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**Importance of Pressure Dependence of Viscosity
in Steady Non-isothermal Shearing Flows of
Compressible and Incompressible Fluids**

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Four steady non-isothermal shearing flows of a compressible fluid with a viscosity depending on the pressure, temperature and shear rate are considered. It is shown that the pressure gradient in the flow direction induces a gradient in the direction parallel to the shear rate, leading to a normal stress effect. The pressure dependence of the viscosity plays the most significant role in the above set of consistency relations and examples obeying these are given and their significance is examined. It is shown that the results for incompressible fluids are identical to those of compressible fluids. Extension of the results to the CEF model and viscoplastic fluids are also derived. Finally, it is shown that if the compatibility conditions are not satisfied, secondary flows must arise.