# ADIABATIC-LIQUEFACTION TEMPERATURE OF LNG MAIN CRYOGENIC HEAT EXCHANGER APPLYING FIRST LAW OF THERMODYNAMICS

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## ABSTRACT

This research centered on the development of thermodynamic model equations to simulate the adiabatic-liquefaction temperature of natural gas (methane 86%) into liquefied natural gas. The thrust model is derived from the first law of Thermodynamics maintaining adiabatic process operation; the model predicted perfectly the liquefaction temperature of natural gas as -159 $^{o}$C, and was validated with plant data to a maximum deviation of -3.91. This study gave industrial applicability of first law of thermodynamics to real plant operations.

**Keywords:** Liquefaction process, thermodynamic model, adiabatic process, Simulation, main cryogenic heat exchanger (special reactor).