

The American Society for Testing and Materials is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

ASTM F593 Stainless steel bolts, hex cap screws, and studs.

ASTM F593 covers the chemical and mechanical requirements for stainless steel bolts, hex cap screws and studs in diameters ranging from 1/4" to 1-1/2" inclusive. These fasteners are for general purpose usage, and are available in seven alloy groups. Below is a basic summary of the common grades within the ASTM F593 specification. A number of other less common grades of ASTM F593 exist, but are not detailed in the description below. The Mechanical table here is limited to Alloy groups 1 and 2, as those are the most common and the Chemical table is only showing the most common alloy grades used for their respective alloy groups . More detailed information can be found in the ASTM F593 standard on the ASTM website.

#### F593 Alloy Groups

| Alloy Group | Alloy Designation                                   | Alloy Type              |
|-------------|---|-------------------------|
| 1           | 303, 304, 304L, 305, 384, XM1, 18-9LW, 302HQ, 303Se | Austenitic              |
| 2           | 316, 316L   | Austenitic              |
| 3           | 321, 347  | Austenitic              |
| 4           | 430, 430F   | Ferritic                |
| 5           | 410, 416, 416Se                                     | Martensitic             |
| 6           | 431   | Martensitic             |
| 7           | 630 (17-4)  | Precipitation Hardening |

\*The selection of an alloy within each group is at the discretion of the manufacturer unless the purchaser requests a specific alloy.

#### F593 Mechanical Properties / Condition

| Element, max except as shown | Alloy Group 1, Type 304 | Alloy Group 2, Type 316 |
|------------------------------|-------------------------|-------------------------|
| Carbon                       | 0.08%                   | 0.08%                   |
| Manganese                    | 2.00%                   | 2.00%                   |
| Phosphorus                   | 0.045%                  | 0.045%                  |
| Sulfur                       | 0.030%                  | 0.030%                  |
| Silicon                      | 1.00%                   | 1.00%                   |
| Chromium                     | 18.0 to 20.0%           | 16.0 to 18.0%           |
| Nickel                       | 8.0 to 10.5%            | 10.0 to 14.0%           |
| Copper                       | 1.00%                   |                         |
| Molybdenum                   |                         | 2.00 to 3.00%           |

#### F593 Recommended Hardware

| Nuts | Washers        |
|------|----------------|
| F594 | SS304 or SS316 |