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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

JB/T 4330-1999

Replacing JB 4330-1986

**Determination of noise emitted by refrigeration and air
conditioning equipment**

制冷和空调设备噪声的测定

(English Translation)

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1 Scope

This standard specifies the determination methods for sound power level of noise on the reflection plane under the free-field conditions. Annex C (Normative Annex) presents the measuring methods for sound pressure level of noise. And Annex D (Normative Annex) presents the measuring methods for sound pressure level of noise emitted by air conditioners.

This standard is applicable to the refrigerating and air conditioning Equipment/parts (hereinafter referred to as "units") assembled by facilities.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

GB/T 3785-1983 Electric, sonic properties and measuring methods for sound level meters

JJG 176-1984 Verification regulation of sound calibrators

JJG 188-1984 Verification regulation of sound level meter

3.1 Reflection Plane

Reflection plane shall be the flat surface which is composed of concretes, asphalt, terrazzo or other similar solid materials; its dimension shall be larger than the projection of the measuring surface wheresoever.

3.2 Appropriate Measuring Environment

As for the unit, its noise test shall be carried out on half space of the reflection plane. The be verified periodically according to those specified in JJG 188.

6.1 Unit Installation

The stationary units shall be installed according to the relevant technical requirements, and the mobile units shall be directly installed on the reflection ground. All of the parts shall be completely installed. However, vibration isolation, sound isolation and sound absorption parts shall not be installed additionally.

6.2 Unit Operation

The units shall be able to function continuously in steady conditions. The following requirements are made for different units:

- a) As for the refrigeration compressor, the condensing units shall be operated under nominal refrigerated conditions according to those specified in the relevant standards.
- b) As for the room fan-coil air conditioners and air-cooled condensers, they may be measured only when the fan is running.
- c) As for other units, their operation shall be in accordance with their test methods.

7.1 Datum Body

A datum body is the smallest rectangular hexahedron which can precisely envelop the measured unit and end at the reflection plane. In terms of determining the datum body, the small parts (such as the connecting pipes and handles) protruding on the unit may not be considered.

7.2 Measuring Surface

The measuring surfaces include hemisphere measuring surface and rectangular hexahedron measuring surface [see Figure B1 and Figure B2 shown in Annex B (Normative)].

7.2.1 Hemisphere Measuring Surface

a) As for the full-closed and semi-closed refrigeration compressors as well as other smaller-dimension units, the hemisphere measuring surface shall be adopted.

8 Measurement of Sound Pressure Level

8.3.2 10 measuring points are totally arranged on the hemisphere measuring surface (see Figure B1 and Table B1).

8.3.3

The measuring points on the rectangular hexahedron measuring surface include 9 basic measuring points and 8 additional measuring points (see Figure B2 and Table B2).

8.3.4

Measuring points shall be added under the following conditions:

- a) Any side of the datum body is larger than $2d$ (d is the measuring distance);
- b) The measured difference between the maximum sound pressure level value and the minimum sound pressure level value on the basic measuring points is larger than the number of the measuring points;
- c) If the measured unit is very large or smaller measuring distance is adopted, then the additional measuring points shall be kept on increasing to make the spacing of the measuring points on the measuring surface not exceeding $2d$ and distribute uniformly.

8.3.5 Decrease of Number of the Measuring Points

As for some kinds of units, if it is proved that the difference between their sound power level measured by decreasing several measuring points and that measured on the basic measuring points is within $\pm 1\text{dB}$, then the measuring points may be appropriately decreased.

8.4 Measurement

The microphone shall be over against the direction of the measured unit. As for the sound level meter, the "slow" time-weighted characteristic measurement shall be adopted. If the beat of the sound level meter pointer is not larger than $\pm 3\text{dB}$, then the mean value between the maximum and minimum sound pressure level shall be adopted. As for the A-weighting and octave whose center frequency is larger than 160Hz, the observation time shall be at least 10s; while for the octave whose center frequency is less than 160Hz, the observation time shall be at least 30s.

If the beat of the sound level meter pointer is larger than $\pm 3\text{dB}$, then:

- a) Analog Equipment which have longer time constant or digital integration-type sound level meters shall be adopted for the measurement;
- b) As for the non-steady noise with periodic changes, the "slow" time-weighted characteristic measurement of the sound level meter shall be adopted. Record the sound pressure level and duration in a complete alternation, and then calculate the energy mean value in this complete alternation. S -- the measuring surface area, m^2 ; S_0 -- the reference area is 1m^2 .

10 Measuring Records

The measuring records shall include the following contents. The recommended record list form is given in Annex E (Informative Annex).

10.1 Measured Units

- a) The unit type, name, manufacturer and factory number as well as other relative parameters;
- b) The measuring operating condition parameters of the unit.

10.2 Acoustic Environment

The reflection plane condition, test cabinet volume, total surface area and acoustic treatment condition shall be recorded. In addition, the sound source diagram also shall be drawn. As for the outdoor measurement, the wind speed and the distance of the measuring points from the nearest reflector and many other conditions shall be recorded.

10.3 Measuring Equipment

- a) The equipment type, name, manufacturer and factory number;
- b) The inspection dates and departments of the equipment.