Long Wave stability criteria for paralell miscible flow MAR-GUERITE D’OLCE, JEROME MARTIN, NICOLE RAKOTOMALALA, DOMINIQUE SALIN, Laboratoire FAST, Univerity Pierre et Marie CURIE (Paris 6), University PARIS SUD and CNRS, UMR 7608, YANNIS C. YORTSOS, University Southern California — We analyze the stability of miscible fluid paralell flow (x direction) with a given transverse viscosity (or velocity) profile, N(y) in 2D or N(r) for axisymmetric flow (pipe flow). From the Navier-Stokes and Convection-Diffusion equations, we derive the eigenvalue problem. In the Long Wave limit which corresponds to Stokes flow, and for the diffusionless regime (Peclet number infinite), we derive criteria for instability to occur depending on the shape of the velocity profile for shear and Poiseuille flows in 2D and for the axisymmetrical geometry. A series of generic transverse velocity profile examples are analyzed.