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

**GB/T 17747.1-2011**

Replacing GB/T 17747.1-1999

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**Natural gas -- Calculation of compression factor -- Part 1:  
Introduction and guidelines**

天然气压缩因子的计算 第1部分：导论和指南

**(English Translation)**

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### Foreword

GB/T 17747 "Gas Calculation of compression factor" is divided into the following three parts.

- Part 1. Introduction and guidelines;
- Part 2. The calculation of molar composition;
- Part 3. Calculation using physical properties.

This section is the first part.

This section drafted in accordance with GB/T 1.1-2009 given rules.

This Part replaces GB/T 17747.1-1999 "gas - Calculation of compression factor - Part 1. Introduction and guidelines." this section compared with the GB/T 17747.1-1999, the main changes are as follows.

- The second paragraph 5.1.6 "The only exception is the mole fraction of N<sub>2</sub> or CO<sub>2</sub> mole fraction greater than 0.15 greater than 0.09 (corresponding the upper limit of 0.20) of gas "to" The only exception is N<sub>2</sub> or CO<sub>2</sub> mole fraction greater than 0.15 mole fraction greater than 0.05 (corresponding to a maximum of 0.20) of gas ";

For more detailed information --- 5.2.5 "Draw histogram is based see GB/T 17747.2-2011 and Appendix E GB/T 17747.3-2011 Appendix F ", the 1999 edition is" to draw more detailed information, see the histogram is based GB/T 17747.2-2011 and GB/T 17747.3-2011 Appendix E ";

- Revised Figure 1 symbols and legend;
- Remove the body "±" number and value Uncertainty Uncertainty symbols before;
- Remove Appendix B.

This section uses redrafted Law Amendment uses ISO 12213-1:2006 "gas - Calculation of compression factor - Part 1. Introduction and guide". This part of ISO 12213-3:2006 The main differences are.

--- Chapter 2 normative references, and some apply to international standard formulation modified to apply to our standard formulation, ISO Replace the standard content of the corresponding national standards, the remaining chapters corresponding to the content is modified accordingly; It also increases the GB/T 17747.2-2011 and GB/T 17747.3-2011 two reference standards;

--- 5.1.1 and 5.1.4 will increase the relative density of the high heat and converted to the corresponding value of natural gas under standard reference conditions Note;

--- Remove the body " $\pm$ " number and value Uncertainty Uncertainty symbols before;

--- Deleted and references ISO foreword, preface to redraft this part;

--- Remove Appendix B.

"Calculation of gas compression factor" standard user with the National Standardization Technical Committee of natural gas to contact the Secretariat to obtain compressed Factor calculation software information.

This part of the National Gas Standardization Technical Committee (SAC/TC244) centralized.

This section drafted by. China Southwest Oil & Gas Field Branch, Research Institute of Petroleum, China Southwest Oil and Gas Field Branch Petroleum Safety and Environmental Protection and Technical Supervision Institute.

## 1 Scope

This section GB/T 17747 provides for natural gas, including labor and other similar blend a mixture of gaseous state only memory when the compression factor calculation method.

"Natural gas compressibility factor calculation" standard consists of three parts. Part 1 includes the introduction and described as Part 2 and Part 3 Guide to calculation methods provided. Section 2 gives a detailed method known molar composition of the gas calculated compression factor, also known as AGA8-92DC calculation method. Section 3 presents with a high calorific value (volume-based), relative density, CO<sub>2</sub> content available and include H<sub>2</sub> content (if not zero) and other non-detailed analysis of the data compression factor calculation method, also known as SGERG-88 calculation.

Two calculation methods are mainly used within the normal range of conditions Gas Transmission and Distribution of dry gas pipeline, including custody transfer measurement or for other Metered billing. Gas Transmission and Distribution usual operating temperature of 263K ~ 338K (about -10 °C ~ 65 °C), operating pressure does not exceed 12MPa. Within this range, if you do not count include the relevant pressure and temperature input data uncertainty, the two calculation methods of pre Uncertainty about 0.1%.

**Note:** The terms used in this part of the gas pipe used in the processing means has been used as a

concise term industrial, commercial and domestic fuel gas used. in 5.1.1 provides the user with some quantitative guidelines tube gas, but not as a gas pipe temperament standards.

AGA8-92DC calculation method GB/T 17747.2 provided also apply to a wider temperature range and higher pressures, including Moisture and acid gases, including (sourgas) of a wider category of natural gas, for example in gas underground gas storage layer or conditions, or natural gas vapor Vehicles (NGV) applications, but uncertainty increases.

SGERG-88 calculation method GB/T 17747.3 provided suitable for N<sub>2</sub>, CO<sub>2</sub>, and C<sub>2</sub>H<sub>6</sub> gas content than common tube containing Amount of gas. The method can also be applied to a wider range of temperatures and pressures, but uncertainty increases.

Under specified conditions, the gas temperature is above the water dew point and hydrocarbon dew point, two calculation methods are valid.

GB/T 17747.2 and GB/T 17747.3 given the use AGA8-92DC SGERG-88 and all the required calculation method and numerical equations. Proven computer program see GB/T 17747.2-2011 and GB/T 17747.3-2011 Appendix B.

## 2 Normative references

The following documents for the application of this document is essential, dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

GB/T 11062-1998 natural gas calorific value, density, relative density and Wobbe index calculation method (ISO 6976:1995, NEQ) GB/T 19205 standard reference gas conditions (GB/T 19205-2008, ISO 13443:1996, NEQ) GB/T 17747.2-2011 gas - Calculation of compression factor - Part 2. Calculation using molar composition analysis (ISO 12213-2:2006, MOD) GB/T 17747.3-2011 gas - Calculation of compression factor - Part 3. Calculation (ISO 12213-3 using physical properties.

2006, MOD)

## 3 Terms and Definitions

The following terms and definitions apply GB/T 17747 in the present document. Meaning and value and the unit symbol appears in the text represented Mitsuke