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RECIPROCATING ENGINE MODEL DESCRIPTION

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RECIPROCATING ENGINE MODEL DESCRIPTION.

The applicant should submit, where applicable, the following information, plus any additional information which, in the applicant's opinion, is essential to the certification and safe operation of the engine.

a. Engine type.

b. Engine model, cylinder arrangement, number of cylinders, valve arrangement, cycle used, and type of cooling, etc.

C. Performance ratings as defined in FAR Part 1

TABLE 1. PERFORMANCE RATINGS AT STANDARD SEA LEVEL CONDITIONS

RATINGS	Shaft Horse Power (min rated)	Speed (RPM) (max)	Cylinder Head & Base Temperature 'C, OF (max)	Manifold Pressure Limit in. Hg.
Takeoff Wet				
Takeoff Dry				
Maximum Continuous				
Idle				

d. Performance charts consistent with the ratings.

e. Design structural loading envelope for mounting attachments and maximum allowable loads.

f. Maximum time the engine may be operated under negative and zero "g" conditions.

g. Maximum permissible temperature limits and cooling criteria for engine components and accessories.

- Type and location of thermocouples used for cooling test.
- Description of temperature sensing provisions.

h. Maximum carburetor air inlet duct attachment loads.

- Shear load.
- Loads normal to mounting surfaces.
- Overhang moment.

1. Lubrication system.

- Oil grade, type, and specification.
- Oil consumption rate (normal and maximum).
- Oil inlet pressure limits. Par 1 AC 33-2B 06/30/93 Appendix 2
- Oil system vent pressure limits.

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- Oil inlet and scavenge temperature limits.
- Inlet oil flow rate.
- Usable oil capacity, if oil tank is part of engine.
- Maximum heat rejection to oil, including turbo super chargers.
- Oil pump outlet pressure limits for normal operation and idle, if oil tank is not part of engine.
- Oil filter provisions and requirements.
- Oil pressure limits for propeller governing engine oil passages.

j. Fuel system.

- Grade, type, and specification.
- Fuel inlet pressure limits.
- Inlet fuel flow rate (maximum).
- Method of providing for carburetor icing precautions.
- Fuel filter provisions and requirements.

k. Maximum permissible exhaust attachment loads.

- Shear loads.
- Loads normal to mounting surfaces.
- Overhang moment.

1. Accessory attachments.

For each aircraft accessory drive, give the following information:

- Type of drive and mounting arrangement.
- Direction of rotation.
- Static torque (maximum limit).
- Continuous torque (limit).
- Drive speed ratio with crankshaft.
- Maximum overhang moment.
- Vibration limits (if applicable).

m. Output shaft.

- Maximum steady state allowable torque, or power limits, of the output shaft.
- Maximum allowable transient power output torque.
- Maximum bending load limits on the output shaft.
- The type and dimensions of the output shaft, direction of rotation, speed ratio with crankshaft, and nominal speed.

n. Describe all instrumentation in detail. Describe provisions for connecting permanent and optional instrumentation, including provisions for trend or condition monitoring equipment.

o. Give model designation, setting numbers, or other pertinent identifying information relative to the engine accessories or controls and special equipment, such as:

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- Carburetor, injectors, and subsystems.
- Ignition system.
- Spark plugs.
- Safety devices.
- Other accessories or components to be furnished as part of, or with the engine.
- Optional accessories available with the engine for mounting on, or for use with the engine.

P. Performance data should be presented in the form of suitable curves in order to portray the relationship of the various parameters of a minimum engine of the model, including the effects of varying ambient temperature and altitude. The maximum, or limiting air intake temperature(s), should be specified together, with all other engine performance limitations.

- For engines incorporating manual mixture controls, performance charts should include recommended data on rich and lean operation.
- For engines to be used with variable pitch propellers and in helicopters, performance charts should include manifold pressure variations, starting from several representative full throttle points, in the engine operating speed range.
- For all engines, include altitude performance charts.

q. The applicant should include, in the engine description, an installation drawing of the engine showing all the dimensions and details necessary for proper installation of the engine in an aircraft, including mounting, mounting provisions, and accessory and component installation/removal envelopes.

r. Radiated electromagnetic interference (EMI/HERF) protection requirements of the engine.

s. Lightning protection requirements of the engine.

t. Any additional information to adequately describe the operational and installation limitations of the engine.

u. Engine requirements for any externally supplied electricity.

v. Weight:

- Dry weight of complete engine, with all required equipment and no residual fuel or oil.
- Weights of optional external equipment and accessories.
- Estimated weight or residual fuel and lube oil.
- Center of gravity location of engine (dry).

w. Mass moment of inertia of rotating system - frictional horsepower.

- Estimated effective mass moment of inertia of those engine rotating components involved in starting.
- Estimated mass moment of inertia of main engine rotating component assemblies.
- Mounting Points

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