HARTZELL PROPELLER INC.

SERVICE BULLETIN

TRANSMITTAL SHEET

HC-SB-61-217

Propeller - X and V Shank Propeller Inspection

November 01, 2019

This page transmits a revision to Service Bulletin HC-SB-61-217.

- Original Issue, dated Apr 04/97
- Revision 1, dated Jul 11/97
- Revision 2, dated Oct 07/99
- Revision 3, dated Sep 10/09
- Revision 4, dated Nov 01/19

Propeller assemblies that have previously complied with the inspections and requirements in a previous version of this Service Bulletin are affected.

Changes are shown by a change bar in the left margin of the revised pages.

This revision is issued to change the following in the Service Bulletin:

- Revised Table 2, "Aircraft and Propeller Applications"
  ("GA22A Goodyear Drake", was previously "GA22A Goodyear Blimp")

This Service Bulletin is re-issued in its entirety.

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Propeller - X and V Shank Propeller Inspection

1. Planning Information

   A. Effectivity

      (1) All Hartzell ( )HC-( )(2,3)(X,V)( )-( ) series and HA-A2V20-1B propellers with aluminum blades are affected by this Service Bulletin. This includes all 2 and 3 blade, steel hub propellers with the letter X or V in the propeller model designation. The X or V designates propeller designs with "double shoulder" blades. Propellers are installed on, but not limited to, the aircraft applications shown in Table 2.

         NOTE: The parenthesis shown in the model designations throughout this Bulletin indicate letter(s) that may or may not be present due to different configurations allowable on the various aircraft installations. Definition of propeller model designations and further details of letters that may be present are shown in Table 1.

   CAUTION: DO NOT USE OBSOLETE OR OUTDATED INFORMATION. PERFORM ALL INSPECTIONS OR WORK IN ACCORDANCE WITH THE MOST RECENT REVISION OF THIS SERVICE BULLETIN. INFORMATION CONTAINED IN THIS SERVICE BULLETIN MAY BE SIGNIFCANTLY CHANGED FROM EARLIER REVISIONS. USE OF OBSOLETE INFORMATION MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE. REFER TO THE SERVICE BULLETIN INDEX FOR THE MOST RECENT REVISION LEVEL OF THIS SERVICE BULLETIN.

   B. Concurrent Requirements

      (1) FAA Airworthiness Directive AD 85-14-10R2 may be applicable. This Airworthiness Directive affects propellers with C-3-( ) Blade Clamps with certain serial numbers. (C-3 Clamps are used on affected propellers). If affected, depending on clamp serial number, compliance requires replacement or visual and magnetic particle inspection of blade clamps within 60 days and thereafter reinspect (penetrant method) every 100 hours. Another serial number block requires a onetime visual and magnetic particle inspection. Inspection criteria are in Hartzell Service Instruction 159C.

      (2) The Time Between Overhaul specification for affected propellers has been reduced to 1000 hours of operation or 60 calendar months, whichever occurs first, except for HC-A3VF-7( ) turbine engine propellers, which remain at 3000 hours of operation or 60 calendar months. Time Between Overhaul specifications are published in Hartzell Service Letter HC-SL-61-61Y.

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C. Reason

(1) There have been several instances of blade separations resulting from cracks in hubs, blades, or blade clamps in this series propeller. Blade separation may cause injury or death. Compliance with this Service Bulletin is required in order to maintain flight safety for this propeller type.

(2) There have been several reports of cracks in a blade shank retention radius that were not detected during penetrant inspection. The cracks were discovered using eddy current inspection methods. This situation raises concern that compliance with the repetitive penetrant inspection requirements contained in various previously released Airworthiness Directives may not detect a possible fatigue crack. A new eddy current inspection method has been developed and is now required during inspection of all X and V shank blades.

(3) Numerous incidents of cracks in the propeller blade retention radius of X and V shank blades have been reported (over 30 cracked blades, including one fatal accident). Incidents typically have occurred on propellers already affected by previously released Airworthiness Directives. However, these Airworthiness Directives had been in effect for over 20 years and the number of incidents indicates that the problem has not been eliminated. In fact, the incidents may have been increasing, indicating there is a continuing need for blade inspections at intervals shorter than the originally specified overhaul intervals.

(4) In addition to the blade retention radius inspection required in this Service Bulletin, when a propeller is disassembled for the blade inspection, the following inspections are considered necessary. These requirements are specified as a result of service difficulty reports:

(a) The steel blade clamps must be magnetic particle inspected. There have been a few recent reports of cracked C-3-( ) blade clamps.

(b) The blade internal bearing bore must be penetrant inspected. There has been one incident of in-flight blade separation of an X shank blade due to fatigue cracks that originated from corrosion in the internal bearing bore radius.

(c) The steel hubs of all HC-(1,4,5,8)(2,3)(X,V)( )-( ) propellers must be magnetic particle inspected. In the past there have been five incidents of in-flight blade separations due to fatigue cracks that originated at the hub retention radius where a split ring retainer is installed between the hub and blade bearing.

NOTE: The above condition is related to old hubs that use a split ring retainer. Later hubs, ( )HC-(A,D)(2,3)(X,V)( )-( ), do not use a split ring retainer and have not had retention radius cracks.

(5) FAA Airworthiness Directive 97-18-02 was released to address this issue and replaces previously released FAA Airworthiness Directives 68-13-2, 68-19-4, 75-17-34, and 77-14-07, which applied to various X and V shank propeller blades.

D. Description

(1) This Bulletin provides requirements for:

(a) Inspection of the retention area of double shoulder (X, V shank) blades which includes fluorescent penetrant inspection and new procedures for eddy current inspection,

(b) Optical comparator inspection of the blade retention area,

(c) Penetrant inspection of the blade internal bearing bore radius,

(d) Magnetic particle inspection of all blade clamps,

(e) Magnetic particle inspection of certain hubs.

NOTE: Procedures for penetrant, optical comparator, magnetic particle, eddy current inspection, and other overhaul procedures are published in other Hartzell publications.

(2) Revision 3 is issued to update the table reference for Steel Hub inspections, update Figure 1 to match current requirements, and update Table 1.

E. Compliance

NOTE: It is possible that the requirements for the Blade Internal Bearing Bore Inspection have been accomplished during a previous overhaul. A blade is in compliance with requirements of Internal Bearing Bore Inspection where service records document accomplishment of blade overhaul in accordance with Hartzell Aluminum Blade Manual 133C (61-13-33) (dated May 20, 1996 or later), or compliance with Service Bulletin 136G (dated Nov. 15, 1991), or Service Bulletin 136H (dated March 12, 1993), or Service Bulletin HC-SB-61-136I (dated April 25, 2003 or later). Also, blades manufactured since November 1991 meet the initial requirements for internal bearing bore inspection.

(1) HC-(1,4,5,8)(2,3)(X,V)( )-( ) series propellers:

(a) Initial Inspection:

1 The initial inspection consists of compliance with all applicable Accomplishment Instructions in sections 3. through 3.G. of this Service Bulletin, including: Blade Internal Bearing Bore Inspection (if required, refer to Note under section 1.E.), Blade Clamp Inspection, Blade External Inspections, and Steel Hub Inspection.

2 If total time in service since new (TSN) of the propeller is:

a If TSN is less than 900 hours of operation, compliance is required upon reaching 1000 hours of operation. However, compliance must not exceed 60 calendar months from new.

b If TSN is equal to or greater than 900 hours of operation or if total time is unknown, compliance is required within 100 hours of operation, not to exceed October 31, 2001.

(b) Repetitive Inspection:

1 Perform Steel Hub Inspection (Accomplishment Instructions sections 3.B. and 3.E. through 3.G.) at intervals not to exceed 250 hours of operation or 60 calendar months from the date of last Service Bulletin compliance, whichever occurs first.

2 Perform Blade External Inspections and Blade Clamp Inspection (Accomplishment Instructions sections 3.C. through 3.G.) at intervals not to exceed 500 hours of operation or 60 calendar months from the date of last Service Bulletin compliance, whichever occurs first.

3 Perform Blade Internal Bearing Bore Inspection (Accomplishment Instructions sections 3.A. and 3.E. through 3.G.) at intervals not to exceed 60 calendar months from the date of last Service Bulletin compliance.

(2) ( )HC-(A,D)(2,3)(X,V)( )-( ) series and HA-A2V20-1B propellers (except -7 models):

(a) Initial Inspection:

1 The initial inspection consists of compliance with all applicable Accomplishment Instructions, this includes: Blade Internal Bearing Bore Inspection (if required, see Note on page 4), Blade Clamp Inspection, and Blade External Inspections.

2 If total time in service since new (TSN) of the propeller blades is:

a If TSN is less than 800 hours of operation, compliance is required upon reaching 1000 hours of operation. However, compliance must not exceed 60 calendar months from new.

b If TSN is equal to or greater than 800 hours of operation or if total time is unknown, compliance is required within 200 hours of operation, not to exceed October 31, 2001.

(b) Repetitive Inspection:

1 Perform Blade External Inspections and Blade Clamp Inspection (Accomplishment Instructions sections 3.C. through 3.G.) at intervals not to exceed 500 hours of operation or 60 calendar months from the date of last Service Bulletin compliance, whichever occurs first.

2 Perform Blade Internal Bearing Bore Inspection (Accomplishment Instructions sections 3.A. and 3.E. through 3.G.) at intervals not to exceed 60 calendar months from the date of last Service Bulletin compliance.

(3) HC-A3VF-7( ) turbine engine propellers:

(a) Initial Inspection:

1 The initial inspection consists of compliance with all applicable Accomplishment Instructions, this includes: Blade Internal Bearing Bore Inspection (if required, refer to Note under section 1.E.), Blade Clamp Inspection, and Blade External Inspections.

2 If total time in service since new (TSN) or since overhaul of the propeller is:

a If TSN is less than 2500 hours of operation, compliance is required upon reaching 3000 hours of operation. However, compliance must not exceed 60 calendar months from new or overhaul.

b If TSN is equal to or greater than 2500 hours of operation or if total time is unknown, compliance is required within 500 hours of operation, not to exceed October 31, 2001.

(b) Repetitive Inspection:

1 Perform Blade External Inspections and Blade Clamp Inspection (Accomplishment Instructions sections 3.C and 3.D through 3.G.) at intervals not to exceed 3000 hours of operation or 60 calendar months from the date of last Service Bulletin compliance, whichever occurs first.

2 Perform Blade Internal Bearing Bore Inspection (Accomplishment Instructions sections 3.A and 3.E through 3.G) at intervals not to exceed 60 calendar months from the date of last Service Bulletin compliance.

F. Approval

(1) This revision has been approved by the Manager, FAA, Chicago Aircraft Certification Office, ACE 115C, by approval document dated September 2, 2009 as an alternate method of compliance to AD 97-18-02.

G. Manpower

(1) If compliance is performed as part of normal overhaul: the only additional manpower required is for the eddy current inspection - approximately 30 minutes per blade. (All other inspection requirements in this Service Bulletin are previously established overhaul procedures.)

(2) If work is performed outside of overhaul and includes internal blade bearing bore inspection: 14.0 man-hours are required for two blade propellers, 17.0 man-hours for three blade propellers (both include 2.0 hours for removal and installation).

(3) If work is performed outside of overhaul and if internal blade bearing bore inspection is not required: 9.0 man-hours are required for two blade propellers, 9.5 man-hours for three blade propellers (both include 2.0 hours for removal and installation).

H. Weight and Balance

(1) Not changed.

I. Electrical Load Data

(1) Not changed.

J. References

(1) Hartzell Aluminum Blade Overhaul Manual 133C (61-13-33)

(2) Hartzell Standard Practices Manual 202A (61-01-02)

(3) Hartzell Tool and Equipment Manual 165A (61-00-65)

(4) Hartzell Hydro-Selective Propeller Overhaul Manual 100D

(5) Hartzell Hydro-Selective Propeller Overhaul Manual 100E (61-10-00)

(6) Hartzell Steel Hub Propeller Overhaul Manual 105A

(7) Hartzell Steel Hub Propeller Overhaul Manual 109A

(8) Hartzell Steel Hub Propeller Overhaul Manual 114B

(9) Hartzell Steel Hub Propeller Overhaul Manual 114C (61-10-14)

(10) Hartzell -1, -4, -6 Series Steel “A” Hub Propeller Maintenance Manual 171 (61-10-71)

(11) Hartzell -2 Series Steel “A” Hub Propeller Maintenance Manual 172 (61-10-72)

(12) FAA Airworthiness Directive 97-18-02

(13) Hartzell Service Letter HC-SL-61-61Y

(14) Hartzell Service Bulletin 136G, 136H, and HC-SL-61-36I

K. Other Publications Affected

(1) Hartzell Aluminum Blade Overhaul Manual 133C (61-13-33)

(2) Hartzell Standard Practices Manual 202A (61-01-02)

(3) Hartzell Hydro-Selective Propeller Overhaul Manual 100D

(4) Hartzell Hydro-Selective Propeller Overhaul Manual 100E (61-10-00)

(5) Hartzell Steel Hub Propeller Overhaul Manual 105A

(6) Hartzell Steel Hub Propeller Overhaul Manual 109A

(7) Hartzell Steel Hub Propeller Overhaul Manual 114B

(8) Hartzell Steel Hub Propeller Overhaul Manual 114C (61-10-14)

(9) Hartzell -1, -4, -6 Series Steel “A” Hub Propeller Maintenance Manual 171 (61-10-71)

(10) Hartzell -2 Series Steel “A” Hub Propeller Maintenance Manual 172 (61-10-72)

2. Material Information

A. Special Tooling.

Hartzell P/N	Description
BST-3075	Double Shoulder Blade Eddy Current Tool Kit (includes eddy current probe, blade fixture, calibration standard, tape and case)

NOTE: Other specialized equipment for penetrant inspection, magnetic particle inspection, and eddy current inspection are required. Propeller repair stations that service Hartzell products should already possess such equipment. Information regarding these procedures is found in Hartzell Standard Practices Manual 202A (61-01-02) and Hartzell Tool and Equipment Manual 165A (61-0-65).

3. Accomplishment Instructions

NOTE: The following procedures assume the blade has been removed from the propeller hub. Perform disassembly/assembly in accordance with the applicable propeller overhaul manual. This inspection must be accomplished by an approved propeller repair station.

A. **Blade Internal Bearing Bore Inspection**:

(1) Remove the blade internal bearings/bushing(s) and inspect the internal bearing bore in accordance with procedures in the Blade Shank Overhaul chapter of Hartzell Aluminum Blade Manual 133C (61-13-33) dated May 20/96 (or subsequent revision).

(2) Blades with crack indications are to be retired from service in accordance with Hartzell Standard Practices Manual 202A (61-01-02). Blade internal bearing bores must meet acceptance criteria specified in the Blade Shank Overhaul chapter of Hartzell Aluminum Blade Overhaul Manual 133C (61-13-33) dated May 20/96 (or subsequent revision).

B. **Steel Hub Inspection**:

(1) The steel hubs of HC-(1,4,5,8)(2,3)(X,V)( )-( ) propellers must be visually and magnetic particle inspected in accordance with procedures in Hartzell Standard Practices Manual 202A (61-01-02). Pay particular attention to the blade arm retention radius in the area of contact with the split ring retainer.

(2) No magnetic particle indication is permitted. Any Hub with a crack indication must be retired from service in accordance with Hartzell Standard Practices Manual 202A (61-01-02). All hubs must meet acceptance criteria specified in Table 1-8 in the Steel Hub Overhaul chapter of Hartzell Standard Practices Manual 202A (61-01-02).

C. **Blade External Inspections**:

(1) Perform cleaning, etching, and fluorescent penetrant inspection of the blade shank in accordance with procedures in Hartzell Standard Practices Manual 202A (61-01-02).

NOTE: While all external areas of the blade retention require inspection, reported incidents are typically circumferential cracks located in the radius of the inner blade retention groove and typically have been tight cracks that are not easily detected. For this reason, specialized eddy current inspection procedures are required for inspection of this area.

(2) Perform eddy current inspection of the blade retention radius in accordance with the Eddy Current Inspection chapter of Hartzell Standard Practices Manual 202A (61-01-02).

CAUTION: COMPLIANCE WITH BLADE SHANK DIMENSIONAL AND OPTICAL COMPARATOR REQUIREMENTS ARE IMPORTANT TO MAKE SURE OF OPTIMUM FUTURE SERVICE LIFE.

(3) Perform dimensional and optical comparator inspection of the blade shank, and rework as required, in accordance with Hartzell Aluminum Blade Overhaul Manual 133C (61-13-33). Blades that cannot meet the acceptance criteria must be retired from service in accordance with Hartzell Standard Practices Manual 202A (61-01-02).

(4) If not previously accomplished, shot peen the propeller blade shank area in accordance with the Shot Peening chapter of Hartzell Standard Practices Manual 202A (61-01-02) .

NOTE: Any non-shot peened blades must be shot peened. Re-shot peening is not a requirement during each inspection. Re-shot peening is required if necessary because of excessive wear/damage or repairs as defined in Hartzell Aluminum Blade Overhaul Manual 133C (61-13-33).

(5) No penetrant or eddy current indication is permitted. Any blade with a crack indication must be retired from service in accordance with Hartzell Standard Practices Manual 202A (61-01-02). Indications of corrosion pitting may be repaired if within the limits specified in Hartzell Aluminum Blade Overhaul Manual 133C (61-13-33).

D. **Blade Clamp Inspection**:

(1) Perform visual inspection in accordance with the Blade Clamp Overhaul chapter of Hartzell Standard Practices Manual 202A (61-01-02).

(2) Perform magnetic particle inspection of the steel blade clamps in accordance with the Magnetic Particle Inspection chapter of Hartzell Standard Practices Manual 202A (61-01-02). For compliance with this inspection, removal of the counterweight from the clamp is required.

(3) No magnetic particle indications are allowed. Any clamp with a crack indication must be retired from service in accordance with Hartzell Standard Practices Manual 202A (61-01-02). Any relevant indication (visual or magnetic) of damage or corrosion pitting is not permitted, but is repairable within the limits shown in Figure 1.

E. During re-assembly of blade clamps, use of new A-321 Screws and A-2043-1 Nuts is required.

(1) Replacement of other fasteners is "on condition". Visually inspect other fasteners in accordance with the Blade Clamp Overhaul chapter of Hartzell Standard Practices Manual 202A (61-01-02) for damage or corrosion that may affect serviceability.

F. Make an entry in the propeller logbook indicating compliance with this Service Bulletin and with AD 97-18-02.

G. Report any incidents of parts with crack indications to the Hartzell Propeller Product Support Department.

H. Recommended Service Facilities

(1) Hartzell Propeller has a worldwide network of Recommended Service Facilities that are approved by Hartzell Propeller for overhaul and repair of our products.

(2) Each facility must meet the standard FAA requirements and the additional Hartzell Propeller requirements before being approved by Hartzell Propeller. Each facility is audited by Hartzell Propeller to verify the continuation of the standards.

(3) Hartzell Propeller recommends that you use one of these facilities when having your propeller overhauled or repaired.

(4) For a current list of Hartzell Propeller Recommended Service Facilities, contact Hartzell Product Support or refer to the Hartzell Propeller website at www.hartzellprop.com; select Product Support then Worldwide Network.

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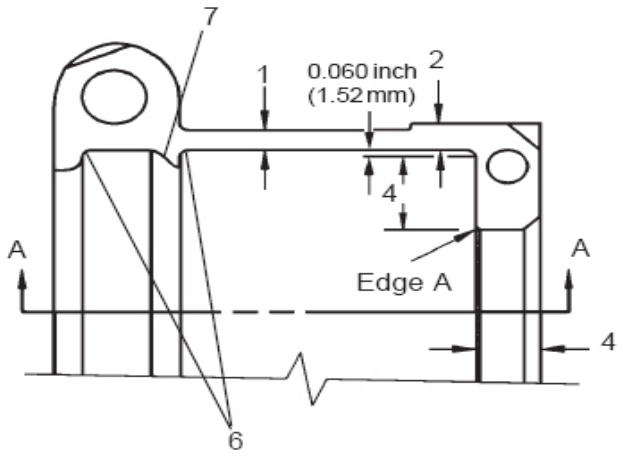
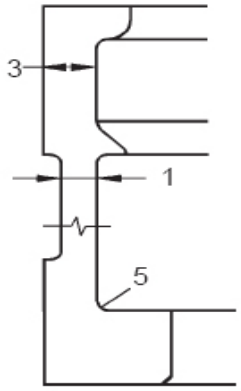
Propeller - X and V Shank Propeller Inspection

APS1807



C-3-( ) Clamp



Section "A-A"

Area Number (above)	Description	Rework Limits
Area 1	Wall thickness - blade retention area	Rework allowed to 0.007 inches (0.17mm) depth. Minimum wall thickness after rework to be no less than 0.132 inches (3.35 mm).
Area 2	Wall thickness - bearing retention area	Rework allowed to 0.007 inches (0.17mm) depth. Minimum wall thickness after rework to be no less than 0.215 inches (5.46 mm).
Area 3	Wall thickness - double shoulder	Rework allowed to 0.007 inches (0.17mm) depth. Minimum wall thickness after rework to be no less than 0.195 inches (4.95 mm).
Area 4	Inboard wall thickness - bearing retention area	Local spot rework permitted. Maximum material removed is 0.007 inches (0.17mm). Minimum wall thickness after rework to be no less than 0.618 inches(15.69 mm). Wear depth in the area where the link arm rubs is 0.006 inches (1.15mm) maximum. Minimum thickness of clamp inboard wall, in area of link arm only, is 0.612 inches (15.54 mm). Maintain 0.032 inches (0.81mm) x 45 degrees chamfer at "A."
Area 5	Corner - inboard wall	Maintain 0.050 to 0.070 inches (1.27 to 1.77 mm) radius. Rework allowed to 0.007 inches (0.17mm) depth.
Area 6	Corner	Local spot reowrk is permitted. Maximum material removal is 0.002 inches (0.051 mm). Corner radius of 0.060 inches (1.52 mm) must be maintained.
Area 7	Corner	Local spot rework is permitted. Maximum material removal is 0.005 inches (0.12 mm). Corner radii of 0.060 inches (1.52 mm) and 0.040 inches (1.01 mm) must be maintained.

NOTE 1: Area 4 applies to the point of tangency to the radius, all the way around the entire circumference of the clamp.

NOTE 2: All rework must blend smoothly and have a surface finish of 32 Ra or better when completed.

Clamp Inspection Areas and Rework Limits
Figure 1

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Propeller - X and V Shank Propeller Inspection

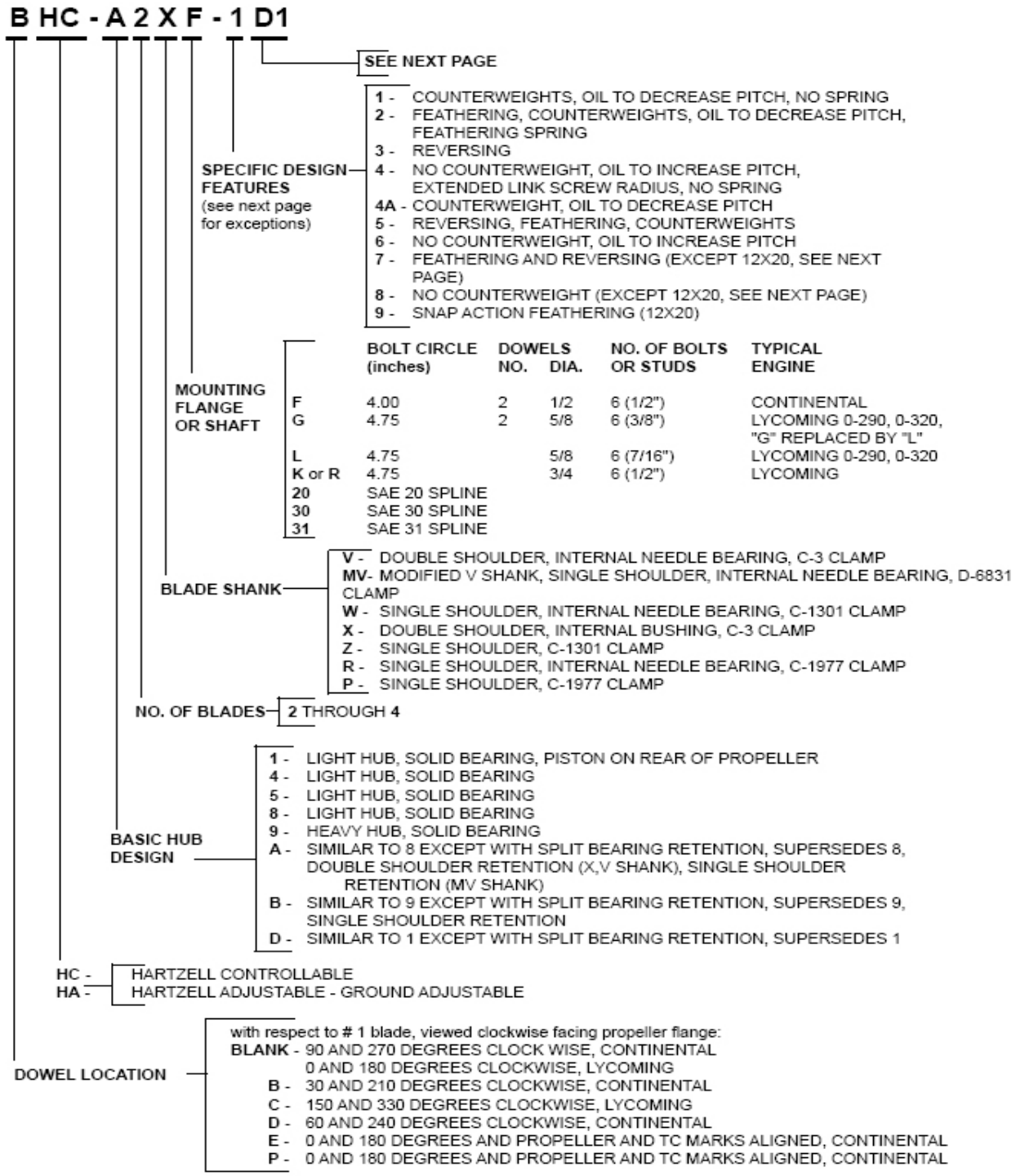

Table 1
Model Designations for Steel Hub, Reciprocating Engine Propellers

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Propeller - X and V Shank Propeller Inspection

AIRCRAFT MODEL	TC/STC #	ENGINE	PROPELLER	BLADE
AeroCommander (Twin Commander)				
500 AERO COMMANDER	STC-SA257CE	IO-540-A1A5	HC-A3VK-2	V7636D
500 AERO COMMANDER	STC-SA340SO	IO-520-D, -E	EHC-A3VF-2B	V7636D
500 AERO COMMANDER	6A1	O-540-A2B	HC-(A,8)2(X,V)K-2	(V)84333(N)-4
500 AERO COMMANDER	UNK	O-540-A2B	HC-A3VK-2B	V7636D
500A AERO COMMANDER	6A1	IO-470-M	HC-A2(X,V)F-2	(V)8433(N)-4
500B, 500S, 500U AERO COMM.	EXP	IO-540-	HC-A3VK-2B	V8433N-6Q
500B, 500U, 500S AERO COMM.	6A1	IO-540-B1(A,C)5, E1(A,B)5	HC-A3(X,V)K-2, -2A	(V)8433(N)-4
500U, 500S AERO COMM.	STC-SA2478SW	IO-720-B1B, -B1BD	HC-A3VK-2A	V8433(N)-4R, -4Q
520 AERO COMMANDER	6A1	GO-435-C2	HC-12X20-8C, 9C	9333C-3
520 AERO COMMANDER	6A1	GO-435-C2, -C2B, -C2B1	HC-82X20-2	9333C-3
520 AERO COMMANDER	6A1	GO-435-C2, -C2B, -C2B1	HC-83X20-2	8433
560 AERO COMMANDER	STC-SA2-89	GO-480-C1D6	HC-83X20-2	V8833(N)(-2), V8433(N)
560 AERO COMMANDER	6A1	GO-480-B, -B1C	HC-82X20-2	9333C-3
560A AERO COMMANDER	6A1	GO-480-D1A, -(C,G)1B6	HC-83X20-2	8433
560A, 560E AERO COMM.	6A1	GO-480-(C,G)1B6	HC-83X20-2	(V)8833(N)-2
680, 680E AERO COMMANDER	STC-SA439WE	IGSO-480-A1D6	HC-A3X20-2	9333C
680, 680E, 720 AERO COMM.	2A4	GSO-480-A1A6, -B1A6	HC-83X20-2	9333C
680F AERO COMMANDER	UNK	IO-720-B1B	HC-A3VK-2A	V8433B-6Q
680F, FP, FL, FLR AERO COMM.	STC-SA2891WE	IO-720-B1B	HC-A3VK-2A	V8433-R
B1 (CALLAIR)	A7WE, A8WE	IO-720-A1A	HC-A3VK-4	V8433(N)-4
Aeromere				
FALCO F.8.L	7A11	O-320-A1A	HC-82XL-1F	7636D-4
Aeronautica Macchi				
AL60-F5	7A12	IO-720-A1A	HC-A3VK-4	V8433
AM-3	A19EU	GTSIO-520-C	HC-A3VF-4	V8833
Bauger				
SAIL PLANE	UNK	O-290-D	HC-A2XL-2	7636D-4
Beech				
35 SERIES BONANZA	STC-SA4-1305		HC-12X20-7E	8433
35 SERIES BONANZA	STC-SA4-550	E-225-8	HC-12X20	8433
35 SERIES BONANZA	STC-SA4-785		HC-12X20-7D	(V)8433(N)
35 SERIES BONANZA	STC-SA4-819		HC-12X20-7D	(V)8433(N)
35 SERIES BONANZA	STC-SA609SW		PHC-A3VF-4	V8433-4, V8433N-4
35 SERIES BONANZA	STC-SA4-1146		HC-12X20-7C	(V)8433(N)
35, A35 BONANZA	A777	E-185-1	HC-12X20-7B	8433
35, A35, B35 BONANZA	A777	E-185-1, E-185-8	HC-12X20-7C	8433
35,A35,B35,C35,D35,E35,F35	STC-SA1-570	E-185-8, -11, -1; E225-8	HC-A2X20-4A1	(V)8433(N),(V)8833(N)-4
C35, D35 BONANZA	A777	GO-435-D1	HC-12X20-1	(V)9333C-3
G35, 35R BONANZA	STC-SA1-570	E-225-8	HC-A2X20-4A1	(V)8433(N),(V)8833(N)-4
S35, V35 BONANZA	3A15	IO-520-; TSIO-520-D	PHC-A3VF-4	8433-2R,-4R
V35A, V35B BONANZA	3A15	IO-520-; TSIO-520-D	PHC-A3VF-4	8433-4R
35-C33 DEBONAIR	3A15	IO-470-K	PHC-A3VF-4	V8433-4R(D)
35-C33A,E33A,F33A	3A15	IO-520-B,-BA,-BB	PHC-A3VF-4	8433-2R,-4R
50 SERIES TWIN BONANZA	STC-SA2-665	GO-480-C3C6, -C2D6	HC-83XF-2A	9333C-3
50 SERIES TWIN BONANZA	STC-SA2-87,93	GO-480-C2C6, -C2D6	HC-83X20-2E	9333C-3
50 SERIES TWIN BONANZA	STC-SA2-602	GO-480-F4B6	HC-83XF-2A	9333C-3
50 SERIES TWIN BONANZA	STC-SA2-602	GO-480-F2A6	HC-83X20-2C	9333C-3
50 SERIES TWIN BONANZA	STC-SA2-1	GO-435-C2B	HC-83X20-2C	9333C-3
50, B50, C50 TWIN BONANZA	STC-SA2-66	GO-480-B,-B1(B,C,D), -F2A	HC-83X20-2C	9333C-3
58P, 58TC BARON	STC-SA538GL	TSIO-520-L, -LB, -WB	PHC-A3VF-5R	V7636NRB
BARON	STC-SA350SO	IO-520-E	EHC-A3VF-2B	V7636D(B)-2R
95-55, 95-A55, 95-B55 BARON	STC-SA126CE	IO-470	(P)HC-A3(X,V)F-2B	(V)7636D, V7636N
65, A65, 65-(B)80, 65-A80, 70	STC-SA444SW	IO-720-A1A, -A1B	HC-A3VK-2A	V8433-2R, -4R, -4Q
65, A65, A65-8200, 70	STC-SA2365WE		HC-83X20-2	9333C-3

Table 2
Aircraft and Propeller Applications

AIRCRAFT MODEL	TC/STC #	ENGINE	PROPELLER	BLADE
B50 TWIN BONANZA	5A4	GO-435-C2B	HC-83X20-2C	9333C-3
C50 TWIN BONANZA	STC-SA2-233	GO-480-F4B6, -F4A6	HC-83XF-2A, -A3VF-2	9333C-3
C50 (EXCALIBER)	STC-SA360/242SW	GO-480-G2D6, -G2F6	HC-A3VF-2	V9333C-3 TO -4
D50, D50A, D50B, D50C, D50E	5A4	GO-480-(C,G)2(C,D,F)6	HC-(A,8)3(X,V)F-2A	9333C-3
Bellanca				
14-13	STC-SA2-848	O-435-C	HC-12X20-8D, -D2X20-8	8433-6
14-19	1A3	O-435-A	HC-12X20-8C, -D2X20-8	8433-6
14-19-2	1A3	O-470-K	HC-82XF-1, -A2XF-1A	8433S-6
14-19-3	1A3	IO-470-F	HC-A2XF-1A	8433-2
7GCA, 7GCB, 7GCC	STC-SA282AL		HC-82XL-1	7663D-4
DW-1 EAGLE	A4NW	W670-6N,-6A (R-670-4,-5)	HA-A2V20-1B	V10133N
Camair				
480	2A2	O-470-B	HC-82XF-2B	8433-2
480	2A2	O-470-D	HC-82XF-2B	8433-4
Cessna				
170	STC-SA1-245	O-340-A1A	HC-82XL-1F, -A2XL-1	8433-12
170	STC-SA135CE	O-320-(A,B)(1,3)(A,B)	HC-82XL-1F, -A2XL-1	7636D-4
170	STC-SA3-13	O-340	HC-82XL-1F, -A2XL-1	7636D-4
170A	STC-SA1-240	O-435-C	HC-(1,D)2X20-8(D), -5C	8433-6
172 SKYHAWK	STC-SA3-126	O-340-A1A	HC-82XL-1F	8433-12
172, 175	STC-SA610SW	O-320	HC-82XL-2	7636D-4
180, A, B, C, D, E, F, G, H	STC-SA816SW	O-470-A, -J, -R, -K, -L	BHC-A2VF-3	V8833
180, A, B, C, D, E, F, G, H	STC-SA816SW	O-470-A, -J, -R, -K, -L	BHC-A2VF-3	V8833
180,A,B,C,D,E,F	5A6	O-470-A,-J, -K,-L	(B)HC-(8,A)2(X,V)F-(1,6)	8433, 8833
182	STC-SA108CE		BHC-A2VF-3	V8433-2
182, 182A, B, C, D, E	STC-SA129EA	O-470-L	(B)HC-A2XF-G or -1	8433-2
182, A, B, C, D, E, F, G	3A13	O-470-L, -R	(B)HC-(8,A)2(X,V)F-1	8433-2
182E, F, G, H, J, K, L, M	STC-SA692SW		BHC-A2VF-3	8433-2
210, A, B, C, 5, 5A	3A21	IO-470-E, -S	HC-A2XF-1	8433-2
310	UNK	IO-540-(A,B)1(A,B)5	HC-A3(V,X)K-2B	V7636DB
310, 310A, 310B	3A10	O-470-B, -M	HC-(A,8)2(X,V)F-2	8433
310, 310B, 310G	STC-SA212SO	IO-540-A1A5	HC-A3(X,V)K-2B	(V)7636D(B)
310C, D, E, F, G, H, E310H	3A10	IO-470-D	HC-(A,8)2(X,V)F-2B	8433
320, 320-1 SKYKNIGHT	STC-SA285SO	IO-540-A1A5	HC-A3XK-2B	7636D
320, 320-1, 320A, 320B	3A25	TSIO-470-B, -C	HC-A2XF-2	8433-4
402 BUSINESSLINER	UNK	250-C18	HC-A3VF-7	V9333C-3R
411	A7CE	GTSIO-520-C	HC-A3VF-2D	V8833
WREN 460	STC-SA403SW		BHC-A2VF-3	V8433-2
WREN 460H, J, K, L, M	STC-SA485SW		BHC-A2VF-3	V8433-2
DeHavilland				
DH104 DOVE	STC-SA168SO	IO-720-A1A	HC-A3VK-2A	V8433-4R
DH114 HERON	STC-SA629SO	IO-540-G1B5	HC-A3VK-2A	V8433-7
DH114 HERON	STC-SA816WE	GYPSY QUEEN 30MK-2	HC-A3X21-2L	L7636D TO -1
Dornier				
DO27Q-6	A8IN	GO-480-B1A6	HC-82X20-1B, -A2X20-1	10133D-3
DO28A-1	7A13	O-540-A1D	HC-A2XK-2	8433-2
DO28B-1	7A13	IO-540-A1A5	HC-A3VK-2C	V8433-4
Fuji				
T-3, LM-2	UNK	IGSO-480-A1F6	HC-A3V20-1F	V9333N-3
GAF - Gov't. Aircraft Factories				
N22B, N24A, N22S, N22C	A7PC	250-B17B, -B17C,E,F	HC-A3VF-7, -7B	V10133(D,N)-11
Goodyear (Loral)				
GA22A GOODYEAR DRAKE	1A12	E-225-8	HC-12X20-5E	L8833
GZ19, 19A GOODYEAR BLIMP	1	GO-300-F	HC-82XF-3L	L9333CH-3

Table 2, continued
Aircraft and Propeller Applications

AIRCRAFT MODEL	TC/STC #	ENGINE	PROPELLER	BLADE
Great Lakes				
2T-1A-2	EXP	250-B17C	HC-A3VF-7	V10133AN-11
Grumman				
G44, G44A WIDGEON	A734	GO-435-C2, -C2B	HC-12X20-9	9333C
G44, G44A WIDGEON	A734	GO-435-C2, -C2B	HC-82X20-2	9333C-3
G44, G44A WIDGEON	A734	GO-435-C2B	HC-82X20-2	9333C-3
G44, G44A WIDGEON	A734	GO-435-C2B	HC-83X20-2A	8433
G44, G44A WIDGEON	STC-	IO-520-E	PHC-A3VF-2B	V7636N
G44, G44A WIDGEON	STC-	6-440-C5	HC-D2X20-8	8833
G44, G44A WIDGEON	STC-SA2-13	IO-470-D	HC-82XF-2B	8433
G44, G44A WIDGEON	STC-SA4-65,-64	GO-480-B1	HC-83X20-2A	8433
G44, G44A WIDGEON	STC-SA4-64	GO-435-C2B	HC-83X20-2A	8433
G44, G44A WIDGEON	STC-SA4-64	GO-435-C2B	HC-82X20-2	9333C-3
G44, G44A WIDGEON	STC-SA4-111	GO-480-C1D6	HC-83X20-2A	8433
G44, G44A WIDGEON	STC-SA835SO	GO-480-G2D6	HC-A3VF-5R	V9333C(H)-3
G44, G44A WIDGEON	STC-	6-440-C5	HC-A2V20-2	V8833NS
G44, G44A WIDGEON	A734	GO-480-B1	HC-83X20-2A	8433
G44, G44A WIDGEON	STC-SA2-13	O-470-B	HC-82XF-2C	8433
G21C, D GOOSE	4A24	GSO-480-B2D6	HC-83XF-3A	9333CH
Helio				
H-391 COURIER	1A8	GO-435-C2	HC-12X20-8C	9333C
H-391B COURIER	1A8	GO-435-C2B( )	HC-82X20-1A,-1B	10133D
H-395A COURIER	1A8	GO-435-C2B2-6	HC-(8,A)2X20-1A,-1B	10133D
Luscombe				
11	STC-SA3-71	E-185-2	HC-A2XF-2	8433-1
11A	A-804	E-185-2	HC-42XF-2	8433-1
Mooney				
M20	2A3	O-320	HC-82XG-1B, -A2XL-1	7636D
Multitech (Temco)				
D16 TWIN NAVION	2A1	O-320-A1A	HC-82XG-2,-A2XL-2	7636C-2, D-2
D16 TWIN NAVION	2A1	O-290-D2A	HC-82XG-2,-A2XL-2	7636C-2
D16A, D16 TWIN NAVION	2A1	O-340-A1A	HC-82XG-2,-A2XL-2	8433-12
Nardi				
FN-333	7A5	IO-470-P	HC-A3X20-5L	L8433-6B
FN-333	7A5	IO-470-P	HC-(A,8)2X20-5L	L8433H
Navion				
NAVION	A782	E-185-3	HC-52X20-1	8433
NAVION	STC-SA1-635	E-185	HC-A2X20-4A1	8433
NAVION	STC-SA1-635	E-185-3, -9	HC-A2X20-4A1	8433
NAVION	STC-SA1-635	E-225-4	HC-A2X20-4A1	8433
NAVION	STC-SA1-635	E-225-4	HC-A2X20-4A1	8433
NAVION	STC-SA4-118		HC-12X20-7C	8433-0
NAVION B	STC-SA752WE	GO-480-B1D	HC-83X20?	9333C-3
NAVION B	A782	GO-435-C2	HC-12X20-8C	9333C
NAVION B	A782	GO-435-C2	HC-13X20-8D	8433
NAVION, NAVION A	A782	E-225-4	HC-12X20-7B	8433
NAVION, NAVION A	A782	E-185-3, -9	HC-12X20-7( ),-8( )	8433
NAVION, NAVION A	A782	E-185-3, -9	HC-12X20-5	8433
NAVION, NAVION A	A782	E-185-3, -9	HC-12X20-1	8433
Pacific Aerospace (Fletcher)				
FU-24, FU-24A	4A12	O-470-E	HC-82XF-1B	8833
Piaggio				
P-149D	UNK	GO-480-B1A6	HC-A3V20-1D	V8433N
P136-L1 ROYAL GULL	A813	GO-480-B, -B1B, -B1D	HC-83X20-2CL	L8433
P136-L2 ROYAL GULL	A813	GSO-480-A1A6	HC-83X20-2CL	L9333C

Table 2, continued
Aircraft and Propeller Applications

AIRCRAFT MODEL	TC/STC #	ENGINE	PROPELLER	BLADE
P149D	UNK	GO-480-G( ), IGO-480-A1B6	HC-A3V20-1( )	V9333C, V9333N
P166 ROYAL GULL	7A4	GSO-480-B1C6	HC-(A,8)3X20-2CL	L9333C(H)
P166 ROYAL GULL	UNK	GSO-480	HC-A3VF-5AL	VL9333CH-5
Pilatus				
PC-3	UNK	GO-435-C2A	HC-83X20-2A	8433
PC-6; PC-6-H1, -H2 PORTER	7A15	GSO-480-B1A6	HC-A3X20-1D,-83X20-1B	9333C
Piper				
PA-E23-250 AZTEC	STC-SA164CE	O-540-A1B5, -A3D5, -A1D5	HC-A3XK-2B	7636D-4
PA14 FAMILY CRUISER	STC-SA196SW	O-235-C1	HC-82XL-6F	7636D-4
PA18(A)(S)-150 SUPER CUB	STC-SA4-1143	O-320-A3B	HC-82XL-6F	7636D-2
PA18(A)(S)-150 SUPER CUB	STC-SA284AL	O-320-A2A, -A2A	HC-82XL-1,-2,-6	7636D-4
PA18A-150 SUPER CUB	STC-SA4-254	O-320-A2A, -A2B	HC-82XL-6F	7636D-4
PA22-150, PA22S-150 TRIPACER	1A6	O-320-A1A, -A1B	HC-82XL-6F	7636D-4
PA23	STC-SA179CE	IO-540-A1A5	HC-A3XK-2C	8433-10 TO -12
PA23	STC-SA179CE	IO-540-G1A5	HC-A3XK-2B	7636D-4
PA23 APACHE	1A10	O-320-A(1,3)(A,B)	HC-82XG-2	7636D
PA23 APACHE	1A10	O-320-A(1,3)(A,B)	HC-(8,A)2X(G,L)-2( )	7636D-4
PA23 APACHE	STC-SA4-783	O-340-A1A	HC-82XL-2C	8433-12 V7636(D,N)
PA23 APACHE	STC-SA1-6	O-320-A(1,3)(A,B)	HC-82XG-2	7636D-4
PA23 SERIES APACHE	STC-SA2-1088	O-320-B3B	HC-82XL-2B	7636D-4
PA23, PA23-160 APACHE	STC-SA1-5	O-320-A(1,3)(A,B)-150hp	HC-(A,8)2XL-2C	7636D-4
PA23, PA23-160 APACHE	STC-SA1-5	O-320-(B,C)(1,3)(A,B)	HC-(A,8)2XL-2	7636D-4
PA23-160 APACHE	1A10	O-320-(B,C)(1,3)(A,B)	HC-82XG-2	7636D
PA23-160 APACHE	1A10	O-320-(B,C)(1,3)(A,B)	HC-(8,A)2X(G,L)-2(B,C)	7636D-4
PA23-235 APACHE	1A10	O-540-B1A5	HC-82XK-2C1, -A2XK-2	8433-10
PA23-235, 250 AZTEC	STC-SA495CE	O-540-B1A5	HC-A3VK-2B	V7636D-4
PA23-235, 250 AZTEC	STC-SA495CE	O-540-A1B5, -A1D5, -A3D5	HC-A3VK-2B	V7636D-4
PA23-250 AZTEC	STC-SA164CE	O-540-A1B5, -A3D5, -A1D5	HC-A3XK-2B	7636D-4
PA23-250 AZTEC SN<27-2000	1A10	IO-540-C( ), O-540-A( )	HC-A2XK-2	8433B-10
PA23-250 AZTEC SN<27-2505	1A10	IO-540-C( ), O-540-A( )	HC-82XK-2C1, -A2XK-2	8433-10
PA24-250 COMANCHE	1A15	O-540-A1( );IO-540-C1B5	HC-A2(X,V)K-1,-82XK-1D	8433-7
PA24-400 COMANCHE	1A15	IO-720-A1A	HC-A3VK-4	V8433-7
PA24S COMANCHE	STC-SA511WE	O-540-B1B5	HC-A2XK-1	8433-7
PA28 CHEROKEE	STC-SA222SW	O-320-A2B	HC-82XL-6F	7636D-4
PA28-140 CHEROKEE	STC-SA2052SE	O-320-E2A	HC-82XL-6F	8433-12
Prop Jets Inc.				
200	3A18	O-470-M	HC-82XF-1DB1,-A2XF-1A	8433S
200A,B,C	3A18	IO-470-D	HC-82XF-1DB1,-A2XF-1A	8433(R)-4
Republic (STOL Amphibian)				
RC3 SEABEE	STC-SA282NW	GO-480-F( )	HC-A3XF-5AL	L9333C-6
RC3 SEABEE	UNK	GSO-480-B1C6	HC-A3V20-3L	LV9333N-6Q
RC3 SEABEE	STC-SA3-88	6A8-215-B8F	HC-D3X20-6L	L8433H-2
RC3 SEABEE	STC-SA3-88	6A8-215-B8F	HC-13X20-5L	L8433H-2
RC3 SEABEE	STC-SA282NW	GO-480-C1D6	HC-83X20-3L	L9333C-4
RC3 SEABEE	STC-SA282NW	GO-480-B( )	HC-83X20-3L	L8433
RC3 SEABEE	STC-SA615NW	IGSO-540-A1B6	HC-A3V20-3L	LV9333CH-4 or -5
RC3 SEABEE	STC-SA615NW	GO-435-C2B	HC-A3V20-3L	LV9333N-5, LV9333CH-5
RC3 SEABEE	A769	6A8-215-B8F	HC-12X20-3,-3A,-3C,-3E	L8433
RC3 SEABEE	A769	6A8-215-B8F	HC-12X20-2	L8433
RC3 SEABEE	STC-SA282NW	GO-435	HC-83X20-3L	L8433
RC3 SEABEE	STC-SA282NW	GO-480-C( ), -G( )	HC-A3XF-5AL	L9333C-4
Scottish Aviation (BAE)				
B.206 SERIES 2 BEAGLE	A11EU	GTSIO-520-C	HC-A3VF-2D	V8833B
Stinson				
L-5	STC-	O-435-C	HC-D2X20-8	8433-6

Table 2, continued
Aircraft and Propeller Applications

AIRCRAFT MODEL	TC/STC #	ENGINE	PROPELLER	BLADE
108, -1, -2, -3	STC-SA4-46	O-435-1	HC-12X20-8D, -D2X20-8	8433-6
108-2-3	STC-SA1199WE	O-470-A, -J, -K, -L	HC-A2(X,V)F-1	8433
108-2-3	STC-SA4-398	O-435-C	HC-12X20-8D, -D2X20-8	8433-6
Sud Aviation (SOCATA)				
GY.80-150 GARDAN	A12IN	O-320-A3C	HC-82XL-1	7636D-4
GY.80-160 GARDAN HORIZON	A12IN	O-320-B3C	HC-82XL-1	7636D-4
Swift				
GC-1B	UNK	IO-320-B1A	HC-82XL-1D	7636D-4
Taylorcraft				
20	3A3	O-470-A	HC-82XF-1	8433
20	3A3	O-470-J	HC-82XF-1	8433
Texas Bullet				
205	4A2	E-185-1-7	HC-12X20-7	8433-6
Windecker				
EAGLE	UNK	250-B17C	HC-A3VF-7A	V10133N-17Q

Table 2, continued
Aircraft and Propeller Applications