
Standard Specification for

Pavement Ride Quality When Measured Using Inertial Profiling Systems

AASHTO Designation: MP 17-08 (2008)¹



1. SCOPE

- 1.1. This example specification is intended for Owner-Agencies to use in development of specific language when requiring the measurement and evaluation of ride quality and compliance using inertial profiling systems.
- 1.2. *This specification 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 specification to establish appropriate safety and health practices and determine the applicability of regulatory limitations related to and prior to use.*

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
- MP 11, Inertial Profiler
 - PP 49, Certification of Inertial Profiling Systems
 - PP 50, Operating Inertial Profilers and Evaluating Pavement Profiles
 - R 43M/R 43, Quantifying Roughness of Pavements
- 2.2. *ASTM Standards:*
- E 867, Standard Terminology Relating to Vehicle-Pavement Systems
 - E 950, Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference
 - E 1926, Standard Practice for Computing International Roughness Index of Roads from Longitudinal Profile Measurements

3. TERMINOLOGY

- 3.1. *Definitions:*
- 3.1.1. *International Roughness Index (IRI)*—a statistic used to determine the amount of roughness in a measured longitudinal profile. The IRI is computed from a single longitudinal profile using a quarter-car simulation as described in the paper “On the Calculation of International Roughness Index from Longitudinal Road Profile” (Sayers 1995). The IRI is reported as described in ASTM E 1926.
- 3.1.2. *localized bump*—areas of pavement for which the deviations of the reported relative elevation from the moving average exceeds a threshold value as described in Fernando and Bertrand (2003).

The recommended threshold value is 0.15 in. between the reported relative elevation and the moving average for every point using a 25-ft average filter.

- 3.1.3. *localized roughness*—areas of pavement for which the IRI exceeds the average for the section under consideration. It may be calculated using a continuous IRI with a short (25-ft) running interval and a threshold of at least 1.5 times the average IRI for the segment.
- 3.1.4. *longitudinal profile*—the set of perpendicular deviations of the pavement surface from an established horizontal reference plane to the lane direction.
- 3.1.5. *reporting interval*—the travel distance between the outputs of a profile index value.
- 3.1.6. *roughness*—according to ASTM E 867, the deviation of a surface from a true planar surface with characteristic dimensions that affects vehicle dynamics and ride quality.
- 3.1.7. *Surface Test Type A*—a test procedure to measure the surface profile index known as the International Roughness Index (IRI) using an inertial profiling system.
- 3.1.8. *Surface Test Type B*—a test procedure to measure surface profile deviations using a straightedge or Owner-Agency approved equal.

4. SIGNIFICANCE AND USE

- 4.1. This example specification language is for measuring ride quality on newly constructed paving projects using inertial profiling systems.
Note 1—Coarse surface textures, such as those found on open-graded, chip-sealed, tined (transverse or longitudinal), or grooved pavement, for example, are very challenging to existing inertial profilers. Coarse texture is likely to adversely affect the repeatability and accuracy of any profile-based index, such as the IRI. The consequence may be an upward bias in the index value. Please note that application of these protocols does not guarantee acceptable performance of inertial profilers on coarse-textured surfaces.

5. EQUIPMENT

- 5.1. Provide an approved straightedge (minimum length of 10 ft) or Owner-Agency approved equal.
- 5.2. Provide an inertial profiling system meeting all requirements and specifications found in MP 11 and currently certified in accordance with PP 49. The equipment must be operated in accordance with PP 50.
Note 2—For consistent pavement profile determination, maintain air pressure on the wheels of the housing vehicle according to the manufacturer’s specification. The housing vehicle and all system components will be in good repair and proven to be within the manufacturer’s specifications. The operator of the inertial profiler shall have all tools and components necessary to adjust and operate the inertial profiler according to the manufacturer’s instructions.
- 5.3. Provide the Owner-Agency copies of Equipment Certification. Display a current decal on the equipment indicating the expiration date of certification.
- 5.4. Provide a certified profiler operator. Provide the Owner-Agency copies of Operator Certification.