

Sea Water, Physical Properties		
Standard	JEH-ES-02-006	Issue 01 : 06/19

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(unless otherwise stated)	

Issue	Reason for Revision	Author	Checked/ Approved
01 : 06/19	1 st issue of standard.	CHWG	SRY

Table 1 Revision History

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1. Introduction

The properties of sea water are a function of temperature, salinity (i.e. total dissolved solids in g kg^{-1}) and pressure.

2. Physical Properties

Temp ($^{\circ}\text{C}$)	Salinity (g kg^{-1})				
	20	25	30	35	40
0	16.04	20.06	24.08	28.10	32.14
5	15.84	19.78	23.73	27.68	31.64
10	15.31	19.18	23.07	26.96	30.86
15	14.48	18.30	22.13	25.97	29.82
20	13.39	17.17	20.96	24.75	28.56
25	12.07	15.82	19.57	23.34	27.12

Table 2 Density ρ of Sea Water at Atmospheric Pressure

In oceanographical work, density data is expressed in terms of $1000(S - 1)$ where S is the density relative to water at 4.0°C . These values can be obtained by adding 0.03 to the salinity values given in Table 2.

	Pressure (MPa)					
	0	20	40	60	80	100
$\rho/\text{kg m}^{-3} - 1000$	28.10	37.44	46.37	54.92	63.12	71.02

Table 3 Density ρ of Sea Water at 0.0°C and Salinity 35 g kg^{-1}

Property		Temperature ($^{\circ}\text{C}$)	
		0.0	20.0
Viscosity	Dynamic	$1.88 \times 10^{-3} \text{ Pa s}$	$1.08 \times 10^{-3} \text{ Pa s}$
	Kinematic ν	$1.83 \times 10^{-6} \text{ m}^2 \text{ s}^{-1}$	$1.05 \times 10^{-6} \text{ m}^2 \text{ s}^{-1}$
Thermal	Conductivity	$0.563 \text{ W m}^{-1} \text{ K}^{-1}$	$0.596 \text{ W m}^{-1} \text{ K}^{-1}$
	Diffusivity k	$1.37 \times 10^{-7} \text{ m}^2 \text{ s}^{-1}$	$1.46 \times 10^{-7} \text{ m}^2 \text{ s}^{-1}$
Pressure	@ 0.1 MN m^{-2}	$52.0 \times 10^{-6} \text{ K}^{-1}$	$250.0 \times 10^{-6} \text{ K}^{-1}$
	@ 100 MN m^{-2}	$244.0 \times 10^{-6} \text{ K}^{-1}$	$325.0 \times 10^{-6} \text{ K}^{-1}$
Prandti number ν/k		13.4	7.2
Specific heat capacity C_p		$3985 \text{ J kg}^{-1} \text{ K}^{-1}$	$3993 \text{ J kg}^{-1} \text{ K}^{-1}$
Ratio of specific heat capacities C_p/C_p		1.000.4	1.010.6
Velocity of sound		1.449 m s^{-1}	1522 m s^{-1}
Compressibility		$4.65 \times 10^{-10} \text{ Pa}^{-1}$	$4.28 \times 10^{-10} \text{ Pa}^{-1}$
Freezing point		-1.91 $^{\circ}\text{C}$	
Boiling point		100.56 $^{\circ}\text{C}$	

Table 4 Properties of Sea Water at Salinity 35 g kg^{-1} and Atmospheric Pressure (unless otherwise stated)

3. Source Data

Refer to M. Hill (ed.), *The Sea*, vol. 1, chap. 1 and vol. 4, pt. 1, chap. 18 (Wiley) and Cox *et al.*, *Deep Sea Res.*, 1970, **17**, 679.