Some non-newtonian fluids exhibit nonmonotonous dependence of the shear stress on shear rate. This nonmonoticity leads to flow instabilities which result in formation of banded flow, namely in shear banding and vorticity banding. An important role is played here by so called stress diffusion which uniquely determines size of bands in the flow. If the classical kinetic approach is employed and the spatial inhomogeneity of the flow is taken into the account, then stress diffusion can be obtained in the fluid model, however this approach has difficulties with identifying heat transfer within the continuum. In this thesis, we present alternative approach how to introduce stress diffusion to fluid models. We employ thermodynamical framework proposed by Rajagopal and Srinivasa (2000), this approach guaranties thermodynamical consistency of resulting model and also the interplay between stress diffusion and heat transfer can be easily established. Furthermore, we extend this framework such that wider range of viscoelastic models can be obtained, in particular we derive Johnson-Segalman model.