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BRL 2024
draft 29-05-2024

Evaluation Guideline

For the KOMO® product certificate for Galvanized steel pipes for indoor sewage systems

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Determined by CWK Water Cycle dated **date of determination**

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date **date accepted**



KOMO. Kwaliteit zoals beloofd.

BRL XXXX

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Remark: publication date = date equal to or later than acceptance date

**EVALUATION GUIDELINE
FOR THE KOMO PRODUCT CERTIFICATE FOR
GALVANIZED STEEL PIPES FOR INDOOR SEWAGE SYSTEMS**

Determined by the BoE Water Cycle on ...-...-20...

Accepted by the Komo Quality and Admissions Commission on ...-...-20...



Preface

This KOMO evaluation guideline (BRL) has been drawn up by the Board of Experts Water Cycle in which all relevant parties in the field of this BRL are represented. This Board of Experts also supervises the certification activities based on this BR: and will make adjustments if required. All references to “Board of Experts” in this evaluation guideline pertain to the above-mentioned Board of Experts.

This BRL will be used by certification bodies who have a license agreement with the *Stichting KOMO* for that purpose, in conjunction with their established procedures for certification. This BRL establishes the requirements an application or holder of a KOMO product certificate shall meet and the way this is assessed by the certification body. In their established certification procedures, the method of working has been established as it is used by the certification body when carrying out activities of:

- The investigation for granting and extending a KOMO product certificate based on this BRL.
- The periodic assessments for the maintenance of a KOMO product certificate issued based on this BRL.

In case of changes in the BRL:

The following parts of this BRL have been changed:

- The entire BRL is based on the latest version of the KOMO model BRL.
- In the entire text the terms “provider” and “producer” have been replaced by “certificate holder.”
- The 5th paragraph of article 1.1 has been moved to 1.3 (validity).
- Article 1.4.2 (legislation and rules and regulations – Building Decree Living Environment Building Decree) is new.
- Article 1.7 is new. The text from article 4.3 has been moved to his article.
- Chapter 3 (raw materials) is new. De text from article 4.3 has been moved to article 3.1.
- In Chapter 4 the product properties to be investigated have been included in a table instead of a simple reference to the relevant product standard.
- Articles 5.1 and 5.2 have been combined in article 5.1.
- Articles 5.3 and 5.4 have been combined in article 5.2.
- The test matrix of article 6.4 (Chapter 6) has been moved and its text has been adjusted in accordance with the product properties included in article 4.1.
- (The weight) of nonconformities and the sanctions policy have been included in article 6.5.
- In Chapter 8 the public law legalisation has been added and the references to standards have been updated.

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1 Introduction, general conditions, and general requirements

1.1 Introduction

Based on the regulations laid down in this KOMO Evaluation Guideline (BRL) a KOMO product certificate is issued for galvanized steel pipes for indoor sewage systems. This product certificate enables the certificate holder to prove their clients that an expert, independent organization supervises the certificate holder's production process, the quality of the product and its respective quality control. Thus, it may be assumed that the product has the characteristics as established in the present BRL.

The requirements determined in this BRL are employed by the certification bodies, which have been accredited as such by the Board of Accreditation, or have presented an application, and who have a license agreement with the KOMO Foundation, when processing an application for the issuance and maintenance of a KOMO product certificate for galvanized steel pipes for indoor sewage systems.

In addition to the requirements laid down in this BRL, certification bodies impose additional requirements in the sense of general procedure requirements for certification, as established in their internal procedures.

1.2 Subject matter and area of application

1.2.1 1.2.1 Subject matter

This BRL describes the requirements and determination methods for galvanized steel pipes and accessories for indoor sewage systems as per NEN-EN-1123-1.

1.2.2 1.2.2 Area of application

The galvanized steel pipes and accessories will be used for indoor sewage systems in buildings for the disposal of domestic wastewater.

1.3 Validity

If dealing with a new BRL, do not include the following 2 paragraphs.

This version of the BRL replaces the version dated June 5, 2013.

The KOMO product certificates that have been issued based on that version of the BRL will expire in any case on «date».

Based on the aforementioned previous version of this BRL, new product certificates may be issued at the latest within 3 months before the current certificates must be replaced.

The KOMO product certificate does not expire. Validity may be limited (terminated), among other reasons, because of:

- A modification of this evaluation guideline,
- Incompliance of the certificate holder's obligations.

1.4 Relation with Legislation and Rules and Regulations

1.4.1 European Ordinance construction products (CPR, EU 305/211)

The harmonized European standard 1123-1 is applicable to the products this BRL refers to.

The statements expressed in the product certificates issued based on this BRL, may not be used to replace the CE-marking and/or the corresponding Performance Declaration.

1.4.2 Building Decree Living Environment/Building Decree

The Building Decree Living Environment Building Decree is applicable to the products this BRL refers to regarding the disposal capacity and the air and water tightness of the means of disposal for domestic wastewater.

The person or entity who is applying must verify if the indoor sewage system that is being made with the products delivered in accordance with this BRL comply with the requirements laid down in the Building Decree Living Environment/Building Decree.

In the context of this BRL the pipe connections will be assessed on water and air tightness.



The disposal capacity depends on the design of the indoor sewage system. In the design the diameters of the pipes and accessories to be used to be able to satisfy the disposal capacity will be recorded. This is not within the scope of this BRL.

1.5 Requirements to be imposed on conformity assessing bodies

With regard to the requirements laid down in this evaluation guideline, the applicant may submit, in the scope of external inspections, reports issued by conformity assessing institutions to prove that the requirements of this BRL are being satisfied. It must be demonstrated that the respective analysis/inspection/test and/or evaluation reports have been drawn up by a body that complies with the respective applicable accreditation norm with regard to the subject matter,

NEN-EN-ISO/IEC 17020 inspection institutions;

NEN-EN-ISO/IEC 17021-1 for institutions that certify management systems;

NEN-EN-ISO/IEC 17025 for laboratories;

NEN-EN-ISO/IEC 17065 for institutions certifying products, processes, and service.

An organization will be deemed compliant with these criteria if an accreditation certificate for the respective subject matter can be submitted, issued by the Board of Accreditation (RvA) or another accreditation organization which has been accepted as a member of a multilateral agreement on the subject of mutual recognition and acceptance of accreditation, which have been drawn up within the EA, IAF and ILAC. If no accreditation certificate can be submitted, the certification organization itself will assess if compliance is given to the accreditation criteria.

1.6 KOMO product certificate

KOMO product certificates will be issued based on this BRL. Statements included in these product certificates are based on chapters, 3, 4 and 5 of this BRL.

The product certificate to be issued must correspond to the model product certificate as published for this version of the BRL on the KOMO website (www.komo.nl).

1.7 Marking and specifications

The following shall be applied to the products:

- KOMO logotype/KOMO word mark followed by the certificate number without specifying the version,
- Name of certificate holder,
- Manufacturing brand or manufacturing location
- Production code or production date
 - Product standard (NEN-EN 1123-1)
 - Specification of type

The marking of the KOMO logotype must be as follows:



The marking of the KOMO word mark must be as follows:

KOMO®

After issuance of the KOMO product certificate, this KOMO logotype may be used by the certificate holder in their public communications regarding their certified activities as described in the “Rules and regulations for the use of the KOMO marks” as published on the KOMO website.



2 Terminologie

Please go the glossary on the website of the KOMO Foundation (www.komo.nl) for an explanation of the terminology used in this evaluation guideline for certification.



3 Requirements for products and/or materials to be processed

This chapter includes the requirements for the characteristics of the employed raw materials, materials, and products used for the production of the products to be certified according to this BRL.

3.1 General

The raw materials, products, and/or materials (including semi-finished products) used/applied for production, must meet the following requirements:

3.1.1 Basic material steel pipes

In addition to article 4, paragraph 3 of NEN-EN 1123-1, the basic material for the steel pipes must demonstrably comply with the requirements described in NEN-EN 10305-3.

3.1.2 Rubber rings

Contrary to article 7.2 of NEN-EN 1123-1, the rubber rings must demonstrably comply with the requirements described in BRL 1013, type WC or WG.

If the product under this product certificated based on the above-mentioned evaluation guideline is delivered, the certificate holder may assume that this requirement is being met.

3.2 Processing instructions

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

3.3 Initial investigation and/or periodic inspection

During the initial investigation and periodic inspections (4 times annually) it will be assessed if the products and/or materials to be processed comply with the specifications by means of an incoming goods inspection.



4 Requirements the product must meet

This chapter includes the requirements a product must meet, converted to the product characteristics of galvanized steel pipes and accessories, as well as the determination methods and the limit values to determine that these requirements are being met.

4.1 Product characteristics

Property	Determination method	Limit value	Remark
Dimensions	NEN-EN 1123-1, article 10.9	NEN-EN 1123-2, article 5	
Requirements pipe and accessory:			
Straightness	NEN-EN 1123-1, article 10.1	NEN-EN 1123-1, article 6.1	
Squareness of ends	NEN-EN 1123-1, article 10.2	NEN-EN 1123-1, article 6.2	
Finishing inner surface	NEN-EN 1123-1, article 10.3	NEN-EN 1123-1, article 6.3	
Finishing outer surface	NEN-EN 1123-1, article 10.3	NEN-EN 1123-1, article 6.4	
Roundness	NEN-EN 1123-1, article 10.4	NEN-EN 1123-1, article 6.5	
Welds	NEN-EN 1123-1, article 10.5	NEN-EN 1123-1, article 6.6	
Pipe connection:			
Seal	NEN-EN 1123-2, article 7	NEN-EN 1123-1, article 6.1	
Water tightness	NEN-EN 1123-1, article 10.12.1	NEN-EN 1123-1, article 6.2	
Air tightness	NEN-EN 1123-1, article 10.12.2	NEN-EN 1123-1, article 6.3	
Thermal load	NEN-EN 1123-1, article 10.11	NEN-EN 1123-1, article 6.4	
Joint connection:			
- Force in assembly	-	NEN-EN 1123-1, article 7.6	
- Insertion depth	NEN-EN 1123-1, article 10.9	NEN-EN 1123-1, article 5.2, table 5	
Thermal requirements	NEN-EN 1123-1, article 10.11	NEN-EN 1123-1, article 8	
Corrosion protection:			
- Pipes and accessories in buildings	NEN-EN 1123-1, article 10.7	NEN-EN 1123-1, article 6.1	
- Additional protection	NEN-EN 1123-1, article 10.8	NEN-EN 1123-1, article 6.2	
- Underground pipes and fittings (optional)	NEN-EN 12068	NEN-EN 1123-1, article 6.3	Not applicable to indoor sewage systems
Reaction to fire	-	NEN-EN 1123-1, article 13	In accordance with decision 96/603/EC class A without testing (no contribution to fire)
Durability	-	NEN-EN 1123-1, article 14	When meeting the requirements of NEN-EN 1123-1 the durability requirement is deemed to be met
Hazardous substances	-	NEN-EN 1123-1, article 15	
Longitudinal pipe strength	NEN-EN 1123, article 10.9	NEN-EN 1123-1, article 5.2, table 5	Requirement for wall thickness of the pipe

Initial investigation and periodic assessment

The product characteristics will be assessed during the initial investigation and the periodic assessments (4 times annually).

Product certificate

The product certificate specifies the certified galvanized steel pipes and accessories.

4.2 Application and operating conditions

If and in the extent that the products characteristics are partially determined by or can be affected by the way the product is processed, applied, or used, the certificate holder must prepare application and operating conditions and processing instructions which, if applied correctly, will result in the preservation of the product characteristics during application/use.



5 Certificate holder requirements and internal quality control

5.1 General

The management of the certificate holder is responsible at all times for the quality of the production process, internal quality control, and the quality of the product. The internal quality control must meet the requirements laid down in this chapter.

5.2 Internal quality control

The certificate holder must have an internal quality control scheme used by them (IQC scheme).

This scheme must clearly establish:

- Which aspects are subject to inspections carried out by the organization of the certificate holder or an external organization contracted by them,
- Which methods are employed to carry out these inspections,
- The frequency of these inspections,
- If and if affirmative, the inspection results are recorded.

The IQC-scheme must at least include the following main groups:

- Inspection of measuring equipment,
- Entrance inspection,
- Process inspection,
- Product inspection,
- Internal transportation and storage,
- Delivery,
- Procedures for:
 - Processing of claims,
 - Processing of deviations and follow-up of corrective measures.

This IQC-scheme must be based on the QC-scheme model included in the attachment, and detailed in such a way that the CI generates sufficient confidence that the requirements laid down in this this evaluation guideline are being continuously satisfied.

The internal quality control must enable the certificate holder to demonstrate that the requirements laid down in this evaluation guideline are being continuously satisfied.



6 External conformity assessments

6.1 General

The certification body will carry out an initial investigation for the purpose of granting a KOMO product certificate. After issuance of the KOMO product certificate, the certification body will carry out periodic inspections.

6.2 Initial investigation

The applicant of the product certificate will specify which products they want to be included in the product certificate to be issued. The applicant will provide all relevant information on these products for the formulation of the product specification and the declaration on the product characteristics as they will be included in the product certificate to be issued.

The certification body will perform an initial investigation for the purpose of issuing a product certificate in which

- The certification body will assess if the applicant is able, by means of their internal quality control, to guarantee that the products will continuously have the characteristics, respectively perform as established in chapters 3 and 4 of this BRL. Assessment of the production process and the finished product are part of this.
- The certification body will assess if the operational system of the internal quality control meets the requirements laid down in chapter 5 of this BRL.
- The certification body will assess the processing instructions, application conditions and maintenance instructions

If applicable, it will be verified if the submitted documents with regard to the product and/or the internal quality control and the results specified in those documents, meet the requirements of this evaluation guideline.

The certifying body will ascertain that the statements comply with the requirements laid down in this evaluation guideline with regard to the essential product characteristics, as included in attachment ZA of the harmonized European standard.

A report will be made on the initial investigation, based on which the product certificate may or may not be granted.

At the beginning of the initial investigation for the purpose of issuing a product certificate, the internal quality control must have been demonstrably functioning for at least 3 months.

6.3 Type and frequency of periodic inspections

After issuing the product certificate, the certification body must carry out periodic inspections at the certificate holders' to verify compliance with their obligations. The Board of Experts will decide the type, scope, and frequency of the periodic inspections.

At the time this evaluation guideline is entering into effect, the frequency has been determined on 4 annual periodic inspections.

These must include:

- The certificate holder's IQC scheme,
- The results of the inspections performed by the certificate holder,
- The correct method of marking of the certified products,
- Compliance with the required procedures,

and compliance with the requirements of this evaluation guideline will be verified.

The audit program is included in article 6.4 of this BRL.

The results of each assessment carried out, will be recorded in a traceable manner in a report by the certification body.

The certifying body will ascertain that the statements comply with the requirements laid down in this evaluation guideline with regard to the essential product characteristics and the corresponding elements of the internal quality control, as specified in attachment ZA of the harmonized European standard.



6.4 Test matrix

Below is a summary of the product investigation to be carried out for certification:

Initial investigation: the investigation to determine that all requirements of the evaluation guideline are being met.

Periodic inspections: the investigations carried out after granting the product certificate to determine that the certified products continue complying with the requirements of the evaluation guideline; the frequency of inspections to be performed by the certification body (CBI) is specified as well.

Description of requirement	Article of BRL	Tests within the scope of:		
		Initial investigation	Inspection after granting of certificate ¹⁾	
			Inspection ²⁾	Frequency
Materials to be processed	3	X	X	2 x annually
Dimensions	4.1	X	X	Every visit
Requirements pipes and accessories		X	X	Every visit
Pipe connection:		X	X	1 x annually
Joint connection		X	X	1 x annually
Thermal requirements		X	-	
Corrosion protection		X	X	Every visit
Reaction to fire		X	-	
Durability		X	-	
Hazardous substances		X	-	
Longitudinal pipe strength		X	X	Every visit
Quality system	5	X	X	1 x annually

6.5 Nonconformities

6.5.1 Weighing of nonconformities

When weighing a nonconformity in the context of the supervision after granting the product certificate by the certification body, the following differences exist:

- Nonconformities that can directly affect the quality of the product negatively (critical nonconformities),
- “Other” nonconformities (non-critical nonconformities)

The aspects that will be marked as critical nonconformities are specified in the following table:

Summary critical nonconformities	
Main group	Aspect
Laboratory and measuring equipment	Permitted deviations
Inspection and storage of materials	Correct product type
Product inspection	Finishing inner surface
	Finishing outer surface
	Roundness
	Insertion depth
	Corrosion protection
Storage	Products with deviations
Quality system	Deflecting from established procedures/working instructions

6.5.2 Follow-up of nonconformities

The follow-up of nonconformities by a certification body is as follows:



The certification body must be able to process critical nonconformities within the term established by that certification body, with a maximum term of 1 month;

Non-critical nonconformities shall be processed by the certification body at the next periodic inspection.

6.5.3 Sanctions procedure

The sanctions that may be imposed by the certification body can consist in:

- Realize additional visits,
- Temporarily increasing of the frequency of the periodic inspections,
- Temporary suspension of the certificate,
- Revoking the certificate

6.6 Temporarily no production or delivery

If (temporarily) no products are manufactured and/or delivered, at the request of the certificate holder the validity of their KOMO product certificate can be (temporarily) suspended in case the stop will last more than 6 months. Such a suspension can be granted by the certification body for a total of maximum 3 years.

After the suspension has been granted, a certificate holder may request earlier ending of the suspension.

If the suspension period lasts more than 1 year, prior to restarting the production and delivery under the product certificate, it shall be verified by means of an additional inspection if all the requirements of this evaluation guideline are still being met and if the suspended status can be converted into a valid status.



7 Requirements for the certification body

7.1 General

The certification body must have a procedure that establishes the general rules employed for certification processes.

7.1.1 Certification staff

Certification staff involved can be divided as follows:

- Certification assessor/Reviewer: in charge of preparing the design and documentation assessments, initial investigations, assessment of applications, and the review of the conformity assessments,
- Location assessor: in charge of external conformity assessments at the certificate holders' site,
- Decision maker: in charge of making decisions regarding initial investigations carried out, and about the continuity of certification based on performed inspections.

Basis competencies	
Knowledge of business processes Skills to carry out assessments professionally	<i>Relevant experience:</i> SAS, CAS: 1 year RV: 3 years including 1 year related to certification UM: 5 years including 1 year related to certification <i>Relevant technical knowledge and experience compared to:</i> SAS: High School CAS, RV, UM: Bachelor (HBO)
Skills for site assessments	<ul style="list-style-type: none"> • SAS: KIWA Auditing training or equivalent • SAS: 4 site assessments including 1 self-reliant under supervision • 1 presence as witness of a self-reliant site assessment • Adequate communication skills. writing reports, presentation, and interviewing skills
Skills for performing Initial Investigation	CAS: performed 3 initial audits under supervision
Skills for performing reviews	RV: assessments of 3 reviews
Technical competencies	
Education	General: Education in one of the following technical areas: <ul style="list-style-type: none"> • Civil Engineering; • Mechanical Engineering.
Testing skills	General: <ul style="list-style-type: none"> • 1 week laboratory training (general and scheme specific) including measuring techniques and performing tests under supervision; • Conducting tests (per scheme).



Experience - specific	<p>CAS, RV</p> <ul style="list-style-type: none"> • 3 complete initial investigations (including the initial assessment of the production site) • 1 complete self-reliant application <p>CAS-2</p> <ul style="list-style-type: none"> • 3 initial assessments of the production site under supervision • 1 complete self-reliant initial application <p>SAS</p> <ul style="list-style-type: none"> • 5 inspection visits together with a qualified SAS • 3 inspection visits conducted self-reliant
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7.1.2 Qualification certification staff

The qualifications of the certification staff shall be demonstrated by means of assessing the education and experience to the above-mentioned requirements. In case staff is to be qualified on the basis of deflecting criteria, written records shall be kept.

The authority to qualify staff must be recorded in the quality systems of the certifying body.

7.2 Reporting on initial investigation and periodic inspections

The certification body will record the findings of their initial investigations and periodic inspections in an unequivocal report. A report shall meet the following requirements:

- **Completeness:** the report includes a well-founded account of the degree of conformity established with the requirements laid down in this evaluation guideline;
- **Traceability:** the findings on which the verdicts have been based shall be recorded and traceable.

7.3 Decisions on the KOMO product certificate

The decision on granting a product certificate or imposing measures regarding the product certificate must be based on the findings recorded in the file.

The findings of an initial investigation and a periodic inspection (in case of a critical nonconformity) must be assessed by a reviewer.

Based on the review carried out the decision maker will determine if:

- The product certificate can be granted,
- Sanctions will be imposed,
- The product certificate must be suspended or revoked.

The reviewer and the decision maker must not have been involved in the initial investigation.

The decision shall be recorded in a traceable manner.

7.4 Reporting to the Board of Experts

The certification body shall report at least annually to the Board of Experts about the performed activities and findings regarding the product certificates based on this evaluation guideline. This report shall include the following anonymized subjects:

- Number of executed inspections in relation to the established frequency;
- Number of initial investigations performed
- Results of the assessments,
- Measures imposed in case of detected nonconformities;
- Complaints received from third parties about certified products.

7.5 Interpretation of requirements

The Board of Experts may record the requirements of this evaluation guideline in one or more interpretative documents. This/these interpretative document(s) will be available to the members of the BoE, the certification bodies, and the certificate holders who are actively involved in this evaluation



guideline. This/these interpretative document(s) will be published on the website of the scheme manager.

All certification bodies that use this evaluation guideline are under the obligation to manage the interpretations laid down in them.



8 Document list

8.1 Public law regulations

Construction Products Decree EU 305/2011

8.2 Normatieve documenten

In this evaluation guideline reference is made normatively to the following documents:

NEN-EN 1123-1:1999 +A1:2004	Pipes and fittings of longitudinally welded hot-dip galvanized steel pipes with spigot and socket for wastewater systems - Part 1: Requirements, testing, quality control
NEN-EN 1123-2:2006 +A1:2007	Pipes and fittings of longitudinally welded hot-dip galvanized steel tube with spigot and socket for wastewater systems - Part 2: Dimension
NEN-EN 10305-3 2016	Steel tubes for precision applications - Technical delivery conditions - Part 3: Welded cold sized tubes
NEN-EN 12068: 1998	Cathodic protection - External organic coatings for the corrosion protection of buried or immersed steel pipelines used in conjunction with cathodic protection - Tapes and shrinkable materials
BRL 2013:2016+WB2018	Vulcanized rubber products for cold and hot non-drinking water applications
96/603/EC, including amendments 2000/905/EC and 2004/424/FC	Commission Decision of 4 October 1996 establishing the list of products belonging to Classes A 'No contribution to fire' provided for in Decision 94/611/EC implementing Article 20 of Council Directive 89/106/EEC on construction products (Text with EEA relevance)

Remark:

We verify annually that the standards are up to date. Modifications of the applicable standards are published on the services page of the certification body's website that has drawn up this evaluation guideline.



ANNEX A: MODEL IQC SCHEME

Inspection subjects	Inspection aspects	Inspection method	Inspection frequency	Inspection registration
Raw materials or materials supplied				
Pipes and accessories	External diameter Wall thickness Non-roundness Weld seam Straightness Marking	Calibres Wall thickness gauge Micrometre Visual Visual According to current pipe standard	According to random check plan incoming goods inspection	Form incoming goods inspection/ release sticker
Rubber seals	External Dimensions Hardness Tensile strength/ Elongation Tension relaxation Marking	Visually Visually +projector ISO 3387 ISO 37 ISO 815 BRL2013/11.2		
Zinc ingots (Z1 quality)	Purity (Zn content) Correct type/colour	Supplier's cert.	1x per bath charge	Supplier's certificate
Possible epoxy paint, PE etc.	Adhesion	Supplier's cert. Water vapour test according to EN1123-21	every delivery per coating charge 5 samples	Supplier's certificate Final inspection form coating
Production process, production equipment, materials:				
PIPES				
Cut to length	Squareness cut Length of the pipe	Visual using profile projector Tape measure	According to random check plan production inspection	
Widen pipe ends	Sleeve surface Dimensions	Visually Caliber		
Die cutting	Burr formation	Machine settings + conditions of tools		
Extending branches	Form	Visual measuring		
ELBOWS				
Cut to length	Squareness cut Length of the pipe	Visually with profile projector Tape measure		
Widen pipe ends	Sleeve surface Dimensions	Visually Caliber		
Bending	Bending angle	Angle gauge		
Welding	Welding Weld seam condition Main dimensions Diameter d1	Visually Visually Caliper	X units at the beginning and x units at the end of a series, in between 5%.	
Rounding/calibrating		Caliper		
BRANCHES AND OTHER FITTINGS				



Cut to length	Squareness cut	Visually with profile projector	According to random check production inspection	Measurement report
Widen pipe ends	Length of the pipe Sleeve surface Dimensions	Tape measure Visually Caliber		
Die cutting	Burr formation	Machine settings + condition of tools		
Extension branches	Form	Visual measuring		
Welding	Condition of weld seam	Visually		
	Sleeve dimension	Caliper		
	Diameter d1	Caliper		
Rounding/calibrating		Caliper		
Continuation Production process, production equipment, materials				
SEMI FINISHED PRODUCT INSPECTION			See random check plan	Measurement report
Total production	Dimensions Tightness	EN1123-2 UV-testing	Final testing	
GALVANIZING PLANT/ PRE-TREATMENT				
Degreasing	Concentration solvent	Titration	1x per 14 days	Database/journal
Staining	Acid concentration Fe- and Zn content pH value	Titration Photometer or externally	1x per 14 days 1x per month	Laboratory journal External measuring report
Rinsing	Baumé pH value	PH meter	1x per 14 days	Database/journal
Fluxing		Measuring PH meter	1x per 14 days 1x per 14 days	Database/journal Database/journal
GALVANIZING PLANT/ GALVANIZING PROCESS INSPECTION (NEN-EN-ISO 1461)				
Zinc bath	Al content Bath temperature Length of bath	Visually Measuring probe Timer switch	1x daily Continuously With every immersion	Database/Printer
GALVANIZING PLANT / FINISHED PRODUCT INSPECTION				
Galvanized products	Appearance Thickness of zinc layer (min. 50µm per measurement) Damage resistance	Visually Measuring/Elcometer DIN 50978	Random check Internally: See random check plan Externally: 2x per year on 5 samples 1x per week on 3 samples	Zinc layer measuring report / database External inspection report Lab. journal
LINING : PROCESS INSPECTION				



Application process	Burr inspection Flushing Spray flow rate Spraying time Oven temperature Belt speed	Visually Visually Fixed setting Fixed setting Fixed setting Fixed setting	Every pipe Every pipe Continuously Continuously Continuously Continuously	
LINING : PRODUCT INSPECTION Lining quality	Coverage Adhesion	Visually Crush test	Random check Per coating charge: 5 pipes	
Measuring and testing instruments				
For example: Micrometre Callipers Calibres Thermometers Sliders Layer thickness meters Scales Etc.	Allowed deviation in the relevant measuring area	Internal/External monitoring with calibration equipment	According to procedure monitoring measuring test instruments	Measuring reports quality service / Certificates of external bodies.
Internal Logistics and Storage				
Internal transport approval Internal transport rejection Marking Storage finished products Storage raw materials Packaging	Order identification Identification rejection BRL 2024 Product identification Storage conditions Storage conditions Through supplier Bundle size	Visually/barcode Rejection chart Visually Visually/barcode Visually/climate Visually/climate Visually/barcode	Per batch Per occurring unit Every pipe/fitting All packaging units Depending on the order	Production order Production order Production order Delivery note
Processing of complaints				
Product related products from the market	All aspects or according to possible insurance report	Depending on the aspects to be measured	100% according to procedure or instructions	Form + database