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**Minimum Allowable Values of Energy Efficiency and
Energy Efficiency Grades for Fan**

通风机能效限定值及能效等级

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Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades for Fan

1 Scope

This Standard specifies the energy efficiency grade, minimum allowable values of energy efficiency, test methods and technical requirements of the fan.

This Standard is applicable to general-purpose centrifugal fans, general-purpose axial flow fans, centrifugal induced draft fans for industrial boilers, centrifugal fans for boiler of power station, axial flow fans for power station, centrifugal fans for HVAC, and forward multi-blade centrifugal Fan.

This Standard is not applicable to duct fans for air conditioning, box fans, unhooded centrifugal fan, and fans with other uses and special structure.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 1236 Industrial Fan - Performance Testing Using Standardized Airways

GB/T 3235 Basic Types Sizes Parameters and Characteristics of Fans

GB/T 10178 Industrial Fans-Performance Testing in Situ

JB/T 2977 Technical Terms for Industry Fans, Turbo-Blowers and Compressors

JB/T 4357 Centrifugal ID-Fan for Industry Boiler

JB/T 4358 Centrifugal Fan for Boiler of Power Station

JB/T 4362 Power Station Axial Fans

JB/T 7221 Centrifugal Fan for Heating Ventilation and Air Conditioner

JB/T 9068 Forward Curved Centrifugal Fan

JB/T 10562 Technical Specification for General Purposes Axial Fans

JB/T 10563 Technical Specification for General Purposes Centrifugal Fans

3 Terms and Definitions

For the purpose of this document, the terms and definitions given in GB/T 1236, GB/T 3235, JB/T 2977 and the following apply.

3.1 Minimum allowable values of energy efficiency for fan

Under the test conditions specified in the standard, the minimum guaranteed value of the fan's efficiency is allowed.

3.2 Plant

Device composed of driving machine and fan.

4 Energy Efficiency Grade

The energy efficiency grade of the fan is divided into three grades, of which the energy efficiency of Grade-1 is the highest, and the energy efficiency of Grade-3 is the lowest. The regulations are as follows:

a) Centrifugal fan

- 1) The maximum fan efficiency η_r in the stable working area shall be no lower than the provisions specified in Tables 1 and 2;
- 2) The maximum fan efficiency of ordinary motor direct drive type (Type-A transmission) centrifugal fan in the stable working area shall be no lower than the provisions specified in Tables 1 and 2;
- 3) For the efficiency η_r of the double suction centrifugal fan in the stable working area, the Grades 1 and 2 shall decrease by 1 percentage point according to the provisions specified in Tables 1 and 2; while the Grade 3 shall decrease by 3 percentage points;
- 4) For the efficiency η_r of centrifugal fans for HVAC in the stable working area, Grades 1 and 2 shall decrease by 1 percentage point according to the provisions specified in Tables 1 and 2; while the Grade 3 shall decrease by 3 percentage points;
- 5) When the inlet has an air inlet box, the efficiency η_r at each grade in the stable

- 2) The ordinary motor direct drive (Type-A transmission) centrifugal fan in the stable working area shall have a maximum fan efficiency no lower than the provisions of Grade-3 in Tables 1 and 2.
- 3) The efficiency η_r of the double-suction centrifugal fan in the stable working area shall decrease by 3 percentage points in accordance with the provisions of Grade-3 in Tables 1 and 2.
- 4) The efficiency η_r of the centrifugal fan for HVAC in the stable working area shall decrease by 3 percentage points according to the provisions of Tables 1 and 2.
- 5) When the inlet has an air inlet box, the efficiency η_r at each grade in the stable working area shall decrease by 4 percentage points in accordance with the provisions of Grade-3 in Tables 1 and 2.
- 6) For forward multi-blade centrifugal fans with external rotor motors (except single-phase and three-phase multi-speed type, three-phase six-pole and above) direct drive type, the maximum plant efficiency shall be no lower than the provisions of Grade-3 in Table 4.

b) Minimum allowable values of energy efficiency for axial flow fan

- 1) The maximum fan efficiency in the stable working area shall be no lower than the provisions of Grade-3 in Table 3;
- 2) The maximum fan efficiency of the axial flow fan using the direct drive type (Type-A transmission) of ordinary motor in the stable working area shall be no lower than the provisions of Grade-3 in Table 3;
- 3) When the inlet has air inlet box, it shall decrease by 3 percentage points according to the provisions of Grade-3 in Table 3;
- 4) When the outlet has a diffusion tube, the efficiency value shall be no lower than the provisions of $0.55 \leq \gamma < 0.75$, machine No. $\geq$ No10 of Grade-3 in Table 3; and when the fan outlet has no diffusion tube, the efficiency value shall increase by 2 percentage point compared with Grade-3 in Table 3;
- 5) For an axial flow fan with adjustable moving blades (complete the synchronous adjustment of the moving blade angle during operation), under the condition that the inlet has no air inlet box, the outlet has no diffusion tube, the efficiency value shall be no less than 82%;
- 6) The reversible axial flow fan, the efficiency value shall decrease by 8 percentage points according to the provisions of Grade-3 in Table 3.

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