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**Method of test for resistance of
exterior materials of buildings to
freezing and thawing**

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry, through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Testing Center for Construction Materials (JTCCM)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS A 1435:1991** is replaced with this Standard.

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Method of test for resistance of exterior materials of buildings to freezing and thawing

Introduction

This Japanese Industrial Standard was established in 1991 for the purpose of applying to the exterior wall materials and has not revised since then. The revision at this time is made to respond to the application later expanded to roof materials, test methods which have been partially reviewed, accompanied by the withdrawal (planned) of normative references and the like. Further, the comparison table between previous and current editions of this Standard on technically significant revisions is given in Annex A. The corresponding International Standard has not yet been published at this moment.

1 Scope

This Standard specifies the testing method for the resistance to freezing and thawing action of the inorganic materials manufactured in plate form in a factory among the materials used for the exterior of buildings (hereafter referred to as “exterior materials”).

2 Classification of tests

The tests shall be classified according to the freezing conditions, thawing conditions and water supply method to test pieces, as given in table 1.

Table 1 Classification of tests

Class of test	Freezing conditions	Thawing conditions	Water supply method	Example of the environmental conditions to be assumed
Under water freezing and under water thawing	Under water	Under water	Whole surface	Where it is used in a place in contact with the water for a comparatively long time, such as around groundsill, dripping part, etc.
Air freezing and air thawing	In air	In air	Whole surface	Where it is used in a place exposed to the rain.
Air freezing and under water thawing	In air	Under water	Whole surface	
Single-face water-absorption freezing and thawing	In air	In air	Single face	Where it is used in a place highly influenced by condensation of exterior materials, etc.

3 Test methods

3.1 Under water freezing and under water thawing

3.1.1 Test apparatus The freezing and thawing test apparatus shall be composed of a cooling and heating device, test tank, temperature measuring device, and controller necessary to give the test piece the prescribed freezing and thawing cycles.

3.1.1.1 Cooling and heating device A device capable of adjusting the temperature of the central part of the test piece for temperature control, within the prescribed time, to $-20\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ at the time of freezing and $10\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ at the time of thawing, and with the capability to control the refrigerant temperature in the test tank within the range $+20\text{ }^{\circ}\text{C}$ to $-25\text{ }^{\circ}\text{C}$.

3.1.1.2 Test tank A test tank with a circulating device capable of distributing the temperature uniformly in the tank.

3.1.1.3 Temperature measuring device A temperature measuring device capable of measuring and continuous recording the temperature of the central part of the test piece for temperature control with an accuracy of $\pm 1\text{ }^{\circ}\text{C}$.

3.1.1.4 Test apparatus for freezing and thawing cycle The test apparatus for freezing and thawing cycle capable of automatically controlling the switch of freezing and thawing, and the temperature.

3.1.1.5 Test piece container As a rule, a test piece container made of rubber with protrusions at the internal part (or that with a function equivalent to it). An example of the container is shown in figure 1.

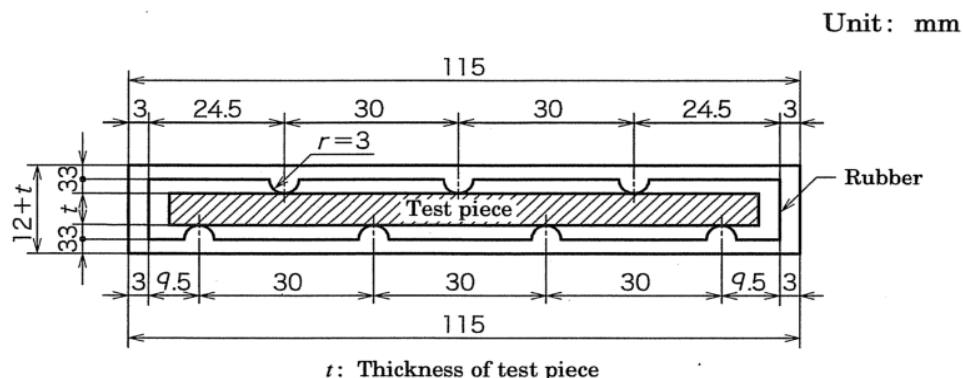


Figure 1 Cross section of the test piece container (example)

3.1.2 Test pieces

Test pieces shall be as follows.

- The dimensions of the test pieces (length $\times$ width) shall be 200 mm $\times$ 100 mm or 400 mm $\times$ 100 mm, and the thickness shall be that of the product. When test pieces have smaller dimensions than these, the dimensions of the product shall be applied.
- The surface, back face, and header face shall not be treated.
- Five test pieces shall be used.

3.1.3 Test method

The test method shall be as follows.

- Prior to the freezing and thawing test, immerse the test pieces in water for 48 h.