

Methods of test for Desiccants —

Part 9: Determination of cobalt chloride content

NOTE It is recommended that this Part be read in conjunction with BS 3482-1 “*Sampling, and preparation and storage of test samples*” which is issued separately.

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/2, upon which the following bodies were represented:

- Chemical Industries Association
- Ministry of Defence
- Royal Society of Chemistry
- Society of British Aerospace Companies Limited
- Society of Environmental Engineers

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Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Principle	1
3 Reagents	1
4 Apparatus	1
5 Procedure	1
6 Calculation and expression of results	1
7 Test report	2
Publication(s) referred to	Inside back cover

Foreword

This Part of BS 3482 has been prepared under the direction of the Chemicals Standards Policy Committee. This revision of BS 3482 comprises Part 1, which describes procedures for sampling and preparation and storage of test samples and a number of Parts describing methods of test for desiccants. This revision supersedes BS 3482:1962 which is withdrawn. It differs from BS 3482:1962 in that individual methods have been published in separate Parts and have been generally updated. Some additional methods not included in BS 3482:1962 have also been incorporated.

This Part of BS 3482 also supersedes the methods given in Appendix C of BS 3523:1962 which is withdrawn.

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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 Part of BS 3482 describes a method for the determination of the cobalt chloride content of desiccants.

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

2 Principle

The sample is extracted with hot 0.5 % hydrochloric acid solution. The cobalt content is then determined using atomic absorption spectrometry.

3 Reagents

3.1 General. During the analysis, use only reagents of recognized analytical grade and water complying with grade 3 of BS 3978.

3.2 Hydrochloric acid solution, $c(\text{HCl}) = 0.05 \text{ mol/L}$ approximately.

3.3 Cobalt stock solution, 1 000 μg cobalt per mL, commercially available or prepared as follows. Dissolve 1.00 g of metallic cobalt in 50 mL of hydrochloric acid solution, $c(\text{HCl}) = 5 \text{ mol/L}$, transfer quantitatively to a 1 L one-mark volumetric flask, and dilute to the mark with water.

3.4 Cobalt solution, 100 μg cobalt per mL. Pipette 10.0 mL of the cobalt stock solution (3.3) into a 100 mL one-mark volumetric flask and dilute to the mark with the hydrochloric acid solution (3.2).

4 Apparatus

4.1 Atomic absorption spectrometer

NOTE Refer to the manufacturer's operating manual for instrument conditions.

4.2 Ordinary laboratory apparatus

4.3 Filter paper, fine grade, hardened.

4.4 One-mark volumetric flask, 250 mL capacity, complying with class A of BS 1792.

5 Procedure

5.1 Sample extraction

Weigh, to the nearest 0.01 g, about 5 g of the dried sample (see clause 4 of BS 3482-1:1991) and place in a 100 mL beaker. Carefully add 25 mL of the hot hydrochloric acid solution (3.2). After swirling the contents, gently decant off the supernatant liquid into a filter funnel fitted with the filter paper (4.3) delivering into the 250 mL one-mark volumetric flask (4.4). Repeat the process three more times, finally washing the contents into a filter funnel. Wash the sample three times with the hot hydrochloric acid solution and allow to drain each time. Dilute to the mark with the hydrochloric acid solution.

5.2 Determination

5.2.1 Calibrate the atomic absorption spectrometer (4.1) in accordance with the manufacturer's instructions.

5.2.2 Aspirate the cobalt solution (3.4) into the atomic absorption spectrometer in accordance with the manufacturer's instructions and take three individual readings of the absorbance. Calculate the average absorbance.

5.2.3 Aspirate the sample solution obtained in 5.1 and take three individual readings of the absorbance. Calculate the average absorbance.

6 Calculation and expression of results

If the result is not given directly, the cobalt chloride content, calculated as CoCl_2 and expressed as a percentage by mass, is given by the following expression:

$$\frac{(A_2/A_1) \times 5.508}{m}$$

where

- A_1 is the average absorbance reading for the 100 $\mu\text{g/mL}$ cobalt solution (5.2.2);
- A_2 is the average absorbance reading for the sample solution (5.2.3);
- M is the mass of the dried sample taken (5.1) (in g).

7 Test report

The test report shall include the following information.

- a) A complete identification of the sample.
- b) A reference to this British Standard method, i.e. BS 3482-9:1991.
- c) The results expressed in accordance with clause 6.
- d) Any unusual features noted during the determination.

Publication(s) referred to

BS 1792, *Specification for one-mark volumetric flasks.*

BS 3482, *Methods of test for desiccants.*

BS 3482-1, *Sampling, and preparation and storage of samples.*

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

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