

BRL 2020-2
October 25, 2016

Evaluation Guideline

For the KOMO® product certificate for

TPE pipe joint seals for non-pressure waste water
and drainage - SEALS



Adopted by the CvD-LSK d.d. 11-07-2016

Accepted by the KOMO Quality- and Screening
Commission d.d 13-10-2016

Preface Kiwa

This KOMO Evaluation Guideline has been prepared by Kiwa's Board of Experts "Plastics piping systems (Leidingsystemen Kunststof, CvD- LSK), in which the parties interested in the area of TPE pipe joint seals for non-pressure waste water and drainage are represented.

This Board of Experts also guides the performance of certification and adjusts this Evaluation Guideline where necessary. Wherever the term 'Board of Experts' is used in this Evaluation Guideline, the above mentioned Board of Experts is meant.

Kiwa will use this Evaluation Guideline in conjunction with the Kiwa Regulations for Product Certification. The said regulations embody the examination procedure laid down by Kiwa for the issue of a certificate as well as the procedure for the external inspection.

Certification of TPE seals and/or TPE material

Based on part 2 of the guideline product certificates are issued on TPE seals. Requirements for the materials used for the production of the seals are given in part 1 of this guideline.

Declared in force by Kiwa

This Evaluation Guideline is declared in force by Kiwa per October 25, 2016.

Kiwa Nederland B.V.

Sir W. Churchill-laan 273

P.O. Box 70

2280 AB RIJSWIJK ZH

The Netherlands

Tel +31 (0)88 998 44 00

Fax +31 (0)88 998 44 20

info@kiwa.nl

www.kiwa.nl

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1 Introduction

1.1 General

The requirements embodied in this Evaluation Guideline are used by certification bodies, acknowledged by the Dutch Accreditation Council (RvA)¹, when dealing with applications or maintenance of a product certificate for TPE seals to be used for the production of pipe joint seals for non-pressure waste water and drainage.

The certificate issued is referred to as KOMO® product certificate.

Besides the requirements embodied in this Evaluation Guideline, certification bodies impose additional requirements in the sense of requirements with regard to general procedures for certification as laid down in the general certification regulations of the respective certification body.

Together with evaluation guideline BRL 2020-1, this guideline replaces Evaluation Guideline BRL 2020 from 1 November 2006, including the amendment from 31 December 2014. Product certificates issued on the basis of that Evaluation Guideline and the amendment lose their validity at most after one year after binding declaration.

During the execution of certification activities, the certification bodies have to fulfil the requirements as laid down in the chapter 'Requirements imposed on the certification body'.

1.2 Fields of Application

The different types of TPE seals which, at least partly, have been manufactured from TPE are intended for use in piping systems for non-pressure underground drainage and sewerage at temperatures up to 45°C, intermittently up to 90 °C. At this moment the application area is specified as follows:

- Standardised ring seal sockets in PVC, PP or PE pipes in outside building drainage and sewage systems according to:
 - EN 1401-1, EN 1852-1, CEN/TS 14578;
 - EN 13476-1.
- Standardised ring seal sockets in PVC, PP or PE pipes in inside building soil and waste water systems according to:
 - EN 1329-1 and EN 1451-1.

These joints include both joints between pipes and joints between pipes and fittings.¹

1.3 Relation to European Regulation for Construction Products (CPR, EU 305/2011)

For the products belonging to the scope of this Evaluation Guideline, EN 681-2 is the harmonised European standard applicable.

¹ For other applications than mentioned here a more explicit testing could be necessary to assure the function of the seals. Dimensions and tolerances of ring seal sockets for which the TPE seals are intended are specified in the product certificate

1.4 Requirements for conformity assessing bodies

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

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

Remark:

NEN-EN ISO/IEC 17021-1 is published at the 1st of July 2015 and will replace NEN-EN ISO/IEC 17021. For this replacement a period of 2 years is in force.

The body is deemed to meet these criteria if an accreditation certificate can be submitted which has been issued by Raad voor Accreditatie (Board of Accreditation) or an accreditation body with which Raad voor Accreditatie has concluded a mutual acceptance agreement.

If no accreditation certificate can be submitted, the certification body itself shall verify whether the accreditation standard has been met.

1.5 Product certificate

Based on the KOMO-system applicable to this Evaluation Guideline, a KOMO® certificate is issued for:

- Product certificate for TPE pipe joint seals for non-pressure waste water and drainage - SEALS applications. The claims in this product certificate are based on chapters 4 and 5 (Product requirements and determination methods and Quality System requirements) of this Evaluation Guideline.

On the website of 'Stichting KOMO' (www.komo.nl) the template for product certificates applicable for this Evaluation Guideline are given. The product certificate to be issued should match.

2 Terminology

2.1 Definitions

In principle for definitions it is referred to the terminology as described in the relevant standards.

For definitions related to the conformity assessment it is referred to the website of the foundation of KOMO (www.komo.nl) and to the regulations of the certification body.

In the Evaluation Guideline the following terms have the following meanings:

- TPE material: Thermoplastic elastomer made from a polymer or blend of polymers that does not require vulcanization or crosslinking during processing, yet has elastic and rubberlike properties, at its service temperature. These properties disappear at processing temperature, so that further processing is possible, but return when the material is returned to its service temperature;
- Board of Experts: The Board of Experts “Plastics Piping Systems (LSK)”;
- Supplier: the party that is responsible for ensuring that the products meet and continue to meet the requirements embodied in this Evaluation Guideline;
- IQC scheme (Internal Quality Control 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.
- Determination methods:
 - **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.

The test matrix contains a summary showing what tests will be carried out by certification body 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.

3 Procedure for obtaining a product certificate

3.1 Initial investigation

In order to obtain a KOMO product certificate, the certification institute will conduct an investigation. The initial investigation comprise of:

- Review of the by the supplier supplied or to be supplied documents, at which time is verified if the with the products combined piping system complies with the performance requirements as stipulated in this evaluation guideline.
- Determination of the product characteristics (of compounded products) as documented in this evaluation guideline.
- Evaluation of the installation instructions of the supplier.

3.2 Assesment quality system

In order to obtain a KOMO product certificate, the certification institute will conduct an investigation. The initial investigation comprise of:

- Evaluation of the production process;
- Evaluation of the quality system and the IQC-scheme;
- Assessment of the presence and functioning of other required procedures;

A determination has to be made to what extend the quality system is in accordance with the demands as stated in chapter 5 and 7 of this evaluation of this guideline.

3.3 Issue of the product certificate

After completion of the initial investigation, the results are presented to the decision-maker. The decision-maker evaluates the results and determines whether the product certificate can be issued or whether additional information and/or investigations are required in order to be able to issue the product certificate.

4 Product requirements and determination methods

4.1 General

This chapter contains the requirements to be met by the TPE pipe joint seals for non-pressure waste water and drainage. At setting the requirements the uncertainties of the measurements are taken into account. This implies that drawing conclusions whether requirements are fulfilled these uncertainties do not need to be weighted anymore. These requirements will form part of the technical specification of the product, which will be included in the product certificate.

Annex A, table 4 contents a summary of the requirements.

All properties must be determined on test pieces prepared out of TPE seals according to table 4, annex A.

Concerning to requirements set out in this chapter regarding the essential characteristics there will be no initial audit and there won't be a declaration recorded in the product certificate.

4.2 Material

4.2.1 General

Within the scope of this Evaluation Guideline all types of TPE material may be used as long as they fulfil the requirements of part 1 of this guideline.

4.3 Functional requirements

4.3.1 General

The TPE seals shall be suitable for the intended purpose. The design, the type(s) of TPE selected and the construction shall be such that, with regard to the type of application, a good (non-leaking) sealing of the joints under normal circumstances is assured. Depending on the type of product and the construction used the materials have to be tested as follows.

4.3.2 Specific requirements

The TPE seals shall be resistant to any chemicals that waste water and heating water can contain under usual circumstances and in the usual concentrations. If necessary, the resistance to chemicals must be determined according to a procedure suitable for the purpose, see for instance ISO 1817. The requirements shall be laid down by mutual agreement of the manufacturer and the buyer.

4.3.3 Types of TPE seals

4.3.3.1 Solid TPE seals

The TPE seals shall fulfil the requirements of this Evaluation Guideline in paragraph 4.3.4, 4.3.5, 4.3.6 and 4.4.

4.3.3.2 TPE seals out of two types of TPE

If both types of TPE take part in the sealing function they both shall fulfil all requirements in this Evaluation Guideline.

4.3.3.3 TPE attached to TPE or other materials

The TPE shall fulfil the requirements of this Evaluation Guideline in paragraph 4.3.4, 4.3.5, 4.3.6 and 4.4. The adhesion between TPE and the other material shall be at least 100 N/25

mm when tested in a way similar to ISO 813. In cases where the rigid parts are too small for a real test based on ISO 813 the TPE should tear and not detach when it is tried to separate the bond by peeling under an angle of about 90°.

4.3.4 Appearance

The appearance of the TPE seals shall comply with ISO 9691.

4.3.5 Homogeneity

The TPE seals may not contain foreign bodies and shall be free of imperfections and defects such as cracks, entrapped air, bubbles or other irregularities, i.e. ISO 9691. Test according to 4.6.2.

4.3.6 Dimensions

The nominal measurements of the TPE seals and the acceptable deviations shall be in accordance with the figures stated by the manufacturer and they shall be laid down in a drawing. Tolerances shall be specified from the appropriate classes of ISO 3302-1. For dimensions of O-rings also reference could be made to NEN-ISO 3601-1. Determine the dimensions by means of appropriate measuring equipment (see ISO 23529). Test according to 4.6.3.

4.4 Physical and mechanical properties of the TPE seals

4.4.1 General

Unless stated otherwise, tests shall be carried out at a temperature of 23 °C according to ISO 23529.

The allowed tolerances for all mentioned test durations and test temperatures shall be according to ISO 23529.

For tests carried out at the production location, a temperature between 15 °C and 30 °C is allowed.

4.4.2 Hardness

4.4.2.1 General

The hardness shall be suitable for the material and the construction of the joints for which the TPE seals are intended.

Therefore the hardness shall be determined in consultation between the manufacturer of the pipes and fittings and the manufacturer of the TPE seals.

Then the hardness concerned shall be reported to the inspection body as nominal hardness with the tolerance range which has been determined by mutual consent.

Usually the tolerance range for the TPE is ± 5 IRHD. When the customer or the sort of construction demands such a thing the tolerance range can be ± 3 IRHD.

The hardness shall be determined according to 4.6.4.

4.4.2.2 Difference in hardness

The difference in hardness (the difference between the highest and lowest value measured) of a seal shall not exceed 5 IRHD.

4.4.3 Mechanical properties

Tensile strength and elongation at break shall meet the requirements laid down in table 4, annex A.

Determination must take place in accordance with 4.6.5.

4.4.4 Compression set

The compression set of the TPE determined according to 4.6.6 shall not exceed the values given in table 1.

Table 1 – Compression set

Property	Dimension	Method A	Requirement
Compression set 24 h, 70°C	%	ISO 815-1	Max. 40

4.4.5 **Stress relaxation**

The stress relaxation shall be determined in accordance with 4.6.7. The values obtained shall not exceed the maximum values given in table 2.

The 100 days test shall be considered as a pre certification test. The requirement in respect of the 100 days relaxation shall also be regarded as a pre certification requirement.

Table 2 – Stress relaxation

Property	Dimension	Method	Requirement
Stress relaxation 168 h at 23°C	%	ISO 6914 or ISO 3384-1	Max. 22

4.4.6 **Stress fall**

The stress fall shall be determined in accordance with 4.6.8. The values obtained shall not exceed the maximum values given in table 3.

Table 3 – Stress fall

Property	Dimension	Method	Requirement
Stress fall 168 h at 23°C with 2 times 1 hour at 70°C	%	ISO 6914 or ISO 3384-1	Max. 25

4.4.7 **Properties for special type of products**

4.4.7.1 **General requirements**

A TPE ring made of an extruded profile or cord shall not contain more than one weld, possible joints between different TPE compounds excluded, except by agreement between the manufacturer and the client.

A ring made of two TPE compounds shall not contain more than one weld in the direction of the outline of the product.

4.4.7.2 **Behaviour at elongation**

- **TPE seals with a weld**
The weld shall not crack or contract when tested in accordance with 4.6.9.1 and 4.6.9.3.
- **Seals made from two TPE compounds**
The joint shall not crack or contract when tested in accordance with 4.6.9.2 and 4.6.9.3.

4.5 Sampling, test material and test pieces

4.5.1 Sampling

The sample shall be representative of the product to be checked.

4.5.2 Test material

4.5.2.1 Test pieces

The test pieces required shall, in accordance with ISO 23529, be made out of seals (see 4.5.2.2).

4.5.2.2 Test pieces from seals

Depending on the dimensions of the seals it is allowed and can be necessary to take test pieces with other (smaller) dimensions than those prescribed in the standards. A guideline for this preparation is given in annex E.

4.6 Test Methods

4.6.1 Appearance

Judge the appearance aspect of a random selection of a number of (at least 5) TPE seals and test the findings against 4.3.4.

4.6.2 Homogeneity

Take a random selection of at least five seals and cut them in flat slices or parts of approx. 2 mm in thickness.

Stretch those 100% and test the findings by the requirements according to 4.3.5.

4.6.3 Dimensions

Determine the dimensions by means of appropriate measuring equipment.

Test the findings against that which is laid down in 4.3.6.

4.6.4 Hardness

Determine the hardness according to NEN-ISO 48 at a temperature of 23 ± 2 °C.

Only in the case where the form and the dimensions of the ring do not allow measurement according to the standard mentioned previously, or in case of a check measurement (non destructive), the apparent hardness shall be determined in a way which both parties (buyer and manufacturer) have agreed upon. In that case the following issues must be laid down and submitted to the inspection body: the nominal apparent hardness plus the corresponding tolerance, the method of measurement and the place(s) of measurement.

4.6.5 Mechanical properties

The tensile strength and elongation at break shall be determined by the method specified in ISO 37. Dumbbell shaped test pieces of type 2 shall be used.

4.6.6 Compression set in air

4.6.6.1 General

If the test piece is taken from a seal, then the measurement shall be carried out as far as possible in the direction of the compression of the seal in service. The test conditions specified in table 4, annex A apply.

4.6.6.2 *Compression set at 70°C*

Determine the compression set by the method specified in ISO 815-1, at 70 °C using the small test piece.

Where the cross section is too small to obtain compression buttons from the product, as an alternative to moulding buttons, the tension set of test sheets may be determined using the method specified in ISO 2285 with strain 50%. For this alternative test method the same test conditions (except strain) and requirements apply as used for the determination of the compression set.

4.6.7 *Stress relaxation*

The stress relaxation shall be determined by method A of ISO 3384-1 using the small test piece after applying mechanical and thermal conditioning. Measurements shall be taken after 3 hrs, 1, 3 and 7 days.

The best fit straight line shall be determined by regression analysis using a logarithmic time scale. The 7 days requirement is that derived from this straight line.

The measurement shall be carried out as far as possible in the direction of compression of the seal in service.

Where the cross section is too small to obtain compression buttons from the product, as an alternative to moulding buttons, the stress relaxation in tension of the product may be determined, at a temperature of 23 °C, using method A specified in ISO 6914 with the same requirements as for stress relaxation in compression.

4.6.8 *Stress fall*

The stress fall shall be determined based on the method given in the standard (ISO 6914).

The test is started as a normal test at 23°C. After a period of 48 hours the test rig is carefully transferred to a temperature of 70°C. After 1 hour the test piece is placed back at 23°C. 47 hours later this is repeated. After the second period at 70°C the test piece is kept at 23°C for at least another 48 hours. The stress fall is the distance between the line before the first transfer to 70°C and the line at 23°C after the second transfer to 70°C. The principle is given in figure 1.

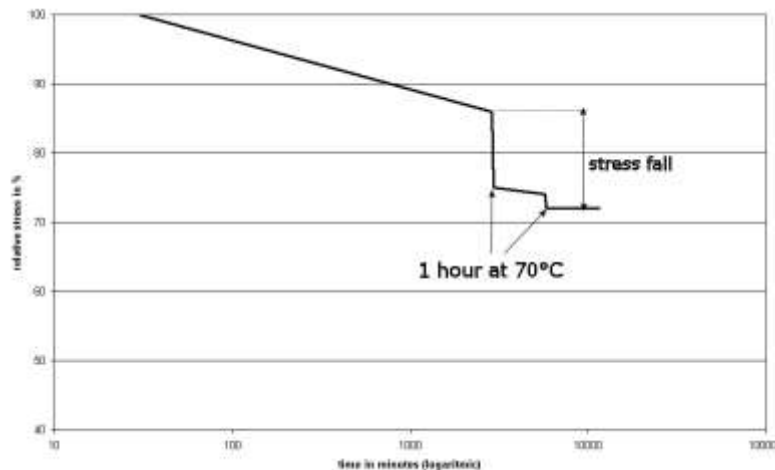


Figure 1: Example of relaxation curve and definition of stress fall

4.6.9 Behaviour at elongation

4.6.9.1 TPE seals with a weld

Elongate two TPE seals with a weld with a tensile speed of 500 mm/min to 100% elongation, unless a reduced elongation has been agreed upon by both the buyer and the manufacturer. Such agreement has to be reported to the inspection body. Keep the rings in an elongated state for at least 30 seconds. In case of a TPE seal made of welded coextruded profile or cord having a soft TPE and a hard plastic part (fig. 2A), a TPE part with the weld of at least 100 mm length is first cut off from the hard part (fig. 2B), and then tested (fig. 2C).

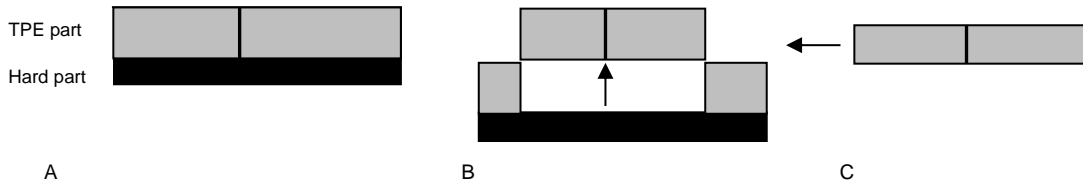


Figure 2. Test of behaviour at elongation on coextruded welded profile or cord

4.6.9.2 Seals made from two TPE compounds

Elongate two test pieces containing the joint between the two materials with a tensile speed of 500 mm/min to 100% elongation. Keep the test pieces in an elongated state for at least 30 seconds.

4.6.9.3 Elongation test for welded products after ageing

After ageing for 168 hours at 70 °C in accordance with ISO 188 the test of 4.6.9.1 and / or 4.6.9.2 is repeated.

4.7 Certification mark

The following marks and indications must be provided on each product[#] and product packaging in a clear, legible and indelible way:

- KOMO logo (or KOMO® word mark) with certificate number;
- name of manufacturer or the deposited trade mark;
- the nominal dimension or dimensions;
- the year of manufacturing and preferably the quarter;
- the type of TPE in a letter code according to the nomenclature used in ISO 18064; e.g. TPE-V.

[#] If the dimensions of the products are such that the indications applied to them may impair the product, the products may be marked per package in consultation with the manufacturer, the buyer and the inspection body. Fittings with co-injected seals shall be marked according to the requirements in the evaluation guideline for the fitting.

The KOMO® marking has to be clearly separated from the CE-marking.

5 Quality system requirements

5.1 General

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

5.2 Manager of the quality system

Within the organisational structure an employee must be appointed who is in charge of managing the quality system.

5.3 Internal quality control/quality plan

The supplier must have an implemented and operational internal quality control scheme in place (IQC-scheme).

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

- materials used in the product
- which aspects are checked by the manufacturer;
- according to which methods these inspections are carried out;
- how often these inspections are carried out;
- how the inspection results are registered and stored.

This IQC-scheme shall be derived from the example format as shown in annex A. The scheme must be detailed in such a way that it provides CI sufficient confidence that the requirements of this Evaluation Guideline are continuously fulfilled.

5.4 Management of laboratory- and measure apparatus

The supplier must determine which laboratory- and measure apparatus are needed based on this Evaluation Guideline in order to demonstrate the product fulfils the requirements. When applicable laboratory- and measure apparatus need to be calibrated at specified intervals.

The supplier needs to validate and register the previous measure results, when at the time of calibration is determined that the laboratory and measure devices are not operating correctly.

The apparatus in question need to be marked in such a way that can be determined what the calibration status is. The supplier is required to register the calibration results.

5.5 Procedures and working instructions

The supplier must be able to submit procedures for:

- the handling of non-conforming products;
- corrective actions in case non-conformities are found;
- the handling of complaints regarding the products and/or services supplied;
- managing work instructions and inspection sheets in use;
- instructions for packaging and closing off of products during storage and transport.

5.6 Other requirements imposed on the quality system

In case the quality system of the supplier is certified on the basis of ISO 9001 or ISO/TS 16949, a combination can be made with the IQC-scheme.

6 Summary of tests and inspections

The table below contains a summary of the tests and inspections to be carried out in the event of certification. The following definitions are used.

- **Initial tests:** The test to determine if all demands are met as stated in the BRL.
- **Inspection:** the evaluation tests which is held after issuing of the certificate in order to determine if the certified products are meeting the demands continuously; thereby is also noted at what frequency inspections by the certifying institute (CI) are needed.
- **Evaluation of the quality system:** evaluation of the compliance to the IQC schedule and procedures.

6.1 Test matrix

Description of requirement	Article BRL	Tests within the scope of		
		Initial evaluation	Supervision by certification body after granting of the certificate	
			Inspection ¹⁾	Frequency
Resistance against chemicals	4.3.2	X	X ²⁾	1x year
Appearance	4.3.4	X	X ³⁾	1x year
Homogeneity	4.3.5	X	X ³⁾	1x year
Hardness	4.4.2	X	X	1x year
Tensile test *	4.4.3	X	X	1x year
Compression set	4.4.4	X	X	1x year
Stress relaxation	4.4.5	X	X	1x year
Stress fall	4.4.6	X	X	1x year
Properties for special type of products	4.4.7	X	X	1x year
Marking of the product	4.7	X	X	1x year

(*) Tensile strength and elongation at break

¹⁾ In case of significant changes in the production process the product requirements shall be evaluated again (to be decided by the certification body).

²⁾ This aspect is compared on the basis of IQC inspection (indirectly by means of direct related parameters) with the aspect found for approval.

³⁾ This aspect is only controlled visually during the inspection. In case of reasonable doubt samples will be taken and sent to an accredited laboratory for determination of this property.

6.2 Evaluation of the quality system

During each inspection visit the quality system of the supplier shall be examined and evaluated.

7 Requirements imposed on the certification body

7.1 General

The certification body has to be accredited for the subject of this Evaluation Guideline on the basis of NEN-EN-ISO/IEC 17065 by the Dutch Accreditation Council (RvA) and have a license of KOMO.

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

- The general rules for carrying out the initial tests, to be distinguished in:
 - The way suppliers are informed about the handling of the application;
 - Execution of the initial tests;
 - The decision with regard to the initial tests executed.
- The general rules with regard to the execution of inspections and the inspection aspects to be employed;
- The measures to be taken by the certification body in the event of non-conformities;
- The measures to be taken by the certification body in the event of illegitimate use of certificates, certification marks, icons and trademarks.
- The rules for termination of the certificate;
- The possibility of lodging appeal against decisions or measures made by the certification body.

7.2 Certification staff

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

- Certification assessor/ Reviewer: in charge of review of the by the supplier supplied or to be supplied construction drawings and documents, admissions, reviewing of applications and the review of conformity assessments;
- Site assessor: in charge of carrying out external inspections at the supplier's works;
- Decision-maker: in charge of taking decisions in connection with the initial tests performed, continuing the certification in connection with the inspections performed and making decisions on the need of corrective actions.

7.2.1 Competence requirements

Distinguished are:

- Competence requirements for executive certification staff of a CI that fulfil the requirements of NEN-EN-ISO/IEC 17065;
- Competence requirements for executive certification staff of a CI that are in addition set up by the Board of Experts for the subject of this Evaluation Guideline.

The competencies of the relevant certification personnel must be visibly documented.

	Certification assessor/ Reviewer	Site assessor	Decision-maker
General competence			
General education	• Higher vocational education	• Intermediate technical vocational education	• Higher vocational education
Knowledge of company processes Competence for professional evaluation	• 1 year workexperience	• 2 years workexperience • audittraining	• 5 years workexperience of which 1 year in certification
Technical competence			
Knowledge of the Evaluation Guideline	• Detailed knowledge of the specified Evaluation Guideline in question or the Evaluation Guideline's related to each other.	• Witness inspection • Knowledge of the chapters of the Evaluation Guideline which relate to the quality system and the tests.	• n/a
Relevant knowledge of: <ul style="list-style-type: none"> • The technology involved with producing the products to be inspected, the execution of processes and the provisioning of services. • The way products are used, processes are applied and services are rendered; • Any deficiency that can occur during use of the product, any mistake that can be made during the use of a product and any imperfection in the rendering of services. 	<ul style="list-style-type: none"> • Relevant technical higher vocational education work and intellectual level. • At least 1 year of experience in production, testing, inspection and or in the installation trade, including: <ul style="list-style-type: none"> • 2x inspections under supervision • Or internal training course including: <ul style="list-style-type: none"> • 2x inspections under supervision 	<ul style="list-style-type: none"> • Intermediate technical vocational education work and intellectual level. • At least 1 year of experience in production, testing, inspection and or in the installation trade, including: <ul style="list-style-type: none"> • 3x inspections under supervision • 1x independent inspection • Or internal training course including: <ul style="list-style-type: none"> - 3x inspections under supervision - 1x independent inspection 	• n/a

7.2.2 **Qualification**

Certification staff must be demonstrably qualified by evaluation of education and experience of the above-mentioned requirements.

The authority for qualification rests with the management of the certification body

7.3 **Report initial tests**

The certification body records the results of the initial tests in a report. The report must fulfil the following requirements:

- **Completeness:** the report judges about all requirements of the evaluation guideline;
- **Traceability:** the findings whereupon the judgements are based must be recorded in a traceable way;

With regard to granting the certificate, the decision-maker must be able to base his decision upon the findings recorded in the report.

7.4 **Decision with regard to the issue of the certificate**

The decision with regard to the issue of the certificate must be made by a qualified decision-maker, who was not involved at the initial tests. The decision must be traceable recorded.

7.5 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 four inspection visits per year.

In case the quality system of the supplier is certified on the basis of ISO 9001, the frequency is set at 2 inspection visits per year.

If the supplier is a private label owner (identical certificate derived from a 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.

7.6 Report to the Board of Experts

The certification body reports at least once a year about the certification activities performed. In this reporting, the following subjects must be addressed:

- Mutations in number of certificates (new/cancelled);
- Number of inspections carried out in relation to the fixed frequency;
- Results of the inspections;
- Measures imposed in case of non-conformities;
- Complaints received from third parties concerning certified products.

7.7 Interpretation of requirements

The Board of Experts may lay down the interpretation of this Evaluation Guideline in a separate interpretation document.

The certification body is obliged to inform whether an interpretation document is available. If this is the case, then the interpretations as laid down in the interpretation document must be employed.

7.8 Sanction policy

The sanction policy and the weighing of shortcomings is available on the service page on the website of the certification body, which has formulated this quality assessment.

8 List of documents stated

8.1 Standards / normative documents:

EN-ISO/IEC 17020:2012	Conformity assessment -- Requirements for the operation of various types of bodies performing inspection
EN-ISO/IEC 17021-1:2015	Conformity assessment -- Requirements for bodies providing audit and certification of management systems -- Part 1: Requirements
EN-ISO/IEC 17024:2012	Conformity assessment -- General requirements for bodies operating certification of persons
EN-ISO/IEC 17025:2005+C1:2007	General requirements for the competence of testing and calibration laboratories
EN-ISO/IEC 17065:2012	Conformity assessment -- Requirements for bodies certifying products, processes and services
EN 681-2:2000+A2:2005	Elastomeric seals – Materials requirements for pipe joint seals used in water and drainage applications – Part 2: Thermoplastic elastomers
ISO 37:2011	Rubber, vulcanised or thermoplastic - Determination of tensile stress - strain properties
ISO 48:2010	Rubber, vulcanised or thermoplastic - Determination of hardness (hardness between 30 and 85 IRHD)
ISO 815-1:2014	Rubber, vulcanized or thermoplastic -- Determination of compression set -- Part 1: At ambient or elevated temperatures
ISO 1817:2015	Rubber, vulcanized or thermoplastic - Determination of the effect of liquids
ISO 3302-1:2014	Rubber – Tolerances for products – Part 1: Dimensional tolerances
ISO 3384-1:2011	Rubber, vulcanized or thermoplastic -- Determination of stress relaxation in compression -- Part 1: Testing at constant temperature
ISO 3601-1:2012	Fluid power systems - O-rings - Part 1: Inside diameters, cross-sections, tolerances and designation codes
ISO 6914:2013	Rubber, vulcanized; Determination of ageing characteristics by measurement of stress at a given elongation
EN-ISO 9001:2015	Quality management systems -- Requirements
ISO 9691:1992	Rubber – Recommendation for the workmanship of pipe joint

	rings – Description and classification of imperfections
ISO 18064:2014	Thermoplastic elastomers -- Nomenclature and abbreviated terms
ISO 23529:2010	Rubber - General procedures for preparing and conditioning test pieces for physical test methods

Annex A: Summary of the material requirements for TPE seals and TPE sheets

Table 4: Summary of the requirements for TPE material for seal rings to be used in waste water and drainage piping systems

Property	Dimension	Method	Requirement	Reference
Hardness	IRHD	ISO 48	± 5	4.4.2
Tensile strength on seal test piece (in flow direction)	MPa	ISO 37	> 60 % of value measured on the material in flow direction	4.4.3
Elongation at break on seal test piece (in flow direction)	%	ISO 37	> 80 % of value measured on the material in flow direction	4.4.3
Compression set 24 h, 70°C	%	ISO 815-1	Max. 40	4.4.4
Stress relaxation 168 h at 23°C	%	ISO 6914 or ISO 3384-1	Max. 22	4.4.5
Stress fall after 168 h at 23°C with 2 times 1 hour at 70°C		ISO 6914	Max. 25	4.4.6

Annex B: Example model IQC-schedule

<p><u>IQC-schedule</u></p> <p><u>INTERNAL QUALITY PLAN</u></p>	<p>Manufacturer / supplier :</p> <p>Production location address :</p>	<p>Number of appendices:</p>
<p><u>Field(s) of application</u></p> <p><u>According Evaluation Guideline(s)</u></p>		
<p><u>Number of production shifts:</u></p>	<p><u>Quality manual, procedures and working instructions</u></p> <p>Is the Quality Management System (QMS) certified according to ISO 9001¹⁾?</p> <p>If yes, by which certification body:</p> <p>If yes, is the certification body accredited for the particular scope of certification?</p>	
<p><u>Quality Control</u></p> <p>Total number of employees in QC department : Number of QC-operators per shift :</p> <p>If no QC-inspections are carried out during night shifts, state the QC procedure(s)/instruction(s) to be followed: , documented in:</p>	<p>In case the QMS is not certified according to ISO 9001:</p> <ul style="list-style-type: none"> • Working instructions, test instructions and procedures are documented as follows: • The following procedure for dealing with <u>complaints</u> applies: • The following procedure for <u>nonconformity review</u> applies: 	
<p><u>Inspection and test records</u></p> <p>All records shall be maintained for a minimum of years.</p>		
<p><u>Specific agreements/comments/explanations</u></p>	<p>Signature of the manufacturer/supplier:</p> <p>Date :</p>	

¹⁾ In case the QMS is ISO 9001 certified and covers the scope of the product certificate(s), reference to the applicable procedure(s) on the next pages is sufficient and the tables A till F do in principle not have to be further filled-out except for the frequency of tests/inspections (to be approved by Kiwa) in tables B, C and D.

A. Calibration of measuring and test equipment Applicable procedure(s) nr(s):				
Equipment to be calibrated	Calibration aspect	Calibration method	Calibration frequency	Calibration file (name and location)

B. Raw material and additives Applicable procedure(s) nr(s):				
B.1 Receipt For each delivery of raw material or additives data with respect to dates, producers, types and quantities are recorded as follows:				
B.2 Entry control				
Type of raw material	Inspection aspect	Inspection method	Inspection frequency	Registration file (name and location)

C. Batch release tests per machine (including in-process and finished product testing) Applicable procedure(s) nr(s): Production process(es):				
Type of product	Type of test	Test method	Test frequency	Registration file (name and location)

Specific agreements/comments/explanations:

D. Process verification tests Applicable procedure(s) nr(s):				
Type of product	Type of test	Test method	Test frequency	Registration file (name and location)

E. Control of nonconforming and/or rejected products Applicable procedure(s) nr(s):				
E.1 Method of registration				
E.2 Method of identification				
E.3 Method of nonconformity review and disposition				

F. Inspection with regard to packaging, storage and transportation of the finished product Applicable procedure(s) nr(s):				
Inspection aspects		Inspection method	Inspection frequency	Registration file (name and location)
F.1 Packaging/storage/ transportation etc				

Specific agreements/comments/explanations:

Raw materials list (not required to fill-out this appendix in case reference can be made to the Kiwa ATA part of the certification agreement)		Appendix I Date:
I.1	<p>The product is built-up of the following raw materials:</p> <p>a) In case of products made from ready-made raw materials: listing of name and/or unique code of the raw material(s);</p> <p>b) In case of products made from own compounded raw materials: reference to raw material/compound sheets which are (only) available at the production location and which have to be authenticated by Kiwa (e.g. by the Kiwa inspector);</p> <p>c) In case of composed products (e.g. plastics fitting body, with separate nut, clamp ring and rubber sealing ring): of each part a specification according to a) or b) (whatever applicable).</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p>	

List of technical drawings				Appendix II Date:.....
Drawing title and number	Drawing date	Drawing title and number	Drawing date	