C. Inspection of the Flat Plate Radiator for Damage

(1) Flat plate radiators are reasonably forgiving of minor damage. In this section, we will discuss different types of damage that are seen and define the allowable damage. The allowable damage level defined should not cause the sidelobe levels to rise to the point where the pilot will notice their effects on the radar display. If an inspection of the flat plate shows damage below these allowable levels, the flat plate may be considered airworthy.

(2) The decision to replace a flat plate depends on the level of physical damage and pilot observations of anomalies in the radar display that may be caused by flat plate damage. It is possible that a combination of damage at the allowable levels could add up in the wrong ways and the pilot may notice effects described in the previous section. In that case, we recommend that the flat plate be replaced.

NOTE: Some minor damage to the flat plate may be repaired by the aircraft operator service center. Refer to the APPROVED REPAIRS section of this manual for details.

(3) The recommendations for inspection of the flat plate radiator that follow supersede any previously published recommendations.

(4) Scratches

(a) The typical thickness of the material on the front and back of a flat plate is 0.030-inch thick. Scratches on the front or back surface of the flat plate that are less than 0.003-inch deep (10 percent) into the material thickness are purely cosmetic and allowable. They will not affect the performance and are not a reason to replace the flat plate.

NOTE: The amount of force to make scratches greater than 0.003-inch deep into the material thickness may have also created a dent. Thus, use the dent criteria to evaluate the affected area.

(5) Uneven Coating

(a) The flat plate radiators have a chemical conversion film coating (Alodyne is a trade name of a typical coating). There is a wide range of allowable coating color. It may be so light as to be almost unnoticeable. It may also be light shades of a gold color or darker shades of a tan color.

(b) It is almost impossible to completely avoid having some uneveness in the color of the coating. It is typically noticeable on close inspection, but significant differences in the color are sometimes seen.

(c) An uneven coating is purely cosmetic and will not affect the performance of the flat plate radiator. It is allowable and is not a reason to replace the flat plate.

(6) Pitting and Corrosion

(a) On the front face of the flat plate, pitting or corrosion less than 0.003-inch (10 percent) into the thickness of the material and covers less than 25 percent of the area may be considered cosmetic and will not affect the performance of the flat plate radiator. It is allowable and is not a reason to replace the flat plate.

(b) On the back face of the flat plate, pitting or corrosion less than 0.003-inch (10 percent) into the thickness of the material and covers up to 100 percent of the area may be considered cosmetic and will not affect the performance of the flat plate radiator. It is allowable and is not a reason to replace the flat plate.

(7) Damage to the Outer Edge

(a) It is common for damage to occur on the outer edge of round flat plates. Common types of damage include: the front and back faces pinched toward each other, one face or the other severely dented, or one face or the other bent in or out. If the damage is in the non-radiating area, outside of the radiating waveguide wall and the waveguide short, it may be considered cosmetic and will not affect the performance of the flat plate radiator. It is allowable and is not a reason to replace the flat plate. See Figure 3-7 for the locations of the non-radiating area, the waveguide wall, and the waveguide short.

(b) On truncated flat plates, the non-radiating area outside the radiating waveguides is much smaller than in round flat plates and are less likely to become damaged. Evaluate the damage the same as for the round flat plate radiating waveguides, but since the damage is more likely to extend into the face, it should also be examined in terms of dents to the face.

(8) Dents to the Front or Rear Face

(a) Dents less than 0.06-inch deep in the front or rear face can be permitted. The acceptable number of dents depends on the flat plate diameter and zone.

(b) For a 10-inch round or a 10 x 14-inch truncated flat plate:

- Zone 1: In a 6-inch diameter center radiating area, no dents are permitted.
- Zone 2: In the outer radiating area, one dent that is no deeper than 0.06 inch for each radiating waveguide is permitted. No more than four total dents are permitted.

(c) For a 12-inch round or a 12 x 18-inch truncated flat plate:

- Zone 1: In a 6-inch diameter center radiating area, one dent that is no deeper than 0.06 inch is permitted.
- Zone 2: In the outer radiating area, one dent that is no deeper than 0.06 inch for each radiating waveguide is permitted. No more than four total dents are permitted.

(d) For an 18-inch flate plate:

- Zone 1: In a 6-inch diameter center radiating area, one dent that is no deeper than 0.06 inch is permitted.
- Zone 2: In the outer radiating area, one dent that is no deeper than 0.06 inch for each radiating waveguide is permitted. No more than six total dents are permitted.

(e) For a 24-inch flat plate:

- Zone 1: In an 8-inch diameter center radiating area, two dents that are no deeper than 0.06 inch are permitted if they are different radiating waveguides.
- Zone 2: In the outer radiating area, one dent that is no deeper than 0.06 inch for each radiating waveguide is permitted. No more than six total dents are permitted.

(9) Dents to the Corporate Feed

(a) One dent that is no larger than 0.375-inch diameter and deeper than 0.012 inch is permitted.

(10) Warpage/Flatness

(a) To check the warpage, place the flat plate face down on a certified flat surface. Look for any areas around the perimeter or in the center of the flat plate that do not uniformly touch the flat surface. For 10-, 12-, 15-, and 18-inch flat plates, no more than 0.1 inch of deviation from the flat surface in any area is permitted. For a 24-inch flat plate, no more than 0.15 inch of deviation from the flat surface in any area is permitted.

(11) Damage to the Dust Shield (if present)

(a) Some flat plates in the 7021479 series have a plastic dust shield in the waveguide flange aperture. This dust shield may become physically damaged. It is allowable if the dust shield is not present.