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

GB 14098-1993

Replacing GB/T 14098-1993

**Gas turbine and gas turbine unit Airborne noise measurement
Engineering method/simplified method
(English Translation)**

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GB/T 14098-1993 "Gas Turbine Noise". In view of the fact that this standard is equivalent to ISO 10494:2018, and Compared with GB/T 14098-1993, the main technologies are quite different, and they are not listed one by one.

The translation method used in this standard is equivalent to ISO 10494:2018 "Engineering Method/Measurement Method for Gas Turbine and Gas Turbine Unit Airborne Noise Measurement." the Chinese documents that have a consistent correspondence with the international documents cited in this standard are as follows.

---GB/T 3241-2010 Electroacoustic Octave and Fractional Octave Filter (IEC 61260:1995, MOD)

---GB/T 3785.1-2010 Electroacoustic Sound Level Meter Part 1: Specification (IEC

61672-1:2002, IDT)

---GB/T 4129-2003 Acoustics. Performance and calibration requirements for standard sound sources used for sound power level determination (ISO 6926:1999, IDT)

---GB/T 15173-2010 Electroacoustic Sound Calibrator (IEC 60942:2003, IDT) this standard was proposed by China Machinery Industry Federation.

This standard is under the jurisdiction of the National Gas Turbine Standardization Technical Committee (SAC/TC259).

Drafting organizations of this standard. Dongfang Electric Group Dongfang Turbine Co., Ltd., Nanjing Gas Turbine Research Institute, Guodian Science and Technology Research Institute Co., Ltd., Zhuzhou AVIC South Gas Turbine Complete Manufacturing and Installation Co., Ltd., Hangzhou Steam Turbine Co., Ltd., Shanghai Electric Gas Turbine Co., Ltd., Xi'an Thermal Power Research Institute Co., Ltd.

0.1 Background

Noise control of machinery and equipment requires effective exchange of sound information between related parties. Related parties include machine and equipment manufacturers, rule-making, installers and users. Sound information can be obtained through measurement.

These measurements are only useful when using standard instruments to measure the specified acoustic quantities under specified conditions.

The sound power level determined according to this standard is basically independent of the environment in which the data is obtained. This is the use of sound power level to characterize various machinery and equipment. One of the reasons for the sound.

Sound power level data is mainly used for.

- a) Calculation of the approximate sound pressure level at a given distance from the running machine in a specific environment;
- b) Comparison of noise emitted by machines of the same type and capacity;
- c) Comparison of noise emitted by machines of different types and capacities;
- d) Determine whether the machine complies with the noise emission limit;
- e) Measurement plan for sound transmission loss or noise control amount in a specific environment;
- f) Assist in the technical work of developing low-noise machines and equipment.

This standard gives requirements for measuring noise emissions of gas turbine units and steam turbine units. This standard is in GB/T 3767-Based on 2016, it is formulated in

accordance with ISO 3740:2000. Due to the particularity of gas turbine units and steam turbine units, it is necessary to define different the noise source is different from the measurement surface specified in GB/T 3767-2016.

For certain environmental conditions, it may be necessary to use the simple method specified in GB/T 3768-2017 to obtain low-precision noise. Frequency information should also be recorded and reported.

0.2 Goal

The method specified in this standard is suitable for measuring the noise emissions of gas turbine units and steam turbine units under steady-state operating conditions. Measuring junction the results are expressed in terms of A-weighted and octave sound pressure level and sound power level.

The goal of this standard is to obtain the results of level 2 (engineering method) (see Table 1). When the background noise correction exceeds 1.3dB and is lower than 3dB and (or) when the environmental correction exceeds 4dB and is lower than 7dB, a level 3 (simple method) result will be obtained (see Table 2).

According to the measurement carried out in this standard, the standard deviation should not be greater than the deviation in Table 3. The uncertainty in Table 3 is not only composed of sound pressure level and the accuracy of the measurement surface area is determined by the increase due to the decrease of the measurement distance and the decrease of the frequency (such as. frequency below 250Hz) the "near field error" is determined. Near-field errors often cause the measured sound power level to be greater than the actual sound power level.

Note 1: If the method specified in this standard is used to compare the sound power level of omnidirectional radiation broadband noise of similar machines, and the shape of the environment and measurement surface are the same Under the conditions, the uncertainty of the comparison may be less than the standard deviation given in Table 3.

Note 2: The standard deviation given in Table 3 reflects the cumulative effect of various causes of measurement uncertainty, and does not include installation or operation work such as changing the sound source.

The change in sound power level caused by conditions. The reproducibility and repeatability of the measurement results may be better than those described in Table 3 (ie, the standard deviation is smaller).

Airborne noise measurement engineering method/simple method

1 Scope

This standard specifies the measurement method for noise emission of gas turbine units and steam turbine units under stable operating conditions. It specifies the measurement method of the sound pressure level of the measuring surface of the envelope sound source and the calculation method of the sound power level produced by the sound source. This standard specifies the measurement environment and the requirements of the instrument and the technology to obtain the surface sound pressure level measurement, in which the A-weighted sound power level of the sound source and the octave or 1/3 octave sound power level is calculated based on the surface sound pressure level. These methods can be used for performance testing, even if the purpose of the test is simply to determine the sound pressure level around the machine.

This standard applies to gas turbine units and steam turbine units used in the following environments.

- Power plants and industrial applications (e.g. stationary);
- Onboard or offshore applications, highway and railway vehicle applications.

This standard does not apply to gas turbines in aviation applications.

This standard only applies to gas turbine units and steam turbine units (gas turbines, steam turbines and their driving equipment and auxiliary equipment) located on the platform the upper part of the measurement surface is continuously enveloped by the platform.

This standard applies to stable operating conditions, and does not include transient operations such as start-up and shutdown with high short-term noise emissions.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GB/T 3767-2016 Acoustic sound pressure method to determine the sound power level of noise sources and the engineering method for the approximate free field above the sound energy level of the reflecting surface (ISO 3744:2010, IDT) GB/T 3768-2017 Acoustic sound pressure method is used to determine the sound power level and sound energy level of noise sources using the envelope measurement surface above the reflecting surface the simple method (ISO 3746:2010, IDT) ISO 6926 Acoustic Sound Power Level Measurement Standard Sound Source Performance and Calibration Requirements IEC 60942 Electroacoustic Sound Checker IEC 61260-1 Electroacoustic Octave and Fractional Octave Filter Part 1: Specification IEC 61672-1 Electroacoustic Sound Level Meter Part 1: