

CORROSION-RESISTANT SUPER ALLOYS™ AL-6XN® & HASTELLOY® C-22®



AL-6XN®
FERRULE

316L FERRULE
CORROSION FROM
CHILI SAUCE

316L FERRULE
CORROSION FROM
SALINE SOLUTION

Corrosion in hygienic piping systems is a serious concern that can affect any plant's efficiency. That's why AL-6XN® and Hastelloy® C-22® are widely used to avoid unplanned downtime, product loss, and recurring maintenance costs.



CSI stocks a complete inventory of high purity and sanitary tubing and fittings that are available to ship today.



CORROSION-RESISTANT SUPER ALLOYS™

AL-6XN and C-22 are widely used in the biotech, pharmaceutical, personal care, home care, food, dairy, and beverage industries. These alloys are recognized by the ASME BPE standard, which identifies several specifications in Part MM (Metallic Materials) and by the U.S. Food and Drug Administration (FDA).

Microbial contamination, system reengineering, maintenance downtime, production loss, and safety of employees and the environment are the main reasons why end-users, and Architects and Engineers (A&E's) select Super Alloys™.



Super Alloy™
Valve Manifold

Good Manufacturing Practice

Choosing the right equipment and materials to avoid corrosion is a best practice for most processing environments.

No Microbial Contamination

No crevice and pitting corrosion, no product accretion.

Product Availability

With over 65,000 feet of tubing and thousands of fittings in stock, CSI is ready to ship your alloys today.

Avoid Equipment Replacement

Super Alloys provide a good return on investment by reducing product loss and maintenance time repairing and replacing corroded parts.

Speak with the Experts

Whether you have questions on stock, welding techniques, custom fabrication needs, or anything else, give our Super Alloy experts a call.

APPLICATIONS

Biotech and Pharmaceutical

- Buffer Solutions
- Chromatography Columns
- API
- Saline Solutions
- Ethanol Distillation
- Oral Rehydration Salts (ORS)

Personal Care

- Shampoo and Conditioner
- Toothpaste
- Deodorant/Antiperspirant
- Body Wash
- Liquid Soap

Home Care

- Fabric Softener
- Detergent
- Cleaning Supplies

Food, Dairy, and Beverage

- Condiments: Ketchup, Salsa, Mayonnaise
- Sauces: Tomato, Soy, Barbecue, Fish, Chili
- Breaker Eggs/Liquid Eggs
- Soup Stock
- Brine Solutions
- Isotonic Drinks
- Cheese
- Vinegar-based Products

AL-6XN®

AL-6XN® alloy (UNS N08367) is a superaustenitic stainless steel alloy with high molybdenum, nickel, chromium, and nitrogen content. It provides superior resistance to pitting, crevice, and stress corrosion cracking compared to 316L and many other 6 Mo alloys when subjected to sodium chloride in hot and cold solutions. AL-6XN has succeeded in industries where 316L has failed due to corrosion or when Ni alloys are too expensive an option.

Specifications

- Available in ½" through 4"
- Welded tubing in compliance with ASTM A270/A249/B676 and ASME SA249/SB676
- Tubing provided in random lengths, 20 ft. ± 1.0 in. is typical (not less than 17 ft. lengths)
- Fittings comply with ASME BPE table DT-3-1

AUSTENITIC AND DUPLEX ALLOYS (NOTE 1)

ALLOY	UNS	EN NUMBER	Cr	Ni	Mo	N	PRE NUMBER	
316L	S31603	1.4404	16.5-18.5	10.0-14.5	2.0-3.0	0.1	23	Austenitic
-	S31603	1.4435	17.0-19.0	12.5-15.0	2.5-3.0	0.1	26	Austenitic
904L	N08904	1.4539	19.0-23.0	23.0-28.0	4.0-5.0	0.1	34	Superaustenitic
2205	S32205	1.4462	22.0-23.0	4.5-6.5	2.5-3.5	0.14-0.20	35	Duplex
2507	S32750	1.4410	24.0-26.0	6.0-8.0	3.0-5.0	0.24-0.32	42.5	Duplex
254SMO	S31254	1.4547	19.5-20.5	17.5-18.5	6.0-6.5	0.18-0.25	42	Superaustenitic
AL-6XN®	N08367	-	20.0-22.0	23.5-25.5	6.0-7.0	0.18-0.25	43	Superaustenitic

HASTELLOY® C-22®

Hastelloy® C-22® (UNS N06022) is the most versatile Ni-Cr-Mo alloy available today. With improved resistance to corrosion, it out-performs other nickel alloys—such as C-276, Alloy 625, and C-4—in a variety of corrosive environments. Hastelloy C-22 has been successfully used in extremely aggressive media where standard 316L is insufficient and AL-6XN is borderline.

Specifications

- Available in ½" through 3"
- Welded tubing in compliance with specification ASTM B626 and ASME SB626
- Seamless tubing in compliance with specification ASTM B622 and ASME SB622
- Tubing provided in random lengths, 20 ft. ± 1.0 in. is typical (not less than 17 ft. lengths)
- Specification SB622 and SB626 are recognized by ASME BPE and acceptable for pharmaceutical applications
- Fittings comply with ASME BPE table DT-3-1

NICKEL ALLOYS (NOTE 2)

ALLOY	UNS	EN NUMBER	Cr	Ni	Mo	N	PRE NUMBER	
625	N06625	2.4856	20.0-23.0	58	8.0-10.0	-	41	Nickel
C-276	N10276	2.4819	14.5-16.5	57	15.0-17.0	-	45	Nickel
C-22®	N06022	2.4602	20.0-22.5	56	12.5-14.5	-	46	Nickel

Maximum, unless range or minimum is indicated. Values listed are primary elements only and are not complete chemical compositions as listed in specific product type specifications.

GENERAL NOTES:

The following are industry-accepted formulas. Other formulas may be used at the owner's discretion.

(1) For stainless steels: PRE Number = %Cr + 3.3 [%Mo + 0.5(%W)] + 16(%N).

(2) For nickel alloys: PRE Number = %Cr + 1.5 (%Mo + %W + %Nb).

CORROSION-RESISTANT SUPER ALLOYS™

SURFACE FINISH OPTIONS

The finish designator is indicated in the CSI item number as a suffix. The suffix will define the finishing requirements for the process component and tubing.



FITTINGS AND TUBING, FINISH DESIGNATOR CODES, AND ACCEPTANCE STANDARDS

BPE SURFACE FINISH CODE	CSI SURFACE FINISH CODE	PROCESS CONTACT SURFACE		NON-PROCESS CONTACT SURFACE		DIMENSIONS & TOLERANCES (BPE) OR (CSI)
		MAXIMUM RA (ID)	FINISH CONDITION	MAXIMUM RA (OD)	FINISH CONDITION	
N/A	7	32 µin (0.81 µm)	Polished or Drawn	32 µin (0.81 µm)	Mechanical Polished	CSI
SF1	PL	20 µin (0.51 µm)	Polished or Drawn	32 µin (0.81 µm)	Mechanical Polished	BPE
SF5	PO	20 µin (0.51 µm)	Electropolished	32 µin (0.81 µm)	Mechanical Polished	BPE

This brochure does not intend to address all acceptance criteria in the ASME BPE standard. The items offered within this catalog identified as "BPE" Dimensions and Tolerances are in accordance with ASME BPE. Items identified as "CSI" Dimensions and Tolerances are made to CSI standards.

SPEAK WITH ONE OF OUR SUPER ALLOY EXPERTS TODAY FOR MORE INFO 417.831.1411

Since 1999, Central States Industrial (CSI) has proactively responded to the demand for more corrosion-resistant alloys in the high purity and sanitary markets by stocking tubing and fittings in both AL-6XN® and Hastelloy® C-22®. CSI is a leader in the distribution of tubing, fittings, valves, hoses, pumps, heat exchangers, and MRO supplies for industrial processors, with four distribution facilities across the U.S.

CSI also provides detail design and execution for hygienic process systems in the food, dairy, beverage, pharmaceutical, biotechnology, and personal care industries. Specializing in process piping, system start-ups, and cleaning systems, CSI leverages technology, intellectual property, and industry expertise to deliver solutions to processing problems.



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