DESIGNER

HANDBOOK

SPECIFICATIONS

FOR

STAINLESS

STEEL

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INTRODUCTION

This designer handbook has been written to provide the designer, engineer, specification writer, producer and user of STAINLESS STEEL with a listing of all the current ASTM (American Society for Testing and Materials) standards. These standards are listed by mill shape (BAR, SHEET, WIRE, etc.) and by product (bolts, fittings). Stainless types are also listed, along with a selection of applicable society, government and military specifications.

ACKNOWLEDGEMENT

An original version was initially published by the Committee of Stainless Steel Producers, American Iron and Steel Institute (AISI), Washington, D.C., and was used, with thanks, as a basis for this updated handbook.

The 1995 Annual Book of ASTM Standards, section 1 was used as the reference base for listed ASTM specifications.

GENERAL INFORMATION

Stainless steel is not a single alloy, but rather the name applies to a group of iron based alloys containing a minimum of 10.5% chromium. Other elements are added and the chromium content increased to improve corrosion resistance and/or enhance mechanical properties. There are over 50 stainless steel grades, originally recognized by the AISI and are detailed in a designer handbook, “Design Guidelines for the Selection and Use of Stainless Steel,” available from the Specialty Steel Industry of North America (SSINA).

The assumption is made that the reader is well aware of the various types of stainless steels including the five metallurgical classifications (austenitic, ferritic, martensitic, austenitic/ferritic-or-duplex, and precipitation hardening). Where possible, these five classifications are generally shown with austenitic first. In some cases the ASTM reference is to the content rather than the classification. In those cases the basic content is listed (i.e., iron-chromium-nickel).

With certain mill products, there is a “general requirement” specifications and when that is the case, it is listed first with all the applicable specifications listed below it. The symbols ***** mark the end of these applicable specifications.

Specifications by grade are listed by the grades generally in use and do not cover all the stainless steel grades that are available. This listing applies mainly to mill products.

STAINLESS STEEL SPECIFICATIONS (NUMERICAL LISTING)

STANDARD SPECIFICATIONS FOR:

Specification Product Reference

ASTM "A" (Note: M designations have been left off)

167.....Plate, Sheet, Strip (chromium-nickel)
176.....Plate, Sheet, Strip (chromium)
177.....Sheet, Strip (chromium-nickel) Note: Replaced by A666
182.....Forged Flanges, Fittings, Valves
193.....Bolts
194.....Nuts
213.....Heat Exchanger Tubes
217.....Castings
240.....Plate, Sheet, Strip for Pressure Vessels
249.....Heat Exchangers & Condenser Tubes
263.....“Clad” Plate, Sheet and Strip (chromium)
264.....“Clad” Plate, Sheet and Strip (chromium-nickel)
268.....Tubing (ferritic)
269.....Tubing (austenitic)
270.....Sanitary Tubing (austenitic)
271.....Tubing for Refinery Service
276.....Bars and Shapes
297.....Castings (iron-chromium, iron-chromium-nickel)
312.....Pipe (austenitic)
313.....Spring Wire (chromium-nickel)
314.....Reforging Bars and Billets
320.....Bolts
336.....Forgings for Drums, Heads and other Pressure Vessel Components
351.....Castings for Pressure-Containing Parts (austenitic, austenitic/ferritic-duplex)
352.....Castings for Valves, Flanges and Pressure-Containing Parts for Low-Temperature Service
356.....Castings for Cylinders (Shells) and Valves for Steam Turbine Applications
358.....Electric Fusion Welded Pipe (austenitic)
368.....Wire Strand
376.....Pipe for High-Temperature Central Station Service (austenitic)
403.....Pipe Fittings
409.....Welded Large Diameter Pipe (austenitic)
412.....Plate, Sheet, Strip (chromium-nickel-manganese) Note: Replaced by A666
426.....Centrifugally Cast Pipe (ferritic)
430.....Forged and Bored Pipe (austenitic)
447.....Castings (chromium-nickel-iron) for High-Temperature Service
450.....General Requirements for Tubes (austenitic, ferritic)
453.....Bolting Material, High-Temperature (not for general purpose applications)
473.....Forgings
478.....Weaving Wire
479.....Bars and Shapes for Use in Boilers and other Pressure Vessels
480.....General Requirements for Plate, Sheet and Strip
484.....General Requirements for Forgings
487.....Castings Suitable for Pressure Service (martensitic)
492.....Rope Wire
493.....Cold Heading & Cold Forging Bar and Wire
498.....Heat Exchanger Tubes with Integral Fins (austenitic, ferritic)
511.....Mechanical Tubing (seamless)
554.....Mechanical Tubing (welded)
555.....General Requirement for Wire and Wire Rods
564.....Bars and Shapes, Hot-Rolled and Cold-Finished (age hardening)
565.....Forgings and Forging Stock (martensitic)
580.....Wire
581.....Wire (free-machining)
582.....Bars, Hot-Rolled or Cold-Finished (free-machining)
608.....Tubing Centrifugally Cast (iron-chromium-nickel)
632.....Tubing, Small Diameter (austenitic)
666.....Sheet, Strip, Plate and Flat Bar for Structural and Architectural Applications
Note: This specification has replaced A177 and A412
688.....Feedwater Heater Tubes (welded, austenitic)
693.....Plate, Sheet and Strip (precipitation hardening)
705.....Forgings (age-hardening)
731.....Pipe (ferritic, martensitic)
733.....Pipe Nipples (austenitic)
743.....Castings, Corrosion-Resistant, for General Applications
744.....Castings, Corrosion-Resistant, for Severe Service
747.....Castings, Precipitation Hardening
757.....Castings for Pressure-Containing Parts for Petroleum and Gas Pipelines
771.....Tubing for Breeder Reactor Core Components (austenitic)
774.....Fittings (as welded wrought, austenitic)
778.....Tubular Products (welded, austenitic)
781.....Common Requirements for Castings
789.....Tubing (ferritic/austenitic-duplex)
790.....Pipe (ferritic/austenitic-duplex)
791.....Tubing (ferritic)
793.....Floor Plate (rolled)
803.....Feedwater Heater Tubes (ferritic)
813.....Pipe (single or double welded, austenitic)
814.....Pipe (cold-worked, welded, austenitic)
815.....Pipe Fittings (ferritic, ferritic/austenitic-duplex, martensitic)
826.....Duct Tubes for Breeder Reactor Core Components
831.....Forgings for Core Components of Liquid Cooled Nuclear Reactors
851.....Condenser Tubes (high-frequency induction, welded, austenitic)
872.....Pipe, Centrifugally Cast (ferritic/austenitic-duplex)
887.....Borated Plate, Sheet and Strip for Nuclear Applications
890.....Castings (austenitic/ferritic-duplex) for General Applications
895.....Plate, Sheet and Strip (free-machining)
908.....Needle Tubing
928.....Pipe, Electric Fusion Welded with the Addition of Filler Metal (ferritic/austenitic-duplex)

ASTM "F"

55.....Surgical Implants, Bar and Wire
56.....Surgical Implants, Sheet and Strip
138.....Surgical Implants, Bar and Wire (special quality)
139.....Surgical Implants, Sheet and Strip (special quality)
593.....Bolts, Hex Cap Screws
594.....Nuts
738M.....Metric Bolts, Screws and Studs
836M.....Metric Nuts
837/837M .....Socket Head Cap Screws (Metric)
879/879M .....Socket Button and Flat Countersunk Head Cap Screws (Metric)
880/880M .....Socket Set Screws (Metric)

STANDARD PRACTICES FOR:

Specification	Practice Reference
ASTM "A"	
262	Austenitic Stainless Steel — Susceptibility to Intergranular Attack
380	Cleaning/Descaling Stainless Steel Parts/Equipment/Systems
609	Castings, Martensitic Stainless Steel, Ultrasonic Examination Thereof
700	Packaging, Marking and Loading Steel Products for Domestic Shipment
745	Ultrasonic Examination of Austenitic Steel Forgings
763	Ferritic Stainless Steels — Susceptibility to Intergranular Attack
799	Calibration/Testing of Instruments for Estimating Ferrite Content of Cast Stainless Steels
800	Steel Castings, Austenitic Alloy, Estimating Ferrite Content Thereof
880	Criteria for Use in Evaluation of Testing Laboratories and Organizations for Examination and Inspection of Stainless Steels

STANDARD TEST METHODS FOR:

Specification	Test Reference
ASTM "A"	
604	Macroetch Testing, Bars, Billets, Blooms
923	Detecting Detrimental Intermetallic Phase in Wrought Ferritic/Austenitic-Duplex Stainless Steels

SPECIFICATIONS BY MILL SHAPE

1. BAR (ASTM Volume 01.05)

These specifications cover hot-finished or cold-finished bars including rounds, squares, hexagons and hot-rolled or extruded shapes, such as angles, tees, and channels in the more commonly used types of stainless steel.

A 484/484M:	General requirements that apply to stainless steel bars (and applies to each of the following: A 276, A 314, A 473, A 479/479M, A 564/564M, A 565, A 582, A 705/705M, A 831)
A276:	Stainless steel hot/cold-finished bars
A 479/479M:	Stainless steel bars for boilers/pressure vessels
A 564/564M:	Age-hardened stainless steel bars
A 565:	Martensitic stainless steel bars
A 582:	Free-machining stainless steel bars
A 831:	Stainless steel bars for core components of liquid-cooled nuclear reactors

2. CASTINGS (ASTM Volume 01.02)

A 781/781M:	Castings, steel and alloy, common requirements, for general industrial use (includes the following: A 297/297M, A 447/447M, A 743/743M, A 744/744M, A 747/747M, and A 890/890M)
A 297/297M:	Steel castings, iron-chromium, and iron-chromium-nickel, heat-resistant, for general application
A 447/447M:	Steel castings, chromium-nickel-iron alloy (25-12 class) for high-temperature service.
A 743/743M:	Castings, iron-chromium-nickel, corrosion-resistant, for general application
A 744/744M:	Castings, iron-chromium-nickel, corrosion resistant, for severe service
A 747/747M:	Steel castings, stainless, precipitation hardening
A 890/890M:	Castings, iron-chromium-nickel-molybdenum corrosion-resistant, austenitic/ferritic (duplex) for general applications

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A 217/217M:	Stainless steel castings for pressure-containing parts for high-temperature service
A 351/351M:	Steel castings, austenitic, austenitic/ferritic (duplex), for pressure-containing parts
A 352/352M:	Stainless steel castings for valves, flanges and pressure-containing parts for low-temperature service
A 356/356M:	Stainless steel castings for cylinders (shells), valve chests, throttle valves, and other heavy-walled castings for steam turbine applications
A 478/487M:	Steel castings suitable for pressure service (martensitic)
A 757/757M:	Stainless steel castings for pressure-containing parts and other applications intended primarily for petroleum and gas pipelines subject to low-temperature service

3. FORGINGS (ASTM Volume 01.05)

These specifications cover forgings and billets or other semi-finished material (except wire) for forging.

A 484/484M: .....General requirements that apply to stainless steel forgings (and applies to each of the following:
A 276, A 314, A 473, A 479/479M, A 564/564M, A 565, A 582, A 705/705M, and A 831)
A 314: .....Stainless steel billets and bars for reforging
A 473: .....Stainless steel forgings for general use
A 705/705M: .....Age-hardened stainless steel forgings for general use
A 831: .....Stainless steel forgings for core components of liquid-colled nuclear reactors

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A 336/336M: .....Stainless steel forgings for boilers, pressure vessels, high-temperature parts, and associated equipment

4. PIPE (ASTM Volume 01.01)

A 312/312M: .....Seamless and welded austenitic stainless steel pipes
A 409/409M: .....Welded large diameter austenitic steel pipe for corrosive or high-temperature service.
A 814/814M: .....Cold-worked welded austenitic stainless steel pipe
A 813/813M: .....Single- or double-welded austenitic stainless steel pipe
A 376/376M: .....Seamless austenitic steel pipe for high-temperature central-station service
A 358/358M: .....Electric-fusion-welded austenitic chromium-nickel alloy steel pipe for high-temperature service
A 430/430M: .....Austenitic steel forged and bored pipe for high-temperature service
A 731/731M: .....Seamless, welded ferritic, and martensitic stainless steel pipe
A 426: .....Centrifugally cast ferritic alloy steel pipe for high-temperature service
A 790/790M: .....Seamless and welded ferritic/austenitic (duplex) stainless steel pipe
A 872: .....Centrifugally cast ferritic/austenitic (duplex) stainless pipe for corrosive environments
A 928/928M: .....Ferritic/austenitic (duplex) stainless steel pipe electric fusion welded with addition of filler metal

5. PLATE, SHEET and STRIP (ASTM Volume 01.03)

A 480/480M: .....General requirements for flat-rolled stainless and heat-resisting steel plate, sheet, and strip (and applies to each of the following:
A 167, A 176, A 240/240M, A 263, A 264, A 666, A 693, A 793, and A 895)
A 167: .....Stainless and heat-resisting chromium-nickel steel plate, sheet and strip
A 176: .....Stainless and heat-resisting chromium steel plate, sheet and strip
A 240/240M: .....Heat-resisting chromium and chromium-nickel stainless steel plate, sheet and strip for pressure vessels
A 263: .....Corrosion-resistant chromium steel clad plate, sheet and strip
A 264: .....Stainless chromium-nickel steel clad plate, sheet and strip
A 666: .....Austenitic stainless steel sheet, strip, plate and flat bar for structural and architectural applications (replaces A 177 and A 412)
A 693: .....Precipitation-hardening stainless steel and heat-resistant steel plate, sheet and strip
A 793: .....Stainless steel rolled floor plate
A 895: .....Free-machining stainless steel plate, sheet and strip

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A 887: .....Borated stainless steel plate, sheet and strip for nuclear applications

6. TUBE (ASTM 01.01)

A 450/450M: .....General requirements for carbon, ferritic alloy, and austenitic alloy steel tubes (and includes the following:
A 213/213M, A 249/249M, A 268/268M, A 269, A 270, A 271, A 688/688M, A 771, A 789/789M, A 791/791M, A 803/803M, A 826, A 851)
A 213/213M: .....Seamless ferritic and austenitic alloy-steel boiler, superheater, and heat exchanger tubes
A 249/249M: .....Welded austenitic steel boiler, superheater, heat exchanger, and condenser tubes
A 268/268M: .....Seamless and welded ferritic and martensitic stainless steel tubing for general service
A 269: .....Seamless and welded austenitic stainless steel tubing for general service
A 270: .....Seamless and welded austenitic stainless steel sanitary tubing
A 271: .....Seamless austenitic chromium-nickel stainless steel tubes for refinery service
A 688/688M: .....Welded austenitic stainless steel feedwater heater tubes
A 771: .....Austenitic stainless steel tubing for breeder reactor core components
A 789/7899M: ...Seamless and welded ferritic/austenitic (duplex) stainless steel tubing for general service
A 791/791M: .....Welded unannealed ferritic stainless steel tubing
A 803/803M: .....Welded ferritic stainless steel feedwater heater tubes
A 826: .....Austenitic and ferritic stainless steel duct tubes for breeder reactor core components
A 851: .....High-frequency induction welded, unannealed, austenitic steel condenser tubes

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A 632: .....Seamless and welded austenitic stainless steel tubing (small diameter) for general service
A 498: .....Seamless and welded carbon, ferritic and austenitic alloy steel heat exchanger tubes with integral fins
A 608: .....Centrifugally cast iron-chromium-nickel high-alloy tubing for pressure applications at high temperature
A 778: .....Welded unannealed austenitic stainless steel tubular products
A 908: .....Stainless steel needle tubing

7. MECHANICAL TUBING (ASTM Volume 01.01)

A 511: .....Seamless stainless steel mechanical tubing
A 554: .....Welded stainless steel mechanical tubing

8. WIRE & WIRE ROD (ASTM Volume 01.03)

Wire is intended primarily for cold forming, including coiling, standing, weaving, heading and machining. Wire rods are semifinished products intended primarily for the manufacturer of wire.

A 555/555M: .....General requirements for stainless steel and heat-resistant steel wire and wire rods (and apply to the following: A 313, A 368, A 478, A 492, A 493, A 580/580M, and A 581/581M)
A 313: .....Chromium-nickel stainless steel and heat-resisting steel spring wire
A 368: .....Stainless steel and heat-resisting steel wire strand
A 478: .....Chromium-nickel stainless steel and heat-resisting steel weaving and knitting wire
A 492: .....Stainless steel and heat-resisting steel rope wire
A 493: .....Stainless steel and heat-resisting steel wire and wire rods for cold heading and cold forming
A 580/580M: .....Stainless steel and heat-resisting steel wire (includes round, square, octagon, hexagon, and shape wire) in coils only
A 581/581M: .....Free-machining stainless steel and heat-resisting steel wire and wire rod

STAINLESS STEEL SPECIFICATIONS BY PRODUCT TYPE

1. BEARINGS (ASTM Volume 01.05)

A 756: .....Stainless anti-friction bearing steel

2. BOLTS (and NUTS) (ASTM Volume 01.01)

A 193/193M: .....Alloy steel and stainless steel bolting materials for high-temperature service
A 194/194M: .....Carbon and alloy steel nuts for bolts for high-pressure and high-temperature service
A 320: .....Alloy steel bolting materials for low-temperature service
A 453/453M: .....Bolting material, high-temperature, 50 to 120 ksi (345 to 827 mpa) yield strength, with expansion coefficients comparable to austenitic steels (not for general purpose applications)

3. PIPE FITTINGS (ASTM Volume 01.01)

A 403/403M: .....Wrought austenitic stainless steel pipe fittings
A 815/815M: .....Wrought ferritic, ferritic/austenitic (duplex), and martensitic stainless steel piping fittings
A 733: .....Welded and seamless austenitic stainless steel pipe nipples

4. FITTINGS, FLANGES and VALVES (ASTM Volume 01.01)

A 774/774M: .....As-welded wrought austenitic stainless steel fittings for general corrosive service at low and moderate temperatures
A 182/182M: .....Forged or rolled alloy-steel pipe flanges, forged fittings, and valves and parts for high-temperature service

5. FASTENERS (ASTM Volume 15.08)

F 593:.....Stainless steel bolts, hex cap screws, and bolts
F 594:.....Stainless steel nuts
F 738M: .....Stainless steel metric bolts, screws & studs
F 836M: .....Stainless steel metric nuts
F 837/837M: .....Stainless steel socket head cap screws
F 879/879M: .....Stainless steel socket button and flat countersunk head cap screws
F 880/880M: .....Stainless steel socket set screws

6. ARCHITECTURAL APPLICATIONS

A 666: .....Austenitic stainless steel sheet, strip, plate and flat bar for structural and architectural applications

7. SANITARY TUBING

A 270: .....Seamless and welded austenitic stainless steel sanitary tubing

SPECIFICATIONS BY GRADE TYPE ARE LISTED BELOW:
(Generally they apply to mill products: BAR, PLATE, SHEET, STRIP, SINGLE & WIRE)
*ASTM coating specs are not included

TYPE	UNS	ASTM	Military	Federal	SAE	AMS	ACI
201	S20100	A 240 A 276 A 473 A 666		QQ-S-766C			
202	S20200	A 240 A 276 A 314 A 473 A 666		QQ-S-766C			
205	S20500	A 276 A 473 A 666					
301	S30100	A 240 A 264 A 554 A 666	MIL-S-5059 MIL-S-22216 MIL-T-5695	QQ-S-682 QQ-S-766	30301	5517 5518 5519	
302	S30200	A 240 A 264 A 276 A 313 A 314 A 368 A 473 A 478 A 479 A 492 A 493 A 511 A 554 A 580 A 666	MIL-S-853 MIL-S-854 MIL-S-862 MIL-S-5059 MIL-S-7720 MIL-S-17509 MIL-S-22216 MIL-S-46044 MIL-T-5677 MIL-W-6712 MIL-W-17481	QQ-S-682 QQ-S-763 QQ-S-766 QQ-S-786 QQ-W-423	30302	5358 5515 5516 5517 5518 5519 5560 5565 5636 5637 5688	CF-20
302 B	S30215	A 167 A 276 A 473 A 580		QQ-S-766	30302 B		HF
303	S30300	A 194 A 314 A 320 A 473 A 581 A 582 A 895	MIL-S-853 MIL-S-862 MIL-S-7720 MIL-W-52263	QQ-S-763 QQ-S-764	30303	5640	CF-16F
303Se	S30323	A 194 A 314 A 320 A 473 A 511 A 581 A 582 A 895	MIL-S-862 MIL-S-7720 MIL-W-52263	QQ-S-763 QQ-S-764	30303Se	5640 5738	

Unified Numbering System: Included in the tables are six-character designations under the Unified Numbering System (UNS) for the AISI numbered stainless steels. The Unified Numbering System originated through a cooperative effort of the American Society for Testing and Materials and the Society of Automotive Engineers, and UNS numbers apply to all metals and alloys. All stainless steels will be identified under this system with the letter “S” followed by five digits.

ACI	American Casting Institute
Military	United States Government
Federal	United States Government
SAE	Society of Automotive Engineers
AMS	Aerospace Material Specifications
ASTM	American Society for Testing and Materials

TYPE	UNS	ASTM	Military	Federal	SAE	AMS	ACI
304	S30400	A 182 A 193 A 194 A 213 A 240 A 249 A 264 A 269 A 270 A 271 A 276 A 312 A 313 A 314 A 320 A 336 A 358 A 368 A 376 A 409 A 430 A 473 A 478 A 479 A 492 A 493 A 511 A 554 A 580 A 632 A 666 A 688	MIL-F-20138 MIL-P-1144 MIL-S-853 MIL-S-854 MIL-S-862 MIL-S-5059 MIL-S-18170 MIL-S-22216 MIL-S-23195 MIL-S-23196 MIL-T-6845 MIL-T-8504 MIL-T-8506 MIL-T-18063 MIL-W-17481	QQ-S-763 QQ-S-766 QQ-W-423	30304	5370 5371 5501 5511 5513 5560 5565 5566 5567 5639 5697	CF-8
304L	S30403	A 182 A 213 A 240 A 249 A 264 A 269 A 270 A 276 A 312 A 314 A 336 A 358 A 409 A 473 A 478 A 479 A 493 A 511 A 554 A 580 A 632 A 666 A 688	MIL-S-853 MIL-S-854 MIL-S-862 MIL-S-4043 MIL-S-18170 MIL-S-18171 MIL-S-22216 MIL-S-23195 MIL-S-23196 MIL-T-18063	QQ-S-763 QQ-S-766	30304 L	5370 5371 5511 5513 5647	CF-3
304N	S30451	A 182 A 193 A 194 A 240 A 276 A 312 A 336 A 358 A 376 A 430 A 479 A 666 A 688					

TYPE	UNS	ASTM	Military	Federal	SAE	AMS	ACI
304LN		A 240 A 276 A 269 A 336 A 358 A 376 A 479 A 666 A 688					
305	S30500	A 240 A 249 A 276 A 313 A 314 A 368 A 473 A 478 A 492 A 493 A 511 A 554 A 571 A 580	MIL-W-3068 MIL-W-17481	QQ-S-423 QQ-S-763 QQ-S-766 QQ-W-409 QQ-W-423	30305	5514 5685 5686	
308	S30800	A 167 A 276 A 314 A 473 A 580	MIL-E-19933 MIL-R-5031	QQ-S-706	30308		
309	S30900	A 167 A 240 A 249 A 264 A 276 A 312 A 314 A 473 A 580	MIL-E-19933 MIL-R-5031 MIL-S-862	QQ-S-763 QQ-S-766	30309	5523 5574 5650	CH-20
309S	S30908	A 213 A 240 A 276 A 312 A 314 A 358 A 409 A 478 A 479 A 511 A 554 A 580		QQ-S-763 QQ-S-766	30309S	5523 5574 5650	HH
310	S31000	A 167 A 182 A 213 A 240 A 249 A 276 A 312 A 314 A 336 A 473 A 580 A 632	MIL-E-19933 MIL-N-15721 MIL-R-5031 MIL-S-853 MIL-S-854 MIL-S-862 MIL-S-22216 MIL-W-17481	QQ-S-763 QQ-S-766 QQ-W-423	30310	5521 5572 5577 5651 5694 5695	CK-20

TYPE	UNS	ASTM	Military	Federal	SAE	AMS	ACI
310S	S31008	A 213 A 240 A 249 A 264 A 276 A 314 A 358 A 409 A 473 A 479 A 511 A 554 A 580		QQ-S-763 QQ-S-766	30310S	5521 5572 5577 5651	HK
314	S31400	A 276 A 314 A 473 A 580			30314	5522 5652	
316	S31600	A 182 A 193 A 194 A 213 A 240 A 249 A 264 A 269 A 270 A 271 A 276 A 312 A 313 A 314 A 320 A 336 A 358 A 376 A 409 A 430 A 473 A 478 A 479 A 492 A 493 A 511 A 554 A 580 A 632 A 666 A 688 F 55 F 56	MIL-E-16715 MIL-E-19933 MIL-S-854 MIL-S-862 MIL-S-867 MIL-S-1144 MIL-S-5059 MIL-S-7720 MIL-S-18262 MIL-S-22216 MIL-W-17481	QQ-S-763 QQ-S-766 QQ-W-423	30316	5524 5573 5646 5648 5649 5690 5691	CF-8M CF-12M
316L	S31603	A 182 A 213 A 240 A 249 A 269 A 270 A 276 A 312 A 314 A 336 A 358 A 376 A 409 A 473 A 478 A 479 A 493 A 511 A 554 A 580 A 632 A 666 A 688	MIL-E-19933 MIL-R-5031 MIL-S-862 MIL-S-7720	QQ-S-763 QQ-S-766	30316L	5507 5646 5653	CF-3M

TYPE	UNS	ASTM	Military	Federal	SAE	AMS	ACI
316F	S31620						
316N	S31651	A 182 A 193 A 194 A 240 A 312 A 376 A 430 A 479 A 666 A 688					
316LN		A 240 A 269 A 336 A 358 A 376 A 479 A 688					
317	S31700	A 182 A 213 A 240 A 249 A 269 A 276 A 312 A 314 A 409 A 473 A 478 A 479 A 511 A 554 A 580 A 632 F 55 F 56 F 138 F 139	MIL-E-19933 MIL-S-862	QQ-S-763	30317	CG-8M	
317L	S31703	A 182 A 213 A 240 A 249 A 269 A 312 F 55 F 56 F 138 F 139					
321	S32100	A 182 A 193 A 194 A 213 A 240 A 249 A 264 A 269 A 271 A 276 A 312 A 313 A 314 A 320 A 336 A 358 A 376 A 409 A 430 A 473 A 479 A 511 A 554 A 580 A 632	MIL-E-19933 MIL-P-1144 MIL-S-853 MIL-S-854 MIL-S-862 MIL-S-6721 MIL-S-22216 MIL-T-6737 MIL-T-8606 MIL-T-8808	QQ-S-682 QQ-S-763 QQ-S-766	30321	5510 5557 5559 5570 5576 5645 5689 7211	

TYPE	UNS	ASTM	Military	Federal	SAE	AMS	ACI
329	S32900	A 240					
330	N08330	A 554 B 511 B 512 B 535 B 536 B 546				5592 5716	HK
347	S34700	A 182 A 193 A 194 A 213 A 240 A 249 A 264 A 269 A 271 A 276 A 312 A 313 A 314 A 320 A 336 A 358 A 376 A 409 A 430 A 473 A 479 A 511 A 554 A 580 A 632	MIL-E-16715 MIL-E-19933 MIL-R-5031 MIL-S-853 MIL-S-862 MIL-S-6721 MIL-S-17509 MIL-S-18170 MIL-S-18171 MIL-S-22216 MIL-S-23195 MIL-S-23196 MIL-T-6737 MIL-T-8606 MIL-T-8808 MIL-T-18063	QQ-S-682 QQ-S-763 QQ-S-766	30347	5363 5512 5556 5558 5571 5575 5646 5654 5680 5681 7229	CF-8C
348	S34800	A 182 A 213 A 240 A 249 A 269 A 276 A 312 A 314 A 358 A 376 A 409 A 473 A 580 A 632	MIL-S-867 MIL-S-6721 MIL-S-18191 MIL-S-23195 MIL-S-23196	QQ-S-766	30348		
384	S38400	A 493			30384		
403	S40300	A 176 A 276 A 314 A 479 A 511 A 580		QQ-S-763	51403	5614	
405	S40500	A 240 A 268 A 276 A 314 A 479 A 511 A 580		QQ-S-763	51405		
409	S40900	A 240 A 651 A 791 A 803			51409		

TYPE	UNS	ASTM	Military	Federal	SAE	AMS	ACI
410	S41000	A 193 A 194 A 240 A 268 A 276 A 314 A 473 A 479 A 493 A 511 A 580		QQ-S-763 QQ-S-766	51410	5504 5613	
414	S41400	A 276 A 314 A 473 A 479 A 511 A 580		QQ-S-763	51414	5615	
416	S41600	A 194 A 314 A 473 A 581 A 582 A 895	MIL-W-52263	QQ-S-764	51416	5610	
416Se	S41623	A 194 A 314 A 473 A 511 A 581 A 582 A 895	MIL-W-52263	QQ-S-764	51416Se	5610	
420	S42000	A 176 A 276 A 314 A 473 A 580		QQ-S-763 QQ-S-766	51420	5506 5621	
420F	S42020	A 582 A 895			51420F	5620	
422	S42200				51422		
429	S42900	A 182 A 240 A 268 A 276 A 314 A 473 A 493 A 511 A 554			51429		
430	S43000	A 182 A 240 A 268 A 276 A 314 A 473 A 479 A 493 A 511 A 554 A 580		QQ-S-763 QQ-S-764	51430	5503 5627	
430F	S43020	A 314 A 473 A 581 A 582 A 895	MIL-W-52263	QQ-S-764	51430F		

TYPE	UNS	ASTM	Military	Federal	SAE	AMS	ACI
430FSe	S43023	A 314 A 473 A 581 A 582 A 895	MIL-W-52263	QQ-S-764	51430FSe		
431	S43100	A 176 A 276 A 314 A 473 A 493 A 580	MIL-S-18732		51431	5628	
434	S43400				51434		
436	S43600				51436		
439	S43035	A 240 A 268 A 791 A 803					
440A	S44002	A 276 A 314 A 473 A 580		QQ-S-763	51440A	5631	
440B	S44003	A 276 A 314 A 473 A 580		QQ-S-763	51440B		
440C	S44004	A 276 A 314 A 473 A 493 A 580		QQ-S-763	51440C	5630	
442	S44200	A 176			51442		
444	S44400	A 240 A 268 A 791					
446	S44600	A 176 A 276 A 314 A 473 A 580		QQ-S-763 QQ-S-766	51446		
446 MOD	S44660	A 240 A 268 A 791 A 803					
	S13800	A 564 A 693 A 705				5629	
	S15500	A 564 A 693 A 705				5520 5658 5659	
	S17400	A 564 A 693 A 705				5604 5622 5643	
	S17700	A 564 A 693 A 705	MIL-S-25043			5529 5644 5673	
2205	S31803	A 240					