



Standard Test Method for Analysis of Heavy Metals in Glass by Field Portable X-Ray Fluorescence (XRF)¹

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1. Scope

1.1 This test method covers field portable X-ray fluorescence (XRF) spectrometric procedures for analyses of arsenic and lead in glass compositions using field portable energy dispersive XRF spectrometers.

1.2 The mass fraction range of arsenic within which this test method is quantitative is given in [Table 1](#). Scope limits were determined from the interlaboratory study results using the approach given in Practice [E1601](#).

1.3 The mass fraction range for which lead was tested is given in [Table 1](#). However, lead results cannot be considered quantitative on the basis of single-sample results because the precision performance is not good enough to allow laboratories to compare results in a quantitative manner.

NOTE 1—The performance of this test method was evaluated using results based on single-sample determinations from specimens composed of glass beads. One laboratory has determined that performance can be significantly improved by basing reported results on the mean of determinations from multiple samples to overcome inherent heterogeneity of elements in glass beads, especially the element lead. Additional information is provided in Section [17](#) on Precision and Bias.

1.3.1 To obtain quantitative performance, lead results must consist of the average of four or more determinations.

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

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. Some specific hazards statements are given in Section 7 on Hazards.*

¹ This test method is under the jurisdiction of ASTM Committee [F40](#) on Declarable Substances in Materials and is the direct responsibility of Subcommittee [F40.01](#) on Test Methods.

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2. Referenced Documents

2.1 ASTM Standards:²

- [D75/D75M Practice for Sampling Aggregates](#)
- [D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance](#)
- [E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications](#)
- [E135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials](#)
- [E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods](#)
- [E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)
- [E1361 Guide for Correction of Inter-element Effects in X-Ray Spectrometric Analysis](#)
- [E1601 Practice for Conducting an Interlaboratory Study to Evaluate the Performance of an Analytical Method](#)
- [E1621 Guide for Elemental Analysis by Wavelength Dispersive X-Ray Fluorescence Spectrometry](#)
- [F2576 Terminology Relating to Declarable Substances in Materials](#)

2.2 ANSI Standard:³

- [N43.2 Radiation Safety for X-Ray Diffraction and Fluorescence Analysis Equipment](#)

2.3 AASHTO Standard:⁴

- [TP-97-11 Test Method for Glass Beads used in Pavement Markings](#)

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>.

⁴ Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001, <http://www.transportation.org>.