BS 2000 :
Part 213 : 1993

Methods of test for

Petroleum and its products

Part 213. Determination of neutralization value of bitumen - Colour indicator titration method

(Identical with IP 213/82(88))

Confirmed
January 2010

BSi
British Standards

Foreword

This British Standard, having been prepared under the direction of the Petroleum Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 28 February 1993.

This British Standard supersedes BS 2000 : Part 213 : 1983, which is withdrawn.

BS 2000 comprises a series of test methods for petroleum and its products that are published by the Institute of Petroleum (IP) and have been accorded the status of a British Standard. Each method should be read in conjunction with the preliminary pages of 'IP Standard methods for analysis and testing of petroleum and related products' which gives details of the BSI/IP agreement for publication of the series, provides general information on safety precautions, sampling and other matters, and lists the methods published as Parts of BS 2000.

The numbering of the Parts of BS 2000 follows that of the corresponding methods published in 'IP Standard methods for analysis and testing of petroleum and related products'. Under the terms of the agreement between BSI and the Institute of Petroleum, the revised version of BS 2000 : Part 213 will be published by the IP (in 'Standard methods for analysis and testing of petroleum and related products' and as a separate publication). BS 2000 : Part 213 : 1993 is thus identical with IP 213/82, which was reapproved in 1988. Square brackets marked in the margin of this IP Standard indicate text that differs from the previous edition.

IP 213 was first published as a British Standard as BS 4694 (now withdrawn) which was subsequently renumbered and issued in the BS 2000 series.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Committee reference PTC/13

IP 213/82[1] (1988) BS 2000: Part 213: 1993

Determination of neutralization value of bitumen – Colour indicator titration method

This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations.

1. SCOPE

1.1. This method describes a procedure for the determination of the neutralization value of bitumen.

2. SUMMARY OF METHOD

2.1. The bitumen is dissolved in a mixture of toluene, alcohol, and water, a slight excess of alkali added, and the mixture back-titrated with acid.

3. DEFINITION

3.1. *Neutralization Value* – The quantity of base, expressed in mg of potassium hydroxide required to neutralize the total acidic constituents in one g of the sample under the conditions of the test.

4. APPARATUS

4.1. *Titration Flask* – of 250 ml capacity, with ground-glass stopper and with a long narrow neck, e.g. a volumetric flask.

5. MATERIALS

5.1. *Potassium hydroxide solution (0.1 N)* – Dissolve 6 g of potassium hydroxide in 1 litre of freshly boiled and cooled distilled water and allow the solution to settle in the dark for 24 hours. Decant or filter the solution and store in a bottle fitted with a guard tube containing soda-lime to prevent access of carbon dioxide. Restandardize the solution at frequent intervals.

5.2. *Hydrochloric acid (0.1 N)* – Dilute 9 ml of concentrated hydrochloric acid (sp gr 1.19) to 1 litre of distilled water and accurately standardize.

5.3. *Alkali Blue Solution* – Extract 2 g of alkali blue 6B with boiling alcohol (IMS) by means of a Soxhlet apparatus, filter if necessary, and dilute the solution to 100 ml with alcohol.

5.4. *Toluene* – conforming to the IP specification.

CAUTION: *Toluene is a toxic, volatile hydrocarbon which is absorbed by inhaling the vapour or through the skin by contact with the liquid. Use in adequate ventilation and avoid skin contact.*

5.5. *Ethyl Alcohol* – Dilute 85 parts of absolute alcohol with 15 parts of water, by volume.

6. PROCEDURE

6.1. Weigh approximately 5 g of the sample to the nearest 0.01 g into a 250 ml conical flask. Dissolve the sample in about 60 ml of toluene by boiling and swirling the contents of the flask and transfer the hot solution to the titration vessel. To 160 ml of the diluted alcohol add 20 ml of alkali blue solution and one drop of the 0.1 *N* standard acid, and neutralize the mixture with the potassium hydroxide solution; add this mixture to the solution of the sample in the titration vessel. Titrate the mixture with the standard alkali solution, shaking vigorously after each addition of alkali until a colour change is observed then add an excess of 0.5 ml of alkali. Back-titrate with the standard acid.

NOTE 1: The colour change, which is clearer when titrating back with acid than in direct titration, can be observed in the thin layer of liquid in the narrow neck of the flask.

6.2. Make a blank determination in the same way, but omitting the sample.

7. CALCULATION AND REPORTING

7.1. Calculate the neutralization value (*NV*) as follows:

$$NV = \frac{56.1[(A_1 - B_1)N_1 - (A_2 - B_2)N_2]}{W}$$

where:

A_1 = millilitres of alkali used in the determination;
B_1 = millilitres of alkali used in the blank;
N_1 = normality of alkali;
A_2 = millilitres of acid used in the determination;
B_2 = millilitres of acid used in the blank;
N_2 = normality of acid;
W = grams of sample.

7.2. Report the result as Neutralization Value, IP 213.

8. PRECISION

8.1. The precision of this method has not yet been established.

[1]This method differs from IP 1/74, Method A, in the use of a back titration, in the nature of the solvent, and in the type of reaction flask.