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PRODUCT DATA SHEET

INCO Alloy C-276 UNS N10276

Nickel Alloys

Inco alloy G276 is a nickel, chromium, molybdenum, tungsten alloy designed for outstanding corrosion resistance in a wide range of severe environments. This alloy is non magnetic, single phase and has good strength and ductility.

Chemical Composition (ASTM B574 – Rod)

Element	%	Element	%
Nickel	~ 60%	Carbon	0.010 max
Chromium	14.5 - 16.5	Manganese	1.0 max
Molybdenum	15.0 - 17.0	Silicon	0.08 max
Iron	4.0 - 7.0	Phosphorus	0.04 max
Tungsten	3.00 - 4.50	Sulphur	0.03 max
Cobalt	2.5 max	Vanadium	0.35 max

Typical Applications Used in severe environments in chemical processing, pollution control, pulp and paper manufacture, treatment of industrial wastes and municipal waste. Applications in chemical processing include heat exchangers, reaction vessels, evaporators and process piping. In air pollution control: stack liners, ducts, dampers, scrubbers, stack gas reheaters, fans and fan housings. In sour gas recovery Inco C-276 delivers a high level of performance in various down hole and surface components, including tubing, coupling and subsurface valves.

Specified Minimum Mechanical Properties (ASTM B574 – Rod) and Typical Values

	0.2% Proof Stress, MPa	Tensile Strength, MPa	Elongation, %
B574 Minimum	283	690	40
Typical	415	790	50

Description Inco C-276 is a nickel chromium molybdenum tungsten alloy designed for corrosion resistance in a wide variety of severe environments. The alloy has good strength and ductility, and can be used at elevated temperatures. It can not be hardened by heat treatment but will harden by cold work. In the annealed condition it is strengthened by solid solution hardening with nickel, chromium, molybdenum and tungsten. C-276 has outstanding corrosion resistance in sulphuric and hydrochloric acids, & the nickel level gives near immunity to stress corrosion cracking.

Austral Wright Metals can supply this alloy as plate, sheet and strip, rod and bar, seamless and welded tube and pipe, welding fittings, forgings and forging stock.

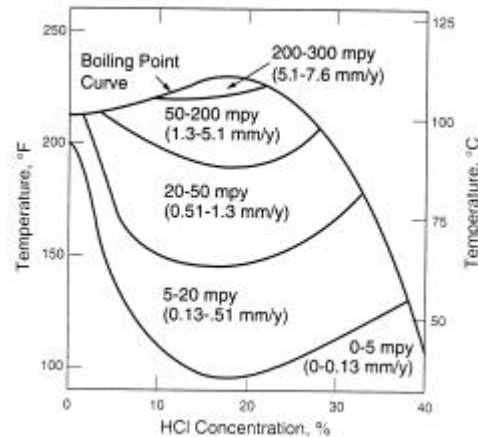
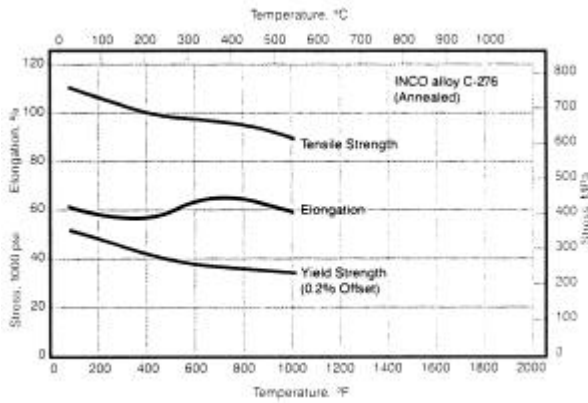
Corrosion Resistance Outstanding corrosion resistance is the major attribute of C-276. The alloy resists general corrosion, stress corrosion cracking, pitting and crevice corrosion in a wide range of aggressive environments. It has very low carbon content, and in most media can be used as welded without loss of corrosion resistance. C-276 has exceptional resistance to many of the most severe media in chemical processing. Including highly oxidising neutral and acid chlorides, solvents, formic and acetic acids, acetic anhydride, wet chlorine gas, hypochlorites and chlorine solutions.

In flue gas desulphurisation applications C-276 outperforms many other alloys.

Maximum pitting or crevice attack, mm, in FGD scrubber slurry

(6 months at 52°C, pH 5.5, 5000 ppm chlorides)

Alloy	Quencher	Absorber	Absorber Outlet	Outlet Duct	Bypass Duct
316L	0.56	0.53	0.89	0.89	0.30
317LM	0.51	0.56	0.74	0.84	0.74
Incoloy 825	0.38	0.84	0.99	1.27	0.25
Incoloy 625	< 0.05	0.25	0.28	0.18	nil
Inco C-276	nil	nil	< 0.05	nil	nil



Variation of tensile properties with temperature

Corrosion rates in hydrochloric acid

Fabrication Inco C-276 is readily fabricated by standard methods. Work hardening in cold forming may require intermediate annealing. Heavy forces are required for both hot and cold forming due to the high strength of C-276.

Machinability Inco C-276 is classed as a "D-2" alloy as it is difficult to machine. Heavy machines, sharp tools, slow speeds and deep, continuous cuts to remove the work hardened layer are needed.

Heat Treatment Inco C-276 is annealed at 1150 - 1175°C and water quenched. Please consult Austral Wright Metals for specific advice.

Welding Inco C-276 is readily welded by GMAW (MIG), GTAW (TIG), SMAW (manual) and SAW processes. Preheat, post heat and post weld heat treatment are not needed. Clean the parent material to avoid contamination of the weld pool.

Welding Consumables

	Normal Service	Higher Strength	Best Corrosion Resistance
Welding electrode	Inconel WE C-276	Inco Weld WE 686CPT	Inco Weld WE 686CPT
Filler metal	Inconel FM C-276	Inco Weld FM 686CPT	Inco Weld FM 686CPT
Flux cored wire	N/A	N/A	N/A

Physical Properties

Property	at	value	unit	Property	at	value	unit
Density	20°C	8,820	Kg/m ³	Melting Range		1325 - 1370	°C
Electrical Resistivity	20°C	1.3	micro-ohm . m				
Modulus of Elasticity							
Tension	20°C	205	GPa	Specific Heat	20°C	427	J/Kg . °C
Torsion	20°C	79	GPa	Thermal Conductivity	20°C	9.8	W/m . °C
Poisson's Ratio	20°C	0.307		Mean Coefficient of Expansion	20°C	12.20	x10 ⁻⁶ /°C
Magnetic Permeability	200 Oe	1.0002					

Equivalent Grade Specifications

Country	Body	Grade
USA	UNS	N10276
France	AFNOR	NC 17 D
GB	BS	-
Germany	DIN	2.4819

ASTM Product Specifications

Specification	Title
B366	Nickel and Nickel Alloy Fittings
B564	Nickel Alloy Forgings
B574	Low Carbon Nickel Molybdenum Chromium, Low Carbon Nickel Chromium Molybdenum and Low Carbon Nickel Chromium Molybdenum Tungsten Alloy Rod
B575	Low Carbon Nickel Molybdenum Chromium, Low Carbon Nickel Chromium Molybdenum and Low Carbon Nickel Chromium Molybdenum Tungsten Alloy Plate, Sheet and Strip
B619	Welded Nickel and Nickel Cobalt Alloy Pipe
B622	Seamless Nickel and Nickel Cobalt Alloy Pipe and Tube
B626	Welded Nickel and Nickel Cobalt Alloy Tube
B751	General Requirements for Nickel and Nickel Alloy Welded Tube
B775	General Requirements for Nickel and Nickel Alloy Welded Pipe