HERCULES | Lockheed Martin Aeronautics Company
Marietta, Georgia 30063

ALERT SERVICE BULLETIN

* REVISION NOTICE *

WING - INSPECTION OF CENTER WING LOWER AND UPPER RAINBOW FITTINGS

Attached is Revision 1, dated August 16, 2019 to Service Bulletin A382-57-98. Information added or changed in this issue is indicated by a vertical revision bar in the outside margin of affected pages or pointing hand for illustrations.

This revision updates the Effectivity and adds FAA Airworthiness Directive (AD) requirements.

This revision is a complete reissue and replaces the basic issue of this Service Bulletin dated August 9, 2019. Retain this notice with your copy of this publication.

Previously modified aircraft are not affected.

List of Previous Revisions and/or Reissues

Basic	August 9, 2019

_____#_____

File: I-4838R1

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ALERT SERVICE BULLETIN

WING - INSPECTION OF CENTER WING LOWER AND UPPER RAINBOW FITTINGS

1. **PLANNING INFORMATION**

A. EFFECTIVITY

(1) This Service Bulletin is applicable to all model 382, 382B, 382E, 382F, and 382G FAA Certified Hercules aircraft including any 282, 382, 382C, and 382T aircraft operating in any category (excluding 382U, 382V, and C-130J aircraft).

(2) Spares - This Service Bulletin is not applicable to spares.

B. REASON

(1) The purpose of this Alert Service Bulletin is to inspect the left and right 398827 Center Wing Lower and 398335 Center Wing Upper Wing Joint (Rainbow) Fittings. A crack was found on the inner tang of the center wing lower rainbow fitting of a 382C (C-130H) aircraft spanning three wing joint nodes (each node contains a single attachment bolt to the outer wing). A single cracked inner tang across one node has also been found on a C-130J aircraft.

NOTE: The inspection threshold provided in this Alert Service Bulletin is based on Commercial Baseline usage and is given in Equivalent Flight Hours (EFH). Operators who have completed a Lockheed Martin Operational Usage Evaluation (OUE) can use the results of the OUE to determine center wing lower surface EFH. For any operator conducting Air Tanker (Firefight) operations, Service Bulletin 382-57-97 is to be used to determine center wing lower surface EFH of these operations. If EFH on the lower rainbow fitting cannot be determined, Lockheed Martin Aeronautics Company recommends the inspections contained in this Alert Service Bulletin be completed.

(2) Lockheed Martin Aeronautics Company recommends that the inspection specified herein be accomplished on all center wing rainbow fittings that have accumulated more than 15,000 Flight Hours on the lower wing joint fitting. For operators who have had a Lockheed Martin Aeronautics OUE completed or have performed Firefight operations should inspect rainbow fittings that have accumulated more than 15,000 EFH on the lower wing joint fitting. The inspection should be performed within 30 days after receipt of this Alert Service Bulletin.

C. DESCRIPTION

(1) Inspect the left and right 398827 Center Wing Lower and 398335 Center Wing Upper Rainbow Fittings. A visual inspection will be accomplished on center wing lower and upper rainbow fittings. An eddy current surface scan inspection will be performed on the center wing lower rainbow fitting. Report any suspect cracks or damage to Lockheed Martin Aeronautics Company.

D. APPROVAL

(1) The aircraft owner/operator will make an appropriate entry in the aircraft log records upon compliance with this Alert Service Bulletin.

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(2) After the work has been completed on each affected aircraft, please complete and mail or fax (770-494-5682) a Notice of Service Bulletin Compliance; or notify Lockheed Martin Aeronautics Company of compliance with this Alert Service Bulletin at website address: http://www.lockheedmartin.com/eoc and log into Data Library.

E. MANPOWER

The work prescribed in this Alert Service Bulletin has not been performed at the Lockheed Martin facility exactly as described herein. Therefore, the manpower estimates provided have not been validated, and should not be construed as being acceptable for use in making fixed price quotes for accomplishment of the work. These estimates are provided only as a convenience for customer planning purposes. It is estimated that approximately 16 man-hours (a crew of two) will be required to accomplish the work described herein on each affected aircraft. This will take approximately 8 hours elapsed time while the aircraft is out of service.

NOTE: This Alert Service Bulletin is based upon the configuration of the aircraft as it was delivered from Lockheed Martin Aeronautics Company. Previous service bulletins issued by Lockheed Martin Aeronautics Company have been considered in the preparation of this Service Bulletin, but no consideration has been given to peculiar changes made to the aircraft by the owner/operator since its delivery.

F. MATERIAL - COST AND AVAILABILITY

None.

G. TOOLING - PRICE AND AVAILABILITY

(1) Eddy Current Unit, Nortec, 16-pin LEMO cable connector, Models 2000D/2000D+, or equivalent.

(2) Probe, right angle, shielded, 1/8 inch diameter, 1/2-inch drop, frequency to include 200kHz, VM Products P/N VM202RAF-6, or equivalent.

(3) Cable, 6 foot, VM Products, P/N VM99L16/M-NR, or equivalent.

(4) Standard, aluminum, VM Products, P/N VM30889-C1A, or equivalent.

H. WEIGHT AND BALANCE

None.

I. REFERENCES

Service Bulletin 382-57-97

Hercules Maintenance Instructions Manual

J. OTHER PUBLICATIONS AFFECTED

None.

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2. **ACCOMPLISHMENT INSTRUCTIONS**

WARNING: OBSERVE ALL APPLICABLE SAFETY PRECAUTIONS WHILE ACCOMPLISHING THIS INSPECTION. ENSURE THAT ALL ELECTRICAL AND HYDRAULIC POWER SOURCES ARE OFF, THE BATTERIES AND EXTERNAL ELECTRICAL POWER DISCONNECTED, AND HYDRAULIC SYSTEMS DEPRESSURIZED BEFORE STARTING THE WORK. FAILURE TO COMPLY MAY RESULT IN SERIOUS INJURY OR DEATH.

NOTE: Some steps in the accomplishment instructions are identified as Required for Compliance (RC). If this Service Bulletin is mandated by an Airworthiness Directive (AD), the steps identified as RC must be done to comply with the AD. Steps not identified with RC are recommended and may be deviated from; done as a part of other actions; or done with accepted methods different from those given in the Service Bulletin if the RC steps can be done and the airplane returned to a serviceable condition.

These work instructions refer to methods, techniques, and practices described in other referenced documents. When the words "refer to" are used and there are other acceptable methods, techniques, and practices (including tools, equipment, and test equipment) those acceptable methods, techniques, practices (including tools, equipment, and test equipment) may be used to complete the work. When the words "in accordance with" are included in the instruction, the methods, techniques, and practices specified (including tools, equipment, and test equipment) in the referenced document must be used.

A. PREPARE AIRCRAFT FOR INSPECTION

(1) Remove electrical power from aircraft in accordance with appropriate Hercules Maintenance Manual or Hercules Maintenance Instructions Manual.

(2) Remove the hydraulic and fuel equipment dry bay access doors from the upper surface of the center wing behind engines No. 2 and 3.

WARNING: DO NOT ENTER FUEL AREAS UNLESS FUEL VAPOR CONTENT IS 0.0 PERCENT LOWER EXPLOSIVE LIMIT (LEL) (NO RESPIRATOR PROTECTION REQUIRED) WITH AN OXYGEN CONCENTRATION NOT LESS THAN 19.5 PERCENT. PROVIDE CONTINUOUS VENTILATION IN THE FUEL AREA THROUGHOUT THIS PROCEDURE.

(3) Depuddle, as required, and purge the dry bay areas in accordance with the maintenance manual to the 0.0 percent LEL and 19.5 percent oxygen content.

(4) Brush or wipe all loose dirt and debris from the inspection areas.

(5) Remove sealant from the inspection area using a phenolic scraper. Metallic tools shall not be used to remove sealant. See Figure 1, Sheet 4. Not applicable to the upper rainbow fittings.

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WARNING: ISOPROPYL ALCOHOL AND CLEANING COMPOUND ARE FLAMMABLE AND TOXIC TO EYES, SKIN AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION IS REQUIRED. GOOD GENERAL VENTILATION IS NORMALLY ADEQUATE. AVOID ALL SOURCES OF IGNITION.

(6) Remove oil, grease and residual sealant by wiping area with clean rags wet with ASTM D 770 Isopropyl Alcohol. Oils, grease and dirt may also be removed using MIL-PRF-87937 Cleaning Compound. Residual thin films of sealant may take several applications of solvent, scraping and wiping to be completely removed. See Figure 1.

(7) Remove any flaking and/or loose paint from the inspection areas.

NOTE: For the best NDE inspection results, the paint and sealant should be removed from the testing area. Coating thickness on the inspection surface greater than 0.010 inch (10 mils) thick will significantly reduce inspection sensitivity and can result in failure to detect cracks.

(8) On both the left and right side of the aircraft, mark the upper surface of the 398827 Center Wing Lower Rainbow Fitting inspection area at each tang (13 total per side, 26 per aircraft) as follows. See Figure 1, Sheet 4, View E.

(a) The forward/aft width dimension of each inspection area shall be the same as the width of the corresponding node face, approximately 2.40 inches.

(b) The outboard boundary of each inspection area shall coincide with the start of the chamfer of the node.

(c) The inboard boundary of each inspection area shall extend inboard to the outboard-most fasteners on each side of the 398817-3 Reinforcing Straps and around the Reinforcing Straps.

B. RC - INSPECTION PROCEDURES

CAUTION: THE NDI TECHNICIAN SHALL ENSURE PART PREPARATION HAS BEEN PROPERLY PERFORMED PRIOR TO BEGINNING THE INSPECTION. FAILURE TO PROPERLY PREPARE SURFACE INSPECTION AREAS CAN RESULT IN MISSED CRACKS.

(1) Calibration

(a) Use the following NDI Equipment:

1 Eddy Current Unit, Nortec, 16-pin LEMO cable connector, Models 2000D/2000D+, or equivalent.

2 Probe, right angle, shielded, 1/8 inch diameter, 1/2-inch drop, frequency to include 200kHz, VM Products P/N VM202RAF-6, or equivalent.

3 Cable, 6 foot, VM Products, P/N VM99L16/M-NR, or equivalent.

4 Standard, aluminum, VM Products, P/N VM30889-C1A, or equivalent.

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(b) Nortec 2000D or 2000S Equipment Preparation:

1 Connect probe and cable to the instrument. Probe and cable shall connect directly to the 16-pin LEMO connector on the Nortec 2000D or 2000S. Use of any adapters to mate with other types of probes is prohibited without authorization.

2 Connect eddy current unit to power source, if necessary.

3 Refer to manufacturer's instrument manual for all operating instructions.

4 The part to be inspected, calibration standard, inspection unit and probe must be at ambient temperature to assure that valid test data is obtained.

5 Adjust initial equipment settings as follows:

NOTE: Minor adjustments to these settings are allowable to achieve optimum signal characteristics.

- On main menu, set FREQUENCY 1 to 200 KHZ, set FREQUENCY 2 to OFF (not applicable to the Nortec 2000S), set HORIZONTAL GAIN to 65.0 dB, set VERTICAL GAIN to 75.0 dB, and set ANGLE to 70 degrees.
- On filter menu, set LP FILTER to 30, set HP FILTER to OFF, and set CONT NULL to OFF.
- On display menu, set SWEEP to OFF, Set V-POS to 10%, and set H-POS to 80%.
- On screen menu, set PERSIST to OFF, set DISP ERASE to 5.0 S, set GRATICULE to ON, set DOT/BOX to ON, and set SWEEP to OFF.
- On setup menu, set FREQ to SINGLE, and PRB DRV to MID.

6 Equipment calibration: Place probe on the calibration standard surface so the coil is a minimum of twice the probe diameter from all notches and edges. Press the NULL key. Hold the probe still until NULLING is complete. Press the ERASE key.

NOTE: Periodic erasing may be required.

7 While lifting the probe on and off the calibration standard, adjust ANGLE until a substantially horizontal, right to left, lift-off signal is achieved.

8 Repeatedly scan across the 0.020 inch deep notch in the calibration standard. Adjust H-GAIN and V-GAIN until a signal trace of 80% vertical deflection is obtained from the 0.020 inch notch.

9 Check lift-off and notch indication to insure that the signals are similar to those shown in Figure 2.

10 Recalibration of the eddy current instrument and probe shall be accomplished when one of the following occurs:

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- Immediately prior to a series of examinations/scans.
- After any interruption in system continuity such as power interruptions, instrument or probe change-outs, activation of new examination/scan setups, change in examination personnel, etc.
- At any instance of suspected system irregularity.

11 Proceed to Step 2.B.(2).

(2) Inspection

(a) Visually inspect the center wing lower and upper rainbow fittings as follows:

1 Using a bright light and, if necessary, a mirror, perform a visual inspection of all exposed areas of the upper surface of the left and right 398827 Center Wing Lower Rainbow Fittings. See Figure 1, Sheet 2, View B.

2 Using a bright light and, if necessary, a mirror, perform a visual inspection of all exposed areas of the lower surface of the left and right 398335 Center Wing Upper Rainbow Fittings. See Figure 1, Sheet 3, Views C and D.

(b) Eddy current inspect the left and right 398827 Center Wing Lower Rainbow Fitting as follows:

1 For each inner tang of the lower fitting, scan the upper surface of the center wing lower rainbow fitting within the previously marked inspection areas. Scan in the spanwise (inboard/outboard) direction. Index the probe by one half of the probe diameter (1/16 inch) between scan lines to ensure 100% coverage of the inspection area. Mark each rainbow fitting tang that has been inspected. See Figure 1, Sheet 4, View E.

2 Mark and report suspected defects.

3 Confirm suspected defects by performing a redundant backup eddy current inspection in accordance with Paragraph. 2.B.(2) for confirmation of all findings as follows:

NOTE: If a second inspector is not available, proceed to the Alternate Backup Method.

a Preferred Method - Different inspector repeats the inspection using the same equipment, after resetting and recalibrating the equipment.

b Alternate Method No. 1 – The same inspector recalibrates the same equipment and re-inspects the area with an appropriate alternate method.

C. RC - ACCEPTANCE/REJECTION CRITERIA

(1) Mark and Report Damage:

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(a) Report any damage detected by this inspection procedure to Lockheed Martin Aeronautics Company. Provide the following information of all damage detected:

1 Aircraft Serial Number.

2 Center Wing Flight Hours (or Aircraft Flight Hours if center wing hours are unknown).

3 Center Wing Equivalent Flight Hours (EFH) calculated in accordance with a Lockheed Martin Operational Usage Evaluation and/or Service Bulletin 382-57-97.

4 Wing Joint Fitting Flight Hours and EFH if different from the Center Wing Flight Hours and EFH (for rainbow fittings that have been replaced in service).

5 Part number and description.

6 Crack Location (Upper or Lower Rainbow Fitting and Specific Node Number, 1 through 11 on upper and 12 through 24 on lower).

7 Length, depth, and orientation of crack.

(2) Aircraft with detected fatigue cracks in the rainbow fitting should not be operated. Cracked rainbow fittings must be replaced before returning the aircraft to service.

D. RESTORE AIRCRAFT TO SERVICE

(1) Clean inspection area and restore any finishes removed. Reinstall any removed components and structure. Remove maintenance and inspection equipment and supplies from the inspection area.

(2) Restore aircraft to service.

(3) The aircraft owner/operator shall make an appropriate entry in the aircraft log records upon compliance with this Service Bulletin.

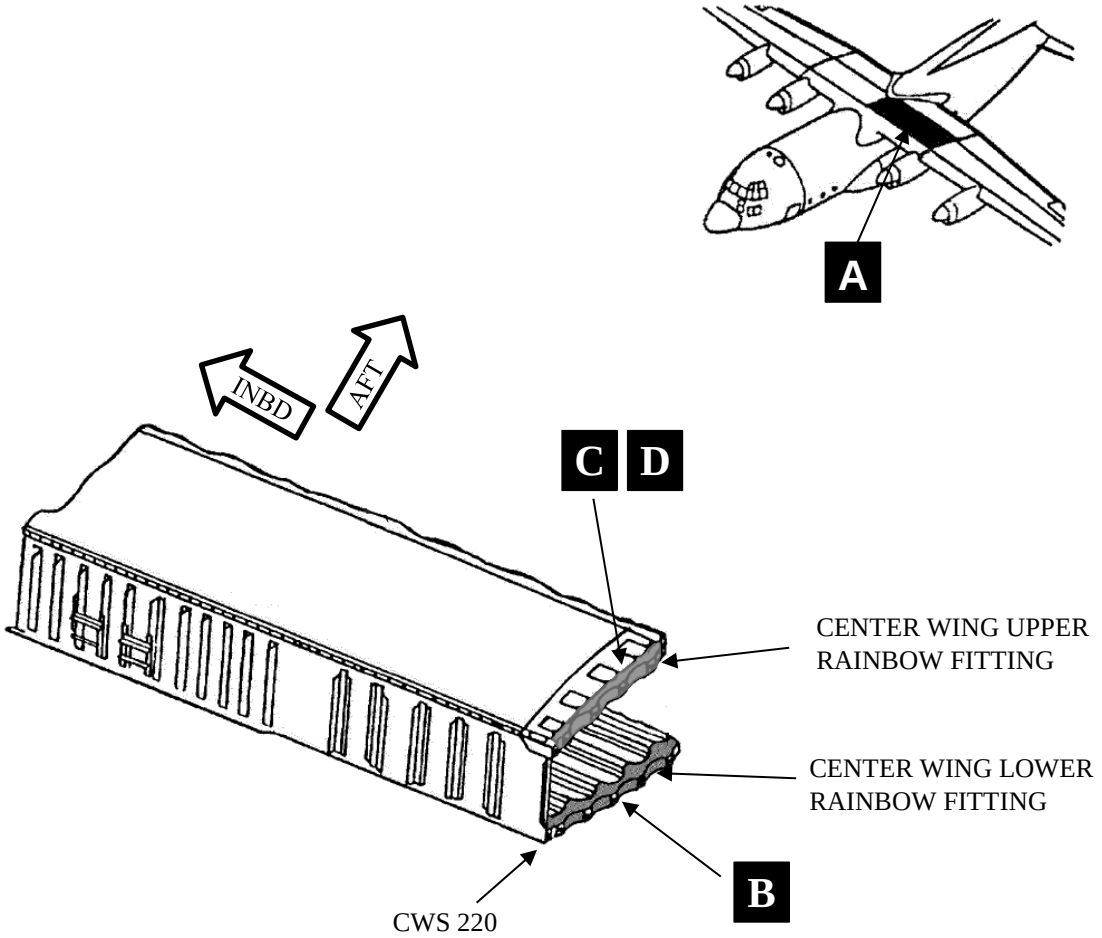
(4) After the work has been completed on each affected aircraft, please complete and mail or fax (770-494-5682) a Notice of Service Bulletin Compliance; or notify Lockheed Martin Aeronautics Company of compliance with this Service Bulletin at website address: www.lockheedmartin.com/ams and log into Data Library.

NOTE: If assistance is needed, contact your local Lockheed Martin Aeronautics Company representative, or the Customer Support Center in Marietta, Georgia, USA, as follows:

TELEPHONE:	(770) 494-9131
FAX:	(770) 494-9122
E-MAIL:	hercules.support@lmco.com
MAIL:	Lockheed Martin Aeronautics Company 86 South Cobb Drive Dept. 3E1M, Zone 0591 Marietta, GA 30063, USA

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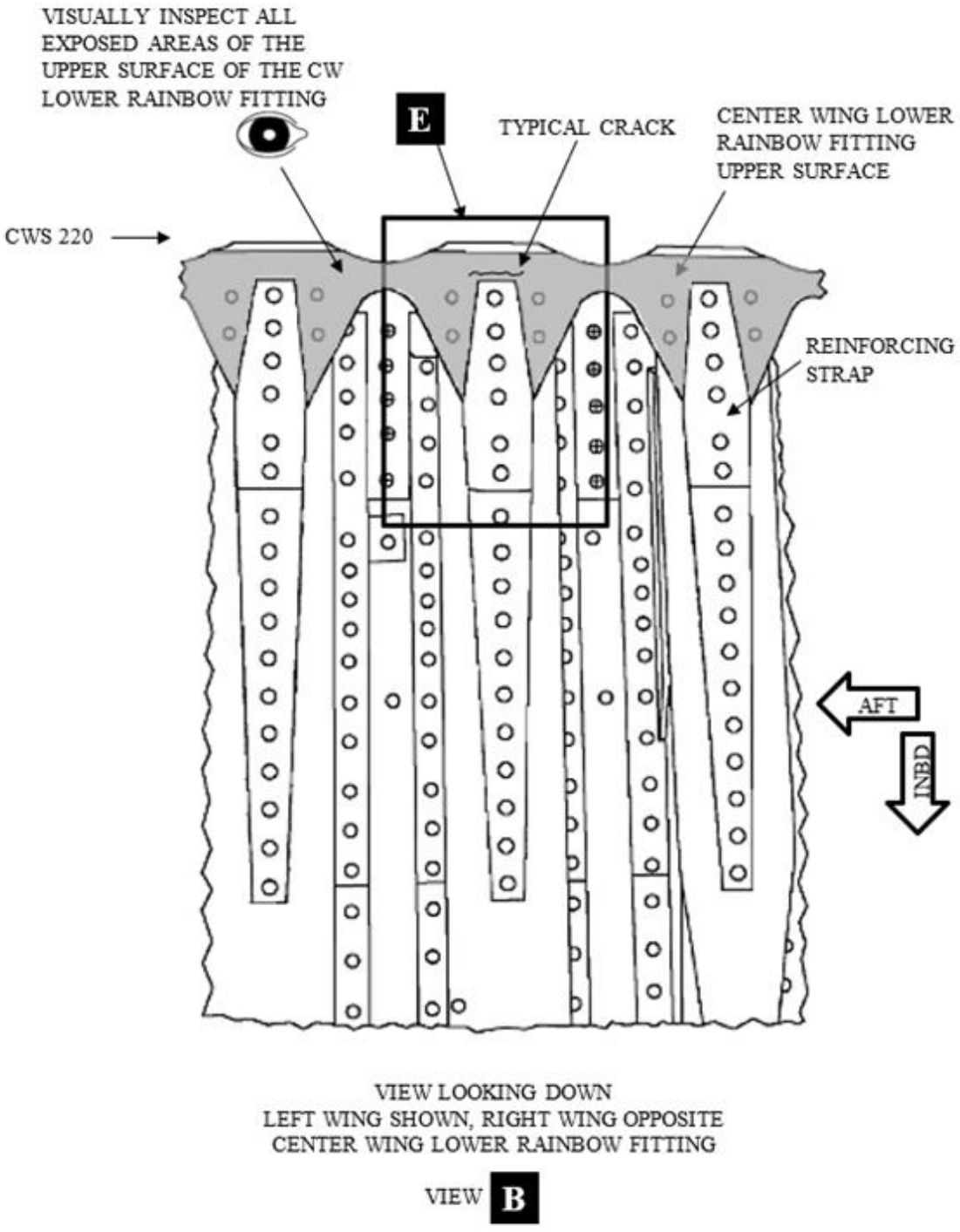


VIEW LOOKING DOWN AND AFT
LEFT WING SHOWN, RIGHT WING OPPOSITE
CENTER WING

VIEW **A**

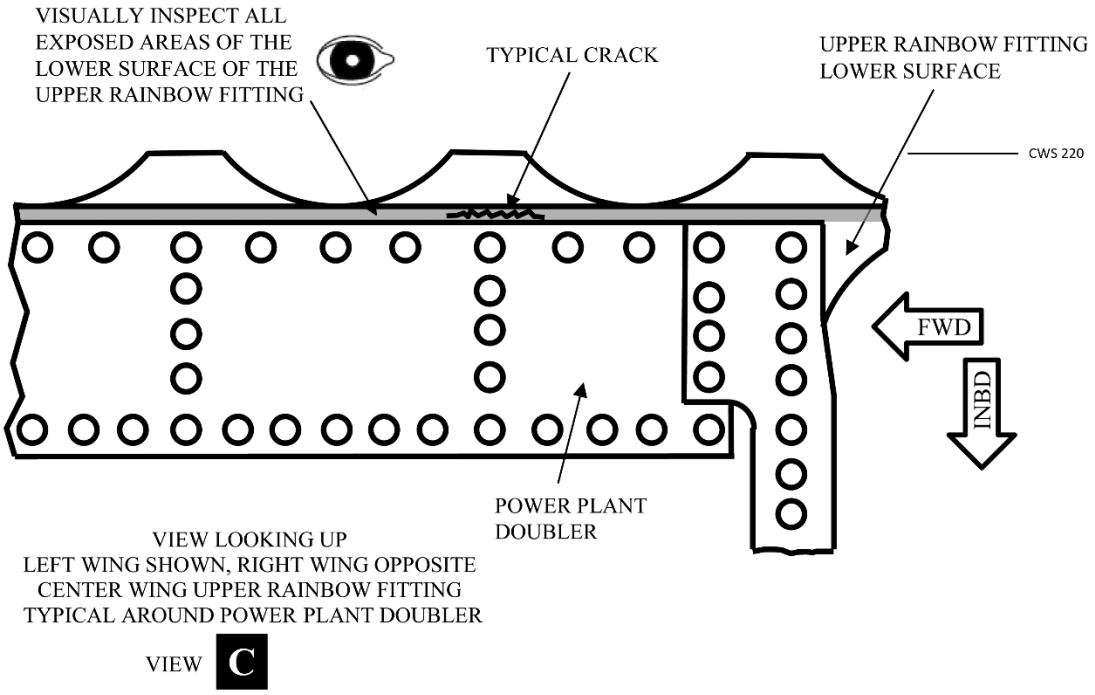
Inspection of Center Wing Lower and Upper Rainbow Fittings
Figure 1, Sheet 1 of 4

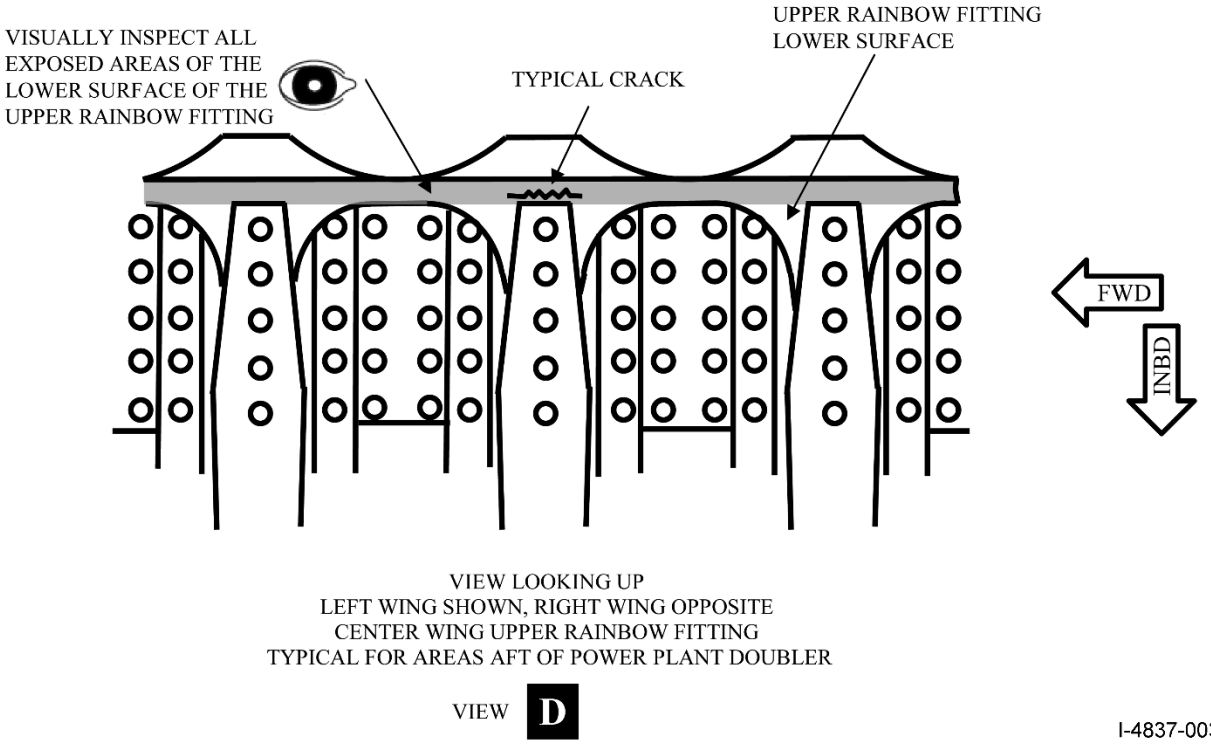
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Inspection of Center Wing Lower and Upper Rainbow Fittings
Figure 1, Sheet 2

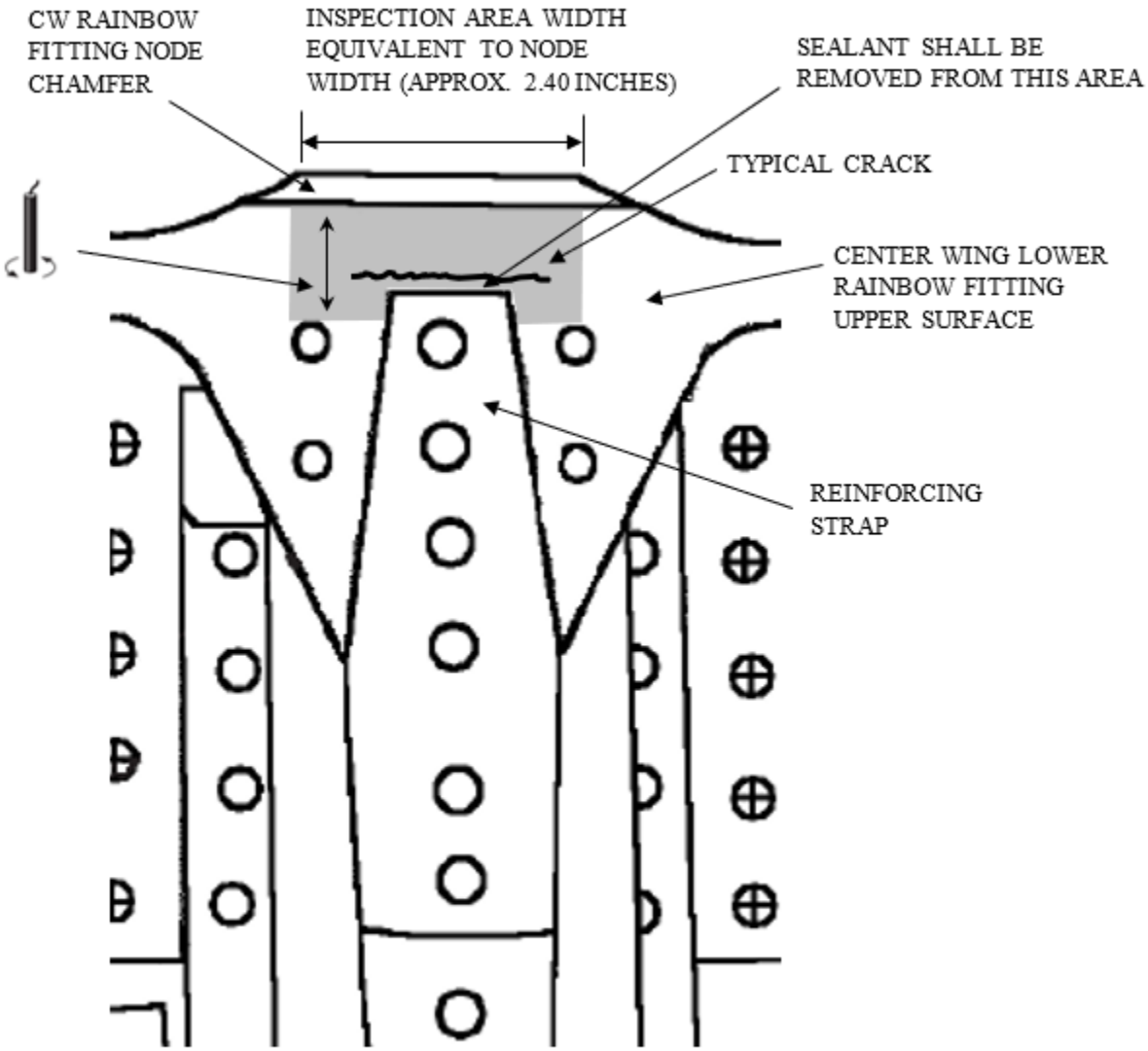
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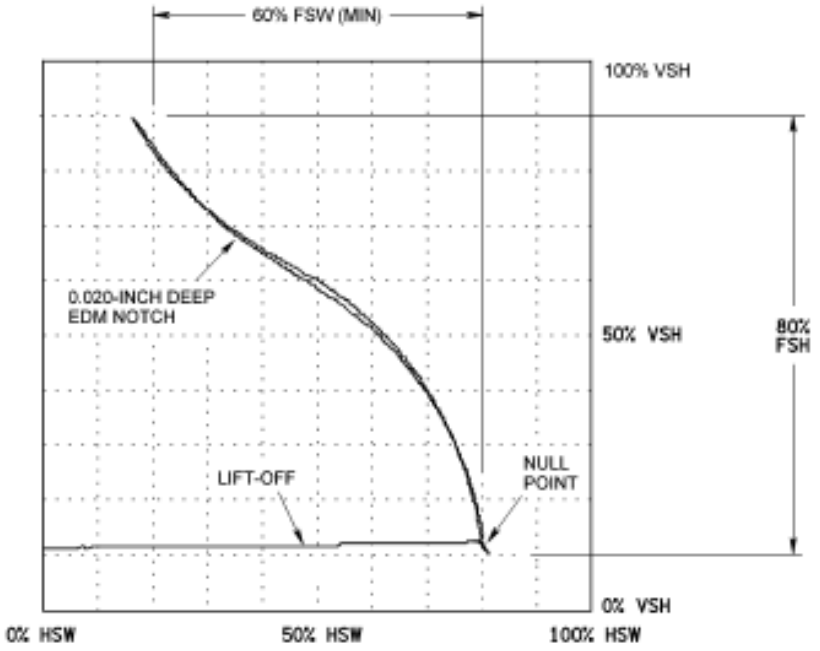
Inspection of Center Wing Lower and Upper Rainbow Fittings
Figure 1, Sheet 3

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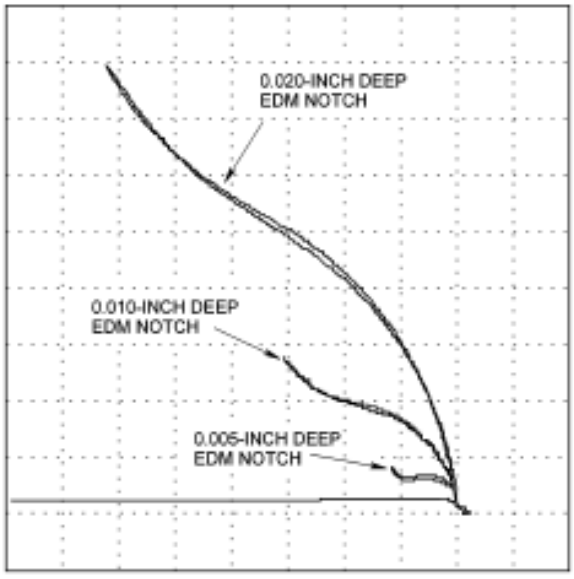


Inspection of Center Wing Lower and Upper Rainbow Fittings
Figure 1, Sheet 4

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SIGNAL RESPONSE FROM 0.020-INCH DEEP EDM NOTCH
(ALUMINUM, WEAKLY/NON-FERROMAGNETIC ALLOYS)



SIGNAL RESPONSES FROM 0.005, 0.010, AND 0.020-INCH DEEP EDM NOTCHES
(ALUMINUM, WEAKLY/NON-FERROMAGNETIC ALLOYS)

Typical Screen Presentations for Equipment Calibration
Figure 2

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3. **MATERIAL INFORMATION**

The following material, required to inspect each aircraft listed in Paragraph 1.A.(1), will be provided by the aircraft owner/operator:

PART NUMBER	QUANTITY	NOMENCLATURE
ASTM D 770	A/R	Isopropyl Alcohol or equivalent
MIL-PRF-87937	A/R	Cleaning Compound

_____#_____

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