REPORT ON AVAILABLE STANDARD SAMPLES AND RELATED MATERIALS FOR SPECTROCHEMICAL ANALYSIS

1960

Compiled by
ROBERT E. MICHAELIS
NATIONAL BUREAU OF STANDARDS
FOR
ASTM COMMITTEE E-2 ON EMISSION SPECTROSCOPY

ASTM Special Technical Publication No. 58–D

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FOREWORD

Quantitative spectrochemical analysis is based on comparison of unknown samples with standard samples of similar composition. Standard samples frequently are prepared by the analyst for the particular problem in hand; but, for the analysis of many common materials, particularly metals and alloys, standard samples have been prepared in quantities adequate for general distribution. The rapid growth of spectrochemical analysis and a corresponding increase in available standard samples call for a periodic compilation of types and sources of standards for the information of analysts.

In 1943 a report on available standard samples was prepared under the sponsorship of the War Metallurgy Committee by W. R. Brode. The report was revised by W. R. Brode and B. F Scribner and published in October, 1944, by the American Society for Testing Materials. Since then, Subcommittee IV on Electrodes, Pure Materials, Reagents, and Standards of the ASTM Committee E-2 on Emission Spectroscopy has undertaken to keep the report up to date. Revisions compiled by C. H. Corliss in 1947, by C. H. Corliss and Alan Goldblatt in 1950, and by Robert E. Michaelis in 1955 have been published. The current revision presents the results of a new survey conducted for Subcommittee IV by Robert E. Michaelis, National Bureau of Standards. Acknowledgment is given to Miss Betty Ann Kilday for her aid in the preparation of this publication.

The information is published to provide ready reference to the availability and sources of standard samples, reference samples, and high-purity materials. The numbers of available standard samples, including samples in different sizes, listed in the series of reports are as follows:

Year	Spectrographic Standards	Chemical Standards	Total
1944	210	103	313
1947	435	113	548
1950	632	120	752
1955	979	169	1148
1960	2145	205	2350

The listing of high-purity materials provides useful information to the analyst, particularly in the preparation of standards in the laboratory when other suitable standard samples are not available. The listings of high-purity materials in the series of reports are as follows:

Year	Entries	Sources
1950	325	43
1955	648	54
1960	864	61

The section added to the 1955 revision and retained in this revision covers

the available reference samples which are used principally for semiquantitative spectrochemical analysis. Some 185 reference samples are listed in this section.

The total number of entries of standard samples, reference samples, and high-purity materials in this report is 3400; this represents an increase of 1300 in the five-year period between revisions.

September, 1960

NEW INFORMATION

New information concerning the availability of standard samples, reference samples, and high-purity materials should be directed to the Spectrochemistry Section, Chemistry Building, National Bureau of Standards, Washington 25, D. C.

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APPENDIX I.—NATIONAL BUREAU OF STANDARDS SPECTROGRAPHIC STANDARDS IN PREPARATION

The National Bureau of Standards has a considerable number of spectrographic standards in the preparation stage. These include a set of eight for white cast iron, one leaded steel, four stainless steels, nine copper-base alloys to be covered by three standards each and in both wrought and chill-cast forms, 15 additional high-temperature alloy standards (8 have been issued) to include two sets of three for two alloys—some will be wrought and some will be chill cast, at least two more sets of three each for titanium alloys (3 sets now are available for issue); and six zirconium-base standards, three each for zirconium metal and for Zircaloy 2. Also in the preparation stage are several new and renewal standards in chip, granules, or powder form which, although are designed primarily for chemical analyses, also may serve as spectrochemical standards.

All of the spectrochemical standards in preparation will be of suitable size for use in both optical emission and X-ray spectroscopic techniques. The standards planned for availability about March 1, 1961 include the set of eight for white cast iron, a set of three for naval brass, and four high-temperature standards consisting of a set of three for alloy Inco 713, and one for Udimet 500. Announcements of availability for the new and renewal standards will appear in the technical journals. (Further information may be obtained by writing to the address given on p. 21.)

APPENDIX II.—BUREAU OF ANALYSED SAMPLES, LTD., STANDARD SAMPLES RECENTLY AVAILABLE OR IN PREPARATION

A set of five spectrographic standards of plain carbon steel recently has been made available by the Bureau of Analysed Samples, Ltd. (obtained in U.S.A. from the Jarrell-Ash Co., or from Spex Industries, Inc.) It is understood that the samples can be obtained in the form of sections 1 in. square and $\frac{1}{2}$ in. thick. The temporary certificate lists the values shown as follows:

PLAIN CARBON STEELS

B.C.S. Number	SS Number	Analysis, per cent					
		C	Si	S	P	Mn	As
291	31	0.47	0.55	0.029	0.043	0.36	0.11
292	32	0.071	0.063	0.010	0.019	1.14	0.003
293	33	0.63	0.26	0.089	0.067	0.62	0.070
294	34	0.15	0.36	0.012	0.004	1.47	0.001
295	35	0.26	0.54	0.054	0.036	0.72	0.024

The Bureau of Analyzed Samples, Inc. reports some new spectrographic standard in preparation as follows:

1. A set of six cast iron standards which are to be certified for nickel over the concentration range of about 0.3 to 1.5 per cent, and magnesium over the range of about 0.01 to 0.15 per cent. The samples will be available in disks $1\frac{3}{16}$ in. in diameter.

2. A set of four low-tungsten steels which will contain tungsten in the general concentration range of 0.5–3.5 per cent. These samples mainly will be available in disks $\frac{3}{4}$ in. in diameter, but with some in disks $1\frac{1}{2}$ in. in diameter.

A number of new standard samples in chip, granules, or powder form are also being made available for issue. (Further information may be obtained by writing to the addresses given on p. 20).

APPENDIX III.—MORRIS P. KIRK AND SON, INC. SPECTROGRAPHIC STANDARDS IN PREPARATION

A new and enlarged bulletin (Issued August, 1960) is now available from Morris P. Kirk and Son, Inc., and lists a substantial number of new standard samples for the analyses of aluminum, tin, zinc, lead, and their alloys.

Also described is a section on "Soft Solder Standard Samples in Preparation" which are planned for distribution in the Spring of 1961. (Further information may be obtained by writing to the address on p. 20).

APPENDIX IV.—INDIUM CORPORATION OF AMERICA. SPECTROGRAPHIC STANDARDS OF INDIUM AND ITS ALLOYS RECENTLY AVAILABLE

The Indium Corporation of America recently announced the limited availability of five standard samples of indium metal and five alloy standards. All samples are in the form of spheres, 0.010 to 0.015 in. in diameter and are air packed in 1-oz vials. The master samples are stated not to contain an exact amount of impurity or alloy, but the diluted samples have been done carefully and accurately and thus should be relative within a group. Further information on these may be obtained by writing to The Indium Corporation of America, 1076 Lincoln Ave., Utica 4, N. Y., P. O. Box 269, or to the Jarrell-Ash Co. (see p. 20.) The samples are listed as follows:

Sample Designation	Description
A	Indium, HP, 99.9995 per cent
B	Indium; Lot DP-1, 99.95 per cent In, containing 100 ppm (max) of Pb and Cd; and 50 ppm (max) Ag, Cu, Fe, Ga, Ni, and Sn
C	Indium; Lot DP-2, 99.98+ per cent In; made by dilution of B with A, 1:2
D	Indium; Lot DP-3, 99.99+ per cent In; made by dilution of C with A, 1:2
E	Indium; Lot DP-4, 99.998+ per cent In; made by dilution of D with A, 1:2
A-A	Indium-base alloy, 70 per cent In; 10 per cent Ag, Ga, and Ge (max)
A-B	Indium-base alloy, 90 per cent In; 3.3 per cent Ag, Ga, and Ge (max); made from A-A and A, 1:2
A-C	Indium-base alloy, 96.5 per cent In; 1.1 per cent Ag, Ga, and Ge (max); made from A-B and A, 1:2
A-D	Indium-base alloy, 98.5 per cent In; 0.4 Ag, Ga, and Ge (max); made from A-C and A, 1:2
A-E	Indium-base alloy, 99.5 per cent In; 0.15 Ag, Ga, and Ge (max); made from A-D and A, 1:2

APPENDIX V. -ATLAS TESTING LABORATORIES, INC. SPECTROGRAPHIC STANDARDS OF STAINLESS STEEL

The Atlas Testing Laboratories, Inc., has recently announced the availability of a set of three chill-cast stainless steel standard samples. The samples are for the 300 series of stainless steel and are of a size suitable for both optical emission and X-ray spectroscopic analysis. All standards have approximately the same iron content and results are furnished for C, P, S, Si, Mn, Cr, Ni, Mo, Cu, Ti, and Nb (Cb). For further information write to Atlas Testing Laboratories, Inc., 1225 East 63rd St., Los Angeles 1, Calif.

APPENDIX VI.—REFERENCE SAMPLES RECENTLY MADE AVAILABLE FROM THE JARRELL-ASH CO.

The Jarrell-Ash Co. recently announced the availability of a new group of samples for semiquantitative spectrochemical analysis. The master standard is a 200–300 mesh powder and is packaged in 2-g lots. Composed of high-purity materials the standard contains 1.3 per cent by weight of 45 elements. By combining the master with graphite, a series was prepared, also in 2-g lots, containing the 45 elements in weight concentrations of 0.1 per cent, 0.01 per cent, 0.001 per cent, and 0.0001 per cent. The elements included are: Al, Sb, As, Ba, Be, Bi, B, Ca, Cl, Ce, Cs, Cr, Co, Nb (Cb), Cu, Ga, Ge, In, Hf, Fe, Pb, Ti, Mg, Mn, Hg, Mo, Ni, P, K, Rb, Si, Ag, Ni, Sr, Ta, Te, Tl, Th, Sn, Ti, W, U, V, Zr, and Zn.

It is to be noted that other matrices can be supplied, as well as special standards of any matrix containing specified elements, concentration ranges, and lot sizes, according to the specific requirements of the customer. For further information, write to Jarrell-Ash Co., 26 Farwell St., Newtonville, Mass.

American Society for Testing Materials

Application for Membership

The undersigned hereby applies for { *sustaining* / *company* } { *individual* / *associate* } membership
(circle one)
in the American Society for Testing Materials including subscription to MATERIALS RESEARCH & STANDARDS. If this application be duly approved, he agrees to be governed by the Charter and By-laws of the Society and to further its objects as laid down therein.

NAME.....
(Firm, Organization or Individual Applicant)

ADDRESS FOR MAIL.....
(If other than below)

CITY.....ZONE..... STATE.....

NATURE OF BUSINESS.....

NAME.....TITLE.....
If company membership, indicate above the name and title of individual who will exercise membership privileges.

NAME OF ORGANIZATION.....
If individual membership, indicate above the name of organization with which applicant is affiliated.

ADDRESS OF ORGANIZATION.....

APPLICANT'S TITLE OR OCCUPATION.....

DATE OF BIRTH.....

GRADUATE OF, OR ATTENDED.....
Name of College or University

YEAR.....DEGREE, OR COURSE.....

Recommended by (TWO MEMBERS) .....
.....

A list of ASTM Members in your locality will be furnished on request.

Application for membership should be mailed to
AMERICAN SOCIETY FOR TESTING MATERIALS—1916 RACE ST., PHILADELPHIA 3, PA.

AMERICAN SOCIETY FOR TESTING MATERIALS

EXTRACT FROM CHARTER

1. The name of the proposed corporation is the "American Society for Testing Materials."
2. The corporation is formed for the promotion of knowledge of the materials of engineering, and the standardization of specifications and the methods of testing.

EXTRACT FROM BY-LAWS

ARTICLE I. *Members and Their Election*

SECTION 1. The Society shall consist of Individual Members, Company Members, Sustaining Members, Associate Members, Student Members and Honorary Members.

SEC. 2. An Individual Member shall be a person, technical or scientific society, college or university or department thereof, library, government bureau or department, or such other organizations as the Board of Directors may deem as appropriately coming under this classification.

SEC. 3. A Company Member shall be a company, corporation, firm, industrial or trade association, or such other organizations as the Board of Directors may deem as appropriately coming under this classification.

SEC. 4. A Sustaining Member shall be an Individual Member or Company Member who wishes to support and participate in the work of the Society through the payment of larger dues.

SEC. 5. An Associate Member shall be a person less than thirty years of age. An Associate Member shall have the same rights and privileges as an Individual Member, except that he shall not be eligible for office. His status shall be changed from Associate Member to Individual Member at the beginning of the fiscal year next succeeding his thirtieth birthday.

ARTICLE V. *Meetings*

SECTION 1. The Society shall meet annually, for the transaction of its business, including actions on standards, at a time and place fixed by the Board of Directors. Twenty-five members shall constitute a quorum.

SEC. 2. Special meetings may be called whenever the Board of Directors shall deem it necessary, or upon the written request of 25 members to the President.

ARTICLE VIII. *Dues*

SECTION 1. The fiscal year shall commence on the first day of January. The annual dues*, payable in advance, shall be as follows: For Individual Members, $18; for Company Members, $75; for Sustaining Members, $200; for Associate Members, $10; for Student Members, $2. Honorary Members shall not be subject to dues.

SEC. 2. The entrance fees, payable on admission to the Society, shall be $10 for Individual Members, Company Members and Sustaining Members, and $5 for Associate Members. Student Members shall pay no entrance fee. The fee payable upon transfer from one class of membership to another, shall be the difference between the corresponding entrance fees.

SEC. 5. Any person elected after six months of any fiscal year shall have expired, may pay only one-half of the amount of dues for that fiscal year;....

* NOTE—Of the annual dues $5.00 is for subscription to MATERIALS RESEARCH & STANDARDS.