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Standard Test Method for Density of Polyethylene by the Ultrasound Technique¹

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1. Scope*

1.1 This test method covers the determination of the density of polyethylene through the utilization of ultrasound equipment.

1.2 This test method is based on the distinct behaviors of the amorphous and crystalline phases of polyethylene in response to ultrasound. Polyethylene can be viewed as a composite structure where high-density crystalline regions are connected by lower-density amorphous material. The ratio of crystalline to amorphous material determines the final density of the material. The amorphous and crystalline phases exhibit very distinct behaviors with regard to the propagation of sound waves. The propagation characteristics in the composite will depend on the relative amount of the two phases (the degree of crystallinity).

1.3 Inorganic materials increase density as measured by Test Methods D 792 and D 1505, but they have little or no effect on ultrasonic density. The ultrasonic measurement is basically a base resin density.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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.*

NOTE 1—There is no similar or equivalent ISO standard.

2. Referenced Documents

2.1 *ASTM Standards:*

¹ This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.70 on Analytical Methods, Section 01, Physical Methods.

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*A Summary of Changes section appears at the end of this standard.