

Washers

As we all learned in grade school, the washers' basic function is to act as a load bearing face to prevent a bolt and/or nut from digging into the surfaces of what is being clamped together. Washers also make good shims. Those listed below are the most regularly specified.

AN 960 Washers

Commonly referred to as "AN" washers they are available in "regular" and "light" thickness in a given diameter. Gold cad-plated steel; they are also available in stainless steel.

| AN 960 FLAT WASHER | | | | | |
|--------------------|--------------------|---------------|---------------|-----------|------|
| DASH NO. | BOLT or SCREW SIZE | O.D. (inches) | I.D. (inches) | THICKNESS | |
| | | | | LIGHT | REG. |
| -4 | #4 | .312 | .124 | .016 | .032 |
| -6 | #6 | .375 | .149 | .016 | .032 |
| -8 | #8 | .375 | .174 | .016 | .032 |
| -10 | 3/16" | .438 | .203 | .032 | .063 |
| -416 | 1/4" | .500 | .265 | .032 | .063 |
| -516 | 5/16" | .562 | .328 | .032 | .063 |
| -616 | 3/8" | .625 | .390 | .032 | .063 |
| -716 | 7/16" | .750 | .453 | .032 | .063 |
| -816 | 1/2" | .875 | .515 | .032 | .063 |
| -916 | 9/16" | 1.062 | .578 | .032 | .063 |
| -1016 | 5/8" | 1.118 | .640 | .032 | .063 |
| -1216 | 3/4" | 1.312 | .765 | .032 | .090 |

AN 970 Washers

These large OD steel "fender" washers are used where a large washer bearing area is required. Gold cad-plated steel.

| AN 970 FLAT WASHER | | | | |
|--------------------|--------------------|---------------|---------------|--------------------|
| DASH NO. | BOLT or SCREW SIZE | O.D. (inches) | I.D. (inches) | THICKNESS (inches) |
| -3 | 3/16" | .875 | .203 | .063 |
| -4 | 1/4" | 1.125 | .265 | .063 |
| -5 | 5/16" | 1.375 | .328 | .063 |
| -6 | 3/8" | 1.625 | .390 | .063 |
| -7 | 7/16" | 1.812 | .453 | .109 |
| -8 | 1/2" | 2.000 | .515 | .109 |
| -10 | 5/8" | 2.375 | .640 | .125 |

TINNERMAN COUNTERSUNK FINISHING WASHERS

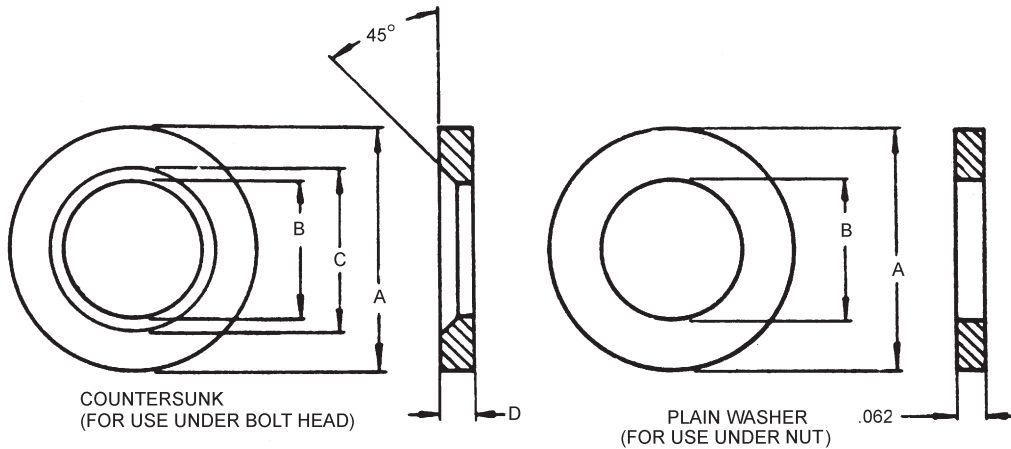
For use with 100° flat-head aircraft bolts and screws such as NAS1102 torq-set and MS24694 machine screws. Provides a reinforced, flush profile attachment. Made of spring steel, clear (silver) cad-plated.

| TINNERMAN WASHERS | | | |
|-------------------|------------|-----------|-----------|
| PART NO. | SCREW SIZE | O.D. (in) | I.D. (in) |
| A3135 017 24A | #8 | .560 | .171 |
| A3235 028 24A | #10 | .750 | .196 |
| A3475 028 24A | 1/4" | .810 | .255 |

MS20002 & MS20002C Washers

A high strength, heat-treated washer which must be used ("C" version) with the MS/NAS twelve point and internal wrenching bolts. The chamfer matches the radius under the bolt head. Also good for use with heavy torquing loads where ordinary steel washers would gall.

Note: Although the MS 20002 washer will fit over the shanks of standard NAS (1103/1303/6403 etc.) hexbolts, the washer ID is small enough that it will usually "crash" with the bolt head-to-shank radius. DO NOT USE MS20002 WASHERS UNDER THE HEAD OF STANDARD NAS HEX BOLTS.



| Thread Size | MS Part Number | | A Dia | B (Dia) | | C (Dia) | | D | Flatness Tolerance Max |
|-------------|----------------|------------|-------|---------|-------|---------|-------|------|------------------------|
| | Countersunk | Plain | | Max | Min | Max | Min | | |
| 1/4 | MS20002C4 | MS20002-4 | .531 | .260 | .252 | .344 | .334 | .078 | .007 |
| 5/16 | MS20002C5 | MS20002-5 | .593 | .324 | .315 | .406 | .396 | .078 | .007 |
| 3/8 | MS20002C6 | MS20002-6 | .687 | .388 | .378 | .495 | .483 | .078 | .007 |
| 7/16 | MS20002C7 | MS20002-7 | .781 | .451 | .441 | .557 | .543 | .078 | .007 |
| 1/2 | MS20002C8 | MS20002-8 | .875 | .515 | .504 | .620 | .604 | .078 | .007 |
| 9/16 | MS20002C9 | MS20002-9 | .968 | .579 | .568 | .687 | .667 | .078 | .010 |
| 5/8 | MS20002C10 | MS20002-10 | 1.062 | .643 | .631 | .785 | .765 | .078 | .010 |
| 3/4 | MS20002C12 | MS20002-12 | 1.250 | .770 | .757 | .910 | .890 | .078 | .010 |
| 7/8 | MS20002C14 | MS20002-14 | 1.437 | .897 | .884 | 1.035 | 1.015 | .078 | .010 |
| 1 | MS20002C16 | MS20002-16 | 1.625 | 1.025 | 1.010 | 1.160 | 1.140 | .078 | .010 |
| 1-1/8 | MS20002C18 | MS20002-18 | 1.875 | 1.150 | 1.135 | 1.285 | 1.265 | .078 | .010 |
| 1-1/4 | MS20002C20 | MS20002-20 | 2.125 | 1.275 | 1.260 | 1.447 | 1.427 | .094 | .010 |
| 1-3/8 | MS20002C22 | MS20002-22 | 2.313 | 1.400 | 1.385 | 1.572 | 1.552 | .094 | .015 |
| 1-1/2 | MS20002C24 | MS20002-24 | 2.500 | 1.525 | 1.510 | 1.697 | 1.677 | .094 | .015 |

MATERIAL: Alloy steel

HEAT TREAT: 125,000 to 145,000 (MIL-H-6875)

FINISH: Cadmium plating, Type II, Class 2.

Washer faces parallel within .002 inch.