shear viscosity

For a *Newtonian fluid*, the shear viscosity η is often termed simply *viscosity* since in most situations it is the only one considered. It relates the shear components of stress and those of rate of *strain* at a point in the fluid by:

$$\sigma_{xy} = \sigma_{yx} = \eta(\partial v_x/\partial y + \partial v_y/\partial x) = 2\eta\dot{\gamma}_{xy}$$

where $\dot{\gamma}_{xy}$, the shear component of rate of strain is defined as follows:

$$\dot{\gamma}_{xy} = \tfrac{1}{2}(\partial v_x/\partial y + \partial v_y/\partial x)$$

Corresponding relations hold for σ_{xz} and σ_{yz}; σ_{xy} is the component of stress acting in the y-direction on a plate normal to the x-axis; v_x, v_y, v_z are the components of velocity.

See also *shear dependent viscosity*.

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