



Quick Reference Guide

Salinity Calculation for CTD-Divers

Introduction

This document outlines how the conductivity data from the CTD-Diver is converted to salinity data.

Salinity is the saltiness or dissolved salt content of a body of water. Salinity is an important factor in determining many aspects of the chemistry of natural waters and of biological processes within it [2]. Salinity cannot not be measured directly, but needs to be calculated from conductivity measurements. Salinity is most commonly reported using the Practical Salinity Scale 1978, a scale developed relative to a standard potassium-chloride solution and based on conductivity, temperature and barometric pressure measurements. Salinity expressed in the PSS is a dimensionless value, although by convention, it is reported as practical salinity units (psu). Salinity in practical salinity units is nearly equivalent to salinity in parts per thousand [1].

Diver-Office (version 2016 and newer) offers the option to export salinity data to Excel. Figure 1 shows the Default Export Settings with the salinity export data option highlighted. The salinity data can only be exported for CTD-Divers. Salinity data cannot be shown in Diver-Office.

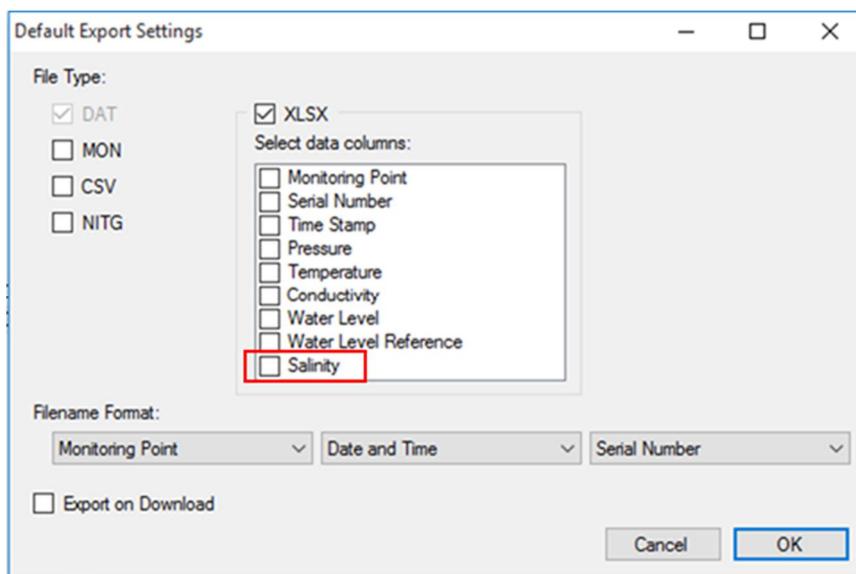


Figure 1 File export settings as used in Diver-Office 2016.

Computation of Salinity

If specific conductivity values have been compensated to 25 °C and water depths are sufficiently shallow that pressure corrections are not necessary, salinity can be calculated using the conductivity measured by the CTD-Diver. The salinity is expressed in practical salinity units (psu). The relationship



between specific conductivity and salinity is shown in Figure 2. The underlying data set is listed in Table 1 and obtained from [1].

In case the CTD-Diver is set to measure conductivity instead of specific conductivity at 25 °C the conductivity will be converted

$$C_s = \frac{C_m}{1+0.0191(T_m-25)}$$

Where C_s is the specific conductivity at 25 °C, C_m and T_m are the measured conductivity and temperature, respectively.

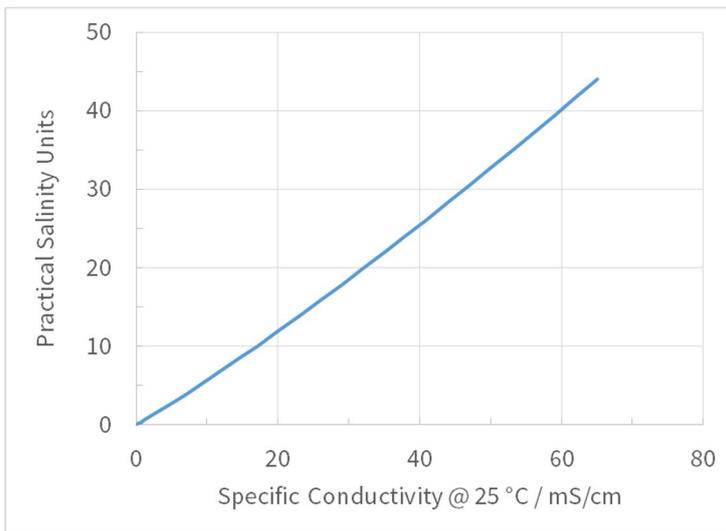


Figure 2 Conversion of specific conductivity, in millisiemens per centimeter, to salinity, in practical salinity units [1].

Table 1 Rating table for conversion of specific conductivity, in millisiemens per centimeter, to salinity, in practical salinity units [1].

Specific conductivity in mS/cm	Salinity in psu	Specific conductivity in mS/cm	Salinity in psu	Specific conductivity in mS/cm	Salinity in psu
0.100	0.046	11.000	6.233	38.000	24.099
0.300	0.142	13.000	7.464	41.000	26.220
0.500	0.240	15.000	8.714	44.000	28.364
0.700	0.340	17.000	9.981	47.000	30.532
1.000	0.492	20.000	11.911	50.000	32.722
2.000	1.016	23.000	13.873	53.000	34.935
3.800	2.001	26.000	15.865	56.000	37.172
5.000	2.679	29.000	17.885	59.000	39.430
7.000	3.836	32.000	19.931	62.000	41.712
9.000	5.022	35.000	22.003	65.000	44.016

References

- [1] pubs.usgs.gov/tm/2006/tm1D3/pdf/TM1D3.pdf
- [2] <https://en.wikipedia.org/wiki/Salinity>