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WATER INJECTION ON P-47D AIRPLANES

Advance Service Bulletin No. A-255 describes the installation of water injection equipment on P-47D airplanes. This water injection equipment increased the power output of R-2800-63 and -59 engines to a War Emergency Rating of approximately 2300 BHP, corresponding to a manifold pressure limit of 56 in. Hg. The Air Forces now contemplate increasing the present War Emergency Rating of the R-2800-63 and -59 engines, on a manifold pressure basis, to 64 in. Hg manifold pressure, corresponding to about 2535 BHP with 130°F. carburetor air temperature and 48 in. Hg back pressure. The Army will conduct service tests at the new rating in the near future, and this Special Instruction is being written to acquaint field representatives with the changes which will be necessary in the present equipment to permit these airplanes to operate at the higher rating. The first change listed will be accomplished by Pratt & Whitney Aircraft service representatives.

1. Change the present No. 25 water regulator metering jet to a No. 13 jet. This may be accomplished by removing the Part No. 19865 Plug indicated in Sketch I. The Part No. 79315 Jet shown in Sketch II can then be removed and replaced by a Part No. 79838 Jet. This new jet corresponds to a Bendix Part No. P-10455 Size No. 13 Jet (which is the jet already used in the derichment valve). The old jet can be removed and the new one installed with a tool similar to Bendix T-24962 Tool (see Sketch III) or with a suitable wide bladed screw driver, provided extreme care is exercised to avoid damage to the jet or the housing.

The remainder of the changes involve airplane equipment and will be accomplished by the manufacturers' service representatives when possible, in accordance with Republic Aviation Corporation Service Bulletin No. 47-168.

2. Install new packing in the airplane exhaust system at the collector ring and at the turbo.
3. Readjust the fuel pump relief valve to give 23 ± 1 lbs./sq. in. fuel pressure. If the fuel pump which is in the airplane will not provide this pressure, the pump should be removed and replaced with a Thompson G9 Fuel Pump.
4. Change the water pump relief valve spring to a 30 lb. spring and readjust the water pump relief valve to give 23 ± 1 lbs./sq. in. in flight at high power.

Note - It will be necessary to obtain approximately 30 lbs./sq. in. water pressure on the ground check described in Advance Service Bulletin No. A-255, in order to obtain 23 ± 1 lbs./sq. in. in flight.

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5. See that either an A-13 or, preferably, an A-23 turbo supercharger regulator is installed on the airplane. A-17 regulators are not suitable for use with this new high power. Airplane Nos. 2101 thru 2355 were equipped with A-13 Regulators, but airplanes subsequent to No. 2355 were equipped with A-17 Regulators, which must be replaced.

6. Reset the turbo supercharger regulator reset unit so that 64 in. Hg manifold pressure will be obtained in flight at the high power.

7. Water pumps driven by the tachometer shaft cannot be used with the new high power. Refer to Republic Service Bulletin for pump installation. Airplanes from No. 1231 thru No. 1449 were equipped with tachometer shaft driven pumps and airplanes subsequent to No. 1449 were equipped with electric pumps.

The revised operating limits for the new high power are as follows:

Manifold Pressure - 64 in. Hg

Fuel Pressure - 23 ± 1 lbs./sq. in.

Water Pressure - 23 ± 1 lbs./sq. in. in flight at high power

The rate of water consumption will of course be increased, and the new rate will be approximately 2.1 gallons per minute.