

Basic Gauge Operation

Troxler Models 3411, 3430, 3440, 3450 and 4640 nuclear density gauges

The following is a basic guide on using Troxler's nuclear density gauges on typical compacted construction materials. Please refer to your operator's manual for more detailed information.

There are some basic parameters that need to be set in the gauge's memory. Please refer to the operator's manual for instructions on setting these in your specific model. They are as follows:

- Count Time; 1 minute or more is recommended for better precision
- Set Units; metric or US standard units
- Depth; Models 3440 and 3450 offer automatic and manual depth modes (automatic is recommended)
- Mode; Model 3440 and 3450 offer soil and asphalt modes, 3450 also offers a thin layer mode; when using the 3430 set the target to PR for soil materials and MA for asphalt, concrete or other material where moisture is not of concern

After turning the gauge on allow at least 10 minutes for the gauge to warm up. The standard count should be performed each day that the gauge is used to determine that the gauge is working properly and to adjust for source decay and environmental influences. Be sure that the gauge is positioned properly on the standard block that was supplied with the gauge. Please follow these guidelines:



1. Place the gauge on the white standard block with the keypad side (the side away from the source) against the metal plate (3400 series gauges).
2. The Model 4640 should be placed on the air gap spacer with the source above the end with the two posts, and centered on the magnesium standard plate.
3. Place the standard block (plate) on a smooth, dry surface at least 10 ft. (3 m) from any large vertical structure.
4. Be sure that any other nuclear sources are at least 33 ft. (10 m) from the gauge during the standard count.
5. The surface under the standard block should be compacted material with a density of at least 100 pcf that is at least 4 in. (10 cm) thick. An asphalt or concrete surface is ideal.
6. Make sure that the handle is in the safe position (all the way up).

After the standard count (240 seconds) check the results on the display. The results should show ----.-%P for all counts. If using a 3430 or 3411, the operator must calculate the percentage of difference between the current standard and the average of the last 4 standard counts taken as explained in the operator's manual. If there is a failing result (---.-%F), don't worry. First check to make sure that all of the guidelines listed above have been followed. If so and the failure is a small percent (under 4%), go ahead and accept the count and take another one. The result may fail again by a smaller percent, accept it and keep going until it passes (must pass by the 5th count). If the standard count fails regularly it may be necessary to perform a STAT test as explained in the

operator's manual. If the standard count fails by a larger percent (over 4% but under 10%) and all of the guidelines have been followed, perform a STAT test. If this passes, perform a new standard, accept the result, erase the previous counts (when using a 3440, 3450 and 4640) and perform 4 more. The 5th count must pass. If this happens frequently, please call a Troxler service or sales representative. If the count fails by more than 10% and all of the guidelines have been followed, call a Troxler service or sales representative.

Display Screens for Standard Counts

3430

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Standard Count:
DS= ---- MS= ----
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The operator must record the std. counts and calculate the %P or %F as compared to the previous 4 counts. For the DS, $\pm 1\%$ variance is allowed; for MS, $\pm 2\%$ variance is allowed.

3440

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MS= ---- -.-%P
DS= ---- -.-%P
Do you want to
use the new std?
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For the DS, $\pm 1\%$ variance is allowed; for MS, $\pm 2\%$ variance is allowed.

3450

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DS1= ---- -.-%pass
DS2= ---- -.-%pass
MS= ---- -.-%pass
Use new standard?
```

For the DS1, $\pm 1\%$ variance is allowed; for DS2, $\pm 1.2\%$ is allowed; for MS, $\pm 2\%$ variance is allowed.

4640-B

```
Std1 Std2
---- ----
-.-%p -.-%p
Use new standard?
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For the DS1, $\pm 1\%$ variance is allowed; for DS2, $\pm 1.2\%$ is allowed.

To perform a backscatter measurement:

(This is a surface measurement measuring from the surface to a depth of approximately 4 inches (10 cm) when not using a thin layer gauge.)

Locate a test site on the compacted material (soil, sand, aggregate, asphalt). This site should be as smooth as possible so no large voids are present under the gauge base. Place the gauge on the site and make sure that it doesn't "rock" or shift due to an uneven surface. Lower the handle to the first notch, being careful not to pass the proper position. (Press the trigger to release the handle, take your finger off the trigger and lower the handle until it stops.) To begin the measurement, press START. At the end of the count the gauge will beep (except 3411), pull up on the handle to place it in the "safe" position and check the display screen. For the best results, it is recommended to take 3 or 4 measurements at a site and find the average.



To perform a direct transmission measurement:

(The rod is lowered below the test material surface into a predrilled hole to measure a layer of compacted material up to 12 inches (30 cm) thick. The measurement is an average density of the material between the source and the detectors in the gauge base.)



Locate a smooth test site and place the scraper plate on the site. Place the extraction tool over the guide post and the drill rod in the guide post. Hammer the drill rod to the desired depth of measurement (the marks on the rod are in 2 inch (10cm) intervals), the rod should be driven to the bottom of the recently compacted layer of material or deeper, if possible.

Using the extraction tool, pull the drill rod straight up from the ground. Mark the corners or edges of the scraper plate so the gauge can be placed in the same "footprint". Lift the scraper plate and place the gauge in the outline just marked. Lower the handle to the desired depth. Make sure that the depth on the screen corresponds with the depth of the source rod. When using the 3411 and 3430 it is the operator's responsibility to program the correct depth into the gauge either by the keypad (3430) or the depth knob (3411). After the count the gauge will beep (except 3411), pull up on the handle to place it in the "safe" position and check the display screen. For the best results, it is recommended to take 3 or 4 measurements at a site and find the average.

To perform a thin layer measurement:

(Using a Troxler Model 4640 or 3450 gauge on asphalt or concrete materials.)

The procedure for a thin layer measurement is the same as that for a backscatter measurement. When using the Model 3450 make sure that the Mode is set to the Thin Layer option. Enter the appropriate lift thickness when using the Model 3450 or 4640 gauges before taking measurements. Any thickness between 1 inch and 4 inches (2.5 cm to 10 cm) can be programmed into the gauge, it is recommended that a thickness of .25 inch (.625 cm) less than the actual thickness be used when possible.

Please see the section titled "To perform a backscatter measurement".



To store measurement results:

To store data for future viewing, printing or downloading, a project number must be created before testing begins. After the project is created or enabled, the STORE button is pressed after each measurement result is displayed. Please see your operator's manual for more detailed instructions.



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