



Standard Practice for Calibration of Systems Used for Measuring Vehicular Response to Pavement Roughness¹

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1. Scope

1.1 This practice describes equipment and procedures for the calibration of systems used for measuring vehicular response to pavement roughness. Such systems are referred to as response-type systems. (See Test Method E1082.)

1.2 The response-type system includes the driven vehicle, the driver and contents of the vehicle, the towed trailer (if one is used with the system), and a device called a road meter that measures the vehicle response to pavement roughness. The road meter may be mounted in an automobile, van, or in a towed trailer. Response-type (road meter) devices covered in this practice include: devices measuring the relative axle-body motion of a vehicle, devices measuring the vertical acceleration of the vehicle body, and devices measuring the vertical acceleration of the vehicle axle.

1.3 The calibration procedures described in this practice are limited to the use of the simulations described in Practice E1170.

1.4 This practice is not intended to apply to pavement roughness measuring equipment whose output is not influenced by the response of the host vehicle.

1.5 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

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 This practice is under the jurisdiction of ASTM Committee E17 on Vehicle - Pavement Systems and is the direct responsibility of Subcommittee E17.31 on Methods for Measuring Profile and Roughness.

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2. Referenced Documents

2.1 ASTM Standards:²

- E867 Terminology Relating to Vehicle-Pavement Systems
- E950 Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference
- E1082 Test Method for Measurement of Vehicular Response to Traveled Surface Roughness
- E1170 Practices for Simulating Vehicular Response to Longitudinal Profiles of Traveled Surfaces
- E1215 Specification for Trailers Used for Measuring Vehicular Response to Road Roughness
- E1364 Test Method for Measuring Road Roughness by Static Level Method
- E1926 Practice for Computing International Roughness Index of Roads from Longitudinal Profile Measurements

3. Terminology

3.1 Definitions:

3.1.1 *half-car roughness index (HRI)*—an index resulting from a mathematical simulation of vehicular response to the longitudinal profile of two wheelpaths of a pavement using the half-car simulation model described in Practice E1170 and a traveling speed of 80 km/h [50 mph]. Units are in millimeters per kilometer or inches per mile.

3.1.2 *international roughness index (IRI)*—an index resulting from a mathematical simulation of vehicular response to the longitudinal profile of one wheelpath of a pavement using the quarter-car simulation model described in Practice E1170 and a traveling speed of 80 km/h [50 mph]. Units are in millimeters per kilometer or inches per mile.

3.1.3 Additional definitions of terms related to this practice may be found in Definitions E867.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *response type system number (RTSN)*—the raw measured output from a response-type system being calibrated.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.