Evaluation guideline

for the Kiwa product certificate for
Cartridges to be used for sanitary tapware:
Mechanical mixers
Preface

This evaluation guideline has been accepted by the board of experts CWK of Kiwa, in which the parties concerned in the sector Drinking water appliances are being represented. This Board of Experts also supervises the certification activities and where necessary requires 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 the product certificate and the method of external control.

This evaluation guideline is to be assessed by the Board of Experts at least every 5 years, but at the latests before 1 February 2017.
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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 cartouches to be used for sanitary tapware.

This evaluation guideline replaces BRL-K14008/01 dated 25 March 2005.

For the performance of its certification work, Kiwa is bound to the requirements as included in the clause 4.6 “conditions and procedures fro granting, maintaining, extending, suspending and withdrawing certification” of EN45011.

1.2 Field of application / scope
The products are intended to be used as part of sanitary tapware as meant in the Kiwa evaluation guideline BRL-K607, for which a separate Kiwa product certificate has been issued. The cartridges are designed for use in drinking-water installations with a maximum water pressure of 1000 kPa and a maximum water temperature of 90°C.

Remark
This evaluation guideline does not refer to cartridges which may be sold to consumers directly, to be used as replacement for defective parts.

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 an Annex.
2 Terms and definitions

In this evaluation guideline the following terms and definitions are applicable:

**Evaluation Guideline**: the agreements made within the Board of Experts on the subject of certification.

**Board of Experts**: The Board of Experts "CWK".

**Supplier**: the party that is responsible for ensuring that the products meet and continue to meet the requirements on which the certification is based.

**IQC scheme**: a description of the quality inspections 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.

**Tap water** (origin NEN 1006:2002): water intended for drinking, cooking, food preparation or other domestic purposes.
3 Procedure for granting the quality declaration

3.1 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,
• Assessment on the presence and functioning of the remaining procedure.

3.2 Granting the quality declaration
After finishing the pre-certification tests the results are presented to the person deciding on granting of certificate. This person evaluates the results and decides whether the certificate can be granted or additional data and/or tests are necessary.
4 Requirements and test methods

4.1 General
This chapter contains the requirements the cartridges have to fulfil. These requirements will make part of the technical specification of the products, as included in the certificate.

4.2 Product requirements
The conditions of use and requirements for the sanitary tapware where the cartridge shall be mounted in are laid down in:

NEN-EN 817: Sanitary tapware – Mechanical mixers (PN 10) – General technical specifications

4.3 Materials

4.3.1 Toxicological requirements
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 the toxicological, microbiological and organoleptic requirements as laid down in the valid “Ministerial Regulation materials and chemicals drinking water and warm tap water supply” (published in the Government Gazette). Consequently the procedure for obtaining a recognised quality declaration, as specified in the valid Regulation, has to be concluded with positive results.

Products and materials with a quality declaration*, e.g. issued by a foreign certification institute, are allowed to be used in the Netherlands, provided that the Minister has declared this quality declaration equivalent to the quality declaration as meant in the Regulation.

4.3.2 Chemical and mechanical requirements

4.3.2.1 Expectation of life of plastic materials
The expectation of life of plastic materials, used for water containing parts, shall be at least 10 years in the field of use of the cartridge. This shall be proved by the supplier of the material.

4.3.2.2 Rubber
Natural rubber (NR) and isoprene rubber (IR) are not allowed to be used.
Synthetic rubber shall comply with NEN-EN 681-1.
Lubrication of parts, either during assembly or permanently, where the lubricants come in contact

4.3.2.3 Changes in raw materials
The supplier may only make changes in the raw materials or use a different type of raw material after the test institution has given approval to that.

4.4 Functional requirements

4.4.1 General
The product examination can not be carried out on only the cartridge itself. It is therefore to be tested in a test housing to be supplied by the manufacturer. This test housing can consist of a brass body in

* A quality declaration issued by an independent certification institute in another member state of the European Community than the Netherlands or another state party to the agreement to the European Economic Area, is equivalent to a recognised quality declaration, to the extent that, to the judgment of the Minister of the first mentioned quality declaration, is fulfilled the at least equivalent requirements as meant in the Regulation materials and chemicals drinking water- and warm tap water supply.
which the headpart can be tested or a sanitary tap complying with EN 817. The flow resistance of this 
brass body or tap shall be lower than that of the cartridge.

The body or sanitary tap in which the cartridge is tested may be selected by the applicant.

Further more the applicant shall provide a control handle to carry out the product examination.

4.4.2 Dimensional requirements
The standard dimensions and torque for correct installation and use of the cartridge shall be properly 
given in an instruction delivered with the cartridge.

4.4.3 Leaktightness and cross flow
When tested according to article 6.1 the cartridge and tap assembly may show no leakage or any sign 
of damage.

4.4.4 Flow rate
The flow rate shall comply with EN 817, clause 10.6.1. The flow rate shall be measured with an open 
outlet.

4.4.5 Torsion tests
4.4.5.1 Operation torque
The operation torque for flow and temperature adjustment shall not exceed 3 N·m. This shall be 
tested according to article 6.2.

Note
In case the cartridge has been equipped with overrideable device(s) in order to limit the 
flow rate and/or the temperature, the torque needed to override this limitation shall also 
not exceed 3 N·m.

4.4.5.2 Resistance to forces
The cartridge shall be resistant to an operating force of 10 N·m in opening/closing direction and 
5 N·m in the direction for temperature adjustment. This shall be tested according to article 6.3.
During and after this test, the cartridge shall show no deformation or other deteriorations which 
impairs the function and comply with the requirements for leaktightness.

4.4.6 Sensitivity
The relation between the movement of the control device and the resulting changes in temperature 
shall be tested according EN 817, clause 10.7. With this test, the minimum length for the control 
device will be determined.

4.4.7 Resistance to pressure jumps
Cartridges shall be resistant to 10 000 pressure jumps of 2,5 MPa. The frequency of the pressure 
jumps from 0 to 2.5 MPa shall have a maximum of 0,5 Hz.
After the test according to 6.4 the cartridge shall comply with the requirements for leaktightness.

4.4.8 Hydraulic strength
Cartridges shall be resistant to cooling down under pressure after being rinsed with hot water with a 
temperature of 90°C. This shall be tested according to 6.5. After this test the cartridge shall comply 
with the requirements for leaktightness.

4.4.9 Mechanical Endurance
The cartridge shall be able to withstand a large number of cycles to test its mechanical endurance. 
This shall be tested according to what has been mentioned in the EN 817.
During and after this test, the cartridge shall show no deformation or other deterioration which impairs the function of the tap and comply with the requirements for leaktightness.

4.4.10 **Resistance to high temperatures and thermal shock**
The cartridge shall be resistant to a flow with water with a temperature of 90°C, suddenly followed by a flow with water with a temperature of 20°C. This shall be tested according to article 6.6. After this test, the cartridge shall show no deformation or other deteriorations which impairs the function and comply with the requirements for leaktightness.

4.4.11 **Noises (informative)**
During all tests to be performed, the cartridge shall not cause any inconvenient noise.

**Remark**
The cartridge will be acoustically tested in accordance to the relevant standards, as part of the sanitary tap in which it will used.
5 Marking

5.1 General
The cartridge shall be provided with the following markings:
• manufacturer’s name or mark,
• name of mark of the manufacturer in which the cartridge is being used,
• type code or name,
• production date or code

The marking shall be legible and indelible.

5.2 Certification mark
After conclusion of the Kiwa certification agreement, in addition to the marks indicated in 5.1, the mark KIWA 🍪 or the abbreviated wordmark KK in a rectangle shall be applied legible and indelible.
6 Test methods

6.1 Determination of leaktightness and cross flow

6.1.1 Test piece
For this test a new cartridge mounted in a test housing is required.

6.1.2 Procedure for determination of leaktightness
a. Install the test piece on the test rig and connect both inlets to the water supply circuit.
b. Open the cartridge and fill the test housing with water;
c. After expelling all the air, close the cartridge in mixed water position;
d. Apply pressure gradually increasing over 15 seconds to (1600 ± 50)kPa and maintain this pressure.
e. Adjust the control device to the direction of full hot water position and maintain this position for (60 ± 5) seconds.
f. Change the control device to the full cold water position and maintain this position for (60 ± 5) seconds.
g. Change the control device to the mixed water position and maintain this position for (60 ± 5) seconds.

6.1.3 Procedure for determination the cross flow
a. Install the test piece on the test rig and connect one inlet to the water supply circuit.
b. Open the cartridge and rinse the cartridge;
c. After expelling all the air, close the cartridge in the position of the inlet connected;
d. Apply pressure gradually increasing over 15 seconds to (400 ± 20)kPa and maintain this pressure.
e. Move the temperature control device over the full operating range and back within (60 ± 5) seconds.
f. Repeat the test, reversing the water supply to the other inlet

6.2 Determination of operation torque

6.2.1 Test piece
For this test a new cartridge mounted in a test housing is required.

6.2.2 Procedure for open close
a. Rinse the test piece with water with a pressure of (300 ± 30)kPa and the cartridge, fully open in the mixed water position.
b. Close the cartridge and measure the torque needed.
c. Open the cartridge and measure the torque needed.

6.2.3 Procedure for temperature adjustments
a. Rinse the test piece with water with a pressure of (300 ± 30)kPa and the cartridge, fully open in the warm water position.
b. Move to the cold water position and measure the torque needed.
c. Move to the warm water position and measure the torque needed.

6.3 Determination of resistance to forces

6.3.1 Test piece
For this test a new cartridge is required. The test is carried out at ambient temperature with no water supplied during testing.
6.3.2 Procedure
a. Close the cartridge and gradually apply over 4 s to 6 s and maintain for 5 min a torque of (8 ± 0.2)N·m in closing direction in the mid mixed water position;
b. Move to the warm water position and gradually apply over 4 s to 6 s and maintain for 5 min a torque of (5 ± 0.2)N·m in the direction of the movement to this position.
c. Move to the cold water position and gradually apply over 4 s to 6 s and maintain for 5 min a torque of (5 ± 0.2)N·m in the direction of the movement to this position.
d. Repeat a. to c. inclusive in the open position.

6.4 Determination of resistance to pressure jumps

6.4.1 Test installation and appliances
The test installation must be able to generate pressure jumps to 2,5 MPa and a frequency up to 2 Hz.

6.4.2 Test pieces
For this test a new cartridge mounted in a test housing is required.

6.4.3 Procedure
a. Mount the test piece in the test installation, fill the system with water and de-aerate the system.
b. Generate 10 000 times a pressure jump from 0 to 2,5 MPa. The pressure jump shall be according to figure 2 with the restriction that the pressure line must stay within the white area.
c. Assess the test piece visually.
d. Carry out the leaktightness test according to 6.1.2.

6.5 Determination of hydraulic strength

6.5.1 Test piece
For this test a new cartridge mounted in a test housing is required.

6.5.2 Procedure
a. Install the test piece on the test rig and connect both inlets to the hot water supply circuit.
b. Open the cartridge and rinse it with hot water with a temperature of 90 ± 2 °C for a period of 30 minutes at a flow rate of not less than 2 l/min.
c. Close the cartridge and apply a pressure of (300 ± 10)kPa and hold this pressure for (60 ± 1) minutes. During this period the cartridge should be allowed to cool down.
d. Repeat steps b and c 10 times.
e. Carry out the leaktightness test according to 6.1.2.
6.6 Determination of resistance to high temperature and thermal shock

6.6.1 Test piece
For this test a new cartridge mounted in a test housing is required.

6.6.2 Procedure
a. Install the test piece on the test rig and connect both inlets to the water supply circuit.
b. Adjust the control device to the direction of full open hot water position.
c. Rinse the cartridge with water with a temperature of 90 ± 2 °C and a dynamic pressure of 300 ± 10 kPa for 1 hour.
d. Change the control device within 2 seconds to the full open cold water position.
e. Rinse the cartridge with water with a temperature of 20 ± 2 °C for 15 minutes.
f. Test the cartridge on leaktightness according to 6.1.2.
7 Instructions

The standard dimensions and torque for correct installation and use of the cartridge shall be properly given in an instruction delivered alongside to the headpart.

At the same time this information shall made known in documentation about the cartridge.
8 Requirements in respect of the quality system

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

8.1 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.

8.2 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 included in the addendum.

8.3 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.
9 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;
- Inspection test as to toxicological requirements and product requirements;
- Inspection of the quality system.

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

9.1 Test matrix

<table>
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<tr>
<th>Description of requirement</th>
<th>Tests within the scope of</th>
<th>Pre-certification</th>
<th>Supervision by Kiwa after granting of certificate</th>
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<td>1) Inspection 2) frequency (no./year)</td>
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<td>Toxicological requirements</td>
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<td>Chemical and mechanical requirements</td>
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<td>Functional requirements</td>
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</table>

1) In case of significant changes of the product or production process, compliance of the product to the performance requirements shall be determined.

2) The indicated inspections shall be carried out by the manufacturer, eventually in presence of the inspector.

9.2 Inspection of the quality system

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

10.1 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 audited,
- 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.

10.2 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.

10.2.1 Qualification requirements

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

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| Education - general | • Technical higher-level professional education  
• Internal training certification and Kiwa policy  
• Training auditing | • Intermediate-level professional education  
• Internal training certification and Kiwa policy  
• Training auditing | • Higher level professional education  
• Internal training certification and Kiwa policy  
• Training auditing |
| Education - specific | • for BRL relevant technical education  
• specific studies and training (know-how and skills) | • for BRL relevant technical education  
• specific studies and training (know-how and skills) | • not applicable unless the CvD has specific requirements |
| Experience - general | • 1 year of relevant work experience with at least 4 pre certification tests of which one carried out independent under supervision. | • 1 year of relevant work experience with at least 4 inspections of which one carried out independent under supervision | • 4 year of relevant work experience with at least 1 year in certification |
10.2.2 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.

10.3 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.

10.4 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.

10.5 Lay out of quality declaration

The product certificate shall be conform the model included as an annex

10.6 Nature and frequency of external inspections

The certification body shall carry out Audits at the supplier at regular intervals to check whether the supplier complies with his obligations. About the frequency of inspections the Board of Experts decides. At the time this Evaluation Guideline took effect, the frequency was set at the number of two inspection visits per year.

Inspections shall at least refer to:

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

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

10.7 Interpretation of requirements

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

Titles of the Standards and Publications as mentioned and to be consulted:

NEN-EN 681-1  Elastomeric seals – Materials requirements for pipe joint seals used in water and drainage applications – Part 1: Vulcanised rubber
NEN-EN 817  Sanitary tapware – Mechanical mixers (PN 10) – General technical specifications
NEN 1006  General requirements for water supply installations
NEN-EN 1982  Copper and copper alloys - Ingots and castings
NEN-EN 12163  Copper and copper alloys - Rod for general purposes
NEN-EN 12164  Copper and copper alloys - Rod for free machining purposes
NEN-EN 12420  Copper and copper alloys – Forgings

Staatscourant van 13 december 2002, nr. 241, pagina 25

In this BRL is referred to the version in force, unless something else is mentioned.
I Model certificate

Product certificate
KXXXXXXXX/0X

Issued
Replaces
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Cartridges to be used for sanitary tapware

STATEMENT BY KIWA
With this product certificate, issued in accordance with the Kiwa Regulations for Product Certification, Kiwa declares that legitimate confidence exists that the products supplied by

Name supplier

complying with the technical specifications as laid down in this product certificate and marked with the Kiwa®-mark in the manner as indicated in this product certificate, on delivery, may be relied upon to comply with Kiwa evaluation guideline BRL-KI4008/02 “Cartridges to be used for sanitary tapware”.

Bouke Meekma
Kiwa

Publication of the certificate is allowed.

Advice: consult www.kiwa.nl in order to ensure that this certificate is still valid.
## II Model IQC-scheme

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