

Development of Computer Programs for the Thermal Properties of Natural Gas Mixture  
flowing through the Turbo-Expander at Pressure Reduction Stations

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Natural gas is a hydrocarbon mixture consisting primarily of methane with commonly including varying amounts of other higher alkanes and sometimes a usually lesser percentage of carbon dioxide, nitrogen, and/or hydrogen sulfide. For the accurate predictions of thermodynamic properties (which are important in the natural gas industry such as natural gas distribution system), mixing properties must be considered by using appropriate equation of state (EOS). In this study, Peng-Robinson EOS is employed in the computer programs for the calculations of the thermodynamic properties which are coded in Fortran, especially isentropic process in the Turbo-expander. Turbo-expander carries out pressure reducing of natural gas with electricity generation at the natural gas pressure reduction stations. This program can be used to analyze the Turbo-expander pressure reduction system and draw the thermodynamic diagrams.