

ICS 75.780.10
CCS E 92



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

GB/T 16750.1-1997

Replacing GB/T 16750-2008

**Electrical submersible pump units
(English Translation)**

Issued on: December 31, 2015

Implemented on: April 1, 2016

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of the People's Republic of China, Standardization
Administration of the People's Republic of China**

Table of Contents

Foreword
1 Scope
2 Normative references
3 Terms and definitions
4 Type and model
4.1 Submersible electric pump unit
4.2 Motor
4.3 Protector
4.4 Inhalation and treatment device
4.5 Pump
4.6 Cable
4.7 Transformer
4.8 Control cabinet
4.9 Junction box
5 Requirements
5.1 Submersible pump unit requirements
5.2 Component Requirements

Foreword

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

This standard replaces GB/T 16750-2008 "Submersible Electric Pump Unit". Compared with GB/T 16750-2008, the main changes are as follows.

--- According to the change of standard content, added "GB/T 528 vulcanized rubber or thermoplastic rubber pull" in "normative reference documents" Determination of tensile stress and strain properties" and "GB 1094.11 Power Transformer Part 11 Dry-type Transformers", deleted "GB/T 14549 Power Quality Utility Grid Harmonics" (see Chapter 2, Chapter 2 of the 2008 edition);

--- Revised the "Application of Well Temperature Grade Code for Submersible Electric Pump Units" and incorporated the "Applicable Well Temperature" section into the "Submersible Electric Pump" Group model representation method" (see 4.1.2, 2008 editions 4.1.2 and 4.1.3);

- Modified the "model representation method" for protectors, transformers, control cabinets and junction boxes (see 4.3.2, 4.7.2, 4.8.2 and 4.9.2, 4.3.2, 4.7.2, 4.8.2 and 4.9.2 of the 2008 edition);
- The pump, protector and suction and treatment devices that are routinely matched with the YQY116 motor have been added to the 101 and 102 series (see Table 1);
- Change the type of transformer from "three oil immersed" to "three phase transformer" (see 4.7.1, 4.7.1 of 2008 edition);
- Modified and improved "cable specifications, basic parameters" (see Table 7, Table 7 of the 2008 version);
- Improved the "standard value of DC resistance of conductors at 20 ° C" (see Table 11, Table 11 of the 2008 edition);
- Change the "cable head sealing performance factory test in normal temperature water," change to "the cable head should have good sealing performance, Under the pressure of 0.35MPa, keep the test for 5min and should not leak. (see 5.2.5.12, 5.2.5.12 of the 2008 edition);
- Modified "Cable insulation, sheath thickness and tolerance" (see Table 20, Table 20 of the 2008 edition);
- Revised the "Technical Specifications for Temperature Rise of Transformer Windings" (see Table 21, Table 21 of the 2008 edition);
- Modified the requirements of transformer "safety protection device" and "oil temperature measuring device" (see 5.2.6.5 and 5.2.6.6, 2008 edition) 5.2.6.5 and 5.2.6.6);
- Change the "fixed frequency control cabinet" to "power frequency control cabinet" (see 5.2.7.1, 6.1.8 and Figure 19, 2008 editions of 5.2.7.1, 6.1.8 and Figure 20);
- Modified the function of the power frequency control cabinet (see 5.2.7.1.3, 5.2.7.1.3 of the 2008 version);
- Modified the technical requirements of the "inverter control cabinet" (see 5.2.7.2.2 and 5.2.7.2.4, 5.2.7.2.2 and 5.2.7.2.4 of the 2008 version);
- Modified "Cable withstand voltage test wiring diagram", "Cable 4h high voltage inspection wiring diagram", "Cable leak inspection wiring diagram", "Outside cable "Withstand voltage test wiring diagram" and "fixed-frequency control cabinet main circuit power frequency withstand voltage test wiring diagram" (see Figure 14, Figure 15, Figure 16, Figure 17 and Figure 19, Figure 15, Figure 16, Figure 17, Figure 18 and Figure 20);
- Revised the "measurement requirements" for "mechanical properties of cable insulation and sheathing materials" (see 6.1.5.6.1, 6.1.5.6.1 of the 2008 edition);

---Modify "cable tensile strength" to "cable tensile strength" (see 6.1.5.6.3, 6.1.5.7.3.1 and 6.1.5.7.4, 2008 edition) 6.1.5.6.3, 6.1.5.7.3.1 and 6.1.5.7.4);

--- Revised the "meaning of the symbol in the cable tensile strength calculation formula" (see 6.1.5.6.3, 6.1.5.6.3 of the 2008 edition);

--- Revised the "method for measuring the sealing performance of cable ends" (see 6.1.6.1.2, 6.1.6.1.2 of the 2008 version);

---Modified the measurement requirements and measurement methods of the power frequency withstand voltage of the main circuit of the power frequency control cabinet (see 6.1.8.3.1.1 and 6.1.8.3.2.1, 6.1.8.3.1.1 and 6.1.8.3.2.1) of the 2008 edition;

---Modified the "Measurement Method for Simulation Operation of Power Frequency Control Cabinet" (see 6.1.8.5.2.2, 6.1.8.5.2.3 and 6.1.8.5.2.5, 2008 Edition) 6.1.8.5.2.2, 6.1.8.5.2.3 and 6.1.8.5.2.5);

--- Combine "6.4 Type Inspection Prerequisite" and "6.5 Type Inspection Item" into "6.4 Type Inspection", change 6.4 and 6.5 respectively for 6.4.1 and 6.4.2, change 6.5.1~6.5.7 to 6.4.2.1~6.4.2.7 and 6.5.8 to 6.4.3 (see 6.4, 6.4, 6.5) of the 2008 edition;

---In the "nameplate" of motors, protectors, suction and treatment devices, pumps, cables, transformers and control cabinets, the contents of the "site" have been added.

(see 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.1.5, 7.1.6 and 7.1.7);

--- Added "junction box nameplate" requirements in the "identification" (see 7.1.8);

--- Revised the "protection requirements for submersible pump units" (see 7.2.2, 7.2.3 and 7.2.4, 2008, 7.2.2, 7.2.3 and 7.2.4);

--- Revised the "Storage Requirements for Motors, Protectors and Control Cabinets" (see 7.4.1 and 7.4.4, 2008, 7.4.1, 7.4.2 and 7.4.5).

This standard is proposed and managed by the National Petroleum Drilling Equipment and Tools Standardization Technical Committee (SAC/TC96).

This standard was drafted. Daqing Oilfield Lishen Pump Co., Ltd., Shengli Oilfield Shengli Pump Co., Ltd., National Electric Submersible Pump Quality Supervision and Inspection Center, Bohai Petroleum Equipment (Tianjin) Zhongcheng Machinery Manufacturing Co., Ltd., China National Offshore Oil (China) Co., Ltd. Tianjin Branch the company.

1 Scope

This standard specifies the type, basic parameters, technical requirements, assembly requirements, test methods and signs, packaging, transportation and Store. Submersible electric pump unit includes submersible motor (referred to as motor), motor protector (referred to as protector), suction and treatment device, submersible pump (simplified

Pump), submersible cable (referred to as cable), submersible electric pump special control cabinet (referred to as control cabinet), submersible electric pump special transformer (referred to as transformer) and Special junction box for submersible electric pump (referred to as junction box).

This standard applies to the design, manufacture, testing and acceptance of submersible electric pump units.

2 Normative references

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

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

GB/T 191 packaging storage and transportation pictorial signs (GB/T 191-2008, ISO 780:1997, MOD) GB/T 528 Determination of tensile stress-strain properties of vulcanized rubber or thermoplastic rubber GB 1094.1 Power transformers Part 1 General GB 1094.2 Power transformer part 2 temperature rise GB 1094.3 Power transformers - Part 3. Insulation level, insulation test and external insulation air gap GB 1094.5 Power transformer part 5 ability to withstand short circuit GB 1094.11 Power transformers Part 11 Dry-type transformers GB/T 2900.1 Basic terminology of electrical terminology GB/T 2900.15 Electrotechnical terminology transformers,, voltage regulators, reactors GB/T 2900.25 Electrotechnical term rotary motor GB/T 3797-2005 electrical control equipment GB 3836.1 Explosive atmosphere - Part 1. General requirements for equipment (GB/T 3836.1-2010, IEC 60079-0:2007, MOD) GB 3836.3 Explosive atmosphere - Part 3. Equipment protected by an increased safety "e" (GB/T 3836.3-2010, IEC 60079-7.

2006, IDT)

GB/T 6451 three-phase oil-immersed power transformer technical parameters and requirements GB/T 8423 oil drilling equipment and special pipe vocabulary GB/T 12668.1 Speed control electric drive systems - Part 1. General requirements Regulations (GB/T 12668.1-2002, IEC 61800-1:1997, IDT) GB/T 12668.2 Speed control electric drive system Part 2 General requirements Low-voltage AC variable frequency electric drive system rating Regulations (GB/T 12668.2-2002, IEC 61800-2:1998, IDT) GB 12668.3 Speed control electric drive system Part 3 Product electromagnetic compatibility standards and their specific test methods (GB 12668.3-2012, IEC 61800-3:2004, IDT) GB/T 12668.4 speed control electric drive system part 4 generally requires AC voltage above 1000V but not exceeding 35kV AC speed control electric drive system rating (GB/T 12668.4-2006, IEC 61800-4:2002, IDT) GB/T 17389 Application of Submersible Electric Pump Cable System GB/T 18050 submersible electric pump cable test method GB/T 18051-2000 Submersible electric pump vibration test method SY/T 5313 Drilling Engineering Terminology SY/T 6598