

Page 126, equation (3.238)

From constitutive equation (3.194) we have in the component form:

$$(\text{grad}P)^i = \frac{\partial P}{\partial x^i} = \frac{\partial \hat{P}}{\partial \rho} \frac{\partial \rho}{\partial x^i} + \frac{\partial \hat{P}}{\partial T} \frac{\partial T}{\partial x^i} \equiv \frac{\partial \hat{P}}{\partial \rho} h^i + \frac{\partial \hat{P}}{\partial T} g^i.$$

Thus

$$\text{grad}P = \frac{\partial \hat{P}}{\partial \rho} \mathbf{h} + \frac{\partial \hat{P}}{\partial T} \mathbf{g} = \frac{\partial \hat{P}}{\partial \rho} \mathbf{h} \quad (1)$$

where (3.221) was used in the last equality. Combining (1) and (3.228), (3.238) follows.