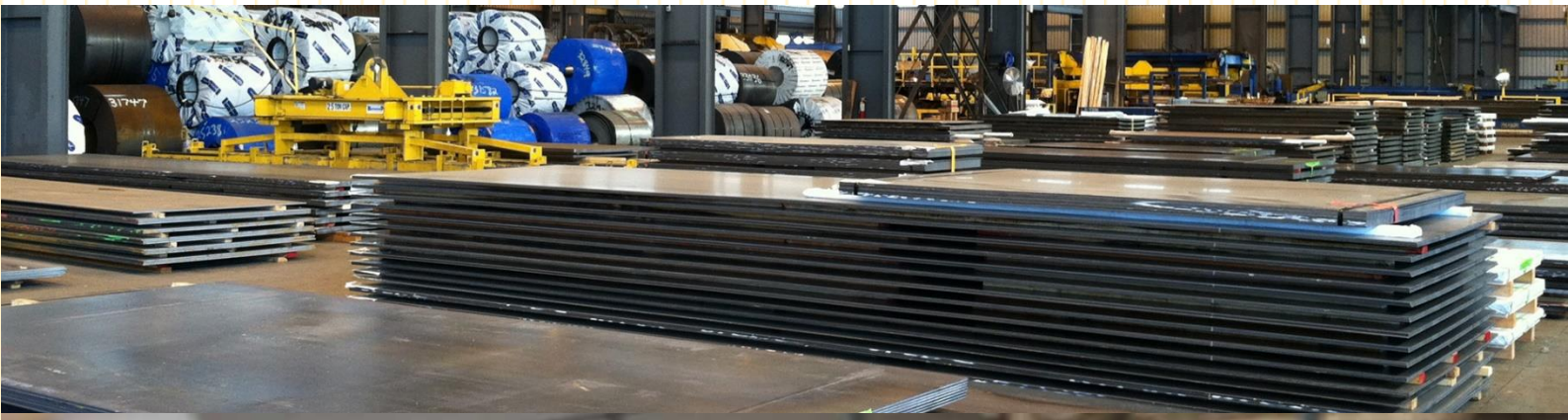
RECOMMENDED QUALITY & HIGH PERFORMANCE

STAINLESS STEEL AND CARBON STEEL BQ PLATES



SEEPL

STATIC ENGINEERING EQUIPMENTS PVT LTD

स्टॅटिक इंजिनियरिंग इक्विपमेंट्स प्रायवेट लिमिटेड

STATIC ENGINEERING

Your Engineering Partner for Premium Quality Products

www.staticengineering.com

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SEEPL is leading supplier, exporter of Jindal Stainless is India's largest manufacturer of stainless steel in 200, 300, 400 and Duplex Stainless-Steel products.

Our product range includes stainless steel slab, bloom, coils, plates, sheets, precision strips.

PLATES

No. 1 finish plates in stainless steel are produced after annealing and pickling, or by cutting hot rolled annealed & pickled coils to desired lengths.

Product	Width (mm)		Thickness (mm)	
	Min	Max	Min	Max
Plates	1000	1620	11	80

HOT ROLLED COILS

HR Black : As cast / ground stainless steel slabs are first heated and soaked in reheating furnace, they are rolled to intermediate thickness in roughing mill and then to the final thickness.

Hot rolled stainless steel coils are annealed & pickled in continuous annealing-pickling lines having scale breaker, shot blasting unit, sulphuric acid and mixed acid bath.

Product	Width (mm)		Thickness (mm)	
	Min	Max	Min	Max
Hot Rolled Coil	1000	1650	2	10
N1	1000	1650	2	10
2E	1000	1600	1.4	6.7

GRADES

The following data sheets can be used as a reference for a better understanding of different Stainless Steel grades and product information.

- ✓ **200 Series of Stainless-Steel products.**
- ✓ **300 Series of Stainless-Steel products.**
- ✓ **400 Series of Stainless-Steel products.**
- ✓ **Duplex Grade of Stainless-Steel.**

Static Engineering is one of the most reputed Stainless-Steel PLATES / PIPES Supplier & compliance with **ASTM / ASME & DIN standards.**

TEST CERTIFICATE

Manufacturer Test Certificate as per EN 10204 / 3.1, Raw Material Certificate, 100% Radiography Test Reports, Third Party Inspection Report.

EXPORT SHIPMENT

CARBON STEEL STORAGE FACILITY

Available MAKE

1) **ESSAR / AMNS, INDIA**
2) **SAIL**
3) **JSPL**

Running Materials
SA 516 GR 60 / 70
SA 36
SA 537 CLASS 1 / 2

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TECHNICAL DETAILS FOR BELOW GRADES

- ✓ 300 Series of Stainless-Steel products.
- ✓ Duplex Grade of Stainless-Steel.

EN 1.4828

AUSTENITIC STAINLESS STEEL

General Characteristics:

EN 1.4828 is a heat resistant Cr-Ni-Si stainless steel with increased levels of Silicon as compared to type 309S. Its high chromium & nickel contents along with silicon provide superior resistance to oxidation & good strength at both room and elevated temperatures.

Chemical Composition:

JSL	EN standard		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%N
J1.4828	1.4828	Min	-	-	-	-	1.50	11.0	19.0	-
		Max	0.20	2.00	0.015	0.045	2.50	13.0	21.0	0.10

Mechanical Properties:

Grade	Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness(HRB)
1.4828	EN standard	550-750	≥ 230	≥ 28	≤95

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Thermal Conductivity (W/m ^0C)	Thermal expansion coefficient (µm/m/ ^0C)	Electrical Resistivity (µΩm)
7900	200	15	16.5	0.85

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

Furnace parts, Conveyor belts & heating elements, Heat exchanger, Refinery and Chemical processing equipment

Corrosion Resistance:

In Solution Annealed condition, EN 1.4828 provides better corrosion resistance in marine atmosphere than type 304. EN 1.4828 has a high destructive scaling temperature of above 1000 ^0C thus exhibiting good scaling resistance in both continuous & intermittent service.

EN 1.4841

AUSTENITIC STAINLESS STEEL

General Characteristics:

Type J1.4841 is a highly alloyed stainless steel designed for service at elevated temperatures. High Chromium and Nickel contents enable this alloy to resist oxidation in continuous service temperatures of up to 1200 ^{0}C. Increased level of silicon in J1.4841 than type 310S further improves oxidation resistance at higher temperature.

Chemical Composition:

JSL	EN standard		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%N
J1.4841	1.4841	Min	-	-	-	-	1.50	19.0	24.0	-
		Max	0.20	2.00	0.015	0.045	2.50	22.0	26.0	0.10

Mechanical Properties:

Grade	Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness(HRB)
J1.4841	EN standards	550-750	≥ 230	≥ 28	≤95

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Thermal Conductivity (W/m ^{0}C)	Thermal expansion coefficient (µm/m/ ^{0}C)	Electrical Resistivity (µΩm)
7900	200	15	15.5	0.84

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

Furnace parts, Conveyor belts & heating elements, Heat exchanger, Refinery and Chemical processing equipment

Corrosion Resistance:

Type J1.4841 provides good resistance to moist air at elevated temperatures. High chromium & nickel contents result in superior resistance to carburizing atmospheres as compared to type 304. This grade provides resistance to oxidation even at continuous service temperature of 1200 ^{0}C.

J301/J301L/J301LN

AUSTENITIC STAINLESS STEEL

General Characteristics:

301 is an austenitic stainless steel with lower Cr & Ni than 304 to improve its work hardening rate at lower cost. Excellent mechanical property & corrosion resistance make it suitable for application like transportation, architectural and electrical equipment etc.

301L is low carbon variant of 301 grade to avoid carbide precipitation during welding. 301LN is another variant with high nitrogen for better strength and corrosion resistance.

Chemical Composition:

JSL	ASTM		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%N
J301	301	Min	-	-	-	-	-	6.0	16.0	-
		Max	0.15	2.00	0.030	0.045	1.00	8.0	18.0	0.10
J301L	301L	Min	-	-	-	-	-	6.0	16.0	-
		Max	0.03	2.00	0.030	0.045	1.00	8.0	18.0	0.20
J301LN	301LN	Min	-	-	-	-	-	6.0	16.0	0.07
		Max	0.03	2.00	0.030	0.045	1.00	8.0	18.0	0.20

Mechanical Properties:

Grade	Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness(HRB)
301	ASTM A240	≥ 515	≥ 205	≥ 40	≤95
301L	ASTM A240	≥ 550	≥ 220	≥ 45	≤100
301LN	ASTM A240	≥ 550	≥ 240	≥ 45	≤100

Mechanical Properties of Grade 301L at different temper condition:

Temper Condition	Y.S. (MPa), Min	U.T.S (MPa), Min	%EL, Min
1/16 Hard	345	690	40
1/8 Hard	415	760	35
¼ Hard	515	825	25
½ Hard	690	930	20

Physical Properties:

Density (Kg/m^3)	*Modulus of Elasticity (GPa)*	*Thermal Conductivity ($W/m\ ^0C$) (at 100°C)*	*Thermal expansion Coefficient(µm/m/°C) (20-100°C)*	*Specific heat (J/Kg.K) (20-100°C)*	*Electrical Resistivity (µΩm)*
7910	*193*	*16.3*	*16.9*	*500*	*0.72*

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

301/301L/301LN-transportation cars such as railway/metro coaches, subway cars, electrical equipment, endless belts, aircraft structural parts, trailer bodies and architectural parts etc.

301L tempers-transportation cars such as railway coaches, wagons, fixtures for construction purposes, electrical equipment and endless belts, springs, automotive gaskets

Corrosion Resistance:

Corrosion resistance of 301 is almost equivalent to 304 grade in mild corrosion environment.

J304/J304H/J304L/J304LN

AUSTENITIC STAINLESS STEEL

General Characteristics:

304 is most popular and versatile austenitic stainless steel grade with excellent corrosion resistance, formability, deep drawability and weldability.

304L is lower carbon version of 304 for excellent intergranular corrosion resistance. So, 304L can be extensively used in welded condition and does not require any post weld heat treatment.

304H is high carbon variant of 304 grade with higher strength above 450°C.

304LN is a nitrogen-strengthened variant of 304L. By means of solid solution strengthening, nitrogen provides significantly higher yield and tensile strength than 304L without adversely affecting ductility, corrosion resistance or non-magnetic properties.

Chemical Composition:

JSL	ASTM		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%N
J304	304	Min	-	-	-	-	-	8.0	17.5	-
		Max	0.07	2.00	0.030	0.045	0.75	10.5	19.5	0.10
J304L	304L	Min	-	-	-	-	-	8.0	17.5	-
		Max	0.030	2.00	0.030	0.045	0.75	12	19.5	0.10
J304H	304H	Min	0.04	-	-	-	-	8.0	18.0	-
		Max	0.10	2.00	0.030	0.045	0.75	10.5	20.0	-
J304LN	304LN	Min	-	-	-	-	-	8.0	18.0	0.10
		Max	0.030	2.00	0.030	0.045	0.75	12	20.0	0.16

Mechanical Properties:

Grade	Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness(HRB)
304	ASTM A240	≥ 515	≥ 205	≥ 40	≤92
304L	ASTM A240	≥ 485	≥ 170	≥ 40	≤92
304H	ASTM A240	≥ 515	≥ 205	≥ 40	≤92

304LN	***ASTMA240***	***≥ 515***	***≥ 205***	***≥40***	***≤95***

Physical Properties:

Density (Kg/m³)	*Modulus of Elasticity (GPa)*	*Thermal Conductivity (W/m ⁰C)*	*Thermal Expansion coefficient(µm/m/°C)*	*Electrical Resistivity (µΩm)*
7910	***195***	***16.3***	***17.3***	***0.72***

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

304-Transport, chemical, petrochemical and fertilizers industries, dairy, food processing, pharmaceutical industries, hospital equipment, cryogenic vessels, households as utensils & appliances , heat exchangers, machinery in paper, pulp, textile and beverage industries; architectural applications like panels, curtain walls, roofing etc

304H-petroleum refineries, boilers, heat exchangers, condensers, pipelines, cooling towers, steam exhausts, and electric generation plants, also be found in fertilizer and chemical plants

304L-Tanks and containers for a large variety of liquids and solids, Process equipment in the mining, chemical, cryogenic, food, dairy and pharmaceutical industries

304LN- Heat exchanger, Chemical industry, food industry, petroleum industry, fabrication industry, nuclear industry, Railroad cars, pressure vessel, flanges and valves.

Corrosion Resistance:

These grades exhibit excellent resistance to wide range of atmosphere and corrosive media like petroleum, food, pharmaceutical, textile etc.

304*

AUSTENITIC STAINLESS STEEL

General Characteristics:

304 is most popular and versatile austenitic stainless steel grade with excellent corrosion resistance, formability, deep drawability and weldability.

304* is having same chromium level as 304 with higher nitrogen and lower nickel content and ensure comparable performance with respect to 304 in respect of corrosion resistance with added advantage of superior yield strength at a lower cost

Chemical Composition:

Chemical Composition Range of 304 and 304* is given below:

		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%N
*304**	**Min**	-	-	-	-	-	**6.0**	**18.0**	**0.10**
	Max	**0.07**	**2.00**	**0.030**	**0.045**	**0.75**	**8.5**	**20.0**	**0.20**
304	**Min**	-	-	-	-	-	**8.0**	**18.0**	-
	Max	**0.07**	**2.00**	**0.030**	**0.045**	**0.75**	**12.0**	**20.0**	**0.10**

Typical Chemical Composition of 304 and 304* is given below:

	%C	%Mn	%S	%P	%Si	%Ni	%Cr	%N
*304**	**0.05**	**1.10**	**0.003**	**0.035**	**0.30**	**6.1**	**18.05**	**0.18**
304	**0.05**	**1.10**	**0.003**	**0.035**	**0.30**	**8.05**	**18.05**	**0.06**

Mechanical Properties:

304 fully conforms to the ASTM specification of 304 grade.*

	YS (MPa)	UTS (MPa)	%EL	Hardness(HRB)
304 ASTM Range	**≥ 205**	**≥ 515**	**≥ 40**	**≤92**
304* Typical	**351**	**667**	**58**	**84**

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Thermal Conductivity ($W/m\ ^0C$)	Thermal Expansion coefficient($10^{-6}/\ ^0C$)	Electrical Resistivity (μΩm)
7910	**198**	**16.3**	**18.2**	**0.72**

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Corrosion Resistance:

Pitting is the most common form of corrosion in stainless steels. The resistance to pitting of a grade is generally assessed by Pitting Resistance Equivalent Number (PREN).

PREN= %Cr + 3.3 * % Mo + 16* % N.

Grade	*Pitting Resistance Equivalent Number (PREN)*
304*	***≥21***
304	***≥20***

304* has a higher PREN compared to 304 grade.

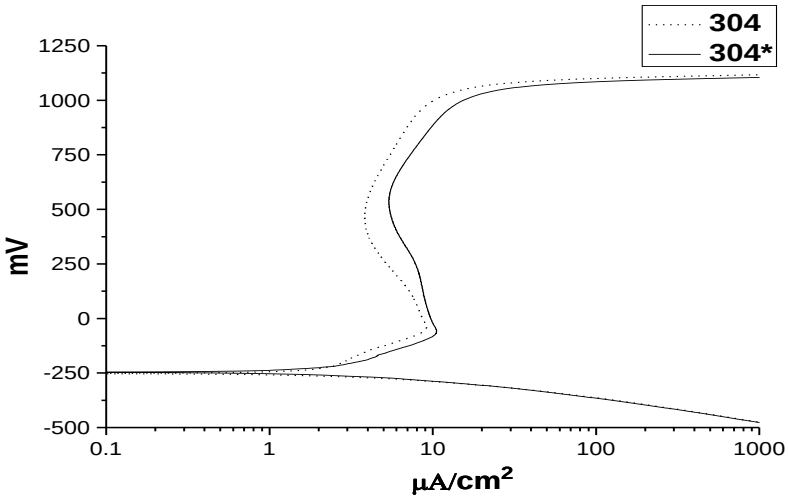
- **Salt Spray tests**

304 exhibited no rusts after subjecting it to 500 hours of tests in Salt Spray chamber in 5% NaCl spray at 35degC as per ASTM B 117. This behavior is at par with ASTM 304.*

- **Potentiodynamic tests**

Potentiodynamic tests in various acidic media were carried out.

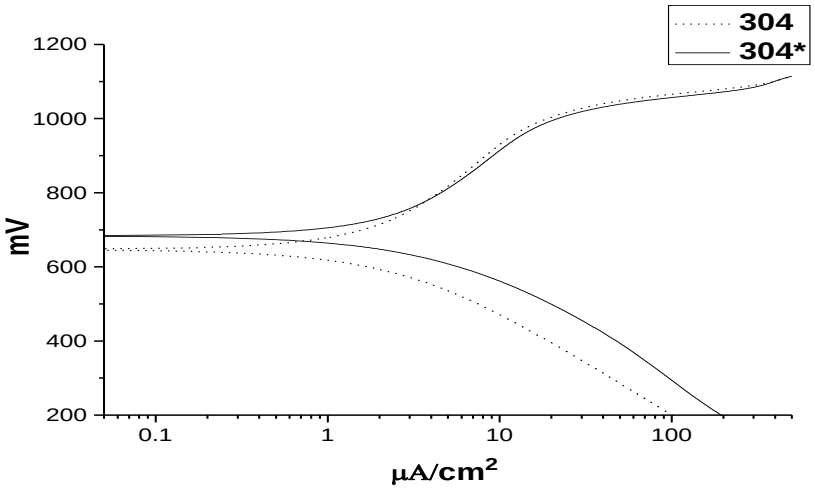
1. Reducing inorganic acids



Test solution: 50% Phosphoric Acid at 25degC

Similar pitting potential and comparable passivation current for 304* is observed indicating similar behaviour in reducing inorganic media like phosphoric acid.

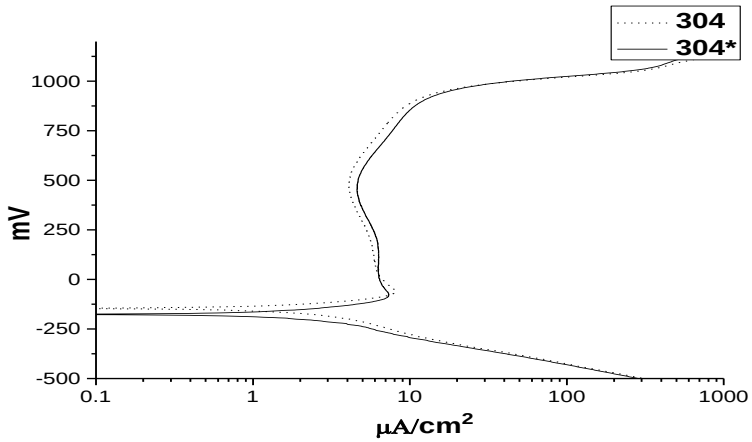
2. Oxidizing inorganic acids



Test Solution: 50% Nitric Acid at 25degC

Similar pitting and passivation current in oxidizing acids is observed. Typically 20-30% nitric acid is used as cleaning agent in food processing industries and chemical plants. The suitability of 304* is evident in such media.

3. Organic Acids



Test Solution: 50% Formic acid at 25degC

Similar pitting resistance and slightly better passivation current is observed in 304* in organic media. Various food processing industries deal with organic acids and 304* is a recommended substitute for 304 in such applications.

Boiling tests in wide range of corrosive media like chemicals, petroleum, food, pharmaceutical, textile etc exhibit the suitability of 304* to replace 304 grade.

➢ Boiling tests results

Acids	*304**	*304*
25%Acetic Acid	*A+*	*A+*
25% Lactic Acid	*A+*	*A+*
25%Citric Acid	*A+*	*A+*
10% Acetic+ 5% NaCl	*A+*	*A+*
3.5% NaCl	*A+*	*A+*
50% Nitric Acid	*A*	*A*
50% Ortho Phosphoric Acid	*A*	*A*

Criterion:<0.02 mmpy Outstanding (A^+), 0.02-0.1mmpy Excellent (A),0.1-0.5 mmpy Good(B) 0.5-1.0 mmpy Fair (C), 1.0-5.0 mmpy Poor (D),

Welding:

The fabrication of austenitic stainless steel typically 304 is well known among stainless steel fabricators. 304* has similar welding behavior compared to 304. This material is easily weldable by conventional practices like MMAW, TIG, MIG etc using standard welding electrodes like E308. Brief summary of the welding consumables for 304* is mentioned below.

Welding process	**Without filler metal**	**With filler metal**		
	Typical thickness	**Thickness**	**Filler Metal**	
			Rod	**Wire**
Manual Metal Arc Welding (MMAW)		≥ 1.5 mm	E 308/308L, E 309	
Gas Metal Arc Welding (GMAW/ MIG)		> 0.8 mm		ER 308/308L, ER 308LSi, ER309
Gas Tungsten Arc Welding (GTAW/ TIG)	< 1.5 mm	> 0.5 mm	ER 308/308L, ER 308LSi, ER 309	ER 308/308L, ER 308LSi, ER 309
Resistance Welding: Spot, Seam	≤ 2 mm			
Submerged Arc Welding (SAW)		> 2 mm		ER 308/308L, ER 309

Heat treatment is not essential after welding. However in order to fully restore the corrosion resistance of the metal, the welds must be mechanically or chemically descaled, then passivated and decontaminated. As in case of ASTM 304, If there is a risk of intergranular corrosion, a solution annealing treatment should be carried out.

Applications:

304* exhibits lustrous surface, very good weldability, very good formability and higher toughness. Equally good corrosion resistance and cost effectiveness make it a highly suitable material as replacement for 304 grade for a wide variety of applications:

Appliances:
Clock cases, Home mixers, ice cube maker parts, Name plates, stove supports, stove trims, Vacuum cleaner parts, Floor polisher covers, Washing machine parts. Water coolers, refrigerators, microwave ovens

Architectural
Airport exterior and interior trims, Angles, Mailbox, bathroom cabinet, Cafeteria equipment, Washroom fixtures, Window parts, Kitchen exhaust hoods, Revolving doors, Ventilation panels

Automotive
Bumper bolt caps, Door accessories, Seat anchor belts

Beverages:
Beer barrels, Brewery conveyor belts, Drinking tumblers, Soft drink liners/ parts/coolers, Wine serving buckets/ tanks, fermentation Vats.

Citrus and Fruit Juices Manufacturing
Handling, Crushing, Storage, Pipelines, Transportation for fruit-juice manufacturing plant.

Communications
Suspension brackets, Telephone coin chutes

Construction
Canopies- door and window, Masonry trowel, Sump pump starters

Cookware and utensils
Bread box, Cake covers, Coffee makers, Cookie cutters, Kitchen accessories

Dairy
Bulk milk containers, Cheese manufacturing, Cream separator parts, Milk transport tanks

Electrical and electronic
Bases for electronic, Capacitor cans, Circuit breaker parts, Electrical panel trims

Food Processing and serving
Bakery Dough carts, Cafeteria trays, Chocolate moulds, Commercial dishwater (interior and exterior), Ice buckets, trays, Counter tops, Restaurant cabinets, carts, Vending machine parts

Household, Tableware and Cutlery
House mail box, Medicine cabinet frames, Shower stalls, Dog and cat feeding bowls, Water bottles Cake Servers, Forks and spoons, Meat Steak Platters, Salad forks, servers, teaspoons

Jewellery
Watch case backs, Watch expansion bracelets

Plumbing
Bath tub drains, Toilet floats, Sinks

J305

AUSTENITIC STAINLESS STEEL

General Characteristics:

305 grade is austenitic stainless steel that can be spun and deep drawn more easily due to an increased Ni content that decreases work hardening.

Chemical Composition:

JSL	ASTM		%C	%Mn	%S	%P	%Si	%Ni	%Cr
J305	305	Min	-	-	-	-	-	10.5	17.0
		Max	0.12	2.00	0.030	0.045	0.75	13.0	19.0

Mechanical Properties:

Grade	Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness(HRB)
J305	ASTM A240	≥ 485	≥ 170	≥ 40	≤88

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Thermal Conductivity ($W/m\ ^0C$)	Thermal Expansion Coefficient ($\mu m/m/^\circ C$)	Electrical Resistivity ($\mu\Omega m$)
7930	193	16.2	17.3	0.72

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

Any application requiring maximum formability such as spun or deep drawn eyelets, barrels, shells, cold headed rivets or screws will work well.

Corrosion Resistance:

Type 305 is suitable in wide variety of atmosphere in the chemical, textile, petroleum, dairy and food industries. This grade also provides good oxidation resistance in air up to 900°C.

J309S

AUSTENITIC STAINLESS STEEL

General Characteristics:

Type 309S is an austenitic chromium-nickel stainless steel which is typically used for elevated temperature applications. Its high chromium & nickel contents provide superior resistance to oxidation, high corrosion resistance & good strength at both room and elevated temperatures. Type 309S having lower carbon content also minimizes carbide precipitation and thus improves weldability.

Chemical Composition:

JSL	ASTM		%C	%Mn	%S	%P	%Si	%Ni	%Cr
J309S	309S	Min	-	-	-	-	-	12.0	22.0
		Max	0.08	2.00	0.030	0.045	0.75	15.0	24.0

Mechanical Properties:

Grade	Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness(HRB)
J310S	ASTM A240	≥ 515	≥ 205	≥ 40	≤95

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Thermal Conductivity ($W/m\ ^0C$)	Thermal expansion coefficient ($\mu m/m/°C$)	Electrical Resistivity ($\mu\Omega m$)
7900	200	15	16	0.78

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

Furnace parts, conveyor belts & heating elements, carburizing - annealing boxes, heat exchangers, sulfite liquor handling equipment, kiln liners, oven linings, boiler baffles, refinery and chemical processing equipment, auto-exhaust parts.

Corrosion and oxidation Resistance:

Type 309S provides better corrosion resistance to marine atmosphere than type 304. It exhibits high resistance to sulfite liquors and is useful for handling nitric acid, nitric-sulphuric acid mixtures, acetic, citric and lactic acids. Generally considered Heat Resisting Alloys, Type 309S has a very high destructive scaling temperature of about 1090 ^{0}C thus exhibiting good scaling resistance in both continuous & intermittent service.

J310S

AUSTENITIC STAINLESS STEEL

General Characteristics:

310S is a highly alloyed austenitic stainless steel used for high temperature application. Due to high Cr and Ni content, the steel exhibits excellent oxidation resistance and high strength at high temperature.

Chemical Composition:

JSL	ASTM		%C	%Mn	%S	%P	%Si	%Ni	%Cr
J310S	310S	Min	-	-	-	-	-	19.0	24.0
		Max	0.08	2.0	0.030	0.045	1.50	22.0	26.0

Mechanical Properties:

Grade	Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness(HRB)
J310S	ASTM A240	≥ 515	≥ 205	≥ 40	≤95

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Thermal Conductivity ($W/m\ ^0C$)	Thermal expansion coefficient ($\mu m/m/^\circ C$)	Electrical Resistivity ($\mu\Omega m$)
7990	193	15	15.5	0.78

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

Used for air heaters, annealing boxes, ovens, carburizing boxes, fire box sheets, furnace linings, furnace stacks and dampers, gas turbine parts, heat exchangers, kiln linings, nozzle diaphragm assemblies for turbo jet engines, oil burner parts, paper mill equipment, oil refinery equipment and recuperator.

Corrosion Resistance:

310S has especially excellent resistance to stress corrosion cracking in chloride environment or in high density hot alkaline environment because of its high nickel content. 310S has similar acidic corrosion resistance as Type 304, but has excellent corrosion resistance to nitric acid because of high chromium content.

J316/J316L/J316Ti

AUSTENITIC STAINLESS STEEL

General Characteristics:

J316 is standard Mo added austenitic stainless steel. Addition of Mo increases general corrosion resistance, resistance to pitting and crevice corrosion in chloride environments and high temperature strength.

J316L is low carbon version of 316 for excellent intergranular corrosion resistance during welding.

J316Ti is Ti stabilised 316 for excellent intergranular corrosion resistance at elevated temperature.

Chemical Composition:

JSL	ASTM		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Ti	%Mo	%N
J316	316	Min	-	-	-	-	-	10.0	16.0	-	2.00	-
		Max	0.08	2.00	0.030	0.045	0.75	14.0	18.0	-	3.00	0.10
J316L	316L	Min	-	-	-	-	-	10.0	16.0	-	2.00	-
		Max	0.030	2.00	0.030	0.045	0.75	14.0	18.0	-	3.00	0.10
J316Ti	316Ti	Min	-	-	-	-	-	10.0	16.0	5*(C+N)	2.00	-
		Max	0.08	2.00	0.030	0.045	0.75	14.0	18.0	0.70	3.00	0.10

Mechanical Properties:

Grade	Mechanical properties	YS (MPa)	UTS (MPa)	%EL	Hardness(HRB)
316	ASTM A240	≥ 205	≥ 515	≥ 40	≤95
316L	ASTM A240	≥ 170	≥ 485	≥ 40	≤95
316Ti	ASTM A240	205	515	≥ 40	≤95

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Thermal Conductivity ($W/m\ ^0C$)	Thermal Expansion coefficient ($\mu m/m/°C$)	Electrical Resistivity ($\mu\Omega m$)
7980	193	16.3	15.9	0.72

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

316- architectural trims, marine exteriors, chemical processing equipment, food processing equipment, petroleum refining equipment, pharmaceuticals equipment, photographic equipment, pulp & paper processing equipment and textile finishing equipment

316L- food processing, chemical and petrochemical equipment, brewery equipment, coastal architectural paneling ,laboratory equipments, heat exchangers, mining screens, chemical transportation containers

316Ti- Chemical & Petrochemical Industry

Corrosion Resistance:

These grade exhibits excellent resistance to wide range of atmosphere and corrosive media like petroleum, food, pharmaceutical, textile etc.

317L/317LN/317LMN

AUSTENITIC STAINLESS STEEL

General Characteristics:

Type 317L is a molybdenum-containing austenitic stainless steel for improved corrosion resistance as compared to Type 316L in extremely corrosive environments, such as chlorides or other halides environments. This grade also provides high intergranular corrosion resistance due to low carbon content.

317LN is nitrogen added grade with 317L for improved strength and pitting corrosion resistance.

317LMN is added with high molybdenum & Nitrogen for improved strength & corrosion resistance and is predominantly effective in enhancing resistance to pitting and crevice corrosion in acidic and chloride environment.

Chemical Composition:

ASTM		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Mo	%N
317L	Min	-	-	-	-	-	11.0	18.0	3.0	-
	Max	0.030	2.00	0.030	0.045	0.75	15.0	20.0	4.0	0.10
317LN	Min	-	-	-	-	-	11.0	18.0	3.0	0.10
	Max	0.030	2.00	0.030	0.045	0.75	15.0	20.0	4.0	0.22
317LMN	Min	-	-	-	-	-	13.5	17.0	4.0	0.10
	Max	0.030	2.00	0.030	0.045	0.75	17.5	20.0	5.0	0.20

Mechanical Properties:

Grade	Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness(HRB)
317L	ASTM A240	≥ 515	≥ 205	≥ 40	≤95
317LN	ASTM A240	≥ 550	≥ 240	≥ 40	≤95
317LMN	ASTM A240	≥ 550	≥ 240	≥ 40	≤96

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Thermal Conductivity ($W/m\ ^0C$)	Thermal Expansion coefficient(µm/m/°C)	Electrical Resistivity (µΩm)
7950	195	14.6	16.5	0.79

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

317L- Chemical, petrochemical process equipment, pulp, paper manufacturing, condensers in fossil and nuclear fueled power generation stations.

317LN - Various tanks, Vessels, Chemical plants, other equipments that require corrosion resistance similar to or higher than that of SUS 317L with higher strength.

317LMN - Air pollution control system; flue gas desulfurization system - stack liners, absorbers, ducts, dampers & fans; highly corrosive atmosphere in chemical & petrochemical, food & beverage processing and pharmaceutical equipments.

Corrosion Resistance:

Type 317L has excellent corrosion resistance in a wide range of chemicals, especially in acidic chloride environments such as those encountered in pulp and paper mills.

Type 317LN has excellent corrosion resistance in sulphuric acid, phosphoric acid and organic acid environment than 316L and 317L grade. It has also higher pitting corrosion resistance compare to 316L and 317L grade.

Type 317LMN has excellent corrosion resistance in highly corrosive acidic chloride environment; corrosion resistance of 317LMN is only slightly below that of 904L stainless steel. The high chromium, molybdenum, & nitrogen content enhance its ability to resist pitting & crevice corrosion.

J321

AUSTENITIC STAINLESS STEEL

General Characteristics:

J321 is Ti added 304 stainless steel grade for excellent intergranular corrosion resistance for high temperature (450-900^{0}C) application.

Chemical Composition:

JSL	ASTM		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Ti	%N
J321	321	Min	-	-	-	-	-	9.0	17.0	5*(C+N)	-
		Max	0.08	2.00	0.030	0.045	0.75	13.0	19.0	0.70	0.10

Mechanical Properties:

Grade	Mechanical properties	YS (MPa)	UTS (MPa)	%EL	Hardness(HRB)
321	ASTM A240	≥ 205	≥ 515	≥ 40	≤95

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Thermal Conductivity (W/m ^{0}C)	Thermal expansion coefficient (µm/m/°C)	Electrical Resistivity (µΩm)
7925	193	16.1	17.1	0.72

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

Exhaust stacks and manifolds, pressure vessels, large mufflers for engines, expansion bellows, stack liners, thin wall tubes

Corrosion Resistance:

J321 grade exhibits excellent resistance to organic chemicals, many inorganic chemicals, nitric acid and moderately in sulphuric acid. This grade shows improved resistance to intergranular corrosion compared to unstabilized grades (450-900°C).

J347

AUSTENITIC STAINLESS STEEL

General Characteristics:

Nb added austenitic stainless steel for elimination of carbide precipitation and thus improvement in intergranular corrosion resistance.

Chemical Composition:

JSL	ASTM		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Nb
J347	347	Min	-	-	-	-	-	9.0	17.0	10*(C)
		Max	0.08	2.00	0.030	0.045	0.75	13.0	19.0	1.00

Mechanical Properties:

Grade	Mechanical properties	YS (MPa)	UTS (MPa)	%EL	Hardness(HRB)
347	ASTM A240	≥ 205	≥ 515	≥ 40	≤92

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Thermal Conductivity ($W/m\ ^0C$)	Thermal expansion coefficient($\mu m/m/°C$)	Electrical Resistivity ($\mu\Omega m$)
7960	193	16.3	16.6	0.72

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

High temperature gaskets and expansion joints, rocket engine parts, aircraft collector rings and exhaust manifolds and chemical production equipment.

Corrosion Resistance:

347 grade is more resistant to general corrosion in strongly oxidizing environments than Type 321. 347 grade is very high resistance to intergranular corrosion resistance.

J904L

AUSTENITIC STAINLESS STEEL

General Characteristics:

904L is an Austenitic Stainless Steel with high Nickel (25%) and Molybdenum (4.5%) providing good corrosion resistance to stress corrosion cracking in severe chloride environment. Low carbon content of 904L improves its welding characteristic by good resistance to intergranular corrosion. Annealed 904L provides excellent toughness even at sub-zero temperature. It contains a combination of chromium and molybdenum which provides it an improved level of resistance to pitting and crevice corrosion by chlorides compared to 316L Stainless Steel. The copper addition provides added resistance to reducing media such as hot phosphoric acid and dilute sulfuric acid.

Chemical Composition:

Designation		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Mo	%N	%Cu
UNS N08904	Min	--	--	--	--	--	23.0	19.0	4.00	--	1.00
	Max	0.020	2.00	0.035	0.045	1.00	28.0	23.0	5.00	0.10	2.00

Mechanical Properties:

Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness
ASTM A240 – UNS N08904	490 min	220 min	35 min	90 HRB max

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Coefficient of thermal expansion($\mu m/m/^0C$)	Thermal Conductivity ($W/m\ ^0C$)	Specific Heat ($J/Kg\ ^0C$)	Electrical Resistivity ($\mu\Omega$-cm)
7950	195	15.6	11.5	450	95.2

Products available:

The grade is available in both HRAP and CRAP finishes; and in different forms such as Coils, Plates, Sheets and Strips.

Applications:

- *904L is widely used in chemical industries for components such tanks and other products used in handling sulphuric and phosphoric acid.*
- *Fertilizer production equipments.*
- *Bleaching equipments in pulp and paper industry.*
- *Heat exchangers handling sea water.*

Corrosion Resistance:

This alloy provides excellent general corrosion resistance and pitting or crevice corrosion that is usually higher than 316 Stainless Steel. 904L provides very good resistance to sulphuric acid, phosphoric and acetic acid. Resistance to chloride stress corrosion cracking depends on the percentage of nickel, with 25% nickel 904L offers more resistance stress corrosion cracking compared to an 8% nickel alloy like 304 Stainless Steel.

Heat Treatment

904L in annealed state provides excellent impact strength at room temperature and at cryogenic temperatures.

UNS S30815/EN 1.4835

AUSTENITIC STAINLESS STEEL

General Characteristics:

UNS S30815 is heat resistant Cr-Ni-N austenitic stainless steel with additions of silicon and rare earth metal - cerium. Cerium combined with silicon improves the oxidation and corrosion resistance. Due to the additions of carbon and nitrogen, UNS S30815 has more creep strength than 310S stainless steel at temperatures above 850 °C. Maximum Service temperature is nearly 1100 °C

Chemical Composition:

Table 1

UNS		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%N	%Ce
S30815	Min	0.05	-	-	-	1.40	10.0	20.0	0.14	0.03
	Max	0.10	0.80	0.030	0.040	2.00	12.0	22.0	0.20	0.08
EN 1.4835	Min	0.05	-	-	-	1.40	10.0	20.0	0.12	0.03
	Max	0.12	1.00	0.015	0.045	2.50	12.0	22.0	0.20	0.08

Mechanical Properties:

Table 2

Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness
ASTM A240 – UNS S30815	600 min	310 min	40 min	95 HRB max

Mechanical properties	Product Form	UTS (MPa)	YS (MPa)	%EL
EN 1.4835 as per EN 10095	Flat product	650-850	310 min	40 min

Physical Properties:

Table 3

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Poisson's Ratio	Thermal Conductivity ($W/m\ ^0C$)	Specific Capacity ($J/Kg\ ^0C$)	Electrical Resistivity ($\mu\Omega m$)
7800	200	0.3	15	500	0.85

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

Heat exchanger tubes and pipes in processes for:

- *Exhaust system*
- *Furnace rolls*
- *Furnaces for drying*
- *Heat recovery, carbon black*
- *Hydrocarbon gases, painting*
- *Flue gas and synthetic graphite*
- *Production of Aluminium Sulphate*
- *Production of mineral wool*
- *Pyrometer*
- *Recuperator*
- *Waste combustion*
- *Waste incineration*

Corrosion Resistance:

Grade UNS S30815 has very high resistance to oxidation. Silicon along with chromium helps in forming a protective oxide layer on the surface of UNS S30815 thus providing good oxidation resistance. The service temperature in air should not exceed 1100°C.

Compared with conventional austenitic stainless steels, UNS S30815 (EN 1.4835) has good resistance to cyanide melts and neutral salt melts and also to metal melts, e.g. lead, at high temperatures.

UNS S30815 is not generally used in conditions requiring great resistance to wet corrosion. The steel is, however, slightly more resistant than Grade 304 to stress corrosion cracking in chloride bearing aqueous solutions. Its resistance is more or less similar to the Grade 316L.

Weldability:

UNS S30815 has good weldability and can be welded by manual metal arc welding with covered electrodes and gas shielded arc welding like TIG and MIG. Preheating and post weld heat treatments are not normally necessary. Low heat input during welding is recommended so as to keep deformation of welded joint under control.

J2101 – UNS S32101 – EN 1.4162

DUPLEX STAINLESS STEEL

General Characteristics:

Lean Duplex Stainless steel 2101 (UNS S32101) possesses high strength coupled with corrosion resistance comparable to austenitic grades like 316L. Being a cost-effective grade owing to low nickel and molybdenum contents, along with its superior mechanical properties and good corrosion resistance, they can be utilized in various applications thus providing durability and long-term cost efficiency.

Chemical Composition:

Table 1

UNS	EN		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Cu	%Mo	%N
S32101	1.4162	Min	-	4.00	-	-	-	1.35	21.0	0.10	0.10	0.20
		Max	0.040	6.00	0.030	0.040	1.00	1.70	22.0	0.80	0.80	0.25

Mechanical Properties:

Table 2

Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness
ASTM A240 – UNS S32101	650 min	450 min	30 min	290 BHN

Physical Properties:

Table 3

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Poisson's Ratio	Thermal Conductivity ($W/m\ ^0C$)	Thermal Capacity ($J/Kg\ ^0C$)	Electrical Resistivity ($\mu\Omega m$)
7800	200	0.3	15	500	0.80

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

Storage Tanks: Palm oil, Wine, Marble slurry, Potable and Sewage water, Ethanol, Fruit juice, Biodiesel

Infrastructure: Bridges, Sluice gates

General-purpose applications and environments:

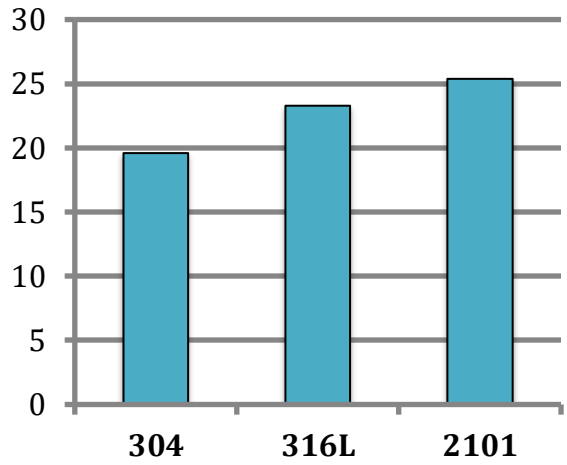
Heat Exchangers, Water Heaters, Sea-water systems, Flue-gas cleaning.

Corrosion Resistance:

Pitting Resistance Equivalent Number (PREN):

Pitting Resistance Equivalent number (PREN) illustrates the resistance to pitting corrosion and is denoted by using the formula - %Cr + 3.3*%Mo + 16*%N. Typical PREN values of both austenitic and duplex grades are mentioned in Fig: 1

Figure 1

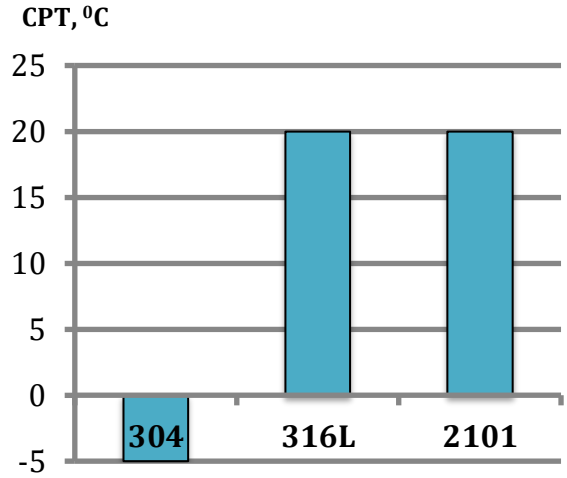


TYPICAL PREN VALUES

Critical Pitting Corrosion:

Critical Pitting corrosion is a more reliable method of differentiating duplex grades based on their resistance to corrosion. A comparative chart is presented in Fig: 2

Figure 2



Critical Pitting Corrosion:
(As per ASTM G150)

J2205 – UNS S32205/EN 1.4462

DUPLEX STAINLESS STEEL

General Characteristics:

Standard Duplex Stainless steel 2205 (UNS S32205) is the most widely used duplex stainless steel comprising almost 80% of duplex stainless steel market. This alloy provides better corrosion resistance than 316L in various environments and has an added advantage of higher yield strength thereby helping in material savings.

Chemical Composition:

UNS		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Mo	%N
S32205	Min	-	-	-	-	-	4.50	22.0	3.0	0.14
	Max	0.030	2.00	0.020	0.030	1.00	6.50	23.0	3.5	0.20
EN 1.4462	Min	-	-	-	-	-	4.50	21.0	2.5	0.10
	Max	0.030	2.00	0.015	0.035	1.00	6.50	23.0	3.5	0.22

Mechanical Properties:

Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness
ASTM A240 – UNS S32205	655 min	450 min	25 min	293 BHN

Mechanical properties	Product Form	Thickness max	UTS (MPa)	YS (MPa)	%EL	Impact Toughness, J
EN 1.4462 as per EN 10088	Cold Rolled	8	700-950	500 min	20 min	-
	Hot Rolled	13.5		460 min	25 min	100 (long) min
	Plate	75	640-840	460 min	25 min	

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Poisson's Ratio	Thermal Conductivity ($W/m\ ^0C$)	Thermal Capacity ($J/Kg\ ^0C$)	Electrical Resistivity ($\mu\Omega m$)
7800	200	0.3	15	500	0.80

Products available:

Hot Rolled Plates

- Width – 1250
- Thickness - 5 mm to 80 mm

Hot Rolled Coils

- Width – 1250
- Thickness - 5-6 mm

Cold Rolled Coil & Sheets

- Width – 1250
- Thickness - 0.5 mm to 3 mm

Applications:

Chemical industry: Sour gas piping, Heat exchanger, tanks and vessels for chloride-containing media

Oil and Gas industry: Piping and process equipment, offshore structures

Cargo tanks in ships for transport of chemicals

Flue gas desulphurization systems, Electrostatic precipitators

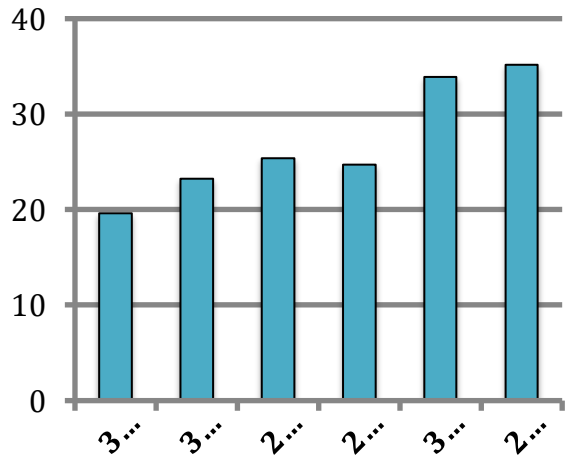
Pulp and Paper industry: Digester

Corrosion Resistance:

Pitting Resistance Equivalent Number (PREN):

Pitting Resistance Equivalent number (PREN) illustrates the resistance to pitting corrosion and is denoted by using the formula - %Cr + 3.3*%Mo + 16*%N. Typical PREN values of both austenitic and duplex grades are mentioned in Fig: 1

Figure 1

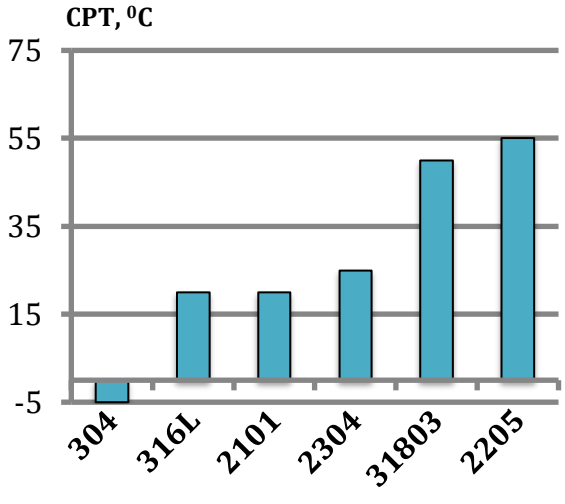


TYPICAL PREN VALUES

Critical Pitting & Crevice Corrosion:

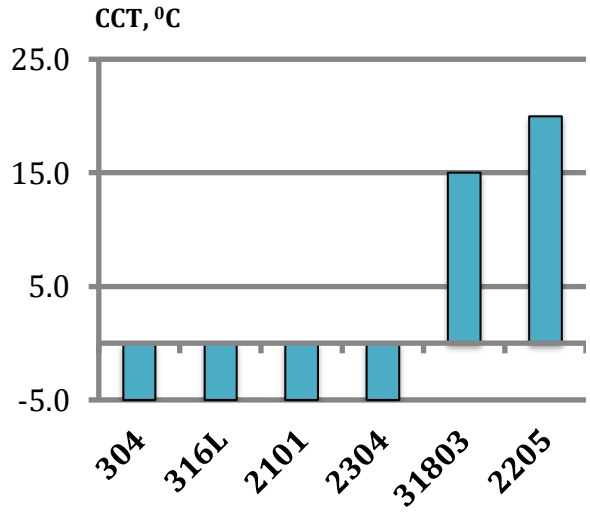
Critical Pitting & crevice corrosion are more reliable methods of differentiating duplex grades based on their resistance to corrosion. A comparative chart is presented in Fig: 2 & Fig: 3

Figure 2



Critical Pitting Corrosion:
(As per ASTM G150)

Figure 3



Critical Crevice Corrosion
(As per ASTM G48 Method F):

J2304 – UNS S32304 – EN 1.4362

DUPLEX STAINLESS STEEL

General Characteristics:

Lean Duplex Stainless steel 2304 (UNS S32304) possesses high strength coupled with corrosion resistance comparable to austenitic grades like 316L.

Chemical Composition:

Table 1

UNS		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Cu	%Mo	%N
S32304	Min	-	-	-	-	-	3.0	21.5	0.05	0.05	0.05
	Max	0.030	2.50	0.030	0.040	1.00	5.5	24.5	0.60	0.60	0.20

EN		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Cu	%Mo	%N
1.4362	Min	-	-	-	-	-	3.5	22.0	0.10	0.10	0.05
	Max	0.030	2.00	0.015	0.035	1.00	5.5	24.0	0.60	0.60	0.20

Mechanical Properties:

Table 2

Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness
ASTM A240 – UNS S32304	600 min	400 min	25 min	290 BHN
EN 10088 – EN 1.4362	630 – 800	400 min	25 min	-

Physical Properties:

Table 3

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Poisson's Ratio	Thermal Conductivity ($W/m\ ^0C$)	Thermal Capacity ($J/Kg\ ^0C$)	Electrical Resistivity ($\mu\Omega m$)
7800	200	0.3	15	500	0.80

Products available:

Hot Rolled Plates & Coil

Applications:

Storage Tanks: Palm oil, Wine, Marble slurry, Potable and Sewage water, Ethanol, Fruit juice, Biodiesel

Infrastructure: Bridges, Sluice gates

General-purpose applications and environments

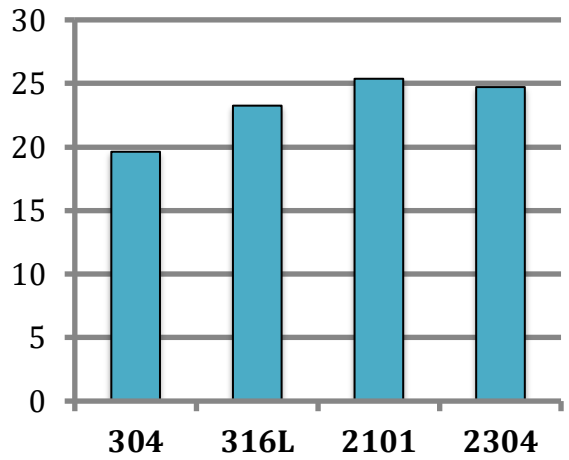
Heat Exchangers, Water Heaters, Sea-water systems, Flue-gas cleaning.

Corrosion Resistance:

Pitting Resistance Equivalent Number (PREN):

Pitting Resistance Equivalent number (PREN) illustrates the resistance to pitting corrosion and is denoted by using the formula - %Cr + 3.3*%Mo + 16*%N. Typical PREN values of both austenitic and duplex grades are mentioned in Fig: 1

Figure 1

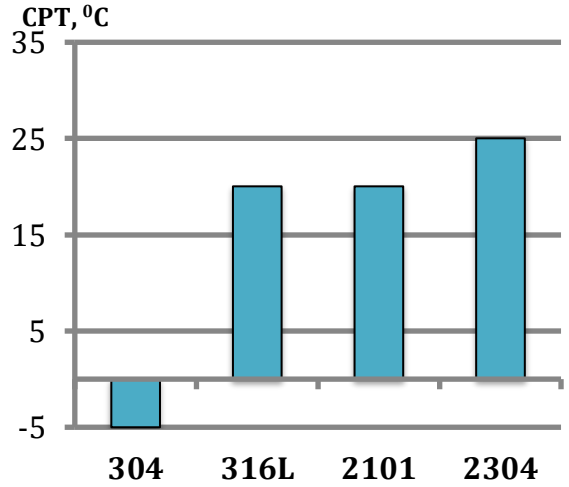


TYPICAL PREN VALUES

Critical Pitting Corrosion:

Critical Pitting corrosion is a more reliable method of differentiating duplex grades based on their resistance to corrosion. A comparative chart is presented in Fig: 2

Figure 2



Critical Pitting Corrosion:
(As per ASTM G150)

J31803 – UNS S31803 - EN 1.4462

DUPLEX STAINLESS STEEL

General Characteristics:

Standard Duplex Stainless steel 31803 (UNS S31803) along with UNS S32205 is the most widely used duplex stainless steel comprising almost 80% of duplex stainless steel market. With 0.5% less Molybdenum than UNS S32205, this alloy provides good corrosion resistance than 316L in various environments and has an added advantage of higher yield strength thereby helping in material savings.

Chemical Composition:

UNS		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Mo	%N
S31803	Min	-	-	-	-	-	4.50	21.0	2.5	0.08
	Max	0.030	2.00	0.020	0.030	1.00	6.50	23.0	3.5	0.20

EN		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Mo	%N
1.4462	Min	-	-	-	-	-	4.50	21.0	2.5	0.10
	Max	0.030	2.00	0.015	0.035	1.00	6.50	23.0	3.5	0.20

Mechanical Properties:

Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness
ASTM A240 – UNS S31803	620 min	450 min	25 min	293 BHN
EN 10088	640 – 840	460 min	25 min	-

Physical Properties:

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Poisson's Ratio	Thermal Conductivity ($W/m\ ^0C$)	Thermal Capacity ($J/Kg\ ^0C$)	Electrical Resistivity ($\mu\Omega m$)
7800	200	0.3	15	500	0.80

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

Chemical industry: Sour gas piping, Heat exchanger, tanks and vessels for chloride-containing media

Oil and Gas industry: Piping and process equipment, offshore structures

Cargo tanks in ships for transport of chemicals

Flue gas desulphurization systems, Electrostatic precipitators

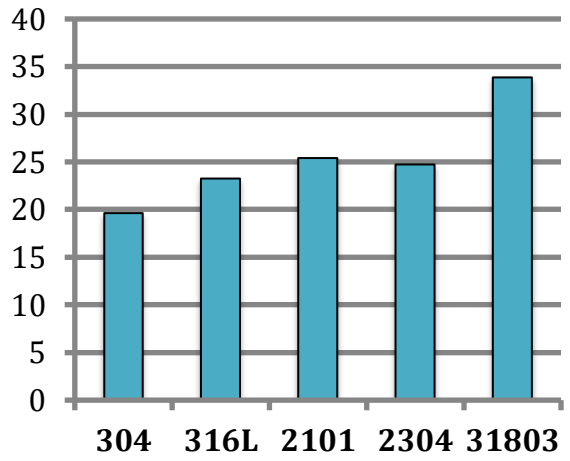
Pulp and Paper industry: Digester

Corrosion Resistance:

Pitting Resistance Equivalent Number (PREN):

Pitting Resistance Equivalent number (PREN) illustrates the resistance to pitting corrosion and is denoted by using the formula - %Cr + 3.3*%Mo + 16*%N. Typical PREN values of both austenitic and duplex grades are mentioned in Fig: 1

Figure 1

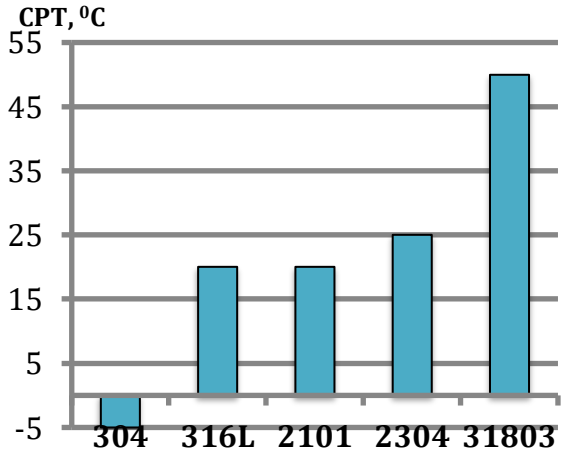


TYPICAL PREN VALUES

Critical Pitting & Crevice Corrosion:

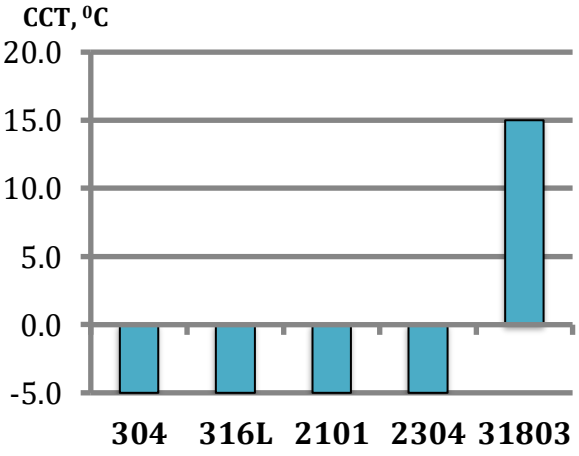
Critical Pitting & crevice corrosion are more reliable methods of differentiating duplex grades based on their resistance to corrosion. A comparative chart is presented in Fig: 2 & Fig: 3

Figure 2



Critical Pitting Corrosion:
(As per ASTM G150)

Figure 3



Critical Crevice Corrosion
(As per ASTM G48 Method F):

J2507 –UNS32750 – EN 1.4410

DUPLEX STAINLESS STEEL

General Characteristics:

Super Duplex Stainless Steel UNS S32750 combines high strength and excellent corrosion resistance in many environments & has found applications in chemical and process industries. Localized corrosion resistance of super-duplex stainless steel is close to what is achieved with 6% Mo super-austenitic grades.

Chemical Composition:

Table 1

UNS		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Cu	%Mo	%N
S32750	Min	-	-	-	-	-	6.0	24.0	-	3.0	0.24
	Max	0.030	1.20	0.020	0.035	0.80	8.0	26.0	0.50	5.0	0.32

EN		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Mo	%N
1.4410	Min	-	-	-	-	-	6.0	24.0	3.0	0.24
	Max	0.030	2.00	0.015	0.035	1.00	8.0	26.0	4.5	0.35

Mechanical Properties:

Table 2

Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness
ASTM A240 – UNS S32750	795 min	550 min	15 min	310 BHN

Physical Properties:

Table 3

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Poisson's Ratio	Thermal Conductivity ($W/m\ ^0C$)	Thermal Capacity ($J/Kg\ ^0C$)	Electrical Resistivity ($\mu\Omega m$)
7800	200	0.3	15	500	0.80

Products available:

Hot Rolled Plates

Applications:

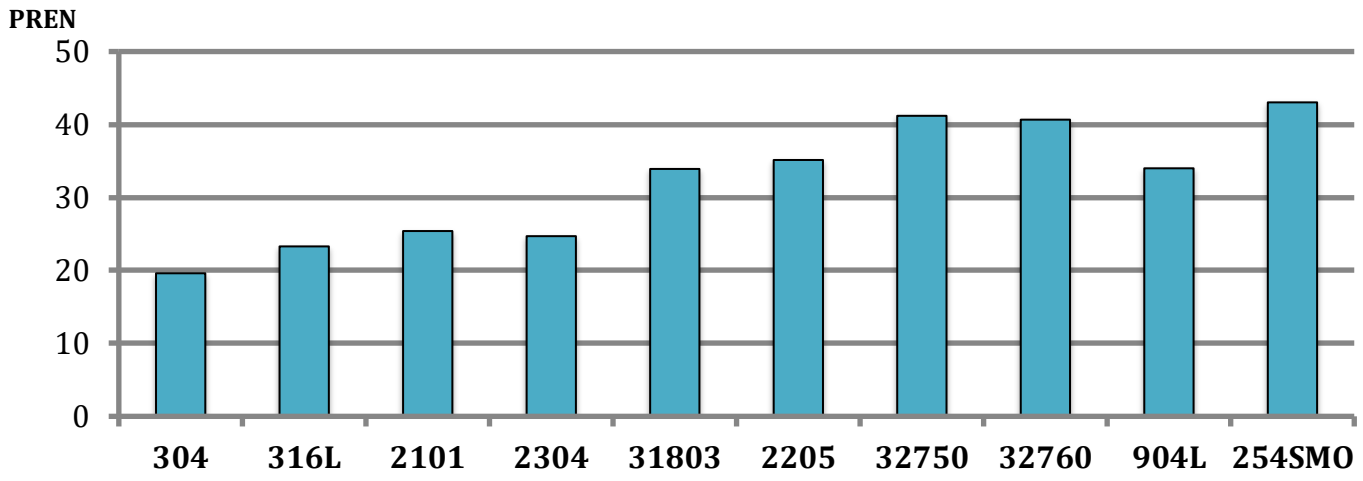
Sea Water Desalination plants and pumps, Petrochemical industries, Oil & Gas Industry, Fertilizer plant, Power Industry, Mining Extraction systems, Sewage

Corrosion Resistance:

Pitting Resistance Equivalent Number (PREN):

Pitting Resistance Equivalent number (PREN) illustrates the resistance to pitting corrosion and is denoted by using the formula - %Cr + 3.3*%Mo + 16*%N. Typical PREN values of both austenitic and duplex grades are mentioned in Fig: 1

Figure 1

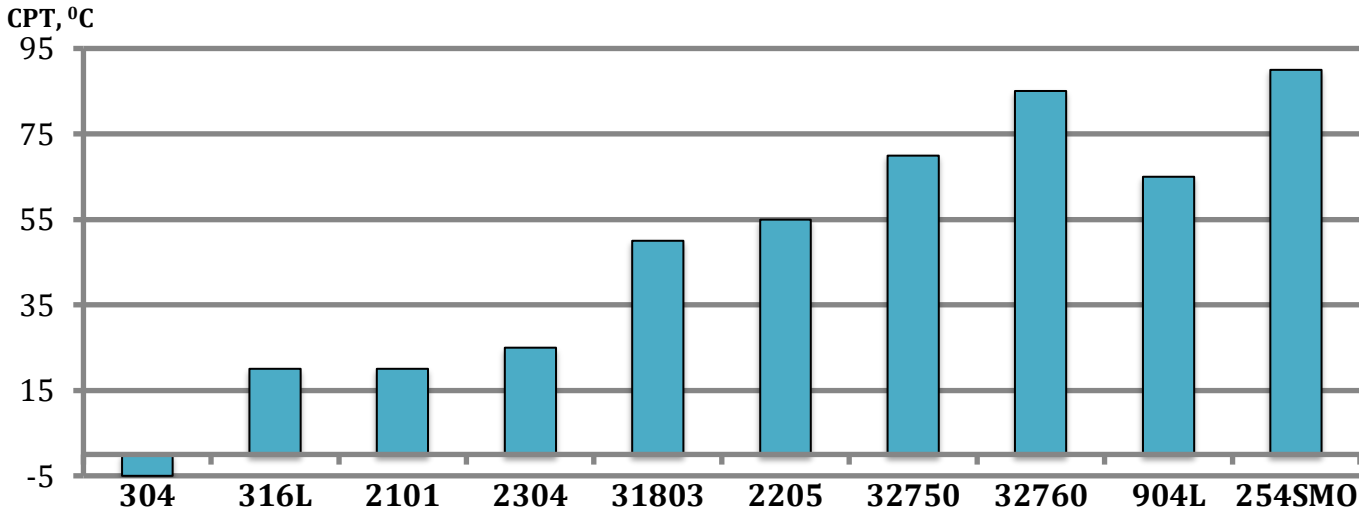


TYPICAL PREN VALUES

Critical Pitting & Crevice Corrosion:

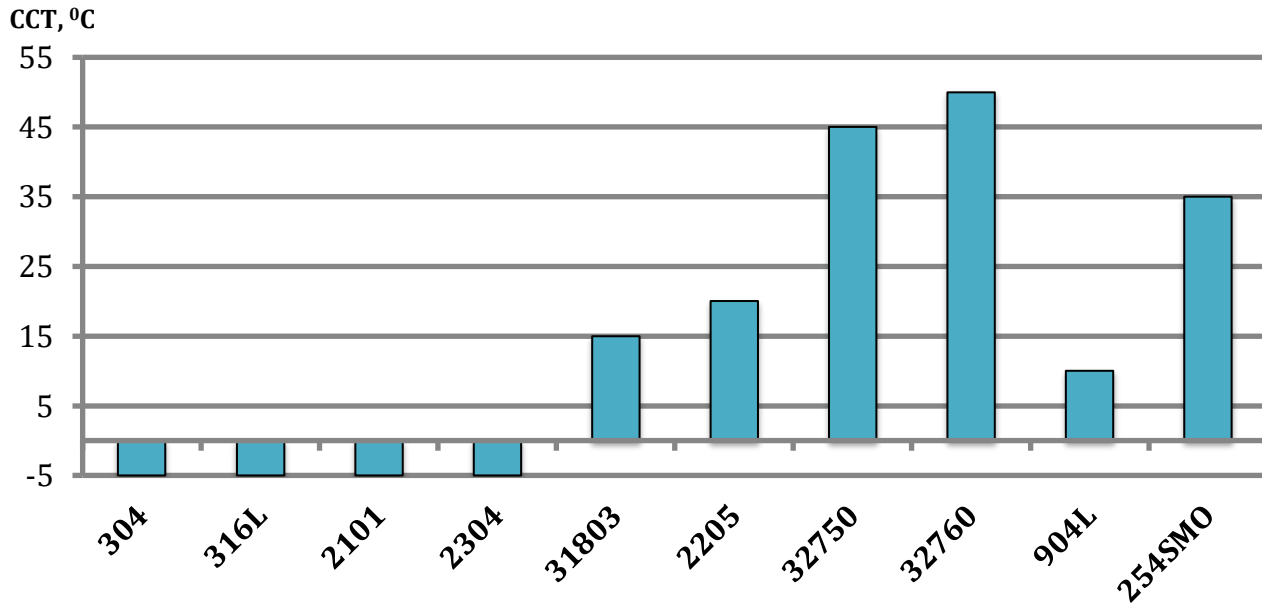
Critical Pitting & crevice corrosion are more reliable methods of differentiating duplex grades based on their resistance to corrosion. A comparative chart is presented in Fig: 2 & Fig: 3

Figure 2



Critical Pitting Corrosion: (As per ASTM G150)

Figure 3



Critical Crevice Corrosion: (As per ASTM G48 Method F)

J32760 – UNS S32760 - EN 1.4501

SUPER DUPLEX STAINLESS STEEL

General Characteristics:

Super Duplex Stainless Steel UNS S32760 combines high strength and excellent corrosion resistance in many environments & has found applications in chemical and process industries. Localized corrosion resistance of super-duplex stainless steel is close to what is achieved with 6% Mo super-austenitic grades.

Chemical Composition:

Table 1

UNS		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Cu	%Mo	%N	%W
S32760	Min	-	-	-	-	-	6.0	24.0	0.50	3.0	0.20	0.50
	Max	0.030	1.00	0.010	0.030	1.00	8.0	26.0	1.00	4.0	0.30	1.00

EN		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%Cu	%Mo	%N	%W
1.4501	Min	-	-	-	-	-	6.0	24.0	0.50	3.0	0.20	0.50
	Max	0.030	1.00	0.015	0.035	1.00	8.0	26.0	1.00	4.0	0.30	1.00

Mechanical Properties:

Table 2

Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness
ASTM A240 – UNS S32760	750 min	550 min	25 min	310 BHN

Physical Properties:

Table 3

Density (Kg/m^3)	Modulus of Elasticity (GPa)	Poisson's Ratio	Thermal Conductivity ($W/m\ ^0C$)	Thermal Capacity ($J/Kg\ ^0C$)	Electrical Resistivity ($\mu\Omega m$)
7800	200	0.3	15	500	0.80

Products available:

Hot Rolled Plates

Applications:

Sea Water Desalination plants and pumps, Petrochemical industries, Oil & Gas Industry, Fertilizer plant, Power Industry, Mining Extraction systems, Sewage

Corrosion Resistance:

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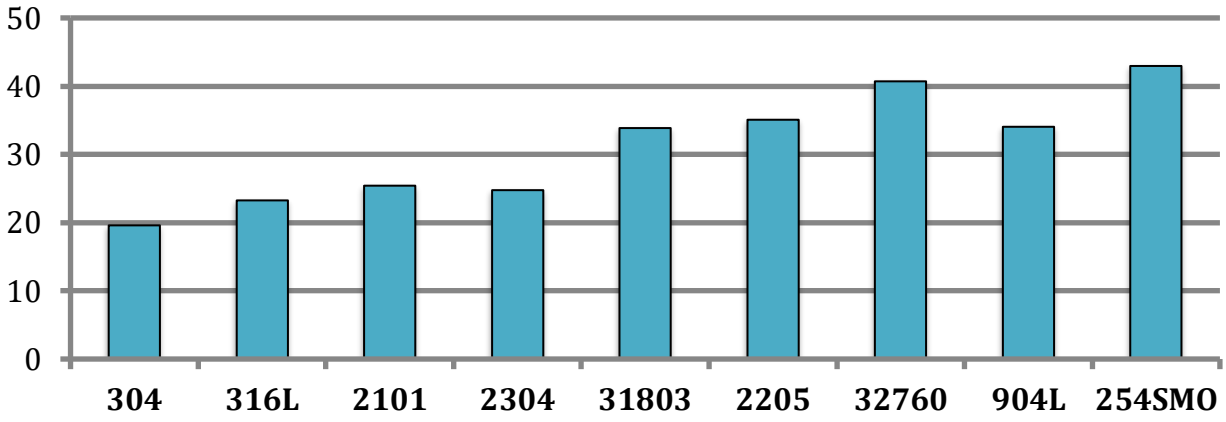
Figure 1



TYPICAL PREN VALUES

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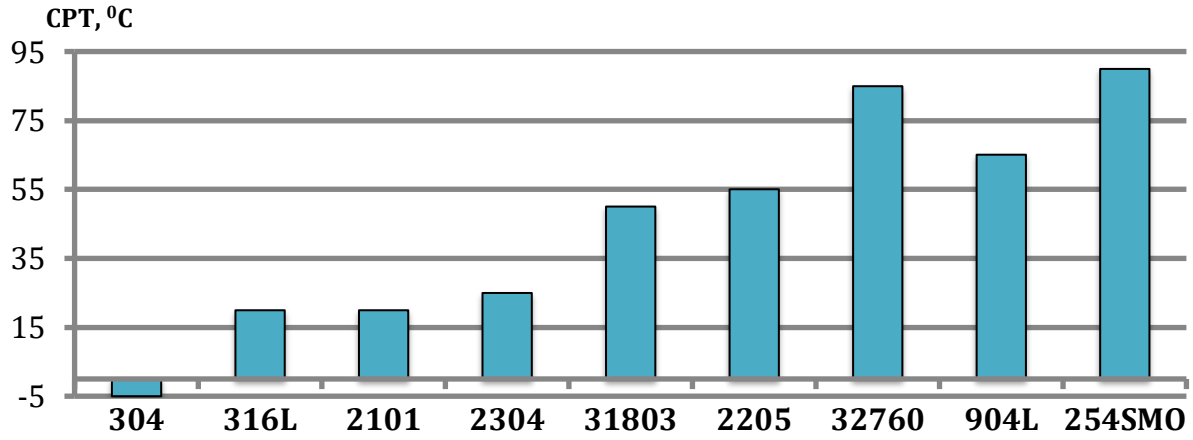
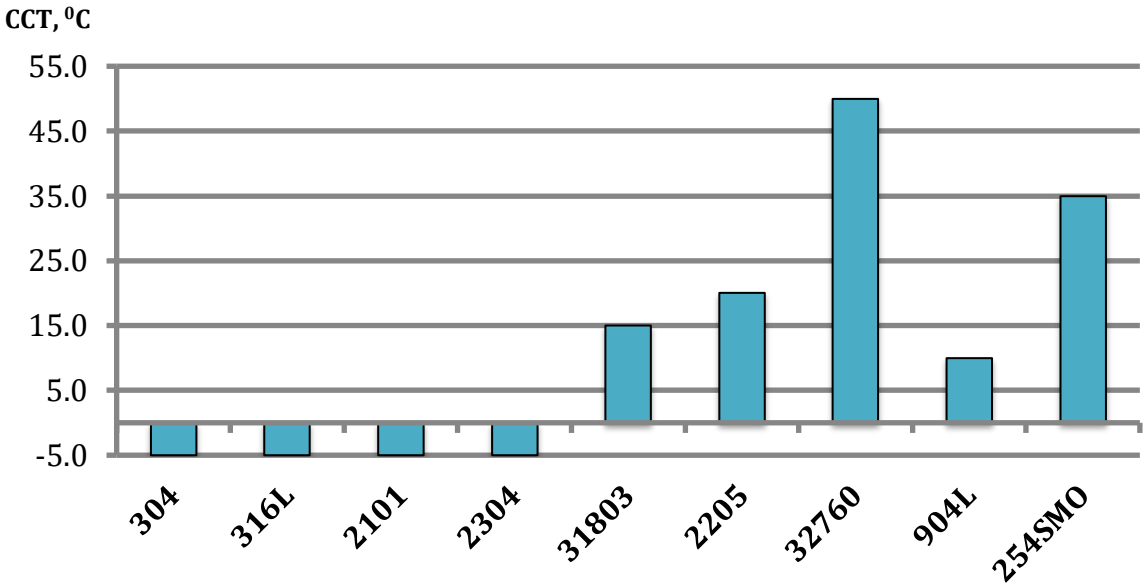
Figure 2



Critical Pitting Corrosion: (As per ASTM G150)

Figure 3



Critical Crevice Corrosion: (As per ASTM G48 Method F)