

2.13 Helmholtz energy

The specific Helmholtz energy of seawater f is given by

$$f = f(S_A, t, p) = g - (p + P_0)v = g - (p + P_0) \left. \frac{\partial g}{\partial P} \right|_{S_A, T}. \quad (2.13.1)$$

This expression is another example where the use of non-basic SI units presents a problem, because in the product $-(p + P_0)v$, p must be in Pa if specific volume has its regular units of $\text{m}^3 \text{kg}^{-1}$. The specific Helmholtz energy f has units of J kg^{-1} in both the SIA and GSW computer software libraries.