



U.S. Department
of Transportation

**Federal Highway
Administration**

Memorandum

6300 Georgetown Pike
McLean, Virginia 22101

Subject: **ACTION:** LTPP Directive P-38
Temperature Measurements During Longitudinal Dipstick®
Data Collection

Date: April 27, 2005

From: Larry Wiser *Larry J. Wiser*
Long Term Pavement Performance Team

Reply to
Attn of: HRDI-13

To: Dr. Frank Meyer, PM - LTPP North Atlantic Regional Contract
Dr. Frank Meyer, PM - LTPP North Central Regional Contract
Mr. Mark Gardner, PM - LTPP Southern Regional Contract
Mr. Kevin Senn, PM - LTPP Western Regional Contract

Attached is the Long Term Pavement Performance (LTPP) Program Directive P-38: Temperature Measurements During Longitudinal Dipstick® Data Collection. Procedures for performing longitudinal Dipstick® data collection are outlined in Section 3 of the LTPP Manual for Profile Measurements and Processing, Version 4.1, May 2004 (hereafter referred to as LTPP Profiler Manual or manual). Section 3.3.3.2 of the manual indicates that the header information on Form DS-1 must be completed using the guidelines presented in section 3.3.5.2. These guidelines indicate that the pavement temperature shall be obtained and recorded in the temperature field on Form DS-1. Please ensure that all personnel involved are aware of this new directive.

Should you have any questions or would like to discuss this directive, please do not hesitate to contact me at 202-493-3079.

Attachments (3)

LONG TERM PAVEMENT PERFORMANCE PROGRAM DIRECTIVE



For the Technical Direction of the LTPP Program



Program Area:	Monitoring	Directive Number:	P-38
Date:	April 27, 2005	Supersedes:	N/A
Subject:	Temperature Measurements During Longitudinal Dipstick® Data Collection		

Procedures for performing longitudinal Dipstick® data collection are outlined in Section 3 of the LTPP Manual for Profile Measurements and Processing, Version 4.1, May 2004 (hereafter referred to as LTPP Profiler Manual or manual). Section 3.3.3.2 of the manual indicates that the header information on Form DS-1 must be completed using the guidelines presented in section 3.3.5.2. These guidelines indicate that the pavement temperature shall be obtained and recorded in the temperature field on Form DS-1.

Effective immediately, the temperature recorded on Form DS-1 during longitudinal Dipstick® data collection shall be the air temperature and not the pavement temperature. Air temperature measurements shall be obtained using the following equipment:

- K-type, 2 inch, Handheld Thermocouple Probe (Omega Model KHSS-18U-2)
- Microprocessor Thermometer Display (Omega Model HH21, HH22, HH33 or HH64)

Air temperature measurements shall be obtained at the start of data collection and at the end of data collection. Measurements should be taken at an adequate distance from any heat source such as vehicle engine, vehicle exhaust, and pavement surface. Operators must also ensure that the probe is not held in direct sunlight when allowing the probe to reach a stable value before recording it. The start and the end temperatures as well as the average of those two temperatures shall be recorded on Form DS-1, but only the average air temperature shall be entered into the LTPP pavement performance database. Form DS-1 has been revised to allow recording of the three temperatures, and is attached to this directive. This revised form replaces the one in the current version of the LTPP Profiler Manual.

A calibration check of the temperature probe shall be performed within 30 days prior to the air temperature measurements or whenever the operator observes suspicious temperature readings. A National Institute of Standards and Technology (NIST) traceable mercury thermometer is

required to perform the check. The test should be performed in a shade area, using the following procedure:

1. Place a thermometer close to the temperature probe and, after they have reached a stable value, observe the reading of the thermometer and probe.
2. If the difference between the two temperature readings are less than or equal to 2 °C, the temperature probe is considered to be acceptable.
3. If the difference between the two temperatures is greater than 2 °C, wait at least 5 minutes and repeat steps 1 and 2. If the difference is still greater than 2 °C, wait at least 5 minutes and repeat steps 1 and 2 again. If the difference between the temperatures is still greater than 2 °C consider the air temperature probe to be unacceptable, and contact manufacturer of probe to resolve the problem.
4. If there are any questions regarding the accuracy of the temperature probe, a cold temperature check shall be performed on the sensor. In this check, a plastic bag containing crushed ice is placed around the temperature probe. Allow sufficient time for the temperature probe to stabilize and check the reading displayed. The temperature should be within ± 2 °C of 0 °C. If not, consider the air temperature probe to be unacceptable, and contact manufacturer of probe to resolve the problem.

The results of the calibration check shall be recorded on Form DS-11, which is also attached to this directive.

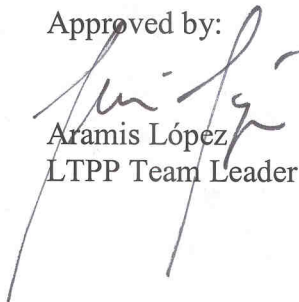
Office processing and performance of quality assurance checks on the longitudinal profile data collected with a Dipstick®, including temperature data, are described in Section 5.3 of the LTPP Profiler Manual. Step 2 in this section describes the entry of header information into the ProQual software and the quality assurance checks performed on the header information. At present, the manual has the following description regarding temperature measurements: "The pavement surface temperature, in degrees Celsius, obtained with an infrared device is entered in this field." Under this directive, the referenced sentence shall be changed to: "The average air temperature, in degrees Celsius, obtained with the air temperature probe is entered in this field."

Note: *This directive does not affect the guidelines for temperature measurements during transverse Dipstick® data collection.*

Question concerning this directive should be addressed to the FHWA LTPP Team representative responsible for profiler activities. If there are problems with the implementation and/or usage of this directive, please submit a Profiler Problem Report (PROFPR) form in accordance with the guidelines contained in the current version of the LTPP Profiler Manual.

Prepared by: TSSC

Approved by:


Aramis López
LTPP Team Leader

LTPP Dipstick Operations Air Temperature Probe Calibration Check Longitudinal Profile Form DS-11	Region [____]
	Probe Serial Number [____]
	NIST Serial Number [____]
	Date [____ / ____ / ____]
	Scheduled [YES / NO]

Ambient Temperature Check - Trial # 1	
Time	[____ : ____]
Air Probe	[____ °C]
NIST Thermometer	[____ °C]
Is Air Probe within $\pm 2^{\circ}\text{C}$ of NIST Thermometer?	¹ [YES / NO]
¹ If yes, Trial # 2 and Trial # 3 are not required.	
Ambient Temperature Check - Trial # 2	
Time	[____ : ____]
Air Probe	[____ °C]
NIST Thermometer	[____ °C]
Is Air Probe within $\pm 2^{\circ}\text{C}$ of NIST Thermometer?	² [YES / NO]
² If yes, Trial # 3 is not required.	
Ambient Temperature Check - Trial # 3	
Time	[____ : ____]
Air Probe	[____ °C]
NIST Thermometer	[____ °C]
Is Air Probe within $\pm 2^{\circ}\text{C}$ of NIST Thermometer?	³ [YES / NO]
³ If no, air probe is unacceptable.	
Cold Temperature Check	
Is Cold Temperature Check required?	[YES / NO]
Air Probe	[____ °C]
Is Air Probe Measurement $0^{\circ}\text{C} \pm 2^{\circ}\text{C}$	⁴ [YES / NO]
⁴ If no, air probe is unacceptable.	

Performed by: _____

Employer: _____

LTPP Dipstick Data Collection Form Longitudinal Profile Form DS-1 Measurement Information and Closure Computation	State Code [] LTPP Section [] Date (dd/mm/yy) ____/____/____
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Dipstick Serial Number: [] Dipstick Model Number: 1500/2000/2200 Dipstick Fitted with 32 mm footpads? ____
 Footpad Spacing (mm): [] Operator: [] Recorder: []
 Site Type: GPS/SPS/WIM/Other Surface Type: [] Pavement Condition: V.GOOD/GOOD/FAIR/POOR
 Road Name: _____ Lane: Inside/Outside
 Direction: NORTH/EAST/SOUTH/WEST Cloud Conditions: CLEAR/P. CLOUDY/CLOUDY
 Start Air Temperature: ____ °C End Air Temperature: ____ °C Average Air Temperature: ____ °C
 Weather Comment: _____
 Start Time (military): ____ : ____ Stop Time (military): ____ : ____

Closure Error Computation

Right Wheel Path		Left Wheel Path		
No	Elevation Sum	No	Elevation Sum	
O1		I1		
O2		I2		
O3		I3		
O4		I4		
O5		I5		
O6		I6		
O7		I7		
O8		I8		
O9		I9		
O10		I10		
O11		I11		
O12		I12		
O13		I13		
O14		I14		
O15		I15		
O16		I16		
O17		I17		
O18		I18		
O19		I19		
O20		I20		
Total O1 to O20	OA	Total I1 to I20	IA	
Transverse Sum T2	OB	Transverse Sum T1	IB	
Total OA+OB	OC	Total IA + IB	IC	OC+IC

**Traffic Control
Crew:**

**Other Personnel
At Site:**

Closure Error