



Langley Alloys

Stainless

Fermonic® 60

Specifications:

UNS S21800, AMS 5848, ASME SA479, ASTM A193, ASTM A276, ASTM A479,

Fermonic® 60 is a fully austenitic alloy supplied in the hot worked and annealed condition. The general corrosion resistance is between that of Alloy 304 and Alloy 316 stainless steel, whereby it is generally better than Alloy 304 in most environments but superior to Alloy 316 with respect to chloride pitting resistance. More significantly, additions of Silicon and Manganese provide superior wear, galling and fretting resistance than many other corrosion resistant alloys making it preferable for applications where there is repeated movement/sliding or frequent assembly/disassembly. These compositional additions also provide almost double the yield strength of Alloys 304/316, and higher strength can be achieved through cold working. Importantly, it remains fully austenitic - and therefore, fully non-magnetic - even after severe cold-working, although there is no improvement in galling performance from this operation.

Key Features:

- Superior resistance to galling and associated wear mechanisms
- Retention of mechanical properties up to 1200°C combined with good oxidation resistance
- Good corrosion resistance in a wide variety of environments
- Cost effective alternative to Cobalt- and Nickel-based alloys in wear/galling critical applications
- Readily strengthened by cold-working
- Non-magnetic
- Readily fabricated and welded in the same way as Alloy 304 and Alloy 316

Typical Applications:

- Fasteners
- Pins and bushings
- Wear rails and guides
- Roller bearings
- Marine shafts
- Pump components such as seals and wear rings
- Valve stems, seats and trim

Physical Properties:

Density (Kg/m ³)	7622
Magnetic Permeability (20°C)	1.003
Young's Modulus (kN/mm ²)	181
Specific Electrical Resistance, 20°C (Ω-m)	0.98 x 10 ⁻⁶
Mean coefficient of thermal expansion, 20 - 100°C (m/m/°C)	15.8 x 10 ⁻⁶

Product Forms Available:

Bar	✓
Plate	Enquiry
Tube	Enquiry
Fittings	Enquiry
Forgings	To order
Castings	To order

Mechanical Properties:

	Bars up to and including 0.5" diameter or section		Bars above 0.5" diameter or section	
0.2% Proof Stress	379 N/mm ²	55ksi	345 N/mm ²	50ksi
Tensile Strength	724 N/mm ²	105ksi	655 N/mm ²	95ksi
Elongation, 5.65√S0 and 4D	35%		35%	
Reduction of Area	55%		55%	
Hardness (Brinell)	241 max		241 max	

Notes:

1. Tensile testing shall be carried out in accordance with ASTM A370 or EN10002-1
2. Minimum properties quoted (tested at room temperature in a longitudinal direction)
3. Testing performed on each melt of material per heat treatment batch

Chemical Composition:

	Cr	Ni	Mo	Co	Nb (+Ta)	Ti	W	Cu	C	Mn	N	Si	P	S	Fe	Al
Min	16.0	8.0							0.06	7.5	0.10	3.7				
Max	17.0	8.5	0.75		0.10	0.05	0.15	0.75	0.08	8.5	0.18	4.2	0.04	0.03	Bal	0.02

Product Comparison:

	Fermonic® 60	S30400 (Annealed)	S31603 (Annealed)	S17400 (17- 4PH)
Pitting Resistance Equivalent number	20	19	25	16
0.2% Proof Strength (N/mm²)	345	205	205	725
Corrosion rate (mm/year) - 5% sulphuric acid at 80°C	13.2	33	1.5	
Corrosion rate (mm/year) - Boiling 65% nitric acid	1.5	0.3	0.3	3.4
Wear resistance (couples) - mg/1000 cycles	2.8	12.8	12.5	52.8

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	250 rpm	0.075 (0.003)	
Drilling 12.7mm (1/2") dia	250 rpm	0.125 (0.005)	
Drilling 25.4mm (1") dia	150 rpm	0.28 (0.011)	
Turning - Roughing	27 - 42 (90 - 140)	0.2 - 0.38 (0.008 - 0.015)	3 (0.125)
Turning - Finishing	35 - 60 (120 - 190)	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:

Fermonic® 60 is produced through high-precision steelmaking processes to ensure cleanliness and consistency.

- a) All material shall be refined by Argon Oxygen Decarburisation (AOD) or Electric Slag Refining (ESR).
- b) The minimum forging ratio utilised is at least 4:1
- c) Solution treatment shall be carried out at a temperature between 1070 - 1120°C for one hour minimum.
- d) This will be followed by water quench
- e) Bars are supplied peeled and polished to a surface finish of 125CLA or better
- f) 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

Unique metals for your demanding applications

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