



## Standard Part

### Hex Nuts – Flange Prevailing Torque, Inch, ZND, Grades F and G, Non-Preferred

**STPE180****87366958**

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#### 1. SCOPE

This specification conforms with Industrial Fasteners Institute IFI-100/107 Prevailing Torque Type Steel Hex Flange Locknuts, sizes 1/4 through 3/4 inch, unified coarse or fine thread series.

When a standard is referenced in a drawing or specification, it is understood that the reference is to the latest revision of the standard, unless stated otherwise.

#### 2. PART DESCRIPTION

Typical part description for CAD drawings and BOM's entered by Standards.

NUT, FLANGE P/T 1/2-13 GR F ZND

For cross reference listing of company part numbers, go to [PARTsolutions](#).

#### 3. RELATED DOCUMENTS

##### 3.1 REFERENCE STANDARDS

CNH STPA020—Fastener Finishes and Material Specifications

CNH MAT0310—Zinc Plating

CNH ENS7001—Tightening Threaded Fasteners

ANSI/ASME B1.1—Unified Inch Screw Threads

ASME B18.2.2—Square and Hex Nuts (Inch Series)

SAE J122—Surface Discontinuities on Nuts

SAE J995—Mechanical & Material Requirements for Steel Nuts

IFI 100/107—Industrial Fasteners Institute Prevailing Torque Type Steel Hex Flange Locknuts

##### 3.2 REPLACED STANDARDS

Case E-105—Hex Flange Nuts Prevailing Torque General Specification

Case E-106—Hex Flange Nuts Prevailing Torque Preferred and Non-Preferred

NH FNHA-1-B-405.00—Flanged Lock Nuts, Grade F, All Metal, ZnCr Plated, Coarse Threads

| AUTHOR | APPROVED BY | ECO      | PART NUMBER     |
|--------|-------------|----------|-----------------|
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### 4. REQUIREMENTS

#### 4.1 MATERIAL

Nuts shall be made of steel designated as Grade F or Grade G that meet the mechanical and performance requirements of IFI-100/107. Each grade of nut is suggested for use with bolts having specified minimum tensile strengths within the following values:

| Grade of Locknut | Specified Min. ULT Tensile Strength of Bolt, psi  | SAE Bolt Grade |
|------------------|---------------------------------------------------|----------------|
| Grade F          | not greater than 120,000                          | 5              |
| Grade G          | not less than 120,000<br>nor greater than 150,000 | 8              |

#### 4.2 HEAT TREATMENT

Nuts may be heat treated as necessary to meet the mechanical and performance requirements of IFI-100/107 except they shall not be case hardened.

#### 4.3 PREVAILING TORQUE

The prevailing torque characteristic is obtained by deformation of the threads at or near the top of the nut. Alternate styles or methods may be supplied subject to prior approval.

#### 4.4 PREFERRED PARTS POLICY

Preferred parts are so designated to reduce variety of parts and assure maximum availability, interchangeability, and cost savings in volume buying.

#### 4.5 MECHANICAL DIMENSIONS

Hex Nut thread geometry shall conform to Unified Series 2B per ANSI/ASME B1.1. The dimensions shall meet the requirements of ASME B18.2.2 (see Tables 1 and 2).

#### 4.6 SURFACE DISCONTINUITIES

All products under this specification shall be free from burrs, seams, laps, loose scale, irregular surfaces and any defects affecting their serviceability per SAE J122 (Surface Discontinuities on Nuts).

#### 4.7 MARKING

Steel nuts of Grade F and G shall be marked with the appropriate symbols for grade and manufacture in accordance with IFI-100/107.

#### 4.8 LUBRICATION

All locknuts shall be provided with an additional supplementary lubricant which shall be clean and dry to the touch.



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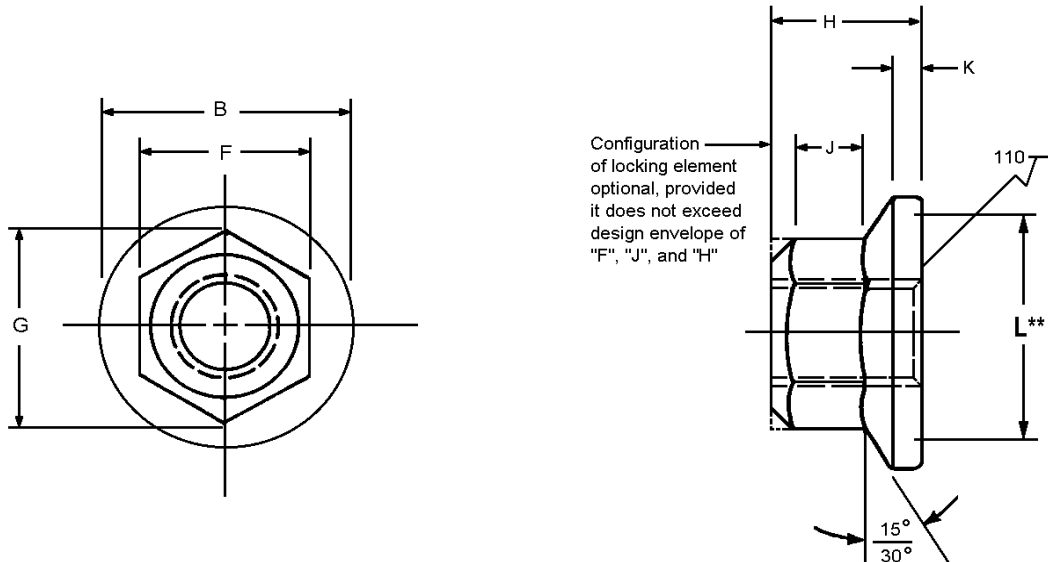
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**Table 1. Hex Nut Dimensions – Flange Prevailing Torque (Inch), All Metal**

| Nominal<br>Size or Basic<br>Major<br>Diameter<br>of Thread | F                     |        |       | G                       |       | H      | B              | J                          | K              | L**             |
|------------------------------------------------------------|-----------------------|--------|-------|-------------------------|-------|--------|----------------|----------------------------|----------------|-----------------|
|                                                            | Width Across<br>Flats |        |       | Width Across<br>Corners |       | Height | Flange<br>Dia. | Corner<br>Wrench<br>Length | Flange<br>Thk. | Bearing<br>Dia. |
|                                                            | Basic                 | Max    | Min   | Max                     | Min   | Max    | Max            | Min                        | Min            | Min             |
| 1/4 0.250                                                  | 7/16                  | 0.4385 | 0.428 | 0.505                   | 0.488 | 0.300  | 0.560          | 0.14                       | 0.04           | .484            |
| 5/16 0.312                                                 | 1/2                   | 0.5020 | 0.489 | 0.577                   | 0.557 | 0.365  | 0.680          | 0.17                       | 0.05           | .602            |
| 3/8 0.375                                                  | 9/16                  | 0.5645 | 0.551 | 0.650                   | 0.628 | 0.425  | 0.810          | 0.20                       | 0.06           | .730            |
| 7/16 0.438                                                 | 11/16                 | 0.6895 | 0.675 | 0.794                   | 0.768 | 0.495  | 0.930          | 0.23                       | 0.07           | .846            |
| 1/2 0.500                                                  | 3/4                   | 0.7520 | 0.736 | 0.866                   | 0.840 | 0.555  | 1.070          | 0.26                       | 0.08           | .982            |
| * 9/16 0.562                                               | 7/8                   | 0.8770 | 0.861 | 1.010                   | 0.982 | 0.625  | 1.190          | 0.29                       | 0.09           | 1.101           |
| 5/8 0.625                                                  | 15/16                 | 0.9395 | 0.922 | 1.083                   | 1.051 | 0.690  | 1.330          | 0.32                       | 0.10           | 1.230           |
| 3/4 0.750                                                  | 1-1/8                 | 1.1270 | 1.088 | 1.299                   | 1.240 | 0.825  | 1.585          | 0.38                       | 0.11           | 1.472           |
| Non-Standard                                               |                       |        |       |                         |       |        |                |                            |                |                 |
| * 7/8 0.875                                                | 1-5/16                | 1.3120 | 1.269 | 1.506                   | ---   | 0.855  | 1.750          | ---                        | 0.13           | ---             |

\* Non-Preferred for new design

\*\* Minimum bearing diameter must be flat to concave within 2 degrees when assembled without clamp load.



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**Table 2. Proof Load, Clamp Load, Prevailing Torque and Tightening Torque  
for Flange Lock Nuts, Grade F, Coarse Threads**

| Nut<br>Size | Proof<br>Load | Clamp<br>Load | Prevailing Torque |                  |                  | Locknut<br>Tightening<br>Torque |         |
|-------------|---------------|---------------|-------------------|------------------|------------------|---------------------------------|---------|
|             |               |               | First<br>Install  | First<br>Removal | Fifth<br>Removal | Max.                            | Min.    |
|             | lb.           | lb.           | lb. in.<br>Max.   | lb. in.<br>Min.  | lb. in.<br>Min.  | lb. ft.                         | lb. ft. |
| 1/4-20      | 3,800         | 2,000         | 40                | 5                | 1.5              | 11.1                            | 7.6     |
| 5/16-18     | 6,300         | 3,350         | 80                | 8                | 2.5              | 21.1                            | 14.1    |
| 3/8-16      | 9,300         | 4,950         | 110               | 12               | 4                | 37                              | 23      |
| 7/16-14     | 12,800        | 6,800         | 135               | 17               | 5                | 59                              | 39      |
| 1/2-13      | 17,000        | 9,050         | 204               | 22               | 7.5              | 80                              | 53      |
| 9/16-12     | 21,800        | 11,600        | 300               | 30               | 10               | 120                             | 77      |
| 5/8-11      | 27,200        | 14,500        | 420               | 39               | 12.5             | 158                             | 106     |
| 3/4-10      | 40,100        | 21,300        | 540               | 58               | 20               | 274                             | 190     |

**Table 3. Proof Load, Clamp Load, Prevailing Torque and Tightening Torque  
for Flange Lock Nuts, Grade F, Fine Threads**

| Nut Size | Proof<br>Load | Clamp<br>Load | Prevailing Torque |                  |                  | Locknut<br>Tightening<br>Torque |         |
|----------|---------------|---------------|-------------------|------------------|------------------|---------------------------------|---------|
|          |               |               | First<br>Install  | First<br>Removal | Fifth<br>Removal | Max.                            | Min.    |
|          | lb.           | lb.           | lb. in.<br>Max.   | lb. in.<br>Min.  | lb. in.<br>Min.  | lb. ft.                         | lb. ft. |
| 1/4-28   | 4,350         | 2,300         | 40                | 5                | 1.5              | 10.6                            | 7.6     |
| 5/16-24  | 6,950         | 3,700         | 80                | 8                | 2.5              | 18.8                            | 14.1    |
| 3/8-24   | 10,500        | 5,600         | 110               | 12               | 4                | 35                              | 24      |
| 7/16-20  | 14,200        | 7,550         | 135               | 17               | 5                | 63                              | 42      |
| 1/2-20   | 19,200        | 10,200        | 204               | 22               | 7.5              | 93                              | 62      |
| 9/16-18  | 24,400        | 13,000        | 300               | 30               | 10               | 132                             | 87      |
| 5/8-18   | 30,700        | 16,300        | 420               | 39               | 12.5             | 169                             | 113     |
| 3/4-16   | 44,800        | 23,800        | 540               | 58               | 20               | 270                             | 180     |



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**Table 4. Proof Load, Clamp Load, Prevailing Torque and Tightening Torque  
for Flange Lock Nuts, Grade G, Coarse Threads**

| Nut Size | Proof<br>Load | Clamp<br>Load | Prevailing Torque |                  |                  | Locknut<br>Tightening<br>Torque |         |
|----------|---------------|---------------|-------------------|------------------|------------------|---------------------------------|---------|
|          |               |               | First<br>Install  | First<br>Removal | Fifth<br>Removal | Max.                            | Min.    |
|          | lb.           | lb.           | lb. in.<br>Max.   | lb. in.<br>Min.  | lb. in.<br>Min.  | ft. lb.                         | ft. lb. |
| 1/4-20   | 4,750         | 2,850         | 40                | 5                | 1.5              | 17.6                            | 11.7    |
| 5/16-18  | 7,850         | 4,700         | 80                | 8                | 2.5              | 28.1                            | 18.2    |
| 3/8-16   | 11,600        | 6,950         | 110               | 12               | 4                | 45                              | 30      |
| 7/16-14  | 15,900        | 9,600         | 135               | 17               | 5                | 72                              | 48      |
| 1/2-13   | 21,300        | 12,800        | 204               | 22               | 7.5              | 120                             | 77      |
| 9/16-12  | 27,300        | 16,400        | 300               | 30               | 10               | 169                             | 113     |
| 5/8-11   | 33,900        | 20,300        | 420               | 39               | 12.5             | 201                             | 134     |
| 3/4-10   | 50,100        | 30,100        | 540               | 58               | 20               | 338                             | 225     |

**Table 5. Proof Load, Clamp Load, Prevailing Torque and Tightening Torque  
for Flange Lock Nuts, Grade G, Fine Threads**

| Nut Size | Proof<br>Load | Clamp<br>Load | Prevailing Torque |                  |                  | Locknut<br>Tightening<br>Torque |         |
|----------|---------------|---------------|-------------------|------------------|------------------|---------------------------------|---------|
|          |               |               | First<br>Install  | First<br>Removal | Fifth<br>Removal | Max.                            | Min.    |
|          | lb.           | lb.           | lb. in.<br>Max.   | lb. in.<br>Min.  | lb. in.<br>Min.  | ft. lb.                         | ft. lb. |
| 1/4-28   | 5,450         | 3,250         | 40                | 5                | 1.5              | 18.8                            | 12.3    |
| 5/16-24  | 8,700         | 5,200         | 80                | 8                | 2.5              | 27.0                            | 18.2    |
| 3/8-24   | 13,200        | 7,900         | 110               | 12               | 4                | 46                              | 31      |
| 7/16-20  | 17,800        | 10,700        | 135               | 17               | 5                | 84                              | 56      |
| 1/2-20   | 24,000        | 14,400        | 204               | 22               | 7.5              | 125                             | 83      |
| 9/16-18  | 30,400        | 18,300        | 300               | 30               | 10               | 186                             | 124     |
| 5/8-18   | 38,400        | 23,000        | 420               | 39               | 12.5             | 246                             | 162     |
| 3/4-16   | 56,000        | 33,600        | 540               | 58               | 20               | 380                             | 239     |



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Table 6. Hex Nuts – Flange Prevailing Torque (Inch), Grades F and G, Non-Preferred

| Nominal<br>Diameter | Threads<br>per<br>Inch | Material | Nut Finish |          |          |
|---------------------|------------------------|----------|------------|----------|----------|
|                     |                        |          | DOR        | ZND      | PHC      |
| 1/4                 | 20                     | F        |            | 9626558  |          |
| 1/4                 | 28                     | F        |            | 92863276 |          |
| 5/16                | 18                     | F        |            | 9823743  |          |
| 5/16                | 18                     | G        |            | 87034814 |          |
| 3/8                 | 16                     | F        | 87343938   |          |          |
| 3/8                 | 16                     | F        |            | 86521609 |          |
| 7/16                | 14                     | F        |            | 86637767 |          |
| 1/2                 | 13                     | F        |            | 86521610 |          |
| 1/2                 | 13                     | G        | 87343935   | 87025806 |          |
| 1/2                 | 20                     | G        |            | 87033645 |          |
| 5/8                 | 11                     | F        |            | 86521611 |          |
| 5/8                 | 11                     | G        |            | 84180923 | 47821548 |
| 3/4                 | 10                     | F        |            | 87490324 |          |
| 3/4                 | 10                     | G        | 87343946   |          |          |
| 1                   | 8                      | G        |            | 87378794 |          |