

Specification for

Sulfuric acid used in lead-acid batteries

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Committees responsible for this British Standard

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- Chemical Industries Association
- Ministry of Defence
- National Sulfuric Acid Association
- Society of British Battery Manufacturers

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Foreword

This British Standard has been prepared by Technical Committee CII/8. It supersedes BS 3031 : 1972, which is withdrawn.

This edition of BS 3031 incorporates specifications for nickel, chromium and cadmium and the specifications for manganese have been revised. A flame atomic absorption spectrophotometric method has been added for the determination of copper, manganese, nickel, chromium and cadmium. This edition also introduces up-to-date terminology.

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

Specification

1 Scope

This British Standard specifies the limits for impurities in sulfuric acid suitable for use in lead-acid batteries and details procedures for the determination of those impurities.

This edition covers sulfuric acid of any relative density.

NOTE. This is a matter for agreement between purchaser and supplier. Clauses and relevant appendices are worded accordingly.

All of the numerical limits refer to sulfuric acid of relative density 1.215 at 20 °C. Conversions to 100 % and other commonly used acid bases are given in annex K. Useful tables relating density to percentage composition will be found in BS 753.

2 References

2.1 Normative references

This British Standard incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on the inside back cover. Subsequent amendments to, or revisions of, any of these publications apply to this British Standard only when incorporated in it by updating or revision.

2.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definition

For the purposes of this British Standard the following definition applies.

reference acid

Sulfuric acid of relative density 1.215 at 20 °C.

4 Description

The material shall consist essentially of an aqueous solution of sulfuric acid, H_2SO_4 , having a relative density not less than 1.215 at 20 °C. When diluted to a relative density of 1.215 at 20 °C with water conforming to Grade 3 of BS EN ISO 3696 : 1995, it shall be clear and colourless when viewed through a depth of 300 mm.

5 Sample

A representative sample of not less than 1 l of the material shall be taken from the bulk. The sample shall be placed in a clean, dry and airtight stoppered glass bottle of such a size that it is nearly filled by the sample. When it is necessary to seal the bottle, care shall be taken to avoid contaminating the contents in any way.

The mass of test portion required for each test is given in the appropriate annex.

Since all numerical limits refer to acid having a relative density of 1.215 at 20 °C, all results obtained on the sample of acid as received to their equivalents, based on an acid of that relative density, shall be converted by use of a conversion factor, F . The calculation of the conversion factor is given in annex A.

6 Residue on ignition

When determined and calculated by the method described in annex B, the residue, on ignition of the material, shall not exceed the equivalent of 150 $\text{mg}\cdot\text{kg}^{-1}$ of the reference acid.

7 Chloride content

When determined and calculated by the method described in annex C, the chloride content of the material, expressed as C_{Cl} , shall not exceed the equivalent of 7 $\text{mg}\cdot\text{kg}^{-1}$ of the reference acid.

8 Sulfur dioxide content

When determined and calculated by the method described in annex D, the sulfur dioxide content of the material, expressed as C_{SO_2} , shall not exceed the equivalent of 5 $\text{mg}\cdot\text{kg}^{-1}$ of the reference acid.

9 Ammoniacal nitrogen content

When determined and calculated by the method described in annex E, the ammoniacal nitrogen content of the material, expressed as C_{NH_3} , shall not exceed the equivalent of 50 $\text{mg}\cdot\text{kg}^{-1}$ of the reference acid.

10 Nitrogen oxides content

When determined and calculated by the method described in annex F, the nitrogen oxides content of the material, expressed as C_{N} , shall not exceed the equivalent of 5 $\text{mg}\cdot\text{kg}^{-1}$ of the reference acid.

11 Iron content

When determined and calculated by the method described in annex G, the iron content of the material, expressed as C_{Fe} , shall not exceed the equivalent of $12 \text{ mg}\cdot\text{kg}^{-1}$ of the reference acid.

12 Arsenic content

When determined and calculated by the method described in annex H, the arsenic content of the material expressed as C_{As} , shall not exceed the equivalent of $2 \text{ mg}\cdot\text{kg}^{-1}$ of the reference acid.

13 Copper content

When determined and calculated by the method described in annex J, the copper content of the material, expressed as C_{Cu} , shall not exceed the equivalent of $7 \text{ mg}\cdot\text{kg}^{-1}$ of the reference acid.

14 Manganese content

When determined and calculated by the method described in annex J, the manganese content of the material, expressed as C_{Mn} , shall not exceed the equivalent of $0.1 \text{ mg}\cdot\text{kg}^{-1}$ of the reference acid.

15 Nickel content

When determined and calculated by the method described in annex J, the nickel content of the material, expressed as C_{Ni} , shall not exceed the equivalent of $0.6 \text{ mg}\cdot\text{kg}^{-1}$ of the reference acid.

16 Chromium content

When determined and calculated by the method described in annex J, the chromium content of the material, expressed as C_{Cr} , shall not exceed the equivalent of $0.2 \text{ mg}\cdot\text{kg}^{-1}$ of the reference acid.

17 Cadmium content

When determined and calculated by the method described in annex J, the cadmium content of the material, expressed as C_{Cd} , shall not exceed the equivalent of $0.2 \text{ mg}\cdot\text{kg}^{-1}$ of the reference acid.

18 Test report

The test report shall include the following information:

- a) a complete identification of the sample;
- b) a reference to this British Standard;
- c) the results of the determinations;
- d) any unusual features noted during the determination.