



European Technical Approval ETA-13/0023

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung
Trade name

Poly 25, 35, 51, 61, 81, 101, 131, 151

Zulassungsinhaber
Holder of approval

Haase GFK-Technik GmbH
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DEUTSCHLAND

Zulassungsgegenstand
und Verwendungszweck
*Generic type and use
of construction product*

Mehrschichtiger, kugelförmiger unterirdischer Tank
Spherical, multi-layer walled underground storage tank

Geltungsdauer:
Validity: vom
from
bis
to

4 February 2013
4 February 2018

Herstellwerk
Manufacturing plant

Diese Zulassung umfasst
This Approval contains

20 Seiten einschließlich 2 Anhänge mit 12 Seiten
20 pages including 2 annexes with 12 sheets

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 products¹, modified by Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - *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 1998⁴, as amended by Article 2 of the law of 8 November 2011⁵;*
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁶.
- 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.

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 2011*, p. 2178
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 the storage tanks and intended use

1.1 Definition of the storage tanks

The underground storage tanks with the following type designations

- Poly 25
- Poly 35
- Poly 51
- Poly 61
- Poly 81
- Poly 101
- Poly 131
- Poly 151

are spherical shaped, multi-layer walled tanks made of two glass-reinforced unsaturated polyester resin walls and permeable polymer concrete in the interstice. An illustration of the product and intended use is given in Annex 1. The maximum storage capacity is at least 2,5 m³ (Poly 25) and 15 m³ (Poly 151) at most.

The space between the two shells of the wall (see Annex 1.3) is leakage observed by class 1 leakage detector (vakuum method) according to EN 13160-1. In the event of a leak, an audible and visual alarm is activated. The dimensions and filling capacity of the different types of storage tanks are shown in Annex 1.1 and 1.2. The tanks are prefabricated.

The tanks consist of the following parts:

- Double-wall tank made of GRP (inner- and outer wall)
- Polymer concrete in the interstice
- Dome pit with manhole and connections for filling, extraction, overfill prevention and leak detection

The tanks are manufactured in spray-up- and vibrated mineral casting method (polymer concrete). Here, unsaturated polyester resins (UP resins) of the Group 1B to 6 according to EN 13121-1, fibre rovings with 2400 tex in accordance with EN 14020 and polymer concrete 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 ER 1, ER 2, ER 3 and ER 4 of Council Directive 89/106 EEC shall be fulfilled.

The storage tanks may only be installed fully underground. The ground water level can rise up to the ground surface. At a certain groundwater level, concrete, as seen in Annex 1.9, must be installed on the storage tanks, to prevent buoyancy uplift.

The built-in tank with a dome cover according to EN 124 (class D) according to Annex 1.10 can take the weight of a truck with a maximum axle weight of 130 kN.

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.

As part of this European technical approval, the effects of earthquakes are not considered. Whether the storage tanks can be installed within earthquake zones, must be determined by the National Authorities depending on the local hazard.

The storage tanks may be used for storage of the above-mentioned storage liquids at atmospheric pressure. The maximum operating temperature is 30 °C.

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 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 raw materials are shown in Annex 2.

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

	Characteristics	Verification methods	Value
1	Wall thickness of shell laminate	-	≥ 3,0 mm (inner- and outer wall)
2	Wall thickness of polymer concrete (interstice layer)	-	≥ 30,0 mm
3	Density of laminat	-	wall laminat ≥ 1,35 g/cm ³ polymer concrete ≤ 2 g/cm ³
4	Textile glass portion of the mass (GRP layer)	EN ISO 1172	≥ 25 % ≤ 40 %
5	Textile glass mass per unit area (GRP layer)	EN ISO 1172	≥ 1250 g/m ²
6	Laminate setup	-	2400 tex rovings according EN 14020
7	Barcol hardness laminate	EN 59	≥ 30
8	Resistance to pressure, normal force of polymer concrete	EN ISO 604	≥ 5 N/mm ²
9	long-term reduction factor of GRP shells	DIN EN ISO 14125 or EN 13121-3	≤ 2,0
10	Resin content of the polymer concrete		4 up to 10 %

Table 1: General characteristics and verification methods

2.1.2 Structural stability

The storage tanks are stable for the boundary conditions mentioned in section 1. This was verified by a load test. The permissible limit strains are kept under the given loads.

2.1.3 Reaction to fire of the components

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

2.1.4 Enviromental requirements and characteristics

The leak-tightness and strength of the interstitial space were proved with at least 500 mbar negative pressures. 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.

2.1.5 Safety in use

The storage tanks are equipped with connections for filling, extraction, venting, overflow prevention and the leak detector.

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

2.2 Release of dangerous substances

The manufacturer of the tanks has submitted a written declaration stating that the product contains no dangerous substances according to European and national regulations. When these are relevant in the Member States of destination the substances must be listed.

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 of attestation of conformity laid down in Decision 1999/472/EC as amended by 2001/596/EC of the European Commission⁷ for piping kits pipes, tanks, leakage alarm systems and overflow prevention devices etc.

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".

⁷

Official Journal of the European Communities L 184 of 17.07.99 and L 209 of 02.08.01

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.⁸

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.

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:
 - o type designation
 - o date of manufacture of the tank parts (month and year)
 - 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"
 - o note " Underground use only"

⁸ 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.

- o admissible service temperature 30 °C
- o maximum filling temperature 40 °C
- o maximum traffic load authorized
- o note “for pressure-free operation only”

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

4.1 Manufacturing

The storage tanks are made by spray-up and vibrated mineral casting 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 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 inside the excavation pit. The filling of the excavation must be carried out in layers with filling material with a maximum grain size of 40 mm. The structural information contained in Annexes 1.8 to 1.10 must be considered. 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 97 % 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. For the prevention of hazards to employed persons and third parties when installed in the excavation pit the relevant regulations for the prevention of accidents of the Member States shall be considered.

5 Indications to the manufacturer

5.1 Packaging and transport

The components shall be packed in an appropriate way. The packaging may only be removed on installation site. The storage tanks can be transported without packaging.

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. Shock loads during loading and unloading are prohibited.

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 filling must be performed according to the manufacturer's documentation.

5.2.2 Inspection and alarm

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.

Regular appraisals for other areas of law are not affected.

5.2.3 Cleaning

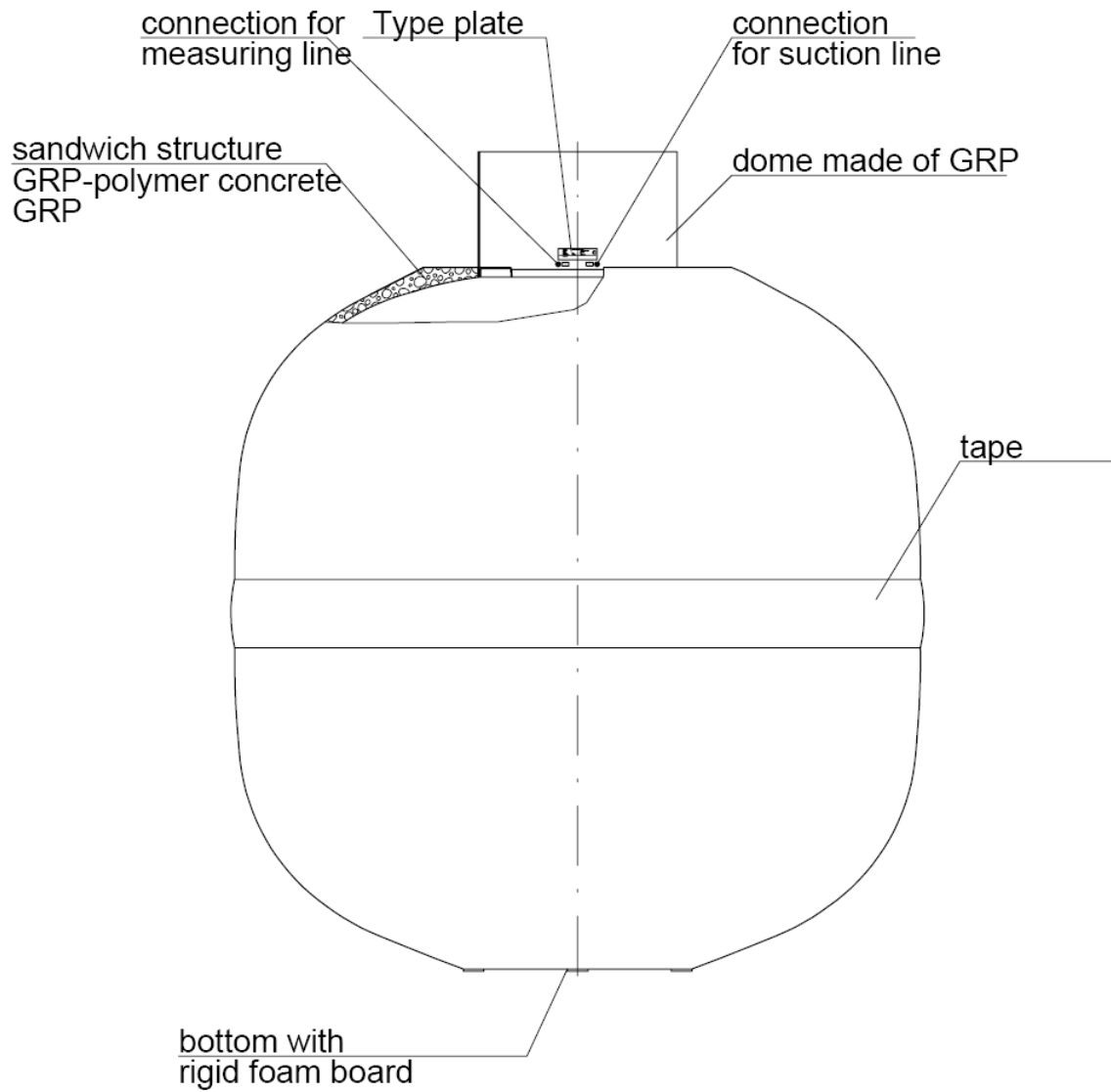
The cleaning must be performed according to the manufacturer's documentation.

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

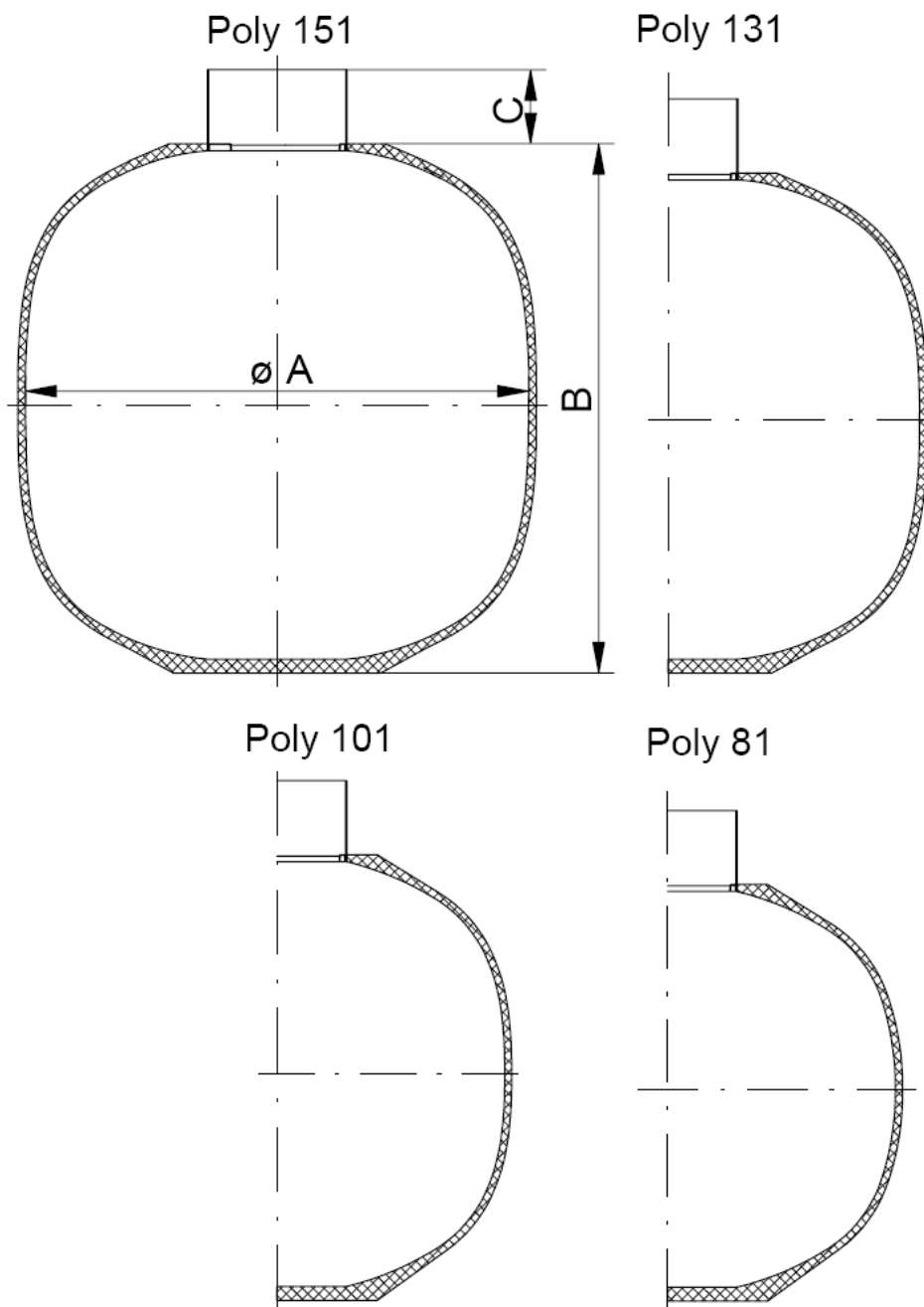


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Spherical, multi-layer walled underground storage tank

General tank construction

Annex 1



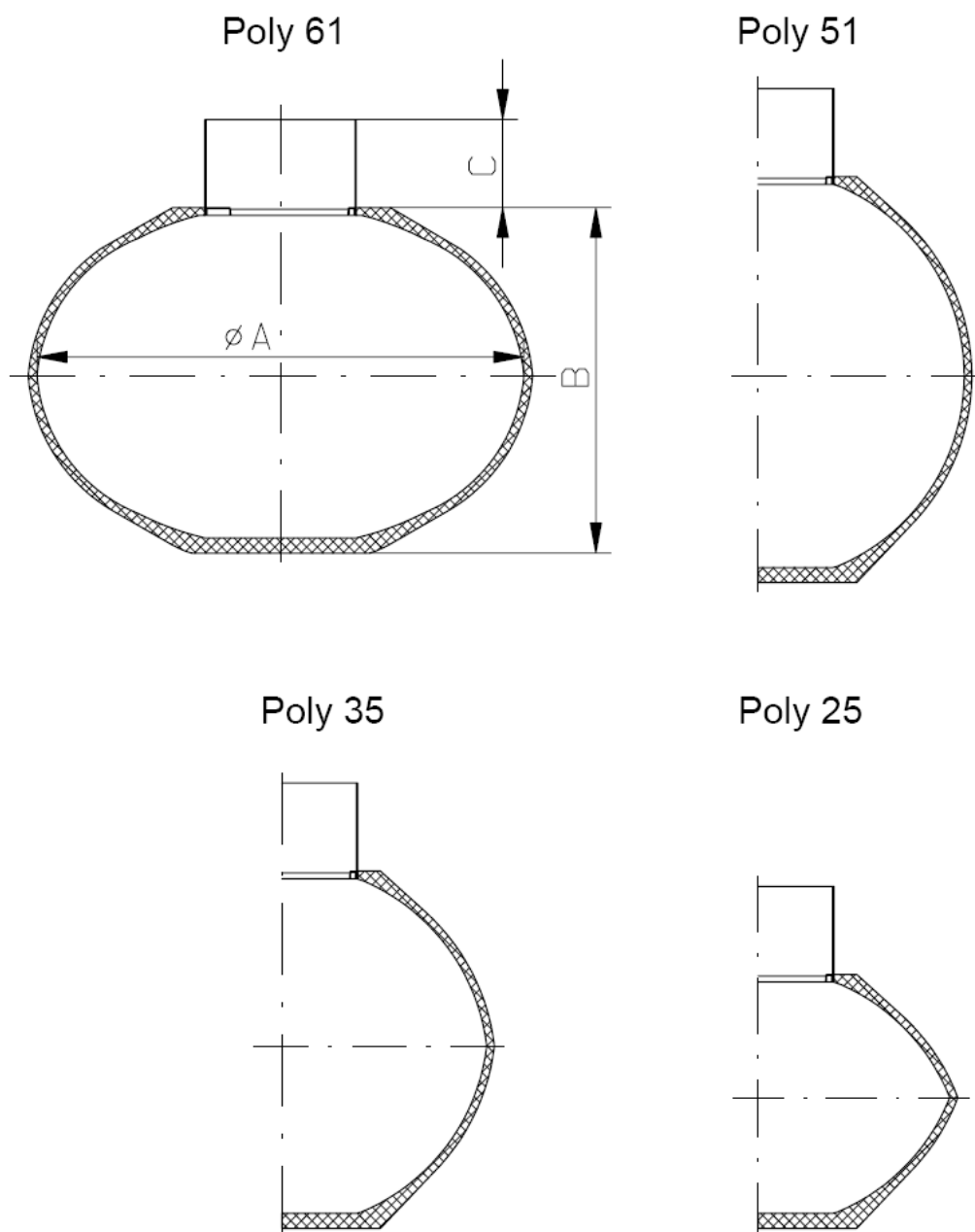
Poly	volume	A (mm)	B (mm)	C (mm)
81	8.000	2.650	2.250	450
101	10.000	2.680	2.600	450
131	13.000	2.900	2.750	450/200*
151	15.000	2.910	3.070	450/200*
tolerance range		A ±15mm	B ±30mm	C ±30mm

* in case of transport with height restriction

Spherical, multi-layer walled underground storage tank

Poly 81-151

Annex 1.1



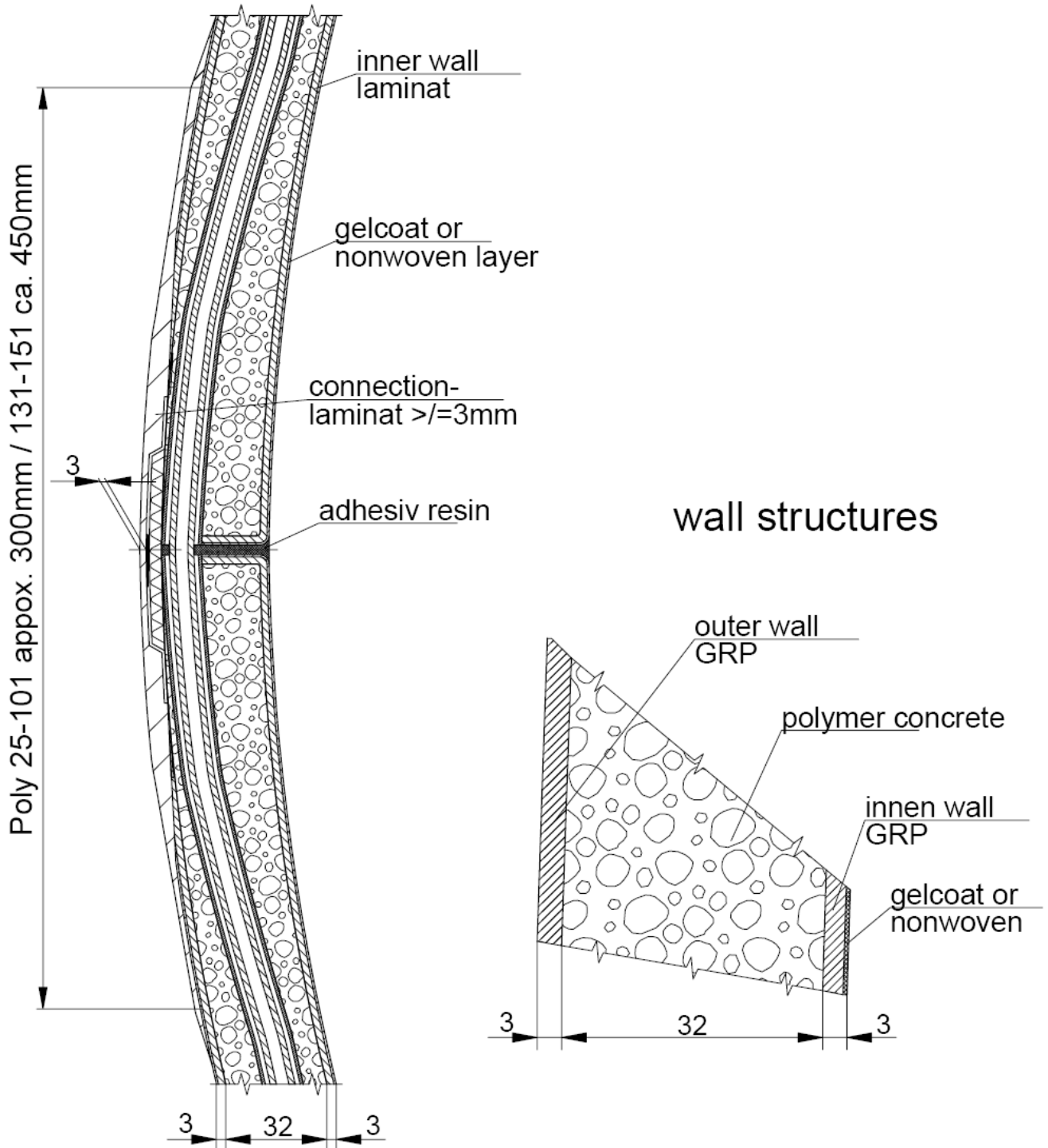
Poly	volume	A (mm)	B (mm)	C (mm)
25	2.500	2.045	1.430	450
35	3.500	2.140	1.700	450
51	5.000	2.210	2.200	450
61	6.000	2.600	1.850	450
tolerance range		A ± 15 mm	B ± 30 mm	C ± 30 mm

Spherical, multi-layer walled underground storage tank

Poly 25-61

Annex 1.2

Half-cup adhesive bonding



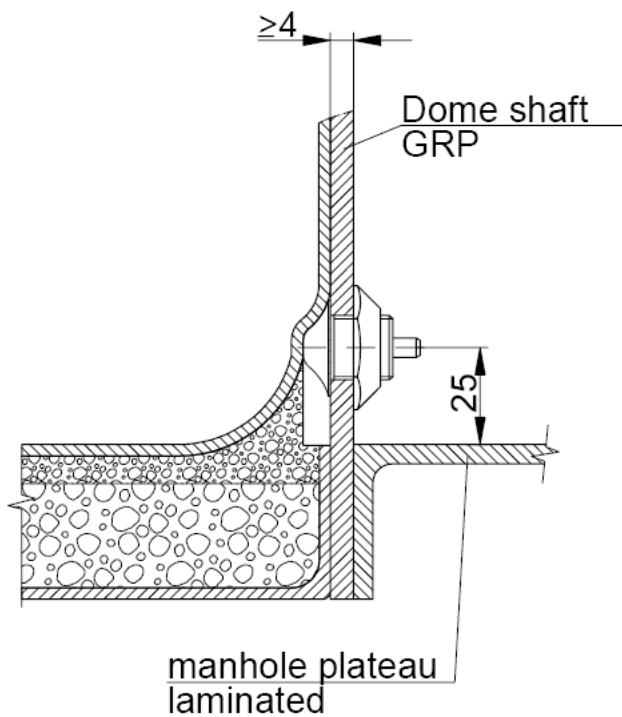
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Spherical, multi-layer walled underground storage tank

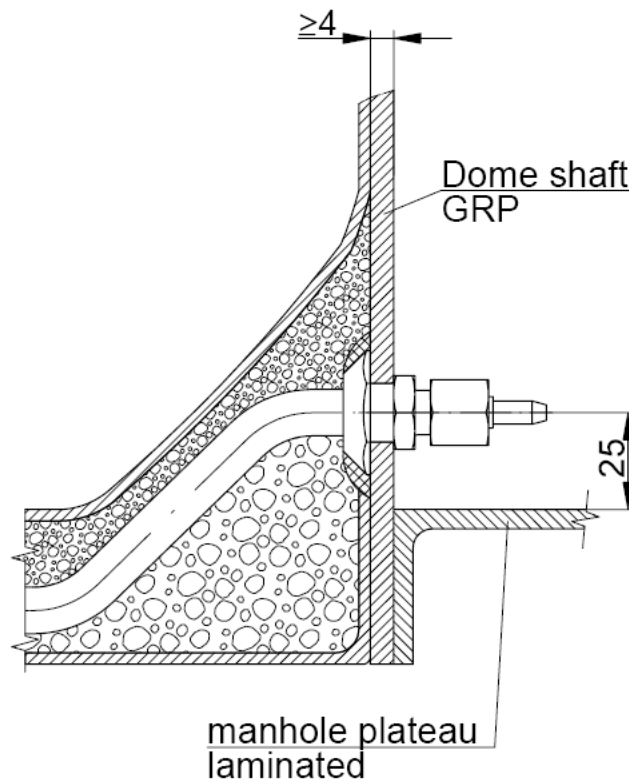
Half-cup bonding and wall structure

Annex 1.3

measuring line



suction line

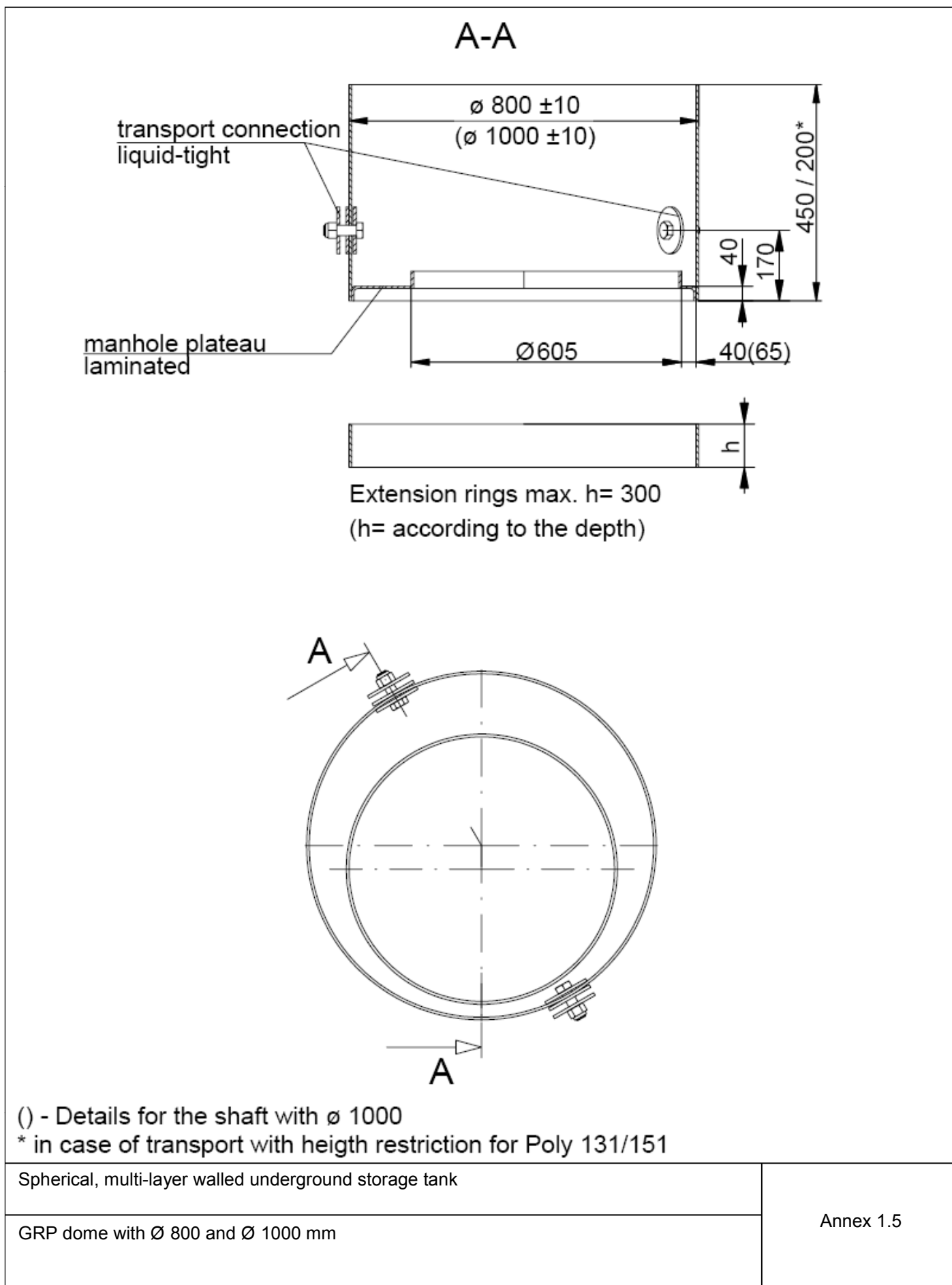


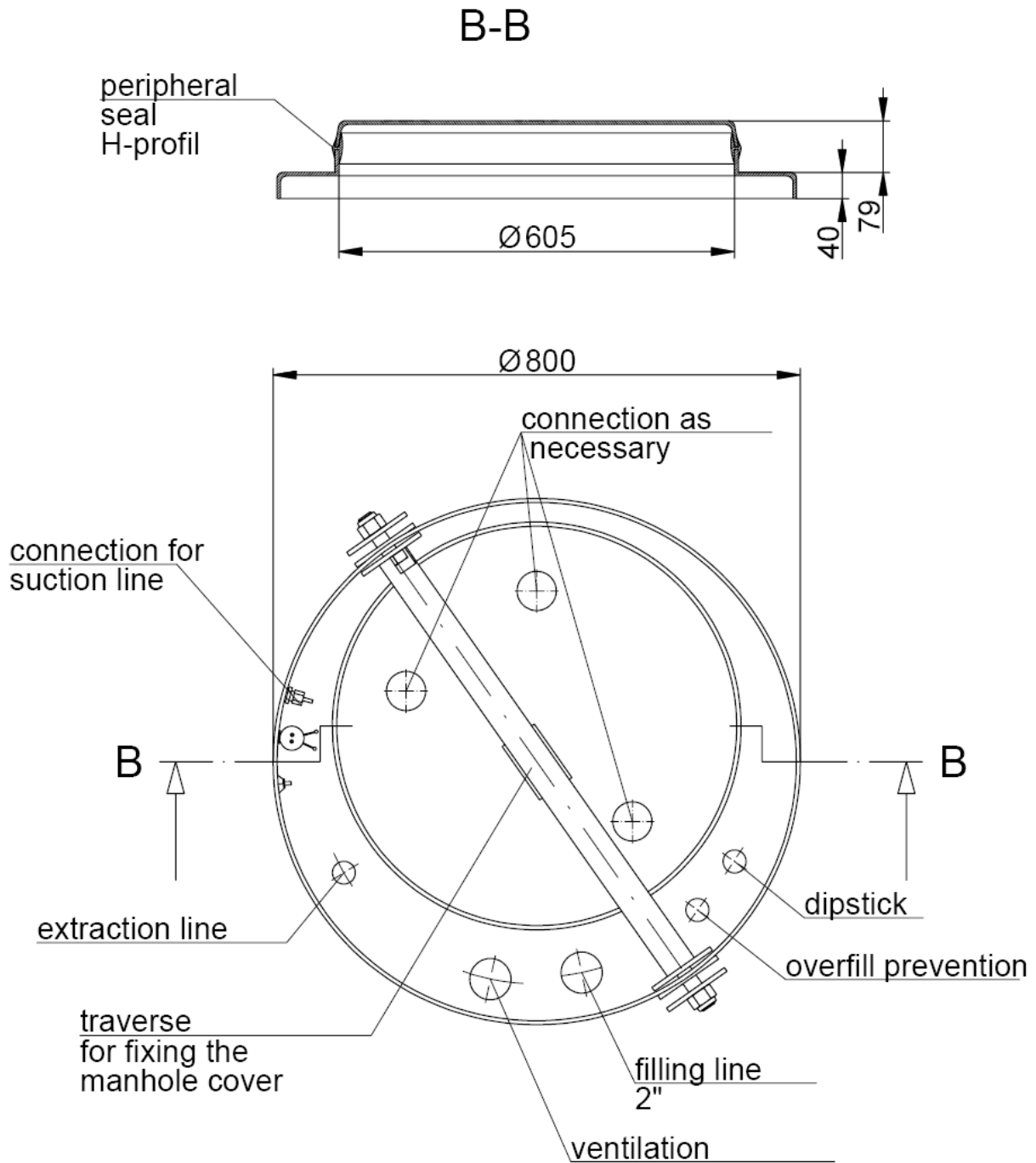
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Spherical, multi-layer walled underground storage tank

Connections for measuring and suction lines

Annex 1.4



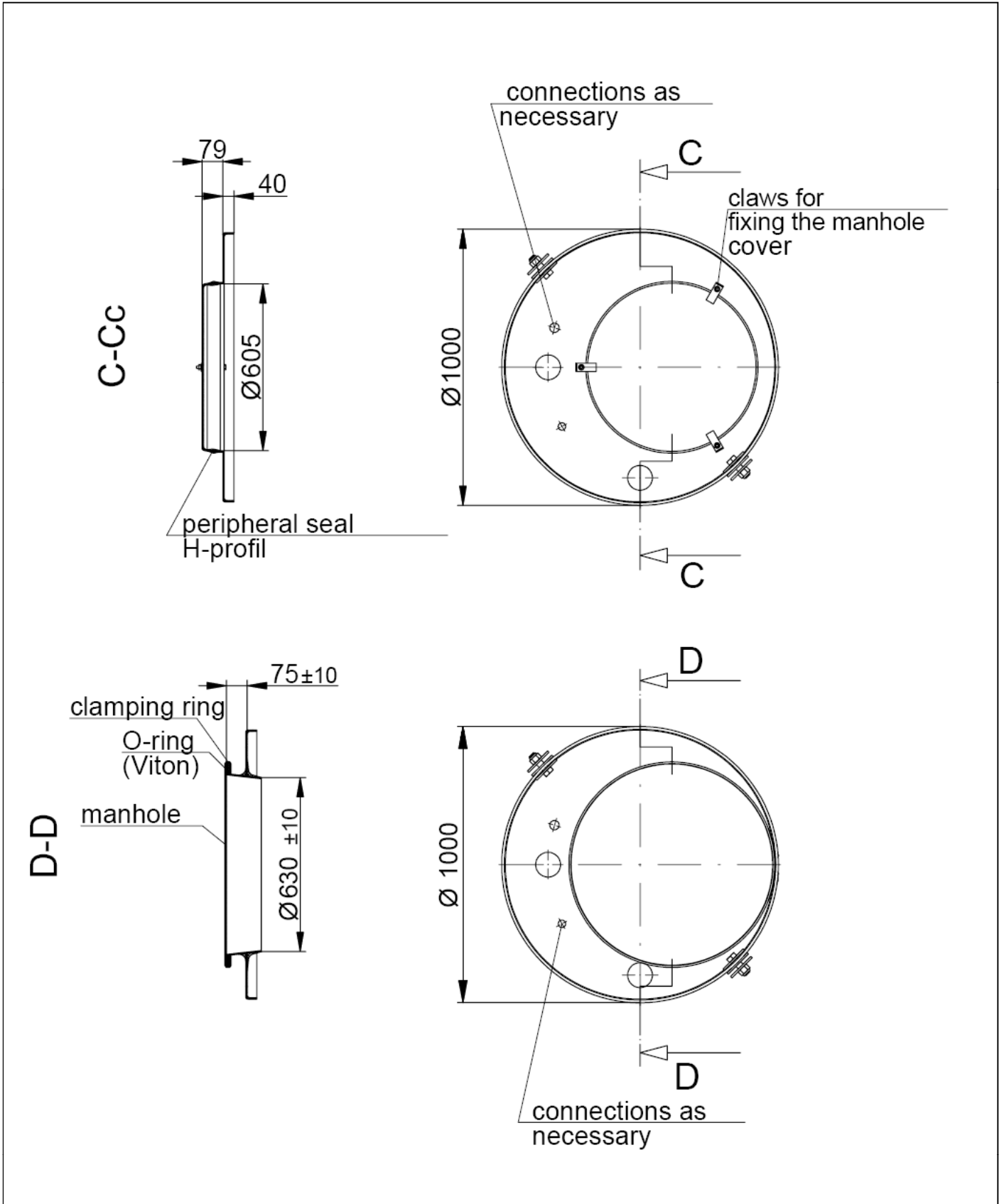


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Spherical, multi-layer walled underground storage tank

Manhole plateau Ø 800 mm

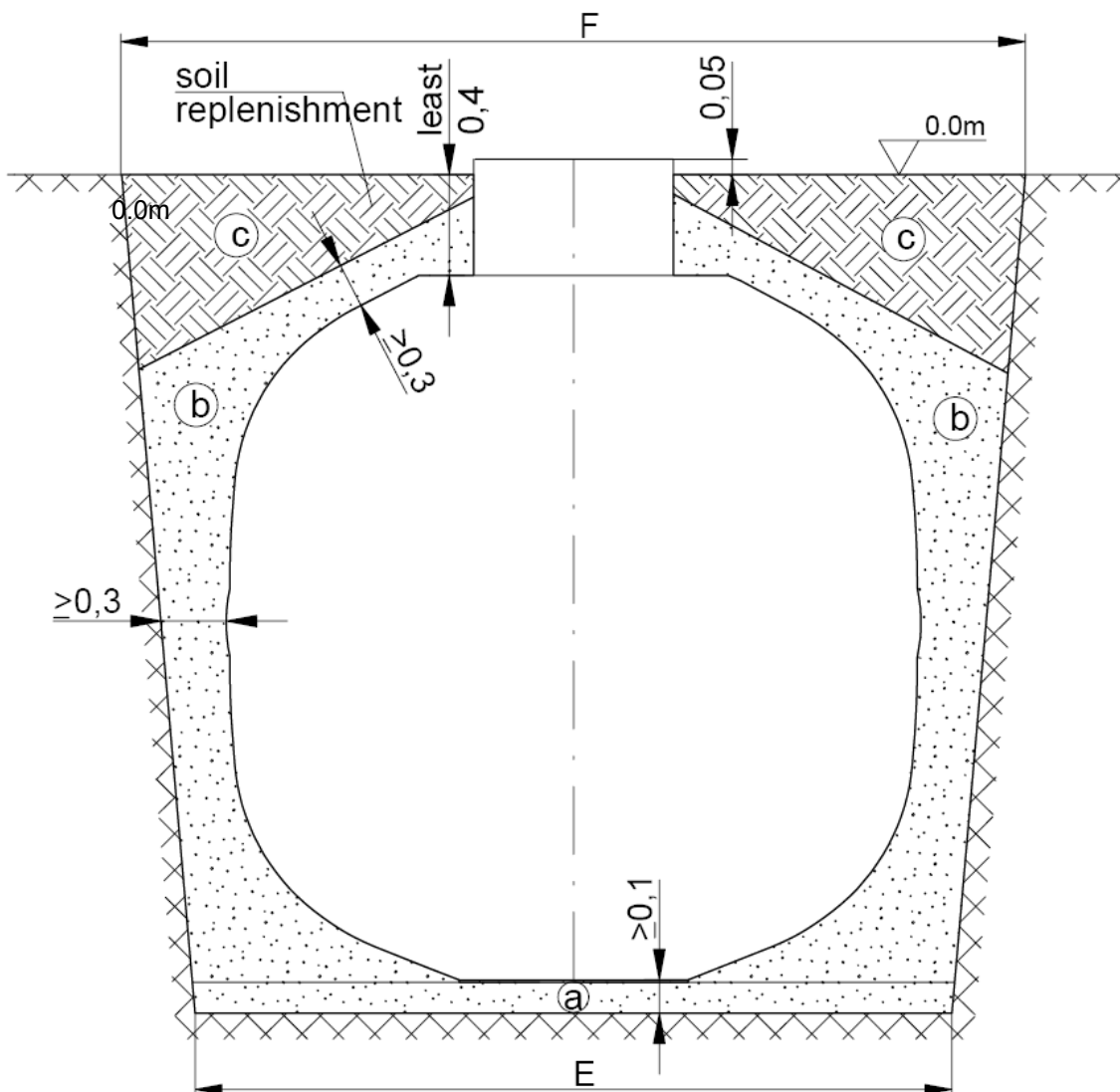
Annex 1.6



Spherical, multi-layer walled underground storage tank

Manhole plateau $\text{Ø} 1000$ mm

Annex 1.7



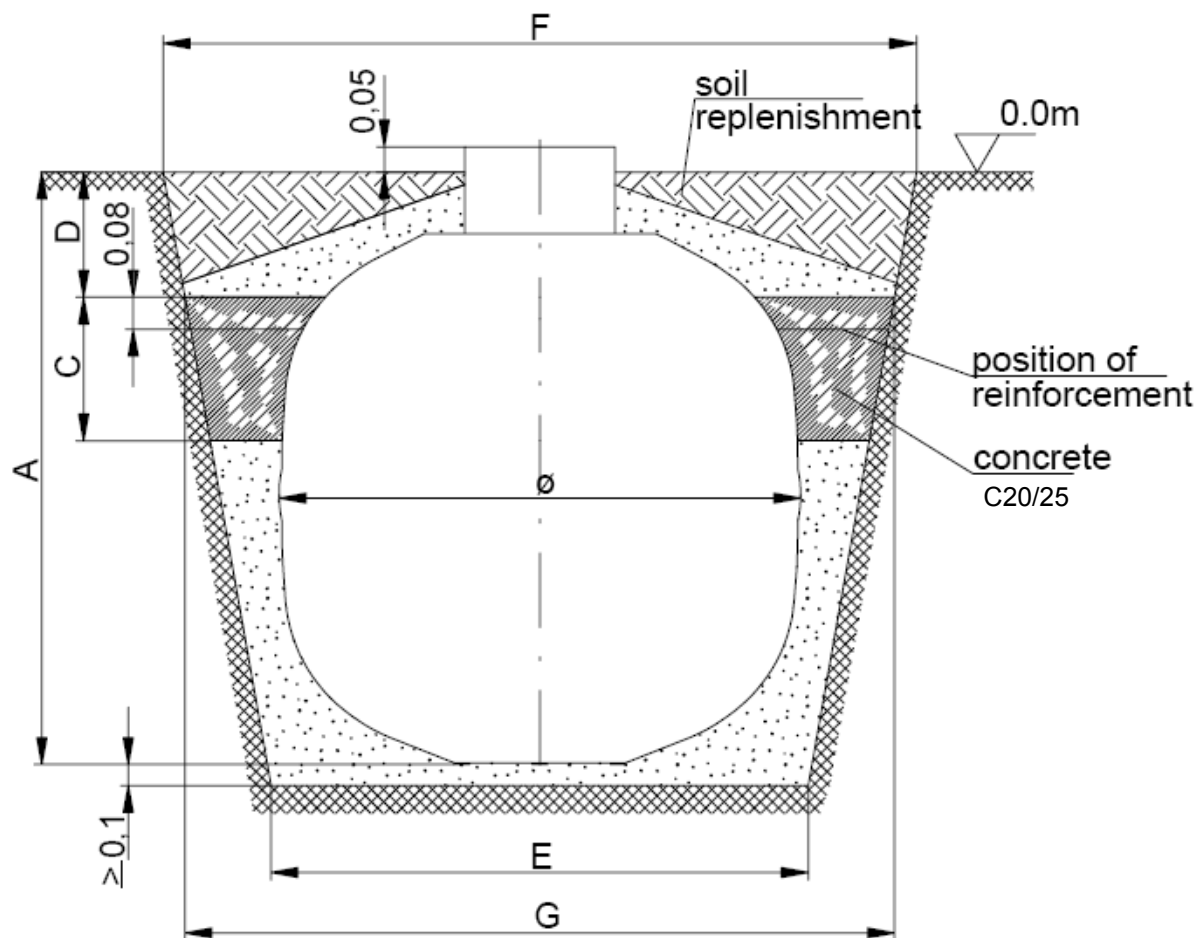
Poly	E (m)	F (m)
25	2.30	3.70
35	2.40	4.40
51	2.50	3.90
61	2.90	4.30
81	2.90	4.40
101	3.00	4.40
131	3.20	4.60
151	3.20	4.60

- a. Sand or soil in upcoming free-flowing state.
granulation max. 16mm
- b. Sand or soil in upcoming free-flowing state.
granulation max. 40mm
- c. excavation

Spherical, multi-layer walled underground storage tank

Installation

Annex 1.8



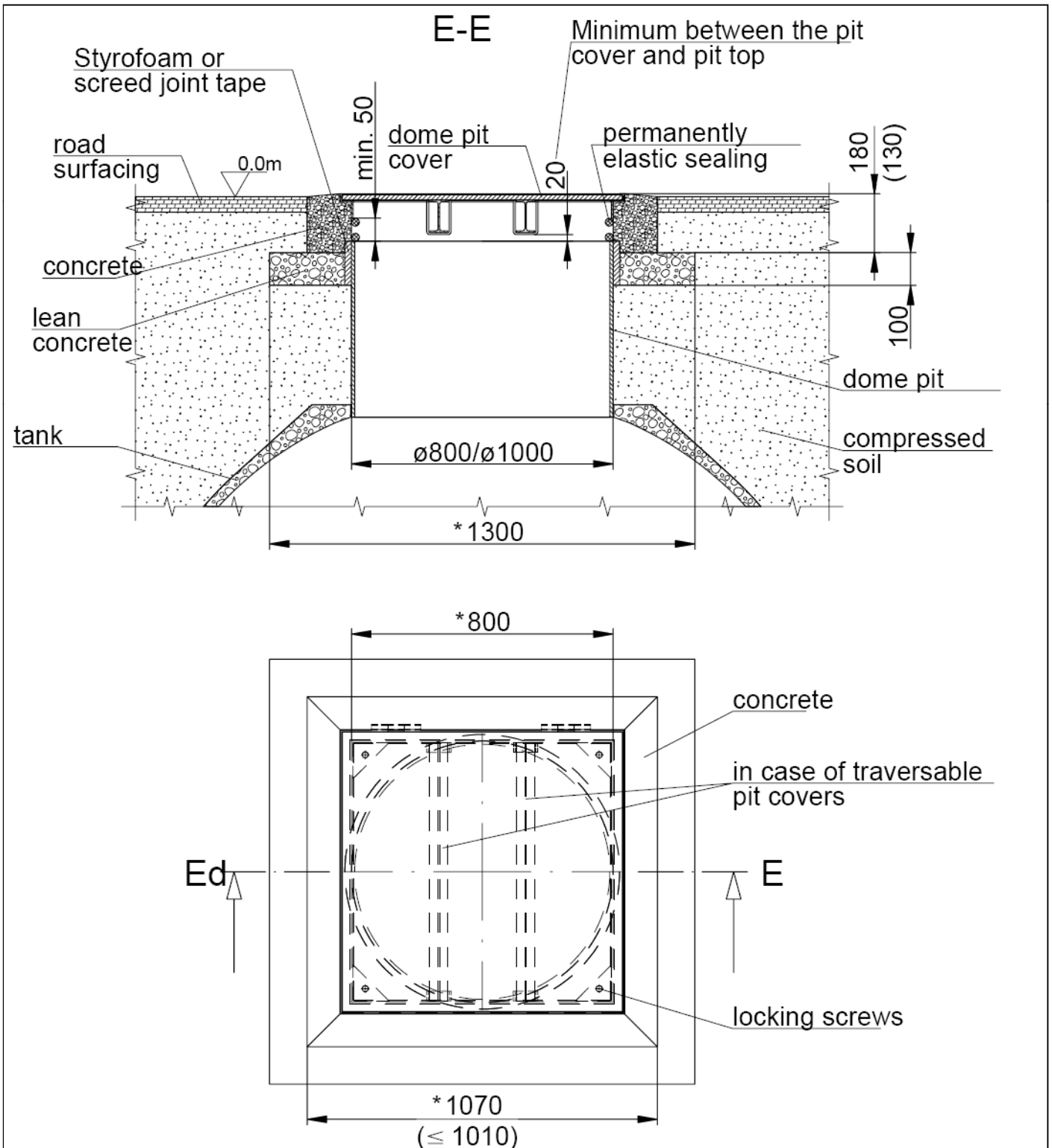
Poly	\varnothing m	A m	C m	D m	E m	F m	G m	reinforcement*	buoyancy protection	required for ground- water level below ground level
								ring beam	m ³ concrete	m
25	2.10	1.83	0.35	0.70	2.30	3.70	3.30	IVS 3 d10	1.5	≤0.7
35	2.20	2.10	0.35	0.70	2.40	4.40	3.40	IVS 3 d10	1.5	≤0.8
51	2.30	2.60	0.35	0.80	2.50	3.90	3.50	IVS 3 d10	1.5	≤0.9
61	2.70	2.25	0.40	0.70	2.90	4.30	3.90	IVS 3 d10	2.0	≤0.7
81	2.70	2.65	0.50	0.75	2.90	4.40	3.90	IVS 4 d10	3.0	≤0.9
101	2.80	3.00	0.65	0.60	3.00	4.40	4.00	IVS 5 d10	5.0	≤1.15
131	3.00	3.15	0.75	0.70	3.20	4.40	4.20	IVS 4 d10	6.0	≤1.40
151	3.00	3.45	0.75	0.70	3.20	4.40	4.20	IVS 5 d10	7.0	≤1.70

* with concrete reinforcement steel according to EN 10080 with $Re \geq 500 N/mm^2$

Spherical, multi-layer walled underground storage tank

Installation in case of ground water

Annex 1.9



- dimension with () are valid for non -traversable pit covers
- in case of pit covers 1000x1000mm all dimension marks with * +200

Spherical, multi-layer walled underground storage tank

Dome pit cover according to EN 124

Annex 1.10

1 Setup/ Structure

F1 = spray-up layer with 2400 tex rovings

PC1 = polymer concrete according to 2.4

Part	Thickness t_n	Setup	Glass-weight per unit area
Inner wall	≥ 3,0 mm	F1	≥ 1250 g/m ²
Interstice	≥ 30 mm	PC1	-
Outer wall	≥ 3,0 mm	F1	≥ 1250 g/m ²
Dome pit	≥ 4,0 mm	F1	appr. 1600 g/m ²
Connection laminate	≥ 3,0 mm	F1	≥ 1250 g/m ²

Table: Setup/Structures

2 Raw material for the components

2.1 Resin and curing systems

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

2.2 Reinforcement

Fibre rovings of 2400 tex according to DIN EN 14020-1.

2.3 Adhesiv resin

A resin of the type seen in 2.1 is used as adhesive resin.

2.4 Polymer concrete

The polymer concrete contains aggregates, including gravel screened. Gravel fraction is 2/8 according to EN 12620.

Spherical, multi-layer walled underground storage tank

Setup and materials

Annex 2