

A. SYSTEM DESCRIPTION  
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The Redstone Model A7 powerplant is a turbopump-fed, liquid bipropellant rocket engine which operates at 78,000 lb of sea-level thrust for a nominal duration of 121 sec. The engine is of the single-start type and, since no provision is made for intermediate thrust control, operates only at rated thrust settings.

Main engine propellants are liquid oxygen and denatured 75-percent ethyl alcohol; the turbopump is driven by the exhaust products of decomposed 75-percent hydrogen peroxide. During engine start, liquid oxygen is supplied from the missile main oxidizer tank, and alcohol is supplied from a ground fuel start system.

The double-wall thrust chamber, characteristic of previous models, is also used on the A7. A major change in engine configuration over earlier models is the use of a single fuel line which extends from the fuel side of the turbopump to the fuel inlet connection at the base of the thrust chamber exhaust nozzle. An injector change on 7086, 7087, 7089, 7091 through 7108, 7109a through 7118a, 7119, and subsequent engines replaces the Type 021 injector with a Type 056, an injector of equivalent performance but with a lower pressure drop. Other major system components consist of the turbopump, hydrogen peroxide system, pneumatic and electrical control systems, a propellant feed system, and an engine mount.

Engines 7109a through 7118a, assigned to the Mercury Program, are equipped with an auxiliary peroxide tank to provide the capability of additional engine burning time. This auxiliary tank provides approximately 13 gal of additional hydrogen peroxide.