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SERVICE BULLETIN NO. 1372

PIPER CONSIDERS COMPLIANCE MANDATORY

Date: April 3, 2024 (S)

Service Bulletin (SB) 1372 supersedes SB 1345 and SB 1345A, except for requirements of SB 1345 that are mandated by an FAA-issued Airworthiness Directive. Aircraft that were previously made compliant with SB 1345 or SB 1345A must comply with SB 1372.

SB 1372 supersedes SB 886 and SB 978A for all aircraft models affected except for the following: PA-28-140, PA-28-150, PA-28-160, and PA-28-180. Aircraft that were previously made compliant with SB 886 or SB 978A must comply with SB 1372.

In addition, various Piper Airplane Maintenance Manuals (AMM) and Service Manuals (SM) have incorporated the recurring inspections from SB 886 and/or SB 978A, titled as 'Wing Spar Inspection' or similar. SB 1372 supersedes these inspections and aircraft that were previously made compliant with this inspection must comply with SB 1372.

SUBJECT: **MAIN WING SPAR INSPECTION**

MODELS AFFECTED:	**SERIAL NUMBERS AFFECTED**:
Group 1:	
PA-28-151 Warrior	28-7415001 thru 28-7715314
PA-28-161 Warrior II	28-7716001 thru 28-8616057, 2816001 thru 2816109
PA-28-161 Cadet	2841001 thru 2841365
PA-28-161 Warrior III	2816110 thru 2816119, 2842001 thru 2842420
PA-28-181 Archer II	28-7690001 thru 28-8690056, 28-690061, 28-690062, 2890001 thru 2890205
PA-28-181 Archer III	2890206 thru 2890231, 2843001 thru 2843949, 2881001 thru 2881040, 2881042 thru 2881687
PA-28-181 Piper Pilot	2881041, 28020001 thru 28020148
PA-28R-180 Arrow	28R-30000 thru 28R-31270, 28R-7130001 thru 28R-7130013
PA-28R-200 Arrow / Arrow II	28R-35001 thru 28R-35820, 28R-7135001 thru 28R-7635545
Group 2:	
PA-28-235 Cherokee 235	28-03, 28E-11, 28-10001 thru 28-11378, 28-7110001 thru 28-7710089
PA-28R-201 Arrow III	28R-7737001 thru 28R-7837317, 2837001 thru 2837061, 2844001 thru 2844185
PA-28R-201T Turbo Arrow III	28R-7703001 thru 28R-7803373, 2803001 thru 2803012
PA-28RT-201 Arrow IV	28R-7918001 thru 28R-8218026
PA-28RT-201T Turbo Arrow IV	28R-7931001 thru 28R-8631005, 2831001 thru 2831038

ATA/JASC: 5711

(OVER)

MODELS AFFECTED (continued):	**SERIAL NUMBERS AFFECTED** (continued):
Group 2 (continued)**:**	
PA-32-260 Cherokee Six 260	32-1 thru 32-14, 32-16 thru 32-20, 32-22 thru 32-1297, 32-7100001 thru 32-7800008
PA-32-300 Cherokee Six 300	32-15, 32-21, 32-40000 thru 32-40974, 32-7140001 thru 32-7840202
PA-32S-300 Cherokee Six Seaplane	32S-40001 thru 32S-40974, 32S-7140001 thru 32S-7240137

COMPLIANCE TIME:

Initial compliance with Part I is required within 30 days of the effectivity date of this service bulletin. Recurring compliance with Part I is required following each annual/100-hour inspection.

Compliance with Part II must occur in accordance with the Calculated Service Hours (CSH) limits defined in Table 1 on page 3. In addition, Part II must also be performed within the next 50 hours time in service (TIS), regardless of the total CSH, whenever one of the following conditions are met:

- Either main wing spar has missing and/or incomplete maintenance records.
- Either factory installed main wing spar has been replaced with a serviceable (more than zero hours TIS) main wing spar.

NOTE: If either of the main wing spars is going to be replaced, inspect the replacement main wing spar(s) per Part II prior to installation.

NOTE: If either factory installed main wing spars has been replaced with a new (zero hours TIS) main wing spar, then the inspections are to be based upon CSH calculations and in Table 1 on page 3.

Compliance with Part III is required when an indication from an eddy current inspection or non-crack damage in one or more bolt holes is discovered and cannot be repaired by cleaning instructions described in Part II.

Compliance with Part IV must occur in accordance with the CSH limits defined in Table 1 on page 3 and whenever a wing spar is rejected during inspection per Part IV.

WARNING: THE INSPECTION INTERVALS, MODIFICATION, AND REPLACEMENT EVENTS IN TABLE 1 ON PAGE 3 ARE BASED ON AIRPLANES OPERATING UNDER NORMAL USAGE, WHICH IS DEFINED AS PERSONAL OR FLIGHT INSTRUCTION. AIRPLANES THAT OPERATE OUTSIDE OF NORMAL USAGE AND/OR OPERATE IN MORE SEVERE ENVIRONMENT DO SO AT THE RISK OF REDUCING THE LONGEVITY OF THE WING SPARS AND AIRPLANE, MAY REQUIRE MORE FREQUENT INSPECTIONS AT REDUCED CSH INTERVALS (WHICH IS NOT DEFINED IN THIS SERVICE BULLETIN), AND AN INCREASED RISK TO THE LIVES ONBOARD THE AIRPLANE.

APPROVAL:

The engineering aspects of Part III and Part IV in this service bulletin and the eddy current inspection method (starting on page 12 of this service bulletin) have been shown to comply with the applicable Federal Aviation Regulations and are FAA approved.

TABLE 1
COMPLIANCE TIMES

AIRCRAFT MODEL	WING SPAR CONFIGURATION	INITIAL INSPECTION [2] (Part II)	RECURRING INSPECTIONS [1] [2] (Part II)				ACTION REQUIRED (Part IV)
			TIER A (Initial Inspection − 9,999 TOTAL CSH)	**TIER B** (10,000−14,999 TOTAL CSH)	**TIER C** (15,000−17,499 TOTAL CSH)	**TIER D** (17,500−25,000 TOTAL CSH)	
Group 1	Unmodified Wing Spars	When wing spars reach **5,000** TOTAL CSH, perform initial inspection within the next 100 hours TIS.	Perform recurring inspection each **1,750** CSH	Perform recurring inspection each **900** CSH	Perform recurring inspection each **600** CSH	See **ACTION REQUIRED**	Wing spars must be replaced prior to **17,500** TOTAL CSH OR Wing spars must be modified with Reinforcement Kit [3] to extend spar life beyond **17,500** TOTAL CSH
	Wing Spars modified with Reinforcement Kit [3]	Initial inspection upon installation of Reinforcement Kit. [3] Begin performing recurring inspections at the CSH interval defined in the appropriate Tier of **RECURRING INSPECTIONS**.	Perform recurring inspection each **4,800** CSH			Perform recurring inspection each **3,700** CSH	Modified wing spars must be replaced prior to **25,000** TOTAL CSH
Group 2	Unmodified Wing Spars	When wing spars reach **4,500** TOTAL CSH, perform initial inspection within the next 100 hours TIS.	Perform recurring inspection each **400** CSH	See **ACTION REQUIRED**			Wing spars must be replaced prior to **12,000** TOTAL CSH

(1) Perform recurring inspections based on the CSH the wing spar(s) were previously inspected at plus one inspection interval of the current Tier as defined in Recurring Inspections. If an upcoming inspection interval would cause the CSH of the wing spar(s) to transition into the CSH range of another Tier, then calculate the result of the CSH minimum value of the next tier plus one inspection interval of the next tier. The next inspection is required at whichever results in the lower total CSH. (Example 1: If an aircraft in Group 1 with unmodified wing spars were previously inspected at 9,550 CSH, then the next inspection would occur at 10,900 CSH [since 9,550 + 1,750 = 11,300 is greater than 10,000 + 900 = 10,900]. Example 2: If an aircraft in Group 1 with unmodified wing spars were previously inspected at 8,500 CSH, then the next inspection would occur at 10,250 CSH [since 8,500 + 1,750 = 10,250 is less than 10,000 + 900 = 10,900].)

(2) If an equivalent eddy current inspection (as defined in Part II) was performed as part of a previous action of compliance (such as SB 1345A, AD 2020-26-16, etc.) at a CSH greater than the required CSH defined in Initial Inspection, then the subsequent recurring inspections shall be calculated starting at the CSH the previous inspection was performed at and the interval defined in the appropriate Tier listed in Recurring Inspections. (Example: If an aircraft in Group 1 with unmodified wing spar(s) was inspected a part of a previous action of compliance at 6,000 CSH, then the inspection interval is currently 1,750 CSH, and the next inspection would occur at 7,750 CSH.)

(3) The reinforcement kit may be installed, per Part IV, at anytime prior to 25,000 TOTAL CSH. This kit is not approved for PA-28R-180 Arrow, PA-28R-200 Arrow / Arrow II, or any aircraft model in Group 2; no modification or kit is currently approved for these aircraft.

WARNING: THE INSPECTION INTERVALS, MODIFICATION, AND REPLACEMENT EVENTS IN THIS TABLE ARE BASED ON AIRPLANES OPERATING UNDER NORMAL USAGE, WHICH IS DEFINED AS PERSONAL OR FLIGHT INSTRUCTION. AIRPLANES THAT OPERATE OUTSIDE OF NORMAL USAGE AND/OR OPERATE IN MORE SEVERE ENVIRONMENT DO SO AT THE RISK OF REDUCING THE LONGEVITY OF THE WING SPARS AND AIRPLANE, MAY REQUIRE MORE FREQUENT INSPECTIONS AT REDUCED CSH INTERVALS (WHICH IS NOT DEFINED IN THIS SERVICE BULLETIN), AND AN INCREASED RISK TO THE LIVES ONBOARD THE AIRPLANE.

PURPOSE: This service bulletin mandates initial and recurring inspections of the affected aircraft for cracks and/or surface damage at specific bolt hole locations in the main wing spars. The inspection interval will vary based upon an airplane's usage history, determined by CSH, as explained in the Compliance Time and Part I of this service bulletin. A multi-tiered approach is used, as shown in Table 1 on page 3, with a shorter inspection interval for each proceeding tier as the risk of cracks and other damage to the bolt holes increases based on the age of the aircraft.

SAFETY INTENT: Depending on the severity of usage, some of the affected aircraft may have fatigue fractures at the lower outboard-most wing attachment holes (designated as C-1 and D-1 as shown in Figure 1 on page 16).

The safety intent of Part I of this service bulletin is to define the mathematical formula for determining the CSH for compliance times and provide calculation examples.

The safety intent of Part II of this service bulletin is to identify, through inspections, the condition of wing spar bolt holes to determine any fatigue damage, repair non-crack damage within the defined limitations.

The safety intent of Part III of this service bulletin is to provide instructions to repair any bolt hole in the wing spars that are found to have non-crack damage that cannot be repaired by instructions described in Part II.

The safety intent of Part IV of this service bulletin is to modify the wing spars to increase their longevity before replacement of the wing spars are required, and to contain, destroy, dispose, and replace wing spars that have reached their life limits and prevent the wing spars from being reinstalled on any aircraft.

INSTRUCTIONS:

NOTE: Some steps in these 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 completed to comply with the AD. Steps not identified as RC are recommended and may be deviated from, completed as a part of other actions, or completed with accepted methods different from those given in this service bulletin. If the RC steps can be completed, the airplane can be put back in a serviceable condition.

Part I. Maintenance Records Review and Calculate Service Hours Determination

1. RC − Review Airplane Maintenance Records

   For each wing spar, review the airplane maintenance records and determine the number of 100-hour inspections completed on the airplane since new and any record of wing spar replacement(s).

   In addition to licensed mechanics and technicians, this review may be performed by any owner/operator (pilot) holding at least a private pilot certificate. Cite the actions in the airplane records (a logbook entry detailing compliance with this step) in accordance with 14 CFR Sections (§) 43.9(a)(1) through (4), and 14 CFR § 91.417(a)(2)(v). This record must be maintained as required by § 91.417, 121.380, and 135.439.

   a. For purposes of this review, count any inspection conducted to comply with the 100-hour requirement of § 91.409(b) pertaining to carrying persons for hire, such as in-flight training environments, including any inspection entered in the maintenance records as an "annual" inspection or as an "annual/100-hour" inspection.

   b. If the purpose of an inspection was to comply with § 91.409(b), then it must be counted. To determine the purpose of an inspection, note the repeating intervals between inspections, i.e., less than 10 months between, and typically 90–110 flight hours.

      An inspection entered as a "100-hour" inspection but completed solely for the purpose of meeting the requirement to complete an annual inspection, or those otherwise not required by § 91.409(b), need not be counted.

      For operators utilizing a progressive inspection program, count the completion of each § 91.409(b) 100-hour interval as one inspection.

c. If a main wing spar has been replaced with a new (zero hours TIS) main wing spar, count the number of 100-hour inspections from the time of installation of the new main wing spar.

d. If an aircraft or the main wing spars have missing or incomplete maintenance records, the wing history cannot be determined properly. Immediately proceed to Part II within the next 50 hours TIS. Compliance times such as recurring inspection intervals, CSH ranges, required actions, etc. (as defined in Table 1 on page 3) with missing/incomplete records must be determined by the owner/operator, which is outside the scope of this service bulletin.

2. Calculated Service Hours

WARNING: THESE CALCULATION FORMULAS ARE ONLY TO BE USED FOR DETERMINING CALCULATED SERVICE HOURS WHEN COMPLYING WITH SB 1372.

The value of the Calculated Service Hours (CSH) of the aircraft is a method to determine an aircraft time that accounts for the mixed usage of personal and instructional flying. This produces a single number to ease comparison to the required inspection times defined in this service bulletin.

a. RC − Before further flight, after step 1 has been completed, determine the Calculated Service Hours (CSH) for each main wing spar using the formula shown below.

b. RC − Following each annual and/or 100-hour inspection, recalculate and update the CSH for each main wing spar. Record these calculations in the airplane logbook to aid in determining when an eddy current inspection (refer to "Part II. Bolt Hole Inspection") is required in accordance with Table 1 on page 3 under Compliance Times. Following each annual and/or 100-hour inspection, recalculate and update the CSH for each main wing spar until the main wing spar has accumulated the applicable CSH in the table under Compliance Time.

$$\frac{T + (N \times 100)}{2} = Calculated\ Service\ Hours$$
***N** is the number of 100-hour inspections required by § 91.409(b).* ***T** is the total hours TIS of the airplane main wing spar (see note below).*

NOTE: While T is defined as the total hours time in service (TIS) of the airplane, for any serviceable replacement (with more than zero TIS) main wing spar that is installed, the CSH shall be calculated using the total hours TIS of the replacement main wing spar, in accordance with this service bulletin's Compliance Time and instructions described in Part I.

c. Converting FSH to CSH (Initial Compliance Only)

Some aircraft previously determined compliance times using the Factored Service Hours (FSH) formula per AD 2020-26-16. During initial compliance with this service bulletin, the most recent FSH result can be used to determine the number of inspections that were previously performed to facilitate calculating the initial CSH result.

1) Back calculate to determine the number of inspections (**N**) performed, rounded up. Use the following formula:

$$\frac{(17 \times FSH) - T}{1600} = N$$
***FSH** is the Factored Service Hours previously calculated.* ***N** is the number of 100-hour inspections required by § 91.409(b), rounded up.* ***T** is the total hours TIS of the airplane main wing spar during the last inspection calculated using the FSH formula.*

2) Using the number of inspections (**N**), determined in step 1), calculate the CSH using the formula defined in step b, above.

d. Calculation Examples

1) Initial Calculation

An airplane in Group 1 with unmodified wing spars is performing the initial compliance with Part I and has no 100-hour inspections (that is, § 91.409(b) is not applicable to any flight time):

The airplane maintenance records show that each wing spar installed on the airplane have a total of 12,100 hours TIS, only annual inspections have been done, and none of the annual inspections were done for purposes of compliance with § 91.409(b). Both main wing spars are original factory installed.

Using these values in the formula, as shown below, results in 6,050 CSH. In this example, the initial inspection would be required within the next 100 hours TIS as the wing spars have exceeded the 5,000 CSH threshold for initial inspection. The wing spars are now within Tier A with an interval of 1,750 CSH and next inspection would be required at 7,800 CSH (6,050 + 1,750 = 7,800).

If the number of 100-hour inspections required by § 91.409(b) is 0, the total hours TIS of the airplane is 12,100 hours, then the formula and resulting CSH would be:
$$\frac{12{,}100 + (0 \times 100)}{2} = 6{,}050\ Calculated\ Service\ Hours$$

2) Recurring Calculation

An airplane in Group 1 with unmodified wing spars is performing recurring compliance with Part I and has both 100-hour (§ 91.409(b) is applicable) and annual inspections:

The airplane maintenance records show that each wing spar installed on the airplane have a total of 12,100 hours TIS, 42 of the 100-hour inspections in compliance with § 91.409(b) have been done, the initial inspection (as defined in Part II) was performed at 6,050 CSH, and the most recent recurring inspection was performed at 7,800 CSH (6,050 + 1,750 = 7,800). Both main wing spars are original factory installed.

Using these values in the formula, as shown below, results in 8,150 CSH. In this example, the wing spars are in Tier A with an interval of 1,750 and the next eddy current inspection would be required when the wing spars reach 9,550 CSH (7,800 + 1,750 = 9,550).

If the number of 100-hour inspections required by § 91.409(b) is 56, the total hours TIS is 12,100 hours, then the formula and resulting CSH would be:
$$\frac{12{,}100 + (42 \times 100)}{2} = 8{,}150\ Calculated\ Service\ Hours$$

However, the next proceeding inspection interval after 9,550 CSH will cause the wing spar(s) to transition into the CSH range of Tier B (9,550 + 1,750 = 11,300). When wing spar(s) are to transition into a new Tier, calculate the value of the CSH minimum value of that next Tier plus one inspection interval (10,000 + 900 = 10,900). The next inspection will be required at whichever calculation results in the lowest total CSH. In this case, the next eddy current inspection would be required at 10,900 CSH instead of at 11,300 CSH.

3) Initial Calculation with Converting FSH to CSH

An airplane in Group 1 with unmodified wing spars is calculating CSH to comply with initial compliance with Part I. Previously, this airplane was maintained using the FSH formula and as apart of initial compliance with this SB is converting FSH to CSH as described in "Converting FSH to CSH (Initial Compliance Only)" on page 5. This aircraft has both 100-hour (§ 91.409(b) is applicable) and annual inspections:

The airplane maintenance records show that each wing spar installed on the airplane currently have a total of 12,100 hours TIS and 80 of the 100-hour inspections in compliance with § 91.409(b) have been done. The previous eddy current inspection was performed at 7000 FSH and each wing spar at the time had a total of 10,200 hours TIS. Both main wing spars are original factory installed.

Using the values from the previous inspection in the FSH to CSH conversion, as shown below, results in 68 of the 100-hour inspections in compliance with § 91.409(b) have been done.

If the FSH during the last inspection was 7000 FSH and the total hours TIS was 10,200 hours, then the formula and resulting number of inspections (N) would be:
$$\frac{(17 \times 7{,}000) - 10{,}200}{1{,}600} = 68\ Inspections\ (N)$$

Then using this value in the CSH formula, as shown below, results in a CSH equivalent of 8,500 CSH during the previous inspection.

If the number of 100-hour inspections required by § 91.409(b) is 68, the total hours TIS is 10,200 hours, then the formula and resulting CSH would be:
$$\frac{10{,}200 + (68 \times 100)}{2} = 8{,}500\ Calculated\ Service\ Hours$$

Using the current values of the airplane in the CSH formula, as shown below, results in 10,050 CSH. In this example, the wing spars at the time of the previous inspection are in Tier A. However, the next inspection interval will cause the wing spar(s) to transition into the CSH range of Tier B (8,500 + 1,750 = 10,250). When wing spar(s) are to transition into a new Tier, calculate the value of the CSH minimum value of that next Tier plus one inspection interval (10,000 + 900 = 10,900). The next inspection will be required at whichever calculation results in the lowest total CSH. In this case, the next eddy current inspection would then be required at 10,250 CSH.

Then the next proceeding inspection would then be required at 11,200 CSH since the wing spar(s) are now in Tier B (10,250 + 900 = 11,150).

If the number of 100-hour inspections required by § 91.409(b) is 80, the total hours TIS is 12,100 hours, then the formula and resulting CSH would be:
$$\frac{12{,}100 + (80 \times 100)}{2} = 10{,}050\ Calculated\ Service\ Hours$$

Part II. Bolt Hole Inspection

WARNING: FLIGHT WITH KNOWN CRACKS IN THE AIRCRAFT STRUCTURE IS NOT PERMITTED. AN AIRPLANE WITH A CRACK IN THE STRUCTURE DOES NOT MEET ITS TYPE DESIGN AND NO LONGER POSSESSES ITS REQUIRED TYPE DESIGN STRENGTH. ANY CRACK DISCOVERED IN THE AIRCRAFT STRUCTURE MUST BE REPAIRED PRIOR TO THE NEXT FLIGHT.

NOTE: The instructions contained within this service bulletin are applicable only to aircraft that conform to type design at the interface of the main wing spar and spar box. Any previously approved repairs or modifications may require alternate methods, instructions and hardware.

NOTE: Temporary removal of interior components, fairings and/or access panels may be required in order to accomplish the instructions contained in this service bulletin.

NOTE: Refer to the applicable Piper Airplane Maintenance Manual (AMM) or Service Manual (SM) for model specific details. Refer to the applicable Piper Airplane Parts Catalog (APC) for the type and size of replacement hardware.

NOTE: These instructions apply to both the left and right wings.

NOTE: If there is any uncertainty when performing an eddy current inspection (ECI), uncertainty in the results of an ECI, or when performing an ECI it is believed that a noisy condition exists, Piper Aircraft, Inc. recommends consulting with a NAS 410 (or equivalent standard per FAA AC 65-31B) Level III technician.

1. Review the guidance in “Care for Bolts and Bolt Holes" on page 15 for methods on safe spar bolt removal. Do not proceed until the fuselage and wings are properly supported as described in this section.
2. Locate the two (2) outermost main spar attach bolts, as shown in Figure 1, installed on the lower cap of the left and right main spar, on the forward and aft sides of the spar web.

   CAUTION: DO NOT DRIVE OUT MAIN WING SPAR BOLTS. TAKE EXTREME CARE NOT TO DAMAGE BOLT HOLES.

   CAUTION: DO NOT ROTATE BOLTS WHEN THE THREADS ARE INSIDE THE BOLT HOLE.

   NOTE: Make a record of the type, number and orientation of washers in the hardware stack-up prior to bolt removal at each bolt location, to ensure proper reassembly upon completion of the inspection. Make special note of the condition and placement of washers which have a radiused outer diameter, Piper part numbers (P/Ns) 96352-002 and 96352-003.

   NOTE: When radius washers are properly installed, the radius feature of the washer will be oriented to match the radius of the adjacent structure, as shown in Figure 1, Detail D.
3. Carefully remove the two (2) wing spar attach bolts using the guidance described in “Care for Bolts and Bolt Holes" page 15. Discard the bolts and nuts. Retain or replace the washers on condition.
4. RC − Inspect the inner surface of each bolt hole in the lower wing spar cap. Figure 1 provides cross sections of the main wing spar, and identifies the bolt hole inspection areas.

   NOTE: The inspection steps in these instructions are visualized in Figure 2, a process flowchart.

   NOTE: If a previous ECI revealed an indication, then, at owner/operator discretion, the inspections described in this service bulletin may begin at step 4.d., with wing removal (omitting the inspections with the wing installed).

   a. With the wing installed, perform the ECI method (using Inspection Type 1 criteria and 50% calibration height), following the guidance under Inspection Methods on page 12.
      - If no indications are present, then proceed to step 7.
      - If an indication is found, or indicates a potentially noisy signal, proceed to step b.

   b. Clean the subject bolt holes, as described under “Cleaning Surface Imperfections,” on page 15.

   c. With the wing still installed, perform another ECI method (using Inspection Type 1 criteria and 50% calibration height), following the guidance under Inspection Methods on page 12.
      - If no indications are present, then proceed to step 7.
      - If an indication is found or indicates a potentially noisy signal, proceed to step d.

d. If an indication continues to exists with the wing installed, then the wing shall be removed in accordance with the applicable Piper AMM or SM and the guidance under “Care for Bolts and Bolt Holes,” page 15. Prior to removal, tag the wing to be removed with the aircraft serial number.

NOTE: Flip the removed wing 180 degrees so that the lower wing surface is facing up, in order to gain optimum access to the bolt hole in the wing spar.

e. Perform the fluorescent penetrant inspection (FPI) method on the subject bolt holes and the surrounding area local to each bolt hole. FPI improves situational awareness of the inspection area and potential contributors to false positives (e.g., fay gaps, swarf, etc.); it can further identify potential false positives and corroborate eddy current findings (additional ECIs are appropriate, as necessary). Follow the guidance under Inspection Methods on page 12.

NOTE: If the technician accomplishing FPI is not the ECI technician, then the ECI technician shall observe the FPI to gain situational awareness of the inspection area for the benefit of the ECI in step i.

NOTE: Performing FPI helps to classify persistent eddy current indications as being a crack or not a crack (other damage).

f. Measure subject bolt hole diameters using a pin gauge. Refer to the table below for the maximum acceptable bolt hole diameter.

BOLT HOLE TYPE	MINIMUM HOLE DIAMETER	MAXIMUM HOLE DIAMETER
Nominal Original Bolt Hole	0.3770 in.	0.3790 in.
1st Event Repaired Bolt Hole (per Part III)	0.3901 in.	0.3911 in.
2nd Event Repaired Bolt Hole (per Part III)	0.4060 in.	0.4065 in.

- If the bolt hole does not exceed the maximum diameter, proceed to step g.
- If the bolt hole does exceed the maximum diameter, proceed to step j.

g. Clean the subject bolt holes, as described under “Cleaning Surface Imperfections,” on page 15.

h. Measure subject bolt hole diameters using a pin gauge a second time. Refer to the table in step f for the maximum acceptable bolt hole diameter.

- If the bolt hole does not exceed the maximum diameter, proceed to step i.
- If the bolt hole does exceed the maximum diameter, proceed to step j.

i. Perform another ECI (using Inspection Type 1 criteria and 50% calibration height) on the subject holes with indications. Follow the guidance under Inspection Methods on page 12.

- If all indications are below 50 % (as defined under the “Acceptance” section of “Eddy Current Inspection Method,” above) proceed to step 6.
- If any eddy current indication still exists that is equal to or greater than 50%, or indicates a noisy signal, then proceed to step j.

j. Perform "Part III. Bolt Hole (Oversize) Repair" on page 10.

k. Consult with a NAS 410 (or equivalent standard per FAA AC 65-31B) Level III technician to interpret the NDT results and provide final determination of indications.

- If any indication is determined to be a crack, then the subject bolt hole(s) shall be rejected and documented (i.e., the spar does not meet type design requirements) and the wing shall be tagged as “Rejected per SB 1372.” Proceed to step 5.
- If any indication is determined not to be a crack but the subject bolt hole(s) are still rejectable, then proceed to “Further Action” on page 15.

5. The discovery of cracks in any wing spar must be reported to Piper Aircraft, Inc. by completing and submitting the online feedback form at https://techpubs.piper.com/feedback. Provide the aircraft history, CSH inspection intervals logs, and photos of the wing or wing spar, including close-up photos of the cracks where possible.

Once completed, proceed to disposing and replacing the subject wing spar(s) per Part IV on page 11.

CAUTION: DO NOT DRIVE IN MAIN WING SPAR BOLTS. TAKE EXTREME CARE NOT TO DAMAGE BOLT HOLES.

CAUTION: DO NOT ROTATE BOLTS WHEN THE THREADS ARE INSIDE THE BOLT HOLE.

6. RC − Reinstall the wing, if removed in step 4, in accordance with the applicable AMM. Use caution while reinstalling the wing to avoid damage to aircraft structure; clean the subject bolt holes prior to installing bolts. Install new wing spar bolts and nuts per the applicable Piper APC. Existing washers in good condition may be reused. Torque the nuts according to the applicable AMM.

   NOTE: When radius washers are properly installed, the radius feature of the washer will be oriented to match the radius of the adjacent structure, as shown in Figure 1, Detail D.

7. RC − Make a logbook entry documenting compliance with Part II of this service bulletin.

Part III. Bolt Hole (Oversize) Repair

If during inspection, one or more bolt holes in the wing spar(s) are identified with non-crack damage (deep scratches, gouges, thread marks, etc.) or an ECI indication exists which cannot be repaired by cleaning the subject bolt holes as described under “Cleaning Surface Imperfections", on page 15, then it is permissible to ream these bolt holes to an approved oversized diameter and install an oversized bolt. If a bolt hole cannot be repaired of all non-crack damage by reaming or exceeds the maximum diameter approved for repairing (oversizing) the bolt hole, an alternative repair is required (which is outside the scope of this service bulletin).

NOTE: This oversize repair can only be performed twice per bolt hole.

NOTE: Repairing bolt holes using this procedure does not affect the CSH inspection intervals as defined in Table 1 on page 3, Compliance Times.

1. Model Effectivity

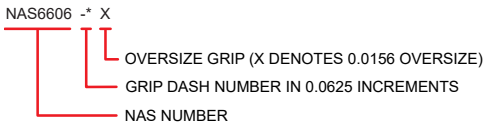
   Bolt hole oversize repairs can only be performed on aircraft models in Group 1, PA-28-235 Cherokee 235, PA-28R-201 Arrow III, and PA-28R-201T Turbo Arrow III from Group 2. No repair instructions for damaged bolt holes are currently approved for other models in Group 2.

2. Prior to reaming any bolt hole, review the aircraft logbook for previous oversize repair events on the subject bolt holes and make note of them. If any of the subject bolts holes have previously been repaired twice, no additional oversize repairs may be performed; instead proceed to step 4.k. in Part II.

3. Ream each subject bolt hole to the next diameter defined in the table below. Take special care to ensure all reaming is performed concentric to the original bolt holes by using a tooling block or drill guide.

NOMINAL ORIGINAL BOLT SIZE	OVERSIZED REPAIR #	OVERSIZED REPAIR BOLT SIZE	OVERSIZED REPAIR BOLT P/N(1)	MAXIMUM OVERSIZED BOLT HOLE DIAMETER
0.374 in.	1st Event	0.0156 in. Oversize Shank	NAS6606-*X	0.3901 – 0.3911 in.
	2nd Event	0.0312 in. Oversize Shank	NAS6606-*Y	0.4060 – 0.4065 in.

(1) Repair Bolt Example:



4. Perform the ECI method (using Inspection Type 1 criteria and 50% calibration height) on the reamed bolt holes. Follow the guidance under "Inspection Methods" on page 12.
   - If noise is reduced to below 50% (as defined under the “Acceptance” section of “Eddy Current Inspection Method,” above), proceed to step 5.
   - If an indication or noise is found with equal to or greater than 50% in one or more bolt holes that have been oversized twice per Part III, then no additional oversize repairs may be performed; instead proceed to step 4.k. in Part II.
   - If an indication or noise is found with equal to or greater than 50% in one or more bolt holes that have been oversized once, then ream the bolt holes to the next oversized repair as described in step 3; then repeat step 4.

5. Perform the ECI method (using Inspection Type 2 criteria with 50% calibration standard) on the reamed bolt holes. Follow the guidance under "Inspection Methods" on page 12.
   - If no indications are present, proceed to step 6.
   - If an indication is found, proceed to step 4.k. in Part II.
6. For each bolt hole that was reamed to an oversized diameter, ream the associated bolt hole in the spar box to match the oversized diameter. Take special care to ensure all reaming is performed concentric to the original spar box hole by using a tooling block or drill guide.
7. Procure replacement oversized bolt(s) and installation hardware as required.
8. Make a logbook entry documenting compliance with Part III of this service bulletin, including a statement indicating which bolt holes were repaired and the number of times each bolt has been repaired (once or twice).
9. Once repairs are completed, proceed to step 6 of Part II.

Part IV. Action Required

1. Wing Spar Modification (Kit)

   A wing spar reinforcement kit is available for certain aircraft models. When installed, this modification increases the longevity of the wing spars and reduces the rate that recurring inspections are required as defined in Compliance Times, Table 1 on page 3.

   NOTE: Modification of a wing spar may be performed at anytime prior to accumulating a total of **25,000** CSH. When a wing spar reaches a total of **17,500** CSH, the kit must be installed or the wing spar must be replaced per "Wing Spar Replacement", below.

   a. Model Effectivity

      Wing spar modifications can be performed on all aircraft models in Group 1 except for PA-28R-180 Arrow and PA-28R-200 Arrow / Arrow II. No modification or kit is currently approved for all aircraft models in Group 2 and aircraft models PA-28R-180 Arrow and PA-28R-200 Arrow / Arrow II in Group 1.

   b. On each main wing spar being modified, perform a bolt hole inspection per Part II. Wing spars must pass inspection to be approved for modification.

   c. Order and install Kit - Spar Assy Reinforcement - Wing, Piper P/Ns 88731-701 (LH Wing Spar) and/or 88731-702 (RH Wing Spar) as required.

   d. Make a logbook entry documenting compliance with Part IV of this service bulletin including a statement describing the action taken (wing spar modification) and instruction to follow the inspection routine for modified wing spars as defined in Table 1 on page 3.

2. Wing Spar Replacement

   Replacement is required when each wing spar reaches their total CSH life limit, as defined in Table 1 on page 3, or are rejected during inspection per Part II.

   a. Remove each affected wing from the aircraft and tag each inboard main spar as "Spar Retired/Rejected per SB 1372" as applicable. Refer to the appropriate AMM or SM for removal instructions.

   b. Render the retired inboard main spar unusable, through destructive means, to prevent unairworthy installations. If the remainder of the wing assembly is to be reused, take special care not to damage any other parts other than the inboard main spar.

      NOTE: It is recommended photos of the retired spar(s) are taken to verify, if requested, that the spar(s) are indeed no longer usable.

   c. Order/procure service replacement wing assemblies or main wing spars as required. Depending on the condition of the service replacement parts, compliance with Part I or Part II of this service bulletin may be required before installation. Refer to "Compliance Times" on page 2 for more information.

   d. Install the service replacement wing assembly or the original wing assembly with service replacement main wing spar. Refer to the appropriate Piper AMM or SM for installation instructions.

   e. Make a logbook entry documenting compliance with Part IV of this service bulletin including a statement describing the action taken (main wing spar retired/rejected and parts being replaced/retained) and instructions to follow the appropriate inspection routine for the replacement spar as defined in Table 1 on page 3.

INSPECTION METHODS: Follow the Instructions for the implementation of the inspection methods described here. This section describes the methodology for eddy current and fluorescent penetrant inspections.

Eddy Current Inspection Method

The standard, SAE ARP4402, "Eddy Current Inspection of Open Fastener Holes in Aluminum Aircraft Structure," should be used when performing the applicable inspections under Instructions, below.

NOTE: Prior to inspection, wipe the surfaces clean using a soft cloth dampened with isopropyl alcohol or mineral spirits.

Personnel Qualifications:

Personnel that perform eddy current and/or fluorescent penetrant inspections shall be qualified in accordance with NAS 410 (or equivalent standards that are listed in FAA Advisory Circular (AC) 65-31B) as qualified Level II or Level III nondestructive inspection personnel.

Eddy current bolt hole inspections shall be performed in accordance with SAE ARP4402 or a written procedure specific to the aircraft being inspected and approved by the FAA.

Equipment:

- Equipment used shall provide impedance plane diagrams.
- Probes may be either absolute or differential coil configurations.
- For manual bolt hole probing: use probe collars at an increment of every 1/64 inch to ensure the uniform depth of rotation and to aid in reducing lift-off effects.
- Automated scanning systems may be used.
- Bolt hole probes shall match as closely as possible, but not exceed, the bolt hole diameter. Split core probes may be expanded to a maximum of 0.050 inch beyond the probe's nominal diameter (based on the probe manufacturer's recommendation). The fill factor shall be 80 % minimum.
- Holes being inspected shall be no larger than 10 % of the expanded bolt hole diameter.
- A right angle (90-degree) surface probe may be used for further detail indication, if needed.

Reference Standard:

- Any reference standard used shall be of the same conductivity 2024-T3 within ±15 % IACs. It shall have electrical discharge machining (EDM) notches for simulating defects as calibration references.
- The surface finish shall be 63 RHR or better.
- The reference standard shall be, as required:
  - Inspection Type 1: Have a corner notch size of 0.030 x 0.030 inch
  - Inspection Type 2: Have a corner notch size of 0.050 x 0.050 inch

  (Screen set at minimum of three divisions vertical with a phase signal of between 45 and 120 degrees separation from the horizontal lift-off.)
- Frequency used shall be between 100 and 500 kHz.
- The calibration shall be checked at the beginning and end and every 30 minutes during inspections.

Equipment Guidelines:
The following is a list of equipment capable of performing the inspections described in this service bulletin. The following optional inspection equipment has been shown to be adequate to conduct this procedure and is provided as an example only. Other equipment meeting the requirements under the heading "Equipment" may be used.

NOTE: Other manufacturers offer equivalents to what is listed here (including GE, Hocking, Rohman, Uniwest, VM, and Zetec).

Eddy Current Inspection Method (cont.)

- NORTEC 500D or 600D Series Portable Eddy Current Flaw Detector – Olympus
- Bolt hole probe, 0.375 in. with 0.062 inch shielded coil – Olympus
- A bolt hole probe must first be used to inspect the bolt holes; an Olympus right angle (90-degree) surface probe with 0.062 inch shielded coil may be used for a more detailed inspection, if needed.
- For the calibration standard (NIST traceable) for bolt holes and surface, use the Air Force General Purpose Eddy Current Standard with the following criteria:
  - Bolt Hole
    - Inspection Type 1: 0.030 x 0.030 inch corner notch, 0.030 inch radial notch
    - Inspection Type 2: 0.050 x 0.050 inch corner notch, 0.050 inch radial notch
  - Surface: 2024-T3: 0.008, 0.020, and 0.040 inch depth EDM notches
  - Frequency 300-500 kHz, EDM notch set at five (5) divisions screen height

Acceptance:
Using the successive evaluation procedure provided under Instructions, step 4 of Part II, relevant crack or crack-like indications with amplitudes equal to or greater than 50 % of the reference level signal shall be rejected and documented (i.e., such an amplitude reading may mean that the spar does not meet type design requirements and must be reported to Piper Aircraft, Inc. for disposition; fluorescent penetrant inspection is to be accomplished on relevant indications as part of the evaluation).

The subject bolt holes, as viewed from beneath the wing, penetrate the aluminum sheets in the lower skin lap joint, the lower surface of the wing spar box, the lower flanges of the spar extrusions, and the web doublers on the upper surface of the lower spar flange. The pass-fail criteria of this inspection is only applicable to a crack in the spar extrusion. Damage in the other areas mentioned should be reported to Piper Aircraft, Inc. for disposition.

It is possible for non-crack damage, such as fay gaps, thread marks, gouges, or edge chips in the spar bolt hole to return a flaw indication similar to that of a crack. Multiple indications or broad indications may be associated with fay gaps or swarf within these fay gaps and may not be representative of cracks.

If an indication is observed, the hole should be carefully inspected for non-crack damage to eliminate the possibility of false crack indications. Any non-crack damage, including elongated holes, should be evaluated by a FAA designee (DER). See "Further Actions", below.

Fluorescent Penetrant Inspection Method

If there is paint in the inspection area, remove it from the area specified using only chemical processes. Abrasives or other mechanical methods for paint removal will hide the existence of any cracks, making it impossible to do an accurate inspection. Use isopropyl alcohol to wipe clean the areas to be inspected where paint was removed.

Perform a fluorescent penetrant inspection for cracks as described in FAA AC 43.13-1B, “Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair,” Chapter 5, Section 5.

If no cracks are detected during the inspection, wipe the area of inspection clean with isopropyl alcohol. Apply primer to the areas where paint was removed for inspection using MIL-PRF-85582 Type I Class C2 primer. Alternatively, use any primer conforming to MIL-PRF-23377 and apply per the primer manufacturer’s instructions.

Any non-crack damage, including elongated holes, that cannot be repaired per Part III should be evaluated by a FAA designee (DER). See "Further Actions", below.

Further Action:

Non-crack damage that is discovered as a result of the inspections described in Part II may require a repair, outside of the scope of Part III, that is not defined in this service bulletin. The damage should be evaluated by an FAA designated engineering representative (DER) (or the equivalent authorized by civil aviation regulators outside the U.S.). The FAA website (link) provides a DER directory that lists designees by their location and lists their credentials. Visit https://www.faa.gov/other_visit/aviation_industry/designees_delegations/ (link) to obtain the regularly updated PDF directory.

INSPECTION AREA CARE:

Care for Bolts and Bolt Holes

To facilitate bolt removal and avoid damage to the bolt holes, follow this guidance.

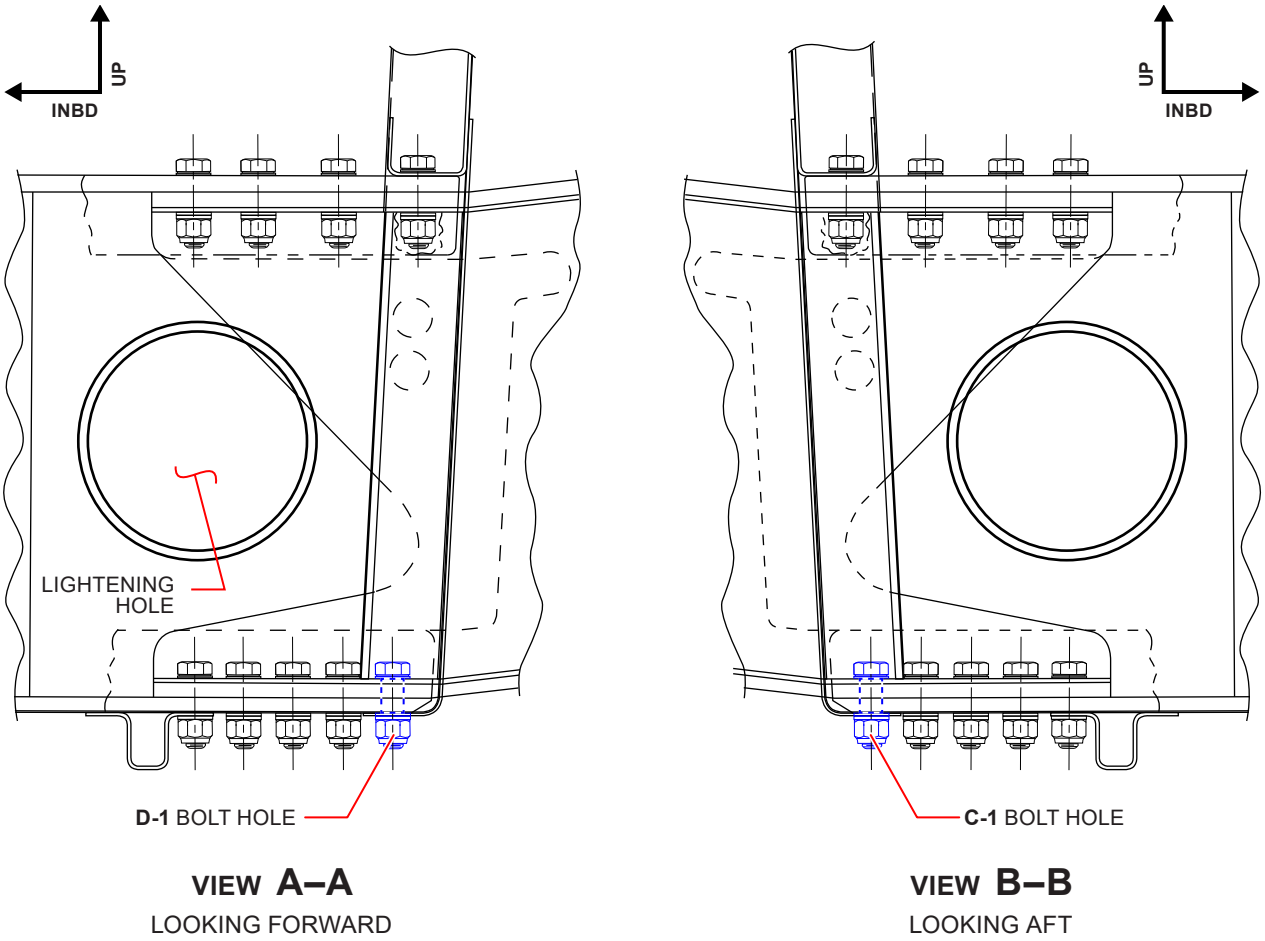
- Within the instructions for wing removal found in the applicable Piper AMM, there is the statement, “Arrange and put in place a suitable fuselage cradle and supports for both wings.” Proper placement of these supports can neutralize the shear loading of the bolt at the interface of the wing spar and spar box, easing bolt removal.
- Apply penetrating oil around all washers in the inspection area. Capillary action will draw the oil to the bolt shank to facilitate removal. One such oil is Kroil Penetrating Oil Aerosol, from Kano Laboratories (visit www.kroil.com and see “Where To Buy”).
- Remove the nut and washers. After removing the nut, apply torque to the bolt head to rotate the bolt approximately one turn, to help draw in the penetrating oil and break the bolt shank free from the hole. Do not wrench the bolt out of its hole, because this can result in thread marking of the hole.
- Before removing a bolt from its hole, thoroughly clean all debris from the exposed threaded end. Use a nylon bristle brush, as necessary, to remove all debris from the threads and solvent clean using acetone.
- Ideally, three people should work simultaneously to remove the bolts. This approach should not demand a lot of effort from the group, as follows:
  - One person adjusts the wing supports or deflects the wing tip up and/or down to neutralize the shear loading.
  - A second person underneath the aircraft pushes the threaded end of the bolt to move it up and out of the hole.
  - A third person, in the aircraft, would receive and remove the pushed bolt.
  - For the person underneath the aircraft: a suitable non-marring tool (such as a 1/4-inch wooden dowel) may be used to push the bolt completely upwards through the hole. If necessary, use a rubber mallet or equivalent to very gently tap the lower end of the tool upwards – do not to make contact with the hole bore.
- Clean the inspection areas using acetone.

Cleaning Surface Imperfections:

Surface imperfections (blemishes, drag marks or scratches) in the hole bore can be cleaned – deburred, smoothed, and polished – using a medium (brown colored) or fine (rust colored) rubberized abrasive, either a point or cylinder, on a 1/16-inch mandrel in a rotary tool:

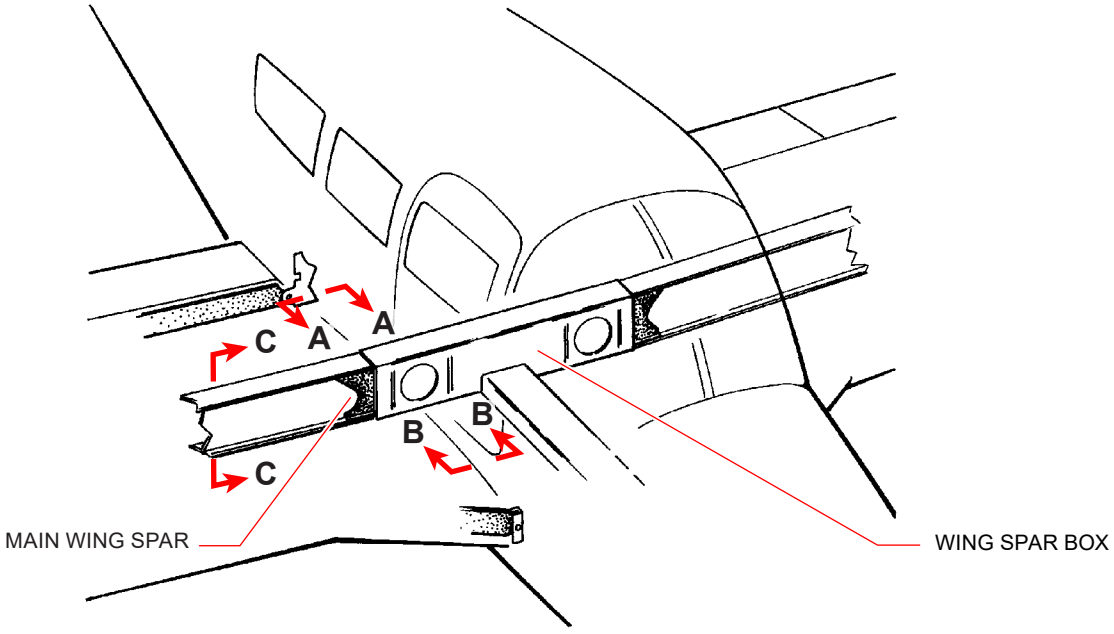
- Cratex Q8M or Q8F – 1 x 9/32 bullet point
- Cratex Q6M or Q6F – 7/8 x 1/4 cylinder

The best results are obtained between 7,500 and 15,000 RPM, using light work pressure. To procure Cratex points, call 800-800-4077 or visit www.cratex.com.



VIEW A–A
LOOKING FORWARD

VIEW B–B
LOOKING AFT



WARNING: Do not drive bolts into or out of the main spar attaching bolt holes (see Views A–A and B–B). Be careful to avoid damaging the bolt holes while removing and replacing the bolts. Refer to "Care for Bolts and Bolt Holes" in this service bulletin.

Figure 1 (Sheet 1 of 2)
Typical Main Wing Spar Attach Bolts and Spar Cross Section (Right Wing Shown)

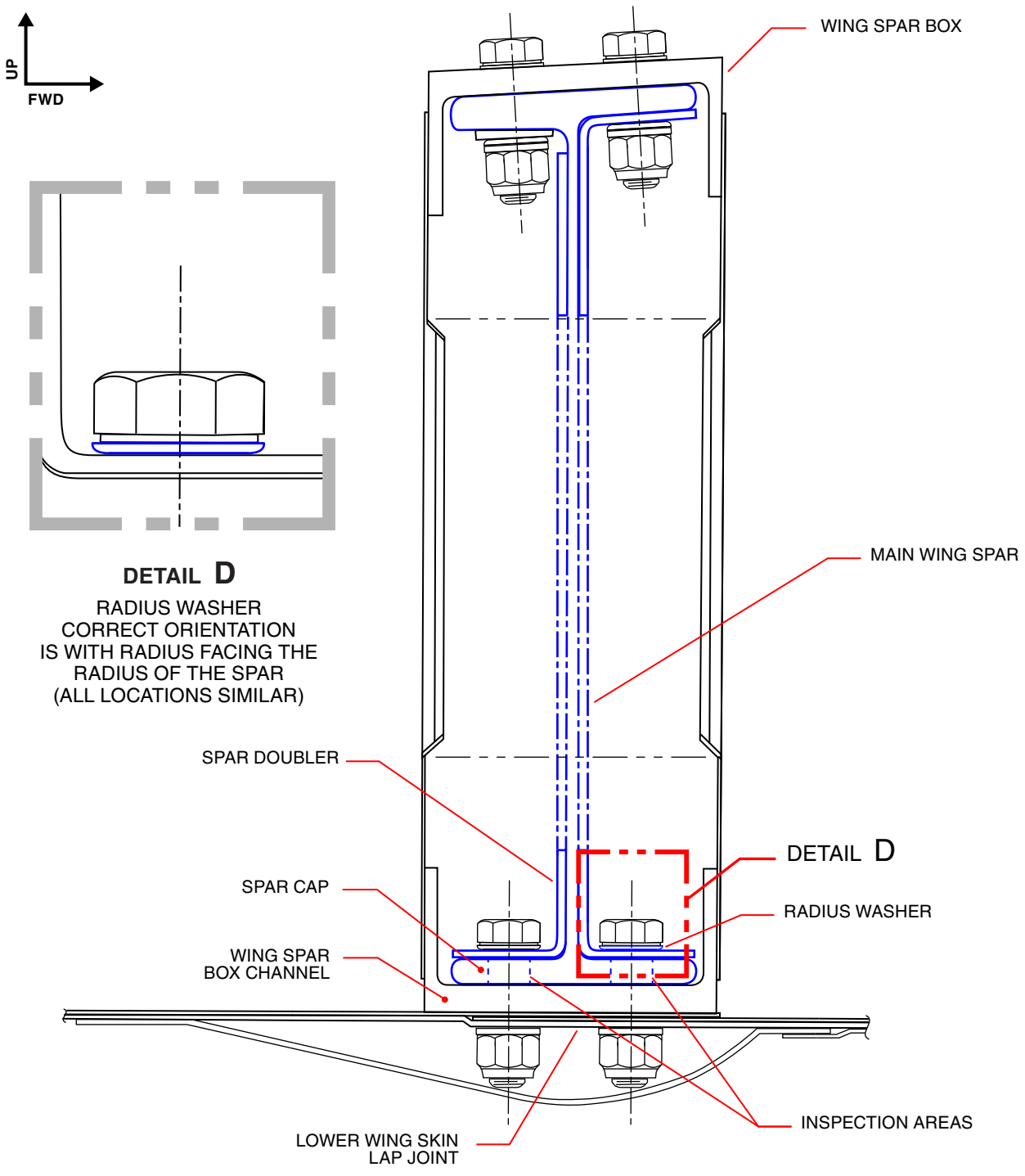


Figure 1 (Sheet 2 of 2)
Typical Main Wing Spar Attach Bolts and Spar Cross Section (Right Wing Shown)

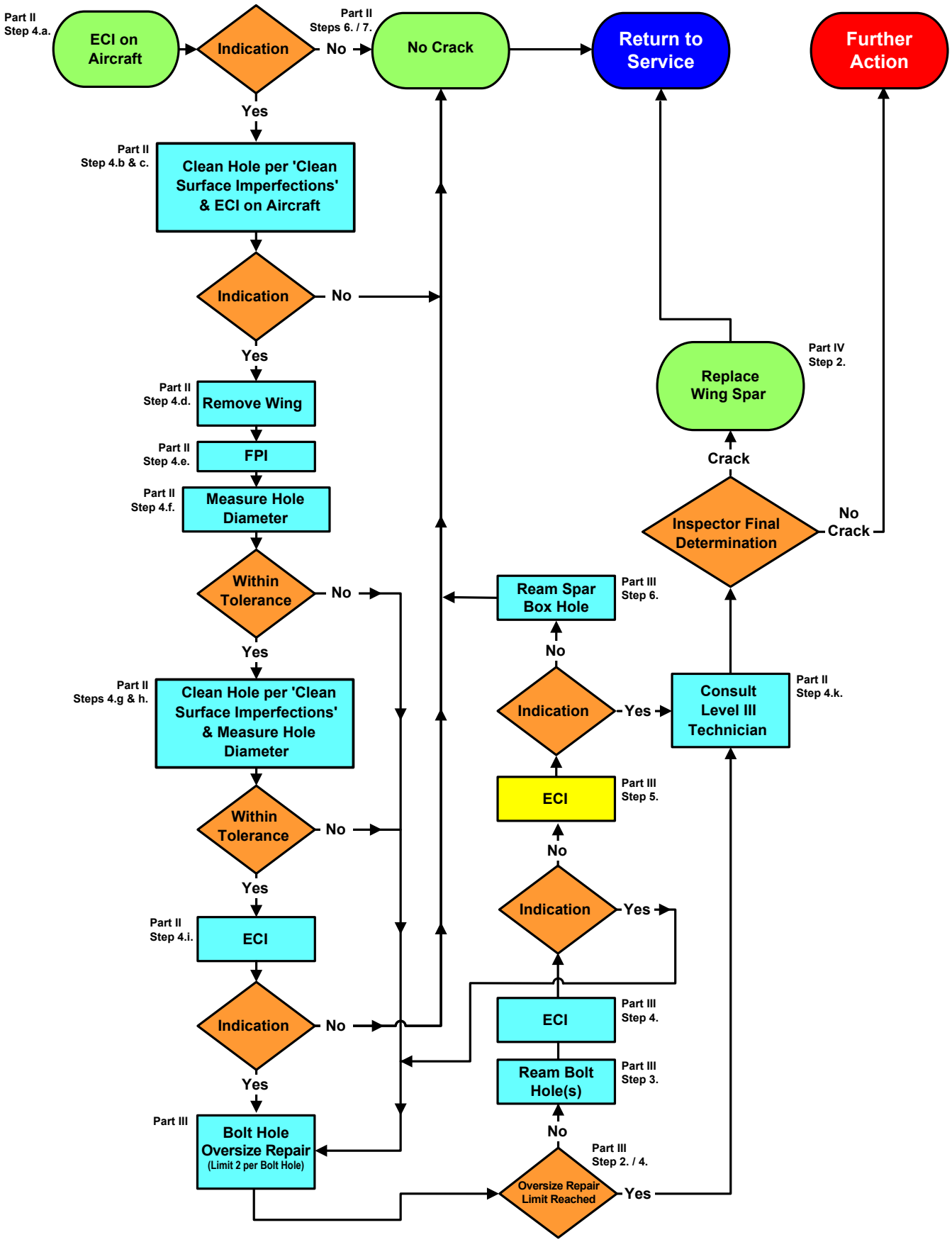


Figure 2
Inspection Process Flowchart

MATERIAL REQUIRED: Per aircraft:

- On condition, quantity as required, wing spar attach bolts, nuts, washers, and other installation hardware, per aircraft. Refer to the appropriate Piper airplane parts catalog (APC) for part numbers.
- On condition, one (1) each, Kit - Spar Assy Reinforcement - Wing, Piper P/N 88731-701 (LH) and 88731-702 (RH)

  NOTE: Kit installation is limited to specific models as defined in Table 1 on page 3 and "Part IV. Action Required" on page 11.
- On condition, up to two (2) wing assemblies or main wing spar(s), per aircraft. Refer to the appropriate Piper APC for part numbers.

AVAILABILITY OF PARTS: Procure Locally or at your Piper Approved Service Center – Find your local service center at https://www.piper.com/

EFFECTIVITY DATE: This service bulletin is effective on April 4, 2024.

SUMMARY: Please contact your Piper Approved Service Center to make arrangements for compliance with this service bulletin in accordance with the compliance time indicated.

NOTE: Please notify the factory of any address/ownership corrections. Changes should include aircraft model, serial number, and current owner's name and address.

Corrections and/or changes should be directed to:

PIPER AIRCRAFT, INC.
Attn: Customer Service
2926 Piper Drive
Vero Beach, FL 32960
or:
CustomerService@piper.com
Please include in subject line: "Aircraft ownership update"

BULLETIN SUPPLEMENT - PROCEDURAL OPERATING INFORMATION

MATERIAL ALLOWANCE: N/A

LABOR ALLOWANCE: N/A

DISPOSITION OF PARTS IN STOCK: N/A

DISPOSITION OF PARTS REPLACED: D (nuts and/or bolts)