EL227. Pipes for Water Works

[EL227-2003/3/2010-13]

1. Scope

The criteria shall apply to the metal water supply pipe mainly used inside a building for the purpose of supplying water/bath or to the water supply pipe with a coating/lining of synthetic resin on metal (hereinafter referred to as "synthetic resin coating pipe").

Note) In case of supplying both water supply pipe and fittings at the reason of construction, fitting shall be included as an object.

2. Definition

2.1

“Synthetic resin coating/lining” refers to coating or lining outside or inside metal water supply original pipes with synthetic resin to improve the performance of the water supply pipe.

2.2

“Original pipe” refers the pipe before gilding, coating, lining and coating inside and outside of the pipe.

3. Certification Criteria

3.1 Environmental Criteria

3.1.1

With respect to the life span of product affecting the consumption of resources during its use stage, the product shall satisfy the following requirements.

3.1.1.1

In order to improve the life span of the product, stainless steel (STS 304, STS 316), brass and brass alloy or synthetic resin (excluding chlorine-originated synthetic resin) shall be used on the surface that pipe water touches in consideration of problems such as corrosion or scaling.

3.1.1.2

Brass and brass alloy, metal pipe and synthetic resin coated pipe in the joints shall not have any problem such as flaw, crack, falling off the coat in the flatness test.

3.1.1.3

With respect to the pipe coated with synthetic resin, the attachment stability of synthetic resin coat in synthetic resin coated pipes shall satisfy at least one of the following requirements.

Items	Intensity of pulling [N/cm]	Gluing power[N/㎠]	
		Inside	Outside
Requirements	≥ 30	≥ 20	≥ 200

Note) Ultimate strength shall be applied to the evaluation of attachment stability of polyethylene coat, and gluing power shall be the evaluation of attachment stability of epoxy resin coat.

3.1.1.4

Corrugated stainless steel pipes and synthetic resin coated pipes shall not be leaked out in the bending test, and there shall not be any problem such as bursting, cracking or falling off the coat.

3.1.2

With respect to the emission of harmful elements during the use stage, the product shall satisfy the following requirements.

3.1.2.1

The leaching solution by product type shall conform to the standards for sanitation and safety in accordance with the「Water Supply Law」.

3.1.2.2

With regard to water pipes or seamed pipes using a copper alloy such as brass, bronze, etc. as a substance, any substance certified under 'Copper Alloy for Casting (EL742)' of the certification criteria according to the product corresponding to the environmental mark shall be used. Furthermore, when water used as a leaching solution is eluted at 95℃ for 30 minutes, the amount of lead in the leaching solution shall be 1 ㎎/L or below 1 ㎎/L.

3.2 Quality Criteria

3.2.1
If Korean Industrial Standards are available as a national standard of the product in question, it should satisfy the quality or performance criteria of the standard in question. However, items related to “3.1 Environmental Criteria” are excluded.

3.2.2
If no Korean Industrial Standards are available as a national standard of the product in question, it should satisfy the quality and performance criteria according to the following sequence. However, the items related to “3.1 Environmental Criteria” are excluded. Also, if the E-Mark Certification Criteria Setting Committee determines that the applying criteria are not reasonable considering the characteristic of the product, it should satisfy the standards that were modified by the committee (test item, test method, standards, etc.).

3.2.2.1
National standards other than Korean Industrial Standards.

3.2.2.2
Overseas national standards or international standards regarding the product quality in question.

3.2.2.
Standards of the organizations at home and abroad that are referred by the current E-mark target product and certification standard.

3.2.2.4
A private standard that is recognized as higher than the national standard in the industry of the product in question.

3.3 Consumer Information

Mark item that contributes to the reasons of certification (corrosion and scale resistance, water-saving, contributing to supply safe water) for the relevant product at its consumption stage.

4. Test Methods

Certification Criteria			Test and Verification Methods
Environmental Criteria	3.1.1	3.1.1.1	Verification of submitted documents
		3.1.1.2	Test report by an accredited testing laboratory in accordance with the test methods 4.1 and 4.2
		3.1.1.3	‘Test report by an accredited testing laboratory in accordance with the test methods 4.1 and 4.3
		3.1.1.4	‘Test report by an accredited testing laboratory in accordance with the test methods 4.1 and 4.4

	3.1.2	3.1.2.1	The test results of the officially recognized agency according to the “Hygiene Safety Standard and Official Testing Method for Water Supply Materials and Products.”
		3.1.2.2	Verification of submitted documents or food industry book ‘7. a tool and a criterion·standard of container · packing, 3. an experimental method, 6. an experimental method of metal goods, 2) elution experiment’
Quality Criteria			Test report by an accredited testing laboratory in accordance with the relevant standards or certificate of equivalent
Consumer Information			Verification of submitted documents

4.1 General Matters

4.1.1

One test sample shall be required for each applied product. However, if more than one test sample is needed, the former requirement may not be required.

4.1.2

Test samples shall be collected at random by a certification institute from products in market or those in storage at the production site.

4.1.3

Except for a particular set up, the test temperature shall be the normal temperature (20±15℃).

4.1.4

Test result shall be numerically set according to KS Q 5002 (Statistical interpretation method of the data – Part 1: Statistical description of the data).

4.2 Flatness Test

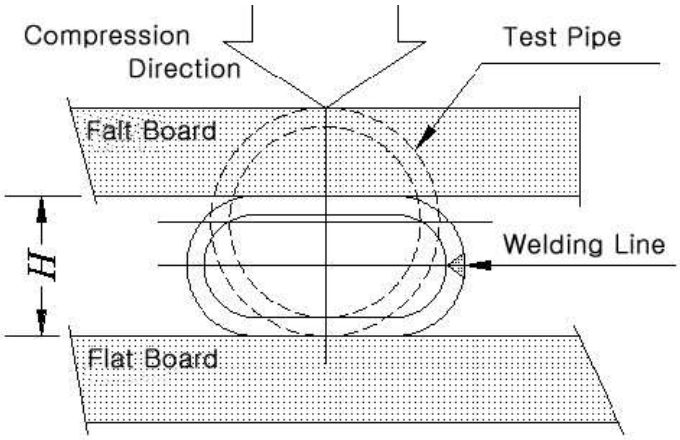
4.2.1

Test pipe that is cut more than 50mm out of water supply pipe shall be put inside between two flat boards. At this time, the welding line of test pipe shall be placed vertically against the direction of compression.

4.2.2

Check out whether there is any flaw, crack, or falling off the coat on the pipe when the distance between flat boards becomes a certain value (H). The set up of distance

between flat boards (H) shall be '3 times of the pipe thickness' in respect to the copper and copper alloy pipes, and '2/3 of the pipe external diameter' in respect to other water supply pipes.

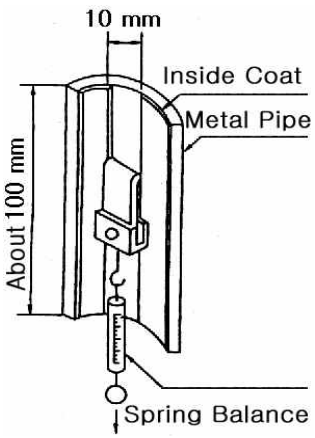


<Picture> Flatness Test

4.3 Test of Ultimate Strength and Adhesive Strength of the Coat

4.3.1

Test of ultimate strength: Cut 100mm out of water supply pipe, and cut it again in half, get two rows of blade scar with a 10mm width and a 60mm length on the coat of test specimen until the blade touches the base metal of the pipe, lift one end of it and pull it in the direction of about 90^{o} ~ 180^{o} with the speed of 50mm/min. Then, read the load. Also, if the film is cut off while pulling it off, the attachment capacity of the coat shall be regarded enough.



<Picture> Pulling Intensity Test

4.3.2 Adhesive Force Test

4.3.2.1

Cut 20mm out of water supply pipe, put the test specimen on the bedplate, add load on the gland and measure the weight when coating is scaled.

4.3.2.2

Adhesive strength shall be calculated from the measured weight as follows.

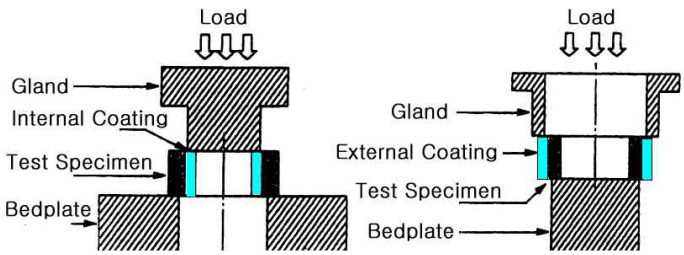
- Internal adhesive strength: $F_1 = W_1/(\pi \times d_1 \times l_1)$
- External adhesive strength: $F_2 = W_2/(\pi \times d_2 \times l_2)$

F : Adhesive strength, [N/㎠]

W : Weight measured when coat is fallen, [N]

d_1, d_2 : Average internal diameter of water supply pipe(d_1) or average external diameter(d_2), [cm]

l : Length of test specimen, 2cm



<Picture> Adhesive Force Test

4.4 Bending Test

4.4.1

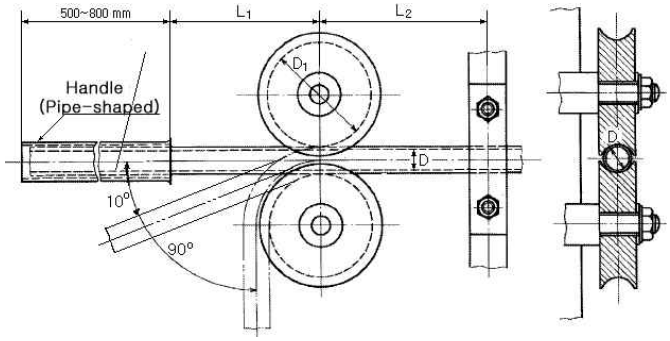
Use the bending test with the following structures.

4.4.1.1

The product shall have the equipment to fix the end of one side of the test pipe, and be able to add pressure to and supply water through this fixed part.

4.4.1.2

The product shall have the handle in the shape of roller and pipe equivalent to three times as big as the inside diameter of the test pipe.



<Picture> Example of the Bending Tester

Test Pipe Inside Diameter, D [mm]	13	20	25
Roller Diameter, D1 [mm]	39	60	75
L1 [mm]	≤120	≤190	≤260
L2 [mm]	130	250	250

4.4.2

With respect to the test pipe, water pipe cut in an adequate length in accordance with the type of pipe shall be used. Close the end of one side and fix the other end at the fixing part of the bending tester, and then fill up water inside of the test pipe and remove the air.

4.4.3

Bending Test shall be conducted as follows.

4.4.3.1

Synthetic resin coated pipe: Raise the water pressure inside the pipe to 0.75MPa and bend the wrinkled part slowly (for 10~15 seconds) to 10^{o} degrees with a bending tester.

4.4.3.2

Corrugated stainless steel pipe: Raise the water pressure inside the pipe to 0.1MPa, bend the wrinkled part slowly (for 10~15 seconds) to 90^{o} degrees with a bending tester. Return it to the original position with the same speed, and bend it to 90^{o} degrees towards the opposite direction again and return it to the original position again.

5. Reasons for Certification

“Corrosion and scale resistance, Water-Saving, Contributing to supply safe water”

Common Criteria, Notice No. 2012-36, the Ministry of Environment

1. Eco-label products must follow the following provisions with regard to the proper treatment of environmental pollution substances, such as air and water wastes and noxious chemical substances emitted in the process of manufacturing or service operation.

A. When first applying for certification, the product manufacturer should observe the environment related laws and agreements pertaining to the region where the production factory or the place of service operation is located for a period of one year prior to the date of application. Any case of violation of the penalty clause will be verified by confirming documents involved during a period of one year to the date of application. Regarding any violation not related to the penalty clause, confirmation will be made on the completion of appropriate measures.

B. A person who has received a certification of eco-labeling shall observe the environment related laws and agreements pertaining to the region where the production factory or the place of service operation is located during the period of certification. However, regarding any violation besides a penalty, confirmation will be made on the completion of appropriate measures.

2. As a general rule, information for consumers shall be indicated on the surface of the product in such a way not to be easily erased. However, in case that indication on the surface of the product is impossible or undesirable, it can be indicated on the appropriate part such as product packaging, product guidebook and user's manual that consumers can recognize. However, the service information should be indicated inside and outside of the place of service operation. In case that indication inside and outside of the place of service operation is impossible or undesirable, it can be indicated on the appropriate part such as an agreement, letter of delivery, letter of guarantee, and PR materials that consumers can recognize.

3. In order to establish fair trade and to protect consumer, the applicant for eco-label and the holder of eco-label license shall observe the Act on the Fairness of Indication and Advertisement with respect to the environmental aspects of the product.

4. For Various standards referred in the certification criteria by target product, the latest revised edition applies at the date of application, if not specified otherwise.

5. In applying the quality related criteria for each target product, if no standard is available that can be applied as the quality criteria, the president of Korea Environmental Industry & Technology Institute (KEITI) (hereafter referred to as "president of KEITI") may establish and operate the quality criteria for the product involved after review by a competent committee.