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Performance tests of mechanical draft cooling tower

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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 Japan Cooling Tower Institute (JCI)/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 B 8609**:1981 is replaced with this Standard.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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Contents

Performance tests of mechanical draft cooling tower

1 Scope This Japanese Industrial Standard specifies the performance tests at the atmospheric pressure for mechanical draft cooling tower of 233 kW or less in design standard cooling capacity which is the equipment for cooling the cooling water warmed by packaged conditioner, refrigerating apparatus or the like by means of direct contacting operation with the atmosphere, and for using the cooling water by circulation.

However, for the noise test, this Standard may apply to the tower of 4 535 kW or less in design standard cooling capacity used for a compression refrigerating machine, and apply to the tower of 4 892 kW or less in design standard cooling capacity used for a double effect absorption refrigerating machine.

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

JIS B 8346 *Fans, blowers and compressors—Determination of A-weighted sound pressure level*

JIS C 1509-1 *Electroacoustitcs—Sound level meters—Part 1: Specifications*

JIS Z 8731 *Acoustics—Description and measurement of environmental noise*

3 Terms and definitions For the purpose of this Standard, in addition to the definitions stated in **JIS C1509-1**, **JIS B 8346** and **JIS Z 8731**, the following terms and definitions apply:

a) **standard design temperature** the standard temperature when testing the tower used for a compression refrigerating machine, that is inlet water temperature 37 °C, outlet water temperature 32 °C and inlet air wet bulb temperature 27 °C

When the tower is used for a double effect absorption refrigerating machine, the standard design temperature shall be inlet water temperature 37.5 °C, outlet water temperature 32 °C and inlet air wet bulb temperature 27 °C.

b) **standard design water quantity** the standard water quantity when testing the tower used for a compression refrigerating machine, that is 13 L/min per cooling quantity-of-heat 4.535 kW at the standard design temperature

When the tower is used for a double effect absorption refrigerating machine, the standard design water quantity shall be 17 L/min per cooling quantity-of-heat 3.523 kW at the standard design temperature.

c) **design standard cooling capacity** the cooling capacity obtained at the standard design temperature and at standard design water quantity

d) **standard cooling capacity** the cooling capacity obtained by Test method 1 or Test Method 2 of the cooling capacity test

e) **performance curve** the curve expressing the thermal characteristics of the specimen machine or the cooling tower designed same as the specimen machine

f) **water temperature range** the difference between the inlet- and the outlet-water temperatures

g) **water mass velocity** the value of water quantity divided by the front area at right angles to the water flow

h) **air mass velocity** the value of air quantity divided by the front area at right angles to the water flow

i) **number of transfer units** $\frac{U}{N}$ the value $\frac{U}{N}$ of counterflow type cooling tower obtained by using the state lines I and II obtained by Annex 1 figure 5 and by using Annex 1 figure 7 and an approximate calculation method of formula (5)

In the case of the crossflow type cooling tower, the value is obtained by the method of formula (6).

j) **specimen machine** the cooling tower to be used for performance test

k) **counterflow type cooling tower** the cooling tower of the type in which water flows in opposition to air

l) **crossflow type cooling tower** the cooling tower of the type in which water flows in cross at right angles to air

m) **stationary conditions** the conditions when the measured values of the specimen machine have reached the equilibrium in time

n) **water-drop loss** the sum of the quantity of discharged water drops accompanied by discharge air and the quantity of water spattering from louver to outside

4 Classification of test methods The test methods specified in this Standard shall be classified as follows:

a) Cooling capacity test

b) Noise test

c) Water-drop loss test

d) Consuming power and operating current test

e) Insulation resistance test

f) Withstand voltage test

g) Starting current test

5 Tests

5.1 General The tests shall be carried out by use of the instrument specified in **a)** and under the conditions specified in **b)**, unless otherwise specified.