Designation: E 275 – 01

Standard Practice for Describing and Measuring Performance of Ultraviolet, Visible, and Near-Infrared Spectrophotometers[1]

This standard is issued under the fixed designation E 275; the number immediately following the designation indicates the year of original adoption or, in the case of revision, 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.

INTRODUCTION

In developing a spectrophotometric method it is the responsibility of the originator to describe the instrumentation and the performance required to duplicate the precision and accuracy of the method. It is necessary to specify this performance in terms that may be used by others in applications of the method.

The tests and measurements described in this practice are for the purpose of determining the experimental conditions required for a particular analytical method. In using this practice an analyst has either a particular analysis for which he describes requirements for instrument performance, or he expects to test the capability of an instrument to perform a particular analysis. To accomplish either of these objectives it is necessary that instrument performance be obtained in terms of the factors that control the analysis. Unfortunately, it is true that not all the factors that can affect the results of an analysis are readily measured and easily specified for the various types of spectrophotometric equipment.

Of the many factors that control analytical results, this practice covers selection of the setting of analytical wavelength, selection of slit width, photometric measurements, and characteristics of absorption cells as the parameters of spectrophotometry that are likely to be affected by the analyst in obtaining data. Other important factors, particularly those primarily dependent on instrument design, are not covered in this practice.

1. Scope

1.1 This practice covers the description of requirements of spectrophotometric performance especially for ASTM methods, and the testing of the adequacy of available equipment for a specific method. The tests give a measurement of some of the important parameters controlling results obtained in spectrophotometric methods, but it is specifically not to be concluded that all the factors in instrument performance are measured.

1.1.1 This practice is not to be used (*1*) as a rigorous test of performance of instrumentation, or (*2*) to intercompare the quantitative performance of instruments of different design.

1.1.2 This practice is primarily directed to dispersive spectrophotometers used for transmittance measurements rather than instruments designed for diffuse transmission and diffuse reflection.

2. Referenced Documents

2.1 *ASTM Standards:*

E 131 Terminology Relating to Molecular Spectroscopy[2]

E 168 Practices for General Techniques of Infrared Quantitative Analysis[2]

E 169 Practices for General Techniques of Ultraviolet-Visible Quantitative Analysis[2]

E 387 Test Method for Estimating Stray Radiant Power Ratio of Spectrophotometers by the Opaque Filter Method[2]

E 958 Practice for Measuring Practical Spectral Bandwidth of Ultraviolet—Visable Spectrophotometers[2]

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this practice, refer to Terminology E 131.

4. Significance and Use

4.1 This practice permits an analyst to compare the general performance of his instrument, as he is using it in a specific spectrophotometric method, with the performance of instruments used in developing the method.

[1] This practice is under the jurisdiction of ASTM Committee E13 on Molecular Spectroscopy and is the direct responsibility of Subcommittee E13.01 on Ultraviolet and Visible Spectroscopy.

Current edition approved Feb. 10, 2001. Published April 2001. Originally published as E 275 – 65 T. Last previous edition E 275 – 93.

[2] *Annual Book of ASTM Standards,* Vol 03.06.

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