

## SECTION 5. WASHERS

**7-85. GENERAL.** The type of washers used in aircraft structure are plain washers, , and special washers. Typical washer types are shown in table 7-14.

**7-86. PLAIN WASHERS (AN960 AND AN970).** Plain washers are widely used with hex nuts to provide a smooth bearing surface, act as a shim to obtain the proper grip length, and to position castellated nuts in relation to drilled cotter pin holes in bolts. Use plain washers under lock washers to prevent damage to bearing surfaces. Cadmium-plated steel washers are recommended for use under boltheads and nuts used on aluminum alloy or magnesium structures to prevent corrosion. The AN970 steel washer provides a larger bearing surface than the plain type, and is often used in wooden structures under boltheads and nuts to prevent local crushing of the surface.

**7-87. LOCKWASHERS (AN935 AND AN936).** Lock washers may be used with machine screws or bolts whenever the self-locking or castellated type nut is not applicable. Do not use lock washers where frequent removal is required, in areas subject to corrosion, or in areas exposed to airflow. Use a plain washer between the lock washer and material to prevent gouging the surface of the metal.

**CAUTION: Lock washers are not to be used on primary structures, secondary structures, or accessories where failure might result in damage or danger to aircraft or personnel.**

**7-88. BALL SOCKET AND SEAT WASHERS (AN950 AND AN955).** Ball socket and seat washers are used in special applications where the bolt is installed at an angle to the surface or when perfect alignment with the surface is required. These washers are used together as a pair.

**7-89. TAPER PIN WASHERS (AN975).** Taper pin washers are used with the threaded taper pin. NAS143 and MS20002 washers are used with NAS internal wrenching bolts and internal wrenching nuts. They may be plain or countersunk. The countersunk washer (designated as NAS143C and MS20002C) is used to seat the bolthead shank radius, and the plain washer is used under the nut.

**7-90.—7-100. [RESERVED.]**