

Methods for

Analysis of high purity copper cathode Cu-CATH-1 —

**Part 3: Method for determination of
antimony, arsenic, bismuth, selenium,
tellurium and tin by hydride generation
and atomic absorption
spectrophotometry**

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- British Bathroom Council
- British Cable Makers' Confederation
- British Gas plc
- British Malleable Tube Fittings Association
- British Non-ferrous Metals Federation
- British Valve and Actuator Manufacturers' Association
- Copper Development Association
- London Metal Exchange
- Non-ferrous Metal Stockists
- Society of British Aerospace Companies Ltd.
- Transmission and Distribution Association (BEAMA Ltd.)
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The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- BNF Metals Technology Centre
- British Bronze and Brass Ingot Manufacturers' Association
- Bureau of Analysed Samples Ltd.
- Copper Smelters' and Refiners' Association
- Ministry of Defence

This British Standard, having been prepared under the direction of the Non-ferrous Metals Standards Policy Committee, was published under the authority of the Board of BSI and comes into effect on 31 July 1990

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Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Principle	1
3 Reagents	1
4 Apparatus	3
5 Procedure	3
6 Calculation and expression of results	6
7 Repeatability and reproducibility	6
8 Test report	7
Figure 1 — Hydride generator: solution type	2
Figure 2 — Silica absorption tube	4
Table 1 — Calibration solutions	3
Table 2 — Test conditions for the silica tube hydride method	6
Table 3 — Maximum mean differences for impurity elements	6
Table 4 — Repeatability of results	7
Table 5 — Reproducibility of results	7
Publications referred to	Inside back cover

Foreword

BS 7317 has been prepared under the direction of the Non-ferrous Metals Standards Policy Committee. It describes methods for the determination of impurity elements in high purity copper cathode designated Cu-CATH-1, each method being published as a separate Part. The methods are based on those previously issued in the Draft for Development series DD 95-1 to DD 95-7. The information and experience gained from the practical application of DD 95 have been taken into account in the methods in BS 7317.

This Part of BS 7317 supersedes DD 95-3:1984, which is withdrawn. It is one of a series of methods in BS 7317, the others being as follows:

- *Part 1: Method for determination of cadmium, manganese and silver (screening procedure for chromium, cobalt, iron, nickel and zinc) by atomic absorption spectrophotometry;*
- *Part 2: Method for determination of chromium, cobalt, iron, nickel and zinc by discrete volume nebulization atomic absorption spectrophotometry;*
- *Part 4: Method for determination of antimony, arsenic, bismuth, lead, selenium, tellurium and tin by electrothermal atomization atomic absorption spectrophotometry;*
- *Part 5: Method for determination of sulphur by hydrogen sulphide evolution and spectrophotometry;*
- *Part 6: Method for determination of phosphorus and silicon by spectrophotometry;*
- *Part 7: Method for determination of lead by lanthanum hydroxide separation and atomic absorption spectrophotometry.*

The atomic absorption spectrophotometric procedures in Parts 1 and 2 are complementary. A sample solution concentration found to be satisfactory for nebulizers in standard atomic absorptimeters was 20 g/L. At this concentration the precision obtainable, using the method described in Part 1, is only sufficient to allow the determination of cadmium, manganese and silver. Results would be obtained for chromium, cobalt, iron, nickel and zinc that would prove useful in detecting impurities grossly in excess of the requirements for chemical composition specified in BS 6017 for Cu-CATH-1 and would give a guide to the levels to be determined by Part 2.

The discrete volume nebulization procedure in Part 2 was developed to enable a higher equivalent sample solution concentration of 100 g/L to be used without nebulizer blockage. The method involves no chemical separation, which can give rise to contamination problems, and the extra sensitivity obtained enables the impurities to be determined to an adequate accuracy for the requirements for chemical composition specified in BS 6017 for Cu-CATH-1.

Parts 1 and 2 essentially cover the same impurities. Part 4 covers the electrothermal atomization atomic absorption spectrophotometric method and is recommended where the facility is available. Parts 1, 2, 3 and 7 are included for use where the electrothermal atomization equipment is not available.

The method described in this Part has been developed from analytical work in which various types of commercially available apparatus have been used. Consequently, although every reasonable effort has been made to draft the method in a form that is practicable irrespective of the type of apparatus, information on the actual test conditions for particular types of apparatus that have been found to yield satisfactory results may be available. Requests for such information should be sent to Enquiry Section (Milton Keynes), British Standards Institution, enclosing a stamped addressed envelope for reply. Subject to availability, information will be supplied provided that the type, i.e. manufacturer/model, of apparatus for which the information is required is clearly stated in the request.

DD 95-3 described two methods for generating the impurity element hydrides:

- a) the direct flame hydride method; and
- b) the silica tube hydride method.

Experience gained in the use of DD 95-3 led to the conclusion that the sensitivity of the direct flame method was significantly less than the silica tube method. The direct flame method has therefore been deleted in this Part of BS 7317.

Revised techniques for the preparation of the primary calibration solutions for arsenic, selenium and tellurium have been introduced.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 8, 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.