
Standard Practice for

Certification of High-Speed Macrotexture Measurement Equipment

AASHTO Designation: PP 115-23¹

First Published: 2023

Technical Subcommittee: 5a, Pavement Measurement



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1. SCOPE

- 1.1. This practice describes a certification procedure for equipment used to measure macrotexture of pavements at highway speeds. The minimum requirements stipulated in this standard are intended to verify that the equipment can collect repeatable and accurate macrotexture data at the project and network level.
- 1.2. This practice 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 practice to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to its use.

2. REFERENCED STANDARDS

- 2.1. *AASHTO Standards:*
 - < MP 48, Equipment for Measuring Macrotexture Data on Pavements at Highway Speeds
 - < PP 116, Operating Equipment for Measuring Macrotexture at Highway Speeds
- 2.2. *ASTM Standards:*
 - < E1845, Standard Practice for Calculating Pavement Macrotexture Mean Profile Depth
- 2.3. *Other Documents:*
 - < ISO Standard 13473-1:2019, Characterization of Pavement Texture by Use of Surface Profiles, Part 1: Determination of Mean Profile Depth
 - < PIARC Road Dictionary. 2016. Available at <https://www.piarc.org/en/activities/Road-Dictionary-Terminology-Road-Transport>

3. TERMINOLOGY

- 3.1. *Definitions:*
 - 3.1.1. *3D system*—A laser system that collects elevation data along the full width of a travel lane. Such transverse profiles are obtained at regular intervals as the host vehicle moves along the road.
 - 3.1.2. *mean profile depth (MPD)*—An index used to quantify the macrotexture of a pavement surface that is computed by averaging the MSD values over a specified distance. The procedure for computing the MPD is described in ASTM E1845.

- 3.1.3. *mean segment depth (MSD)*—An index used to quantify the macrotexture of a pavement surface over a distance of 100 mm (4 in.). The procedure for computing the MSD from macrotexture data is described in ASTM E1845. The MSD can be computed over a 100 mm (4 in.) distance for data collected along the travel direction, perpendicular to the travel direction, or at any orientation to the travel direction.
- 3.1.4. *line laser*—A line laser obtains a series of data points along a line, with the line typically being 100 mm (4 in.) long. The line laser is mounted such that it collects data perpendicular to the travel direction, or at a defined angle from the travel direction.
- 3.1.5. *pavement macrotexture*—According to the World Road Association (Permanent International Association of Road Congress, PIARC), macrotexture is defined as surface irregularities of a road pavement with horizontal dimensions ranging between 0.5 mm and 50 mm (0.02 in. and 2 in.) and vertical dimensions between 0.2 and 10 mm (0.008 in. and 0.4 in.).
- 3.1.6. *single spot laser*—A laser that projects a spot of light that typically has a diameter of 1 mm (0.04 in.) on to the pavement surface.

4. SIGNIFICANCE AND USE

- 4.1. This practice describes a certification procedure for equipment that is used to measure macrotexture of pavements at highway speeds. Such equipment may be equipped with single-spot lasers, line lasers, or a 3D system for collecting the elevation data. The certification of equipment is aimed at verifying that the equipment can collect repeatable and accurate macrotexture data at project level and network level. In this practice, the MPD is used as the macrotexture index that is used to assess the repeatability and accuracy of the equipment.

5. EQUIPMENT

- 5.1. *Minimum Requirements*—The high-speed macrotexture measuring equipment shall meet all requirements and specifications found in PP 116.
- 5.2. The software in the equipment must be capable of calculating and reporting MPD from data collected at test sections.
- 5.3. The equipment must be equipped with a trigger that can automatically initiate and terminate data collection from reflective tape placed on the pavement surface or on a cone placed on the side of the road.

6. VERIFICATION OF CALIBRATION OF THE HEIGHT SENSORS AND THE DISTANCE MEASURING INSTRUMENT

- 6.1. *Height Sensors*—The first step of certification of the equipment is evaluating the ability of the equipment to pass the static block check and the stationary dynamic test that are described in Section 5.3.2 of PP 116. The operator of the equipment shall be asked to perform the static block check and the stationary dynamic test according to the procedures described in Section 5.3.2 of PP 116. The equipment must pass the block test by satisfying the specified criterion in PP 116. The equipment must pass the stationary dynamic test by satisfying the criterion specified by the manufacturer. The equipment must pass both of these tests in order to proceed with the equipment certification procedures outlined in Section 7 of this standard. If equipment fails the block check, or the stationary dynamic test, or both tests, the operator should work with the manufacturer to adjust or repair the equipment such that the equipment will be able to pass both of these tests.