

**Abstract** In this work we calculated the energy confinement time by analytical solution of Grad-Shafranov equation (GSE) with Lithium limiter for circular cross-section HT-7 tokamak. A generalized Grad-Shafranov-type equation has been used. Specific functional forms of plasma internal energy and current are used. For this, the Shafranov parameter (asymmetry factor) and poloidal beta were obtained from by analytical solution of GSE. Then we can find the plasma energy confinement time. It is observed, the energy confinement time obtained from the analytical solution of GSE by using liquid lithium limiter is longer than that using graphite limiter, which shows that the plasma performance was improved.