BRL-K17201, part 2
2023-09-14

Evaluation guideline

for the Kiwa-(technical-approval-with) product certificate for the renovation of drinking water piping systems – part 2 – Products for cured in place pipes (CIPP) – factory impregnated liner systems

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Preface

This Evaluation Guideline (BRL) has been accepted by the Kiwa Board of Experts Water Cycle (CWK), in which all relevant parties in the field of “Renovation of drinking water piping systems – Products for cured in place pipes (CIPP) – factory-impregnated liner systems” are represented. This Board of Experts also supervises the certification activities and where necessary requires the BRL to be revised. All references to Board of Experts in this BRL pertain to the above mentioned Board of Experts.

This BRL will be used by Kiwa in conjunction with the Kiwa Regulations for Certification.

The product requirements and test methods comply with the requirements listed in EN-ISO 11298 – part 1 and part 4. The aspects of the assessment of conformity comply with ISO/TS 23818 – part 2. This BRL includes additional requirements and test methods specified by the Board of Experts.

This BRL, together with BRL-K17201 part 1 – “Design and installation of cured in place pipes (CIPP)” is a series of BRL’s that among other things include requirements for the design, installation, semi-finished products, and end products of cured in place pipes.

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Validation
This evaluation guideline has been declared binding by Kiwa on 8 September 2023.

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Contents

1 Introduction

1.1 General

This Evaluation Guideline (BRL) includes all relevant requirements which are employed by Kiwa when dealing with applications for the issue and maintenance of a Kiwa-(technical-approval-with) product certificate for the renovation of drinking water piping systems – products for cured in place pipes (CIPP) – factory-impregnated liner systems.

Based on this BRL Kiwa issues a:

- Kiwa technical approval with product certificate on the liner system (liner including fittings and joints).
- Kiwa product certificate on the liner.
- Kiwa product certificate on fittings.

This BRL replaces BRL-K17201, part 2, dated 2017-02-08. The quality declarations issued and based on that BRL shall lose their validity after 24 months of validation of this BRL.

The product requirements and test methods comply with the requirements listed in EN-ISO 11298 – part 1 and part 4. The aspects of the assessment of conformity comply with ISO/TS 23818 – part 2. This BRL includes additional requirements and determination methods specified by the Board of Experts.

For the performance of its certification work, Kiwa is bound to the requirements as included in EN-ISO/IEC 17065 “Conformity assessment - Requirements for bodies certifying products, processes and services”.

1.2 Scope

The scope of this BRL is a renovation technique for underground and above ground piping systems using cured in place pipes (CIPP technique).

This BRL is applicable for the renovation of pipelines (pipes, fittings, and their connecting joints) with sizes from DN 100 to DN 2000 intended for transportation of drinking water with a temperature up to a maximum of 35 °C.

The requirements and test methods listed in this BRL are based on a life expectancy of 50 years of the liner system.

The liners are suitable to sustain in whole or in part hydraulic and mechanical loads. In the case of a partial load, the host pipe retains in part its function.

The liners are factory-impregnated. Impregnation on the job site is not within the scope of this BRL.

The products are not intended for use under continuous varying loads of one cycle per minute or more.

The certification scope is a liner system consisting of various components as referred to in § 4.2 and § 4.3. Joints (appendages) and seals of the joints are included. The certification is applicable for the renovation of circular pipes. The renovation of egg shaped pipes is not within the scope of this BRL.

When the assembled product complies with the requirements of this BRL, both the components of the liner system as well the liner system itself shall be declared suitable for this application.

The certified liner system is the basic product for the renovation of drinking water pipelines, that shall be used by an installer certified in accordance with BRL-K17201 part 1.

Repairs on the drinking water pipeline are outside the scope of this BRL. Repairs to the liner itself fall under the scope of this BRL.

1.3 Acceptance of test reports provided by the supplier

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

- EN-ISO/IEC 17020 for inspection bodies;
- EN-ISO/IEC 17021-1 for certification bodies certifying systems;
- EN-ISO/IEC 17024 for certification bodies certifying persons;

- EN-ISO/IEC 17025 for laboratories;
- EN-ISO/IEC 17065 for certification bodies certifying products.

Remark:

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

1.4 Quality declaration

The quality declaration to be issued by Kiwa is described as a Kiwa (technical-approval-with) product certificate.

A model of the certificate to be issued based on this BRL has been included for information in Annex I.

2 Terms and definitions

In this BRL, the following definitions, abbreviations and symbols apply.

2.1 Definitions

- **Allowable maximum operating pressure (PMA):** Maximum pressure occurring from time to time, including surge, that a component is capable of withstanding in service.
- **Allowable operating pressure (PFA):** Maximum hydrostatic pressure that a component is capable of withstanding continuously in service.
- **Allowable test pressure (PEA):** Maximum hydrostatic pressure that a newly installed component is capable of withstanding for a relatively short duration, in order to ensure the integrity and tightness of the pipeline.
- **Evaluation Guideline (BRL)**: the agreements made within the Board of Experts on the subject of certification.
- **Board of Experts**: the Board of Experts Water Cycle (CWK).
- **Certification mark**: a protected trademark of which the authorization of the use is granted by Kiwa, to the supplier whose products can be considered to comply on delivery with the applicable requirements.
- **Drinking water:** water intended or partly intended for drinking, cooking or food preparation or other domestic purposes, but does not include hot water, and is made available to consumers or other customers.
- **Factory-impregnated liner:** The resin is mixed with the necessary curing agents and optionally other additives at the production location. Production tools and equipment are only intended to be used for the renovation on drinking water piping systems.
- **Initial investigation**: tests in order to ascertain that all the requirements recorded in the BRL are met.
- **Inspection (audit) 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 BRL.
- **IQC scheme (IQC):** a description of the quality inspections carried out by the supplier as part of his internal quality system.
- **"I" stage**: refers to the stage of the liner as installed and is related to the final configuration at the job site of the CIPP liner in the cured condition.
- **"M" stage**: refers to the stage of the liner as produced before there is any processing on the job site of the components which are required for the CIPP technique.
- **Pre-certification tests:** Tests in order to ascertain that all the requirements recorded in the BRL are met.
- **Private Label Certificate:** A certificate that only pertains to products that are also included in the certificate of a supplier that has been certified by Kiwa, the only difference being that the products and product information of the private label holder bear a brand name that belongs to the private label holder.
- **Product requirements**: requirements made specific by means of measures or figures, focussing on (identifiable) characteristics of products and containing a limiting value to be achieved, which can be calculated or measured in an unequivocal manner.
- **Supplier**: the party that is responsible for ensuring that the products meet and continue to meet the requirements on which the certification is based.
- **(Technical-approval-with-) 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.

In addition, the terms and definitions according to EN-ISO 11298-1, EN-ISO 11298-4 and EN 14525 apply.

2.2 Abbreviations

In this BRL the following abbreviations are used.

Abbreviation	Denotes
BRT	batch release tests
CIPP	cured in place pipe
IQC	internal quality control
PM	product manager
PVT	process verification tests
SN	nominal stiffness

2.3 Symbols

The symbols used in this BRL and the EN-ISO 11298-4 denote the following.

Symbol	Denotes
d_{em}	Mean outside diameter
d_n	Nominal outside diameter
e	Wall thickness
e_m	Mean wall thickness
e_{min}	Minimum wall thickness at any point
e_n	Nominal wall thickness
E_0	Short-term flexural modulus
E_F	Initial flexural modulus
E_T	Initial modulus of elasticity
E_L	Long-term modulus of elasticity
E_{FL}	Long-term flexural modulus
$E_{x,dry}$	Long-term flexural modulus under dry conditions
σ_L	Ultimate longitudinal tensile stress
σ_{TL}	Long-term tensile strength
σ_{fb}	Flexural stress at first break
ε_{fb}	Flexural strain at first break
σ_T	Initial tensile stress at first break
h_c	Wall thickness of the structural layer
S	Specific ring stiffness
S_0	Initial specific ring stiffness
$S_{0,min}$	Minimum initial specific ring stiffness
$S_{50,\,creep,\,wet}$	Long-term specific ring creep stiffness
$\alpha_{x.wet}$	wet creep factor

3 Procedure for granting a Kiwa-(technical-approval-with) product certificate

3.1 Initial investigation

The initial investigation to be performed are based on the (product) requirements as contained in this BRL, including the test methods, and comprises the following:

- 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 other applicable procedures.

3.2 Granting the Kiwa-(technical-approval-with) product certificate

After finishing the initial investigation, the results are presented to the Decision Maker (see § 11.2) for evaluation. The Decision Maker evaluates the results and decides whether the certificate can be granted or if additional data and/or tests are necessary.

3.3 Investigation into the product and/or performance requirements

Kiwa will investigate the products to be certified against the certification requirements as stated in this BRL.

The necessary samples will be drawn by or on behalf of Kiwa.

3.4 Production process assessment

When assessing the production process, it is investigated whether the manufacturer is capable of continuously manufacturing products that meet the certification requirements.

The evaluation of the production process takes place during the ongoing work at the manufacturer.

The assessment also includes at least:

- The quality of raw materials, half-finished products and end products;
- Internal transport and storage.

3.5 Contract assessment

If the supplier is not the manufacturer of the products to be certified, Kiwa will assess the agreement between the supplier and the manufacturer.

This written agreement, which is available for review by Kiwa, shall include at least that accreditation bodies, product managers and Kiwa shall be granted access to the manufacturers' production facilities in order to observe the certification activities being carried out on these products.

4 Requirements for the materials and the design of the CIPP liner system

4.1 General

This chapter details the requirements pertaining to the raw materials and other materials used for manufacturing the products to be certified in accordance with this BRL as well as the requirements for the design of the piping system.

Regarding the raw materials and additives used in the production, the requirements as stated in § 4.2 and § 4.3 shall be complied with.

The design of the piping system (see § 4.4) shall define the raw materials and additives to be used. These shall be recorded by the supplier and their conformity with the requirements shall be carried out by Kiwa.

Any intended changes are to be reported to Kiwa prior to their implementation. Kiwa shall evaluate if the intended change can influence the attested performance(s) of the product, in which a re- evaluation of said performance(s) can be required.

When the applicant / supplier has multiple production locations, the applicant / supplier shall specify which production locations are involved in the production of the products to be certified.

This BRL is applicable to both the ´manufactured" and "installed" stages which are defined as follows:

- "M" stage: refers to the stage as produced before there is any processing on the job site of the components which are required for the CIPP technique.
- "I" stage: refers to the stage, as installed and is related to the final configuration at the job site of the CIPP liner in the cured condition.

This BRL specifies the various properties of the components and materials in both stages referring to the applicable clauses of EN-ISO 11298-4. See also the definitions for "M" stage and "I" stage as defined in EN-ISO 11298-1.

4.2 Materials at the "M" stage

The requirements of § 5.1 and § 5.3 of EN-ISO 11298-4 shall be complied with.

4.3 Materials at the "I" stage

The requirements of § 8.1 and § 8.3 of EN-ISO 11298-4 shall be complied with.

4.3.1 Elastomers

Each elastomeric material of the sealing component shall conform to the applicable requirements of BRL-K17504 (class 1).

The supplier shall verify the proper installation of the elastomeric component and CIPP component(s) by means of drawings of all dimensions and tolerances of the components.

4.4 Design of the CIPP piping system

4.4.1 General characteristics

The CIPP piping system shall be designed for a life time expectancy of at least 50 years and at the specified nominal pressure and temperature profile within the application. The piping system shall remain (water)tight as per the requirements of § 6 and § 7.

Aside from recording the raw materials to be used (see § 4.2 and § 4.3), the design shall specify the relevant diameters with their respective wall thicknesses and other relevant geometrical characteristics. In case elastomeric sealants are used, then the elastomeric material, the dimensions and the hardness shall be specified. The elastomeric sealing elements shall be certified in accordance with Kiwa BRL-K17504.

Furthermore, the general characteristics requirements at the "M" stage and "I" stage as specified in § 5.2 and § 8.2 of EN-ISO 11298-4 are applicable.

4.4.2 Demonstration of the soundness of the CIPP piping system design

The supplier shall demonstrate to the certification body that the design and manufacturing of pipes, fittings and arrangements for the joints are in accordance with relevant design practices that

results in a mechanical performance of the fitting or joint equal to or greater than that of a straight CIPP pipe of the same pressure and stiffness rating when installed in a piping system and, if appropriate, supported by anchor blocks or encasements.

The quality management system of the supplier shall document the procedures for designing and manufacturing the pipes, fittings, and joints. It shall also include the results of testing programs to verify performance and establish over which range the test results are applicable and how the design procedures are proven and how they apply across the product range.

It is likely that multiple tests will be required to qualify the full range of PN and DN for any given combination of fitting or joint configuration and loading condition and these results shall be documented as part of the quality management system.

The quality management system shall document the fitting and joint design procedures including materials, material properties, sequence of attaching and reinforcing layups, the process for applying layups and quality control procedures during and after fabrication for the entire range of fittings and/or joints produced.

Remark: The soundness of the design procedure can be demonstrated by means of a (validated) calculation program.

In order to keep the total test burden within acceptable limits, but at the same time to control the use of test data beyond their limits of application, the concept of Type Test Groups is used in this BRL. The supplier shall declare its Type Test Groups in his quality plan, see also § 10.2.

4.4.3 Declaration of the materials/components of the liner system

For each liner system (Type Test Group) the construction of the liner, the materials and components used, dimensions and tolerances shall be specified, as follows:

- Description of the structure and dimensional drawing of the liner(s);
- The wall construction (the sequence and composition of the individual layers) shall be documented by the supplier. The supplier shall translate the product design into detailed process specifications to control the amount and placement of material components.
- Description of the structure and dimensional drawing of the joints;
- If relevant, definition and composition of the seal;
- Tolerances (dimensions, properties, materials);
- Product names and product types of materials / components;
- Technical specifications (properties) of the materials / components (what material, dimensions, mechanical and physical properties);
- Whether any membranes used is an integral part of the liner.

4.4.4 Classification of the CIPP piping system design

The designed CIPP piping system shall be classified according to its nominal size (DN) and nominal pressure (PN) and joint type (e.g., flange adapters, end seals). In addition, pipes shall include nominal stiffness (SN) in their classification (see Table 1).

Table 1 – Nominal stiffness class (SN)

Nominal Stiffness Class (SN) N/m^2	Nominal Stiffness Class (SN) N/m^2
630	5000
1250	10000
2500	-

Remarks:
- Nominal stiffness classes higher than 10000 N/m² can be required in special piping systems like casings for wells subject to external load and/or offshore piping subject to possible large water heads, piping systems under runways of airports.
- In Europe it is common practice to classify stiffness on the basis of the initial stiffness.

The nominal pressure (PN) shall conform to one of those given in Table 2.

Table 2 - Nominal pressure class (PN*)*

Nominal Pressure (PN)	Nominal Pressure (PN)	Nominal Pressure (PN)
1	8	20
2,5	10	25
4	12,5	32
6	16	--

Remark: components marked PN 1 are non-pressure (gravity) components.

4.5 Declared values

Regarding the characteristics included in Table 3, minimum declared values shall be specified by the supplier which shall be stated in the Kiwa technical-approval-with-product certificate.

Table 3 – Values of characteristics to be declared by the supplier

Characteristic	Test method
Residual monomer content after curing	ISO 4901
Wet creep factor ($\alpha_{50,wet}$)	ISO 10468
Flexural stress at first break (initial bending strength) (σ_{fb})	EN-ISO 11298-4 Annex B
Flexural strain at first break (ε_{fb})	EN-ISO 11298-4
Initial flexural modulus (E_F)	EN-ISO 11298-4, Annex B
Long-term flexural modulus (E_{FL})	EN-ISO 11298-4, Annex C
Ultimate longitudinal tensile stress (σ_L)	ISO 8513, method A or method B
Ultimate elongation	ISO 8513, method A or method B
Long-term flexural modulus under dry conditions	EN-ISO 11298-4, Annex C

4.6 Processing instructions

The raw materials, materials, and semi-finished products used shall be applied/processed in accordance with the corresponding processing instructions and/or application conditions.

4.7 Installation instructions

The supplier shall provide installation instructions in the Dutch and/or English language. The instructions shall contain specific information regarding storage, safety, transport, processing temperature, construction of the joints and specific installation guidelines. These aspects are checked by Kiwa. A reference to the installation instructions is made in the Kiwa technical-approval-with-product certificate.

5 Requirements imposed on the liners

5.1 General

This chapter details the requirements pertaining to the cured in place pipes (CIPP), semi-finished products and end products of the liner system and the relevant test methods required to determine that these requirements are being met with. These requirements shall be listed in the technical specification of the product as detailed on the product certificates.

A specification of the applicable nominal sizes, the classification (nominal pressure(s) and nominal stiffness(es)) shall be included in the Kiwa product certificate.

5.2 Regulatory requirements

5.2.1 Requirements to avoid deterioration of the quality of drinking water

Products and materials which (may) come into contact with drinking water or warm tap water, shall not release substances in quantities which can be harmful to the health of the consumer, or negatively affect the quality of the drinking water. Therefore, the products or materials shall meet toxicological, microbiological, and organoleptic requirements as laid down in the latest "Ministerial Regulation materials and chemicals drinking water and warm tap water supply", (published in the Government Gazette). Consequently, the procedure for obtaining a quality declaration, as specified in the current Regulation, shall 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 Dutch Minister has declared this quality declaration to be equivalent to the quality declaration as meant in the Regulation.

5.2.2 Impregnation of the liner at factory location

Impregnation of the liner at the factory location shall be done under controlled circumstances. Impregnation on location is not allowed.

It is mandatory that a properly functioning impregnating system is present. The storage and preparation of the materials to be used shall be in accordance with the instructions as provided by the manufacturer(s) of the materials. This means for example that storage of the resin, or the impregnated sockets takes place at the required temperature and for the maximum time allowed. The storage of reagents shall be in temperature controlled storage tanks.

A correct impregnation of the liner material can only take place if a vacuum is applied and taking into account a specified distance between the impregnation rolls (calibration height). The process parameters are to be registered.

The manufacturer shall use equipment as specified by the supplier of the liner system (if specific equipment is required and if prescribed).

The manufacturer shall have a procedure (manual) implemented to show that relevant registrations take place, for example in relation to:

- Condition of the resin components prior to mixing
- Procedure and method of recording considering the:
  - Mixing process;
  - Amounts of the separate components mixed;
  - Maintaining the vacuum during the mixing and impregnation of the liner;
  - Correct amount of resin per liner length.

5.3 Requirements and test methods for liners

5.3.1 Product characteristics at the “M” stage

The lining tubes shall conform to the requirements of § 5.2, § 5.4 and § 5.5 of EN-ISO 11298 part 4.

5.3.2 Product characteristics at the “I” stage

The lining tubes shall conform to the requirements of § 8.2, § 8.4 and § 8.5 of EN-ISO 11298 part 4.

In addition, the requirements according § 5.3.2.1 and § 5.3.2.2 shall be applicable.

5.3.2.1 Wall thickness, wall construction and density

The thickness and relative position of each component layer of the liner, including tolerances, shall be specified as declared values. The wall structure shall be verified by means of visual assessment of the cross section of the test piece, which may be enlarged if necessary, and wherein use is made of a calliper and / or wall thickness measuring tool having an accuracy of at least 0.1 mm. Measurements shall be performed at a temperature of (23 ± 2) °C in accordance with EN-ISO 3126. See further Table 4.

Table 4– Wall thickness, wall construction and density

Property	Requirement	Test method
Construction of the wall	declared wall thickness and relative position of each layer	Manual supplier (certificate holder)
Mean wall thickness (e_m)	Not less than the design wall thickness	See § 5.3.2.2
Mean wall thickness of the structural layer-(h_c)	Not less than the design wall thickness	See § 5.3.2.3
Minimum wall thickness [1] (e_{min})	$e_{min} \geq$ 80% of design wall thickness (e_n = nominal wall thickness = design wall thickness) $e_{min} \geq$ 3 mm	See § 5.3.2.4
Density	> 90% of declared value	EN-ISO 1183-1, method A, i.e., immersion method. See § 5.3.2.5
1) The requirement for minimum wall thickness does not apply to those points in which the reduction in wall thickness is caused by the irregularity of the pipe to be renovated. Irregularities which touch the structural layer are not allowed.		

5.3.2.2 Measurement of the mean wall thickness

The mean wall thickness (e_m) shall be determined according to ISO 7685 at a full ring cut from the pipe under test. The cutting edges shall be smooth and perpendicular to the longitudinal axis of the pipe. Straight lines, which shall serve as reference lines are to be drawn on the inside or the outside along the length of the test piece by 60° intervals around the circumference. The mean wall thickness (e_m) is to be calculated on the basis of the 12 results of the measurements at the ends of the reference lines.

5.3.2.3 Measurement of the thickness of the structural layer

The composite thickness should be determined according to EN-ISO 11298-4:2011, Annex B.4.1 and B.4.2.

5.3.2.4 Minimum wall thickness

The minimum wall thickness is the lowest value measured according to § 5.3.2.2.

5.3.2.5 Density

Cavities by the inclusion of air (gas) in the liner shall be minimized and characterized on the basis of the density of the liner material. The density shall be determined according to EN-ISO 1183-1. The value of the density shall be declared by the manufacturer of the liner, in combination with the respective wall construction of the liner.

5.3.3 Resistance to underpressure

The resistance to underpressure shall be determined using a cured liner pipe having a length not less than either 500 mm or 3 x d_n. The test piece is tested with a vacuum of 0,8 bar relative to atmospheric pressure for a duration of at least 2 hours and a test temperature of (23 ± 2) °C.

After testing the test piece shall not show any signs of delamination or other type of failure.

5.4 Initial investigation and periodic assessment

The investigation matrix, see § 10.5 (Table 8), summarizes the requirements that the CIPP products shall be required to meet during the initial investigation and thereafter during the periodic assessments once the product certificate is issued.

6 Requirements and test method for ductile iron fittings and their joints

6.1 General

This chapter details the requirements pertaining to ductile iron fittings for cured in place pipe (CIPP) and the relevant test methods required to determine that these requirements are being met with. The requirements shall be listed in the technical specification of the product that shall be a part of the issued product certificates.

The fittings e.g., couplings and saddles shall be used to make the following joints:

- Connections to the main pipeline including the connection between the liner and the existing pipeline;
- Branches in the main pipeline;
- Lateral connections;
- Connection with fire hydrants.

6.2 Product requirement and test methods

The product shall meet the requirements listed in EN 14525, except the requirements for the size (diameter range listed in § 4.1.1 of EN 14525). Because the liners have a smaller outside diameter than the inside diameter of the fitting, it is the responsibility of the fitting supplier that the fitting connects well with the liner. The dimensions shall be specified in technical drawings.

6.3 Performance testing of the joints

The joints shall exhibit no visible leakage when subjected to the tests. For a joint that can be used in the restrained and in the non-restrained configuration, only one set of tests in the restrained condition is required.

The test temperature shall be (23 ± 5) °C.

All flange adaptors and couplings shall be designed to be fully flexible; consequently, the allowable angular deflection declared by the manufacturer shall be not less than (for each wide tolerance end):

- 3° for OD 40 mm to 315 mm or DN 32 to DN 300;
- 2° for OD 316 mm to 630 mm or DN 350 to DN 600.

In addition, the supplier shall declare:

- annulus of the fitting it is designed for; i.e., allowed maximal radial and allowed maximal axial displacement (draw);
- Maximum misalignment i.e., maximum amount by which the centrelines of consecutive components fail to coincide.

Performance test for the leak tightness of joints shall be carried out according to EN 14525:2004 clause 7 and Table 5 instead of Table 4 listed in EN 14525:2004.

The number of test pieces for performance testing is 2.

Table 5 – Performance testing of the joints: requirements and test conditions

Test	Test requirements	Pipe section(s)	Test conditions
Positive internal pressure	Test pressure (bar): 1.5 x PN + 5 Test duration 2 h No leakages	Cured liner pipe	EN 14525:2004 § 7.1.1 or § 7.1.2 whatever applicable. shear force F = 0 N
Positive internal pressure and bending [1)]	Test pressure (bar): 1.5 x PN + 5 Test duration 2 h No leakages	Cured liner pipe	EN 14525:2004 § 7.1.1. Additional force F shall be calculated according to ISO 8483, Annex A
Negative internal pressure	Test pressure (bar): - 0.8 bar Test duration 2 h Max pressure change: 0.08 bar	Cured liner pipe	EN 14525:2004 § 7.2.

Test	Test requirements	Pipe section(s)	Test conditions
Long term leak tightness	Test pressure (bar): 2.5 x PN Test duration 100 h No leakages	Cured liner pipe	EN 14525:2004 clause 7.1.1 or 7.1.2 whatever applicable. Shear force F = 0 N
1) Test shall be performed depending on the design of the rehabilitated pipeline.			

6.4 Additional product requirements and test methods

In addition to § 6.2, the following provisions apply.

6.4.1 Requirements to avoid deterioration in the quality of drinking water

The requirements in accordance with § 5.2.1 apply.

6.4.2 Rubber sealing elements and flange gaskets

Notwithstanding § 4.1.3.1 of EN 14525 rubber sealing elements and flange gaskets shall meet the requirements described in BRL-K17504 comprising WA type.

6.4.3 Flanges

In addition to § 4.1.3.2 of EN 14525, non-standard flanges are allowed under the condition that for type testing, the required appropriate pipes and covers are made available.

6.4.4 Surface protection layers

6.4.4.1 Coating system inside

The coating system shall meet the requirements of BRL-K759. The application of the coating shall comply to BRL-K746.

6.4.4.2 Coating system outside

If in addition to § 4.4.1 of EN 12842, the outside of the fitting is equipped with a protective layer. That external protective PE or PUR layer shall comply with the requirements of BRL-K767.

6.4.4.3 Other coating systems

In addition to § 6.4.4.1 and § 6.4.4.2 of this BRL, other coating systems that are suitable to be used for ductile iron fittings may be used provided they meet the functional and sustainability requirements listed in BRL-K759.

6.5 Initial investigation and periodic assessment

The investigation matrix, see § 10.5 (Table 8), summarizes the requirements that the ductile iron fittings shall be required to meet during the initial investigation and thereafter during the periodic assessments once the product certificate is issued.

7 Requirements and test methods for not-ductile iron fittings and their joints

7.1 General

In principle all types of fittings and joints may be used under the condition that the performance of the fitting and the joint is proven sound for the purpose for the manufacturer's declared allowable operation pressure (PFA).

Examples of fittings / joint systems are flange adapters for glass reinforced thermosetting plastics (GRP), metal couplings with rubber gaskets etc.

7.2 Diameter range

The dimensions of the liner and other parts (e.g., fittings, valves) of the piping system shall be demonstrable attuned to each other.

7.3 Type of fittings / joints

7.3.1 General

Rubber gasket material shall comply with the requirements of BRL-K17504.

7.3.2 Proof of structural design of fittings

The structural design of a GRP fitting shall be demonstrated according to ISO 18851 and the following test parameters:

- Number of test samples for pre-certification tests is 2;
- Test temperature (23 ± 5) °C;
- Whether the fitting is or is not to be tested with end thrust.

After the fitting is subjected to specified internal pressure tests the test pieces shall show no signs of failure at the end of each of the tests.

The proof of structural design test on the GRP fitting may be combined with an appropriate leak tightness test.

The proof of structural design of metal fittings may also be demonstrated by internal pressure tests for a duration of e.g., 1 hour.

7.3.3 Performance testing of the joints

The joints shall exhibit no visible sign of damage to its components nor leak when subjected to the tests. For a joint that can be used in the restrained and in the non-restrained configuration, only one set of tests in the restrained condition is required.

The length of the test assembly shall be recorded in the quality system of the supplier after approval of Kiwa.

The number of test pieces to be used is 2.

The test temperature shall be (23 ± 5) °C.

The summary of test conditions is given in Table 6, see also § 7.3.3.1 and § 7.3.3.2.

Table 6 – Summary of the test conditions for evaluation of the joints

Property to be tested	Test to be performed	Test pressure / test duration	Additional requirement
External pressure differential	Negative pressure	-0.8 bar / 1 h	Max pressure change 0,08 bar/h
Resistance to bending [1)]	Maintained pressure	1.5 x PN / 15 min	
		2.0 x PN / 24 h	
Resistance to internal pressure	Maintained pressure	1.5 x PN / 15 min	
		2.5 x PN / 100 h	
1) Test shall be performed depending on the design of the rehabilitated pipeline.			

7.3.3.1 Flexible joints

Flexible joints between GRP fitting and liner, restrained or non-restrained, shall meet the performance requirements of ISO 7432 or ISO 8639 as applicable, see Table 7.

Supporting sleeves (inserts) may be necessary depending on pipe material, on pipe wall thickness, on joint design and on local authorities. They shall provide adequate support over the entire compression area of the gasket. The manufacturer shall indicate when supporting sleeves are required.

A technical drawing of the test set-up shall be provided by the supplier and documented in the quality system of the supplier after approval by Kiwa.

7.3.3.2 Non-flexible joints

Non-flexible joints between GRP fitting and liner, restrained or non-restrained, shall meet the performance requirements of ISO 8483 or ISO 8533 (whatever applicable), see Table 7.

A technical drawing of the test set-up shall be provided by the supplier and documented in the quality system of the supplier after approval by Kiwa.

Table 7 – Test methods for joints between GRP fittings and the liner

Glass Reinforced Plastics (GRP)	Remarks
ISO 8639 - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Test methods and proof of structural design of flexible joints.	Test performed using a test rig able to take the axial end thrust and permit free longitudinal movement.
ISO 7432 - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Test methods to prove the design of locked socket-and-spigot joints, including double-socket joints, with elastomeric seals.	Test performed with end-sealing devices securely fixed to the pipes to transmit the end thrust loads to the pipes.
ISO 8483 - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Test methods to prove the design of bolted flange joints	
ISO 8533 - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Test methods to prove the design of cemented or wrapped joints	

Metal fittings / joint shall be tested for leak tightness by the relevant test method which has to be approved by Kiwa. The test methods listed in Table 7 may be used as guidance.

7.4 Additional product requirements and test methods

In addition to § 7.2 and § 7.3, the following provisions apply.

7.4.1 Requirements to avoid deterioration in the quality of drinking water

The requirements of § 5.2.1 shall apply.

7.4.2 Rubber sealing elements and flange gaskets

Rubber sealing elements and flange gaskets shall meet the requirements described in BRL-K17504 comprising WA type.

7.5 Initial investigation and periodic assessment

The investigation matrix, see § 10.5 (Table 8), summarizes the requirements that the fittings shall be required to meet during the initial investigation and thereafter during the periodic assessments once the product certificate is issued.

8 Marking

8.1 General

The individual components of the liner system shall be marked with the KIWA certification mark.

Each part shall be marked – on the product itself or its packaging – with the following marks:

- Factory name and / or registered trademark;
- Production date or coding;
- Type designation;
- Material identification (for fittings);
- DN and PN (for flanges and flange parts).

Further the marking requirements according § 5.8 of EN-ISO 11298-4 (for liners) and § 4.5.2 of EN 14525 (for ductile iron fittings) shall be complied with.

A certified supplier of the liner system may use the KIWA certification mark (see below) in combination with the certificate number e.g., in quotations, brochures, website, etc.

Kiwa Certification Mark

9 Requirements for the quality system

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

9.1 Manager of the quality system

The supplier shall appoint a Quality Systems Manager who shall report directly to the director.

9.2 Internal quality control/quality scheme

The supplier shall have an internal quality control scheme (IQC scheme) which has been implemented within the organisation. The following shall be demonstrably recorded in this IQC scheme:

- the aspects that are checked by the supplier;
- the methods used to perform such inspections;
- the frequency of these inspections;
- the manner of recording and archiving the inspection results.

This IQC scheme shall be in the format of the model IQC scheme as included in Annex II.

9.3 Control of test and measuring equipment

The supplier shall verify the availability of the required test and measuring equipment for demonstrating product conformity with the requirements of this BRL.

When required the equipment shall be calibrated periodically. The calibration status of each equipment shall be traceable by means of an unique identification number.

The supplier shall keep records of the calibration results.

In the event that the equipment is out of calibration then the supplier shall review the validity of the data previously recorded by that equipment.

9.4 Procedures and working instructions

The supplier shall be able to submit the following:

- procedures for:
  - dealing with products showing deviations;
  - corrective actions to be taken if non-conformities are found;
  - dealing with complaints about products and/or services delivered;
- the working instructions and inspection forms used.

10 Summary of tests and inspections (assessment of conformity)

10.1 General

This chapter contains a summary of the tests and inspections to be performed for the certification of the products:

- Pre-certification: the investigation necessary to determine whether all the requirements of the BRL are fulfilled;
- Inspection visit: the surveillance inspections carried out after issue of the certificate to ensure that the certified products continuously fulfil the requirements of this BRL. The inspections are carried out by Kiwa according to the indicated frequency;
- Inspection of the quality system of the supplier: inspection with regard to the correct implementation of the IQC-scheme and procedures.

The conformity assessment shall comply with the requirements of ISO/TS 23818-2.

The manufacturer shall describe in his quality plan and IQC scheme all relevant procedures relating to Batch Release Tests (BRT) and Process Verification Tests (PVT).

10.2 Type test groups

A type test group consists of a range or family of products made such that the results of the long-term type tests are applicable to all products in the group. A pipe type test group for example shall contain products:

- manufactured by the same process;
- with the same material specifications;
- with the same wall construction (i.e., the sequence of layers, layer compositions, material properties);
- design method;
- tested with the same loading condition (end load bearing or not end load bearing).

The quality management system shall document all process details that could influence type test performance. The quality management system shall document the complete product design method and demonstrate how the results of the type tests are used to establish product designs and pipe type test groups.

10.3 Test conditions for Type Tests (TT) and Audit Tests (AT)

The tests shall be carried out at a temperature of (23 ± 5) °C, unless otherwise indicated in the respective sections.

If water is used during the test then this shall be tap water with a pH (7 ± 2).

The test pieces shall be conditioned for at least 24 hours prior to testing.

10.4 Assessment of conformity

For the assessment of conformity, the required test pieces shall be manufactured using the same manufacturing process, raw materials and design as used to manufacture the test pieces used for the pre-certification. It is not allowed to manufacture the test pieces for the assessment of conformity at different production locations.

10.5 Investigation matrix for type testing and inspections

During the pre-certification, type tests shall be carried out in order to determine whether the product meets the specified performance and product requirements.

The requirements that shall be fulfilled in order to qualify for certification are listed in Table 8. After certification Kiwa shall periodically inspect the manufacturer for his continued compliance with this BRL.

Table 8 – Investigation matrix

Description of requirement	Clause BRL	Tests within the scope of:		
		Product investigation	Surveillance by CB after issue of the certificate	
			inspection	Frequency
Requirements imposed on the materials and the design of the CIPP liner system				
General	4.1	x	x	1 / year
Materials at the “M” stage	4.2	x	x [a)]	1 / year
Materials at the “I” stage	4.3	x	x [a)]	1 / year
Design of the GRP piping system	4.4	x	x [a)]	1 / year
Processing instructions	4.5	x	x	1 / year
Installation instructions	4.6	x	x	1 / year
Requirements imposed on the liners				
General	5.1	x		
Requirements to avoid deterioration of the quality of drinking water	5.2.1	x	x	1 / year
Impregnation of the liner at factory location	5.2.2	x	x	1 / year
Requirements and test methods for liners	5.3	x		
Requirements and test methods for ductile iron fittings and their joints				
General	6.1	x		
Product requirements and test methods	6.2	x		
Performance testing of the joints	6.3	x		
Additional product requirements and test methods	6.4	x		
Requirements and test methods for not-ductile iron fittings and their joints				
General	7.1	x		
Diameter range	7.2	x		
Proof of structural design of the fitting	7.3.2	x		
Performance testing of the joints	7.3.3	x		
Additional product requirements and test methods	7.4	x		
Marking				
General	8.1	x	x	1 / year
Requirements in respect of the quality system				
Manager of the quality system	9.1	x	x	1 / year
Internal quality control / quality plan	9.2	x	x	1 / year
Control of measuring and test equipment	9.3	x	x	1 / year
Procedure and working instructions	9.4	x	x	1 / year

a) Requirement is compared with the for this aspect ascertained values that are listed in the supplier’s IQC scheme.

10.6 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. See also § 9.

11 Agreements on the implementation of certification

11.1 General

Beside the requirements included in this BRL, the general rules for certification as included in the Kiwa Regulations for Product Certification also apply.

In particular, these are:

- the general rules for conducting the pre-certification tests, in particular:
  - the way suppliers are to be informed about how an application is being handled;
  - how the tests are conducted;
  - the decision to be taken as a result of the pre-certification tests.
- the general rules for conducting inspections and the aspects to be audited,
- the measures to be taken by Kiwa in case of Non-Conformities,
- the measures 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 or measures taken by Kiwa.

11.2 Certification staff

The staff involved in the certification have the following responsibilities:

- Certification assessor (**CAS**): responsible for carrying out the pre-certification tests and assessing the site assessors' reports;
- Site assessor (**SAS**): responsible for carrying out external inspections at the supplier's works;
- Decision maker (**DM**): responsible for deciding whether the supplier can be certified on the basis of the pre-certification tests carried out and for the continuation of the certification based on the external inspections carried out and for taking decisions on the need for corrective actions.

11.2.1 Qualification requirements

The qualification requirements for all personnel of a certification body performing certification activities shall consist of:

- the requirements in accordance with EN-ISO / IEC 17065, and
- any extra qualification requirements set by the Board of Experts for the subject matter of this BRL.

Education and experience of the certification personnel as detailed in Table 9 shall be recorded in a traceable manner.

Table 9 – Qualification requirements for certification personnel

Basic requirements	Evaluation criteria
Knowledge of company processes Requirements for conducting professional audits on products, processes, services, installations, design, and management systems.	*Relevant experience: in the field* **SAS, CAS** : 1 year **DM**: 5 years inclusive 1 year with respect to certification Relevant technical knowledge and experience on the level of: **SAS**: High school **CAS, DM** : Bachelor
Competence for execution of site assessments. Adequate communication skills (e.g., reports, presentation skills and interviewing technique).	**SAS**: Kiwa Audit training or similar and 4 site assessments including 1 autonomic under review.
Execution of initial examination	**CAS**: 2 initial applications under review.
Execution of review	**CAS**: evaluation of 3 reviews

Technical competences	Evaluation Criteria
Education	**General**: Education in one of the following technical areas: • Engineering.
Relevant testing knowledge	**General:** • Training (general and scheme specific) including measuring techniques.
Experience - specific	**CAS** • 2 complete applications self-reliant (to be evaluated by **PM**) **SAS** • 2 inspection visits together with a qualified **SAS**)
Skills in performing witnessing	**SAS** Internal training witness testing

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

11.2.2 Qualification

The qualification of the Certification staff shall be demonstrated by means of assessing the education and experience in accordance with the above requirements. In case the certification staff is qualified on the basis of alternative criteria, written records shall be kept.

The authority to qualify staff rests with the:
- **PM**: qualification of **CAS** and **SAS**;
- management of the certification body: qualification of **DM**.

11.3 Report initial investigation

The certification body records the results of the initial investigation in a report. This report shall comply with the following requirements:
- completeness: the report provides conclusions on all requirements included in the BRL;
- traceability: the findings on which the conclusions have been based shall be recorded and traceable;
- basis for decision: the **DM** shall be able to base his decision on the findings included in the report.

11.4 Decision for granting the certificate

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

11.5 Layout of quality declaration

The product certificate shall be in accordance with the model included in Annex I.

11.6 Nature and frequency of third party audits

The certification body shall carry out surveillance audits on site at the supplier at regular intervals to check whether the supplier complies with his obligations. The Board of Experts decides on the frequency of audits.

At the time of validation of this BRL, the audit frequency has been fixed at two audits on site per year.

The audit program on site shall cover at least:
- the product requirements;
- the production process;
- the suppliers IQC scheme and the results obtained from inspections carried out by the supplier;
- the correct way of marking certified products;

- compliance with required procedures;
- handling complaints about products delivered.

For suppliers with a private label certificate the audit frequency will be one extra audit per every two years. These audits are conducted at the site of the private label certificate holder and focusses on the aspects detailed in the IQC scheme and the results of the control performed by the private label holder. The IQC scheme of the private label holder shall refer to at least:

- the correct way of marking certified products;
- compliance with required procedures for receiving and final inspection;
- the storage of products and goods;
- handling complaints.

The results of each audit shall be recorded by Kiwa in a traceable manner in a report.

11.7 Non conformities

When the certification requirements are not met, measures are taken by Kiwa in accordance with the sanctions policy as written in the Kiwa Regulation for Certification.

11.8 Report to the Board of Experts

De certification body shall report annually to the Board of Experts regarding the certification activities performed. In this report the following aspects are included:

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

11.9 Interpretation of requirements

The Board of Experts may record the interpretation of requirements of this BRL in a separate interpretation document.

12 Titles of standards

12.1 Public legislation

Number	Title
Dutch Government Gazette (“Staatscourant”) dated 1 July 2017	Regulation on materials and chemicals drinking water and warm tap water supply (“Regeling Materialen en Chemicaliën drink- en warm tapwatervoorziening”)

12.2 Standards / normative documents

Number	Title	Version
BRL-K746	Het appliceren van coatingsystemen ten behoeve van drinkwatertoepassingen	2012
BRL-K759	Coatingsystemen ten behoeve van drinkwatertoepassingen	2019
BRl-K767	Uitwendige bekleding voor metalen buizen	2018
BRL-K17201, deel 1	Kunststof leidingsystemen voor de renovatie van drinkwaterleidingen – Deel 1 – Het ontwerp en de installatie van ter plaatse uithardende buis (CIPP) – fabrieksmatig geïmpregneerde linersystemen	2023
BRL-K17504	Gevulkaniseerde rubber afdichtingsringen voor drinkwaterleidingen	2018
ISO 7432	Glass-reinforced thermosetting plastics (GRP) pipes and fittings – Test methods to prove the design of locked socket-and-spigot joints, including double-socket joints, with elastomeric seals	2021
ISO 8533	Glass-reinforced thermosetting plastics (GRP) pipes and fittings – Test methods to prove the design of cemented or wrapped joints	2019
ISO 8639	Glass-reinforced thermosetting plastics (GRP) pipes and fittings – Test methods for leak tightness and proof of structural design of flexible joints	2016
ISO 10468	Glass-reinforced thermosetting plastics (GRP) pipes - Determination of the long-term specific ring creep stiffness under wet conditions and calculation of the wet creep factor	2018
ISO/TS 23818-2	Assessment of conformity of plastics piping systems for the rehabilitation of existing pipelines - Part 2: Resin-fibre composite (RFC) material	2021
EN 12842	Ductile iron fittings for PVC-U or PE piping systems - Requirements and test methods	2012
EN 14525	Ductile iron wide tolerance couplings and flange adaptors for use with pipes of different materials: ductile iron, Grey iron, Steel, PVC-U PE, Fibre-cement	2004
EN-ISO 1183-1	Plastics - Methods for determining the density of non-cellular plastics – Part 1: Immersion method, liquid pycnometer method and titration method	2019
EN-ISO 3126	Plastics piping systems – Plastics components - Determination of dimensions	2005
EN-ISO 9001	Quality management systems – Requirements	2015
EN-ISO 11298-1	Plastics piping systems for renovation of underground water supply networks – Part 1: General	2018
EN-ISO 11298-4	Plastics piping systems for renovation of underground water supply networks – Part 4: Lining with cured-in-place pipes	2021
EN-ISO/IEC 17020	Conformity assessment – General criteria for the operation of various types of bodies performing inspection	2012
EN-ISO/IEC 17021-1	Conformity assessment – Requirements for bodies providing audit and certification of management systems	2015
EN-ISO/IEC 17024	Conformity assessment – General requirements for bodies operating certification of persons	2012
EN-ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories	2018
EN-ISO/IEC 17065	Conformity assessment – Requirements for bodies certifying products, processes and services	2018

Number	Title	Version
ISO 4901	Reinforced plastics based on unsaturated-polyester resins – Determination of the residual styrene monomer content, as well as the content of other volatile aromatic hydrocarbons, by gas chromatography	2011
ISO 7685	Plastics piping systems – Glass-reinforced thermosetting plastics (GRP) pipes - Determination of initial specific ring stiffness	2019
ISO 8483	Glass-reinforced thermosetting plastics pipes and fittings – Test methods to prove the design of bolted flange joints	2019
ISO 8513	Plastics piping systems – Glass-reinforced thermosetting plastics (GRP) pipes – Test methods for the determination of the initial longitudinal tensile strength	2016
ISO 18851	Plastics piping systems – Glass-reinforced thermosetting plastics (GRP) pipes and fittings – Test method to prove the structural design of fittings	2015

Annex I Model certificate (example)

CERTIFICATE

Product certificate
KXXXXX/XX

kiwa

Issued *yyyy-mm-dd*

Replaces -

Page *1 of 1*

Products for cured in place pipes (CIPP) – factory impregnated liner systems

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

Name certificate holder

as specified in this product certificate and marked with the Kiwa®-mark in the manner as indicated in this product certificate may, on delivery, be relied upon to comply with Kiwa evaluation guideline K17201, part 2 "Renovation of drinking water piping systems – part 2 – Products for cured in place pipes (CIPP) – factory impregnated liner systems" dated dd-mm-yyyy.

Ron Scheepers
Kiwa

This product certificate is only valid in combination with a Kiwa certified plastics piping system.
Advice: consult www.kiwa.nl in order to ensure that this certificate is still valid.

Kiwa Nederland B.V.
Sir Winston Churchilllaan 273
Postbus 70
2280 AB RIJSWIJK
The Netherlands
Tel. +31 88 998 44 00
Fax +31 88 998 44 20
info@kiwa.nl
www.kiwa.nl

Company
Name certificate holder
Address certificate holder

T: Telephone number
E: Email
I: www.

Certification process consists of initial and regular assessment of:
- quality system
- product

Annex II Model IQC-scheme **(informative)**

<table>
<tr><td><u>IQC-schedule</u>

<u>INTERNAL QUALITY PLAN</u></td><td colspan="2">Manufacturer / supplier :
Production location address :</td><td>Number of appendices:</td></tr>
<tr><td colspan="4"><u>Field(s) of application</u>

<u>According BRL(s)</u></td></tr>
<tr><td colspan="2"><u>Number of production shifts:</u></td><td colspan="2" rowspan="3"><u>Quality manual, procedures and working instructions</u>
Is the Quality Management System (QMS) certified according to ISO 9001[1)]?
If yes, by which certification body:
If yes, is the certification body accredited for the particular scope of certification?

The following procedure for dealing with <u>complaints</u> applies:
In case the QMS is <u>not</u> certified according to EN-ISO 9001:
• Working instructions, test instructions and procedures are documented as follows:
• The following procedure for <u>nonconformity review</u> applies:</td></tr>
<tr><td colspan="2"><u>Quality Control</u>
Total number of employees in QC department :
Number of QC-operators per shift :
If no QC-inspections are carried out during night shifts, state the QC procedure(s)/instruction(s) to be followed: , documented in:</td></tr>
<tr><td colspan="2"><u>Inspection and test records</u>
All records shall be maintained for a minimum of years.</td></tr>
<tr><td colspan="2"><u>Specific agreements/comments/explanations</u></td><td colspan="2">Signature of the manufacturer/supplier:
Date :</td></tr>
</table>

[1)] In case the QMS is EN-ISO 9001 certified and covers the scope of the product certificate(s), reference to the applicable procedure(s) is sufficient in the tables A to F. In that case, only the frequency of tests/inspections (to be approved by CB) is to be completed 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 Receiving inspection

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 and transport**		

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