

ICS 75.160.20

CCS E 31



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

GB/T 30519-2014

**Determination of hydrocarbon types and benzene in light
petroleum distillates and products - Multidimensional gas
chromatographic method**

(English Translation)

Issued on: February 19, 2014

Implemented on: June 1, 2014

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of the People's Republic of China**

Table of Contents

Foreword...	3
Introduction...	4
1 Scope...	5
2 Normative references...	6
3 Terms and definitions...	6
4 Method principles and summary...	7
5 Method application...	9
6 Interference substance...	9
7 Instruments...	10
8 Reagents and materials...	13
9 Establishment and preparation of the instrument system...	15
10 System verification and standardization...	16
11 Test procedure...	17
12 Quality control inspection...	19
13 Calculation and report...	19
14 Precision...	21

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed by the National Standardization Technical Committee for Petroleum Products and Lubricants (SAC/TC 280).

This standard shall be under the jurisdiction of the National Petroleum Products and Lubricants Standardization Technical Committee (SAC/TC 280/SC 1).

The responsible drafting organization of this standard. China Petroleum & Chemical Corporation Petrochemical Research Institute.

The participating drafting organizations of this standard. National Oil Quality Supervision and Inspection Center, China Petroleum and Natural Gas Co., Ltd.

Northeast Sales Company, China Shenhua Coal Oil Chemical Co., Ltd.
Shanghai Research Institute, Shenzhen Institute of Metrology and Quality
Inspection, China Petrochemical Co., Ltd. Company Jinan Branch.

Introduction

Light petroleum distillates and products mainly refers to solvent oil, gasoline blending components, and finished gasoline and other substances; these substances have low boiling point AND are easy to volatilize; AND the aromatic hydrocarbons, benzene and olefins existed in such substances may have an adverse effect on the health of the human body, the environment or the stability of the product due to their own toxicity and Instability. Therefore, in gasoline, solvent oil and other product standards, the benzene, aromatics and olefin contents are often limited. In the production and processing links, for the purpose of quality control, the manufacturer needs to make control analysis of the hydrocarbon fraction in the petroleum fraction of the corresponding distillation range. This standard test method is designed to establish a method for the determination of hydrocarbon composition and benzene in light petroleum distillates and products, to address the limitations or problems existed in the current test methods.

Determination of hydrocarbon types and benzene in
light petroleum distillates and products -

Multidimensional gas chromatographic method

WARNING. This standard may involve certain hazardous materials, operations and equipment, BUT does not advise on all safety issues related to this. Therefore, the user shall establish appropriate safety and protective measures before applying this standard AND determine the applicability of the relevant regulatory restrictions.

1 Scope

This standard specifies the test methods of using multidimensional gas chromatography technology for the determination of hydrocarbon composition and benzene content in light petroleum distillates and products.

This standard is applicable to the determination of hydrocarbon composition and benzene content in light petroleum distillates or products having a final boiling point not more than 215 °C such as gasoline blending components, solvent oils, gasoline products and the like. As for the concentration range of determination, the volume fraction (OR mass fraction) of olefin is from 0.5% to 70%, the volume fraction (OR mass fraction) of aromatic hydrocarbon is 1% to 80%, AND the volume fraction (or mass fraction) of benzene is 0.2% to 10%.

This method is also applicable to the gasoline products processed from other unconventional crude oils such as shale or oil sands or hydrocarbon fuels synthesized from non-petroleum fossil fuels, such as Fischer-Tropsch synthetic oils, provided that their boiling ranges comply with the requirements of this standard. This method can only be used to determine the sample exceeding the content range, BUT it cannot provide the precision data.

As for the gasoline for motor vehicles, in order to improve the performance of gasoline products OR for other purposes, it often contains ether or alcohol oxygen compounds, AND there may also be a variety of oxygen compounds coexisted, in such case the ether compounds in the sample will produce peak together with the olefin component, whilst the alcohol compounds will produce peaks together with the C7+ aromatics component. As for the oxygen-containing gasoline samples, after the relevant test methods (such as SH/T 0663) are used to determine the type and content of the oxygen-containing compounds, AND the procedures in Appendix A are referred to make necessary corrections of the results of the hydrocarbon composition, this standard is applicable.

This standard does not apply to the determination of monomer component content in each hydrocarbon group except benzene.

C7+ Aromatics

The aromatic components in the light petroleum distillates or products except for benzene, including monocyclic substituted aromatics, aromatic olefins, and ring diene components greater than the six-membered ring.

3.5

Total aromatics or aromatic hydrocarbon

The sum of benzene (3.3) and C7+ aromatics (3.4).

3.6

Olefin traps

The column in the analytical systems which is used to selectively retain olefinic components from mixtures of saturated hydrocarbons and olefins.

The column has a good reversibility for the capture and release of the olefin component at a specific temperature, so it can be reused. Under certain temperature, this column is capable of selectively retaining the olefin component from the mixture of saturated hydrocarbons and olefins, AND let the saturated hydrocarbon component pass through; AND the retained olefin component is completely released after rising the temperature.

4.1 The analytical principles of using gas chromatography to determine the

hydrocarbon components and benzene content in light petroleum distillates and products are as shown in Figure 1, AND the system and the column connection diagram are as shown in Figure 2. After the sample enters the chromatographic system, it first passes through the polar separation column using a fixer of N, N-bis (alpha-cyanoethyl) formamide (shortly referred to as BCEF column) to separate the aliphatic hydrocarbon component from the aromatic hydrocarbon component. The olefin component in the aliphatic hydrocarbon component consisting of saturated hydrocarbons and olefins is selectively