



# Standard Part

## Hexagon Serrated Flange Bolts – Inch – Non-Preferred

STPB300

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### 1. GENERAL

1.1 There are no national or international standards for hexagon head, serrated flange bolts. This standard is based upon user requirements and available commercial products.

1.2 All dimensions in this standard are in inches.

1.3 The Serrated Flange Bolt is generally used in applications with joints that require integrity when tightened and do not come loose when subjected to vibration.

### 2. RELATED DOCUMENTS

#### 2.1 REFERENCE STANDARDS

MAT0310—Zinc Plating

MAT4030—Gas Carburizing

STPA020—Fastener Finishes and Material Specifications

Case MS-91—Zinc Phosphate Coating

Case P-2—Shallow Case Carburizing

SAE J403—Chemical Compositions of SAE Carbon Steels

SAE J429—Mechanical and Material Requirements for Externally Threaded Fasteners

#### 2.2 REPLACED STANDARDS

Case B-044—Hex Serrated Flange Bolts (General Specifications)

Case B-045—Hex Serrated Flange Bolts Grade 5 UNC ZND & Grade 8 PHC - Preferred

Case B-046—Hex Serrated Flange Bolts - Non-Preferred

Case B-047—Hex Serrated Large Flange Bolts - Non-Preferred

FNHA 1-B-070.00—Screw, Cap, Hex Head, Flange, Underserrated, ZnCr, Inch

### 3. PREFERRED PARTS POLICY

All standard parts measured in inches are considered non-preferred. See STPB810 for preferred parts (metric).

### 4. CROSS REFERENCE

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

### 5. MATERIAL

5.1 Serrated flange bolts are made from 5SPL or Grade 8 steels

5.1.1 5SPL is a special, case-hardened steel material that meets mechanical and performance requirements for Grade 5 steel per SAE J429.

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5.1.2 5SPL steel will mechanically bite into the base material.

5.1.3 Table 1 shows the material composition.

**Table 1: 5SPL Material Composition**

| Material          | Range                   |
|-------------------|-------------------------|
| Carbon            | .13 – .25%              |
| Manganese         | .60 – 1.50%             |
| Silicon           | .10 – .35%              |
| Phosphorus        | .05% maximum            |
| Sulfur            | .06% maximum            |
| Alloying Elements | Optional                |
| Boron (optional)  | .0005 – .003 if present |

5.1.4 Case-harden 5SPL material as follows:

Carbonitride per Case Spec P-2 or carburize per MAT4030

Case depth .08 - .18 mm for 9.5 mm and under and .18 - .30 mm for 11.1 minimum diameter and greater

Temper to a surface hardness between 79 to 86 HR15N

Core hardness of 25 to 34 HRC

5.2 Bake or otherwise treat these parts for hydrogen embrittlement relief as agreed by the supplier and local user.

5.3 Grade 8 steel shall conform to the chemical composition, mechanical properties, and heat treatment requirements of SAE J429.

5.4 Grade 8 is a softer alternative to 5SPL and might not bite into the base material.

## 6 FINISH

Bolts shall be furnished plain (PLN), plated, or coated as designated by part number in accordance with CNH or former company Material Specifications.

## 7 HEAD MARKING

7.1 Bolts shall have a legible manufacturer's identification symbol recognizable in the trade to indicate source. Grade 8 bolts shall have appropriate radial raised head markings. Refer to SAE J429 for standard grade marking symbols for grade 8 bolts.

7.2 Marking symbols on the heads for bolt sizes 5/8 inch and smaller shall project not less than .005 inch above surface nor more than .015 inch over the specified maximum head height.

## 8 SERRATIONS

The underside of the flange shall contain serrations designed to produce approximately 25% more break loose torque than application torque. The configuration of serrations is optional.



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### 9. THREAD LENGTH

Serrated flange bolts shall be fully threaded unless otherwise noted.

### 10. SOURCING

Sources for bolts in this standard should be cleared with Materials Engineering.



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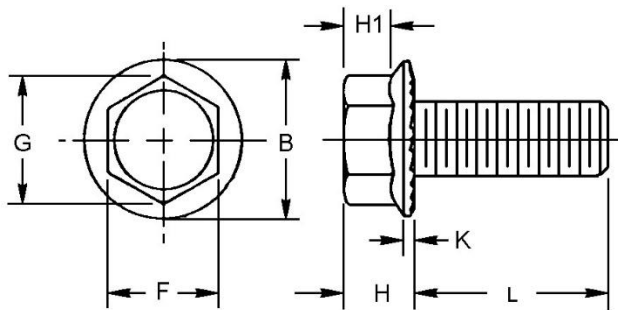
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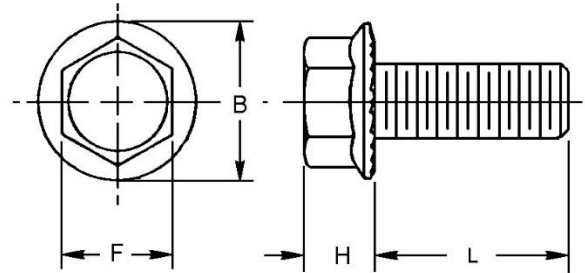
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REGULAR FLANGE



LARGE FLANGE

FIGURE 1: Hex Serrated Flange Bolt

TABLE 2: Basic Dimensions in Inches

| Nominal Size          | F                  |       | G                    |       | B               |       | H                 |       | H <sub>1</sub> | K                |
|-----------------------|--------------------|-------|----------------------|-------|-----------------|-------|-------------------|-------|----------------|------------------|
|                       | Width Across Flats |       | Width Across Corners |       | Flange Diameter |       | Total Head Height |       | Wrench Height  | Flange Thickness |
|                       | Max                | Min   | Max                  | Min   | Max             | Min   | Max               | Min   | Min            | Min              |
| #8                    | 0.250              | 0.244 | -                    | -     | 0.355           | 0.341 | 0.168             | 0.132 | -              | -                |
| #10                   | 0.312              | 0.305 | NA                   | 0.340 | 0.441           | 0.425 | 0.210             | 0.152 | 0.110          | 0.016            |
| 1/4                   | 0.375              | 0.367 | 0.433                | 0.409 | 0.565           | 0.513 | 0.280             | 0.201 | 0.130          | 0.019            |
| 5/16                  | 0.500              | 0.489 | 0.577                | 0.548 | 0.710           | 0.630 | 0.320             | 0.259 | 0.170          | 0.025            |
| 3/8                   | 0.562              | 0.551 | 0.650                | 0.618 | 0.810           | 0.750 | 0.390             | 0.296 | 0.190          | 0.028            |
| 7/16                  | 0.625              | 0.612 | 0.722                | 0.685 | 0.930           | 0.856 | 0.460             | 0.365 | -              | -                |
| 1/2                   | 0.750              | 0.736 | 0.866                | 0.825 | 1.070           | 1.020 | 0.510             | 0.392 | 0.312          | 0.038            |
| Large Serrated Flange |                    |       |                      |       |                 |       |                   |       |                |                  |
| 1/4                   | 0.375              | 0.367 | 0.433                | 0.409 | 0.625           | 0.607 | 0.250             | 0.230 | -              | -                |
| 5/16                  | 0.500              | 0.489 | 0.577                | 0.548 | 0.820           | 0.800 | 0.308             | 0.293 | -              | -                |
| 3/8                   | 0.562              | 0.551 | 0.650                | 0.618 | 0.915           | 0.890 | 0.349             | 0.332 | -              | -                |



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TABLE 3: Inch Hex Serrated Flange Bolts, 5SPL, ZND

| Length<br>L         | Nominal Bolt Diameter |          |          |          |          |         |          |
|---------------------|-----------------------|----------|----------|----------|----------|---------|----------|
|                     | #8*                   | #10*     | 1/4      | 5/16     | 3/8      | 7/16*   | 1/2      |
| 0.375*              |                       |          | 590860   |          |          |         |          |
| 0.5                 | 86512166              | 86512167 | 523291   | 256873   | 50215    |         |          |
| 0.625*              |                       | 274792   | 87564727 | 271288   |          |         |          |
| 0.75                |                       |          | 523292   | 145913   | 255918   | 9790589 | 86512178 |
| 1                   |                       |          | 86511443 | 86512168 | 9706726  | 86471   | 30944    |
| 1.25                |                       |          |          | 86512169 | 86512174 |         | 84209    |
| 1.5                 |                       |          |          | 86512170 | 86512175 |         | 86512179 |
| 1.75                |                       |          |          | 86512171 |          |         |          |
| 2                   |                       |          |          | 86512172 | 86512176 |         |          |
| 2.25                |                       |          |          | 30530    | 86512177 |         |          |
| 2.5                 |                       |          |          | 86512173 | 86977730 |         |          |
| 2.75                |                       |          |          |          | 50210    |         |          |
| 3                   |                       |          |          |          | 86514459 |         |          |
|                     | #8*                   | #10*     | 1/4      | 5/16     | 3/8      | 7/16*   | 1/2      |
| Coarse Thread Pitch | 32                    | 24       | 20       | 18       | 16       | 14      | 13       |

\* Do not use these sizes in new designs

TABLE 4: Inch Hex Serrated Flange Bolts, Grade 8, ZND

| Length<br>L         | Nominal Bolt Diameter |          |          |          |
|---------------------|-----------------------|----------|----------|----------|
|                     | 1/4                   | 5/16     | 3/8      | 1/2      |
| 0.5                 | 87327155              | 87327160 |          |          |
| 0.75                | 87327156              | 87327161 | 87327166 |          |
| 1                   | 87327157              | 87327162 | 87327171 | 87327175 |
| 1.25                |                       |          | 87327172 | 87327176 |
| 1.5                 | 87327158              | 87327164 | 87327173 | 87327177 |
| 1.75                |                       |          |          |          |
| 2                   |                       |          | 87602943 | 87327178 |
| 2.25                |                       |          |          |          |
| 2.5                 |                       |          | 87327174 |          |
| 2.75                |                       |          |          |          |
| 3                   |                       |          |          |          |
|                     | 1/4                   | 5/16     | 3/8      | 1/2      |
| Coarse Thread Pitch | 20                    | 18       | 16       | 13       |



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TABLE 5: Inch Hex Serrated Flange Bolts, 5SPL, DOR

| Length<br>L            | Nominal Bolt Diameter |          |          |          |
|------------------------|-----------------------|----------|----------|----------|
|                        | 1/4                   | 5/16     | 3/8      | 1/2      |
| 0.5                    | 87343120              | 87343271 | 87343281 |          |
| 0.75                   | 87343134              | 87343272 | 87343449 | 87343458 |
| 1                      | 87343135              | 87343273 | 87343452 | 87343459 |
| 1.25                   |                       | 87343275 | 87343453 | 87343465 |
| 1.5                    | 87343270              | 87343277 |          | 87343466 |
| 1.75                   |                       |          |          |          |
| 2                      |                       | 87343279 |          | 87343468 |
| 2.25                   |                       |          |          |          |
| 2.5                    |                       |          | 87343455 |          |
| 2.75                   |                       |          |          |          |
| 3                      |                       |          |          |          |
|                        | 1/4                   | 5/16     | 3/8      | 1/2      |
| Coarse<br>Thread Pitch | 20                    | 18       | 16       | 13       |

TABLE 6: Inch Hex Serrated Flange Bolts, Miscellaneous

| Nominal Diameter | Threads Per Inch | Length (L) | Material | Finish | Other        | Part Number |
|------------------|------------------|------------|----------|--------|--------------|-------------|
| 0.25             | 20               | 0.375      | 5        | PLN    |              | 271955      |
| 0.312            | 18               | 2.25       | 5SPL     | BZN    |              | 86625017    |
| 0.375            | 16               | 0.75       | 8        | DOR    |              | 92864642    |
| 0.375            | 16               | 1          | 5SPL     | ZND    | Large flange | 87034804    |