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

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**Standard test method for distillation of petroleum products at
atmospheric pressure
(English Translation)**

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1 Scope

This Standard specifies the method that uses laboratory batch distillation equipment to quantitatively determine the distillation characteristics of petroleum products at atmospheric pressure. This Standard includes measurement methods for manual instruments and automatic instruments.

This Standard is applicable to distillate fuels such as natural gasoline (stabilized light hydrocarbons), light and middle distillates, automotive spark-ignition engine fuels, aviation gasoline, jet fuel, diesel and kerosene, as well as naphtha and white spirit products. This Standard does not apply to products that contain more residues.

NOTE: The residual volume fraction of samples used to establish the precision of this method is not more than 2%.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard, however, parties who reach an

agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable.

For undated references, the latest edition of the referenced document applies.

GB/T 514, Specification for Liquid-In-Glass Thermometers for Testing of Petroleum Products

GB/T 3535, Petroleum products - Determination of pour point (GB/T 3535-2006, ISO 3016:1994, MOD)

GB/T 4756, Method for manual sampling of petroleum liquids (GB/T 4756- distillation flask.

NOTE: In use, the final boiling point is generally used instead of the dry point. For some naphtha with special uses, such as naphtha used in the paint industry, the dry point can be reported. When the final boiling point determination precision of some samples does not always meet the specified requirements, the dry point can also be used instead of the final boiling point.

3.5 dynamic holdup

The materials that appear in the neck of the distillation flask, branch pipes and condenser tubes during the distillation process.

3.6 emergent stem effect

The deviation of the thermometer reading produced when using the fully immersed glass mercury thermometer under partial immersion conditions.

NOTE: Under local immersion conditions, part of the mercury column, that is, the exposed part of the mercury column, is at a lower temperature than the immersed part, which causes the mercury column to shrink and causes the thermometer to read lower.

3.7 final boiling point; FBP end point; EP

The highest calibrated thermometer reading obtained during the test.

NOTE: The final boiling point or end point usually occurs after all the liquid at the bottom of the distillation flask has evaporated, and is often referred to as the maximum temperature.

3.8 front end loss

It refers to the volatilization loss of the specimen transferred from the receiving cylinder to the distillation flask, the evaporation loss of the specimen during the distillation process, and the uncondensed specimen vapor loss in the distillation flask at the end of the distillation.

3.9 initial boiling point; IBP

The corrected thermometer reading observed when the first drop of condensate is dripped from the end of the condenser tube.

3.10 percent evaporated

The sum of the percent recovery and the loss percentage.

The temperature obtained by a temperature measurement device or system and equivalent to the thermometer reading described in 3.19

3.18.1 corrected temperature reading

The temperature of the temperature reading described in 3.18 after being corrected by atmospheric pressure.

3.19 thermometer reading; thermometer result

Under the test conditions of this method, the saturated vapor temperature at the neck below the branch pipe of the distillation flask measured with a prescribed thermometer.

3.19.1 corrected thermometer reading

The temperature after the thermometer reading described in 3.19 is corrected by atmospheric pressure.

4 Method summary

According to the specimen composition, vapor pressure, expected initial boiling point and expected final boiling point, classify the specimen into one of the five specified groups. Put the 100mL of specimen under the conditions specified by the corresponding group, under the ambient atmospheric pressure and the design that is about a theoretical fractionation tray. Use the laboratory batch distillation equipment to distill. According to the requirements of test results, systematically observe and record temperature readings and condensate volume, distillation residue and loss volume. The observed temperature readings need to be corrected for atmospheric pressure. The test result is expressed as a table or graph of the evaporation percentage or percent recovery to the corresponding temperature.

5.1 Basic components of the instrument

5.1.1

The basic components of the distillation instrument are the distillation flask, the condenser and the connected condensation bath, the metal protective cover or enclosure for the distillation flask, the heater, the distillation flask holder and support plate, the temperature measurement device and the receiving cylinder for collecting the distillate.

5.1.2

The manual distillation apparatus is shown in Figure 1 and Figure 2.

14 - Distillation flask stand;

15 - Ground wire;

- 16 - Electric heater;
- 17 - Operation hole for adjusting the level of stand platform;
- 18 - Power cable;
- 19 - Receiving cylinder;
- 20 - Cooling bath of receiving cylinder;
- 21 - Cover of receiving cylinder.

Figure 2 -- Diagram of electric heating type distillation apparatus

5.2 Instrument details

The specific regulations of the instrument are detailed in Annex A.

5.3 Temperature measurement device

5.3.1

Glass mercury thermometer

Shall meet the specifications of GB-46 and

GB-47 thermometers in GB/T 514. The GB-46 thermometer is a low temperature range thermometer. The temperature measurement range is -

2°C~300°C. The graduation value is 1°C. The GB-47 thermometer is a high temperature range thermometer. The temperature measurement range is -

2°C~400°C. The graduation value is 1°C.

When the thermometer is continuously exposed to a temperature higher than

370°C for a long time, the thermometer shall be zero-calibrated or verified in accordance with the provisions of GB/T 514 and JJG 50. Otherwise, the thermometer cannot be used again.

NOTE: When the observed thermometer reading is higher than 370°C, the temperature of the thermometer bulb is close to the stable limit range of the bulb glass. The calibration of the thermometer may be invalid.

5.3.2 Except for the glass mercury thermometer specified in 5.3.1, another

temperature measurement system can also be used in this method, as long as it is confirmed that it has the same temperature hysteresis, exposed liquid column influence and accuracy as the glass mercury thermometer.