BRITISH STANDARD

BS 1715-2.4: 1989

Analysis of soaps —

Part 2: Quantitative test methods —

Section 2.4 Method for determination of free fatty acids content

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Chemicals Standards Policy Committee (CIC/-) to Technical Committee CIC/34, upon which the following bodies were represented:

Chemical Industries Association
Consumer Policy Committee of BSI
Department of the Environment
Department of Trade and Industry (Laboratory of the Government Chemist)
Ministry of Defence
Royal Society of Chemistry
Soap and Detergent Industry Association
Society of Dyers and Colourists

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Amendments issued since publication

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Contents

Foreword

This Section of BS 1715 has been prepared under the direction of the Chemicals Standards Policy Committee. It supersedes the method "Free fatty acids" given in BS 1715:1963, which will be deleted by amendment.

This Section describes a method of test only, and should not be used or quoted as a specification defining limits of purity. Reference to this Section should indicate that the method of test used is in accordance with BS 1715-2.4.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 and 2, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This Section of BS 1715 describes a method for the determination of the free fatty acids content of alkali metal soaps. It may be expressed either as free fatty acid content or as acid value. The method is not applicable in the presence of ethanolamine soaps.

NOTE The titles of the publications referred to in this Section are listed on the inside back cover.

2 Definitions

For the purposes of this Section of BS 1715 the following definitions apply.

2.1
free fatty acids content

a conventional expression of the percentage by mass of free fatty acids

NOTE According to the type of soap, the free fatty acids content can be expressed as given in Table 1.

Table 1 — Expression of free fatty acids

Type of acid	Relative molecular mass
Lauric acid	200
Palmitic acid	256
Oleic acid	282

2.2
acid value

the number of milligrams of potassium hydroxide required to neutralize the free fatty acids in 1 g of soap

3 Principle

A test portion is dissolved in hot ethanol solution and titrated with an aqueous solution of sodium hydroxide.

4 Reagents

The reagents shall be of a recognized analytical grade. Water complying with grade 3 of BS 3978 shall be used throughout.

4.1 *Ethanol* 95 % (*V*/*V*) *solution in water*

NOTE For the purposes of **4.1** and **4.3** the ethanol may be replaced by industrial methylated spirits complying with BS 3591 and of appropriate strength. It should be noted that the use of industrial methylated spirits is governed by the Methylated Spirits Regulations, 1983 (S.I. 1983 No. 252). It is not permissible to use duty-free ethanol, received under the provisions of the Alcoholic Liquors Duties Act 1972, Section 10, for purposes for which industrial methylated spirits is an acceptable alternative.

4.2 *Sodium hydroxide standard volumetric solution,* c(NaOH) = 0.100 mol/L.

4.3 *Phenolphthalein indicator solution,* 5 g/L in 50 % (*V*/*V*) ethanol solution.

5 Apparatus

5.1 *Ordinary laboratory apparatus*

6 Sampling

The laboratory sample shall have been taken in accordance with BS 1715-1.

7 Procedure

7.1 Test portion

Weigh, to the nearest 0.01 g, approximately 5 g of the laboratory sample into a 250 mL conical flask.

7.2 Determination

Heat to boiling point 100 mL of the ethanol (**4.1**) in a second 250 mL conical flask. While the temperature of the ethanol solution is still over 70 °C, neutralize with the sodium hydroxide solution (**4.2**) using 0.5 mL of the phenolphthalein indicator solution (**4.3**).

Add the neutralized ethanol to the test portion in the first flask and swirl to dissolve the test portion, heating if necessary.

Maintain the temperature at approximately 70 °C, and titrate with the sodium hydroxide solution (**4.2**).

NOTE The end point of the titration is reached when the addition of a single drop produces a slight but definite colour change to pink persisting for at least 15 s.

8 Expression of results

8.1 Free fatty acid content

The free fatty acid content, expressed as a percentage by mass, is given by the following expression

$$V \times 0.1 \times \frac{M}{1\,000} \times \frac{100}{m}$$

$$= \frac{V \times M \times 0.01}{m}$$

where

V is the volume of the sodium hydroxide solution used to titrate the test portion (in mL);

M is the relative molecular mass of the acid chosen for expression of the result (see Table 1);

m is the mass of the test portion (in g).

8.2 Acid value

The acid value is given by the following expression

$$\frac{V \times 0.1 \times 56.1}{m}$$

where

V and m are as given in **8.1**.

9 Precision

No precision data are available.

10 Test report

The test report shall include the following information:

a) a reference to this British Standard, i.e. BS 1715-2.4:1989;

b) the results expressed in accordance with **8.1**, including the relative molecular mass used in the calculation, or **8.2**;

c) a complete identification of the sample.

Publications referred to

BS 1715, *Analysis of soaps.*

BS 1715-1, *General introduction, sampling, and test for presence of synthetic anionic active surface active agents.*

BS 3591, *Specification for industrial methylated spirits.*

BS 3978, *Specification for water for laboratory use.*

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