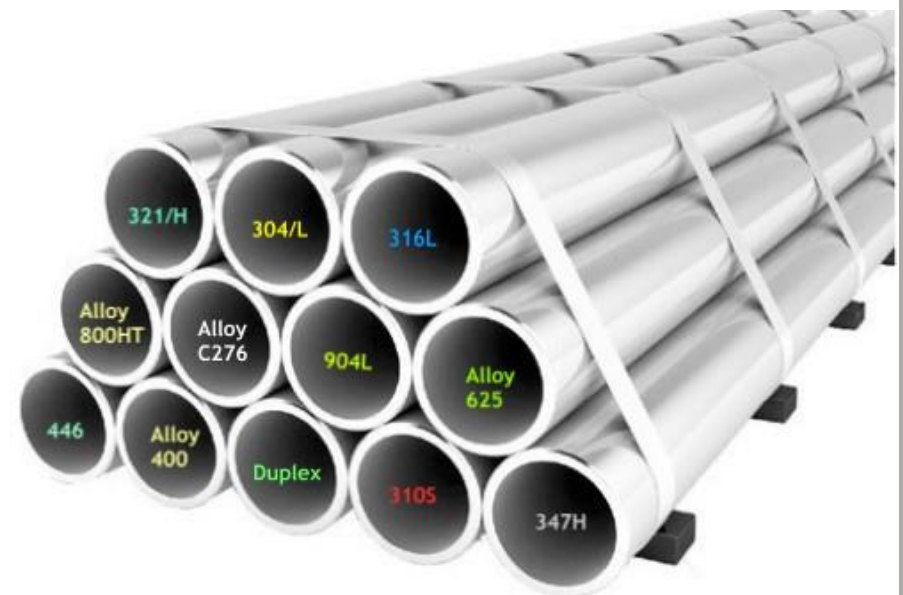




SUPER DUPLEX 2507 STAINLESS STEEL

Datasheet for Stainless Steel Super Duplex 2507

- Pipes & Tubes
- Sheets & Plates
- Bars & Rods, Forgings
- Fittings & Flanges
- Nuts & Bolts
- Valves



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Datasheet for Stainless Steel Super Duplex 2507

UNS S32760 (F55), UNS S32750 (F53), 1.4410, 1.4501

What is 304/304L Stainless Steel?

- The term “Super-Duplex” was first used in the 1980’s to denote highly alloyed, high-performance Duplex steel with a PREN of >40 (based on Cr% + 3.3Mo% + 16N%). Super Duplex stainless steel are designed for applications which demand exceptional strength and corrosion resistance. The high molybdenum, chromium and nitrogen content in Super Duplex stainless steels result in excellent resistance to chloride pitting and crevice corrosion attack and the duplex structure provides Super Duplex steels with exceptional resistance to chloride stress corrosion cracking.

The Duplex family of Stainless Steels Consists of the following Grades & Designations:

- Lean Duplex SS – lower nickel and no molybdenum – 2101, 2102, 2202, 2304
- Duplex SS – higher nickel and molybdenum - 2205 (UNS S32205), 2003, 2404
- Super Duplex – 25 Chromium and higher nickel and molybdenum “plus” – 2507 (UNS S32750, UNS S32760)
- Hyper Duplex – More Cr, Ni, Mo and N - 2707

Product Forms and Standards of Stainless Steel Super Duplex 2507

Product Forms	Material Standards
Plates, Sheets & Strips	ASTM A240, EN 10088-2
Billets, Bars & Rods	ASTM A276, A479, A484, EN 10088-3
Forgings (Flanges & Fittings)	ASTM A182 F53/F55
Wires	ASTM A313, A580.
Seamless and Welded Pipes	ASTM A790 (Pipes), ASTM A790 (Tubes)

Wrought Buttweild Pipe Fittings

ASTM A815

- Metallica supplies Duplex stainless steel in various grades such as ASTM A790 UNS S32760, ASTM A182 F53/F55 (Forgings), ASTM A815 UNS S32750/UNS S32760 (Buttweld Fittings), ASTM A240 UNS S32750/UNS S32760 (Sheets & Plates).

What is the Difference Between Duplex & Super Duplex Stainless Steels?

- Super Duplex stainless steel has all of the same benefits as Duplex Stainless Steel - the main difference being that this metal has a higher chromium, nitrogen and molybdenum content, which provides it with increased corrosion resistance.
- Duplex stainless steel is more durable with twice as much strength & better performance index than a regular traditional stainless steel. Hence a lighter product can bring about a better performance. The alloys used to arrive at duplex quality steel renders unique feature like high resistance to pitting, cracking & corrosion to the ultimate outcome thereby making duplex steel a much favored product in the stainless steel industry.
- The same material is used while manufacturing duplex stainless steel and super duplex stainless steel; however the alloying element usage ratio is different in both cases & change in ratio results in increased strength, & corrosion resistance. Many of the applications in which 904L grade has previously performed well can now be fulfilled at lower cost by duplex stainless steel 2205 (S31803 or S32205). Due to increased usage of Duplex stainless steels, SS 904L is used less commonly used these days.

Comparison Table of Super Duplex Stainless Steels and Relative Substitutes in Austenitic Stainless Steels

Duplex vs. Austenitic	
Duplex Grades	Austenitic Grades
2202 /2101/2102	304L
2304	316L
2003 /2404	317L, 317LMN
2205	904L
255 / 2507 / Z100 / 2707	6Mo Grades

Applications of Super Duplex Stainless Steels

- Subsea control lines
- Fire-fighting systems
- Injection & ballast water systems
- Heat exchangers
- Oil and gas industry equipment
- Offshore platforms, heat exchangers, process and service water systems, fire-fighting systems, injection and ballast water systems
- Chemical process industries, heat exchangers, vessels, and piping
- Desalination plants, high pressure RO-plant and seawater piping
- Mechanical and structural components, high strength, corrosion-resistant parts
- Power industry FGD systems, utility and industrial scrubber systems, absorber towers, ducting, and piping

Properties & Characteristics of Super Duplex Stainless Steel

Characteristics

- Like other duplex (ferritic/austenitic) grades the super duplex grades are not suitable for high or low temperature service. **2507 is not recommended for temperatures below -50°C or above +300°C, because of reduced toughness outside this range.**
- High strength
- High resistance to pitting, crevice corrosion resistance.
- High resistance to stress corrosion cracking, corrosion fatigue and erosion
- Excellent resistance to chloride stress- corrosion cracking
- High thermal conductivity
- Low coefficient of thermal expansion
- Good sulfide stress corrosion resistance
- Low thermal expansion and higher heat conductivity than austenitic steels
- Good workability and weldability
- High energy absorption

Processing/Welding

- Super Duplex stainless steels possesses good weldability and can be joined to itself or other materials by shielded metal arc welding (SMAW), gas tungsten arc welding (GTAW), plasma arc welding (PAW), flux cored wire (FCW), or submerged arc welding (SAW). 2507/P100 filler metal is suggested when welding Super Duplex materials so that it can produce the appropriate duplex weld structure.
- Preheating of Super Duplex stainless steel is not necessary except to prevent condensation on cold metal. The interpass weld temperature should not exceed 300°F or the weld integrity can be adversely affected. The root should be shielded with argon or 90% N₂/10% H₂ purging gas for maximum corrosion resistance. The latter provides better corrosion resistance.

Equivalents of Super Duplex Stainless Steel

Standard	Super Duplex 2507 / Zeron 100
UNS	S32750 / S32760
Werkstoff Nr.	1.4410/1.4501

Chemical, Mechanical & Physical Properties of Duplex Stainless Steel

Super Duplex 2507, F53 (UNS S32750) Steel Chemical Composition

Weight%	Content
C	0.03 max
Mn	1.2 max
P	0.035 max
S	0.015 max
Si	0.8 max

Cr	24-26
Ni	06-08
Mo	03-05
N	0.24-0.35
Cu	0.5 max
$PREN = (Cr\% + 3.3Mo\% + 16N\%) \geq 40$	

Super Duplex F55, (UNS S32760) Steel Chemical Composition

Weight%	Content
C	0.03 max
Mn	1.00 max
P	0.03 max
S	0.01 max
Si	1 max
Cr	24-26
Ni	4.5-6.5
Mo	03-04
N	0.25
W	0.08-0.20

$$\text{PREN} = (\text{Cr}\% + 3.3\text{Mo}\% + 16\text{N}\%) \geq 40$$

Super Duplex Stainless Steel Physical Properties

Specific Heat (0-100°C)	500	J.kg-1.°K-1
Thermal Conductivity	15	W.m -1.°K-1
Thermal Expansion	11	µm/µm/°C
Modulus Elasticity	200	GPa
Electrical Resistivity	8.12	µhm/cm
Density	7.8	g/cm3

Super Duplex Stainless Steel Mechanical Properties

Temper	Annealed	
Tensile Rm	115	ksi (min)
Tensile Rm	800	MPa (min)
R.p. 0.2% Yield	80	ksi (min)
R.p. 0.2% Yield	550	MPa (min)
Elongation (2" or 4D gl)	15	% (min)

Stainless Steel Super Duplex 2507 Product Specification

Product	Super Duplex Stainless Steel
Equivalents	Super Duplex 2507, UNS S32750, F53, 1.4410 UNS S32760, 1.4501
Items	Pipe, Tubes, Tubing, Fittings, Flanges, Valves, Fasteners, Sheet, Square Bar, Threaded Bar, Plate, Hexagon Bar, Fasteners and Fixings, Round Bar, Flat Bar, Rebar, Angle, Tube & Pipe, Wire
Size	1/4" - 60"
Pipe Type	Seamless, Welded, ERW, Fabricated, Custom Size Pipes
Specifications	ASTM, ASME, DIN, GOST, JIS
Certification	EN 10204 3.1
Fittings Type	Butt Weld, Screwed & Socket Weld, Flanges, Instrumentation
Other Fittings	Elbows, Tees, Reducers, Caps, Stub Ends, Flanges (ANSI, Table E, D and H), Nuts, Bolts, Screws, Threaded Bars

Fabrication Data and Heat Treatment of Super Duplex Stainless Steels

- Super Duplex stainless steel is a high strength steel, so high forming forces will be required and high spring-back should be anticipated. The ductility of the grade is quite adequate for most operations, but heavy deformation, such as cold forging, is not possible. If more than about 20% cold work is carried out an intermediate solution anneal is required. Hot forging can be carried out in the temperature range 1200 – 1025°C. Like other duplex grades UNS S32750/UNS S32760 grade has low hot strength, so may need support during heat treatment or forging. Hot forging should be followed by solution treatment.

Heat Treatment

- Super Duplex stainless steel should be solution annealed and quenched after either hot or cold forming. Solution annealing should be done at a minimum of 1925°F. Annealing should be followed immediately by a rapid air or water quench. To obtain maximum corrosion resistance, heat treated products should be pickled and rinsed.

Corrosion Resistance of Super Duplex UNS S32750/UNS S32760 Steels

- High chromium and molybdenum content of Super Duplex stainless steel makes it extremely resistant to uniform corrosion by organic acids like formic and acetic acid.

- Provides excellent resistance to inorganic acids, especially those containing chlorides.
- Can be used in dilute hydrochloric acid.
- Pitting need not be a risk in the zone below the borderline in this figure, but crevices must be avoided.
- A PRE of least 40 indicates that the material has good pitting and crevice corrosion resistance to warm sea water and other high chloride environments; it is rated as more resistant than grade 904L and approximating that of the 6% Molybdenum "super austenitic" grades.

What is the PREN of Super Duplex 2507, UNS S32750, UNS S32760 Stainless Steel?

- The PREN value of Super Duplex stainless steel is typically more than 40 levels, depending upon the content of alloying elements.

Our Key Products

Super Duplex 2507 Sheet	Super Duplex 2507 Plate Cuttings/Profiles	Super Duplex 2507 Nuts, Bolts and Fasteners
Super Duplex 2507 Plate	Super Duplex 2507 Foil, Coil	Super Duplex 2507 Wire
Super Duplex 2507 Blocks/Slabs	Super Duplex 2507 Strip	Super Duplex 2507 Ingot
Super Duplex 2507 Rod/Bar	Super Duplex 2507 Pipes and Tubes	Super Duplex 2507 Forgings and Castings
Super Duplex 2507 Flanges	Super Duplex 2507 Forged Fittings	Super Duplex 2507 Buttweld Fittings

About Metallica Metals – The Steel Pipes Factory

- Established in 1975, the Metallica Metals Group (The Steel Pipes Factory) has its operations spread across major cities in India. We are a pioneer in the stainless steel pipes, nickel alloy products, titanium products, carbon steel pipes and alloy steel pipes manufacturing and processing industry. Our products including pipe fittings, flanges, pipes, sheet plates and valves are exported to over 70 countries across the world, while in India we have supplied to even the remote areas. With over 250 tons of sale in stainless steel and carbon steel pipes every day, Metallica has emerged as a prominent vendor for many buyers in India and Overseas
- **More than 3000 tons ready from stock and new production ready in just a few weeks.**
- Feel free to contact us on - Email: info@metallicametals.com | Tel: +91 8928722715 | +91-22-66581538, +91-22-67436694, +91-22-66109768

Our Key Products

STAINLESS STEEL & NICKEL ALLOYS

Pure Nickel Alloys
Monel Alloys (Ni-Cu Alloys)
Inconel (Ni-Cr-Mo) Alloys
Incoloy Alloys (Ni-Cr-Fe)
Hastelloy Alloys
Stainless Steel 304/304L
Stainless Steel 309S/309H
Stainless Steel 310/310S
Stainless Steel 316/316L
Stainless Steel 316Ti
Stainless Steel 317/317L
Stainless Steel 321/321H
Stainless Steel 347/347H
Stainless Steel 904L
Duplex Steels (UNS S32205, UNS S31803)
Super Duplex Steels (UNS S32760 / UNS S32750)
Stainless Steel 254 SMO (UNS S31254 / 1.4547)

INSTRUMENTATION TUBES & FITTINGS

Instrumentation Tube
Hydraulic Tubing
Seamless Tubing
Instrumentation Tube Fittings
Double Compression Tube Fittings
Precision Pipe Fittings
Needle & Gauge Valves
Manifold Valves

PRODUCTS

Steel Sheet & Plate
Steel Coil & Strip
Steel Pipes
Steel Tubes
Electropolish Tube
Heat Exchanger Tubes
Steel Bars/Rods & Wire
Fasteners (Nut, Bolt, Washer)
Steel Angle Bars
Hex Steel Bars
Round Steel Bars & Rod
Flat Steel Bars
Forgings, Rings & Forged Blocks
Stainless Steel Pipe
Stainless Steel Seamless Pipe
Stainless Steel Welded Pipe
Stainless Steel Tubes
Stainless Steel Furnace Tubes
Stainless Steel Seamless Tubing
Stainless Steel Heat Exchanger Tubes
Large Diameter Pipe

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