Deutsches Institut für Bautechnik

Anstalt des öffentlichen Rechts

Kolonnenstr. 30 L
10829 Berlin
Germany

Tel.: +49(0)30 787 30 0
Fax: +49(0)30 787 30 320
E-mail: dibt@dibt.de
Internet: www.dibt.de

Authorised and notified according to Article 10 of the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products (89/106/EEC)

DIBt

Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-08/0108

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung *Trade name*	BTE Stelcon Stahlbeton-Fertigteilelemente *BTE Stelcon pre fabricated elements made of re-inforced concrete*
Zulassungsinhaber *Holder of approval*	BTE Stelcon Deutschland GmbH Philippsburger Straße 4 76726 Germersheim DEUTSCHLAND
Zulassungsgegenstand und Verwendungszweck *Generic type and use of construction product*	BTE Stelcon-Ableitflächensystem aus Betonfertigteilen zur Verwendung in LAU-Anlagen *BTE Stelcon Sealing construction for sealing areas made of pre fabricated elements made of concrete used in facilities to deal with liquid chemicals (substances hazardous to water)*
Geltungsdauer: vom *Validity: from*	25 January 2010
bis *to*	28 April 2013
Herstellwerk *Manufacturing plant*	BTE Stelcon Deutschland GmbH Philippsburger Straße 4 76726 Germersheim DEUTSCHLAND

Diese Zulassung umfasst *This Approval contains*	24 Seiten einschließlich 10 Anhänge *24 pages including 10 annexes*
Diese Zulassung ersetzt *This Approval replaces*	ETA-08/0108 mit Geltungsdauer vom 28.04.2008 bis 28.04.2013 *ETA-08/0108 with validity from 28.04.2008 to 28.04.2013*

I LEGAL BASES AND GENERAL CONDITIONS

1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], modified by Council Directive 93/68/EEC[2] and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council[3];
- Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998[4], as amended by law of 31 October 2006[5];
- Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC[6].

2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.

3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.

4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.

5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.

6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

1 Official Journal of the European Communities L 40, 11 February 1989, p. 12
2 Official Journal of the European Communities L 220, 30 August 1993, p. 1
3 Official Journal of the European Union L 284, 31 October 2003, p. 25
4 *Bundesgesetzblatt Teil I 1998*, p. 812
5 *Bundesgesetzblatt Teil I 2006*, p.2407, 2416
6 Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1 Definition of the construction product

(1) The "BTE Stelcon Sealing construction" (in the following called "sealing construction") consists of liquid tight pre-fabricated reinforced concrete elements (in the following called "pre-fabricated elements") that are connected impermeable to liquid with the appropriate approved joint sealing systems, see Annex 1.

(2) The pre-fabricated elements consist of uncracked reinforced concrete of a determined composition (recipe), which shall additionally have the performance capacities of a liquid-tight concrete.

(3) The pre-fabricated elements themselves and/or the pre-fabricated elements jointed together to the sealing constructions are manufactured in different types for draining of liquids hazardous to water.

(4) They are manufactured with and/or without integrated drainage installations. The dewatering and/or drainage occur by means of the slope drain (sloping areas).

(5) The pre-fabricated elements satisfy in regard to the reaction-to-fire performance the class "A1" according to EN 13501-1. In case of pre-fabricated elements that are jointed together to the sealing constructions, the reaction-to-fire performances have to be additionally taken into account depending on the selected joint sealing system.

1.2 Intended use

(1) The pre-fabricated elements may be used in facilities for the storage, filling and handling of liquid chemicals (substances hazardous to water) and petrol stations. They can be used both inside the buildings and outdoors over a specified period of time and/or frequency in case of against

- time limited effects in the event of accident (storage) and/or
- intermittent stress (decanting and handling)

of liquid chemicals (substances hazardous to water). In the course of which are exposed to combinations of simultaneous and/or successive effects (e.g. chemicals, temperature, weather, traffic).

(2) The use of the pre-fabricated elements in sealing constructions is restricted to the fields of application where under mechanical action due to load and restraint

- the least thickness of the un-cracked pre-fabricated elements in the field range is bigger than γ_e-times of the characteristic penetration depth and
- on the edge of the element of the un-cracked pre-fabricated elements the area of the protected joint sidewall " d_H" exceeds the characteristic penetration depth of the liquid chemicals (substances hazardous to water).

The characteristic penetration depth "e_{tk}" is determined to $e_{tk} = e_{tm} \bullet \gamma_s$

(3) The connection of the pre-fabricated elements to the sealing construction shall only occur by means of suitable joint sealing systems that are approved for the respective intended use (e.g. in accordance with national or European technical approvals). The provisions of these approvals have to be considered.

(4) The pre-fabricated elements may be used under constantly changing mechanical stress in facilities. Taking into account the specific design requirements, the pre-fabricated elements connected to a sealing construction may be accessible and/or trafficable by vehicles.

(5) For the drainage of the sealing construction the drainage systems for the absorption and dewatering of liquid chemicals (substances hazardous to water) that are approved for the respective intended use (e.g. in accordance with national or European technical approvals) shall be used. The provisions of these approvals have to be considered.

(6) The mounted parts may be fixed while setting on the pre-fabricated elements by means of bonded anchor which are national and/or European technical approved according to specified constructional provisions.

(7) The provisions referred to in this European technical approval have been written based upon the assumed working life of the pre-fabricated elements of at least 25 years, provided that the conditions for the transport/storage/installation/use/servicing/correction of the defect/utilization are met. The indications given on the working life cannot be interpreted as a guarantee given by the ETA holder, but are regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

2 Characteristics of the product and methods of verification

2.1 General

(1) The pre-fabricated elements of the sealing construction shall correspond to the drawings and indications given in the Annexes.

(2) The characteristics of the material, the dimensions and tolerances which are not declared in this approval correspond to the information laid down in the technical documentation[7] of this European technical approval.

2.2 Properties

(1) The pre-fabricated elements are manufactured in following types:

Type 1 Standard elements

Type 2 Tolerance elements

Type 3 Drainage trough elements for the concrete framing

Type 4 Drainage floor inlet elements

(2) The pre-fabricated elements satisfy the requirements of the exposure classes XA3, XC4, XD3, XF4 and XM2 according to EN 206-1:2001-07.

(3) The penetration behaviour of liquid chemicals (substances hazardous to water) in the pre-fabricated elements correspond the penetration behaviour curve according to Annex 2.

(4) The pre-fabricated elements

- are free of cracks, weather-resistant and, in case of frost, insensitive to freeze-thaw cycle
- are in case of all-over bearing of the pre-fabricated elements on a load-spreading basis (fine-grading layer, support layer and load-bearing frost protection layer, see Annex 9) accessible by pedestrians and trafficable by vehicles with pneumatic tyres or by specific vehicles with vulkollan wheels, taking into account the provisions according to Annex 3, Table 1.
- are classified in the wear classes according to Annex 3, Table 1.

2.3 Formulation

(1) For the pre-fabricated elements the concrete is used according the composition (recipe) deposited, which has the performance capacities of a liquid-tight concrete after penetration test[7]. The safety factor γ_s for determining the characteristic penetration depth e_{tk} and the safety factor γ_e for determining minimum thickness of construction element shall be considered according to Annex 10. The concrete composition (recipe) for the pre-fabricated elements is deposited with DIBt.

(2) The concrete for the pre-fabricated elements, cement, aggregats, concrete admixture and reinforcement of the pre-fabricated elements shall comply with the deposited information and requirements given in Annex 3, Table 1.

---

7 The technical documentation of this European technical approval is deposited with Deutsches Institut für Bautechnik and shall be made available to the approved bodies, who are involved in the procedure of conformity attestation, for the fulfilment of their tasks.

(3) As transport and mounting fixings for the Drainage troughs elements (Type3) the flat steel anchors are used dependent on the relevant pressure step.

2.4 Emission of dangerous substances

(1) According to the applicant's declaration the pre-fabricated elements taking account of the EU[8] database do not contain any dangerous substances.

(2) In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive these requirements need also, if applicable, to be complied with.

(3) There may be other requirements applicable to the products resulting from other applicable national regulations and administrative provisions. These requirements need also to be complied with.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

(1) According to the Decision 1999/94/CE of the European Commission, the System 2+ of attestation of conformity is to be used.

(2) Additionally according to the Decision 2001/596/EC of the European Commission[9] the System 4 of attestation of conformity is to be used in relation to the reaction-to-fire performance. These systems of attestation of conformity are described in the following:

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

(a) Tasks for the manufacturer:
   (1) initial type–testing of the product;
   (2) factory production control;
   (3) testing of samples taken at the factory in accordance with a prescribed test plan.

(b) Tasks for the notified body:
   (4) certification of factory production control on the basis of:
      – initial inspection of factory and of factory production control;
      – continuous surveillance, assessment and approval of factory production control.

System 4: Declaration of conformity of the product by the manufacturer on the basis of:

Tasks for the manufacturer:
   (1) initial type–testing of the product;
   (2) factory production control;

Note: approved body are also named "notified body"

8 References in Guidance Paper H: A harmonised approach with regard to the handling of dangerous substances according to the Construction Products Directive, Brussels 18 February 2000.

9 Official Journal of the European Communities L 209/33 of 02.08.2001.

3.2 Responsibilities

3.2.1 Tasks of the manufacturer

3.2.1.1 Factory production control

(1) The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. The factory production control shall ensure that the product conforms with this European technical approval.

(2) The manufacturer may only use initial and constituent materials stated in the technical documentation of this European technical approval. He shall inspect or control the initial materials within the incoming goods inspection according to the prescribed test plan.

(3) The factory production control must be in accordance with the Control plan of April 2008 relating to the European technical approval ETA-08/0108 issued on 25.01.2009 this is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.[10] The factory production control follows the properties given in the control plan. They are specified in the technical documentation. For the test of penetration behaviour according to the test plan the ethanol shall be used as reference testing liquid.

(4) The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan. The records shall include at least the following information:

- Designation of the product, of the initial materials,
- type of inspection or test,
- date of the manufacture of the product, batch N° (if relevant) and date of the inspection or test of the product / the initial materials
- results of the inspections or tests and, if applicable, comparison with the requirements
- signature of the person responsible for the factory production control.

(5) The records shall be kept for a minimum of five years. On request they shall be presented to Deutsches Institut für Bautechnik.

(6) Details concerning extent, type and frequency of the tests or inspections to be performed within the scope of the factory production control shall correspond to the control plan which is part of the technical documentation to this ETA.

3.2.1.2 Other tasks for the manufacturer

(1) The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of pre-fabricated elements in order to undertake the actions laid down in section 3.2.2. For this purpose, the "control plan" referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

(2) The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of the European technical approval ETA-08/0108 issued on 25.01.2010.

10 The "control plan" is a confidential part of the European technical approval and only handed over to the approved bodies involved in the procedure of attestation of conformity. See section 3.2.2.

3.2.2 Tasks for the approved bodies

(1) The approved body shall perform the following tasks in accordance with the provisions of the "control plan":

- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control.

(2) The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

(3) The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the factory production control stating the conformity with the provisions of this European technical approval.

(4) The verifications, on which the ETA is based, were furnished by samples taken from the current production, thus only a reduced initial type-testing according to the specifications in the control plan[11] shall be performed.

(5) In cases where the provisions of the European technical approval and its "control plan" are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

3.3 CE marking

The CE marking shall be affixed on the delivery. The letters ”CE” shall be followed by the identification number of the approved certification body and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacturer),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate for the factory production control,
- number of the European technical approval
  - reaction to fire
  - essential properties:
  - details of the crack class
  - details of the level of trafficability relating to the loading contact area and trafficable intensity
  - the resistance to various media shall be defined in terms "*Penetration behaviour of liquids in accordance with annex 2 of the ETA*".

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

(1) The pre-fabricated elements including all built-in units for the drainage as well as transport and mounting fixings are manufactured at the factory “BTE-Stelcon, Germersheim, Philippsburger Straße 4, 76726 Germersheim, Germany ".

(2) The European technical approval is issued for the product on the basis of agreed information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged.

(3) Changes to the product or production process, which could result in this deposited information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

4.2 Installation

4.2.1 Conditions for the installation

(1) A sealing construction (drainage surface) with pre-fabricated elements shall be carried out by expert designers only. The controllable design drawings and/or positioning plans for the installation of the pre-fabricated elements shall be made by an expert designer taking account of the requirements at national level of the respective countries for this field of application and the expected installation conditions.

(2) The design of a facility for the storage, decanting and handling of liquid chemicals (substances hazardous to water) shall take into account that this approval does not regulate the altogether necessary retaining volume, no the further facility parts necessary for ensuring this volume (e.g. storage space, pipe systems).

(3) Furthermore the requirements for the drainage and the control of atmospheric water applicable to the installation have to be considered.

(4) The drainage surface shall be designed in such a way that in case of the precipitation attack and of the liquid chemicals (substances hazardous to water) at the same time, the whole amount of liquid will be conducted backflow-free and no running over of the troughs elements caused by the liquid chemicals (substances hazardous to water) can occur. The maximum allowed size of the not covered drainage surface shall be determined according to Annex 4.

(5) The requirements relative to the occupational safety law and the hazardous substances legislation will remain unaffected.

(6) For the closure of joints between the pre-fabricated elements and to other protection surfaces the joint sealing systems are appropriate with European technical approval and/or national approval according to requirements at national level of the respective countries for this field of application that

- are tight and resistant to the liquids which penetration behaviour can be evaluated positive according to Annex 2
- ensure an allowed extension and/or compression deflection according to the respective approval of the joint sealing system,
- ensure an allowed shear strain of $\geq$ 3,5 mm in the field of cross- or T-intersections and
- allow a required joint width according to Annex 3.

(7) Joint sealing's shall be designed in such a way that the interaction between the selected joint sealing system on the concrete sealing construction will be considered, see the mounting and installation instruction of the manufacturer. Thereby, the protected joint sidewall d_H according to Annex 3 is decisive.

(8) The installation of the pre-fabricated elements shall be designed on the load-bearing basis according to the provisions of this European technical approval (see Annex 9) and the applicant’s installation instruction. The flawless nature of the foundation as well as the permissibility of the foundation loads occurring shall be tested and verified separately. In case of foundations with unfavourable or strongly varying deformation behaviour, the corrections of the foundation have to be designed beforehand.

(9) The fixing on the pre-fabricated elements shall be only carried out with national and/or European technical approved anchors according to section 1.2(8). The fixing of the mounted parts shall be designed for the relevant object taking into consideration the provisions of the respective approved bonded anchor. Thereby, it shall be taking into account that the fixing devices are set up in such a way that the setting depth is less than the element thickness reduced at 5 cm.

(10) The pre-fabricated elements are designed sufficient for the applications according to section 1. This shall only apply, provided that the basis satisfies provisions of the section 4.2.3 as well as Annex 9.

4.2.2 Processing

(1) The installation of pre-fabricated elements is carried out by firms according to section 4.2.5 only.

(2) For the proper installation of the pre-fabricated elements the holder of approval shall draw up an installation and assembling instruction.

(3) The conditions of installation given in the approval and by the applicant have to be respected.

(4) In case of additional setting up the bonded anchors taking into account section 4.2.1(9) no perforating of the pre-fabricated elements shall occur (setting up is permitted with distance gauge only).

(5) The installer shall hand over to the user of the installation a copy of this approval as well as installation and assembling instructions of the applicant.

4.2.3 Basis

Before laying the pre-fabricated elements the suitability of the basis shall be determined according to the provisions of the sections 4.2.1(8). It shall not exceed the allowed values of the annex 9 and shall not differ from provisions given in the installation and assembling instructions. The modulus of deformation "E_{V2} " shall be confirmed by means of the plate-bearing test.

4.2.4 Installation of pre-fabricated elements

(1) The pre-fabricated elements shall be with all integrated drainage installations and prepared joints. Single elements may not be replaced.

(2) The application of the installations shall occur in accordance with installation and assembling instructions of the ETA holder.

(3) The pre-fabricated elements are installed in the fine-grading layer. Thereby, the all-over bearing of the pre-fabricated elements shall be ensured. In order to ensure the horizontal support of edge traction plates and/or surface closing trough elements, the upper concrete layer of the basis shall be provided with an upstand at the side of these plates.

(4) Damaged pre-fabricated elements (e.g. with cracks) may not be installed.

(5) The pre-fabricated elements type 1 and 2 shall be only installed by a vacuum lifter pad.

(6) The accessible joint width according to Annex 3 shall be guaranteed, e.g. by gauge or distance piece.

4.2.5 Installing firm

(1) The installation of pre-fabricated elements is carried out by firms only who (including their specialists) are authorised and trained by the approval holder. Further requirements for the installing firm can result from national provisions of the Member States, e.g. in G.: obligation of a qualified firm (*Fachbetriebspflicht*).

(2) The confirmation of the conformity of the installed sealing construction with this approval shall be given with a declaration by the installing firm on basis of the following controls:

- Control, weather the right pre-fabricated elements are used for the installation according to technical rules of the sealing construction as well as the marking according to section 3.3.

- Control, that between the pre-fabricated elements only joint sealing systems with national and /or European approval are installed, which meet the criteria of the sections 1.2(3) and 4.2.
- Control, that for the drainage of the sealing construction only drainage systems for the absorbing and drainage of substances hazardous to water with national approvals are installed, which meet the criteria of the section 1.2(5).
- Control of the installation according to section 4.2.6.

(3) The results of controls shall be recorded and evaluated. The records shall include at least the following information:

- Sealing construction: "BTE Stelcon Sealing construction made of pre-fabricated elements to use in SFH-facilities"
- Approval number: ETA-08/0108
- Approval holder: *Name, Address*
- Installation on: *Date*
- Installing firm: *Name, Address*
- Kind of control or test (see section 4.2.6)
- Day of the test
- Results of the control and tests and comparison with the requirements
- Provisions to which the sealing construction conforms:
  - reaction-to-fire class,
  - admissible levels of road serviceability (elements and joint sealing)
  - resistance to media of the pre-fabricated elements shall be given with the wording "*Resistance to media in accordance with Annex 2 of the* ETA-08/0108".
  - resistance to media of the installed joint sealing system shall be given with the wording "*Resistance to media in accordance with Annex 2 of the* ETA-xx/yyy (*and/or national approval Nr.: xyz*)".
- Particular conditions applicable to the use of the product
  "Repair work /retrofitting is only permitted with retrofit systems and or -products, which are approved for the respective intended use (in accordance with national and/or European technical approvals), see section 1.2. Beyond that the respective instructions of the manufacturer have to be taken into account."
- Name of, and position held by, the person empowered to sign the declaration on behalf of the installing firm or of his authorized representative.

(4) The documentation and the declaration of the installing firm shall be given to the construction file of the respective object. On request they shall be presented to the approval body, the relevant construction supervision authority and the expert personnel in accordance with the national regulations of the Member States.

(5) If there are insufficient test results the installing firm shall immediately take the necessary actions to stop the defect. After having stopped the defects the test to be passed which is necessary to verify that the defect has been eliminated shall be repeated immediately, if technically possible.

4.2.6 Control of the execution

(1) The basis set-up must comply with representations of Annex 9.

(2) The sufficient compaction of the basis (E_{v2}-value according to Annex 9) shall be verified before laying the pre-fabricated elements (once every 500 m², at least three times per area at minimum).

(3) Control that only the fixing devices according to section 1.2(6) were used for the fixing of elements. The control of the fixing of mounted parts is carried out according to the respective national and/ or European technical approval of the fixing devices.

(4) During the laying of the pre-fabricated elements, records on the verification of the proper installation shall be kept by construction supervisor or agents of supervisor.

(5) The records shall be at the disposal during the construction period on the construction site and on request shall be handed over to the construction supervision agent. They shall also be kept as the delivery note after works by the company for a minimum of five years such.

4.2.7 Repair works of the elements in used facilities

(1) The repair works shall be planned and designed by expert designers only based on this ETA, a expertise of the construction level and the repair concept, based on this expertise.

The respective repair works shall be designed in such a way that the interaction between the pre-fabricated elements and the selected joint sealing systems will be considered, e.g. penetration behaviour of the liquids and the resulting joint width from it. The determination of the penetration behaviour of the liquids into the pre-fabricated elements shall be performed according to the national regulations of the respective Member State (in G.: TRwS 786, section 9).

(2) Repair-products and/or Repair-systems with national and/or european technical approval for the repair works in used facilities for the storage, filling and handling of liquid chemicals (substances hazardous to water) shall be used for the repair work in used SFH-facilities, only.

The provisions of the approval of the respective repair-product and/or -system and the additional instructions by the approval holder shall be taken into consideration.

(3) The repair works shall be carried out by firms in accordance with section 4.2.5 only. Further requirements for the firm can result from national provisions of the Member States.

(4) Before the repair works starts make sure, that the detected damages of the sealing construction and there reasons according to the expertise of the construction level are cleared away.

(5) The inspection of the correct state of the plant by an approved expert shall be arranged by the operator of the plant before putting the plant into operation again if there are essential repair works necessary.

4.3 Responsibilities for the ETA holder

(1) It is the responsibility of the holder of approval to make sure that all those who use his pre-fabricated elements will be appropriately informed about the specific conditions according to sections 1, 2, 4, and 5 including the annex to this ETA, the installation and processing instructions by the holder of approval and the not confidential part of the technical documentation to this ETA.

(2) This information can be given by reproduction of the corresponding parts of the European technical approval.

5 Indications to the holder of approval

5.1 Transport and storage

5.1.1 Transport

(1) The pre-fabricated elements are provided for transportation/delivering with all inlets and prepared joints.

(2) The transportation to the installation point occurs with an appropriate transport vehicle.

5.1.2 Storage

The storage and/or intermediate storage of the pre-fabricated elements on load-spreading frost-free basis shall be so that no inadmissible exposures can occur.

5.2 Use, servicing, correction of the defect

(1) In order to ensure the fitness for use of the pre-fabricated elements and/or the sealing construction manufactured of these pre-fabricated elements, the measures described in sections (2) to (6) are recommended. It is the task of the ETA holder to make sure that all parties involved are adequately informed.

(2) The operator of the respective facility establishes operating instructions including the description of the necessary measures

- for the control of the proper condition
- for ensuring proper operation
- for maintenance and cleaning

of the sealing construction as well as the description of measures to be taken in case of damage. The inspection intervals are specified according to the stress levels given in Annex 2 in conjunction with Annex 10 of this ETA. The inspection results are documented.

(3) Dripping losses and/or accumulations of already minor liquid quantities are directly removed.

(4) Leaked out substances hazardous to water will immediately be bound with suitable means. The polluted bonding agent is taken up and recycled duly and without loss or is disposed of. Appropriate materials and/or employment devices are specified in the operating instructions and are constantly ready in sufficient quantity. For the disposal and treatment, respectively, of the materials resulting in waste reference is made to the applicable regulations of the respective Member State (e.g. in G: Abfallgesetz ('Waste management law')).

(5) The operator charges only those factories with maintenance and cleaning of the sealing construction, which for this purpose dispose of personnel authorised and instructed for this field of application according to the requirements of the respective countries.

(6) Before the operation of a facility and, if necessary, after required correction of the defect, the start-up inspections are carried out as follows:

- The start-up inspection is carried out by expert personnel only. Further requirements for the individuals can result from national regulations of the Member States.
- The person put in charge of the inspection will constantly be kept informed on the process of the work. The person is given the possibility to participate in the controls of the pre-fabricated elements before and after the installation according to section 4.2.6 and to evaluate the results of the controls.
- Checking the condition of the installed pre-fabricated elements is done via visual inspection of the sealing construction.
- Checking of the installed joint sealing system and/or drain and sewer system is done according to the provisions of the relevant European technical approval or the national approval according to the requirements of the respective countries for this field of application.
- The person put in charge of the inspection examines the intended control intervals of the operating instructions by the operator of the respective installation (see section 5.2(2)).

(7) One year after every start-up inspection and then every five years recurring inspections shall be performed as follows.

- The recurring inspections are carried out by expert individuals. Further requirements for the individuals can result from national regulations of the Member State.
- The investigation of the condition of the sealing construction is done via visual check of all areas of the respective sealing construction. The pre-fabricated elements are considered furthermore as tight and usable by pedestrians within the meaning of this approval, if no mechanical damage of the surface and no visible conversion procedure on the surface which reduce the cross section of the pre fabricated elements more than 2 mm are identifiable and if no cracks are identified.

- In addition the examination for protection effect of the joint sealing system and, if relevant, of the drain and sewer system shall be carried out according to the provisions of the relevant European technical approval and/or the national approval according to the requirements of the respective countries for this field of application.
- On the basis of the documentation in accordance with section 5.2(2) it is checked whether
  - the check intervals were kept,
  - the specifications of the operating instructions are observed, and
  - no longer contact has occurred between the pre-fabricated elements and the liquids hazardous to water in the course of use.
- If doubts arise about the tightness of the sealing construction (e.g. due to cracks) further examinations become necessary. For that purpose samples (drilling core) will be taken from the section concerned, if need be. It can be done without the taking of samples from the soil underneath the pre-fabricated elements, if demonstrably no complete penetration of the sealing construction occurred by liquids hazardous to water.

(8) If during the start-up inspection the defects have been determined, they are to be repaired immediately, taking account of the following provisions. A firm according to section 4.2.2 is charged with repair damage that may use materials indicated in this notification in accordance with indications of the processing instructions by the applicant.

- The damaged pre-fabricated elements of the sealing construction (e.g. cracks, scalings and/or excavations) shall be exchanged. The replacement of the damaged pre-fabricated element is carried out in accordance with the provisions of this approval, taking into account the provisions of the relevant approval for the joint sealing system for facilities for the storage, filling and handling of liquid chemicals (substances hazardous to water).
- Damaged area and/or parts of the joint sealing system or the drain and sewer system of the sealing construction shall be corrected taking into account the provisions of the relevant approval of the joint sealing system and/or drain and sewer system.
- If a correction of the defect is necessary, the testing shall be repeated in either case by an expert person according to section 5.2(7), first dash.

(9) Further national regulations of the Member States shall remain unaffected.

6 Recommendations for the operator of a facility for the storage, decanting and handling of liquid chemicals (substances hazardous to water)

(1) Recommendations for the operator of a facility for the storage, filling and handling of liquid chemicals (substances hazardous to water)

(2) An operating instruction is prepared by the operator of the respective installation which takes the following points into account:

- The contents of the regulations to be applied by the employee working in these fields will be presented in the operating instructions in a comprehensible and clear way and be laid out or put up at a suitable place of the plant. The operating instruction can be part of operating instructions in accordance with other fields of law of the respective Member States.
- The employees working in these fields will be instructed in the possible threats to water when storing, filling and handling substances hazardous to water as well as in the measures of hazard control. Before working in this field, they will be instructed before working with these substances and afterwards at least once per year.
- All essential measures of control by the operator, the maintenance and the cleaning will be specified in the operating instructions. The realization of the measures will be noted in each case in the company journal.

- In this operating instruction the operator lays down his inspection intervals in accordance with Annex 2 in conjunction with Annex 10. These records are ready and will be presented to the person responsible according to the national regulations in force of the respective country.

(3) The operator of a facility for the storage, filling and handling of liquid chemicals (substances hazardous to water) commissions only enterprises with maintenance and cleaning of the sealing construction according to section 4.2.2(1).

(4) If after the start-up check a correction of the defect is necessary, the start-up check shall be repeated in either case according to section 5.2(7), taking into account the applicable national regulations of the respective country.

(5) The sealing construction is driven on only with vehicles according to the provisions referred to Annex 3, Table 1.

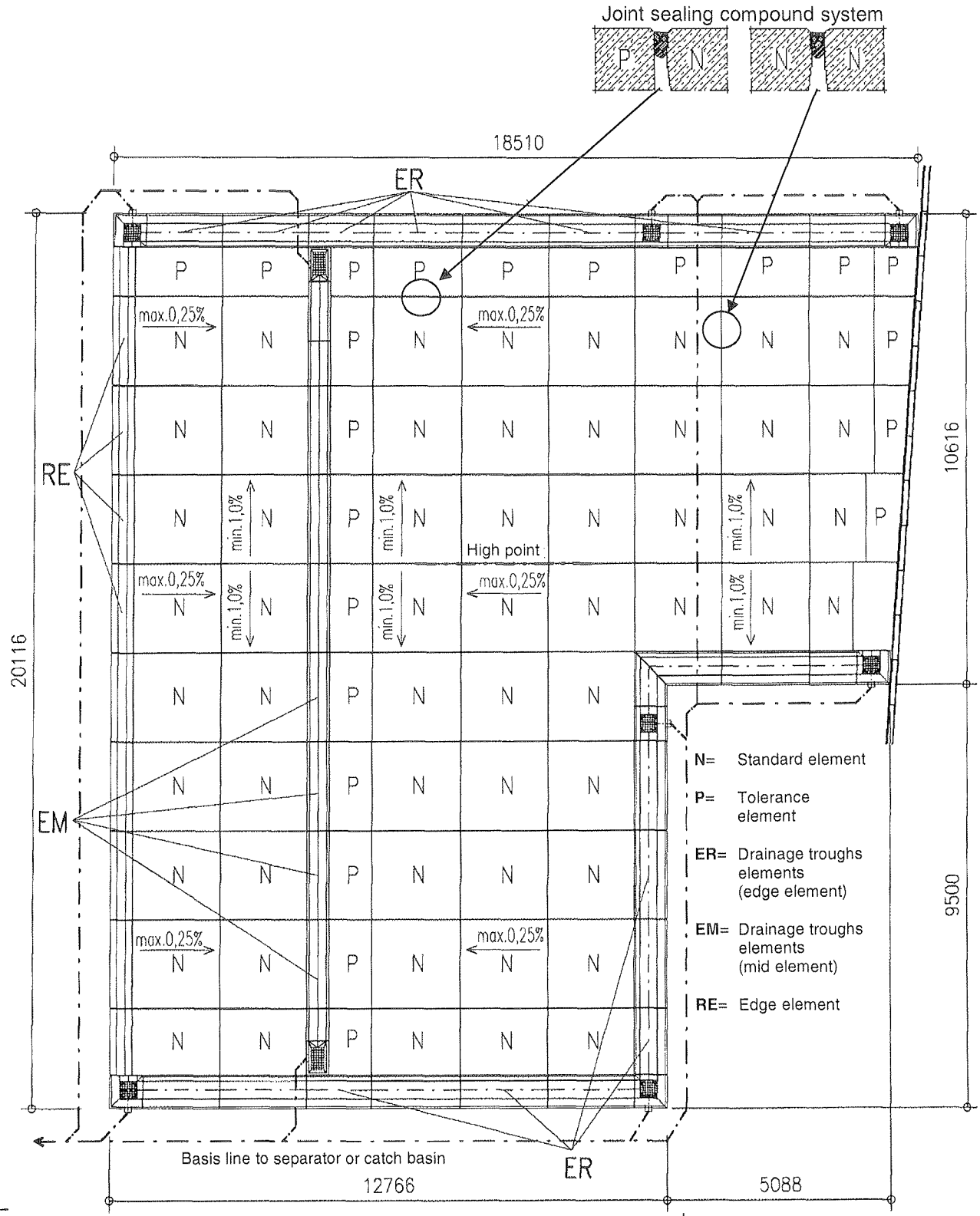
Dipl.-Ing. Georg Feistel
Head of the Division Construction Engineering
of Deutsches Institut für Bautechnik
Berlin, 25 January 2010

beglaubigt
Dr. Kluge

Sealing construction

of the BTE Stelcon Deutschland GmbH

made of liquid tight pre-fabricated elements of reinforced concrete for use in facilities for the storage, filling and handling of liquid chemicals (substances hazardous to water) and petrol stations



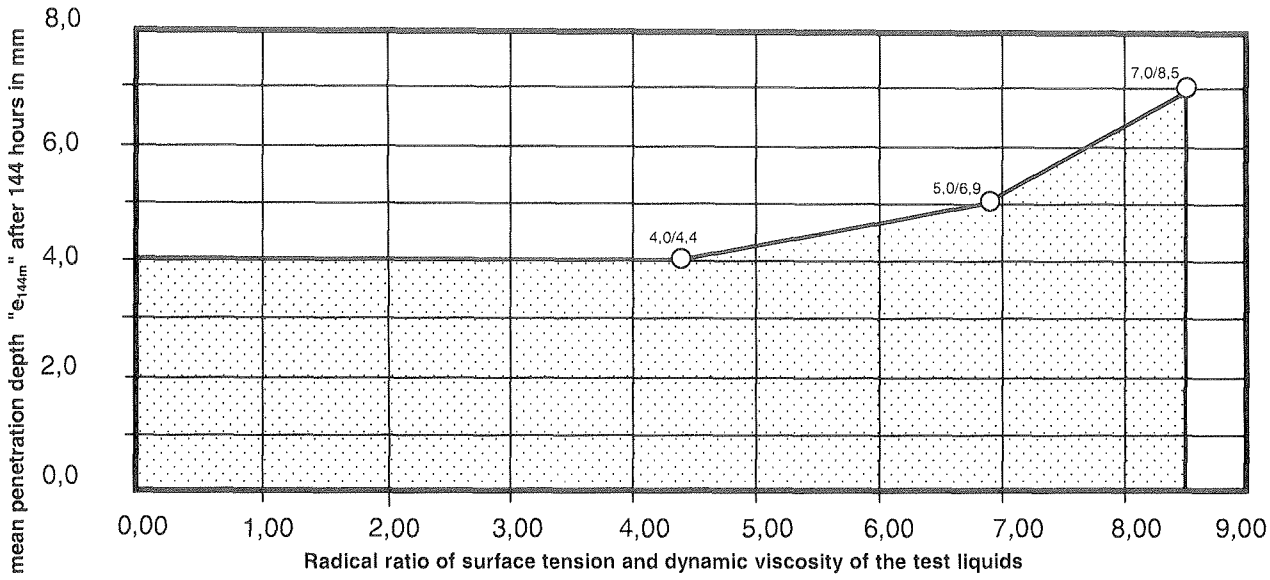
BTE Stelcon pre-fabricated elements of reinforced concrete
as a part of the BTE Stelcon sealing construction to use in facilities for the storage, filling and handling of liquid chemicals (substances hazardous to water)

Annex 1
of the European technical Approval

Installation and/or laying examples

ETA-08/0108

Figure 1: Penetration behaviour (mean penetration depth "e_{144m}" of liquids)[1)] on the basis of the respective dynamic viscosity and surface tension of the test liquids.



$\sqrt{\frac{\sigma}{\eta}}$, [$m^{0,5}/s^{0,5}$] ; σ= surface tension [mN/m]
η= dynamic viscosity [mNs/m²]

1) safety factors for determining the characteristic penetration depth and the minimum element thickness see Annex 10

Table 1: Materials and properties

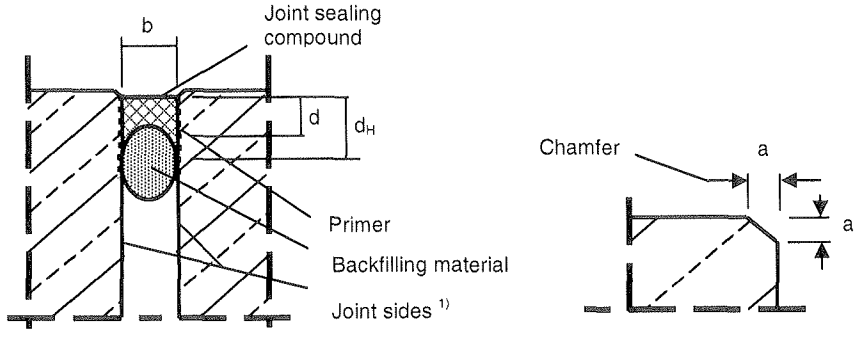
No	Value	Requirement
1	Precast concrete	Concrete according to the deposited information taking into account the provisions of this approval
	Aggregate	Aggregate according to the deposited information taking into account EN 12620:2003-4 and corrigenda 1 to EN 12620:2004-12
	Cement	Cement according to EN 197-1:2004-08
	Concrete admixture	FM and LP according to EN 934-2
2	Reinforcement	Reinforcing steel bars; reinforcing steel fabric within the meaning of EN 10080 taking into account the deposited information of the ETA holder
3	Drainage installation	Floor inlets with approval (ETA or national approvals) according to the provisions of this approval and the requirements of the ETA holder Drain pipe: – Austenitic stainless steel e.g. according to EN 1124-1 – High density polyethylene, PE-HD according EN 12666-1
4	Transport and mounting device	According to the provisions of this approval and the deposited information
5	Fixing devices for mounted part	Bonded anchor with European and/or national approval according to the provisions of this approval and the requirements of the ETA holder
6	Joint sealing system	Joint sealing system with European and/or national approval according to the provisions of this approval

Table 1: Characteristic component and material values

No	Value	Requirement
1	Fresh concrete for pre-fabricated components:	Concrete composition according to the deposited information
	- Monitoring class	2
	- Degree of compactability class	C1
	- Slump class	F3 to F6
	- Cement	CEM II/A-S 52,5N
	- water/cement -value	≤ 0,45
	- Aggregate	according to the deposited information, alkali sensitivity class E I
2	Pre-fabricated components:	Liquid-tight according to section 2.1.3 (1)
	- Monitoring class	2
	- Concrete compressive strength class	C45/55
	- Design state	State 1
	- Crack state class	w_{F-1}, uncracked
	- Concrete cover	above 55 mm below 30 mm
	- Reinforcement	BSt 500 S (Wst.-nr. 1.0438) and/ or BSt 500 M (Wst.-nr. 1.0466)
	- Exposure classes	XA3, XC4, XD3, XF4, XM2
	- Level of trafficability	t 0: pedestrians t 1: pneumatic-tyred vehicles to 60kN/(0,4x0,4)m² t 2: pneumatic-tyred vehicles to 120kN/(0,4x0,4)m² t 3: folk lift truck with pneumatic-tyred and/or solid rubber wheels to 0,8 N/mm²
	- Class of wear and tear	XM1: moderate exposed to wear by means of pneumatic wheels XM2: strongly exposed to wear by means of air or solid rubber forklift truck lift
	- Reaction to fire class	A1, when using in sealing constructions with joint sealing systems, reaction to fire class of the relevant joint sealing system has to be observed
3	Flat steel anchor	dependent on the relevant pressure step Rd 16 and/or Rd 20
4	Joint width[1)]	b ≥ 16 mm, < 20 mm

1) Joint widths bigger than 20 mm are only accessible by pedestrians.

Example of a joint construction, schematic representation

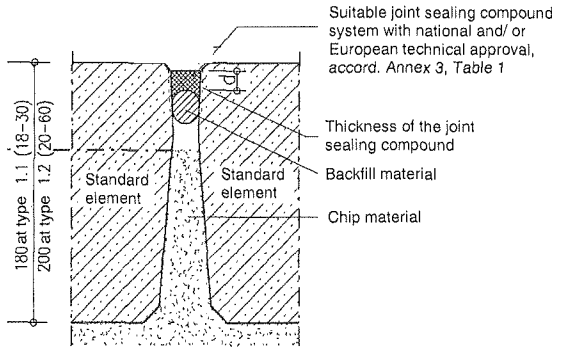


a = Chamfer edge 3-5 mm
b = Joint width
d = Thickness of the joint sealing compound
d_H = Joint sealing compound bonding or contact surface on the joint side wall (protected joint side) $d_H = \gamma_s \cdot e_{tm} \leq b+0,5b$
e_{tm} = mean penetration depth; see Annex 2, Figure 1,
γ_s = Safety factor for determining the characteristic penetration depth, Annex 10
1) = The joint sides shall be aligned parallel to one another

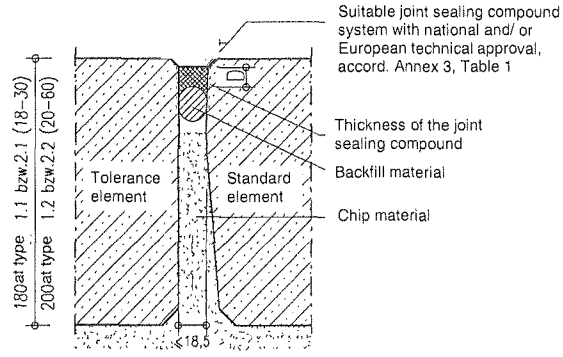
BTE Stelcon pre-fabricated elements of reinforced concrete as a part of the BTE Stelcon sealing construction to use in facilities for the storage, filling and handling of liquid chemicals (substances hazardous to water)	**Annex 3** of the European technical Approval
Characteristic component and material values Properties of a joint sealing compound system	ETA-08/0108

Examples of joint construction for the element types

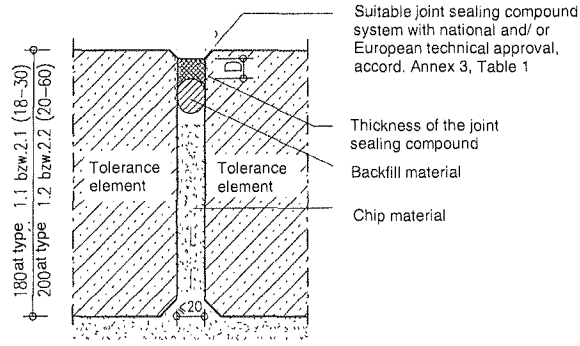
Construction at standard elements



Construction at tolerance and standard elements



Construction at tolerance elements



Determination of the size of drainage surface (not covered areas):

- Maximum allowed size by a trough element with integrated inlet on case of the nominal diameter:

	DN 100	DN 150
dispenser with maximum flow rate of 50 l/min:	72 m²	105 m²
high performance dispenser with maximum flow rate of 150 l/min:	16 m²	50 m²

If the dispenser allows major dosages as the above mentioned, the maximum possible dosages shall be taken into account for the measurement of areas.

- General determination of size of the drainage surface

$$A = (Q_{DN} - Q_{dispenser}) / q_A$$

q_A discharge rate = 300 l/(s·ha)

Qdispenser - dispenser with max. flow rate over 3 minutes of 50 l/min l/min ($Q_{dispenser}$ = 0,84 l/s)

- high performance dispenser with max. flow rate over 3 minutes of 150 l/min ($Q_{dispenser}$ = 2,5 l/s)

Q_{DN} - DN 100= 3,00 l/s

- DN 150= 4,00 l/s

A minimum size of the drainage surfaces[1)]

[1)] The drainage surface from pre-fabricated elements towards the floor inlets must correspond at least the following specifications:

- dispenser (max. flow rate: 50 l/min): ≥ maximum tube length including nozzle plus **one** meter,
- high performance dispenser (max. flow rate: 150 l/min): ≥ maximum tube length including nozzle plus **three** meter.

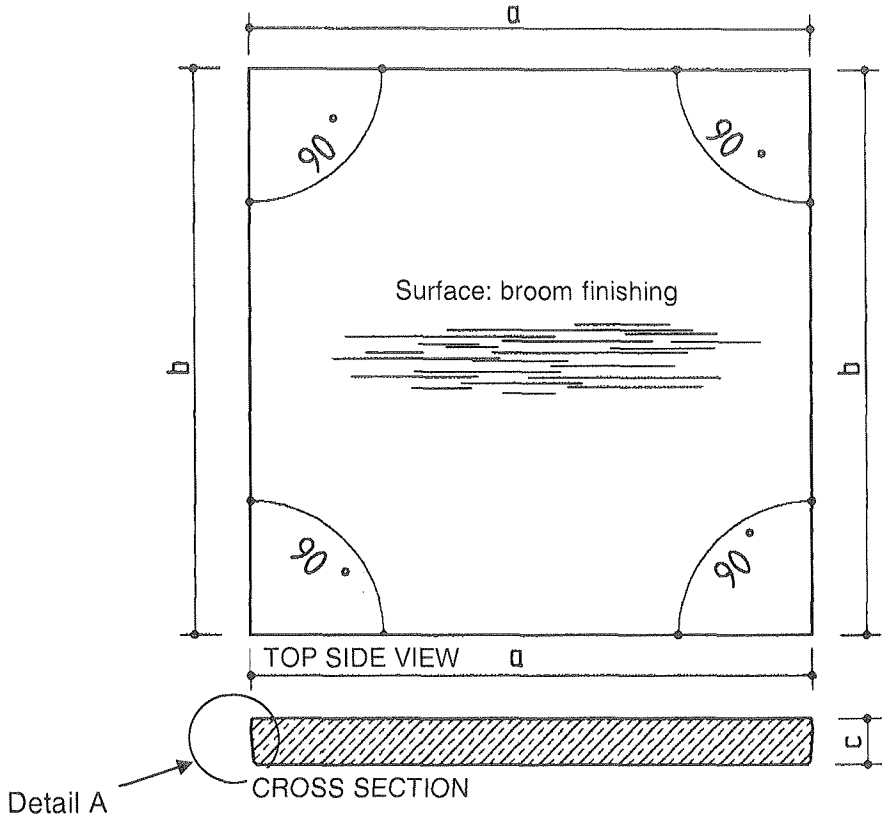
BTE Stelcon pre-fabricated elements of reinforced concrete
as a part of the BTE Stelcon sealing construction to use in facilities for the storage, filling and handling of liquid chemicals (substances hazardous to water)

Annex 4
of the European technical Approval

Example of a joint construction
Determination of the size of drainage surface

ETA-08/0108

Type 1: Standard element



Detail A: Edge construction of a standard element

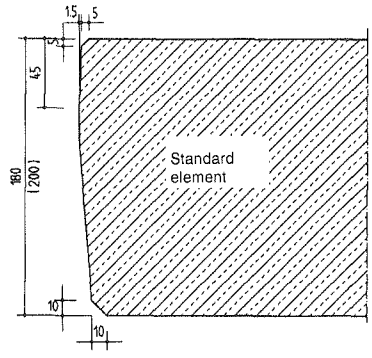


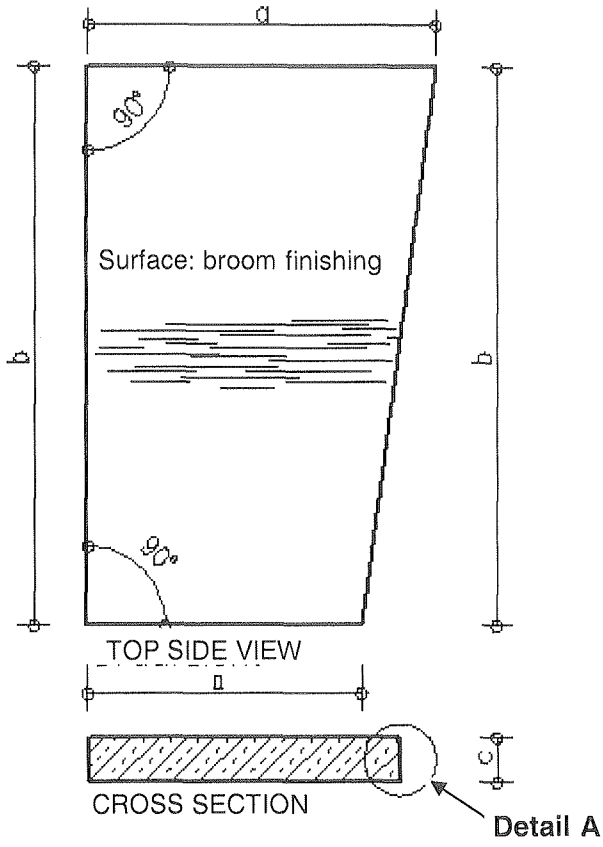
Table 1: Dimensions of the standard element, Type 1

No	Type	Designation	a	b	c
			[mm]		
1	Type 1.1*) (18-30)	standard element level of trafficability: t1	1984	984 to 1984	180
2	Type 1.2 (20-60)	standard element level of trafficability: t3	1984	984 to 1984	200

*) Allowed up to level of trafficability t 1 only.

BTE Stelcon pre-fabricated elements of reinforced concrete as a part of the BTE Stelcon sealing construction to use in facilities for the storage, filling and handling of liquid chemicals (substances hazardous to water)	**Annex 5** of the European technical Approval
Geometry and dimensions of the standard elements, Type 1,	ETA-08/0108

Type 2: Tolerance element



Detail A: Edge construction of a tolerance element

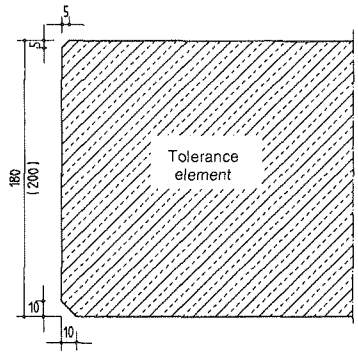


Table 1: Dimensions of the tolerance element, Type 2

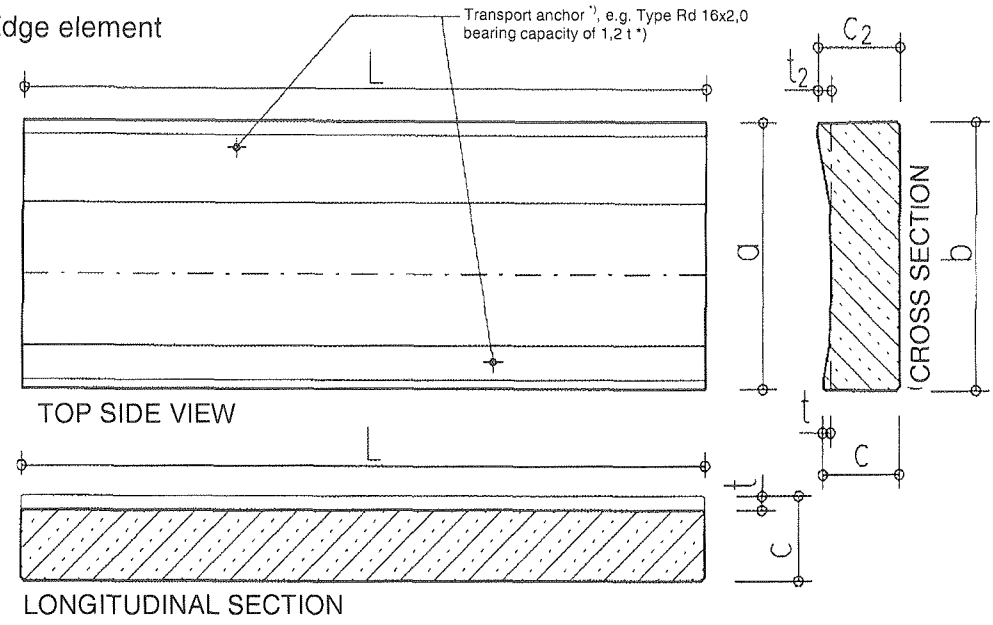
No	Type	Designation	a	b	c
			[mm]		
1	Type 2.1*) (18-30)	tolerance element level of trafficability: t1	500 bis 1984		180
2	Type 2.2 (20-60)	tolerance element level of trafficability: t3			200

*) Allowed up to level of trafficability t 1 only.

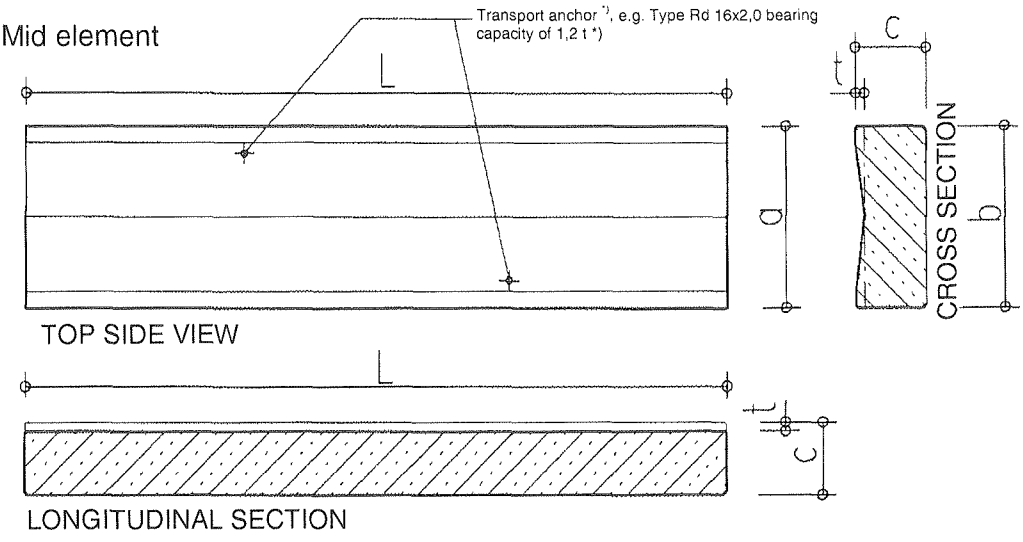
BTE Stelcon pre-fabricated elements of reinforced concrete as a part of the BTE Stelcon sealing construction to use in facilities for the storage, filling and handling of liquid chemicals (substances hazardous to water)	**Annex 6** of the European technical Approval
dimensions of the tolerance elements, Type 2,	ETA-08/0108

Type 3: Drainage trough elements

Type 3.1: Edge element



Type 3.2: Mid element



*) Flat steel anchor: Closing of the anchor with a joint sealing compound that is approved for the respective intended use (section 1.2) of this approval after installation of the elements.

Table 1: Dimensions of the troughs elements [1)]

No	Type	Designation	a	b	c	c2	L	t	t2
			[mm]						
1	3.1	Edge element	750	756	223	240	500 bis 1984	23[2)]	40
2	3.2	Mid element	500	500	200	200		25	-

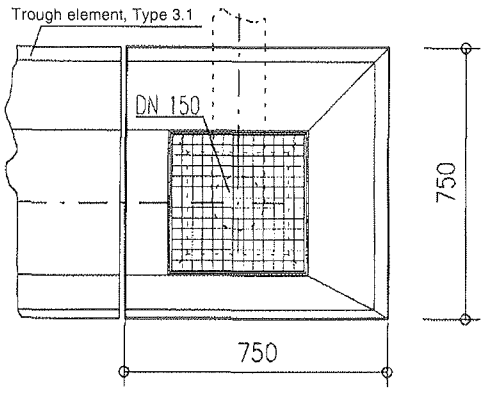
1) Acceptable trafficability up to level of trafficability t3
2) R= 1000 mm

BTE Stelcon pre-fabricated elements of reinforced concrete as a part of the BTE Stelcon sealing construction to use in facilities for the storage, filling and handling of liquid chemicals (substances hazardous to water)	**Annex 7** of the European technical Approval
Dimensions of the troughs elements, Type 3	ETA-08/0108

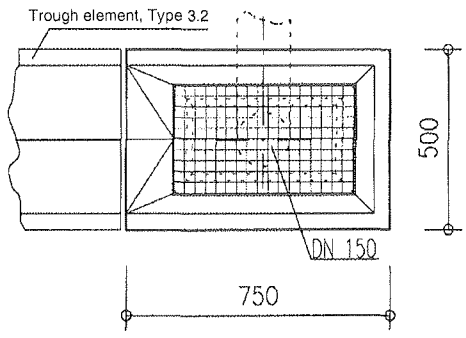
Type 4: Drainage floor inlet elements [1), 2)]

Type 4.1 Trough end

Type 4.1.1 Inlet for edge element Type 3.1

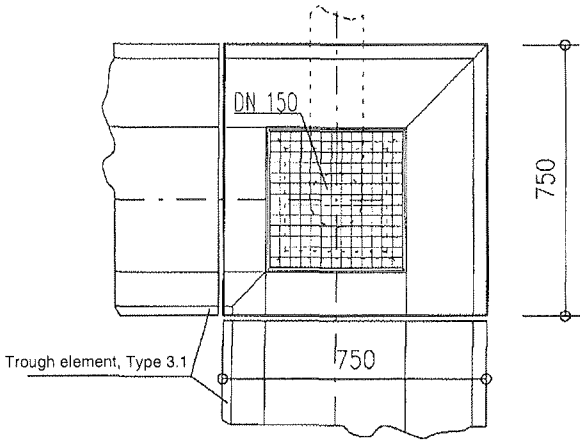


Type 4.1.2 Inlet for mid element Type 3.2

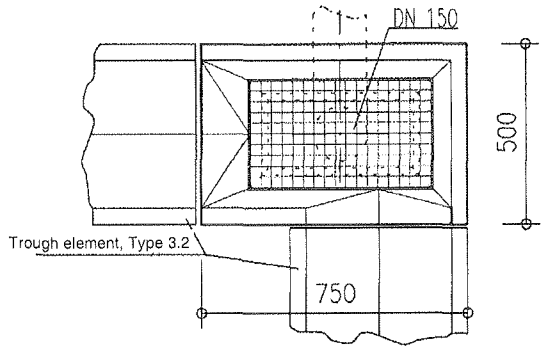


Type 4.2 Trough edge, examples

Type 4.2.1 Inlet for edge element Type 3.1

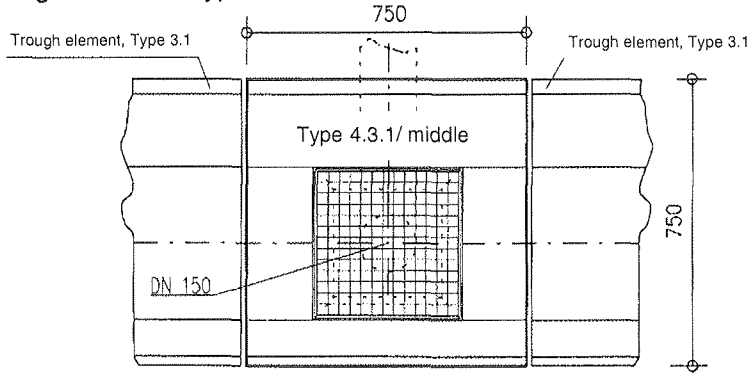


Type 4.2.2 Inlet for edge element Type 3.2



Type 4.3 Trough middle

Type 4.3.1 Inlet for edge element Type 3.1



1) Acceptable trafficability up to level of trafficability t3

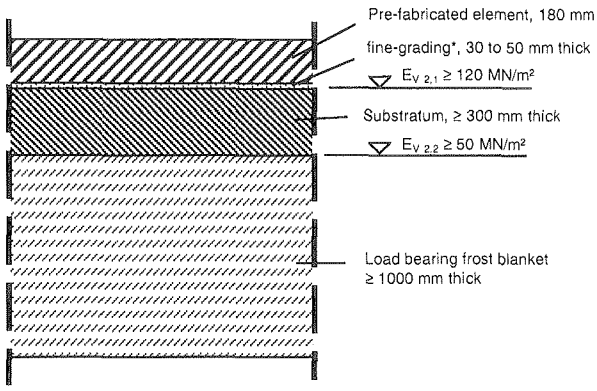
2) The dimensions of additional elements are according to the deposited information.

BTE Stelcon pre-fabricated elements of reinforced concrete as a part of the BTE Stelcon sealing construction to use in facilities for the storage, filling and handling of liquid chemicals (substances hazardous to water)	**Annex 8** of the European technical Approval
Example geometry of drainage floor inlet elements Type 4	ETA-08/0108

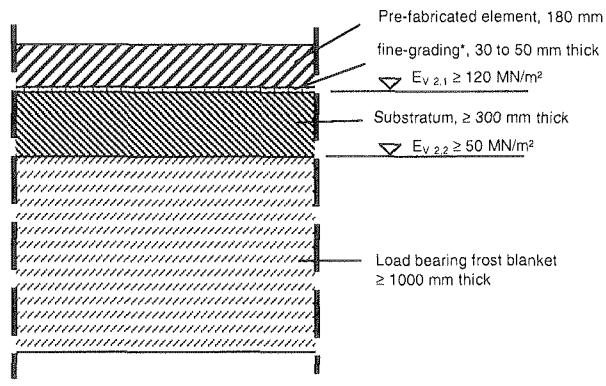
Basis for pre-fabricated elements:

A: for **element thickness 18 cm** (allowed for normal vehicle only **up to level of trafficability t 1**)

Type 1 (standard element)

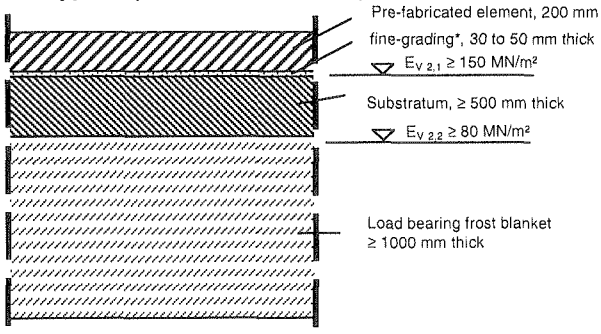


Type 2 (tolerance element)

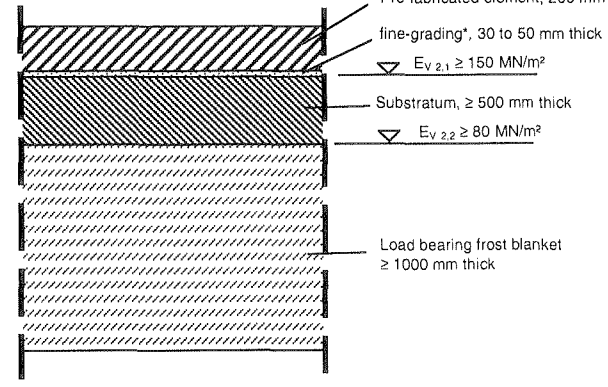


B: for **element thickness 20 cm** (allowed for normal vehicle only **up to level of trafficability t 3**)

Type 1 (standard element)



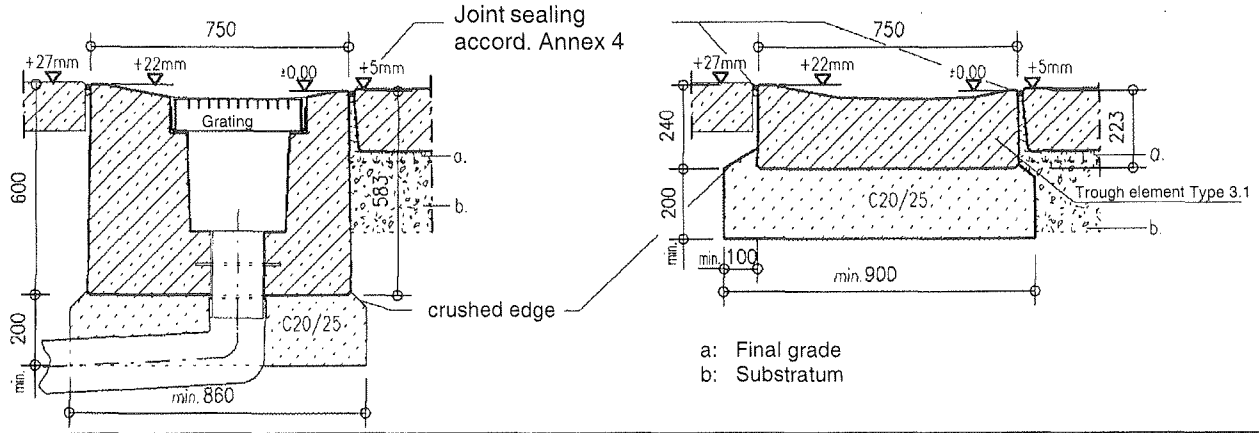
Type 2 (tolerance element)



* Fine-grading layer: twice crushed and screened hard rock chip mix, e.g. 3/8

C: for drainage trough and drainage floor inlet elements
(allowed for normal vehicle only **up to level of trafficability t 3**)

Type 3 (drainage trough element) / Type 4 (drainage floor inlet element)



a: Final grade
b: Substratum

BTE Stelcon pre-fabricated elements of reinforced concrete as a part of the BTE Stelcon sealing construction to use in facilities for the storage, filling and handling of liquid chemicals (substances hazardous to water)	**Annex 9** of the European technical Approval
Basis for Type 1 to 4, Examples	ETA-08/0108

1. Stress levels for the impact:

1.1 Pre-fabricated elements in the area of storage

The stress of the pre-fabricated elements when storing shall be determined in individual cases according to the operating conditions taking into account the relevant national provisions of the countries. It is dependent amongst others on the duration of stress determined. Within this duration of stress determined the leaked liquids must be identified and removed from the sealing construction.

Table 2.11: Storing of substances hazardous to water

Abbreviation	Stress level	Duration of stress	Testing period
S_1	low	Duration of stress up to 8 hours[1)]	8 hours
S_2	mean	Duration of stress up to 72 hours[1)]	72 hours
S_3	high	Duration of stress up to 3 months[1), 2)]	2200 hours

1) In this period of the duration of stress the stress is to be identified and removed, the sealant is to be cleaned and (if applicable, after the professional judgment) put into operation again.
2) In case of a duration of stress over 3 months, a permanent impact shall be assumed and the determinations given in this ETA shall not be applied.

1.2 Pre-fabricated elements in the area of filling and handling:

The stress of the pre-fabricated elements when filling and handling will be determined in individual cases taking into account the operating conditions. It is dependent on the frequency of the filling procedures, on the infrastructure and on the national provisions of the countries regarding the legal dangerous substances requirements for packing of substances hazardous to water.
Reloading and filling processes will be constantly visual checked for dripping losses and leakages, so that the measures on their elimination can be disposed immediately.

Table 2.12: Filling and Handling of substances hazardous to water

Abbreviation	Stress level	Frequency / measure	Testing period
F_1, H_1	low	a) Filling up to 4 x per annum. b) Handling of substances in suitable packing[1)]	8 hours
F_2, H_2	mean	a) Filling up to 200 x per annum. b) Handling of substances in not suitable packing[1)]	Impact cycle: 28 days per 5 hours[2)]
F_3	high	Filling and handling without restriction of the frequency	Impact cycle: 40 days per 5 hours[3)]

1) According to the national provisions of the countries regarding the legal dangerous substances requirements for packing of substances hazardous to water.
2) Equivalent impact (same penetration depth) one-time 144 hours.
3) Equivalent impact (same penetration depth) one-time 200 hours.

2. Safety factors for determining the characteristic penetration depth and the minimum component thickness:

Safety factor γ_s: Failing an agreement to the contrary, the safety factor for the static deviation from the individual values of the penetration depths is 1,35. As opposed to this it may be determined according to the provisions of the respective Member States.

Safety factor γ_e: Failing an agreement to the contrary, the safety factor for the penetration depth is 1,5 based on the specifications of the supervision and testing and during the use of the pre-fabricated components (installation surveillance). As opposed to this it may be determined according to the provisions of the respective Member States.