



# SERVICE *No. 886* BULLETIN

Piper Aircraft Corporation  
Vero Beach, Florida, U.S.A.

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\* PIPER CONSIDERS \*  
\* COMPLIANCE MANDATORY \*  
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Date June 8, 1988 S

SUBJECT: Wing Spar Inspection

<u>MODELS AFFECTED:</u>	<u>GROUP I:</u>	<u>SERIAL NUMBERS AFFECTED:</u>
PA-28-140 Cherokee		28-20000 through 28-7725290
PA-28-150/160/180 Cherokee		28-1 through 28-7505259 and 28-E13
PA-28-151 Warrior		28-7415001 through 28-7715314
PA-28-161 Warrior II		28-7716001 through 28-8616057, 2816001 and up
PA-28-181 Archer II		28-7690001 through 28-8690062, 2890001 and up
PA-28R-180 Arrow		28R-30001 through 28R-7130013
PA-28R-200 Arrow/Arrow II		28R-35001 through 28R-7635545

GROUP II:

PA-28R-201 Arrow III	28R-7737001 through 28R-7837319
PA-28R-201T Turbo Arrow III	28R-7703001 through 28R-7803374
PA-28RT-201 Arrow IV	28R-7918001 through 28R-8218026
PA-28RT-201T Turbo Arrow IV	28R-7931001 through 28R-8631005, 2831001 and up
PA-28-235 Cherokee	28-10001 through 28-7710089 and 28-E11
PA-32-260 Cherokee Six	32-1 through 32-7800008
PA-32-300 Cherokee Six 300	32-40000 through 32-7940290

COMPLIANCE TIME: (ALL AIRCRAFT)

1. Within the next fifty (50) hours time in service, accomplish INSTRUCTION 1 and INSTRUCTION 2 below.
2. Within 50 hours time in service of the initial and repetitive compliance times determined in instruction 2 below, accomplish INSTRUCTION 3.

(Over)  
ATA: 5711

PURPOSE:

On March 30, 1987, a PA-28 engaged in pipeline patrol operations suffered an in-flight wing separation resulting in a fatal accident. Investigation revealed the wing failure was due to propagation of a fatigue crack, which originated in the wing lower main spar cap.

F.A.A. issued Airworthiness Directive 87-08-08 requiring wing removal and inspection on many PA-28 and PA-32 series airplanes with more than 5000 hours total time in service. To date, over five-hundred (500) inspections have been accomplished. Only two (2) negative findings were reported on a pair of PA-32's operating in a severe environment and with considerable damage histories.

Based on these 500+ inspections, and extensive wing fatigue and fracture analyses begun by Piper, F.A.A. suspended AD 87-08-08 on September 28, 1987; and published additional information in the General Aviation Airworthiness Alerts (Special Issue Advisory Circular AC 43.16). The Piper fatigue/fracture analysis program is complete, resulting in the inspection requirements contained in this Service Bulletin.

Piper understands that the majority of aircraft are, have been, and will continue to be operated well within the aircraft's design parameters during all of their operational life. It has been determined that aircraft that remain in this "normal usage class" may safely continue to operate tens of thousands of hours before wing removal and inspection is required.

HOWEVER, Piper also realizes that some small number of aircraft engage in operations which, for the purposes of this Service Bulletin, are considered "severe" or "extreme" and require greatly reduced wing removal and inspection intervals.

This Service Bulletin provides instructions for: (1) determining the aircraft's "usage class"; (2) determining the initial and recurring inspection times; and (3) accomplishing the wing spar inspection(s).

The contents of this Service Bulletin are somewhat complicated. Owner/operators should read it CAREFULLY, and conduct a thorough review of their aircraft's operating records to establish the correct compliance times. **FAILURE TO FULLY COMPLY WITH THIS SERVICE BULLETIN COULD SERIOUSLY AFFECT THE STRUCTURAL INTEGRITY, SAFETY AND AIRWORTHINESS OF THE AIRCRAFT!**

APPROVAL:

The technical contents of this Service Bulletin have been approved by the FAA.

INSTRUCTIONS:

Instruction 1, Determination of Aircraft "Usage Class". (See TABLE 1)

NOTE: It is necessary to have complete documentation and/or knowledge of the aircraft's entire operating history, in order to make a valid determination of "Usage Class" and Compliance times.

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A. Normal Usage, Class 'A'.

This class applies to all aircraft which do not and have not engaged in operations considered as "Severe", "Extreme", or "Unknown" in the Usage Class described below.

Most aircraft affected by this Service Bulletin will fall into this "Normal Usage Class". Normal flight training operations fall into this class as well. However, if there is any doubt as to the aircraft's operating history, it is recommended that the initial inspection be conducted in accordance with the UNKNOWN USAGE CLASS 'D' Compliance Time.

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B. Severe Usage, Class 'B'.

This class applies to aircraft which have engaged in severe usage, involving contour or terrain following operations, (such as power/pipeline patrol, fish/game spotting, aerial application, aerial advertising, police patrol, livestock management or other activities) where a significant part of the total flight time has been spent below one-thousand (1000) feet AGL, altitude.

NOTE: Aircraft with part of total time in service in SEVERE USAGE CLASS 'B' operations and part in NORMAL USAGE CLASS 'A', may adjust compliance times by a "Factored Service Hours" calculation. See Instruction 2A to calculate "Factored Service Hours".

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C. Extreme Usage, Class 'C'.

This class applies to aircraft which have been damaged due to operations from extremely rough runways, flight in extreme damaging turbulence or other accident/incident which required major repair or replacement of wing(s), landing gear or engine mount.

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D. Unknown Usage, Class 'D'.

This class applies to aircraft and/or wings of unknown or undetermined operational or maintenance history.

(Over)

Instruction 2, Determination of Initial and Repetitive Compliance Times.

Upon determining aircraft model/serial number "affected" group, from Page 1, and Aircraft "Usage Class" from Instruction 1, determine the applicable initial or repetitive wing spar inspection compliance time from TABLE 1 on Page 7.

Instruction 2A, Factored Service Time Formula.

NOTE: This formula applies only to aircraft in SEVERE USAGE CLASS 'B'. It may be used to calculate the initial and repetitive inspection times in factored hours to afford use of TABLE 1 in Instruction 2 above, provided a portion of their operating time in service has been in "Normal Usage, Class A".

FACTORED SERVICE hours shall be determined as follows:

EXAMPLES (For Group I aircraft)

	<u>Hours in</u> <u>Severe Service</u>	+	<u>Hours in</u> <u>Normal Service</u>	=	<u>FACTORED SERVICE</u> hours
			<u>17</u>		
(1)	2000	+	<u>10000</u> <u>17</u>	=	2588 Factored Service Hours
(2)	3500	+	<u>8500</u> <u>17</u>	=	4000 Factored Service Hours

EXAMPLE NO. 1 - Initial inspection not required at this time. Will require initial inspection when Total Factored Service Hours reach 3700.  
(12,000 hours total time in service.)

EXAMPLE NO. 2 - Initial inspection required within the next 50 hours time in service.  
(12,000 hours total time in service.)

Instruction 3, Wing Spar Inspection Instructions.

To prevent the propagation of cracks in the wing lower spar cap and subsequent separation of the wing, accomplish the following.

- (A) Remove both wings in accordance with Piper Service Letter No. 997, dated May 14, 1987.
- Caution: Use extreme care in removing and replacing the wing main spar to the fuselage attachment bolts (18 per side) to preclude damaging the bolt holes. Do not drive the bolts in or out of the holes. As the bolts are removed, number each bolt and hole to ensure replacement in the same hole. Use proper torque values when installing bolts. If replacement of some bolts is required, ensure proper part number and grip length. Installation of new MS20365-624C nuts on the main spar attach bolts during wing reinstallation is recommended.
- (B) Visually inspect, using a 10-power (minimum) magnifying glass and a dye-penetrant method or equivalent, for cracks in the wing lower spar cap from the wing skin line outboard of the outboard row of wing attach bolt holes to an area midway between the second and third row of bolt holes from the outboard row.
- (1) If no cracks are found, prior to further flight, accomplish the actions specified in Paragraph (C) below.
  - (2) If any cracks are found, prior to further flight, replace the spar or wing with a serviceable unit shown to be free of cracks when subjected to the inspections specified in this paragraph.
- (C) Visually inspect for cracks in each upper wing skin adjacent to the fuselage and forward of each main spar.
- (1) If no cracks are found, reinstall the wings in accordance with the instructions in the applicable Piper Maintenance Manual for that airplane.
  - (2) If cracks are found, prior to further flight, repair in accordance with AC 43.13-1, and reinstall the wings in accordance with the instructions in the applicable Piper Maintenance Manual for that airplane.
- (D) Make an appropriate logbook entry of compliance with this Service Bulletin.

(Over)

MATERIAL REQUIRED:

To be determined by inspection.  
Refer to the appropriate  
aircraft Parts Catalog.

AVAILABILITY OF PARTS:

Your Piper Field Service Facility.

EFFECTIVITY DATE:

This Service Bulletin is effective upon receipt.

SUMMARY:

Please contact your Factory Authorized Piper Field Service Facility to make arrangements for compliance with this Service Bulletin, in accordance with the Compliance Time indicated.

NOTE: If you are no longer in possession of this aircraft, please forward this information to the present owner/operator and notify the Factory of address/ownership corrections. Changes should include aircraft model, serial number, current owner's name and address.

Corrections/Changes should be directed to:

Piper Aircraft Corporation  
Attn: Customer Services  
P.O. Box 1328  
Vero Beach, FL 32961-1328

USAGE CLASS	GROUP I AIRCRAFT REPETITIVE INSPECTION		GROUP II AIRCRAFT REPETITIVE INSPECTION	
	INITIAL INSPECTION	REPETITIVE INSPECTION	INITIAL INSPECTION	REPETITIVE INSPECTION
NORMAL USAGE CLASS 'A'*	62,900 Hours total time in service*	Every 6000 hours time in service after 62,900 hours total time in service	30,600 Hours total time in service*	Every 3000 hours time in service after 30,600 hours total time in service
SEVERE USAGE CLASS 'B' **(see instruction) 2A	Within 50 hours time in service upon reaching 3,700 hours** total time in service	Every 1,600 hours time in service after initial inspection	Within 50 hours time in service upon reaching 1,800 hours** total time in service	Every 800 hours time in service after initial inspection
EXTREME USAGE CLASS 'C' (Damage History)	Within 50 hours time in service***	Every 1,600 hours time in service after initial inspection	Within 50 hours time in service***	Every 800 hours time in service after initial inspection
UNKNOWN USAGE CLASS 'D' (Aircraft/Wings with unknown service history)	Within 50 hours time in service***	Determined by applicable usage class after initial inspection	Within 50 hours time in service***	Determined by applicable usage class after initial inspection

\*NOTE: Aircraft which have complied with AD 87-08-08 in Normal Usage Class 'A', must comply with the initial inspection requirements upon reaching 62,900 hours total time in service for Group I and 30,600 total time in service for Group II.

\*\*NOTE: Aircraft which have previously complied with AD 87-08-08 in Severe Usage Class 'B' are in compliance with the initial inspection requirement, only if the AD 87-08-08 inspection was performed at or after 3,700 hours time in service for Group I or 1,800 hours time in service for Group II.

\*\*\*NOTE: Aircraft which have previously complied with AD 87-08-08 in CLASS 'C', and 'D' are in compliance with the initial inspection requirements of this Service Bulletin.