

# RoadReader™ Nuclear Density Gauges

Models 3430 & 3440



Model 3430



Model 3440



[www.troxlerlabs.com](http://www.troxlerlabs.com)

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Outside the USA — +1.919.549.8661

Troxler is a proud member of:



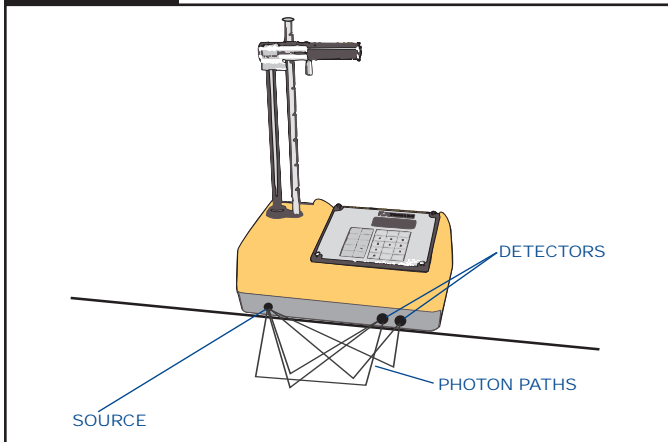
Winner of the 2003 IRF Global Road Achievement Award  
in the category of Technology, Equipment & Manufacturing

The Troxler RoadReader™ nuclear moisture / density gauges are used by many contractors, engineers, and highway departments for compaction control of soil, aggregate, concrete and full depth asphalt. These gauges meet or exceed ASTM standards D-6938 (which replaced D-2922 and D-3017 as of November 2006), D-2950, and C-1040. Two test modes are available for density determination: direct transmission and backscatter. The operator selects the mode depending on the material type and thickness of the layer being tested. The Model 3430 is available with keypad, display and operator's manual in four languages and is the simplest, most economical gauge offered by Troxler. The Model 3440 provides 30 special functions, storage of up to 450 test records, an 18-month warranty and many more options that make it simple to operate and a necessity for all technicians.

# RoadReader™ Nuclear Density Gauge

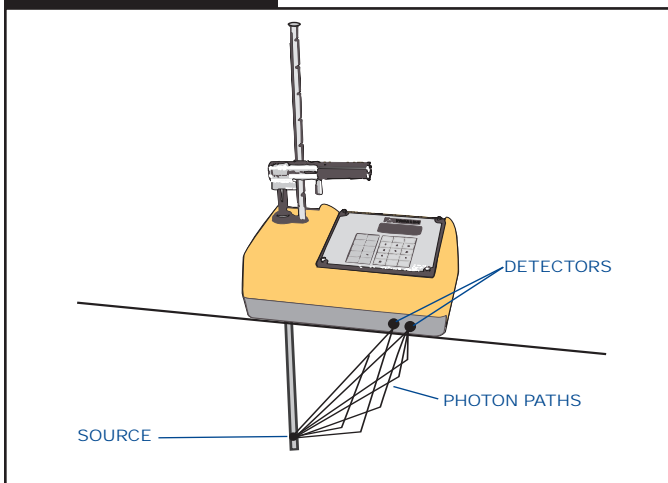
## Three Test Modes

### Backscatter



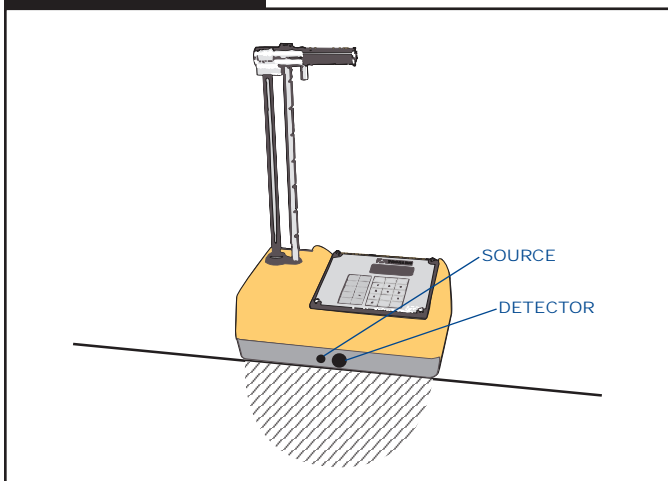
Backscatter is rapid and nondestructive. The gamma source and detectors remain inside the gauge which rests on the surface of the test material. Gamma rays enter the test material and those scattered through the material and reaching the detectors are counted. Backscatter is primarily used to determine density on layers of asphalt and concrete approximately 4" thick.

### Direct Transmission



The gamma source is positioned at a specific depth within the test material by insertion into an access hole. Gamma rays are transmitted through the test material to detectors located within the gauge. The average density between the gamma source and the detectors is then determined. Errors resulting from surface roughness and chemical composition of the test material are greatly reduced, and gauge accuracy is improved. Direct transmission is used for testing lifts of soil, aggregate, asphalt and concrete up to 12" in depth.

### Moisture Detection



The moisture measurement is nondestructive, with the neutron source and detector located inside the gauge just above the surface of the test material. Fast neutrons enter the test material and are slowed after colliding with the hydrogen atoms present. The helium-3 detector in the gauge counts the number of thermalized (slowed) neutrons, which relates directly to the amount of moisture in the sample.

### Both Models offer:

- Direct readout of wet density, dry density, moisture, % moisture, % voids and % compaction
- Lightweight
- Powered by rechargeable nicad batteries or backup alkaline batteries
- Prompts user through steps of operation
- Software allows for moisture, density and trench offsets

### ASTM

The Troxler Models 3430 & 3440 meet or exceed the following ASTM standards:

D-6938    D-2950    C-1040

### 3430 Features:

- Choice of languages — keypad, display and operator manual available in English, Chinese, Spanish and French.
- Simple to operate — single keystroke function access. Direct readout of test results.
- Economical — no other moisture / density gauge offers the benefits and proven performance of the Model 3430 at such an attractive price.



### 3440 Features:

- Data storage — stores up to 450 complete test records which can be downloaded to a printer or computer.
- Extended storage — gauge allows notes to be stored with test record
- Automatic indexing — eliminates a major source of operator error by automatically sensing depth of measurement.
- 30 Special functions provided — for example: self test and service programs, selected precision and field calibration for special materials.
- Calculator mode with storage.
- Nomograph method for measurement of asphalt overlays.
- Extended warranty — the first 18-month limited warranty in the industry.

### USA Patent Numbers:

4,749,858 & 5,442,186

# SPECIFICATIONS

## Measurement — US Customary Units

Direct Transmission (6")	<u>15 sec</u>	<u>1 min</u>	<u>4 min</u>
Precision (pcf)	0.42	0.21	0.11
Composition Error (pcf)	1.25	1.25	1.25
Surface Error (0.05", 100% Void) (pcf)	-1.1	-1.1	-1.1
Backscatter (98%) (4")	<u>15 sec</u>	<u>1 min</u>	<u>4 min</u>
Precision (pcf)	1.0	0.50	0.25
Composition Error (pcf)	2.50	2.50	2.50
Surface Error (0.05", 100% Void) (pcf)	-4.7	-4.7	-4.7
Moisture at 15 pcf	<u>15 sec</u>	<u>1 min</u>	<u>4 min</u>
Precision (pcf)	0.64	0.32	0.16
Surface Error (0.05", 100% Void) (pcf)	-1.2	-1.2	-1.2
Depth of Measurement = 6"			

## Electrical

Time Accuracy and Stability	±0.005%, ±0.0002% / °C
Power Supply Stability	±0.01% / °C
Stored Power	30 watt-hours
Battery Recharge Time	14-16 hours, automatic cutoff
Charge Source	110/220 V ac, 50-60 Hz or 12-14 V dc
Readout	4x16 alpha-numeric LCD (3430: 2x16)

Gauge returns to "Gauge Ready" (power saving mode) after 2 minutes of inactivity except in "standard", "stat test", "drift test" and "in nomograph" programs when a 30-minute delay is provided. After 5 hours of inactivity, the gauge performs complete power shut-down.

Battery packs are fully protected against overcharge and overdischarge (remaining battery voltage is indicated on the display - 3440 only).

Emergency use - Capable of operation with D size alkaline batteries.

## Measurement — SI Units

Direct Transmission (150 mm)	<u>15 sec</u>	<u>1 min</u>	<u>4 min</u>
Precision (kg/m3)	6.8	3.4	1.7
Composition Error (kg/m3)	20.0	20.0	20.0
Surface Error (1.25 mm, 100% Void) (kg/m3)	-17.0	-17.0	-17.0
Backscatter (100 mm)	<u>15 sec</u>	<u>1 min</u>	<u>4 min</u>
Precision (kg/m3)	16.0	8.0	4.0
Composition Error (kg/m3)	40.0	40.0	40.0
Surface Error (1.25 mm, 100% Void) (kg/m3)	-75.0	-75.0	-75.0
Moisture at 250 kg/m3	<u>15 sec</u>	<u>1 min</u>	<u>4 min</u>
Precision (kg/m3)	10.3	5.1	2.5
Surface Error (1.25 mm, 100% Void) (kg/m3)	-18.0	-18.0	-18.0
Depth of Measurement = 150 mm			
Calibration Specifications			
Accuracy of Density Standards	±0.2%		
Accuracy of Moisture Standards	±0.2%		
Calibration Range	70-170 pcf (1100-2700 kg/m3) Density 0-40 pcf (0-640 kg/m3) Moisture		

## Mechanical

Gauge Size (with handle)	<u>12" rod:</u> 591 H x 376 L x 231 W mm (23.25 H x 14.8 L x 9.1 W in) <u>8" rod:</u> 489 H x 376 L x 231 W mm (19.25 H x 14.8 L x 9.1 W in)
Shipping Case Size	432 H x 749 L x 356 W mm (17 H x 29.5 L x 14 W in)
Weight	13.2 Kg (29 lbs)
Shipping Weight	40.8 Kg (90 lbs)
Operating Temperature	Ambient -10 to 70°C (14 to 158°F)
Max Test Material Surface Temperature	175°C (350°F)
Storage Temperature	-55 to 85°C (-70 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, TI = 0.6

## Standard Equipment

• Shipping case	• 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

## Promat (HK) Ltd

901 New Trend Centre, 704 Prince Edward Road, San Po Kong, Kowloon, Hong Kong

寶時(香港)有限公司 香港九龍新蒲崗太子道東 704 號新時代商業中心 901 室

Tel.: (852) 2661 2392 Fax.: 2661 2086 e-mail: info@promat.hk Website: http://www.promat.hk

