



Standard Guide for Preparation of Metallographic Specimens¹

This standard is issued under the fixed designation E 3; the number immediately following the designation indicates the year of original adoption or, in the case of revisions, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 The primary objective of metallographic examinations is to reveal the constituents and structure of metals and their alloys by means of a light optical or scanning electron microscope. In special cases, the objective of the examination may require the development of less detail than in other cases but, under nearly all conditions, the proper selection and preparation of the specimen is of major importance. Because of the diversity in available equipment and the wide variety of problems encountered, the following text presents for the guidance of the metallographer only those practices which experience has shown are generally satisfactory; it cannot and does not describe the variations in technique required to solve individual specimen preparation problems.

Note 1—For a more extensive description of various metallographic techniques, refer to Samuels, L. E., *Metallographic Polishing by Mechanical Methods*, American Society for Metals (ASM) Metals Park, OH, 3rd Ed., 1982; Petros, G., *Metallographic Etching*, ASM, 1978; and Vanderhoff, G., *Metallography: Principles and Practice*, McGraw-Hill, NY, 2nd Ed., 1969.

1.2 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:

- A 90/A 90M Standard Test Method for Weight (Mass) of Coating on Iron and Steel with Zinc or Zinc-Alloy Coatings
- E 7 Terminology Relating to Metallography²
- E 45 Practice for Determining the Inclusion Content of Steel²
- E 340 Test Method for Macroetching Metals and Alloys²
- E 407 Test Methods for Microetching Metals and Alloys²
- E 768 Practice for Preparing and Evaluating Specimens for Automatic Inclusion Assessment of Steel²

- E 1077 Test Method for Estimating the Depth of Decarburization of Steel Specimens²
- E 1122 Practice for Obtaining JK Inclusion Ratings Using Automatic Image Analysis²
- E 1245 Practice for Determining the Inclusion or Second-Phase Constituent Content of Metals by Automatic Image Analysis²
- E 1268 Practice for Assessing the Degree of Banding or Orientation of Microstructures²
- E 1558 Guide to Electrolytic Polishing of Metallographic Specimens²
- E 1920 Guide for Metallographic Preparation of Thermal Sprayed Coatings²

3. Terminology

3.1 Definitions:

3.1.1 For definitions used in this practice, refer to Terminology E 7.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *castable mount*—a metallographic mount generally made from a two component castable plastic. One component is the resin and the other hardener. Both components can be liquid or one liquid and a powder. Castable mounts generally do not require heat and pressure to cure.

3.2.2 *compression mount*—a metallographic mount made using plastic that requires both heat and pressure for curing.

3.2.3 *planar grinding*—is the first grinding step in a preparation procedure used to bring all specimens into the same plane of polish. It is unique to semi or fully automatic preparation equipment that utilize specimen holders.

3.2.4 *rigid grinding disc*—a non-fabric support surface, such as a composite of metal/ceramic or metal/polymer charged with an abrasive (usually 6 to 15 μ m diamond particles), and used as the fine grinding operation in a metallographic preparation procedure.

4. Significance and Use

4.1 Microstructures have a strong influence on the properties and successful application of metals and alloys. Determination and control of microstructure requires the use of metallographic examination.

4.2 Many specifications contain a requirement regarding microstructure; hence, a major use for metallographic examination is inspection to ensure that the requirement is met. Other

¹ This guide is under the jurisdiction of ASTM Committee E04 on Metallography and is the direct responsibility of Subcommittee E04.01 on Sampling, Specimen Preparation, and Photography.

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² Annual Book of ASTM Standards, Vol 03.02.

Astm E3 Standard

Xiaolong Qi



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ASTM E3-01 ,2009 **A.S.T.M. Standards** American Society for Testing Materials,1927 **Index of Specifications and Standards** , **Book of A.S.T.M. Tentative Standards** American Society for Testing Materials,1924 Al-Si Alloys Francisco C. Robles Hernandez,Jose Martin Herrera Ramirez,Robert Mackay,2017-07-02 This book details aluminum alloys with special focus on the aluminum silicon Al Si systems that are the most abundant alloys second only to steel The authors include a description of the manufacturing principles thermodynamics and other main characteristics of Al Si alloys Principles of processing testing and in particular applications in the Automotive Aeronautical and Aerospace fields are addressed **ASTM Standards 1924** American Society for Testing and Materials,1924 **A.S.T.M. Tentative Standards** American Society for Testing Materials,1929 **Department Of Defense Index of Specifications and Standards Federal Supply Class Listing (FSC) Part III November 2005** , **Understanding Processing, Structure, Property, and Behavior Correlations** International Metallographic Society. Technical Meeting,2000 Biomaterials Science Buddy D. Ratner,1996 Materials science and engineering Properties of materials Classes of materials used in medicine Biology biochemistry and medicine Host reactions to biomaterials and their evaluation Testing biomaterials Degradation of materials in the biological environment Application of materials in medicine and dentistry Practical aspects of biomaterials Implants and devices New products and standards Advanced Materials - XV Tahir Ikram,Mustasim Billah Bhatti,Muhammad Mansoor,Ejaz Ahmed Mukhtar,2018-09-05 International Symposium on Advanced Materials Islamabad Pakistan Selected peer reviewed papers from the 15th International Symposium on Advanced Materials ISAM 2017 October 16 20 2017 Islamabad Pakistan *Engineering Materials, Devices and Equipments* Faisal Mahmuddin,Juraj Marek,Gregor Pobegen,Ulrike Grossner,2023-06-06 Special topic volume with invited peer reviewed papers only **Corrosion, Failure Analysis, and Metallography** International Metallographic Society. Technical Meeting,Stuart A. Shiels,International Metallographic Society,1986 **5th EPI International Conference on Science and Engineering (EICSE)** Faisal Mahmuddin,2023-07-28 Selected peer reviewed extended articles based on abstracts presented at the 5th EPI International Conference on Science and Engineering EICSE2021 Aggregated Book *Publications of the National Electric Light Association.-* ,1929 **Design Standard for Rigid Printed Boards and Rigid Printed Board Assemblies** American National Standards Institute,1991 **Welding Handbook: Engineering costs, quality, and safety** American Welding Society,1976 **ASTM Bulletin** American Society for Testing and Materials,1921 Index and Directory of U.S. Industry Standards ,1987 *Industrial Standardization* ,1951

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the Hills (Psalm 121) (Full Score). Description: This calm, meditative original composition directly ... I will lift up mine eyes - Sheet Music - John Rutter John Rutter. I will lift up mine eyes. Vocal score. Forces or Category: SATB & organ/orchestra. Orchestration: 2.2.2.2-2.0.0.0-timp(opt)-hp-str. I to the Hills Will Lift Mine Eyes (Psalm 121) I to the Hills Will Lift Mine Eyes (Psalm 121): from Tenebrae (III) (Full Score) - 8598A. \$17.00 ; I to the Hills Will Lift Mine Eyes (Psalm 121): from Tenebrae ... I Will Lift Up Mine Eyes Vocal Range: High ; Pitch Range: E4- F#5 ; Composer: Michael Head ; Text Source: Ps 121 ; Publisher: Carl Fischer ... John Tavener: I Will Lift Up Mine Eyes ... John Tavener: I Will Lift Up Mine Eyes Unto The Hills (Vocal Score). German Edition. John Tavener: I Will Lift Up Mine Eyes Unto The Hills (Vocal Score). I Will Lift My Eyes - Full Score and Parts Vocal Forces: SATB, Cantor, Solo, Assembly. Accompaniment: Keyboard. Guitar: Yes. Instrumental parts included: C Instrument, Flute I, Flute II, Oboe, ... I Will Lift up Mine Eyes - Marzo, Eduardo Jul 5, 2014 — Marzo, Eduardo - I Will Lift up Mine Eyes Psalm 121. Voice High and ... "For over 20 years we have provided legal access to free sheet music. I Will Lift Up Mine Eyes (Sowerby, Leo) [7 more...]For voice, mixed chorus, organ; Scores featuring the voice; Scores ... Note: I can only provide full works, not arrangements or individual movements. Student Activities Manual Answer Key, Lab Audioscript ... Student Activities Manual Answer Key, Lab Audioscript, Videoscript for Blitt/Casas' Exploraciones by Mary Ann Blitt - ISBN 10: 0495914177 - ISBN 13: ... Exploraciones-Student Activities Manual Answer Key Buy Exploraciones-Student Activities Manual Answer Key 11 edition (9780495914174) by Mary Ann Blitt for up to 90% off at Textbooks.com. Student Activities Manual Answer Key, Lab Audioscript ... Provided to instructors to share with students at their own discretion, the Answer Key provides answers to the activities in the Student Activities Manual. Student Activities Manual Answer Key, Lab Audioscript ... Buy Student Activities Manual Answer Key, Lab Audioscript, Videoscript for Blitt/Casas' Exploraciones 1 by Blitt, Mary Ann, Casas, Margarita (ISBN: ... Student Activities Manual Answer Key, Lab Audioscript ... Student Activities Manual Answer Key, Lab Audioscript, Videoscript for Blitt/Casas' Exploraciones. 1st Edition - 1 January 2011. ISBN-13: 978-0495914174 ISBN ... Student Activities Manual Answer Key, Lab... - ThriftBooks Provided to instructors to share with students at their own discretion, the Answer Key provides answers to the activities in the Student Activities Manual. Get Exploraciones Student Activities Manual Answers Complete Exploraciones Student Activities Manual Answers online with US Legal Forms. Easily fill out PDF blank, edit, and sign them. by Blitt, Mary Ann; Casas, Margarita Student Activities Manual Answer Key, Lab Audioscript, Videoscript for Blitt/Casas' Exploraciones by Blitt, Mary Ann; Casas, Margarita ; Format/Binding Paperback ... Student Activities Manual Answer Key, Lab Audioscript, ... Student Activities Manual Answer Key, Lab Audioscript, Videoscript for Blitt/Casas' Exploraciones (Paperback) ; Publisher: Cengage Learning, Inc ; ISBN: ... Student Activities Manual for Blitt/Casas' Exploraciones The eBook includes all of the key concepts that instructors, like you, require for your course, and a full suite of learning aids to accommodate your students' ... Massey Ferguson MF 1105 MF 1135 MF 1155 Tractors Massey Ferguson MF 1105 MF 1135 MF 1155 Tractors Operator's Manual 60

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