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MICROWAVE ANTENNAS
KS-15676 HORN-REFLECTOR AND WAVEGUIDE SYSTEM
MAINTENANCE
HORN-REFLECTOR ASSEMBLY

CONTENTS	PAGE
1. GENERAL	1
2. MAINTENANCE AND REPAIRS	1
3. PROCEDURE FOR CLASS A REPAIR	3
4. PROCEDURE FOR CLASS B REPAIR	3
5. PROCEDURE FOR LEAKAGE REPAIR	4

Class A: The repair of approximately circular perforations in the skin, less than 3/8 inch in diameter, using sealing compound and screw repair plugs.

Class B: The repair of irregular or large perforations in the skin using sealing compound and a patch plate secured with self-tapping screws.

1. GENERAL

1.01 This section outlines the maintenance methods to be employed to repair perforations of the aluminum skin and to stop air leaks in the seams or joints of the skin of the KS-15676 L8 or L9 horn-reflector assembly and the L14 hardened horn-reflector assembly. The methods given in this section apply to both the inner and outer skin of the L14 assembly.

1.02 This section is revised to add reference to the KS-15676 L14 horn-reflector and to include materials, equipment, and procedures for repairing seams or joints.

2. MAINTENANCE AND REPAIRS

2.01 Loose nuts and bolts on the antenna assembly shall be tightened in accordance with instructions contained in Section 402-421-201.

ALUMINUM REPAIRS

2.02 The procedure to be used when repairing perforations of the aluminum skin can generally be placed in one of the following classes:

2.03 It will be more difficult to repair damaged areas in or very near structural bracing. In some cases, it may be necessary to cut away portions of the bracing to gain access to perforations in the skin. In general, it is advisable to avoid the removal of portions of structural framing which are riveted or welded to the skin. Each case of this kind will require individual study, and shall be reported to supervision for action. However, the materials and procedures described herein can generally be applied to these repairs. The strength and stiffness of any bracing, damaged or removed, should be restored by the external application of aluminum bars, angles, or channels either bolted or screwed to the existing bracing. When the damaged area is inaccessible from the tower platform, it may be necessary to rotate the antenna as covered in Section 402-421-502 or use the two part work platform available from Up-Right Scaffolds, Berkeley, Calif., as their part No. L1586. This platform provides a work area around the antenna above and below the tower platform making rotation of the antenna unnecessary. If the antenna orientation is changed it must be realigned using procedures outlined in Section 402-421-206, 402-421-207, or 402-421-208.

2.04 Materials and Equipment Required for Class A and B Repairs:

SECTION 402-421-501

Materials (Part of KS-15676 L10 Repair Kit)

Self-Tapping Repair Plugs—Parker-Kalon,
1/4-, 5/16-, or 3/8-Inch

Stainless Steel Self-Tapping Screws—Parker-
Kalon Type Z—RH No. 10 by 3/8 Inch

12-inch square sheets of 0.064 Aluminum
(61S-T6, 52S, or 2S)

Minnesota Mining and Manufacturing Company
EC-801 Class B-2 with EC-807 (3-1/2 ounce
Sealant Kit)

Tongue Depressors

No. 1-1/2 Emery Cloth

◆Trichloroethane◆ or other approved solvent

Clean Rags

Scotch Transparent Tape or Equivalent

Caution: ◆*The sealant kit (EC-801 Class B-2 with EC-807) has a 6-month shelf life. The material in the kit is not suitable for use 6 months after the date marked on the container. The material should be stored in a cool place (refrigerate if possible).*◆

Equipment

12-Inch Square Metal Plate or Plate Glass

1/4-Inch Electric Drill

No. 29, 27, and 4 Drill

Hacksaw

1-Pound Hammer

1-Inch Wood Chisel

Prick Punch

Screw Driver

6-Inch Adjustable Open-End Wrench

◆SEALANT REPAIR OR REPLACEMENT◆

2.05 ◆Leakage in seams of the antenna *except for joints around the weather cover/antenna orifice* may be remedied by removing old sealant where it is accessible and placing a new bead of sealant.◆

2.06 ◆*Materials and Equipment Required for Replacement or Repair of Sealant:*

Materials

Semkit two-part sealant cartridges—Semkit Model 651 Cartridge (6 oz.) or Semkit Model 653 Cartridge (2 1/2 oz.) packaged with Minnesota Mining and Manufacturing Company EC-801 Class B-2 or approved equivalent. Order quantities as required.

Trichloroethane or other approved solvent.

Clean Rags

Equipment

Semco Model 755 Sealant Gun or equivalent

Semco #254 Nozzles, one per cartridge as required

Putty knife or other tool suitable for removing old sealant from seam◆

Note: ◆Semco equipment and Semkit packaged cartridges may be obtained from one of the following distributors:

H. S. Bancroft & Co.
209 Cooper Street
Westmont, N. J.

Semco Sales & Service, Inc.
18881 South Hoover Street
Los Angeles, Calif.◆

Caution: *In all cases where solvent is used, the last operation before a sealing compound is applied shall be to wipe the surface with a clean cloth. Any residual film may prevent proper adhering of the sealing compound. ◆Solvent should not be allowed to come in contact with any*

sealant that will remain on the antenna since solvent tends to deteriorate sealant.◆

3. PROCEDURE FOR CLASS A REPAIR

3.01 When effecting the class A repairs, the air escaping from the antenna will be helpful in keeping metal chips, dust, and other foreign material from falling into the antenna. ◆As an added precaution the flexible circular waveguide may be disconnected from the feedhorn and a plastic film (such as Saran Wrap) placed over the top of the waveguide to catch falling chips. To preserve electrical continuity, care should be taken to maintain the position of the waveguide with respect to the feedhorn. This may be done by replacing a few bolts during the operation, making certain that the plastic film always covers the hole.◆ The air supply should be turned off just before the application of the repair device, and should not be turned on again until a reasonable time has elapsed to permit a partial cure of the sealer. A minimum period of 12 hours is desirable. This may not always be practicable, but as much time as possible should be allowed before repressurizing.

Caution: ◆Radiation protection clothing must be worn if the input to the waveguide feeding the antenna exceeds 60 watts, particularly if the period of exposure will be of long duration or under conditions of high temperature and humidity. See Section 010-150-002 for further information regarding radiation protection.◆

3.02 Cut away burrs, torn edges, etc, with the wood chisel. Take great care to prevent any chips from falling into the antenna. Smooth the edges of the opening and the area immediately surrounding it with the emery cloth.

3.03 Clean the area around the opening with trichloroethane.◆

3.04 Select the smallest repair plug which will screw securely into the perforation. Turn the plug half-way into the hole to start the threads. Remove the plug. At this time the air supply should be turned off.

3.05 Place the contents of the EC-801 and EC-807 containers together on a glass or metal plate, and take special care to mix thoroughly, until no brown color is visible in the mixture and the paste

is uniform and homogeneous. The sealer mixture will be usable for 1/2 to 3/4 hours from the time of mixing. To determine whether or not the sealer mixture is still usable, spread a small amount on a clean glass or metal plate. If it has a tendency to pull back or does not spread into a continuous film, it should be discarded. The sealer will be easier to work and will set better if it is used at temperatures higher than 50 degrees F. The sealer will set up at temperatures below freezing but at a considerably slower rate.

3.06 Apply the sealer to the metal around the puncture, covering an area about 1-1/2 inches in diameter. Start the repair plug into the hole. Apply the sealer to the neoprene and metal washer as illustrated in Fig. 1A. Screw the plug tightly into the perforation. Smooth the excess sealer into a fillet around the shoulder of the plug as shown in Fig. 1B.

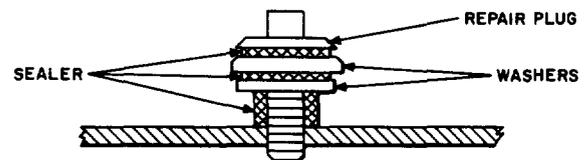


FIG. 1A

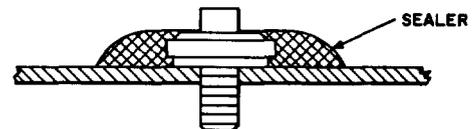


FIG. 1B

Fig. 1—Application of Sealer to Plug and Smoothing of Excess Sealer

3.07 If the plug selected does not fit tightly in the aluminum skin during the tightening operation, remove it and use the next larger size plug. If the 3/8-inch plug does not hold securely, use a class B repair.

4. PROCEDURE FOR CLASS B REPAIR

4.01 When effecting the class B repair, the air escaping from the antenna will be helpful in keeping metal chips, dust, and other foreign material from falling into the antenna. The air

supply should be turned off just before the application of the repair device, and should not be turned on again until a reasonable time has elapsed to permit a partial cure of the sealer. A minimum period of 12 hours is desirable. This may not always be practicable, but as much time as possible should be allowed before repressurizing.

4.02 Cut away burrs, torn edges, etc, with the wood chisel. Take great care to prevent any chips from falling into the antenna. Smooth the edges of the opening and the area immediately surrounding it with the emery cloth. Tap out skin bulges to form as nearly a plane surface as possible by tapping lightly with a mallet, wood hammer handle, or similar tool.

4.03 Determine the size of rectangular patch required to cover the damaged area with a minimum of 1-1/4 inch overlap in all directions, from the perforation to the edge of the sheet, and saw a piece of aluminum to these dimensions.

4.04 Lay out the hole pattern in the patch as shown in Fig. 2, and drill pilot holes in the patch with the No. 29 drill. Remove burrs from back of patch. Make sure all edges are smooth.

4.05 Fasten the patch in position with Scotch Tape and drill through both patch and skin with the drill indicated in Fig. 2 for the skin thickness being repaired. It is most important that metal chips be prevented from falling into the antenna. Drilling should be done in short steps, brushing aside chips at frequent intervals. The drilling should be discontinued before the break-through point and the break through completed with the prick punch.

4.06 Remove the patch and redrill the pilot holes in it with the No. 4 drill. Remove burrs from holes.

4.07 Clean the antenna skin and the patch plate with solvent.

4.08 Prepare the sealer by thoroughly stirring the EC-801 with EC-807. Place the contents of the two containers together on a glass or metal plate and take special care to mix until the paste is uniform and homogeneous. The sealer mixture will be usable for 1/2 to 3/4 hours from the time of mixing. To determine if the sealer mixture is still usable spread a small amount on a clean glass

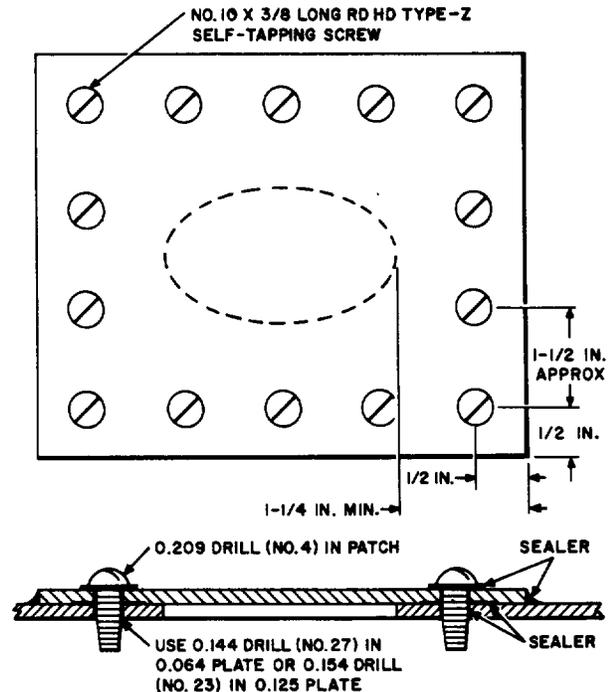


Fig. 2—Laying out Hole Pattern in Patch

or metal plate. If it has a tendency to pull back or does not spread into a continuous film, it should be discarded. The sealer will be easier to work and set better if repair operations are done at temperatures higher than 50 degrees F.

4.09 Spread the sealer on the mating surfaces of the skin and the patch. Place the patch in position and start the screws into the skin. Apply sealer to the underside of each screwhead. Tighten the screws. Smooth the excess sealer into a fillet around the edges of the patch and on the screwheads.

5. ◀PROCEDURE FOR LEAKAGE REPAIR▶

5.01 ▶After the leakage area has been determined by soap testing, turn off the air supply. The air supply should not be turned on again after repairs are complete, until sufficient curing time has elapsed. A minimum period of 12 hours is desirable.▶

5.02 ▶Using a putty knife or other suitable tool, remove the old sealant from the leakage area.▶

5.03 ♦ Clean the area thoroughly with trichloroethane taking care to prevent the solvent from coming in contact with any sealant that will remain on the antenna. After cleaning, the joint must be wiped dry with a clean rag. Any residual film not wiped away may prevent proper adhesion when the new sealing compound is applied.♦

5.04 ♦ Prepare the sealant cartridge according to the instructions provided by the manufacturer,

mixing the ingredients for 2 to 3 minutes. Place the cartridge in the sealant gun and apply a bead of sealant along the length of the exposed joint. Make certain that the bead is continuous and in contact with the existing sealant to assure a proper seal. After a reasonable curing time has elapsed, approximately 12 hours, apply air pressure and test the joint for leakage.♦