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

GB/T 18603-2023

Replacing GB/T 18603-2014

Technical requirements of measuring systems for natural gas

天然气计量系统技术要求

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Foreword

This document complies with the provisions of GB/T 1:1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents" Drafting: This document replaces GB/T 18603-2014 "Technical Requirements for Natural Gas Metering Systems": Compared with GB/T 18603-2014, except for the structure In addition to adjustments and editorial changes, the main technical changes are as follows:

- a) Changed the definitions of metering stations, metering systems, fixed assignments, and variable assignments (see 3:3, 3:2, 3:10:1, 3:10:2,:2014 edition 3:1, 3:3, 3:13:1, 3:13:2); added terms and definitions for metering circuits, data acquisition and processing devices, and natural gas real flow calibration (See 3:1, 3:4, 3:9); deleted terms and definitions of flow computer, conversion device, pressure, temperature, dry basis (see:2014 edition 3:6, 3:7, 3:10, 3:11, 3:14):
- b) Added gas quality requirements (see 4:2); changed equipment selection requirements in extreme environments (see 4:6:4,:2014 version 4:6:4); deleted the requirements for quality management system (see 4:8 of the:2014 edition); changed the requirements for vent design (see 4:7,:2014 edition 4:6:6); Added outage requirements (see 4:9):
- c) The requirements for other devices supporting the metering system have been changed (see 5:1:1:3, 5:1:1:3 of the:2014 edition); the metering pipeline has been changed Requirements for installing small-diameter bypass pipes and valves on one side of the upstream stop valve (see 5:1:2:6, 5:1:2:6 of the:2014 edition); added Relevant requirements for standard nozzle flow meters and channel flow meters (see 5:1:5:2, 7:2:9, 7:2:10, 8:4:3:7, 8:4:3:8, 10:2:8, 10:2:9); Change the orifice flowmeter to a standard orifice flowmeter (see 5:1:2:2, 7:2:3, 8:4:3:1,:2014 version of 5:1:2:2, 7:2:7, 8:4:3:6); deleted the

requirement for conversion device (see 5:1:5:3, 10:3 of the:2014 edition); added data acquisition and processing device requirements for placement (see 5:1:5:3, 10:3); changed the requirements for the depth of thermometer sleeve insertion into the pipeline (see 5:2:4:4, :2014 edition 5:2:4:4):

d) Added the overall requirements for using offline or assignment methods to measure calorific value (see 6:1); changed the requirements for installing processing equipment (See 6:2:2, 6:2:2 of the:2014 edition); Added requirements for the cumulative sampling system (see 6:2:2); Changes to the gas chromatograph or the Requirements for calorimeter performance evaluation (see 6:3:1:2, 6:3:1 of the:2014 edition); added the selected assignment method when using Evaluation criteria before or when the assignment source changes [see 6:5:3a)]; Added the assignment method available for Class A metering systems to obtain heat Relevant requirements for quantity or composition data [see 6:5:3d), Chapter 6 of the:2014 edition]:

e) The installation requirements for vortex flowmeters are deleted (see 7:2:5 of the:2014 edition):

f) Delete the relevant requirements for vortex flowmeters in the test and calibration procedures (see 8:4:3:3 of the:2014 edition); delete the The uncertainty caused by differences in installation conditions should not exceed the requirement of 0:3% (see 8:4:4 of the:2014 edition); changed the gas chromatograph Instrument performance related requirements (see 8:4:6:5, :2014 version of 8:4:6:5):

g) Added measurement system performance evaluation requirements (see 9:3): Please note that some content in this document may be subject to patents: The publisher of this document assumes no responsibility for identifying patents: This document is proposed and coordinated by the National Petroleum and Natural Gas Standardization Technical Committee (SAC/TC355): This document was drafted by: China Petroleum Engineering Construction Co., Ltd: Southwest Branch, China National Petroleum Corporation Southwest Oil and Gas Tian Branch, National Petroleum and Natural Gas Pipeline Network Group Co., Ltd: West-East Gas Pipeline Company, National Petroleum and Natural Gas Pipeline Network Group Co., Ltd., National Oil and Gas Pipeline Network Group Co., Ltd: Western Pipeline Company, Emerson Process Control Co., Ltd., and Tianxin Instrument Group Co., Ltd: The main drafters of this document: Huang He, Chen Yu, Duan Jiqin, Ren Jia, Xu Gang, Wu Yan, He Min, Luo Qin, Song Chaofan, Cai Haohui, Zhou Yang, Xu Ming, Jia Xiaolin, Huang Yangting, Qiu Hui, Huang Yixiang, Chen Yubo, Zhou Yu, Tao Chaojian, Wang Hailan: This document was first published in:2001, revised for the first time in:2014, and this is the second revision: Technical requirements for natural gas metering systems

1 Scope

GB/T 18603-2023 is the Chinese national standard on technical requirements of measuring systems for natural gas, in the field of petroleum and related technologies. 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 27 November 2023 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 March 2024. Classification: ICS 75.180.30, CCS E98. 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 document specifies the general requirements, design and construction, calorific value measurement, and Technical requirements for reliability and calibration, commissioning and trial operation, acceptance, operation and maintenance: This document applies to designs with a throughput capacity of not less than 100m³/h (under standard reference conditions) and a working pressure of not less than 0.1MPa (gauge pressure): Natural gas metering station trade metering system:

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text: Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document: GB/T 3836:

1 Explosive atmosphere Part 1: General requirements for equipment GB/T 3836:

2 Explosive atmospheres Part 2: Equipment protected by flameproof enclosure "d" GB/T 3836:

3 Explosive atmospheres Part 3: Equipment protected by increased safety type "e" GB/T 3836:

4 Explosive atmospheres Part 4: Equipment protected by intrinsically safe type "i" GB/T 5274:

1 Preparation of mixed gases for gas analysis calibration Part 1: Preparation of first-level mixed gases by weighing method

GB/T 10248 Static volume method for preparation of mixed gases for gas analysis calibration

GB/T 11062 Calculation method for calorific value, density, relative density and Wobbe index of natural gas

GB/T 13610 Gas chromatography method for composition analysis of natural gas

GB/T 17626:1-2006 General introduction to electromagnetic compatibility testing and measurement technology immunity testing GB/T 17626:

3 Electromagnetic compatibility testing and measurement technology Radio frequency electromagnetic field radiation immunity test GB/T 17626:

6 Electromagnetic compatibility test and measurement technology Conducted disturbance immunity induced by radio frequency fields GB/T 17626:

9 Electromagnetic compatibility test and measurement technology pulse magnetic field immunity test

GB/T 17747 (all parts) Calculation of natural gas compression factor GB 17820 Natural gas