

HASTELLOY® C-276

UNS N10276 · W.Nr. 2.4819

Nickel–Chromium–Molybdenum–Tungsten Alloy

A versatile corrosion-resistant alloy for severe and unpredictable process environments.

01 PRODUCT INTRODUCTION

C-276 is a solid-solution strengthened nickel alloy engineered for broad resistance across reducing and oxidizing media. Its high molybdenum content supports resistance to pitting and crevice corrosion, while chromium improves performance in oxidizing conditions. Tungsten further strengthens localized-corrosion resistance. Low carbon and silicon contents help retain corrosion resistance in weld heat-affected zones, allowing many fabricated components to be used in the as-welded condition. It is commonly evaluated for wet chlorine, mixed acids, flue-gas desulfurization, chemical processing and waste-treatment equipment. Final selection still depends on concentration, temperature, velocity, contaminants, crevices and the applicable design code.

02 WHY ENGINEERS SPECIFY C-276

Broad chemistry	Handles mixed acids, chlorides and process contaminants better than narrowly optimized alloys
Weldability	Low C and Si reduce grain-boundary precipitation during fabrication and welding
Service range	Used from ambient corrosive service to elevated-temperature process equipment
Lifecycle value	Selected where leakage, unplanned shutdowns and replacement costs outweigh alloy premium

03 COMMON INDUSTRY USE

- CHEMICAL
- POLLUTION
- MARINE
- PULP & PAPER
- WASTE

SELECTION NOTE

C-276 is not universally immune. Final selection requires actual media composition, concentration, temperature, velocity, aeration, crevices and expected service life.

Composition & Physical Data

Nominal chemistry and typical room-temperature physical properties.

04 CHEMICAL COMPOSITION

WEIGHT %

Nickel (Ni)	Balance	Chromium (Cr)	14.5–16.5
Molybdenum	15.0–17.0	Iron (Fe)	4.0–7.0
Tungsten (W)	3.0–4.5	Cobalt (Co)	≤ 2.5
Carbon (C)	≤ 0.01	Manganese	≤ 1.0
Vanadium (V)	≤ 0.35	Silicon (Si)	≤ 0.08
Phosphorus	≤ 0.04	Sulfur (S)	≤ 0.03

METALLURGICAL LOGIC

Cr supports oxidizing resistance; Mo and W drive resistance to reducing acids and localized chloride attack; low C/Si support weld-zone stability.

05 TYPICAL PHYSICAL PROPERTIES

APPROX. 20–25°C

Density	8.89 g/cm ³	Melting range	1325–1370°C
Elastic modulus	Approx. 205 GPa	Poisson ratio	Approx. 0.30
Thermal cond.	Approx. 10.2 W/m·K	Specific heat	Approx. 427 J/kg·K
Electrical resist.	Approx. 1.30 μΩ·m	Thermal expansion	Approx. 11.2 μm/m·K

06 MATERIAL IDENTITY

Common name	Hastelloy® C-276 / Alloy C-276
UNS / EN	UNS N10276 / EN 2.4819
ISO group	Nickel–chromium–molybdenum corrosion-resistant alloy
Condition	Normally supplied solution annealed

Mechanical & Corrosion Performance

Minimum room-temperature properties and qualitative service guidance.

07 MECHANICAL PROPERTIES

SOLUTION ANNEALED

Tensile strength	≥ 690 MPa	Yield strength	≥ 283 MPa
Elongation	≥ 40%	Hardness	≤ 100 HRB
Design caution	Use code-approved allowable stresses for pressure design; typical values are not design allowables		

08 CORROSION RESISTANCE PROFILE

Reducing acids	Strong general resistance in hydrochloric and sulfuric acid service across many concentrations
Oxidizing media	Chromium supports resistance where oxidizing contaminants or ferric ions are present
Chlorides	Excellent resistance to pitting, crevice corrosion and chloride stress-corrosion cracking
Wet chlorine	Widely used for wet chlorine, hypochlorites and chlorine dioxide systems
Organic acids	Good resistance to formic, acetic and mixed organic-acid process streams

09 APPLICATION-SPECIFIC GUIDANCE

FGD systems	Excellent candidate	Seawater	Strong candidate
Pulp bleaching	Commonly used	Sour process	Evaluate media
Hot nitric acid	Not first choice	Fluorides	Case-specific review

IMPORTANT

Published corrosion tables are screening tools. Laboratory testing or documented field experience is recommended for critical service.

Fabrication, Welding & Heat Treatment

Practical guidance for maintaining corrosion performance after fabrication.

10 FORMING & MACHINING

Cold forming	Good ductility, but rapid work hardening requires higher forming loads and suitable intermediate anneals
Hot working	Use controlled nickel-alloy practice; avoid prolonged exposure in sensitization-prone temperature ranges
Machining	Use rigid setups, positive tooling, low cutting speeds and continuous feed to prevent work-hardening glaze

11 WELDING GUIDANCE

Processes	GTAW / TIG, GMAW / MIG and SMAW are commonly used
Matching wire	ERNiCrMo-4 for GTAW and GMAW
Covered electrode	ENiCrMo-4 for SMAW
Heat input	Control interpass temperature and avoid excessive heat input or unnecessary reheating
Cleanliness	Remove oil, grease, marking compounds, oxides and iron contamination before welding

12 HEAT TREATMENT & FINISHING

Solution anneal	Typically about 1120°C followed by rapid cooling; verify product-specific specification
As-welded use	Many chemical-process fabrications are used as welded because of the low-carbon chemistry
Post-fabrication	Remove heat tint and embedded iron; use appropriate pickling or mechanical cleaning procedures

QUALITY CONTROL

Confirm filler metal, weld procedure qualification, surface condition, NDE and final cleaning requirements before production.

Product Forms, Standards & Procurement

A practical checklist for quotation, specification and incoming inspection.

13 COMMON PRODUCT STANDARDS

Plate / sheet	ASTM B-575	Rod / bar	ASTM B-574
Welded pipe	ASTM B-619	Seamless pipe/tube	ASTM B-622
Welded tube	ASTM B-626	Butt-weld fittings	ASTM B-366
ASME forms	Matching SB series	UNS designation	N10276

14 AVAILABLE PRODUCT FORMS

PLATE	SHEET	BAR	PIPE	FITTINGS
Also available	Strip, wire, tube, forgings, flanges and custom-fabricated components			

15 RFQ INFORMATION

Material	Alloy / UNS designation and governing ASTM or ASME specification
Dimensions	Product form, OD / ID, wall or thickness, length, tolerances and quantity
Condition	Solution annealed condition, surface finish, edge condition and straightness
Testing	Chemistry, tensile, hardness, PMI, NDE, corrosion or customer-specific testing
Documents	EN 10204 3.1 MTR, heat number traceability, inspection and compliance certificates

16 TECHNICAL DISCLAIMER

The values in this data sheet are typical or specification-level reference values and may vary by product form, thickness, heat treatment and governing standard. They do not replace engineering design calculations, corrosion testing, applicable codes or the manufacturer’s certified material test report.