



American Aviation Corporation
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SERVICE

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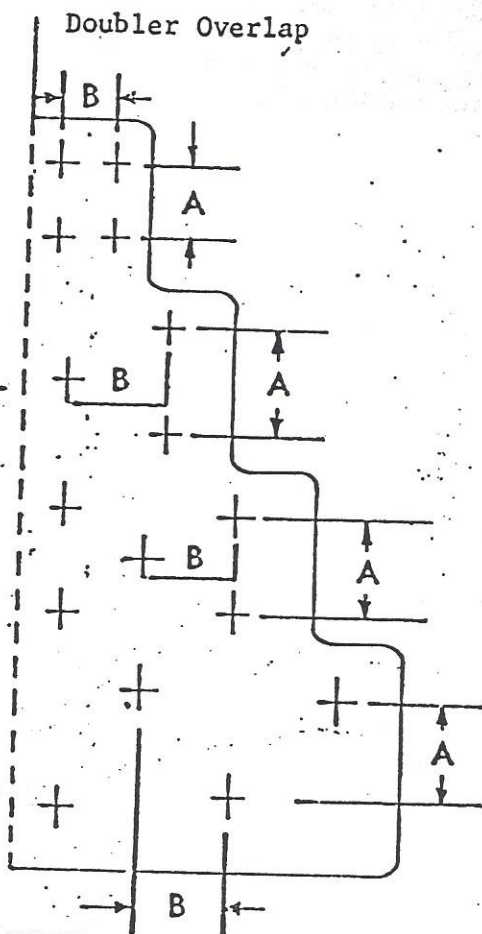
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See SK-100 H

SUBJECT: SERVICE KIT S-100 - BONDING

- 1.0 GENERAL - This Service Kit is applicable to American Aviation Corporation Aircraft only, and supplements all service manuals and publications covering these aircraft.
- 2.0 STRUCTURAL REPAIRS
 - 2.1 Major repairs of bonded joints must utilize bonded repairs in lieu of, or in addition to any mechanical fasteners.
 - 2.2 Engineering Data
 - 2.2.1 3M Co. EC 2216 adhesive when used per the following instructions will provide a minimum of 1000 PSI shear strength (with a safety factor of 2.0).
 - 2.2.2 All bonded overlap joints shall be made with a minimum of 1.00 inches or 50T (T=Thickness of original skin) overlap-which ever is greater.
 - 2.2.3 Doublers shall be of at least the same strength material and thickness as the skin being repaired (Reference Service Manual 10C).
 - 2.2.4 2024T3 Alclad Aluminum .032" thick minimum shall be used as doubler material for all honeycomb repairs that involve both faces of a honeycomb panel.
 - 2.2.5 Adhesive bond line thickness shall be .005 to .009 inches. Scrim cloth is to be used in the adhesive joint to control the bond line thickness.
 - 2.2.6 Rivets are normally used to hold bonded parts in place while the adhesive is curing and to draw the parts together to provide a uniform bond thickness. Rivet spacing may be calculated per FAR Part 43 or per the following table.



Doubler Overlap (Inches)	Rows of Rivets	A (Inches)	B (Inches)
1.00	2	1.25	.50
1.50	2 Stag'd	2.00	1.00
2.00	2 Stag'd	2.00	1.25
2.50	3 Stag'd	2.00	1.00
3.00	3 Stag'd	2.00	1.25
3.50	3 Stag'd	2.00	1.38
4.00	3 Stag'd	2.00	1.62
5.00	4 Stag'd	2.00	1.50

NOTES:

1. Minimum edge distance = 2 x (rivet diameter).
2. Minimum rivet size = 1/8 inch diameter.
3. Minimum of 2 rows required for any splice.

3.0 BONDING REPAIR KIT3.1 Contents

- 1 tube of EC-2216A hardener (3M Co.)
- 1 tube of EC-2216B adhesive resin (3M Co.)
- 1 container of chromic-sulphuric acid cleaner (paste) (prepared per APS-1162)
- 6 pairs of white gloves (Standard Glove Co., Cleveland, Ohio)
- 1 6 x 6 inch scouring pad (Type A - Fine 3M Co.)
- 1 sheet of emery paper - medium grit (non-silicone)
- 4 test strips
- 1 sheet of scrim cloth (No. 1658 D. A. Campbell Co., Cleveland, Ohio)

3.2 The bonding kit will be used for all repairs requiring the use of an adhesive.

3.3 The approximate area which can be covered by 1 kit is 250 square inches.

4.0 BONDING SEPARATION

- 4.1 To separate bonded parts, create a small separation at the bond line between the parts. Once this small separation is started it is relatively easy to continue the separation by a peeling action. The part being peeled back shall not be used in the repair, thus it is recommended that the damaged piece be subjected to the peeling action.

5.0 ADHESIVE REMOVAL

- 5.1 To remove any excess adhesive from the surface of any part, scrub the surface carefully with emery paper.

6.0 SURFACE CLEANING AND PREPARATION

- 6.1 Scrub the surface of the part to be cleaned with a piece from the scouring pad.

NOTE

The entire surface must be roughened to a dull finish.

- 6.2 Thoroughly clean the surface with MEK (Methyl Ethyl Ketone).
- 6.3 Apply the acid cleaning paste to the surface of the part to be cleaned. It is recommended that a piece of clean glass cloth or scrim cloth be used to apply the paste.
- 6.4 Continuously rub the paste until the surface becomes slightly scuffed (paste and surface will turn black).

CAUTION

Avoid any skin exposure to the chromic-sulphuric acid paste. Use rubber gloves.

- 6.5 Allow the paste to remain on the surface for a minimum of 20 minutes.
- 6.6 Remove the paste with a clean cloth soaked in clean distilled water.
- 6.7 Thoroughly rinse the part in clean distilled water (room temperature).
- 6.8 Allow the part to air dry in a clean area. Do not wipe. After drying, keep the part covered to prevent contamination. Do not cover while wet.

NOTE

Avoid placing the part in a horizontal position. Positioning of the part in a near vertical attitude will permit the water to drain off readily and enhance drying. One recommended method is to hang part by a wire, hooked thru a rivet hole.

- 6.9 Any further handling of the part shall be accomplished with the use of clean white cotton gloves.
- 6.10 The bonding operation must be completed within 8 hours of the cleaning operation or the parts must be recleaned.

NOTE

Always use a clean white cloth for all operations of the bond procedure. White gloves which are supplied with the bonding kit can be used to perform item 6.6.

7.0 ADHESIVE PREPARATION

- 7.1 Carefully follow the directions below. The instructions enclosed within the box containing the adhesive are correct except for the cleaning instructions.

Directions For Use

1. Clean all surfaces per items 6.0 thru 6.9. Bonding must be completed within 8 hours of the cleaning operation.
 2. Scotch-Weld Brand Structural Adhesive 2216B/A consists of two parts. Mix thoroughly by volume 3 parts of "A" (gray) and 2 parts of "B" (off-white). Color should be a uniform gray. (Replace caps on proper tubes.) Use within 1 hour after mixing.
 3. For maximum bond strength, apply evenly to both surfaces to be joined. Optimum bond thickness is .005" + .009". Use scrim cloth per item 7.2.
 4. Join the adhesive coated surfaces and allow to cure at 60° F. or above until completely firm. (Will resist fingernail penetration.)
 5. Keep parts from moving during cure, by use of rivets.
- 7.2 Prior to mating of the surfaces, place scrim cloth over the adhesive on one of the surfaces only.
 - 7.3 Optimum bond line thickness is .005/.009 inches. Bond line thicknesses greater, or less than the optimum will produce a decrease in bond strength.
 - 7.4 Cure time for a bonded joint to reach maximum strength is 7 days. (See 9.1 note.)
 - 7.5 The applicable primer or adhesive shall be applied to the clean surfaces within 8 hours maximum after cleaning.

8.0 STORAGE

8.1 Storage of the adhesive should not exceed six months from the date marked on the box.

8.2 Example: Rec 10/29/68 (marked on box)
Expiration date would be 4/29/69

8.3 Storage of the chromic-sulphuric acid cleaner should not exceed 6 months after it is received.

9.0 TEST

9.1 A 90° peel test is required for every repair. The results shall be the average of two specimens. The required bond strength is 45 pounds per inch width. No specimen shall be less than 40 pounds per inch width.

NOTE

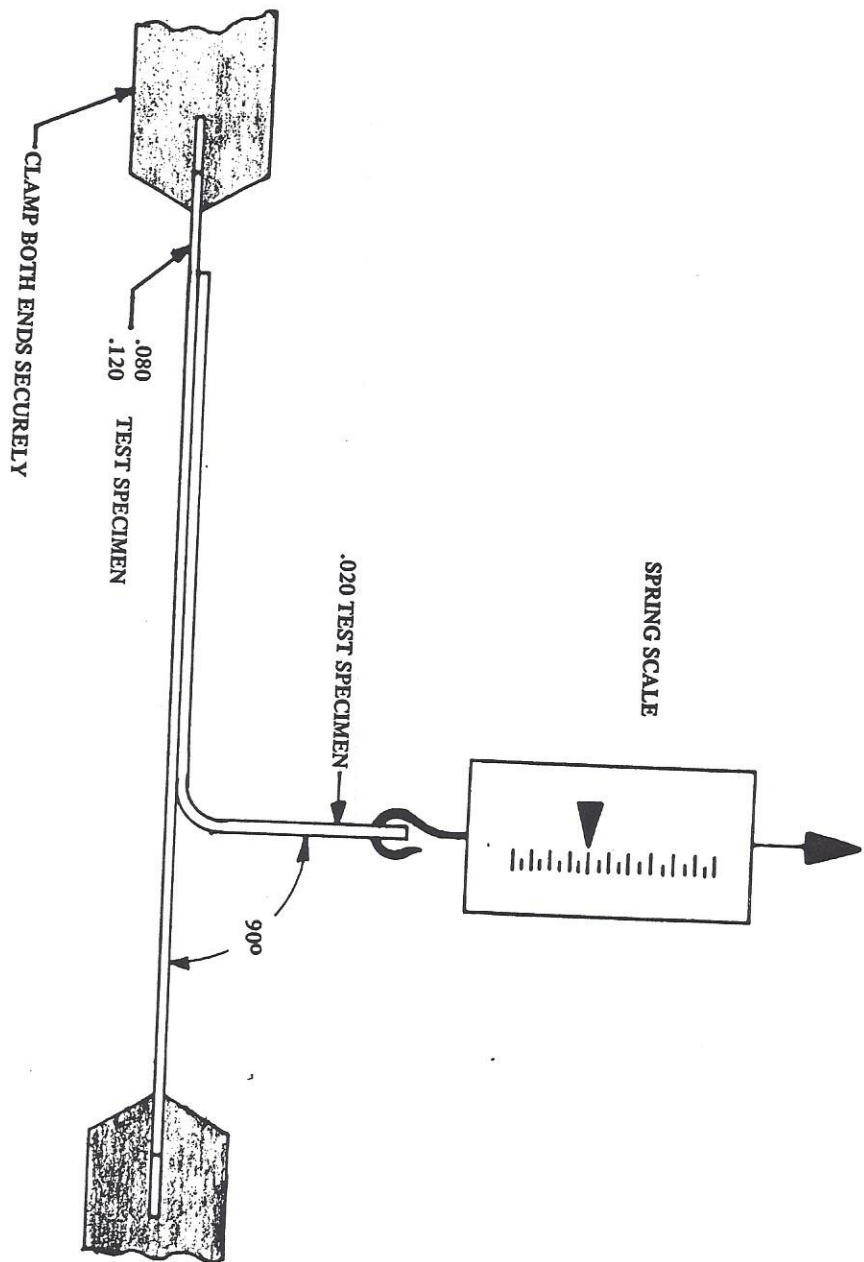
The peel tests shall be performed after 7 days cure time. It is permissible to bond extra peel specimens at the time of the repair for the purpose of early testing. If the peel tests are satisfactory after a shorter cure time (minimum of 24 hours), the repair may be placed back into service. At all times, retain 2 specimens for testing after the 7th day. Failure of the specimens to meet the strength requirements is cause for rejection of the repair.

9.2 Preparation, process, and cure of the specimens should correspond to the same manner and time as the repair.

9.3 If additional test specimens are required, they may be fabricated from clad and tempered aluminum alloy sheets; one strip from .020 inch material, and the other strip from .080 to .120 inch material. Size of the specimens should be 1.00 inch wide by 12.00 inches long. A minimum of 9.00 inches shall be bonded.

NOTE

It is imperative to adhere strictly to the specimen dimensions, especially thickness, as described in item 9.3, to avoid erroneous test results.



TYPICAL TEST METHOD