The thermal development of the hydrodynamically developing laminar flow of a viscoplastic fluid (fluid of Bingham) between two plane plates maintained at a constant temperature has been studied numerically. This analysis has shown the effect caused by inertia and the rheological behaviour of the fluid on the velocity, pressure and temperature fields. The effects of Bingham and Peclet numbers on the Nusselt values with the inclusion of viscous dissipation are also discussed