

Enhanced RoadReader™ Plus Nuclear Density Gauge Model 3451

The Model 3451 is Troxler's newest addition to the line of moisture / density gauges for the construction industry. This new gauge offers the proven reliability and user-friendly operation that Troxler products are known for with the addition of innovative features such as GPS (global positioning system) locations automatically stored with each reading, a wireless PDA (Personal Digital Assistant) device to control the gauge operation and advanced software with data storage capabilities. These features add integrity to the reported gauge data; all measurement data is stored in the PDA and in the gauge for backup purposes.



All of your field moisture / density testing requirements fulfilled in one gauge . . . and more!

Ease of Operation

The first field moisture / density gauge to offer such advanced technology.

- Gauge functions completely controlled by discrete hand held PDA.
- Measurement data automatically stored in the PDA as well as in the gauge for backup.
- PDA has user-friendly software application to simplify user interface.
- GPS locations are automatically stamped and stored in the measurement record along with date and time of reading.
- Data Management Software is supplied for downloading stored data to your PC.
- Data can be sent to a Microsoft Excel spreadsheet for sorting, printing and emailing.
- Cables required for PC connectivity are supplied.
- PDA can be used for other record keeping needs (Windows® CE).



Outside the USA— +1.919.549.8661

Troxler is a proud member of:

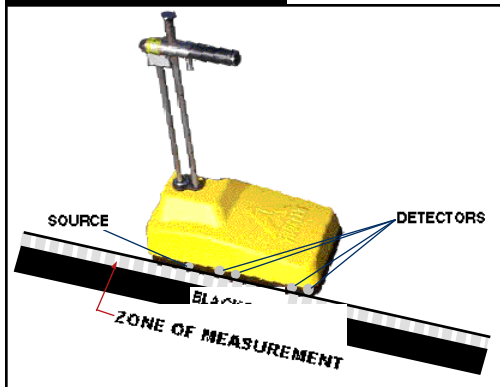


Enhanced RoadReader™ Plus Nuclear De

Four measurement modes are included in one gauge

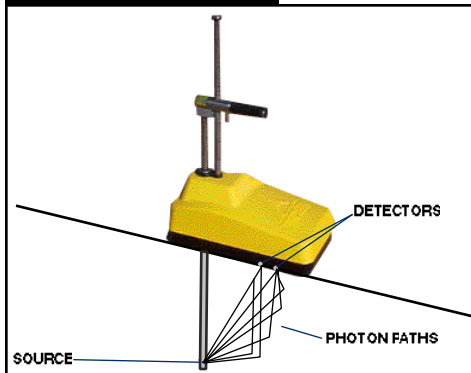
With the 3451 you will always be sure to have the right gauge available when it is needed.

Thin Overlay Asphalt



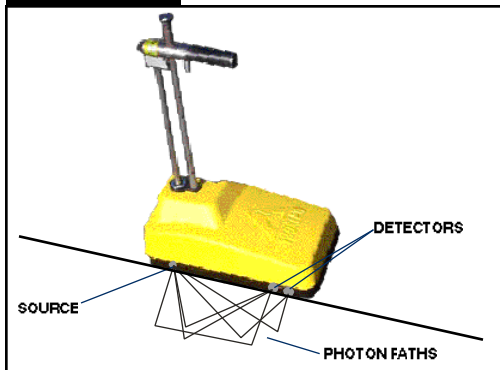
This patented Troxler process measures the density of asphalt & concrete overlays from 1-4 in. (2.5 - 10 cm) without influence from the underlying material.

Direct Transmission



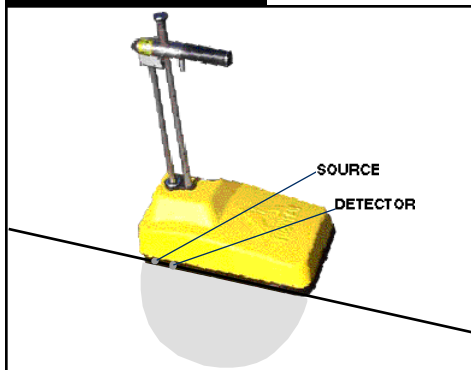
Density measurement of choice for lifts of soil, soil aggregate and stone up to 12 in. (30.48 cm).

Backscatter



Ideal nondestructive density measurement mode for full depth asphalt and concrete.

Moisture Detection

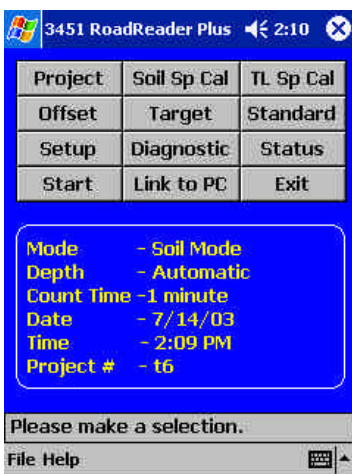


Nondestructive moisture measurement for soil, soil aggregate and stone base.

Updated Power Architecture

The Model 3451, Enhanced Roadreader Plus is powered by Nickel Metal Hydride batteries. This type of battery allows for longer use and shorter recharge time. In addition, the NiMH batteries can be charged incrementally without damage to the battery. No more waiting until the Battery Low warning is displayed to charge.

PDA Control



All gauge functions are controlled from a user-friendly wireless PDA (Windows® CE Operating System). Measurement storage, date / time stamp and GPS locations are all handled automatically. A ruggedized PDA case, rechargeable PDA batteries, AC or DC charging capabilities and bright, intuitive screens make for a satisfying user experience.

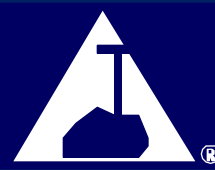
Data Storage

The PDA has user-friendly software which offers a Setup Wizard to assist the operator when beginning a project. All measurements performed are stored in the PDA under a project number. The data can be viewed on the PDA or downloaded to a computer. The DMS (Data Management Software) provided with the Model 3451 allows the user to download all project data to the computer as well as other information such as STAT and Drift tests and Calibration constants. The stored data is in an encrypted format so it cannot be altered. When it is sent to an Excel™ spreadsheet the user can sort the data as desired. Measurement data is also stored in the 3451 gauge in case the PDA is lost or damaged.



ASTM

The Troxler Model 3451 exceeds the following ASTM standards:
 D2922 D3017 D2950 C1040



Features & Benefits

- Thin layer capabilities in addition to traditional soil, full depth asphalt and moisture measurement applications
- GPS coordinate locations are recorded with each measurement record (automatically)
- Controlled by wireless PDA device; user-friendly RoadReader™ software ensures simple user interface
- Every measurement performed is automatically stored under the active project
- NiMH batteries last longer and charge in 2.5 hrs.; can be charged incrementally without harm to batteries
- PC-ready Data Management Software CD for managing projects and measurement data is supplied with the product
- Storage of all readings — no more searching for the “good spot” on the pavement to record
- All readings are downloaded at the same time; no need to select which ones to report
- PDA controls the gauge functions — no bending required to press buttons for reading and recording data
- Automatic standard count comparison and storage (last 4 readings stored)
- Field offset of density and moisture data
- Field calibration for special materials
- Self-test and diagnostic tests included
- GM tube test
- PDA display screen backlight
- Adjustable volume beeper on gauge
- Leak test date alert
- Automatic averaging of multiple measurement results

USA Patent Numbers:

4,525,854; 4,641,030; 4,701,868;
4,749,858; 5,442,186; 6,310,936;
6,442,232; other patents pending

Canada Patent Number:

1,219,970



SPECIFICATIONS

Measurement — US Customary Units

	15 sec	1 min	4 min
Direct Transmission (6")			
Precision (pcf)	0.32	0.15	0.08
Composition Error (pcf)	0.50	0.50	0.50
Surface Error (0.05", 100% Void) (pcf)	-1.1	-1.1	-1.1

	15 sec	1 min	4 min
Backscatter			
Precision (pcf)	1.0	0.50	0.25
Composition Error (pcf)	0.87	0.87	0.87
Surface Error (0.05", 100% Void) (pcf)	-5.0	-5.0	-5.0

	15 sec	1 min	4 min
Moisture at 15 pcf			
Precision (pcf)	0.69	0.34	0.17
Surface Error (0.05", 100% Void) (pcf)	-1.2	-1.2	-1.2
Depth of Measurement = 8.5"			

Measurement — SI Units

	15 sec	1 min	4 min
Direct Transmission (150 mm)			
Precision (kg/m ³)	5.2	2.6	1.3
Composition Error (kg/m ³)	8.0	8.0	8.0
Surface Error (1.25 mm, 100% Void) (kg/m ³)	-18.0	-18.0	-18.0

	15 sec	1 min	4 min
Backscatter			
Precision (kg/m ³)	16.0	8.0	4.0
Composition Error (kg/m ³)	14.0	14.0	14.0
Surface Error (1.25 mm, 100% Void) (kg/m ³)	-80.0	-80.0	-80.0

	15 sec	1 min	4 min
Moisture at 240 kg/m³			
Precision (kg/m ³)	11.0	5.5	2.8
Surface Error (1.25 mm, 100% Void) (kg/m ³)	-19.0	-19.0	-19.0
Depth of Measurement = 215 mm			

Thin Overlay Mode

Precision at 2240 kg/m³ (140 pcf)

<u>Time (min)</u>	<u>Thickness</u>	<u>kg/m³</u>	<u>pcf</u>
1.0	2.5 cm (1.0")	±16	±1.0
	5.0 cm (2.0")	±10	±0.60
	6.3 cm (2.5")	±8	±0.50
	10.0 cm (4.0")	±8	±0.50

<u>Time (min)</u>	<u>Thickness</u>	<u>kg/m³</u>	<u>pcf</u>
4.0	2.5 cm (1.0")	±8	±0.50
	5.0 cm (2.0")	±5	±0.30
	6.3 cm (2.5")	±4	±0.25
	10.0 cm (4.0")	±4	±0.25

Precision is defined as ± one standard deviation in density readings. This number is calculated by the ratio of the standard deviation in the counting rate and slope of the calibration curve at a given density.

Electrical

Stored Power	5 watt-hours
Time Before Automatic Shutdown	5 hours of complete inactivity
Power Source(s)	5 "C" cell nickel metal hydride rechargeable batteries
Battery Recharge Time	2.5 hours maximum, automatic cutoff
Charge Source	110/220 V ac, 50-60 Hz or 10-14 V dc
Readout	Provided by means of the PDAdevice
Keypad	Provided by means of the PDAdevice

Mechanical

Gauge Size (with handle)	12" rod: 604 H x 411 L x 229 W mm (23.8 H x 16.2 L x 9.0 W in)
	8" rod: 503 H x 411 L x 229 W mm (19.8 H x 16.2 L x 9.0 W in)
Shipping Case Size	782 H x 353 L x 455 W mm (30.8 H x 13.9 L x 17.9 W in)
Weight	16 Kg (35.3 lbs)
Shipping Weight	42.5 Kg (94 lbs)
Operating Temperature	Ambient 0 to 70°C (32 to 158°F)
Max Test Material Surface Temperature	175°C (347°F), for 15 minutes
Storage Temperature	-55 to 85°C (-67 to 185°F)
Humidity	98%, noncondensing

This instrument contains sensitive electronic components. This instrument must not be subjected to stress, abuse or used other than in accordance with the standard operating procedures listed in the user manual.

Radiological

Gamma Source	0.30 GBq (8 mCi), ± 10% Cs-137
Neutron Source	1.48 GBq (40 mCi), ± 10% Am-241:Be
Source Type	Sealed Source - Special Form
Source Housing	Stainless Steel, single or double encapsulated
Shipping Case	Type A, Yellow II, T1 = 0.6

Standard Equipment

• Shipping case	• PDAto PC cable
• Wireless PDAdevice	• PDAto gauge cable adapter
• PDAcharger	• Operator's manual
• Reference (standard) block	• Quick reference card
• Drill rod	• Gauge warranty
• Scraper plate	• Gauge certificate
• Extraction tool	• Calibration data sheet
• AC charger	• Shipping documents
• DC adapter	• Handle lock & key
• Gauge to PC cable	



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