

Highlighting innovation design features  
and useful application information for  
**Thermo Scientific™ Orion™ VERSA STAR™ Meters**

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# smart notes

operation, installation tips ▶ conductivity meters



# Q A

**How do you account for temperature differences when measuring water conductivity?**

There are three ways to account for temperature effects when measuring the conductivity of water:

1. Record the temperature at which the reading was taken
2. Adjust the sample temperature to a controlled reference temperature
3. Apply temperature compensation to report readings at a reference temperature

The conductivity of water depends on the concentration of ions and temperature. We use conductivity measurements to determine the amount of dissolved ions present in a water sample, which serves as a measure of water quality.

Although conductivity measurements are generally simple, not accounting for temperature will greatly affect the validity of the data generated. Applying temperature compensation is a way to account for temperature effects, and ensuring the reliability and accuracy of your measurements. Temperature compensation uses the raw conductivity and temperature readings of the sample and applies a coefficient or algorithm to calculate and report the conductivity value of the sample at the selected reference temperature.



# How does Orion VERSA STAR make conductivity measurement easier?

## Selecting a Temperature Compensation Mode

The choice of temperature compensation mode depends on the method you are following, the sample you are testing, the temperature at which you are testing, and the meter you are using.

## Temperature Compensation with Orion VERSA STAR meters

Mode	When it should be applied
Non-temperature compensated	Used when required by the method, the temperature coefficient is not known, or the conductivity will be measured at the required reference temperature.
European Pharmacopoeia (Non-temperature compensated)	Complies with the EP and United States Pharmacopoeia (USP) methods for conductivity of pure water samples. Displays warning limits when the pure water exceeds the acceptable reading for that temperature.
Linear (% Coefficient)	Used when the temperature coefficient is known and is linear (salts, acids, bases, and sugars).
Non-Linear Natural (Air Equilibrated) Pure Water	Used when measuring low conductivity water that is in equilibrium with the carbon dioxide in air. (e.g. pure waters reading near 1 $\mu\text{S}/\text{cm}$ at 25°C and natural waters having a composition comparable to natural ground, well, or surface waters)
Non-Linear Ultra Pure Water (Degassed)	Used when measuring ultra pure water that contains no air and no carbon dioxide. (e.g. ultra pure water $\geq 18$ megohms resistance directly from the source without aeration)

Selectable reference temperatures for linear and non-linear temperature compensation modes are 5, 10, 15, 20 or 25 °C.

## Summary

Use Thermo Scientific Orion VERSA STAR series meters when you need quick and accurate liquid analysis results for all your toughest pH, ISE, conductivity, and dissolved oxygen testing challenges.



Explore the full range of Orion meters for liquid sensing and measurement at [www.thermoscientific.com/orionmeters](http://www.thermoscientific.com/orionmeters)

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