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Evaluation Guideline

for the Kiwa product certificate with technical approval for
PE/GRP sumps for underground fuel storage tanks, manifold chambers and pump dispensers

Amendment to BRL-K21006/02
PE/GRP sumps for underground fuel storage tanks, manifold chambers and pump dispensers

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Technology code: CK-K-T&B03 – Tanks and pipes
Validated by BoE "Tanks, Tank installations & Appendages" on February 27th, 2015

Validity
This amendment sheet pertains to BRL-K21002/03 dated December 15th, 2010.

Validation
This amendment sheet has been validated by Kiwa per March 15th, 2015.

1.1 General
Revise the text in the last paragraph to read:
For the performance of its certification work, Kiwa is bound to the requirements concerning the agreements on the implementation of certification as detailed in the NEN-EN-ISO/IEC 17065.

1.4 Acceptance of test reports provided by the supplier
Revise the text as follows:
Should the manufacturer submit reports from test Institutions or laboratories in order to demonstrate compliance of the product with the requirements of this evaluation guideline, that institute or laboratory shall comply with the applicable accreditation standards, i.e.:
- NEN-EN-ISO/IEC 17025 for laboratories;
- NEN-EN-ISO/IEC 17020 for inspection bodies;
- NEN-EN-ISO/IEC 17065 for certification bodies certifying products;
- NEN-EN-ISO/IEC 17021 for certification bodies certifying systems;
- NEN-EN-ISO/IEC 17024 for certification bodies certifying persons.

This requirement is being considered to be fulfilled when a certificate of accreditation can be shown, either issued by the Board of Accreditation (RvA) or one of the institutions with which the RvA an agreement of mutual acceptance has been concluded.

The accreditation shall refer to the examination as required in this BRL. When no certificate of accreditation can be shown, Kiwa will verify whether the accreditation norm is fulfilled.

3.1 General
Revise the text as follows:
This chapter refers to the legal requirements in relation to the products manufactured to this Evaluation Guideline.

3.2 Public requirements
Revise the text as follows:
3.2 Dutch legislation
The sumps, manifold chambers and pump dispensers manufactured in accordance with this Evaluation Guideline fall under the jurisdiction of the Dutch Ministry for Infrastructure and Environment (I&M). The relevant legislation Activiteitenbesluit milieubeheer (AM) specifies the requirements pertaining to various activities and these are further clarified in, amongst others, the Soil Quality Decree (Besluit Bodemkwaliteit) with its regulation.

One of the stipulations of the AM refers to the PGS 28 and the installation in accordance with the Evaluation Guideline BRL-K903. This requirement pertains to all fuels.

The certified installation company shall then be able to issue an installation certificate stating that the tank installation complies with the requirement of Evaluation Guideline BRL-K903. Compliance with BRL-K903 can be given when an adequate Risk Inventory and Evaluation (RI&E) has been carried out in accordance with the requirements of document PBV-107776. The tanks and spill containers used for the above ground storage of fuels will be part of this RI&E. The RI&E shall then be evaluated by the Certification Body. On approval of the RI&E the certified installation company can then issue an installation certificate.

The RI&E of each tank installation can be streamlined when use is made of certified products. In that case the RI&E aspects pertaining to these products will not be required. The tanks and spill containers manufactured in accordance with this Evaluation Guideline will comply with all the requirements stipulated in the regulations and the Evaluation Guideline BRL-K903.

Some companies do not fall under the jurisdiction of these regulations. The requirements pertaining to the above ground storage of liquid fuels and lubricants for these companies are laid down in each individual permit. In such cases the local authority shall define the technical and operational requirements for the storage of these fluids in the individual permit and can in a lot of cases refer via the PGS 28, BRL-K903 to this Evaluation Guideline.

8.2 Certification personnel

Revise the text as follows:

- **Certification assessor / Application reviewer**: they are in charge of carrying out the pre-certification tests and assessing the site assessors' reports;
- **Site assessor**: they are in charge of carrying out external inspections at the supplier's works;
- **Decision-makers**: they are in charge of taking decisions in connection with the pre-certification tests carried out, continuing the certification in connection with the inspections carried out and taking decisions on the need to take corrective actions.

8.3 Qualification requirements

Revise Table D.3.1 to read:

	Certification assessor / Application reviewer	Site assessor	Decision maker
Basic competence			
• Knowledge and competent assessment of the production processes	• Technical education at Bachelor level or higher • 1 year of relevant working experience	• Technical vocational education at intermediate level or higher • 1 year of relevant working experience	• Technical education at Bachelor level or higher • 5 years of working experience with a minimum of 1 year experience with certification
• Audit skills	• Not applicable	• Training in audit skills • Minimum of 4 complete audits of which at least 1 has been has been carried out independently and witnessed for qualification	• Not applicable
Technical competence			
Knowledge of this BRL	• Detailed knowledge of this BRL • A minimum of 4 complete audits for this BRL or for related BRL's	• Detailed knowledge of this BRL • A minimum of 4 complete audits for this BRL or for related BRL's	• Not applicable
Relevant knowledge of: • The technology related to the manufacturing of the products to be inspected, the performance of these processes and the provision of these services • The manner in which the products are used, the processes are performed and the services are provided • Any defect which may occur during the use of the product, any error in the execution of processes and any inadequacies in the provision of services	• Relevant technical education at Bachelor level or higher • Specific courses and training (knowledge and skills) related to plastics	• Relevant technical vocational education at intermediate level or higher • Specific courses and training (knowledge and skills) related to plastics	• Not applicable

8.4 Qualification

Revise the text as follows:

Certification personnel shall be qualified by assessing the knowledge and skills on the above mentioned requirements. The responsibility for the qualification is determined by the management of the certification body.

Preface

This evaluation guideline has been accepted by the Kiwa Board of Experts Tanks, Tank installations and Appendages, wherein all the relevant parties in the field of PE/GRP sumps for underground fuel storage tanks, manifold chambers and pump dispensers are represented. This Board of Experts also supervises the certification activities and where necessary require the evaluation guideline to be revised. All references to Board of Experts in this evaluation guideline pertain to the above mentioned Board of Experts.

This evaluation guideline will be used by Kiwa in conjunction with the Kiwa-Regulations for Product Certification. This regulation details the method employed by Kiwa for conducting the necessary investigations prior to issuing he product certificate and the method of external control. The inspection frequency is determined by the above mentioned Board of Experts.

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1 Introduction

1.1 General

This Evaluation Guideline contains all relevant requirements on the basis of which Kiwa issues and maintains a Kiwa product certificate with technical approval for PE/GRP sumps for underground fuel storage tanks, manifold chambers and pump dispensers.

This Evaluation Guideline replaces BRL-K21006/01 dated 2007-12-07. All certificates issued in accordance with BRL-K21006/01 will lose their validity after a maximum period of 6 months after this Evaluation Guideline has been issued.

During the performance of the certification work, Kiwa is bound to the requirements as stated in NEN-EN 45011 and as laid down in the chapter 8: "Agreements on the implementation of certification".

1.2 Scope / Field of application

The sumps are designed:

- For giving access to the manhole, vital equipment, fittings and the piping system of the underground tank, manifold chamber and/or fuel dispenser;
- To contain (bio) fuel spilt during calamities within the space of the sumps – see note;
- For underground installation;
- For atmospheric pressure storage.

Note: The sump is resistant to various types of fuels as determined by the tests detailed in § 5.3.3.

The sumps are not designed for:

- The storage of fuels.

The designed working life of the sump shall be 25 years.

Installation and application instructions

- The sumps shall be installed in such a way that no excessive mechanical forces caused by vehicular traffic or the movement of the tank can be transferred to the sump.
- The connections of the piping to the tank shall be such that no excessive force can be transferred to the sump.
- The tank and/or piping connections in the sump shall be checked for leak tightness directly after installation and on a periodic basis.
- Spilt fuel shall be removed from the sump as quickly as possible.
- The sumps need to have an explosion safe ventilation outlet in order to prevent the accumulation of possible vapours.
- The approval for the installation of the total construction on site of the sump is the responsibility of the local authorities.
- The sump manufacturer along with the installation company are responsible for the functioning of the combined construction of the tank and sump. The relation of the combination between the sump and the tank shall be documented and approved by the manufacturer.
- Personnel shall be instructed regarding the risks and the related safety measures required prior to entering the sump. A user manual shall fulfil this function and shall be provided by the sump manufacturer together with the sump.

The product certificate with technical approval is only applicable if also the requirements of § 5.5 are fulfilled.

1.3 Terminology

The terms shall have the following definitions:

- Evaluation Guideline: the agreements made within the Board of Experts on the subject of certification;
- Board of Experts: The Board of Experts of "Tanks, Tank installations & Appendages";

- Supplier: the party that is responsible for ensuring that the products meet and continue to meet the requirements on which the certification is based;
- Internal Quality Control schedule (IQC-schedule) a description of the quality inspections carried out by the supplier as part of his quality system.

1.4 Acceptance of test reports supplied by the supplier

If the supplier submits reports from certification bodies or testing laboratories to show that the requirements and procedures of the Evaluation Guideline are met, it will have to be shown that such reports were prepared by a certification body or testing laboratory meeting the prevailing accreditation standard, i.e.

- NEN-EN 45011 for certification bodies certifying products;
- NEN-EN-ISO/IEC 17020 for inspection bodies;
- NEN-EN-ISO/IEC 17021 for certification bodies certifying systems;
- NEN-EN-ISO/IEC 17024 for certification bodies certifying persons;
- NEN-EN-ISO/IEC 17025 for laboratories.

The certification body or testing laboratory body is deemed to meet these criteria if an accreditation certificate can be submitted which has been issued by Dutch Council of Accreditation (Raad voor Accreditatie) or an accreditation body with which Raad voor Accreditatie has concluded a mutual acceptance agreement. This accreditation should relate to the tests required for this Evaluation Guideline.

If no accreditation certificate can be submitted, Kiwa itself shall verify whether the accreditation standard has been met or carry out the tests concerned itself, or have them carried out under it's direct supervision. Test reports from laboratories, other than mentioned above (manufacturer laboratories, or universities or colleges, not accredited nor notified for the relevant testing) may be accepted. The certification body shall assess these reports. In EOTA GD 004 - The Provisions of Data For Assessments leading to ETA – guidance is given how to proceed in such cases.

1.5 Product certificate with technical approval

The model of the product certificate with technical approval, issued on the basis of this Evaluation Guideline has been included in Annex I.

2 Definitions

Ageing factor β for GRP material
Ratio between the final tangential stiffness after storage in water of 50 °C for 1000 h and the initial tangential stiffness determined in dry condition at 23 °C after post curing of the sample. By selecting the exposure period and temperature the value of β can be assumed to be representative for a handling period of 25 years.

Basic PE material
The basic material is the PE raw material with pigments and additives required for the manufacture of a sump. It can be the virgin material, own re-workable material, external re-workable material or recycled material. The basic material will have singular characteristics.

External reworkable PE material
Material comprising either one of the following forms:
- A material free from contamination and degradation prepared from unused sumps including cut-offs, which has been originally processed by a manufacturer other than that carrying out the processing.
- A material prepared from unused products, other than sump, regardless of where they were originally manufactured.

Creep
Time based deformation of a material caused by an applied load during a longer period of time.

Creep factor α for GRP material
Ratio of the initial deformation of a glass reinforced polyester material under an applied load and the deformation under the same constant load, extrapolated to an estimated working life, in this guideline of 25 years.

Creep factor γ for PE material
Ratio of the initial deformation of a thermoplastic material under an applied load and the deformation under the same constant load, extrapolated to an estimated working life, in this guideline of 25 years.

Own reworkable PE material
A material of defined formulation, free from contamination and degradation, prepared from unused sumps including cut-offs, which is to be reworked in the same factory in which it was previously processed.

Recycled PE material
A material comprising either one of the following forms:
- A material prepared from used sump, which is free from contamination.
- A material prepared from used other products, which are also free from contamination.

Sump for dispensers
The sump provides access to equipment, pumps, fittings and piping systems installed under the pump dispensers. The sump is capable of containing fuels spilt within the space of the sumps during calamities but is not intended to be used for the storage of fuels. The sump can retain its designed shape and function in any stage of its designed working life.

Sump for manifold chambers
The sump is an entrance chamber on tanks giving access to fittings and piping systems. The sump is capable of containing fuels spilt within the space of the sumps during calamities but is not intended to be used for the storage of fuels. The sump can retain its designed shape and function in any stage of its designed working life.

Sump for tanks
The sump is an entrance chamber on tanks giving access to equipment, fittings and piping systems. The sump is capable of containing fuels spilt within the space of the sumps during calamities but is not intended to be used for the storage of fuels. The sump can retain its designed shape and function in any stage of its designed working life.

Sump cover
The cover is placed over the sump to prevent rainfall, dirt or other unwanted matter from entering the sump.

Tank
This is a container for fluids, which can retain its designed shape and function in any stage of its designed working time as stationary storage.

Virgin PE material
This is the raw PE material with additives, pigments or other substances.

VSOB
Classification of traffic loads (Verkeersbelasting op stalen brugdelen).

3 Essential requirements

3.1 General

This chapter contains the essential requirements, which products have to fulfil in relation to their testing methods to establish conformity.

3.2 Public requirements

Dutch legislation requires that all underground storage tank installations are constructed in accordance with the requirements of Evaluation Guideline BRL-K903 (Certification scheme for Installers of Tank Installations). The sumps installed on the underground storage tanks are part of this installation. This Evaluation Guideline takes into account the requirements of Evaluation Guideline BRL-K903.

3.2.1 Construction Products Directive

Table 3.1 summarizes the essential requirements which are applicable to these products in relation to the Construction Products Directive (CPD) 89/106/EEC; 1988-12-21.

Essential Requirements	Explanation
Mechanical resistance and stability	Covered by this guideline including durability
Safety in case of fire	Covered by this guideline and directed to national installation instructions
Hygiene, health and environment	Covered in this guideline. This product is not intended for storing products, like water intended for human consumption
Safety in use	Covered by in this guideline and directed to installation and users instructions and by national installation and users instructions
Protection against noise	Not applicable
Energy economy and heat retention	Not applicable

Table 3.1: Summary of essential requirements in relation to the CPD

3.2.2 Requirements relating to dangerous substances

The product must be such that, when installed according to the appropriate provisions of the Member States, it allows for the satisfaction of the ER3 of the CPD as expressed by the national provisions of the Member States and in particular does not cause harmful emission of toxic gases, dangerous particles or radiation to the indoor environment nor contamination of the outdoor environment (air, soil or water). The EN-databank gives information about these substances.

4 Certification procedure

4.1 Initial evalauation

The initial evaluation shall be carried out on the basis of the product requirements stipulated in this Evaluation Guideline and shall include the relevant test methods as follows:

- Test samples in order to determine whether the products comply with the product requirements;
- Evaluation of the production process;
- Evaluation of the quality system and the IQC schedule;
- Determine whether the required procedures are available and are fully implemented.

4.2 Certification

On conclusion of the initial evaluation the results will be presented to the decision maker of the certification body. The decision maker will evaluate whether the certificate can be issued or whether additional information and/or test results are required before the certificate can be issued.

5 Product / performance requirements and testing methods

5.1 General

This chapter contains the product / performance requirements to be met by the PE/GRP sumps for underground fuel storage tanks, manifold chambers and pump dispensers. These requirements will form part of the technical specification of the product, which will be included in the product certificate with technical approval.

5.2 Sump design

5.2.1 Design drawings and calculations

The manufacturer shall specify the design details of the assembled product along with the materials used, the lifting capabilities and the dimensional tolerances in technical drawings. The calculated life expectancy of the sump, based on the values obtained from § 5.2.2 or § 5.2.3, shall be 25 years. The design drawings and calculations shall be approved by the certification body. The manufacturer shall define all the nominal sizes proposed for approval.

The sump for tanks and manifolds shall be designed to include a sliding unit on the top of the sump in order to compensate for any vertical movement caused by vertical loading due to (vehicular) traffic or by movement of the underground tank. This sliding unit shall allow a vertical displacement of at least 50 mm without imposing a vertical load on either the body or the base unit of the sump. The sump body shall be as high as possible in order to keep groundwater from entering the sump. The covering sliding unit shall be provided with a means of preventing the ingress of rainwater into the sump and shall carry all of the vertical load that the sump can be subjected to.

5.2.2 Long term behaviour of PE

The calculation of the life expectancy of a PE sump shall be determined using the values obtained from § 5.2.2.1 through § 5.2.2.4.

5.2.2.1 Maximal allowable stress, strain and deformation of PE

The manufacturer shall declare the maximal allowable stress, strain and deformation based on testing according NEN-EN-ISO 178 using an expected working life of 25 years.

5.2.2.2 Calculation of the Long Term Stiffness (STES) of PE

The Long Term Stiffness (STES) shall be calculated using the following formula:

$$STES = STIS / \gamma \qquad \text{(Equation 5-1)}$$

5.2.2.3 Determination of the Initial Ring Stiffness (STIS) of PE

For cylindrical sumps the Initial Ring Stiffness (STIS) shall be determined in accordance with NEN-EN-ISO 9969 on rings taken from the shaft.

For all other cases the Initial Ring Stiffness shall be calculated using the bending E-modulus in accordance with NEN-EN-ISO 178. The samples shall be obtained using the rotomoulding process.

5.2.2.4 Determination of the creep factor (γ) of PE

For cylindrical sumps the creep factor γ shall be determined in accordance with NEN-EN-ISO 9967 on rings taken from the shaft.

For all other cases the creep modulus γ shall be calculated using the bending E-modulus in accordance with EN-ISO 178 or the tensile E-modulus in accordance with NEN-EN-ISO 527-2. The samples shall be obtained using the rotomoulding process.

5.2.3 Long-term behaviour of GRP

The long-term behaviour of sump wall is tested by evaluation of the creep factor α and ageing factor β using an expected working life of 25 years.

5.2.3.1 Creep factor α

The creep factor α tested according to NEN-EN 978 shall have a minimum value of 0,5.

5.2.3.2 Ageing factor β

The ageing factor β tested according to NEN-EN 978 shall have a minimum value of 0,6.

5.2.4 Strength and stability of the sumps

The sump shall withstand during it's working life the loads which occur from the soil, ground water and traffic. This shall be demonstrated by meeting the requirement of § 5.2.4.1 and § 5.2.4.2.

5.2.4.1 Resistance to vertical loads of the sumps

The minimum traffic load shall be Class A 15 and the minimum load due to the ground water shall be based on the situation where the ground water level is equal to the ground level. Furthermore the sump shall be resistant to loads due to transport, handling and installation. The manufacturer shall declare under which class the sump can be installed whereby the loads according to Table 5.1 shall apply. For the assessment of the sump the following loading conditions have to be considered:

- Hydrostatic loading;
- Backfill;
- Dynamic loading;
- Static loading.

Group	Classification to traffic load of the cover (according to NEN-EN 124)	Vertical traffic load 1) (kN)	Type of traffic
1	A 15	10	Pedestrians & bicyclists
2	B 125	20	Footways, pedestrian areas & car parks
3	C 250	55	Kerbsides of roads
4	D 400	82,5	Carriageways of roads
1) When the internal surface is greater than 1 m² the following applies. The number of points loads is equal to the largest horizontal dimension in m, rounded off to the lowest value, with a minimum of 2; The centre distance of the point loading shall be 1000 mm.			

Table 5.1: Classification of traffic loads

The sumps of group 1 to 4 according to Table 5.1 shall be assessed by checking the calculations submitted by the manufacturer. In spite of the fact that the sump is equipped with a sliding unit the sump body shall be able to withstand at least a direct vertical load according to group 1 to 4 of Table 5.1 as applicable. This also applies to the sliding unit itself.

For the calculation of the shaft and base unit the upward load induced by the ground(water) shall be taken into account.

5.2.4.2 Resistance to horizontal loads of the sumps

5.2.4.2.1 Cylindrical sumps

For the horizontal load, due to soil and hydrostatic load, the following shall be taken into account:
Initial ring stiffness (STIS) of 1500 N/m2 is required taking into account the installation of the sump:
The long-term ring stiffness (STES) of the sump shall meet the requirements according Table 5.2.

Sump height	Up to 2 m	Up to 3 m	Up to 4 m
Minimum long term ring stiffness (STES) in N/m²	1000	2000	4000

Table 5.2: Requirements for the long-term ring stiffness in relation to the sump height

For sumps with a height greater than 4m a separate calculation on design shall be made. In this calculation account shall be taken with the horizontal component of the hydrostatic load, the load induced by the backfill and if applicable increased with the traffic load VSOB class 60 on the surrounding soil.

5.2.4.2.2 Sumps in the form of a prism or other than cylindrical

It shall be demonstrated by calculation that the requirements of Table 5.2 are met, taken into account the horizontal component of the hydrostatic load, the load induced by the backfill and if applicable, the traffic load VSOB class 60 on the surrounding soils.

5.2.5 Access opening of the sump

5.2.5.1 Access opening of the sump for storage tanks or manifold chambers

Legislation stipulates that the access opening of the sump shall have either a minimum inside diameter of 0,6 m or a minimum surface area of 0,6 x 0,6 m. The access opening shall be at the top of the sump. If it is apparent that the sump is to be used to service the storage tank installation then the access opening of the sump on the tank shall be large enough to facilitate the removal of the tank manhole cover and associated fittings.

5.2.5.2 Access opening of the dispenser sump

Access openings on the dispenser sumps shall be large enough to access all the required pipe and electrical connections.

5.2.6 Provision for condensation

The sump for storage tanks or manifold chambers shall be provided with a permanent provision to collect the moisture condensed in the sump. This provision shall have at least of a volume of 5 litres or be provided with a drainage system.

5.2.7 Metallic components for sump parts

All metallic components shall, in order to ensure sufficient protection against corrosion, comply with the following requirements:

- Steel components for all sump parts will be made of stainless steel type 304 or better,
- Extruded aluminium components for tank sumps, dispenser sumps and manifold chambers will be made of alloy type 6005/6005A or better;
- Aluminium components for dispenser sump and manifold chamber parts will be made of alloy type 6082 or better;
- Access cover frames shall comply with the requirements of NEN-EN 124, and
- The combination of the materials used shall not cause any galvanic corrosion.

The dimensions of all load bearing components for dispenser sump and manifold chamber parts such as access frames for covers, shear valve rails, pipe support rails, dispenser sump rails, dispenser sump supports, etc. shall be designed such that they are properly dimensioned for their function. This shall be confirmed by appropriate testing or calculations that have been approved by the certification body. See also § 5.2.1.

5.2.8 Elastomeric sealing elements for sump connections

The sealing elements shall fulfil requirements of NEN-EN 681, type WG for the applicable hardness (IRHD) in relation to volume change. This shall be evaluated by the certification body. It should be noted that these sealing elements are <u>not</u> designed to be in continuous contact with the fuels stored in the underground tanks.

5.2.9 Manhole tops

The manhole tops required to cover the access opening of the sump shall meet the relevant traffic load classification in accordance with NEN-EN 124 – refer Table 5.1. .For glass reinforced plastic manhole tops the requirements of PAS 26 shall apply. The manhole tops shall be certified by a certification body in accordance with the relevant standard.

Note: PAS 26 is related to NEN-EN 124.

For glass reinforced plastic manhole tops at least the following shall apply:
Surface resistance (type test): The surface resistance shall be in accordance with the PAS 26 standard.
Hardness test (production test): The hardness shall be in accordance with the PAS 26 standard.
Impact resistance (type test): The impact resistance shall be in accordance with the PAS 26 standard.

5.2.10 Leak detection in manifold chambers and dispenser sumps

Manifold chambers and dispenser sumps shall be provided with a leak detection device. This device shall consist of a liquid sensor that is activated by the presence of liquid in the sump. The sensor is to be connected to an earthed signalling unit containing a potential free contact NO/NC. For PGS Class 1 fluids (e.g. petrol) the sensor and signalling unit shall be approved in accordance with the requirements of ATEX 95.

The sensor shall be positioned at the low end / collecting point of the dispenser sump and shall be fixed into position using a suitable support that allows the height to be adjusted. The sensor tip that reacts to liquid must be encased in a protective tube not longer than 10 mm thereby enabling the detection of a minimal amount of liquid. The potential free contact shall be used to shut of pumps, dispensers or specified parts of the installation.

5.3 Materials requirements and test methods

5.3.1 Sumps of PE materials

5.3.1.1 Materials used in production

Only virgin material shall be used for the manufacturing of the sump. Own- or extern rework able or recycled material shall not be used.

5.3.1.2 Density

The reference density of the raw material shall not be less then 930 kg/m^3 when determined according to NEN-EN-ISO 1183-1 method B and NEN-EN-ISO 1183-2. Annealing of the specimen shall be in accordance with NEN-EN-ISO 1872-2.

5.3.1.3 Melt Mass-flow rate

The melt mass-flow rate (MFR) of the raw material shall be 4,0 ± 3,0 g/10 min at 190 °C when determined according to NEN-EN-ISO 1133, condition D (mass applied is 2,16 kg). The MFR of material taken from the sump shall also be determined and shall not vary by more than 20% of the MFR for the raw material.

5.3.1.4 Oxidation Induction Time (OIT)

The isothermal oxidation induction time (OIT) of the polyethylene material, when determined according to ISO 11357-6 with a test temperature of 200 °C, shall not be less than 20 minutes. Preferably, the tangent method shall be used and when this is not possible the offset method with a trigger value of 0,05 W/g shall be used. The test samples shall be taken from the inside surface of the tank and the test shall be carried out in duplicate.

5.3.2 Sumps of GRP materials

The sumps shall be made by a system of thermosetting resins of the type unsaturated polyester or vinyl ester, a reinforcement of glass fibre with or without filler with on the inside and outside a resin rich layer.

5.3.3 Sumps of PE or GRP materials

5.3.3.1 Chemical resistance

5.3.3.1.1 Reference test fluids

The sump material shall be chemically resistant to the stored medium. This shall be demonstrated using the following test fluids:

A) Benzine (100% mineral based fuel = Petrol):

- 41,5 % by volume of toluene
- 41,5 % by volume of iso-octane
- 15,0 % by volume of methanol
- 2,0 % by volume of isobutanol

B) Kerosene (100% mineral based fuel):

- 41,5 % by volume of toluene
- 41,5 % by volume of iso-octane
- 17,0 % by volume of methyl-tertiary-butyl-ether

C) Diesel (100% mineral based fuel):
- 100.0% Diesel Fuel, grade no. 2 according to ASTM-D975

D) Bio benzine containing up to 20% Ethanol:
- 39.0% Toluene
- 39.0% Iso-octane
- 2.0% Iso-butyl alcohol
- 20.0% Ethanol (in accordance with NEN-EN 15376)

The manufacturer can choose to test their product with 5%, 10%, 15% or 20% Ethanol. The chemical resistance for the higher concentration will automatically lead to acceptance for the lower concentration but not vice versa.

E) Biobenzine containing 85% Ethanol:
- 7.5% Toluene
- 7.5% Iso-octane
- 85.0% Ethanol (in accordance with NEN-EN 15376)

F) Bio kerosene containing up to 20% Ethanol:
- 33.2% Toluene
- 33.2% Iso-octane
- 6.8% Methyl-tertiary butyl-ether
- 6.8% Ethyl-tertiary butyl-ether
- 20.0% Ethanol (in accordance with NEN-EN 15376)

The manufacturer can choose to test their product with 5%, 10%, 15% or 20% Ethanol. The chemical resistance for the higher concentration will automatically lead to acceptance for the lower concentration but not vice versa.

G) Bio diesel containing up to 20% FAME:
- 20.0% Rape seed oil methyl ester (FAME according to NEN-EN 14214)
- 80.0% Diesel Fuel, grade no. 2 according to ASTM D 975

The manufacturer can choose to test their product with 5%, 10%, 15% or 20% FAME. The chemical resistance for the higher concentration will automatically lead to acceptance for the lower concentration but not vice versa.

Chemical resistance to other fluids will be subject to approval by the certification body.

5.3.3.1.2 Sumps of PE material

The testing of the sump is performed according to the procedure detailed below. After exposure the following requirements shall be met:
- The extrapolated value of the tensile strength shall not be less than 75% of its initial value, and
- The extrapolated elongation at break shall not exceed 220% and shall not be less than 45% of its initial value.

Testing procedure

Principle

Four series of five test pieces each are immersed at 23 °C in the test fluid. The tensile strength and elongation at break of these test pieces are determined after 14, 28, 56 and 112 days of exposure. By extrapolation of the values obtained, the tensile strength and elongation at break at 224 days can be calculated. The change in percentage of the extrapolated tensile strength and the elongation at break in relation to the initial tensile strength and elongation at break is then verified against the requirements.

Test pieces

Five series of five test pieces each are required to determine the initial tensile strength and the elongation at break and these values after an exposure of 14, 28, 56 and 112 days respectively. These test pieces shall be cut or punched from the manufactured sump. The sizes of the test pieces are type 1BA according to NEN-EN-ISO 527-2 with a thickness between 2 and 4 mm.

Apparatus
Containers, according to NEN-EN-ISO 175 article 5.1.1. Tensile strength testing machine, according to NEN-EN-ISO 527 -1 article 5.1. Blotting paper or similar material to dry the test pieces.

Reference fluid
The test liquid shall be in accordance with § 5.3.3.1.1. The manufacturer shall stipulate the medium the sump shall be tested for and this shall be recorded by the certification body on the certificate.

Immersing procedure
Reference is made to NEN-EN-ISO 175 for general instructions regarding the immersing procedure.

Conditioning
The test pieces shall be conditioned for at least 16 hours at a temperature of (23± 2) °C prior to testing.

Determination of dimensions
The width and thickness of the calibrated section of each test piece are measured with an accuracy of 0,2 mm prior to immersion. The test pieces are clearly marked in order to avoid any confusion.

Immersion
Immerse four series of five test pieces in the reference test fluid.

Duration of immersion
After a period of (14± 1,0), (28± 1,0), (56± 1,0) and (112± 1,0) days, the test pieces are taken out of the test liquids in order to carry out the tensile testing.

Quantity of test liquid to be used
In general, the test liquid shall have a quantity, that at least 0.4 m1/mm2 of the total surface of the test piece is covered with the liquid.

Placement of the test pieces
While the test pieces are identical, it is permitted that several test pieces are put in the same container as long as they do not touch each other. Take care that the part of the test piece surface that is in contact with the container side is as small as possible, for example by resting one side on the bottom of the jar and the other against the vertical side or by suspending them.

Changing of the test fluid
Stir the test fluid every day during the immersing period and change the liquid every seven days.

Determination of the tensile strength and elongation at break
- Determine the tensile strength (σ) and elongation at break (E) of the series of test pieces, which are not immersed and of the series of test pieces which are immersed into the test liquid after 14 days, 28 days, 56 days and 112 days, according to NEN-EN-ISO 527-1, using the tensile speed as indicated by the manufacturer;
- Note the actual exposition time of each test piece with an accuracy of 0.05 days and round it up to the nearest 0.1 day;
- Calculate for every test liquid from the obtained values of the tensile strength (σ) and elongation at break (ε) of every test piece, starting at 14 days, and the corresponding time (t) in using the method of the smallest quadrates the extrapolated value for the tensile strength (σ) and elongation at break (ε) at 224 days using the equations:

$$\text{Log } \sigma_c = A + B \log t \text{ en} \qquad \text{(Equation 5-2)}$$

$$\text{Log } E_t = a + b \log t \qquad \text{(Equation 5-3)}$$

- Calculate the change in percentage for each test liquid of tensile strength and the elongation at break at 224 days in regard to the initial tensile strength and breaking elongation and verify the values against the requirements.

Chemical resistance to other fluids will be subject to approval by the certification body.

5.3.3.1.3 Sumps of GRP materials

Testing procedure

The chemical resistance is tested according to NEN-EN 977 during a period of 1000 hours at (50 ± 1) °C or 3000 hours at (40 ± 1) °C.

The testing of the sump is performed according to NEN-EN 977 during a period of 1000 hours at (50 ± 1) °C or 3000 hours at (40 ± 1) °C. After exposure the following requirements shall be met:

- The surface of the test pieces shall be free of cracks, blisters or other apparent symptoms of degradation, and
- The flexural modulus of the material shall be retained for at least 80% using the initial thickness for calculation determined according to NEN-ISO 178.

5.3.3.2 Resistance to UV-ageing

Test pieces manufactured from the PE and GRP material are exposed for a time period equal to 1 year at natural weathering conditions for the climate zone M or S (moderate or Severe). For climate conditions in The Netherlands testing is done after an exposure following climate zone M.

	Moderate climate (M)	Severe climate (S)
Yearly solar-energy on the Horizontal plate	< 5 GJ/m² and	≥ 5 GJ/m² or
Average temperature of the warmest month per year	< 22 °C	≥ 22 °C

Table 5.3 - Classification of climatic zones in Europe

Note: To be classified as a moderate climate (**M**), the yearly solar energy on a horizontal plate shall be less than 5 GJ/m² and the average temperature of the warmest month of the year shall be lower than 22°C. When the yearly solar energy on a horizontal plate is equal to or greater than 5 GJ/m² or the average temperature of the warmest month of the year is equal to or greater than 22°C, then the climate is classified as severe (**S**). The Netherlands is classified as a moderate climate M.

After an exposure the change in tensile impact strength shall not be greater than 25% for PE and 50% for GRP.

Testing procedure

Apparatus

- Xenon-arc artificial ageing device
- Apparatus is according to EN 513 clause 4.1.
- Tensile impact tester
- Apparatus according to ISO 8256 with the following specifications:
  1. Tensile impact tester according method A;
  2. Maximum energy pendulum: preferably 25.0 J;
  3. Cross head mass: (60 ± 1) g;
  4. Additional clamps for test pieces type 5 may be necessary.

Procedure

Manufacture the rectangular test pieces as mentioned under test pieces.

- Expose one of the series rectangular test pieces according NEN-EN 513 to the equivalent of 1 year natural weathering for the climate zone M.
- In annex C of NEN-EN 12608 a calculation method is given for the determination of the radiation dose or exposure time at artificial ageing.
- The other series of test pieces are stored in the dark.

NOTE: Machining of the test pieces which have been exposed in the artificial ageing device and those stored in the dark shall be carried out at the same time using the same tools.

For the determination of the UV-resistance five series of five test pieces are needed in order to determine the initial tensile impact strength and the tensile impact strength after an exposure of 14, 28, 56 and 112 days.

Conditioning and test conditions

Unless otherwise specified, testing shall be carried out at (23 ± 2) °C after conditioning for at least 16 hours at the same temperature.

Assessment of the appearance
Assessment of the appearance is done visually with the naked eye.

Determination of the resistance against UV ageing
The tensile impact strength of one series of test pieces is determined at 23 °C.
The tensile impact strength of a second series of test pieces is determined after exposure of the test pieces in a Xenon-arc artificial ageing device at a specified radiation dose, black plate temperature and test cycle.

PE Sumps
Test pieces
Unless otherwise specified, testing shall be carried out on test pieces, which are at least 16 hours old. These test pieces shall be cut or punched from the manufactured PE object.

The sizes of the test pieces are type 1BA according to NEN-EN-ISO 527-2 with a thickness between 2 and 4 mm. One series of test pieces shall be machined to type 5 of NEN-EN-ISO 8256 with the instructions given in NEN-EN-ISO 8256 and NEN-EN-ISO 2818. All machined test pieces shall be checked for irregularities such as crazing in the machined surface. In case of any such irregularities, the test pieces concerned shall no longer be used for these tests.

Testing and evaluation
- Placing of test pieces shall be carried out according to NEN-EN-ISO 4892.
- Exposure is ended when the amount of the radiation dose is reached.
- Remove the frame from the chamber and the test pieces from the frame. Machine the six test pieces from the artificial ageing device and the six, which were stored in the dark. (Test pieces assessment of the appearance is done visually with the naked eye with size type 5 according to NEN-EN-ISO 8256).
- Determine the tensile impact strength of both the series of exposed and non-exposed test pieces according to ISO 8256.Use for both series the same pendulum.
- Note for each test piece the tensile impact strength in kJ/m² and its type of failure.
- Calculate for both series (initial and exposed) the average tensile impact strength and the standard deviation in kJ/m².
- Calculate the change of average value of tensile impact strength for both series as a percentage and verify with the requirements.

GRP sumps
Test pieces
Unless otherwise specified, testing shall be carried out on test pieces, which are at least 16 hours old. These test pieces shall be cut or punched from the manufactured GRP object.
The sizes of the test pieces are:
- Length: 120 ± 2mm
- Width: 15 ± 0,5mm
- Thickness: As assembled

The test pieces shall not be notched or cracked.

Testing and evaluation
- Placing of test pieces shall be carried out according to DIN 53435 with a supporting distance of 70mm.
- Exposure is ended when the amount of the radiation dose is reached.
- Determine the bending blow strength of both the series of exposed and non-exposed test pieces according to DIN 53435.
- Note for each test piece the bending impact strength in kJ/m² and its type of failure.
- Calculate for both series (initial and exposed) the average bending impact strength and the standard deviation in kJ/m².

Calculate the change of average value of bending blow strength for both series as a percentage and verify with the requirements.

5.3.3.3 Surface resistivity of sump (optional)
Where the build up of static electricity may cause problems the surface resistivity of the inside surface of the sump shall not exceed 10^6 Ω/m². The testing shall be in accordance with NEN-EN-ISO 3915.

5.3.3.4 Reaction to fire of the basic material

The materials shall be classified according NEN-EN 13501-1.
Note: Reaction to fire is not the same as flame resistance. Plastics have usually a low classification.

5.3.3.5 Dangerous substances basic material of the sump

The manufacturer shall control and document that there are no dangerous substances in the basic material. He shall control this by its suppliers. The certification body shall verify this. In guidance paper H of the CPD is information found on this subject.

5.3.3.5.1 Presence of dangerous substances in the product

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

5.3.3.5.2 Compliance with the applicable regulations

If the product contains dangerous substances as declared above, the product certificate with technical approval will provide the methods which has been used for demonstrating compliance with the applicable regulations in the Member States of destination, according to the EU data-base (methods of content or release, as appropriate).

5.4 Requirements and test methods of the fabricated products

5.4.1 Visual inspection / appearance of the sump

Products should be free from defects detrimental to its functional characteristics.
The inner and outer surface of al sumps shall be smooth and flawless, whiteout holes, blisters or other defects. The profile shall be even when present. The material shall be free of contamination. The manufacturer's quality system shall include distinct criteria for approval and rejection.

5.4.2 Dimensional inspection of the sump

The wall thickness and the shape of every sump will meet the requirements specified in the approved drawings. The manufacturer's quality system shall include distinct criteria for approval and rejection.

5.4.3 Barcol Hardness of GRP sumps

The manufacturer shall periodically check that the curing of the resin used for the manufacture of the GRP sumps has been carried out properly. The Barcol hardness shall be the average value obtained from at least 10 measurements and shall comply with the specification of the resin manufacturer whereby a minimum value of 30 shall apply.

5.4.4 Resistance to mechanical loads (type test)

The structure of the sump shall be tested in the factory during 15 minutes with a negative pressure to atmosphere of 30 kPa (70 kPa absolute pressure) for tank sumps and 12 kPa (88 kPa absolute pressure) for dispenser sumps and manifold chambers. The construction must be free of leakage, damages or deformation.

5.4.5 Tightness test of the sump in the factory

All connections on the sump shall be properly installed with closed pipes before this test. Close the top of the sump. The tank sump shall be leak tight under a vacuum of 18 kPa for at least 15 minutes and the dispenser sump and manifold chamber under a vacuum of 9 kPa for at least 10 minutes.

5.4.6 Functional tightness testing on site

The sump shall have provisions that enable personal on site to check the tightness of the sump and al its connections. On site the sump and all connections must be tested with a vacuum of 12 kPa (88 kPa absolute pressure) for tank sumps and 6 kPa (94 kPa absolute pressure) for dispenser sumps and manifold chambers. The Certification Body shall subject these provisions for approval.

5.5 Documentation and marking

5.5.1 Installation and user instructions for sumps

The manufacturer shall provide proper written installation and user instructions in the language of use. These instructions shall direct to compliance with nation regulations on storage of fuels polluting water and soil.

They shall furthermore direct to compliance to nation regulations on the storage of flammable fluids in or near buildings. The manufacturer shall approve the installer of the sump. Nation's regulations can require provisions for the installation by certified installers. Entering a sump shall only be performed by trained personal.

Evaluation Guideline BRL-K903 gives requirements for process of the installation of tanks and appendages.

5.5.2 Documentation

Every sump shall be supplied with at least the installation / user instructions in the language of use. The certification body shall approve these instructions.

5.5.3 Certification mark

Each sump shall be indelibly marked as follows:

- Manufacturers name and trade mark;
- Certification mark;
- Serial number of the sump
- Year of manufacture.

6 Quality system requirements

6.1 General

This chapter contains the requirements, which have to be met by the supplier's quality system.

6.2 Manager of the quality system

Within the supplier's organisational structure an employee must have been appointed who is in charge of managing the supplier's quality system.

6.3 Internal quality control schedule / quality plan

As part of the quality system the manufacturer must implement an internal quality control schedule (IQC schedule).

In this IQC-schedule the following must be demonstrably recorded:

- which aspects are inspected by the manufacturer;
- according to which methods these inspections are carried out;
- how often these inspections are carried out;
- how the inspection results are registered and stored.

This IQC schedule shall be in the format as shown in Annex II. The schedule must be detailed in such a way that it provides Kiwa sufficient confidence that requirements will be continuously fulfilled.

Static process control by the manufacturing shall be performed according to ISO 2859-1, with an inspection and AQL-level to be approved by the certification body.

6.4 Qualification of personnel

All personnel involved in the production of the sumps shall be qualified for this work in accordance with the manufacturer's requirements. The procedures used and the scope of qualification of each person shall be documented. The manufacturer shall review and renew this documentation on a yearly basis. All welders required for the production of PE sumps shall be qualified in accordance with the requirements of DVS 2212-1.

6.5 Qualification/approval of special processes

All lamination procedures shall be approved by the manufacturer prior to releasing these procedures for production purposes. The qualification of personnel shall be in accordance with these approved procedures. The approvals shall be documented and the manufacturer shall review and renew this documentation on a yearly basis.

6.6 Procedures and working instructions

The supplier shall be able to submit the following:

- Procedures for:
  - Dealing with products showing deviations;
  - Corrective actions to be taken if non-conformities are found;
  - Dealing with complaints about products and/or services delivered;
- The working instructions and inspection forms used.
- Other requirements to be met by the quality system

6.7 Design Changes

Design changes of the certified products shall always be reported to Kiwa prior to the start of production. Kiwa shall evaluate these changes in order to determine the impact these changes have on the initial approved design and to determine which type tests shall have to be repeated.
Products that have been subjected to a design change can only be identified with the Kiwa quality stamp after they have been given a written approved by Kiwa.

7 Summary of tests and audits

This chapter contains a summary of the following tests and audits to be carried out in the event of certification:

- Type tests and certification audits;
- Certification audits of the product requirements;
- Certification audits of the quality system.

The frequency with which Kiwa will carry out audits and tests is also stated in the summary.

7.1 Test and audit matrix

Description of requirement	BRL Article	Category (see note)	Tests within the scope of		
			Initial evaluation	Surveillance audit by Kiwa after issue of the certificate	
				Audit	Frequency
Sump design					
Design drawings and calculations	5.2.1	1	Yes	Yes in event of change	By every change
Long term behaviour of PE	5.2.2	1	Yes		
Long-term behaviour of GRP	5.2.3	1	Yes		
Strength and stability of the sumps	5.2.4	1	Yes		
Access opening of the sump	5.2.5	1	Yes		
Provision for condensation	5.2.6	2	Yes	Yes	Every audit
Metallic components for sump parts	5.2.7	2	Yes	Yes	Every audit
Elastomeric sealing elements for sump connections	5.2.8	2	Yes	Yes	Every audit
Manhole tops	5.2.9	1	Yes	Yes	Every audit
Leak detection in manifold chambers and dispenser sumps	5.2.10	1	Yes	Yes	Every audit
Materials requirements and test methods					
Sumps of PE materials	5.3.1	1	Yes	Yes in event of change	By every change
Sumps of GRP materials	5.3.2	1	Yes		
Sumps of PE or GRP materials	5.3.3	1	Yes		
Requirements and test methods of the fabricated products					
Visual inspection / appearance of the sump	5.4.1	3	Yes	Yes	Every audit
Dimensional inspection of the sump	5.4.2	2	Yes	Yes	Every audit
Barcol Hardness of GRP sumps	5.4.3	1	Yes	Yes	Every audit
Resistance to mechanical loads (type test)	5.4.4	1	Yes	Yes	1x/year
Tightness test of the sump in the factory	5.4.5	1	Yes	Yes	Every audit
Functional tightness testing on site	5.4.6	1	Yes	Yes	Every audit
Documentation and marking					
Installation and user instructions for sumps	5.5.1	2	Yes	Yes	1x/year
Documentation	5.5.2	2	Yes	Yes	Every audit
Certification mark	5.5.3	1	Yes	Yes	Every audit
Quality system requirements					
Internal quality control schedule / quality plan	6.3	2	Yes	Yes	Every audit
Qualification of personnel	6.4	3	Yes	Yes	1x/year
Qualification/approval of special processes	6.5	2	Yes	Yes	1x/year
Procedures and working instructions	6.6	2	Yes	Yes	1x/year
Design Changes	6.7	1	Yes	Yes	Every audit

Table 7.1: Test and audit matrix

Notes:

Non-conformities can be reported during the surveillance audits. These non-conformities can be classified into the following categories:

1 = Critical: These non-conformities can lead to a dangerous situation or result in a substandard product. The manufacturer shall, after approval from the certification body, implement corrective actions to

rectify the situation within a maximum period of 2 weeks. Failure to do so shall result in the withdrawal of the certificate.

2 = Important: These non-conformities can in the long term lead to a substandard product. The manufacturer shall, after approval from the certification body, implement corrective actions to rectify the situation within a maximum period of 3 months. Failure to do so shall result in the withdrawal of the certificate.

3 = Less important: These non-conformities are less important but shall be rectified within a reasonable amount of time. The certification body shall check the corrective action taken during the following surveillance audit.

During the initial evaluation of the product, type tests have to be performed to determine whether the product meets the specified performance and product requirements. The requirements that shall be fulfilled in order to qualify for certification are stated in the above matrix. In the event of a change of the raw material or the supplier thereof the type tests shall be repeated by the tank manufacturer.

The quality system of the manufacturer is also audited during the initial evaluation.

After certification Kiwa shall periodically audit the manufacturer for compliance with this Evaluation Guideline. During these audits a periodic repetition of some of type tests can also be required.

8 Agreements on the implementation of certification

8.1 General

In addition to the requirements stipulated in this Evaluation Guideline the general requirements pertaining to certification as stated in the Kiwa-Regulations for Product Certification will be applicable.

Specifically, the following shall be applicable:

- The general procedure for conducting the initial evaluation including:
  - The method of informing the suppliers regarding the processing of the application;
  - The conduction of the initial evaluation;
  - The decision taken after the conduction of the initial audit.
- The general procedure for conducting the audits and the relevant checkpoints;
- The procedure to be implemented by the certification body in the event of non-conformities;
- The procedure to be followed by the certification body in the event of unauthorized use of the certificates, certification mark, pictograms and logos.
- The procedure to be followed in the event of termination of the certificate;
- The possibility to contest a decision made by the certification body.

8.2 Certification personnel

The staff involved in the certification may be sub-divided into:

- **Certification engineer**: they are in charge of carrying out the pre-certification tests and assessing the inspectors' reports;
- **Inspectors**: they are in charge of carrying out external inspections at the supplier's works;
- **Decision-makers**: they are in charge of taking decisions in connection with the pre-certification tests carried out, continuing the certification in connection with the inspections carried out and taking decisions on the need to take corrective actions.

8.2.1 Qualification requirements

The Board of Experts has set the following qualification requirements for the subject matter of this Evaluation Guideline:

Requirements	Function and responsibility		
	Certification Engineer	**Inspector**	**Decision maker**
Education: general	• Relevant technical education at Bachelor level or higher • Internal training in certification and Kiwa policy • Training in audit skills	• Technical vocational education at intermediate level or higher • Internal training in certification and Kiwa policy • Training in audit skills	• Technical education at Bachelor level or higher • Internal training in certification and Kiwa policies • Training in audit skills
Education: specific	• Training related to this Evaluation Guideline • Specific courses and training (knowledge and skills) related to plastics	• Training related to this Evaluation Guideline • Specific courses and training (knowledge and skills) related to plastics	• Not applicable
Experience: general	• 1 year of relevant working experience • A minimum of 4 complete certification cycles of which at least 1 has been witnessed for qualification	• 1 year of relevant working experience • A minimum of 4 complete certification cycles of which at least 1 has been witnessed for qualification	• 4 years of working experience, with a minimum of 1 year of experience with certification
Experience: specific	• Detailed knowledge of this Evaluation Guideline • A minimum of 4 complete certification cycles for this Evaluation Guideline or related Evaluation Guidelines	• Detailed knowledge of this Evaluation Guideline • A minimum of 4 complete certification cycles for this Evaluation Guideline or related Evaluation Guidelines	• Basic knowledge of this Evaluation Guideline

Table 8.1 Qualification requirements for certification personnel

The level of education and the experience of the certification staff involved should be demonstrably recorded.

8.2.2 Qualification

Certification personnel shall be qualified on the basis of the above mentioned criteria. Should qualification be otherwise determined then this shall be recorded.

The responsibility for the qualification of the certification personnel is determined by:

- Decision-makers: qualification of certification engineers and inspectors
- Management of the certification body: qualification of the Decision-makers.

8.3 Report initial audit

The certification body shall detail the findings of the initial audit in a report. This report shall comply with the following:

- Complete: The report shall indicate the findings pertaining to each and every requirement detailed in this Evaluation Guideline;
- Traceability: The findings used to determine compliance with the requirements shall be traceable;
- Basis for the decision: The decision maker responsible for certification shall be able to decide on the basis of the findings detailed in the report.

8.4 Decision regarding certification

The decision to certify the supplier shall be made by a qualified decision maker who has not participated in the initial audit. This decision shall be traceable.

8.5 Product certification

The product certificate shall be in conformance with the model in Annex I.

8.6 Nature and frequency of external audits

The certification body shall ensure that the supplier continues to comply with the certification requirements. The number of external audits shall be determined by the Board of Experts. At the time of publication of this Evaluation Guideline the number of audits has been fixed at 2 audits per year.

The audits shall at least include:

- The IQC schedule of the supplier and the results of the internal inspections carried out;
- The correct marking of the certified products;
- The implementation of the required procedures.

The audit results shall be reported by the Kiwa inspector in a report.

8.7 Interpretation of the requirements

The Board of Experts may specify how the requirements are to be interpreted. These interpretations shall be documented in a separate interpretation document.

9 List of referenced documents

9.1 Standards / normative documents:

Standard number	Title	Revision
ASTM D 975 Rev. B	Standard Specification for Diesel Fuel Oils	2009-01-01
BRL-K903	Certification scheme for Installers of Tank Installations (REIT)	2006-12-08
CPD 89/106/EEC	Council Directive on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products	1988-12-21
DIN 53435	Testing of plastics: Bending test and impact test on Dynstat test pieces	1983-07-01
DVS 2212-1 incl. Supplement 1	Qualification testing of plastic welders – Qualification Test Groups I and II – Hot gas welding with the torch separate from the filler rod (WF), high speed hot gas welding (WZ), heated tool butt welding (HS), sleeve welding with an incorporated electric heating element (HM), heated tool sleeve welding (HD) and hot gas extrusion welding (WE)	2006-05-01
ISO 2859-1 incl. Corr. 1:2001	Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection	1999-11-15
NEN-EN 124	Gully tops and manhole covers for vehicular and pedestrian areas. Design requirements, type testing, marking and quality control	1994-11-01
NEN-EN 12608	Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors - Classification, requirements and test methods	2003-06-01
NEN-EN 13501-1	Fire classification of construction products and building elements – Part 1: Classification using the test data from reaction to fire test	2009-09-01
NEN-EN 14214	Automotive fuels - Fatty acid methyl esters (FAME) for diesel engines – Requirements and test methods	2009-02-01
NEN-EN 15376 + NEN-EN 15376/A1	Automotive fuels - Ethanol as a blending component for petrol - Requirements and test methods	2009-09-01
NEN-EN 513	Unplasticized polyvinylchloride (PVC-U) profiles or the fabrication of windows and doors – Determination of the resistance to artificial weathering	1999-08-01
NEN-EN 527-1	Plastics - Determination of tensile properties - Part 1: General principles	1996-01-03
NEN-EN 681-1 incl. Amdts. 1 to 3 + incl. Corr. 1:2002	Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications - Part 1: Vulcanized rubber	2005-08-01
NEN-EN 977	Underground tanks of glass-reinforced plastics (GRP) - Method for one side exposure to fluids	1997-08-01
NEN-EN 978	Underground tanks of glass-reinforced plastics (GRP) - Determination of factor α and factor β	1997-08-01
NEN-EN-ISO 175	Plastics - Methods of test for the determination of the effects of immersion in liquid chemicals	2000-04-01

Standard number	Title	Revision
NEN-EN-ISO 178 + NEN-EN-ISO 178/A1	Plastics - Determination of flexural properties	2003-03-01 2005-02-01
NEN-EN-ISO 1133	Plastics – Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics	2005-06-01
NEN-EN-ISO 1183-1	Plastics -- Methods for determining the density of non-cellular plastics -- Part 1: Immersion method, liquid pyknometer method and titration method	2004-02-01
NEN-EN-ISO 1183-2	Plastics -- Methods for determining the density of non-cellular plastics -- Part 2: Density gradient column method	2004-08-01
NEN-EN-ISO 1872-2	Plastics -- Polyethylene (PE) moulding and extrusion materials -- Part 2: Preparation of test specimens and determination of properties	2007-02-01
NEN-EN-ISO 2818 + NEN-EN-ISO 2818/C1	Plastics - Preparation of test specimens by machining	1997-02-01 2007-11-15
NEN-EN-ISO 3915	Plastics - Measurement of resitivity of conductive plastics	1999-06-01
NEN-EN-ISO 4892-2	Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps	2006-02-01
NEN-EN-ISO 527-2 incl. Corr. 1:1994	Plastics – Determination of the tensile properties –Part 2: Test conditions for moulding and extrusion plastics	1996-07-01
NEN-EN-ISO 8256	Plastics - Determination of tensile-impact strength	2004-07-01
NEN-EN-ISO 9967	Thermoplastics pipes - Determination of creep ratio	2007-11-01
NEN-EN-ISO 9969	Thermoplastics pipes - Determination of ring stiffness	2008-01-01
NEN-ISO 11357-6 + C1	Plastics — Differential scanning calorimetry (DSC) — Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT)	2008-11-01
NPR-CLC/TR 50504	Electrostatics – Code of practice for the avoidance of hazards due to static electricity	2003-07-01
PAS 26 (BSI)	Manhole tops intended for use on service station forecourts and pavement areas. Requirements, performance and marking	1998-11-01

Annex I Model certificate

Number	K12345/01	Replaces	
Issued	2009-01-01	Dated	--

Certificate

Product certificate with technical approval

PE/GRP sumps for underground fuel storage tanks

Based on pre-certification tests as well as periodic audits by Kiwa, the products referred to in this certificate and marked with the Kiwa-mark as indicated under 'Marking', manufactured by

Sump and cover company

may, on delivery, be relied upon to comply with the Kiwa Evaluation Guideline BRL-K21006 "PE/GRP sumps for underground fuel storage tanks". The product has been tested for compliance for the following media:

- Petrol (100% mineral based fuel)
- Kerosene (100% mineral based fuel)
- Diesel (100% mineral based fuel)
- Bio petrol containing up to 20% Ethanol (= up to E20)
- Bio petrol containing 85% Ethanol (= E85)
- Bio kerosene containing up to 20% Ethanol
- Bio diesel containing up to 20% FAME (= up to B20)

Kiwa Nederland B.V.

ing. B. Meekma
Director,
Kiwa Nederland B.V.

This certificate is issued in accordance with the Kiwa Regulations for Product Certification and consists of 3 pages.
Publication of the certificate is allowed.

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PE/GRP sumps for underground fuel storage tanks

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Application and use

Access chambers to be mounted on underground tanks complying with this evaluation guideline are suitable to access underground manhole covers or piping systems easily. It is noticed that the access chamber is a closed area without ventilation where safety instructions are required. It is the responsibility of the owner to follow the safety instructions that are stipulated by the manufacturer.

The access chamber to be selected must be suitable for the maximum level of the groundwater as applicable. The access chamber is intended to keep water out during the lifetime of the tank installation. Where pipework and/or electrical cables enter through the wall of the access chamber entry boots must be used to ensure tightness.

An access chamber can only be mounted on an underground tank when the tank has been equipped with a suitable support for connection or when the access chamber is provided with a solid bottom prepared to fit to the manway flange. The access chamber consists of a chamber, corbel, internal cover, skirt, and access cover with frame.

Technical specification

This following products comply with the BRL-K21006 and have a technical approval:

- XXX
- XXX

The following products shall be used in combination with the access chamber:

- Chamber base seal
- Pipe entry seals
- Adhesive sealant for chamber to corbel joint
- Self levelling sealant between corbel and skirt

The manufacturer shall be able to supply drawings of the access chamber construction in which the components used are identified

Installation

The access chambers are mounted above the manhole covers on underground tanks. The access chambers are part of a construction to enable easy access to the manhole cover and/or underground piping system mounted on the manhole cover of the tank.
For installation the manufacturer's instructions and the requirements as stipulated in BRL-K903 are to be followed. The instructions must be available in the local language. Before starting the installation, the personnel must be instructed and qualified by the manufacturer or the distributor. The manufacturer or distributor shall deliver a certificate of qualification to each person qualified.

The access chamber shall be fixed to a support on the tank. The tank must be equipped with a support to make mounting of the access chamber possible. When openings are made in the access chamber for installing piping or electrical wiring, entry boots must be used to ensure a leak tight construction. The vertical part of the **access chamber** and the entry boots must be leak tested during installation with a vacuum of 12 kPa. The **corbel** must be tested with a vacuum of 6 kPa.
All parts that may come in contact with the stored product must be chemical resistant against that product. This must be verified by the installer. For all connections the sealants and seals as advised by the manufacturer shall be used.

The access chambers must be installed such that they are not subjected to any vertical or horizontal traffic loads. When this is not possible, the frame of the access cover must be part of the pavement or concrete construction above the access chamber. It is recommended to use a suitable access cover. The access cover must be leak tight in order to prevent any fluid leakage from above into the access chamber.

Certified installers for The Netherlands

The access chambers have to be installed by certified installers according to the Kiwa Guideline BRL-K903 "Guideline for installers for installation of atmospheric storage tank- and pipe systems for liquid petroleum products".

PE/GRP sumps for underground fuel storage tanks

Recommendations for the Installer

Check the product at the time of delivery according to the paragraph ''Technical specification" to ensure that:

1. the producer has delivered in accordance with the agreement;
2. the mark and the marking method are correct;
3. the products show no visible defects as a result of transport etc.

Check whether the products meet the specifications according to section general, pipes and fittings of the paragraph "Technical specification"

If you should reject a product on the basis of the above, please contact:

- Manufacturer or local supplier and, if necessary,
- Kiwa Nederland B.V.

It is recommended by the manufacturer to use suitable entry boots and access covers.

Entry boots

Entry boots are meant to accommodate a watertight passage of pipes and/or electrical cables through the chamber wall.

Entry boots consist of a housing that seals to the chamber wall and a flexible part that seals to the pipe.

The housing consists of 2 parts, of which at least one is provided with a gasket-like seal. The 2 parts are bolted to each other and are thus fixed to and holding the chamber wall. The material of the housing must be suitable for underground sub-groundwater level installation.

The flexible part may be single or double sided and is made of a flexible material. The quality of the flexible material is at least a nitrile rubber.

The clamps used to seal to the pipe are to be made of stainless steel.

The entry boot must be able to maintain a watertight entry of the pipe withstanding a groundwater height of 3 meters.

This must be demonstrated by a vacuum test to a pressure of 12 kPa during 15 minutes.

The flexible part must be able to accommodate a deviation of the perpendicular up to 12° of the pipe through the chamber wall and remain functional. Piping must be installed as perpendicular as possible. The diameter of the pipe for which a specific entry boot is suitable, is indicated by the type number of the entry boot. Only entry boots that are in accordance with the pipe (outer) diameter are to be used.

Cable entry boots may accommodate a variation in cable diameters as to the manufacturer's specification. Cable entry boots may be single or multi cable types.

Access Cover

The manufacturer recommend the following access cover and frames:

Cover type Classification Clear opening (mm)

Marking

The products will be marked with the KIWA logo.

For the different products to be carried out as follows:

By inerasable ink or paint, a sticker, a moulded imprint mentioning:

- Manufacturers name and trade mark
- Type number product date code
- Year of manufacture

Maintenance and inspection

Before entering a sump safety measures as instructed by the manufacturer must be taken.

During the 15 or 20 yearly re-qualification, the good operation the access chamber must be visually inspected simultaneously with underground tank.

List of documents

- Kiwa Evaluation Guideline BRL-K-903: "Guideline for Installers for installation of atmospheric storage tank and pipe systems for liquid petroleum products" (only available in Dutch language).
- Kiwa Evaluation Guideline BRL-K-21006: "PE/GRP sumps on underground fuel storage tanks, manifold chambers and/or pump dispensers".

Annex II Model IQC schedule

Subject	Inspection aspects	Inspection method	Inspection frequency	Inspection registration
Raw materials or materials supplied • recipe sheets • incoming goods inspection raw materials				
Production process, production equipment, plant: • procedures • working instructions • equipment • plant				
Finished products				
Measuring and testing equipment • means of measurement • calibration • test equipment				
Logistics • Internal transport • Storage • Packaging • Preservation • Identification or marking of semi-manufactures and end-products				