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

GB/T 4945-2002

**Standard test method for acid and base number of petroleum
products and lubricants by colour-indicator titration**

(English Translation)

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Foreword

This Standard equivalently adopts American Society for Testing and Materials ASTM D974-1997 "Standard Test Method for Acid and Base Number by Color-Indicator Titration". It is a revision to GB/T 4945-1985 (1991) "Petroleum Products and Lubricants-Neutralization Number-Colour Indicator Titration Method".

The differences between this Standard and ASTM D 974-1997 are as follows.

1 The standard names are different. The name of ASTM D974-1997 is "Standard

Test Method for Acid and Base Number by Color-Indicator Titration"; while the name of this Standard is "Standard Test Method for Acid and Base Number of Petroleum Products and Lubricants by Colour-indicator Titration".

The main revision in this Standard to GB/T 4945-1985 (1991).

1 The standard name was revised from "Petroleum Products and Lubricants -

Neutralization Number - Colour Indicator Titration Method" to "Standard Test Method for Acid and Base Number of Petroleum Products and Lubricants by Colour-indicator Titration".

3 For the preparation of standard solution of potassium hydroxide-isopropanol,

the sample weight of potassium hydroxide was revised from 5.6g to 6g; preparation process has some difference.

Annex A in this Standard is normative.

This Standard was proposed by the State Bureau of Petroleum and Chemical Industry.

This Standard shall be under the jurisdiction of Sinopec Research Institute of Petroleum Processing.

Drafting organization of this Standard. Lanzhou Lubricating Oil Research and Development Institute of Petro China.

Chief drafting staffs of this Standard. Li Suping, Zhou Yabin, and Gao Jun.

This Standard was issued in 1985 for the first time.

Standard Test Method for Acid and Base Number of Petroleum Products and Lubricants by Colour-indicator Titration

1.1 This Standard is applicable to the determination of acid or basic constituents in

petroleum products and lubricants soluble or nearly-soluble in mixtures of toluene and isopropyl alcohol. It is applicable for the determination of acids or bases whose dissociation constants in water are larger than 10^{-9} ; extremely weak acids or bases whose dissociation constants are smaller than 10^{-9} . If their hydrolysis constants are

larger than 10⁻⁹, then there is influence.

Notes.

1 In new and used oils, the constituents considered to have acidic characteristics include organic and inorganic

acids, esters, phenolic compounds, lactones, resins, salts of heavy metals, and addition agents such as

inhibitors and detergents. Similarly, constituents considered to have basic properties include organic and

inorganic bases, amino compounds, salts of weak acids (soaps), basic salts of poly acidic bases, salts of

heavy metals, and addition agents such as inhibitors and detergents.

2 This test method is not suitable for measuring the basic constituents of many basic additive-type lubricating oils.

Test method in SH/T 0688 may be used for this purpose.

1.2 This test method can be used to indicate relative changes that occur in an oil

product during use under oxidizing conditions. Although the titration is made under specified conditions, the method is not able to measure an absolute acidic or basic property that may be used to predict performance of an oil product under service conditions. No general relationship between bearing corrosion and acid or base numbers is known.

Note: Oils, such as many cutting oils, rust proofing oils, and similar compounded oils, or dark-colored oils, that are

not able to be analyzed for acid number by this test method due to obscurity of the color-indicator end point,

may be analyzed by test method in GB/T 7304. The acid numbers obtained by this color-indicator test

method need not be numerically the same as those obtained by test method in GB/T 7304, the base

numbers obtained by this color indicator test method need not be numerically the same as those obtained by

test method in SH/T 0688, but their data is in a certain relation.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. Unless otherwise specified in the standard, the standards below shall be valid and current.

GB/T 6682 Water for Analytical Laboratory Use - Specification and Test Methods

GB/T 7304 Petroleum Products and Lubricants - Determination of Neutralization Number - Potentiometric Titration Method

SH/T 0688 Petroleum Products and Lubricants - Determination of Base Number - Potentiometric Titration Method

3 Definitions

This Standard adopts the definitions as follows.

3.1 Acid number

It refers to the quantity of base of sample that is required to titrate a sample of 1g to a specified end point, expressed in mgKOH/g.

3.2 Base number

It refers to the quantity of acid of sample that is required to titrate a sample of 1g to a specified end point, expressed in mgKOH/g.

3.3 Strong acid number

It refers to the quantity of base of sample that is required to titrate a hot water extract of 1g sample to a yellow end point using methyl orange solution, expressed in mgKOH/g.

3.4 Used oil

It refers to any oil that has been in a part of equipment (for example, an engine, gearbox, transformer, or turbine) whether operated or not.