



Standard Guide for Selection of Calibrations Needed for X-ray Photoelectron Spectroscopy (XPS) Experiments¹

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1. Scope

1.1 This guide describes an approach to enable users and analysts to determine the calibrations and standards useful to obtain meaningful surface chemistry data with X-ray photoelectron spectroscopy (XPS) and to optimize the instrument for specific analysis objectives and data collection time.

1.2 This guide offers an organized collection of information or a series of options and does not recommend a specific course of action. This guide cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this guide will be applicable in all circumstances.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *This standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.*

1.5 *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:²

E995 Guide for Background Subtraction Techniques in Au-

ger Electron Spectroscopy and X-Ray Photoelectron Spectroscopy

E996 Practice for Reporting Data in Auger Electron Spectroscopy and X-ray Photoelectron Spectroscopy

E1078 Guide for Specimen Preparation and Mounting in Surface Analysis

E1127 Guide for Depth Profiling in Auger Electron Spectroscopy

E1217 Practice for Determination of the Specimen Area Contributing to the Detected Signal in Auger Electron Spectrometers and Some X-Ray Photoelectron Spectrometers

E1523 Guide to Charge Control and Charge Referencing Techniques in X-Ray Photoelectron Spectroscopy

E1577 Guide for Reporting of Ion Beam Parameters Used in Surface Analysis

E1634 Guide for Performing Sputter Crater Depth Measurements

E1636 Practice for Analytically Describing Depth-Profile and Linescan-Profile Data by an Extended Logistic Function

E1829 Guide for Handling Specimens Prior to Surface Analysis

E2108 Practice for Calibration of the Electron Binding-Energy Scale of an X-Ray Photoelectron Spectrometer

2.2 ISO Standards:³

ISO 10810 Surface Chemical Analysis—Depth Profiling—Measurement of Sputtered Depth

ISO 14606 Surface Chemical Analysis—Sputter Depth Profiling—Optimisation Using Layered Systems as Reference Materials

ISO 14701 Surface Chemical Analysis—X-ray Photoelectron Spectroscopy—Measurement of Silicon Oxide Thickness

ISO 14976 Surface Chemical Analysis—Data Transfer Format

ISO 15470 Surface Chemical Analysis—X-ray Photoelectron Spectroscopy—Description of Selected Instrumental Performance Parameters

¹ This guide is under the jurisdiction of ASTM Committee E42 on Surface Analysis and is the direct responsibility of Subcommittee E42.03 on Auger Electron Spectroscopy and X-Ray Photoelectron Spectroscopy.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.