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**APPLICATION BRIEF**

Model 2701 PaveTracker™  
Electromagnetic Sensing Device

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**Introduction**

The Troxler Model 2701 is the first electromagnetic sensing device to be offered by Troxler. The PaveTracker provides advanced technology in a patented<sup>1</sup> device designed for the asphalt industry that allows rapid and reliable pavement measurements. It is ideal for quick quality control measurements to check for segregation, areas of low density and overall pavement uniformity.

**Traditional Methods**

The PaveTracker works in a very different way than the traditional nuclear density gauges in that it is not giving a direct density measurement. A relative reading is given that can be offset to a representative core sample to give actual density readings for the pavement being measured. The nuclear density gauges measure the actual density of the material, however the PaveTracker indicates the density of the material by detecting a component of the material density and relating that to a density value. The component is referred to as the dielectric property of the material. As the asphalt is compacted, the air voids in the mix decrease and the dielectric properties change; therefore the PaveTracker reports this change as an increase in the density.

**Troxler Technology**

The technology that the PaveTracker uses to report pavement uniformity is related to the “chemical composition per unit volume”. For asphalt material that is relatively homogeneous, the change in the dielectric properties monotonically increases as the material densifies. The dielectric properties of asphalt include the composite chemical properties of the binder, aggregate and air voids in the mix. As the asphalt is compacted, the air voids component of the mix will be reduced. Since air has a lower dielectric constant than the other components, this change will be reflected as an increase in the density of the asphalt. Non-uniformity in the asphalt mix can also be reflected in a similar way, alerting the user of possible segregation of the asphalt.

## **PaveTracker Operation**

The operation of the PaveTracker is quick and simple. Measurement results are updated on the display screen every second. After the device is turned on and “referenced” on a test plate built into the PaveTracker transport case, measurements can be performed immediately. If the device is not offset to match core samples or nuclear gauge measurement results, it can be used to indicate “relative density” values. In other words, the results can indicate if the maximum compaction level has been achieved or if a uniform compaction level has been achieved. If core values are available and the PaveTracker is offset to match these, a direct density value can be measured. Two modes are available for performing measurements on asphalt pavements; fast and average. In the fast mode the measurement results appear on the screen almost instantaneously as it is placed on the asphalt. The average mode requires that the PaveTracker be allowed to remain in place for a few seconds while the results are averaged out.

This device is non-nuclear, therefore requires no licensing or special training in order to possess, use or transport the equipment. It is also lightweight, weighing two pounds. No moisture or temperature corrections are needed by the PaveTracker. The three- foot telescoping handle allows the user to perform many measurements without bending. The PaveTracker is also supplied with slider gaskets that cover the bottom surface of the sensor to prevent damage from hot asphalt. These are generally used when the device is pulled across the mat to obtain a density profile. The test plate or “reference block” contained in the transport case is always available for checking instrument stability. The Model 2701 PaveTracker was designed for convenience and ease of use by the operator.

## **Control Panel**

The PaveTracker has a very simple control panel. The Reference button, to the left of the display allows the operator to “reference” the device on the test plate and to adjust the reference value when offsetting to an alternative density value (core or nuclear gauge). The Power and Battery switches are available for turning the device on and off and checking battery voltage. The Core Match toggle switches allow the operator to adjust the displayed density value when referencing and when offsetting to an alternative density value. The Fast/ Average switch determines how quickly the measurement results are displayed on the screen.

## **Batteries and Power Consumption**

This device runs on rechargeable batteries. Under normal conditions a fully charged battery will operate for 8 hours. A full charge takes 15 hours. A 110 V ac and a 12 V ac charger/adaptor are included as standard accessories.

## Summary

The Model 2701, PaveTracker is a lightweight electro magnetic sensing device for measuring the uniformity of asphalt pavement. The measurements are practically instantaneous when the device is placed on the asphalt surface. Areas of segregation, low density or other non-uniformities are easily detected by the PaveTracker, which allows the operator to correct the problem before construction is complete. This is the first of its kind to be offered by Troxler.

## Model 2701 PaveTracker Specifications

Size, electronics module	3.5" W x 4.5" D x 2.25" H
Size, field case with electronics module	6" W x 8" D x 3.5" H
Weight, electronics module	1 lb
Weight, field case with electronics module	2 lb
Display	Pavement density in lb/ft <sup>3</sup>
Probe	Non-nuclear, electromagnetic
Probing depth	1.75 in
Measurement time	1 second
Repeatability	±0.5 pcf
Power	Rechargeable battery, run time 8 hours
Calibration	To asphalt cores, unit will sit on a 6" core or puck
Handle	Telescoping, detachable
Transport Case	Water resistant with built in reference standard "test plate"