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**Environmental**

The level of conductivity in surface water can be affected by the wastewater from sewage and treatment plants, septic systems and urban runoff from roads.

# Conductivity of Surface Fresh Water

Orion 3-Star Conductivity Portable Meter



## Conductivity in Surface Fresh Water

Aqueous samples conduct an electric current via ions that are present in the solution. The most common ions contributing to conductivity levels are calcium ( $\text{Ca}^{+2}$ ), magnesium ( $\text{Mg}^{+2}$ ) and bicarbonate ( $\text{HCO}_3^{-1}$ ) or sodium ( $\text{Na}^{+1}$ ). Aqueous samples conduct an electric current due to ions present in the solution. The most common ions contributing to conductivity levels are calcium ( $\text{Ca}^{+2}$ ), magnesium ( $\text{Mg}^{+2}$ ), sodium ( $\text{Na}^{+1}$ ) and bicarbonate ( $\text{HCO}_3^{-1}$ ). High conductivity surface water negatively impacts plant productivity as the plants must now compete for ions in the soil for water. As the conductivity of water increases there is a proportional reduction of water available for plant transpiration since plants can only transpire "pure" water. Symptoms of high conductivity include slow growth, limited root development and plants that appear to be undersized.

Conductivity levels will vary with the water source: ground water, water drained from agricultural fields, municipal wastewater and rainfall. Knowledge of water quality is critical to understanding which management changes are necessary for long-term plant productivity. Precise, easy to read measurements are important in a quality product, such as the Orion 3-Star Conductivity meter (Cat. No. 1214000) and the Orion Conductivity probe (Cat. No. 013010MD).

The Orion 3-Star meter is packaged to provide a simple to operate user interface, allows up to 200 data points and is rated IP67 waterproof. The new Orion meters and electrodes are ideal for use in the lab or field for a variety of samples.

# Orion 3-Star Conductivity

Thermo Electron's advanced technology offers you superior quality with the Orion 3-Star Conductivity meter (Cat. No. 1214000) and simpler, faster measurements with the Orion Conductivity probe (Cat. No. 013010A) than with any other analytical techniques.

## Orion 3-Star Conductivity Specifications:

Specifications		Benefit
<b>Conductivity</b>		
Range	0.000 to 3000 mS/cm, auto resolution with cell constant dependence	Measures extended range
Resolution	4 significant digits down to 0.001 $\mu$ S/cm, cell constant dependent	
Relative Accuracy	0.5% $\pm$ 1 digit or 0.01 $\mu$ S/cm, whichever is greater	For exceptional accuracy
Cell Constant/Cell Compatibility	0.001 to 199.9 / 2 Cell, 4 Cell, Planar Cell	Broaden application range
DirectCal™ / AUTO-CAL™	1 to 5 points / 1 to 3 points	
<b>Resistivity</b>		
Range / Resolution	0.0001 to 100 Megohm auto resolution	Ideal for pure water samples
Relative Accuracy	0.5 % $\pm$ 1 digit	
<b>Salinity</b>		
Range / Resolution	0.01 to 80.0 ppt NaCl equivalent, 0.01 to 42 ppt practical salinity /0.01	
Relative Accuracy	$\pm$ 0.1 $\pm$ 1 digit	
<b>TDS</b>		
Range / Resolution	0 to 19999 / 1 mg/L	
Relative Accuracy	$\pm$ 0.5 % $\pm$ 1 digit	
<b>Temperature</b>		
Range / Resolution	-5 to 105 °C / 0.1 up to 99.9 °C, 1.0 over 99.9 °C	Allows for temperature variations
Relative Accuracy	$\pm$ 0.1 °C	
Temperature Compensation	Cond (nLF, linear 0.0 to 10.0% / °C)	
<b>Display</b>		
	Custom backlit LCD, for easy viewing	Easy to read
# Of Data Logging Points	200 points by time, stability or manual read with time/date stamp	Expanded data storage available
Calibration Log / User Method Storage	Last 10 Calibrations / 10 Saved Methods	Establish audit trail / For easy retrieval of routine tests
<b>Power</b>		
	4 x AA batteries, powerless data protection	Data is secure
<b>Regulatory and Safety</b>		
	CE, CSA, UL, TÜV, FCC Class A limits	Meets all necessary regulations
Ambient Operating Temperature	5 to 45 °C	
Relative Humidity	5 to 85% Non-Condensing	
<b>Warranty</b>		
	36 months (from date of purchase)	Reduces service cost

Above data generated under optimal/controlled circumstances.

## Equipment needed for conductivity measurements using the Orion 3-Star meter

Description	Orion Cat. No.
Conductivity Application Package (includes all items listed below)	1010122
Star Series Method Note: Conductivity in Surface Fresh Water	M-1021-E
3-Star Portable Conductivity meter	1214000
Conductivity Probe	013010MD (Formerly 013010A)
Conductivity Standard, 1413 $\mu$ S/cm	011007
Conductivity Standard, 12.9mS/cm	011006
Electrode storage sleeve	1210003
Field Case	1210004