

ICS 75.060
CCS E 24



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

GB/T 17747.3-2011

Replacing GB/T 17747.3-1999

**Natural gas -- Calculation of compression factor -- Part 3:
Calculation using physical properties**

天然气压缩因子的计算 第3部分：用物性值进行计算

(English Translation)

Issued on: December 5, 2011

Implemented on: May 1, 2012

Issued by: Standardization Administration of China

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Foreword

GB/T 17747 "Gas Calculation of compression factor" criteria include 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 part 3.

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

This Part replaces GB/T 17747.3-1999 "gas - Calculation of compression factor - Part 3. Calculation using physical properties." this section compared with the GB/T 17747.3-1999 The main changes are as follows.

- 4.4.1 "Natural gas molar fraction of other components not as input data. However, they must be within the following ranges." After "(with a continuous series of paraffins molar fraction ratio is generally 3.1, see Appendix E)";
- 4.5.2 will be "beyond the scope of temperament 4.5.1 gives gas compressibility factor calculation of expected uncertainty in Appendix E" to "Out of scope 4.5.1 temperament given expected gas compression factor calculation Uncertainty Appendix F";
- Remove the text " $\pm$ " number of Uncertainty value before;

--- Increase in Appendix E "gas pipe specifications";

--- Modify the diagram symbols and legend.

The partial modification of the use of ISO 12213-3:2006 "gas - Calculation of compression factor - Part 3. Calculation using physical properties." 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;

--- 4.4.1 and 4.4.2 will be increased by high heat and relative density of natural gas under the terms of the standard reference conditions corresponding values Note;

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

--- Delete the contents of Chapter 5;

--- Remove Appendix B other execution;

--- B.1.1 input variables pressure and temperature units replaced by a bar and °C MPa and K;

--- Table D.1 increase in China's heat was determined by reference conditions;

--- The D.2 pressure and temperature unit °C and bar to MPa and K, Table D.2 conversion formula can also be modified accordingly and

Table D.2 increase conversion formula under our standard reference conditions;

--- Remove Appendix G and references.

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

This section drafted by. China Southwest Oil and Gas Field Branch Gas Research Institute of Petroleum.

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. This calculation method is to use known high calorific value, relative density and CO₂ content and the corresponding pressure and Temperature gas compressibility factor calculation. If the presence of H₂, also need to know its content, this is often the case in a gas containing artificial blend in.

Note: Given the high calorific value, relative density, CO₂ content and N₂ content of any of the three

variables, you can calculate the compression factor. But N₂ content as input Calculation Method for the variable one is not recommended as a method is generally used to calculate the first three variables as input variables.

This calculation method is also known as SGERG-88 calculation method is mainly used in the pressure P and temperature Gas Transmission and Distribution normal range of T Gas pipe circumference within the uncertainty of about 0.1%. It can also be used in a wider range, but the results will increase the uncertainty (see Appendix F).

About the scope of application of the calculation methods and applications described in more detail, see GB/T 17747.1.

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 3102.3-1993 Quantities and units of mechanics Quantities and units of GB 3102.4-1993 Thermal GB/T 11062-1998 natural gas calorific value, density, relative density and Wobbe index calculation method (neqISO 6976.1995) GB/T 17747.1-2011 Gas Calculation of compression factor - Part 1. Introduction and guidelines (ISO 12213-1:2006, MOD) GB/T 17747.2-2011 gas - Calculation of compression factor - Part 2. molar composition analysis (ISO 12213-2.

2006, MOD)

3 Terms and Definitions

Terms and definitions GB/T 17747.1 given apply to this document. Meaning and unit symbol appears in the text represented see Appendix A.

4.1 Principle

SGERG-88 calculation method used is based on the concept of the equation. the nature of the capacity of the natural gas pipeline by a suitable, special the levy can be measured to characterize the physical properties and calculation. These characteristic physical property values together with pressure and temperature as input data calculation method.

This calculation method using high calorific value, relative density and CO₂ content as input variables. Can not be particularly suitable for gas molar Case of full composition, it lies Youyuezhichu calculation is relatively simple. Artificial containing gas blend, the need to know the content of H₂.

4.2 SGERG-88 equation

SGERG-88 calculation method is based on the GERG-88 standard Willy equation (expressed as SGERG-88 equation, see GB/T 17747.1). The SGERG-88 is derived from the equation Willy MGERG-88 out of the equation. MGERG-88 is based on the equation