



METER
ENVIRONMENT

TECH NOTE: GS3 VS. TEROS 12

The [TEROS 12](#) represents several substantial improvements over the GS3. An improved mechanical design increases the robustness and service life expectancy of the TEROS 12 over the GS3 (as indicated by the extended warranty period). New sensor calibration technology reduces the sensor-to-sensor variability of the TEROS 12 resulting in better water content accuracy across a population of sensors. A new electrical conductivity measurement algorithm results in better EC measurement accuracy. And, compatibility with the [TEROS Borehole Installation Tool](#) allows quick and flawless sensor installation in field soils with minimal site disturbance.

Despite TEROS 12 improvements, we understand that many researchers and growers trust in the GS3, having used them for many years. We also understand the desire to maintain sensor continuity in long-term research and monitoring projects. As a result, we have spent significant development time designing the TEROS 12 to be as drop-in compatible with existing GS3 installations as possible.*

To demonstrate cross-compatibility, we collected data from subsamples of both GS3 and TEROS 12 sensors over several months in primary dielectric permittivity standards. Figure 1 shows TEROS 12 measurements on the vertical axis and the GS3 measurements on the horizontal axis. The black 1:1 line is GS3-measured dielectric permittivity plotted against itself to give a visual reference of the agreement between GS3 and TEROS 12. If the agreement between GS3 and TEROS 12 sensors were perfect, the blue dots would lie exactly on the 1:1 line. It is apparent from Figure 1 that there is very close agreement between GS3 and TEROS 12 in the range of dielectric permittivity normally found in soils. There is some deviation at higher dielectric permittivity levels that might be found in low density growing media close to saturation (e.g., stone wool). However, the TEROS 12 deviation is actually an improvement in accuracy over the GS3.

TEROS 12 Dielectric Permittivity vs. GS3 Dielectric Permittivity

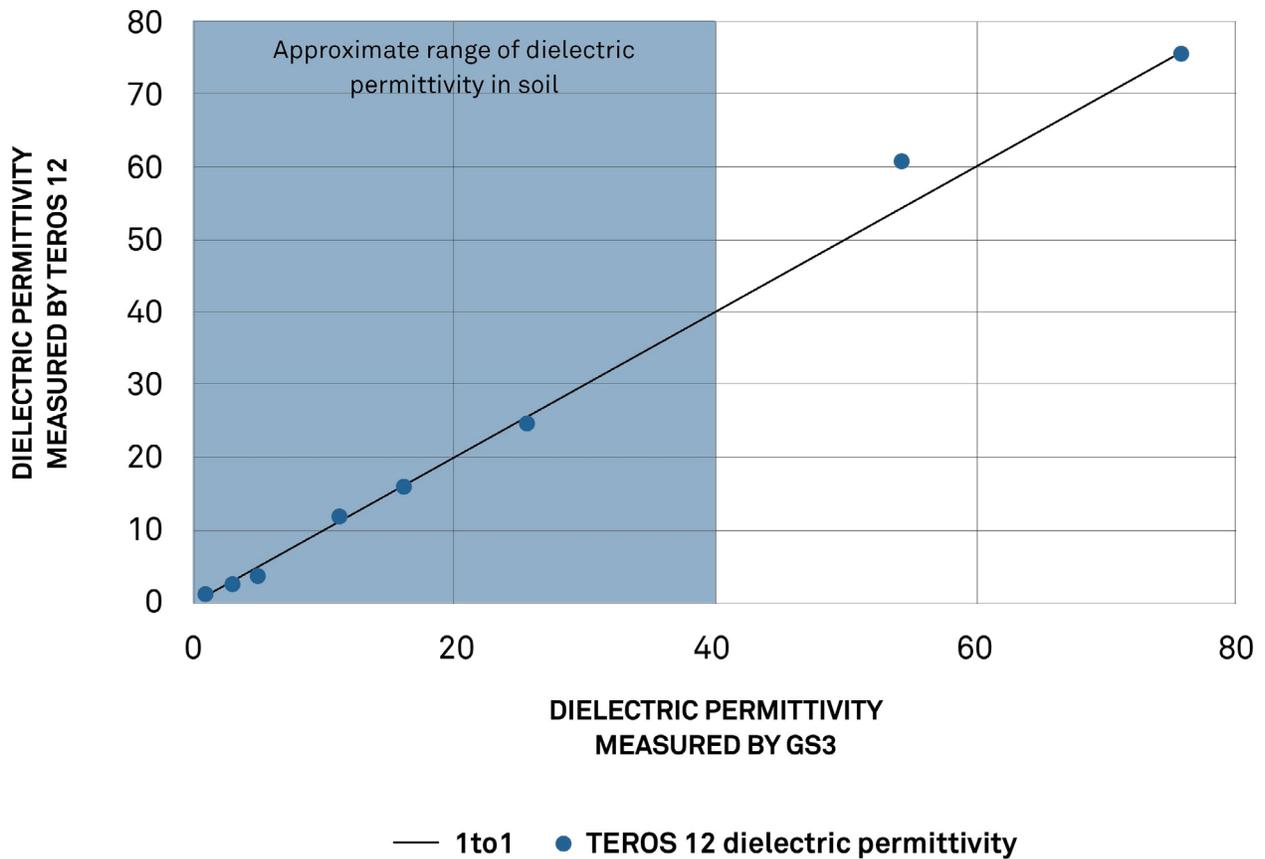


Figure 1. TEROS 12 vs. GS3 comparison

The result of comparing data from the GS3 and TEROS 12 is a small but noticeable difference in the sensor output. A [soil-specific calibration](#) is recommended to achieve the best results.

OUTPUT WHEN USED WITH NON-METER LOGGERS

The end result of the output after calibration is very similar, however, there are some practical considerations when replacing a GS3 with a TEROS 12 on a non-METER datalogger. The GS-3 has a raw output scale of 1 to 80, while the TEROS 12 outputs 1780 to 3600. Some small changes to programming are necessary to incorporate the TEROS 12 into a system that previously used GS-3's. Consult the [TEROS 12 integrator's guide](#) for communication specifics and [the manual](#) to choose the appropriate calibration.

***Note that the mineral soil and soilless media calibration functions are different for the TEROS 12 than the GS3 and must be applied correctly.**

GET THE COMPLETE PICTURE

Everything you need to know about measuring soil moisture—all in one place.

[Download the “Researcher’s complete guide to soil moisture”](#)