

## Chemical Composition - Steels, Alloys and Stainless - Ranges and Limits (Percent)

Grade	C	Mn	P Max.	S Max.	Si Max.	Ni	Cr	Mo Max.	Other Elements
<b>Standard Carbon Steels</b>									
1006	.08 max.	.25 - .40	0.04	0.05					
1008	.10 max.	.30 - .50	0.04	0.05					
1010	.08 - .13	.30 - .60	0.04	0.05					
1018	.15 - .20	.60 - .90	0.04	0.05					
1022	.18 - .23	.70 - 1.00	0.04	0.05					
1038	.35 - .42	.60 - .90	0.04	0.05					
1045	.43 - .50	.60 - .90	0.04	0.05					
<b>Rephosphorized &amp; Resulphurized Carbon Steels</b>									
1117	.14 - .20	1.00 - 1.30	0.04	.08 - .13					
1141	.37 - .45	1.35 - 1.65	0.04	.08 - .13					
1144	.40 - .48	1.35 - 1.65	0.04	.24 - .33					
12L14	.15 - max.	.85 - 1.15	.04 - .09	.26 - .35					Pb (.15 - .35)
1215	.09 - max.	.75 - 1.05	.04 - .09	.26 - .35					
<b>Standard Alloy Steels</b>									
4037	.35 - .40	.70 - .90	0.035	0.04	.20 - .35			.20 - .30	
8620	.18 - .23	.70 - .90	0.035	0.04	.20 - .35	.40 - .70	.40 - .60	.15 - .25	
8630	.28 - .33	.70 - .90	0.035	0.04	.20 - .35	.40 - .70	.40 - .60	.15 - .25	
4130	.28 - .33	.40 - .60	0.035	0.04	.20 - .35		.80 - 1.10	.15 - .25	
4340	.38 - .43	.75 - 1.00	0.035	0.04	.20 - .35		.80 - 1.10	.15 - .25	
<b>Stainless Steel - Austenitic/Non-Magnetic (May Be Slightly Magnetic)</b>									
302HQ	.10 max.	2.00 max.	0.045	0.03	1.00	8.00 - 10.00	17.00 - 19.00		
302	.15 max.	2.00 max.	0.045	0.03	1.00	8.00 - 10.00	17.00 - 19.00		
303	.15 max.	2.00 max.	0.200	.15 min.	1.00	8.00 - 10.00	17.00 - 19.00	0.60	
304	.08 max.	2.00 max.	0.045	0.03	1.00	8.00 - 10.50	18.00 - 20.00		
316	.08 max.	2.00 max.	0.045	0.03	1.00	10.00 - 14.00	16.00 - 18.00	2.00 - 3.00	
<b>Stainless Steel - Martensitic/Magnetic</b>									
410	0.15	1.00	0.04	0.03	1.00		11.50 - 13.50		
420	.15 min.	1.00	0.04	0.03	1.00		12.00 - 14.00		
<b>Stainless Steel - Precipitation Hardening Alloy</b>									
17-4PH	0.07	1.00	0.04	0.03	1.00	3.00 - 5.00	15.50 - 17.50		Co + Ta (.15-.45)

## Fastener Plating & Finishes

Finish	Color	For Use On (material)	Corrosion Resistance	Characteristics
Zinc (electroplated)	White to blue grey	All Metals	Good	Most common used plating. Good rust-resisting qualities, appearance and low cost.
Cadmium (electroplated)	Bright or dull silver grey	All Metals	Excellent	Superior rust-resisting qualities used in marine and aviation applications. Relatively high cost and toxic to the environment.
Chromate	Yellow, olive drab, black, blue/white	Zinc & Cadmium Plated Parts	Very Good	A secondary dipping process after plating increasing corrosion resistance, adding color or brilliance.
Black Oxide	Black	Ferrous Metals & Stainless Steel	Fair	A chemical discoloration which does not add to part thickness. Usually combined with an oil dip. Rust resistance comes from the oil only.
Phosphate & Oil	Charcoal grey or black	Steel	Good	Zinc or manganese phosphate used with a rust-inhibiting oil dip. Low cost.
Iridite	Olive drab, green, black, red, blue, bronze	All Metals	Good	Applied on top of zinc or cadmium plating as a die for color and additional corrosion protection.
Nickel	Silver	All Metals	Very Good	Hard stable finish, relatively expensive and sometimes hard to apply.
Chromium	Bright blue/white	All Metals	Very Good	Hard lustrous finish adds wear resistance and is very expensive.
Hot Dip Zinc (galvanizing)	Dull grey	All Metals	Very Good	Parts are dipped in pure zinc. Gives maximum corrosion protection. Adds a thick irregular coating. Size must be adjusted to allow for thickness of coat.
Passivating	Bright - etched	Stainless Steel	Excellent	Parts are dipped in nitric acid which removes iron particles and brightens the finish. Produces a passive corrosion-resistant finish.
Anodizing	Frosty - etched	Aluminum	Excellent	Acid dip produces a hard oxide surface. Can be color dipped after anodizing for preferred finish.