



Designation: D7228 – 06a (Reapproved 2020)

Standard Test Method for Prediction of Asphalt-Bound Pavement Layer Temperatures¹

This standard is issued under the fixed designation D7228; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers a means of predicting temperatures within the asphalt-bound layer(s) of a flexible pavement section.

1.2 Deflection testing commonly involves the measurement of pavement surface temperatures. This standard is based on temperature relationships developed as part of the Federal Highway Administration (FHWA) Long Term Pavement Performance (LTPP) Seasonal Monitoring Program.

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

D4694 Test Method for Deflections with a Falling-Weight-Type Impulse Load Device

D4695 Guide for General Pavement Deflection Measurements

D4602 Guide for Nondestructive Testing of Pavements Using Cyclic-Loading Dynamic Deflection Equipment

D5858 Guide for Calculating *In Situ* Equivalent Elastic Moduli of Pavement Materials Using Layered Elastic Theory

2.2 AASHTO Standards:³

T256-00 Standard Method of Test for Pavement Deflection Measurements

T317-02 Standard Method of Test for Prediction of Asphalt-Bound Pavement Layer Temperatures

¹ This test method is under the jurisdiction of ASTM Committee E17 on Vehicle - Pavement Systems and is the direct responsibility of Subcommittee E17.41 on Pavement Testing and Evaluation.

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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.

³ Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001.

2.3 Federal Highway Administration:⁴

FHWA-RD-98-085 Temperature Predictions and Adjustment Factors for Asphalt Pavements, June 2000

LTPP Guide to Asphalt Temperature Prediction and Correction Online Temperature Prediction and Correction Guide—TOC, November 2002

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *BELLS*—an acronym based on the initials of the four developers of the method: Baltzer, Ertman-Larsen, Lukanen, and Stubstad.

3.1.2 *depth*—the distance below the surface of the top layer of asphalt.

3.1.3 *1-day air temperature*—the average of the minimum and maximum air temperatures at the location of testing during the previous complete 24-hour day.

4. Summary of Test Method

4.1 Input Data Elements:

4.1.1 *IR Temperature*—The exposed surface temperature of an asphalt pavement is measured, preferably with an infrared (IR) temperature sensing device that is properly calibrated.

4.1.2 *Time of Day*—The time of day the temperature measurement takes place is recorded.

4.1.3 *1-Day Temperature*—The average 1-day air temperature of the previous complete 24-hour day is determined and recorded.

4.1.4 *Pavement Depth*—The depth at which an estimate of the asphalt layer temperature is required is specified.

4.2 The input data elements are entered into a regression formula that predicts the temperature within the asphalt pavement at depth.

5. Significance and Use

5.1 Analysis of deflection data from asphalt pavements almost always requires that the raw deflections or the analysis results from the load-deflection data be adjusted for the effects of pavement surface course temperature. Measuring the temperature at depth normally requires that a hole be drilled into

⁴ Available from Federal Highway Administration (FHWA) 400 Seventh Street, SW Washington, DC 20590.