

CONTENTS

METHODS FOR EMISSION SPECTROCHEMICAL ANALYSIS

For Contents in Numeric Sequence, see p. xi.

A complete subject index appears on p. 471.

GENERAL PRACTICES

<i>Recommended Practices for:</i>	PAGE
E 115 – 56 T. Photographic Processing in Spectrochemical Analysis (Tentative)...	1
E 116 – 56 T. Photographic Photometry in Spectrochemical Analysis (Tentative).....	12
E 130 – 57 T. Designation of Shapes and Sizes of Preformed Graphite Electrodes (Tentative).....	36
Reagents for Chemical Analysis (Excerpt from E 50 – 53, Recommended Practices for Apparatus and Reagents for Chemical Analysis of Metals).....	41
E 29 – 50. Designating Significant Places in Specified Limiting Values.....	46
E 105 – 56 T. Probability Sampling of Materials (Tentative).....	51
E 122 – 56 T. Choice of Sample Size to Estimate the Average Quality of a Lot or Process (Tentative).....	56
<i>Suggested Practices for:</i>	
E-2 SM 1-1. Installation and Safe Operation of the Spectrochemical Laboratory..	63
E-2 SM 1-2. Describing and Specifying the Excitation Source.....	68
E-2 SM 2-1. (<i>Photographic Processing in Spectrochemical Analysis</i>) Replaced by E 115 – 56 T.	
E-2 SM 2-2. (<i>Photographic Photometry in Spectrochemical Analysis</i>) Replaced by E 116 – 56 T.	
E-2 SM 2-3. Spectrochemical Computations.....	72

NOMENCLATURE

<i>Suggested Nomenclature in:</i>	
E-2 SM 3-1. Applied Spectroscopy.....	83

SPECTROCHEMICAL ANALYSIS OF METALS

Copper, Nickel, and Their Alloys

Tentative Method for Spectrochemical Analysis of:

E 129 – 57 T. Nickel Alloys by the Powder – D-C Arc Technique.....	94
--	----

Suggested Methods for Spectrochemical Analysis of:

E-2 SM 5-1. (<i>Nickel Alloys by the Dry Powder – D-C Arc Technique</i>) Replaced by E 129 – 57 T.	
E-2 SM 5-2. Wrought Copper Alloys by the D-C Arc Technique.....	99

<i>Suggested Methods for Spectrochemical Analysis of:</i>		PAGE
E-2 SM 5-3.	Bronze by the Porous Cup – Spark Technique.....	105
E-2 SM 5-4.	Tin Bronze by the Cast Pin – Spark Technique.....	110
E-2 SM 5-5.	Nickel Sheet by the Point-to-Plane Spark Technique.....	114
E-2 SM 5-6.	Nickel Sheet by the A-C Arc Technique.....	117
E-2 SM 5-7.	70-30 Cupro-Nickel by the Cast Pin – Spark Technique.....	120
E-2 SM 5-8.	Admiralty Metal for Arsenic by the Cast Pin – D-C Arc Technique..	125
E-2 SM 5-9.	Copper Alloys by the Point-to-Plane Spark Technique.....	129
E-2 SM 5-10.	Nickel-Base High-Temperature Alloys by the Point-to-Plane Spark Technique.....	133

Lead, Tin, Zinc, and Related Metals

Tentative Methods for Spectrochemical Analysis of:

E 27 – 53 T.	Zinc-Base Alloys and High-Grade Zinc by the Solution – D-C Arc Technique.....	137
E 51 – 43 T.	Tin Alloys for Minor Constituents and Impurities.....	142
E 117 – 56 T.	Pig Lead by the Point-to-Plane Spark Technique.....	145

Suggested Methods for Spectrochemical Analysis of:

E-2 SM 6-1.	Lead-Base Alloys by the Dry Powder – D-C Arc Technique.....	150
E-2 SM 6-2.	Pig Leads by the D-C Arc Technique.....	154
E-2 SM 6-3.	(<i>Pig Leads by the Point-to-Plane Spark Technique</i>) Replaced by E 117 – 56 T.	
E-2 SM 6-4.	Tin-Base Alloys by the Dry Powder – D-C Arc Technique.....	158
E-2 SM 6-5.	Lead-Tin Solders by the Dry Powder – D-C Arc Technique.....	162
E-2 SM 6-6.	Antimonial Lead Alloys by the Point-to-Plane Spark Technique....	166
E-2 SM 6-7.	Lead-Base Bearing Alloys by the Cast Pin – Spark Technique.....	170
E-2 SM 6-8.	Type Metal Alloys by the Point-to-Plane Spark Technique.....	173
E-2 SM 6-9.	Tin by the Cast Pin – Spark Technique.....	177
E-2 SM 6-10.	Bismuth-Cadmium Eutectic Alloy by the Powder – D-C Arc Technique.....	181
E-2 SM 6-11.	Tin-Cadmium Eutectic Alloy by the Powder – D-C Arc Technique.....	184
E-2 SM 6-12.	Zinc-Base Alloys by the Dry Powder – D-C Arc Technique (<i>Formerly Designated E-2 SM 8-1</i>).....	187
E-2 SM 6-13.	Cadmium Metal by the Solution – D-C Arc Technique (<i>Formerly Designated E-2 SM 8-4</i>).....	192
E-2 SM 6-14.	Cadmium Metal by the Point-to-Point A-C Arc Technique (<i>Formerly Designated E-2 SM 8-6</i>).....	195
E-2 SM 6-15.	Zinc Die-Casting Metal and High-Purity Zinc by the Cast Pin and Point-to-Plane Techniques.....	199

Aluminum, Magnesium, and Their Alloys

Tentative Method for Spectrochemical Analysis of:

E 101 – 53 T.	Aluminum and Aluminum-Base Alloys by the Point-to-Plane Spark Technique.....	204
---------------	--	-----

Suggested Methods for Spectrochemical Analysis of:

E-2 SM 7-2.	Aluminum-Base Alloys by the Dry Powder – D-C Arc Technique....	214
E-2 SM 7-3.	(<i>Magnesium-Base Alloys by the Cast Pin – Spark and A-C Arc Techniques</i>). Replaced by E-2 SM 7-11.	
E-2 SM 7-4.	Magnesium-Base Alloys by the Point-to-Plane Spark Technique....	220
E-2 SM 7-6.	(<i>Aluminum and Its Alloys by the Point-to-Plane Spark Technique, Using a Tape-Indicating Spectrometer</i>) Discontinued.	

For Contents in Numeric Sequence, see p. xi.

<i>Suggested Methods for Spectrochemical Analysis of:</i>		PAGE
E-2 SM 7-7.	(Magnesium-Base Alloys by the Cast Pin – Spark Technique). Replaced by E-2 SM 7-11.	
E-2 SM 7-9.	Aluminum and Its Alloys by the Pin-to-Pin Spark Technique.....	224
E-2 SM 7-10.	Aluminum and Its Alloys by the Point-to-Plane Spark and Intermittent Arc Techniques, Using a Recording Photoelectric Spectrometer.....	233
E-2 SM 7-11.	Magnesium and Its Alloys by the Pin-to-Pin Spark Technique.....	246
E-2 SM 7-12.	Aluminum and Its Alloys by the Point-to-Plane Spark Technique Using a Clock-Indicating Photoelectric Spectrometer.....	251

Titanium, Zirconium, and Related Metals

<i>Suggested Methods for Spectrochemical Analysis of:</i>		
E-2 SM 8-7.	Titanium Metal by the Dry Powder – D-C Arc Technique (Formerly Designated E-2 SM 7-8).....	255
E-2 SM 8-8.	Titanium and Titanium Alloys by the Porous-Cup Spark Technique (Replaces E-2 SM 7-5).....	260
E-2 SM 8-9.	Aluminum-Chromium-Titanium Alloy by the Point-to-Plane Spark Technique.....	268
E-2 SM 8-10.	Titanium Sponge and Metal by the Solution-Spark-Rotating Disk Technique.....	271

Ferrous Metals

<i>Suggested Methods for Spectrochemical Analysis of:</i>		
E-2 SM 9-1.	Low-Alloy Steel by the Point-to-Plane Spark Technique.....	278
E-2 SM 9-2.	Alloy Cast Steel and Iron by the Cast Pin – Spark Technique.....	283
E-2 SM 9-3.	Low-Alloy Steel by the Cast Pin – Spark Technique.....	287
E-2 SM 9-4.	Steel for Boron by the Point-to-Plane Intermittent Arc Technique.....	292
E-2 SM 9-5.	Low-Alloy Steel by the Point-to-Plane A-C Arc Technique.....	296
E-2 SM 9-6.	Low-Alloy Steel by the Point-to-Plane Spark Technique.....	301
E-2 SM 9-7.	Low-Alloy Steel by the Pellet – Spark Technique.....	305
E-2 SM 9-8.	Low-Alloy Steel for Residual Elements by the Pellet – Spark Technique.....	309
E-2 SM 9-9.	Low-Alloy Steel by the Rod-to-Rod Spark Technique.....	313
E-2 SM 9-10.	Alloy Cast Iron by the Cast Pin – Spark Technique.....	318
E-2 SM 9-11.	Stainless-Type Steels by the Point-to-Plane Spark-Initiated Intermittent Arc Technique Using a Recording Photoelectric Spectrometer.....	322

SPECTROCHEMICAL ANALYSIS OF NONMETALS

Glass, Ceramics, Alkalies, and Cementitious Materials

<i>Tentative Methods of Test for:</i>		
C 18 – 56 T.	Chemical Analysis of Refractory Materials (Potassium, Sodium, and Lithium Oxides by Flame Photometry).....	329
	Sodium Oxide and Potassium Oxide in Portland Cement by Flame Photometry (Excerpt from C 114 – 57 T, Chemical Analysis of Portland Cement).....	335
D 1428 – 56 T.	Sodium and Potassium Ions in Industrial Water and Water-Formed Deposits by Flame Photometry.....	339

For Contents in Numeric Sequence, see p. xi.

<i>Suggested Methods for Spectrochemical Analysis of:</i>	PAGE
E-2 SM 10-1. Silica Refractories by the Powder - Intermittent Arc Technique.	394
E-2 SM 10-3. Alkaline Earth Titanates by Pellet - Spark and Intermittent Arc Techniques.	348
E-2 SM 10-6. Soda Ash and Other Sodium Salts by the Solution - A-C Arc Technique.	352
E-2 SM 10-8. Caustic Soda by the Solution - A-C Arc Technique.	355
E-2 SM 10-9. Ceramics and Other Nonmetallic Materials by the Powder - D-C Arc Technique.	358
E-2 SM 10-10. Silica Brick and Glass Sand by the Powder - D-C Arc Technique.	364
E-2 SM 10-13. Glass for Alkali Elements by Flame Photometry.	368
E-2 SM 10-14. Alumina Ceramic Materials by the Powder - D-C Arc Technique.	375

Slags, Ores, Petroleum Products, and Other Miscellaneous Nonmetallic Materials

Tentative Methods of Test for:

D 1318 - 54 T. Sodium in Residual Fuel Oil by Flame Photometer.	381
---	-----

Suggested Methods for Spectrochemical Analysis of:

E-2 SM 11-1. Cobaltic Oxide for Impurities by the Powder - D-C Arc Technique.	389
E-2 SM 11-2. Unknown Materials by the Powder - D-C Arc Semiquantitative Technique.	423
E-2 SM 11-3. Copper Strike Plating Solutions for Silver by the D-C Arc Technique (<i>Formerly Designated E-2 SM 10-2</i>).	397
E-2 SM 11-4. Nickel Plating Solutions for Zinc by the A-C Arc Technique (<i>Formerly Designated E-2 SM 10-4</i>).	400
E-2 SM 11-5. Metallic Silver and Silver Nitrate by the Powder - D-C Arc Technique (<i>Formerly Designated E-2 SM 10-7</i>).	403
E-2 SM 11-6. Slags by the Powder - D-C Arc Technique (<i>Formerly Designated E-2 SM 10-11</i>).	405
E-2 SM 11-7. Open-Hearth Slags for Lime-Silica Ratios by the Powder - Intermittent Arc Technique (<i>Formerly Designated E-2 SM 10-12</i>).	409
E-2 SM 11-8. Basic Open-Hearth Slags for Lime-Silica Ratios by the Powder - Spark Technique.	412
E-2 SM 11-9. Lithium-Bearing Ores for Lithium, Sodium, and Iron by the Solution - A-C Arc Technique (<i>Formerly Designated E-2 SM 10-5</i>).	417

Used Diesel Lubricating Oils

Suggested Method for Sampling Diesel Locomotive Lubricating Oil for Spectrographic Analysis.	428
Suggested Spectrochemical Methods for Wear Metals in Used Diesel Lubricating Oils:	
Ashing Procedure.	429
Dish Coking Procedure.	434
Electrode Coking Procedure.	439
Rotating-Disk Electrode Technique.	443
Rotating-Platform Electrode Technique.	448
Suggested Direct-Reading Spectrochemical Methods for Wear Metals in Used Diesel Lubricating Oils:	
Rotating-Disk Electrode Technique.	454
Ashing Procedure.	457

For Contents in Numeric Sequence, see p. xi.

	PAGE
Proposed Recommended Practice for Applying Precision Data Given in ASTM Methods of Test for Petroleum Products and Lubricants.....	460

APPENDICES

Other ASTM Publications on Emission Spectroscopy and Related Subjects.....	467
Officers of Committee E-2 and Its Subcommittees.....	470

INDEX

Index.....	471
------------	-----

ASTM Membership Application Blank.....	489
--	-----

For Contents in Numeric Sequence, see p. xi.