



Langley Alloys

Super-Duplex

Alloy 32760 (Bar)

Specifications:

UNS S32760, ASTM A479, ASTM A276, ASTM A182 F55, EN 10088-3 1.4501, NACE MR0175 / ISO 15156, Norsok MDS 57, API 6A

Alloy 32760 is a super duplex stainless steel supplied in the hot worked and solution annealed condition. As a super duplex stainless steel, it combines the desirable aspects of both austenitic and ferritic grades. The higher Chromium, Molybdenum and Nitrogen contents result in a Pitting Resistance Equivalent number (PREN) of >40, providing pitting and crevice corrosion resistance superior to austenitic and duplex stainless Steels in almost all corrosive media, and a Critical Pitting Temperature exceeding 50°C

Key Features:

- Excellent corrosion resistance in a wide variety of corrosive chemicals
- Pitting Resistance Equivalent number (PREN) of >40
- Outstanding resistance to pitting and crevice corrosion in seawater and other chloride containing environments
- Critical Pitting Temperature exceeding 50°C
- High strength compared to austenitic and 22%Cr duplex stainless steels
- Excellent ductility and impact strength at both ambient and sub-zero temperatures
- High resistance to abrasion, erosion and cavitation erosion
- Excellent resistance to stress corrosion cracking in chloride containing environments
- Listed in NACE MR 0175 for sour service
- ASME Approval for Pressure Vessel application

Typical Applications:

- Process industry components in nitric acid, dioxide, polypropylene & PVC production, caustic evaporators,
- Equipment handling organic & fatty acids
- Marine industry and shipbuilding propellers, shafts, rudders, shaft seals, pumps, bolts, fasteners, valves, instrumentation
- Oil and chemical tankers
- Oil & Gas industry pumps, valves, pipe, vessels, wellhead equipment, subsea equipment
- Pollution control systems, fans and pumps, wet scrubbers, incinerators, flue gas desulphurisation (FGD)
- Pulp & paper industry components such as black liquor heater tubes, digester blow valves, rotary feed valves, I.D.fans, brownstock washers, precipitators, bleaching components
- Food Industry applications including sugar cane centrifuges, corn and vegetable processing plant
- Agrochemicals production such as fertilisers (based on wet phosphoric acid)
- Sewage treatment, seawater cooling, desalination plants

Physical Properties:

Density (Kg/m ³)	7810
Magnetic Permeability (20°C)	33
Young's Modulus (kN/mm ²)	199
Specific Electrical Resistance, 20°C (μΩ.m)	0.80
Mean coefficient of thermal expansion, 20 - 300°C (m/m/°C)	11.1 x 10 ⁻⁶
Specific Heat, 20°C (J/kg.K)	475
Thermal conductivity, 20°C (W/m.K)	14.2
Fracture Toughness, kQ (MPa/m ²)	98

Product Forms Available:

Bar	✓
Plate	n/a
Tube	Enquiry
Fittings	Enquiry
Forgings	To order
Castings	To order

Chemical Composition:

	Cr	Ni	Mo	Co	Nb (+Ta)	Ti	V	W	Cu	C	Mn	N	Si	P	S	Fe	Al
Min	24.00	6.00	3.00					0.50	0.50			0.20	0.10				
Max	26.00	8.00	4.00					1.00	1.00		1.00	0.30	0.80	0.025	0.005	Bal	

Mechanical Properties:

0.2% Proof Stress	550 N/mm ²	79.8 ksi
Tensile Strength	750 N/mm ²	108.8 ksi
Elongation, 5.65√50	25%	
Reduction of area	45%	
Hardness (Brinell)	270 max.	
Impact Strength (Room Temp)	80J	59 lb.ft
Impact Strength (-46°C)	60J av (45J min)	44 lb.ft av (33 lb.ft min)

Notes:

- Testing shall be carried out in accordance with ASTM A370 or EN ISO 6892-1 (tensile), EN ISO 6506-1 (hardness)
- Minimum properties quoted (tested at room temperature in a longitudinal direction)
- Testing performed on each melt of material per heat treatment batch
- Hardness shall be in accordance with NACE MR 1075 with a maximum HRC of 28
- Additional tests routinely undertaken:
 - ASTM G48A corrosion test (at 50°C) - No pitting and < 3.0 g/m² weight loss (ASTM specification < 4.0 g/m²)
 - Ferrite content - 35-55%
 - Microstructure certified free from grain boundary carbides, sigma, chi and laves phases

Product Comparison:

Alloy Comparisons	S32760	S31803	S17400 H1025	S31254	N07718
Pitting Resistance Equivalent number	>40	34	16	43	31
0.2% Proof Strength (N/mm ²)	550	450	1137	300	550 max
Corrosion Rate (mm/year) - Seawater	<0.01	<0.10	~1	<0.01	<0.01
Corrosion Rate (mm/year) - 10% sulphuric acid at 80°C	<0.15	0.4	10	0.4	<0.15
Corrosion Rate (mm/year) - Boiling 50% nitric acid	<0.15	<0.15	<0.15	<0.15	<0.15
Wear Properties related to Hardness (HRC), maximum	28	38	38	20	20

Machining Advice:

Operation	Cutting Speed m/min (ft/min)	Feed Rate mm/rev (in/rev)	Depth of cut mm (in)
Milling	40 (130)	0.05 - 0.13 mm/tooth (0.02 - 0.005 in/tooth)	0.5 - 6.0 (0.02 - 0.25)
Drilling - 6.4mm (1/4") dia	250rpm	0.075 (0.003)	
Drilling - 12.7mm (1/2") dia	250rpm	0.125 (0.005)	
Drilling - 25.4mm (1") dia	150rpm	0.28 (0.011)	
Turning - Roughing	30 - 45 (100 - 150)	0.20 - 0.38 (0.008 - 0.015)	3.0 (0.125)
Turning - Finishing	50 - 60 (165 - 200)	0.13 - 0.20 (0.005 - 0.008)	0.5 (0.02)
Tooling	Milling/Turning: Carbide (SANDVIK GC 235, SECO T25M) Drilling: HSS, point angle 118°, chisel angle 120°		

Production route:

Alloy 32760 is produced through high-precision steelmaking processes to ensure cleanliness and consistency.

- All material shall be refined by Vacuum Oxygen Decarburisation (VOD) or Argon Oxygen Decarburisation (AOD)
- Further refinement by Electric Slag Refining (ESR) is allowable
- The minimum forging ratio utilised is at least 4:1
- Solution treatment shall be carried out at a temperature between 1100-1140°C for a minimum of one hour
- This will be followed by immediate water quench
- Bars are supplied peeled and polished to a surface finish of 125CLA or better
- Each bar is ultrasonically tested and visually inspected

Further processing:

- Order processing and stock control is facilitated by a fully-integrated computer system which links to item production and inspection.
- Automated band saws are available for accurate stock cutting up to a section size of 650mm (25").
- First-stage processing, including water jet cutting, turning, boring and grinding can be undertaken to help manage your overall supply chain.
- Additional documentation and certification can be supplied as required

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