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Methods of salt spray testing

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of International Trade and Industry through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law. Consequently **JIS Z 2371**:1994 is replaced with **JIS Z 2371**:2000.
This revision has been prepared based on **ISO 9227**:1990 *Corrosion tests in artificial atmospheres — Salt spray tests* for the purposes of comparison and conformity with the International Standard.

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Methods of salt spray testing

Introduction This Japanese Industrial Standard has been prepared based on the first edition of **ISO 9227** *Corrosion tests in artificial atmospheres — Salt spray tests* published in 1990. However, some items and contents not specified in the corresponding International Standard have been added, and some parts have been rejected because the experimental results of the reference specimens specified have not conformed to the requirements. The main differences are shown as follows:

The rejected part: The evaluation method for reproducibility of testing apparatus

The portions underlined with dots or sidelined in this Standard are the items not specified in the corresponding International Standard.

1 Scope This Japanese Industrial Standard specifies the required apparatus, reagent, technique or acceptance criteria when the corrosion resistance test of metallic materials or of those electroplated or treated with inorganic or organic films by the methods of neutral salt spray test (NSS), acetic acid salt spray test (AASS) or CASS test (CASS).

Remarks: The International Standard corresponding to this Standard is listed as follows.

ISO 9227: 1990 *Corrosion tests in artificial atmospheres — Salt spray tests*

2 Normative references The following standards contain provision which, through reference in this Standard, constitute provisions of this Standard, the most recent editions of the standards (including amendments) indicated below shall be applied.

JIS G 3141	*Cold-reduced carbon steel sheets and strip*

Remarks: The provisions cited from **ISO 3574**: 1986 *Cold-reduced carbon steel sheet of commercial and drawing qualities* are equivalent to the corresponding provisions of the said standard.

JIS K 0557	*Water used for industrial water and wastewater analysis*
JIS K 8145	*Copper (II) chloride dihydrate*
JIS K 8150	*Sodium chloride*
JIS K 8180	*Hydrochloric acid*
JIS K 8355	*Acetic acid*
JIS K 8576	*Sodium hydroxide*
JIS K 8847	*Hexamethylenetetramine*
JIS Z 8802	*Methods for determination of pH of aqueous solutions*

3 Apparatus The apparatus necessary to salt spray testing shall be composed of an atomizing chamber equipped with an atomizer, a testing salt solution reservoir, a specimen support, atomized solution sampling containers, a temperature controller,

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etc.; a salt water supply tank, a compressed air feeder, an air saturator, an exhauster, etc., and shall conform to the following requirements:

a) The atomizer shall have the performance to spray atomized solution uniformly on a specimen from the upper part (refer to Annex 2).

b) The atomizing chamber shall be not less than 0.2 m^3 in volume. Its shape and dimensions may be optional.

c) The ceiling or cover of the atomizing chamber shall be so constructed that no drops of solution adhering to its inner surface fall on a specimen.

d) Corrosive materials shall not be used for the apparatus.

e) The apparatus shall be so constructed that the temperature and atomization in the atomizing chamber are not influenced by the open air and the solution fallen from the specimen is not reused for the testing.

f) The specimen support shall be capable of keeping the specimen at a specific angle (1).

Note (1) The materials of specimen supports shall be glass, rubber, plastics, or suitably coated wood, and the specimen should preferably be supported from the underside of the bottom or the side face. The specimen may be hung by a glass hook or a vinyl string, provided it is kept in a specific position. If necessary, the specimen is supported from the bottom.

g) The atomized solution sampling container shall be a clean container of 100 mm in diameter in sampling surface and 80 cm^2 in horizontal sampling area, and the containers shall be placed at not less than two positions so as to ensure the uniformity of atomization, for example, near the specimens, and one close to the atomizer and one remote from.

h) The exhauster shall not be influenced by the wind pressure of the open air.

i) The maintenance and control of the apparatus shall always be correctly carried out to meet the specified requirements.

4 Specimen The dimensions and shape of the specimen should preferably be a flat sheet of 70 mm × 150 mm × 1.0 mm or 60 mm × 80 mm × 1.0 mm. However, other dimensions or member may be used subject to the agreement between the parties concerned with delivery.

Informative reference: For the specimen of different metal possible to be mutually influenced, the test should not carried out at the same time.

5 Preparation of specimen The specimen shall be free from stains or flaws. The preparation of the specimen shall be as follows:

a) The section of the specimen shall be protected by a stable covering material under test conditions, as required (2).

Note (2) The covering material includes a tape, paint, paraffin, etc.

b) Metallic and metallic coated specimens shall be suitably cleaned beforehand. Cleaning shall be carried out by an appropriate method according to the nature of surface and the contaminants. Abrasives other than pasty precipitated calcium carbonate, aluminium oxide and magnesium oxide, or detergents causing a corrosive or protective coating shall not be applied.

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The specimen, after cleaning, shall be protected from contamination.

c) The specimen coated with paint and non-metallic coatings shall not be, prior to test, subjected to cleaning or other treatments. However, the adhering matter incovenient to test may be removed. Further, when it is required to measure the development of corrosion from an abraded area, the coating shall be scratched in order to expose the underlying metal prior to the test. The method for scratching shall be subject to an agreement between the parties concerned with delivery.

The following method is an example:

Example: After coating about 5 mm of the periphery of a specimen for protection, scratch the specimen with shaped like × at 1/2 to 1/3 of the bottom on the long side. The flaw shall have a depth reaching the underlying metal surface, and the size of the incision should preferably be constant. The type of the cutting tool should preferably be a cutter knife, a razor blade, etc.

6 Angle and position of specimens during testing The angle and position of the specimens in the atomizing chamber during testing shall conform to the following conditions (refer to Annex 3):

a) The angle of the specimens shall be 20° ± 5° to the vertical line. In the case of a member, it shall be placed with its significant surface at 20° ± 5° to the vertical line.

Other angles may be employed subject to the agreement between the parties concerned with delivery.

The surfaces of the specimens shall be exposed to the motion of free atomization, and shall be placed in the atomizing chamber not to intersect the stream of spray from the atomizing nozzle at right angles.

b) The specimens shall contact with nothing other than the support.

c) Each specimen shall be so positioned and spaced as not to interfere with the free falling of the spray.

d) The salt solution dripping from one specimen shall not fall on other specimens.

7 Salt solution for testing

7.1 Preparation method of salt solution for testing The preparation method of salt solution shall be as follows:

a) **Salt** The salt shall be the sodium chloride of special grade specified in **JIS K 8150** or equal to or higher grade(3).

Note (3) The equal to or higher grade means that copper content shall be less than 0.01 g/kg and nickel content shall be less than 0.01 g/kg when sodium chloride is measured by the means of atomic absorption spectrometry or other analytical method with the same accuracy. Furthermore, the content of sodium iodide shall not exceed 1.0 g/kg or the total amount of impurities as converted to dry salt shall not exceed 5.0 g/kg.

b) **Water** The water shall be the deionized water or distilled water not more than 20 μS/cm in electric conductivity at 25 °C ± 2 °C.

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