BRL-K21011/02
January 1st, 2014

Evaluation Guideline

for the Kiwa product certificate for
Glass reinforced plastic (GRP) tanks, with or without spill containers, for the above ground storage of chemicals

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Validation
This evaluation guideline has been validated by the Director Certification and Inspection of Kiwa on January 1st, 2014.

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Preface

This Evaluation Guideline has been accepted by the Kiwa Board of Experts “Tanks, Tank installations & Appendages”, wherein all the relevant parties in the field of storage of chemicals are represented. A working group, reporting to the Board of Experts, prepared this Evaluation Guideline for glass reinforced plastic (GRP) tanks, with or without spill containers, for the above ground storage of chemicals. This working group included representatives from tank manufacturers, tank installers and the end users.

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 includes all relevant requirements which are adhered to by Kiwa as the basis for the issue and maintenance of a certificate for glass reinforced plastic (GRP) tanks, with or without spill containers, for the above ground storage of chemicals.

This Evaluation Guideline replaces BRL-K21011/01 dated 2009-11-15 including the amendment dated May 15th, 2010. Certificates issued on the basis of the older version of the Evaluation Guideline lose their validity after a period of six months after the date of validation of this version.

For the performance of its certification work, Kiwa is bound to the requirements as included in the clause 4.6 “conditions and procedures for granting, maintaining, extending, suspending and withdrawing certification of NEN-EN 45011.

1.2 Field of application / scope

The tanks are designed for:

- Storage of chemicals;
- With or without a thermoplastic liner;
- Above ground installation;
- Construction can be either:
  - Single or double walled, vertical cylindrical/rectangular construction with a conical, flat or dished end roof or bottom, or
  - Single or double walled, horizontal cylindrical/rectangular construction with dished ends;
- Fabricated in the factory;
- Inside or outside installation;
- Atmospheric pressure i.e. with a design pressure ≤ 50 kPa;
- With or without leak detection or pre-leakage detection;
- Subjected to a normal continuous operating temperature of fluid which can range between – 40 ^{0}C and + 120 ^{0}C;
- Maximum filling capacity = 95% of the nominal capacity.

The tanks are not designed for:

- Combined installation such as a battery arrangement;
- Storage under pressure in excess of 50 kPa;
- Underground installation;
- Site built;
- Spherical tanks and tanks of irregular shape;
- Transport and distribution of fluids.

The spill containers are designed for:

- Secondary containment of chemicals;
- Above ground installation;
- Atmospheric pressure;
- Subjected to a normal operating temperature of fluid which can range between -40 ^{0}C and + 120 ^{0}C;
- 110% of the maximum volume of the tank.

The tanks and spill containers are made from glass reinforced plastic (GRP).

All single wall tanks shall be installed with a secondary containment for retaining fluids. The secondary containment construction on site shall be in compliance with the requirements of AS 6700 or be approved by the certification body for the installation of

the tank. When the construction on site does not fulfil this requirement a spill container as describes in this guideline shall be used.

Should the tank manufacturer supply both the tank and the spill container then he is responsible for the correct functioning of the tank and spill container as a combined unit. The operation of the combined unit shall be documented and approved by the manufacturer of the tank.

Note: A double walled tank equipped with a working leak detection system does not need to be installed with a secondary containment for retaining fluids.

The product certificate is only applicable if the requirements mentioned in paragraph 6.5 and 6.6 are fulfilled.

1.3 Acceptance of test reports provided by the supplier

When by the manufacturer reports from test Institutions or laboratories are produced in order to demonstrate that the product meets the requirements of this evaluation guideline, the institute or laboratory shall meet one of the applicable accreditation norms, being;
NEN-EN-ISO/IEC 17025 for laboratories;
NEN-EN-ISO/IEC 17020 for inspection bodies;
NEN-EN 45011 for certification bodies certifying products.

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.

1.4 Quality declaration

The quality declarations to be issued by Kiwa are described as Kiwa product certificate. A model of the certificate to be issued on the basis of this Evaluation Guideline has been included as Model Certificate.

2 Terminology

In this Evaluation Guideline the following definitions shall apply:

Evaluation Guideline: the agreements made by the Board of Experts on the subject of certification;

Board of Experts: the Board of Experts “Tanks, Tank installations and Appendages”;

Supplier: the party responsible for ensuring that the products meet and continue to meet the requirements on which the certification is based;
Note: the ‘Supplier’ may also be the manufacturer of the certified product(s).

Internal Quality Control schedule (IQC schedule): a description of the quality inspections and tests carried out by the supplier as part of his quality system.

Product requirements: requirements made specific by means of measures or figures, focusing on (identifiable) characteristics of products and containing a limiting value to be achieved, which limiting value can be calculated or measured in an unequivocal manner.

Pre-certification tests: tests in order to ascertain that all the requirements recorded in the Evaluation Guideline are met.

Inspection tests: tests carried out after the certificate has been granted in order to ascertain whether the certified products continue to meet the requirements recorded in the Evaluation Guideline.

Remark
The test matrix contains a summary showing what tests Kiwa will carry out in the pre-certification stage and in the event of inspections as well as showing the frequency with which the inspection tests will be carried out.

Product certificate: a document, in which Kiwa declares that a product may, on delivery, be deemed to comply with the product specification recorded in the product certificate.

3 Terms and definitions

In this Evaluation Guideline the following terms and definitions are applicable:

Brim full capacity
Volume of water held by the tank filled through the filling orifice to the point of overflowing when all the nozzles are closed. The brim full capacity is always more than the nominal capacity.

Chemical protective barrier
A barrier layer provided on the inside of the tank to meet the effects caused by the stored medium at the designed service conditions.

Double walled tank
A tank whereby the structural wall is foreseen with an interstitial space which is used for leak detection purposes. These tanks can be equipped with an internal chemical protective barrier layer or thermoplastic liner which determines the life expectancy of the tank.

Leak detection system
A system for the detection of leaks in the inner or outer wall of a double walled tank which results in a visual and/or audible signal so that preventive measures can be taken. A tank equipped with a leak detection system in accordance with BRL-K910 can prevent soil contamination and can, in most cases, be installed without a spill container.

Maximum filling capacity
95% of the nominal capacity.

Mobile storage of fluids
The term mobile storage is applicable to tanks / spill containers which are suitable for transport when filled. These tanks / spill containers shall also comply with the requirements of ADR and therefore have the UN-identification required by ADR. Such tanks are **not** included in this Evaluation Guideline.

Nominal capacity
The nominal capacity of the tank is the capacity specified by the client. This is the value used in the tank calculations. This capacity is the volume of the cylindrical section of the tank up to the connection with the roof or the lower part of the overflow connection if provided.

Pre-leakage detection system
A system for the detection of leaks in the inner chemical protection layer of a single walled tank which results in a visual and/or audible signal so that preventive measures can be taken. Even though a tank equipped with a pre-leakage detection system can be instrumental in preventing soil contamination it is as a stand-alone system insufficient for the installation of a single walled tank without a spill container.

Secondary containment construction on site
A secondary containment constructed on site for tanks which can retain its designed shape and function in any stage of its designed working life for the retention of any spillage of the medium stored. This construction is the responsibility of the client and is not included in this Evaluation Guideline.

Single walled tank
A tank whereby the single wall is of a layered construction such that these contribute to the strength and stiffness properties of the tank. These tanks are always equipped with an internal chemical protective barrier layer which determines the life expectancy of the tank. These tanks can be equipped with a pre-leakage detection system.

Spill container
A secondary containment for tanks which can retain its designed shape and function in any stage of its designed working life as a stationary storage container.

Stationary storage of fluids
The term stationary storage is applicable when tanks / spill containers are permanently installed in one location and / or are not suitable for transport when filled.

Tank
A container for the storage of fluids, which can retain its designed shape and function in any stage of its designed working life as a stationary storage container. A tank can be either:

- a single walled construction with or without a pre-leakage detection system. These tanks are installed in a spill container;
- a double walled construction with a leak detection system. Tanks with a leak detection system can be installed without a spill container.

Tank battery
Two or more tanks installed parallel or in series, whereby use is made of common suction, filling and venting lines without the possibility of isolating any individual tank. A tank battery is **not** included in this Evaluation Guideline.

4 Legal requirements

4.1 General

This chapter refers to the legal requirements in relation to the tanks and spill containers manufactured in accordance with this Evaluation Guideline.

4.2 Legal requirements

The tanks and spill containers manufactured in accordance with this Evaluation Guideline fall under the jurisdiction of the Dutch government who has specified the requirements pertaining to various industries with regard to the environment in the BARIM (Besluit Algemene Regels voor Inrichtingen Milieubeheer also known as ”Activiteitenbesluit”). The requirements stipulated in the BARIM are further clarified in the RARIM (Regeling Algemene Regels voor Inrichtingen Milieubeheer).

In one of the stipulations of the RARIM it is required that all installations for the above ground storage of chemicals shall be installed by an installation company that has been certified in accordance with the requirements of Evaluation Guideline BRL-K903. This pertains to the following chemicals:

- All fuels except for petrol;
- Waste oils;
- ADR Class 5.1 materials (oxidizing agents);
- ADR Class 8 packaging group II and III materials (corrosive fluids – bases or alkaline solutions and acids);
- PER (Perchloorethyleen = Tetrachloroethylene) and other fluids that could result in the contamination of the ground or ground water.

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 storage of chemicals 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 BARIM, RARIM and Evaluation Guideline BRL-K903.

Some companies do not fall under the jurisdiction of the BARIM/RARIM. The requirements pertaining to the above ground storage of chemicals 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 30, BRL-K903 to this Evaluation Guideline.

5 Procedure for granting the quality declaration

5.1 Pre certification tests

The pre certification-tests to be performed are based on the (product) requirements as included in this Evaluation Guideline including the test methods and contain, depending on the nature of the product to be certified:

- Type testing to determine whether the products comply with the product and/or functional requirements,
- Production process assessment,
- Assessment of the quality system and the IQC-scheme,
- Determine whether the required procedures are available and are fully implemented.

5.2 Granting the quality declaration

On conclusion of the pre-certification tests 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.

6 Requirements and test methods

6.1 General

This chapter lists the product and performance requirements that have to be met by the tanks and spill containers made from glass reinforced plastic with or without a thermoplastic liner.

6.2 Design drawings and calculations

The manufacturer shall define all tank types, nominal sizes including capacities proposed for approval. The design details of the assembled product, materials to be used, lifting instructions, life expectancy of the product and the dimensional tolerances used in production shall be specified by the manufacturer in technical drawings and calculations. The design details and calculations shall be in accordance with NEN-EN 13121-1 through -3. The Certification Body shall evaluate these drawings and design for approval. Furthermore, the design shall be based on the following:

- a life expectancy of at least 20 years
- for outside installation:
  - an ambient temperature between – 20 to + 50 ^{o}C;
  - a snow load of 700 N/m² (see also National Annex to NEN-EN 1991-1-3 (Eurocode 1))
  - a wind load as determined on the basis of the National Annex to NEN-EN 1991-1-4 (Eurocode 1) whereby the tank height shall be used in determining the wind load in the calculations
  - adequate measures, when storing fluids that are susceptible to degradation when directly or indirectly exposed to sunlight, to prevent the degradation of the fluid stored.

For earthquake prone areas **and** when specified by the client, the calculations shall be in accordance with NEN-EN 1998-1:2004 (Eurocode 8) using the following factors:

- Behaviour factor (q) for GRP tanks of 1,5
- Ground type as specified in Table 3.1. Should the ground type not be known then ground type C shall be used
- Building Class as specified in Table 4.3. For water catchment areas, as indicated by the client, the γ1 factor of 1,4 shall be used
- The horizontal acceleration as stated in “Seismic Hazard Zonation in National Building Codes in the context of Eurocode 8” as published by the JRC. For the vertical acceleration 0,67 x horizontal acceleration shall be used.

When no information is available then the client shall have to specify the factors that have to be used.

Note: In some parts of the Groningen province can be marked as an earthquake prone area due to the large scale extraction of natural gas. Should the client require the manufacturer to take the earthquake aspects into account then, unless otherwise specified by the client, the Seismic Zone C shall be applicable.

In addition to the bottoms specified in NEN-EN 13121-3 for fully supported flat bottom tanks, the use of truncated bottoms as specified in Annex 1 is allowed.

6.3 Requirements and test methods of material charecteristics

In addition to the requirements detailed in NEN-EN 13121-1 through -3 the following requirements will be applicable.

6.3.1 Design of double walled tanks with leak detection

The design of the structural wall of double walled tanks shall be in accordance with the requirements of NEN-EN 13121-3. The interstitial space required for leak

detection purposes shall have a minimum height of 5 mm and shall not contribute to the calculation of the structural wall strength of the tank.

A double walled tank shall be constructed as follows:
The structural tank wall with an inside wall for leak detection purposes. The specification for the inside wall will be in accordance with the requirements of NEN-EN 13121-2.

The interstitial space shall be designed to withstand an overpressure or a vacuum dependent on the system used – see paragraph 6.4.4. This design pressure is a minimum of 0,1 bar(a) for vacuum systems and a maximum of 3,5 bar(a) for pressurized systems and shall be based on the hydrostatic pressure exerted by the medium to be stored. The material used for forming the interstitial space shall be resistant to the chemical to be stored – see paragraph 6.3.2. For storage of critical media (as listed in the DIBt Medienlisten 40) a double walled tank shall not be used. The interstitial space shall at least cover the bottom and the cylindrical section up to the nominal capacity of the tank. For the vacuum system the leak detection system shall have a measuring connection to the lowest point of the interstitial space. For pressurized systems this requirement is not applicable.

The interstitial space shall be tested for leak tightness as follows:
- When a leak detection system is used based on an overpressure then the test pressure shall be 20% higher than the pressure obtained by the maximum liquid column, or
- When a leak detection system is used based on a vacuum system then the test pressure shall be an overpressure of 0,3 bar(g).

A double walled tank equipped with a leak detection system in accordance with BRL-K910 can be installed without a spill container.

6.3.2 Resistance to chemicals

The chemical protective barrier of the tank and spill container shall be resistant to the chemical to be stored for a minimum period of 20 years and 6 months respectively. Determination of the resistance to chemicals will be in accordance with the NEN-EN 13121-2 with the additional requirement that any blister or crack formation observed during the testing shall disqualify that material for the proposed application. When use is made of a thermoplastic lining, the material used shall be limited to those defined in NEN-EN 13121-2. Additionally, use may also be made of the DIBt Medienlisten 40. In those cases where the resistance to chemicals as indicated by the EN 13121-2 differs from that given by the DIBt, the value given in the EN 13121-2 shall be used. The method used in determining the resistance to chemicals shall be documented by the tank manufacturer.

In some applications the chemical protective barrier of the tank will not be resistant to the chemical to be stored for the minimum period of 20 years. In such cases the tank manufacturer shall, after obtaining written approval from the client, stipulate the minimum period after which the tank shall be recertified. This shall be specifically stated on the tank compliance document and on the tank identification.

The resin used for outer surface of the tank shall be suitable for a period of 3 months against the medium to be stored. For this purpose, for example, a resin based on an orthophthalic and/or an isophthalic acid can be used. This can be determined on the basis of NEN-EN 13121-2. This requirement is not applicable to tanks provided with a thermoplastic liner. In order to prevent a prolonged contact of the tank bottom with any spilled medium one of the following options shall be used:
- The installation of flat bottomed tanks on a raised platform or grid of 40 to 50 mm height, or
- Provide the tank with a skirt. In this case the bottom of the skirt shall be provided with at least 3 equally spaced openings of 40 to 50 mm so that the spillage can be drained from inside the skirt.

6.3.3 Weathering and UV resistance

The tank and spill container shall be resistant to weathering. In order to achieve this the outer surface of the tank shall be finished with a smooth surface achieved with a resin rich impregnated veil. Thereafter this surface shall be provided with a paraffinated top coat with the addition of a suitable UV stabiliser. Measures are to be taken to ensure that the outer surface is fully cured and this shall be determined by means of the Barcol hardness test whereby at least 80% of the hardness prescribed by the coating manufacturer shall be achieved. The coating manufacturer shall submit a written demonstration of the suitability of the UV stabiliser for the foreseen application.

6.3.4 Electrostatic behaviour (optional)

Some chemicals could form a risk during the filling operation due to the build-up of static electricity. When storing such chemicals means for conducting any build-up of static electricity within the tank to the outside of the tank shall be provided. Hereby use can be made of the internal metallic pipe or a conductive plastic pipe. The electrical resistivity of those parts in contact with the chemical to be stored shall be tested in accordance with NEN-EN 13121-3.

When use is made of this option the manufacturer shall include the measures to be taken in the installation and user instructions – see paragraph 6.5.

6.3.5 Reaction to fire (optional)

When required or specified, the external surface layer(s) of the tank and/or spill container shall be modified to meet the requirements. Classification shall be in accordance with NEN-EN 13501-1.

When use is made of this option the manufacturer shall include the measures to be taken in the installation and user instructions – see paragraph 6.5.

6.3.6 Design of the spill container

The spill container, when supplied, shall preferably have at least the same life expectancy as the tank.

However, since the spill container will only be exposed for short durations to the medium to be stored the tank manufacturer can use different design parameters whereby the life expectancy shall be a minimum of 5 years continuous exposure. In such cases the tank manufacturer shall install a system for the detection of the presence of liquid in the spill container and shall instruct the user to clean all spillage within a maximum period of 1 week. Also, in such cases the tank manufacturer shall, after obtaining written approval from the client, stipulate the minimum period after which the spill container shall be recertified. This shall be specifically stated on the spill container compliance document and on the spill container identification.

6.4 Requirements and test methods of the tank and spill container characteristics

In addition to the requirements detailed in NEN-EN 13121-1 through -3 the following requirements will be applicable.

6.4.1 Visual inspection / appearance

The inner and outer surface of the tank and spill container shall be smooth and flawless, without holes, blisters or other defects. The material shall be free of contamination. The visual inspection shall be in accordance with EN 13121-3. The manufacturer's quality system shall include clear procedures for approval and rejection.

6.4.2 Wall thickness

The wall thickness and the wall build-up of the tank and spill container shall be in accordance with the manufacturer's approved drawings.

6.4.3 Volume of the spill container

The spill container shall have a volume that is at least 110% of the nominal capacity of the tank. If more than one tank is installed in the same spill container then the volume of the spill container shall be at least equal to the volume of the largest tank plus 10% of the volume of all the other tanks.

6.4.4 Leak detection system

A double walled tank shall be provided with a leak detection system that utilises an overpressure or vacuum and is certified in accordance with the requirements of BRL-K910. The installation of the leak detection system shall be in accordance with the instructions of the manufacturer of the leak detection system.

After installation, the leak detection system shall be tested for proper working and the tank interstitial space shall be tested at the calculated overpressure or vacuum. The installation of the leak detection system on site is the responsibility of the installation company.

The manufacturer shall include the measures and/or requirements relating to the leak detection system in the installation and user instructions – see paragraph 6.5.

6.4.5 Pre-leakage detection system (optional)

A single walled tank can be provided with a pre-leakage detection system. If provided, this pre-leakage detection system shall be provided with:

- A fail-safe construction i.e. provide an alarm when the detection system is defective;
- The possibility to automatically monitor the status of the tank wall at least once per day;
- A test mode that allows the personnel to test the proper working of the detection system whereby the (test) alarm can be checked;
- A visual as well as an acoustic signal when the integrity of the tank wall has been breached. In this event the signal shall be connected to the operator's working station in such a way that it can only be turned off after corrective action has been taken.

The chemical protective barrier shall have an electrical resistivity of at least 10^8 $\Omega.m^2$.

Note: According to Dutch legislation, a single walled tank, even when provided with a pre-leakage detection system, shall always be installed in a spill container.

The manufacturer shall include the measures and/or requirements relating to the pre-leakags system in the installation and user instructions – see paragraph 6.5. The installation of the pre=leakage detection system on site is the responsibility of the tank manufacturer.

6.4.6 Leak tightness

All connections on the tank shall be properly closed before performing this test. All connections shall be checked for leaks using a soap water solution or equivalent when using the pneumatic pressure test.

<u>Chemicals having a specific gravity ≤ 1,0</u>
All tanks shall be leak tight to a pneumatic pressure of 30 kPa for at least 15 minutes. Alternatively, the tank shall be filled with water to the highest point of the tank including all flanged connections for a period of at least 24 hours. The tank shall be leak tight and an internal and external visual inspection shall reveal no defects. Alternatively, this test may also be performed at the site under the responsibility of the tank manufacturer.

<u>Chemicals having a specific gravity > 1,0</u>
All tanks shall be filled with water to the highest point of the tank including all flanged connections. A standpipe will be attached to the top of the tank and filled with water to

a level that equates to the specific gravity of the chemical e.g. for a tank having a height of 10 meters the height of the standpipe shall be 2 meters for a chemical with a specific gravity of 1,2. The water filling will be maintained for a period of at least 24 hours. The tank shall be leak tight and an internal and external visual inspection shall reveal no defects.

Alternatively, this test may also be performed at the site without the standpipe, under the responsibility of the tank manufacturer, as follows:

- Fill the tank with water to the highest point of the tank for a period of 12 hours. The tank shall be leak tight and an internal and external visual inspection shall reveal no defects, and
- Fill the tank with the chemical to be stored for a period of 24 hours. The tank shall be leak tight and an external visual inspection shall reveal no defects.

Tanks designed for overpressure

When tanks are constructed for an over pressure i.e. with a design pressure ≤ 50 kPa then the tank shall be filled with water to the highest point of the tank including all flanged connections and further subjected to an overpressure equal to the design pressure for a period of at least 24 hours. The tank shall show no leaks.

Spill containers

All spill containers shall be filled with water to the highest point of the spill container for a period of 24 hours. The spill container shall show no leaks.

6.4.7 Spark testing

When use is made of a thermoplastic liner, the welds made shall be spark tested for discontinuities. Any discontinuities shall be repaired and the retesting shall be performed at the original test voltage. The testing shall be performed in accordance with NEN-EN 13121-3.

In the event that a pre-leakage detection system has been provided, the entire inner tank surface will be subjected to spark testing. A minimum test voltage as stipulated in NEN-EN 13121-3 shall be used for this test.

6.4.8 Connections on the tank

Each assembled tank shall be equipped with at least the connections as detailed in the table below. All connections shall preferably be installed at the top of the tank and above the maximum fluid level. Should the suction connections below the fluid level be necessary then these shall be fitted with a flange connection, a hand operated valve and a failsafe actuated valve. In these cases the spill container shall be large enough for the operator to be able to access and maintain the valves installed and the pipe shall preferably not penetrate the wall of the spill container. Should the latter be necessary then the tank manufacturer is responsible for installing a product bearing pipe that is suitable for the chemical to be stored that penetrates the wall of the spill container. The location of this pipe shall be as high as possible and shall be determined together with the client and the tank installer. The connection between the pipe and the wall of the spill container shall be made leak proof (welded or laminated). In such cases the tank installer shall be:

- advised to install a sensor in the spill container for the detection of any leakage of the medium stored,
- advised to install flexible connectors both inside and outside the spill container to connect with the welded or laminated pipe, and
- provided with instructions to clean up any leakage as soon as possible but within a maximum period of 1 week.

Connection	Minimum size DN	Position
Fill pipe	50	Opposite to the vent, as far away as possible
Suction	50	Not specified
Fluid level indicator	40	Not specified
Vent/U-bend	75	Highest point of the tank

Table 6.1: Tank connections

The connection size of the vent shall not be less than 1,5 times the connection size of the fill pipe in order to avoid either over pressure or vacuum.

The connections on the tank shall be resistant to the fluid to be stored. Only flanged connections are to be used and these shall be welded on the top of the tank and be in accordance with NEN-EN-ISO 15494. For all connections the distance between the top of the tank and the bottom of the flange shall be at least 100 mm with a minimum distance of 50 mm between the flanges of any two connections. All flange surfaces shall be flat and horizontal.

6.4.9 Internal piping in the tank

The internal piping shall form an integral part of the assembled product.

Piping	Requirements
Fill pipe	If provided, this pipe shall have at least a 3 mm diameter hole located as high as possible
Suction	The distance of the lowest point of this pipe to the bottom of the tank shall be at least the diameter of the suction pipe
Fluid level indicator	If provided this pipe shall have a 3 mm diameter hole as high as possible
Vent	No internal pipe allowed

Table 6.2: Internal piping in the tank

Due to the hydraulic cyclical pressure all piping shall be at least PN 16. There shall be no openings in the internal piping with the exception of the pipe used for the fluid level indication or fill pipe (if applicable) which shall be provided with a hole of 3 mm diameter as high as possible. All pipes shall be resistant to the fluid to be stored and shall be in accordance with NEN-EN-ISO 15494.

6.4.10 Manholes and inspection openings

Tanks shall be equipped with a manhole for accessing the tank. The manhole opening shall have a minimum internal diameter of 600 mm and shall be located on the top of the tank.

Horizontal tanks with a cylindrical length greater than 10 m shall be equipped with two manholes. These manholes are to be situated as far apart as possible. The manhole flange shall not extend beyond 20 mm into the tank in order to ensure a free flow of the vapours of the stored chemical.

Vertical tanks with a cylindrical height greater than 2,5 m shall be equipped with two manholes. The axis of the second manhole shall be located at a height of approximately 1 m above ground level in the cylindrical section of the tank. The distance between the weld of the manhole flange and the weld of the dished or conical end or flat bottom knuckle area shall be at a least 50 mm. Alternatively, in this case the tank manufacturer may choose to replace the manhole on top of the tank with an oversized vent with a minimum diameter of 200 mm.

If the size of the tank does not allow the installation of a manhole opening then an inspection opening shall be installed. The inspection opening shall have a diameter of not less than 300 mm, and shall be provided with a means of being secured in place so that it can only be used for the intended purpose.

Note: National regulations may require the re-qualification of a tank at periodic intervals. If these regulations stipulate that an internal inspection of the tank has to be carried out by a qualified inspector then a manhole is recommended. If an adequate internal inspection of the tank is not possible, the tank will be rejected after the first re-qualification period.

6.4.11 Sealing elements

Elastomeric sealing elements shall be resistant to the chemicals to be stored. This shall be demonstrated in writing by the manufacturer of the sealing element based on his chemical resistance list and related to the compound number and design of the gasket.

When no information is available regarding the chemical resistance of the elastomeric sealing element to the chemical to be stored then a declaration from the manufacturer of the sealing element shall be provided as to the suitability of the element used.

Note,
Should testing be required in order to evaluate the chemical resistance of the sealing element then the requirements of NEN-EN 681-1 (or equivalent) whereby the testing shall be done with the chemical to be stored can be used. After performing the swelling test there should be no visual deterioration of the elastomeric seal.

For some applications the use of PTFE sealing elements is required. The PTFE sealing elements shall be resistant to the chemicals to be stored. This shall be demonstrated in writing by the manufacturer of the sealing element based on the test reports of the actual material supplied. In addition, PTFE sealing elements shall be tightened in accordance with the manufacturer's instructions.

Note: Attention should be given to the possibility of over tightening the sealing element resulting in the sealing element being squeezed out of the joint. A reinforcing inlay can be used to prevent this from occurring.

6.5 Installation and user instructions

The manufacturer shall provide proper written installation and users' instructions in the language of the country where the tank is to be installed and used. These instructions shall reference compliance with the national environmental regulations pertaining to the storage of chemicals. National regulations can stipulate requirements for preventing accidental impact to the tank and spill container and requirements for the overfill prevention and anti-siphon devices. National regulations stipulate that the installation is to be carried out by installers certified in accordance with the requirements of BRL-K903 Scope F. The instructions shall include the precautions to be taken and the testing requirements when testing the tank on site. The test pressure to be used for this test will be limited to 5 kPa. For tanks designed for overpressure the design pressure shall be used.

The following Evaluation Guidelines provide additional information pertaining to the installation of the tank and spill container:

- BRL-K903 for the installation of tanks and appendages
- BRL-K910 for leak detection systems for the storage and/or transport of products in the liquid phase or gas phase

In all cases the appendages used shall be resistant to the chemical stored and this shall be suitably demonstrated by the tank installer.

6.6 Documentation to be supplied with tank and spill container

Every GRP-tank / spill container shall be supplied with at least the following documents:

- The documentation as required by NEN-EN 13121-3.
- Installation / user instructions in the language of the country where the tank is to be installed and used. The certification body shall approve these instructions.
- A unique tank / spill container compliance document with the approval of the certification body in relation to the product certificate.

6.7 Tank and spill container identification

Each GRP-tank and spill container shall be indelibly marked with the following items:

- Certification mark and certification number of the certification body;
- Manufacturer's name and/or manufacturer's trade name;
- Serial number of the tank and spill container;
- Month and year of manufacture;
- Nominal volume of the tank or spill container in litres or m^3;
- Name of chemical to be stored in the tank including the CAS number (Chemical Abstract Service number) along with the concentration;
- Location of the storage tank: Inside or outside;
- Factory/site tested*: Pneumatic pressure of 30 kPa for 15 minutes/Hydrostatic pressure with water filling (at design pressure, if applicable) for 24 hours/Hydrostatic pressure with chemical filling at site;
- Maximum design temperature of chemical to be stored;
- Maximum design pressure of the tank;
- Recertification period if chemical resistance is less than 20 years (see 6.3.2).

* = delete as applicable

When this information is provided on an identification label (or plate), the label shall be mounted at eye level and provisions shall be taken to ensure that this label cannot be removed from the tank or spill container. Both the tank and the spill container shall be provided with its own identification label. Should the tank label not be visible due to the spill container then a second tank label shall be mounted next to the spill container label.

7 Quality system requirements

7.1 General

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

7.2 Manager of the quality system

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

7.3 Internal quality control/quality plan

As part of the quality system the supplier 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 supplier;
- according to which methods these inspections are carried out;
- how often these inspections are carried out;
- how the inspection results are registered and archived.

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

At the time of the initial evaluation this schedule shall have been functioning for a period of at least 3 months.

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

7.4 Qualification of personnel

All laminators and welders involved in the production of the tanks shall be qualified for this work in accordance with the requirements of NEN-EN 13121-3. 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.

7.5 Qualification/approval of special processes

All welding and 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.

7.6 Procedures and working instructions

The supplier shall be able to submit the following:

- Procedures for:
  - the handling of non-conforming products;
  - corrective actions in case non-conformities are found;
  - the handling of complaints regarding the products and / or services supplied.
- The working instructions and inspection forms in use.
- Instructions for packaging and closing off of products during storage and transport.

7.7 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.

7.8 Documentation retention

Unless specified otherwise, all qualification, inspection, test reports, calculations, drawings and material certificates shall be retained for a period of at least 10 years.

8 Summary of tests and inspections

This chapter contains a summary of the following tests and inspections to be carried out in the event of certification:
Pre-certification tests: the investigation necessary in order to determine whether all requirements of the evaluation guideline are fulfilled,
Inspection of the quality system: the inspection carried out after issue of the certificate in order to determine whether the certified products continuously fulfil the requirements of this evaluation guideline.

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

8.1 Test matrix

Description of requirement	BRL Article	Category (see note)	Assessment within the scope of the BRL		
			Initial Evaluation	Inspection of quality system after issue of the certificate	
				Inspection	Frequency
Design					
Design drawings and calculations	6.2	1	Yes	Yes	Every visit
Requirements for material characteristics					
Design of double walled tanks with leak detection	6.3.1	1	Yes	Yes	Every visit
Resistance to chemicals	6.3.2	1	Yes	Yes	Every visit
Weathering and UV resistance*	6.3.3	2	Yes	Yes in event of change	By every change
Electrostatic behaviour (optional)*	6.3.4	2	Yes	Yes in event of change	By every change
Reaction to fire (optional)*	6.3.5	2	Yes	Yes in event of change	By every change
Design of the spill container	6.3.6	2	Yes	Yes	Every visit
Requirements for tank en spill container					
Visual inspection / appearance	6.4.1	3	Yes	Yes	Every visit
Wall thickness	6.4.2	2	Yes	Yes	Every visit
Volume of the spill container	6.4.3	3	Yes	Yes	Every visit
Leak detection system	6.4.4	2	Yes	Yes	Every visit
Pre-leakage detection system (optional)	6.4.5	2	Yes	Yes	Every visit
Leak tightness	6.4.6	1	Yes	Yes	Every visit
Spark testing	6.4.7	2	Yes	Yes	Every visit
Connections on the tank	6.4.8	2	Yes	Yes	Every visit
Internal piping in the tank	6.4.9	2	Yes	Yes	1x/year
Manholes and inspection openings	6.4.10	2	Yes	Yes	Every visit
Sealing elements	6.4.11	2	Yes	Yes	Every visit
Installation and user instructions	6.5	2	Yes	Yes	1x/year
Documentation to be supplied with tank and spill container	6.6	2	Yes	Yes	Every visit
Tank and spill container identification	6.7	1	Yes	Yes	Every visit
Internal quality control/quality plan	7.3	2	Yes	Yes	Every visit
Qualification of personnel	7.4	2	Yes	Yes	1x/year
Qualification/approval of special processes	7.5	2	Yes	Yes	1x/year
Procedures and working instructions	7.6	3	Yes	Yes	1x/year
Design changes	7.7	1	Yes	Yes	Every visit
Documentation retention	7.8	3	Yes	Yes	Every visit
* = Certificate of conformity (specifications from suppliers)					

Table 8.1: Test matrix

Note:
Non-conformities can be reported during the surveillance visits. 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 visit.

During the pre-certification evaluation of the product the requirements that shall be fulfilled in order to qualify for certification are stated in the above matrix.

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

After certification Kiwa shall periodically evaluate the manufacturer for compliance with this Evaluation Guideline as stated in the above matrix.

8.2 Inspection of the quality system

The quality system will be checked by Kiwa on the basis of the IQC schedule. The inspection contains at least those aspects mentioned in the Kiwa Regulations for Product certification.

9 Agreements on the implementation of certification

9.1 General

Beside the requirements included in these evaluation guidelines, also the general rules for certification as included in the Kiwa Regulations for Product Certification apply.

These rules are in particular:

- The general rules for conducting the pre-certification tests, to be distinguished in:
  - the way suppliers are to be informed about an application is being handled,
  - how the test are conducted,
  - the decision to be taken as a result of the pre certification tests.
- The general directions for conducting inspections and the aspects to be evaluated,
- The measurements to be taken by Kiwa in case of Non Conformities,
- Measurements taken by Kiwa in case of improper Use of Certificates, Certification Marks, Pictograms and Logos,
- Terms for termination of the certificate,
- The possibility to lodge an appeal against decisions of measurements taken by Kiwa.

9.2 Certification staff

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

- **Certification experts**: 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.

9.2.1 Qualification requirements

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

Requirements EN 45011	**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

Requirements EN 45011	Function and responsibility		
	Certification Engineer	Inspector	Decision maker
Experience: general	• 1 year of relevant working experience • At least 4 pre certification tests of which one carried out independent under supervision.	• 1 year of relevant working experience • At least 4 pre certification tests of which one carried out independent under supervision.	• 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 9.1: Qualification matrix

9.2.2 Qualification

The qualification of the Certification staff shall be demonstrated by means of assessing the education and experience to the requirements mentioned before. In case staff is to be qualified on the basis of deflecting criteria, written records shall be kept.

The authority to qualify staff is dedicated to:

- Decision makers: qualification of certification experts and inspectors,
- Management of Kiwa: qualification of decision makers.

9.3 Report Pre certification tests

Kiwa records the results of the pre certification tests in a report. This report shall comply with the following requirements:

- Completeness: the reports verdicts about all requirements included in the evaluation guideline,
- Traceability: the findings on which the verdicts have been based shall be recorded traceable,
- Basis for decision: the decision maker shall be able to base his decision on the findings included in the report.

9.4 Decision for granting the certificate

The decision for granting the certificate shall be made by a qualified decision maker which has not been involved in the pre certification tests. The decision shall be recorded traceable.

9.5 Lay out of quality declaration

The product certificate shall be conform the model included in Model Certificate.

9.6 Nature and frequency of external inspections

The certification body shall carry out inspections at the supplier at regular intervals to check whether the supplier complies with his obligations. The inspection frequency shall be determined by the Board of Experts. At the time this Evaluation Guideline took effect, the frequency was set as follows:

Number of tanks produced per year	Number of visits per year
Between 0 to 1 tank per year	1 visit per year
Between 2 to 4 tanks per year	2 visits per year
Between 5 to 8 tanks per year	3 visits per year
Between 9 to 12 tanks per year	4 visits per year
More than 12 tanks per year	5 visits per year

Table 9.2: Inspection frequency

Inspections shall at least refer to:

- The suppliers IQC schedule and the results obtained from inspections carried out by the supplier,
- The correct marking of the certified products
- Complying with the required procedures.

The results of each inspection shall be traceable recorded in a report.

9.7 Interpretation of requirements

The Board of Experts may record the interpretation of requirements of these evaluation guidelines in one separate interpretation document.

10 Titles of standards

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Standard number	Title	Revision
BRL-K903	Certification scheme for Installers of Tank Installations (REIT)	
BRL-K910	Leak Detection Systems for the storage and/or transport of liquid or gaseous products	
BRL-K910 Suppl. A	Leak Detection of Double Walled Compartments using gas under pressure or vacuum	
DIBt Medienlisten 40	Medienlisten 40 für Behälter, Auffangvorrichtungen und Rohre aus Kunststoff	
ISO 2859-1	Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection	
JRC 48352	Seismic Hazard Zonation in National Building Codes in the context of Eurocode 8	
NEN-EN 681-1	Elastomeric seals – Material requirements for pipe joint seals used in water and drainage applications – Part 1: Vulcanized rubber	
NEN-EN 1991-1-3 incl. NB	National Annex to NEN-EN 1991-1-3+C1:Eurocode 1 Actions on structures - Part 1-3: General actions - Snow loads	
NEN-EN 1991-1-4 incl. NB	National Annex to NEN-EN 1991-1-4+A1+C2: Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions	
NEN-EN 1998-1	Eurocode 8: Design of structures for earthquake resistance - Part 1 : General rules, seismic actions and rules for buildings	
NEN-EN 13501-1	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests	
NEN-EN 13121-1	GRP Tanks and vessels for use above ground – Part 1: Raw Materials – Specification conditions and acceptance conditions	2003-07-01
NEN-EN 13121-2	GRP Tanks and vessels for use above ground – Part 2: Composite materials – Chemical resistance	2003-10-01
NEN-EN 13121-3 incl. Amdt. 1:2010	GRP Tanks and vessels for use above ground – Part 3: Design and workmanship	2008-07-01

Standard number	Title	Revision
NEN-EN-ISO 15494	Plastics piping systems for industrial applications — Polybutene (PB), polyethylene (PE) and polypropylene (PP) — Specifications for components and the system – Metric series	

Annex 1 Truncated bottoms

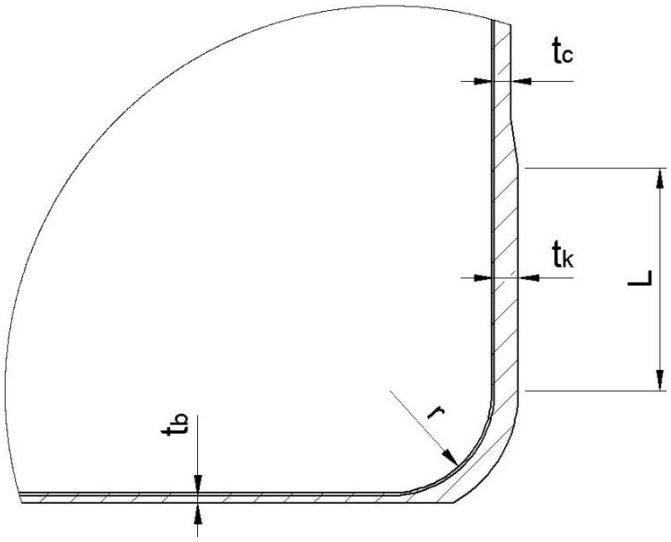

Figure 1.1 : Flat bottom in truncated design

Key:

t_c = Thickness of the cylindrical section in mm
t_b = Thickness of bottom in mm
t_k = Thickness of knuckle area in mm
L = Length of local thickening of cylindrical section in mm
r = Radius of bottom in mm
D = Internal diameter of cylindrical section in mm (= 2*R)
R = Internal radius of cylindrical section in mm

Whereby the following is applicable:

- 50 ≤ r ≤ 150 mm
- t_c as calculated in EN 13121-3
- Taper of knuckle is 1:6
- $L = \sqrt{(D * t_k)}$
- t_b to be determined constructively i.e. at least 0,1% of the diameter with a minimum of 4 mm
- a chemical barrier layer or a thermoplastic liner may be used in order to ensure the chemical resistance

The maximum axial unit load n_x in the knuckle region from internal pressure (hydrostatic plus design pressure = p_d) can be calculated as follows:

$$n_x = 0{,}72 * p_d * R \quad \text{in N/mm} \qquad \text{Equation 1.1}$$

The calculated n_x shall be lower than the maximum allowable unit load of the laminate used in the knuckle region.

Annex 2 Model Certificate

certificate

Number	K12345/01	Replaces	--
Issued	2013-11-01	Dated	--

Product certificate

GRP tanks, with or without spill containers, for the above ground storage of chemicals

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

ABC Company

may, on delivery, be relied upon to comply with the Kiwa Evaluation Guideline BRL-K21011 "Glass reinforced plastic (GRP) tanks, with or without spill containers, for the above ground storage of chemicals".

FIELD OF APPLICATION
See page 2 of this certificate

Kiwa N.V.

Bouke Meekma
Kiwa

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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Glass reinforced plastic (GRP) tanks, with or without spill containers, for the above ground storage of chemicals

PRODUCT SPECIFICATION

The tanks are designed for:
- Storage of chemicals;
- With or without a thermoplastic liner;
- Above ground installation;
- Construction can be either:
  - Single or double* walled, vertical cylindrical construction with a conical, flat or dished end roof or bottom, or
  - Single or double* walled, horizontal cylindrical construction with dished ends;
- Fabricated in the factory;
- Inside or outside installation;
- Atmospheric pressure i.e. with a design pressure ≤ 50 kPa;
- With or without leak detection or pre-leakage detection;
- Subjected to a normal continuous operating temperature of fluid which can range between – 40 ^{0}C and + 120 ^{0}C;
- Maximum filling capacity = 95% of the nominal capacity.

* = double wall option I or option II as defined in paragraph 6.3.1.

APPLICATION AND USE

The tanks are designed for the above ground atmospheric storage of chemicals at an operating temperature between – 40 °C and +120 °C. The maximum filling capacity is 95% of the nominal capacity. The tanks are **not** suitable for:
- Storage of flammable fluids such as domestic heating oil, kerosene and diesel fuels;
- Combined installation such as a battery arrangement;
- Storage under pressure in excess of 50 kPa;
- Underground installation;
- Site built
- Spherical tanks and tanks of irregular shape;
- Transport and distribution of fluids.

The spill containers are designed for the above ground secondary containment of the chemicals contained in the storage tanks. The spill containers have a volume of 110% of the maximum volume of the tank.

The tanks and spill containers are made from glass reinforced plastic (GRP).

All tanks shall be installed with a secondary containment for retaining the chemicals stored. The approval of the secondary containment construction on site is the responsibility of the local authorities or the certification body involved with the tank installation. When no approved construction on site fulfils this requirement, a spill container as specified in this Evaluation Guideline shall be used. The tank manufacturer is responsible for the correct functioning of the tank and spill container as a combined unit. The operation of the combined unit shall be documented and approved by the manufacturer of the tank.

The product certificate is only applicable if the requirements mentioned in paragraph 6.5 and 6.6 of the Evaluation Guideline are fulfilled. These are:

Installation and user instructions

The manufacturer shall provide proper written installation and users' instructions in the language of the country where the tank is to be installed and used. These instructions shall reference compliance with the national environmental regulations pertaining to the storage of chemicals. National regulations can stipulate requirements for preventing accidental impact to the tank and spill container and requirements for the overfill prevention and anti siphon devices. National regulations stipulate that the installation be carried out by certified installers. The following Evaluation Guidelines provide additional information pertaining to the installation of the tank and spill container:
- BRL-K903 for the installation of tanks and appendages
- BRL-K910 for leak detection systems for the storage and/or transport of products in the liquid phase or gas phase

In all cases the appendages used shall be resistant to the chemical stored and this shall be suitably demonstrated by the tank installer.

Documentation to be supplied with the tank and spill container

Every GRP-tank / spill container shall be supplied with at least the following documents:

- The documentation as required by NEN-EN 13121-3.
- Installation / user instructions in the language of the country where the tank is to be installed and used in. The certification body shall approve these instructions.
- A unique tank / spill container compliance document with the approval of the certification body in relation to the product certificate.

MARKING

The products are marked with the Kiwa mark

Place of the mark:
Each GRP tank and spill container shall be indelibly marked.

Compulsory indications:

- Certification mark and certification number of the certification body
- Manufacturer's name and/or manufacturer's trade mark
- Serial number of the tank and/or spill container
- Month and year of manufacture
- Maximum volume of the tank or spill container in litres or m^3
- Name of the chemical to be stored in tank including the CAS number (Chemical Abstract Service number) along with the concentration
- Location of the tank: Inside or outside
- Factory/site tested*: Pneumatic pressure of 30 kPa for 15 minutes/Hydrostatic pressure with water filling (at design pressure, if applicable) for 24 hours/Hydrostatic pressure with chemical filling at site
- Maximum design temperature of the chemical to be stored
- Maximum design pressure of the tank
- Recertification period if chemical resistance is less than 20 years –see paragraph 6.3.2 and 6.3.6.

* = delete as applicable

The realization of the marks is as follows:

- indelible;
- clearly visible on the outside of the tank or spill container.

When this information is provided on an identification label (or plate), the label shall be mounted at eye level and provisions shall be taken to ensure that this label cannot be removed from the tank or spill container. Both the tank and the spill container shall be provided with its own identification label. Should the tank label not be visible due to the spill container then a second tank label shall be mounted next to the spill container label.

---

1. Check at the time of delivery whether:
   1.1 the products are in accordance with the agreement;

- Check at the time of delivery whether:
  1.1 the products are in accordance with the agreement;
  1.2 the mark and marking method are correct;
  1.3 the products show no visible defects as a result of e.g. transport.

- If you should reject a product on the basis of the above, please contact:
  2.1 <<Organisation>> <<Department>>
  and, if necessary:
  2.2 Kiwa Nederland B.V.

3. Consult the supplier's processing guidelines for a proper storage and transport of the products.

- Consult the supplier's processing guidelines for a proper storage and transport of the products.

- Check whether this certificate is still valid by consulting the list of certified companies at www.kiwa.nl.

Annex 3 Tank/Spill Container compliance document

BRL-K21011/02

Glass reinforced plastic (GRP) tanks, with or without spill containers for the above ground storage of chemicals

Client
(name)
(address)
(town)

Installation location
(name)
(address)
(town)

Manufacturer
(name)
(address)
(town)
(telephone)
(telefax)
(e-mail)

Registration Number **Registration date**

Tank serial number

Data	Volume (litre)	Diameter (mm)	Length (mm)	Height (mm)	Year of mfr.	Serial no.	Design no.	Liner material
Tank								PE/PP/..
Spill Container								PE/PP/..

Remarks
The tank and spill container are suitable for outside/inside storage of << name of chemical>>. The tank has been tested at full hydrostatic pressure with water << (at design pressure, if applicable)>> for 24 hours.

Declaration of Kiwa Nederland B.V.

Based on pre-certification tests as well as periodic inspections by Kiwa, the product referred to on this compliance document and constructed by above mentioned manufacturer, may, on delivery, be relied upon to comply with the Kiwa Evaluation Guideline BRL-K21011.

Declaration of Construction Company

The manufacturer declares that the tank and spill container have been produced according to the requirements specified in the Kiwa Evaluation Guideline BRL-K21011.

Recommendations for Customers:
Check on receipt of the tank/spill container compliance document whether:
- The serial number on the tank and spill container complies with this compliance document
- The tank and spill container show no visible defects as a result of transport

If you should reject this product on the basis of the above, please contact:
1. The manufacturer
2. Kiwa N.V.

IMPORTANT INFORMATION FOR TANK INSTALLATIONS
A tank installation can only be in compliance with the Dutch legislation when, in addition to this tank/spill container compliance document, a certificate for the complete installation has been issued.

BRL K21011
GLASVEZEL VERSTERKTE KUNSTSTOF OPSLAGTANKS

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Sir W. Churchill-laan 273
P.O. Box 70
2280 AB Rijswijk
The Netherlands

Telephone +31 70 41 44 400
Telefax +31 70 41 44 420
Internet www.kiwa.nl
E-mail certif@kiwa.nl

A copy of this compliance document shall be given to the: Legislative authorities, Client and the installation company.

Validation date:

Registration Number:

Annex 4 Model IQC-scheme

Subjects	Aspects	Method	Frequency	Registration
Raw materials or materials supplied: • Formulation semi-finished products • Incoming inspection raw materials				
Production process, production equipment, material: • Procedures • Work instructions • Equipment • Release of product				
Finished-products • Visual inspection • Dimensional inspection • Spark testing • Hydrostatic test				
Measuring and testing equipment • Measuring equipment • Calibration				
Logistics • Internal transport • Storage • Preservation • Packaging • Identification or marking of semi-finished and finished products				