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HARTZELL

Standard Practices Manual
Volume 11

Chapter 1: Propeller Lubrication
Chapter 2: Static and Dynamic Balance
Chapter 3: Packaging and Storage

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202A, VOLUME 11 - REVISION 29 HIGHLIGHTS

- Revised the Cover, Highlights, and List of Effective Pages to reflect the manual revision.
- Revised the Propeller Lubrication chapter
  - Revised the instructions for installation of the lubrication fittings to remove the torque requirement
- Revised the Static and Dynamic Balance chapter
  - Added recommendation about dynamic balancing to a reading of 0.2 IPS or less.
- Revised the Packaging and Storage chapter
  - Revised wording about TBO and calendar life
  - Corrected paragraph numbering error

REVISIONS HIGHLIGHTS

1. Introduction

   A. General

      This is a list of current revisions that have been issued against this manual. Please compare to RECORD OF REVISIONS page to ensure that all revisions have been added to the manual.

   B. Components

      (1) Revision No. indicates the revisions incorporated in this manual.

      (2) Issue Date is the date of revision.

      (3) Comments indicates the level of the revision.

         (a) New Issue is a new manual distribution. The manual is distributed in its entirety. All the revision dates are the same and no change bars are used.

         (b) Reissue is a revision to an existing manual that includes major content and/or major format changes. The manual is distributed in its entirety. All the revision dates are the same and no change bars are used.

         (c) Major Revision is a revision to an existing manual that includes major content or minor format changes over a large portion of the manual. The manual is distributed in its entirety. All the revision dates are the same, but change bars are used to indicate the changes incorporated in the latest revision of the manual.

         (d) Minor Revision is a revision to an existing manual that includes minor content changes to the manual. Only the revised pages of the manual are distributed. Each page retains the date and the change bars associated with the last revision to that page.

Revision No.	Issue Date	Comments
Original	Mar/93	New
Revision 1	Jun/94	Minor Revision
Revision 2	Apr/95	Minor Revision
Revision 3	Jun/95	Minor Revision
Revision 4	Apr/96	Minor Revision
Revision 5	Nov/96	Minor Revision
Revision 6	Mar/97	Minor Revision
Revision 7	Oct/97	Minor Revision
Revision 8	Jan/98	Minor Revision
Revision 9	Jun/98	Minor Revision
Revision 10	Dec/98	Minor Revision
Revision 11	Sep/99	Minor Revision
Revision 12	Nov/00	Minor Revision
Revision 13	Sep/01	Minor Revision
Revision 14	Feb/02	Minor Revision
Revision 15	May/02	Minor Revision
Revision 16	Sep/02	Minor Revision
Revision 17	Dec/02	Minor Revision
Revision 18	Aug/03	Minor Revision
Revision 19	Sep/03	Minor Revision
Revision 20	Oct/03	Minor Revision
Revision 21	Nov/03	Minor Revision
Revision 22	Dec/03	Minor Revision
Revision 23	Feb/04	Minor Revision
Revision 24	Apr/04	Minor Revision
Revision 25	Jun/04	Minor Revision
Revision 26	Aug/04	Minor Revision
Revision 27	Oct/04	Major Revision - Volume 11
Revision 28	Dec/04	Minor Revision
Revision 29	Aug/05	Minor Revision

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RECORD OF REVISIONS

This is a permanent historical record of revisions inserted into this manual.
All previous revisions have been incorporated.

Revision Number	Issue Date	Date Inserted	Inserted By
27	Oct/04	Oct/04	HPI
28	Dec/04	Dec/04	HPI
29	Jul/05	Jul/05	HPI

Revision Number	Issue Date	Date Inserted	Inserted By

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RECORD OF TEMPORARY REVISIONS TO THIS MANUAL

Update this page to show all temporary revisions inserted into this manual.
Revision 27 includes all prior temporary revisions, up to and including TR-068.

Temporary Revision No.	Section/ Page	Issue Date	Date Inserted	Inserted By	Date Removed	Removed By

RECORD OF TEMPORARY REVISIONS TO THIS MANUAL

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SERVICE DOCUMENT LIST

Service Doc. No.	Incorporation Rev./Date	Service Doc. No.	Incorporation Rev./Date
SI 104	Orig., Mar/93		
SI 148B	Orig., Mar/93		
SL 53	Orig., Mar/93		

SERVICE DOCUMENT LIST

Service Doc. No.	Incorporation Rev./Date

Service Doc. No.	Incorporation Rev./Date

LIST OF EFFECTIVE PAGES

Chapter	Volume	Page	Rev. Level	Date
Cover/Cover back	11	Cover/Cover back	Rev. 29	Aug/05
Revision Highlights	11	1 thru 4	Rev. 29	Aug/05
Record of Revisions	11	1 and 2	Rev. 27	Oct/04
Record of Temporary Revisions	11	1 and 2	Rev. 27	Oct/04
Service Document List	11	1 and 2	Rev. 27	Oct/04
List of Effective Pages	11	1 and 2	Rev. 29	Aug/05
Table of Contents	11	1 and 2	Rev. 27	Oct/04
Introduction	11	1 thru 12	Rev. 27	Oct/04
Propeller Lubication	11	1-1 thru 1-4	Rev. 27	Oct/04
Propeller Lubication	11	1-5	Rev. 29	Aug/05
Propeller Lubication	11	1-6 thru 1-8	Rev. 27	Oct/04
Static and Dynamic Balance	11	2-1 thru 2-5	Rev. 27	Oct/04
Static and Dynamic Balance	11	2-6 and 2-7	Rev. 28	Dec/04
Static and Dynamic Balance	11	2-8 thru 2-15	Rev. 27	Oct/04
Static and Dynamic Balance	11	2-16	Rev. 29	Aug/05
Static and Dynamic Balance	11	2-17 thru 2-24	Rev. 27	Oct/04
Packaging and Storage	11	3-1 thru 3-4	Rev. 27	Oct/04
Packaging and Storage	11	3-5	Rev. 29	Aug/05
Packaging and Storage	11	3-6	Rev. 27	Oct/04

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1. Statement of Purpose

A. General

(1) This publication is compiled and issued by Hartzell Propeller Inc., Piqua, OH.

(2) Contact the Product Support Department concerning any problems, request for information, or any suggestions for modification or amplification of these instructions to increase their clarity and usefulness.

Hartzell Product Support may be reached during business hours (8:00 a.m. through 5:00 p.m., United States Eastern Time) at (937) 778-4379.

After business hours, you may leave a message on our 24 hour product support line at (937) 778-4376. A technical representative will contact you during normal business hours. Urgent AOG support is also available 24 hours per day, seven days per week via this message service.

Additional information is available on our website at www.hartzellprop.com.

NOTE: When calling from outside the United States, dial (001) before dialing the above telephone numbers.

(3) This manual is written with the intent that it is to be used by propeller repair stations with personnel who are trained and experienced with Hartzell products. This manual does not provide complete information for an inexperienced technician to attempt propeller overhaul without supervision.

(4) Where possible, this manual is written in the format specified by ATA Specification No. 100.

(5) The information in this manual supersedes data in all other Hartzell manuals published before the date of this manual.

2. Required Publications

A. Hartzell Publications

(1) The Hartzell Standard Practices Manual has several volumes. A complete set consists of the following:

Volume Number	Chapter Number	Chapter Name
Volume 1	1	Cleaning
	2	Paint and Finish
Volume 2	1	Eddy Current Inspection
	2	Magnetic Particle Inspection
	3	Penetrant Inspection
Volume 3	1	Aluminum Hub Overhaul
Volume 4	1	Steel Hub Overhaul
Volume 5	1	Blade Clamp Overhaul
Volume 6	1	Special Inspections
	2	Parts Identification and Marking
	3	Part Retirement Procedures
Volume 7	1	Consumable Materials
	2	Vendor Cross Reference
Volume 8	1	Standard Repairs and Instructions
	2	Special Adhesive and Bonding
Volume 9	1	Shot Peening
	2	Approved Facilities
Volume 10	1	Hard Chrome Re-plating
	2	Cadmium Replating
	3	Chromic Acid Anodizing
Volume 11	1	Propeller Lubrication
	2	Static and Dynamic Balance
	3	Packaging and Storage

(2) In addition to this manual, one or more of the following publications are required for information regarding specific recommendations and procedures to maintain propeller assemblies.

Manual No.	ATA No.	Title
Manual 126	61-00-26	Set of Active SB, SA, SL, SI
Manual 165	61-00-65	Illustrated Tool and Equipment Manual
Manual 159	61-02-59	Hartzell Propeller Inc. Application Guide

(3) For Hartzell service literature and revisions, contact:

Hartzell Propeller Inc.
Attn: Service Documents Secretary
One Propeller Place
Piqua, Ohio 45356-2634 U.S.A

Telephone: 937.778.4200
Fax: 937.778.4391

(4) References to Hartzell Publications

(a) Special tooling may be required for procedures in this manual. For further tooling information, refer to Hartzell Manual 165A (61-00-65), Illustrated Tool and Equipment Manual. The reference numbers for tooling appear with the prefix "TE" directly following the tool name to which they apply. For example, a template that is reference number 133 will appear as: template TE133.

(b) Certain instructions throughout this manual refer to consumable materials. Specific approved materials are listed in the Consumable Materials chapter of Hartzell Standard Practices Manual 202A (61-01-02), Volume 6. The reference numbers for consumable materials appear with the prefix "CM" directly following the material to which they apply. For example, an approved adhesive that is reference number 16 will appear as: adhesive CM16. Only those items specified may be used.

3. Personnel Requirements

Personnel inspecting, repairing, and overhauling Hartzell propellers must have adequate training and experience. Inspection and repair of propeller parts require a high degree of skill; therefore, personnel with inspection and supervisory responsibility are expected to have an FAA Propeller Repairman's Certificate and a minimum of 18 months practical experience with Hartzell propeller overhaul. Participation in Hartzell training classes and propeller seminars is strongly recommended.

4. Component Life

A. Component Life

NOTE: Certain components, or in some cases an entire propeller, may be life limited. It is a regulatory requirement that a record of the total time in service be maintained for all life limited parts.

(1) Component life is expressed in terms of hours of service (Time Since New, TSN) and in terms of hours of service since overhaul (Time Since Overhaul, TSO).

NOTE: TSN/TSO is considered as the time accumulated between rotation and landing (i.e. flight time).

(2) Both references are necessary in defining the life of the component. Some parts are "life limited," which means that they must be replaced after a specified period of use (TSN).

(3) When a component or assembly undergoes an overhaul, the TSO is returned to zero hours. Time Since New (TSN) can never be returned to zero.

NOTE: Repair without overhaul does not affect TSO or TSN.

(4) Time Since New (TSN) records must be maintained in the propeller logbook, along with Time Since Overhaul (TSO).

(5) Blades and hubs are sometimes replaced while in service or at overhaul. Maintaining separate TSN and TSO histories for a replacement hub or blade is required. Other propeller components do not require time tracking unless specifically noted in Hartzell service publications.

(a) Hub replacement

NOTE: An alternate hub replacement procedure is available for HD-E6C-3B propeller assemblies only. Refer to Hartzell Service Letter HD-SL-61-030 for additional information.

1 If the hub is replaced, the replacement hub serial number must be recorded (the entry signed and dated) in the propeller logbook. The propeller will assume the serial number of the replacement hub.

NOTE: Propeller assembly serial numbers are impression stamped on the hub. Refer to the Parts Identification and Marking chapter of Hartzell Standard Practices Manual 202A (61-01-02) for stamping information.

2 The TSO and TSN of the replacement hub must be recorded and maintained in the propeller logbook. The TSN and TSO of the remaining propeller components that are required to be tracked as defined above, are not affected by the hub replacement and must be maintained separately.

5. Definitions

Term	Definition
Annealed	softening of material caused by overexposure to heat
Blade Station	refers to a location on an individual blade for blade inspection purposes. It is a measurement from the blade "zero" station to a location on a blade, used to apply blade specification data in blade overhaul manuals (Note: do not confuse *blade station* with *reference blade radius*; they may not originate at the same location.)
Brinelling	a depression caused by failure of the material in compression
Corrosion	gradual wearing away or deterioration caused by chemical action
Crack	irregularly shaped separation within a material, usually visible as a narrow opening at the surface
Depression	surface area where the material has been compressed but not removed
Distortion	alteration of the original shape or size of a component
Erosion	gradual wearing away or deterioration caused by action of the elements
Exposure	leaving material open to action of the elements
Fretting	damage that develops when relative motion of small displacement takes place between contacting parts, wearing away the surface
Gauge (Bearing Ball)	a term to describe an amount by which the mean diameter may differ from the nominal diameter
Gouge	surface area where material has been removed
Galling	to fret or wear away by friction
Horizontal Balance	balance between the tip and the butt of the blade
Impact Damage	damage that occurs when the propeller blade or hub assembly strikes, or is struck by, an object while in flight or on the ground

Term	Definition
Nick	removal of paint and possibly a small amount of material, not exceeding one layer
Onspeed	condition in which the RPM selected by the pilot through the propeller condition lever and the actual engine (propeller) RPM are equal
Overhaul (MPI)	the periodic disassembly, inspection, repair, refinish, and reassembly of a propeller assembly
Overspeed	condition in which the RPM of the propeller or engine exceeds predetermined maximum limits; the condition in which the engine (propeller) RPM is higher than the RPM selected by the pilot through the condition lever
Overspeed Damage	damage that occurs when the propeller hub assembly rotates at a speed greater than the maximum limit for which it is designed
Pitting	formation of a number of small, irregularly shaped cavities in surface material caused by corrosion or wear
Porosity	an aggregation of microvoids; see "Voids"
Reference Blade Radius	a distance from the propeller hub centerline to a location on a blade, used for blade angle measurement in an assembled propeller. A yellow adhesive stripe (blade angle reference tape CM160) is usually located at the reference blade radius location. (Note: do not confuse *reference blade radius* with *blade station*; they may not originate at the same location.)
Rolling	compressive rolling process for the retention area of single shoulder blades that provides improved strength and resistance to fatigue
Scratch	same as "Nick"
Shot Peening	process where steel shot is impinged on a surface to create compressive surface stress that provides improved strength and resistance to fatigue
Synchronizing	setting all propellers at exactly the same RPM

Term	Definition
Synchrophasing	a form of propeller sychronization in which not only the RPM of the engines (propellers) are held constant, but also the position of the propellers in relation to each other
Track	In an assembled propeller, a measurement of the location of the blade tip with respect to the plane of rotation, used to verify face alignment and to compare blade tip location with respect to the locations of the other blades in the assembly
Underspeed	the condition in which the actual engine (propeller) RPM is lower than the RPM selected by the pilot through the condition lever
Vertical Balance	balance between the leading and trailing edges; this cannot be changed on composite blades
Voids	air or gas that has been trapped and cured into a laminate
Windmilling	the rotation of an aircraft propeller caused by air flowing over it while it is not operating

6. Abbreviations

Abbreviation	Term
AN	Army-Navy
AOG	Aircraft On Ground
ATA	Air Transport Association
FAA	Federal Aviation Administration
Ft-Lb	Foot-Pound
ID	Inside Diameter
In-Lb	Inch-Pound
IPL	Illustrated Parts List
Lbs	Pounds
MIL-X-XXX	Military Specification
MS	Military Standard
OD	Outside Diameter
NAS	National Aircraft Standards
N	Newtons
N•m	Newton-Meter
PSI	Pounds per Square Inch
RPM	Revolutions per Minute
TBO	Time Between Overhaul
TSN	Time Since New
TSO	Time Since Overhaul

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CONTENTS - PROPELLER LUBRICATION

LIST OF TABLES

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1. Lubrication Interval

   A. Relubricate the propeller at 12 month intervals, or at the hourly limits stated in Paragraph 1.B. , whichever occurs first.

      NOTE 1: If annual operation is significantly less than the hourly limit stated below, calendar lubrication intervals should be reduced to six months.

      NOTE 2: If the aircraft is operated or stored under adverse atmospheric conditions, (e.g. high humidity, salt air) calendar lubrication intervals should be reduced to six months.

   B. Relubricate the propeller at 100 hour intervals or at the calendar limit stated in Paragraph 1.A., whichever occurs first. Exceptions to this hourly interval are indicated in paragraphs (1) through (3), below.

      NOTE: New propellers or newly overhauled propellers should be re-lubricated after the first hour or two of operation. Initial lubrication normally does not fill all voids completely. Centrifugal force tends to relocate the grease; re-lubrication can then completely fill the bearing area with grease.

      (1) The lubrication interval for HC-A6( )-3( ) propellers is 300 hours.

      (2) The lubrication interval for HD-E6C-3( ) propellers is 600 hours.

      (3) The lubrication interval for lightweight turbine propellers (listed below) is 400 hours:

HC-D3( )-7( )	HC-D4( )-5( )	HC-E4( )-5( )	HC-E6( )-5( )
HC-D4( )-2( )	HC-E4( )-2( )	HC-E5( )-3( )	HC-D4( )-3( )
HC-E4( )-3( )	HC-E5( )-5( )		

      NOTE: The lubrication interval for the HC-E5( )-3( ) propeller installed on the Piaggio P-180 is 100 hours. All other propellers of this type on any other installation should be lubricated at 400 hours.

      (4) Operators of commuter aircraft or aircraft with very high utilization can evaluate previous propeller overhauls with regard to bearing wear and internal corrosion and gradually increase their re-lubrication interval based on service history. Interval extension must be implemented as part of an approved maintenance program, or with the approval of the local airworthiness authority.

2. Lubrication Guidelines

CAUTION 1: FOLLOW THESE LUBRICATION PROCEDURES TO CORRECTLY MAINTAIN ACCURATE STATIC BALANCE OF THE PROPELLER BLADE AND HUB ASSEMBLIES. FAILURE TO FOLLOW THE PROCEDURES MAY LEAD TO EXCESSIVE VIBRATION.

CAUTION 2: USE A HARTZELL PROPELLER APPROVED GREASE ONLY. DO NOT MIX DIFFERENT SPECIFICATIONS AND/OR BRANDS OF GREASE.

NOTE: A label (Hartzell P/N A-3594 or A-3594-6) is normally applied to the propeller to indicate the type of grease previously used. This grease type should be used during relubrication unless the propeller has been disassembled and the old grease removed. Purging of old grease through lubrication fittings is only about 30 percent effective. To completely replace one grease with another, the propeller must be disassembled in accordance with the applicable overhaul manual.

A. Steel Hub Propellers

CAUTION: OVER LUBRICATING A STEEL HUB PROPELLER MAY CAUSE THE GREASE TO BYPASS THE CLAMP-TO-HUB SEAL OR THE CLAMP PARTING LINE GASKETS, LEADING TO EXCESSIVE LEAKAGE OR VIBRATION.

(1) Remove the lubrication fitting caps from both lubrication fittings on each blade clamp. Remove one lubrication fitting from each clamp.

NOTE: Early model steel blade clamps have only one fitting. This fitting is not removed during servicing, requiring the clamp to be very slowly re-lubricated without excessive pressure. Add a small amount (1-2 fluid ounces [30-59 ml]) of grease equally to each blade. To relieve excessive pressure, loosen the lubrication fitting used to add grease, then re-torque the fitting as required in the applicable overhaul manual.

(2) Use a piece of safety wire to loosen any blockage or hardened grease at the threaded holes where the lubrication fittings were removed to permit the old grease to flow freely when new grease is introduced.

CAUTION: GREASE MUST BE APPLIED TO ALL BLADES OF A PROPELLER ASSEMBLY AT TIME OF LUBRICATION.

(3) Using a grease gun, begin pumping grease into the fitting. Apply an approved grease to each fitting until clean grease emerges from the removed fitting hole in a steady flow with no air pockets.

NOTE: Hartzell recommends using a hand operated grease gun. If a pneumatic grease gun is used, make sure to avoid excessive pressure buildup.

(4) Install each lubrication fitting and tighten until snug.

(5) Install a lubrication fitting cap over each lubrication fitting.

B. Aluminum Hub Propellers

(1) Remove the lubrication fitting caps from both sides of the hub assembly. Remove the lubrication fittings from either the cylinder side, or engine side of the hub assembly.

NOTE: It is preferable to apply grease to the fitting located nearest the leading edge of the blade on a tractor installation, or nearest the trailing edge on a pusher installation. Greasing at this location reduces the possibility of grease bypassing the bearing area and entering the hub cavity.

(2) To prevent pressurization of the bearing cavity, use a piece of safety wire to loosen any blockage or hardened grease at the threaded holes where the lubrication fittings were removed.

(3) Lubricate the propeller in accordance with the appropriate instructions, below.

CAUTION: OVER LUBRICATING AN ALUMINUM HUB PROPELLER MAY CAUSE THE GREASE TO ENTER THE HUB CAVITY, LEADING TO EXCESSIVE VIBRATION AND/OR SLUGGISH OPERATION. THE PROPELLER MUST THEN BE DISASSEMBLED TO REMOVE THIS GREASE.

NOTE: If a pneumatic grease gun is used, extra care must be taken to avoid excessive pressure buildup.

CAUTION: GREASE MUST BE APPLIED TO ALL BLADES OF A PROPELLER ASSEMBLY AT THE TIME OF LUBRICATION.

1 **Initial lubrication after assembly or overhaul:** Using a hand operated grease gun, apply approved grease to each lubrication fitting until grease emerges from the removed lubrication fitting hole in a steady flow with no air pockets.

CAUTION: GREASE MUST BE APPLIED TO ALL BLADES OF A PROPELLER ASSEMBLY AT THE TIME OF LUBRICATION.

2 **In-service lubrication:** Using a hand operated grease gun, apply approved grease to each lubrication fitting until grease emerges from the removed lube fitting hole in a steady flow or until a maximum of 1 fl. oz (30 ml) of grease has been applied, **whichever comes first**.

(4) Install each lubrication fitting and tighten until snug.

(5) Install a lubrication fitting cap over each lubrication fitting.

3. Hartzell Approved Greases

A. Hartzell Approved Greases:

Aeroshell 6
Aeroshell 5 (with certain limitations)
Aeroshell 7
Aeroshell 22
Exxon 5114EP
Royco 22C

NOTE 1: Other previously issued Hartzell documents indicate additional greases by brand name and/or MIL-specification. Not all of these greases meet our current performance standards. Hartzell has chosen to specify only those greases that have sufficient testing or field experience to establish that they are acceptable.

NOTE 2: Aeroshell 6 (or Aeroshell 22, in the Piaggio P180 and the Grob Egret) has been used in all new production Hartzell propellers since mid-June of 1989. A label (Hartzell P/N A-3594 or A-3594-6) indicating the type of grease used is affixed to the propeller cylinder.

B. For grease recommendations and restrictions, refer to Table 1-1.

GREASE	RESTRICTIONS
Aeroshell 6	Recommended "all purpose" grease. Used in all new production propellers since 1989, except for propellers used on the Piaggio P180 and the Grob Egret. Higher leakage/oil separation than Aeroshell 5 at higher temperatures.
Aeroshell 5	Good high temperature qualities, very little oil separation or leakage. Cannot be used in temperatures colder than -40°F (-40°C). Aircraft serviced with this grease must be placarded to indicate that flight is prohibited if the outside air temperature is less than -40°F (-40°C).
Aeroshell 7	Good low temperature grease, but high leakage/oil separation at higher temperatures. This grease has been associated with sporadic problems involving seal swelling.
Aeroshell 22	Qualities similar to Aeroshell 7. Aeroshell 22 is the only approved grease for propellers used on the Piaggio P180 and the Grob Egret.
Exxon 5114EP	Exxon 5114 has qualities that are similar to those of Aeroshell 7. Not widely used.
Royco 22C	Royco 22C performance is similar to that of Aeroshell 22. Not widely used.
Mobil 28	Mobil 28 **is not** approved for use due to reports of corrosion associated with its use.
Exxon Andoc 260	High speed bearing lubrication. Only approved use is to grease the A-38( ) bearing.

Grease Recommendations and Restrictions
Table 1-1

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CONTENTS - STATIC AND DYNAMIC BALANCE

FIGURES

TABLES

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1. Overview

A. The location of balance weights is dependent upon three factors: hub type, blade type, and whether or not there is a counterweight. Refer to the figures at the end of this section for samples of locations.

Propeller Assembly Description	Balance Weight Location
Steel Hub\Aluminum Blade	Blade Clamp Assembly
Steel Hub\Composite Blade	Blade Clamp Assembly
Aluminum Hub\Aluminum Blade	Blade Socket Shoulder
Aluminum Hub\Composite Blade	Blade Socket Shoulder
Aluminum Hub\Composite Blade \Counterweight Clamp	Blade Socket Shoulder\ Counterweight Clamp

B. Although the static balance procedures for the 2-way, 3-way, 4-way and 5-way are for steel hub propellers, the procedures are the same for aluminum hub propellers with the exception of where the balance weight slugs are located.

C. Refer to Tables 2-1 and 2-2 for the maximum number of balance weights that may be used.

D. The following screws should be used for attaching balance weights:

Hartzell Part Number	Thread Length
AN501A10-4	0.250 in. (6.35 mm)
AN501A10-5	0.313 in (7.95 mm)
AN501A10-6	0.375 in. (9.53 mm)
AN501A10-7	0.438 in. (11.11 mm)
AN501A10-8	0.500 in. (12.70 mm)
AN501A10-9	0.563 in. (14.30 mm)
AN501A10-10	0.625 in. (15.88 mm)
AN501A10-12	0.750 in. (19.05 mm)

E. Steel hub propellers must have a long enough screw length to ensure a minimum of 1/8 inch (3.175 mm) engaging the clamp threads.

F. Aluminum hub propellers must have a screw engagement into the hub a minimum of 5/16 inch (7.937 mm).

G. Aluminum counterweight clamps on composite blades must have a screw engagement that is a minimum of 5/16 inch (7.937 mm).

H. It is recommended that the number and location of all static balance weights be recorded in the propeller logbook.

I. Static balance is achieved when the placement of one balance weight in a weight location takes the propeller out of balance and the removal of this same weight places the propeller back in its original static balance condition.

J. The preferred method of safety wiring the A-2424-( ) balance weights is to loop the wire over the weight tabs, if provided. The balance weights may be turned over in the stack so the tabs are staggered and the wire can be easily looped around the tab. When this method is not possible, make sure the safety wire does not contact the blade shank. To prevent contact, pull the safety wire away from the blade or slide a plastic tube over the wire to insulate it from the blade base. Contact between the blade shank and the wire may cause damage to the blade shank.

K. If both aluminum and steel balance weights are being used, it is recommended that the steel weight be on top (under the head of the screw). If only two weights are used, the aluminum weight may be on top, if necessary.

CAUTION: REFER TO TABLE 2-2 FOR EXCEPTIONS.

Propeller Assembly Description	Maximum Number of Balance Weights per Location	Hartzell Part Number
Steel Hub\Aluminum Blade (for C-3 and D-6831-( ) clamps) (See Note 1)	4	A-48
Steel Hub\Aluminum Blade (for C-1977-( ) and C-1301-( ) clamps) (See Note 1)	4	A-1305
Steel Hub\Composite Blade (See Note 3)	4	A-1305
Aluminum Hub\Aluminum Blade	6	A-2424( )-( )
Aluminum Hub\Composite Blade (Not applicable to HC-A6A-3[ ])	6	A-2424( )-( )
Aluminum Hub\Aluminum Blade\Counterweight (See Note 2)	(See Note 4)	A-2424( )-( )
Aluminum Hub\Composite Blade\Counterweight	4	A-1305
For HC-A6A-3( ) only	4	A-1929

NOTE 1: For steel hub propellers with a deice system, a maximum of three weights may be attached to the deice terminal block mounted on the blade clamp.

NOTE 2: For aluminum hub propellers with an alcohol anti-ice system, a maximum of three A-2424 or A-2424A weights (in any combination) may be used between the anti-ice system bracket and the hub.

NOTE 3: For propeller model HC-B4MN-5AL/LM10585( )+4 installed on a Casa C-212-CC and -CF aircraft use A-80-( ) bolts to hold the weight slugs on the clamp instead of AN501A10-( ) screws to avoid interference with composite blade windings.

NOTE 4: A maximum of six balance weights may be used per location where the counterweight does not move across the balance weight site. In the areas where the counterweight does move across the balance weight site a maximum of two balance weights may be used per location.

Maximum Number of Balance Weights for Standard Installations
Table 2-1

A-48 Weight Slug Limits on C-3-( ) and D-6831-( ) Clamps

C-3-( ) and D-6831-( ) clamps have only two locations for the A-48, A-48A or A-1419 weight slugs (Figure 6-5). Clamps may have tapped holes on the inboard side of the clamp outboard bolt lugs providing an alternate mounting location if it is necessary to move the weight slugs to clear the spinner.

NOTE: A-48 (steel) weight slugs may be replaced with A-48A (lead) weight slugs although the most outboard slug must be an A-48 (steel) weight slug. The number limits for slugs still applies.

Aircraft Mfg./ Modifier	Propeller Model	Spinner Assembly	Lead**	Trail**
Aero Commander	HC-A2(V,MV)F-2( )/(V,MV)8433( )-4	C-2530	3	4
Aero Commander	HC-A3(V,MV)20-2( )/(V,MV)9333( )	---	0	3-See Note 1
Beech	HC-A3(V,MV)20-2( )/(V,MV)9333( )-3	---	0	3
Riley	HC-A3(V,MV)K-2( )/(V,MV)7636( )	A-835-( )	4	2-See Note 2
Cessna/Riley	HC-A3(V,MV)K-2( )/(V,MV)7636( )	C-2513-( )	4-See Note 3	4
Beech	PHC-A3(V,MV)F-2( )/(V,MV)7636( )	A-836-36, -37	0	4-See Note 4
Beech /Colemill	EHC-A3(V,MV)F-2( )/(V,MV)7636( )	A-836-36	0	4-See Note 4
Aero Commander/ Colemill	EHC-A3(V,MV)F-2( )/(V,MV)7636( )	A-836-25	0	4
Beech/Excaliber	HC-A3(V,MV)K-2( )/(V,MV)8433( )-2R	---	0	4
Beech	HC-A3(V,MV)K-2( )/(V,MV)9333( )-3	---	0	3-See Note 1
Cessna	HC-A3(V,MV)F-2( )/(V,MV)8833( )	---	4	0
Scottish Aviation/ Beagle	HC-A3(V,MV)F-2( )/(V,MV)8833( )	---	0	3
Beech	HC-A3(V,MV)F-4/(V,MV)8433( )-4R	---	See Note 5	
Piper	HC-A3(V,MV)F-4/(V,MV)8433( )-7	---	See Note 5	
DeHavilland (STC SA11685WE)	EHC-A3(V,MV)F-2( )/(V,MV)7636( )	---	See Note 6	
Beech	HC-A2(V,MV)20-4( )/(V,MV)8833( )-4	---	See Note 6	
Beech	HC-A2(V,MV)20-4( )/(V,MV)8433( )	---	See Note 6	
Navion	HC-A2(V,MV)20-4( )/(V,MV)8433( )	---	See Note 6	

** "Lead" and "Trail" refer to the weight location on the outboard bolt lugs of the C-3-( ) and the D-6831-( ) clamps as referenced to the blade lead and trail edges.

Maximum Number of Balance Weights for Non-Standard Installations
Table 2-2

A-1305 Weight Slug Limits on C-1977-( ) Clamp

The C-1977-( ) clamp has four A-1305 balance weight locations on the outboard circular surface of the clamp (Figure 6-2).

Propeller Model	Spinner Assembly	Slugs
HC-B3(P,R)30-2E/(P,R)10152( )-5.5	All	See Note 7

Note 1: Three A-48 weight slugs or two A-1419 weight slugs.

Note 2: Two A-48 weight slugs or one A-1419 weight slugs.

Note 3: Four A-48 weight slugs or two A-1419 weight slugs.

Note 4: Four A-48 weight slugs or two A-1419 weight slugs and one A-48 weight slug.

Note 5: Four A-48 weight slugs on counterweight and five A-48 weight slugs on clamp on inboard side of outboard clamp bolt shoulder of clamp.

Note 6: A-48 weight slugs are only attached to the nut plates mounted on the spinner bulkhead. Maximum of (4) per location.

Note 7: Two A-1305 weight slugs per stack may be installed on the clamp per position, four positions are possible on the outboard of the clamp.

Maximum Number of Balance Weights for Non-Standard Installations
Table 2-2

2. Static Balance of Propeller Assemblies

A. Overview

(1) All 2-way propellers are balanced both in the horizontal and vertical positions when using balance arbor equipment.

(2) Propellers with three or more blades are balanced in the horizontal position and generally are balanced on suspension equipment.

(3) All propeller assemblies should be lubricated before beginning the balance process.

(4) Set blade angle at the proper pitch for balancing as follows:

(a) All non-feathering compact models: Blades resting against the low pitch stop.

(b) All feathering compact models: Blades resting against the start locks as assembled.

(c) Turbine models (lightweight and steel) with external beta system: Blades resting against the low pitch stops.

(d) Turbine models (lightweight and steel) with an internal beta system: Blade angle is visually determined to be at low pitch or flight idle.

(e) Turbine models (lightweight and steel) non-reversing: Blades resting against low pitch stop.

(f) All steel reciprocating flange models: Blades resting against the start locks as assembled.

(g) All splined models: Blade angle is visually determined to be at low pitch.

(h) Dual Acting: Blade angle is visually determined to be at approximately flat pitch.

(5) All propellers should be balanced in a draft-free area.

B. Equipment

(1) An arbor mounted on knife edges may be used for balancing.

(2) For a suspension system it is essential that the center of gravity of the propeller be located at or slightly below the pivot of the balance equipment. Inaccuracies may result otherwise. Refer to manufacturer's instructions.

Procedure	Equipment	Propeller Type	Blade Type	Composite Blade Counterweight Clamp
1.	Balance Arbor	Steel Hub	Aluminum	N/A
			Composite	N/A
2	Balance Arbor	Aluminum Hub	Aluminum	N/A
			Composite	No
3.	Suspension	Steel Hub	Aluminum	N/A
			Composite	N/A
4.	Suspension	Aluminum Hub	Aluminum	N/A
			Composite	No
5.	Suspension	Aluminum Hub	Composite	Yes

NOTE: Do not confuse composite blade counterweights with the blade clamps used on steel hub propellers.

Possible Balance Procedures
Table 2-3

(This page is intentionally blank.)

C. Procedures

(1) Procedure 1

NOTE: This procedure applies to balance arbor equipment when balancing a steel hub propeller with aluminum or composite blades. Refer to Table 2-3.

CAUTION: AVOID DISLODGING THE BLADE SEALS WITH EXCESSIVE PRESSURE WHEN LUBRICATING THE PROPELLER.

(a) Lubricate the propeller in accordance with the Propeller Lubrication chapter of Hartzell Standard Practices Manual 202A (61-01-02), Volume 11.

(b) Remove end play from the blade clamp assembly to hub arm by driving identical small wedges at identical places between the blade clamps and the hub spider.

(c) Bolt the propeller to the balance arbor.

(d) Check horizontal balance by laying balance weights in the corner of the light blade and clamp. Record the number of balance weights required for balance.

(e) Remove the horizontal balance weights.

(f) Check the vertical balance with the heavy blade up.

NOTE: Vertical balance is required on two blade propellers only.

(g) Lay the balance weights on the edge of the blade clamp next to the blade. Line up the balance weights with the leading or trailing edge of the blade.

(h) Record the number of balance weights required for balance.

(i) Remove vertical balance weights.

(j) Distribute the balance weights to maintain horizontal and vertical balance, if applicable.

CAUTION: DO NOT EXCEED THE BALANCE WEIGHT LIMITS SPECIFIED IN THIS CHAPTER.

(k) Attach the balance weights to the blade clamps with screws of appropriate length to insure minimum engagement.

(l) Safety the balance weight attaching screws using 0.032 inch (0.81 mm) minimum diameter wire.

(2) Procedure 2

NOTE: This procedure applies to balance arbor equipment when balancing an aluminum hub propeller with aluminum or composite blades and no composite blade counterweight clamp, refer to Table 2-3.

CAUTION: AVOID DISLODGING THE BLADE SEALS WITH EXCESSIVE PRESSURE WHEN LUBRICATING THE PROPELLER.

(a) Lubricate the propeller in accordance with the Propeller Lubrication chapter of Hartzell Standard Practices Manual 202A (61-01-02), Volume 11.

(b) Bolt the propeller to the balance arbor.

(c) Check horizontal balance by laying balance weights in the corner of the light blade and hub. Record the number of balance weights required for balance.

(d) Remove the horizontal balance weights.

NOTE: Vertical balance is only required on two blade propellers.

(e) Check the vertical balance with the heavy blade up. Lay balance weights on the hub on the heavy blade side positioned on the leading edge or trailing edge side of the blade. Record the number of balance weights required for balance.

(f) Remove vertical balance weights.

(g) Distribute the balance weights to maintain horizontal and vertical balance, if applicable.

CAUTION: DO NOT EXCEED THE BALANCE WEIGHT LIMITS SPECIFIED IN THIS CHAPTER

(h) Attach the balance weights to the hub with screws of appropriate length to insure minimum engagement.

(i) Safety the balance weight attaching screws using 0.032 inch (0.81 mm) minimum diameter wire.

(3) Procedure 3

NOTE: This procedure applies to suspension balance equipment when balancing a steel hub propeller with aluminum or composite blades. Refer to Table 2-3.

CAUTION: AVOID DISLODGING THE BLADE SEALS WITH EXCESSIVE PRESSURE WHEN LUBRICATING THE PROPELLER.

(a) Lubricate the propeller in accordance with the Propeller Lubrication chapter of Hartzell Standard Practices Manual 202A (61-01-02), Volume 11.

CAUTION: MAKE SURE THAT ALL WEDGES USED ON A PROPELLER ASSEMBLY ARE VERY CLOSE TO THE SAME WEIGHT AND SIZE.

(b) Remove the end play from the blade clamp assembly by driving a small wedge between the blade clamp and the hub. Drive wedges between the clamp assembly and the hub for the remaining blades, making sure the wedges are in the same position on each blade clamp assembly.

(c) Bolt the propeller to the suspension balancer.

(d) Place the balance weights on the blades adjacent to the blade clamps to balance the light side of the propeller.

CAUTION: DO NOT EXCEED THE BALANCE WEIGHT LIMITS SPECIFIED IN THIS CHAPTER.

(e) Attach the balance weights to the blade clamps with screws of appropriate length to insure minimum engagement.

(f) Safety the balance weight attaching screws using 0.032 inch (0.81 mm) minimum diameter wire.

(4) Procedure 4

NOTE: This procedure applies to suspension balance equipment when balancing an aluminum hub propeller with aluminum or composite blades and no composite blade counterweight clamp, refer to Table 2-3.

CAUTION: AVOID DISLODGING THE BLADE SEALS WITH EXCESSIVE PRESSURE WHEN LUBRICATING THE PROPELLER.

(a) Lubricate the propeller in accordance with the Propeller Lubrication chapter of Hartzell Standard Practices Manual 202A (61-01-02), Volume 11.

(b) Bolt the propeller to the suspension balancer.

(c) Place the balance weights on the blades adjacent to the hub to balance the light side of the propeller.

NOTE: Two blade propeller hubs may have locations for balance weights on the hub halfway between the blades. These locations may be used for balance, if present.

CAUTION: DO NOT EXCEED THE BALANCE WEIGHT LIMITS SPECIFIED IN THIS CHAPTER.

(d) Attach the balance weights to the blade clamps with screws of appropriate length to insure minimum engagement.

(e) Safety the balance weight attaching screws using 0.032 inch (0.81 mm) minimum diameter wire.

(5) Procedure 5

NOTE: This procedure applies to suspension balance equipment when balancing an aluminum hub propeller with composite blades and composite blade counterweight clamps installed, refer to Table 2-3.

NOTE: The outboard surface of a composite blade counterweight clamp is the preferred location for static balance weights.

CAUTION: AVOID DISLODGING THE BLADE SEALS WITH EXCESSIVE PRESSURE WHEN LUBRICATING THE PROPELLER.

(a) Lubricate the propeller in accordance with the Propeller Lubrication chapter of Hartzell Standard Practices Manual 202A (61-01-02), Volume 11.

CAUTION: IT IS RECOMMENDED THAT A MAXIMUM OF ONE BALANCE WEIGHT BE ADDED TO EACH BLADE SOCKET SHOULDER. THE LOCATION OF THE COUNTERWEIGHT CLAMP MAY MAKE WEIGHT ATTACHMENT TO THE ALUMINUM HUB DIFFICULT.

(b) Bolt the propeller to the suspension balancer.

(c) Place the balance weights on the counterweight clamps and\or blade socket shoulder of the hub to balance the light side of the propeller.

CAUTION: DO NOT EXCEED THE BALANCE WEIGHT LIMITS SPECIFIED IN THIS CHAPTER.

(d) Attach the balance weights to the counterweight clamps or hub with screws of appropriate length to insure minimum engagement.

(e) Safety the balance weight attaching screws using 0.032 inch (0.81 mm) minimum diameter wire.

3. Dynamic Balance

A. Overview

(1) Dynamic balance is accomplished by using an accurate means of measuring the amount and location of the dynamic imbalance.

(2) Unless otherwise specified by the engine or airframe manufacturer, Hartzell recommends that the propeller be dynamically balanced to a reading of 0.2 IPS, or less.

(3) The number of balance weights installed must not exceed the limits specified in this chapter.

(4) Follow the dynamic balance equipment manufacturer's instructions for dynamic balance.

B. Inspection Procedures Before Balancing

(1) Visually inspect the propeller assembly before dynamic balancing.

NOTE: The first run-up of a new or overhauled propeller assembly may leave a small amount of grease on the blades and inner surface of the spinner dome.

a) Use a mild solvent to completely remove any grease on the blades or inner surface of the spinner dome.

b) Visually check each propeller blade assembly for evidence of grease leakage.

c) Visually inspect the inner surface of the spinner dome for evidence of grease leakage.

(2) If there is no evidence of grease leakage, lubricate the propeller in accordance with the Propeller Lubrication chapter in this manual.

(3) On steel hub propellers, note the position of the red slippage tape on the blades and clamp. If the tape halves are not in alignment, blade slippage may have occurred. Refer to overhaul manual before proceeding.

(4) Before dynamic balance, record the number and location of all balance weights.

(5) Static balance is required when an overhaul or major repair is performed at a propeller overhaul facility.

NOTE: If static balancing is not accomplished before dynamic balancing, the propeller may be so severely unbalanced that dynamic balance may not be achieved.

C. Modifying Spinner Bulkhead to Accommodate Dynamic Balance Weights

CAUTION 1: COMPOSITE SPINNER BULKHEADS ARE NOT TO BE MODIFIED TO ACCOMMODATE DYNAMIC BALANCE WEIGHTS.

CAUTION 2: ALL HOLE/BALANCE WEIGHT LOCATIONS MUST TAKE INTO CONSIDERATION, AND MUST AVOID, ANY POSSIBILITY OF INTERFERING WITH THE ADJACENT AIRFRAME, DEICE AND ENGINE COMPONENTS.

(1) It is recommended that placement of balance weights on aluminum spinner bulkheads which have not been previously drilled be placed in a radial location.

(2) The radial location should be outboard of the deice slip ring or bulkhead doubler and inboard of the bend at which point the bulkhead creates a flange to attach the spinner dome.

(3) It is recommended that twelve equally spaced locations be established for weight attachment.

(4) Ideally, install nut plates (10-32 thread) of the type used to attach the spinner dome. This will allow convenient balance weight attachment on the engine side of the bulkhead.

(5) Alternatively, drilling holes for use with the AN3-( ) type bolts with self-locking nuts is acceptable.

NOTE: Chadwick-Helmuth Manual AW-9511-2, “The Smooth Propeller”, specifies several generic bulkhead rework procedures. These are acceptable providing they comply with the conditions specified herein.

D. Placement of Balance Weights for Dynamic Balance

(1) Many spinner bulkheads have factory installed self-locking nut plates provided for the installation of balance weights.

(2) Subsequent removal of the dynamic balance weights will return the propeller to its original static balance condition.

(3) Use only stainless or plated steel washers as dynamic balance weights on the spinner bulkhead.

(4) Do not exceed a maximum weight per location of 0.9 oz. (25.5 g). This is approximately equal to six AN970 style washers (3/16 inch ID, 7/8 inch OD, 1/16 inch thickness) (4.762 mm ID, 22.225 mm OD, 1.587 mm thickness).

(5) Weights must be installed using aircraft quality 10-32 inch screws or bolts.

(6) Balance weight screws attached to the spinner bulkheads must protrude through the self-locking nuts a minimum of one thread and a maximum of four threads.

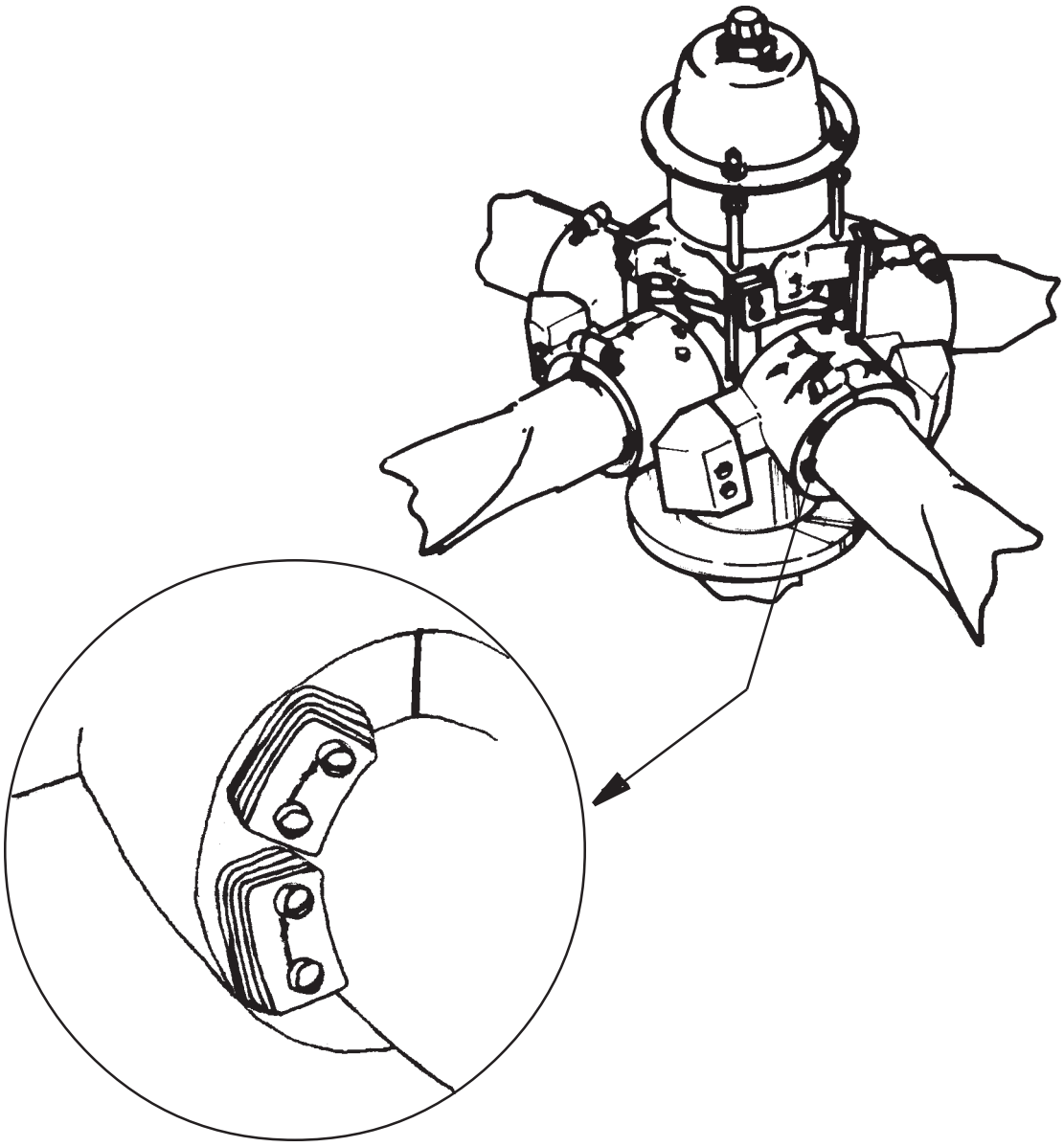
(7) Install Decal No. A-2803 on the propeller cylinder or bulkhead of all propellers that have been dynamically balanced (Figure 2-1). This will alert repair station personnel that the existing balance weight configuration may not be correct for static balance.

(8) Record the number and location of dynamic balance weights in the logbook.

NOTE: The part number for this decal is 79980-A-2803.

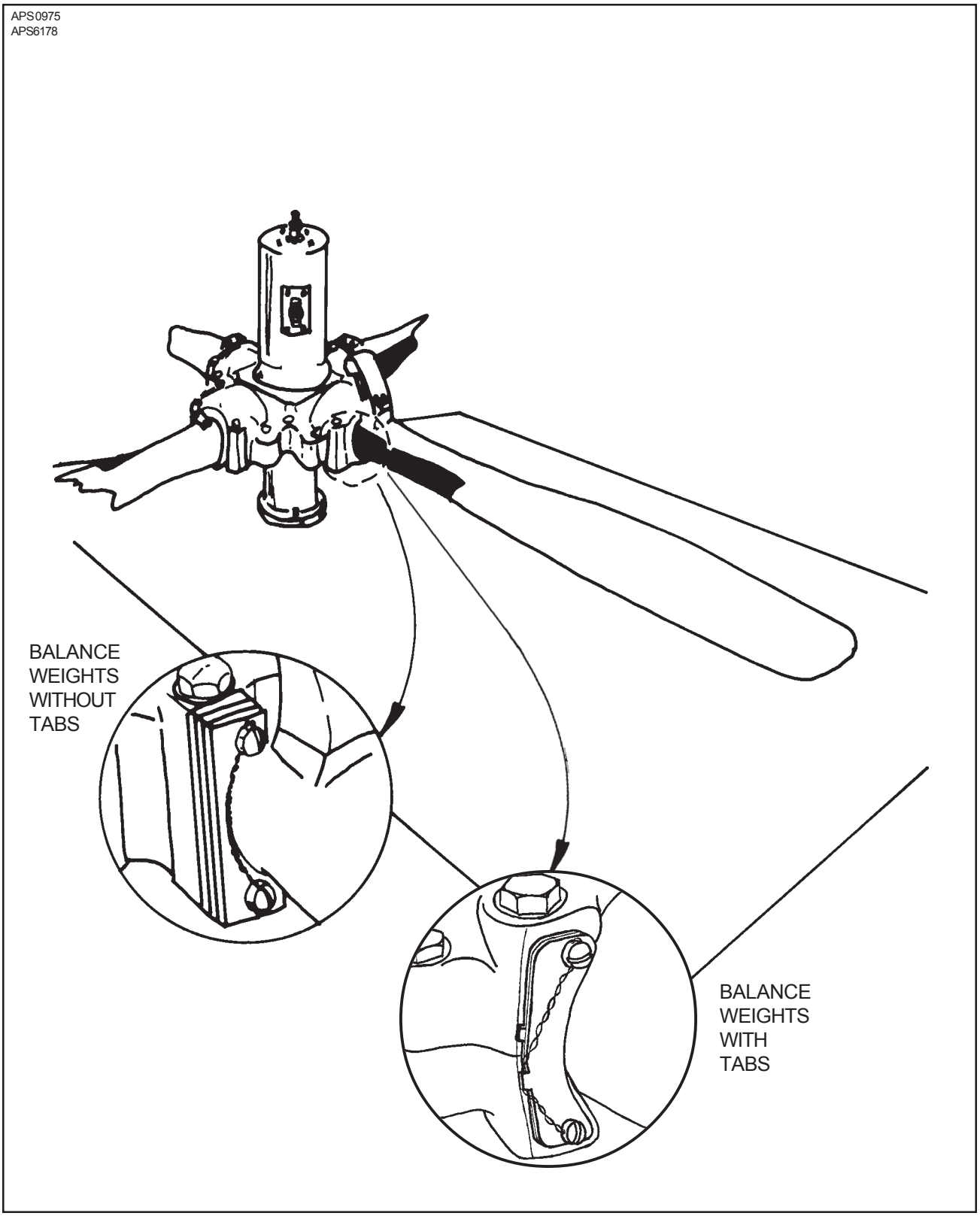
Decal No. A-2803
Figure 2-1

APS6166
ASP6167

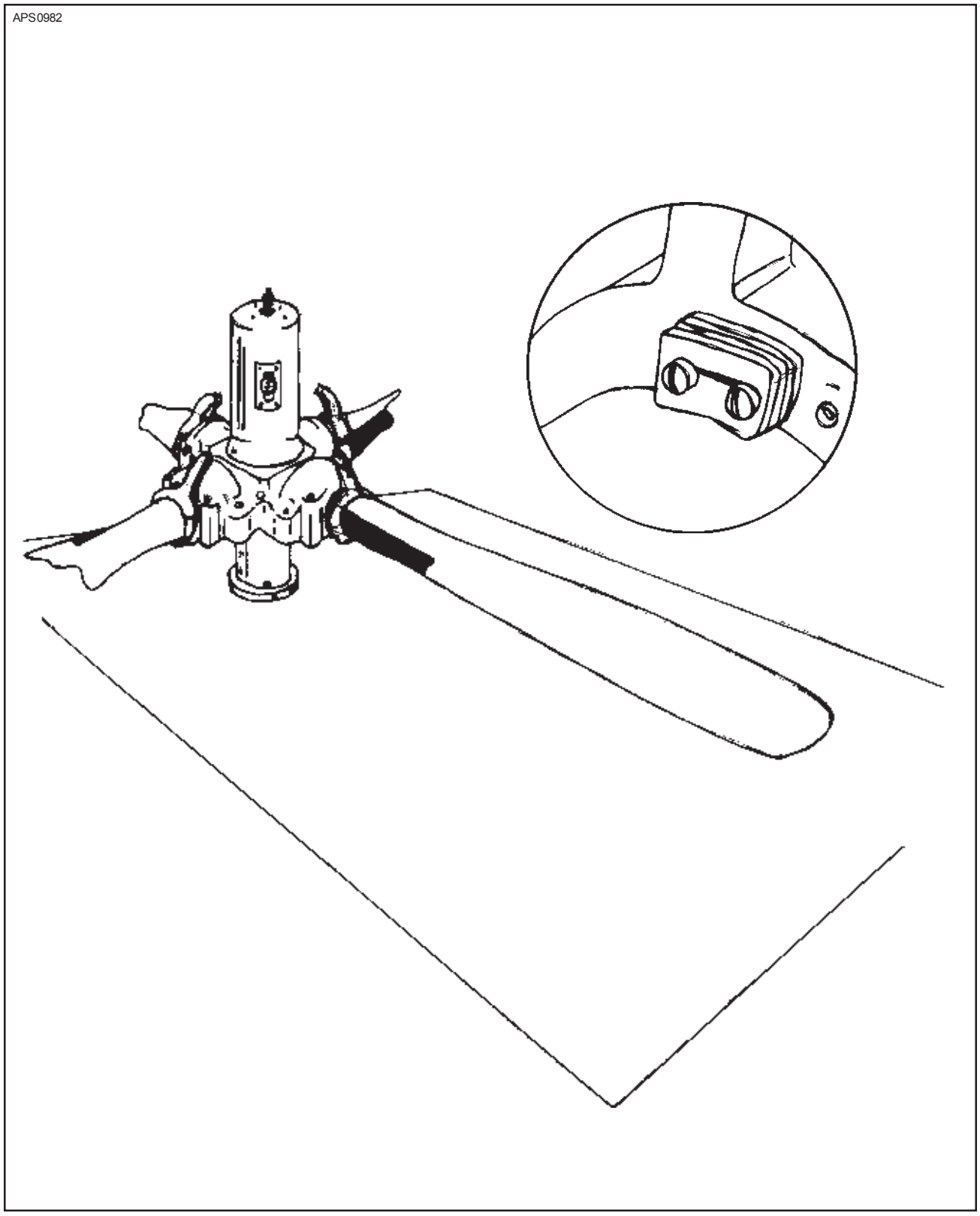


Location of Balance Weights on C-1977-( ) and C-1301-( ) Blade Clamps
Figure 2-2

APS0975
APS6178

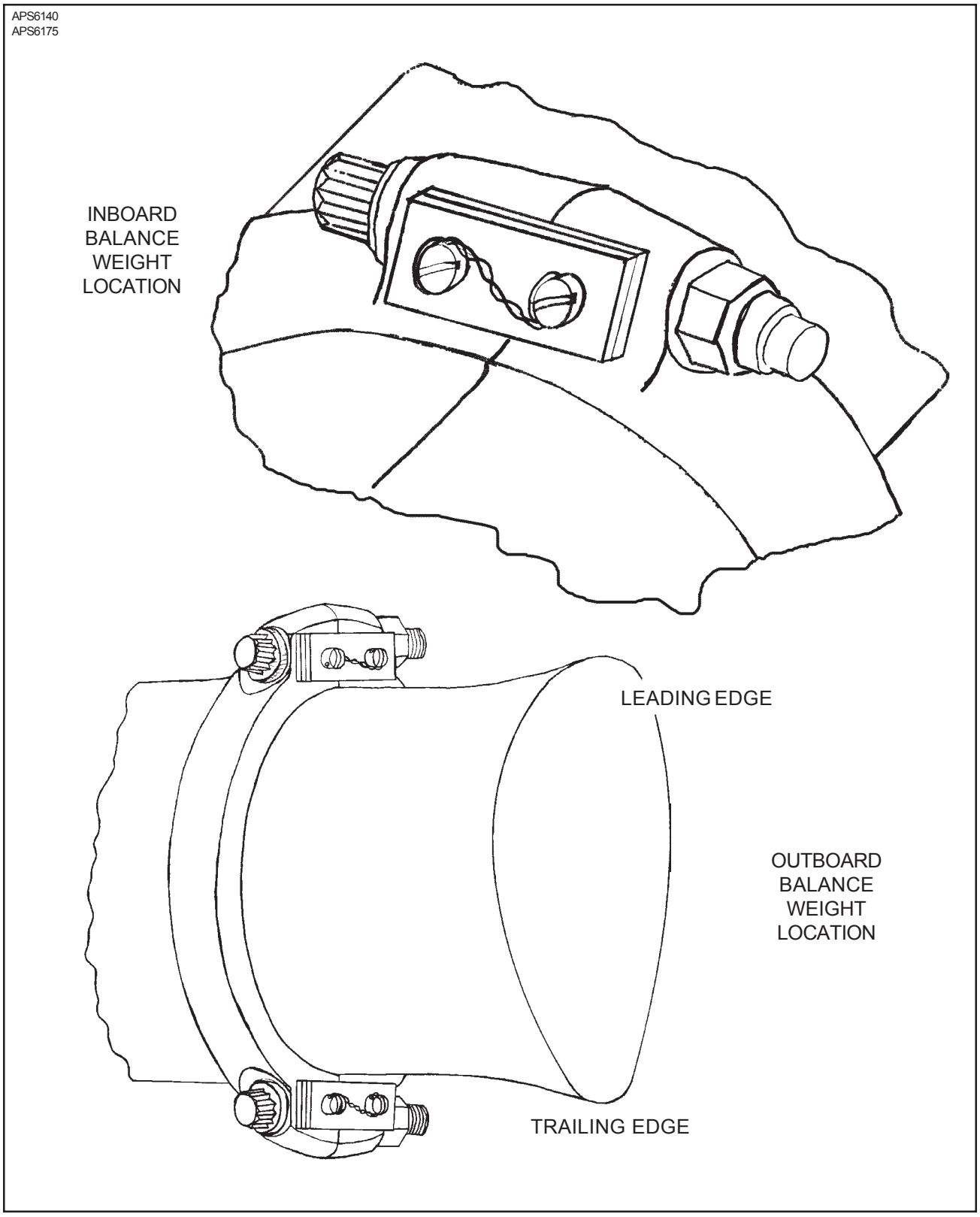


Location of Balance Weights on Blade Socket Shoulder
Figure 2-3



Location of Balance Weights on Composite Blade Counterweight
Figure 2-4

APS6140
APS6175



Locations of Balance Weights on D-6831-( ) and C-3-( ) Blade Clamps
Figure 2-5

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CONTENTS - PACKAGING AND STORAGE

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1. Packaging and Storage

A. Overview

(1) When parts are shipped from the Hartzell factory, the "standard" packaging or shipping container is not designed for use as a container for long term storage.

(2) Hartzell can, at the customer's request (and at an additional cost), provide parts in "special" packaging.

(a) Such packaging is suitable for a storage period of up to six months assuming the following:

1 Use of the part at the first or second destination.

2 Environmental exposure during shipping and transfers is minimal.

3 Container is stored in warehouse conditions where environmental elements are at a minimum, i.e., dry.

(b) Hartzell will guarantee a part stored in original special packaging for up to six months from the factory shipping date. Hartzell is not responsible for a part stored using standard packaging nor for an item repackaged and stored.

(3) If storage is expected to be longer than six months, visually inspect each part for corrosion or other damage at six month intervals. Repackaging may be required using the guidelines below.

B. Guidelines

(1) Refer to the Consumable Materials Table in the Consumable Materials chapter, Volume 7, of Hartzell Standard Practices Manual 202A (61-01-02).

(a) Solvent CM23

(b) Solvent CM109

(c) Corrosion preventative CM108, or equivalent

(2) Packaging of Assembled Propellers

(a) Clean all surfaces with solvent CM23 and permit to dry thoroughly.

(b) Protect parts that are not plated, anodized, or painted using corrosion preventative CM108, or equivalent in conjunction with grease-proof paper, MIL-B-121, Grade A, Type II.

(c) Wrap the entire propeller assembly in metal foil-backed paper, MIL-B-131, Grade B.

(d) Place the propeller assembly, accompanied by a moisture retardant, in a suitable storage container.

(3) Packaging of Disassembled or Partially Disassembled Propellers

(a) Degrease the hub and clean all surfaces with solvent CM23. Permit the parts to dry thoroughly.

(b) Dip the blade butt in corrosion preventative CM108 or equivalent, and then wrap in grease-proof paper, MIL-B-121, Grade A, Type II. Place the grease-proof paper over the butt and up the blade shank for approximately 6 inches (15.24 cm).

(c) Parts that are not plated, anodized or painted must be protected using corrosion preventative CM108 or equivalent, in conjunction with grease-proof paper, MIL-B-121, Grade A, Type II.

(d) Wrap all the parts in metal foil backed paper, MIL-B-131, Grade B.

(e) Place all the parts accompanied by a moisture retardant in a suitable storage container.

(4) Containers

Make sure that blades are held securely in their containers.

(5) Inspection

(a) Hartzell requires the stored parts to be inspected every six months to make sure that no corrosion is developing.

(b) The moisture retardant must be replaced at the time of the inspection.

2. Activating a Propeller Assembly After Long Term Storage

A. General

(1) A calendar limit between overhauls is specified by Hartzell. Refer to Hartzell Service Letter HC-SL-61-61Y-( ).

NOTE: The start date for the calendar limit is when the propeller is first installed on an engine.

(2) These procedures apply to new propellers, propellers with zero hours since overhaul, and propellers with time-in-service that have been in long-term storage.

B. If storage period is less than two (2) years:

(1) Using a clean cloth soaked with solvent CM109, remove the corrosion preventative CM108 or equivalent that may have been added at the time of storage.

(2) Make a general visual inspection of the condition of the parts. As necessary, investigate and correct any questionable conditions.

(3) For a propeller with time-in-service, if the TBO calendar limit has been exceeded for the stored propeller, the propeller must be overhauled before further flight.

NOTE: New propellers or propellers with zero hours do not require overhaul.

(4) Check current FAA Airworthiness Directives and Hartzell Service Documentation. There may be documents issued since the date the propeller was put into storage that require compliance.

C. If storage exceeds two (2) years, comply with the above requirements and in addition:

(1) Inspect internally/externally for damage or corrosion. Paint and plating need not be removed. Total disassembly (such as removing counterweights) is not necessary unless corrosion or damage warrants.

(2) Replace all seals and gaskets.

(3) Replace parts as necessary.

(4) Replace the lubricant according to the procedures in the Propeller Lubrication chapter of this manual.

(5) Test the de-ice system including boots. Make sure that the boots are still acceptably bonded with no signs of blistering or peeling.

(6) Repaint and/or replate components as required.

(7) After accomplishing required procedures, the propeller may be released for the remaining TBO and calendar life.

NOTE: The above steps must be accomplished by an FAA approved (or foreign equivalent) propeller repair station in accordance with the applicable Hartzell Propeller Inc. instruction or overhaul manual.

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