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Introduction

1.1 Features of Asphalt Pavement Quality Indicator

2701 utilizes advanced electromagnetic technology to obtain accurate asphalt pavement density readings.

Its primary features are:

No radioactive materials or special license required

Light weight and easy to use

24 hours of portable operation

Measures density in common units (Kg./M3)

Measures for asphalt temperature

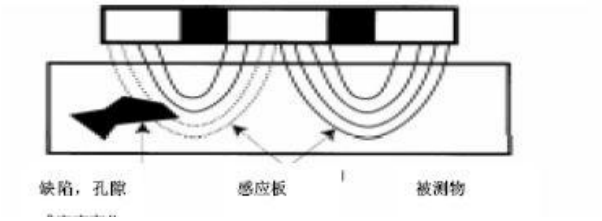
Stores 4000 readings on internal Data Logger

Optional download to computer How Does it Work?

The density of asphalt pavement is directly proportional to the measured dielectric constant of the material. 2701 uses electrical waves to measure dielectric constant using an innovative, toroidal electrical sensing field established by the sensing plate.

The electronics in the 2701 convert the field signals into material density readings and displays the results. Once calibrated, direct density readings can be consistently obtained.

As shown below:



1.2 Packing List

The 2701 shipment package includes the items listed below. Please contact your dealer if any part missing.

1.One storage case

2. One 2701 unit
3. One battery charger: 220V/50Hz
4. One USB data cable
5. User manual, warranty card, certificate

1.3 Charging the Battery

Note: Before using the unit for the first time, the internal battery must be fully charged.

2701 is powered by nickel metal hydride batteries which weigh less and are smaller than equivalent lead-acid cells.

For first use and after a fully discharged battery pack a minimum of 5 hours should be allowed for charging.

Under normal operation, 2701 can operate in excess of 13 hours at full charge. The internal 12 volt battery is designed to be recharged in approximately 2-4 hours, using the 220 V AC battery charger.

Warning!

Attempting to recharge the unit in any other way than with the recharger supplied with the unit can result in damage to the unit and can present a safety hazard. Use of any charging means other than the recharger supplied with the unit will void the unit's warranty.

To charge the unit, proceed as follows:

Turn 2701 off

Connect the charger to the charger connector

Plug the charger into a standard AC outlet

When charging is complete, unplug the charger from the power source first then from the connector.

Operation of 2701

2.1Starting 2701 for the first time

Turn 2701 on by flipping the POWER switch on the left. The display backlight will flash and the internal buzzer emits a beep sound. Then the unit begins self-test and starts. After a few seconds the display will show the boot up screen.

2.2Menu:

After boot up, the screen displays as follows: Main Menu

Measurement Mode Calibration Mode
Data View
Data Deletion
Setup

Record:5 Battery80% Temperature 24°C [2012-10-10 13:30:12]

The up and down arrow keys can be used to select appropriate functions and specific functions are as follows:

<Measurement Mode>

2701 can be used in three different measurement or run modes, respectively:

Continuous reading mode
Single reading mode
Average reading mode

Continuous Reading Mode: Continuous reading mode is used to provide instantaneous density measurements for quality control purposes. When in continuous mode, 2701 will display a screen and update values of density, temperature and compaction continuously.

Note: The data cannot be saved in this mode.

Single Reading Mode: single reading mode is used to provide density measurement for one specific point, and conduct single reading each time.

In the mode, press “OK” to start a reading. The unit begins to read and display data from the probe four seconds later after pressing “OK”.

Note: Any touch to the unit by hand or other metal objects is prohibited once the countdown of reading begins, otherwise will distort the reading seriously.

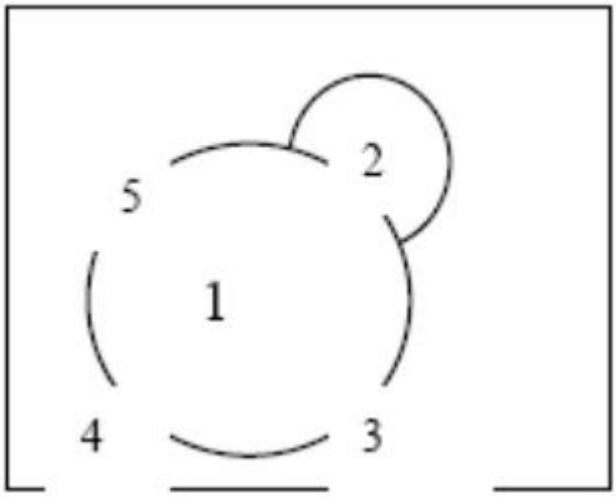
The data gained can be stored on internal data logger.

Storing data: Once a single reading is completed, press <1> to save measured data.

Note: the unit allows maximum storage of data for 4000 points. You will be prompted to delete data, if exceed this number.

Average Reading Mode:

As shown below



Draw a circle around the sensor's outer edge of 2701 and take readings in the center (1) and at 2 o'clock, 5 o'clock, 8 o'clock and 11 o'clock positions. After reading number 5 is complete, calculate the average of the 5 readings.

Press key <1>to save the data after the measurement is completed.

<Calibration Mode>

2701 provides three different calibration methods, respectively:

Normal Method

One Point Method

Two Point Method

Normal Mode: Normal calibration function can be used to obtain a number of core readings, and calculate the average amount that the 2701 is reading too high or low. The first step is to press a key to indicate whether the 2701 is reading too high or low. After pressing the key, the following screen will appear:

Normal Mode

Offset Adjustment: 1200

Up and down arrow keys can be used to change the number

At this point you should enter the difference in the 2701 and core readings.

For example, if the average core reading was 2430kg/m3 and the average 2701 reading at those locations was 2400kg/m3, then the 2701 is reading 30kg/m3 too low, relative to the cores and you would enter 1230 at the "Adjustment" prompt.

Note: The calibration should be entered in the current density units.

One Point Method

Note: You must first enter the mix MTD before using this method.

Many users have found that their screeds obtain a fairly uniform compaction. If this compaction is known, it can be used to perform a quick offset calibration of 2701 using the One Point Method. To use this method, you need to first press key “2” from the Calibration Menu. After displaying a message recommending that you first read this guide, the following menu will be displayed:

One Point Method

Enter compaction:__%

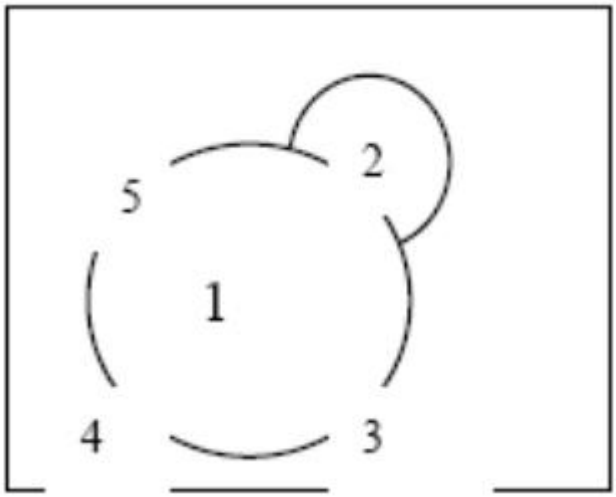
After entering the percent compaction you expect from the screed, you will be prompted as follows:

One Point Method

Enter compaction: 95%

Average value of 5 readings

Then obtain readings at the positions as shown below.



Draw a circle around the sensor’s outer edge of 2701 and take readings in the center (1) and at 2 o'clock, 5 o'clock, 8 o'clock and 11 o’clock positions. After reading number 5 is complete, calculate the average of the 5 readings.

Finally, 2701 will store the calculated average value on internal data logger.

Two Point Calibration Method

The Two Point Calibration Method is similar to the One Point Method but it uses an additional measurement of the finished mat in order to obtain a slope calibration in addition to an offset calibration.

The Two Point Calibration Method requires two screeds to calibrate 2701 and then calculate automatically the slope and offset values correspondingly.

2.2.1 Setup Menu

Press the Up or Down arrow to select the last option ”Setup” and enter into the following screen after pressing the key OK.

Setup

Setting the time
Maximum Theoretical Density (MTD) value
Select Pavement Type
Enter Pavement Thickness
More…..

On this page, you can set time, MTD and select pavement type.

2.2.2 Notice(Routine Operations)

1). Once calibrated the 2701 is ready to be used at each job site and asphalt mix. It is suggested that 5 or more readings be taken at each site following the average reading pattern.

2). Keep 2701 bottom surface clean and dry. For accurate readings, the 2701 should have a clean, dry and smooth interface with the mat.
Therefore, you should wipe the 2701 probe surface dry and clean after each reading.

3). Before placing the 2701 on the mat, you should check the surface of the mat to make sure there is no loose material on the surface. If a buildup of asphalt begins to form on the probe surface, clean the surface with WD-40.

4). Choose measurement spots that are dry. While the 2701 contains moisture correction algorithms, the most accurate readings will be obtained if areas with low moisture levels are measured. If a measurement area has noticeable surface moisture, you should either wait for the moisture to evaporate or remove the moisture with an absorbent cloth.

2.2.3 Watch for suspicious readings

If a reading seems unusual or suspicious, check for possible measurement errors (dirty surface, wet surface, low battery voltage) and retake the reading.

Rest results are obtained when moisture levels for a series of readings are kept relatively constant. If the moisture level for a reading is more than a percentage point higher or lower than the previous readings, the reading should be treated as suspicious.

Don't touch the 2701 while it is making a measurement. Touching any part of the 2701 while it is performing a measurement can distort the reading.

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