



Standard Practice for Calculating Pavement Macrottexture Mean Profile Depth¹

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1. Scope

1.1 This practice covers the calculation of mean profile depth from a profile of pavement macrottexture.

1.2 The mean profile depth has been shown to be useful in predicting the speed constant (gradient) of wet pavement friction.²

1.3 A linear transformation of the mean profile depth can provide an estimate of the mean texture depth measured according to Test Method E 965.

1.4 The values stated in SI (metric) units are to be regarded as standard. The inch-pound equivalents are rationalized, rather than exact mathematical conversions.

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:

E 867 Terminology Relating to Traveled Surface Characteristics³

E 965 Test Method for Measuring Pavement Macrottexture Depth Using a Volumetric Technique³

2.2 ISO Standard:

ISO 13473-1 Acoustics—Characterization of Pavement Texture using Surface Profiles—Part 1: Determination of Mean Profile Depth⁴

3. Terminology

3.1 Definitions:

3.1.1 *baselength*, n —the length of a segment of a pavement macrottexture profile being analyzed, required to be 100 mm in this practice.

3.1.2 *estimated texture depth (ETD)*, n —the estimate of the mean texture depth (MTD), by means of a linear transforma-

tion of the mean profile depth (MPD).

3.1.3 *mean profile depth (MPD)*, n —the average of all the mean segment depths of all of the segments of the profile.

3.1.4 *mean segment depth*, n —the average value of the profile depth of the two halves of a segment having a given baselength.

3.1.5 *mean texture depth (MTD)*, n —the mean depth of the pavement surface macrottexture determined by the volumetric technique of Test Method E 965.⁵

3.1.6 *profile depth (PD)*, n —the difference between the amplitude measurements of pavement macrottexture and a horizontal line through the top of the highest peak within a given baselength.

4. Summary of Practices

4.1 This practice uses a measured profile of the pavement macrottexture.

4.2 The measured profile is divided for analysis purposes into segments each having a baselength of 100 mm (3.9 in.). The slope, if any, of each segment is suppressed by subtracting a linear regression of the segment. The segment is further divided in half and the height of the highest peak in each half segment is determined. The difference between that height and the average level of the segment is calculated. The average value of these differences for all segments making up the measured profile is reported as the MPD.

5. Significance and Use

5.1 This practice is suitable for the calculation of the average macrottexture depth from profile data. The results of this calculation (MPD) has proven to be useful in the prediction of the speed dependence of wet pavement friction.²

5.2 The MPD can be used to estimate the result of a measurement of macrottexture depth using a volumetric technique according to E965. The values of MPD and MTD differ due to the finite size of the glass spheres used in the volumetric technique and because the MPD is derived from a two-dimensional profile rather than a three dimensional surface. Therefore a transformation equation must be used.

5.3 This practice may be used with pavement macrottexture profiles taken on actual road surfaces or from cores or laboratory prepared samples.

¹ This practice is under the jurisdiction of Committee E-17 on Vehicle-Pavement Systems and is the direct responsibility of Subcommittee E17.23 on Surface Characteristics Related to Tire-Pavement Slip Resistance.

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² Wambold, J. C., Antle, C. E., Henry, J. J., and Rado, Z., International PIARC Experiment to Compare and Harmonize Texture and Skid Resistance Measurements, Final report, *Permanent International Association of Road Congresses* (PIARC), Paris 1995.

³ *Annual Book of ASTM Standards*, Vol 04.03.

⁴ Available from International Organization for Standardization, 1, rue de Varembe, Case Postale 56, CH-1211 Geneva 20, Switzerland.

⁵ In the Test Method E 965, the mean texture depth is reported as MATX_d. In this practice it will be reported as MTD, which has more widespread use. The two terms are intended to be equivalent.