

**STATE OF OHIO  
DEPARTMENT OF TRANSPORTATION**

**SUPPLEMENT 1058**

**SURFACE SMOOTHNESS EQUIPMENT AND OPERATOR REQUIREMENTS**

**January 16, 2009**

**1058.01 Scope**

**1058.02 Materials and Equipment**

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**1058.01 Scope.** This Supplement defines the requirements for calibration of equipment measuring smoothness on asphalt and concrete pavements and the approval of operators running the smoothness equipment. This supplement also defines the verification process for the output data at the project site.

**1058.02 Materials and Equipment.**

Furnish and maintain inertial based non-contact road profiling equipment during the paving operations. The equipment may be lightweight, low-speed, high-speed, full-size, motor vehicle mounted, non-motor vehicle [trailer] mounted, and/or portable profiling equipment. The equipment and software will develop an IRI in English units for 0.10 mile (0.1609 km) intervals conforming to ASTM E1926. Only use ProVAL software for development of the IRI and also provide electronic copies of all longitudinal pavement profiles in ProVAL compatible format.

All profilers and the operators will be approved by the Department. Approval does not eliminate project verification of the equipment and operator. Provide a copy of the approval letter to the project Engineer before the start of the mainline paving operation. Do not alter the approved profiler and software settings in any manner during the project and until the next Department approval. Only provide approved operators during the project and do not change approved operators without the Engineer's acceptance. A list of approved contractor operators and approved equipment including make, model, serial number, calibration settings, software (version and release), and other critical items will be posted on the ODOT Office of Pavement Engineering's (OPE) webpage.

**1058.03 Profile Device Approval.**

Obtain approval of all profilers. Arrange a date with the Office of Pavement Engineering, Pavement Management Section for running profiler on the ODOT test track. Approval is valid for one (1) year provided no equipment, operator, or software changes are made. If any changes in equipment settings, operators, or software updates etc. occur obtain re-approval of the profiler. The equipment supplier may be on hand during track runs the Contractor's operator(s) who will operate the desired equipment on Department projects will operate the equipment during track runs. Approval will be by letter to the Contractor.

The profile device approval will include two phases.

### **Phase 1**

The Department will verify the profiler will pass the following criteria for distance, height, and bounce for each wheel path sensor:

- A. distance within +/- 0.10 percent,
- B. height within +/- 0.01 inch (0.254 mm)
- C. bounce IRI reading less than or equal to 10 inches per mile (0.16 m/km).

The height readout or recording will be within +/- 0.01 inches (0.254 mm) of a caliper reading of each gauge block. Gauge blocks will be cold stamped with a unique identifying number.

The bounce test is a dynamic test where the equipment simulates moving longitudinally for 0.1 miles (0.16 km) and the operator physically bounces the equipment in place. The test demonstrates that the height sensor works with the accelerometer to show no elevation change in the profile. The bounce test's measured IRI for the profiler equipment will be created by running the profiler in normal operation mode; saving a collected bounce profile; transferring into ProVAL and calculating through ProVAL the bounce IRI values.

### **Phase 2**

Test track approval will consist of two sets of five runs of the inertial profiling device. Electronic copies of all road profiles collected on the two sets of five runs, including lead in and lead out distance, will be submitted to the Department in ProVAL compatible format. The Department will select up to four subsections within the two sets and establish reference values for IRI. All indices will be generated using ProVal software. For IRI, each of the five reported run values will be within 5.0 percent of the average of those values for each subsection to demonstrate repeatability of the equipment. The average of the five reported run values will be within whichever is greater either 7 percent of the reference value or within 5 inches/mile for each subsection to demonstrate reproducibility of the equipment.

The Department will allow one additional set of five runs should any problems arise.

Upon successful completion of both phases, the equipment settings and information will be recorded on the approval letter. Data will include but not be limited to make, model, serial number, calibration settings, software (version and release), operator name, filter settings, sampling interval, etc.

### **1058.04 Project Site Verification**

The Engineer will verify the equipment and equipment settings against the approval letter data and against the website list of certification information for the equipment on the ODOT OPE website. The Contractor will demonstrate the profile device operation prior to project use. The demonstration will consist of an agreed upon known distance measurement on the project; a height measurement for each wheelpath sensor using the calibration gauge blocks; and a successful bounce test that demonstrates a flat profile. The tolerance for height is 0.02 inches (0.5 mm). The tolerance for distance is 0.20 percent. The IRI for bounce will be less than or equal to 15 inches per mile (0.24 m/km).

The Contractor shall provide a caliper accurate to 0.001 inches (0.0254 mm) for verifying gauge blocks dimensions. The Engineer can request a new demonstration of distance and height accuracy and verify computer settings at any time. Should the equipment not verify or equipment changes are noted by the Engineer, the profile device will not be used.

#### **1058.05 Equipment Operator Approval.**

All operators will demonstrate their ability to successfully perform the following on the equipment they desire to be certified to operate:

- Distance Measuring Instrument (DMI) calibration and check
- Static height sensor(s) calibration and check
- Bounce test conforming to 1058.03
- Generate road profiles in a ProVAL compatible electronic format
- Generate requisite smoothness indices using ProVAL software
- Provide in Excel format smoothness indices calculated for pay adjustment.
- Accurately complete the profile log sheet for profiles collected on the test track

All operators of profile equipment will be approved on the ODOT test track on the equipment being approved. Each operator will be given an approval letter showing the operator approval is valid for one year. Operators can be removed from approval for failure to follow requirements for equipment operation as outlined in the equipment approval letter and list information on the Office of Pavement Engineering's website.