STRINGERS 6, 10 AND 15 AT THE LOWER WING SKIN SPLICE (EXTERNAL)

1. Purpose

A. Use this eddy current inspection procedure to examine the splice stringers on the lower surface of the wing for cracks. This inspection moves the probe along the wing skin gap to examine stringers 6, 10 and 15 at the wing stations shown in Figure 1.

B. MPD Appendix B DTR Check Form Reference:

(1) ITEM 57-20-I15A, B, D and E

2. Equipment

NOTE: Refer to Part 1, 51-01-00 for data about the equipment manufacturers.

A. Instruments

(1) All eddy current instruments with a meter display or an impedance display can be used. The instruments specified below were used to help prepare this procedure.

(a) Phasec 1.1 SD; Hocking

(b) NDT 19; Staveley Instruments Inc.

(c) MIZ-10B; Zetec Inc.

B. Probe

(1) It is necessary to use a reflection type of ring probe with a 0.9 inch (23 mm) (maximum) outer diameter and a 1.2 inch (30 mm) height to do this procedure. The probe must operate at 500 Hz. The probes specified below were used to help prepare this procedure.

(a) RR058-1; NDT Eng. Corp.

(b) ARP/13.5/29P; Nortec Inc.

NOTE: Refer to Part 1, 51-06-00, Fig. 3 for some general data about low frequency probes.

(2) Reference Standards - Make reference standard NDT622 as specified in Figure 2.

3. Prepare for the Inspection

A. Open the strut access doors on each nacelle. This will let you access the inspection area in the hydraulic bay.

B. Move or remove items that prevent access to stringers 10 and 15 between the skate angles.

C. Make sure the inspection area is clean.

4. Instrument Calibration

A. Set the instrument frequency to 500 Hz.

B. Put the probe on the reference standard at probe position 1. See Figure 3.

C. Balance the instrument as specified in the manufacturers instructions.

D. Adjust the balance point as follows:

(1) For instruments with impedance plane displays, adjust the balance point to 20 percent of the vertical display and 80 percent of the horizontal display as shown in Figure 3.

(2) For instruments with meter displays, adjust the balance point to 20 percent of the display as shown in Figure 3.

E. Adjust the instrument for lift-off with a 0.006 inch (0.15 mm) nonconductive shim. Adjust the phase control so that:

(1) The signal moves horizontally to the left for instruments with impedance plane displays.

(2) The meter needle does not move more than 5 percent of the display for instruments with meter displays.

F. Use a nonconductive probe guide to help move the probe along the gap to probe position 2 on the reference standard (Figure 3). You must adjust the instrument so that the signal increases by 60 percent when the probe is above the defect. When the probe is at position 2, the signal must be at 80 percent of the display. See Figure 4.

NOTE: You can get a signal as you move the probe by the fasteners (Figure 3, Flagnote 1). The signals from the fasteners must be no more than 20 percent of the display above the balance point.

5. Inspection Procedure

A. Find the inspection area. See Figure 1.

B. Do the instrument calibration as shown in Paragraph 4.

NOTE: It is not necessary for the fastener dimensions and locations to be the same for the airplane as they are for the reference standard to get a satisfactory calibration.

C. Put the probe on the gap in the inspection area and balance the instrument. During the inspection, frequently do a check of the balance point. If the balance point changes by 10 percent (or more) during the inspection, balance the instrument and do the inspection again.

D. On all 767 airplanes but the 767-200 airplanes with dry bays, move the probe along the skin gap to examine stringer 6 for cracks from rib 1 (wing buttocks line 121.0) to rib 3 (wing station 283.7).

NOTE: Use a nonconductive probe guide to keep the probe above the gap as you move it along the gap. See Figure 3 and Figure 4.

E. Move the probe along the skin gap to examine stringer 10 for cracks at the intersection of stringer 10 and rib 3.

F. Move the probe along the skin gap to examine stringer 10 for cracks from wing station 344.3 (rib 7) to wing station 692.4 (rib 20). It will not be possible to do a scan of the lower skin at the skate angle locations.

G. Move the probe along the skin gap to examine stringer 15 for cracks at the intersection of stringer 15 and rib 9.

H. Do the inspection again on the other wing.

6. Inspection Results

A. Signals that are 50 percent or more of the instrument display are possible crack indications. Make sure the fastener hole is not the cause of the signal.

B. The conditions specified below can cause crack indications:

(1) A change in fastener dimensions, material or edge margin.

(2) Steel particles or other magnetic material caught in the sealant in the gap.

(3) Aluminum structure, such as a surge tank, can cause the signal to increase. For steel, the meter (or screen) indication is down.

C. Make sure of a crack as follows:

(1) Center the ring probe above many fasteners and monitor the instrument to identify the usual signal.

(2) Put the probe above the fastener in the area that gives the unusual signal and monitor the instrument.

(3) If the signal is 30 percent (or more) higher than the usual signal, it is necessary to examine the area by a different procedure.

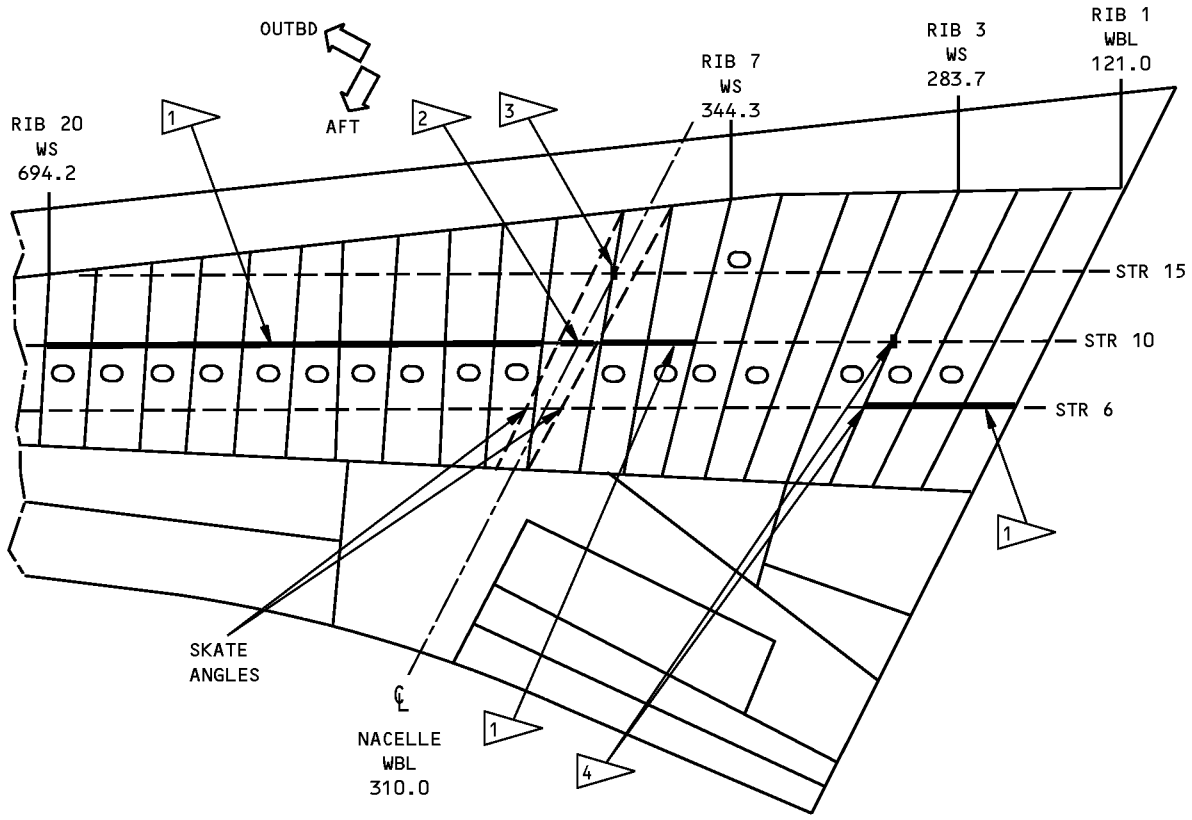
D. Compare the crack signals with:

(1) The crack signals you got from reference standard NDT622 during calibration.

(2) The signals that occur when the probe is put at same location on the other wing.

(3) The signals that occur when the probe is put at same location on a different airplane.

E. You can go into the tank and do a visual inspection of an area to make sure there is a crack. Or, you can remove the fastener and do an open hole eddy current inspection as specified in Part 6, 51-00-04, Part 6, 51-00-11 or Part 6, 51-00-16.



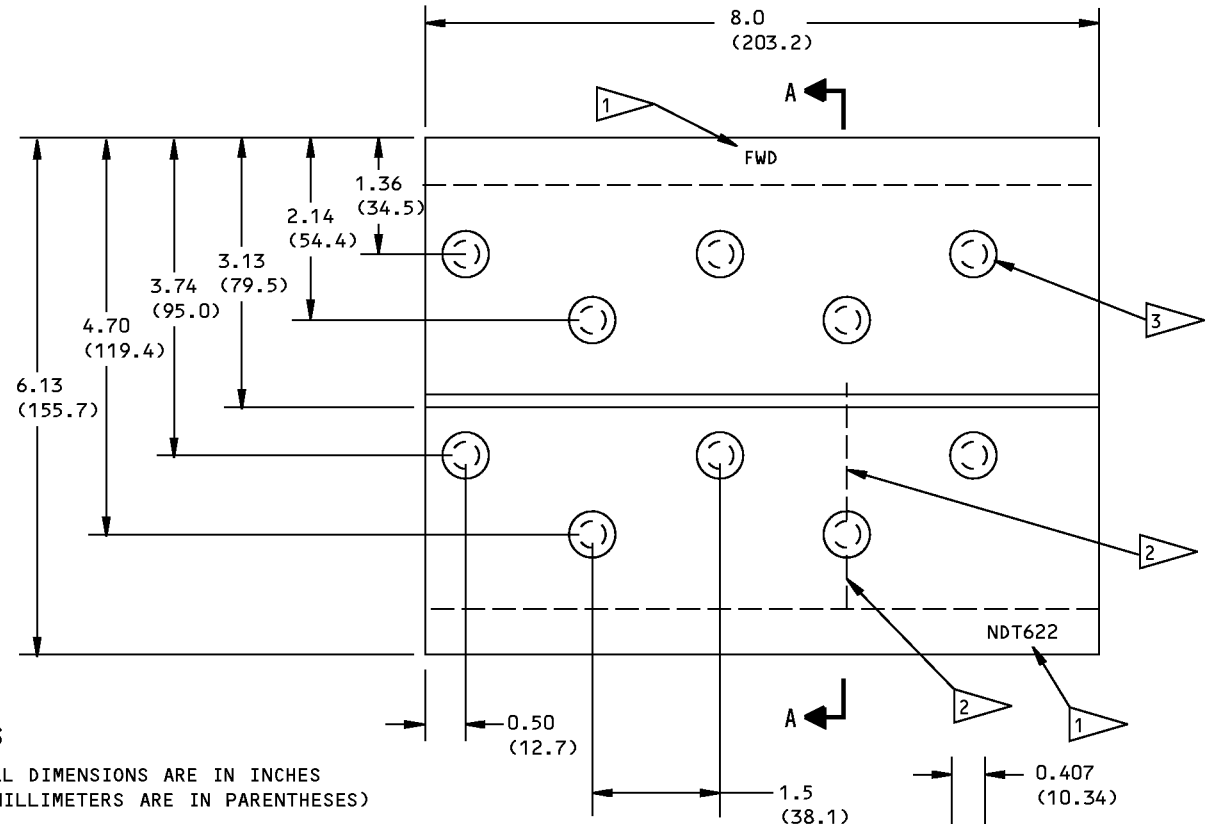
TOP VIEW OF THE LEFT WING

NOTES

1. MPD APPENDIX B DTR CHECK FORM ITEM 57-20-I15A
2. MPD APPENDIX B DTR CHECK FORM ITEM 57-20-I15B
3. MPD APPENDIX B DTR CHECK FORM ITEM 57-20-I15D
4. MPD APPENDIX B DTR CHECK FORM ITEM 57-20-I15E

INSPECTION AREA

Inspection Area
Figure 1



NOTES

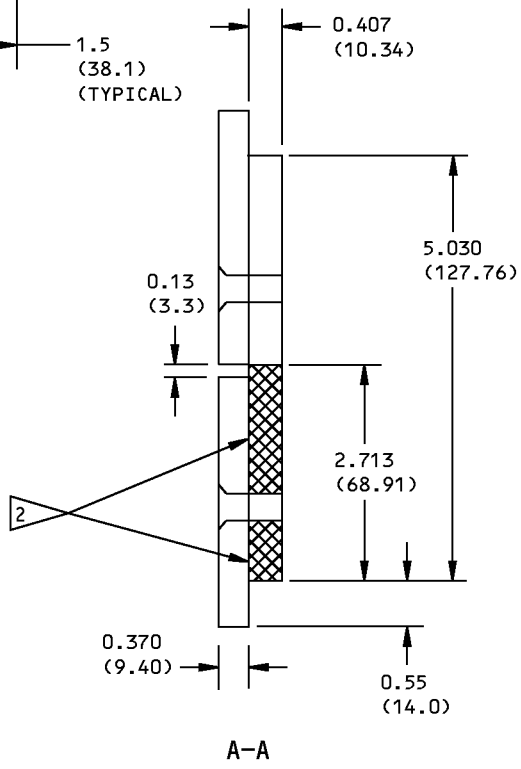
- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCES (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.025	X.X = ± 0.5
X.X = ± 0.050	X = ± 1

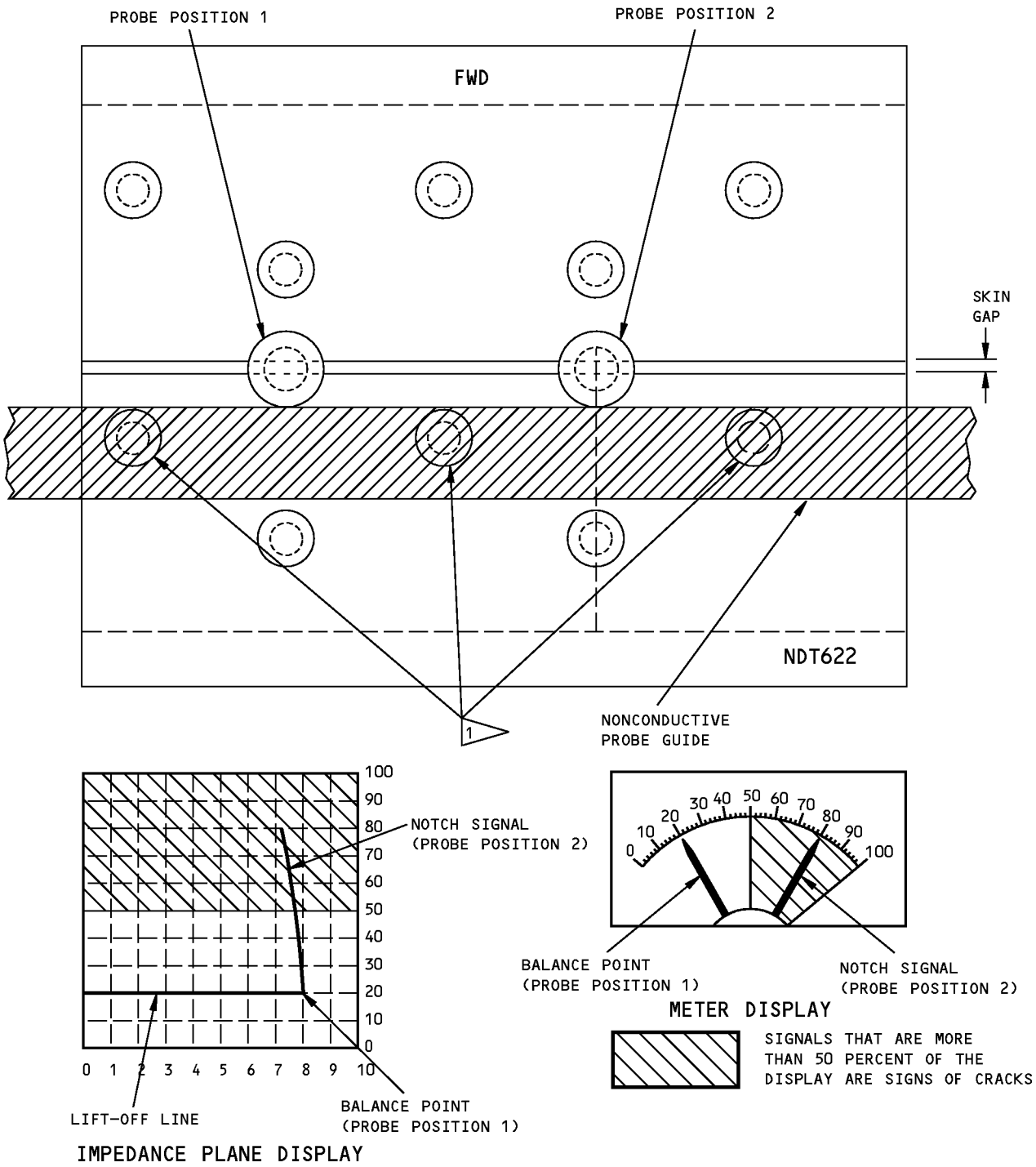
- SURFACE ROUGHNESS = 125 RA OR BETTER
- MATERIAL: 7075-T6, 2024-T3 OR AN AIRPLANE QUALITY MATERIAL WITH AN ELECTRICAL CONDUCTIVITY BETWEEN 28% AND 43% IACS.

1. ETCH OR STEEL STAMP THE REFERENCE STANDARD NUMBER NDT622 AND FWD IN THESE LOCATIONS
2. NOTCH:
   WIDTH: 0.007± 0.002 (0.18 ±0.05)
   LENGTH: 2.713 (68.91) ±10%
   DEPTH: THROUGH THE THICKNESS

   THE NOTCH MUST BE WITHIN ± 0.005 (± 0.10) OF THE CENTER OF THE HOLE.
3. FASTENERS:
   BACB30TY10K12 BOLTS WITH BACC30BE10 COLLARS, (10 LOCATIONS)
   OR BACB30VM10K12 BOLTS WITH BACC30BK10 COLLARS (OPTIONAL)

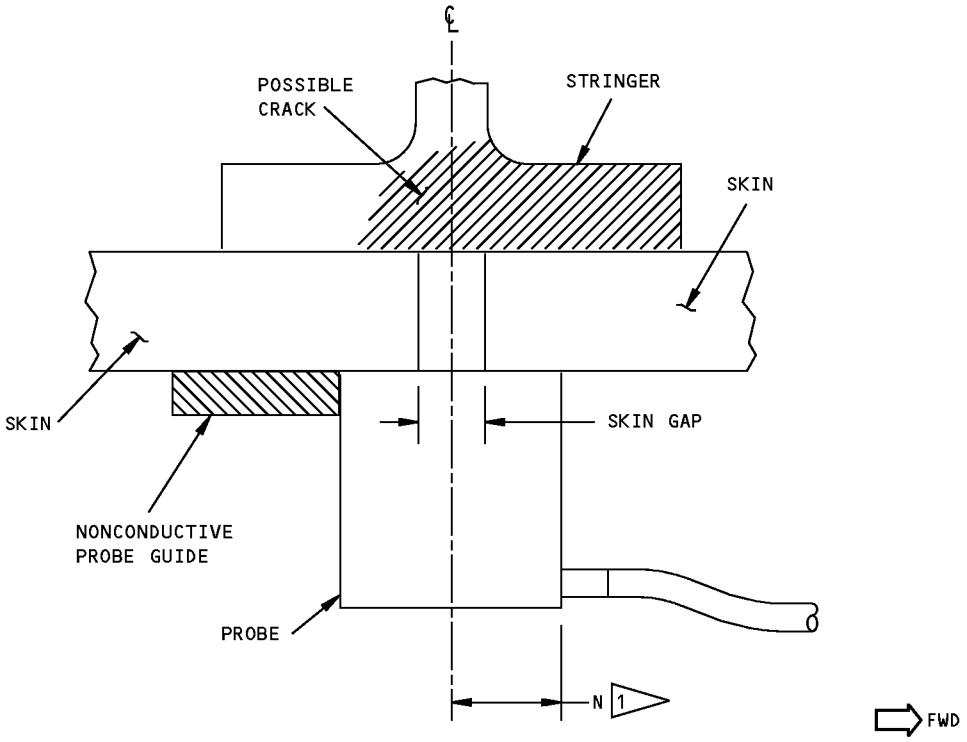


Reference Standard NDT622
Figure 2



1 YOU CAN GET A SIGNAL AS YOU MOVE THE PROBE BY THESE FASTENERS. SEE THE NOTE IN PARAGRAPH 4.F.

Instrument Calibration
Figure 3



NOTE

1 DISTANCE N MUST STAY CONSTANT DURING THE LENGTH OF THE SCAN

POSSIBLE CRACK

Probe Position During Inspection
Figure 4

INTERNAL INSPECTION OF THE LOWER WING SPLICE AT STRINGERS 6, 10 AND 15

1. Purpose

A. Use this procedure to do an inspection for surface cracks in the lower splice stringers.

B. See Figure 1 and Figure 2 for the inspection area locations.

C. This procedure uses an instrument with an impedance plane or a meter display.

D. MPD Appendix B DTR Check Form Reference:

(1) ITEM 57-20-I15A, B and C

2. Equipment

A. General

(1) Use inspection equipment that can be calibrated on the reference standard as specified in Paragraph 4.

(2) Refer to Part 1, 51-01-00 for data about the equipment manufacturers.

B. Instrument

(1) Use an eddy current instrument that:

(a) Has an impedance plane display or meter display.

(b) Operates at a frequency range of 100-500 kHz.

(2) The instruments specified below were used to prepare this procedure.

(a) Phasec 1.1; Hocking Krautkramer

(b) Defectometer 2.835; Foerster Instruments, Inc.

(c) MIZ-22; Zetec, Inc.

(d) Locator UH; Hocking Krautkramer

(e) MIZ-10A, MIZ-10B; Zetec, Inc.

C. Probes

(1) It is necessary to use a shielded probe that has a diameter of 0.125 inch (3.2 mm) to do this procedure. Refer to Part 6, 51-00-01 or Part 6, 51-00-19 for more data about probe selection. The probes specified below were used to help prepare this procedure:

(a) MP902-50B/L500K; NDT Engineering Inc.

(b) SS-AFB2X6; Tyvin Inc.

(2) Reference Standard

(a) Use reference standard 188A. Refer to Part 6, 51-00-01 or Part 6, 51-00-19 for data about the reference standard.

3. Preparation for Inspection

WARNING: PERSONNEL WHO GO INTO A FUEL TANK MUST KNOW THE PRECAUTIONS AND SAFETY PROCEDURES CONTAINED IN CHAPTER 28 OF THE BOEING MAINTENANCE MANUAL. DANGEROUS FUMES AND THE POSSIBILITY OF AN EXPLOSION OCCUR IN FUEL TANKS.

A. Remove the fuel cell access doors to get access to the inspection areas.

B. Remove loose paint, dirt and sealant from the surface of the inspection area.

4. Instrument Calibration

A. Calibrate the equipment as specified in par. 4 in Part 6, 51-00-01 or Part 6, 51-00-19.

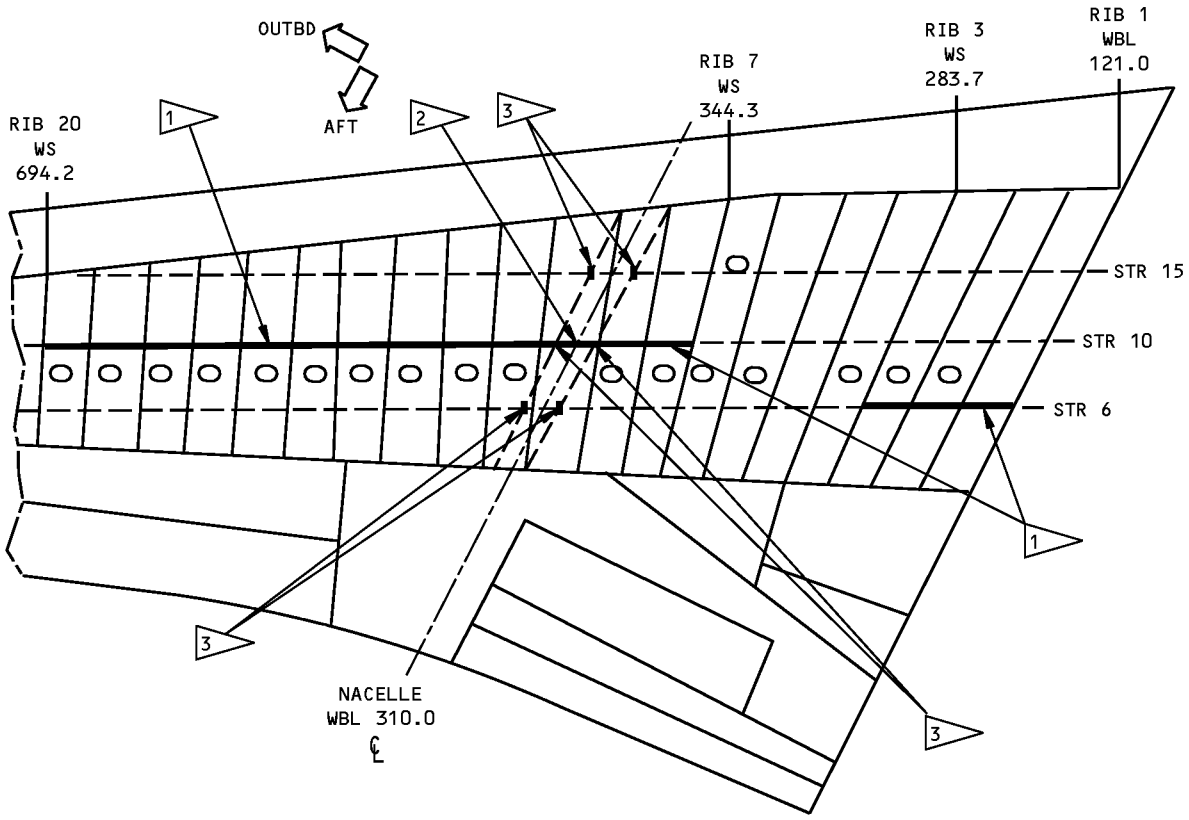
5. Inspection Procedure

A. Move the probe around all the fastener collars in the inspection areas identified in Figure 1 and Figure 2 to examine the splice stringers for cracks.

(1) Refer to Part 6, 51-00-01 or Part 6, 51-00-19 for the inspection procedure.

6. Inspection Results

A. Refer to par. 6, "Inspection Results", in Part 6, 51-00-01 or Part 6, 51-00-19 to help make an analysis of crack signals that occur.



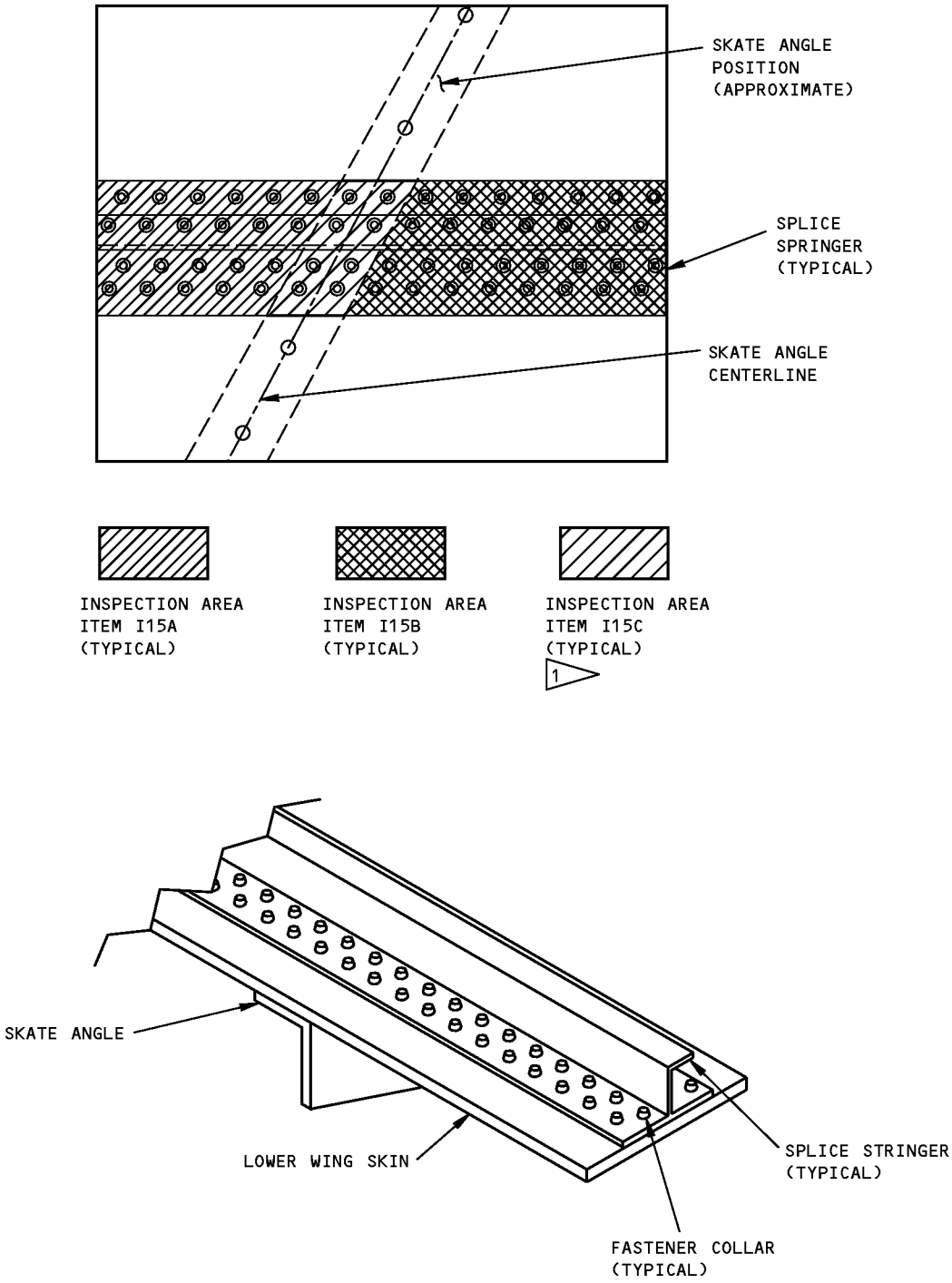
TOP VIEW OF THE LEFT WING

NOTES

1. MPD APPENDIX B DTR CHECK FORM ITEM 57-20-I15A
2. MPD APPENDIX B DTR CHECK FORM ITEM 57-20-I15B
3. MPD APPENDIX B DTR CHECK FORM ITEM 57-20-I15C

INSPECTION AREA

Inspection Areas
Figure 1



1 THE LOCATION OF THE SKATE ANGLE CAN BE DIFFERENT THAN SHOWN. EXAMINE ONE ROW OF FASTENERS ON EACH SIDE OF THE SKATE ANGLE CENTERLINE.

Example of an Inspection Area
Figure 2

LOWER CHORD AT THE REAR SPAR FROM THE WING-TO-BODY FAIRING TO RIB 3 (APPROXIMATELY WS 213.5 TO WS 283.7) - HORIZONTAL FLANGE INSPECTION

1. Purpose

A. Use this procedure to find cracks that start at the fastener holes in the lower chord of the rear spar and in the lower wing skin. The inspection areas include the areas between the wing-to-body fairing and rib 3 (approximately) on the left and right wings. Cracks can start at the fastener holes and get larger in the forward or aft direction. See Figure 1 for the fastener hole inspection areas.

B. Use a meter display or an impedance plane display instrument to do this inspection.

C. This procedure was prepared for MPD Appendix B DTR Check Form Items 57-20-I16A and 57-20-I16B. Figure 1, Sheet 2 identifies which fasteners are examined for each item.

D. Fastener holes with a first or second oversize condition can also be examined with this procedure. A first or second oversize condition does not change the sensitivity of this inspection when the instrument is calibrated to the instructions given in Paragraph 4. Also, inspection hole locations with titanium fasteners that have one of the conditions that follow will not change the sensitivity of this inspection and can be examined with this procedure.

(1) Standard size shank with an oversize head diameter that is no more than 0.800 inch (20.32 mm).

(2) First or second oversize shank with an oversize head diameter that is no more than 0.800 inch (20.32 mm).

2. Equipment

NOTE: Refer to Part 1, 51-01-00 for data about the equipment manufacturers.

A. Instrument - Use an eddy current instrument with a meter display or an impedance plane display that can:

(1) Operate at frequencies between 120 Hz and 130 Hz.

(2) Be calibrated as specified in the calibration instructions of this procedure. The instruments specified below were used to help prepare this procedure.

(a) MIZ-10A, MIZ-10B; Zetec, Inc.

(b) Elotest B1; Rohmann GmbH

(c) NDT 19, NDT 19e; Nortec/Staveley, Inc.

(d) Phasec 1.1; Hocking

B. Probes - A reflection ring probe that can operate at a frequency of 130 Hz and that has an inner diameter of 0.50 inch (13 mm) is satisfactory for use. The probes identified below were used to help prepare this procedure.

(1) RRO110-1; NDT Engineering, Inc.

(2) SPO-2030; Nortec/Staveley, Inc.

C. Reference Standard - Make reference standard NDT643 as specified in Figure 2.

NOTE: The reference standard does not have fasteners installed in the fastener holes because the fasteners used in the inspection area are titanium. Titanium has very low conductivity and, for this inspection, has little or no effect on the sensitivity.

3. Preparation for Inspection

A. Identify and clean the inspection areas shown in Figure 1.

4. Instrument Calibration

A. Set the instrument frequency to 120 or 130 Hz.

B. Put the probe on reference standard NDT643 at position 1 as shown in Figure 3, Detail I. Make sure the probe is centered on the fastener hole.

C. Balance the instrument with the null/balance instrument control.

D. Set the instrument balance point as follows:

(1) Meter display instrument -- Set the meter needle to 20 percent of full scale. See Figure 3, Detail III.

(2) Impedance plane instrument -- Set the balance point at 20 percent full-screen height and 80 percent full-screen width. See Figure 3, Detail II.

E. Adjustment the instrument lift-off as follows:

(1) Meter display instrument -- Adjust the phase control so that the meter needle moves no more than 5 percent of full scale for probe to part distances of approximately 0.006 inch (0.15 mm). This is equivalent to the thickness of two sheets of paper.

(2) Impedance plane instrument -- Adjust the phase control so that the signal moves horizontally from right to left when the probe is lifted off the reference standard. See Figure 3, Detail II.

F. Put the probe on the reference standard at position 2 as shown in Figure 3, Detail I. For a meter display instrument, the needle must be upscale. For an impedance plane display instrument, the signal must be above the balance point.

NOTE: Make sure the probe is centered above the fastener hole.

G. Adjust the instrument sensitivity as follows:

(1) Meter display instrument -- Adjust the gain so that the meter needle is at 80 percent of full scale as shown in Figure 3, Detail III.

(2) Impedance plane instrument -- Adjust the vertical signal so it is at 80 percent of full-screen height as shown in Figure 3, Detail II.

NOTE: It can be necessary to adjust the horizontal and vertical gain to get the notch signal at 80 percent of full-screen height as shown in Figure 3.

H. For an instrument with an impedance plane display, set the horizontal gain or the vertical-to-horizontal gain ratio as follows:

(1) Put a nonconductive shim of approximately 0.036 inch (0.91 mm) between the probe and the reference standard at position 1.

(2) Increase or decrease the horizontal gain to put the signal at approximately 30 percent of the horizontal display or,

(3) Set the vertical-to-horizontal gain ratio to put the signal at approximately 30 percent of the horizontal display.

I. Do Paragraph 4.B., Paragraph 4.C., Paragraph 4.D., Paragraph 4.F. and Paragraph 4.G. again and again until you get the necessary signals without more instrument adjustments. For impedance plane instruments, go to Paragraph 4.J.

J. Put the probe on the reference standard at probe position 3 as shown in Figure 3, Detail I. Make sure the probe is centered above the fastener hole and balance the instrument.

K. Move the probe to probe position 4 on the reference standard as shown in Figure 3, Detail I. Be sure that the probe is centered above the fastener hole.

L. If the signal amplitude from the notch at position 4 is more than the signal amplitude from the notch at position 2, no more calibration is necessary. If the signal amplitude is less than the signal amplitude from the notch at position 2, calibrate the instrument as follows:

(1) Do Paragraph 4.B. thru Paragraph 4.E. with the probe set at position 3 instead of position 1.

(2) Do Paragraph 4.F. and Paragraph 4.G. with the probe set at position 4 instead of position 2.

5. Inspection Procedure

NOTE: A small amount of movement in the balance point can occur during the inspection because of the different material thicknesses in these locations. If necessary, compare the same fastener locations on the other wing.

NOTE: During this inspection, it is important that the probe is approximately centered on the fastener of each hole to be examined. If the fasteners are easy to see, look through the hole in the probe and center the probe on the fastener head. If you cannot see a fastener, move the probe above the fastener head until the signal is at the balance point.

A. Identify the inspection area shown in Figure 1.

B. Calibrate the instrument as specified in Paragraph 4.

C. Put the ring probe on one of the fasteners in the inspection area. Adjust the probe to the center of the fastener and balance the instrument.

D. Examine two adjacent fastener holes that are in the inspection area. A large difference in the signals that occur from these fasteners can be caused by a crack at one of the fastener holes. If this occurs, balance the instrument at a different location in the inspection area.

NOTE: Make sure that you center the ring probe on each fastener location.

E. Do an inspection at all the fastener locations identified in Figure 1. Examine the forward and aft fastener rows independently (see the first NOTE below). Because the skin thickness changes in the inspection area, the balance point will change during the inspection. Balance the equipment as necessary to keep the balance point signal at the initial screen location. During the inspection, do as follows:

NOTE: The distance between the forward fastener row and the forward edge of the lower chord is less than the distance between the aft fastener row and the aft edge of the lower chord. This difference gives a different balance point for the forward and aft fastener rows.

NOTE: Make sure that you center the ring probe on each fastener location.

(1) Make a mark at the locations where signals occur that are 40 percent (or more) of the display.

(2) Frequently, do a calibration test of the instrument as follows:

NOTE: Do not adjust the instrument gain.

(a) Put the probe on the reference standard at the position you used during calibration to set the balance point (position 1 or 3) and balance the instrument.

(b) Put the probe on the reference standard at the position you used to set the instrument sensitivity (position 2 or 4). Compare the signal you got from the notch during calibration with the signal you get now.

(c) If the signal from the notch in the reference standard has changed 10 percent or more from the signal you got during calibration, do the calibration and inspection again for all the fasteners examined since the last calibration test.

F. Do the same inspection on the other wing.

6. Inspection Results

A. A signal that is more than 40 percent of the display (vertically) is a sign of a defect.

B. Compare the signal that occurs during the inspection to the signal you got from the notch in the reference standard during calibration.

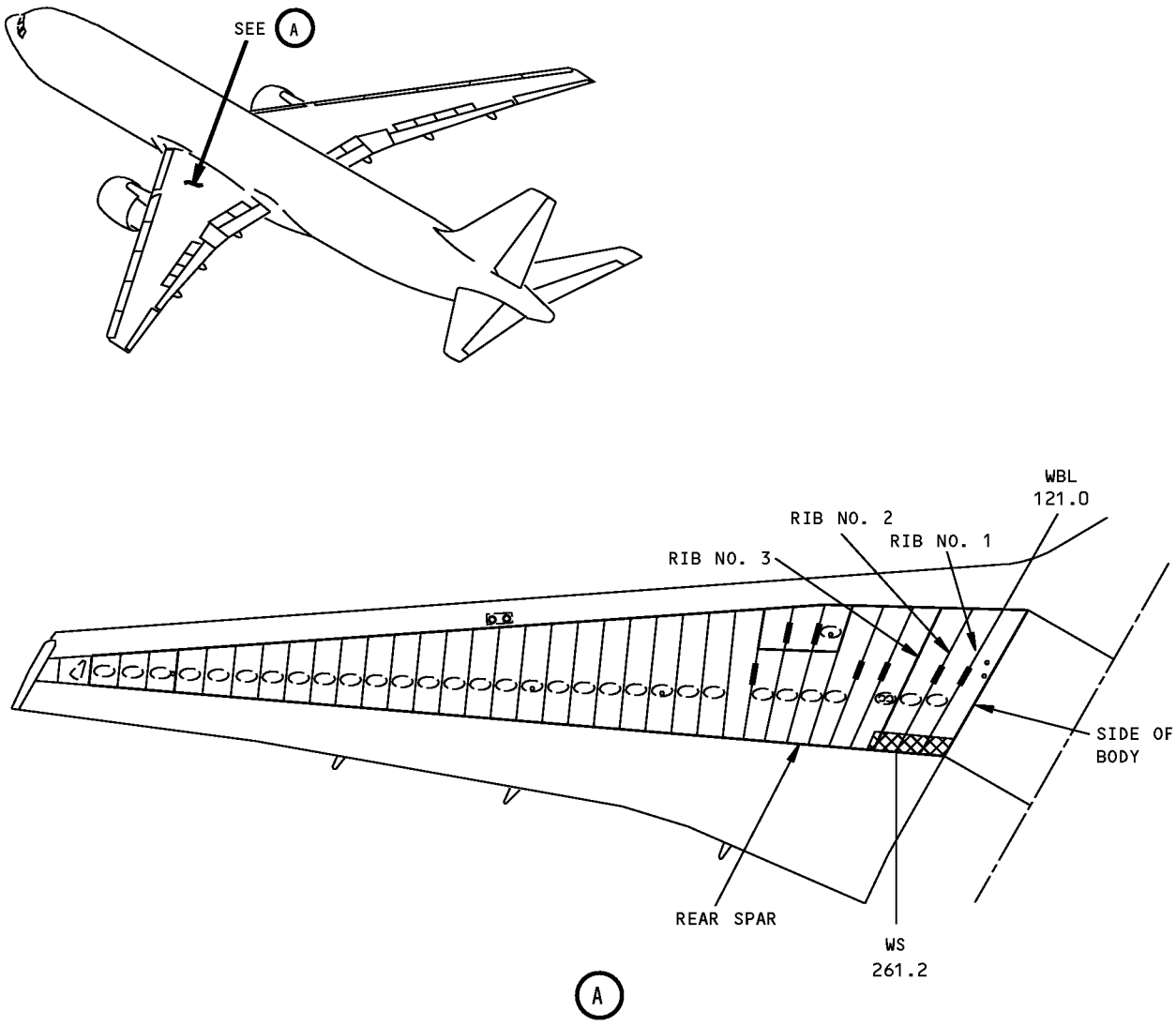
NOTE: The signal from a skin crack can be at a different horizontal screen position (more to the left) than the signal from the notch in the reference standard. Reject a hole location only by the amplitude of the signal.

C. Other conditions that can cause crack type signals are:

(1) A change in the space between fasteners. See if the same location on the opposite wing has the same amount of space between fasteners and, if so, compare the results from the two locations.

(2) A larger fastener has been installed. See if the same diameter fastener is installed on the opposite wing and compare the results with that fastener. If not, make a new reference standard that has the same diameter fastener holes.

D. If crack signals occur, do an open hole eddy current inspection as specified in Part 6, 51-00-04, Part 6, 51-00-11 or Part 6, 51-00-16 .

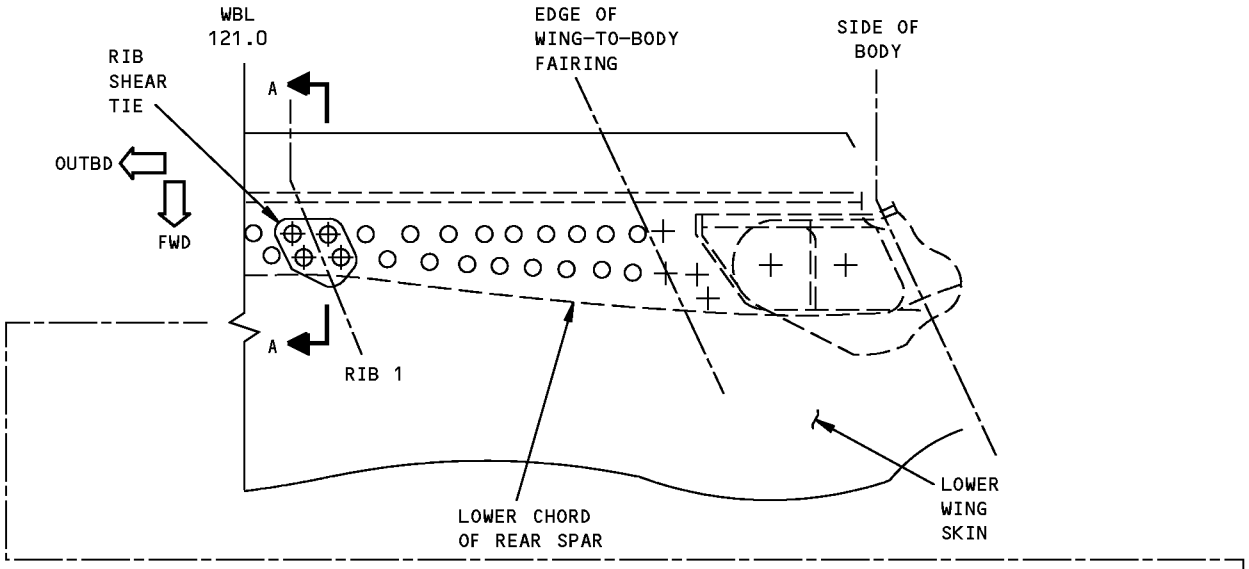


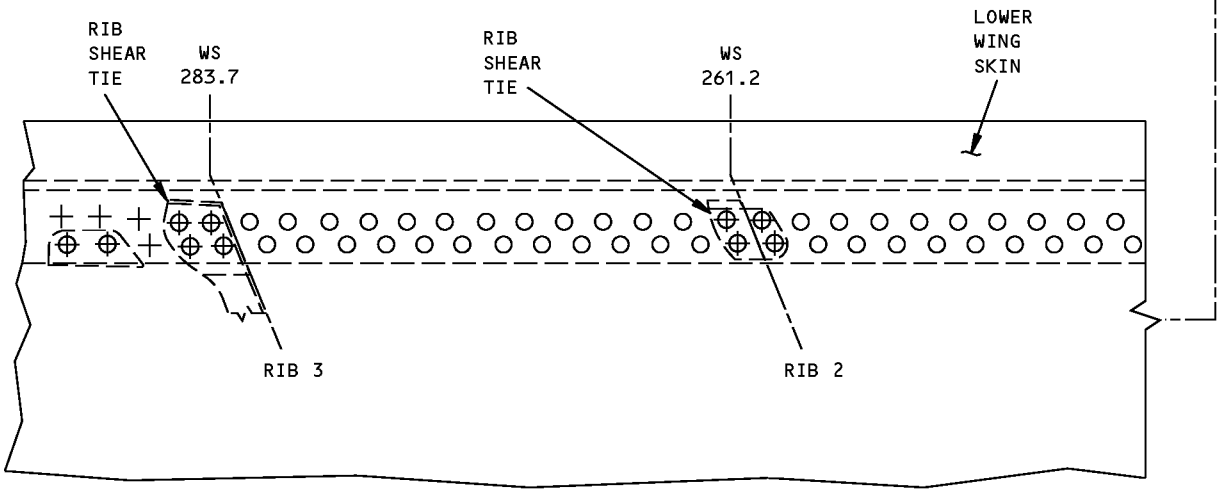
NOTES

- LEFT WING SHOWN; RIGHT WING OPPOSITE

INSPECTION AREA

Wing - Lower Chord and Skin Inspection Details
Figure 1 (Sheet 1 of 2)





NOTES

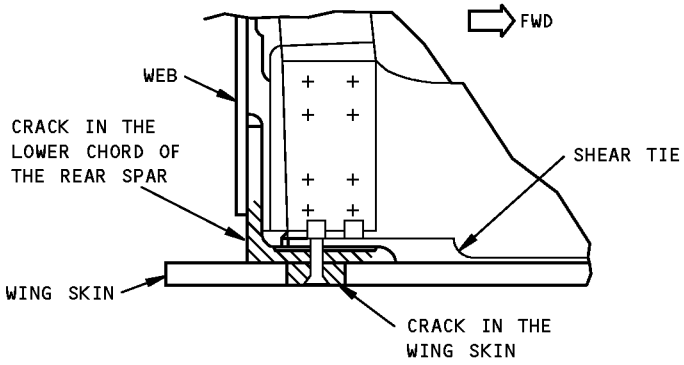
- BOTTOM VIEW OF THE LEFT WING AS YOU LOOK UP

⊕ ○ FASTENERS. EXAMINE THE LOWER CHORD AND WING SKINS FOR CRACKS IN THE AREAS AROUND THESE FASTENERS.

○ THESE FASTENERS ARE IDENTIFIED IN DTR CHECK FORM ITEM 57-20-I16A.

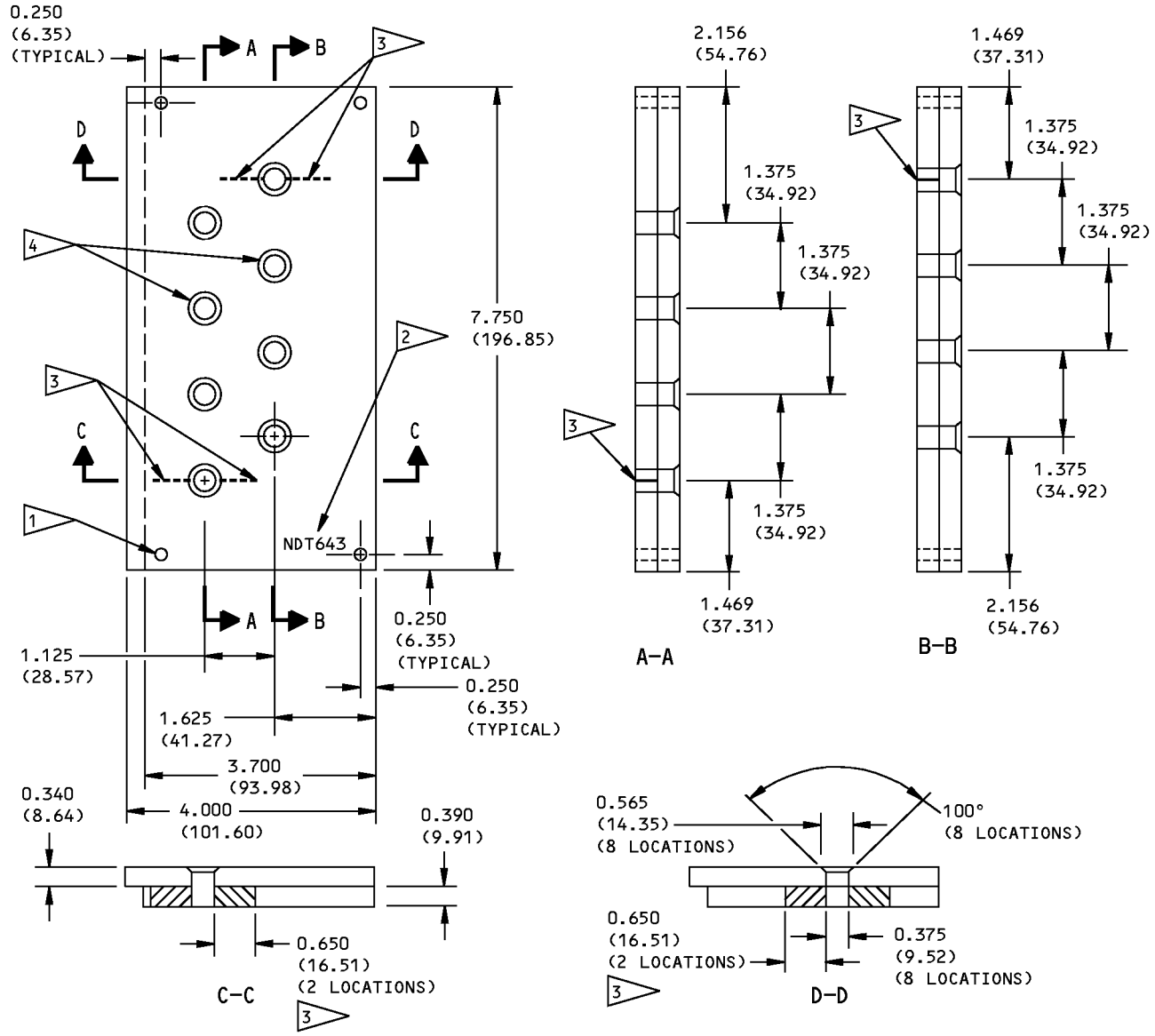
⊕ THESE FASTENERS ARE IDENTIFIED IN DTR CHECK FORM ITEM 57-20-I16B.

EXAMPLE OF A CRACK



A-A
SECTION AT RIB AREAS
(APPROXIMATE EXAMPLE)

Wing - Lower Chord and Skin Inspection Details
Figure 1 (Sheet 2 of 2)



NOTES

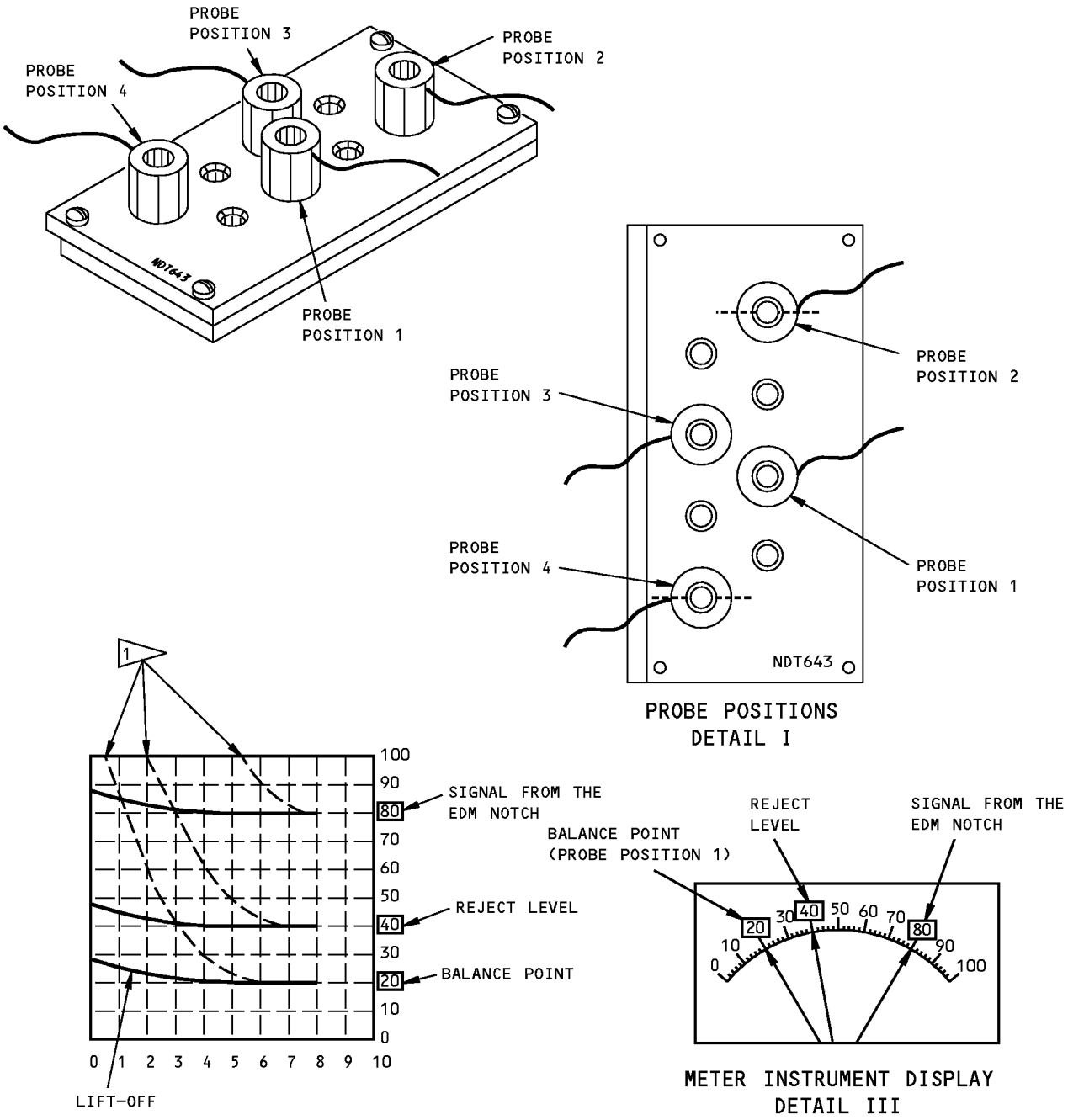
- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCES (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.025	X.X = ± 0.5
X.X = ± 0.050	X = ± 1

- MATERIAL: 2224-T3511; 2324-T39; 2024-T3, -T4; 7075-T6XXX, -T735XX, -T74
- SURFACE ROUGHNESS: 125 RA OR BETTER

1. DRILL AND TAP 10-32 THREADS. INSTALL MACHINE SCREWS WITH LENGTHS NOT LONGER THAN THE FULL THICKNESS AT 4 LOCATIONS.
2. ETCH OR STEEL STAMP THE REFERENCE STANDARD NUMBER NDT643 AT THIS LOCATION
3. EDM NOTCH DIMENSIONS:
   LENGTH: ± 10% OF DIMENSION SPECIFIED
   WIDTH: 0.020 (0.51) MAXIMUM
   DEPTH: THROUGH THICKNESS
4. OPEN HOLES - DO NOT INSTALL FASTENERS IN THESE TWO ROWS. (ALL 8 FASTENER HOLES TO STAY OPEN HOLES).

Reference Standard NDT643
Figure 2



1 THE LIFT-OFF SIGNAL WHEN THE VERTICAL TO HORIZONTAL GAIN RATIO IS HIGH CAN BE DIFFERENT FROM WHEN THE VERTICAL TO HORIZONTAL GAIN RATIO IS LOW.

Calibration Probe Positions and Instrument Displays
Figure 3

PART 6 - EDDY CURRENT

LOWER CHORD OF THE REAR SPAR FROM THE SIDE-OF-BODY TO RIB 3

1. Purpose

A. Use this procedure to examine the lower chord of the rear spar for surface cracks. The area of the lower chord that is examined by this procedure is the area that is between the side-of-body and rib 3 on the left and right wings.

B. This procedure looks for cracks that start at the fastener holes of the lower chord and get larger in the forward to aft direction. The fastener hole locations are shown in Figure 1 and Figure 2.

C. This procedure was prepared for the MPD Appendix B DTR Check Form Items 57-20-I16A and 57-20-I16D. Figure 2 identifies which fasteners are examined for each item.

D. You can use an impedance plane display or meter display instrument to do this inspection.

2. Equipment

A. General

(1) Use inspection equipment that can be calibrated on the reference standard as specified in Paragraph 4.

(2) Refer to Part 1, 51-01-00 for data about the equipment manufacturers.

B. Instrument

(1) Use an eddy current instrument that:

(a) Has an impedance plane display or meter display.

(b) Operates a frequency range of 50 to 500 kHz.

(2) The instruments specified below were used to prepare this procedure.

(a) Locator UH; Hocking, Inc.

(b) NDT 19e; Staveley

C. Probes

(1) Use a right-angle probe. A probe drop of 0.5 inch (7.4 mm) is recommended so that there is no interference between the collar and the probe as you make a scan around each collar.

(2) Refer to par. 2B in Part 6, 51-00-01 for data about probe selection.

(3) The probe specified below was used to help prepare this procedure.

(a) MP905-50; NDT Engineering Corp

D. Reference Standards

(1) Use reference standard 188A as given in par. 2.C.(1) in Part 6, 51-00-01.

3. Preparation for Inspection

WARNING: PERSONNEL WHO GO INTO A FUEL TANK MUST KNOW THE PRECAUTIONS AND SAFETY PROCEDURES CONTAINED IN CHAPTER 28 OF THE BOEING MAINTENANCE MANUAL. DANGEROUS FUMES AND THE POSSIBILITY OF AN EXPLOSION OCCUR IN FUEL TANKS.

A. Get access to the inspection area through the necessary access doors of the wing fuel tanks.

B. Remove sufficient sealant from around the collars of the fasteners to get access to the inspection surface. Refer to Figure 1 and Figure 2 for the location of the fasteners.

4. Instrument Calibration

A. For instruments with a meter display, calibrate the equipment as specified in the calibration instructions of Part 6, 51-00-01, par. 4, "Instrument Calibration". Use reference standard 188A and the aluminum rivet in the reference standard.

NOTE: The fasteners used in the inspection area are titanium lockbolts with aluminum collars. Because you do an inspection around the aluminum collars, the aluminum rivet in reference standard 188A is used during calibration. Keep the probe fully against the aluminum rivet during calibration.

B. For instruments with an impedance-plane display, calibrate the equipment as specified in the calibration instructions of Part 6, 51-00-19, par. 4, "Instrument Calibration". Use reference standard 188A and the aluminum rivet in the reference standard. Refer to the NOTE in Paragraph 4.A.

5. Inspection Procedure

WARNING: PERSONNEL WHO GO INTO A FUEL TANK MUST KNOW THE PRECAUTIONS AND SAFETY PROCEDURES CONTAINED IN CHAPTER 28 OF THE BOEING MAINTENANCE MANUAL. DANGEROUS FUMES AND THE POSSIBILITY OF AN EXPLOSION OCCUR IN FUEL TANKS.

A. Make a scan around the collar of each fastener identified in Figure 2.

NOTE: This procedure is for DTR Check Form Items 57-20-I16A and 57-20-I16D. Figure 2 identifies what fasteners are examined with each Item.

(1) For instruments with a meter display, refer to par. 5 in Part 6, 51-00-01 for the inspection procedure.

(2) For instruments with an impedance plane display, refer to par. 5 in Part 6, 51-00-19 for the inspection procedure.

6. Inspection Results

A. For instruments with a meter display, refer to par. 6 in Part 6, 51-00-01 to make an analysis of the indications that occurred during the inspection.

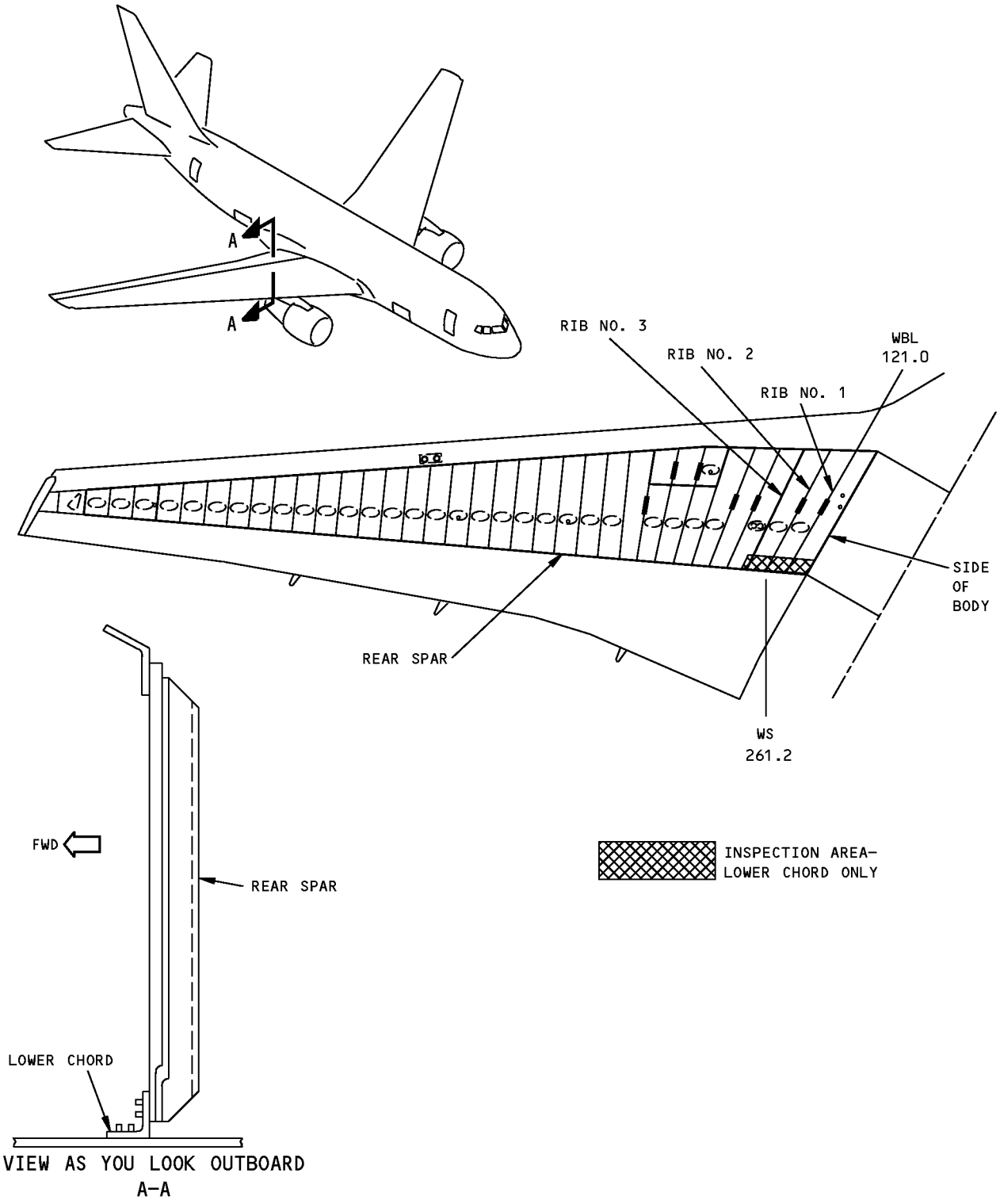
B. For instruments with an impedance plane display, refer to par. 6 in Part 6, 51-00-19 to make an analysis of the indications that occurred during the inspection.

C. Compare the signals that occur during the inspection to the signals you get during calibration from the notch in the reference standard.

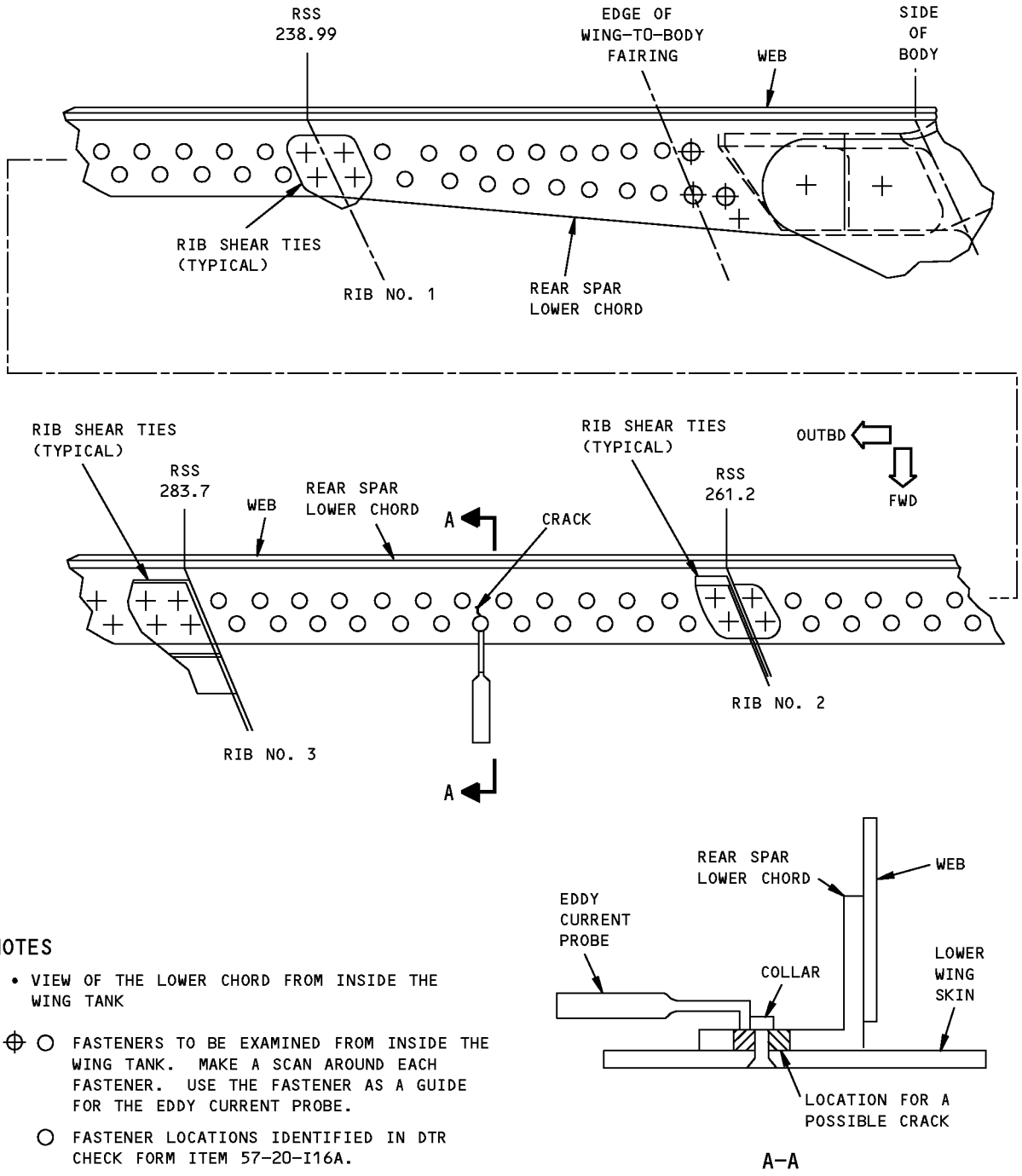
D. Do one of the procedures that follow to make sure a signal is the result of a defect:

(1) Remove the surface finish and do a visual inspection with 10-power (or higher) magnification and sufficient light.

(2) Remove the bolt and do an eddy current inspection of the open hole as specified in Part 6, 51-00-04, Part 6, 51-00-11, or Part 6, 51-00-16.



Inspection Location
Figure 1



NOTES

- VIEW OF THE LOWER CHORD FROM INSIDE THE WING TANK

⊕ ○ FASTENERS TO BE EXAMINED FROM INSIDE THE WING TANK. MAKE A SCAN AROUND EACH FASTENER. USE THE FASTENER AS A GUIDE FOR THE EDDY CURRENT PROBE.

○ FASTENER LOCATIONS IDENTIFIED IN DTR CHECK FORM ITEM 57-20-I16A.

⊕ FASTENER LOCATIONS IDENTIFIED IN DTR CHECK FORM ITEM 57-20-I16D.

Inspection Details
Figure 2

LOWER CHORD OF THE REAR SPAR AT THE INBOARD FLAP AND NACELLE FAIRING AREAS

1. Purpose

A. Use this procedure to do an inspection for surface cracks in the lower chord of the rear spar at these areas:

(1) Between ribs 10 and 11, at the fasteners that go through the aft-pitch-load-fitting and the outboard skate angle. This is an internal inspection with access through the wing fuel tanks. Refer to Figure 1 for the inspection area. This procedure was prepared for MPD Appendix B DTR Check Form Item 57-20-I16E, inspection direction 7.

(2) Aft side of rib 10, WS 436 to WS 440. This is an external inspection with access to the inspection area from the aft side of the rear spar web. Refer to Figure 2 for the inspection area. This procedure was prepared for MPD Appendix B DTR Check Form Item 57-20-I16E, inspection direction 7.

B. You can use an impedance plane display or a meter display instrument to do this inspection.

2. Equipment

A. General

(1) Use inspection equipment that can be calibrated on the reference standard as specified in Paragraph 4.

(2) Refer to Part 1, 51-01-00 for data about the equipment manufacturers.

B. Instrument

(1) Use an eddy current instrument that:

(a) Has an impedance plane display or a meter display.

(b) Operates at a frequency range of 50 to 500 kHz.

(2) The instruments specified below were used to prepare this procedure.

(a) Locator UH; Hocking, Inc.

(b) NDT-19e; Staveley

C. Probes

(1) Use a right-angle probe with a probe drop of approximately 0.20 inch (5.1 mm) or a straight probe with a flexible shaft (copper shaft).

(2) Refer to par. 2.B. in Part 6, 51-00-01 for data about probe selection.

(3) The probe specified below was used to help prepare this procedure

(a) MP905-50; NDT Engineering Corp

D. Reference Standards

(1) Use reference standard 126, or equivalent, as given in par. 2.C.(1) in Part 6, 51-00-01.

3. Preparation for Inspection

WARNING: PERSONNEL WHO GO INTO A FUEL TANK MUST KNOW THE PRECAUTIONS AND SAFETY PROCEDURES CONTAINED IN CHAPTER 28 OF THE BOEING MAINTENANCE MANUAL. DANGEROUS FUMES AND THE POSSIBILITY OF AN EXPLOSION OCCUR IN FUEL TANKS.

A. Get access to the inspection area through the necessary access doors of the wing fuel tanks.

B. If there is sealant at the locations where an inspection is necessary, it must be removed. Refer to Figure 1 and Figure 2 for the locations of the inspection areas.

4. Instrument Calibration

A. For instruments that have a meter display, calibrate the equipment as specified in the calibration instructions of Part 6, 51-00-01, par. 4, "Instrument Calibration". Use reference standard 126 or an equivalent for the calibration.

B. For instruments with an impedance-plane display, calibrate the equipment as specified in the calibration instructions of Part 6, 51-00-19, par. 4, "Instrument Calibration". Use reference standard 126, or equivalent, for the calibration.

5. Inspection Procedure

WARNING: PERSONNEL WHO GO INTO A FUEL TANK MUST KNOW THE PRECAUTIONS AND SAFETY PROCEDURES CONTAINED IN CHAPTER 28 OF THE BOEING MAINTENANCE MANUAL. DANGEROUS FUMES AND THE POSSIBILITY OF AN EXPLOSION OCCUR IN FUEL TANKS.

A. Examine the lower chord of the rear spar in each wing for surface cracks. Make a scan of each inspection area identified in Figure 1 and Figure 2.

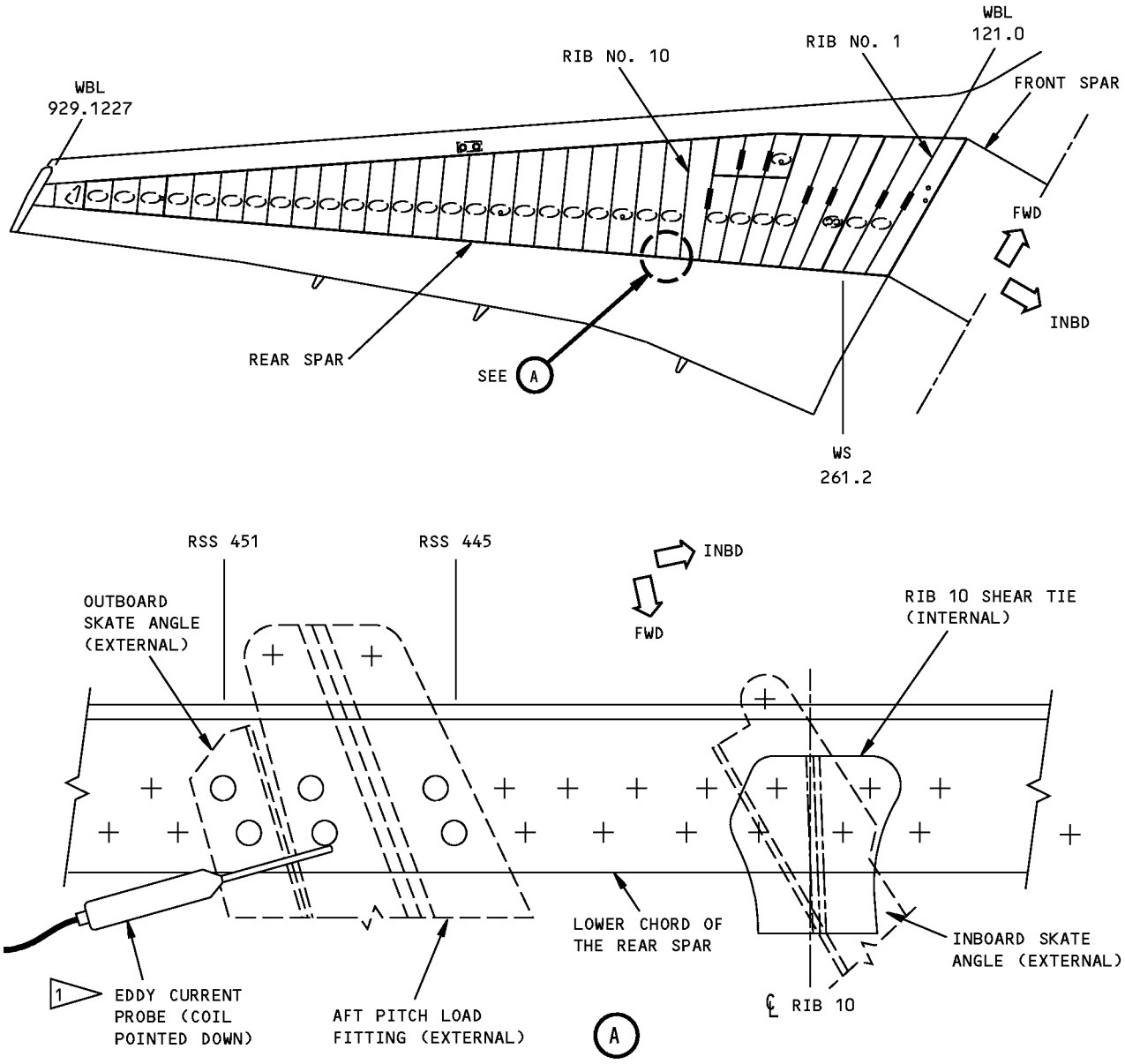
(1) For instruments that have a meter display, refer to par. 5 in Part 6, 51-00-01 for the inspection procedure.

(2) For instruments that have an impedance plane display, refer to par. 5 in Part 6, 51-00-19 for the inspection procedure.

6. Inspection Results

A. For instruments that have a meter display, refer to par. 6 in Part 6, 51-00-01 to make an analysis of the indications that occurred during the inspection.

B. For instruments that have an impedance plane display, refer to par. 6 in Part 6, 51-00-19 to make an analysis of the indications that occurred during the inspection.



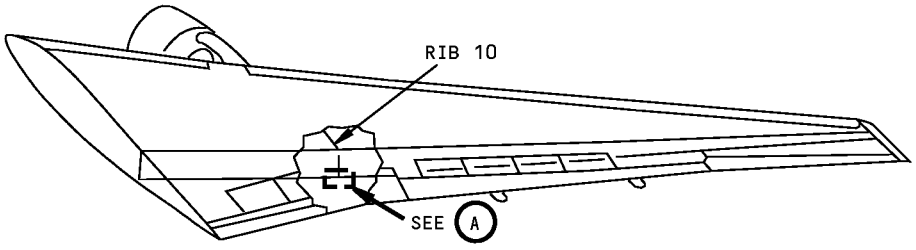
NOTES

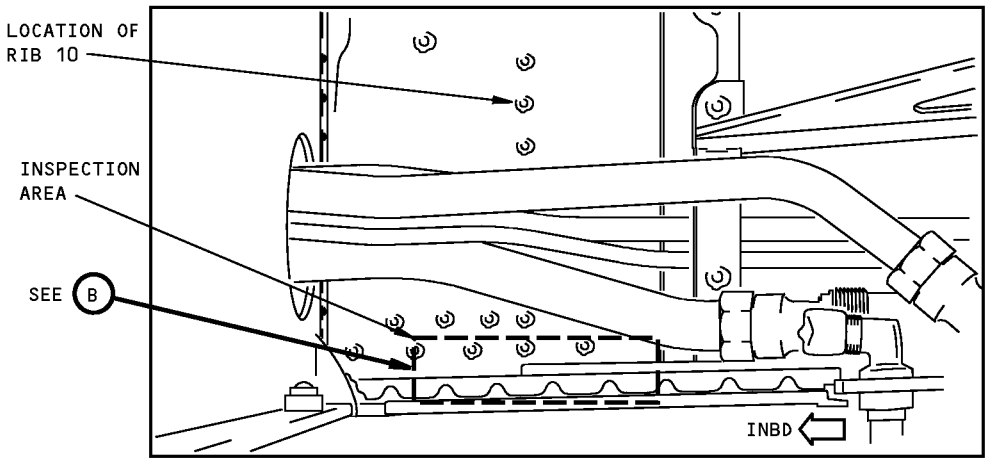
- IT IS NECESSARY TO DO THIS INSPECTION FROM INSIDE THE WING

○ FASTENER LOCATIONS TO EXAMINE

1 USE A SURFACE EDDY CURRENT PROBE TO EXAMINE THE LOWER CHORD OF THE REAR SPAR. USE THE FASTENERS AS A GUIDE AND MAKE A SCAN AROUND EACH FASTENER.

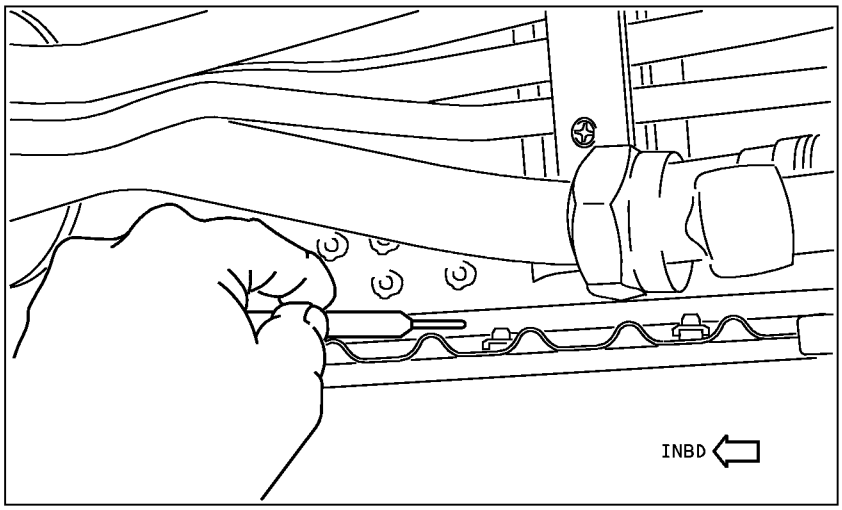
Lower Chord Inspection Area - Between Ribs 10 and 11
Figure 1





APPROXIMATE INSPECTION AREA FROM WS 436 TO WS 440

A



NOTES

DO A SURFACE EDDY CURRENT INSPECTION OF THE LOWER CHORD OF THE REAR SPAR FOR VERTICAL CRACKS. MAKE A SCAN BETWEEN THE LOWER WING SKIN AND THE REAR SPAR WEB FROM WS 436 TO WS 440.

AREA OF INSPECTION - APPROXIMATELY 2 FASTENERS ON EACH SIDE OF RIB 10

B

Lower Chord Inspection Area - Aft Side of Rib 10
Figure 2

PART 6 - EDDY CURRENT

LOWER CHORD OF THE REAR SPAR AT RIBS 5, 6, 8, 9 AND FAIRING AREAS

1. Purpose

A. Use this procedure to find cracks that start at the fastener holes in the lower chord of the rear spar and the lower wing skin. Cracks can occur at the fastener holes and get larger in the forward or aft direction. See Figure 1 for the location of the fastener holes that must be examined.

B. Use a meter display or an impedance plane display instrument to do this inspection.

C. This procedure was prepared for MPD Appendix B DTR check Form Items 57-20-I16C and 57-20-I16E. Figure 1 identifies the fasteners that are examined for each item.

2. Equipment

NOTE: Refer to Part 1, 51-01-00, for data about the equipment manufacturers.

A. Instrument

(1) Use an eddy current instrument with a meter display or an impedance plane display that can:

(a) Operate at 100 Hz, 120 Hz, and 150 Hz.

(b) Be calibrated as specified in the calibration instructions of this procedure.

(2) The instruments specified below were used to help prepare this procedure.

(a) NDT 19e; Nortec/Staveley, Inc.

(b) Phasec 1.1; Hocking

B. Probes - A reflection ring probe that can operate in the frequency range of 100 Hz to 150 Hz and that has an inner diameter of 0.60 inch (15.2 mm) is satisfactory for use. The probe identified below was used to help prepare this procedure.

(1) RR0112-5; NDT Engineering, Inc.

C. Reference Standard - Make reference standard NDT664 as specified in Figure 2.

3. Preparation for Inspection

A. Identify and clean the inspection areas shown in Figure 1.

4. Instrument Calibration

NOTE: Because the thickness of the wing skin is different at different locations along the length of the rear spar lower chord, three different calibrations and inspections are necessary.

A. Calibrate the equipment to examine the fastener hole locations identified in Figure 1, Details 1 and 2.

(1) Set the instrument frequency to 150 Hz.

(2) Put a nonconductive shim on the reference standard. The thickness of the shim must be equivalent to the paint thickness on the airplane (±0.003 inch (0.08 mm)).

(3) Put the probe at position 1 on the reference standard as shown in Figure 3, Detail 1.

(4) Make sure the probe is centered on the fastener hole and balance the instrument.

(5) Adjust the balance point to 20 percent of the display as shown in Figure 3, Detail 2 or 3.

(6) Adjustment the instrument lift-off as follows:

(a) Meter display instrument - Adjust the phase control so that the meter needle moves no more than 5 percent of full scale for probe to part distances of approximately 0.006 inch (0.15 mm). This is equivalent to the thickness of two sheets of paper.

(b) Impedance plane display instrument - Adjust the phase control so that the signal moves horizontally from right to left when the probe is lifted off the reference standard. See Figure 3, Detail 3.

(7) Put the probe on the reference standard at probe position 2 as shown in Figure 3, Detail 1. For a meter display instrument, the needle must be upscale. For an impedance plane display instrument, the signal must be above the balance point.

NOTE: Make sure the probe is centered above the fastener hole.

(8) Adjust the gain to get a signal that is at 60 percent of the display as shown in Figure 3 , Detail 2 or 3.

B. Calibrate the equipment to examine the fastener hole locations identified in Figure 1, Details 3 and 6.

(1) Use the instructions given in Paragraph 4.A.(1) thru Paragraph 4.A.(8) but:

(a) Set the instrument frequency to 120 Hz instead of 150 Hz as given in Paragraph 4.A.(1).

(b) Use probe position 3 instead of probe position 1 as given in Paragraph 4.A.(3).

(c) Use probe position 4 instead of probe position 2 as given in Paragraph 4.A.(7).

C. Calibrate the equipment to examine the fastener hole locations identified in Figure 1, Details 4 and 5.

(1) Use the instructions given in Paragraph 4.A.(1) thru Paragraph 4.A.(8), but:

(a) set the instrument frequency to 100 Hz instead of 150 Hz as given in Paragraph 4.A.(1) .

(b) use probe position 5 instead of probe position 1 as given in Paragraph 4.A.(3).

(c) use probe position 6 instead of probe position 2 as given in Paragraph 4.A.(7).

5. Inspection Procedure

NOTE: During this inspection, always use the aft fastener row of the lower chord to get a signal from a good fastener hole on the airplane. This signal will be called the "baseline" signal.

A. Examine the fastener hole locations identified in Figure 1, Details 1 and 2.

(1) Identify the inspection area shown in Figure 1, Details 1 and 2.

(2) Calibrate the instrument as specified in Paragraph 4.A.

(3) Put the ring probe on one of the fasteners in the aft fastener row of the inspection area.

(4) Adjust the probe to the center of the fastener and balance the instrument.

(5) Move the probe to a different fastener at this inspection location and monitor the instrument display.

NOTE: It is possible that the fastener hole you used to get the baseline signal was cracked. If this occurred, all fastener holes that are not cracked will have a screen signal below the balance point. Put the probe on a different inspection fastener hole if you think you set-up on a cracked fastener hole.

NOTE: The signal from a large crack can be more than 100% of full screen height and difficult to see on the instrument display. If necessary, the gain can be decreased to see where the signal comes into view. Be sure to set the gain back to the calibration level before you examine more fastener locations.

(6) Do Paragraph 5.A.(5) for the remaining fasteners at this location.

(7) Make a record of the fastener locations that cause signals to occur that are 40% (or more) of the display.

(8) Do Paragraph 5.A.(1) thru Paragraph 5.A.(7) for the remaining locations shown in Figure 1, Details 1 and 2.

(9) Do a calibration test of the instrument at the end of the inspection as follows:

NOTE: Do not adjust the instrument gain during this calibration test.

(a) Put the probe on the reference standard at the position you used during calibration to set the balance point and balance the instrument.

(b) Move the probe to the position you used to set the instrument sensitivity. Compare the signal you got from the notch during calibration with the signal you get now.

(c) If the signal from the notch in the reference standard has changed 10 percent (or more) from the signal you got during calibration, do the calibration and inspection again.

(10) Do the same inspection on the other wing.

B. Examine the fastener locations identified in Figure 1, Details 3 and 6.

(1) Identify the inspection area shown in Figure 1, Details 3 and 6.

(2) Calibrate the instrument as specified in Paragraph 4.B.

(3) Put the ring probe on one of the fasteners in the aft fastener row of the inspection area.

NOTE: Because the Detail 6 inspection area has only one fastener in the aft fastener row, put the ring probe on an adjacent fastener in the aft fastener row. See flagnote 1 in Figure 1, Sheet 3.

(4) Adjust the probe to the center of the fastener and balance the instrument.

(5) Move the probe to another fastener at this inspection location and monitor the instrument display.

NOTE: It is possible that the fastener hole you used to get the baseline signal was cracked. If this occurred, all fastener holes that are not cracked will have a screen signal below the balance point. Put the probe on a different inspection fastener hole if you think you set-up on a cracked fastener hole.

(6) Do Paragraph 5.B.(5) for the remaining fasteners at this location.

(7) Make a record of the fastener locations that cause signals to occur that are 40% (or more) of the display.

(8) Do Paragraph 5.B.(1) thru Paragraph 5.B.(7) for the remaining locations shown in Figure 1, Details 3 and 6.

(9) Do a calibration test of the instrument at the end of the inspection as follows:

NOTE: Do not adjust the instrument gain during this calibration test.

(a) Put the probe on the reference standard at the position you used during calibration to set the balance point and balance the instrument.

(b) Move the probe to the position you used to set the instrument sensitivity. Compare the signal you got from the notch during calibration with the signal you get now.

(c) If the signal from the notch in the reference standard has changed 10 percent (or more) from the signal you got during calibration, do the calibration and inspection again.

(10) Do the same inspection on the other wing.

C. Examine the fastener locations identified in Figure 1, Details 4 and 5.

(1) Identify the inspection area shown in Figure 1, Details 4 and 5.

(2) Calibrate the instrument as specified in Paragraph 4.C.

(3) Put the ring probe on one of the fasteners in the aft fastener row of the inspection area. Adjust the probe to the center of the fastener.

(4) Balance the instrument.

(5) Move the probe to a different fastener at this inspection location and monitor the instrument display.

NOTE: It is possible that the fastener hole you used to get the baseline signal was cracked. If this occurred, all fastener holes that are not cracked will have a screen signal below the balance point. Put the probe on a different inspection fastener hole if you think you set-up on a cracked fastener hole.

(6) Do Paragraph 5.C.(5) for the remaining fasteners at this location.

(7) Make a record of the fastener locations that cause signals to occur that are 40% (or more) of the display.

(8) Do Paragraph 5.C.(1) thru Paragraph 5.C.(7) for the remaining locations shown in Figure 1, Details 4 and 5.

(9) Do a calibration test of the instrument at the end of the inspection as follows:

NOTE: Do not adjust the instrument gain during this calibration test.

(a) Put the probe on the reference standard at the position you used during calibration to set the balance point and balance the instrument.

(b) Move the probe to the position you used to set the instrument sensitivity. Compare the signal you got from the notch during calibration with the signal you get now.

(c) If the signal from the notch in the reference standard has changed 10 percent (or more) from the signal you got during calibration, do the calibration and inspection again.

(10) Do the same inspection on the other wing.

6. Inspection Results

A. A signal that is 40% (or more) of the display is a sign of a crack and must be examined more fully.

B. Compare the signal that occurs during the inspection to the signal you got from the notch in the reference standard during calibration.

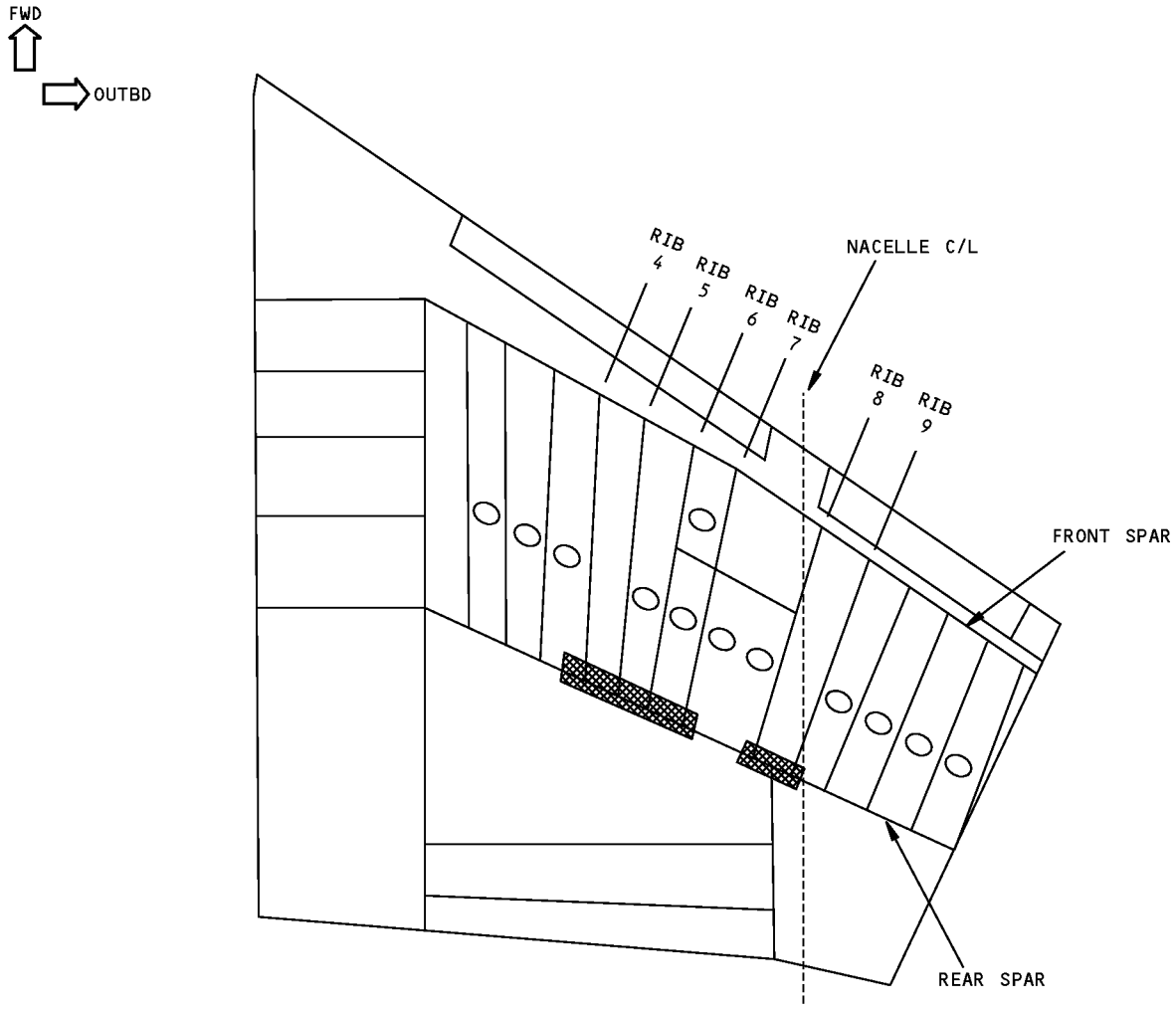
NOTE: It is possible that the fastener hole you used to get the baseline signal was cracked. If this occurred, all fastener holes that are not cracked will have a screen signal below the balance point. Put the probe on a different inspection fastener hole if you think you set-up on a cracked fastener hole.

C. Other conditions that can cause crack type signals are:

(1) A change in the space between fasteners. See if the same location on the opposite wing has the same amount of space between fasteners and, if so, compare the results from the two locations.

(2) Fasteners that have different dimensions or are made of different materials. Examine the fastener to see if it is different and compare the signal to a location with an equivalent, or almost equivalent, fastener type.

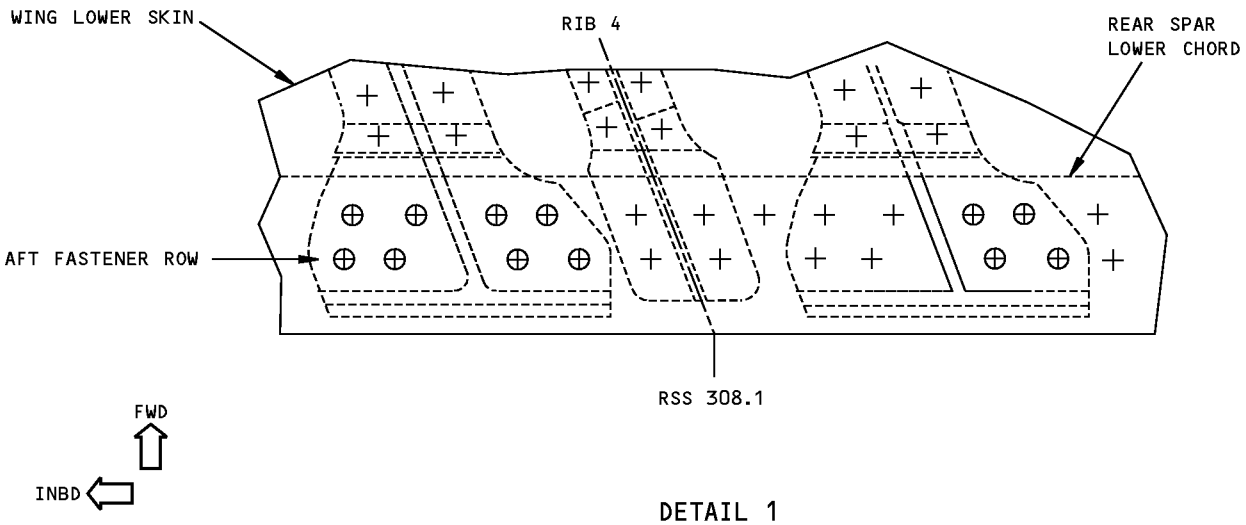
D. If crack signals occur, do an open hole eddy current inspection as specified in Part 6, 51-00-04 (for meter display instrument), Part 6, 51-00-11 (for impedance plane display instruments), or Part 6, 51-00-16 (for an impedance plane display instrument and a rotary scanner).



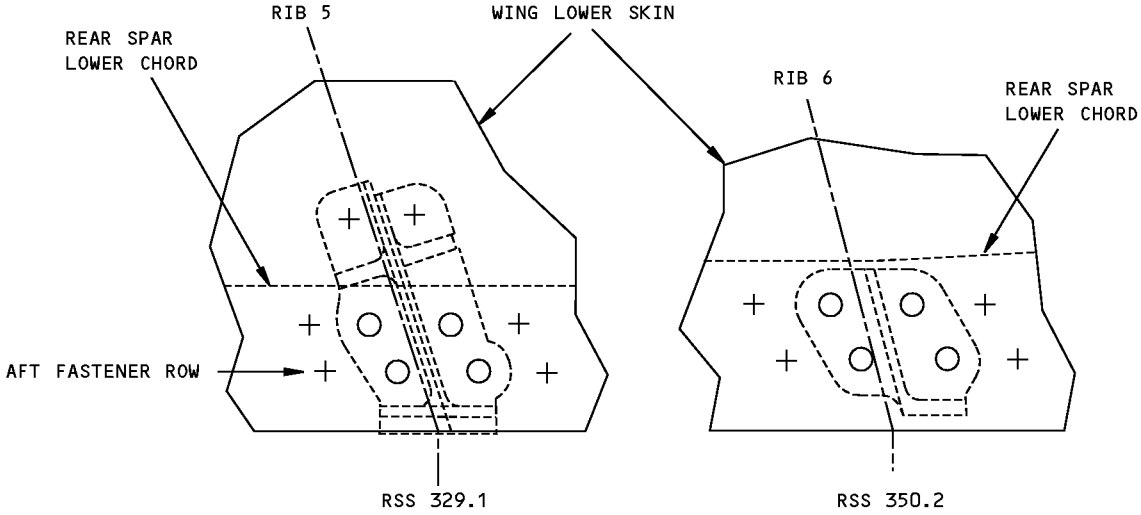
BOTTOM OF THE LEFT WING
(VIEW AS YOU LOOK UP)

INSPECTION AREAS - SEE DETAILS I THRU VI

Inspection Locations
Figure 1 (Sheet 1 of 3)



DETAIL 1



DETAIL 2

DETAIL 3

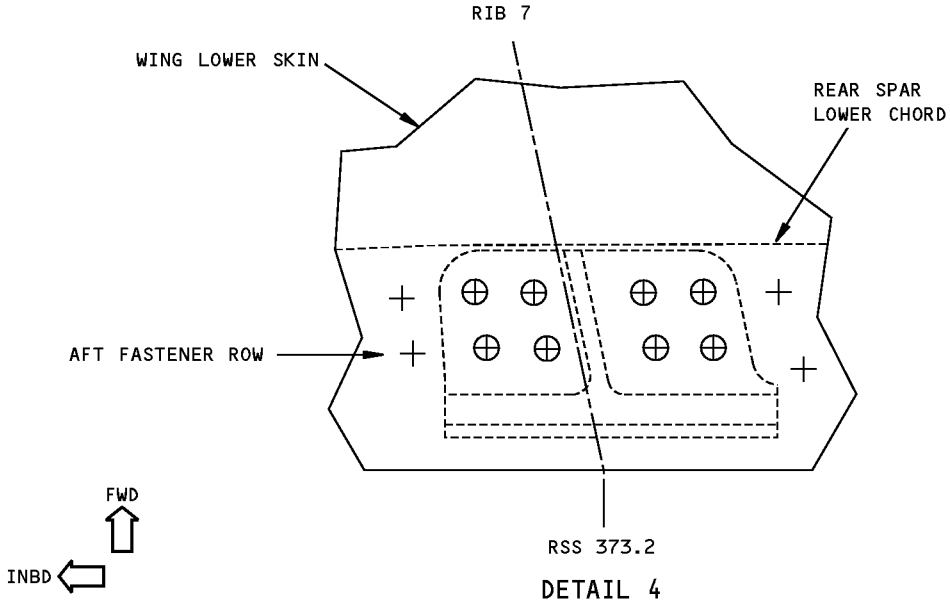
NOTES

⊕ ○ INSPECTION FASTENER LOCATIONS

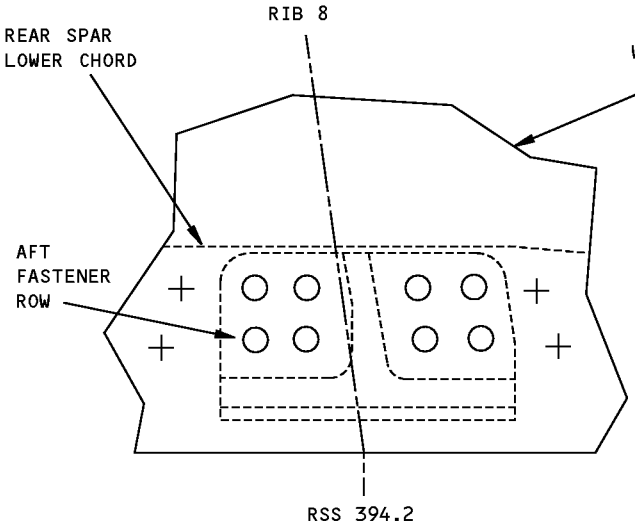
⊕ THESE FASTENER LOCATIONS ARE IDENTIFIED IN SIPD ITEM 57-20-I16E

○ THESE FASTENER LOCATIONS ARE IDENTIFIED IN SIPD ITEM 57-20-I16C

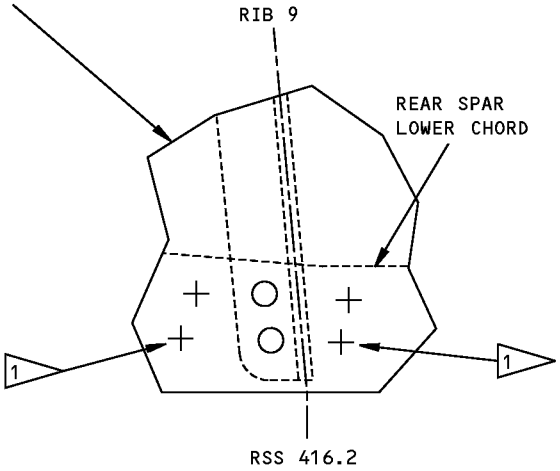
Inspection Locations
Figure 1 (Sheet 2 of 3)



DETAIL 4



DETAIL 5



DETAIL 6

NOTES

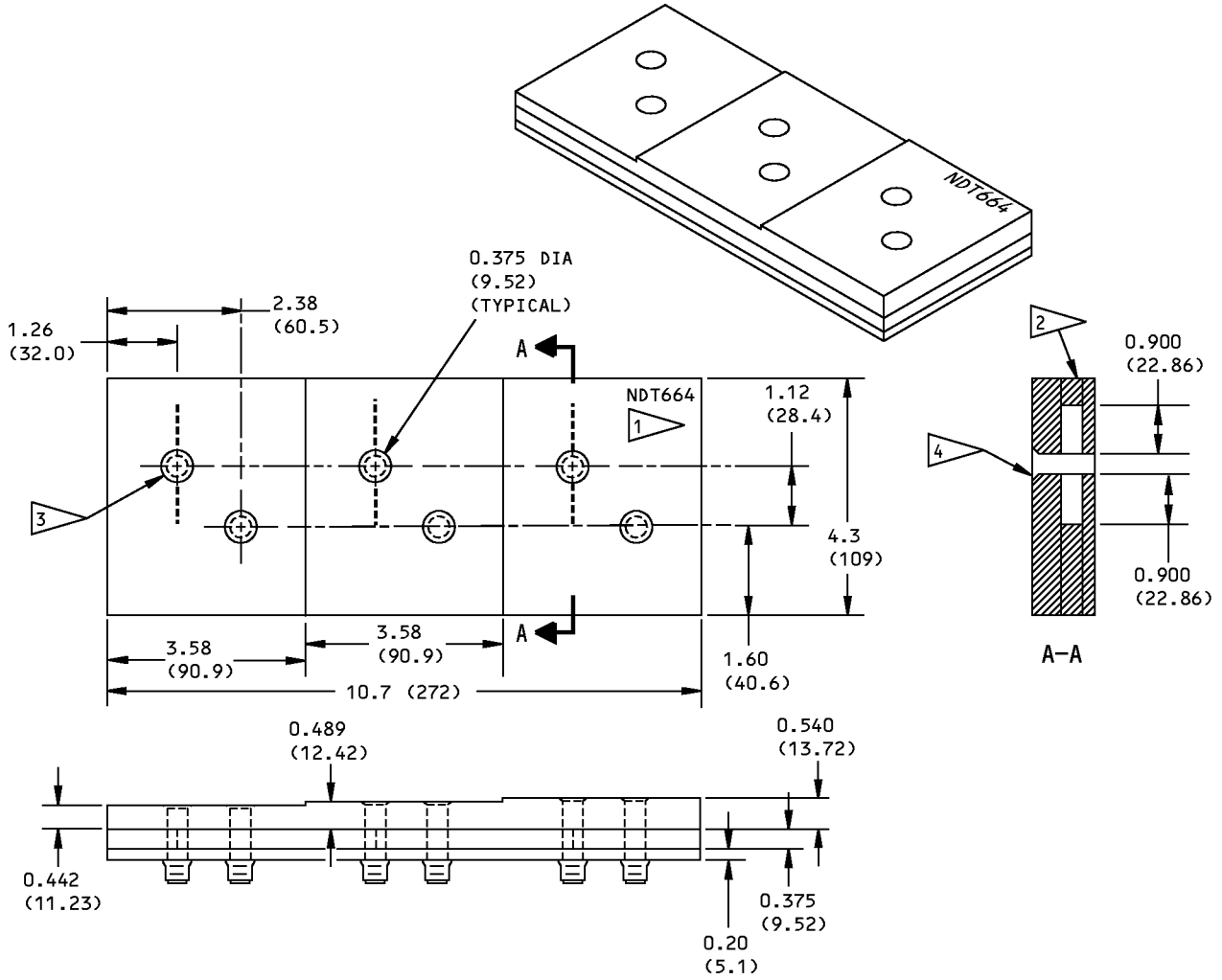
⊕ ○ INSPECTION FASTENER LOCATIONS

⊕ THESE FASTENER LOCATIONS ARE IDENTIFIED IN SIPD ITEM 57-20-I16E

○ THESE FASTENER LOCATIONS ARE IDENTIFIED IN SIPD ITEM 57-20-I16C

1 AT THIS INSPECTION AREA, BALANCE THE INSTRUMENT WITH THE RING PROBE ON ONE OF THESE TWO FASTENER LOCATIONS.

Inspection Locations
Figure 1 (Sheet 3 of 3)



NOTES

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCES (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ±0.005	X.XX = ±0.10
X.XX = ±0.025	X.X = ±0.5
X.X = ±0.050	X = ±1

- MATERIAL: 2224-T3511, 2324-T39, 2024-T4, 7075-T6XXX, 7075-T7XXX
- SURFACE ROUGHNESS = 125 RA OR BETTER

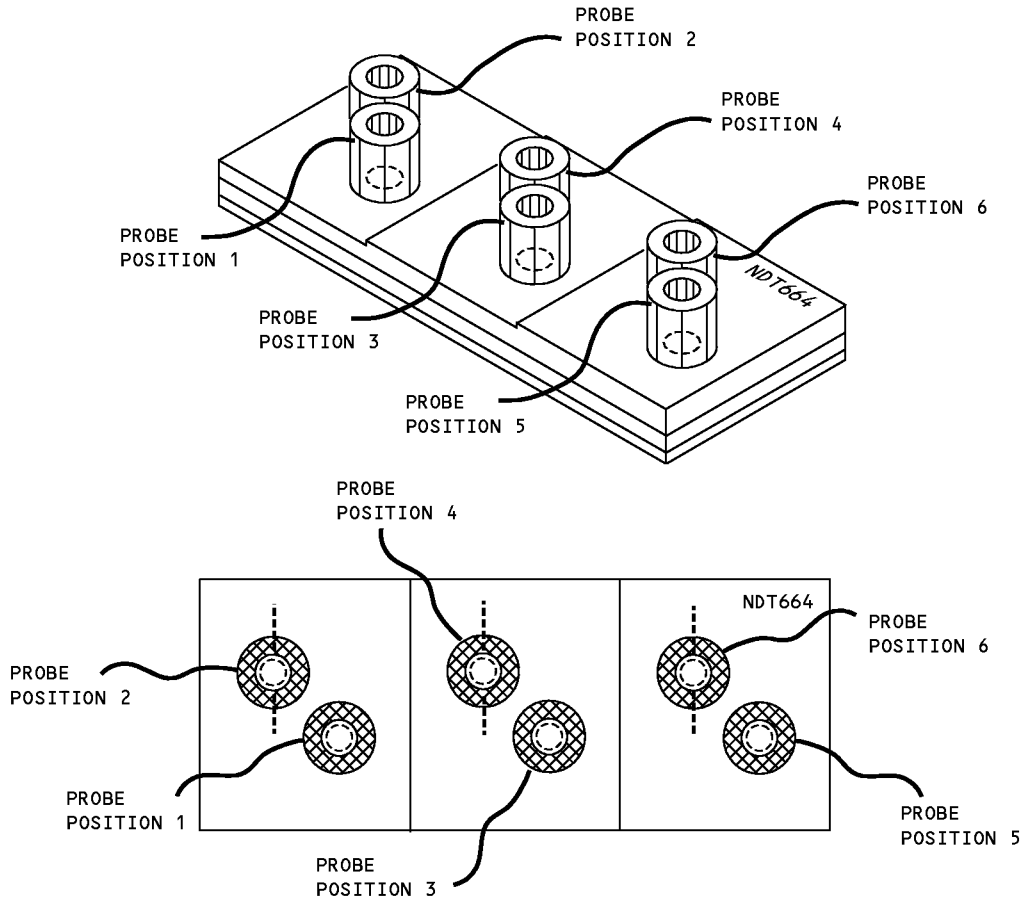
1 ETCH OR STEEL STAMP THE REFERENCE STANDARD NUMBER NDT664 AT APPROXIMATELY THIS LOCATION.

2 EDM NOTCH DIMENSIONS:
LENGTH: 0.900 (22.85)
WIDTH: 0.020 (0.06) MAXIMUM
DEPTH: THROUGH THICKNESS

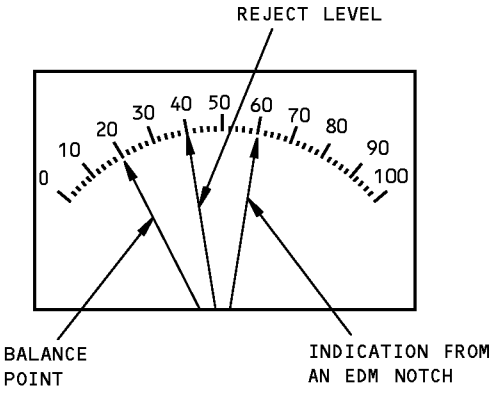
3 BACB30UA12 - TITANIUM LOCK BOLT, 100° TENSION HEAD, USE COLLAR PART NUMBER BACC30BF (6 LOCATIONS). AS AN ALTERNATIVE, DO NOT INSTALL BACB30UA12 FASTENERS AND KEEP THE HOLES EMPTY. USE SMALL FASTENERS AWAY FROM THE HOLES TO ATTACH THE REFERENCE STANDARD PIECES. MAKE SURE THE SMALL FASTENERS DO NOT HAVE AN EFFECT ON THE CALIBRATION. IF THE BACB30UA12 FASTENERS ARE NOT INSTALLED, MAKE SURE THE CORRECT COUNTERSINK IS PUT IN THE REFERENCE STANDARD AT THE SIX HOLE LOCATIONS.

4 CHAMFER AS NECESSARY FOR THE FASTENER TYPE IDENTIFIED IN FLAGNOTE 3

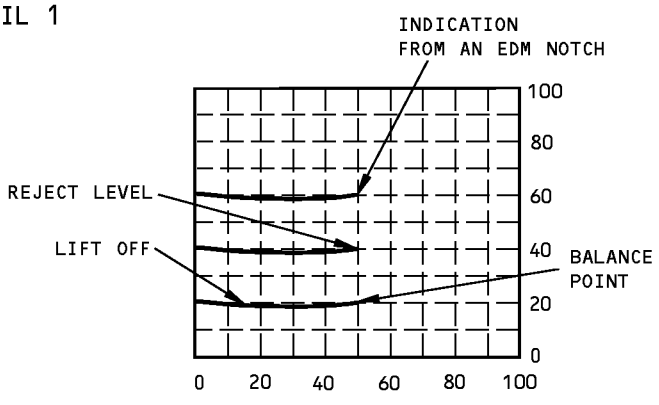
Reference Standard NDT664
Figure 2



PROBE POSITIONS
DETAIL 1



METER INSTRUMENT DISPLAY
DETAIL 2



IMPEDANCE PLANE INSTRUMENT DISPLAY
DETAIL 3

Probe Positions and Instrument Displays for Calibration
Figure 3

PART 6 - EDDY CURRENT

LOWER WING SKIN INSPECTION THROUGH THE SPLICE PLATE BETWEEN RIBS 18 AND 19 (WS 642.2 AND 668.2)

1. Purpose

A. Use this procedure to find cracks in the lower skin in the area of the splice plate that is at the lower chord of the front spar, between ribs 18 and 19 (approximately WS 642.2 and WS 668.2). This inspection is done from the lower surface of the wing. See Figure 1 for the inspection location.

B. MPD Appendix B DTR Check Form Reference:

(1) ITEM 57-20-I16F

2. Equipment

NOTE: Refer to Part 1, 51-01-00 for data about the equipment manufacturers.

A. Instrument

(1) Use an eddy current instrument with an impedance plane display that can:

(a) Operate at a frequency of 450 Hz.

(b) Be calibrated as specified in the calibration instructions of this procedure.

(2) The instruments specified below were used to help prepare this procedure:

(a) NDT19, NDT 19e; Nortec/Staveley, Inc.

(b) Phasec 1.1; Hocking

B. Probe

(1) A reflection ring probe that can operate at a frequency of 450 Hz and that has an inner diameter of 0.50 inch (13 mm) is satisfactory for use. The probe identified below was used to help prepare this procedure:

(a) NEC 4028-2; NDT Engineering, inc.

C. Reference Standard

(1) Make reference standard NDT652 as specified in Figure 2.

3. Preparation for Inspection

A. Identify and clean the inspection area.

NOTE: It can be necessary to remove the paint if the fasteners cannot be seen.

4. Instrument Calibration

A. Set the instrument frequency to 450 Hz.

B. Put the probe at position 1 on the reference standard with the probe centered above the fastener as shown in Figure 3, Detail II.

C. Balance (null) the instrument.

D. Adjust the phase control so that the lift-off signal moves horizontally from right to left when the probe is lifted off the reference standard as shown in Figure 3, Detail I.

E. Center the probe above the fastener at position 1 and balance the instrument again.

F. Set the instrument balance point to 10 percent of full screen height and 80 percent of full screen width as shown in Figure 3, Detail I.

NOTE: If the probe is not accurately centered on the fastener when you set the balance point, the balance point will not be correct.

G. Put the probe on the reference standard at probe position 2 as shown in Detail II in Figure 3.

H. Adjust the instrument gain to put the signal from the reference notch at the screen location shown in Figure 3, Detail I.

I. Do a check of the balance point at position 1 and the notch sensitivity at position 2 again. If necessary, do Paragraph 4.B. thru Paragraph 4.H. again.

5. Inspection Procedure

NOTE: The splice plate is tapered it is thickest at the center and tapers towards the inboard and outboard edges. All fastener hole locations that have approximately the same splice plate thickness are identified by an inspection code. All fastener locations with the same inspection code are examined as a group. This will keep the balance point signal near the null position during the inspection of each fastener group.

A. Identify the inspection area. See Figure 1 and Figure 4 as necessary.

B. Calibrate the instrument as specified in Paragraph 4.

C. Center the probe on one of the fasteners in the inspection area and balance the instrument.

NOTE: It can be necessary to remove the paint if the fasteners cannot be seen.

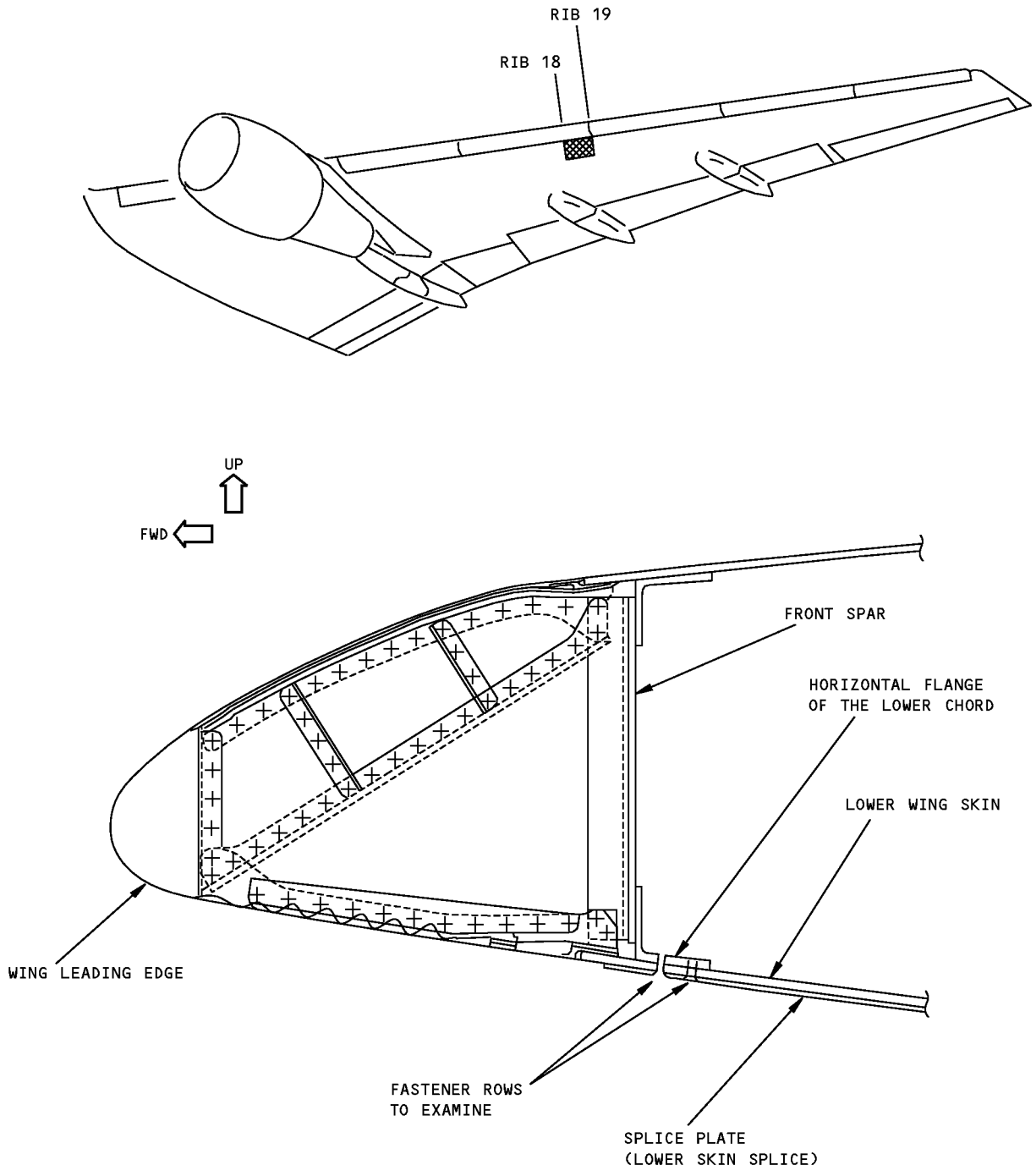
D. Examine the other fastener locations with the same fastener code.

E. The signal from satisfactory fastener holes will be at or near the balance point. A signal that is more than 20 percent above the balance point is an indication of a crack. Make a mark at all of the fastener locations that cause crack signals to occur.

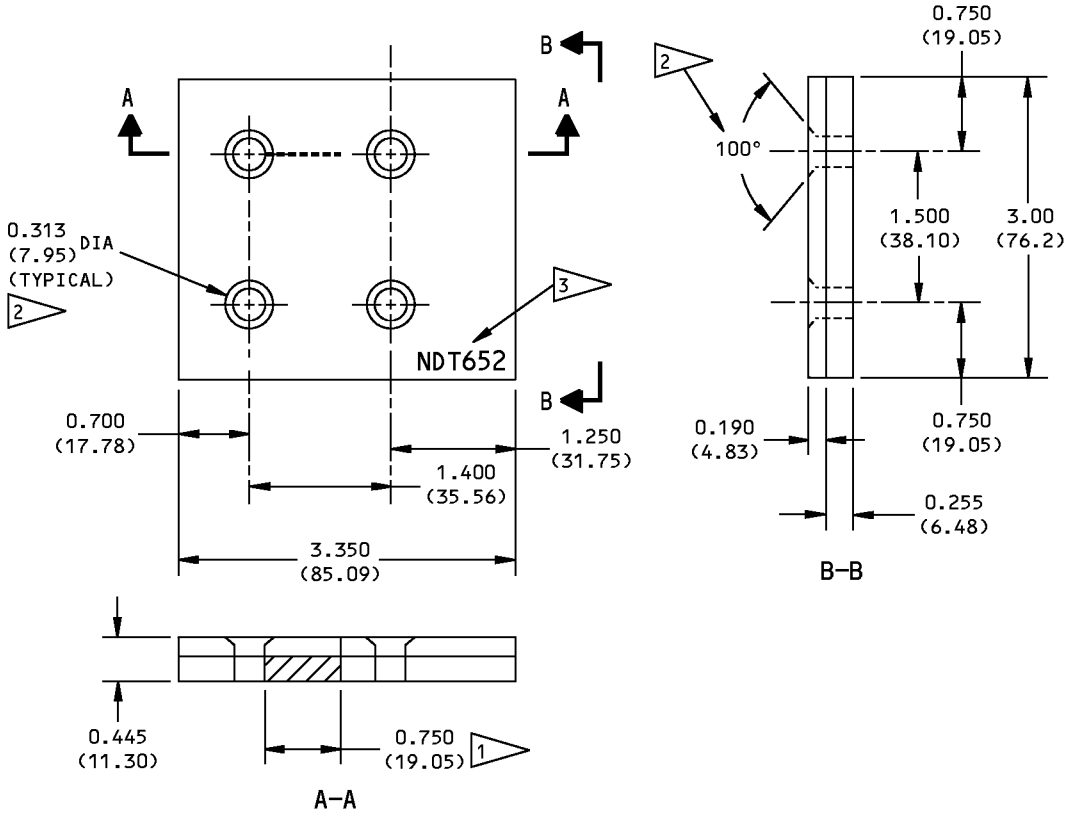
F. Do Paragraph 5.A. thru Paragraph 5.E. on the opposite wing.

6. Inspection Results

A. All fastener locations that cause signals to occur that are 20 percent (or more) above the balance point must be examined by open hole eddy current inspection. Do an open hole eddy current inspection as specified in Part 6, 51-00-04, Part 6, 51-00-11, or Part 6, 51-00-16.



Inspection Locations
Figure 1



NOTES

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCES (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.025	X.X = ± 0.5
X.X = ± 0.050	X = ± 1

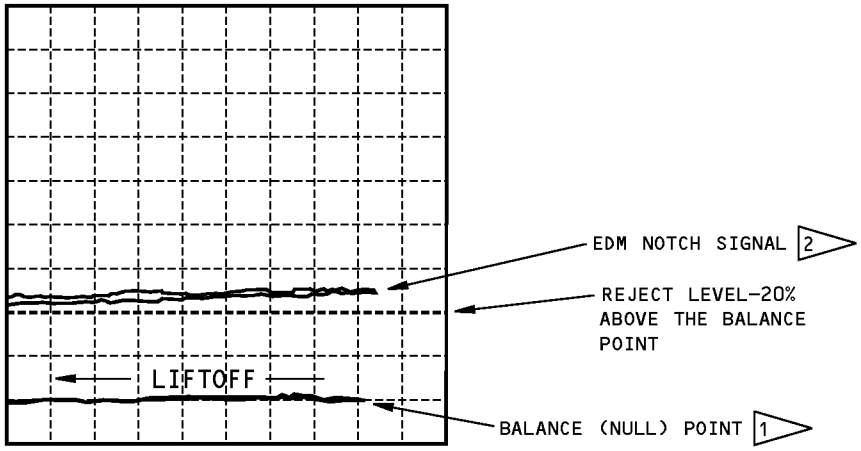
- SURFACE ROUGHNESS = 125 Ra OR BETTER
- MATERIAL: 7075-T6,-T735; 2024-T3,-T4
- INSTALL BACB30YP10K6 TITANIUM FASTENERS AND BACN10ZV5 NUTS

1 EDM NOTCH OR SAWCUT:
MAXIMUM WIDTH: 0.020 (0.51)
LENGTH: 0.75 (19)
DEPTH: THROUGH THE THICKNESS

2 COUNTERSINK THE HOLES AS NECESSARY FOR BACB30YP10K6 FASTENERS

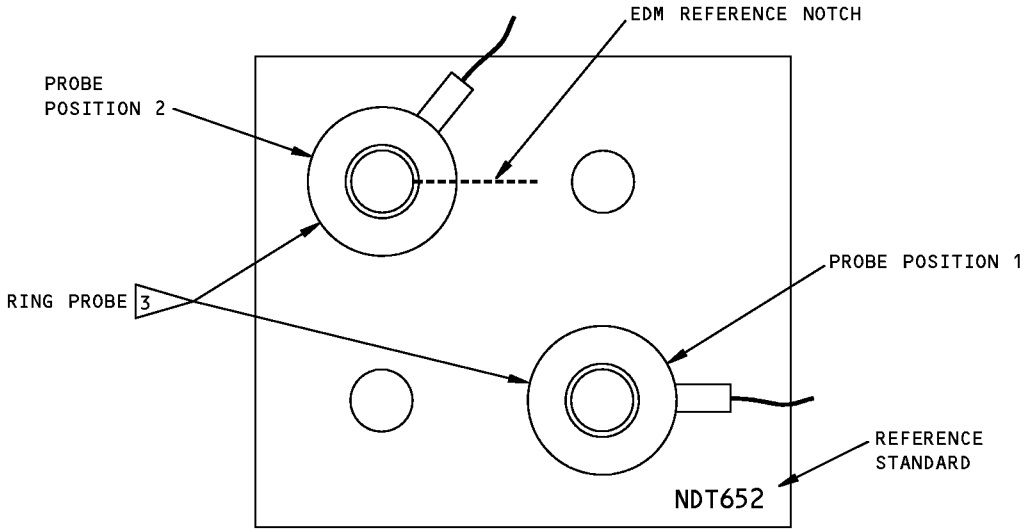
3 ETCH OR STEEL STAMP THE REFERENCE STANDARD NUMBER NDT652 AT APPROXIMATELY THIS LOCATION

Reference Standard NDT652
Figure 2



SCREEN DISPLAY OF CALIBRATION SIGNALS

DETAIL I

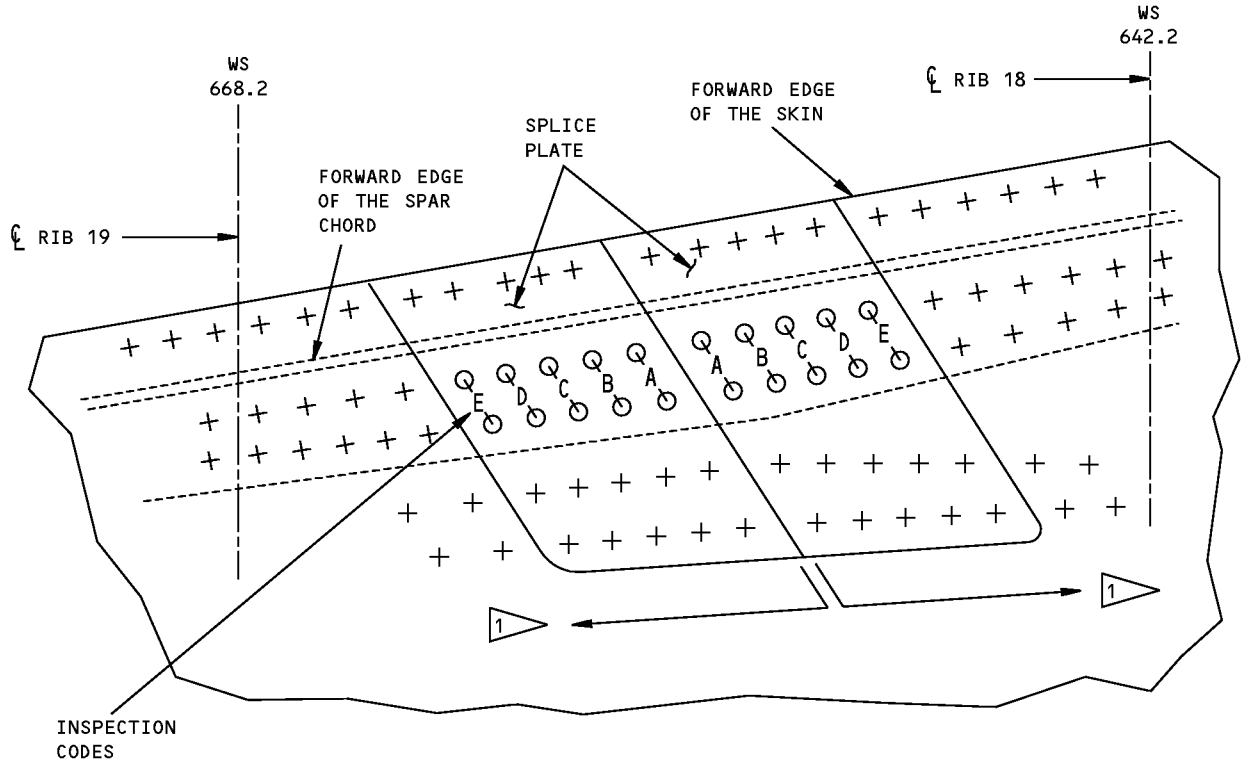


NECESSARY PROBE POSITIONS DURING CALIBRATION

DETAIL II

1. BALANCE (NULL) THE INSTRUMENT WITH THE PROBE SET AT POSITION 1 AND SET THE BALANCE POINT TO 10% OF FULL SCREEN HEIGHT AND 80% OF FULL SCREEN WIDTH
2. WITH THE PROBE AT POSITION 2, ADJUST THE VERTICAL GAIN TO PUT THE EDM NOTCH SIGNAL AT 25% OF FULL SCREEN HEIGHT ABOVE THE BALANCE POINT
3. REJECT ALL AREAS THAT CAUSE SIGNALS THAT ARE MORE THAN 20% OF FULL SCREEN HEIGHT ABOVE THE BALANCE (NULL) POINT

Instrument Calibration
Figure 3



NOTES

- THE LEFT SIDE IS SHOWN (UNDERSIDE OF WING); THE RIGHT IS OPPOSITE

○ FASTENER LOCATIONS TO BE EXAMINED

A,B,C,D,E INSPECTION CODES - ALL FASTENER LOCATIONS WITH THE SAME INSPECTION CODES ARE TO BE EXAMINED AS A GROUP (NOTE: EACH INSPECTION CODE IS A DIFFERENT SPLICE PLATE THICKNESS)

- EXAMINE EACH GROUP OF FASTENERS AS FOLLOWS:

  1) BALANCE (NULL) THE INSTRUMENT ON ONE OF THE FASTENERS (IN A FASTENER CODE)

  2) EXAMINE ALL OTHER FASTENERS IN THE SAME FASTENER CODE

  3) THE SIGNAL FROM SATISFACTORY FASTENER HOLES WILL BE AT OR NEAR THE THE BALANCE POINT

  4) A SIGNAL THAT IS MORE THAN 20% ABOVE THE BALANCE POINT IS AN INDICATION OF A CRACK

  5) REFER TO PARAGRAPH 6 FOR INSTRUCTIONS ON HOW TO DO MORE ANALYSIS ON AREAS THAT CAUSE CRACK SIGNALS TO OCCUR.

1 THE SPLICE PLATE THICKNESS DECREASES IN THIS DIRECTION

Inspection Details - Lower Wing Skin Through the Splice Plate
Figure 4

LOWER WING SKIN AND CHORD OF THE FRONT SPAR AT RIBS 9 THRU 23

1. Purpose

A. Use this procedure to find cracks that start at the fastener holes in the lower chord of the front spar and in the lower wing skin. The inspection areas are at ribs 9 thru 23 on the left and right wings. Cracks can start at the fastener holes and get larger in the forward or aft direction. See Figure 1 and Figure 2 for the areas to examine.

B. This procedure was prepared for the MPD Appendix B DTR Check Form Item 57-20-I16G.

C. This procedure is done externally to the airplane at the bottom surface of the wing.

2. Equipment

NOTE: Refer to Part 1, 51-01-00 for data about the equipment manufacturers.

A. Instrument - use an eddy current instrument with an impedance plane display that can:

(1) Operate at frequencies between 100 Hz and 400 Hz.

(2) Be calibrated as specified in the calibration instructions of this procedure. The instruments specified below were used to help prepare this procedure:

(a) NDT 19e; Nortec/Staveley, inc.

(b) Phasec 1.1; Hocking

B. Probes - A ring probe and a surface probe are necessary for this inspection.

(1) A reflection ring probe that can operate in the frequency range of 100 Hz to 400 Hz and that has an inner diameter in the range of 0.50 inch (12.7 mm) to 0.60 inch (15.2 mm) is satisfactory for use. The probes identified below were used to help prepare this procedure.

(a) RR0112-5/TF, 50 Hz - 3 kHz, 0.60 inch (15.2 mm) inner diameter; NDT Engineering, Inc.

(b) LFRR-0.55/1.0, 50 Hz - 5 kHz; EC NDT

(2) A 0.125 inch (3.2 mm) diameter, shielded, straight or right angle surface probe in a length of 3 to 6 inches (76 to 152 mm). The probe identified below was used to help prepare this procedure.

(a) MP-50FX; NDT Engineering Corp

(3) Other probes, that are approximately the same dimensions, can be used if a satisfactory calibration can be done.

C. Reference Standard -- Make reference standards NDT666A, NDT666B, and NDT666C as specified in Figure 3 thru Figure 5.

D. Special Tools - A nonconductive circle template with a circle diameter of approximately 0.56 inch (14 mm).

3. Preparation for Inspection

A. Identify and clean the bottom wing surface at the inspection areas shown in Figure 1 and Figure 2.

4. Instrument Calibration

A. Calibrate the instrument to examine the lower chord and wing skin at ribs 9 thru 15. See Figure 2 for the location of the fasteners to examine.

(1) Set the instrument frequency to 200 Hz.

(2) Set the horizontal and vertical gain to the same value or, if your instrument has a horizontal-to-vertical gain ratio, set it to 1:1.

(3) Put the probe at position 1 on reference standard NDT666A as shown in Figure 6. Make sure the fastener head is in the center of the probe.

(4) Balance the instrument.

(5) Move the probe above the fastener as necessary until the height of the signal is at a minimum and then balance the instrument again.

(6) Set the instrument balance point at approximately 20 percent of full-screen height (FSH) and 60 percent of full-screen width (FSW). See Figure 6, Detail I.

(7) Adjust the instrument lift-off so that the signal moves horizontally from right to left when the probe is lifted off the reference standard. See Figure 6, Detail I.

(8) Move the probe to position 2 on the reference standard as shown in Figure 6. Make sure the fastener is in the center of the probe.

(9) Adjust the instrument gain to set the signal from the reference notch at 60% of FSH. See Figure 6, Detail I.

(10) Move the probe to position 3 on the reference standard as shown in Figure 6. Make sure the fastener is in the center of the probe.

NOTE: The signal from the reference notch at position 3 can be out of view at this time.

(11) Decrease the horizontal gain (and vertical gain if necessary) or set the vertical-to-horizontal gain ratio (and decrease the vertical gain if necessary) to put the signal from the reference notch at approximately 50% of full screen width or as near to 50% of full screen width as possible.

(12) Move the probe to position 1 and balance the instrument again.

(13) Do a check of the instrument sensitivity at probe positions 2 and 3 to be sure the minimum signal height is 60% of FSH. Increase the instrument gain if necessary to set the minimum signal height to 60% of FSH.

B. Calibrate the instrument to examine the horizontal flange of the lower chord and the lower wing skin at ribs 16 thru 19.

(1) Set the instrument frequency to 250 Hz.

(2) Do Paragraph 4.A.(2) thru Paragraph 4.A.(13) but use reference standard NDT666B, not reference standard NDT666A as specified in Paragraph 4.A.(3).

C. Calibrate the instrument to examine the lower chord at ribs 20 thru 23.

NOTE: The wing skin and the horizontal flange of the lower chord at rib areas 20 thru 23 cannot be examined at the same time. Therefore, two different calibrations and inspections are necessary to examine this inspection area.

(1) Set the instrument frequency to 350 Hz.

(2) Put the probe at position 1 on reference standard NDT666C as shown in Figure 7. Make sure the probe is centered on the fastener head.

(3) Balance the instrument.

(4) Set the instrument balance point at approximately 60 percent of full-screen width (FSW) and 20 percent of full-screen height (FSH). See Figure 7, Detail I.

(5) Adjust the instrument lift-off so that the signal moves horizontally from right to left when the probe is lifted off the reference standard. See Figure 7, Detail I.

(6) Move the probe to position 2 on the reference standard as shown in Figure 7. Make sure the probe is centered above the fastener.

(7) Adjust the instrument gain to put the signal from the reference notch at approximately 60% of FSH as shown in Figure 7, Detail I.

D. Calibrate the instrument to examine the lower wing skin only at ribs 20 thru 23.

(1) Calibrate the equipment as specified in the calibration instructions of Part 6, 51-00-19, par. 4., "Instrument Calibration". Use reference standard NDT666C, a circle template as identified in Paragraph 2.D., and the first layer reference notch (surface notch) on NDT666C shown in Figure 7.

NOTE: Other aluminum surface-crack reference standards are satisfactory to use for this calibration.

5. Inspection Procedure

NOTE: During this inspection, it is important that the probe is approximately centered on the fastener of each hole to be examined. If the fasteners are easy to see, look through the hole in the probe and center the probe on the fastener head. If you cannot see a fastener, move the probe above the fastener head until the signal is at a minimum in the vertical direction.

A. Examine the wing skin and the lower chord at rib areas 9-19 and the lower chord only at ribs 20-23.

(1) Identify the inspection area shown in Figure 1 and Figure 2.

(2) Calibrate the instrument as specified in Paragraph 4.A. to examine rib areas 9-15, Paragraph 4.B. to examine rib areas 16-19, and Paragraph 4.C. to examine rib areas 20-23.

(3) Put the ring probe on one of the fasteners in the inspection area. Make sure the fastener is in the center of the probe and balance the instrument as specified by the manufacturer's instructions.

(4) Examine the remaining fastener hole locations that are in the inspection area. During the inspection, do as follows:

NOTE: It is possible that the first fastener hole you used to balance the instrument was cracked. If this occurred, all fastener holes that are not cracked will have a screen signal that is below the balance point and not in view on the screen. Put the probe on a different fastener in the inspection area if you think you balanced the instrument on a cracked fastener hole.

(a) Make a mark at the locations where signals occur that are 40% (or more) of the display.

NOTE: If a crack occurs that is very large or extends to the edge of the part, the usual signal from this type of crack will be more than 100% of FSH. If this condition occurs, it will be necessary to decrease the gain to get the signal to come into view on the screen. Make sure you set the instrument gain back to the calibration level before you examine more fasteners.

(b) Frequently do a calibration test of the instrument as follows:

NOTE: Do not adjust the gain.

1) Move the probe to position 1 on the reference standard and balance the instrument again.

2) Do a check of the instrument sensitivity at probe positions 2 and 3 to be sure the minimum signal height is 60% of FSH.

3) If the sensitivity has changed 10 percent or more from the signal you got during calibration, do the calibration and inspection again for all of the fasteners examined since the last calibration test.

(5) Do the Paragraph 5.A. inspection on the other wing.

B. Examine the lower wing skin at ribs 20-23.

(1) Calibrate the instrument to the instructions given in Paragraph 4.D.

(2) Refer to Part 6, 51-00-19, par. 5., "Inspection Procedure", for the inspection procedure.

(3) Make a scan around each of the fasteners at ribs 20-23 as identified in Figure 1 and Figure 2. Use the scan procedure identified in par. 5.E.(3)(b) in Part 6, 51-00-19.

6. Inspection Results

A. A signal that is 40% or more of FSH is an indication of a crack. Areas that cause crack signals to occur must be examined more fully.

B. Compare the signal that occurs during the inspection to the signal you got from the notch in the reference standard during calibration.

NOTE: It is possible that the first fastener hole you used to balance the instrument was cracked. If this occurred, all fastener holes that are not cracked will have a screen signal that is below the balance point and not in view on the screen. Put the probe on a different inspection fastener hole if you think you balanced the instrument on a cracked fastener hole.

C. If you get a signal at an aft fastener hole location that is 40% or more of FSH, then calibrate the instrument to the instructions that follow and examine the fastener hole location again.

(1) If the signal occurs between ribs 9 thru 15, calibrate the instrument to the instructions given in Paragraph 4.A. and then go to Paragraph 6.C.(2). If the signal occurs between ribs 16 thru 19, calibrate the instrument to the instructions given in Paragraph 4.B. and then go to Paragraph 6.C.(2). If the signal occurs between ribs 20 thru 23, calibrate the instrument to the instructions given in Paragraph 4.C. and then go to Paragraph 6.C.(2).

(2) Put the probe at position 3 (for ribs 20-23) or position 4 (for ribs 9-19) on the necessary reference standard and make sure the fastener head is in the center of the probe as shown in Figure 6 and Figure 7.

(3) Adjust the gain to put the signal from the reference notch at 60% of FSH.

(4) Put the probe on a fastener, adjacent to the fastener location where the crack signal occurred (aft fastener row only) and balance the instrument. Make sure the fastener is in the center of the probe.

(5) Move the probe to the fastener location where the crack signal occurred. Make sure the fastener is in the center of the probe.

(6) If the signal is 40% or more of the display, there is a possible crack at this location and more analysis is necessary. Continue to Paragraph 6.D. to do more analysis.

D. Other conditions that can cause crack type signals are:

(1) A change in the space between fasteners. See if the same location on the opposite wing has the same amount of space between fasteners and, if so, compare the results from the two locations.

(2) A different type of fastener has been installed. See if the same type fastener is installed on the opposite wing and compare the results with that fastener. If not, make a new reference standard with the same type fastener. The fasteners that follow are the usual fasteners for each inspection area. Although the fasteners in the reference standard may not be the same size or type, results show that they give an almost equal signal response.

Table 1 Fasteners

RIB LOCATION	FASTENER INSTALLED
9-10	BACB30VU10 (YVP)
11-15	BACB30PT5 (YKJ)
16	BACB30PT4 (YKJ)
17	BACB30VU8 (YVP)
18-19	BACB30PT5 (YKJ)

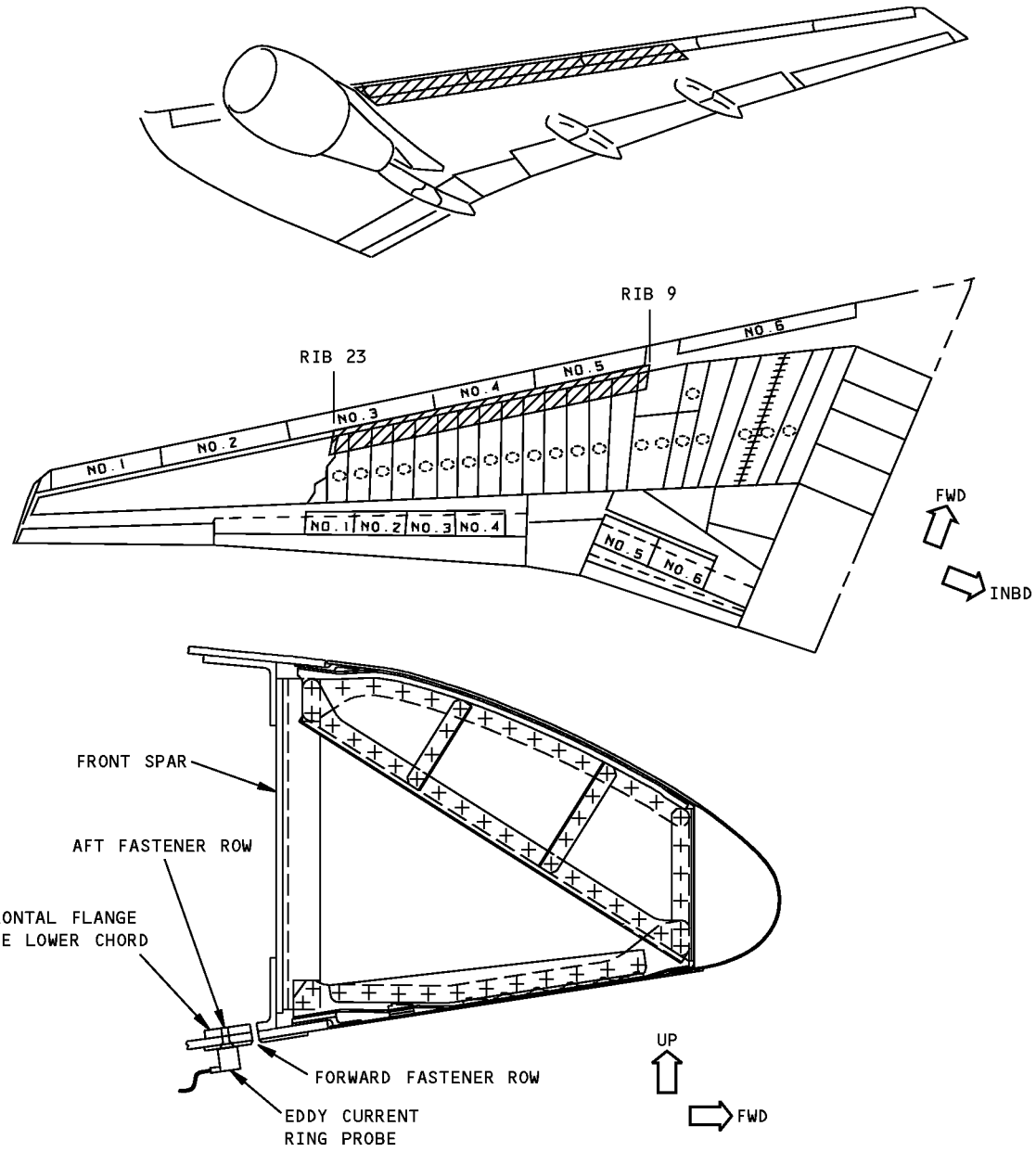
(Continued)

RIB LOCATION	FASTENER INSTALLED
20-23	BACB30PT4 (YKJ)

(3) A steel fastener has been installed. Make a new reference standard with the same type of fastener installed, or temporarily install the same type of fastener in the reference standard.

E. To make an analysis of possible cracks in the wing skin, do a high frequency surface inspection around the fastener head using a circle template and a pencil probe as specified in Part 6, 51-00-01 or Part 6, 51-00-19.

F. To make an analysis of possible cracks in the horizontal flange of the lower chord, do an open hole eddy current inspection as specified in Part 6, 51-00-16.

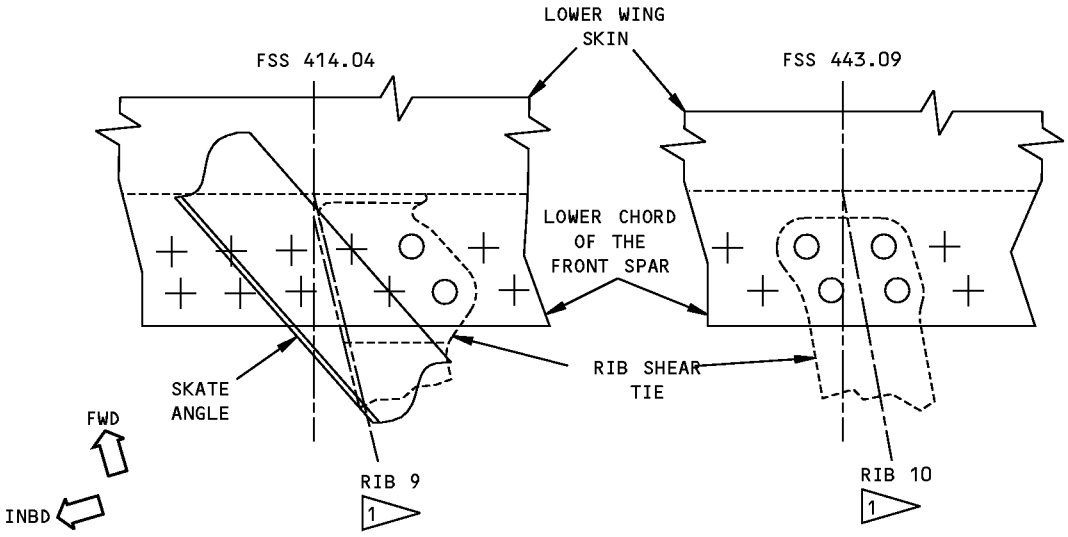


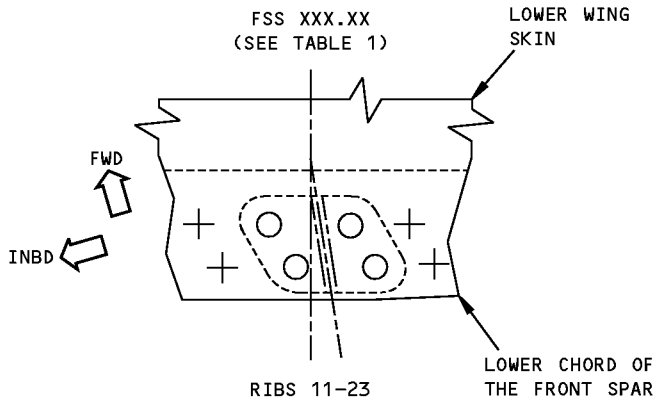
NOTES

AREA TO EXAMINE

- THE LEFT WING IS SHOWN;
  THE RIGHT WING IS OPPOSITE
- EXAMINE THE LOWER WING SKIN AND THE HORIZONTAL FLANGE OF THE LOWER CHORD AT THE FRONT SPAR AT THE FORWARD AND AFT FASTENER HOLE LOCATIONS FROM RIB LOCATIONS 9 THRU 23.

Inspection Locations
Figure 1





RIB #	FRONT SPAR STA	NOTES
11	470.51	
12	496.82	
13	523.13	1
14	549.44	
15	575.75	
16	602.05	
17	628.36	2
18	654.67	
19	680.98	
20	707.29	
21	733.60	3
22	759.91	
23	786.22	

TABLE 1

NOTES

- THE LEFT WING IS SHOWN; THE RIGHT WING IS OPPOSITE
- DO THIS INSPECTION FROM THE BOTTOM SURFACE OF THE WING, EXTERNAL TO THE AIRPLANE

1 TO EXAMINE THE LOWER WING SKIN AND THE HORIZONTAL FLANGE OF THE LOWER CHORD AT RIBS 9 THRU 15, USE REFERENCE STANDARD NDT666A AND CALIBRATE THE INSTRUMENT TO PAR. 4.A.

2 TO EXAMINE THE LOWER WING SKIN AND THE HORIZONTAL FLANGE OF THE LOWER CHORD AT RIBS 16 THRU 19, USE REFERENCE STANDARD NDT666B AND CALIBRATE THE INSTRUMENT TO THE INSTRUCTIONS GIVEN PAR. 4.B.

3 TO EXAMINE THE LOWER WING SKIN AT RIBS 20 THRU 23, USE REFERENCE STANDARD NDT666C AND CALIBRATE THE INSTRUMENT TO THE INSTRUCTIONS GIVEN IN PAR. 4.D.; TO EXAMINE THE HORIZONTAL FLANGE OF THE LOWER CHORD AT RIBS 20 THRU 23, USE REFERENCE STANDARD NDT666C AND CALIBRATE THE INSTRUMENT TO THE INSTRUCTIONS GIVEN IN PAR. 4.C. SEE THE NOTE IN PAR. 4.C.

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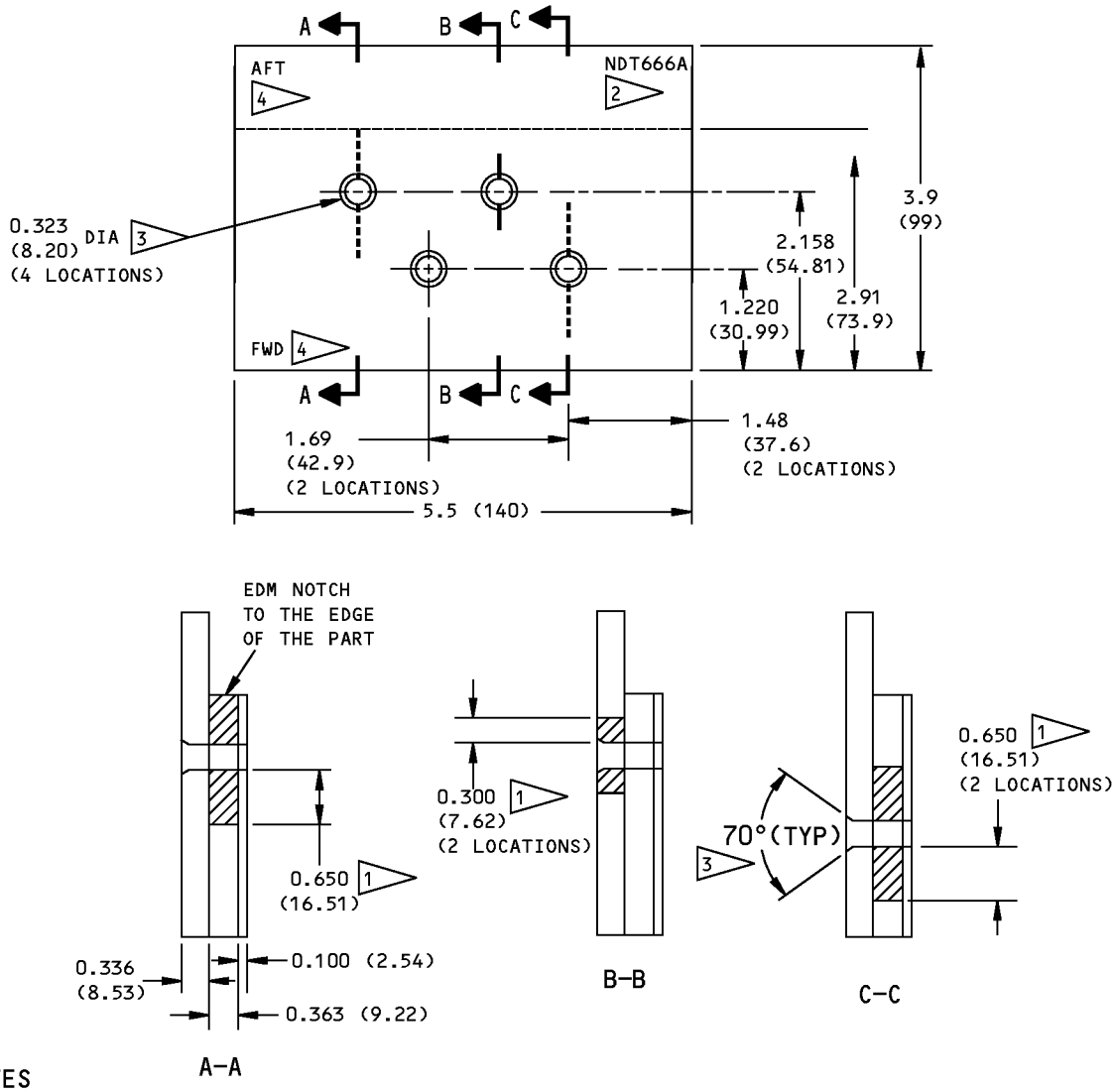
Inspection Details
Figure 2



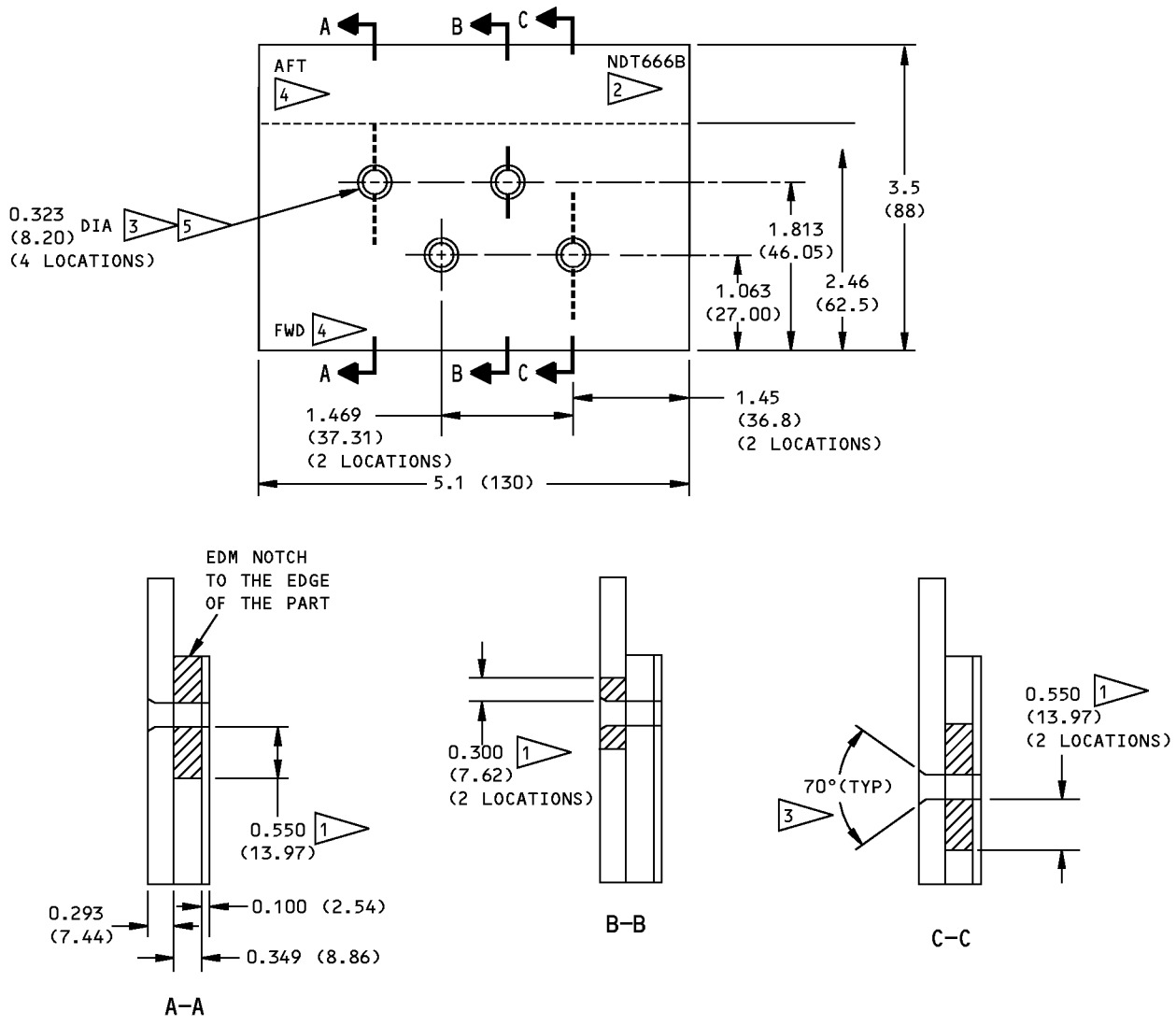
NOTES

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- MATERIAL: 2324-T39 OR AN AIRPLANE QUALITY MATERIAL WITH AN ELECTRICAL CONDUCTIVITY BETWEEN 28% IACS AND 33.5% IACS SUCH AS 2024-T3, -T4, 2219-T4X, 2524-T3XXX, 7079-T6XX, 2224-T3511
- SURFACE ROUGHNESS: 125 Ra OR BETTER
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.025	X.X = ± 0.5
X.X = ± 0.050	X = ± 1

1. EDM NOTCH DIMENSIONS:
   WIDTH: 0.020 (0.06) MAXIMUM
   DEPTH: THROUGH THICKNESS
2. ETCH OR STEEL STAMP THE REFERENCE STANDARD NUMBER NDT666A AT APPROXIMATELY THIS LOCATION
3. DRILL AND CHAMFER HOLES AS NECESSARY FOR BACB30PT5K13 FASTENERS. USE BACN10WM NUTS
4. ETCH OR STAMP THIS IDENTIFICATION ON THE REFERENCE STANDARD AT APPROXIMATELY THIS LOCATION

Reference Standard NDT666A
Figure 3



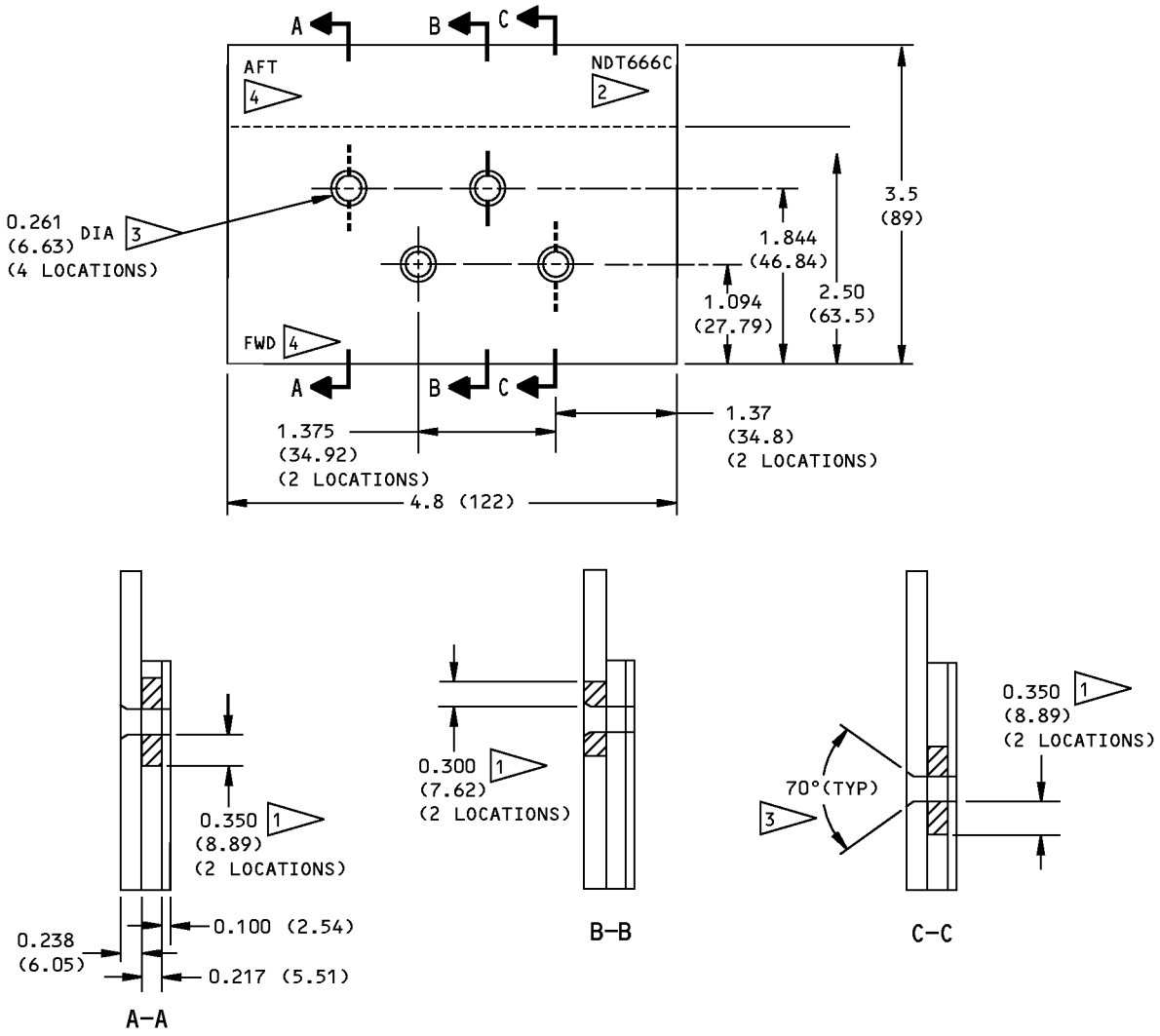
NOTES

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- MATERIAL: 2324-T39 OR AN AIRPLANE QUALITY MATERIAL WITH AN ELECTRICAL CONDUCTIVITY BETWEEN 28% IACS AND 33.5% IACS SUCH AS 2024-T3, -T4, 2219-T4X, 2524-T3XXX, 7079-T6XX, 2224-T3511
- SURFACE ROUGHNESS: 125 Ra OR BETTER
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.025	X.X = ± 0.5
X.X = ± 0.050	X = ± 1

1. EDM NOTCH DIMENSIONS:
   WIDTH: 0.020 (0.06) MAXIMUM
   DEPTH: THROUGH THICKNESS
2. ETCH OR STEEL STAMP THE REFERENCE STANDARD NUMBER NDT666B AT APPROXIMATELY THIS LOCATION
3. DRILL AND CHAMFER HOLES AS NECESSARY FOR BACB30PT5K12 FASTENERS (OR EQUIVALENT). USE BACN10WM NUTS
4. ETCH OR STAMP THIS IDENTIFICATION ON THE REFERENCE STANDARD AT APPROXIMATELY THIS LOCATION
5. 0.264 (6.63) WAS SPECIFIED BEFORE THE SEP 15/04 REVISION AND IS SATISFACTORY

Reference Standard NDT666B
Figure 4



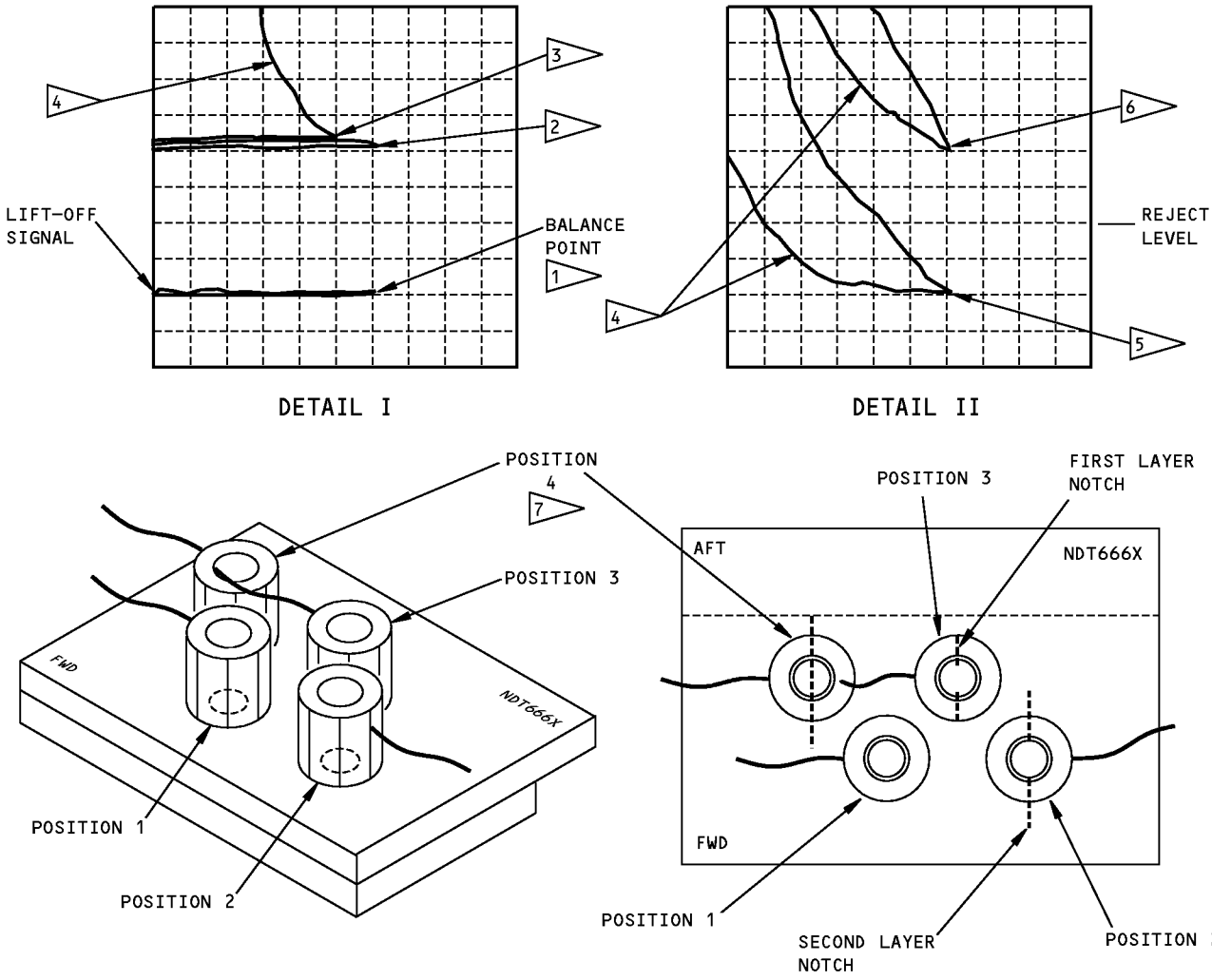
NOTES

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- MATERIAL: 2324-T39 OR AN AIRPLANE QUALITY MATERIAL WITH AN ELECTRICAL CONDUCTIVITY BETWEEN 28% IACS AND 33.5% IACS SUCH AS 2024-T3, -T4, 2219-T4X, 2524-T3XXX, 7079-T6XX, 2224-T3511
- SURFACE ROUGHNESS: 125 Ra OR BETTER
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.025	X.X = ± 0.5
X.X = ± 0.050	X = ± 1

1. EDM NOTCH DIMENSIONS:
   WIDTH: 0.020 (0.06) MAXIMUM
   DEPTH: THROUGH THICKNESS
2. ETCH OR STEEL STAMP THE REFERENCE STANDARD NUMBER NDT666C AT APPROXIMATELY THIS LOCATION
3. DRILL AND CHAMFER HOLES AS NECESSARY FOR BACB30PT4K9 FASTENERS. USE BACN10WM NUTS
4. ETCH OR STAMP THIS IDENTIFICATION ON THE REFERENCE STANDARD AT APPROXIMATELY THIS LOCATION

Reference Standard NDT666C
Figure 5

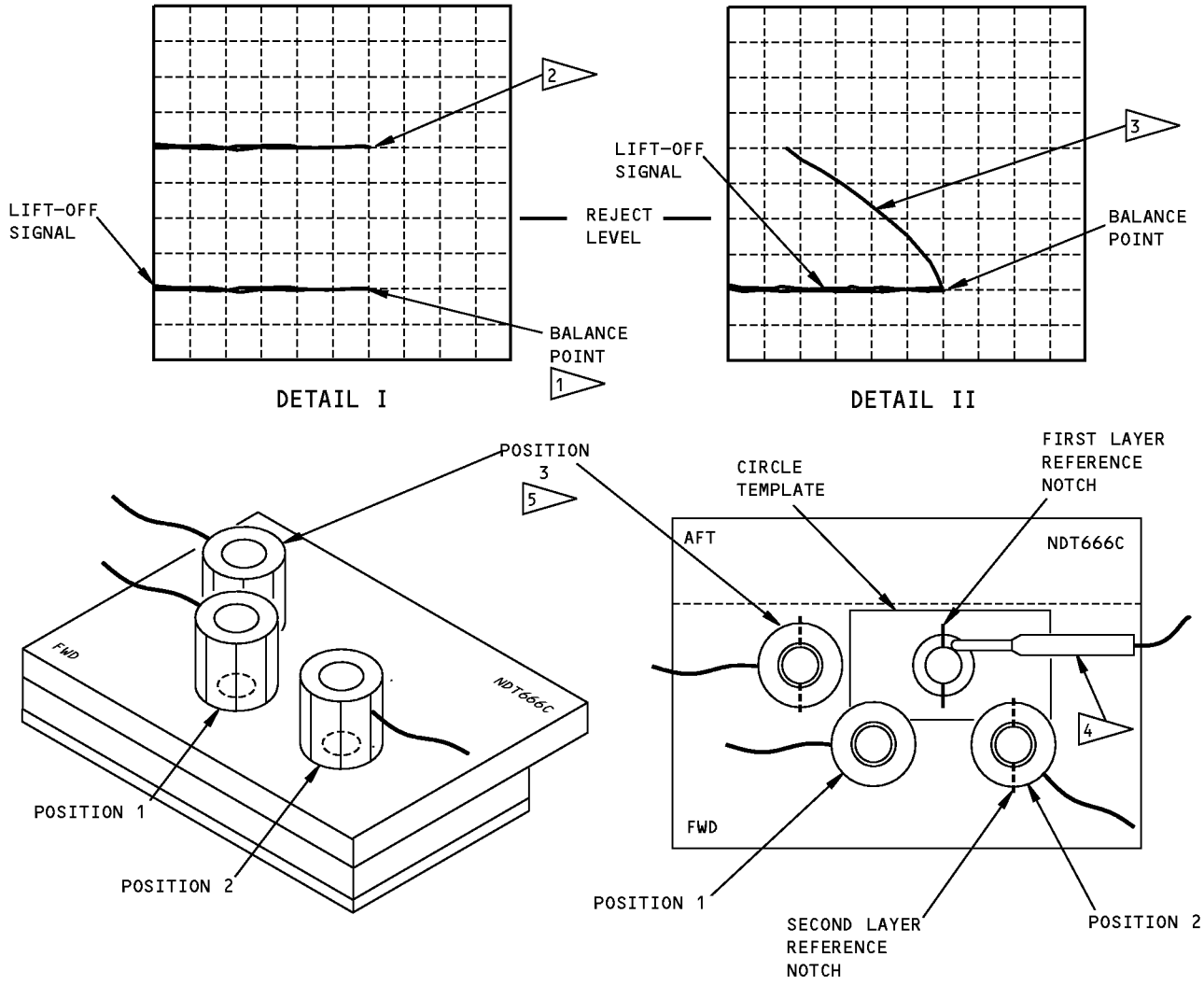


NOTES

- THIS INSTRUMENT CALIBRATION IS FOR RIBS 9 THRU 19 ONLY.

1. BALANCE POINT. SET AT 60% OF FULL SCREEN WIDTH (FSW) AND 20% OF FULL SCREEN HEIGHT (FSH).
2. SIGNAL FROM THE REFERENCE NOTCH SET AT 60% OF FSH (PROBE SET AT POSITION 2).
3. WITH THE PROBE AT POSITION 3, ADJUST THE HORIZONTAL AND VERTICAL GAIN OR THE VERTICAL-TO-HORIZONTAL GAIN RATIO TO SET THE SIGNAL AT APPROXIMATELY 50% OF FSW. THIS SIGNAL CAN BE MORE THAN 60% OF FSH.
4. APPROXIMATE LIFT-OFF SIGNAL AFTER THE HORIZONTAL AND VERTICAL GAIN HAS BEEN ADJUSTED WITH THE PROBE AT POSITION 3.
5. SIGNAL FROM THE HOLE AT POSITION 1 AFTER THE CALIBRATION IS COMPLETED.
6. SIGNAL FROM THE REFERENCE NOTCH WITH THE PROBE AT POSITION 2 AFTER THE CALIBRATION IS COMPLETED.
7. REFER TO PAR. 6.C.

Instrument Calibration
Figure 6



NOTES

- INSTRUMENT CALIBRATION FOR RIBS 20 THRU 23 ONLY. SURFACE AND SUB-SURFACE INSPECTIONS.
- SET THE LIFT-OFF SIGNAL SO THAT THE SIGNAL MOVES HORIZONTALLY FROM RIGHT TO LEFT.

1 BALANCE POINT. SET AT 60% OF FULL SCREEN WIDTH AND 20% OF FULL SCREEN HEIGHT

2 SIGNAL FROM THE SECOND LAYER REFERENCE NOTCH SET AT 60% OF FULL SCREEN HEIGHT.

3 SURFACE NOTCH SIGNAL

4 RIGHT ANGLE, SURFACE EDDY CURRENT PROBE

5 REFER TO PAR. 6.C.

Instrument Calibration
Figure 7