

**MICROWAVE ANTENNAS**  
**KS-16320 PASSIVE REFLECTORS**  
**MAINTENANCE**  
**TOOLS, MATERIALS, AND SAFETY PRECAUTIONS**

CONTENTS	PAGE	QUANTITY	DESCRIPTION
<b>1. GENERAL . . . . .</b>	<b>1</b>	1	Torque Wrench, 0 to 50 pound-feet capacity with 5/8-inch wrench opening (for 3/8-inch bolts)
<b>2. TOOLS AND MATERIALS . . . . .</b>	<b>1</b>		
<b>3. SAFETY PRECAUTIONS . . . . .</b>	<b>2</b>	—	Wrenches to check tightness of bolts and nuts (bolt sizes range from 3/8 to 1 inch)
<b>1. GENERAL</b>			
<b>1.01</b> This section is reissued to specify zinc-rich paint instead of AT-7295X Primer.		1	Measuring Tape, 12 foot
		1	Measuring Scale, 6 inch
		1	Machinist's Square, 12 inch
<b>1.02</b> This section describes the tools and materials to be used and the safety precautions to be followed in the performance of maintenance tasks on KS-16320 passive reflectors.		1	Machinist's Scriber
		1	Machinist's Ball-peen Hammer, 1-3/4 pound
		1	Machinist's Vise with smooth jaws (or inserts), 6 inch
<b>1.03</b> The need for maintenance will be determined either as a result of scheduled inspection or because of the interruption or degradation of service.		1	Smooth Steel Block, approximately 3 by 3 by 1/2 inches
		1	Anvil (or equivalent working surface)
<b>1.04</b> The following assemblies are referred to in these sections:		—	Files for aluminum
KS-16320, List 1 Passive Reflector		1	File Card
KS-16320, List 2 Passive Reflector		—	Fine Emery Paper
KS-16320, List 7 Elevation Adjustment Screw		1	Screwdriver for No. 6 screws
KS-16320, List 8 Azimuth Adjustment Screw		1	Stickleback Drillsaw or Keyhole Hack-saw, 5/16 inch
		1	Hand Brace
		1 set	Drill Bits to 1/2 inch to fit chuck on hand brace
<b>2. TOOLS AND MATERIALS</b>			
<b>2.01</b> The following tools and materials may be required in carrying out various maintenance tasks:		—	No. 6 Aluminum Sheet Metal Screws, 1/4 inch long
		—	No. 14GA Aluminum Sheet

QUANTITY	DESCRIPTION
1	Wire Brush
1	Chipping Hammer
→ —	Zinc-rich Paint (Galvicon, Galvicon Corp., Brooklyn, N. Y., or equivalent)
—	Paint Brushes
—	Turpentine
—	Grease, Cosmoline No. 1060, or equal per MIL-C-11796A, class 1 or 1A
—	Clean Rags

### 3. SAFETY PRECAUTIONS

**3.01** Passive reflectors generally are installed at considerable elevations on steel towers or miscellaneous supporting structures. The performance of maintenance will usually require that access to the reflector assembly be gained by climbing. The following remarks are intended to assure that the work is accomplished with maximum regard to personal safety. They are not intended to be all-inclusive nor to supersede the customary good practice of experienced contractors, but rather to serve as a basis for review by a competent safety administration in establishing safety procedures for individual cases involving Bell System personnel.

**3.02** Make certain that the structure is in a safe condition to be climbed. The structure and all of its appurtenances including the reflector assembly must be in a stable condition, i.e., free from unusual vibration, sway, etc. Make a visual examination (using field glasses or telescope, if necessary, to check the condition of remote portions) to ascertain structural soundness before proceeding. Examine the guys and anchors of a guyed tower; *do not climb if guys appear to be unevenly loaded (beyond a condition which might be attributed to the prevailing wind), or if there is evidence of shifting or heaving at anchors.* Ladders or step bolts should be available on all structures and are to be used for climbing. If work is in progress aloft, arrange to climb at a time when maximum protection is afforded from possible falling objects. The structure must be dry and free of ice or snow accumulation. Note the locations of all electrical appurtenances (especially exposed wir-

ing) on or near the structure in the vicinity to be climbed and avoid contact with them. Be sure that the structure as a whole (in the case of steel towers, etc.) or metallic portions which must be touched by the workman are not liable to be energized by contact with adjacent electric wiring.

**3.03** The act of climbing a typical supporting structure is, in itself, a strenuous task, to be undertaken only by persons in good physical condition. Climbing should be done only by persons to whom height is not objectionable. In any event, it should be noted that the degree of exertion increases with height above sea level of the microwave station. Avoid overexertion; conserve energy especially in the early phase of the climb when there may be an inclination to proceed too rapidly. Do not climb more than 25 feet without resting for sufficient time to relieve labored breathing and to relax arm and leg muscles. Use the safety strap during rest periods.

**3.04** Wear comfortable clothing of a kind which will not hinder movement or be caught readily on projections. During the actual climb, lighter clothing may be preferred to avoid becoming overheated; consideration should be given, however, to the increased exposure at the elevated position and arrangements made, if necessary, to provide warmer clothing for use while remaining at the reflector position. Protect the hands with fitted gloves while climbing. Wear shoes that provide protection, good footing, and sufficient support to permit standing on narrow ladder rungs or structural members for prolonged periods without fatigue.

**3.05** Safety helmets, body belts, and safety straps are to be worn and used whenever the need is indicated. Keep hands free while climbing; tools, etc, should be hauled up separately or carried in a closed bag or pouch or in suitable slots in a tool belt in such a way as not to interfere with the freedom of movement of the climber.

**3.06** Maintenance is to be performed only in clear weather with winds not exceeding moderate velocities. Since appreciable time can be expected to elapse during the climbing of most structures, the performance of maintenance

work should not be started when adverse weather conditions are anticipated within a conservatively estimated time interval.

**3.07** Careful judgment is to be exercised as to the minimum number of persons required on the structure to assure safety. *Do not attempt to climb unless at least one other person associated with the operation is in attendance on the ground.*

**3.08** Most inspection and maintenance operations can be performed without stepping onto the aluminum structure of the reflector assembly, Item 6B of Fig. 1 or 2, Section 402-423-400. *Avoid stepping onto the reflector assembly whenever possible.* If necessary to move onto the reflector, however, first thoroughly examine the complete assembly for soundness. Use a scaling device, e.g., ladder, platform, etc, which:

- (a) Provides for the complete safety of the user in that it is capable of being firmly attached to the reflector, affords the user adequate support, and, when installed, can be safely and readily mounted and dismounted by the workman.
- (b) Assures complete protection of the reflector from damage.

**3.09** Ground personnel working within a distance from the base of the structure equal to 1/3 of the height at which work is being done aloft shall wear safety helmets *and shall move out of that region when their presence is not essential to the work.* Vehicles shall be parked outside the area determined above. The practice of remaining in a vehicle in the immediate vicinity

of the structure while work is in progress aloft is to be avoided.

**3.10** Loose objects such as tools, etc, which are aloft at any time shall be kept to a minimum. When these items are no longer required aloft, they shall be lowered immediately to the ground, placed in a tool pouch or belt, or otherwise safely secured. *Do not leave loose objects on ledges where they may be inadvertently kicked or pushed off.*

**3.11** Persons handling tools or other loose objects aloft shall exercise extreme care to avoid dropping them. If gloves are worn while working, they shall be of a type which does not restrict manual dexterity.

**3.12** At least one person on the ground shall be assigned to concentrate his attention on work which is in progress aloft, to see that the men receive assistance promptly, to warn of any falling objects, and to report and/or investigate any unusual occurrences.

**3.13** When people are aloft, vulnerable ground equipment such as antennas must be afforded all possible protection. Place a protector such as a canopy or shield between the antenna and the reflector, if necessary, to assure protection. *If the station is in service, the protector must be transparent to the microwave signal.*

**3.14** Portable electrical equipment which is to be used either on the ground or aloft must be effectively grounded.

**3.15** When work is being done on guyed structures, exercise extreme care to avoid striking the guys as objects are raised or lowered.