

INCH-POUND

AN510 REV 8  
16 MAR 2020  
SUPERSEDING  
AN510 REV 7  
2 JUNE 2011

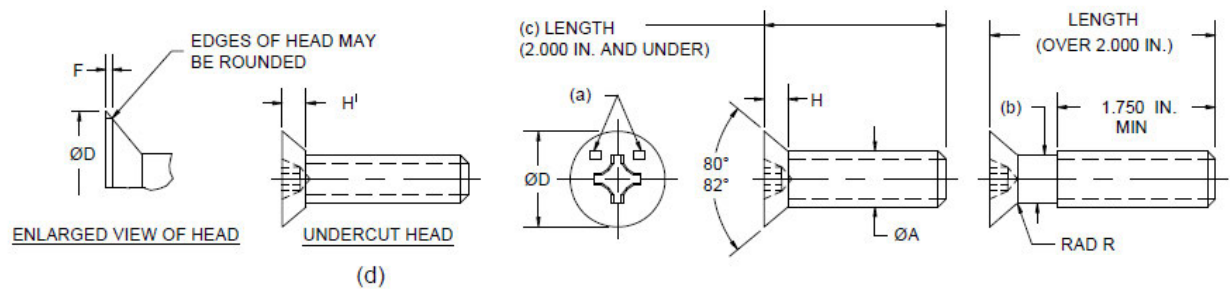
## DETAIL SPECIFICATION SHEET

## SCREW, MACHINE, FLAT HEAD, 82 DEGREE, FINE THREAD

Inactive for new design after 2 June 2011.

This specification sheet is approved for use by all Departments and Agencies of the Department of Defense.

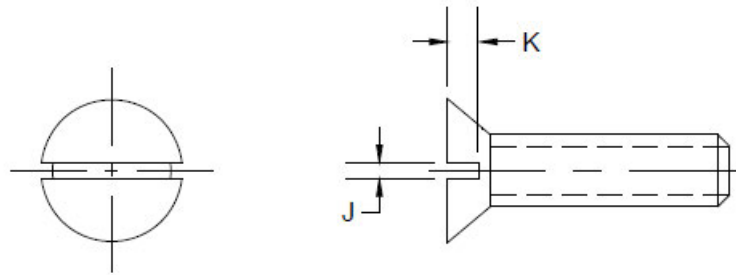
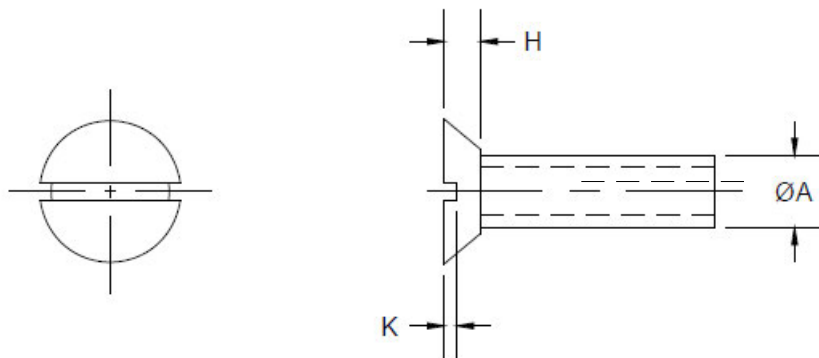
The requirements for acquiring the product described herein shall consist of this specification sheet and procurement specification FF-S-92.

FIGURE I. Crossed-Recessed Head Screw.TABLE 1. Screw Dimensions.

| THREAD<br>SIZE   | ØA   | ØD           |              |                               | F    | H<br>REF |      | R<br>RAD | H <sup>1</sup> |      | J    |      | K    |      |
|------------------|------|--------------|--------------|-------------------------------|------|----------|------|----------|----------------|------|------|------|------|------|
|                  |      | MAX<br>SHARP | MIN<br>SHARP | ABSOLUTE<br>MIN WITH<br>MAX F |      | MAX      | MAX  |          | MIN            | MAX  | MAX  | MIN  | MAX  | MIN  |
|                  | MAX  |              |              |                               |      |          |      |          |                |      |      |      |      |      |
| NO. 0-80 UNF-2A  | .060 | .119         | .105         | .101                          | .011 | .035     | .026 | .025     | .025           | .018 | .024 | .016 | .015 | .010 |
| NO. 1-72 UNF-2A  | .073 | .146         | .130         | .126                          | .013 | .043     | .033 | .030     | .030           | .023 | .026 | .019 | .019 | .012 |
| NO. 2-64 UNF-2A  | .086 | .172         | .156         | .150                          | .014 | .051     | .040 | .030     | .036           | .026 | .031 | .023 | .023 | .015 |
| NO. 3-56 UNF-2A  | .099 | .199         | .181         | .175                          | .015 | .059     | .048 | .035     | .041           | .034 | .035 | .027 | .027 | .017 |
| NO. 4-48 UNF-2A  | .112 | .225         | .207         | .200                          | .016 | .067     | .055 | .040     | .047           | .039 | .039 | .031 | .030 | .020 |
| NO. 5-44 UNF-2A  | .125 | .252         | .232         | .225                          | .018 | .075     | .062 | .045     | .053           | .043 | .043 | .035 | .034 | .022 |
| NO. 6-40 UNF-2A  | .138 | .279         | .257         | .249                          | .019 | .083     | .069 | .050     | .058           | .048 | .048 | .039 | .038 | .024 |
| NO. 8-36 UNF-2A  | .164 | .332         | .308         | .300                          | .022 | .100     | .084 | .055     | .070           | .059 | .054 | .045 | .045 | .029 |
| NO. 10-32 UNF-2A | .190 | .385         | .359         | .348                          | .025 | .116     | .098 | .060     | .081           | .069 | .060 | .050 | .053 | .034 |
| 1/4-28 UNF-2A    | .250 | .507         | .477         | .462                          | .031 | .153     | .131 | .070     | .107           | .092 | .075 | .064 | .070 | .046 |

- (a) SEE REQUIREMENT 10  
(b) SEE REQUIREMENT 6  
(c) SEE REQUIREMENT 5  
(d) SEE REQUIREMENT 7

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FIGURE 2. Slotted Screw Head. (e)FIGURE 3. Undercut Slotted Head Screws. (e)TABLE II. Undercut Dimensions, Slotted Head Screws (e)

| THREAD<br>SIZE   | ØA   | H    |      | K    |      |
|------------------|------|------|------|------|------|
|                  | MAX  | MAX  | MIN  | MAX  | MIN  |
| NO. 0-80 UNF-2A  | .060 | .025 | .018 | .011 | .007 |
| NO. 1-72 UNF-2A  | .073 | .030 | .023 | .014 | .009 |
| NO. 2-64 UNF-2A  | .086 | .036 | .028 | .022 | .015 |
| NO. 3-56 UNF-2A  | .099 | .041 | .034 | .025 | .017 |
| NO. 4-48 UNF-2A  | .112 | .047 | .039 | .028 | .020 |
| NO. 5-44 UNF-2A  | .125 | .053 | .043 | .024 | .016 |
| NO. 6-40 UNF-2A  | .138 | .058 | .048 | .027 | .017 |
| NO. 8-36 UNF-2A  | .164 | .070 | .059 | .032 | .021 |
| NO. 10-32 UNF-2A | .190 | .081 | .069 | .047 | .034 |
| 1/4-28 UNF-2A    | .250 | .107 | .092 | .061 | .046 |

(e) See NOTE 7

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TABLE III. Dash numbers for Carbon Steel Screws. (f)

| L<br>LENGHT                      |             | NO.<br>0-80              | NO.<br>1-72              | NO.<br>2-64                 | NO.3-<br>56                 | NO.<br>4-48                  | NO.<br>5-44                  | NO.<br>6-40                  | NO.<br>8-36                  | NO.<br>10-32                     | 1/4-28                               |
|----------------------------------|-------------|--------------------------|--------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|----------------------------------|--------------------------------------|
| .125<br>.188<br>.250             | +0<br>-.031 | 0-2 (d)<br>0-3<br>0-4    | 1-2 (d)<br>1-3<br>1-4    | 2-3<br>2-4                  | 3-3<br>3-4                  | 4-3 (d)<br>4-4               | 5-4                          | 6-4                          | 8-4 (d)                      | 10-4 (d)                         |                                      |
| .312<br>.375<br>.438<br>.500     |             | 0-5<br>0-6<br>0-7<br>0-8 | 1-5<br>1-6<br>1-7<br>1-8 | 2-5<br>2-6<br>2-7<br>2-8    | 3-5<br>3-6<br>3-7<br>3-8    | 4-5<br>4-6<br>4-7<br>4-8     | 5-5<br>5-6<br>5-7<br>5-8     | 6-5<br>6-6<br>6-7<br>6-8     | 8-5<br>8-6<br>8-7<br>8-8     | 10-5 (d)<br>10-6<br>10-7<br>10-8 | 416-6 (d)<br>416-7 (d)<br>416-8      |
| .563<br>.625<br>.688<br>.750     |             |                          |                          | 2-9<br>2-10<br>2-11<br>2-12 | 3-9<br>3-10<br>3-11<br>3-12 | 4-9<br>4-10<br>4-11<br>4-12  | 5-9<br>5-10<br>5-11<br>5-12  | 6-9<br>6-10<br>6-11<br>6-12  | 8-9<br>8-10<br>8-11<br>8-12  | 10-9<br>10-10<br>10-11<br>10-12  | 416-9<br>416-10<br>416-11<br>416-12  |
| .813<br>.875<br>.938<br>1.000    |             |                          |                          |                             |                             | 4-13<br>4-14<br>4-15<br>4-16 | 5-13<br>5-14<br>5-15<br>5-16 | 6-13<br>6-14<br>6-15<br>6-16 | 8-13<br>8-14<br>8-15<br>8-16 | 10-13<br>10-14<br>10-15<br>10-16 | 416-13<br>416-14<br>416-15<br>416-16 |
| 1.125<br>1.250<br>1.375<br>1.500 |             |                          |                          |                             |                             | 4-18<br>4-20<br>4-22<br>4-24 | 5-18<br>5-20<br>5-22<br>5-24 | 6-18<br>6-20<br>6-22<br>6-24 | 8-18<br>8-20<br>8-22<br>8-24 | 10-18<br>10-20<br>10-22<br>10-24 | 416-18<br>416-20<br>416-22<br>416-24 |
| 1.625<br>1.375<br>1.875<br>2.000 | +0<br>-.062 |                          |                          |                             |                             | 4-26<br>4-28                 | 5-26<br>5-28                 | 6-26<br>6-28<br>6-30<br>6-32 | 8-26<br>8-28<br>8-30<br>8-32 | 10-26<br>10-28<br>10-30<br>10-32 | 416-26<br>416-28<br>416-30<br>416-32 |
| 2.125<br>2.250<br>2.375<br>2.500 |             |                          |                          |                             |                             |                              |                              | 6-34<br>3-36<br>6-38<br>6-40 | 8-34<br>8-36<br>8-38<br>8-40 | 10-34<br>10-36<br>10-38<br>10-40 | 416-34<br>416-36<br>416-38<br>416-40 |
| 2.625<br>2.750<br>2.875<br>3.000 | +0<br>-.094 |                          |                          |                             |                             |                              |                              |                              | 8-42<br>8-44<br>8-46<br>8-48 | 10-42<br>10-44<br>10-46<br>10-48 | 416-42<br>416-44<br>416-46<br>416-48 |

(d) see requirement 7

(f) see requirement 11

TABLE IV. RATED STRENGTH IN POUNDS  
(FOR REFERENCE PURPOSES ONLY)

| SIZE      | MINIMUM ULTIMATE<br>TENSILE BREAKING<br>STRENGTH AT<br>ROOT DIA | MINIMUM<br>SINGLE SHEAR<br>STRENGTH AT<br>ROOT DIA |
|-----------|---|--|
| NO. 0-80  | 82  | 49   |
| NO. 1-72  | 132   | 79   |
| NO. 2-64  | 187   | 112  |
| NO. 3-56  | 247   | 148  |
| NO. 4-48  | 313   | 188  |
| NO. 5-44  | 396   | 238  |
| NO. 6-40  | 478   | 287  |
| NO. 8-36  | 705   | 423  |
| NO. 10-32 | 960   | 575  |
| 1/4-28    | 1790  | 1075   |

ULTIMATE TENSILE BASED ON 55,000 PSI  
SHEAR STRENGTHS 60% OF ULTIMATE TENSILES

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Requirements.1. Material:

Carbon steel, grade 1010 (UNS G10100) in accordance with ASTM A108 minimum 55,000 UTS or other carbon steels meeting the same physical requirements.

Corrosion resistant steel in accordance with SAE-AMS-QQ-S-763, CLASS 430 (UNS S43000) or UNS S30430 (CLASS XM-7), ASTM A582/A582M, Type 303 (UNS S30300) or Type 303e (UNS S30323) or SAE-AMS-S-7720 Composition 302 (UNS S30200) for cold upsetting process.

Brass in accordance with ASTM B16/B16M, ASTM B36/B36M, ASTM B121/B121M, ASTM B134/B134M, ASTM B159/B159M or ASTM B206/B206M with a minimum ultimate tensile strength of 55,000 psi.

Aluminum alloy 2024 (UNS A92024) in accordance with ASTM B211 or SAE-AMS-QQ-A-225/6.

2. Finish:

Carbon steel: cadmium plate in accordance with SAE-AMS-QQ-P-416, Type II, Class 3.  
Brass: black chemical finish in accordance with MIL-F-495 or cadmium plate in accordance with SAE-AMS-QQ-P-416, TYPE, CLASS 3, depending on part number coding (see requirement 11)

Corrosion resistant steel: Passivate in accordance with SAE AMS2700

Aluminum alloy: Anodize in accordance with MIL-A-8625, Type I or II, Class 1.

3. Heat treatment:

Aluminum alloy 62,000 psi minimum ultimate tensile strength in accordance with SAE-AMS2772.

4. Threads:

Threads shall be class 2A in accordance with FED-STD-H28/2. Acceptability of screw threads shall be in accordance with FED-STD-H28/20, System 21.

5. Thread length:

For screws up to and including 2.000 inches in length, the complete threads shall extend to within (2) threads of the bearing surface of the head or closer if practicable. Screws of longer length shall have a minimum complete thread of 1.750 inches.

6. Unthreaded portion:

The diameter of the unthreaded portion of the screws shall not be less than the minimum pitch diameter nor more than the maximum major diameter of the thread.

7. Undercut heads:

Dash numbers designated by (d) to have undercut heads.

8. Head drive style:

Cross-recess: Recess in accordance with NASM9006.

Slotted head: Refer to table for dimensions (see note 7).

9. Manufacturer identification:

Screws with nominal sizes #10 (.1900) and larger shall be permanently marked with a symbol identifying its manufacturer or private label distributor. Markings shall be placed on the top of the head and indented. Method and size of markings shall conform to the requirements for permanent markings specified in SAE AS478.

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10. Material identification:

Corrosion resistant steel screws with nominal sizes #5 (.1250) and larger shall be permanently marked with one dash ("-"). Markings shall be placed on the top of head and indented. Method and size of markings shall conform to the requirements for permanent markings specified in SAE AS478.

11. CODE:

No code between first and second dash number = slotted head screw (see note 7).

"R" between the first and second dash number = cross-recessed head screw.

No code before first dash number = carbon steel with cadmium plating

"B" before first dash number = brass screw with black chemical finish

"PB" before first dash number = brass screw with cadmium plating

"UB" before first dash number = brass screw with no plating or finish

"C" before first dash number = corrosion resistant steel screw passivated

"DD" before first dash number = aluminum alloy screw anodized

## Examples:

|            |   |   |
|------------|---|---|
| AN510-4-8  | = | Slotted Head Screw, Carbon Steel, Cadmium Plated, 4-48 UNF-2A Thread, .500 Inch Long                |
| AN510-4R8  | = | Cross-Recessed Head Screw, Carbon Steel, Cadmium Plated, 4-48 UNF-2A Thread, 500 Inch Long          |
| AN510B4-8  | = | Slotted Head Screw, Brass, Black Chemical Finish, 4-48 UNF-2A Thread, 500 Inch Long                 |
| AN510B4R8  | = | Cross-Recessed Head Screw, Brass, Black Chemical Finish, 4-48 UNF-2A Thread, 500 Inch Long          |
| AN510PB4-8 | = | Slotted Head Screw, Brass, Cadmium Plated, 4-48 UNF-2A Thread, 500 Inch Long                        |
| AN510PB4R8 | = | Cross-Recessed Head Screw, Brass, Cadmium Plated, 4-48 UNF-2A Thread, 500 Inch Long                 |
| AN510UB4-8 | = | Slotted Head Screw, Brass, Unfinished, 4-48 UNF-2A Thread, 500 Inch Long                            |
| AN510UB4R8 | = | Cross-Recessed Head Screw, Brass, Unfinished, 4-48 UNF-2A Thread, 500 Inch Long                     |
| AN510C4-8  | = | Slotted Head Screw, Corrosion Resistant Steel, Passivated, 4-48 UNF-2A Thread, 500 Inch Long        |
| AN510C4R8  | = | Cross-Recessed Head Screw, Corrosion Resistant Steel, Passivated, 4-48 UNF-2A Thread, 500 Inch Long |
| AN510DD4-8 | = | Slotted Head Screw, Aluminum Alloy, Anodized, 4-48 UNF-2A Thread, 500 Inch Long                     |
| AN510DD6R8 | = | Cross-Recessed Head Screw, Aluminum Alloy, Anodized, 6-40 UNF-2A Thread, 500 Inch Long              |

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NOTES.

1. All dimensions are in inches, unless otherwise specified.
2. Interpret dimensions and tolerances in accordance with ASME Y14.5M.
3. Screws shall be free of all loose hanging burrs or slivers which may become dislodged during usage.
4. Do not use unassigned dash numbers or codes.
5. In case of conflict the requirements specified herein shall take precedence over the requirements specified in FF-S-92. For dimensions and tolerances not specified herein or FF-S-92, refer to ASME B18.6.3.
6. These screws are not to be used in the construction of airframes or to attach equipment to the airframe.
7. Slotted head screws are inactive for new design after 17 FEB 59. AN510 is superseded in part by NASM35191, NASM35199, NASM35203 AND MS51960.
8. Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:

Army - AV

Navy - AS

Preparing Activity:

DLA -IS

(Project 5305-2020-004)

Review activity:

Army - MI

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