TÜVRheinland®
DIN CERTCO
Genau. Richtig.

Certification Scheme

Factory insulated district heating pipe systems

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DIN CERTCO ● Alboinstraße 56 ● D-12103 Berlin
Tel: +49 30 7562-1131 ● Fax: +49 30 7562-1141 ● E-Mail: info@dincertco.de ● www.dincertco.de

Preface

DIN CERTCO was founded in 1972 by DIN Deutsches Institut für Normung e. V., is now part of the TÜV Rheinland Group and is the certification body for issuing DIN marks and other certification marks for products, persons, services as well as companies based on DIN standards and similar specifications. Due to its independence, neutrality, competence and many years of experience, DIN CERTCO enjoys a high reputation both at home and abroad.

In order to prove the functionality of the system and our competence as a certification body, we have been accredited, certified or recognised by independent domestic and foreign bodies in both the voluntary and legally regulated areas. Our accreditations.

Alongside the General Terms and Conditions and Testing- Registration- and Certification Regulations in place at DIN CERTCO, this certification forms the basis for enabling providers of Plastic pipe systems to label their products with the “DIN*plus*” quality mark. You document hereby that your products meet all the requirements of the underlying standards and exceed them in many cases.

The “DIN*plus*” quality mark creates customer confidence: they can rest assured that an independent, neutral and specialist institution has carefully investigated and reviewed all the inspection criteria. External quality controls also ensure that product quality is kept at a high level during ongoing manufacture. Thus, customers receives added value that they can take into consideration when making purchase decisions.

Factory insulated district heating pipes is granted the “DIN*plus*” quality mark if they meet the requirements listed in section 3 and in respective annexes in accordance with the procedure described in this certification scheme.

All certificate holders can be viewed on the DIN CERTCO homepage (www.dincertco.tuv.com), which is updated on a daily basis.

Start of validity

This certification scheme is valid after 2020-09-01.

Changes

First edition

Earlier editions

First edition

INHALT

1 Scope of application

This certification scheme applies for factory insulated district heating pipes and contains in conjunction with the testing foundations listed below all requirements for the award of the quality mark “DIN*plus*”.

This certification scheme establishes application specific requirements that need to be met by the product itself, as well as requirements relating to the associated testing, monitoring and certification. In clause 1 to 8 of the main part, the certification procedure is elucidated, the application specific requirements (inspection scope etc.) can be found in the respective annexes.

Table 1 Scope of application of the certification scheme

Application Factory insulated district heating pipe systems		see
D	Flexible factory insulated district heating pipe systems	Annex D – page 22

2 Testing and certification principles

The principles for the test and certification are stated for each scope of application in the corresponding annexes (see table 1). Only the version referred to is applicable if dated references are used. In case of undated references, the current issue of the document referred to including all changes applies.

For all products the following applies in addition:

- This certification scheme
- The general terms and conditions of TÜV Rheinland DIN CERTCO
- the testing, registration and certification regulations of DIN CERTCO
- The relevant fees guideline issued by DIN CERTCO
- The testing foundations of each Annex

3 Terms, abbreviations and symbols

Type test TT: A test to be performed to prove that the product meets the technical specifications and requirements on which it is based.

Initial testing: A type test that is carried out by or on behalf of a certification authority for certification purposes.

Batch release test BRT: A test to be performed by the manufacturer on a batch of the product in which all requirements of the underlying technical specifications must be met prior to the release of the batch.

Process verification test PVT: A test to be performed by the manufacturer at stated intervals to confirm, that products continue to be produced by the production process meet the requirements of the underlying technical specifications.

On-site production controls (WPK) A continuous monitoring and control of the production for each manufacturing plant/production site to be carried out by the manufacturer, at which the manufacturer ensures that the products manufactured by him comply with the underlying technical specifications. Includes BRT and PVT.

Audit test AT: A test to be performed by or on behalf of a certification body to confirm that the product continues to meet the requirements of the underlying technical specifications and to provide information to assess the effectiveness of the quality system.

Witness Testing WT: A test performed by or on behalf of the manufacturer under the supervision of an authorized representative of the certification body qualified for testing and recognized by the certification body as initial type testing and/or monitoring testing.

Group: A summary of similar products from which samples are taken for testing purposes. Certification under the present certification program is carried out according to product groups. The definition of the product groups takes into account, among other things, the grouping of the products into so-called manufacturing groups based on the nominal diameter.

Component type: Products of the same design (a pipe or fitting, a valve or its main components) made from a suitable molding compound.

Component body: The same basic body of a fitting, but with different connections.

Cavity (Nest): A part of an injection mold that gives the product its final shape by injection moulding.

Approach: Starting up (an extruder) denotes the restart of the manufacturing of pipes with an extruder after a change of the pipe dimension, the moulding batch, or similar.

Batch: Production batch means the uninterrupted production under uniform conditions of maximum 1 week. The period of production end of a batch includes the last 24 hours of production. Interruptions in production of less than 24 h (e.g. due to maintenance etc.) are not considered as interruption of the current production batch.

Production unit, unit: A unit is a pipe coil/pipe drums resp. a straight length in the manufacturing state.

New material: Material, for example in form of granules, which has not yet been used or has not yet been subjected to any processing procedure other than that required for its manufacture and to which no circulating material, return material or recyclate has been added.

Material in circulation: Material from rejected, clean, unused pipes, fittings or valves as well as offcuts from a manufacturer's own pipe, fitting or armature production, which is reprocessed in a plant of the same manufacturer and which originates, for example, from extrusion or injection moulding processing.

External reprocessable material (return material): Material that is one of the following types:
Type A Type A material from unused pipes and fittings bearing the quality mark for plastic pipes from DIN CERTCO or similar
Type B Material from unused plastic products other than pipes and fittings.

Recyclable (recyclable material): Material that is available in one of the following types:
Type A material made from used pipes and fittings, bearing the quality mark for plastic pipes from DIN CERTCO which have been cleaned and hackled or milled.
Type B material made from other used plastic products than pipes and fittings that was cleaned and hackled or milled.

Reclaim (regenerat): Material that exists in the following types:
Type A circulating material, external reprocessable material Type A and/or recyclable Type A manufactured by compounding with the addition of additives.
Type B external reprocessable material Type B and/or recyclable Type B produced by compounding with the addition of additives.

Moulding compound (or material type) homogeneous composition of a base material (e.g. PE) and additives such as antioxidants, pigments, carbon black, UV stabilizers and other additives in a dosage required for the production and use of pipe components.

Abbreviations:

DN	nominal diameter; numeric ratio for the size of a piping part, that is another, as through the size of a thread, termed piping part that has the approximate manufacturing measure, in mm.
SN	nominal ring stiffness
C	calculated coefficient
d_e	outside diameter
d_{em}	mean outside diameter
$d_{em,max}$	maximum mean outside diameter
$d_{em,min}$	minimum mean outside diameter
d_n	nominal outside diameter
e	wall thickness of a pipe (at any place)
e_m	mean wall thickness
e_{max}	maximum wall thickness (at any place)
e_{min}	minimum wall thickness (at any place)
e_n	nominal wall thickness
e_4	wall thickness of the inner layer
σ_{LPL}	lower confidence limit of the predicted internal pressure resistance for 50 years at 20 °C
σ_S	dimensioning stress
t_y	wall thickness tolerance

DN/OD	nominal, in regard of the outside diameter
LPL	predicted lower prediction limit
MFR	melt mass-flow rate
MRS	minimum required strength
OIT	oxidation-induction time
PE	polythene
PFA	permissible operating pressure
PN	max. nominal pressure
R	preferred number rows, based on the Renard-rows
S	pipe series S following ISO 4065:1996
SDR	standard dimension ratio

FM	moulding compound	D	diameter
PS	factory	AB	dimension
EG	product group	Wo	week
KA	cavity	Ar	armature
FS	fitting	ESG	fitting group
MuA	sleeve design	VA	compound execution

akt.FM	current used moulding compound
FG	manufacturing group (also dimension group)
WB	material label (for example PE 80 or PE 100)
WT	material type (specific type/name)
BT	component type (same build)
BK	component body (same base body + for example different fittings)
RezS	recipe for removable layer (coating)
min.	smallest/minimum

4 Product requirements

The requirements for factory insulated district heating pipe systems (material - pipe - system) in particular with regard to incoming goods inspection, material and product testing, delivery form, marking and installation instructions are explained in the respective annexes for each area of application.

5 Test

5.1 General

The certification is based on the assessment and examination of the product, as well as the appropriate quality management system as part of an inspection.

To carry out the inspections and tests necessary for the evaluation and certifications, DIN CERTCO uses test laboratories recognized by DIN CERTCO.

The scope of testing for the respective products can be found in the annexes.

The classification of product groups in the respective annex applies to the test samples to be selected.

5.2 Types of tests

5.2.1 Initial test (type testing)

The initial test relates to type testing (design test, type examination) and determines whether the product meets the requirements listed in clause 4 of this certification scheme.

The initial test is the requirement for the certification of a new product.

The test scope is determined in the respective annex or the corresponding assessment- and certification foundation. The classification of groups is to be taken into account.

The initial test is to be conducted by an accredited and/or DIN CERTCO recognized testing laboratory. The samples for the initial inspection can be obtained by the manufacturer.

In addition to the product-specific assessment, the initial test also includes a facility visit or inspection (see clause 8) to the initial inspection. As part of the initial inspection is a proof to be provided by the manufacturer that the plant’s own production control agrees (see clause 7.1) with the requirements of this certification scheme. If the product has not yet been type-tested, the sampling for the initial test can be done during the initial inspection. The transport of the samples to the commissioned testing laboratory is the responsibility of the manufacturer.

5.2.2 Supplementary test

A supplementary test is carried out if additions, extensions or changes (see clause 6.10) are made to a certified product which affect its conformity with the underlying requirements and have not been covered by the initial test.
Type and extent of the supplementary inspection is given by the respective annexes or will be determined in the individual case from DIN CERTCO in coordination with the testing laboratory.
A supplementary test is usually carried out on one dimension per product group to the extent of a monitoring assessment.

The initial inspection is to be conducted by a DIN CERTCO recognized testing laboratory.

Supplementary inspections become necessary (among others) when (see also annexes):

- (M) a change in the moulding compound, for example through to a change of the material, the additives or the recipe
- (E) an extension of the product range (only for the features that are influenced by it)
- (D) a change of design, for example through change of dimensions or joining procedures (only for the features that are influenced by it)
- (P) a change in the manufacturing method (only for the features that are influenced by it)

5.2.3 Surveillance test (control test)

The surveillance test is carried out at regular, fixed intervals and is designed to establish whether the certified product in the production phase is the same as the type-tested product.

In addition to the product-specific test, the surveillance audit includes a factory visit or inspection (see clause 8), which determines whether the technical and organizational conditions for continuous conformity of the products in the respective production facility with the requirements according to clause 4 are given.

DIN CERTCO commissions or carries out the monitoring test. This is based on a surveillance contract between the certificate holder, DIN CERTCO and, if applicable, a recognized testing laboratory.

Type, extent and frequency of the monitoring tests are determined in the annexes.

The samples required for the surveillance test are taken during the respective inspection at the manufacturer's premises and/or in commercial warehouses or at the construction site. The manufacturer is responsible for transporting the samples to the testing laboratory. Care must be taken to take samples of changing dimensions, SDR series, moulding compounds and design types in order to subject all products to the third-party test over time.

In principle, only products that have been accepted and marked as faultless by the factory production control may be taken. The information on the type and number of samples taken (sampling certificates) must be submitted in writing by the respective inspector to DIN CERTCO, the production plant and the testing laboratories involved.

If products are produced and delivered by the manufacturer intermittently between the inspection visits, the necessary test samples of these parts must be stored by the company so that the full scope of the necessary surveillance tests can be carried out.

The samples for the surveillance test must be confirmed as incoming samples at the testing laboratory within four weeks. The surveillance test must be verified by a test report promptly after the date of surveillance or after receipt of the samples by the testing laboratory, if possible until the next surveillance date. If this deadline is not met, DIN CERTCO may initially suspend the certificate and delete it after a further period of 2 months.

The order of the physical tests to be performed is determined as follows:

1. Dimensions and surface
2. All other tests, except creep tests and long term analysis
3. Creep tests and long term analysis

If negative inspection results are noticed during the surveillance test, the surveillance test can be cancelled after consultation of the manufacturer. It follows a re-examination according to clause 5.2.4.

If the result of the test is positive, the samples can be destroyed immediately. If the result of the test is negative, the rejected samples must be kept for up to three months after issue of the certificate.

5.2.4 Repeat test

A repeat test is carried out in case of monitoring tests with negative test results. The repeat test must be initiated no later than 5 weeks after receipt of the test result. The test report must be submitted 3 weeks after completion of the tests.

The certificate owner receives besides the test result a deviation report with the corrective action that needs to be conducted and the appertaining deadline for the implementation.

For the necessary repeat test, the relevant pipe dimension that was objected to during the test must be taken. However, if the corresponding dimension is not available at the time of sampling, it is permissible to use another nominal diameter within the product group.

The type and scope of the repeat test is determined by DIN CERTCO in consultation with the testing laboratory in each individual case in accordance with the purpose.

If the deadlines specified by DIN CERTCO cannot be met by the certificate holder for technical or other reasons, the certificate holder must submit a new binding proposal for the repeat test date, stating the reasons.
If the repeat test is also not passed, certification is initially suspended and a special test is performed in accordance with clause 5.2.5.

5.2.5 Special test

A special test is carried out:

- in case of detected deficiencies
- after suspension of production for a period of more than twelve months
- at the request of DIN CERTCO, which must be justified
- at the written request of third parties (and after examination by DIN CERTCO), if they have a special interest in maintaining proper market conditions in terms of competition or quality

The type and scope of a special test is determined by DIN CERTCO in each individual case in coordination with the testing laboratory. As a rule, it is carried out to the extent of a surveillance test. The report on the special test shall
DIN CERTCO at the latest 3 weeks after completion of the test.

If defects are found during a special test or if the special test is due to production being suspended, the certificate holder must bear the costs of the test procedure.

If no defects are found during special tests at the request of third parties, the costs shall be borne by the third party requesting the special test.

5.3 Sampling

The samples for the type and surveillance testing are usually taken from the manufacturer's current production or from the warehouse of the certificate holder (but only after release by the production-own quality assurance QA). The samples for the initial inspection can be taken by the manufacturer himself.

The number of samples for product testing is agreed between DIN CERTCO and the testing laboratory, unless it is specified in the valid test specifications or in the appendix.

The samples must be received by the testing laboratory no later than 8 weeks after sampling. The manufacturer/dealer shall bear the costs for sampling and shipping the samples to the testing laboratory.

If this deadline is not met, the certificate will be suspended initially and can be deleted after a further period of maximum 4 weeks.

If sampling for a surveillance test (control test) in accordance with clause 5.2.3 or a retest in accordance with clause 5.2.4 is not possible during the inspection visit at the manufacturing plant due to lack of production and stock, samples may be taken from a distributor or obtained from the trade as an alternative. The costs for taking samples at a distributor or procuring them from the trade shall be borne by the certificate holder.

If sampling is not possible for a period of more than 12 months since the last sampling due to lack of production and stock, the manufacturer shall inform DIN CERTCO immediately upon resumption of production and, in agreement with DIN CERTCO, carry out a special test in accordance with clause 5.2.5 as part of a surveillance test (control test) in accordance with clause 5.2.3.

If sampling is not possible for a period of more than 36 months since the last sampling due to lack of production and stock, the relevant DIN CERTCO certificates will be suspended. The manufacturer shall inform DIN CERTCO immediately if production is resumed and, in agreement with DIN CERTCO, carry out an initial test (type test) in accordance with clause 5.2.1.

5.4 Test procedure

The scope and procedure of the tests is carried out unless otherwise stated in accordance with Annexes and the normative requirements of the relevant certification requirements.

5.5 Test report

The testing laboratory shall inform the client of the results of the tests in a test report. This must be submitted to DIN CERTCO in the original.

The test report must normally not be older than 6 months at the time of application. In individual cases, older test reports can also be accepted if the testing laboratory confirms in writing the validity of the information given in the test report.

The test report must comply with DIN EN ISO/IEC17025 and contain at least the following information:

- Name and address of the manufacturer
- Name and address of the applicant (if not the manufacturer)
- Test standards (standards and certification scheme) including date of publication

- Type of test (e.g. type test, surveillance test, supplementary test, etc.)
- Monitoring period, if DIN-certified (e.g. 1st half of 2011)
- Registration number of the tested tube, if DIN-certified
- Pipe material
- Layer structure of multilayer pipes
- Date and place of sampling, if DIN-certified
- Date/Time of testing
- Test results and assessment
- Name and signature of the person responsible for the testing

6 Certification

Certification within the meaning of this certification program is the conformity assessment of a product by DIN CERTCO on the basis of product tests and inspections by DIN CERTCO or by testing laboratories and inspection bodies recognized by DIN CERTCO. The products to be certified are tested for conformity with the requirements specified in Clause 4 and subsequently monitored.
The right to use the "DIN*plus*" quality mark is granted by issuing a corresponding certificate.

6.1 Application for certification

Applicants can be either manufacturers according to § 4 of the Product Liability Act (ProdHaftG) or distributors who, in written agreement with the certificate holder, place the products on the market on their own responsibility within the meaning of the Product Liability Act.

The following documents must be submitted to DIN CERTCO by the applicant:

- Application for certification in original and with legally binding signature
- Current test report in accordance with Clause 5.5 on an initial test (see clause 5.2.1) if the test was not commissioned by DIN CERTCO
- Current inspection report about the inspection of the laboratory at the manufacturer
- Surveillance contract between the testing laboratory and the applicant (this can be submitted at the latest 3 months after the certificate was issued)
- for trader-certificates additionally legally binding declaration of the main certificate holder according to Annex A and legally binding declaration of the trader/distributor according to Annex B
- Technical data sheet

After receipt of the application, DIN CERTCO will send the applicant an order confirmation with a procedure number and information on the further procedure and any missing application documents.

6.2 Classification of types and sub-types

District heating pipes that differ in essential certification-relevant characteristics are defined as type or model. Certification-relevant characteristics are e.g. characteristics that significantly influence safety, function or handling and are therefore sold under a separate trade name. An independent certificate is issued for each type.

As a rule, subtypes are those products of a model/type that differ from each other only in size/performance, formal or non-certification relevant characteristics. They can be combined on one certificate.

6.3 Conformity evaluation

DIN CERTCO carries out the conformity assessment on the basis of the submitted application documents. In particular, the test report is used to assess whether the product meets the requirements of the certification program and the standard.

DIN CERTCO will inform the applicant in writing of any deviations.

6.4 Certificate and right to use the certificate

After successful examination and conformity assessment of the submitted application documents, DIN CERTCO issues a certificate to the applicant and grants the right to use the "DIN*plus*" quality mark in conjunction with an associated registration number.

Structure of the registration number: **P1R0000**

District heating pipes for which the right to use the "DIN*plus*" quality mark has been granted shall be marked with the "DIN*plus*" quality mark and the corresponding registration number.

The mark and registration number may only be used for the type for which the certificate has been issued and which corresponds to the type-tested product.

One register number is assigned per type. The same register number is issued for the design types (subtypes) of a type (see clause 6.2).

In addition, the General Terms and Conditions and the testing, registration and certification regulations of DIN CERTCO apply.

6.5 Sublicenses

In accordance with the requirements of DIN CERTCO's General Terms and Conditions, sub-certificates are required if certified products are to be placed on the market in the name of companies other than the main certificate holder.
Sub-certificates can be issued for all products covered by this certification program. They enable the marketing of certified products in the name of the sub-certificate holder. Sub-certificates depend on the validity of the main certificate. The products may not be modified by the sub-certificate holder.

The following documents must be submitted by the applicant to DIN CERTCO:

- Application for certification in original and with legally binding signature
- Declaration of the sub-certificate holder that the products of the main certificate holder are marketed unchanged
- Declaration of consent of the principal certificate holder to the issuance of the sub-certificate

A sub certificate can be issued

- with its own registration number
- with registration number of the main certificate holder.

6.6 Publications

All certificate holders can be viewed under <Certificate Holders> on the DIN CERTCO homepage www.dincertco.tuv.com, which is updated on a daily basis. Manufacturers, users and consumers can use this research feature in order to learn more about certified products.

In addition to the contact details of the certificate holder (phone, fax, email, Home page), the technical data of the registered district heating piping systems can also be viewed there and downloaded in the form of a technical data-sheet.

6.7 Validity of the certificate

The certificate has a validity of 5 years. The validity period is specified in the certificate. With the expiration of the certificate, the right to use the trademark also expires.

6.8 Extension of the certificate

If the certification is to be maintained beyond the date stated in the certificate, DIN CERTCO must receive a current positive test report and an application for extension in good time before the expiry date. DIN CERTCO carries out the conformity assessment on the basis of the application documents submitted.

Proof of compliance with the requirements of the testing and certification principles in accordance with Clause 2 is provided by a surveillance test (see clause 8.2), which is evaluated by DIN CERTCO.

6.9 Expiry of the certificate

If the renewed check for conformity with the standard in accordance with clause 5 has not been carried out in good time before expiry of the validity period, the right of use for the "DIN*plus*" quality line and the registration number shall expire without any express notification from DIN CERTCO.

In addition, the certificate may expire if:

- the monitoring measures pursuant to Clause 7 and 8 are not carried out in a timely manner or are incomplete,
- the quality mark "DIN*plus*" is misused by the certificate holder,
- the requirements in this certification scheme and its accompanying documents are not fulfilled,
- the resulting certification fees are not paid in due time,
- the requirements for the granting of the certificate are no longer met,

When the certificate expires, the right to use the "DIN*plus*" mark also expires automatically.

6.10 Changes/Supplements

6.10.1 Changes/Supplements to the product

The certificate holder is obliged to inform DIN CERTCO immediately of all changes made to the product. The testing laboratory and DIN CERTCO will together decide the extent of the supplementary examination required in accordance with clause 5.2.2 and whether this comprises a significant change. The testing laboratory sends the associated test report to DIN CERTCO.

If DIN CERTCO detects a significant change, the certificate with the associated registration number shall expire. A new application for initial certification and the right to use the "DIN*plus*" quality mark may be submitted for the modified product.
The certificate holder is further obliged to notify all changes in formal details (e.g. certificate holder or his address).

The certificate holder can apply to DIN CERTCO for an extension of the existing certificate for further types of design (subtypes) of the same type. DIN CERTCO will decide whether these additions make a supplementary test necessary. If the requirements are met, the design types are included in the certificate for the product already certified and are considered to be part of it.

6.10.2 Changes to the test standard

If the test basis for certification changes, an application for a change in certification must be submitted within 6 months after notification by DIN CERTCO and, as a rule, conformity with the changed test basis must be demonstrated after 12 months by submitting a positive test report (see clause 5.5).

DIN CERTCO issues a modified certificate after positive evaluation.

6.11 Product defects

If defects are found in a certified product on the market, the certificate holder will be requested by DIN CERTCO in writing to remedy the defects.

DIN CERTCO decides in consultation with the testing laboratory whether the defect is serious or minor.

In the case of defects which directly or indirectly influence the safety-related or functional behaviour (serious defects), the manufacturer must ensure that the products are no longer marked with the certification marks until the defects have been rectified.

The defects must also be remedied immediately on products that are installed or in stock. Within 3 months, the manufacturer must prove to DIN CERTCO by submitting a test report on a special test in accordance with clause 5.2.5 that the defects have been rectified and that the product complained about again meets the specified requirements.

If the defects do not affect the safety or correct functioning of the product (minor defects), the manufacturer must use suitable means to prove to DIN CERTCO within a 3 month period that the defects affecting the product in question have been remedied.

If the manufacturer does not comply with these deadlines, the certificate and the right to use the certification mark "DIN*plus*" will be withdrawn from him and the distributor.

If there is still reason for complaint, DIN CERTCO will initially suspend the certificate and at the same time grant a final deadline for the elimination of the defects. If the certificate holder fails to comply with the request or fails to do so within the set period, or if the elimination of the defects can again not be proven, the certificate shall expire.

7 Self-monitoring by the manufacturer

The manufacturer shall ensure through appropriate quality assurance measures that the product characteristics confirmed during certification are maintained. This can be ensured by a factory production control (FPC) directly aimed at the product or the production and furthermore by measures within the scope of a quality management system (QM system) according to the standards series DIN EN ISO 9000 ff.

7.1 Factory Production Control (FPC)

7.1.1 General

Internal in-process Factory Production Control (FPC) is the continuous monitoring of the production process by the manufacturer which ensures that the products comply with the defined requirements.

Therefore, the FPC (factory production control) combines operating procedures as well as all measures that enable the maintenance and verification of the conformity of the component with its technical specifications. It can be implemented by means of controls and tests on raw materials and components, processes, production equipment and finished components, including their material properties, and by applying the results thus obtained.

If the result of an inspection is negative, the manufacturer shall immediately take all measures to remedy the defect. Defective products must be marked and sorted out. The test shall be repeated regularly to determine whether the defect has been remedied.

The scope and type of the factory production control required within the scope of certification can be found in the appendices.

7.1.2 Records

All elements, requirements and regulations applied by the manufacturer must be systematically documented in written form. This documentation of the production control system shall ensure a general understanding of the conformity assessment and enable the achievement of the required component characteristics and the verification of the effective application of the production control system.

All results of inspections, tests or evaluations requiring action shall be recorded, as well as the actions taken. The actions required when control values or criteria are not met shall be recorded and retained for a period specified in the manufacturer's FPC system.

The specifications of all delivered raw materials and components shall be documented and the test plan for ensuring their conformity is to be introduced.

The relevant records must be submitted to DIN CERTCO or its agents on request. They must at least contain the following information:

- Name of the product being inspected
- Date of production
- Time of testing
- Result of testing and if applicable, comparison with the defined requirements
- Signature of the person responsible for the test
- Date of the record

7.1.3 Personnel

The responsibility, authority and relationship between the personnel who direct, perform or monitor the work affecting product conformity must be defined. This applies in particular to personnel who take action to prevent products from being non-compliant and, if they are not compliant, to identify and document problems of product conformity.

Personnel who carry out work relating to product conformity must be competent, based on appropriate education, training, skills and experience. The competence of the personnel must be documented.

7.1.4 Equipment

All weighing, measuring and test equipment necessary to achieve or demonstrate conformity shall be calibrated or verified and periodically checked according to the procedures, frequencies and criteria laid down.

The control of the monitoring and measuring equipment must comply with the relevant sections of DIN EN ISO 9001.

All equipment used in the manufacturing process must be regularly inspected and maintained to ensure that use, wear and tear or failure do not lead to irregularities in the manufacturing process.

Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures and the records shall be retained for the period specified in the manufacturer's FPC (WPK) procedures.

7.1.5 Raw materials and components

The specifications of all of supplied raw materials and components as well as the monitoring scheme for ensuring their conformity must be documented.

The verification of conformity of the raw material with the specifications must match DIN EN ISO 9001 clause 8.4.2.

7.1.6 Production control

The manufacturer must plan and carry out production under controlled conditions.

The requirements of this sub-clause are considered to be fulfilled if they are in accordance with DIN EN ISO 9001 sections 8.5.1 and 8.5.5.

7.1.7 Traceability and labelling

Individual products and product-batches must be identifiable and traceable with respect to their origin. The manufacturer must have laid down procedures in writing to ensure that the processes for the fixing of traceability codes and / or identifiers are checked regularly.

The requirements of this subclause are to be considered as fulfilled, when in accordance with the DIN EN ISO 9001 clause 8.5.2.

All products are to be permanently marked with the minimum amount of information. The required minimum need is to be found in the respective annexes.

7.1.8 Non-compliant products

The manufacturer shall establish in written procedures how non-compliant products shall be treated. All such events shall be recorded as soon as they occur and these records shall be retained for the period specified in the manufacturer's written procedures.

The requirements of this Subpart shall be regarded as fulfilled, when in accordance with DIN EN ISO 9001 clause 8.7.

7.1.9 Corrective action

The manufacturer shall document procedures indicating the measures to be taken to eliminate the cause of non-conformity and to prevent recurrence.

The requirements of this Subsection shall be considered as fulfilled, when in accordance with DIN EN ISO 9001 clause 10.2.

7.1.10 Handling, storage and packaging

The manufacturer must have procedures for handling the products and provide suitable storage facilities to prevent damage or impairment.

7.2 Quality management system

DIN CERTCO recommends the establishment and certification of a quality management system according to the standards series DIN EN ISO 9000 ff.

8 External monitoring by DIN CERTCO

In addition to the self-monitoring of the certificate holder, the quality assurance of the products is supported by the external monitoring by DIN CERTCO. DIN CERTCO checks and evaluates the conformity of the product with the requirements specified in the certification program and, if necessary, the effectiveness of the factory production control according to clause 7.1.

After successful type testing, initial inspection and issue of a certificate, external monitoring in the form of surveillance testing (clause 8.2) is carried out at regular intervals. The third party surveillance comprises factory inspections (see clause 8.1) as well as product-specific tests (see Appendices).

8.1 Inspections

In the course of an inspection DIN CERTCO or a third party commissioned by DIN CERTCO checks the production and testing facilities and the quality assurance measures (QA measures) to ensure that they are suitable for the proper manufacture of the product. The inspection takes place every six months.

The inspection also serves to determine whether the technical and organizational prerequisites for the continuous conformity of the products with the requirements according to clause 4 are given.

The client will be informed of the result of the inspection in a separate inspection report. This report must be submitted to DIN CERTCO in the original and comply with the requirements of DIN EN ISO/IEC 17020, clause 13.

If the results of the inspection are not sufficient, the production site and the applicant must be informed immediately. The scope of additional corrective measures to meet all requirements must then be agreed between the certification body and the applicant. If the applicant is not able to implement the necessary measures, the procedure shall be terminated.

8.2 Monitoring tests (control tests)

The type and scope of the monitoring tests shall be in accordance with clause 5.2.3 and the respective annexes.

Annex A Manufacturer declaration

DIN CERTCO Gesellschaft
für Konformitätsbewertung mbH
Alboinstraße 56
D-12103 Berlin

DECLARATION MANUFACTURER

Herewith, we declare:

Comapany: _____
Street: _____
Postal code/city: _____

That we agree that our certified district heating pipe systems with the

Type name: _____
Registration No.: _____

Can be used for the certification of the following supplier/distributer

Company: _____
Street: _____
Postal code/city: _____

Under the following

Type name: _____

We furthermore agree that the supplier/distributor mentioned above, is permitted to apply for a certificate on his own with a separate registration number on the basis of our valid DIN-certification.

DIN CERTCO is permitted to use our available test reports and further certification relevant documents for the conformity assessment.

We furthermore confirm that we will only deliver such products to the applicant, which are identical in construction to those which are certified by us under the registration number mentioned above.

All certification relevant changes according to the current valid certification scheme will be immediately notified in writing by us to DIN CERTCO and the supplier/distributor.

_____ _____
Date Company stamp and legally binding signature

Annex B Declaration Supplier/Distributor

DIN CERTCO Gesellschaft
für Konformitätsbewertung mbH
Alboinstraße 56
D-12103 Berlin

Declaration SUPPLIER/DISTRIBUTOR

We herewith declare as supplier/distributor

Company: _____
Street: _____
Postal code/city: _____

that the district heating piping systems which are distributed by us under the following

Type name: _____

produced by the manufacturer/certificate holder

Company: _____
Street: _____
Postal code/city: _____

and the registration No.: _____

for which we have applied for DIN-certification are identical in construction to those products which are certified by the manufacturer/certificate holder under the registration number mentioned above.

We furthermore confirm that we will not do any changes to those products supplied by the manufacturer or that we will purchase other products with the same registration number.

Date

Company stamp and legally binding signature

Annex D Flexible factory insulated district heating pipe systems

(Stand: 01.09.2020)

D 1 Testing and certification principles (see also section 2):

DIN EN 15632-1	District heating pipes - Pre-insulated flexible pipe systems - Part 1: Classification, general requirements and test methods
DIN EN 15632-2	District heating pipes - Pre-insulated flexible pipe systems - Part 2: Bonded plastic service pipes - Requirements and test methods
DIN EN 15632-3	District heating pipes - Pre-insulated flexible pipe systems - Part 3: Non bonded system with plastic service pipes - requirements and test methods
DIN EN 15632-4	District heating pipes - Pre-insulated flexible pipe systems - Part 4: Bonded system with metal service pipes - Requirements and test methods
DIN EN ISO 15875-1	Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - Part 1: General
DIN EN ISO 15875-2	Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - Part 2: Pipes
DIN EN ISO 15875-3	Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - Part 3: Fittings
DIN EN ISO 15875-5	Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - Part 5: Fitness for purpose of the system
DIN ISO/TS 15875-7	Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - Part 7: Guidance for the assessment of conformity
DIN EN ISO 15876-1	Plastics piping systems for hot and cold water installations - Polybutene (PB) - Part 1: General
DIN EN ISO 15876-2	Plastics piping systems for hot and cold water installations - Polybutene (PB) - Part 2: Pipes
DIN EN ISO 15876-3	Plastics piping systems for hot and cold water installations - Polybutene (PB) - Part 3: Fittings
DIN EN ISO 15876-5	Plastics piping systems for hot and cold water installations - Polybutene (PB) - Part 5: Fitness for purpose of the system

DIN ISO/TS 15876-7	Plastics piping systems for hot and cold water installations - Polybutylene (PB) - Part 7: Guidance for the assessment of conformity
DIN EN ISO 21003-1	Multilayer piping systems for hot and cold water installations inside buildings - Part 1: General
DIN EN ISO 21003-2	Multilayer piping systems for hot and cold water installations inside buildings - Part 2: Pipes
DIN EN ISO 21003-3	Multilayer piping systems for hot and cold water installations inside buildings - Part 3: Fittings
DIN EN ISO 21003-5	Multilayer piping systems for hot and cold water installations inside buildings - Part 5: Fitness for purpose of the system
DIN ISO/TS 21003-7	Multilayer piping systems for hot and cold water installations inside buildings - Part 7: Guidance for the assessment of conformity
DIN EN 253	District heating pipes - Preinsulated bonded pipe systems for directly buried hot water networks - Pipe assembly of steel service pipe, polyurethane thermal insulation and outer casing of polyethylene
DIN EN 1057	Copper and copper alloys - Seamless, round copper tubes for water and gas in sanitary and heating applications
DIN EN 12449	Copper and copper alloys - Seamless, round tubes for general purposes
DIN EN 10088-2	Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes
DIN EN 10305-1	Steel tubes for precision applications - Technical delivery conditions - Part 1: Seamless cold drawn tubes
DIN EN 10305-2	Steel tubes for precision applications - Technical delivery conditions - Part 2: Welded cold drawn tubes
DIN EN 17248	District heating and district cooling pipe systems - Terms and definitions

D 2 General

Annex D Flexible factory insulated district heating pipe systems of this certification scheme applies to flexible factory insulated directly buried district heating pipe systems (bonded systems with plastic service pipes, non-bonded systems with plastic service pipes as well as bonded systems with metal service pipes) and contains in connection with sections 1 to 12 all requirements for awarding the quality mark "DIN*plus*".
The increase in quality is summarized in Table 1.

Table D 1 Plus in quality

Requirements	Annex D	DIN EN 15632-1	DIN EN 15632-2	DIN EN 15632-3	DIN EN 15632-4	see
to the raw material:						
Proof of the thermal stability of the oxygen barrier layer (depending on the application class FFW)	+	/	/	/	n/a	Section 8
Proof of the thermal stability of the adhesion promoter (depending on the application class FFW)	+	/	/	/	n/a	Section 8
to the service pipe:						
Proof of thermal stability (depending on the application class FFW, not for metal pipes)	+	/	x	x	n/a	Section 9
Verification of water vapour tightness (optional, not for multi-layer composite pipes (M) and metal pipes)	+	/	x	x	n/a	Section 9
Proof of compatibility of heating water additives (if heating water additives are used, not for pipes made of metal)	+	/	/	/	n/a	Section 9
to the isolation material:						
Verification of extended creep behaviour (optional)	+	/	/	/	/	Section 9

Requirements	Annex D	DIN EN 15632-1	DIN EN 15632-2	DIN EN 15632-3	DIN EN 15632-4	see
Assessment of compressive strength, density, cell size, homogeneity, closed-cell-sturucture	+	/	/	/	/	Section 9
Assessment of thermal conductivity, compressive strength, density and cell size in aged condition	+	/	/	/	/	Section 9
to the jacket pipe:						
Proof of homogeneity	+	/	/	/	/	Section 9
Proof of thermal stability (depending on the application class FFW)	+	/	/	/	/	Section 9
Verification of the stress crack resistance (optional)	+	x	/	/	/	Section 9
Proof of oxygen tightness by cell gas analysis (optional, for pipes with barrier layer)	+	/	/	/	/	Section 9
Assessment/proof of water vapour tightness (optional, for pipes with barrier layer	+	/	/	/	/	Section 9
to the compound structure:						
Proof of axial shear strength in aged condition	+	/	/	/	/	Section 9

The application classes are listed in Table 2. Application class FFW 2 is only possible for composite systems with metal service pipes.

Table D 2 Definition application class FFW

Application class	T_D		T_{max}	
FFW 1	80°C	29a	90°C	1a
FFW 2	120°C	29a	140°C	1a

D 3 Product Groups

The product groups are shown in Table 3. If all requirements are fulfilled, certificates are issued per product group and product type.

Table D 3 Product Groups

Product groups	Product type	Nominal size DN
620.K1	Flexible factory insulated district heating pipe systems with plastic service pipe	10 mm ≤ d_n ≤ 63 mm
620.K2		75 mm ≤ d_n ≤ 160 mm
620.MV1	Flexible factory insulated district heating pipe systems with composite service pipe (P or M)	10 mm ≤ d_n ≤ 26 mm
630.MV2		32 mm ≤ d_n ≤ 63 mm
630.MV3		75 mm ≤ d_n
640.M1	Flexible factory insulated district heating pipe systems with metal service pipe	12 mm ≤ dn ≤ 50 mm
640.M2		65 mm ≤ d_n ≤ 150 mm

D 4 Material / Material usage

For the material of the oxygen barrier layer and the material of the adhesion promoter, proof of thermal stability must be provided depending on the application class FFW.

For the service pipe (media pipe) plastic pipes made of PE-X or PB, multi-layer composite pipes (P) or (M) with pressure-bearing layers of PE-X or PB as well as metal pipes made of copper, mild steel or corrugated stainless steel may be used.

PUR foam must be used as insulation between the service pipe and the casing pipe.

For the jacket pipe PE-HD, PE-LD and PE-LLD may be used, this includes PE 63, PE 80, PE 100, PE 100-RC, PE-X and PE-RT.

Only new material and reprocessed, non-quality-reduced material from the pipe manufacturer's own production may be used.

D 5 Delivery form

The tubes are supplied in straight lengths, in coils and on drums.

D 6 Processing and installation guidelines

In the case of installation measures that go beyond the specifications of the standards mentioned in Section 1, the pipe manufacturer must provide supplementary information on the installation.

D 7 Minimum marking

All pipes shall be continuously and permanently marked on the outer casing at intervals of approximately 1 m with the minimum information according to Table D 4. In addition, the carrier pipe must be marked according to the respective product standard.

Table D 4 Minimum marking of the casing pipes

Designation	Sample marking
Name and/or trademark of the manufacturer	xyz
Quality mark for plastic pipes with a register number	DIN plus P1R0000
Product standard	DIN EN 15632-2, DIN EN 15632-3 oder DIN EN 15632-4
Material and designation (every layer)	PE-X / PUR / PE-HD
Nominal diameter and nominal wall thickness of the service pipe	carrier pipe 32 x 3,0
Nominal-outside diameter and nominal thickness of the jacket pipe	jacket pipe 110 x 10,0
Maximum operating temperature, maximum operating pressure and application class FFW	90°C / 10bar / FFW 1
Intended usage	FW
Date of manufacture of the complete pipe system (coded if necessary)	29.03.2019

D 8 Material / goods inward check

The material tests (TT, BRT/PVT, AT) are grouped in Table D 5.

Table D 5 Material test (per moulding compound)

Property	Require-ments acc. to	Requirement (Parameter)	Type test (TT)	Internal monitoring (BRT/PVT)		Monitoring (AT)
			Initial type testing (ITT)	Test confirmation (according to DIN EN 10204)	Spot checks	
Thermal stability of the oxy-gen barrier layer (depend-ing on the application class FFW, not for metal pipes)	DIN EN 15632-1 Sect. 1	for application class FFW 1/FFW 2	The type testing of the materials takes place at the mate-rial manufac-turer or tube manufac-turer.	/	/	every 5 years
Thermal stability of the ad-hesion promoter (depending on the application class FFW, not for metal pipes)				/	/	/

D 9 Pipe-/ system test

The pipe and system tests (TT, BRT/PVT, AT) are summarized in Table D 6.

Table D 6 Pipe-/ system test

Property	Require-ments acc. to	Requirement (Parameter)	Type test (TT) per moulding compound				Internal monitoring (BRT/PVT)	External monitoring (AT)
			Testing to be conducted at [a]				Factory production control [see 7.1]	Monitoring test [see 5.2.3]
			N (ITT)	M1	M2	M3		
Media pipe								
Quality	DIN EN 15632-2 sect. 5.2.1 DIN EN 15632-3 sect. 4.4.1 DIN EN 15632-4 sect. 5.2	For FFW 1 and FFW 2: Service pipe system must comply with relevant product standards [b c]	x	x	/	/	x	2x/year
Thermal stability (depending on the application class FFW, not for metal pipes)	DIN EN 15632-1 sect. 1	For application class FFW 1: 110°C/15000h or 115°C/10000h test pressure according to alignment	1x/material	x	/	/	/	/
Oxygen tightness (not for metal pipes)	DIN EN 15632-2 sect. 5.2.2 DIN EN 15632-3 sect. 4.4.2	at 80°C: max. 1,8 mg/m²d [d]	1x/Oxygen barrier layer	x	/	/	/	2x/year/Oxygen barrier layer
Water vapour tightness (not for multi-layer composite pipes (M) and pipes made of metal)	DIN EN 15632-2 sect. 5.5 DIN EN 15632-3 sect. 4.6	Verification of the manufacturer's specification	1x/design type	x	/	/	/	/

Property	Require-ments acc. to	Requirement (Parameter)	Type test (TT) per moulding compound				Internal monitoring (BRT/PVT)	External monitoring (AT)
			Testing to be conducted at [a]				Factory production control [see 7.1]	Monitoring test [see 5.2.3]
			N (ITT)	M1	M2	M3		
Water vapour tightness (optional, not for multi-layer composite pipes (M) and pipes made of metal)	manufacturer's specification	Verification by testing, see section D 12	1x/design type	x	/	/	/	/
Compatibility of heating water additives (when using heating water additives, not for pipes made of metal)	DIN 4726 sect. 4.6	no leakage or cracking	1x/design type	x	/	/	/	/
Insulation material								
Thermal conductivity	DIN EN 15632-1 sect.5.1	Verification of the manufacturer's specification	1x/Insulation material	/	x	/	/	every 3 years/Insulation material
Thermal conductivity in aged condition	/	Deviation max. 10 % after ageing for application class FFW 1: 80°C/150d FFW 2: 120°C/150d	1x/Insulation material	/	x	/	/	/
Creeping behavior	DIN EN 15632-1 sect. 5.4.1	after 300h and 1000h: deformation ≤ 10 %	1x/Insulation material	/	x	/	/	/
Extended creep behaviour (optional)	following DIN EN 253	after up to 10000h	1x/Insulation material	/	x	/	/	/
Water absorption at elevated temperatures	DIN EN 15632-1 sect. 5.4.2	at 100°C: max. 10 Vol% and bei 80°C: max. 1 Vol%	1x/Insulation material	/	x	/	/	1x/year/Insulation material

Property	Require-ments acc. to	Requirement (Parameter)	Type test (TT) per moulding compound				Internal monitoring (BRT/PVT)	External monitoring (AT)
			Testing to be conducted at [a]				Factory production control [see 7.1]	Monitoring test [see 5.2.3]
			N (ITT)	M1	M2	M3		
Foam production	DIN EN 253 sect.4.4.1, Tab. B.3	Deposition of receipe	1x/Insulation material	/	x	/	x	1x/year/Insulation material
Compressive strength, density and cell structure (cell size, homogeneity, closed cellity)	DIN EN 253 sect. 4.4.3, Tab. B.3 DIN EN 253 sect. 4.4.4, DIN EN 253 sect. 4.4.2	Verification of the manufacturer's specification	1x/Insulation material	/	x	/	x	1x/year/Insulation material
Compressive strength, density and cell structure (cell size) in aged condition	following DIN EN 253 sect. 4.4.3, following DIN EN 253 sect. 4.4.4, following DIN EN 253 sect. 4.4.2	Deviation after aging according to manufacturer's specifications for application class FFW 1: 80°C/150d FFW 2: 120°C/150d	1x/Insulation material	/	x	/	/	/
Jacket pipe								
Homogeneity	DIN EN 253 sect. 4.3.1.1	Grade ≤ 3, appearence A1, A2, A3	1x/material	/	/	x	/	1x/year/Werkstoff
UV resistance	DIN EN 15632-1 sect. 5.5.1	Carbon black content ≥ 2% or impact strength ≥ 4 J after weathering with ≥ 3.5 GJ/m²	1x/material	/	/	x	/	/
Thermal stability (depending on the application class FFW)	DIN EN 15632-1 sect. 5.5.2	For application class FFW 1: 30°C/30 a FFW 2: 70°C/30 a	1x/material	/	/	x	/	/

Property	Require-ments acc. to	Requirement (Parameter)	Type test (TT) per moulding compound				Internal monitoring (BRT/PVT)	External monitoring (AT)
			Testing to be conducted at [a]				Factory production control [see 7.1]	Monitoring test [see 5.2.3]
			N (ITT)	M1	M2	M3		
Stress crack resistance	DIN EN 15632-1 sect. 5.5.3	PE-HD: FNCT ≥ 100 h at 80°C/4 MPa/2 % ArkopalN100 PE-LD and PE-LLD: SCR (stress crack resistance) ≥ 1000h at 50°C/10 % Igepal CO-630	1x/material	/	/	x	/	1x/year/material
Stress crack resistance (optional)	DIN EN 15632-1 sect. 5.5.3	PE 100-RC: FNCT ≥ 3300h at 80°C/4MPa/2%ArkopalN100 or correlating test procedure	1x/material	/	/	x	/	1x/year/material
Dimensions	DIN EN 253 Abs. 4.3.2.1, 4.3.2.2; Tab. B.2	Verification of the manufacturer's specification	1x/EG	/	/	x	1x/EG	1x/year/EG
Oxygen tightness by cell gas analysis (optional, for pipes with barrier layer)	/	Deviation after determination of the thermal conductivity in aged condition according to manufacturer's specifications	1x/material	/	/	x	/	/
Water vapour tightness (optional, for pipes with barrier layer)	DIN EN 15632-2 sect. 5.5 DIN EN 15632-3 sect. 4.6	Verification of the manufacturer's specification	1x/design type	/	/	x	/	/
Water vapour tightness (optional, for pipes with barrier layer)	Manufacturer specification	Verification by testing, see section D 12	1x/design type	/	/	x	/	/

Property	Require-ments acc. to	Requirement (Parameter)	Type test (TT) per moulding compound				Internal monitoring (BRT/PVT)	External monitoring (AT)
			Testing to be conducted at [a]				Factory production control [see 7.1]	Monitoring test [see 5.2.3]
			N (ITT)	M1	M2	M3		
Pipe-Composite								
Flexibilty	DIN EN 15632-1 sect. 5.2	with minimum bending radius: ovality ≤ 30% and cracking in the insulation ≤ 5mm	1x/material combination	x	x	x	/	/
Resistance to external influence	DIN EN 15632-1 sect. 5.3	Ring stiffness ≥ 4 kN/m² and ring stiffness/creep behaviour ≥ 0.8 and impact strength ≥ 4 J	1x/material combination jacket pipe and insulation	/	x	x	/	/
Technical specification	DIN EN 15632-1 sect. 8	Check for completeness	1x	x	x	x	/	/
Coaxiality deviation	DIN EN 253 sect. 4.5.5, Tab. B.4	for DN ≤ 160mm: 3mm for DN > 160mm: 5mm	1x	/	/	/	x	1x/year/EG
Axial shear strength	DIN EN 15632-2 Abs. 5.3 DIN EN 15632-4 sect. 5.3	for plastic pipes ≥ 0.09 MPa for multi-layer composite pipes ≥ 0.12 MPa	1x/material combination service pipe and insulation	x	x	/	/	1x/year/material combination service pipe and insulation
Axial shear strength in aged condition	Following DIN EN 15632-2 sect. 5.3 DIN EN 15632-4 sect. 5.3	Deviation max. 45% after aging for application class FFW 1: 80°C/7d FFW 2: 120°C/7d	1x/material combination service pipe and insulation	x	x	/	/	/
Longitudinal water tightness	DIN EN 15632-2 sect. 5.4 DIN EN 15632-3 sect. 4.5 DIN EN 15632-4 sect. 5.4	for composite systems: after 168h ≤ 100g for non-compound systems: no water absorption	1x/material combination service pipe and insulation	x	x	/	/	/

Property	Require-ments acc. to	Requirement (Parameter)	Type test (TT) per moulding compound				Internal monitoring (BRT/PVT)	External monitoring (AT)
			Testing to be conducted at [a]				Factory production control [see 7.1]	Monitoring test [see 5.2.3]
			N (ITT)	M1	M2	M3		
System								
Monitoring system	DIN EN 15632-1 sect. 5.6	Functionality	1x/design type	/	/	/	/	/
Whole system	/	Verification of the manufacturer's specification	1x/design type	x	x	x	/	/

[a] N: New system [initial test, see section 5.2.1].
M1: Modification of the media pipe [supplementary test, see section 5.2.2].
M2: Modification of the insulation material [Supplementary test, see section 5.2.2].
M3: Modification of the jacket pipe [Supplementary test, see section 5.2.2].

[b] The service pipe must comply with the relevant product standards – see Testing and certification principles in chapter D1

[c] For application class FFW 1, proof of quality of the service pipe system is deemed to have been provided, if the service pipe system is certified as a heating pipe system for application class 5 with the corresponding pressure in accordance with the DIN CERTCO certification program for plastic pipe and multi-layer pipe systems for hot water surface heating and radiator connections.

[d] Pipes which have a homogeneously closed and longitudinally welded metal layer in the pipe structure with a layer thickness ≥ 100 µm are considered to be oxygen-tight. A separate test for oxygen tightness is not necessary for these types of pipe.

D 10 Number of samples

For the type test, at least 6 samples, each 4000 mm long, shall be sent per product group.
For the surveillance test, at least 2 test specimens each 4000 mm long shall be taken from each product group.

D 11 Conclusion in case of deviation

In principle, products that do not meet the specified requirements must be discarded.

D 12 Test method for determining water vapour tightness (optional)

The determination of the tightness against water or water vapour is preferably carried out using the test method according to DIN EN ISO 12572.

The permeation coefficient must be determined at least at 20°C and 50°C at 100% relative humidity and/or in a water bath.

In order to be able to assess the efficiency of the barrier layer, it is recommended that the permeation coefficient is also determined on test specimens without barrier layer.

As an alternative to testing on sheet material, a test can also be carried out on pipe sections, preferably on one dimension of the smallest product group and the smallest barrier layer thickness.

The test procedure and the test specimens shall be agreed with the Certification Body and the testing laboratory.