



SCHWEIZER SERVICE NOTICE

NOTICE NO. N-162

DATE 12 October 1979

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MANDATORY

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SUBJECT: INSPECTION OF TAIL ROTOR BLADE ASSEMBLY, PN 269A6035-21 AND
PN 269A6035-23

MODELS AFFECTED: All Model 269A, TH-55A, 269A-1 and 269B Helicopters
equipped with PN 269A6035-21 (LTS) Tail Rotor Blade
Assemblies

All Model 269C Helicopters equipped with PN 269A6035-23
Tail Rotor Blade Assemblies

All PN 269A6035-21 and PN 269A6035-23 Tail Rotor Blade
Assemblies in Spares Inventory

All PN 269A6034-13, PN 269A6034-15 and PN 269A6034-21
Tail Rotor Assemblies in Spares Inventory

- TIME OF COMPLIANCE: Part I - Shall be accomplished prior to 600 hours time
in service or within 6 months, whichever is
sooner, for subject tail rotor blade assemblies
having less than 500 hours time in service at
date of this Notice.
- Shall be accomplished within next 100 hours time
in service or within 6 months, whichever is
sooner, for subject tail rotor blade assemblies
having 500 or more hours time in service at
date of this Notice.
 - Shall be accomplished at each 600 hours of
operation or each 12-month interval, whichever
occurs first, following initial inspection.
 - Shall be accomplished prior to installation of
Spares PN 269A6035-21 and -23 tail rotor
blade assemblies, or Spares PN 269A6034-13, -15
and -21 tail rotor assemblies, on helicopter

Part II - Shall be accomplished at first 100 hours time in service following each compliance with Part I of this Notice.

PREFACE: Evidence of corrosion in the interior of the steel spar in the subject tail rotor blades has been found. Part I of this Notice provides instructions for a periodic visual inspection for possible corrosion in the interior of the blade spar. Part II lists a procedure for retorquing the blade retention bolts at the first 100 hours time in service following each compliance with Part I. If corrosion of the blade interior spar is noted in Part I inspection, Part III of this Notice establishes limits to determine if blade is serviceable, and provides corrective measures for removal and treatment to prevent further corrosion.

Reference

- 269 Series - Basic HMI, Issued 1 April 1973; Revision Nd. 5,
1 February 1978
- 269 Series - HMI Appendix B, Issued 1 July 1973; Revision No. 5,
1 August 1976
- 269 Series - HMI Appendix C, Issued 15 March 1976

PART I - PERIODIC VISUAL INSPECTION
TOOLS AND EQUIPMENT

Flashlight

Mirror - 7/8-inch diameter, handle length as required

Swab - clean soft bottle brush or cloth, handle
length as required

MATERIALS

Primer, zinc chromate MIL-P-8585 Commercial

- a. Remove tail rotor blade assemblies, per Section 9 of Basic HMI.

NOTE

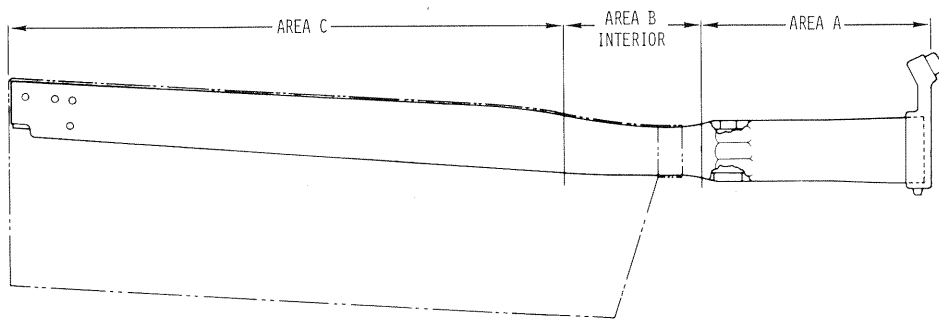
Corrosion will have same appearance as rust on any other ferrous metal, varying in color from dark brown to bright red. Evidence may be visible as spots, patches or uniform discoloration over a considerable area. Without zinc chromate coating, normal appearance of original interior surface of spar is a uniform, smooth textured gray (cadmium plate) finish.

- b. Using light and mirror, inspect interior of blade spar for evidence of cracking, and for obvious corrosion on original cadmium plated interior surface, or penetrating zinc chromate primer coat.

NOTE

1. If any cracking is noted, discard blade assembly.
2. If any corrosion is noted, perform Part III of this Notice.

- c. Swab light coat of zinc chromate primer on interior surface of blade spar in Areas A and B as shown in Figure 1. Use care to avoid zinc chromate on bearing races.



AREAS A THROUGH C
ALLOWABLE INTERNAL PITTING 0.006
DEEP X 0.015 WIDE X 0.020 LONG
MAXIMUM.

88-357

Figure 1. Blade Spar Internal Inspection Areas

- d. Reinstall tail rotor blade assemblies, per Basic HMI.
- e. Record compliance with Part I of this Notice in Compliance Record of helicopter Log Book.

NOTE

Retorque blade retention bolts per Part II of this Notice, at first 100 hours time in service following each compliance with Part I.

PART II - RETORQUE OF BLADE RETENTION BOLTS
TOOLS AND EQUIPMENT

Wrench, torque - 0 to 100 foot-pounds

- a. Retorque blade retention bolts to 50 to 54 foot-pounds torque.
- b. Record compliance with Part II of this Notice in Compliance Record of helicopter Log Book.

PART III - CORROSION INSPECTION AND REWORK

NOTE

Refer to pages 18 through 23 for parts, tools and equipment, and materials required for Part III Corrosion Inspection and Rework.

A. PRELIMINARY PROCEDURE

1. Weigh and record weight of each blade prior to inspection and rework; use scale accurate within 0.5 gram.
2. Remove pitch bearings from bore of blade spar using a suitable drift made of hard wood; strike bearings on side with mallet.
3. Clean tail rotor blades using alcohol and soft cloth; remove all grease, oil and dirt from exterior of blades.

B. CORROSION INSPECTION AND REMOVAL PROCEDURE

1. Using light and mirror, inspect full length of blade spar interior for corrosion. If corrosion is other than superficial, inspect spar interior using a borescope.
2. With blade secured in horizontal position, remove corrosion from interior of spar.
 - a. Using appropriate size wire brushes, by hand and in-and-out motion, brush out full length of spar until all corrosion and loose scale is removed. Use progressively smaller diameter brushes as cleaning progresses up the tube interior. Clean blade mounting holes in same manner. After cleaning, determine that all corrosion and loose scale has been removed.
 - b. Remove debris from spar interior by shaking; follow with compressed air, then use clean cloth.
 - c. Determine that drain holes in blade and spar are free from obstructions. Open drain holes as required, using wooden toothpick for vent holes and steel rod for drain hole between tip weight and spar.
 - d. Make casts (Part III-C below) of areas determined to have corrosion pits.

NOTE

Performance of Part III-C Casting Procedure (if required) and Part III-D Material Treatment should be accomplished immediately to prevent accumulation of corrosion producing contaminants, with resultant further damage to the surface.

C. CASTING PROCEDURE (As Required)

1. The casting materials are prepared and used as follows:
 - a. COECAL 50 grams of powder/15cc, distilled water
 - b. SUPER-CAL 50 grams of powder/12cc, distilled water
 - c. VELMIX 50 grams of powder/15cc, distilled water

NOTE

Amounts given are sufficient to make casts of two blades. Increase quantities in same proportions as required.

2. Add powder to water; stir until mixture is smooth with no lumps and will stand up in peaks in container. If possible, vibrate before, during and after mixing.
3. Apply release agent to spar interior.
4. Place sufficient amount of mixture on stick. Press mixture into approximately 1/3 of interior circumference of spar, being sure to cover entire pitted area (areas A and B, Figure 1). Leave stick in place to facilitate removal of cast after hardening.

NOTE

Keep coated area to 1/3 of tube to facilitate removal. Mix has working life of approximately 20 minutes and will cure within 45 minutes at room temperature.

5. Repeat steps 3 and 4 for remaining 2/3 of spar interior, 1/3 at a time, as required.
6. Remove all casting residue from spar interior.
7. Using magnifying glass and wire sizes noted as a comparable object, inspect casts in accordance with limits defined in Figure 1, for the area for which the casts were made (0.006 inch maximum).

NOTE

Retire blade from service if limits are exceeded.

D. MATERIAL TREATMENT PROCEDURE

Phosphoric Acid Cleaner Formulation

As noted in the List of Materials, premixed materials conforming to the specification may be procured from the manufacturers indicated. Should it be impossible to procure the premixed, the following formula and mixing instructions will provide the proper cleaning material.

<u>Item</u>	<u>Nomenclature</u>	<u>Parts By Weight (PBW)</u>
a.	Phosphoric Acid 85%	18.0
b.	Water Distilled	22.0
c.	I-Butanol	35.0
d.	Iso Propanol	<u>25.0</u>
	Total	100.0

1. Place distilled water (22.0 PBW) in suitable glass container, slowly add phosphoric acid (18.0 PBW).

2. Add Butanol (35.0 PBW) to mixture; then add Iso Propanol (25.0 PBW). Stir well.

NOTE

Store mixture in closed glass container.

CAUTION

Materials containing fluoride may induce hydrogen embrittlement. Use no material containing fluoride.

a. After CORROSION REMOVAL and prior to CORROSION PROTECTION treat interior of spar as follows:

1. Using masking tape, cover mounting bolt holes.

2. Using long handled brush, treat the exposed metal with phosphoric acid cleaner (diluted 2 to 1 with water), keep the surface wet for at least 10 minutes.

NOTE

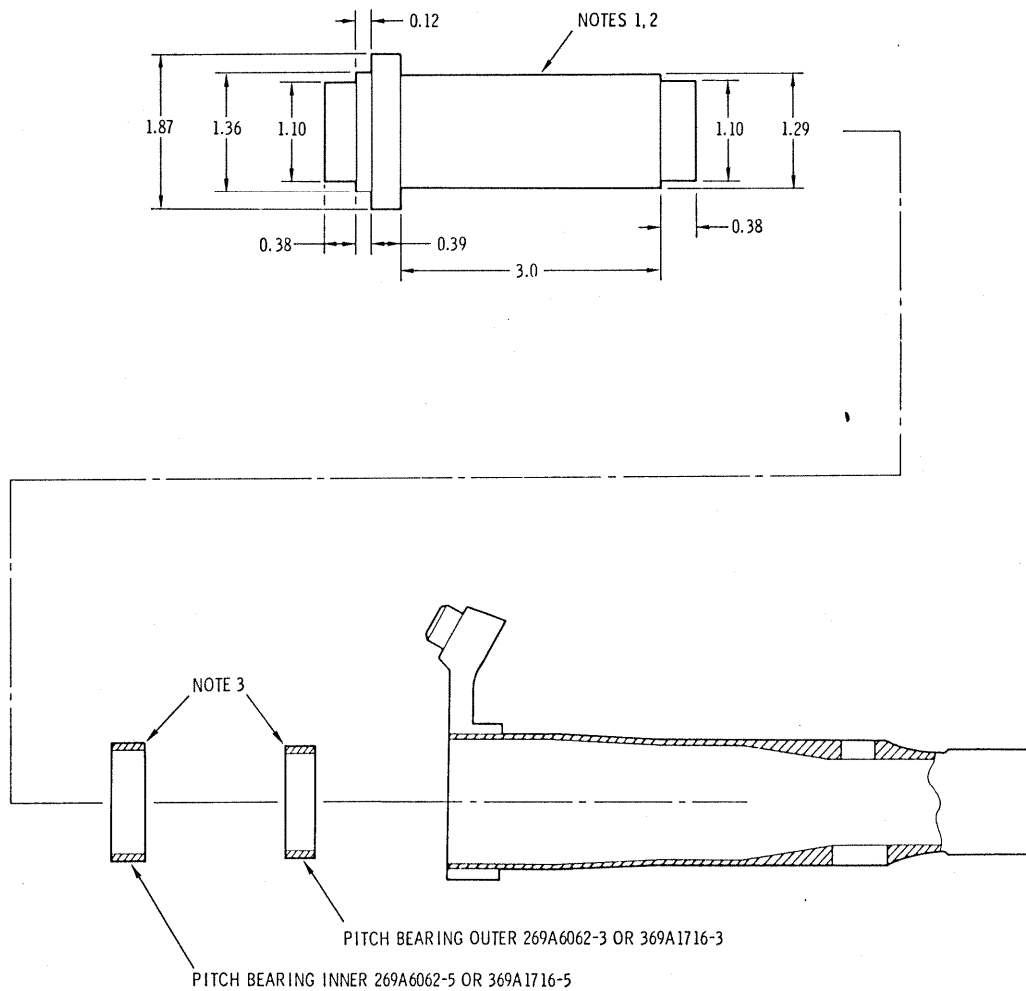
When other products are used follow manufacturer mixing and application directions.

3. Remove tape from mounting bolt holes, using clean cloth on dowel, apply diluted cleaner to bolt holes.
4. Rinse blade spar thoroughly with water, drain and flush with alcohol; thoroughly air dry, using moderate heat (not to exceed 150° F).
5. Inspect mounting bolt holes for corrosion and wear. (Refer to HMI Appendix C).
 - b. Replace pitch bearings as follows, (see Figure 2).

CAUTION

Do not sand bore of blade spar to clean bearing seat areas.

1. Using masking tape, mask bearing inner diameter.
2. Apply Loctite grade A, locking compound to outer surfaces of outer pitch bearing by rolling the bearing over a stamp pad saturated with locking compound (an alternate method of application is acceptable).
3. Place outer pitch bearing over shoulder on outer end of bearing installation tool and insert bearing and tool into blade spar. Use mallet to tap installation tool and bearing into spar until bearing is fully seated inside spar.
4. Remove installation tool from blade spar. Clean excess Loctite off with alcohol.
5. Remove inner pitch bearing with masking tape and Loctite as above; place bearing on opposite end of installation tool and insert end of tool into bore of blade spar, tapping with mallet to seat bearing. Clean excess Loctite off with alcohol.



NOTES:

1. ALL DIMENSIONS IN INCHES.
2. FABRICATE FROM HARD WOOD, PHENOLIC, OR ANY OTHER SUITABLE MATERIAL.
3. MASK INTERIOR DIAMETER OF BEARINGS PRIOR TO INSTALLATION.
4. INSTALL WITH LOCTITE GRADE A.

88-155A

Figure 2. Tail Rotor Blade Pitch Bearing Installation

NOTE

Do not install mounting bolt bushings at this time.

E. CORROSION PROTECTION PROCEDURE

CAUTION

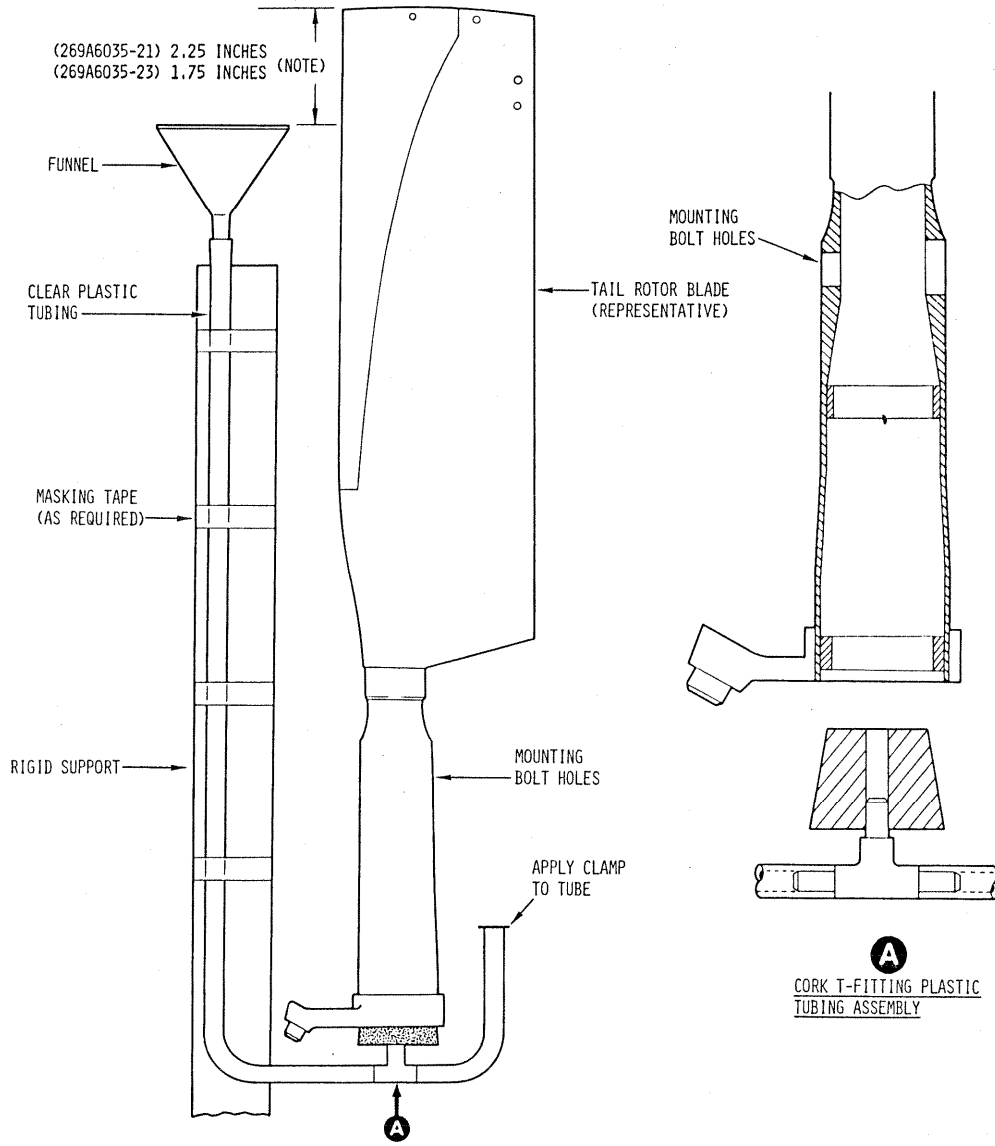
The following procedures (spray or fill method) must be strictly adhered to. Any deviation may allow paint to enter fiberglass cavity of blade, making it impossible to balance tail rotor.

a. Treat interior of spar to prevent corrosion. (See zinc pigment primer formulation at end of this procedure.)

1. Verify bearing inner diameter masking.
2. Cover bolt holes with masking tape.
3. Test spray gun for evidence of fine spray pattern.
4. Use zinc pigment primer thinned and spray gun with regulated pressure of from 45 to 55 psi; spray coat (0.003 inch thick) of zinc primer full length of spar interior. Maintain blade upright (blade tip up) during spraying.

NOTE

As soon as primer comes out of spray gun, start to withdraw nozzle from spar interior, using smooth motion. (Time inside spar 2 to 3 seconds.) Continually agitate primer by stirring or shaking container to prevent separation.



NOTE:
OBSERVE LEVEL OF PRIMER, DO NOT
FILL ABOVE DIMENSION SHOWN.

Figure 3. Zinc Primer Application, Fill Method

CAUTION

Damage to primer finish will result if excess solvent is used. Confine cleaning to bearing seats.

6. With blade tip up, air dry a minimum of 2 hours, then oven cure at $170^{\circ} \pm 15^{\circ}$ F for 4 hours. Monitor oven temperature using separate thermometer.

7. Determine that drain holes at trailing edge of blade and area between tip weight and spar are not plugged with primer, by blowing into spar. With fingers over bolt holes, listen for air escaping from blade tip vent holes.

NOTE

A long wire may be used to clear holes.

Alternate Priming Procedure (See Figure 3.)

1. Assemble large cork, "T" fitting, plastic tubing and funnel.
2. Verify bearing inner diameter masking.
3. Cover bolt holes with masking tape.
4. Using padding and masking tape, secure tail rotor blade to 2 x 4 or other suitable wooden support. Secure wooden support in vise. Install cork tubing assembly in spar, secure funnel and drain tubes (clamp drain tube closed) to any convenient rigid support.
5. Agitate, then slowly pour thinned primer into funnel. During pouring, determine primer level in spar tube by observing fill tube and funnel mouth, fill spar to dimension shown on Figure 3.

CAUTION

Do not overfill. Do not squeeze or disturb fill tube and funnel.

6. Unclamp drain tube, drain spar tube immediately by placing drain tube into container positioned below hub end.
7. Remove cork/tubing assembly. Allow 3 hours for primer to drain and air dry with blade still in vertical position.
8. Remove masking tape from bearings and bolt holes. Clean bearing ID as necessary after primer application, using MEK and small gauze pad on finger or swab on stick. Use MEK and swab for bolt holes.

CAUTION

Damage to primer finish will result if excess solvent is used. Confine cleaning to bearing seats.

9. Oven cure primer at $170^{\circ} \pm 15^{\circ} \text{F}$ for 4 hours. Monitor temperature using separate thermometer.
10. Determine that drain holes at trailing edge of blade and area between tip weights and spar are not plugged with primer, by blowing into spar, with fingers over bolt holes, listen for air escaping from blade tip vent holes.

NOTE

A long wire may be used to clear holes between tip weight and spar.

11. Inspect primer finish for smooth even coat.

General: If it should become necessary to remove zinc primer due to insufficient coverage, use MEK and swab.

Zinc Pigment Primer Formulation

As noted in the List of Materials, premixed materials conforming to the specifications may be procured from the manufacturers indicated. Should it be impossible to procure the premixed, the following formula will provide the zinc rich primer coating necessary to protect the interior of the spar. The quantities of material noted is sufficient to prime up to 12 blades.

Mixing instructions, thinner preparation and other necessary data are also provided.

<u>Item</u>	<u>Nomenclature</u>	<u>Parts by Weight (PBW) Spray Method</u>	<u>Grams - Fill Method</u>
a.	Phenoxy resin - PKHH ⁽¹⁾ EPONAL 53 ⁽²⁾	19.0	190.0
b.	Cellusolve acetate	66.0	660.0
c.	Toluene	15.0	150.0
d.	Zinc oxide	1.5	15.0
e.	Bentone ⁽³⁾ or equivalent	2.0	20.0
f.	MPA -60 ⁽⁴⁾ or equivalent	1.5	15.0
g.	Zinc dust ⁽⁵⁾ (9 micron or less)	<u>95.0</u>	<u>950.0</u>
Total		200.0	2000.0

The liquid vehicle portion of the primer shall be a thermoplastic, high molecular weight phenoxy resin PKHH or EPONAL 53.

NOTES

- (1) Union Carbide Corp
- (2) Shell Chemical Corp
- (3) NL Industries
- (4) Baker Castor Oil Co.
- (5) New Jersey Zinc Co.

Primer Mixing

1. Dissolve phenoxy resin in cellusolve acetate. Use high speed agitator. Heat to approximately 170° F. Cool mixture to 120° F before proceeding.

NOTE

Heating speeds up solution process.

Any device such as an electrical household mixer or a drill motor with a rod bent at right angles installed (1/2 inch bend) is acceptable.

2. While stirring, add toluene to phenoxy resin and cellusolve acetate mixture.
3. Continue stirring, add zinc oxide, Bentone and MP A-60 to mixture.
4. Continue stirring and add zinc dust.

NOTE

Continue stirring until primer mixture is homogeneous with a smooth texture. Mixture shall be free of any contaminants.

Primer/Thinner Mixing

1. Primer/thinner mix shall be as follows:

<u>Item</u>	<u>Nomenclature</u>	<u>Parts by Volume (PBV)</u>
a.	Primer	100.0
b.	Methyl Ethyl Keytone	70.0

2. While stirring add thinner to primer.

NOTE

Continue stirring until primer/thinner mix is homogeneous with a smooth texture. Strain mixture through a double layer of cheesecloth or paint strainer. Mixture is now ready for use.

F. ASSEMBLY INSTALLATION AND BALANCE-TAIL ROTOR

a. Using gram scale, weigh and record weight of each blade after all work defined in this Service Notice has been completed.

b. If the weight of one blade has increased more than 2 grams greater than the weight increase of the other blade, determine the static balance moment. (Refer to HMI, Appendix C.)

c. If the weight of one blade has not increased more than 2 grams greater than the other blade, dynamically balance tail rotor. (Refer to Basic HMI.)

1. Reassemble and install the tail rotor in accordance with the HMI.
2. Perform an operational check of the tail rotor control system.
3. Balance tail rotor.

CAUTION

During runup, increase rpm slowly; monitor aircraft for vibration. Excess vibration due to out of balance condition can result in damage.

d. Identify reworked blades by adding a 1/4-inch white paint dot above data plate on spar.

e. Record compliance with Part I and Part III of this Notice in Compliance Record of helicopter Log Book.

WEIGHT AND BALANCE DATA

Weight and balance not affected

FAA APPROVED

PART III-A - PRELIMINARY PROCEDURE

TOOLS AND EQUIPMENT

Scale - gram	-	Commercial
Drift - wood or equivalent	1 ea.	Commercial

MATERIALS

Solvent - Alcohol or	AR	Commercial
Solvent - Benzine or	AR	Commercial
Solvent - PD-680 or	AR	Commercial
Gasoline White	AR	Commercial
Solvent Dry Cleaning	AR	Commercial
Solvent Aliphatic Naptha	AR	Commercial
Cloth clean soft	AR	Commercial

PART III-B-CORROSION VISUAL INSPECTION AND REMOVAL PROCEDURE

TOOLS AND EQUIPMENT

Mirror - inspection; 7/8 inch diameter, handle length as required	1	Commercial
Flashlight - inspection	1	Commercial
Steel bristle bottle brush		Commercial
1/4 inch dia. Bristle dia, 0.004 inch	1 ea	(Complete Brush Set - 4 brushes - PN 127; Gordon Brush Co. 1018 Santa Fe Ave. Los Angeles, CA 90021)
3/8 inch dia, Bristle dia, 0.0085 inch	1 ea	
1.0 inch dia. Bristle dia. 0.0085 inch	1 ea	
1.25 inch dia, Bristle dia, 0.0085 inch	1 ea	
Installation tool - blade pitch bearing	-	Local manufacturer - See Figure 2.
Rod Steel - 0.050 inch dia x 24 inches long	1 ea	Commercial

Borescope -

National Borescope Catalog No 250-24C, 0.250 inch dia with No. 250-RA viewing head-right angle.

"X", power 1 to 8 at one inch from objective lens. Focus, universal from objective lens to infinity.

National Instrument Div.
Englehard Hanovia, Inc.
92-21 Corona Avenue
Elmhurst, L.I., N.Y.
11373
Tel: (212) 592-4044 or
Expanded Optics Co.
14112 Willow Lane
Westminister, CA 92683
Tel: (714) 894-1388

NOTE

Any equivalent instrument is acceptable.

MATERIALS

LOCTITE Grade A, per MIL-S-22473 or equivalent material	AR	Commercial
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PARTS

Pitch bearing outer	1 ea per blade	369A1716-3
Pitch bearing inner	1 ea per blade	369A1716-5

PART III-C - CASTING PROCEDURE

TOOLS AND EQUIPMENT

Steel wire 0.005 to 0.009 inch dia	AR	Commercial
Magnifying glass - 5x to 10x	1 ea	Commercial
Containers - glass or paper	AR	Commercial

MATERIALS

Wooden sticks 1/4 x 1/8 x 10 long	AR	Commercial
Dental stone - quick setting low shrinkage hard setting	AR	Dental supply house; 40 gr quantity required for 2 blade if pitting is found

NOTE

The following items comply with the
above, equivalents are acceptable.

COECAL or SUPER CAL

COE Laboratories, Inc.
8737 W. 127th St.
Chicago, Ill 60658
Tel: (812) 568-2100

VELMIX

Kerr Mfg Co.
Romulus, Mich.
Tel: (313) 926-7800

Release Agent
WD-40

WD-40 Co.
San Diego, CA.

NOTE

Any equivalent non-silicone, rust
freeing penetrant packaged in an
aerosol container is acceptable.

PART III-D - METAL TREATMENT PROCEDURE

TOOLS AND EQUIPMENT

Brush long handled - nylon bristles, 3 inch long x 3/4 inch dia	2 ea	Commercial
Heat lamp or oven		Commercial

MATERIALS

Inhibited phosphoric acid base surface cleaner	AR	MIL-C-10578 Type II or TT-C-490 or equivalent
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NOTE

The following commercial items are acceptable.

TURCO WO #1	SP-5-2111	Turco Products Wilmington, CA
JELCIO #33		Oakite Products
C-621		McGean Chemical Co.
FOSBEND 67 or 36		Penwalt Co.
PHOSIT		BASK Wyandotte Co.
NAVAL JELLY (for ferrous metals)		Woodhill Chemical Co. Cleveland, Ohio

NOTE

Surface cleaner may be obtained by following the formulation given in Part D.

PART III-E - CORROSION PROTECTION PROCEDURE

TOOLS AND EQUIPMENT

*Binks Slosh Spray Gun (engine cleaning gun), Model #140B 10-inch nozzle extension	-	Commercial
*Compressed air source, 100 psi	-	Commercial
*, **Oven or heat lamp	-	Commercial or household
**Fitting - T 3/8 in OD	1 ea	Commercial

*Required if spray method is used

**Required if fill method is used

**Funnel - small plastic 1 ea Commercial

MATERIALS

**Tubing - clear polyethylene 100 inches, Commercial
3/8 in. ID or equivalent approx

**Cork 2 inches long x 3/4 x 1 per T/R Commercial
1-1/2 inch

*, **Methyl ethyl ketone AR Commercial

*, **Gauze - medical AR Commercial

*, **Swabs cotton 6 inch stick AR Commercial

Padding As available

**Wood 2 x 4 inch or equivalent As available

**Masking tape AR Commercial

Zinc dust rich primer - MIL-P-26915A
Type 1, Class A

NOTE

Premixed zinc primer conforming to the above, and suitable thinner, may be procured from the following manufacturers:

Koppers Co., Los Angeles, CA

Sinclair Paint Co., Los Angeles, CA

Industrial Metal Protection Inc.
2685 Culver Blvd., Dayton, Ohio

Advanced Coating and Chemical Co.
El Monte, CA

*Required if spray method is used

**Required if fill method is used

Other manufacturers' products are acceptable if they comply with the applicable specification.

Refer to the primer and thinner formulation (Part III-E) for the ingredients necessary to compound the primer/thinner, should ready mixed materials not be available. The formula as given complies with the above specification.

*, **Cheese cloth	AR	Commercial
*, **Paint Strainer	AR	Commercial

*Required if spray method is used

**Required if fill method is used