Deutsches Institut für Bautechnik

Eine vom Bund und den Ländern gemeinsam getragene Anstalt des öffentlichen Rechts

Zulassungs- und Genehmigungsstelle für Bauprodukte und Bauarten

Allgemeine bauaufsichtliche Zulassung / Allgemeine Bauartgenehmigung

Datum: 31.10.2025

Geschäftszeichen: II 24-1.65.30-8/23

Nummer:
Z-65.30-562

Geltungsdauer
vom: **31st October 2025**
bis: **17th August 2026**

Antragsteller:
Fenotec GmbH
Bahnhofsweg 2
14547 Beelitz

Gegenstand dieses Bescheides:
Leak protection lining type "fenosafe fuel", "fenosafe chemical", "fenosafe black" and "fenosafe yellow" for the storage of water-polluting liquids

The above-mentioned subject of regulation is hereby generally approved/authorised by the building authorities.
This decision includes 13 pages and two annexes.
This general technical approval/general type approval replaces the general technical approval/general type approval no. Z-65.30-562 dated 28th April 2022.
"Translation of the original German version not approved by Deutsches Institut für Bautechnik"

I GENERAL PROVISIONS

1 This decision verifies the usability or applicability of the subject matter of the regulation within the meaning of the state building regulations.

2 This decision does not replace the authorisations, approvals and certificates required by law for the implementation of building projects.

3 This notice is issued without prejudice to the rights of third parties, in particular private property rights.

4 Notwithstanding any further provisions in the "Special Provisions", copies of this notice must be made available to the user of the subject matter of the regulation. In addition, the user or user of the subject matter of the regulation must be informed that this notification must be available at the place of use or application. Copies must also be made available to the authorities involved on request.

5 This notice may only be reproduced in full. Publication of extracts requires the approval of Deutsches Institut für Bautechnik. Texts and drawings of promotional literature may not contradict this notice; translations must contain the note "Translation of the original German version not approved by Deutsches Institut für Bautechnik".

6 This notice is issued on a revocable basis. The provisions may be supplemented and amended at a later date, in particular if new technical findings make this necessary.

7 This decision refers to the information and documents provided by the applicant. Any change to this basis is not covered by this decision and must be disclosed to Deutsches Institut für Bautechnik without delay.

II SPECIAL PROVISIONS

1 Subject of regulation

(1) The subject of this notification are leak protection linings type "fenosafe fuel", type "fenosafe chemical", type "fenosafe black" and type "fenosafe yellow", each of which is used as part of a leak detection device to create a monitoring room together with a tank wall.

(2) The leak protection linings may be used in containers in accordance with paragraph (5) and, depending on the type of leak protection lining and the type of liner and intermediate layer, for the storage of the following liquids with a minimum ignition energy MIE ≥ 0.2 mJ:

1. Petrol fuels according to DIN EN [2281] with an ethanol content of max. 20 % (media group 1a according to DIN EN 14879-4, Annex C, Table C.[12]),
2. Diesel fuel according to DIN EN [5903] (media group 3a after [2]), or mixtures of diesel fuel and a total of max. 20 % fatty acid methyl ester (FAME) according to DIN EN [142144], for use as fuel for vehicles (media group 3b after [2]),
3. unused combustion engine oils, unused motor vehicle gear oils, aliphatic and aromatic hydrocarbons with a mass fraction of aromatics of max. 20% and a flash point > 55 °C (media group 3 according to [2]),
4. Used combustion engine oils and used motor vehicle gear oils with a flash point > 55 °C (media group 5b according to [2]) (origin and flash point must be verifiable by the operator),
5. Hydrocarbons with < 1% aromatics,
6. Aviation fuel 100 LL (media group 2 a) and aviation turbine fuel Jet-A1 with additives (NATO code F-34) (media group 2 c) according to [2]),
7. all alcohols and glycol ethers (media group 7 after [2]),
8. all organic esters and ketones (media group 8 including 8a and 8b (biodiesel) according to [2]),
9. organic acids (carboxylic acid, except formic acid) and their salts (in aqueous solution) (media group 12 after [2]),
10. aqueous solutions of organic surfactants (media group 16 after [2]),
11. Crude oils (media group 4 after [2]),
12. all hydrocarbons including benzene and mixtures containing benzene (media group 5 after [2]),
13. aqueous solutions of organic acids (carboxylic acids) up to 10 % and their salts (in aqueous solution) (media group 12a after [2]),
14. Mineral acids up to 20 % as well as acid hydrolysing inorganic salts in aqueous solution (pH<6), except hydrofluoric acid and oxidising acids and their salts (media group 13 according to [2]),

[1]	DIN EN 228:2025-09	Fuels - Unleaded petrol fuels - Requirements and test methods
[2]	Annex C, Table C.1 of DIN EN 14879-4:2008-01	Coatings and linings of organic materials for the protection of industrial installations against corrosion by aggressive media - Part 4: Linings for components made of metallic materials
[3]	DIN EN 590:2025-0910	Fuels - Diesel fuel - Requirements and test methods
[4]	DIN EN 14214:2019-05	Liquid petroleum products - Fatty acid methyl esters (FAME) for use in diesel engines and as heating oil - Requirements and test methods

15. Inorganic alkalis and alkaline hydrolysing inorganic salts in aqueous solution (pH>8), except ammonia solutions and oxidising solutions of salts (e.g. hypochlorite) (media group 14 after [2]),
16. aqueous solutions of inorganic non-oxidising salts with a pH value between 6 and 8 (media group 15 after [2]),
17. paraffinic diesel fuel according to EN [159405] with a FAME content < 7 %.

(3) Each leak protection lining consists of a prefabricated insert (inner casing), a floor protection plate welded to the insert, an intermediate layer and the accessories, e.g. fastening devices, connection lines, lead-through grommets and angled hose nozzles (see Appendix 1 for an example of the arrangement of the leak protection lining).

(4) The interstitial space is protected by a negative pressure leak detector with an alarm switching pressure of at least 30 mbar negative pressure (≤ -30 mbar) and a pump-out pressure, depending on the intermediate layer, of
max. 100 mbar ± 15 mbar negative pressure (≥ -100 mbar) or
max. 450 mbar ± 15 mbar negative pressure (≥ -450 mbar).
A leak in the walls of the interstitial space is detected by an increase in pressure and signalled visually and acoustically.

(5) The leak protection linings may be installed in tanks made of steel or GRP. The tanks must not be higher than 3 metres.

(6) The leak protection linings may only be installed in tanks in which diffusion of the storage liquid through the tank walls is excluded.

(7) The containers must be installed underground (at least 30 cm below ground level) or in areas that are not exposed to sunlight and in which the temperature does not exceed 40 °C.

(8) The containers must be verifiably suitable for the storage of the liquids specified in paragraph (2) and must be operated under atmospheric pressure at a maximum temperature of 30 °C.

(9) This notice provides proof of the functional safety of the controlled object within the meaning of paragraphs (1) and (2).

(10) The notice is issued without prejudice to the provisions and testing or authorisation requirements of other areas of law.

(11) This decision takes into account the requirements of water law with regard to the subject matter of the regulation. Pursuant to § 63 para. 4 nos. 2 and 3 [WHG6], the regulated object is thus deemed suitable under water law.

(12) The period of validity of this notice (see page 1) refers to the use in the sense of installation of the regulated object and not to the use in the sense of subsequent utilisation.

2 Provisions for the construction product

2.1 General information

The leak protection lining and its parts must comply with the Special Provisions and the Annex to this certificate as well as the information deposited with Deutsches Institut für Bautechnik.

[5] DIN EN 15940:2023-07 Fuels - Paraffinic diesel fuel from synthesis or hydrogenation processes - Requirements and test methods; German version EN 15940:2023

[6] Water Resources Act (Wasserhaushaltsgesetz - WHG) of 31st July 2009 (Federal Law Gazette I p. 2585), last amended by Article 2 of the Act of 12th August 2025 (Federal Law Gazette 2025 I No. 189).

2.2 Composition and properties

(1) For the production of the liner of the leak protection lining

- type "fenosafe fuel", the film type "fenosafe silver 800ext" with a total thickness of 0.9 mm must be used.

  The film type "fenosafe silver 800ext" is chemically resistant to the liquids 1. to 8. as well as 11. and 12. mentioned in section 1 (2).
  The film type "fenosafe silver 800ext" is conductive and may be used for the storage of liquids with a flash point ≤ 55 °C w [7].

- The film type "fenosafe clear 350" with a total thickness of 0.35 mm must be used for the "fenosafe chemical" type.

  The film type "fenosafe clear 350" is chemically resistant to the liquids mentioned in section 1 (2) 1., 2 (diesel with FAME), 6. (only aviation fuel 100 LL), as well as 8. to 10. and 13.
  The film type "fenosafe clear 350" is not dissipative and may only be used for the storage of liquids with a flash point < 55 °C in conjunction with dissipative intermediate layer LSV 6 in accordance with Appendix [27].

- type "fenosafe black", the film type "fenosafe black" with a total thickness of 1.0 mm must be used.

  The film type "fenosafe black" is chemically resistant to the liquids 14. to 16. mentioned in section 1 (2).
  The film type "fenosafe black" is not conductive and may only be used for the storage of liquids with a flash point > 55 °C.

- The film type "fenosafe silver 800" with a total thickness of 0.8 mm must be used with the film type "fenosafe yellow".

  The film type "fenosafe silver 800" is chemically resistant to the liquids 1., 2. (diesel with FAME) and 17. mentioned in section 1 (2).
  The film type "fenosafe silver 800" is not conductive and may only be used in conjunction with conductive intermediate layers in accordance with Appendix 2 when storing liquids with a flash point < 55 °C[7].

The interlayers made of the aforementioned films fulfil the following requirements:

- The films withstand the mechanical and thermal stresses that occur.
- The films have a permeability that does not impair the functionality of the intermediate layers in accordance with section 2.2 (3) and the leak detector.

(2) The **floor protection panel** consists of the material of the film used, type "fenosafe silver 800" with a thickness of 0.8 mm, or type "fenosafe clear 350" with a thickness of 0.7 mm, or type "fenosafe black" with a thickness of 1.0 mm.
Type "fenosafe clear 350" with a thickness of 0.7 mm, or
type "fenosafe black" with a thickness of 1.0 mm.
The floor protection panel is welded to the interlayer at the applicant's factory.

(3) Sheets of plastic fleece and fabric may be used as **an intermediate layer** in accordance with the table in Appendix 2.

(4) The leak detector must also be installed in accordance with the regulations for leak detectors.

[7] Assessment and test reports of the Physikalisch-Technische Bundesanstalt Braunschweig and Berlin "PTBEx 14-54194" from 5th December 2014, "PTB Ex 16-56154-best-korr" from 13th January 2017, "PTB Ex 24-52143" dated 19th March 2024 and "PTB Ex 24-52144" dated 19th March 2024

2.3 Manufacture and labelling

2.3.1 Manufacture

(1) The films type "fenosafe silver 800", type "fenosafe clear 350" and type "fenosafe black" as well as the nonwovens and fabrics for the intermediate layers may only be manufactured in the factories specified to the DIBt.

(2) The manufacture of the films and the production of the conductivity of the film type "fenosafe silver 800" may only take place in the applicant's factory, Fenotec GmbH in 14547 Beelitz. The film type "fenosafe silver 800" has the designation "fenosafe silver ^{800ext}" after the production of the conductivity.

(3) The joining seams of the insert must be produced in accordance with DVS guideline [2225-18][8]. The person performing the weld seam or the person responsible for performing the weld seam must have a valid certificate in accordance with DVS guideline [2212-39][9].

2.3.2 Packaging, transport, storage

Packaging, transport and storage of the construction products or components in accordance with Section 1 (3) must be carried out in such a way that the fitness for use is not impaired. Construction products or components damaged during transport and storage must be removed from further use.

2.3.3 Labelling

(1) The ready-made insert and the intermediate layer, its packaging or its delivery note must be labelled by the applicant with the conformity mark (Ü mark) in accordance with the conformity mark regulations of the federal states. The mark may only be applied if the requirements in section 2.4 are met. In addition, the prefabricated insert must be labelled with the following information.

-Name or code of the product type,

-Year of manufacture,

-Serial number.

(2) With regard to the labelling of containers fitted with a leak protection lining by the operator, see section 4.1 (1).

2.4 Confirmation of conformity

2.4.1 General information

(1) Confirmation of the conformity of the unassembled film with the provisions of the general technical approval covered by the decision must be provided for the manufacturing plant with a declaration of conformity from the manufacturer on the basis of a factory production control and a certificate of conformity from a certification body recognised for this purpose as well as regular external surveillance by a recognised surveillance body in accordance with the following provisions:

- For the issue of the certificate of conformity and the external surveillance, including the product tests to be carried out, the manufacturer of the film shall involve a certification body recognised for this purpose and a surveillance body recognised for this purpose.
- The certification body shall provide the Deutsches Institut für Bautechnik with a copy of the certificate of conformity issued by it.

[8]	DVS 2225-1:2019-10	Welding of geomembranes made of polymeric materials in earthworks and hydraulic engineering construction
[9]	DVS 2212-3:1994-10	Testing of plastic welders - Test group III - Membranes in earthworks and hydraulic engineering

(2) Confirmation of the conformity of the prefabricated liner and the intermediate layer with the provisions of the general technical approval covered by the decision must be provided for the manufacturer's plant with a declaration of conformity on the basis of a factory production control and an initial test of the products by a testing body recognised for this purpose.
The manufacturer must submit the declaration of conformity by labelling the products with the mark of conformity (Ü mark) with reference to the intended use.

2.4.2 Factory production control

(1) A factory production control system must be set up and implemented in the manufacturing plant. Factory production control is understood to mean the continuous surveillance of production to be carried out by the manufacturer to ensure that the products manufactured by him comply with the provisions of the general technical approval covered by the notification.

(2) The factory production control must include at least the measures listed below.

(3) The results of the factory production control shall be recorded and analysed. The records must contain at least the following information:

-Designations of the film and the interlayer,

-Type of inspection or test,

- Date of manufacture and testing of the unfinished film, the finished interlining and the interlayer,

-Results of the checks or tests,

-Signature of the person responsible for factory production control.

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

(5) If the test results are unsatisfactory, the applicant shall immediately take the necessary measures to rectify the defect. Foils, inserts and intermediate layers that do not meet the requirements must be handled in such a way that any confusion with matching ones is ruled out. Once the defect has been rectified, the relevant test must be repeated without delay, if technically possible and necessary to prove that the defect has been rectified.

2.4.2.1 Factory production control of the unassembled film

(1) The applicant shall verify that the acceptance test certificate 3.1 in accordance with DIN EN 1020 [410] for the film confirms that the manufacturer of the film has carried out the tests in accordance with the following table and that the requirements have been met:

	Test basis	Test basis Requirements	Frequency
General condition and appearance	visual	closed surface, free of cracks, bubbles and pores, no damage	at least 1 x per batch
Thickness	DIN EN 1849-2[11]	Nominal thickness: 0.8 mm "fenosafe silver 800" Nominal thickness: 0.35 mm "fenosafe clear 350" Nominal thickness: 1.0 mm "fenosafe black" Average deviation ± 10% Deviation from individual values ≤ 12%	min. 1 x per batch
Density	DIN EN ISO 1183-1[12]	1.26 g/cm3 ± 10% "fenosafe silver 800" 0.972 g/cm3 ± 10% "fenosafe clear 350" 0.897 g/cm3 ± 10% "fenosafe black"	1 x per batch
Tensile strength	DIN EN ISO 527-3[13] Test speed: 200 mm/min ± 10% Samples: Type 2	≥ 15 MPa	min. 1 x per batch
Elongation at break	DIN EN ISO 527-3 Test speed: 200 mm/min ± 10% Samples: Type 2	≥ 200%	at least 1 x per batch
Dimensional change after storage at 80°C	DIN EN 1107-2[14]	≤ 10%	min. 1 x per batch
Seaming in the cold	DIN EN 495-5[15]	no cracks at -20 °C	annually
Labelling	visual	Labelling of the respective film type on the inside of the roll core	on each roll

10 DIN EN 10204:2005-01 Metallic products, types of inspection certificates

11 DIN EN 1849-2:2019-09 Flexible sheets for waterproofing - Determination of thickness and mass per unit area Part 2: Plastic and elastomeric sheets for roof waterproofing

12 DIN EN ISO 1183-1:2025-09 Plastics - Methods for the determination of the density of non-foamed plastics plastics - Part 1: Immersion method, liquid pycnometer method and titration method

13 DIN EN ISO 527-3:2019-02 Plastics - Determination of tensile properties - Part 3: Test conditions for films and sheets

14 DIN EN 1107-2:2001-04 Flexible sheets for waterproofing - Determination of dimensional stability - Part 2: Plastic and elastomeric sheets for roof waterproofing

15 DIN EN 495-5:2013-08 Flexible sheets for waterproofing - Determination of behaviour at low temperatures temperatures - Part 5: Plastic and elastomeric sheets for roof waterproofing

(2) At the applicant's factory, the surface resistance of each prefabricated "fenosafe silver 800ext" film insert must be tested at eight defined measuring points in accordance with DIN EN IEC 62631-3-216 with the corresponding measuring voltage. The resistance must be be < 10^9 Ω.

2.4.2.2 Factory production control of the assembled insert

(1) The routine test of the prefabricated insert must include at least the following measures

-Inspection for dimensional accuracy,

-Check for leaks,

- Testing of all seams in accordance with DVS guideline 2225-217,

(2) For each type of film used and for each welding process applied, the behaviour of the joint seam in the shear test and the joining factor must be tested four times a year on parallel samples in accordance with the following conditions:

Test according to DIN EN ISO 527-318, test speed: at least 100 mm/min, samples: Type 2

The test specimens are taken from two web sections joined together parallel to the longitudinal direction in such a way that the joint seam is positioned in the centre of the test length and perpendicular to the tensile direction. The ratio of the tensile strength of the joined to the unjoined material gives the joining or welding factor. The test conditions must be the same for all samples to be compared.

The following requirements must be met:

-Fracture outside the joint seam,

- Joining factor ≥ 0.5 for the film type "fenosafe silver 800", joining factor ≥ 0.8 for the film type "fenosafe clear 350", joining factor ≥ 0.5 for the film type "fenosafe black".

2.4.2.3 Factory production control of the intermediate layer

(1) As part of the incoming inspection of each layer pad, the result of subsequent tests in accordance with DIN EN 13160-719 Section 5.1.4, as documented in the factory of the manufacturer of the layer pad by acceptance test certificate 3.1 in accordance with DIN EN 1020410, must be checked for completeness and documented:

16	DIN EN IEC 62631-3-2:2024-10	Dielectric and resistive properties of solid insulating materials - Part 3-2: Determination of resistive properties (DC method) - Surface resistivity and surface resistivity
17	DVS 2225-2:2019-02	Joining of geomembranes made of polymeric materials in earthworks and hydraulic engineering; Construction site tests
18	DIN EN ISO 527-3:2003-07	Plastics - Determination of tensile properties - Part 3: Test conditions for films and sheets
19	DIN EN 13160-7:2025-04	Leak detection systems - Part 7: Requirements and test/evaluation methods for interstitial spaces, leak protection linings and leak protection jackets

(2) A fleece test sample of 100 ^{cm2}, square or circular, from each batch is subjected to 1.3 x the highest possible ^{pressurex}, but at least 0.5 bar at room temperature, until the residual thickness does not change by more than 1% within 24 h from the initial thickness.
½ this pressure load must be applied to the nonwoven test samples at 40 °C every year.

These fleece test samples are then compressed further until half the residual thickness (½ x s_2) is reached or they are subjected to 2.6 x the highest possible ^{pressurex}, but at least 1.0 bar. In this condition, the air flow resistance must be measured at a flow rate of 85 l/h.

Requirement: The measured air flow resistance must be ≤ 10 mbar.

[x] The maximum possible pressure is to be determined from the max. pump-out pressure, the max. density of the liquid and the max. container height, which result for the corresponding intermediate layer from this notice.

(3) For type "LSV 6" and type "Fenotex 200", the conductivity, the surface or conductive resistance < ^{109} Ω, must be tested in accordance with DIN EN IEC 62631 [20].

2.4.3 External monitoring of the unassembled film

(1) The tests specified in Section 2.4.2.1 shall be carried out regularly, at least once a year, by a recognised inspection body for the unassembled film. The samples shall be provided by the applicant.

(2) An initial test must be carried out as part of external monitoring. The approval tests for this general technical approval / general type approval can be counted as initial testing.

(3) The results of the certification and external surveillance must be kept for at least five years. They must be submitted by the certification body or the surveillance body to Deutsches Institut für Bautechnik and the competent supreme building supervisory authority on request.

2.4.4 Initial testing of the prefabricated insert and the intermediate layer by a recognised testing body

As part of the initial inspection of the prefabricated insert and the intermediate layer, tests must be carried out that correspond to the factory production control. If the evidence on which the general technical approval / general type approval is based has been provided on samples from current production, these tests replace the initial test.

3 Provisions for planning and execution

3.1 Planning

(1) The leak protection lining may only be installed if the access opening (manhole) of the tank has a diameter of at least 500 mm.

(2) When installing a leak protection lining in containers made of GRP, it must be ensured that no more styrene escapes from the container material.

(3) After installation of the leak protection lining, the setting dimension (dimension x) for the limit value transmitter/overfill protection of the respective tank must be determined by the installing company or by an expert in accordance with water law in accordance with the reduced filling volume and the limit value transmitter/overfill protection must be set accordingly. The changed setting dimension must be documented in the tank labelling or filed with the tank documentation.

[20] Assessment and test reports of the Physikalisch-Technische Bundesanstalt Braunschweig and Berlin:
PTB Ex 24-52143 dated 19th March 2024 in connection with the test report PÜZ-8122555391-2 Rev.02 dated 29th July 2025 of TÜV Nord and PTB Ex 24-52144 dated 19th March 2024 in connection of the test report PÜZ-8122555391-4 dated 25th July 2025 of TÜV Nord.

3.2 Execution

(1) The leak protection lining must be installed and commissioned in accordance with the tested installation instructions[21].
Only companies with knowledge of fire and explosion protection may be commissioned with the installation, maintenance, repair and cleaning of the leak protection lining if these activities are carried out on tanks for liquids with a flash point ≤ 55 °C.

(2) The so-called unmanned installation of the leak protection lining (without access to the tank) may only be carried out on cylindrical tanks and only by specialised companies that have been instructed accordingly by Fenotec GmbH. The camera inspection of the tank prior to unmanned installation may only be carried out by a DIBt-certified testing centre[22], see also section 2.2.2 of the installation instructions[21].

(3) The conductive coating must be connected to earth in a suitable manner, e.g. at the dome shaft or the potential equalisation rail of the installation.

(4) An electrically conductive connection must be provided for potential equalisation between liquid and earth.

(5) The suction line must be gas and liquid-tight and routed between the intermediate layer and the tank wall from the dome to the tank base and then along the tank base to the end of the tank in the case of cylindrical tanks or diagonally on the tank base in the case of rectangular tanks. A perforated hose (equalisation line) is connected to the respective suction line using a plastic plug-in connection.

(6) Edges and reinforcements or reinforcing rings in the containers must be padded separately with plastic fleece, see section 2.2 (3).

(7) The intermediate layers are to be used in accordance with section 2.2 (3).

(8) If a container that is already in operation is to be fitted with the leak protection lining, it must fulfil the following requirements:

- -The condition of the inner tank wall must be sufficient at the time of refurbishment,
- -Corrosion damage must have been repaired,
- -in the case of cylindrical tanks, deviations from roundness must be permissible.

(9) The installing company must submit a declaration of conformity of the design (installed leak protection lining) with this notice. This is based on the requirements in section 4.2 of this notice.

4 Provisions for use, maintenance, servicing and inspections

4.1 Provisions for use

(1) The operator must affix a sign to the tank with the inscription

"Attention! Storage container is equipped with inner liner and vacuum leak detector. Filling may only take place when the system is in proper operation."

must be affixed.

(2) When storing liquids with a flash point ≤ 55°C, the containers fitted with the leak protection lining must not be repeatedly filled and emptied quickly. The containers must not be operated with agitators.

21 Assembly instructions tested by TÜV NORD Systems GmbH & Co KG, version 2025, for the installation of the leak protection linings type "fenosafe fuel", "fenosafe chemical", fenosafe "yellow" and fenosafe "black"

22 Information available from the DIBt

(3) The user of the leak protection lining must be provided with the following documents:

-Copy of this certificate,

-Declaration of conformity in accordance with section 3.2 (9) (e.g. installation and test certificate),

-Installation instructions,

-Technical description of the leak detector.

(4) It is not permitted to mix the bearing fluids listed in section 1 (2) with each other or with other media.

(5) Alternate filling of the storage liquids listed in section 1 (2) with liquid 17. and with liquid 5. is not permitted.

4.2 Provisions for the commissioning tests

(1) The following checks and tests must be carried out by the installing company in accordance with section 3.2 (1) and (2):

-Check the identity of the construction products intended for installation,

- Checking the correct installation of the inserts and their labelling in accordance with section 2.3.3,

-Checking the tightness of the installed leak protection lining:

The interstitial space is first evacuated to 600 mbar negative pressure and then ventilated to 300 mbar negative pressure. The maintenance of the negative pressure of 300 mbar is then tested in a long-term test (up to a maximum of 7 days, depending on the volume of the interstitial space, but at least 30 minutes) by connecting a suitable measuring device. The measuring device is deemed suitable if pressure changes of ≤ 1 mbar can be read.

The test is deemed to have been passed if the following condition is met

$$0{,}1 \geq \frac{(p_{(B)} - p_{(E)}) \cdot V_1}{t} \quad \text{in mbar} \cdot \text{l} \cdot \text{s}^{-1}$$

Whereby

p_B the pressure at the start of the test, in mbar p_E the pressure at the end of the test, in mbar

V_1 the volume of the interstitial space, in litres t the test time, in seconds

The temperature should not deviate by more than 1 K at the start and end of the test, otherwise the temperature difference must be taken into account in the test result.

The test is also deemed to have been passed if the conditions in the following table are met:

Container volume [litres]	Test time [min]	$p_B - p_{(E)}$ [mbar]
≤ 1000	≥ 30	≤ 10
≤ 5000	≥ 30	≤ 3
≤ 10.000	≥ 60	≤ 4
≤ 16.000	≥ 60	≤ 3
≤ 30.000	≥ 90	≤ 3
≤ 60.000	≥ 150	≤ 3
≤ 80.000	≥ 180	≤ 3
≤ 100.000	≥ 240	≤ 3
≤ 200.000	≥ 300	≤ 3

- The electrically conductive connection of the leak protection lining and all installations for the required potential equalisation between liquid and earth must be checked. The explosion protection measures are not covered by this certificate.

(2) The results of the checks and tests must be recorded. The records must contain at least the following information:

-Designation of the leak protection lining,

-Date and result of the inspection,

-Signature of the person responsible for the inspection.

(3) The records must be kept in the operator's files. They must be submitted to the Deutsches Institut für Bautechnik, the competent supreme building supervisory authority and the expert under water law upon request.

(4) If the test result is unsatisfactory, the installing specialised company must immediately take the necessary measures to rectify the defect. Inlays that do not meet the requirements must be handled in such a way that confusion with matching ones is ruled out. Once the defect has been rectified, the existing test must be repeated immediately, if technically possible and necessary to prove that the defect has been rectified.

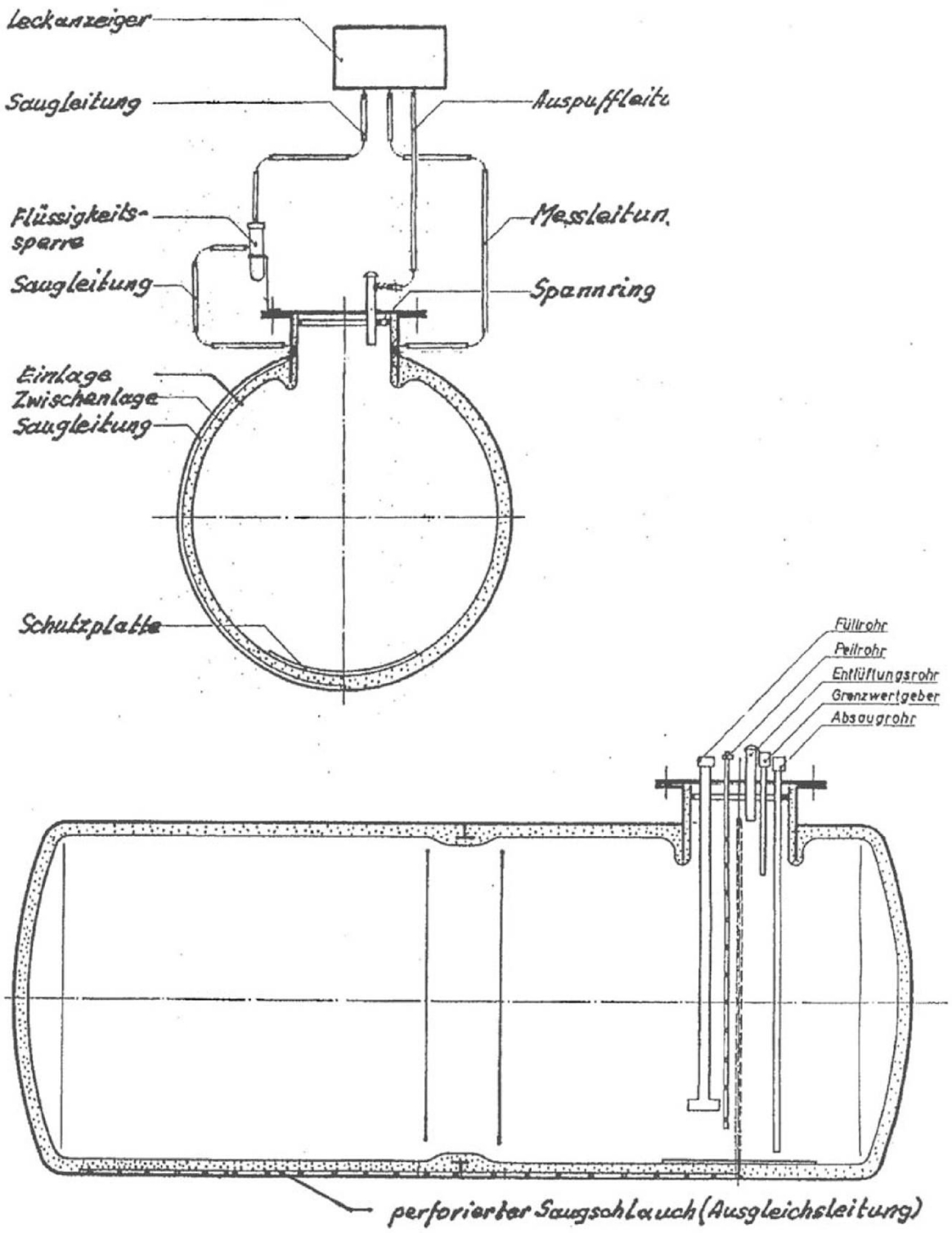
4.3 Provisions for periodic inspections

(1) The leak protection lining must be included in the inspections of the tank.

(2) Periodic inspections in accordance with other legal areas, also with regard to explosion protection, remain unaffected.

Holger Eggert
Head of Division

Certified
Hill



Leak protection lining type "fenosafe fuel", "fenosafe chemical", "fenosafe black" and "fenosafe yellow" for the storage of water-polluting liquids

Principle sketch

Appendix 1

Interlayer	Fleece/fabric Type Weight per unit area Thickness	Liquids *)	Pump-out pressure of the leak detector	Container height**)	Double-layer installation	Single-layer installation
LSV 6	1000 g/m²± 5 % approx. 9 mm, dissipativ e	1. to 8.	Max. negative pressure 100 mbar ± 15 mbar (≥ -100 mbar) (low pressure leak detector)	up to 3.0 m	--	Floor and tank wall
Fenotex	350 g/m² ±10 % (also up to 450 g/m²) 4 to 5 mm non-dissipative	1. to 14, 16. and 17.	Max. negative pressure 450 mbar ± 15 mbar (≥ -450 mbar) (high pressure leak detector)	up to 3.0 m	Bottom and complete tank wall ***)	-
			max. negative pressure 100 mbar ± 15 mbar (≥ -100 mbar) (low pressure leak detector)	2.0 m to 3,0 m	at the bottom and from there on the container wall 1 m ***)	on the container wall over 1 m
				< 2,0 m	on the floor and from there on the container wall 0.5 m (***))	on the container wall over 0.5 m
Fenotex plus	600 g/m² ±10 % 6 to 7 mm, non-conductive	1. and 2, 6. only aviation fuel 100 LL and 7. to 10.	max. negative pressure 100 mbar ± 15 mbar (≥ -100 mbar) (low pressure leak detector)	up to 3.0 m	-	Floor and tank wall
Fenotex 150	150 to 160 g/m² 1.0 to 1.2 mm, non-conductive	15.	Max. negative pressure 100 mbar ± 15 mbar (≥ -100 mbar) (low pressure leak detector)	up to 3 m	-	Floor and tank wall
Fenotex 150 + Fenotex 200 (intermediate layer consists of 2 layers - fabric + fleece)	"Fenotex 150", 150 to 160 g/m² 1.0 to 1.2 mm, non-conductive + "Fenotex 200" 200 g/m² 5 mm (+/- 1 mm), dissipative	1. and 2.	max. negative pressure 100 mbar ± 15 mbar (≥ -100 mbar) (low pressure leak detector)	up to 3 m	-	Floor and tank wall (double-layered)
Fenotex + Fenotex 150 (intermediate layer consists of 2 layers - fleece + fabric)	"Fenotex", 350 g/m² ±10 % (also up to 450 g/m²) (also up to 450 g/m²), non-dissipative + "Fenotex 150", 150 to 160 g/m² 1.0 to 1.2 mm, non-conductive	1., 2. and 8.	Max. negative pressure 100 mbar ± 15 mbar (≥ -100 mbar) (low pressure leak detector)	up to 3 m	-	Bottom and tank wall (double-layered)

*)according to section 1 (2) of the Special Conditions

**)depending on the type of leak protection lining according to section 2.2 of the Special Conditions

***)Fenotex 150 can be used as an alternative second layer when storing liquids 1., 2. and 8. The fabric is sewn to the Fenotex at the factory.

Leak protection lining type "fenosafe fuel", "fenosafe chemical", "fenosafe black" and "fenosafe yellow" for the storage of water-polluting liquids

Appendix 2

Use of plastic nonwovens and fabrics as intermediate layers