

Draft Protocol for calibration of Troxler in-field

To calibrate the Troxler for different soils, counts must be recorded rather than values presented based on factory calibrations.

Counts must be the gamma- ray count

- without an intervening soil sample - most easily obtained from Troxler manual. If glass standards are available, then this count should be confirmed before starting.
- and the count at the detector with an intervening soil sample of known depth

To obtain the calibration

1. Record gamma ray count at detector for a known depth of soil. Soil should be moist, but not wet
2. Record Troxler measure of soil water content
3. Collect soil core sample to known depth; 4 cores in the Troxler measurement site are suggested
4. Record wet bulk density and volumetric water content
5. Record dry bulk density
6. A small area of the paddock (approx 2m²) should be watered and allowed to drain to field capacity (or repeated after a heavy rainfall or irrigation event)
7. The measurements 1-5 outlined above should be repeated in this area

The aim should be to get counts for the soil moisture ranges that are likely to be encountered in the field. The number of repetitions for accuracy still needs to be determined.

The data of counts, soil bulk density and volumetric water content can then be used to develop the calibration equation described by Culley and McGovern².

To measure soil density to a known depth,

1. Record counts of gamma rays from Troxler
2. Record Troxler volumetric soil content measurement
3. Insert these into calibration equation for calculation of soil density.

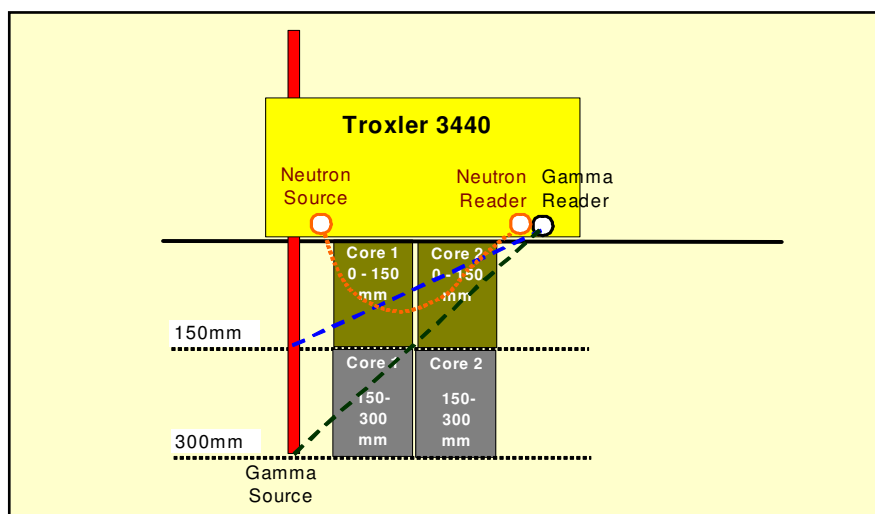


Figure 1. Schematic of Troxler and physical core sample positions as taken for soil calibration purposes