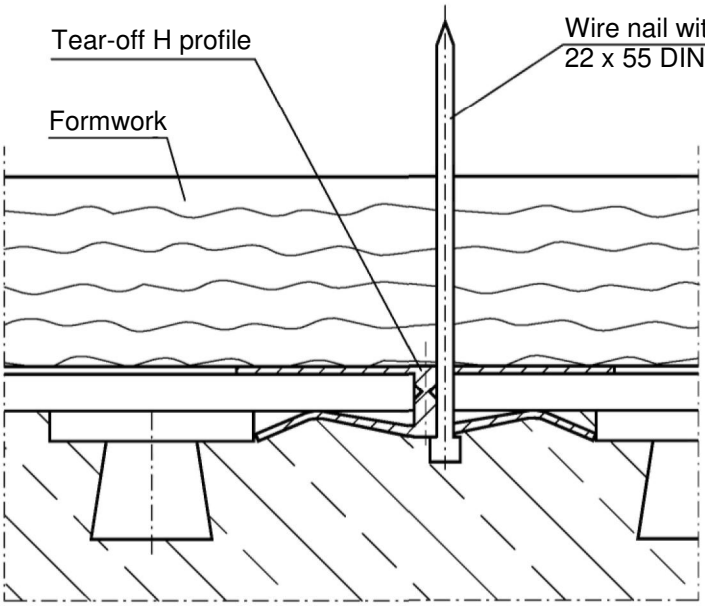
# a) Fixation of the Bekaplast panels in welding seam area




Nailing only permitted where the nail hole is covered by the welding seam during subsequent welding of the H profile.
Nailing should be done systematically with the same distance (approx. every 30 cm) from rail to rail, always at the same level.

# b) Fixation of tear-off H-profile in the bar area




Nailing only permitted in the joint directly next to the tear-off bar so it will be covered by the welding seam during subsequent welding of the tear-off H profile.
Nailing should be done systematically with the same distance (approx. every 30 cm) from rail to rail, always at the same level.

| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 13 |
| Fixation of panels | |

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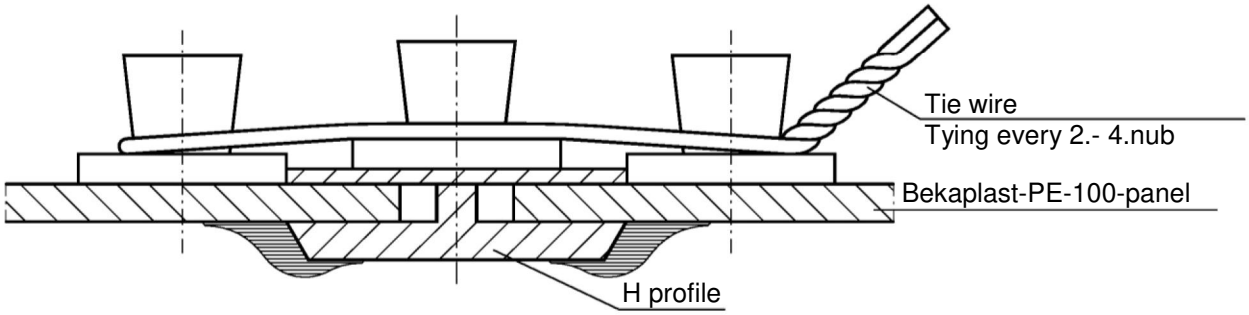
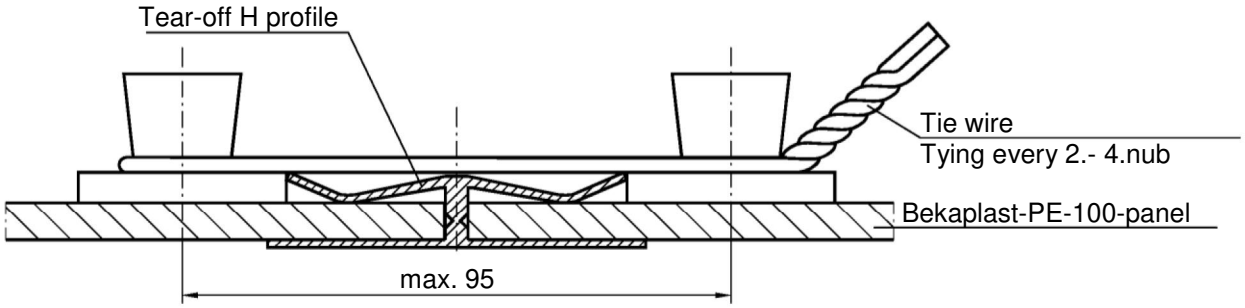
# Fixation of Bekaplast panels in formwork

a1/a2 panels to each other
b panels only at top edge of formwork

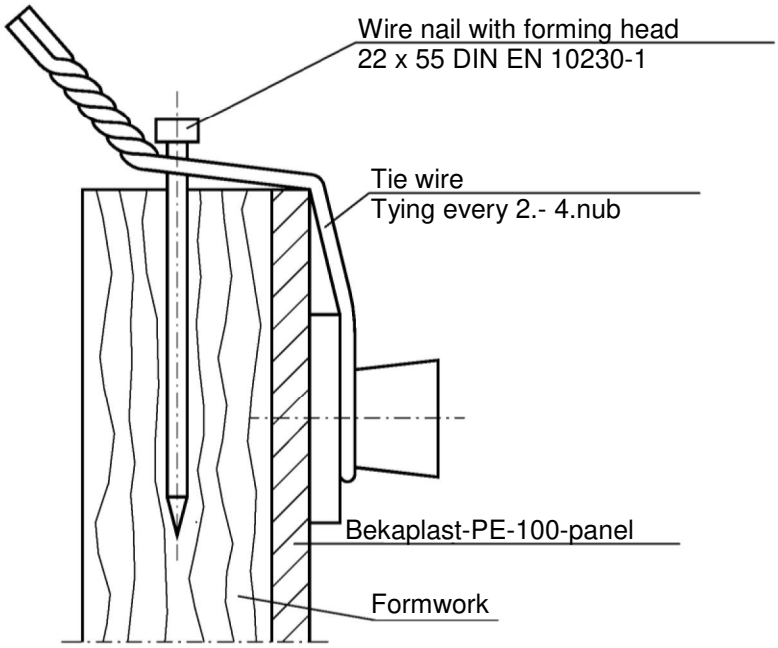
## a1) Connection of Bekaplast panels to joints by way of tie wire




## b2) Connection of Bekaplast panels to joint parts by way of tear-off H-profile and tie wire



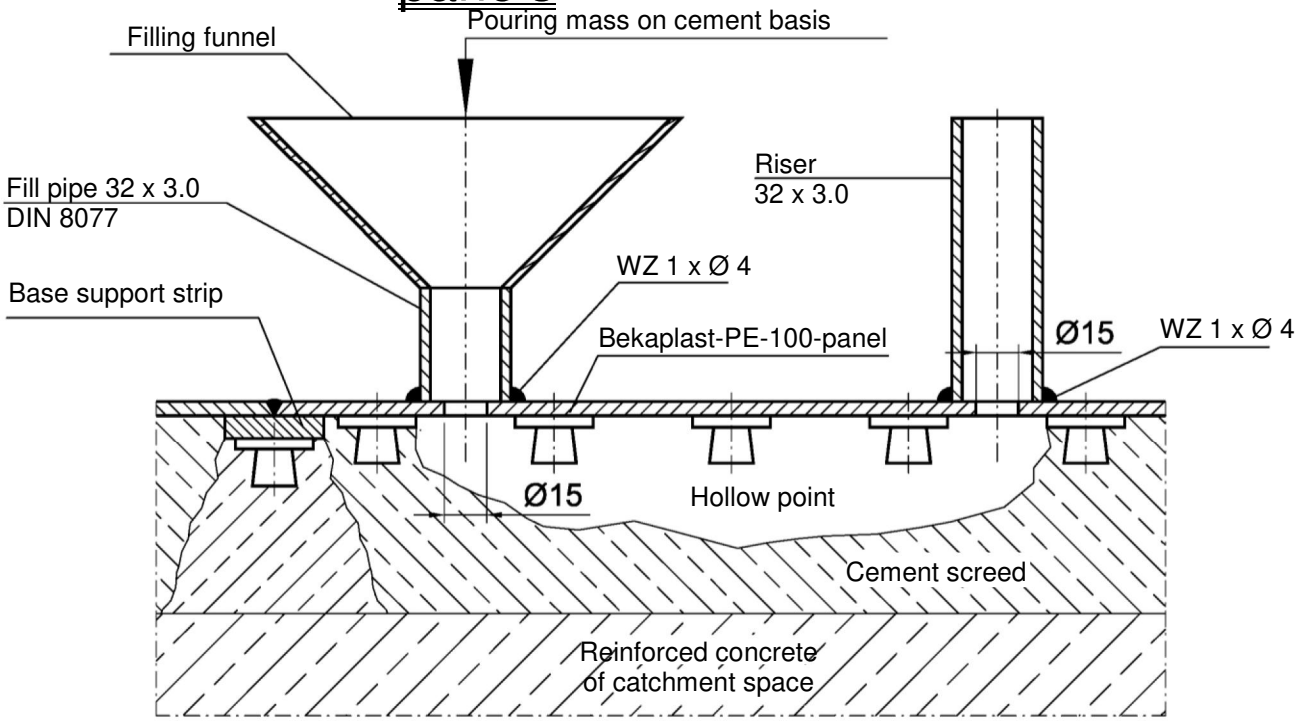

## b) Fixation of Bekaplast panels to upper formwork




Measurements in mm

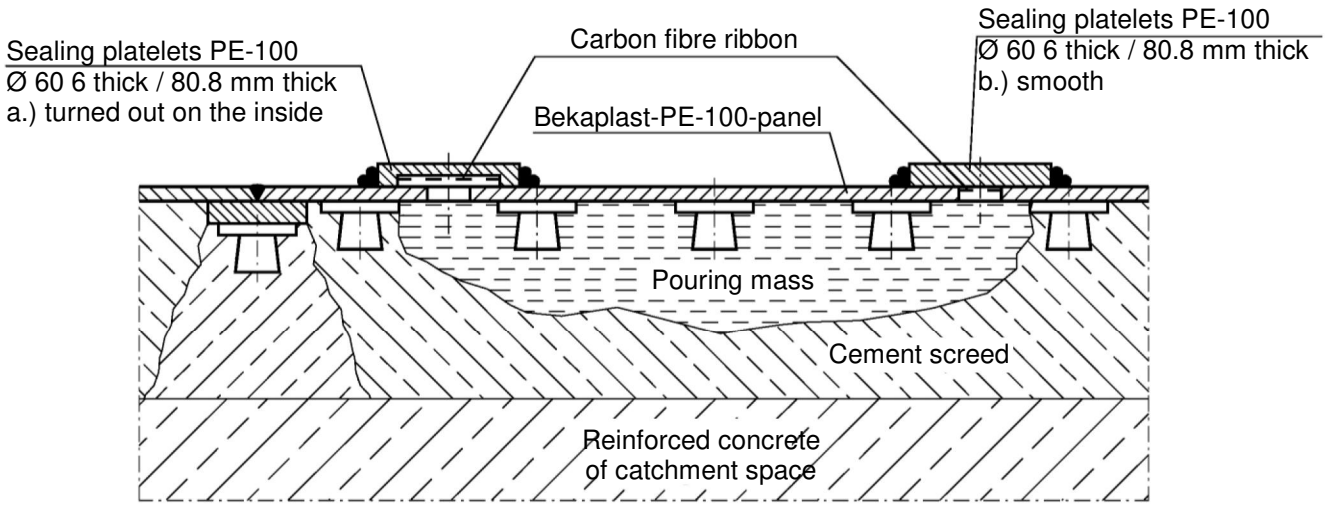
| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 14 |
| Fixation of panels to formwork | |

# Hollow points during laying of floor panels




maximum hollow point area approx. 1 m²

# Poured and closed hollow point




Welding of sealing platelets: WZ 3 x Ø 4

Measurements in mm

| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 15 |
| Pouring hollow points | |

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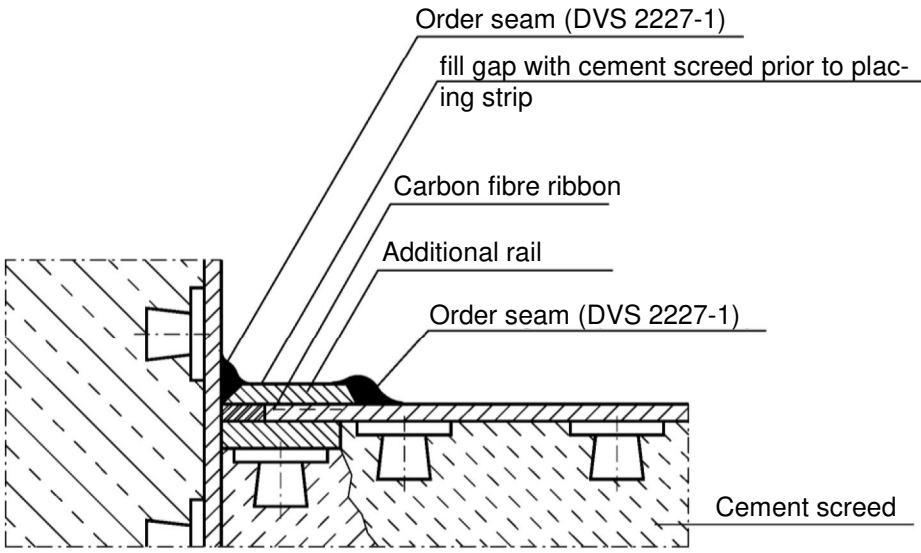
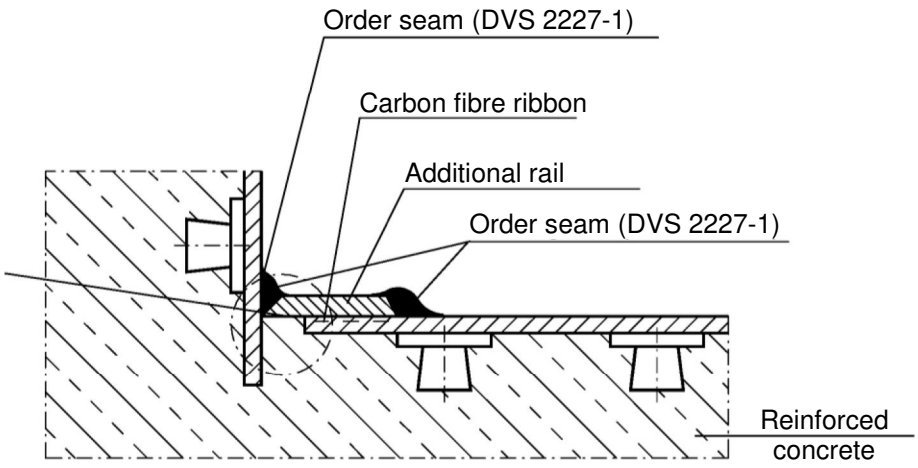
# Covered edge strip 50 x 5

a) floor/wall




b) wall/wall




| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 16 |
| Covered edge strip | |

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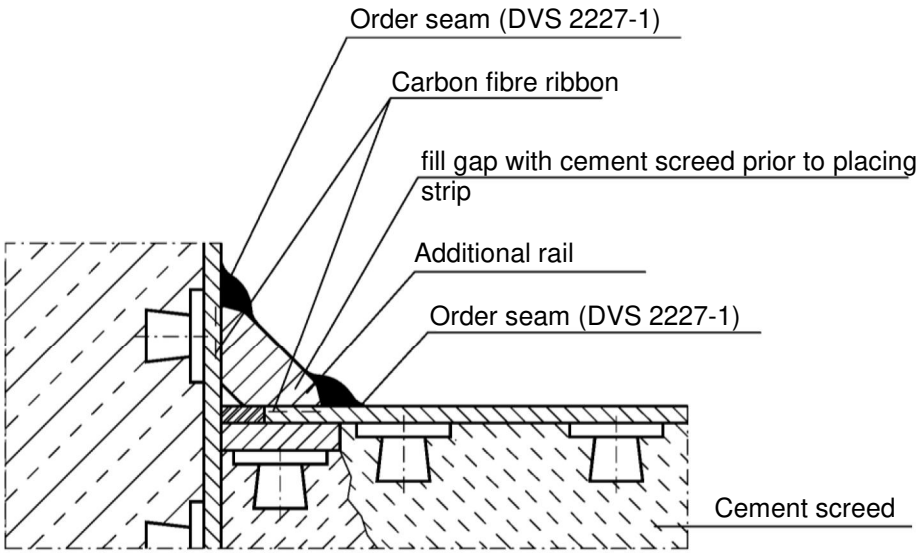
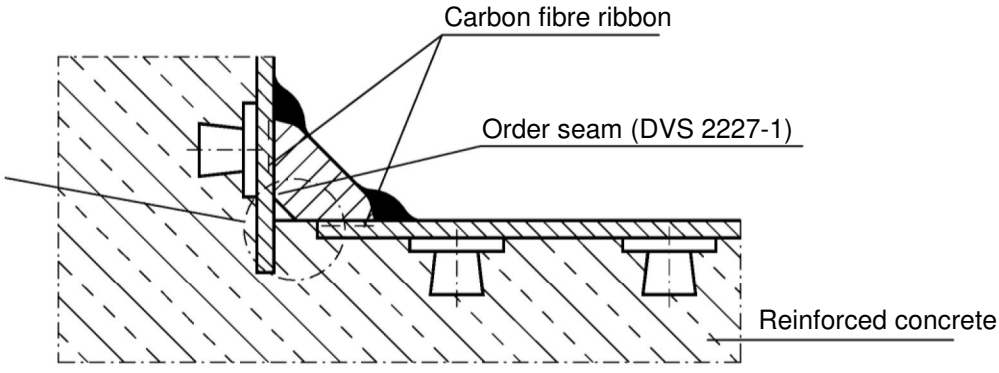
# Covered three-edge strip 30 x 30

c) floor/wall




d) wall/wall




| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 17 |
| Covered three-edge strip | |

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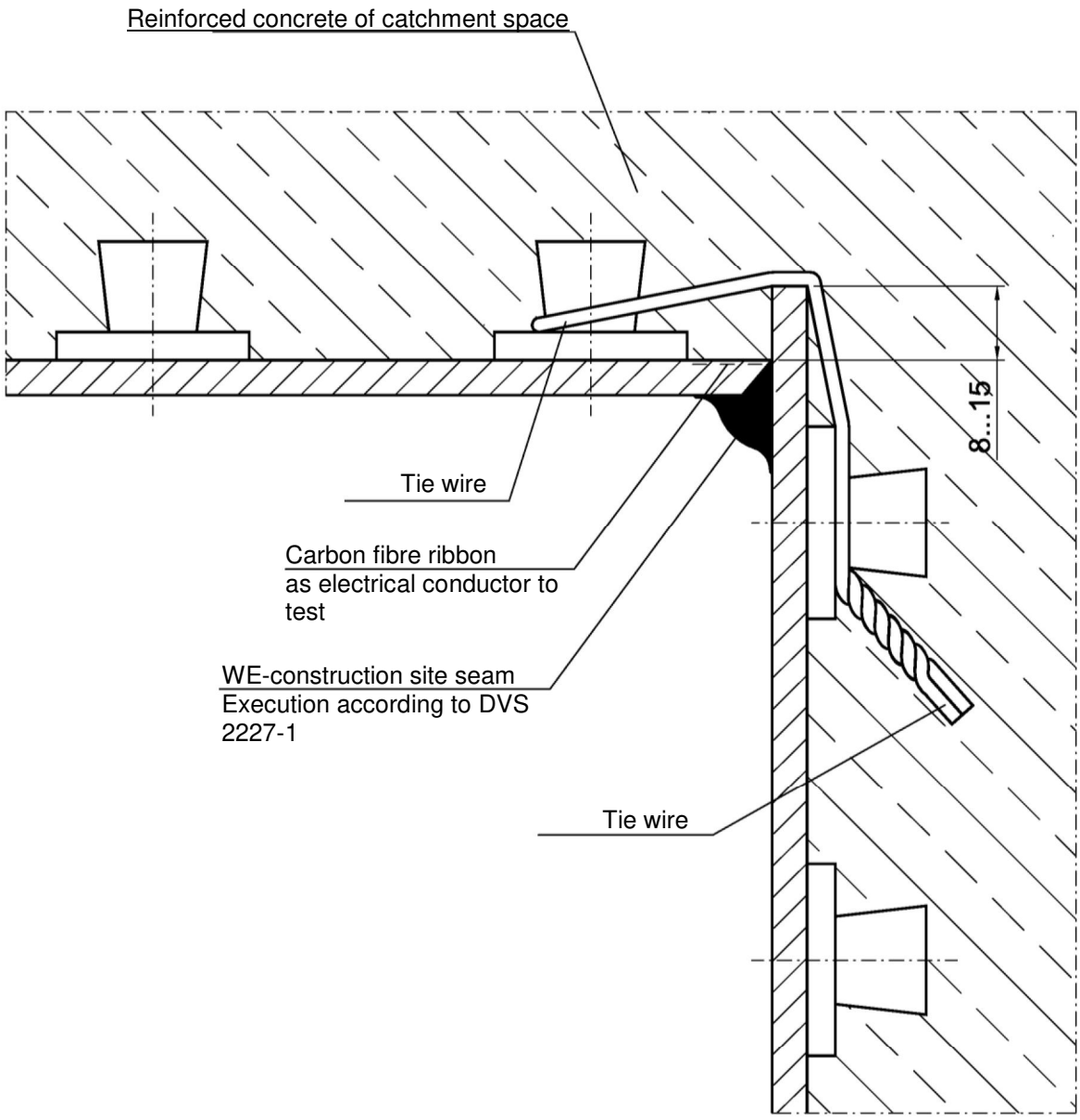
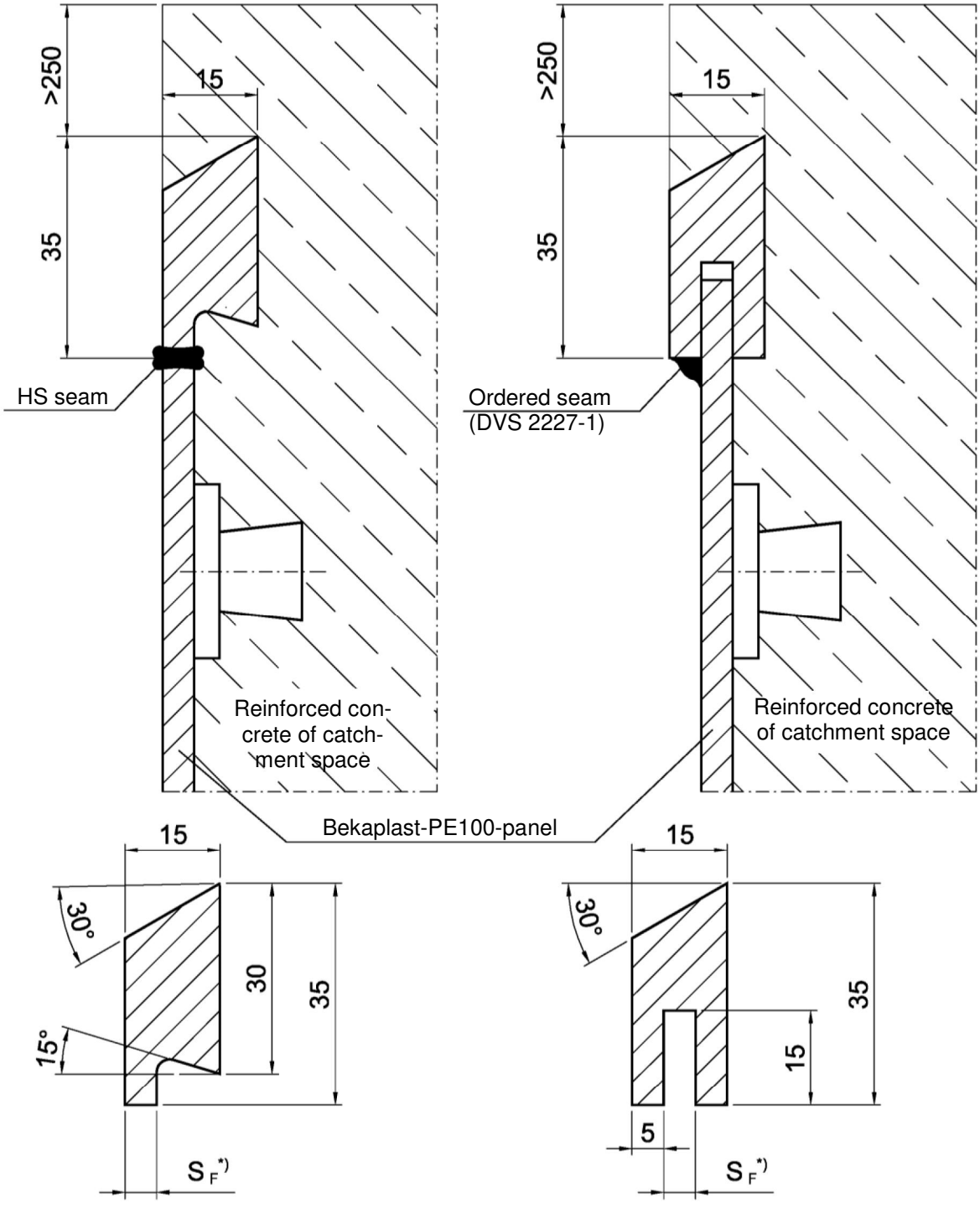
# Corner connections (wall/wall) without corner connection profile (tied)




Measurements in mm

| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 18 |
| Corner connection without corner profile | |

# Wall end profile




*)
- $S_F$=3.3 for S=3 (panel thickness) 0.36 kg/m
- $S_F$=4.3 for S=4 (panel thickness) 0.37 kg/m
- $S_F$=5.3 for S=5 (panel thickness) 0.38 kg/m

*)
- $S_F$=3.3 for S=3 (panel thickness) 0.39 kg/m
- $S_F$=4.3 for S=4 (panel thickness) 0.38 kg/m
- $S_F$=5.3 for S=5 (panel thickness) 0.37 kg/m

Measurements in mm

| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 19 |
| Wall end profile | |

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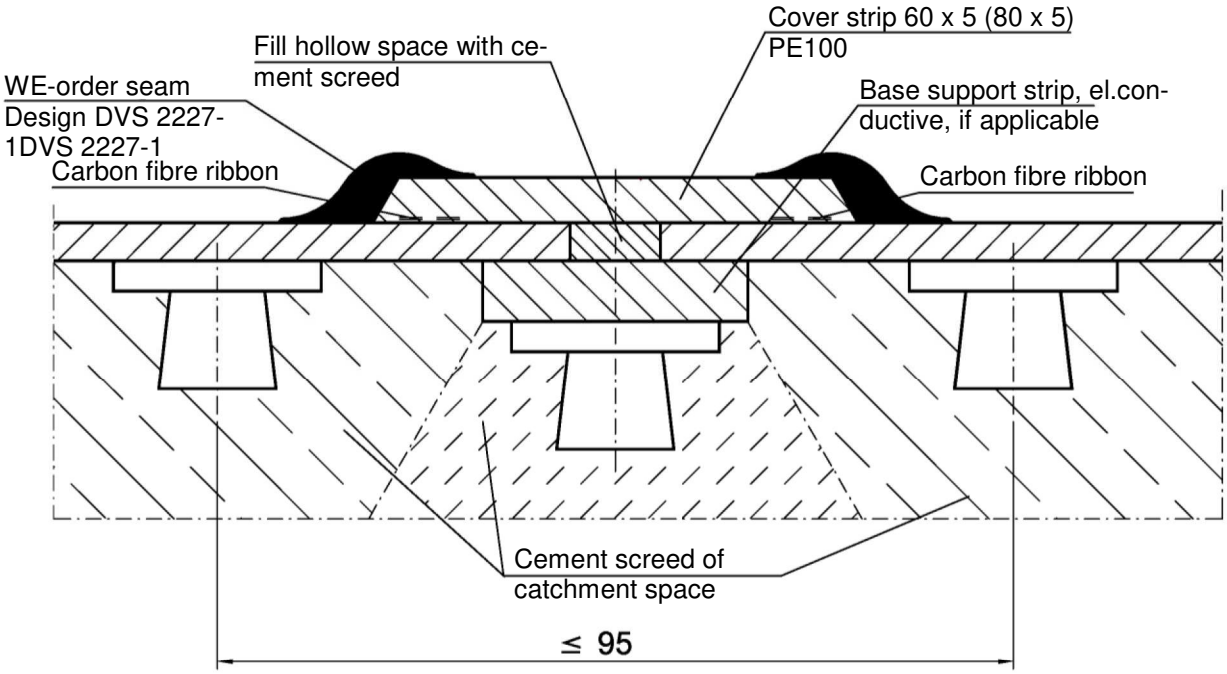
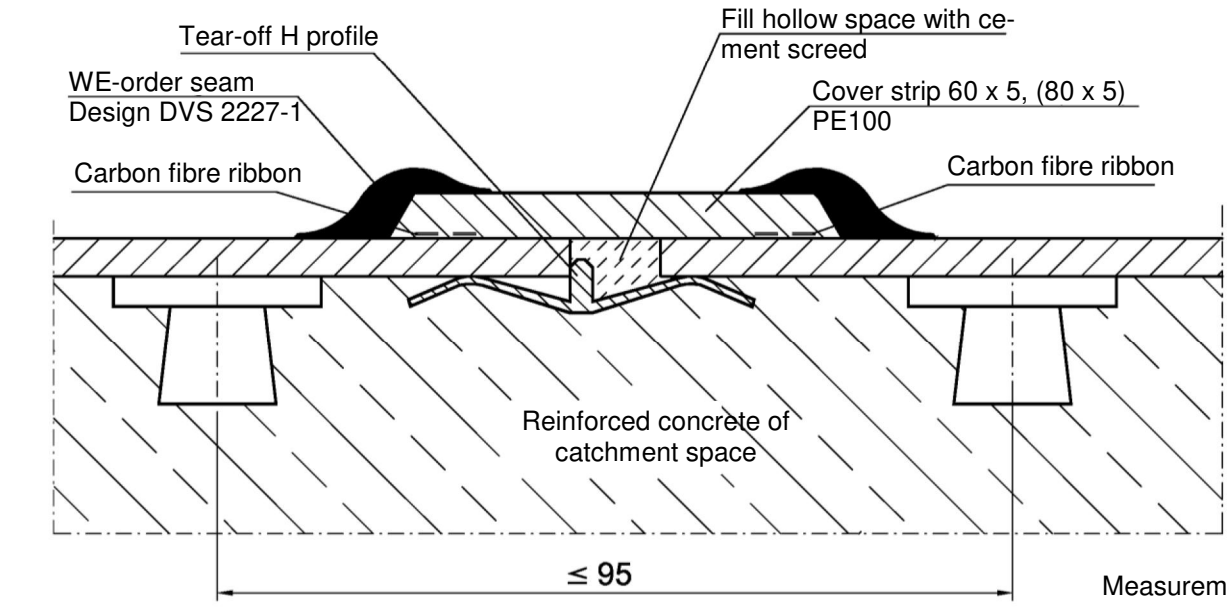
# a) Blunt joint with cover panel and order seam (floor)




# b) Blunt joint with cover panel and order seam (floor)

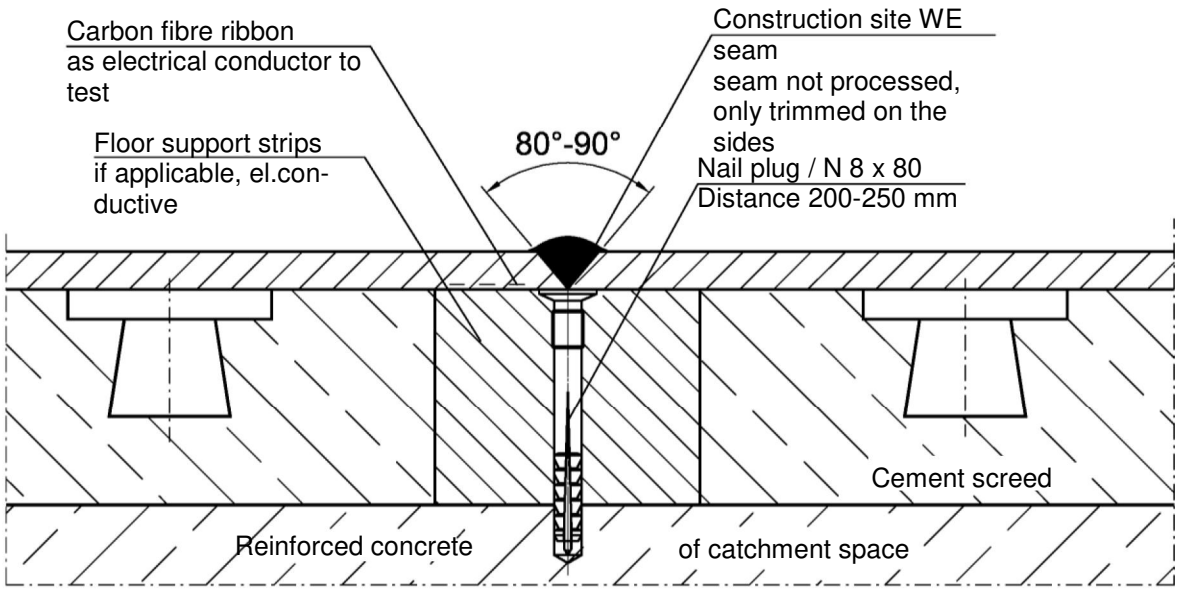



Measurements in mm

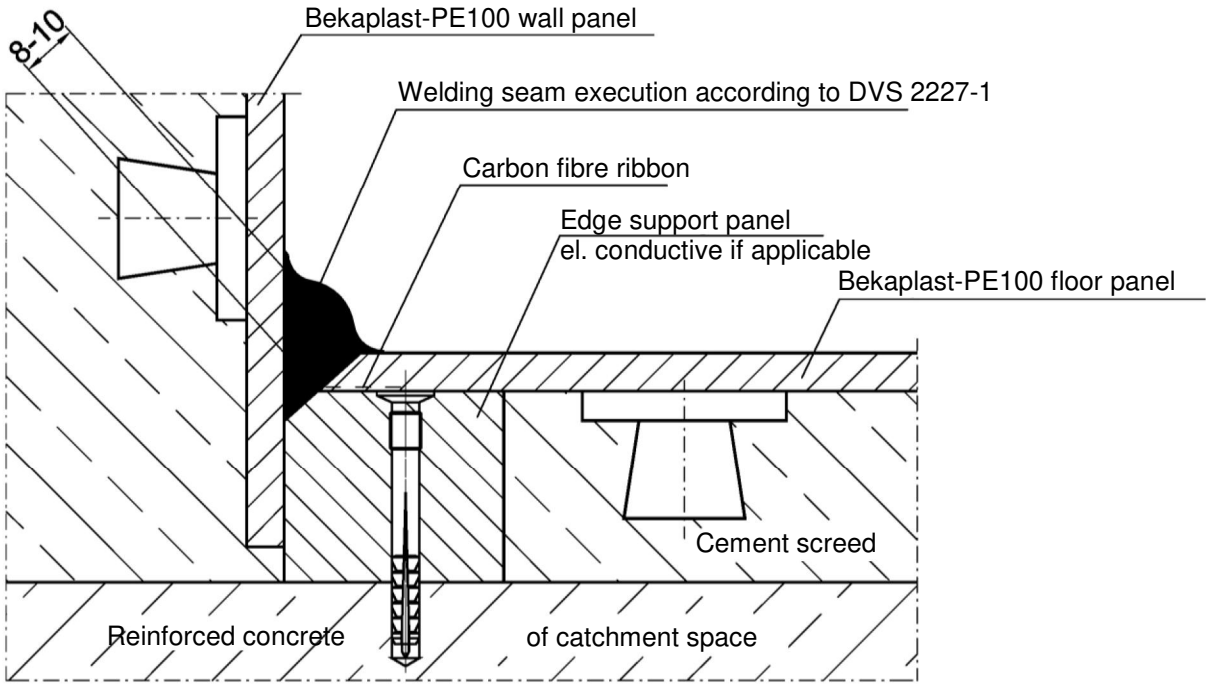
| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 20 |
| a) Blunt joint with cover panel and order seam | |

# a) Floor board connection with nailed strip

(Welding seam execution according to DVS 2227-1)

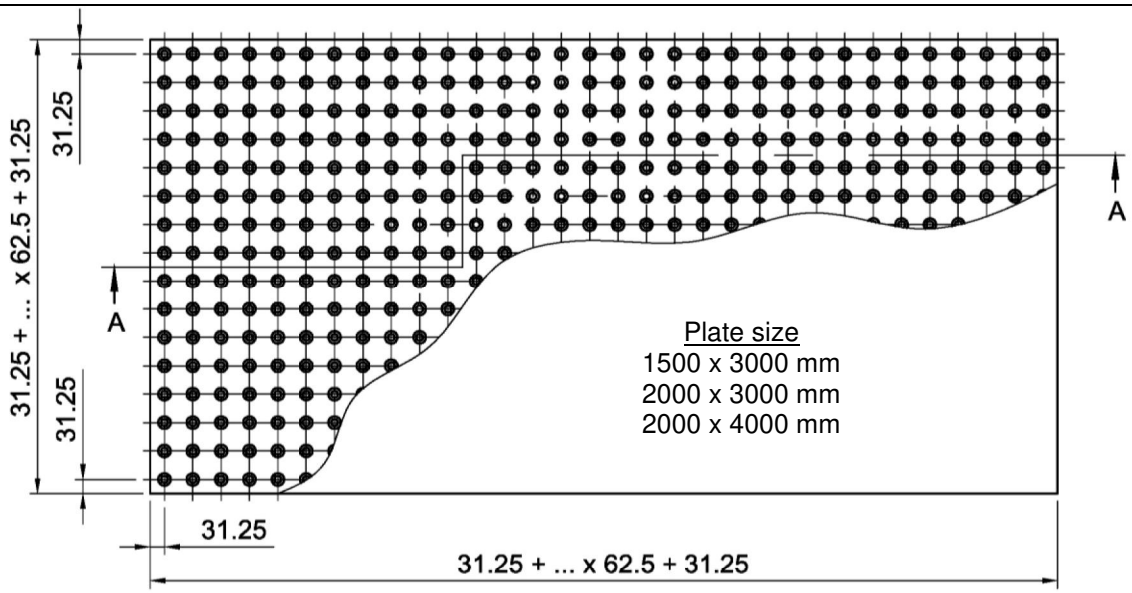



# b) Corner joint with internal fillet weld and nailed strip

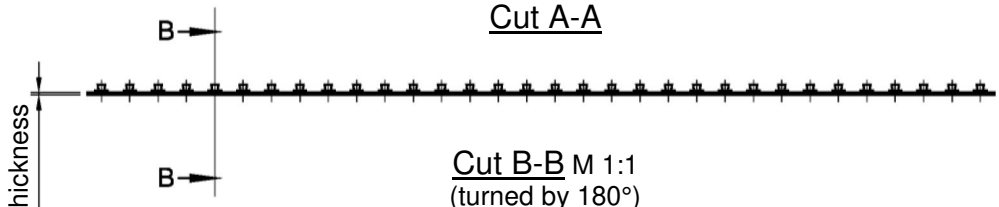



Measurements in mm

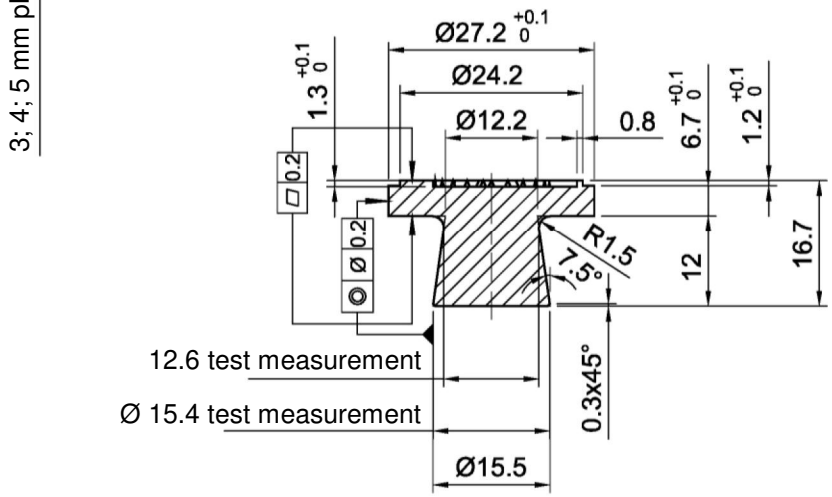
| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 21 |
| Floor panel connection and corner joint with internal fillet weld | |



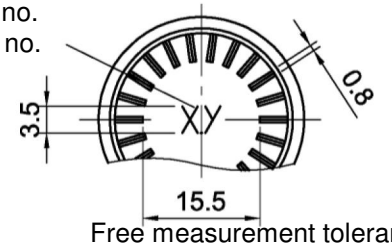

Cut A-A




Cut B-B M 1:1
(turned by 180°)




Code:
X = Tool no.
Y = Nest no.




Free measurement tolerances according to DIN ISO 2768-1 medium

| | |
|---|---|
| Sealing system "Bekaplast PE100" made of concrete protection slabs for the use in collection trays and rooms in facilities for the storage of materials hazardous for water | Annexure 22 |
| Plate and nub geometry | |