doi:10.1351/goldbook.S06189

surface shear viscosity

Also contains definitions of: area viscosity, surface dilatational viscosity

For steady state deformations a surface shear viscosity η^s, and an area viscosity or surface dilatational viscosity ζ^s can be defined. In a Cartesian system with the x-axis normal to the surface, they are defined by the equations:

$$\eta^s = \frac{\sigma_{xy}}{\frac{\partial v_y}{\partial v_x}}$$

$$\zeta^s = \frac{\Delta\gamma}{\frac{\mathrm{d}(\ln A)}{\mathrm{d}t}}$$

where σ_{xy} is the shear component of the surface stress tensor, v_x and v_y are the x and y components of the surface velocity vector, respectively, A is the surface area, t is the time, and $\Delta\gamma$ is the difference between the (steady state) dynamic surface tension and the equilibrium surface tension.

Source:
PAC, 1979, *51*, 1213 *(Manual of symbols and terminology for physicochemical quantities and units. Appendix II: Definitions, terminology and symbols in colloid and surface chemistry. Part 1.13. Selected definitions, terminology and symbols for rheological properties)* on page 1218

