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

GB/T 12785-2014

Replacing GB/T 12785-2002

Test methods for submersible motor-pumps

潜水电泵 试验方法

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1 Scope

GB/T 12785-2014 is the Chinese national standard on test methods for submersible motor-pumps, in the field of agriculture. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 24 July 2014 by the General Administration of Quality Supervision,

Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 January 2015. Classification: ICS 65.060.35, CCS B91. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This standard specifies the performance test and acceptance (or assessment) methods of submersible motor-pumps. This standard applies to all types of submersible motor-pumps (hereinafter referred to as "motor-pumps"), including the test of all types of submersible motors and submersible pumps.

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) is applicable to this standard.

GB 755-2008 Rotating electrical machines - Rating and performance

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

GB 1971 Rotating electrical machines - Terminal markings and direction of rotation

GB/T 3214 Methods for measurement of capacity of pump

GB/T 3216 Rotodynamic pumps - Hydraulic performance acceptance tests - Grades 1, 2 and 3

GB/T 9651 Test procedures for single-phase induction motor

GB/T 10068 Mechanical vibration of certain machines with shaft heights 56 mm and higher - Measurement, evaluation and limits of vibration severity

GB/T 10069.1 Measurement of airborne noise emitted by rotating electrical machines and the noise limits - Part 1: Method for the measurement of airborne noise emitted by rotating electrical machines

GB 10069.3 Measurement of airborne noise emitted by rotating electrical machines and the noise limits - Part 3: Noise limits

GB/T 22714 Test specifications of interturn insulation of form-wound winding for AC low-voltage electrical machines

GB/T 22715 Impulse voltage withstand levels of form-wound stator coils for rotating a. c. machines

GB/T 22719.1 Interturn insulation of random-wound winding for AC low- voltage electrical

machines - Part 1: Test methods

GB/T 22719.2 Interturn insulation of random-wound winding for AC low-voltage electrical machines - Part 2: Test limits

3.1 Guarantee

3.1.1 Guaranteed points The guaranteed point of the pump shall be determined by the guaranteed flow QG and the guaranteed head HG. The guaranteed point of the motor is determined by the motor's nominal frequency fN, nominal voltage UN, nominal power PN. The guaranteed value is the parameter value, that the motor-pump shall guarantee, at the guaranteed point, which can be the standard specified value, the design value or the agreed value during the acceptance test.

Note: The guaranteed points can be referred to as guaranteed, specified, designed (or nominal), according to different occasions where the provisions are used.

3.1.2 Guaranteed conditions Unless otherwise specified, the acceptance test shall comply with the following guaranteed conditions:

- a) It shall use the test liquid, which is specified in 3.3.1, on a test bench, which meets the methods, test devices, test conditions, which are specified in this standard.
- b) The performance of the pump, which shall be guaranteed, refers to the performance between the pump inlet and outlet flanges. The pipeline and accessories, on the outlet side of the pump, are not within the scope of the guarantee.
- c) The performance of the motor, which shall be guaranteed, refers to the performance of the motor, which contains lead cable within 5 m. The change in motor performance, which is caused by more than 5 m, is not within the scope of the guarantee. The test bench shall be provided by the manufacturer, OR it may be provided. The acceptance test is carried out, with the participation of the buyer's representative. The test items shall be negotiated by both parties to the contract. The acceptance result shall be signed by the buyer's witness.

3.2.3 Supervised spot check test It is the random inspection test of quality, which is conducted by product quality supervision and inspection agencies, as authorized by the competent government departments at all levels of the country. The test content and items shall be in accordance with the relevant product standards AND the relevant documents of the product quality supervision and inspection agency. The test shall comply with the requirements of this standard, be carried out on a certified third-party's test bench OR a test bench of a manufacturer, which is approved by the quality inspection agency.

3.3 Test conditions

3.3.1 Test liquid The test medium shall be clean cold water OR a liquid, which has the same chemical and physical properties as clean cold water. The characteristics of "clean cold

water" shall meet the requirements of GB/T 3216.

3.3.2 Test power supply The test power supply shall meet the requirements of GB/T 1032.

3.3.3 Length of lead cable of test motor-pump Unless otherwise specified, the cable length of the test motor-pump shall not exceed 5 m.

3.3.4 Submerged depth of test motor-pump The test shall be carried out with the motor-pump submerged in water. For submersible motor-pumps, which are used in high-head wells, the pump head can be partially submerged; the submerged depth shall ensure that cavitation does not occur, during the test of the motor-pump.

3.3.5 Stability during the test

3.3.5.1 Operational stability 3.3.5.1.1 Concepts related to operational stability The following concepts are involved, in determining whether the operation is stable:

a) Signal average - Usually the measured signal has randomness. The signal average is one of the statistical characteristics of random signals, which is represented by the arithmetic average of n repeated measurements, in an observation period T . The observation period T shall be long enough. When determining T , it shall consider the longest response time of each instrument, in the measurement system AND whether it fully reflects the change characteristics of the measured value.

b) Fluctuations - The periodic or random changes of the signal, which is output by the measurement system, AND the physical quantities, which are derived from it around the average value over time, are called fluctuations. If the measurement signal fluctuates greatly, due to the structure or operation of the pump, it may use a buffer or damper, that can reduce the fluctuation to the value range, which is given in Table 1, in the measuring instrument or its connecting pipeline. However, it shall be noted that the measures taken cannot affect the "distortion" of the average value of the readings; it shall provide a fluctuation integral, within at least one complete fluctuation cycle. The reduction of the fluctuation range by the buffer shall be bidirectional symmetrical and linear.

c) Variation - The change in the average value of the output signal of the measurement system and its derived physical quantity.

d) Reading - The visible observation value, which can be recorded by the output signal of the measuring system. 1) "Quasi-instantaneous" reading: The value, which is read in the shortest possible time (but not shorter than the response time of the measurement system). 2) "Average reading" of the signal: The average value of the signal, which is directly given by a measuring instrument with integral function.

e) Reading group - The group of n "quasi-instantaneous" readings, which is read during the observation period T . It can be used for statistical analysis and calculation of data (such as the calculation of average, variance, standard deviation). Compared with the change of the