excess volume (at a solid/liquid interface)

Also contains definition of: excess mass (at a solid/liquid interface)

For a pure liquid, despite its low compressibility, the variation of density near a solid surface can be detected and measured. The total volume V of a system consisting of solid and pure liquid is different from (usually less than) that calculated assuming a constant liquid density. If the densities of bulk solid (ρ^{sol}) and liquid (ρ^{l}) are known then an excess volume (usually negative) can be defined as:

$$V^{\sigma} = V - V^{\text{sol}} - V^{\circ} = V - \frac{m^{\text{sol}}}{\rho^{\text{sol}}} - \frac{m^{\text{l}}}{\rho^{\text{l}}}$$

where m^{sol} is the mass of solid, V^{sol} its volume calculated from the bulk density, V° is the initial volume of liquid and m^{l} is the mass of liquid. The excess mass is given by:

$$m^{\sigma} = m^{\text{l}} - (V - V^{\text{sol}}) \, \rho^{\text{l}}$$

Source:
PAC, 1986, *58*, 967 *(Reporting data on adsorption from solution at the solid/solution interface (Recommendations 1986))* on page 972