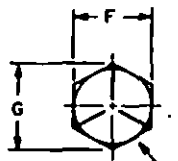
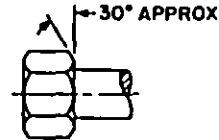
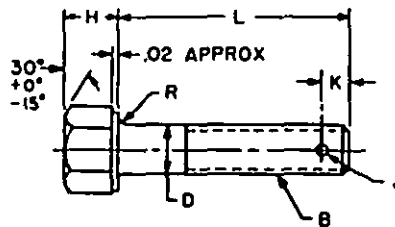


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SEE NOTE 6



OPTIONAL DESIGN

TABLE 1

| NOMINAL SIZE | | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 | 7/8 | 1 |
|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|------------------|
| B THREAD | UNC-2A | 20 | 18 | 16 | 14 | 13 | 11 | 10 | 9 | 8 |
| D BODY DIAMETER | MAX MIN | .2500 .2450 | .3125 .3065 | .3750 .3690 | .4375 .4305 | .5000 .4930 | .6250 .6170 | .7500 .7410 | .8750 .8660 | 1.0000 .9900 |
| F WIDTH ACROSS FLATS | MAX MIN | .4375 .4280 | .5000 .4890 | .5625 .5510 | .6250 .6120 | .7500 .7360 | .9375 .9220 | 1.1250 1.1000 | 1.3125 1.2850 | 1.5000 1.4690 |
| G WIDTH ACROSS CORNERS | MAX MIN | .505 .488 | .577 .557 | .650 .628 | .722 .698 | .866 .840 | 1.083 1.051 | 1.299 1.254 | 1.516 1.465 | 1.732 1.675 |
| H HEAD HEIGHT | MAX MIN | .163 .150 | .211 .195 | .243 .226 | .291 .272 | .323 .302 | .403 .378 | .483 .455 | .563 .531 | .627 .591 |
| J HOLE DIAMETER | +.006 -.002 | .076 | .076 | .107 | .107 | .107 | .140 | .140 | .140 | .140 |
| K $\pm .010$ | | .109 | .125 | .156 | .156 | .172 | .188 | .219 | .250 | .250 |
| R RADIUS | MAX MIN | .025 .015 | .025 .015 | .025 .015 | .025 .015 | .025 .015 | .045 .020 | .045 .020 | .065 .040 | .095 .060 |
| MIN TENSILE STRENGTH - LBS | | 3,600 | 6,300 | 9,300 | 12,800 | 17,000 | 27,100 | 40,100 | 55,400 | 72,700 |

| L LENGTH | TOLERANCE | | DASH NO. | DASH NO. | DASH NO. | DASH NO. | DASH NO. | DASH NO. | DASH NO. | DASH NO. | DASH NO. |
|--|-----------------------|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | SIZE 3/4 AND UNDER | SIZE 7/8 AND OVER | | | | | | | | | |
| .375 .438 .500 .562 .625 .750 .875 1.000 | +0 -.031 | --- | 301 | 327 | | | | | | | |
| | | | 302 | 328 | | | | | | | |
| | | | 303 | 329 | 355 | | | | | | |
| | | | 304 | 330 | 356 | | | | | | |
| | | | 305 | 331 | 357 | | | | | | |
| | | | 306 | 332 | 358 | 384 | 410 | 433 | | | |
| | | | 307 | 333 | 359 | 385 | 411 | 434 | | | |
| | | | 308 | 334 | 360 | 386 | 412 | 435 | 457 | | |
| 1.250 1.500 1.750 2.000 | +0 -.062 | +0 -.125 | 309 | 335 | 361 | 387 | 413 | 436 | 458 | 482 | 506 |
| | | | 310 | 336 | 362 | 388 | 414 | 437 | 459 | 483 | 507 |
| | | | 311 | 337 | 363 | 389 | 415 | 438 | 460 | 484 | 508 |
| | | | 312 | 338 | 364 | 390 | 416 | 439 | 461 | 485 | 509 |
| 2.250 2.500 2.750 3.000 3.250 3.500 3.750 4.000 4.250 4.500 4.750 5.000 5.500 6.000 | +0 -.094 | +0 -.188 | 313 | 339 | 365 | 391 | 417 | 440 | 462 | 486 | 510 |
| | | | 314 | 340 | 366 | 392 | 418 | 441 | 463 | 487 | 511 |
| | | | 315 | 341 | 367 | 393 | 419 | 442 | 464 | 488 | 512 |
| | | | 316 | 342 | 368 | 394 | 420 | 443 | 465 | 489 | 513 |
| | | | 317 | 343 | 369 | 395 | 421 | 444 | 466 | 490 | 514 |
| | | | 318 | 344 | 370 | 396 | 422 | 445 | 467 | 491 | 515 |
| | | | 319 | 345 | 371 | 397 | 423 | 446 | 468 | 492 | 516 |
| | | | 320 | 346 | 372 | 398 | 424 | 447 | 469 | 493 | 517 |
| | | | 321 | 347 | 373 | 399 | 425 | 448 | 470 | 494 | 518 |
| | | | 322 | 348 | 374 | 400 | 426 | 449 | 471 | 495 | 519 |
| | | | 323 | 349 | 375 | 401 | 427 | 450 | 472 | 496 | 520 |
| | | | 324 | 350 | 376 | 402 | 428 | 451 | 473 | 497 | 521 |
| | | | | | | | 429 | 452 | 474 | 498 | 522 |
| | | | | | | | 430 | 453 | 475 | 499 | 523 |

NOTE: For notes and Interchangeability Table see sheet 2.

(D) For changes see sheet 2.

| | | |
|--------------------------------------|---|------------------------------|
| P.A. VC Other Cont. 5H 82 | TITLE SCREW, CAP, HEXAGON HEAD (FINISHED HEXAGON BOLT), SHANK DRILLED FOR COTTER PIN, STEEL, GRADE 5, CADMIUM PLATED, UNC-2A | MILITARY STANDARD MS51105 |
| PROCUREMENT SPECIFICATION FF-3-83 | SUPERSEDED BY MS51103, BSA15, BSA15.1, BUK120, BUK120.1 and BUK121 | SHEET 1 OF 2 |

DD FORM 672-1 (Continued)

REPLACES EDITION OF THE FORM AND COMPLETE.

REVIEWER: AV, IS, AT, NSA, OS, 85
USER: ME, GL, MC, MI, TD, AS

This military standard is mandatory for use by all Departments and Agencies of the Department of Defense. Selection for all new engineering and design applications and for repetitive use shall be made from this document.

APPROVED 16 JUL 58 REVISED (A) 16 FEB 65 (B) 16 JUL 65 (C) 14 OCT 68 (D) 1 MAY 1989

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NOTES:

1. **MATERIAL:** Medium carbon steel, grade 5, in accordance with procurement specification. Minimum ultimate tensile strength: 120,000 psi.
2. **PROTECTIVE COATING:** Cadmium plating in accordance with procurement specification.
3. **THREADS:** The threads shall be in accordance with Screw-Thread Standards for Federal Services, Handbook H28.
4. **THREAD LENGTH:** Minimum thread length shall be twice the diameter plus 1/4 inch. The tolerance shall be plus 3/16 inch or 2-1/2 threads, whichever is greater. On screws that are too short for minimum thread lengths, the distance from the bearing surface of the head to the first complete thread shall not exceed the length of 2-1/2 threads.
5. **DIMENSIONS:** All dimensions are in inches, unless otherwise specified.
6. **HEAD MARKING:** Heads shall be marked in accordance with MIL-HDBK-131. Raised markings are preferred, stampings are acceptable.
7. **PART NUMBER:** The MS part number consists of the MS number, plus the dash number. Example: MS51105-301.
8. Referenced documents shall be of the issue in effect on date of invitations for bid.
9. For design feature purposes, this standard takes precedence over procurement documents referenced herein.

INTERCHANGEABILITY TABLE

The following table shows the interchangeability relationship between the former dash numbers of MS51103, MS51105, and the present dash numbers. Existing stock of screws may be used until depleted. Use only the screws shown as present dash numbers in new design.

TABLE II

| DASH NUMBERS | | | DASH NUMBERS | | | DASH NUMBERS | | | DASH NUMBERS | | |
|--------------|---------|---------|--------------|---------|---------|--------------|---------|---------|--------------|---------|---------|
| FORMER | | PRESENT | FORMER | | PRESENT | FORMER | | PRESENT | FORMER | | PRESENT |
| MS51103 | MS51105 | MS51105 | MS51103 | MS51105 | MS51105 | MS51103 | MS51105 | MS51105 | MS51103 | MS51105 | MS51105 |
| 1 | 1 | 301 | 50 | 50 | 350 | 115 | 115 | 415 | 167 | 167 | 467 |
| 2 | 2 | 302 | 55 | 55 | 355 | 126 | 126 | 426 | 168 | 168 | 468 |
| 3 | 3 | 303 | 56 | 56 | 356 | 117 | 117 | 417 | 169 | 169 | 469 |
| 4 | 4 | 304 | 57 | 57 | 357 | 118 | 118 | 418 | 170 | 170 | 470 |
| 5 | 5 | 305 | 58 | 58 | 358 | 119 | 119 | 419 | 171 | 171 | 471 |
| 6 | 6 | 306 | 59 | 59 | 359 | 120 | 120 | 420 | 172 | 172 | 472 |
| 7 | 7 | 307 | 60 | 60 | 360 | 121 | 121 | 421 | 173 | 173 | 473 |
| 8 | 8 | 308 | 61 | 61 | 361 | 122 | 122 | 422 | 174 | 174 | 474 |
| 9 | 9 | 309 | 62 | 62 | 362 | 123 | 123 | 423 | 175 | 175 | 475 |
| 10 | 10 | 310 | 63 | 63 | 363 | 124 | 124 | 424 | 182 | 182 | 482 |
| 11 | 11 | 311 | 64 | 64 | 364 | 125 | 125 | 425 | 183 | 183 | 483 |
| 12 | 12 | 312 | 65 | 65 | 365 | 126 | 126 | 426 | 184 | 184 | 484 |
| 13 | 13 | 313 | 66 | 66 | 366 | 127 | 127 | 427 | 185 | 185 | 485 |
| 14 | 14 | 314 | 67 | 67 | 367 | 128 | 128 | 428 | 186 | 186 | 486 |
| 15 | 15 | 315 | 68 | 68 | 368 | 129 | 129 | 429 | 187 | 187 | 487 |
| 16 | 16 | 316 | 69 | 69 | 369 | 130 | 130 | 430 | 188 | 188 | 488 |
| 17 | 17 | 317 | 70 | 70 | 370 | 131 | 131 | 431 | 189 | 189 | 489 |
| 18 | 18 | 318 | 71 | 71 | 371 | 134 | 134 | 434 | 190 | 190 | 490 |
| 19 | 19 | 319 | 72 | 72 | 372 | 135 | 135 | 435 | 191 | 191 | 491 |
| 20 | 20 | 320 | 73 | 73 | 373 | 136 | 136 | 436 | 192 | 192 | 492 |
| 21 | 21 | 321 | 74 | 74 | 374 | 137 | 137 | 437 | 193 | 193 | 493 |
| 22 | 22 | 322 | 75 | 75 | 375 | 138 | 138 | 438 | 194 | 194 | 494 |
| 23 | 23 | 323 | 76 | 76 | 376 | 139 | 139 | 439 | 195 | 195 | 495 |
| 24 | 24 | 324 | 84 | 84 | 384 | 140 | 140 | 440 | 196 | 196 | 496 |
| 25 | 25 | 325 | 85 | 85 | 385 | 141 | 141 | 441 | 197 | 197 | 497 |
| 26 | 26 | 326 | 86 | 86 | 386 | 142 | 142 | 442 | 198 | 198 | 498 |
| 27 | 27 | 327 | 87 | 87 | 387 | 143 | 143 | 443 | 199 | 199 | 499 |
| 28 | 28 | 328 | 88 | 88 | 388 | 144 | 144 | 444 | 206 | 206 | 506 |
| 29 | 29 | 329 | 89 | 89 | 389 | 145 | 145 | 445 | 207 | 207 | 507 |
| 30 | 30 | 330 | 90 | 90 | 390 | 146 | 146 | 446 | 208 | 208 | 508 |
| 31 | 31 | 331 | 91 | 91 | 391 | 147 | 147 | 447 | 209 | 209 | 509 |
| 32 | 32 | 332 | 92 | 92 | 392 | 148 | 148 | 448 | 210 | 210 | 510 |
| 33 | 33 | 333 | 93 | 93 | 393 | 149 | 149 | 449 | 211 | 211 | 511 |
| 34 | 34 | 334 | 94 | 94 | 394 | 150 | 150 | 450 | 212 | 212 | 512 |
| 35 | 35 | 335 | 95 | 95 | 395 | 151 | 151 | 451 | 213 | 213 | 513 |
| 36 | 36 | 336 | 96 | 96 | 396 | 152 | 152 | 452 | 214 | 214 | 514 |
| 37 | 37 | 337 | 97 | 97 | 397 | 153 | 153 | 453 | 215 | 215 | 515 |
| 38 | 38 | 338 | 98 | 98 | 398 | 157 | 157 | 457 | 216 | 216 | 516 |
| 39 | 39 | 339 | 99 | 99 | 399 | 158 | 158 | 458 | 217 | 217 | 517 |
| 40 | 40 | 340 | 100 | 100 | 400 | 159 | 159 | 459 | 218 | 218 | 518 |
| 41 | 41 | 341 | 101 | 101 | 401 | 160 | 160 | 460 | 219 | 219 | 519 |
| 42 | 42 | 342 | 102 | 102 | 402 | 161 | 161 | 461 | 220 | 220 | 520 |
| 43 | 43 | 343 | 110 | 110 | 410 | 162 | 162 | 462 | 221 | 221 | 521 |
| 44 | 44 | 344 | 111 | 111 | 411 | 163 | 163 | 463 | 222 | 222 | 522 |
| 45 | 45 | 345 | 112 | 112 | 412 | 164 | 164 | 464 | 223 | 223 | 523 |
| 46 | 46 | 346 | 113 | 113 | 413 | 165 | 165 | 465 | | | |
| 47 | 47 | 347 | 114 | 114 | 414 | 166 | 166 | 466 | | | |
| 48 | 48 | 348 | | | | | | | | | |
| 49 | 49 | 349 | | | | | | | | | |

| | | |
|--------------------------------------|--|-------------------|
| P.A. VC | TITLE | MILITARY STANDARD |
| Other Code 2H 02 | SCREW, CAP, HEXAGON HEAD (FINISHED HEXAGON BOLT); SHANK DRILLED FOR COTTER PIN, STEEL, GRADE 5, CADMIUM PLATED, UNC-2A | MS51105 |
| PROCUREMENT SPECIFICATION FF-3-85 | SUPERSEDES: MS51103, BSA15, BSA15.1, SUBX20, SUBX20.1 and SUBX21 | SHEET 2 OF |

DD FORM 672-1 (Continued)

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

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REVISION: 15, AT, NSA, OS, 85
USER: ME, CL, MC, MI, TD, 85

This military standard is mandatory for use by all Departments and Agencies of the Department of Defense. Selection for all new engineering and design applications and for repetitive use shall be made from this document.

APPROVED 16 JUL 59 REVISED 16 JUL 85 14 OCT 88 FOR CHANGES SEE SHEET 2.