

ICS 75.180.30

CCS E98



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

GB/T 35065.2-2023

**Wet natural gas flow measurement - Part 2: Test and evaluation
method of flow meter**

湿天然气流量测量 第2部分：流量计测试和评价方法

Issued on: December 28, 2023

Implemented on: April 1, 2024

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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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 is Part 2 of GB/T 35065 "Wet Natural Gas Flow Measurement": GB/T 35065 has released the following parts:

---Part 1: General principles;

---Part 2: Flowmeter testing and evaluation methods: 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 Natural Gas Standardization Technical Committee (SAC/TC244): This document was drafted by: Natural Gas Research Institute of Southwest Oil and Gas Field Branch of China National Petroleum Corporation, PetroChina Co., Ltd: Southwest Oil and Gas Field Branch, China Petroleum Engineering Construction Co., Ltd: Southwest Branch, China National Petroleum Corporation Starim Oilfield Branch Experimental Testing Research Institute, CNOOC (China) Co., Ltd: Beijing Research Center, CNOOC (China) Co., Ltd: Hainan Branch, Tianjin University, Shenzhen Lianxingxing Technology Co., Ltd., Metzolon Instrument (Changzhou) Co., Ltd: The main drafters of this document: Zhang Qiang, Liu Dingfa, He Min, Wang Qiang, Song Bin, Duan Jiqin, Huang Min, Wang Hui, Chen Mi, Zhou Fang, Zhou Xuejun, Xu Yingying, Xu Ying, Chen Yubo, Wang Xiaoqiang, Zhu Yong, Wu Hongguang, Li Wanjun, Zhou Daibing, Yu Peining, Huang He, Li Yi, Yang Di:

Wet natural gas flow measurement is used for gas reservoir dynamic management, gas well production capacity optimization, hydrate control and flow during wet natural gas transportation operations: It provides calculation and related basic data for dynamic guarantee, production calculation and sales distribution, and is one of the key

measurement methods in the upstream field of natural gas: system GB/T 35065 is established to ensure the orderly development of wet natural gas measurement work in the upstream field and to promote the goals and objectives of natural gas extraction in the upstream field: Realization of benefits: GB/T 35065 "Wet Natural Gas Flow Measurement" is the basic method to guide the flow measurement of liquid natural gas in the upstream field of natural gas: The legal standard involves equipment selection, general operation, performance testing, etc: for wet natural gas flow measurement in the upstream field of natural gas: It is planned to be composed of the following three parts composition:

---Part 1: General principles: The purpose is to provide the classification of wet natural gas flow patterns, flow measurement methods and flow meter selection, installation and General principles for commissioning, performance testing, operational maintenance and uncertainty assessment:

---Part 2: Flowmeter testing and evaluation methods: The purpose is to provide wet natural gas flow meter for measurement in laboratory and field General requirements for performance testing and evaluation, testing principles, testing conditions, testing process control, evaluation methods and evaluation results:

---Part 3: Method for measuring wet natural gas flow using a two-phase wet natural gas flow meter: The purpose is to provide a two-phase wet natural gas General requirements, installation, maintenance, etc: for measuring wet natural gas with flow meters: Wet natural gas flow measurement Part 2: Flowmeter testing and evaluation methods

1 Scope

GB/T 35065.2-2023 covers how a wet gas flow meter is tested. Natural gas arriving from a well carries liquid - condensate and water - and that liquid destroys the assumptions every conventional gas meter is built on. A differential pressure meter reads high because the liquid adds to the pressure drop, an ultrasonic meter loses its signal when the transducer faces are wetted, and the error is not a fixed offset: it depends on how much liquid is present and on how it is distributed, which changes with flow rate and with the shape of the pipework upstream. Since these meters allocate production between parties, the error is money. This part specifies the principles, the test facility arrangement, the test conditions and the procedures for testing and evaluating the metering performance of wet natural gas flow meters, both in the laboratory and in the field, together with the treatment of the data. Testing in both places is the point: a laboratory can generate controlled liquid fractions, but only a field test exposes the meter to the real flow regime. Under ICS 75.180.30 and CCS E98, it is written for meter manufacturers, for oil and gas operators, and for the metering laboratories and allocation auditors.

This document describes the principles, test setup, and procedures for testing and evaluating the metering performance of wet natural gas flow meters in the laboratory and in the field: quality, test conditions, test process, data processing and evaluation methods: This

document applies to the measurement performance testing and evaluation of flow meters for wet natural gas flow measurement defined in GB/T 35065:1:

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:

4 Explosive atmospheres Part 4: Equipment protected by intrinsically safe type "i" GB/T 8423:

4 Petroleum and natural gas industry terminology Part 4: Oil and gas measurement and analysis

GB/T 13609 Guidelines for natural gas sampling

GB/T 17611 Measurement terms and symbols for fluid flow in closed pipes

GB/T 18603 Technical requirements for natural gas metering systems GB/T 35065:

3 Terms and definitions

The following terms and definitions as defined in GB/T 8423:4, GB/T 17611 and GB/T 35065:1 apply to this document: 3:1 wet natural gas flowmeter wetgasflowmeter Flow measuring equipment or device that can simultaneously measure the gas phase and liquid phase flow in wet natural gas:

Note: It is generally composed of flow measurement equipment, content measurement equipment, supporting temperature measurement components, pressure measurement components, etc: 3:

2 Gas volume fraction gas volume fraction; GVF Under working conditions, the ratio of the gas phase volume flow to the total gas and liquid two-phase flow can be expressed as a ratio or a percentage, see formula (1): $GVF = \frac{Q_g}{Q_g + Q_l} \times 100\%$ (1) In the formula: GVF

--- gas phase volume fraction; Q_g

--- Gas phase volume flow rate, unit is cubic meter (m^3); Q_l

--- Liquid phase volume flow rate, unit is cubic meter (m^3):