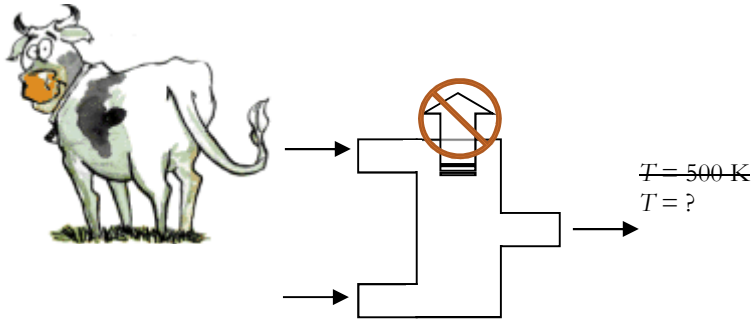
EXAMPLE: Open system mixing

Let us reconsider the dubious bovine flatulence energy source problem yet again. As before, the proposed process combusts methane (CH_4) with air in a steady-state reaction chamber and produces 90% CO_2, 10% CO and no O_2 in the products. Both the methane and the air enter at 1 bar and 25°C.

This time, however, we will *not* assume that the products leave the chamber at 500 K and 1 bar. Rather, we will assume the chamber operates *adiabatically* and at constant pressure. You are to find the exit temperature of the products. That is, you are to find the



i	T [K]	$\Delta\overline{h}_f^0$ [kJ/kmol]	$\overline{h}(T)$ [kJ/kmol]	$\overline{h}(298\text{K})$ [kJ/kmol]	$\overline{h}$ [kJ/kmol]
$CO_2)_2$					
$CO)_2$					
$H_2O)_2$					
$N_2)_2$					
$CH_4)_1$					
$O_2)_1$					
$N_2)_1$					