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**Petroleum and natural gas industries—Beam
pumping units**

石油天然气工业 游梁式抽油机

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Foreword

This Standard is drafted according to the regulations specified in GB/T 1.1-2009.

This Standard modified and adopted the API Spec 11E-2008 *Specifications for Pumping Unit* using the redraft method.

Compared with API Spec 11E-2008 *Specifications for Pumping Unit*, this Standard has many adjustments in terms of the structure. The contrast list between clause numbers in this Standard and API Spec 11E-2008 *Specifications for Pumping Unit* is listed in Annex A.

Compared with the API Spec 11E-2008 *Specifications for Pumping Unit*, this Standard has many differences that the involved clauses have been indicated by single vertical line (|) in blank positions of lateral margin and Annex B gives a list of the corresponding technical differences and their causes.

Compared with the API Spec 11E-2008 *Specifications for Pumping Unit*, this Standard makes the following technical modifications:

— Deleted the "Scope of Application" in Chapter 1, "Normative References" in Chapter 2 and "Terms and Definitions" in Chapter 3 of API Spec 11E-2008 and redrafted the "Scope" in Chapter 1, "Normative References" in Chapter 2 and "Terms and Definitions" in Chapter 3 of this Standard;

— Deleted other contents in addition to 5.2.4 in "Product Requirements" in Chapter 5 of API Spec 11E-2008;

— Deleted the Clause 7.3 "The Chain Reducer" in API Spec 11E-2008;

— Deleted Clause 8.4 "Requirements of Supplier / Manufacturer" in API Spec 11E-2008;

— Deleted Chapter 9 "Storage and Maintenance" in API Spec 11E-2008;

— Added the "Product Classification and Naming" (See Chapter 4);

— Added the "Double Arc Gear Reducer" (See 5.3.3);

— Added the "Railings and Ladders" and "Fastening Bolt" (See 5.4 and 5.5);

— Added the "Manufacturing Technology Requirements for the Beam Pumping Unit Complete Machine and Its Spare Parts" (See Chapter 6);

— Added the "Test Methods and Inspection Rules" (See Chapter 7);

Introduction

The domestic pumping unit industry has been implementing SY/T 5044-2003 *Beam Pumping Unit* for a long term, which guides the manufacturing, inspection, use and maintenance of domestic beam pumping unit and is basis for issuance and assessment of domestic production license. With the domestic economic development and social progress, this Standard encounters some problems in the implementation process, and SY/T 5044-2003 has been unable to meet the needs for producing pumping units of the modern enterprise. There are many standards related to pumping unit such as API Spec 11E and ISO 10431, and ISO 10431 is equivalent to the adopted standard API Spec 11E internationally, which includes requirements and guidelines for beam pumping unit design and rated value. The simple application of the international standard can not meet the manufacturing, inspection and other requirements of pumping unit product, and also has no design and material selection specification on double arc reducer for large scale pumping unit promoted and applied in China.

With the strengthening of international trade, the export of pumping unit product and acquisition of recognition from the international market for the domestic pumping unit products must meet the requirements of API 11E, which exists issues on that the domestic pumping unit manufacturing license certification standard SY/T 5044 and pumping unit API Spec 11E certification cannot be simplified and harmonized well. To solve the above problems, there is an urgent need to develop Standard of *Beam Pumping Unit*, normalize domestic pumping unit market, improve the pumping unit quality and participate in international competition.

This Standard is drafted based on API Spec 11E-2008 *Specification for Pumping Unit*, while reference to the SY/T 5044-2003 *Beam Pumping Unit*.

Petroleum and natural gas industries—Beam pumping units

1 Scope

This Standard specifies the structure types, basic parameters, technical requirements, test methods, inspection rules and marking, packaging, storage, etc. of the beam pumping unit in petroleum and natural gas industry and provides installation size of beam pumping unit, vulnerable part fit size and other related contents.

This Standard applies to the design, manufacture and inspection of the beam pumping unit.

2 Normative References

The articles contained in the following documents have become this standard when they are quoted herein. For the dated documents so quoted, all the modifications (Including all corrections) or revisions made thereafter shall be applicable to this Standard.

GB/T 2828.1 Sampling procedures for inspection by attributea-Part1: Sampling schemes indexed by acceptance quality limit(AQL) for lot-by-lot inspection

GB/T 3480.5 Calculation of load capacity of spur and helical gears - Part 5: Strength and quality of materials

GB/T 8423-2008 Glossary of oil field drilling and production equipment and oil country tubular goods terminology

GB/T 10095 (All parts)Cylindrical gears - System of accuracy

GB/T 13306 Plates

GB/T 13799 Methods of the calculation for load capacity of cylindrical gear with double-circular-arc tooth profile

GB/T 15753 Accuracy of cylindrical gear with circular-arc tooth profile

SY/T 6518 Recommended practice for guarding of pumping units

JB 4708 Welding procedure qualification for steel pressure vessels

AGMA 908-B89 Geometry Factors for Determining the Pitting Resistance and Bending Strength of Spur, Helical and Herring bone Gear Teeth

3 Terms and definitions

For the purpose of this standard, those defined in GB/T 8423 and the following terms and definitions apply.

3.1

Polished rod load

The polished rod tension at the place where the beam hanger hangs the polish rod, the unit is in kN.

[GB/T 8423-2008, Definition 14.6.4]

3.2

Rated polished rod load

The rated value of the polished rod tension at the place where the beam hanger hangs the polish rod, the unit is in kN.

[GB/T 8423-2008, Definition 14.6.5]

3.3

Maximum stroke of polished rod

Adjust the pumping unit stroke adjustment mechanism to make the place where the hangs the polish rod of beam hanger obtains the maximum displacement, the unit is in m.

3.4

Maximum strokes per minute

The maximum stroke rate of the pumping; the unit is in min^{-1} .

3.5

Torque of reducer

The actual torque of the reducer output shaft, the unit is in $\text{kN} \cdot \text{m}$.

3.6

Rating torque of reducer

The maximum torque of the reducer output shaft, the unit is in $\text{kN} \cdot \text{m}$.

3.7

Design rotary speed of reducer's output shaft

The allowable maximum rotary speed of the reducer's output shaft, the unit is in r/mm .

3.8

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