BRL K536-L
Draft 01-08-2025
Comments before 26-09-2025

Evaluation Guideline

for the Kiwa (technical approval-with-) product certificate for plastics piping systems with metal inner layer intended for transport of hot and cold drinking water inside buildings

creating trust *driving progress*

kiwa

DRAFT BRL K536-L part 1
xx xxxx 2025

Evaluation guideline

Plastics piping systems with metal inner layer intended for transport of hot and cold drinking water inside buildings

Part 1: General requirements

Preface Kiwa

This Evaluation Guideline (BRL) has been accepted by the Kiwa Board of Experts Water Cycle (CWK), in which all relevant parties in the field of 'products in contact with drinking water' are represented. This Board of Experts also supervises the certification activities and will adjust this BRL if required. 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 Certification, which include the general rules employed by Kiwa for its certification activities.

Kiwa Nederland B.V.
Sir Winston Churchilllaan 273
Postbus 70
2280 AB RIJSWIJK

Tel. 088 998 44 00
NL.Kiwa.info@Kiwa.com
www.kiwa.com

Binding declaration
This Evaluation Guideline has been declared binding by Kiwa effective [dd month year]

Content

1 Introduction

1.1 General

The requirements included in this BRL are used by Kiwa when processing an application and maintaining an (technical approval-with-)product certificate for plastics piping systems with metal inner layer intended for transport of hot and cold drinking water inside buildings.
This BRL consists of the following three parts:

- BRL K536-L part 1 General requirements for products in contact with drinking and warm tap water
- BRL K536-L part 2 Hygienic aspects for products in contact with drinking and warm tap water
- BRL K536-L part 3 Plastics piping systems with metal inner layer intended for transport of hot and cold drinking water inside buildings

When carrying out certification activities, Kiwa is bound by the requirements as included in NEN-EN-ISO/IEC 17065.

1.2 Field of application

The plastics pipes with metal inner layer and fittings according to this BRL are intended to be applied in piping systems for hot and cold water distribution at a de-sign pressure (= maximum operating pressure) of 8 or 10 bar (9 or 11 bar absolute or 8 or 10 bar overpressure), under the conditions mentioned in table 1.

Remark:
Each pressure mentioned in this evaluation guideline is defined as overpressure.
(So, with "10 bar" a "10 bar overpressure" is meant).

Table 1 – Temperature profile during 50 years

	Temperature [°C]	Lifetime	Overall service coefficient
$T_{operation}$	70	49 years	1,5
T_{max}	80	1 year	1,3
$T_{malfunction}$	95	100 hours	1,0
Remark: the mentioned temperature profile is in accordance with class 2 of ISO 10508.			

1.3 Acceptance of test reports provided by the supplier

If the supplier provides reports from test institutions or laboratories to prove that the products meet the requirements of this evaluation guideline, the supplier shall prove that these reports have been drawn up by an institution that complies with the applicable accreditation standards, namely:

- NEN-EN-ISO/IEC 17020 for inspection bodies;
- NEN-EN-ISO/IEC 17021-1 for certification bodies certifying systems;
- NEN-EN-ISO/IEC 17024 for certification bodies certifying persons;
- NEN-EN-ISO/IEC 17025 for laboratories;
- NEN-EN-ISO/IEC 17065 for certification bodies certifying products.

This requirement is considered to be fulfilled when a certificate of accreditation can be shown, issued either by the Board of Accreditation (RvA) or by one of the institutions with which an agreement of mutual acceptance has been concluded by the RvA. The accreditation shall refer to the examinations as required in this evaluation guideline. When no certificate of accreditation can be shown, Kiwa shall verify whether the accreditation standard is fulfilled.

1.4 Quality declaration

The quality declarations to be issued by Kiwa based on this evaluation guideline will be referred to as Kiwa (technical approval-with-)product certificate.
A model certificate has been published for information purposes on the Kiwa website.

2 Terminology

2.1 Definitions

In this BRL the following terms and definitions apply:

- **Evaluation Guideline (BRL):** the agreements made within the Board of Experts on the subject of certification;
- **Board of Experts:** the Board of Experts Watercycle (CWK);
- **Drinking water:** water intended or partly intended for drinking, cooking or food preparation or other domestic purposes, but does not include hot water, and is made available by pipeline to consumers or other customers (source Dutch drinking water act));
- **Installation:** configuration consisting the pipe work, fittings and appliances;
- **IQC scheme (IQCS):** a description of the quality inspections carried out by the supplier as part of his quality system;
- **Tap water**: water intended or partly intended for drinking, cooking or food preparation or other domestic purposes, (Remark*: tap water can be drinking water, hot tap water or household water.)*
- **Supplier:** the party that is responsible for ensuring that the products meet and continue to meet the requirements on which the certification is based**.**
- **Private label certificate:** A certificate that only pertains to products that are also included in the certificate of a supplier that has been certified by Kiwa, the only difference being that the products and product information of the private label holder bear a brand name that belongs to the private label holder;
- **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;
- **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 can be calculated or measured in an unequivocal manner;
- **Initial investigation:** tests in order to ascertain that all the requirements recorded in the evaluation guideline are met;
- **Hot tap water:** water intended or partly intended for drinking, cooking or food preparation or other domestic purposes, which is heated before it is made available for those applications).

3 Procedure for obtaining the quality declaration

3.1 Admission investigation

The admission investigation to be carried out is carried out on the basis of the product requirements included in BRL K536-L part 3, including determination methods, and includes, depending on the nature of the product to be certified:

- a (sample) investigation to determine whether the products meet the product and/or performance requirements;
- the assessment of the production process;
- the assessment of the quality system and the IQC scheme;
- a test of the presence and functioning of the other required procedures.

3.2 Issuance of certificates

After completion of the admission investigation, the results are submitted to the decision-maker (see 8.3). The decision-maker assesses the results and determines whether the certificate can be granted or whether additional data and/or investigations are required before the certificate can be granted

3.3 Investigation into the product/process and/or performance requirements

Kiwa will (have) the products to be certified investigated on the basis of the product and/or performance requirements included in this assessment guideline.
The samples required for this purpose will be taken by or on behalf of Kiwa.
Relevant test reports may be used for the approval that are not older than 5 years and performed by an ISO/IEC 17025 accredited laboratory for the relevant procedure.

3.4 Assessment of the production process

The assessment of the production process checks whether the manufacturer is able to continuously produce products that meet the certification requirements.
The assessment of the production process takes place during the ongoing work at the manufacturer.
This assessment also includes at least:
• The quality of raw materials, semi-finished products and end products;
• Internal transport and storage.

3.5 Contract assessment

If the supplier is not the manufacturer of the products to be certified, Kiwa will as-sess the agreement between the supplier and the manufacturer. This written agreement, which is available to Kiwa, includes at least:
That accreditation bodies, scheme managers and Kiwa will be given the opportunity to observe the certification activities carried out by Kiwa or on behalf of Kiwa at the manufacturer.

4 Product requirements

The product requirements are included in BRL K536-L part 2 and BRL K536-L part 3.

5 Test methods

The test methods are included in BRL K536-L part 2 and BRL K536-L part 3.

6 Marking

The requirements for marking are included in BRL-K536-L part 3.

7 Quality system requirements

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

7.1 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.

7.2 Internal quality control/quality plan

The supplier shall have an internal quality control scheme (IQC scheme) which is applied by him.

The following must have been demonstrably recorded in this IQC scheme:

- what aspects are checked by the producer;
- according to what methods such inspections are carried out;
- how often these inspections are carried out;
- in what way the inspection results are recorded and kept.

This IQC scheme should at least be an equivalent derivative of the model IQC scheme which is published on the website of the scheme managers. The scheme must be detailed in such a way that it provides CI sufficient confidence that the requirements of part 3 of this evaluation guideline are continuously fulfilled.

7.3 Management of laboratory- and measure apparatus

The supplier shall verify the availability of necessary test and measuring equipment for demonstrating product conformity with the requirements in this evaluation guideline.
When required the equipment shall be kept calibrated (e.g recalibration at interval).
The status of actual calibration of each equipment shall be demonstrated by traceability through a unique ID.
The supplier must keep records of the calibration results.

The supplier shall review the validity of measuring data when it is established at calibration that the equipment is not suitable anymore.

7.4 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.

7.5 Other requirements to the quality system

The supplier shall be able to submit the following:

- the organization's organogram;
- qualification requirements of the personnel concerned.

8 Summary of tests and inspections

The product requirements are included in BRL K536-L part 2 and 3.

8.1 Agreements on the implementation of certification

8.2 General

The certification body must have the disposal of a regulation, or an equivalent document, in which the general rules for certification are laid down.

8.3 Certification staff

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

- Certification assessor (CAS): in charge of carrying out the pre-certification tests and assessing the inspectors' reports;
- Site assessor (SAS): in charge of carrying out external inspections at the supplier's works;
- Decision maker (DM): 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.

8.3.1 Qualification requirements

The qualification requirements for personnel of the certification body will be recorded in the table below. Education and experience of the concerning certification personnel shall be recorded demonstrably.

Basic requirements	**Evaluation criteria**
Knowledge of ISO/IEC 17065, certification, testing, Kiwa-policy and and internal procedures.	**General:** Exam ISO/IEC 17065 ≥ 6
Knowledge of company processes Competence for execution of professional assessments.	*Relevant experience: in the field* ***SAS, CAS** : 1 year* ***DM**: 5 years inclusive 1 year with respect to certification* *Relevant technical knowledge and experience on the level of:* ***SAS**: High school* ***CAS, DM** : Bachelor*

Basic requirements	Evaluation criteria
Competence for execution of site assessments. Adequate communication skills (e.g. reports, presentation skills and interviewing technique).	**SAS**: Kiwa Audit training or similar and 4 site assessments including 1 autonomic under review.
Execution of initial examination	**CAS:** 3 initial audits under review.
Conducting review	**CAS:** conducting 3 reviews

Technical competencies	Assessment criteria
Knowledge of the schemes	**General:** Exam Product group ≥ 6
Education	**General:** Education in one of the following technical areas: • Civil Engineering; • Engineering.
Testing skills	**PM, SAS, CAS/RV** : • Introduction at relevant laboratory.
Experience - specific	**CAS** • 3 complete applications (excluding the initial assessment of the production site) under the direction of the **PM** of **CAS+RV.** • 1 complete application self-reliant (to be evaluated by PM) • 3 certification assessments at a production location under the direction of the **SAS**. • 4 inspection visits together with a qualified **SAS.** • 1 inspection visit conducted self-reliant (evaluated by **CSAS**).
Skills in performing witnessing	**PM, SAS** Internal training witness testing

Legend:

- Product manager: (**PM**)
- Site assessor (**SAS**)
- Certification assessor (**CAS**)
- Reviewer (**RV**)
- Decision maker (**DM**)

8.3.2 Qualification certification personnel

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

8.4 Report initial investigation

The certification body records the results of the initial investigation in a report.
This report shall comply with the following requirements:

- completeness: the report provides a verdict about all requirements included in the evaluation guideline;
- traceability: the findings on which the verdicts have been based shall be recorded and traceable;
- basis for decision: the DM shall be able to base his/her decision on the findings included in the report

8.5 Decision with regard to the issue of the certificate or the imposing of measures

The decision on the granting of a certificate or the imposition of measures with regard to the certificate must be based on the findings recorded in the file.

The results of an admission investigation and a periodic assessment (in the event of a critical deficiency) must be assessed by a reviewer.
Based on the review carried out, the decision maker determines whether:

- The certificate can be granted;
- Sanctions are imposed;
- The certificate must be suspended or withdrawn.

The reviewer and decision maker must not have been involved in the formation of the findings on which the decision is based.
The decision must be recorded in a traceable manner.

8.6 Nature and frequency of external inspections

The certification body must enforce inspections at the supplier's site to investigate whether the obligations are met. The Board of Experts advises about the number of inspection visits required. At the time of validation of this evaluation guideline this frequency has been fixed
at 4 inspection visits per year.

For suppliers who have a quality management system according to ISO 9001 in accordance with the scope of BRL K536-L, certified by an accredited body (according to ISO/IEC 17021), and where the IQC-scheme is an integrated part of the quality management system, the frequency is reduced to 2 inspection visits per year.
If the supplier is the holder of a system (not a manufacturer of a pipe or a fitting), the frequency is set to 1 inspection a year.
If the supplier is a private label owner (identical certificate derived from an existing technical-with-approval product certificate) then the frequency is set at 1 inspection per 2 year.

Inspections shall invariably include:

- The IQC-scheme of the supplier and the results of tests carried out by the supplier;
- The correct marking of the certified products;
- The compliance with the required procedures.

The findings of the inspection visits performed shall be traceably recorded, by the certification body, in a report.

The checks to be carried out by the certification body are shown in the test matrix and will at least relate to:

- the product specifications laid down in the certificate;
- the production process of the products;
- the supplier's IQC-scheme and the results of checks carried out by the supplier;
- the correct method of marking the certified products;
- compliance with the required procedures;
- handling of complaints about delivered products.

For suppliers with a private label certificate, the frequency of inspections for the products included in the certificate is set at 1 inspection visit per year.
If the supplier has a certified NEN-EN-ISO 9001 system, in accordance with the scope of this BRL, the frequency is set at 1 inspection visit every 2 years.
These inspections are carried out at the private label holder and are aimed at the quality aspects to be included in an IQC scheme and the results of the inspections carried out by the certificate holder. The IQC scheme of the private label holder must at least relate to:

- the correct method of marking the certified products;
- compliance with the required procedures for incoming and outgoing inspection;
- the storage of products and goods;
- the handling of complaints about delivered products.

The findings of the inspection visits performed shall be traceably recorded, by the certification body, in a report.

8.7 Non-compliance

In case of non-compliance with the requirements, Kiwa will take measures in accordance with the sanction policy as described in the Kiwa Regulations for Certification. The Kiwa Regulations for Certification are available on the Kiwa website.

The following paragraphs apply with regard to the weighing, follow-up of non-conformities and the sanction policy.

8.7.1 Weighing of non-conformities

When weighing a non-conformity, within the framework of supervision after the product certificate has been granted by the certification body, a distinction is made between:

- Non-conformities which are designated as critical are those which can directly affect the quality and/or performance of product and/or process;
- " Other" non-conformities (non-critical non-conformities).

The aspects designated as critical non-conformities are listed in the Sanction procedure.

8.7.2 Follow-up of non-conformities

The follow-up of non-conformities by a certification body is as follows:

- Critical non-conformities must be capable of being dealt with by the certification body within the period set by the certification body, with a maximum period of 30 working days;
- Non-critical non-conformities must be capable of being dealt with by the certification body within the period set by the certification body, with a maximum period of 3 months.

8.7.3 Sanction procedure

The weighing and follow-up of non-conformities and the sanctions policy are laid down in an interpretation document to this assessment guideline, published on Kiwa's website.

8.8 Temporarily no production or delivery

In the event that no products are produced and/or delivered (temporarily), the validity of his certificate can be declared (temporarily) dormant at the request of the certificate holder in the event of a stop of more than 12 months. Such a dormant status can be granted by the certification body for a total maximum of 2 years. After the dormant status has been granted, a certificate holder can request to terminate it earlier.
In the event of a dormant period of more than 1 year, an additional assessment must be carried out prior to the resumption of production and delivery under a product certificate to determine whether all requirements in this assessment guideline are still met and whether the dormant status can be converted into a valid status. The conditions of the dormant period affect the imposed frequency for external checks, as specified in paragraph 9.1 of Part 3 of this guideline.

8.9 Report to the Board of Experts

The certification body shall report annually about the performed certification activities. In this report the following aspects are included:

- mutations in number of issued certificates (granted/withdrawn);
- number of executed audits in relation to the required minimum;
- results of the inspections;
- required measures for established Non-Conformities;
- received complaints about certified products.

8.10 Interpretation of requirements

The Board of Experts may lay down the interpretation of this evaluation guideline in a separate interpretation document.
This(The) interpretation document(s) is/are available to the members of the Board of Experts, the certification bodies and the certificate holders who are active on the basis of this assessment guideline.
This(The) interpretation document(s) will be published on the Kiwa website.

9 Titles of standards

9.1 Standards / Normative documents

Number	Title	Version*
EN-ISO/IEC 17020	Conformity assessment - General criteria for the operation of various types of bodies performing inspection	
EN ISO/IEC 17021	Conformity assessment - Requirements for bodies providing audit and certification of management systems	
EN-ISO/IEC 17024	Conformity assessment - General requirements for bodies operating certification of persons	
EN-ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories	
EN-ISO/IEC 17065	Conformity assessment - Requirements for bodies certifying products, processes, and services	
ISO 10508	Plastics piping systems for hot and cold water installations — Guidance for classification and design.	

*) If no date of issuance is specified in this column, the current version of the document applies. If standards or normative documents are dated: An annual verification will take place to verify if the normative documents are still up to date. Modifications of the applicable normative documents will be published on the services page of Kiwa's website.

BRL K536-L part 2
xx-xxxx 2025

Evaluation guideline

Plastics piping systems with metal inner layer intended for transport of hot and cold drinking water inside buildings

Part 2: Hygienic aspects for products in contact with drinking and warm tap water

Preface Kiwa

This Evaluation Guideline (BRL) has been accepted by the Kiwa Board of Experts Water Cycle (CWK), in which all relevant parties in the field of 'products in contact with drinking water' are represented. This Board of Experts also supervises the certification activities and will adjust this BRL if required. 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 Certification, which include the general rules employed by Kiwa for its certification activities.

Kiwa Nederland B.V.

Sir Winston Churchilllaan 273

Postbus 70

2280 AB RIJSWIJK

Tel. 088 998 44 00
NL.Kiwa.info@Kiwa.com
www.kiwa.com

Binding declaration
This Evaluation Guideline has been declared binding by Kiwa effective [dd month year]

Content

1 Introduction

1.1 General

No additions and/or deviations to BRL K536-L part 1.

1.2 Field of application / scope

The hygienic aspects concern the impact that ‘products in contact with drinking water and hot tap water’ have on the quality of the drinking water.

1.3 Acceptance of the test reports provided by the supplier

No additions and/or deviations to BRL K536-L part 1.

1.4 Quality declaration

No additions and/or deviations to BRL K536-L part 1.

2 Terminology

No additions and/or deviations to BRL K536-L part 1.

3 Procedure for granting a quality declaration

No additions and/or deviations to BRL K536-L part 1.

4 Product requirements

4.1 General

This chapter contains the requirements that the hygienic aspects shall meet. The determination methods to determine that the requirements are met are described in chapter 5.

4.2 Requirements to avoid deterioration of the quality of drinking water

Products and materials which (may) come into contact with drinking water or warm tap water, shall not release substances in quantities which can be harmful to the health of the consumer, or negatively affect the quality of the drinking water. Therefore, the products or materials shall meet toxicological, microbiological and organoleptic requirements as laid down in the currently applicable "Ministerial Regulation materials and chemicals drinking water and warm tap water supply", (published in the Government Gazette).

4.3 Hygienic treatment of products in contact with drinking water

The supplier shall have a procedure in place that protects the products in such way, that the hygiene is ensured during storage and transport.
In addition, the supplier shall inform the customer about the handling of products delivered under the certificate, which come into contact with drinking water and warm tap water, from arriving at the construction site through to the realization and commissioning. The primary reason for providing this the information is to contribute to the awareness of the importance of hygienic work as a ‘prevention measure’.

4.4 Protection of products during storage and transport

For the purpose of hygienic handling, products shall be protected against contamination. This is with respect to the surfaces of the product that come into contact with drinking water during the application. Precautions to protect the product against contamination shall be agreed upon between the supplier and Kiwa and shall be recorded in the quality management system of the supplier
More information can be found in the interpretation document which is published on the Kiwa website with the Evaluation Guideline.

5 Determination methods

5.1 Regulation on materials and chemicals for drinking and hot tap water supply

Compliance with the Regulation on materials and chemicals for drinking and hot tap water supply means that the procedure for obtaining a recognized quality declaration must have been completed with a positive result.

5.1.1 Equivalent quality declarations

Products or materials that are provided with a quality declaration, issued by, for example, a foreign certification body, may also be used in the Netherlands, provided that this quality declaration has been declared equivalent by the Minister to the quality declaration as referred to in the Regulation.

6 Marking

The requirements are included in BRL K536-L part 3.

7 Quality system requirements

The requirements are included in BRL K536-L part 1.

8 Summary of tests and inspections

The requirements are included in BRL K536-L part 3.

9 Agreements on implementation of certification

The requirements are included in BRL K536-L part 1.

10 Titles of standards

10.1 Public law rules

Bron	Titel
wetten.overheid.nl/BWBR0030279/2024-01-01	Regeling Materialen en Chemicaliën drink- en warm tapwatervoorziening
Dutch Government Gazette (“Staatscourant”) dated 1 July 2017	Regulation on materials and chemicals drinking water and warm tap water supply (“Materialen en Chemicaliën drink- en warm tapwatervoorziening”)

BRL K536-L part 3
xx-xxxx 2025

Evaluation guideline

Plastics piping systems with metal inner layer intended for transport of hot and cold drinking water inside buildings

Part 3: Product requirements

Preface Kiwa

This Evaluation Guideline (BRL) has been accepted by the Kiwa Board of Experts Water Cycle (CWK), in which all relevant parties in the field of 'products in contact with drinking water' are represented. This Board of Experts also supervises the certification activities and will adjust this BRL if required. 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 Certification, which include the general rules employed by Kiwa for its certification activities.

Kiwa Nederland B.V.
Sir Winston Churchilllaan 273
Postbus 70
2280 AB RIJSWIJK

Tel. 088 998 44 00
NL.Kiwa.info@Kiwa.com
www.kiwa.com

Binding declaration
This Evaluation Guideline has been declared binding by Kiwa effective [dd month year]

Content

1 Introduction

1.1 General

No additions and/or deviations to BRL K536-L part 1.

1.2 Field of application / scope

No additions and/or deviations to BRL K536-L part 1.

1.3 Acceptance of the test reports provided by the supplier

No additions and/or deviations to BRL K536-L part 1.

1.4 Quality declaration

No additions and/or deviations to BRL K536-L part 1.

2 Terminology

2.1 Definitions

In additions to BRL K536-L part 1 and EN-ISO 21003 parts 1, 2, 3, 5 and CEN/TS 21003 part 7, the following terms and definitions apply:

- **Certification mark:** a protected trademark of which the authorization of the use is granted by Kiwa to the supplier whose products can be considered to comply on delivery with the applicable requirements. If applicable a specially for this purpose designed label on the quality information about the application of this product may be added, based on the results as stated in the report issued by Kiwa on the inspection of the prototype;
- **Follow-up investigation:** the investigation carried out after granting the certificate to determine that the certified products continue to be in compliance with the requirements laid down in the evaluation guideline;
- **Reworked material:** material from rejected unused products or trimmings that have been manufactured and retained within plants owned and operated by the same legal entity
- **Recyclate:** material resulting from the recycling of pre-consumer (unused products, excluding reworked (plastic) material) and post-consumer (from used products, that have fulfilled their intended purpose or that can no longer be used) products

2.2 Symbols and abbreviated terms

The symbols and abbreviated terms according EN-ISO 21003, parts 1, 2, 3, 5 and CEN/TS 21003 part 7 do apply.

3 Procedure for obtaining the quality declaration

The requirements are included in BRL K536-L part 1.

4 Requirements and test methods for the piping system

4.1 General

This chapter contains the requirements that the piping system shall meet, as well as the determination methods to determine that the requirements are met.

The certificate holder shall ensure a clear description of all relevant design data, including:

- production process / realization process.
- constituent raw materials, materials and products
- recipe

Any proposed change in parameters (material, product etc) as defined in part 7 of ISO 21003 and part 7's of applicable product standards shall be reported to the certification body. The certification body shall assess whether the change may affect the certified products, which requires reassessment of the product in question in line with the requirements of part 7 of ISO 21003 as well as part 7's of applicable product standards.
Once it has been established that the products with the proposed change meet the requirements in accordance with chapter 4-8, the change can be implemented in the production process of the certificate holder.

4.2 Materials

The following requirements apply to the raw materials, (semi)finished products and/or materials processed/applied during production:

4.2.1 Hygienic aspects

The products must demonstrably meet the requirements as stated in BRL K536-L part 2 .

4.2.2 Elastomeric sealing elements

In case rubber sealing elements are present in the joints, the rubber elements shall meet the requirements of Kiwa BRL K17504 class III.
If the rubber sealing element is supplied under a product certificate based on this BRL, the manufacturer may assume that this requirement is met.

4.2.3 Grease and lubricants

Where greases and/or lubricants are used in the making of a joint, these lubricants shall be hygienically assessed (see §4.2.1). If the greases and/or lubricants are certified by Kiwa on the basis of BRL K535-L, then the supplier may assume that this requirement is fulfilled. In both cases the required joints tests according 4.3.2 shall be carried out with the greases and/or lubricants applied.

4.3 Requirements for the joints of the piping system

4.3.1 General

The joints in the piping system shall be tested with regard to their proper functioning. In this chapter all joint tests required for the joint system are included.
The combination of a (possible) rubber seal, pipe, (possible) supporting insert and compression, press or push construction in the fitting have to be tested with regard to the aspects as mentioned in table 2

4.3.2 Tightness and strength of the joints

After testing in accordance with table 2, the joint connections between pipe and fittings shall fulfil the requirements according to table 2. If not otherwise stated, the testing temperature is (23 ± 2) °C.

Table 1 – Tightness and strength of the pipe joints

Aspect	Requirement	Test parameters		Test method
Resistance to thermal cycling	no leakage	5 000 cycles T_{max} = (90 ± 2) °C [1)] T_{min} = (20 ± 2) °C t_{cyclus}= 30 min [2)] P_D (bar) Pre stress = ... MPa [3)] One test piece		EN-ISO 19893
Resistance to pressure cycling	no leakage	Three test pieces 10 000 cycles (30 ± 5) cycles/min Test pressure (bar)		EN-ISO 19892
		p_D = 8 bar	p_D = 10 bar	
		p_{max} = 12,0 p_{min} = 0,5	p_{max} = 15,0 p_{min} = 0,5	
Resistance to pull-out	No separation of pipe and fitting no scratches or breakage within the distance d (= diameter of the pipe) on the pipe and fitting	t = (60 ± 1) min. Three test pieces F = 1,5 x p/4 x d_n^2 x 1 (N) – 23 °C F = 1,0 x π/4 x d_n^2 x p_D (in MPa)(N) – 95 °C d_n in mm T = 23 °C and 95 °C		EN-ISO 3501
Leak tightness under vacuum	Δp ≤ 0,05 bar	t = (60 ± 1) min. T = (23 ± 2) °C Three test pieces p = -0,8 bar		EN-ISO 13056
Leak tightness under internal pressure and bending	no leakage	t = (60 ± 1) min. T = (20 ± 5) °C Three test pieces Minimum bending radius [4)]		EN-ISO 3503
		Test pressure ... bar [3)]		
Resistance to internal pressure	no leakage	t = 1 000 h. T = 95 °C Minimum of 3 connections		EN-ISO 1167-series
		Test pressure ... bar [3)]		

[1)] T_{max} till (95 ± 2) °C is allowed

[2)] t_{cyclus}= t_{Tmax} + t_{Tmin} (= 15^{+1}_{0} + 15^{+1}_{0} = 30^{+2}_{0}) minutes. Total time = 2 500 hours)

[3)] Information from manufacturer, determined according to EN ISO 21003-5

[4)] The minimum bending radius may be declared by the manufacturer. If no declaration is made, 15 x d will be taken as minimum bending radius

4.4 Installation instructions

The supplier shall provide instructions with regard to storage, transport and installation conditions of the piping system components. These instructions comprise instructions for making connections, guidance for assembling flanges and installation instructions.
This information shall be recorded in the supplier's quality plan.

5 Product requirements and test methods for the pipes

5.1 General

This chapter contains the requirements that the pipes shall meet, as well as the determination methods to determine that the requirements are met.

5.2 Hygienic Aspects

The products must demonstrably meet the requirements as stated in BRL K536-L part 2 .

5.3 Materials

5.3.1 General

The material(s) used for each layer of the multilayer pipe shall be specified by the pipe manufacturer.

5.3.2 Metal materials of the inner layer

The material properties of the metal inner layer shall meet the requirements of the relevant reference EN product standards (e.g. EN 10088-1 for stainless steel and EN 1057 for copper).

5.3.3 Thermoplastics materials of the outer layer

The material properties of the outer layer shall meet the requirements of the relevant reference product standards as set out in table 2 or any other material according to their reference product standard covering class 2 application as described in this BRL. The relevant physical properties shall be checked in accordance with the relevant section of the relevant reference product standard.

Table 2 – Reference product standards

Material	Reference product standards
PB	EN-ISO 15876 (part 1 and 2)
PE-RT	EN-ISO 22391 (part 1 and 2)
PE-X	EN-ISO 15875 (part 1 and 2)[a]
PP	EN-ISO 15874 (part 1 and 2)
PVC-C	EN-ISO 15877 (part 1 and 2)

[a] The PE-X used shall be fully cross-linked and meet the requirements of the respective reference product standard.

5.3.4 Peak melting temperature of the adhesive

When determined according to EN ISO 11357-3, the minimum peak melting temperature $T_{p,c}$ of the adhesive shall be > 120 °C.

5.3.5 Thermal stability of the adhesive

When determined according to ISO 2578 and the methodology of annex D of EN-ISO 21003, part 2, the temperature index (thermal stability) of the adhesive shall be at > 70 °C.

5.3.6 Reworked and recyclate materials

The use of reworked material is allowed. The use of recyclate material is not allowed.

5.4 Surface conditions

When inspected visually, the inside and outside of the pipes shall be smooth without any flaws. The weld seam shall be regular without visible damage(s).

5.5 Geometrical characteristics

The dimensions of the pipes (in mm) shall be specified by the pipe manufacturer, which includes:

- Mean outside diameter: d_{em} (mm)
- Tolerance on the outside diameter (mm)
- Mean inside diameter: d_{im} (mm)
- Out-of-roundness: ovality (in mm)
- Minimum wall thickness: e_{min} (mm)
- Tolerance on the total wall thickness (mm)
- Thickness with tolerances of the different layers: e_L (mm)

The dimensions of the pipe (in mm) shall be measured in accordance with EN ISO 3126.

Remark
In the case of dispute the measurements of dimensions shall be made not less than 24 h after manufacturing and after being conditioned for at least 4 h at (23 + 2) °C.

5.6 Mechanical characteristics

5.6.1 Long-term hydrostatic strength

The design pressure strength (p_D) is derived from the long-term pressure strength (p_{LPL}), taking in account application class 5 and the overall service design coefficient given in the relevant product standard of the outer layer material (see annex B of EN ISO 21003-2). The long-term pressure strength (p_{LPL}) of multilayer pipes shall be measured (procedure II) as defined in ISO 17456. The size groups are applicable as described in ISO 17456 and ISO/TS 21003-7:

- dimension group 1, all nominal dimensions less than or equal to 26 mm;
- dimension group 2, all nominal dimensions greater than 26 mm and less than or equal to 63 mm;
- dimension group 3, all nominal dimensions greater than 63 mm.

5.6.2 Strength of the weld seam of the metal inner layer

When tested in accordance with 5.6.1, the strength of the weld seam of the metal inner layer is regarded as being sufficient

5.6.2.1 Control Points for the strength of the weld seam and the pressure strength

Table 3 – Control points for pressure testing

Resistance to internal pressure of the pipe	Testing time (hour)	T (°C)	p (bar) [1]	ISO 1167
	≥ 22	95	....	
	≥ 165	95	....	
	≥ 1000	95	....	

[1)] Test pressures are derived in accordance with ISO 17456 clause 6.2.5 and in combination with testing according to 5.6.1

5.6.3 Resistance to delamination of the pipe layers

The pipes shall comply to the requirements for the resistance to delamination of the pipe layers (between metal and plastics layer) as specified in table 5. In deviation from the ISO 17454 standard the outer polymer layer shall be peeled off from the metal inner layer. The calibration force (F_{cal}) shall not be taken into account.

Table 4 – Delamination resistance

Requirement	**Conditioning**	**Test pieces**	**Test method**
F_{pull} ≥ 30 N/cm	Before and after conditioning in accordance with EN-ISO 19893[a]	5	ISO 17454
[a] Using the test parameters of application class 2 (see EN-ISO 21003-5)			

5.6.4 Thermal durability of the outer layer

When tested according to Annex C of EN-ISO 21003-2 and taking the test parameters according to table 6 into account, the tested pipe shall show no visible cracks in the outer layer by the naked eye.

Table 5 – Test conditions for thermal durability of the outer layer

Test temperature °C	Test environment	Test time h	Number of test pieces
110	Air	8760	3

5.7 Marking of the pipes

The products are marked with the Kiwa-mark.

Marking on the pipes

The minimum required marking on the pipes shall be:

- **KIWA** Or * + Class 2 /8 or 10 bar;
- the manufacturer's name, trade name, system name, logo or certificate number of accompanying technical approval (system)certificate;
- material identification of the build-up of the pipe: i.e. "stainless steel / PE-RT";
- nominal outside diameter and nominal wall thickness of the pipe in mm;
- production code.

Location of the marks: on every pipe at intervals of not more than 2 m.
The realization of the marks is as follows: clear, durable and indelible.
*) for smaller diameters permitted by Kiwa.

6 Product requirements and test methods for the fittings

6.1 General

This chapter contains the requirements that the fittings shall meet, as well as the determination methods to determine that the requirements are met.

6.2 Hygienic Aspects

The requirements of §4.2.1 shall be fulfilled.

6.3 Material and mechanical requirements for plastics fittings

The plastics fittings shall fulfil the requirements of the pertaining product standards taking into account the specifications mentioned in table 7.

Table 6 – requirements for plastics fittings

Aspect	Requirement	Test parameter	Test method
Material	According IQC [1)]	According IQC [1)]	According IQC [1)]
Hydrostatic stress properties of material	≥ design stress (σ_D) according to the relevant product standard for class 2 [5)]	Resistance to internal hydraulic pressure[2)] - at 20 °C - between 60 and 80 °C - at 95 °C - at 110 °C	ISO 1167-series with the help of ISO 9080
Dimensions	Specification manufacturer	Dimensions	ISO 3126
Rubber	BRL 17504, class III	BRL 17504, class III	BRL 17504
Degree of cross linking (PE-X fittings)	PE-Xa ≥ 70% PE-Xb ≥ 65% PE-Xc ≥ 60% PE-Xd ≥ 60%	Degree of cross linking	EN-ISO 10147
Melt flow rate (PP fittings)	≤ 30% difference with respect to granulated material	Mass 2,16 kg Temperature 230 °C	EN-ISO 1133
Melt flow rate (PB fittings)	≤ 30% difference with respect to granulated material	Mass 5 kg Temperature 190 °C	EN-ISO 1133
Resistance to internal pressure	no leakage	t = 1000 h T = 95 °C Minimum of 3 test pieces	ISO 1167-series
		Test pressure .... bar [4)]	
Appearance	Smooth without any flaws	Soundness	Visual inspection
Thermal stability [3), 5)]	Test time > 8760 hours	Resistance to internal hydraulic pressure [2)] at 110 °C Applied stress conform the reference lines or long term strength data	ISO 1167-series
Behaviour at heating	Damages around injection point ≤ 30 % of wall thickness No holes, bubbles or cracks	In consultation with manufacturer	EN-ISO 580

1) IQC: is laid down as part of the certification agreement, after approval of the certification body
2) Test pieces are injection moulded and are cylindrical shaped
3) Test shall be performed on tubular test pieces which are produced by the fitting manufacturer. Alternatively straight couplers can also be used. In this case, the most critical position (smallest wall thickness) of the base body of the coupler shall be used for the calculation of the hydrostatic hoop stress body.
4) Information from manufacturer, determined according to EN ISO 21003-5
5) For PPSU and PVDF ISO 4076 and ISO 4070 respectively do apply

6.4 Material and mechanical requirements for metal fittings

The metal fittings shall fulfil the requirements of table 8.

Table 7 – requirements for metal fittings

Aspect	Requirement	Test parameter	Test method
Material fitting body	**Brass:** EN 1254-3 EN 1254-6 EN 1254-8 **Stainless steel:** EN 10088 EN 10283	IQC [1)]	Information manufacturer
Rubber	BRL 17504, class III	BRL 17504, class III	BRL 17504
Dimensions	EN1254-3 EN 1254-6 EN 1254-8	Minimum thickness	EN-ISO 228-1 or ISO 7-1
Construction	EN1254-3 EN 1254-6 EN 1254-8	Construction drawings	EN-ISO 3126
Resistance to inner water pressure (strength fitting body)	No cracks	**Brass:** EN 1254-3 par. 5.1 EN 1254-6 Par. 5.1.4 EN 1254-8 Par.5.1.1 **Stainless steel:** 25 bar at (23 ± 2) °C during 48 hours [2)]	EN-ISO 1167-1
Brass Resistance to stress corrosion	No cracks	pH 9,5	ISO 6957
Only for DZR Brass: Resistance to dezincification [3)]	Maximum dezincification depth: ≤ 200 µm Average dezincification depth: ≤ 100 µm	ISO 6509-1	ISO 6509-1
Stainless steel: Resistance to intracrystalline degradation	No cracks	Method A	EN-ISO 3651-2

1) Choice of material is free. The chosen material is listed in the IQC.
2) The most critical wall thickness/ DN ratio is tested.
3) Copper alloys containing 15 % or less zinc provide a good resistance to dezincification and may be declared accordingly without testing.

6.5 Marking of the fittings

The products are marked with the Kiwa-mark.

Marking of the fittings

The minimum required marking on the fittings shall be:

- **KIWA** or on small products or or KK or KK* (if not possible **KIWA** only on the smallest packaging unit)**;
- manufacturer's name, trade name or logo;
- nominal outside diameter of the corresponding pipe in mm;
- production code.

Location of the marks: on every fitting.

The realization of the marks is as follows: clear, durable and indelible.

The smallest packaging unit of the fittings are provided with at least the following information:

- KIWA ;
- manufacturer's name, trade name, system name, logo or certificate number of the accompanying technical approval (system) certificate, in accordance with the marking of the connecting pipe;
- nominal outside diameter and nominal wall thickness of the corresponding pipe in mm;
- material identification in case the fitting body is made of plastics.

Location of the marks: on every package.
The realization of the marks is as follows: clear, durable and indelible.

*) for small fittings marking with only KK is permitted
**) only after approval by Kiwa

7 Marking

7.1 General

The following marks and indications must be provided on each product and product packaging in a clear, legible and indelible way.

7.2 Certification mark

After entering into a Kiwa certification agreement, the certification mark must also be permanently and indelibly applied to the product.
See paragraphs 5.7 and 6.5 for marking requirements per product.

8 Quality system requirements

The requirements are included in BRL K536-L part 1.

9 Summary of tests and inspections

This chapter contains an overview of the steps required for certification:

- **initial investigation**: the investigation to determine that compliance is given to all the requirements laid down in the evaluation guideline;
- **follow-up investigation:** the investigation carried out after granting the certificate to determine that the certified products continue to be in compliance with the requirements laid down in the evaluation guideline; the required frequency for the follow-up investigation by the certification body (CI) is also specified;
- **inspection of the quality system of the supplier:** monitoring compliance of the IQC scheme and procedures.

9.1 Test matrix

Table 8 - Test matrix

BRL K 536-L	EN-ISO 21003	Product characteristics	Assessment within the scope of [1, 3]:			
			initiaal investigation[2]	Inspection by Kiwa[2]	IQC By the manufacturer	
					During start-up	Frequency
Requirements and test methods for the piping system						
4.1		General	X			
4.2.1		Hygienic Aspects	X	1 x year		
4.2.2		Elastomeric sealing elements	X	1 x year	X	1 x batch
4.2.3		Greases and lubricants	X	1 x year	X	1 x batch
4.3		Joint requirements	X	1 x year[4]		
4.4		Installation instructions	X	1 x year		
Requirements and test methods for the pipes						
5.1		General	X			
5.2		Hygienic Aspects	X	1 x year		
5.3		Materials	X			
5.3.6		Reworkable and recyclate material	X	1 x year		
5.4		Surface condition	X	1 x year	X	1 x 8 hours
5.5		Geometrical characteristics	X	1 x year	X	1 x 8 hours
5.6		Mechanical characteristics	X			
5.6.1		Long-term hydrostatic strength	X	1 x year[5]		
5.6.2.1		Strength of the weld seam of the metal inner layer	X	1 x year[6]		1 x week/batch 22 h or 165 h
5.6.3		Resistance to delamination of the pipe layers	X			
5.6.4		Thermal durability of the outer layer	X			
5.7		Marking	X	1 x year	X	1 x 8 hours
Requirements and test methods for the fittings						
6.1		General	X			
6.2		Hygienic Aspects	X	1 x year		
6.3		Material and mechanical requirements for plastics fittings	X	1 x year[7]	X[8]	1 x week/batch[9]
6.4		Material and mechanical requirements for metal fittings	X	1 x year	X[8]	1 x week or batch[8]
6.5		Marking	X	1 x year	X	1 x 8 hours

[1] Inspection of the quality system
The supplier's quality system will be evaluated by Kiwa based on the IQC scheme.
This inspection will at least include the aspects specified in §4 of the 'General requirements for products in contact with drinking water'. During the periodic assessment, the inspector will check the product against a selection of the above-mentioned product properties. The frequency of the periodic assessments is laid down in §6.3 Nature and frequency of periodic assessments;

[2] If, for whatever reason, it is not possible to perform a test in a laboratory specifically accredited to ISO/IEC 17025 and impartial for that activity, the test can be performed in consultation with the certification body under 'witness' in an ISO/IEC 17025 accredited laboratory;

[3] The frequency can be adjusted in consultation with the certification body , e.g.:

a. in the case of a continuous (automated) measurement;
b. if it can be demonstrated that a reduction in the frequency does not compromise the quality.

[4] Only applicable for the test "Resistance to internal pressure"

[5] This aspect is compared with the for this aspect ascertained acceptance parameters on the basis of the IQC inspection (indirect by means of direct related parameters).

[6] Only applicable for the test “Resistance to internal pressure of the pipe 1000 h”
[7] Depending on the plastic material: “Melt Flow Rate”, “Resistance to internal pressure of the fitting 1000 h” (to be combined with 1000 h system test), “Degree of crosslinking”
[8] For the aspects “appearance” and “geometrical characteristics”
[9] For the aspects “appearance” and “geometrical characteristics” and depending on the plastic material “Melt Flow Rate”, “Resistance to internal pressure of the fitting 22 h or 165 h”, “Degree of crosslinking”

9.2 Inspection of the quality system

The supplier’s quality system will be evaluated by Kiwa based on the IQC scheme.
This inspection will at least include the aspects specified in §4 of the ‘General requirements for products in contact with drinking water’

10 Title of standards

10.1 Public law rules

Not applicable

10.2 Norms/ normative documents

Number	Title	version*
BRL K17504	Vulcanized rubber products for cold and hot drinking water applications	
EN 1057	Copper and copper alloys - Seamless, round copper tubes for water and gas in sanitary and heating applications	
EN 1254-3	Copper and copper alloys - plumbing fittings - Part 3: Fittings with compression ends for use with plastic pipes	
EN 1254-6+A1	Copper and copper alloys - Plumbing fittings - Part 6: Push-fit fittings for use with metallic tubes, plastics and multilayer pipes	
EN 1254-8+A1	Copper and copper alloys - Plumbing fittings - Part 8: Press fittings for use with plastics and multilayer pipes	
EN-ISO 10147	Pipes and fittings made of crosslinked polyethylene (PE-X) - Estimation of the degree of crosslinking by determination of the gel content	
EN-ISO 1133	Determination of the melt mass flow rate (MFR) and the melt volume (MVR) of thermoplastics	
EN-ISO 11357-3	Plastics - Differential Scanning Calorimetry (DSC) - Part 3: Determination of temperature and enthalpy of melting and crystallization	
EN-ISO 1167 series	Plastics piping systems - Thermoplastics pipes - Determination of the resistance to internal pressure at constant temperature, 1995.	
EN-ISO 13056	Plastics piping systems - Pressure systems for hot and cold water - Test method for leak tightness under vacuum	
EN-ISO 15874 series	Plastics piping systems for hot and cold water installations - Polypropylene (PP)	
EN-ISO 15875 part 1-2	Plastic piping systems for hot and cold water installations- Cross-linked polyethylene (PE-X)	
EN-ISO 15876 series	Plastics piping systems for hot and cold water installations - Polybutylene (PB)	
EN-ISO 15877 series	Plastics piping systems for hot and cold water installations - Chlorinated poly(vinyl chloride) (PVC-C)	
EN-ISO 19892	Plastics piping systems - Thermoplastics pipes and fittings for hot and cold water - Test method for the resistance of joints to pressure cycling	

EN-ISO 19893	Plastics piping systems - Thermoplastics pipes and fittings for hot and cold water - Test method for the resistance of mounted assemblies to temperature cycling
EN-ISO 21003 series	Multilayer piping systems for hot and cold water installations - inside buildings
EN-ISO 22391 series	Plastics piping systems for hot and cold water installations - Polyethylene of raised temperature resistance (PE-RT)
EN-ISO 228-1	Pipe threads where pressure-tight joints are not made on the threads - Part 1: Dimensions, tolerances and designation
EN-ISO 2578	Plastics - Determination of time-temperature limits after prolonged exposure to heat
EN-ISO 3126	Plastics piping systems - Plastics components - Determination of dimensions
EN-ISO 3501	Plastics piping systems - Mechanical joints between fittings and pressure pipes - Test method for resistance to pull-out under constant longitudinal force
EN-ISO 3503	Plastics piping systems - Mechanical joints between fittings and pressure pipes - Test method for leak tightness under internal pressure of assemblies subjected to bending
EN-ISO 3651-2	Determination of resistance to intercrystalline degradation of corrosion-resistant steel
EN-ISO 580	Plastic piping and ducting systems - Injection-moulded thermoplastic fittings - Methods for visually assessing the effects of heating
EN-ISO 6509-1	Corrosion of metals and alloys - Determination of dezincification resistance of copper alloys with zinc - Part 1: Test method
EN-ISO 9080	Plastics piping and ducting systems - Determination of long-term hydrostatic strength of thermoplastics material in pipe form by extrapolation
EN-ISO 9969	Thermoplastics pipes - Determination of ring stiffness
ISO 4070	Polyvinylidene fluoride (PVDF) - Effect of time and temperature on expected strength
ISO 4076	Polyphenylsulfone (PPSU) - Effect of time and temperature on expected strength
ISO 7-1	Pipe threads where pressure-tight joints are made on the threads - Part 1: Dimensions, tolerances and designation
ISO 10508	Plastics piping systems for hot and cold water installations - Guidance for classification and design.
ISO 17454	Plastics piping systems - Multilayer pipes - Test method for the adhesion of the different layers using a pulling rig
ISO 17455	Plastics piping systems - Multilayer pipes - Determination of the oxygen permeability of the barrier pipe
ISO 17456	Plastics piping systems - multilayer pipes - Determination of the long-term strength
ISO 6957	Copper alloys - Ammonia test for stress corrosion in resistance

*) If no date of issuance is specified in this column, the current version of the document applies.

Remark: if standards or normative documents are dated:
An annual verification will take place to verify if the normative documents are still up to date. Modifications of the applicable normative documents will be published on the services page of Kiwa's website.