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

GB/T 30491.1-2014

**Natural gas -- Calculation of thermodynamic properties -- Part I:
Gas phase properties for transmission and distribution
applications**

天然气 热力学性质计算 第1部分：输配气中的气相性质
(English Translation)

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Table of Contents

Preface	
1 Scope	
2 Normative references	
3 Terms and definitions	
Thermodynamic Method 2	
4.1 Principle	
4.2 Helmholtz free energy basic equations	
4.2.1 Overview	
4.2.2 Helmholtz free energy	
4.2.3 Helmholtz free energy of an ideal gas	
4.2.4 Residual Helmholtz free energy	
4.2.5 Helmholtz free energy conversion	
4.3 Thermodynamic properties derived from the Helmholtz free energy	
4.3.1 Overview	
4.3.2 Thermodynamic Properties of Equation	
5 Calculation Method	
5.1 Input variables	
5.2 Pressure to convert density conversion	
7 5.3 Operational	
6 Applications	
6.1 Pressure and temperature	
6.2 Pipeline gas	
Uncertainty 7	
7.1 Uncertainty gas	
7.1.1 Uncertainty of methane	
7.1.2 Gas Uncertainty	
7.2 Effect of input variables Uncertainty	
8 Results Report	
Appendix A (normative) Symbols and units	
Appendix B (normative) ideal gas Helmholtz free energy	
Annex C (normative) Helmholtz free energy equation	
A detailed presentation of Annex D (normative) equation of state of the	

Annex E (informative) assigned minor component

Annex F (informative) calculation step

Annex G (informative) Example

References

Foreword

GB/T 30491 "to calculate the thermodynamic properties of natural gas" is divided into three parts.

--- Part 1. Gas transmission and distribution gas properties;

--- Part 2. extending the application of single-phase properties (gas, liquid and high-density fluid);

--- Part 3. Two-phase properties (gas-liquid equilibrium).

This section GB/T Part of 130,491.

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

This section uses the translation method identical with ISO 20765-1:2005 "Natural Gas calculated thermodynamic properties - Part 1. transmission and distribution of gas Gas nature. " Consistency correspondence between this part of international documents and normative references of our files are as follows.

--- GB 3102.3-1993 Quantities and units of mechanics (eqv ISO 31-3:1992);

--- GB 3102.4-1993 Thermal Quantities and units (eqv ISO 31-4:1992);

--- GB/T 14850-2008 gas analysis vocabulary (ISO 7504:2001, IDT);

Calculation (ISO of molar composition. --- GB/T 17747.2-2011 gas - Calculation of compression factor - Part 2 12213-2.2006, MOD);

--- GB/T 20604-2006 Natural Gas Vocabulary (ISO 14532:2001, IDT).

This part made the following editorial changes.

--- Appendix A symbol "E * nij" to "E * ij";

--- Appendix A symbol G * nij to G * ij.

This part of the National Gas Standardization Technical Committee (SAC/TC244) and focal points.

This section drafted by. China Southwest Oil & Gas Field Company Institute, China Petroleum Engineering Co., Ltd. West South Branch, China Petroleum West-East Gas

Pipeline Company, China PetroChina Southwest Oil and Gas Field Company safety and environmental protection supervision and Technology Research Institute.

1 Scope

This section GB/T 30491 provides for natural gas, including labor and other similar blends a mixture of gaseous state only memory the nature and volume calculation method of thermal properties at the time of.

This section applies to Gas Transmission and Distribution process within a certain pressure (p) and temperature (T) range of the gas pipeline. For volume properties (pressure Shrinkage factor and density), uncertainty calculations about $\pm 0.1\%$ (95% confidence interval). For thermal properties [such as enthalpy, heat capacity, Joule - Thomson (Joule-Thomson) coefficient, speed of sound], uncertainty calculations are usually larger.

2 Normative references

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

ISO 31-3 Quantities and units - Part 3. Mechanics (Quantitiesandunits-Part 3. Mechanics)
 ISO 31-4 Quantities and units - Part 4. Thermal (Quantitiesandunits-Part 4. Heat) ISO 7504
 Gas analysis vocabulary (Gasanalysis-Vocabulary) ISO 12213-2 natural gas - Calculation
 of compression factor - Part 2. calculation of molar composition (Naturalgas-Calculation
 ofcompressionfactor-Part 2. Calculationusingmolar-compositionanalysis) ISO 14532 Gas
 vocabulary (Naturalgas-Vocabulary)

3 Terms and Definitions

ISO 31-3, ISO 7504 and ISO 14532 define the following terms and definitions apply to this document.

Note: This section symbols and units given in the list in Appendix A.

Thermal properties caloricproperty Characteristics can be calculated by the basic equation of state of gas or gas mixture homogeneous.

Note: This section applies to the thermal properties include the internal energy, enthalpy, entropy, isochoric heat capacity, isobaric heat capacity, Joule - Thomson coefficient, isentropic index and the speed of sound.

Equation of state the mathematical relationship homogeneous gas or gas mixture between the various state variables.

NOTE: Use this section need to distinguish between the two equations of state. That

characterization of pressure, volume equation of state of the relationship between temperature and volume, characterization and density, temperature, and Helmholtz (Helmholtz) free energy relationship between the basic equation of state.

The remaining properties residualproperty Thermodynamic properties of non-ideal (real gas) gas or a homogenous mixture of gases produced by the state, that is at the same temperature and density conditions an thermodynamic properties, the real gas or gas mixture or a mixture of the gas with the ideal state exists between the nature of the same species difference.