

## European Technical Approval ETA-12/0412

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung <i>Trade name</i>	Kellertank <i>Basement storage tank</i>
Zulassungsinhaber <i>Holder of approval</i>	Haase GFK-Technik GmbH Adolphstraße 62 01900 Großröhrsdorf DEUTSCHLAND
Zulassungsgegenstand und Verwendungszweck <i>Generic type and use of construction product</i>	Doppelwandiger Flachbodenbehälter aus GFK - Typen K10D, K13D, K15D, K15DA, K17D, K19D, K19DA, K22D, K25D, K30D und K35D <i>Double-wall flat-bottom tank made of GRP - types K10D, K13D, K15D, K15DA, K17D, K19D, K19DA, K22D, K25D, K30D and K35D</i>
Geltungsdauer: <i>Validity:</i>	vom <i>from</i> bis <i>to</i> 13 November 2012 13 November 2017
Herstellwerk <i>Manufacturing plant</i>	Haase GFK-Technik GmbH Adolphstraße 62 01900 Großröhrsdorf DEUTSCHLAND

Diese Zulassung umfasst  
*This Approval contains*

17 Seiten einschließlich 9 Anhänge  
*17 pages including 9 annexes*

## 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<sup>1</sup>, modified by Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - *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<sup>4</sup>, as amended by law of 31 October 2006<sup>5</sup>;*
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>.
- 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.
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- 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.

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

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1 Definition of the storage tanks and intended use

#### 1.1 Definition of the storage tanks and the components

The storage tanks with the following type designations:

- K10D
- K13D
- K15D, K15DA
- K17D
- K19D, K19DA
- K22D
- K25D
- K30D
- K35D

are cylindrical, double-walled flat bottom tanks made of glass-reinforced unsaturated polyester resin (GF-UP, GRP). An illustration of the product and intended use is given in Annex 1. The maximum storage capacity is 12m<sup>3</sup>.

##### 1.1.1 Storage tanks

The space between the two shells of the wall and the two bottoms (see Annex 1) is leakage observed by class 1 leakage detector (vakuum method) according to EN 13160-1. In the event of a leak, an audible or visual alarm is activated. Thereby, the container is equipped with a leak observed secondary wall. The dimensions and filling capacity of the different types of storage tanks are shown in Annex 2. The containers are assembled at the place of installation.

##### 1.1.2 Kit for Assembling of the tanks

The tanks consist of the following prefabricated parts that are assembled on site of final use:

- double-wall made of GRP (inner- and outer wall)
- double-bottom made of GRP (inner- and outer bottom)
- GRP roof/cover with openings and connections for leak detection system of the interstice volume and overflow prevention.

The components of the kit are shown in the installed state in Annex 1. The components are manufactured in hand lay-up- (with mechanical moulding device), spray-up- and SMC-methods (cover type K19). Here, unsaturated polyester resins (UP resins) of the Group 1B to 6 according to EN 13121-1 Table 2 and textile glass mats in accordance with ISO 2559 are used.

## 1.2 Intended use

The storage tanks are intended to be used for the storage of:

- Domestic heating oil (heating fuel) with a flash point above 55 °C,
- Heating fuels - Fatty Acid Methyl Esters (FAME) according to EN 14213,
- Diesel fuel according to EN 590, EN 14214

for which requirements for mechanical and chemical resistance and stability and safety in use in the sense of the Essential Requirements 2, 3 and 4 of Council Directive 89/106 EEC shall be fulfilled.

Regarding the requirements concerning safety in case of fire it is assumed that the storage tanks meet the requirements of class E according to EN 13501-1. Furthermore, it can be assumed that the tank-tightness will remain, if the fire is burning not longer than 30 minutes (see 2.2.1).

The storage tanks may only be installed inside of buildings. This European Technical Approval applies to the use of these storage tanks in non-earthquake endangered areas. The storage tanks may be used for storage of heating oil and diesel fuel (liquids with flashpoint above +55 °C) at atmospheric pressure. The maximum operating temperature is 30 °C. The room, in which the tanks are finally assembled, shall not be used for any other purpose or activities.

The provisions made in this European technical approval are based on an assumed working life of the storage tanks of 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be 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 storage tanks, components and methods of verification

### 2.1 Characteristics of the components

#### 2.1.1 General characteristics of the storage tanks

The storage tanks correspond to the drawings given in Annex 1. The laminate setup, wall-thickness, glass-contents and used materials (glass-reinforcements and resins) are shown in Annex 3.

The following table 1 shows the evaluated characteristics and the verification method.

N°	Characteristics	Verification methods	Value
1	Wall thickness of shell laminate	-	≥ 3,0 mm (inner- and outer wall)
2	Wall thickness bottom and cover	-	bottom ≥ 3,0 mm cover ≥ 3,0 mm
3	Textile glass portion of the maximum mass	EN ISO 1172	walls ≥ 27 % cover, bottom ≥ 27 % SMC cover ≥ 27 %
4	Textile glass mass per unit area	EN ISO 1172	ca. 1600 g/m <sup>2</sup> CSM or roving's
5	Laminate setup	-	used glass mats 1. option: 2*800 g/m <sup>2</sup> 2. option: 4*450 g/m <sup>2</sup>
6	Barcol hardness laminate	EN 59	≥ 30

N°	Characteristics	Verification methods	Value
7	Resistance to tearing, normal force	EN ISO 527-4 equivalent to EN 13121-3	≥ 70 N/mm <sup>2</sup>
8	Tensile modulus of elasticity	EN ISO 527-4 equivalent to EN 13121-3	≥ 7000 N/mm <sup>2</sup>
9	ultimate moment	DIN EN ISO 14125 equivalent to EN 13121-3	≥ 240 Nm/m
10	Bending modulus of elasticity	DIN EN ISO 14125 equivalent to EN 13121-3	≥ 5100 N/mm <sup>2</sup>
11	Creep rate	DIN EN ISO 14125 equivalent to EN 13121-3	≤ 20 %
12	long-term reduction factor	DIN EN ISO 14125 equivalent to EN 13121-3	≤ 2,0
13	Density of the laminate	-	≥ 1,35 g/cm <sup>3</sup>

**Table 1:** General characteristics and verification methods

### 2.1.2 Reaction to fire of the components

The glass-reinforced thermosetting resin material were classified to class E according to EN 13501-1.

## 2.2 Characteristics of the storage tanks

### 2.2.1 Resistance to heat effects (outside burning)

It can be assumed that the tank-tightness will remain, if a fire is burning not longer than 30 minutes.

### 2.2.2 Environmental requirements and characteristics

The leak-tightness and strength of the interstitial space were proved with at least 600 mbar negative pressure. The test is comparable to the requirements of EN 13160-7 section 5.4. There were no leaks and changes in the interstitial space found.

The functionality of the leak observed interstitial space was checked. If a leak observed during operation, an alarm will be displayed.

### 2.2.3 Safety in use

The assembled storage tanks are stable for the boundary conditions mentioned in section 1. Evidence has been provided by a static analysis. The permissible limit strains are kept under the given loads. The storage tanks are equipped with connections for filling, removing, venting, overflow prevention and the leak detector.

The storage tank fulfils the essential requirements for safety in use.

## 2.3 Release of dangerous substances

The manufacturer of the tanks shall submit a written declaration stating whether or not the product contains dangerous substances according to European and national regulations, when and where relevant in the Member States of destination, and shall list these substances.

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 to be complied with, when and where they apply.

### 3 Evaluation and attestation of conformity and CE marking

#### 3.1 System of attestation of conformity

According to the communication of the European Commission the system 3 of attestation of conformity laid down in Decision 1999/472/EC as amended by 2001/596/EC of the European Commission<sup>7</sup> for piping kits pipes, tanks, leakage alarm systems and overflow prevention devices.

This system of attestation of conformity is defined as follows:

System 3: Declaration of conformity of the product by the manufacturer on the basis of:

- (a) Tasks for the manufacturer:
  - (1) factory production control;
- (b) Tasks for the approved body:
  - (2) initial type-testing of the product.

Note: Approved bodies are also referred to as "notified bodies".

#### 3.2 Responsibilities

##### 3.2.1 Tasks for the manufacturer

###### 3.2.1.1 Factory production control

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. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use constituent materials stated in the technical documentation of this European technical approval.

The factory production control shall be in accordance with the "control plan" which 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.<sup>8</sup>

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

###### 3.2.1.2 Other tasks for the manufacturer

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 storage tanks 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.

##### 3.2.2 Tasks for the approved bodies

The approved body shall perform the

- initial type-testing of the product

in accordance with the provisions laid down in the control plan.

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.

<sup>7</sup> Official Journal of the European Communities L 184 of 17.07.99 and L 209 of 02.08.01

<sup>8</sup> The control plan is a confidential part of the European technical approval and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.

### 3.3 CE marking

The CE marking shall be affixed on the product itself, on the packaging or accompanying commercial document of the components. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the European technical approval,
- Description of the product or components:
  - o type designation
  - o date of manufacture of the tank parts (month and year)

Marking of the tanks:

- o maximum filling capacity

Intended use:

- o note "Only for storage of domestic heating oil or diesel fuel (flashpoint > 55 °C)"
- o note "Use only in combination with leak detector system"
- o note "Use only inside of buildings"
- o maximum allowed service temperature
- o maximum filling temperature
- o note "for atmospheric operation only"
- o maximum allowed filling height

## 4 Assumptions under which the fitness of the storage tanks for the intended use was favourably assessed

### 4.1 Manufacturing

The parts of the storage tanks are made by hand lay-up- (with mechanical moulding device), spray-up- and SMC-processes. It is assumed that the manufacturing of the tanks fulfils the criteria for stable industrial production. The samples taken in connection with the evaluation of properties shall be representative of the whole production. The tanks can be assembled at the place of installation.

The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/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

The tanks must be placed vertically on a flat, bending resistant base plate inside of buildings. The tanks must be placed in that way, that all pipes (see Annex 1) as well as connections for the leak detector are easily accessible and verifiable. The tanks must be equipped with a tank approved overfill prevention device according to EN 13616 type B and a leak detector. The maximum allowable filling level is limited to 95 % of the volume. The alarm-pressure of the leak detector and the adjustment of the overfill prevention device, are set in accordance to the technical specifications of the manufacturer.

The installation of the tanks shall be in accordance with the manufacturer's technical documentation.

## 5 Indications to the manufacturer

### 5.1 Packaging, transport and storage

The components of the tank shall be packed in an appropriate way. The packaging may only be removed on installation site.

The transport may only be performed by such companies with technical experience, adequate equipment, facilities and means of transport as well as sufficiently trained personnel.

For the prevention of hazards to employed persons and third parties the relevant regulations for the prevention of accidents of the Member States shall be considered.

### 5.2 Use, maintenance, repair

#### 5.2.1 Filling

The filling process needs to be monitored. Before starting the filling procedure it is necessary to determine whether the liquid is allowed and the temperature of the liquid is within the limits (see 1.2). The overfill prevention device and the leak detection system must be working. The maximum flow rate is 1000 L/min.

#### 5.2.2 Inspection and alarm

The tank operator must periodically carry out a visual inspection on tanks and pipings. When leaks or alarm are detected, the damaged tank must be evacuated. Inspections and checks must be performed to leak detection device, overfill prevention and other equipments in accordance with the relevant regulations.

Tests for other areas of law are not affected.

#### 5.2.3 Cleaning

The cleaning must be performed according to the manufacturer's documentation.

#### 5.2.4 Repair

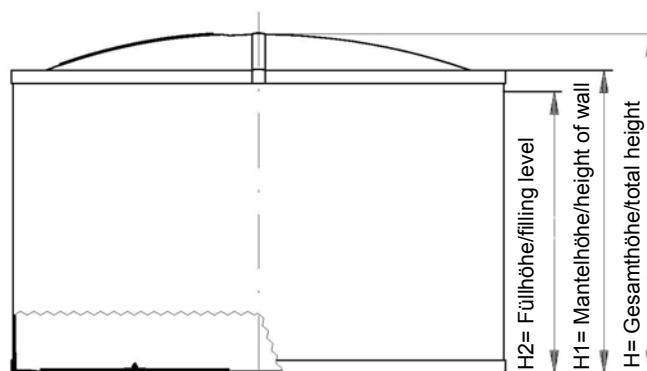
Actions to repair damaged storage tanks must be in accordance with the technical documentation or in agreement with the manufacturer.

Uwe Bender  
Head of Department

*beglaubigt:*  
Dr.-Ing. Schwuchow



Typ/type	D (mm)	H (mm)	Füllvolumen/storage capacity (L) -100 %
K10D	1030	1080 - 3330	770 - 2430
K13D	1300	1100 - 3350	1250 - 3930
K15D /DA	1500	1150 - 3400 / 2010	1680 - 5280 / 2960
K17D	1700	1180 - 3430	2170 - 6820
K19D /DA	1920	1195 - 3445 / 2085	2780 - 8740 / 4900
K22D	2200	1200 - 3450	3670 - 11530
K25D	2500	1255 - 2705	4760 - 11330
K30D	3000	1300 - 1950	6880 - 11140
K35D	3500	1400 - 1600	9400 - 11190

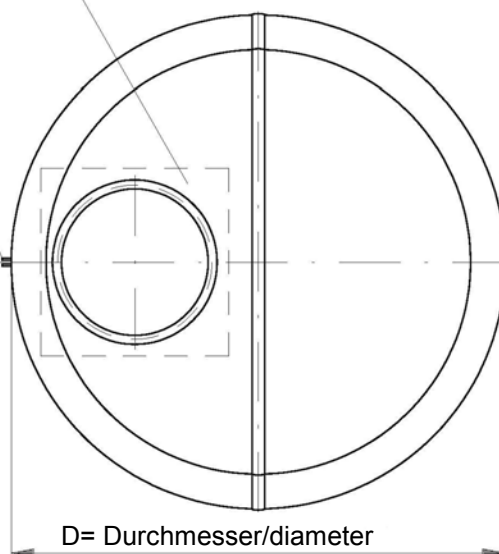


Schutzplatte GF-UP  
730x730x3  
protective plate GRP  
730x730x3

H, H1, H2 siehe Anhang 2/  
H, H1, H2 see Annex 2

Mess- und  
Saugleitungsanschluss  
Leckanzeiger

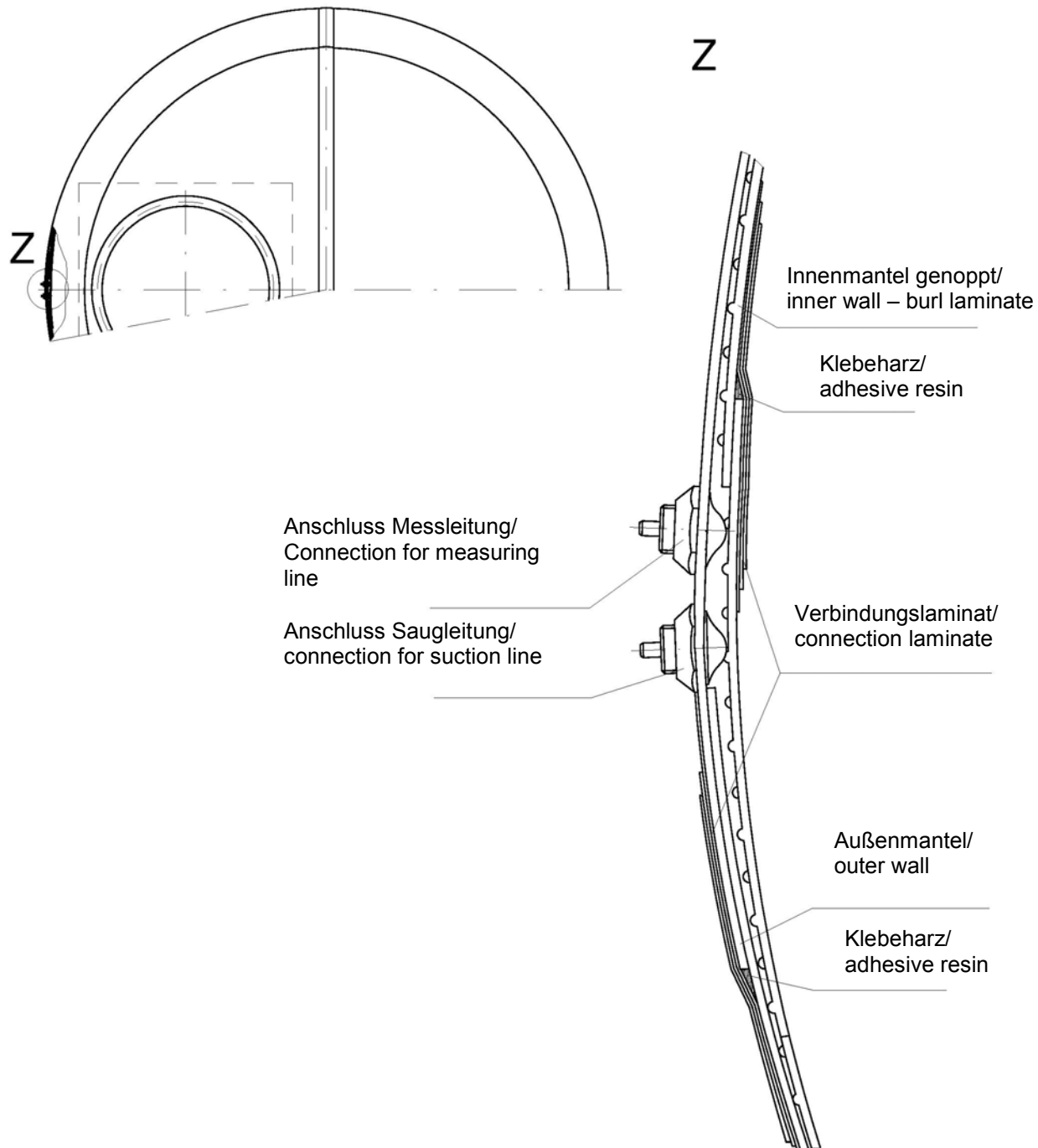
Connections for measuring  
and suction line of the  
leak-detector



Basement storage tank

Storage tank – Overview and types

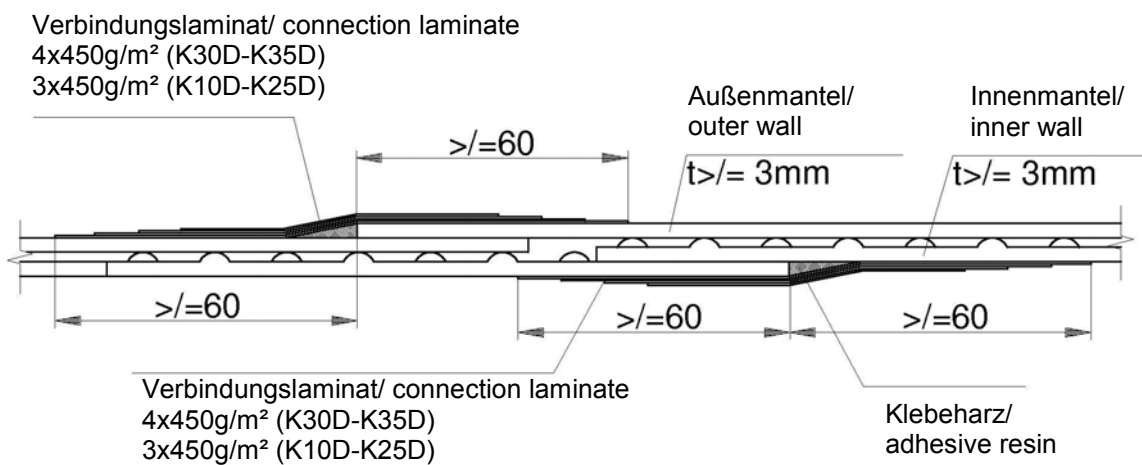
Annex 1



Basement storage tank

Storage tank – connection for the leak-detector

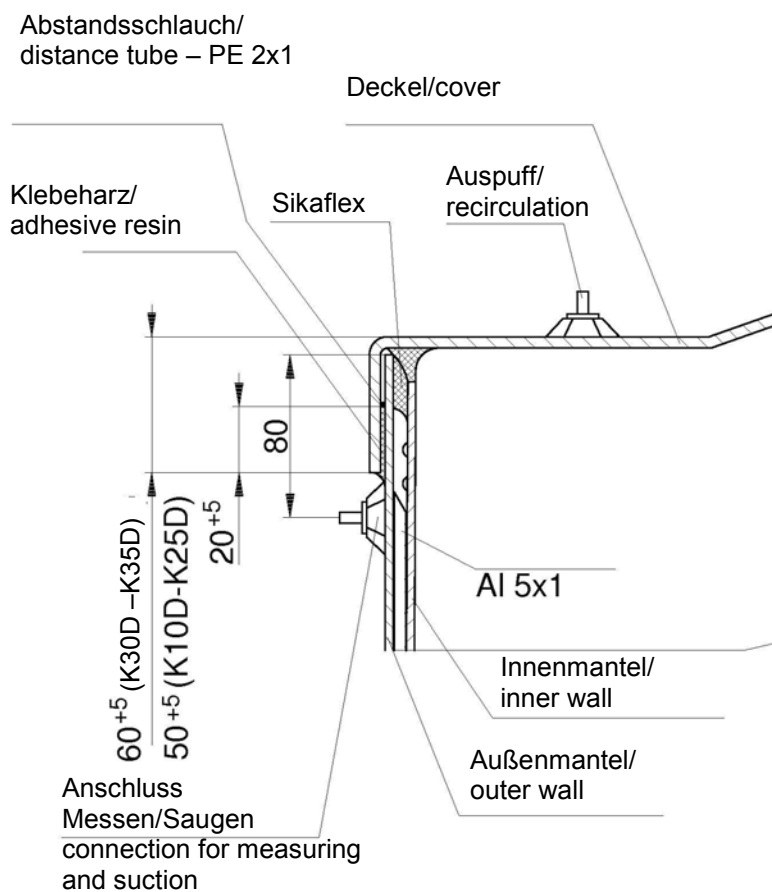
Annex 1.1



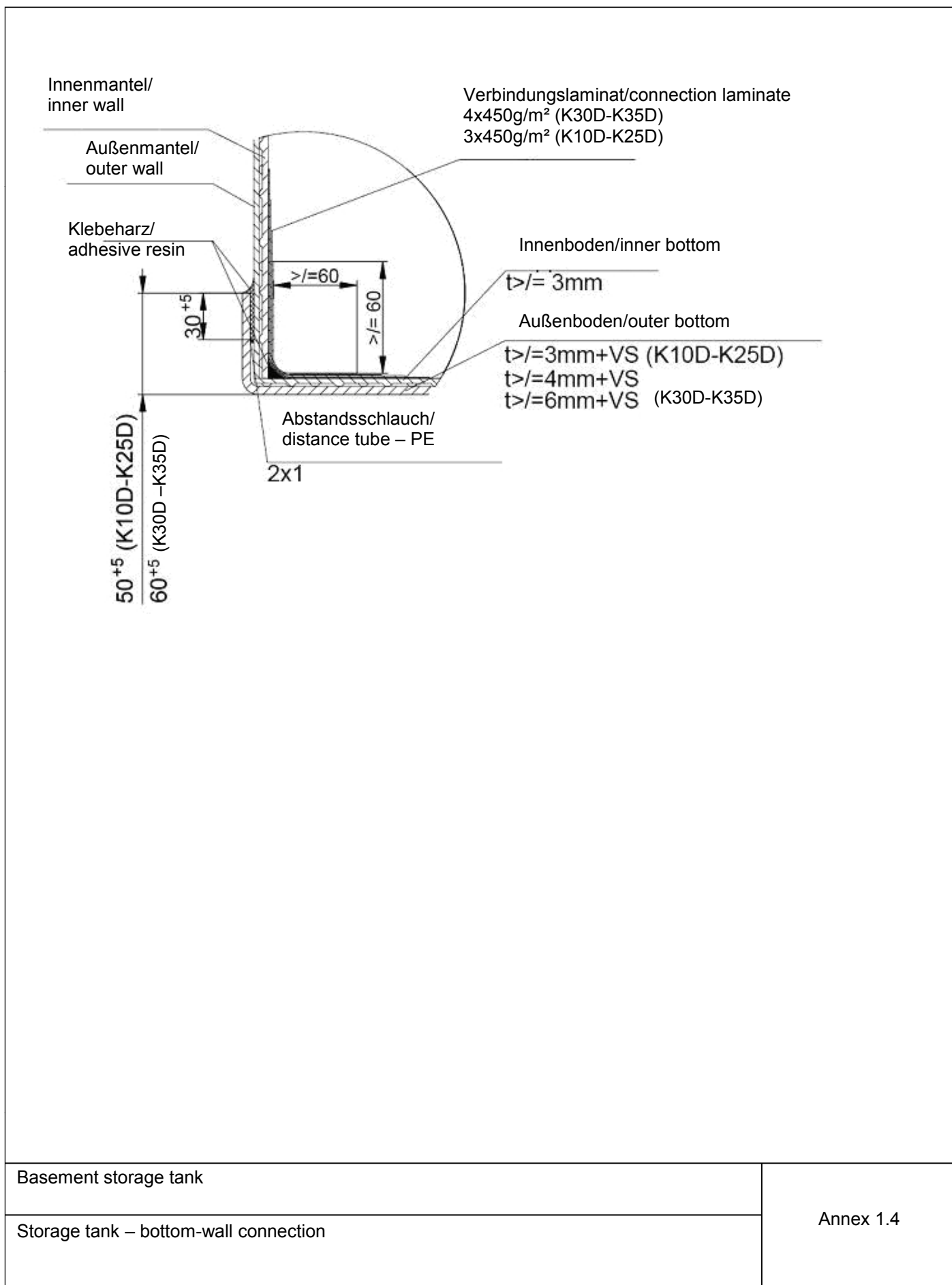
Basement storage tank

Storage tank – connection laminate

Annex 1.2



Typen/ types	Deckeldicke/ thickness of cover
K10D-K25D	3,0mm
K30D-K35D	6,0mm

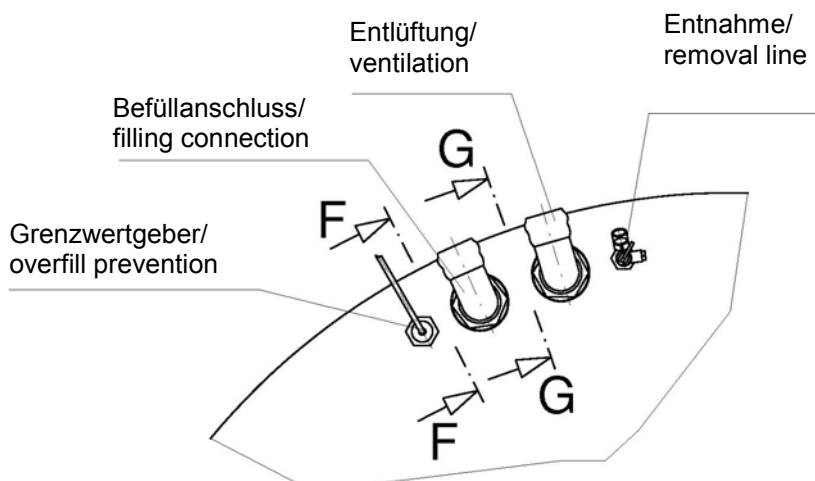


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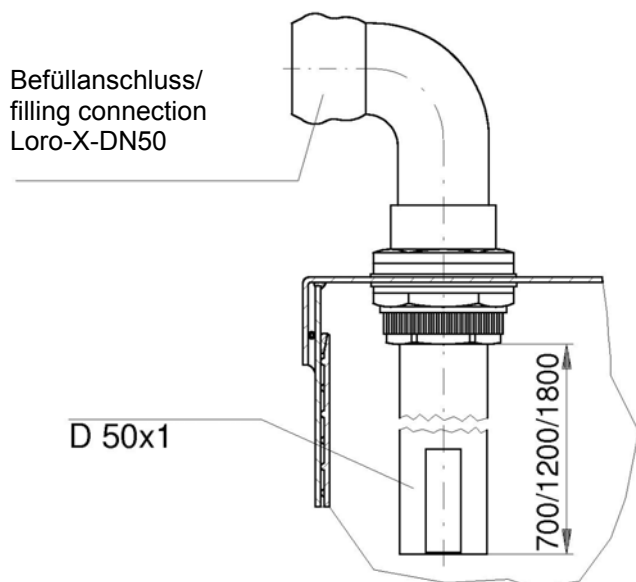
Basement storage tank

Storage tank – bottom-wall connection

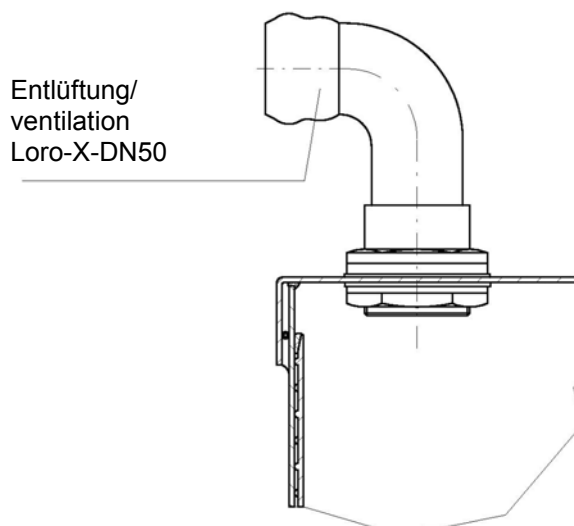
Annex 1.4



Detail F-F



Detail G-G



Basement storage tank

Storage tank - connections

Annex 1.5

Typ/type K10	K10-08 D	K10-10 D	K10-11 D	K10-13 D	K10-14 D	K10-16 D	K10-19 D	K10-22 D	K10-24D
H (mm)	1080	1280	1530	1730	1880	2230	2530	3030	3330
V (m³)	0,8	1,0	1,2	1,3	1,4	1,7	1,9	2,3	2,6
H1 (mm)	1050	1250	1500	1700	1850	2200	2500	3000	3300
H2 (mm)	998	1188	1425	1615	1758	2090	2375	2850	3135
SC (L)	770	920	1110	1250	1360	1620	1840	2210	2430

Typ/type K13	K13-14 D	K13-16 D	K13-20 D	K13-22 D	K13-24 D	K13-28 D	K13-32 D	K13-36 D	K13-39D
H (mm)	1100	1300	1550	1750	1900	2250	2550	3050	3350
V (m³)	1,3	1,6	1,9	2,1	2,3	2,8	3,1	2,8	4,1
H1 (mm)	1050	1250	1500	1700	1850	2200	2500	3000	3300
H2 (mm)	998	1188	1425	1615	1758	2090	2375	2850	3135
SC (L)	1250	1490	1790	2030	2210	2620	2980	3580	3930

Typ/type K15	K15-18 D/ DA	K15-21 D/ DA	K15-25 D/ DA	K15-28 D/ DA	K15-31 D/ DA	K15-36 D	K15-42 D	K15-48 D	K15-53D
H (mm)	1150/1200	1350/1400	1600/1660	1800/1860	1950/2010	2300	2600	3100	3400
V (m³)	1,8	2,1	2,5	2,9	3,1	3,7	4,2	5,1	5,6
H1 (mm)	1050	1250	1500	1700	1850	2200	2500	3000	3300
H2 (mm)	998	1188	1425	1615	1758	2090	2375	2850	3135
SC (L)	1680	2000	2400	2720	2960	3520	4000	4800	5280

Typ/type K17	K17-22 D	K17-27 D	K17-33 D	K17-37 D	K17-40 D	K17-48 D	K17-55 D	K17-62 D	K17-68D
H (mm)	1180	1380	1630	1830	1980	2330	2630	3130	3430
V (m³)	2,3	2,7	3,3	3,7	4,0	4,8	5,4	6,5	7,2
H1 (mm)	1050	1250	1500	1700	1850	2200	2500	3000	3300
H2 (mm)	998	1188	1425	1615	1758	2090	2375	2850	3135
SC (L)	2170	2580	3100	3510	3820	4550	5170	6200	6820

H: Gesamthöhe/total height

V: Rauminhalt/total volume

H1: Höhe Zylindermantel/height of wall

H2: Füllhöhe/filling height

SC: Füllvolumen – ca. 95 % von V/storage capacity – approx. 95 % of V

Basement storage tank

Types and storage capacities

Annex 2  
Page 1

Typ/type K19	K19-30 D/ DA	K19-34 D/ DA	K19-40 D/ DA	K19-45 D/ DA	K19-50 D/ DA	K19-58 D	K19-67 D	K19-79 D	K19-87D
H (mm)	1195/1265	1395/1465	1645/1725	1845/1935	1995/2085	2345	2645	3145	3445
V (m³)	2,9	3,5	4,2	4,7	5,2	6,1	7,0	8,4	9,2
H1 (mm)	1050	1250	1500	1700	1850	2200	2500	3000	3300
H2 (mm)	998	1188	1425	1615	1758	2090	2375	2850	3135
SC (L)	2780	3310	3970	4500	4900	5830	6620	7950	8740

Typ/type K22	K22-37 D	K22-43 D	K22-52 D	K22-59 D	K22-64 D	K22-77 D	K22-87 D	K22-105D	K22-115D
H (mm)	1200	1400	1650	1850	2000	2350	2650	3150	3450
V (m³)	3,9	4,6	5,5	6,3	6,8	8,1	9,2	11,0	12,1
H1 (mm)	1050	1250	1500	1700	1850	2200	2500	3000	3300
H2 (mm)	998	1188	1425	1615	1758	2090	2375	2850	3135
SC (L)	3670	4370	5240	5940	6460	7690	8740	10480	11530

Typ/type K25	K25-50 D	K25-58 D	K25-70 D	K25-79 D	K25-86 D	K25-100D	K25-115D
H (mm)	1255	1455	1705	1905	2055	2405	2705
V (m³)	5,0	6,0	7,2	8,1	8,8	10,5	11,9
H1 (mm)	1050	1250	1500	1700	1850	2200	2500
H2 (mm)	998	1188	1425	1615	1758	2090	2375
SC (L)	4760	5660	6800	7700	8380	9970	11330

Typ/type K30	K30-69 D	K30-82 D	K30-98D	K30-112D
H (mm)	1300	1500	1750	1950
V (m³)	7,2	8,6	10,3	11,7
H1 (mm)	1050	1250	1500	1700
H2 (mm)	998	1188	1425	1615
SC (L)	6880	8190	9830	11140

Typ/type K35	K35-94 D	K35-112D
H (mm)	1400	1600
V (m³)	9,9	11,8
H1 (mm)	1050	1250
H2 (mm)	998	1188
SC (L)	9400	11190

H: Gesamthöhe/total height

V: Rauminhalt/total volume

H1: Höhe Zylindermantel/height of wall

H2: Füllhöhe/filling height

SC: Füllvolumen – ca. 95 % von V/storage capacity – approx. 95 % of V

Basement storage tank

Types and storage capacities

Annex 2  
Page 2



## 1 Laminate setup(structure)

M1 = CSM 450 g/m<sup>2</sup>  
 M2 = CSM 800 g/m<sup>2</sup>  
 F1 = Spray-up moulding with 2400 tex rovings

CSM: chopped strand mat

Component	Thickness t <sub>n</sub>	Laminate setup	Glass-weight per unit area
Inner bottom	3,0 mm	4*M1 bzw. 2*M2	ca. 1600 g/m <sup>2</sup>
Outer bottom	3,0 mm	4*M1 bzw. 2*M2 bzw. 2*F1	ca. 1600 g/m <sup>2</sup>
Inner wall	3,0 mm	4*M1 bzw. 2*M2	ca. 1600 g/m <sup>2</sup>
Outer wall	3,0 mm	4*M1 bzw. 2*M2	ca. 1600 g/m <sup>2</sup>
Cover	3,0 mm	4*M1 bzw. 2*M2 bzw. 2*F1	ca. 1600 g/m <sup>2</sup>

**Table:** Laminate setup

## 2 Raw Materials for the components

### 2.1 Resins and curing systems

There are unsaturated polyester resins of the resin groups 1B to 6 according to EN 13121-1 with associate curing systems used.

### 2.2 Reinforcement

E-textile glass mats according to ISO 2559 with 450 to 800 g / m<sup>2</sup> basis weight and textile-glas-rovings according to DIN EN 14020-1

### 2.3 Adhesive resin

A resin of the type see annex 2.1 is used as adhesive resin.

Basement storage tank

Laminate setup and materials

Annex 3