



# ASTM F593

Scope - This specification 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.

Materials	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.

Mechanical Properties	Alloy Group	Condition	Marking	Diameter Range	Tensile, ksi	Yield, ksi min	Rockwell Hardness
	1	AF	F593A	1/4 to 1-1/2	65 to 85	20	B85 max
		A	F593B	1/4 to 1-1/2	75 to 100	30	B65 to 95
		CW1	F593C	1/4 to 5/8	100 to 150	65	B95 to C32
		CW2	F593D	3/4 to 1-1/2	85 to 140	45	B80 to C32
	2	AF	F593E	1/4 to 1-1/2	65 to 85	20	B85 max
		A	F593F	1/4 to 1-1/2	75 to 100	30	B65 to 95
		CW1	F593G	1/4 to 5/8	100 to 150	65	B95 to C32
CW2		F593H	3/4 to 1-1/2	85 to 140	45	B80 to C32	

Chemical Requirements	Element	Alloy Group 1, Type 304	Alloy Group 2, Type 316
	Carbon, max	0.08	0.08
	Manganese, max	2.00	2.00
	Phosphorus, max	0.045	0.045
	Sulfur, max	0.030	0.030
	Silicon, max	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, max	1.00	
Molybdenum		2.00 to 3.00	

Recommended Mating Materials	Nuts	Washers
	F594	SS304 or SS316