

ICS 17.020
CCS A 61

JJF

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

JJF 1569-2016

**Calibration Specification for Bromine Number and Bromine
Index Meters
(English Translation)**

Issued on: June 27, 2016

Implemented on: September 27, 2016

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

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1 Scope

This specification is applicable to the calibration of bromine value and bromine index measuring instruments by microcoulometric titration (coulometric method).

2 References

This specification refers to the following documents.

SH/T 0630-1996 Determination method of bromine value and bromine index of petroleum products (electric quantity method) SH/T 1551-1993 Determination of Bromine Index in Aromatic Hydrocarbons by Coulometric Titration for dated references, only the dated version applies to this specification; for undated references the latest version (including all amendments) applies to this specification.

3.1 Bromine number

Under specified conditions, the number of grams of bromine consumed when reacting with 100g of the sample is expressed in g/100g.

3.2 Bromine Index

Under specified conditions, the number of milligrams of bromine consumed when reacting with 100g of sample, expressed in mg/100g.

4 Overview

The Bromine Value and Bromine Index Meter is mainly used to determine the content of unsaturated hydrocarbons in petroleum products. when containing unsaturated hydrocarbons the sample is injected into the special electrolyte solution containing bromine, the unsaturated hydrocarbon double bond in the sample is broken, and the addition reaction occurs with the bromine bond.

The bromine consumed by the reaction is supplemented by electrolysis at the electrolytic anode. the electricity consumed by electrolysis to supplement bromine is measured, and according to Faraday's law of electrolysis, the bromine index or bromine value of the sample can be calculated.

5.1 Indication error

The indication errors of the instrument in different measurement ranges are shown in Table 1.

5.2 Measurement repeatability

Instrument measurement repeatability $\leq 5\%$.

Note: The above measurement characteristic requirements are for reference only, not as a basis for judgment.

6.1 Environmental conditions

6.1.1

Ambient temperature. (10~35) °C, relative humidity. $\leq 80\%$.

6.1.2

Power supply voltage and frequency. voltage (220 $\pm$ 22) V, frequency (50 $\pm$ 0.5) Hz, and the instrument is well grounded.

6.1.3

There is no strong electromagnetic field interference around, and no mechanical vibration that affects the normal operation of the calibration system.

6.2 Calibration equipment and reference materials

6.2.1

Microsyringe. full scale 1 μ L, 10 μ L, 100 μ L.

6.2.2

Syringe. full scale 0.5mL, 1mL, 2mL, grade A.

6.2.3

Analytical balance. graduation value (d) is 0.1mg, grade.

Each of the above appliances should be verified or calibrated, and meet the requirements of the corresponding regulations and specifications.

6.2.4 Reference material

National certified standard material for determination of bromine index and national certified standard material for determination of bromine value.

7.1.1 Indication error of bromine index

Preheat the instrument and prepare reagents according to the requirements of the instrument manual, and adjust the parameters of the instrument to the normal working state.

When the zero point of the instrument reaches equilibrium, start the calibration.

In the range of (0.2~1000) mg/100g, select three (10.0, 100, 500) mg/100g or so the determination of the bromine index at the point is calibrated with the national certified standard material, and the injection volume of the standard material can be determined according to the requirements of the instrument.

Quantity or volume measurement. When injecting by mass, use an appropriate injector to extract the required volume of standard substance, and use filter paper to Dry the sampling needle, weigh the quality W1 of the sample injector on the analytical balance, and then inject the sample, the sampling needle must be fully immersed Below the liquid level of the electrolyte, inject all the sample and pull it out, wipe off the electrolyte on the surface of the injection needle, and weigh the sample again.

The quality of the sample needle is W2, input the injection volume (W1-W2) into the instrument, start the instrument to start measurement, and read Take measurements. When sampling by volume, use the required sampler to draw the standard substance to the

required scale V, and then inject the sample.

The injection needle must be fully immersed below the electrolyte liquid level, after all the samples are injected, pull out, and the injection volume V and the sampling time the density of the standard substance is input into the instrument at the same time, start the instrument to start the measurement, and read the measured value after the measurement is completed.

Repeat the above steps for different concentrations of bromine index standard substances, repeat the measurement 3 times for each measurement point, and the difference between the arithmetic mean of the three measurement results of a measurement point and the standard value of the standard substance is the bromine index indication value of the instrument Error, calculated according to formula (3)

7.1.2 Indication error of bromine value

In the range of (0.1~300)g/100g, select three points around (10.0,50.0,100)g/100g the bromine standard substance was used to calibrate the instrument. Calibration method, procedure and calculation method are the same as 7.1.1.

7.2 Measurement repeatability

Under the measurement conditions of 7.1, for bromine index standard substances of about 100mg/100g and about 50.0g/100g the bromine value standard substance on the right was continuously measured 7 times under the repeatability conditions according to the method and steps in 7.1, and the repeatability was measured by bromine the relative standard deviation of the single measurement result of the index or bromine value is expressed, and the measurement repeatability sr of the instrument is calculated according to the formula (4)

8 Calibration result expression

Calibration results should be reflected on the calibration certificate or calibration report.

Calibration certificates or reports include at least the following information.

- a) Title. "Calibration Certificate" or "Calibration Report";
- b) laboratory name and address;
- c) the place where the calibration is performed (if not performed in a laboratory);
- d) The unique identification (such as number) of the certificate or report, the identification of each page and the total number of pages;
- e) customer name and address;
- f) The description and clear identification of the school object;