Chinastandards.org

SN

INDUSTRY STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

SN/T 3077.1-2012

Test method for flash point by continuously closed cup tester

常闭式闭口杯闪点测定法

(English Translation)

Issued on: May 7, 2012 **Implemented on: November 16, 2012**

Issued by: General Administration of Quality Supervision, Inspection and Quarantine of PRC

Preview: page 1 of 5 shown, 15 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/sn-t-3077-1-2012

Chinastandards.org

Table of Contents

Foreword... 3
1 Scope... 4
2 Normative references... 4
3 Terms and definitions... 4
4 Method summary... 5
5 Significance and use... 5
6 Equipment... 6
7 Reagents and materials... 7
8 Sampling... 8
9 Quality control... 8
10 Preparation of instruments... 9
11 Test procedure... 9
12 Flash point correction... 11
13 Report... 11
14 Precision and deviation... 12
Appendix A (Normative) Instrument specifications... 13
Appendix B (Informative) Liquids used for instrument calibration... 15

1 Scope

This Part of SN/T 3077 specifies the method for determining the flash point of continuously closed cup.

This Part is applicable to the determination of the flash point of fuel oil, lubricating oil, solvent oil and other liquids; its determination range is 10 °C ~ 250 °C.

Note: Flash points below 10 °C or above 250 °C can be measured, but the precision has not been obtained.

If the user's product requires a specified flash point test method other than this method, neither this method nor any other method can replace the specified method without comparative data and the approval of the specification developer.

Preview: page 2 of 5 shown, 15 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/sn-t-3077-1-2012

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document;

for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB/T 4756 Petroleum liquids - Manual sampling (GB/T 4756-1998, eqv ISO

3170:1988)

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Flash point

The lowest temperature (corrected to 101.3 kPa pressure) at which the vapor of the specimen ignites under the specified test conditions.

Note 1: For the substance being tested, the flash point is not a constant physical and chemical property, but a collection of instrumentation, instrument use, test process.

Therefore, the flash point can only be defined according to the method. The results measured by different methods or different test instruments do not have a universally valid correlation.

Note 2: When the pressure increase caused by the hot flame in the closed test chamber is at least 20 kPa, it is confirmed that the specimen has flashed.

3.2

Dynamic

The state when the vapor on the specimen and the specimen have not reached temperature equilibrium when the fire source is introduced.

4 Method summary

Adjust the temperature of the test chamber lid to be less than 18 °C below the expected flash point. Inject 1 mL ± 0.1 mL of sample into the sample cup. The temperature of the sample and the sample cup shall be less than 18 °C below the expected flash point; it can be cooled if necessary. Lift the sample cup and press the lid of the specified size, to form a continuously closed but unsealed test chamber, which has a total volume of 4.0 mL ± 0.2 mL.

Preview: page 3 of 5 shown, 15 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/sn-t-3077-1-2012

Close the measuring chamber; the temperature difference between the specimen and the lid shall be within 1 °C; the lid is heated at a specified constant rate. An arc of a certain energy is discharged in the test chamber at a specified time interval. After each ignition, 1.5 mL ± 0.5 mL of air is introduced into the test chamber to provide the required oxygen for the next flash test. Except for the short time when air is introduced and when the flash point is reached, the pressure in the continuously closed but not sealed test chamber shall be the ambient atmospheric pressure.

After each arc discharge, the pressure increase in the test chamber is detected to be higher than the atmospheric pressure. When the pressure increase exceeds the specified critical value, the temperature is recorded as the uncorrected flash point.

5 Significance and use

Flash point is a measure of the tendency of the specimen to form a flammable mixture with air under specified test conditions. It is only one of the indicators for evaluating all combustion hazards of a substance.

This test method is used to measure and describe the sensitivity of a substance to heat and ignition sources under controlled test conditions; it cannot be used to describe and evaluate the fire risk of a substance under actual ignition conditions.

Flash point can be used to indicate that highly volatile or flammable substances may exist in relatively non-volatile or non-flammable substances, such as lubricating oil containing a small amount of diesel or gasoline.

is adjusted by the electric heating and cooling of the lid; the temperature control accuracy is ±0.2 °C.

g) High-voltage arc: The flammable vapor is ignited by a high-voltage arc. The energy of each arc shall be 3 J ± 0.5 J (3 ws ± 0.5 ws)/arc; the arc use time is 43 ms ± 3 ms.

Note: When the specimen contains a low flash point substance or the flash point of the specimen is lower than the initial ignition temperature, there may be supersaturated vapor in the test chamber. Therefore, the instrument shall be designed to enable the instrument to ignite once every 10 °C after the test chamber is closed and before the initial ignition temperature is reached.

h) Flash point pressure test sensor: The flash point pressure test sensor shall be connected to the connecting tube in the lid, which has an operating range of 80 kPa ~ 177 kPa, a minimum resolution of 0.1 kPa, an accuracy of ±0.5 kPa. It can measure a transient pressure increase of at least 20 kPa above atmospheric pressure within 100 ms.

Note 1: Detecting a transient pressure increase above atmospheric pressure is one of several methods used to detect flash fires in the test chamber. A 20 kPa pressure increase is equivalent to a flame volume of approximately 1.5 mL.

Note 2: An automatic pressure calibrator that performs atmospheric pressure calibration according

Preview: page 4 of 5 shown, 15 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/sn-t-3077-1-2012

to the steps described in Chapter 12 can be installed in the test instrument.

Calibration can be performed using the transient pressure readings of the pressure sensor described in this clause.

i) Pipette: Use a pipette or syringe to transfer 1.0 mL of specimen, which has an accuracy of 0.1 mL.

7.1 Reagents and purity

Refer to Table B.1 for reagent purity. Reagents of other grades may be used when the purity of the reagents used does not affect the measurement accuracy.

7.1.1
Anisole.

7.1.2
n-Dodecane.

7.2 Cleaning solvents

Only non-corrosive solvents such as toluene and acetone can be used to clean the sample cup and lid.

8 Sampling

8.1
According to the requirements of GB/T 4756, take at least 50 mL of specimen from the container; put the specimen into a clean, well-sealed container; store it at low temperature.

8.2
Specimens should not be stored in breathable containers such as plastic bottles for a long time, because volatile substances will diffuse through the container wall.

Specimens stored in poorly sealed containers shall be discarded and resampling shall be carried out.

8.3
Appropriate measures shall be taken to avoid the loss of volatile substances to avoid a high flash point. Do not open the container unless it is necessary. Do not pour the specimen unless the specimen temperature is 18 °C below the expected flash point. If possible, the specimen shall be tested for flash point first.

8.4
Before testing, specimens with high viscosity can be slowly heated to a suitable fluid, while ensuring that the sample temperature after heating is 18 °C below the expected flash point.

Preview: page 5 of 5 shown, 15 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/sn-t-3077-1-2012