

HYDROMATIC PROPELLERS DOME & VALVE HOUSING DAMAGE LOW BLADE TORQUE

(This EO replaces EO 15-30AB-5A/1 dated 18 Dec 56)

1 Three maintenance errors are still being reported to this Headquarters in the servicing of Hamilton Standard hydromatic propellers. These errors cause the premature removal of propellers and also the rejection of spare parts at overhaul.

2 Domes - The reason for the high rejection of domes by the overhaul contractor can be separated into two categories:

(a) Dome shells are damaged on installation or removal as evidenced by a series of nicks on the outside diameter, resulting in inside diameter distortion in the vicinity of the dome retaining nut. These nicks are apparently caused when using the dome retaining nut wrench, when installing or removing the dome. Dome retaining nut wrenches are designed to incorporate leather protector strip on wrench teeth, and wrenches presently in service should be checked to ascertain that leather strips are fitted or that the wrench is suitably bound with tape.

(b) Domes are rejected due to breather hole nut threads crossed and damaged due to improper fitting of the dome nut. To overcome this type of damage: First install the dome breather hole washer on the dome breather hole nut, then add the seal over the washer onto the nut, and finally insert and tighten the assembly into the dome shell. This latter procedure will keep the seal lined up on the nut and prevent its catching between the dome shell and dome breather hole nut threads. Tighten it into place using a torque of 30-50 foot-pounds.

3 The overhaul contractors report three causes of distributor valve rejection. The

procedure for installation and removal of distributor valves as outlined in EO 15-30AB-2 should be followed implicitly at all times.

(a) Housing dented on outside diameter thereby distorting or collapsing the barrel. This cause of rejection can be attributed to rough handling when installing, removing or when being packed for shipping. When distributor valves are packed in the shipping case, they should be wrapped and secured in the appropriate section of the propeller case.

(b) Housing bent on overall length, through improper installation.

(c) Damage to the locking splines caused by failure to remove the retaining nut lock wire before turning the distributor valve to remove.

4 Faulty blade torque, and worn gear teeth. Because gear teeth appear to be worn and the blade torque appears to be excessive on some hydromatic propellers, they have been removed from service. As there appears to be some misconception of gear preload and propeller torque, as the propeller manufacturer does not specify wear tolerances for blade gear segments and the rotating cam gear, the following is published for unit information.

(a) As the blade gear segments and the rotating cam gear operate under a preload they will normally show signs of wear. Considerable wear tolerance is permissible between overhaul periods. Where this wear is not sufficient to warrant replacement of

the parts at overhaul, the gear preloading is altered to allow for the wear of teeth on the mating gears. It will thus be possible to receive a serviceable propeller direct from overhaul with worn gear teeth.

(b) As the gear preload is a loading imposed between the blade gear segments and the rotating cam gear when the dome is installed, it is non-existent when the dome is removed and can have no effect on blade torque. Blade torque is incorporated primarily to facilitate propeller balancing

and has no effect on a propeller in operation as the barrel halves are stretched by the centrifugal force of the rotating blades and blade torque no longer exists. The permissible blade torque range of an assembled propeller is 35 to 90 foot-pounds and it is almost impossible to turn the blades by hand when the torque is in the vicinity of the upper range. Blade torque normally decreases with operational time due to wear on various parts and a propeller should not be condemned for low blade torque unless the blades are loose in the hub.

ISSUED ON AUTHORITY OF THE CHIEF OF THE AIR STAFF