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COAL INDUSTRY STANDARD

OF THE PEOPLE'S REPUBLIC OF CHINA

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MT/T 249-1997

Flameproof mining type double speed three-phase induction motors

矿用隔爆型双速三相异步电动机

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Table of contents

Foreword

This standard is revised with reference to the main parameters and the technical performances of the same type products in United Kingdom, Germany and other advanced industrial countries AND combining the production technology level of China. It deletes the reasonable portion of MT 249-91 standard; delete some clauses which are not specific or definite in requirements AND the impractical requirements; AND correct some errors in the preparation and publication process.

This standard has the following major changes:

- ADJUST the series of spectrum and the rated power of some specifications;
- ADD two specifications (4/12 and 6/12 poles) of pole changing motor;
- ADD and IMPROVE the installation size and shape & position tolerance of motor;
- ADD and ADJUST the main performance indicators of motors;
- ADD the voltage rating of 3300 V;
- INCREASE the allowable working pressure of water-cooled motor.

This standard shall, from the date of validation, replace MT 249-91.

This standard was proposed by the Ministry of Science, Technology and Education of the Ministry of Coal Industry.

This standard shall be under the jurisdiction of the Coal Mine Equipment Standardization Technical Committee of the Ministry of Coal Industry.

This standard was responsibly drafted by Fushun Coal Mine Electrical Machinery Factory; AND the participating drafting organizations include Coal Science Research Institute Shanghai Branch, Northwest Coal Mine Electrical Machinery Factory, and Fenyi Coal Mine Electrical Factory.

The main drafters of this standard: Jiang Jinxiang, Xu Fenglin, Shi Chaolong, Liu Limei, Wu Dongying.

As for this standard, the Electrical Equipment Branch of Coal Mine Equipment Standardization Technical Committee of the Ministry of Coal Industry is responsible for its interpretation.

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Flameproof mining type double speed three-phase induction motors

矿用隔爆型双速三相异步电动机

MT/T 249-1997

Replacing MT 249-91

1 Scope

This standard specifies the classification and nomenclature, technical requirements, test methods, inspection rules, marking, packaging, transportation and storage of flameproof mining type double speed three-phase induction motors.

This standard applies to the flameproof mining type double speed three-phase induction motors as supported for the conveyors of the coal mine work face, AND it is also applicable to the flameproof mining type double speed three-phase induction motors as used on such mechanical equipment as plow (hereinafter shortly referred to as motor).

2 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 Standard.

GB 191-90 Packaging - Pictorial markings for handling of goods

GB/T 755-87 Rotary motors - Basic technical requirements

GB/T 997-81 Symbols for types of construction and mounting arrangements of rotating electrical machinery

GB/T 1032-85 Test procedures for three-phase induction motors

GB 1971-80 Terminal markings and direction of rotation of rotating electrical machines

GB/T 1993-93 Cooling methods for rotating electrical machines

GB/T 2423.4-93 Basic environmental testing procedures for electric and electronic products - Test Db: Damp heat, cyclic

GB 3836.1 Explosive atmospheres - Part 1: Equipment - General requirements

GB 3836.2-83 Electrical apparatus for explosive atmosphere - Flameproof electrical apparatus d

GB 3836.3-83 Electrical apparatus for explosive gas atmospheres - Part 3: Increased safety

GB/T 4772 Motor dimensions and tolerances

GB/T 4826-84 Motor power rating

GB/T 4942.1-85 Classification of degrees of protection provided by enclosures for rotating machines

GB/T 10068-88 Rotating electrical machines - Determination methods of vibration and limit value

GB/T 10069-88 Measurement of airborne noise emitted by rotating electrical machinery and the noise limits

GB/T 10111-88 Generation of random numbers and procedures applied to sampling inspection for product quality

GB/T 13384-92 General specification for packaging of mechanical and electrical products

JB/Z 293-87 Test specifications for AC high voltage motor stator winding turn-to-turn insulation

JB/Z 294-87 Test method for AC low voltage motor random winding insulation

3 Product categories

3.1 Type, basic parameters and dimensions

3.1.1 The motor shall be of flameproof type for mining purposes. The protection degree of the main body of the motor shall comply with the IP44 requirements

of GB 4942.1, AND the junction box part shall comply with the IP54 requirements.

3.1.2 The cooling method of the motor shall comply with the provisions of IC 411 or IC3W7 (water cooling) in GB 1993.

3.1.3 The structure and installation method of the motor shall comply with the provisions of IMB 3 and IMB 5 of GB 997.

3.1.4 The motor rating is a continuous rating based on (S1).

3.1.5 The rated frequency of the motor is 50 Hz.

3.1.6 The rated voltage of the motor is 380, 660, 1140, 3300 V (3300 V for more than 375/188 kW).

3.1.7 The synchronous motor speed is 1500/750, 1500/500, 1000/500 r/min.

3.1.8 The motor shall be manufactured with the following power:

18.5/10, 30/17, 40/22, 55/28 (55/27, 55/30) 75/37, 90/45, 110/55, 110/37, 132/65, 160/80, 200/100, 200/65, 250/125, 315/160, 375/188 (375/187), 400/200, 450/225, 525/262 kW.

3.1.9 The installation dimension and tolerance, shape and dimension of motor shall comply with the requirements in Tables 1, 2, 3 AND Figure 1, 2 and 3.

3.1.10 The circumference of the middle point of motor shaft extension joint part AND the circle run-out tolerance when the shaft rotates shall not exceed the values as specified in Table 4.

Table 17

功率,kW	>10~22	>22~37	>37~55	>55~100	>100~132	>132~315	>375~525
Sound power level dB (A)	82	84	88	92	97	101	105

4.21 The motor shall be resistant to moisture. After the damp heat test at 40 °C for 12 days, the insulation resistance shall not be less than 3 times of the specified value as specified in 4.12 of this standard, AND it shall be able to withstand the withstand voltage test as specified in 4.13 without breakdown, BUT the effective value of voltage shall be $(2U_N + 1000) \times 85\%$ V.

4.22 Electrical connections of the motor shall be capable of withstanding the torsion test specified in GB 3836.1, respectively, without rotation and damage.

4.23 The cable entry device of the motor shall be subjected to the clamping action test, the mechanical strength test and the sealing performance test, AND the parts shall not be damaged after the test.

4.24 The material of the motor seal shall be subjected to aging test. AND it shall comply with the provisions of GB 3836.1 after test.

4.25 The motor fan shall comply with the relevant provisions of GB 3836.1. AND it shall obtain the certificate as issued by the national authorized explosion-proof inspection institute.

4.26 The enclosure of the motor shall be capable of withstanding the strength tests without damage.

4.27 The motor shall be capable of withstanding the explosion proof performance test.

4.28 The electrical gap and creepage distance of the motor shall comply with the relevant provisions of GB 3836.3.

4.29 The motor terminal box shall be placed on top of the motor. In the junction box and the foundation bed shall be provided with grounding screws.

4.30 When there is no specification during order, the wiring of the motor shall be assembled in accordance with Y connection method; when the alphabetical order as marked at the outlet end is same as the phase sequence of the three-phase power, as viewed from the shaft end, the motor shall rotate clockwise.

4.31 During the operation of motor, the bearing shall be smooth and light without stagnation, AND the sound shall be uniform and harmonious without harmful noise.

withstand voltage test shall be conducted in accordance with the provisions of GB/T 1032.

5.12 Motor installation dimensions and tolerances shall be inspected in accordance with the provisions of GB/T 4772.

5.13 Motor stator winding turn-to-turn withstand voltage test shall be conducted in accordance with the provisions of JB/Z 293 and JB/Z 294.

5.14 No-load reversible number tests: after motor idling for 0.5 hours, in accordance with the no-load reversible number as specified in 4.5, CONDUCT frequent startup test. During startup, the end voltage of the motor shall be not less than 75% of the rated voltage. Each power-on time is not less than 0.5 s AND the test time is 1 h, AND one positive startup plus reverse startup is considered as one startup.

6 Inspection rules

6.1 Motor shall, before exit-factory, obtain the flameproof certificate as issued by the state authorized inspection institute.

6.2 Each motor shall pass inspection by the quality inspection department of the manufacturer AND obtain the product certificate before exit-factory.

6.3 The exit-factory inspection items include:

6.3.1 Electrical tests:

a) Wiring method inspection;

b) Determination of the insulation resistance between the stator windings and the enclosure as well as between the windings (during exit-factory inspection, it may determine the cold state insulation resistance, BUT it shall ensure that the hot state insulation resistance is not less than the values as specified in 4.12 of this standard);

c) Determination of the DC resistance of the stator windings in the actual cold state;

d) Withstand voltage test for the stator windings and the enclosure, between the windings, and between the turns;

e) Short-term elevated voltage test;

f) Determination of no-load current and no-load loss;

d) Short-time over-torque test;

e) Determination of the maximum torque;

f) Determination of minimum torque during startup;

g) Over-speed test;

h) No-load reversible number tests.

6.7 Sampling and determination rules: the sampling method shall follow the provisions of GB/T 10111. As for the type test, the test sets shall be one set per each test; if there is unqualified item, it shall double the sample number to conduct test. If there is still unqualified item, this batch of products are considered as disqualified AND they are not allowed to exit-factory.

6.8 Under one of the following cases, it shall follow the provisions of GB 3836 to review the drawings and technical documents AND conduct the sample flameproof inspection and test:

a) If the products do not have “flameproof certificate”;

b) If the products have obtained the “flameproof certificate”, when it requires review after the certificate loses its validation;

c) If the products have obtained the “flameproof certificate”, when the local modification relates the flameproof performance, the drawings, documents and descriptions of the modified part shall be submitted to the original inspection institute for review, AND the original inspection institute deems it necessary to conduct the flameproof test;

d) When the inspection institute requires review the products which have obtained the “flameproof certificate”.

6.9 The motor enclosure protection degree test, air gap unevenness inspection, and no-load reversible number tests shall be conducted when the product structure is finalized OR when the structure and process is subjected to significant improvement.

6.10 The damp heat test of the motor can be conducted when the product structure is finalized, when the structure and process is subjected to significant improvement, OR then the product flameproof certificate loses its valid.

7.4 Motor junction box cover shall have “Ex” relief characters, AND coated with red paint.

7.5 The six terminals in the motor outlet cavity shall have the appropriate wiring signs, and it shall ensure that the writing within the motor life is not easy to wear; AND its marking is 1 U for the first phase of the high speed terminal, 1 V for the second phase, 1 W for the third phase, 2 U for the first phase of the low speed terminal, 2 V for the second phase, and 2 W for the third phase.

7.6 The motor shaft extension flat key is tied onto the shaft; AND the shaft extension, flat key, stop, and flange fitting surface shall have antirust or protection measures.

7.7 Motor packaging is through the wooden box, AND it shall ensure that under normal storage and transportation conditions, since the date of shipment within 1 year, the motor is free from moisture or damage due to poor packaging.

7.8 The characters and signs on the outer wall of the motor packaging box shall be clearly and neatly, as follows:

a) The name of the dispatch station and the manufacturer;

b) The name of the receiving station and the receiving unit;

c) The motor model and product number;

d) The net weight of the motor and the gross weight of the connected box;

e) The size of the packaging box;

f) In appropriate locations shall be marked with the words “Handle with care”, “Avoid wet”, “No rollover”, and other words and signs, which shall comply with the provisions of GB 191.

7.9 The technical documentation supplied together with the product shall include:

a) Product certificate;

b) Use the maintenance instructions.

7.10 The motor shall be placed in a well-ventilated and dry warehouse to prevent moisture, corrosion and other damage.

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