Procurement White Paper

HASTELLOY® C-276

UNS N10276 | Nickel-Chromium-Molybdenum alloy optimized for broad corrosion resistance in chemical processing and severe service fasteners

Audience: procurement, sourcing, and quality teams supporting chemical processing equipment and corrosion-resistant fasteners.

At-a-glance	
What it is Wrought Ni-Cr-Mo alloy with tungsten and very low C/Si to support weldability and minimize sensitization risk in as-welded condition.	**Typical reasons to buy** Broad resistance to oxidizing + reducing media, chlorides (pitting/crevice), mixed acids, wet chlorine-bearing environments; widely used for process equipment and FGD systems.
Common supply forms Plate/sheet/strip, bar/rod, pipe/tube (seamless & welded), fittings, welding products; fasteners typically machined from bar.	**Key identifiers** UNS N10276; often ordered to ASTM/ASME B575 (plate), B574 (bar), B622/B619/B626 (tube/pipe), B366 (fittings), B462 (forgings).

This document is a purchasing guide (not an engineering design standard). Final material selection, NACE/ISO sour-service compliance, and welding procedures must be validated for the specific service environment and applicable codes.

1. Material overview for buyers

HASTELLOY C-276 (UNS N10276) is a nickel-chromium-molybdenum alloy with a small tungsten addition and very low carbon and silicon. It earned broad adoption in chemical process industries because it provides corrosion resistance across a wide range of aggressive chemicals and is widely considered suitable for many applications in the *as-welded* condition (reduced risk of weld heat-affected-zone precipitation compared with earlier alloys).

Procurement takeaway: The biggest cost-and-risk lever is specifying the correct product-form standard (ASTM/ASME), condition (solution annealed), and documentation (MTRs, heat/lot traceability) up front—especially for pressure equipment and safety-critical fasteners.

2. Where C-276 is commonly specified in chemical processing

- Reactors, vessels, columns, scrubbers, and heat exchangers handling mixed acids/halides and variable chemistry.
- Flue gas desulfurization (FGD) and pollution-control systems where chloride-bearing condensates and oxidizers are present.
- Piping/tubing, welded fabrications, and lined components where weldability and broad corrosion resistance are required.

Buyer note: C-276 is often chosen to reduce alloy proliferation—one alloy that covers multiple streams. When doing that, confirm corrosion drivers (chlorides, oxidizers, reducing acids, temperature, crevices) and require material test reports and PMI where appropriate.

3. Fastener considerations in corrosive chemical service

- **Galling risk:** Nickel alloys can gall under high contact pressure. Consider surface condition, lubrication/anti-seize policy, and assembly torque strategy.
- **Strength basis:** Most C-276 fasteners are machined from bar (ASTM/ASME B574). Your engineering spec should define required mechanical properties and test methods per the application.
- **Traceability:** For critical joints, require heat/lot traceability from bar to finished fastener, plus PMI and hardness/tensile verification as needed.
- **Coatings/plating:** If coatings are considered to reduce galling, validate chemical compatibility and temperature limits with engineering and the site standards.

4. Common product-form specifications

Use this table to cite the most typical purchasing specs by product form. Confirm the latest revision and any project/OEM overlays.

Product form (common)	Typical standards/specs to cite in RFQ	Procurement notes
Rod / Bar / Wire / Forging stock	ASTM B574 / ASME SB574 (bar/rod); ASTM B462 / ASME SB462 (forgings)	Often the starting point for machined parts and fasteners. Specify condition (solution annealed) and required documentation.
Plate / Sheet / Strip	ASTM B575 / ASME SB575 (plate/sheet/strip)	Common for fabrications and linings. For welded fabrications, confirm any heat-treatment or post-weld requirements.
Pipe / Tube (seamless & welded)	ASTM B622 / ASME SB622 (seamless); ASTM B619 (welded pipe); ASTM B626 (welded tube)	Specify NDE and pressure-test requirements if applicable. Align OD/ID tolerances with fabrication needs.
Fittings (buttweld, etc.)	ASTM B366 / ASME SB366	Match fittings to the pipe/tube spec and schedule. Call out solution-annealed condition and MTRs.
Welding products	Common filler metal is often ERNiCrMo-4 for C-276 applications (verify AWS classification and site standard)	Purchasing should align filler selection with WPS/PQR and corrosion requirements; require lot traceability.
Fasteners (bolts, studs, nuts)	Typically manufactured from bar to ASTM/ASME B574; dimensional standards per application (e.g., ASME B18 series). Testing requirements are program/site-specific.	Define: thread class, surface finish, lubrication policy, traceability, and any supplemental testing (PMI, hardness, tensile).
Sour-service / NACE/ISO	C-276 is often used in ISO 15156 / NACE MR0175 contexts; verify latest limits for temperature, hardness, and environment.	Do not assume compliance. If required, request supplier statement/certification tied to the relevant edition and product form.

5. RFQ checklist (copy/paste)

- UNS: N10276; common name: HASTELLOY C-276.
- Product form & spec: e.g., ASTM/ASME B575 (plate), B574 (bar), B622/B619/B626 (tube/pipe), B366 (fittings), B462 (forgings).
- Dimensions and tolerances (include length, straightness, surface finish; for fasteners include thread standard and class).
- Condition/heat treatment: solution annealed unless otherwise specified.
- Documentation: MTRs to the cited spec; heat/lot traceability; Certificate of Conformance.
- Quality add-ons (as required): PMI, hardness, tensile, grain size, NDE, pressure test, hydrostatic/pneumatic per code, etc.
- Packaging and identification: tag each piece/bundle with heat number; corrosion-safe packaging; protect machined threads and sealing faces.
- Regulatory/project needs: ASME code stamping flowdown, DFARS/ITAR clauses (if applicable), NACE/ISO sour-service statement (if required).

6. Receiving inspection and QA checklist

- Verify paperwork: MTR matches PO spec and revision; heat numbers align to tags/markings; quantity and dimensions correct.
- PMI spot-check: confirm Ni-Cr-Mo signature and heat number consistency for critical orders.
- Check condition: confirm solution-annealed condition stated; review any post-weld heat treatment notes on fabrications.
- Visual inspection: surface defects, lamination, handling damage; for fasteners check thread quality, burrs, and surface finish.
- Traceability control: maintain heat/lot traceability through internal kitting and assembly (especially for studs/nuts sets).

7. Practical sourcing notes (cost, lead time, and risk)

C-276 is widely available, but lead times and pricing can swing with nickel and molybdenum markets and mill allocation. The highest-risk items are often large-wall tube/pipe, specialty fittings, and fasteners requiring additional testing, documentation, or short-run machining.

- Reduce rework: match the spec to the intended use (pressure boundary vs. non-pressure) and flow down exact documentation requirements.
- Prefer traceable starting stock: for fasteners, require bar MTRs tied to finished lots and clear lot-control during machining.
- Plan for substitution rules: if alternates (e.g., C-22) are allowed, define approval steps; do not permit unreviewed substitutions.
- Coordinate welding consumables early: filler metals and WPS/PQR requirements can delay fabrications if not aligned at RFQ time.

8. References

- Nickel Systems material overview: 'Hastelloy C-276' (spec table and general guidance).
https://www.nickel-systems.com/materials/hastelloy-c-276/

- Haynes International: HASTELLOY C-276 alloy brochure (UNS N10276; corrosion and fabrication guidance; standards list).
https://haynesintl.com/wp-content/uploads/2024/08/c-276.pdf

- Sandmeyer Steel: Alloy C-276 spec sheet (general properties and corrosion positioning).
https://www.sandmeyersteel.com/wp-content/uploads/Nickel-Alloy-C-276-Spec-Sheet.pdf

- ASSDA Technical FAQ: 'Galling and its Control' (general galling mitigation concepts).
https://www.assda.asn.au/publications/technical-faqs/galling-and-its-control