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SERVICE BULLETIN NO. 31 WING CENTER SECTION INSPECTION

REVISION 1

DATE: June 14, 2002

SUBJECT: Visual inspection of wing center section structure for evidence of corrosion and/or damage.

MODELS AFFECTED: All Ercoupe 415-C, 415-CD, 415-D, 415-E and 415-G aircraft.
All Forney F-1 and F-1A aircraft.
All Alon A-2 and A-2A aircraft.
All Mooney M10 aircraft.

COMPLIANCE: Initial inspection required within the next 12 calendar months or within the next 100 hours time in service or annual inspection, whichever occurs first. Continued inspections every three years or whenever additional corrosion is suspected, whichever comes first.

PERSONNEL: **IMPORTANT:** All work and inspections required by this Service Bulletin are to be performed by a properly rated and equipped certified mechanic or repair station with experience in the work, use of equipment, inspections, and repairs listed.

STATEMENT OF DIFFICULTY:

There have been field reports of severe corrosion in the wing center section structure of several aircraft. Additional field reports indicate that hard landings or taxiing over rough terrain may transmit damaging loads to the rear spar carry through structure. The most effective means of preventing corrosion damage is early identification and correction. However, the original design configuration does not provide adequate means for routine visual examination of the wing center section wing walkway boxes during periodic inspections. Undetected corrosion or undetected damage, if severe enough, could lead to structural failure of the wing center section, which could result in loss of control of the airplane. Consequently, this Service Bulletin provides for the careful inspection of the wing center section to

establish the condition of the center section structure using one of three methods:
Method 1: Install inspection openings in the bottom of the wing center section skins. The inspection openings will then allow routine inspections to be accomplished as required under FAR Part 43, Appendix D, (f).

Method 2: A Fiberscope Borescope or an Endoscope meeting the minimum characteristics listed in this Service Bulletin may be used to perform the inspections without the installation of inspection openings or outer wing panel removal.

Method 3: Remove the outer wing panels to gain visual access to the wing walkway box structure.

Carefully review the following procedures to determine the best method of accomplishing the inspections.

PROCEDURE:

1. For Methods 1, 2, & 3: Remove the forward floorboard, seat cushion(s), seat bucket(s), and any other interior items necessary to gain clear access to the wing center section where it passes through the fuselage.
2. For Methods 1, 2, & 3: Remove all soundproofing in the lowest belly regions and discard. Do not replace soundproofing. Inspect and clear all drain holes.
3. For Methods 1, 2, & 3: Inspect front and rear spars in fuselage area and surrounding structure for corrosion, wrinkles, loose rivets, skin cracks, and unrepaired damage. FAA Advisory Circular AC 43-4A, "Corrosion Control for Aircraft", dated 7/25/91 or later, should be used to identify corroded areas. Due to the extensive use of thin materials in the wing center section, any parts with corrosion beyond "light corrosion" as defined in AC 43-4A, Chapter 6, Section 4, paragraph 640 is considered unairworthy. Repair or replace any parts considered unairworthy prior to further operation.
4. For Methods 1, 2, & 3: For Ercoupes prior to Serial Number 4869, verify that AD 59-05-04 has been complied with by the installation of the rear spar stiffeners. Ercoupe Service Memorandum 53A shows the details of this reinforcement modification. If there are no rear spar reinforcements in place, install them in accordance with Ercoupe Service Memorandum 53A. Univair Service Kit SK-9 contains the required parts to comply with Ercoupe Service Memorandum 53A.
5. For Methods 1, 2, & 3: On Ercoupes Serial Nos. 113 to 2037 inclusive, if not already done, comply with Ercoupe Service Bulletin No. 18 by installation of center section stiffener clips and, if required, belly skin reinforcements in accordance with Ercoupe Service Bulletin No. 18.
6. For Methods 1, 2, & 3: On Ercoupes prior to Serial Number 5714, install drain holes and clam shell cover plates in accordance with Fornaire Service Bulletin No. 109. Univair Service Kit SK-37 contains required parts to comply with this bulletin.

7. On all Ercoupe, Forney, Alon, and Mooney M-10 aircraft accomplish one of the following:

For Method 1: Locate eight inspection openings on the lower wing surface per the enclosed drawing, SB-31, Sheet 1, Revision None, dated 01-29-02. For aircraft with smooth bottom skins, all openings should be 4 inches in diameter. For aircraft with beaded bottom skins, four of the openings should be 4 inches in diameter and four of the openings should be 3 inches in diameter as shown on drawing SB-31.

CAUTION: If the opening locations specified by the diagram interfere with any skin stiffeners, alter the opening location to clear the stiffener. Be sure also to provide clearance for installation of reinforcement rings to be installed in Step 11.

Cut inspection openings at the locations noted above and deburr.

OR:

For Method 2: Acquire an Endoscope or Fiberscope Borescope that meets the following minimum characteristics:

- ? It must have a high intensity light source.
- ? The optical system must be of a quality such that it remains constantly in focus from about 4 mm (0.16 inch) to infinity.
- ? When the tip is approximately 4 mm from the inspected surface, a magnification of about 10X must be achieved.
- ? The image guide and protective sheath length must be approximately 2 feet long to insure that all areas of the wing center section structure may be properly inspected.
- ? There must be controllable articulation of the last 4 to 5 inches of the tip to insure that all areas of the interior of the wing panel structure may be seen through the endoscope or borescope.
- ? Univair has evaluated and found acceptable the Olympus OSF endoscope (sigmoidoscope) with a Fujinon FIL-150 light source for this alternate inspection means. Other scopes and light sources meeting the minimum characteristics above may also be acceptable, however, no other equipment has been evaluated by Univair.

Remove self-tapping sheet metal screws attaching fairing strips at gaps between center section and outer wing panels. Remove fairings.

OR:

For Method 3: Remove outer wing panels using following procedure for each wing (This procedure is best accomplished by two or more people):

- ? Remove self-tapping sheet metal screws attaching fairing strip at gap between center section and outer wing panel. Remove fairing.

- ? Remove aileron push-pull tube at aileron inboard end.
- ? Disconnect electrical wires leading to wing tip navigation light, landing light (if installed) and strobe light (if installed).
- ? Disconnect pitot and static line (left outer panel only).
- ? Place a padded horse under wing tip, or have someone support wing at its tip.
- ? Remove the two 5/16-inch bolts from the rear spar attachment fitting, and the two 5/8-inch bolts from wing hinge fitting at main spar. Remove outer wing panel.

8. Inspection procedure – Inspect the wing center section using one of the following procedures:

Method 1 (inspection opening method): Using a bright light that can fit through the inspection openings and that will properly illuminate each area of the wing center section, thoroughly inspect the wing panel structure for corrosion and unrepaired damage. Inspect all areas of the wing center section structure through all necessary openings in the wing center section until it has been determined that all areas of the wing center section between the front and rear spars and aft of the rear spar not accessible from the cockpit have been inspected for corrosion and unrepaired damage. FAA Advisory Circular AC 43-4A, “Corrosion Control for Aircraft”, dated 7/25/91 or later, should be used to identify corroded areas. Due to the extensive use of thin materials in the wing center section, any parts with corrosion beyond “light corrosion” as defined in AC 43-4A, Chapter 6, Section 4, paragraph 640 is considered unairworthy. If corrosion is found on the rear side of the front spar or if corrosion is suspected for other reasons, remove wing fuel tanks in accordance with the appropriate Service Manual and inspect the front side of the wing spars for corrosion (required). If no corrosion is found aft of the main wing spar, wing tank removal is to be accomplished at the inspector’s discretion. However, it is highly recommended that the wing fuel tanks be removed to inspect the front side of the main wing spar even if no corrosion is found elsewhere.

Method 2 (borescope method): On each side of the wing center section, insert the borescope into the wing center section through the gap between the wing center section and outer wing panel and through lightening holes in the center section ribs. Inspect all areas of the wing center section structure through all necessary openings in the wing center section until it has been determined that all areas of the wing center section between the front and rear spars and aft of the rear spar not accessible from the cockpit have been inspected for corrosion and unrepaired damage. FAA Advisory Circular AC 43-4A, “Corrosion Control for Aircraft”, dated 7/25/91 or later, should be used to identify corroded areas. Due to the extensive use of thin materials in the wing center section, any parts with corrosion beyond “light corrosion” as defined in AC 43-4A, Chapter 6, Section 4, paragraph 640 is considered unairworthy. If corrosion is found on the rear side of the front spar or if

corrosion is suspected for other reasons, remove wing fuel tanks in accordance with the appropriate Service Manual and inspect the front side of the wing spars for corrosion (required). If no corrosion is found aft of the main wing spar, wing tank removal is to be accomplished at the inspector's discretion. However, it is highly recommended that the wing fuel tanks be removed to inspect the front side of the main wing spar even if no corrosion is found elsewhere.

Method 3 (outer wing panel removal method): On each side of the wing center section, insert a bright light into the wing center section through the lightening holes in the center section ribs. With the light, a mirror, and any other equipment deemed necessary, inspect all areas of the wing center section structure through all necessary openings in the wing center section until it has been determined that all areas of the wing center section between the front and rear spars and aft of the rear spar not accessible from the cockpit have been inspected for corrosion and unrepaired damage. FAA Advisory Circular AC 43-4A, "Corrosion Control for Aircraft", dated 7/25/91 or later, should be used to identify corroded areas. Due to the extensive use of thin materials in the wing center section, any parts with corrosion beyond "light corrosion" as defined in AC 43-4A, Chapter 6, Section 4, paragraph 640 is considered unairworthy. If corrosion is found on the rear side of the front spar or if corrosion is suspected for other reasons, remove wing fuel tanks in accordance with the appropriate Service Manual and inspect the front side of the wing spars for corrosion (required). If no corrosion is found aft of the main wing spar, wing tank removal is to be accomplished at the inspector's discretion. However, it is highly recommended that the wing fuel tanks be removed to inspect the front side of the main wing spar even if no corrosion is found elsewhere.

9. Repair –

Replace any parts considered unairworthy (parts that are damaged or parts with corrosion beyond "light corrosion") prior to further operation (see Step 10).

Remove all light corrosion in accordance with the procedures outlined in Chapter 6, Section 5 of AC 43-4A. Clean and apply chemical conversion coating to the corrosion rework areas as outlined in Chapter 4 of AC 43-4A. For further corrosion resistance, a zinc chromate, zinc oxide, or two-part epoxy listed on the following chart may be applied by spraying or brushing after the chemical conversion coated surfaces have thoroughly dried. Comply with safety procedures of AC 43-4A, as well as paint manufacturer's safety, preparation, and application procedures, during all phases of treating the corroded areas. Be sure primer coating is applied evenly and smoothly so it won't be mistaken for corrosion on subsequent inspections.

Zinc Chromate primer coatings		Zinc Oxide primer coatings		2 Part Epoxy Primer	
Manufacturer	Part Number	Manufacturer	Part Number	Manufacturer	Part Number

Randolph	800 (green)	Tempo	A801 (yellow)	Randolph (Epibond)	W-2248 (off white)
Randolph	656 (yellow)	Tempo	A802 (green)	Randolph (Rand-O-Plate)	B6433 (dark green)
Tempo	A7-6889 (yellow)			Dupont	Corlar
Tempo	A7-6889A (green)				
Any other zinc chromate primer meeting TT-P-1757 or MIL-P-6889 or MIL-P-8585, Type I specification				Any other epoxy primer system meeting MIL-P-23377, Class I, Type 1 (yellow) or Type 2 (dark green)	

10. Replacement –

Replacement of unairworthy components of the wing center section may be accomplished in accordance with the Ercoupe, Forney, Alon, or Mooney M-10 Service Manual as applicable. Ercoupe Service Memorandum No. 53A provides detailed instructions for replacement of rear spar of wing center section. It is highly recommended that all interior surfaces of replacement parts be primed with one of the paints listed in step 9 before installation.

11. Reassembly and cover plate installation -

After inspections and repairs are complete, if inspection openings were made (Method 1), install cover plate assemblies in each opening as shown on drawing SB-31, Sheet 2, Revision None, dated 01-29-02. Secure each cover plate with three (3) #8 machine screws and three .032 thick washers.

Univair Service Kit SK-80-1 includes all inspection panel assemblies for aircraft with smooth center section bottom skins to comply with this Service Bulletin per Method 1. Kit SK-80-1 also includes rivets and cover plate attaching hardware.

Univair Service Kit SB-80-2 includes all inspection panel assemblies for aircraft with beaded center section bottom skins to comply with this Service Bulletin per Method 1. Kit SK-80-2 also includes rivets and cover plate attaching hardware.

Reinstall interior items removed in Step 1 and wing tanks, if removed.

Reinstall outer wing panels, if removed per Method 3, in reverse sequence of removal, making sure that mounting bolts are properly fitted and safetied. NOTE: The recommended method for tightening the nuts on the wing attach bolts is to draw nuts down tight and continue tightening as required to line up the nearest slot and cotterpin hole provided you do not exceed 100 ft-lb dry torque on the front bolts and 10 ft-lbs dry torque on the rear bolts. Safety wing attach bolts with NEW cotter pins: AN380-4-4 (MS24665-353) for front and AN380-2-2 (MS24665-132) for rear fittings. DO NOT reuse old cotter pins.

Reinstall left and right wing fairings between the wing center section and outer wing panels, if removed per Method 2 or 3.

12. Required documentation -

Make log book entry stating compliance with Service Bulletin No. 31. State which method was used for inspection (inspection panel method, borescope method, or wing removal method) and whether wing tanks were removed for inspection of forward side of front spar or not. Weight and balance change is considered negligible.

13. Continued inspections -

Assuming no corrosion has been found in the wing center section or that all corrosion has been detected, repaired, and protected from further corrosion, or corroded parts replaced, then the inspection procedures must be repeated every three years using one of the accepted methods described in this Bulletin. If additional corrosion is suspected prior to the end of the three-year inspection period, repeat the inspections and repairs of this Bulletin prior to further flight.

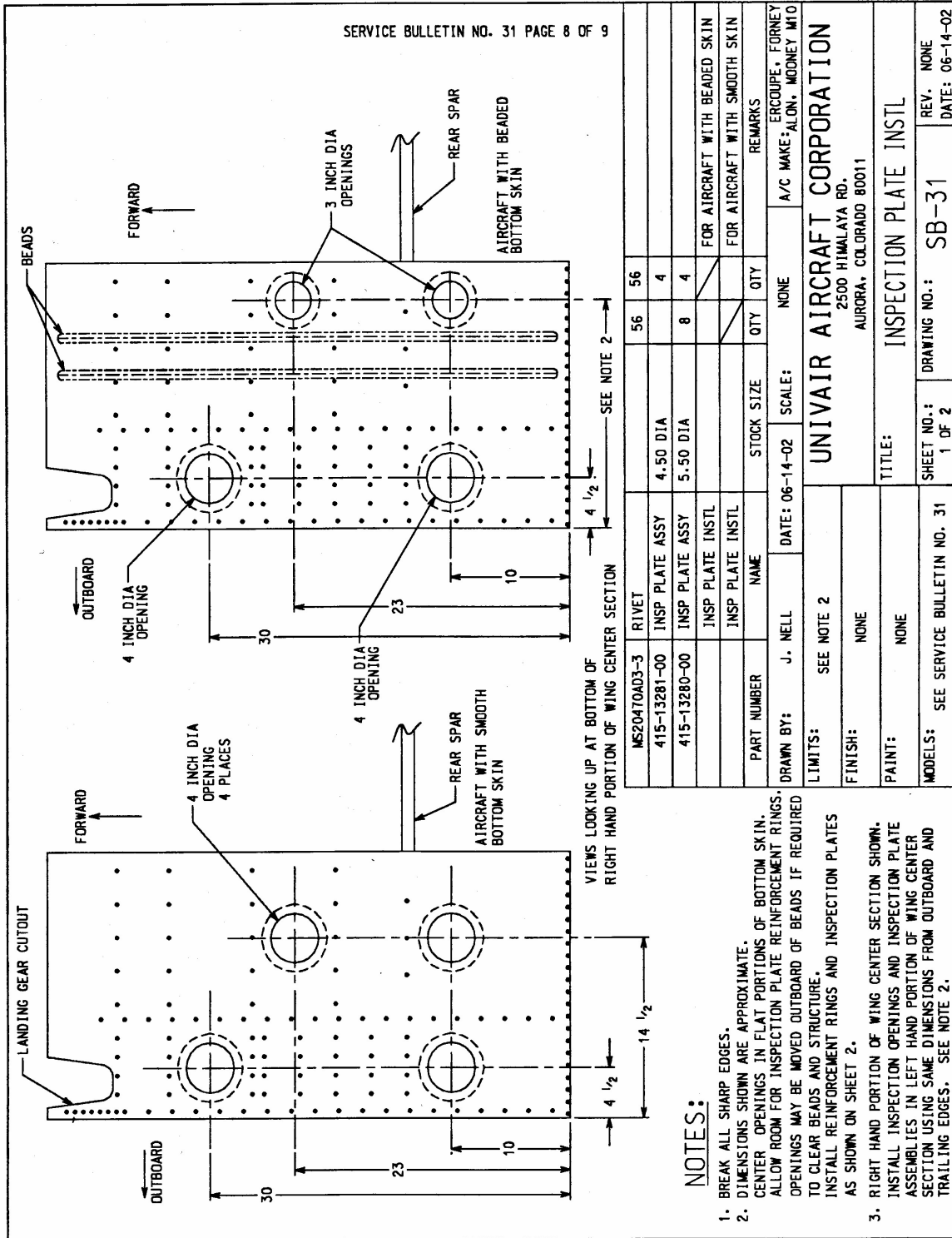
INFORMATION AND PARTS AVAILABILITY:

Copies of Ercoupe, Forney, Alon, and Mooney M-10 Service Manuals are available from Univair Aircraft Corporation.

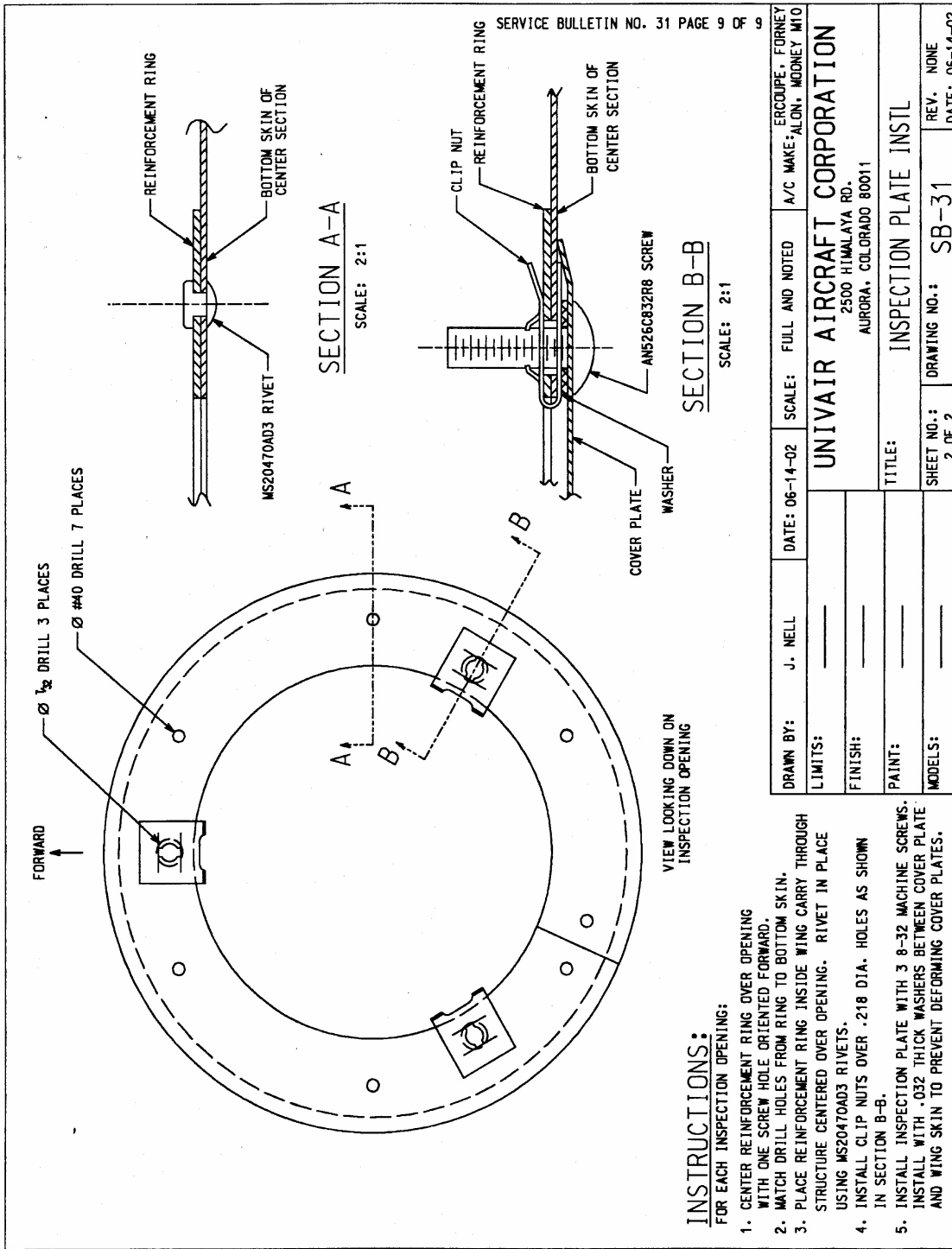
Copies of Ercoupe Service Memorandum No. 53A, Ercoupe Service Bulletin No. 18, and Fournier Service Bulletin No. 109 are available from Univair Aircraft Corporation.

Contact Univair Aircraft Corporation for availability and pricing of wing center section replacement parts and parts for complying with Service Memorandums and Bulletins.

Cover plate kits SK-80-1 and SK-80-2 are available from Univair Aircraft Corporation.



Click on drawing for a larger image.



INSTRUCTIONS:

FOR EACH INSPECTION OPENING:

1. CENTER REINFORCEMENT RING OVER OPENING WITH ONE SCREW HOLE ORIENTED FORWARD.
2. MATCH DRILL HOLES FROM RING TO BOTTOM SKIN.
3. PLACE REINFORCEMENT RING INSIDE WING CARRY THROUGH STRUCTURE CENTERED OVER OPENING. RIVET IN PLACE USING MS20470AD3 RIVETS.
4. INSTALL CLIP NUTS OVER .218 DIA. HOLES AS SHOWN IN SECTION B-B.
5. INSTALL INSPECTION PLATE WITH 3 8-32 MACHINE SCREWS. INSTALL WITH .032 THICK WASHERS BETWEEN COVER PLATE AND WING SKIN TO PREVENT DEFORMING COVER PLATES.

VIEW LOOKING DOWN ON INSPECTION OPENING

SECTION A-A
SCALE: 2:1

SECTION B-B
SCALE: 2:1

DRAWN BY: J. NELL	DATE: 06-14-02	SCALE: FULL AND NOTED	A/C MAKE: ALON. MOONEY M10
LIMITS:			ERCOUPE, FORNEY
FINISH:			UNIVAIR AIRCRAFT CORPORATION
PAINT:			2500 HIMALAYA RD.
MODELS:			AURORA, COLORADO 80011
TITLE: INSPECTION PLATE INSTL			
SHEET NO.: 2 OF 2		DRAWING NO.: SB-31	REV. NONE
		DATE: 06-14-02	

Click on drawing for a larger image