

**BRL-K19005**  
01-02-2012

# Evaluation guideline

for the Kiwa product certificate for  
internally tinned copper tubes for drinking water  
installations



# Preface

This evaluation guideline has been accepted by the board of experts CWK of Kiwa, in which the parties concerned in the sector Drinkingwater 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 01-02-2017.

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The use of this evaluation guideline by third parties, for any purpose whatsoever, is only allowed after a written agreement is made with Kiwa to this end.

## **Validation**

This evaluation guideline has been validated by Kiwa on 1 February 2012.

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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 "Internally tinned copper tubes for drinking water installations".

This evaluation guideline replaces K19005 dated 15 December 2001.

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 EN45011.

## 1.2 Field of application / scope

The internally tinned copper tubes are intended to be used in the transport of hot ( $\leq 90$  °C) or cold water intended for human consumption. The tubes can be supplied in the annealed, half hard and hard material temper conditions.

The internal tinning of copper tubes is intended to reduce the migration of copper into the drinking water, for those applications where this could be a point of consideration. The tube connections can only be made with the help of tinned copper press fittings or tinned copper alloyed press fittings conforming to the requirements of evaluation guideline BRL-K774, or with tinned soft-solder fittings conforming to the requirements of evaluation guideline BRL-K6231.

Tube connections made by drift expanding the tube shall not be allowed.

Due to an increased risk of corrosion caused by excessive heat input it is not allowed to hard solder these tubes. Also, it is not permitted to hot bend or use any other kind of process where the excessive input of heat is required.

Depending on the tinning process an external tin layer may also be applied to the tube. However, this external tin layer is not a consideration for this evaluation guideline

## 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.

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<sup>1</sup> Soft soldering of fittings in accordance with BRL K623 is limited to DN 54 mm. maximum

## 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 products have to fulfil. These requirements will make part of the technical specification of the products, as included in the certificate.

## 4.2 Materials

### 4.2.1 *Requirements to avoid deterioration of the quality of the 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 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.

### 4.2.2 *Chemical and mechanical requirements*

The requirements pertaining to these products and the relevant test methods are detailed in:

EN 1057:1996 Copper and copper alloys – Seamless, round copper tubes for water and gas in sanitary and heating applications

### 4.2.3 *Additional and/or supplementary requirements for the copper tubes*

In addition to and/or in deviation from the EN 1057 the following shall apply.

### 4.2.4 *Nominal outside diameters and wall thicknesses*

For this evaluation guideline only the following nominal outside diameters and nominal wall thicknesses shall be applicable:

10 x 1.0; 12 x 1.0; 15 x 1.0; 18 x 1.0; 22 x 1.1; 28 x 1.2; 35 x 1.5; 42 x 1.5; 54 x 1.5; 64 x 2.0; 76.1 x 2.0; 88.9 x 2.0 and 108 x 2.5.

For the tolerances on the nominal outside diameter and the wall thicknesses, the requirements of EN 1057 shall apply with the exception that the tolerance for tubes up to thickness of 1,2 mm the tolerance on the wall thickness shall be  $\pm 10$  % maximum for all temper conditions.

### 4.2.5 *Bending test*

In addition to the requirement of EN 1057 the bending test shall be applicable to half hard and hard temper tubes.

The tubes shall be bent with minimum radius given in the table 1 herewith.

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\* 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.

Nominal outside diameter <i>D</i>	Minimum radius of curvature	
	Internal radius	neutral axis radius
10	35	40
12	39	45
15	48	55
18	61	70
22*	66	77
28*	100	114

Table1: Minimum radius of curvature

\*halfhard tubes only

#### 4.2.6 *Requirements and test methods for the tinning*

This paragraph covers the requirements and test methods applicable to the tinning process and the final tin layer.

#### 4.2.7 *Surface quality of copper tube prior to tinning*

The surface of the copper tube shall be clean and free of dirt prior to tinning. It is recommended that the tubes be pickled and rinsed to achieve the required surface condition. Surface contaminants such as carbon films, grease, oils etc. which cannot be removed by the pickling process should be removed by degreasing the tubes.

##### Test method

The surface quality of the copper tube shall be examined visually.

#### 4.2.8 *Tinning baths*

Depending on the tinning process used the following shall apply.

#### 4.2.9 *Chemical tinning*

The concentrations in the baths of depositable elements other than tin must be less than 0.1 %.

##### Test method

The purity of the tin used must be proven by the manufacturer and confirmed with a type 3.1.B certification in accordance with EN 10204. The concentration of the bath shall be measured at regular intervals in order to ensure compliance.

#### 4.2.10 *Hot-dip tinning*

The purity of the tin used shall be a minimum of Sn  $\geq$  99,9 %.

##### Test method

The purity of the tin used must be proven by the manufacturer and confirmed with a type 3.1.B certification in accordance with EN 10204.



#### 4.2.11 *Electrolytic tinning*

*The concentrations of depositable elements other than tin in the electrolyte must be less than 0,1%*

##### Test method

The purity of the bath used must be proven by the manufacturer and confirmed with certification.  
The concentrations of the bath shall be measured at regular intervals in order to ensure compliance.

#### 4.2.12 *Tin layer*

The deposited tin forms a bond with the copper material. The composition of the surface layer shall meet the requirement of  $\text{Sn} + \text{Cu} \geq 99.9\%$ .

##### Test method

The chemical analysis of the tin layer shall be carried out by means of electron spectroscopy or another suitable or recognised method.

### **4.3 Requirements and test methods for the completed product**

The finished product shall comply with the following aspects.

#### 4.3.1 *Surface quality*

The tinning shall be uniform and have a homogeneous structure. Discontinuities are not acceptable.

##### Test method

The inspection shall be carried out visually.

In addition the surface condition shall be tested in accordance with Annex 3 whereby the value "b" determined shall be  $< 1$ .

#### 4.3.2 *Tin thickness*

The thickness for the tin applied by the chemical process shall be a minimum of 1  $\mu\text{m}$ .

The thickness for the tin applied by the hot-dip process shall be a minimum of 4  $\mu\text{m}$ .

The thickness for the tin applied by electrolytic process shall be a minimum of 2  $\mu\text{m}$ .

##### Test method

The thickness of the tinning shall be determined by the use of suitable non-destructive testing equipment. Alternatively, the measurement can also be carried out by making metallographic cross sections or by detaching the plating whereafter the thickness can be measured.

#### 4.3.3 *Bending test*

When subjected to the bending test (see 2.5.2) the tin layer shall not crack and must adhere firmly.

##### Test method

The examination shall be carried out visually.

#### 4.3.4 Microbiological requirements<sup>1</sup>

When subjected to this test the product shall not be conducive to microbiological growth when in contact with water intended for human consumption. In order to meet this requirement the Biofilm Production Potential (BPP = the average biofilm production after 8, 12 and 16 weeks exposure to potable water) shall not exceed 100 pg ATP/cm<sup>2</sup> (picograms Adenosine TriPhosphate).

##### Test method

The test shall be carried out in accordance with the requirements of preliminary NEN 1225 "Drinking water - Determination of the potential of substances to influence the microbiological quality - part 3. Assessment of the Biomass Production Potential of materials in contact with (drinking) water" whereby only the effect of the inner tube surface will be assessed.

#### 4.3.5 Durability

When subjected to this test the tinned copper tubes shall have a calculated life expectancy of 50 years. The product can be deemed to comply with this requirement when the migration value of copper (Cu) after the 13 week test period and in the sit and soak test is below 2000 µg/l after 24 hours of stagnation

##### Test method

The duration test is conducted on tinned copper tubes of 22 x 1 mm with a total length of two times 5m (the test is carried out in duplicate). The tubes are installed in a test rig capable of being pressurised to a constant working pressure of 2 bar(g). A daily flow of 30 m<sup>3</sup> is pumped through the test rig for the total test duration of 13 weeks. In week 1, 2, 4, 8 and 12 the system is allowed to stagnate for a period of 16 hours after which the migration value of copper and tin is measured. The 5 values so obtained after completion of the test should give information on any deviations that could occur during the test with respect to tin or copper migration from the inner surface of the tube. The water used for this test shall be in compliance with the Drinking Water Directive and shall comply with the parameters as given in table 1 "Mean composition of laboratory water".

<b>Laboratory water: mean composition</b>	
- pH value	~ 7,8
- Hydrogen Carbonate	~ 290 mg HCO <sub>3</sub> <sup>-</sup> /l
- Conductivity	~ 400 µS/cm

**Table 1: Mean composition of laboratory water**

#### 4.3.6 Sit-and-soak test

After the duration test, a sit and soak test is carried out with parts of the pipes from the test rig. Therefore, from each tinned copper pipes from the test rig, three pipe samples, each with a length of approximately 20 cm, are taken. The bottom ends of the pipes are closed with plastic plugs, and the top left open. To avoid water-line corrosion the pipes shall stand vertically and shall be completely filled with water.

The tests is carried out using synthetic test water, which favors the corrosion of copper. The water preparation is given in table 2.

<b>Synthetic test water: acidic potable water with high CO<sub>2</sub>-content</b>	
- Basis water adjusted to K <sub>S4,3</sub> -value of 2,3 mol/m <sup>3</sup> by adding NaHCO <sub>3</sub> and pH-value by introducing CO <sub>2</sub> -gas until pH 6,5.	
- pH = 6,5,	
- K <sub>B8,2</sub> = 1,8 mol/m <sup>3</sup> ,	

<sup>1</sup> The present value of 100 pg ATP/cm<sup>2</sup> is based on the present experience with metallic materials such as stainless steel. At present the acceptance criteria for the Biofilm Production Potential for metallic materials in contact with water intended for human consumption are being developed and this could lead to a change in this value.

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-  $K_{S4,3} = 2,3 \text{ mol/m}^3$

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**Table 2: Synthetic test waters: Preparation and typical analytic values of relevant water parameters**

The sit-and-soak test will take one week, consisting of four stagnation periods of 24 hours. After each stagnation period the test water is replaced. After each stagnation period the copper concentrations are measured with absorption, or atomic emission spectroscopy (AAS / ICP-OES). The single values are evaluated critically concerning potential failures. The average value is calculated as the final result.


# 5 Marking

## 5.1 General

The products have to be marked with following indelible marks and indications:

- The tubes shall be permanently marked at repeated distances along their length of not greater than 600 mm, as follows:
- -manufacturer's identification mark;
- -nominal outer diameter x wall thickness;
- -temper of the copper tube;
- -date of production: year and quarter or year and month;
- -word mark "KIWA".

## 5.2 Certification mark

After concluding a Kiwa certification agreement the certified products shall, beside the marks indicated in the respective standards, be indelible marked with the wordmark **KIWA**  on the body.

# 6 Requirements in respect of the quality system

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

## 6.1 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.

## 6.2 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.

## 6.3 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.

## 7 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.

### 7.1 Test matrix

Requirements	BRL article	Test performed during the		
		Evaluation	Kiwa audits after certification	
			Test	Frequency
<b>Type tests</b>				
Toxicological requirements	2.3	X	X	See note <sup>1</sup>
Microbiological requirements	2.7.5	X		
Durability test	2.7.6	X		
<b>Process control</b>				
Procedures		X	X	Every visit
Works specifications		X	X	Every visit
Inspection		X	X	Every visit
Calibration		X	X	Every visit
Non conforming materials		X	X	Every visit
Documentation		X	X	Every visit
<b>Products Requirements</b>				
<b>General</b>				
Dimensions and tolerances	2.5.1	X	X	Every visit
Surface quality	EN 1057	X	X	Every visit
Bending test	2.5.2	X	X	Every visit
Freedom from defects	EN 1057	X	X	Every visit
Chemical analysis		X	X	Every visit
<b>Mechanical properties</b>				
- tensile strength	EN 1057	X	X	Every visit
- hardness	EN 1057	X	X	Every visit
Marking		X	X	Every visit
Form of delivery		X	X	Every visit

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

<sup>2)</sup> Inspections as indicated are to be conducted by the inspector or by the manufacturer, whether or not in presence of the inspector.

### 7.2 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.

<sup>1</sup> Note: The frequency with which the tests pertaining to the toxicological requirements shall be carried out is determined by the Chief Inspectorate for Public Health and Environmental Protection.

# 8 Agreements on the implementation of certification

## 8.1 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.

## 8.2 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.

### 8.2.1 Qualification requirements

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

EN45011	Certification Expert	Inspector	Decision maker
<b>Education - general</b>	<ul style="list-style-type: none"> <li>• Technical higher-level professional education</li> <li>• Internal training certification and Kiwa policy</li> <li>• Training auditing</li> </ul>	<ul style="list-style-type: none"> <li>• Intermediate-level professional education</li> <li>• Internal training certification and Kiwa policy</li> <li>• Training auditing</li> </ul>	<ul style="list-style-type: none"> <li>• Higher level professional education</li> <li>• Internal training certification and Kiwa policy</li> <li>• Training auditing</li> </ul>
<b>Education - specific</b>	<ul style="list-style-type: none"> <li>• for BRL relevant technical education</li> <li>• specific studies and training (know-how and skills)</li> </ul>	<ul style="list-style-type: none"> <li>• for BRL relevant technical education</li> <li>• specific studies and training (know-how and skills)</li> </ul>	<ul style="list-style-type: none"> <li>• not applicable unless specific requirements have been specified by the BoE</li> </ul>
<b>Experience - general</b>	<ul style="list-style-type: none"> <li>• 1 year of relevant work experience with at least 4 pre certification tests of which one carried out independent under supervision.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 year of relevant work experience with at least 4 inspections of which one carried out independent under supervision</li> </ul>	<ul style="list-style-type: none"> <li>• 4 year of relevant work experience with at least 1 year in certification</li> </ul>

EN45011	Certification Expert	Inspector	Decision maker
Experience - specific	<ul style="list-style-type: none"> <li>Detailed knowledge of the BRL and 4 certification tests carried out on the basis of the BRL or one related.</li> </ul>	<ul style="list-style-type: none"> <li>Detailed knowledge of the BRL and 4 inspections carried out on the basis of the BRL or one related.</li> </ul>	<ul style="list-style-type: none"> <li>general knowledge of the BRL</li> </ul>

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

### 8.2.2 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.

### 8.3 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.

### 8.4 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.

### 8.5 Lay out of quality declaration

The product certificate shall conform the model included as an annex

### 8.6 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 number of 4 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.

### 8.7 Interpretation of requirements

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



## 9 Titles of standards

BRL-K623/02	Hulpstukken voor soldeer en/of schroefverbindingen aan koperen buizen	March 2001
BRL-K774/04	Klemfittingen dicht te klemmen met bijbehorende klemapparaat	March 2001
EN-1057	Copper and copper alloys - Seamless, round copper tubes for water and gas in sanitary and heating applications	May 1996
EN-10204	Metallic products - Types of inspection documents	October 1995
EN-45004	General criteria for the operation of various types of bodies performing inspection	October 1996
EN-45011	General requirements for bodies operating product certification systems	March 1998
EN-45012	General requirements for bodies operating assessment and certification/registration of quality systems	March 1998
EN-45013	General criteria for certification bodies operating certification of personnel	November 1998
EN-ISO 9001	Quality management systems - Requirements	December 2000
EN-ISO/IEC17025	General requirements for the competence of testing and calibration laboratories	April, 2000

# I Model certificate

**Certificate**

Product certificate  
KXXXXXXX/OX

**kiwa**   
Partner for progress

Issued  
Replaces  
Page 1 of 2

**Naam product**

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-K'', dated 20xx-xx-xx.

  
Bouke Meekma  
Kiwa

Publication of the certificate is allowed.  
Advice: consult [www.kiwa.nl](http://www.kiwa.nl) in order to ensure that this certificate is still valid.

**Supplier**

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**Certification process**  
consists of initial and regular inspection of:

- qualitysystem
- product

## II Model IQC-scheme

Subjects	Aspects	Method	Frequency	Registration
Raw materials or materials supplied: <ul style="list-style-type: none"> <li>• Recipe sheets</li> <li>• Incoming inspection raw materials</li> </ul>				
Production process, production equipment, material: <ul style="list-style-type: none"> <li>• procedures</li> <li>• work instructions</li> <li>• equipment</li> <li>• release of product</li> </ul>				
Finished-products				
Measuring and testing equipment <ul style="list-style-type: none"> <li>• measuring equipment</li> <li>• calibration</li> </ul>				
Logistics <ul style="list-style-type: none"> <li>• internal transport</li> <li>• storage</li> <li>• preservation</li> <li>• packaging</li> <li>• identification or marking of semifinished and finished products</li> </ul>				