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Minimum allowable values of the energy efficiency and energy efficiency grades for hermetic motor-compressor in room air conditioners

空气调节器用全封闭型电动机-压缩机能效限定值及能效等级

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Foreword

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

This standard was proposed by the Department of Resource Conservation and Environmental Protection of the National Development and Reform Commission and by the Department of Energy Conservation and Comprehensive Utilization of the Ministry of Industry and Information Technology.

This standard is under the jurisdiction of the Standardization Administration of China.

Organizations responsible for drafting this standard: China National Institute of Standardization, Shanghai Hitachi Electrical Appliances Co., Ltd., Guangdong Meizhi Refrigeration Equipment Co., Ltd., Zhuhai Landa Compressor Co., Ltd., Beijing University of Technology, Xi'an Daikin Qingan Compressor Co., Ltd., Emerson Climate Technologies (Suzhou) Co., Ltd., Panasonic Compressor (Dalian) Co., Ltd., Vkan Certification and Testing Co., Ltd., Mitsubishi Electric (Guangzhou) Compressor Co., Ltd., Guangzhou Hitachi Compressor Co., Ltd., and China Household Electric Appliance Research Institute.

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1 Scope

China's mandatory efficiency floor for the compressor inside a room air conditioner. The compressor is where nearly all the electricity in a split or window unit is actually spent, so the efficiency of the finished appliance is largely decided before it ever reaches the assembly line. This standard puts the compressor itself under an energy label: it grades

hermetic rotary and scroll compressors into three efficiency classes by their measured coefficient of performance, and it makes the value of the lowest class the minimum a compressor must reach to be sold at all. Because a compressor's efficiency depends on the refrigerant it is charged with and on its cylinder displacement, the grade table is broken down by both, and it treats fixed-speed and variable-speed machines separately, since a speed-controllable compressor is measured at more than one operating point. The standard also fixes the test conditions and the sampling rule used to check a batch, so that a declared grade means the same thing whoever measured it. It is used by compressor manufacturers, by the air conditioner makers who buy from them and by the laboratories that verify the efficiency labels.

This standard specifies the minimum allowable values of energy efficiency, the energy efficiency grades, the test method and the inspection rules for hermetic motor-compressors used in air conditioners (hereinafter referred to as compressors).

This standard is applicable to hermetic rotary compressors and scroll compressors for room air conditioners whose input power under nominal working conditions is not greater than 5 000 W. Compressors used only as repair parts for room air conditioners are not covered by this standard; compressors for other similar uses may be dealt with by reference to it.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 5773 Performance test methods for positive displacement refrigerant compressors.

GB/T 15765-2014 Hermetic motor-compressor for room air conditioners.

3 Terms and definitions

The terms and definitions defined in GB/T 15765-2014 and GB/T 5773, together with the following, apply to this document.

3.1 Minimum allowable values of energy efficiency for compressors

The minimum allowable value of the coefficient of performance (COP) of a compressor under the specified working conditions.

4 Energy efficiency grades

4.1 Compressors are graded by the magnitude of their measured coefficient of performance (COP) into three energy efficiency grades, 1, 2 and 3, grade 1 being the most efficient. The COP corresponding to each grade shall be not less than the value specified in Table 1.

Table 1 sets the required coefficient of performance in W/W separately for R22 and for R410A and other refrigerant types, by cylinder working volume, and separately for fixed-speed and fixed-capacity compressors and for speed-controllable and variable-capacity compressors.

4.2 The measured coefficient of performance (COP) of a compressor shall not fall below the stated proportion of its declared value and shall be greater than or equal to the value of the energy efficiency grade marked on it. The declared value of the cylinder working volume shall lie within the range of cylinder working volume corresponding to its rated energy efficiency grade.

5 Technical requirements

The minimum allowable value of energy efficiency for compressors is the energy efficiency value of grade 3 in Table 1.

6 Test methods

6.1 Testing is carried out by the test methods specified for refrigerating capacity and coefficient of performance (COP) in GB/T 15765-2014 and GB/T 5773, and the results are kept to two decimal places. The test conditions are those of Table 2, which fixes the condensing temperature, the evaporating temperature, the degree of subcooling, the suction temperature and the ambient temperature; the suction temperature shall agree with the nominal test temperature of the product.

6.2 For a speed-controllable compressor the coefficient of performance shall be measured at rated speed and at half rated speed and the mean of the two taken as the measured coefficient of performance. For a variable-capacity compressor it shall be measured at full rated refrigerating capacity and at one other part-load ratio, which shall be the part-load ratio stated by the manufacturer in the product specification, and the mean of the two taken as the measured coefficient of performance.

7 Inspection rules

One sample is drawn from products of the same model and the same batch and its coefficient of performance (COP) is tested. If it does not meet the specified requirements, two further samples are drawn; the measured values of both shall meet the requirements, failing which the batch is judged non-conforming.