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

GB/T 3216-2016

Replacing GB/T 3216-2005

**Rotodynamic pumps -- Hydraulic performance acceptance tests
-- Grades 1, 2 and 3 [including 2018XG1]**

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3.1 Terms and definitions

Foreword

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

This standard replaces GB/T 3216-2005 "Rotary power pump hydraulic performance acceptance test 1 and 2".

This standard compared with GB/T 3216-2005, in addition to editorial changes in the main technical changes are as follows.

- modified the standard name (see cover, 2005 edition of the cover);
 - modified the introduction (see introduction, 2005 edition of the introduction);
 - modified the acceptance level (see Chapter 1, Chapter 1 of the 2005 edition);
 - modified normative reference documents (see Chapter 2, Chapter 2 of the 2005 edition);
 - modified terms, definitions, symbols and footsteps (see Chapter 3, Chapter 3 of the 2005 edition);
- The addition of the tolerances given in Table 8 includes a description of manufacturing tolerances and measurement tolerances (see 4.1);
- modified the object of the guarantee (see 4.1.2, 2005 version 4.1);
 - increase the temperature, the volatility of the import and export head (see Table 3);
 - the deletion of the contents of the unstable condition and the variation in the same amount of repeated measurements (see 5.4.2.3.2 and Table 4);
 - Added random uncertainty e_R calculation formula and t distribution values (see 4.3.3.1 and Table 4);
 - the amount of measurement of the system uncertainty has been modified (see Table 7 in

Table 5,.2005);

- increase the total measurement uncertainty level (see Table 6);
 - modified the assessment of the flow, head, efficiency tolerance (see 3.4,.2005 version 6.3 and 6.4);
 - increased assurance of guaranteed power (see 4.4.4);
 - modified performance test acceptance level and tolerance factor (see Table 8, Table 10 of.2005);
 - increase the default test acceptance level (see 4.5 and Table 9);
 - modified the performance test point requirements (see 5.4.1,.2005, 5.4.1);
 - Removed the test personnel (see 5.2.4 in.2005);
 - removed the "clean cold water" features (see 5.4.5.2 in.2005);
 - the removal of the characteristics of liquids that can be replaced by clean cold water for testing (see 5.4.5.3 of.2005);
 - modified the NPSHR tolerance factor (see 5.3.2.5,.2005 edition 11.3.3);
 - modified the diameter of the cutting impeller (see Appendix II of the .12.1,.2005 edition);
 - modified flow measurement (see Appendix D.3,.2005, Chapter 7);
 - an increase in the test of the entire plant unit - the unit operation test (see Appendix E);
 - a special test method has been added (see Appendix G);
 - increased witness test (see Appendix H);
- Increased NPSH test uncertainty (see Appendix J);
- Remove the friction loss, the original standard "Table E.1 pipe equivalent roughness k" content into the "A.4.9 entrance and out
- (See Appendix E of the.2005 edition);
- Reduced test costs and redo of the test (see Appendix H of the.2005 edition);
 - Removal of viscous liquid performance correction calculation chart (see Appendix I of.2005 edition);
 - Removes the NPSHR reduction value for pumps that transport hydrocarbon and high temperature water (see Appendix J of the.2005 edition);
 - the statistical calculations of the measurement results are deleted (see Appendix K of the.2005 edition);
 - The checklist was deleted (see Appendix M of the.2005 edition).

This standard uses the translation method equivalent to ISO 9906..2012 "rotary power pump hydraulic performance acceptance test 1, 2 and

3".

Compared with ISO 9906..2012, the editorial changes are as follows.

- According to our idiom, increase the speed unit "r/min" (see Table 1);
- modified Figure 5, Figure 6, the power and efficiency tolerance line, ISO original error;
- delete the figure in Figure A.1, ISO original error.

This standard is proposed by the China Machinery Industry Federation.

This standard is owned by the National Standardization Technical Committee of Pumps (SAC/TC211).

The drafting unit of this standard. Shenyang Pump Research Institute, Hefei Huasheng Pump Co., Ltd., Guangdong Foshan Pump Factory Co., Ltd., South

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Star Pump Co., Ltd., Blue Deep Group Co., Ltd., Hunan Galaxy Electric Co., Ltd., Jiangsu University fluid mechanical engineering technology research

center.

Introduction

The tests in this standard are intended to determine the performance of the pump and to compare with the manufacturer's warranty.

If the test is carried out in accordance with this standard and the measured performance value falls within the tolerance range specified for each specific amount (see 4.4)

Shall be deemed to have been satisfied with any given designation.

Test of hydraulic performance of rotary power pump

Level 1, Level 2 and Level 3

1 Scope

This standard specifies the hydraulic performance acceptance test method for rotary power pumps (centrifugal pumps, mixed flow pumps and axial flow pumps, hereinafter referred to as "pumps").

This standard applies to pump acceptance tests at pump test bases, such as laboratory or pump manufacturer test benches.

This standard applies to pumps of any size that conform to clean cold water properties.

This standard specifies three types of acceptance.

- 1B level, 1E level and 1U level, with more stringent tolerance;
- 2B and 2U level, with a wide range of tolerance;
- 3B level, with a wider tolerance.

This standard applies both to the pump itself without any pipe accessory and to all or part of the upstream and/or downstream pipe fittings

Pump assembly.

Note. From the pump classification, the vortex pump is also included in the rotary power pump.

2 normative reference documents

The following documents are indispensable for the application of this document. For dated references, only the dated edition applies to this article

Pieces. For undated references, the latest edition (including all modifications) applies to this document.

ISO 17769-1 Liquid pumps and their installations - Generic terms, definitions, quantities, characters and units - Part 1. Liquid pumps (Liquid

pumpsandinstalation-Generalterms, definitions, quantities, lettersymbolsandunits-Part 1. Liquid

water

ISO 17769-2 Liquid pumps and their installations - General terms, definitions, quantities, characters and units - Part 2. Pump delivery systems (Liquid

pumpsandinstalation-Generalterms, definitions, quantities, lettersymbolsandunits-Part 2. Pum-

pingsystem