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The mathematical modeling of thermodynamic processes of an ideal cycle for H-Diesel using the aluminum hydrate energy carrier allowed us to define the optimal ranges of change in parametric characteristics depending on the com-pression degree, amount of AlH3 water supplied for hydrolysis and amount of regenerated heat. A considerable increase in the values of thermal efficiency factor and fulfilled useful cycle work against a background of reduced thermal load in the working cylinder with pressure levels approaching those pecu-liar for the traditional hydrocarbon Diesel has been established. A possibility in principle for using the aluminum hydrate energy carrier for the available diesel engines structures with-out their cardinal reconstruction has been shown. Table 2. Bib-liogr. 3 names.