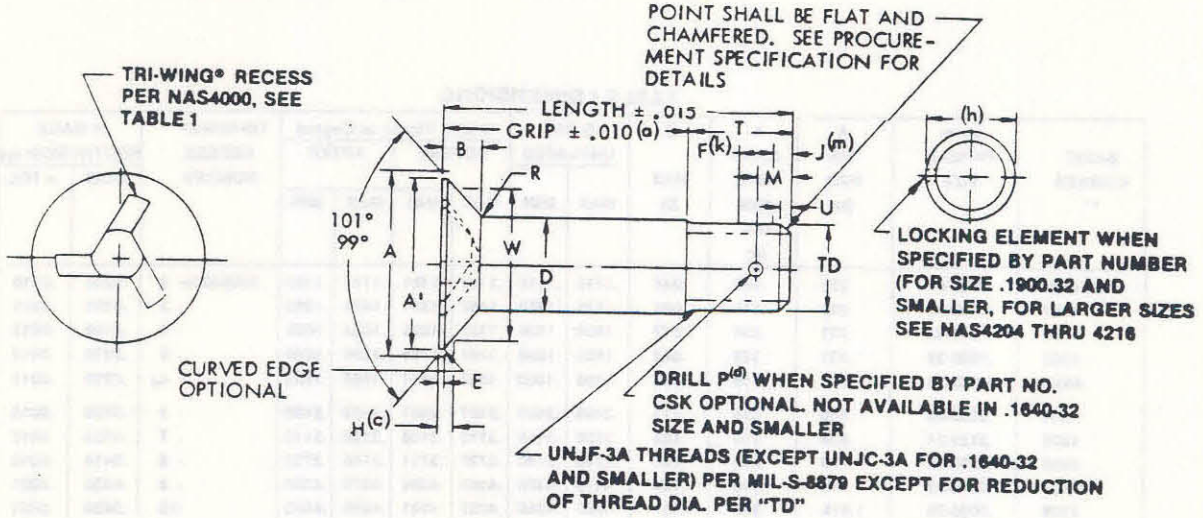
NATIONAL AEROSPACE STANDARD

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC., 1725 DE SALES STREET, N.W., WASHINGTON, D. C. 20036

FED. SUP CLASS



Head marking shall be depressed (.010 Max) and arranged as follows:

First Sector - Mark with basic number ("NAS" optional), except mark .1120-40 size with "4", .1380-32 size with "6", .1640-32 size with "8", and (optional) .1900-32 size with "10". These sizes also to be marked "C" for A286.

Second Sector - Mark with manufacturer's symbol (symbol location optional in any sector), grip dash number and "D", "L" or "P" when applicable.(1)
"D" identifies bolt with drilled shank.
"L" identifies bolt with optional locking element.
"P" identifies bolt with patch type locking element only.

Third Sector - Mark with recess dash number, encircled. Recess number should be approximately 25% larger than other numerals in head marking.

LIST OF CURRENT SHEETS

SHEET NO.	REV. NO.
1	4
2	3
3	4
4	2
5	1
6	3

(4)

(4) **INACTIVE FOR NEW DESIGN AFTER JANUARY 1, 1986 NO SUPERSEDING STANDARD**

TRI-WING® IS A REGISTERED TRADEMARK OF THE PHILLIPS SCREW COMPANY.

CUSTODIAN NATIONAL AEROSPACE STANDARDS COMMITTEE		THIRD ANGLE PROJECTION
PROCUREMENT SPECIFICATION: NOTED ON SHEET 3	TITLE: BOLT, 100° HEAD, TRI-WING® RECESS, CLOSE TOLERANCE, A286 CRES, SHORT THREAD, SELF-LOCKING AND NONLOCKING	CLASSIFICATION: STANDARD PART
		NAS 4500 THRU 4516 SH 1 OF 6

APPROVAL DATE Dec. 1968 REVISION (1) 16 March 1970 (4) 15 Feb 1972 (7) 17 Dec. 1979 (8) 15 August 1985

NATIONAL AEROSPACE STANDARD
AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC., 1725 DE SALES STREET, N.W., WASHINGTON, D. C. 20036

TABLE I DIMENSIONS

BASIC NUMBER **	NOM THREAD SIZE	A DIA MAX (b)	A' ABSOLUTE MIN DIA (b)	B MAX (b)	D DIA, UNPLATED		D DIA, Plated or Coated BEFORE		D DIA, Plated or Coated AFTER		TRI-WING® RECESS NUMBER	H GAGE PROTRUSION (c)	
					MAX	MIN	MAX	MIN	MAX	MIN		NOM	± TOL
NAS4500	.1120-40	.226	.193	.044	.1115	.1110	.1107	.1101	.1115	.1105	NAS4000- 2	.0202	.0010
4501	.1380-32	.280	.246	.061	.1375	.1370	.1367	.1361	.1375	.1365	- 3	.0232	.0011
4502	.1640-32	.331	.296	.072	.1635	.1630	.1627	.1621	.1635	1625	- 4	.0186	.0012
4503	.1900-32	.381	.338	.082	.1895	.1890	.1887	.1881	.1895	.1885	- 5	.0210	.0013
4503J	.1900-32	.381	.338	.082	.1895	.1890	.1887	.1881	.1895	.1885	- 4J	.0210	.0013
4504	.2500-28	.508	.456	.111	.2495	.2490	.2487	.2481	.2495	.2485	- 6	.0299	.0015
4505	.3125-24	.635	.575	.138	.3120	.3115	.3112	.3106	.3120	.3110	- 7	.0354	.0017
4506	.3750-24	.763	.692	.166	.3745	.3740	.3737	.3731	.3745	.3735	- 8	.0414	.0019
4507	.4375-20	.889	.810	.193	.4370	.4365	.4362	.4356	.4370	.4360	- 9	.0435	.0021
4508	.5000-20	1.016	.928	.221	.4995	.4990	.4987	.4981	.4995	.4985	-10	.0496	.0023
4509	.5625-18	1.144	1.047	.249	.5615	.5610	.5607	.5601	.5615	5605	-11	.0556	.0025
4510	.6250-18	1.276	1.169	.279	.6240	.6235	.6232	.6226	.6240	.6230	-12	.0649	.0027
4512	.7500-16	1.531	1.406	.334	.7490	.7482	.7482	.7476	.7490	7480	-13	.0738	.0031
4514	.8750-14	1.786	1.644	.390	.8740	.8735	.8732	.8726	.8740	.8730	-14	.0840	.0035
4516	1.0000-12	2.043	1.882	.446	.9990	.9985	.9982	.9976	.9990	.9980	-15	.0950	.0039

**The last two digits of the basic number designate the size. See Sheet 3 for "D", "L", "P" and "U" codes. See Sheets 4 and 5 for grip dash numbers.

(a), (b) etc: See Notes on Sheet 3.

TABLE I DIMENSIONS (CONTINUED)

BASIC NUMBER	E MAX	F (k)	J (m)	M ±.010	P (d) +.010 −.000	R RAD		T (e) REF	TD DIA		U	W GAGE DIA +.0002 −.0000	Y (f)	Z (g)
						MAX	MIN		MAX	MIN	MAX			
NAS4500	.010	.125	.075	-	-	.012	.005	.238	.1085	.1065	.031	.1740	.0045	.0040
4501	.010	.156	.094	-	-	.012	.005	.276	.1340	.1315	.039	.2208	.0045	.0040
4502	.012	.156	.094	-	-	.020	.010	.323	.1595	.1570	.039	.2830	.0045	.0040
4503	.015	.156	.094	.164	.070	.020	.010	.323	.184	.181	.039	.3270	.0045	.0040
4503J	.015	.156	.094	.164	.070	.020	.010	.323	.184	.181	.039	.3270	.0045	.0040
4504	.018	-	-	.170	.076	.020	.010	.370	.244	.241	.045	.4318	.0045	.0030
4505	.021	-	-	.182	.076	.025	.010	.438	.306	.302	.052	.5449	.0045	.0030
4506	.025	-	-	.183	.106	.030	.015	.454	.368	.364	.052	.6580	.0045	.0025
4507	.028	-	-	.199	.106	.030	.015	.528	.431	.426	.062	.7782	.006	.0025
4508	.031	-	-	.198	.106	.030	.015	.528	.493	.488	.062	.8900	.006	.0020
4509	.034	-	-	.207	.141	.030	.015	.594	.555	.550	.068	1.0026	.006	.0020
4510	.038	-	-	.207	.141	.030	.015	.626	.618	.612	.068	1.1122	.006	.0020
4512	.044	-	-	.222	.141	.030	.015	.666	.743	.737	.078	1.3438	.006	.0020
4514	.050	-	-	.241	.141	.030	.015	.759	.868	.861	.089	1.5730	.009	.0020
4516	.057	-	-	.264	.141	.030	.015	.895	.993	.986	.104	1.8024	.009	.0020

(c), (d), etc: See Notes on Sheet 3.

(3) **INACTIVE FOR NEW DESIGN**
AFTER JANUARY 1, 1986
NO SUPERSEDING STANDARD

THIS DRAWING SUPERSEDES ALL ANTECEDENT STANDARD DRAWINGS FOR THE SAME PRODUCT AND SHALL BECOME EFFECTIVE NO LATER THAN SIX MONTHS FROM THE LAST DATE OF APPROVAL SHOWN HEREON

APPROVAL DATE Dec 1968 REVISION (1) 16 March 1970 (2) 17 Dec. 1979 (3) 15 August 1985

MATERIAL: A-286 Corrosion Resistant Steel with composition per AMS 5731 or AMS 5737.

HEAT TREAT: 160 KSI minimum ultimate tensile; 95 KSI minimum ultimate shear.

FINISH: Unplated bolts - Passivate to meet requirements of NAS4003.
Plated bolts - Cadmium plate per QQ-P-416, Type II, Class 2, Parts plated to Class 3 may be used until stock depleted.
Embrittlement test per QQ-P-416 does not apply.
Coated bolts - Aluminum coating per NAS4006.
Cadmium plated A-286 CRES bolts shall be identified with green dye or paint on the thread end. Maximum coverage may include the chamfer plus one incomplete thread.

CODE: Basic part number = plated bolt with undrilled shank and nonlocking.
Add "A" after basic number for aluminum coated bolts. May be used with "D", "L", or "P" code.
Add "D" after basic number for drilled shank bolt. (For sizes .1900-32 and larger) do not use with "L" or "P" code.)
Add "L" after basic number for self-locking bolt with optional locking element (including patch type); see procurement specification below (for sizes .1900-32 and smaller. For larger sizes see NAS4204 thru NAS4216). Do not use with "D" or "P" code.
Add "P" after basic number for self-locking bolt with patch type locking element only; see procurement spec below. (Size .1900-32 and smaller. See NAS4304 thru NAS4316 for larger sizes). Do not use with "D" or "L" code.
Add "U" after basic number for unplated bolt. May be used with "D", "L", or "P" code.
Dash number indicates grip in .0625 increments (converted to three decimal places per ANSI Y14.5). See Sheets 4 and 5 for tabulations of grip and length dimensions. Intermediate or longer lengths may be specified by usage of whole dash number only.
Add "J" as the fifth digit in basic four-digit part number for the deep number 4 recess.

Examples of part numbers: (See Sheet 6 for oversize bolts).

NAS4503-10	= Bolt, .1900-32 thread, .625 grip, undrilled shank, plated, nonlocking
NAS4503A10	= Bolt, .1900-32 thread, .625 grip, undrilled shank, aluminum coated, nonlocking
NAS4503D10	= Bolt, .1900-32 thread, .625 grip, drilled shank, plated, nonlocking
NAS4503DU10	= Bolt, .1900-32 thread, .625 grip, drilled shank, unplated, nonlocking
NAS4503LU10	= Bolt, .1900-32 thread, .625 grip, undrilled shank, unplated, self-locking (optional type; see procurement specification below).
NAS4503P10	= Bolt, .1900-32 thread, .625 grip, undrilled shank, plated, self-locking (patch type; see procurement specification below).
NAS4503JA10	= Bolt, .1900-32, .625 grip, undrilled shank, aluminum coated, nonlocking, 4J recess.

NOTES:
(a) Grip length of bolt shall be measured from the top of bolt head to the end of the full cylindrical portion of the shank.
(b) Dimensions A, A' and B are included for engineering reference only and are not to be used for inspection. Values A, A' and B are calculated limits resulting from tolerances on W, H, E and head angle.
(c) Dimensions for gage H protrusion shall be inspected per NAS527.
(d) Cotter pin hole centerline: Within .010 and normal within 2° of bolt centerline.
(e) Reference dimensions are for design purposes only. Not an inspection requirement.
(f) Concentricity: Conical surface of head to "D" diameter within .03 TIR. "D" dia to thread pitch dia within "Y" TIR.
(g) Shank straightness: Within "Z" TIR per inch of length.
(h) Protrusion of locking element shall be controlled so that it will pass freely, or with finger pressure, through a ring gage with diameter of .010 (+.001 −.000) greater than maximum major diameter of bolt thread.
(k) "F" min. (5 thread pitches) = region of minimum engagement with female thread required to meet MIL-F-18240 requirements. Locking element within "F" region must develop required torque when tested per MIL-F-18240.
(l) "A", aluminum coated and "U", unplated codes need not appear on the head of the bolt.
(m) For ease in starting, locking element shall not be effective in "J" area (3 thread pitches).
(n) Magnetic permeability shall be less than 2.0 (Air = 1.0)) for a field strength H = 200 oersteds using a magnetic permeability indicator per MIL-I-17214 or equivalent.

SURFACE TEXTURE: (AA max per ANSI B46.1) "D" dia, conical surface of head, thread flanks and thread root 32; other surfaces 125.
Dimensions to be met after plating, except as noted on Sheets 1 and 6.
Dimensions in inches.

PROCUREMENT SPECIFICATION: NAS4003, except as noted. Cold working of head to shank fillet is not required for NAS4500 thru 4503 screws. Locking element for self-locking screws: per MS15981 and MIL-F-18240, any type or configuration, including patch type, is optional when "L" code is specified. Patch type locking element (with no metal removed) is required when "P" code is specified. Locking element must be supplied by a qualified source listed in QPL18240 or approved for listing in QPL18240. Shipping notice should identify supplier of bolt and locking element separately.

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APPROVAL DATE Dec 1968 REVISION (1) 16 March 1970 (2) 15 Feb. 1972 (3) 17 Dec. 1979 (4) 15 August 1985

TABLE II GRIP AND LENGTH DIMENSIONS (CONTINUED ON SHEET 5)

GRIP DASH NUMBER	GRIP ±.010	LENGTH ±.015 (SEE NOTES BELOW) BASIC NUMBER AND THREAD SIZE						
		NAS4500 .1120-40	NAS4501 .1380-32	NAS4502 .1640-32	NAS4503 & 4503J .1900-32	NAS4504 .2500-28	NAS4505 .3125-24	NAS4506 .3750-24
1	.062	.300						
2	.125	.363	.401	.448	.448			
3	.188	.426	.464	.511	.511	.558	.626	.642
4	.250	.488	.526	.573	.573	.620	.688	.704
5	.312	.550	.588	.635	.635	.682	.750	.766
6	.375	.613	.651	.698	.698	.745	.813	.829
7	.438	.676	.714	.761	.761	.808	.876	.892
8	.500	.738	.776	.823	.823	.870	.938	.954
9	.562	.800	.838	.885	.885	.932	1.000	1.016
10	.625	.863	.901	.948	.948	.995	1.063	1.079
11	.688	.926	.964	1.011	1.011	1.058	1.126	1.142
12	.750	.988	1.026	1.073	1.073	1.120	1.188	1.204
13	.812	1.050	1.088	1.135	1.135	1.182	1.250	1.266
14	.875	1.113	1.151	1.198	1.198	1.245	1.313	1.329
15	.938	1.176	1.214	1.261	1.261	1.308	1.376	1.392
16	1.000	1.238	1.276	1.323	1.323	1.370	1.438	1.454
17	1.062	1.300	1.338	1.385	1.385	1.432	1.500	1.516
18	1.125	1.363	1.401	1.448	1.448	1.495	1.563	1.579
19	1.188	1.426	1.464	1.511	1.511	1.558	1.626	1.642
20	1.250	1.488	1.526	1.573	1.573	1.620	1.688	1.704
21	1.312	1.550	1.588	1.635	1.635	1.682	1.750	1.766
22	1.375	1.613	1.651	1.698	1.698	1.745	1.813	1.829
23	1.438	1.676	1.714	1.761	1.761	1.808	1.876	1.892
24	1.500	1.738	1.776	1.823	1.823	1.870	1.938	1.954
25	1.562	1.800	1.838	1.885	1.885	1.932	2.000	2.016
26	1.625	1.863	1.901	1.948	1.948	1.995	2.063	2.079
27	1.688	1.926	1.964	2.011	2.011	2.058	2.126	2.142
28	1.750	1.988	2.026	2.073	2.073	2.120	2.188	2.204
29	1.812	2.050	2.088	2.135	2.135	2.182	2.250	2.266
30	1.875	2.113	2.151	2.198	2.198	2.245	2.313	2.329
31	1.938	2.176	2.214	2.261	2.261	2.308	2.376	2.392
32	2.000	2.238	2.276	2.323	2.323	2.370	2.438	2.454
34	2.125	2.363	2.401	2.448	2.448	2.495	2.563	2.579
36	2.250	2.488	2.526	2.573	2.573	2.620	2.688	2.704
38	2.375	2.613	2.651	2.698	2.698	2.745	2.813	2.829
40	2.500	2.738	2.776	2.823	2.823	2.870	2.938	2.954
42	2.625	2.863	2.901	2.948	2.948	2.995	3.063	3.079
44	2.750	2.988	3.026	3.073	3.073	3.120	3.188	3.204
46	2.875	3.113	3.151	3.198	3.198	3.245	3.313	3.329
48	3.000	3.238	3.276	3.323	3.323	3.370	3.438	3.454
50	3.125	3.363	3.401	3.448	3.448	3.495	3.563	3.579
52	3.250	3.488	3.526	3.573	3.573	3.620	3.688	3.704
54	3.375	3.613	3.651	3.698	3.698	3.745	3.813	3.829
56	3.500	3.738	3.776	3.823	3.823	3.870	3.938	3.954
58	3.625	3.863	3.901	3.948	3.948	3.995	4.063	4.079
60	3.750	3.988	4.026	4.073	4.073	4.120	4.188	4.204
62	3.875	4.113	4.151	4.198	4.198	4.245	4.313	4.329
64	4.000	4.238	4.276	4.323	4.323	4.370	4.438	4.454

Intermediate and longer lengths may be specified by use of whole grip dash numbers only.
Nominal grip dimension equals grip dash numbers times .0625 (rounded to 3 decimal places).
Nominal length equals nominal grip plus "T" (see Sheet 2).

(2) INACTIVE FOR NEW DESIGN
AFTER JANUARY 1, 1986
NO SUPERSEDING STANDARD

APPROVAL DATE Dec. 1968 REVISION (1) 17 Dec. 1979 (2) 15 August 1985