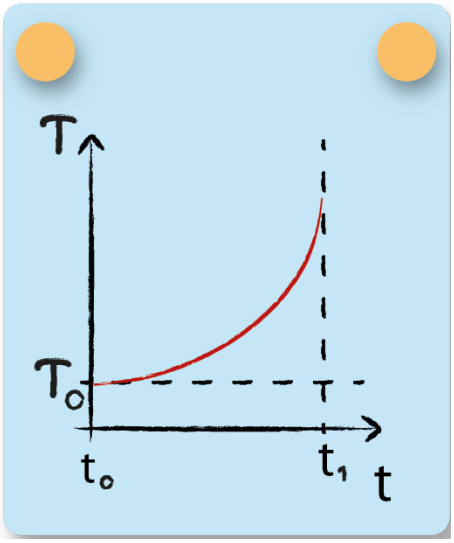
Temperature Profile Transient 6

A vessel with an adiabatic lid and adiabatic sides is constantly heated from below. At time t_0 a side valve is opened and the liquid flows out with $\dot{m}_{\text{out}} = const.$ until time t_1. The liquid is ideally mixed and has a homogeneous temperature $T(t)$ at all times. Select the diagram with the correct temperature development over time.



As time passes, the mass within the system decreases but the rate of heat transfer remains constant. From the relationship, $U = mc_{\text{p}}T$ it can be seen that if the mass m decreases, but U keeps on increasing with a constant rate, that T starts to increase more rapidly. For that reason, the slope of the temperature profile increases over the course of time.