



# Standard Test Methods for Determining Average Grain Size Using Semiautomatic and Automatic Image Analysis<sup>1</sup>

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## INTRODUCTION

These test methods may be used to determine the mean grain size, or the distribution of grain intercept lengths or areas, in metallic and nonmetallic polycrystalline materials. The test methods may be applied to specimens with equiaxed or elongated grain structures with either uniform or duplex grain size distributions. Either semiautomatic or automatic image analysis devices may be utilized to perform the measurements.

## 1. Scope

1.1 These test methods are used to determine grain size from measurements of grain intercept lengths, intercept counts, intersection counts, grain boundary length, and grain areas.

1.2 These measurements are made with a semiautomatic digitizing tablet or by automatic image analysis using an image of the grain structure produced by a microscope.

1.3 These test methods are applicable to any type of grain structure or grain size distribution as long as the grain boundaries can be clearly delineated by etching and subsequent image processing, if necessary.

1.4 These test methods are applicable to measurement of other grain-like microstructures, such as cell structures.

1.5 This standard deals only with the recommended test methods and nothing in it should be construed as defining or establishing limits of acceptability or fitness for purpose of the materials tested.

1.6 *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.*

1.7 The sections appear in the following order:

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<sup>1</sup> These test methods are under the jurisdiction of ASTM Committee E-4 on Metallography and are the direct responsibility of Subcommittee E04.14 on Quantitative Metallography.

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## 2. Referenced Documents

### 2.1 ASTM Standards:

E 3 Practice for Preparation of Metallographic Specimens<sup>2</sup>

E 7 Terminology Relating to Metallography<sup>2</sup>

E 112 Test Methods for Determining Average Grain Size<sup>2</sup>

<sup>2</sup> Annual Book of ASTM Standards, Vol 03.01.