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PEOPLE'S REPUBLIC OF CHINA**

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**Measurement of natural gas flow by turbine meter
(English Translation)**

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Foreword

This standard is non-equivalent to the European standard EN 12261.2002 "Gas flow meter - gas turbine flow meter", makes reference to AGA No.7.2004 "Measurement of fuel gas by turbine meters", ISO 9951.1993 "Measurement of gas flow in closed conduits - Turbine meters", and JJG 198-1994 "Verification regulation of velocity flow meter", AND is, combining with the actual requirements for local use, added with the standard reference conditions for the calculation of natural gas volume and calorific value, the explosion proof requirements for using turbine meter to measure the natural gas flow, the requirements for integrated intelligent flow meter, the calculation for using turbine meter to measure the natural gas flow, the calculation of compression factor, the estimation of uncertainty, real-flow calibration, and the application after calibration, and the other technical provisions.

The main differences between this standard and EN 12261.2002 are as follows.

- ADD Chapter 4 "Measurement principles", Chapter 6 "Flow meter requirements", Chapter 7 "Installation requirements, use and maintenance", and Chapter 8 "Flow calculation methods and measurement uncertainty estimation";
- ADD Appendix B "Additional performance characteristics of the flow meter", Appendix C "Field test of flow meters", and Appendix D "Example of natural gas flow calculation".
- DELETE Chapter 4 "Flow meter classification" and some contents on type tests from Chapter 5 and 6 of EN 12261;
- MODIFY some of the statements that apply to international standards into the statements applicable to Chinese standard.

Appendix A to this standard is a normative appendix. Appendix B, Appendix C and Appendix D are informative.

This standard was proposed by China National Petroleum Corporation.

This standard shall be under the jurisdiction of the Oil & Gas Measurement and Analysis Method Professional Standardization Technical Committee.

The responsible drafting organizations of this standard. National Crude Oil Flow Measurement Station Chengdu Natural Gas Flow Substation.

The participating drafting organizations of this standard. China Petroleum Southwest Oil and Gas Field Branch.

Measurement of natural gas flow by turbine meters

1 Scope

This standard specifies the measurement conditions, requirements, performance, installation, real-flow calibration and field inspection of gas turbine flow meter (hereinafter referred to as flow meter) for natural gas flow measurement.

The natural gas component measured by the flow meter shall be within the range specified in GB 17820-1999, GB/T 17747.1-1999, GB/T 17747.2-1999

and GB/T 17747.3-1999, AND the true relative density of natural gas is 0.55 ~ 0.80.

This standard specifies that the standard reference conditions for the measurement of natural gas flow and the combustion standard reference conditions for the calorific value measurement are absolute pressure $P_n =$

0.101325 MPa and the thermodynamic temperature $T_n = 293.15$ K. It may also

use the contracted pressure and temperature as the reference conditions.

Unless otherwise stated, the pressure referred to in this standard is gauge pressure.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard; however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB 3836.1-2000 Explosive atmospheres - Part 1. Equipment - General requirements (eqv IEC 60079-0:1998)

GB 3836.2-2000 Electrical apparatus for explosive gas atmospheres - Part

2 Flameproof enclosure d (eqv IEC 60079-1:1990)

GB 3836.4-2000 Electrical apparatus for explosive gas atmospheres - Part

4 Intrinsic safety i (eqv IEC 60079-11:1999)

GB/T 4208 Degree of protection of enclosure (IP code)

GB/T 11062-1998 Natural gas - Calculation of calorific values, density, relative density and Wobbe index from composition (neq ISO 6976:1995)

GB/T 13610-2003 Analysis of natural gas by gas chromatography

GB/T 15464 General purpose specification for the packaging of

instrumentation products

GB/T 17747.1-1999 Natural gas - Calculation of compression factor - Part 1.

Introduction and guideline (eqv ISO 12213-1.1997)

GB/T 17747.2-1999 Natural gas - Calculation of compression factor - Part 2.

Calculation using molar (eqv ISO 12213-2.1997)

GB/T 17747.3-1999 Natural gas - Calculation of compression factor - Part 3.

Calculation using physical properties (eqv ISO 12213-3.1997)

GB 17820-1999 Natural gas

GB/T 18603-2001 Technical requirements for measuring systems for natural gas

GB/T 18940-2003 Measurement of gas flow in closed conduits - Turbine meters (ISO 9951.1993, IDT)

JJG 198 Verification regulation of velocity flow meter

SY/T 6143-2004 Measurement of natural gas flow with standard orifice flow meter

3 Terms, definitions and symbols

The following terms and definitions apply to this standard.

3.1

Turbine gas meter

It refers to the metering equipment for which the rotation speed and gas volume flow are in functional relationship when the impeller rotates under the effect of gas flow. The gas volume flow passing through the flow meter is obtained based on the number of impeller rotations.

3.2

Rangeability

5.2.2 Error requirements for integrated intelligent flow meter

As for the integrated intelligent flow meter, within its designated flow range, its error shall not be more than $\pm 1.5\%$.