Datasheet

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nuclear & power

Experience

The Nuclear and Power Markets represent one of our key markets for the supply of Stainless Steel, Nickel alloy and reactive metal alloy tubing. Our pedigree in supporting the exacting quality needs within the Nuclear market is supportive by Quality systems and Customer Reference Approvals. Commencing in the 1970s with the development of Nuclear Fuel cans for the UK AGR market, we have continued to evolve our product range in support of LWR, Heavy Water and Fast Breeder reactor technologies

Innovation and Flexibility

Our commitment to high specification tube manufacture combines with the strength of a manufacturing facility which offers significant capacity and market competitive pricing yet appreciates the need for flexibility and support in 'breakdown', rapid reaction situations.

Our quality and customers service support ensures that the individual requirements for quality plans, procedures and documentation are fully and efficiently complied with.

Nuclear Island Applications

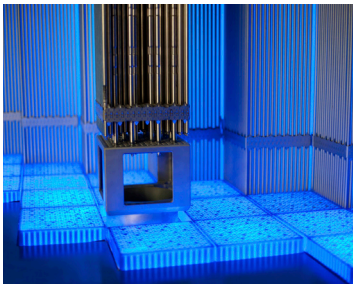
- Steam generator tubing
- In-core heat exchangers
- Thimble tubing
- Guide tubes
- Control rods
- Instrumentation & control

Nuclear Island Manufacturing Capability (Seamless)

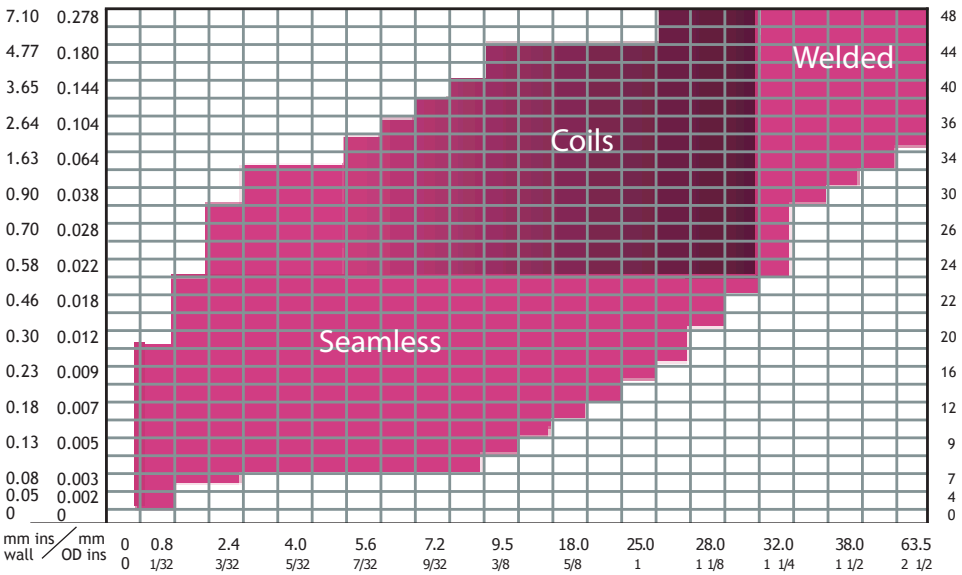
Size Range

Outer Diameter			
min (mm)	max	min (inches)	max
0.8	38.1	0.031	1.5

Lengths: Straights: Maximum 20m (65 feet)
Coils: Maximum 80kgs (177lb)
Forms: Straight or 'C'/'U' bent
Surface Finish: ID 0.4 micron Ra (157 micro inch Ra) (as drawn)
ID 0.1 micron Ra (39 micro inch Ra) (electropolished)



Manufactured Size Range



Fine Tubes Grade Chart

e111 - nuclear & power

ALLOY UNS No.	Werk-stoffe	Chemical Analysis %									Density		Temper	Tensile Rm (min)		Yield Rp 0.2% (min)		Elong. % min	Hardness HV	Application
		C	Mn	Ni	Cr	Fe	Mo	Nb	N	Other	g/cm³	lb/in³		ksi	MPa	ksi	MPa			
304L S30403	1.4306	0.035 max	2.0 max	8.0-11.0	18.0-20.0	bal					7.93	0.286	ANN	70	485	25	170	35	200 max	Lower carbon of 304 with good weldability.
310S S31008	1.4845	0.080 max	2.0 max	19.0-22.0	24.0-26.0	bal	0.75 max				7.93	0.286	ANN	75	515	30	205	35	200 max	For high temperature performance where 18/8 type are inadequate. Good scaling resistance.
316L S31603	1.4404	0.035 max	2.0 max	10.0-13.0	16.0-18.0	bal	2.0-2.5				7.93	0.286	ANN	70	485	25	170	35	200 max	Standard AOD melt austenitic stainless steel grade.
	1.4435						2.5-3													316L with minimum molybdenum content of 2.5%.
316LN S31653	1.4429	0.030 max	2.0 max	10.0-14.0	16.0-18.0	bal	2.0-3.0		0.10-0.16	Si 0.75 max	7.93	0.286	ANN	75	515	30	205	40	200 max	Because of its low magnetic permeability 316LN has been used in concrete rebar applications in close proximity to sensitive electronic devices and magnetic resonance medical equipment.
321 S32100	1.4541	0.080 max	2.0 max	9.0-12.0	17.0-19.0	bal		10XC -1.000		Ti 5XC -0.600	7.93	0.286	ANN	75	515	30	205	35	200 max	Titanium stabilised grade with good weldability, improved resistance to weld decay attack & better mechanical properties at elevated temperatures.
347 S34700	1.4546	0.080 max	2.0 max	9.0-12.0	17.0-19.0	bal		10XC -1.000			7.93	0.286	ANN	75	515	30	205	35	200 max	As for 321 but uses niobium as stabilising element.
904L N08904	1.4539	0.020 max	2.0 max	23.0-28.0	19.0 -23.0	bal	4.0-5.0			Cu 1.0-2.0	8	0.289	ANN	70	485	40	275	35	200 max	Stainless steel with higher resistance to general, pitting & crevice corrosion than 316L.
6Mo S31254	1.4547	0.020 max	1.0 max	17.5-18.5	19.5-20.5	bal	6.0-6.5		0.18-0.22	Cu0.5-1.0	8	0.289	ANN	98	675	45	310	35	230 max	Super-austenitic stainless steel with good resistance to pitting and crevice corrosion.
Z702 R60702		0.005 max			0.1 max	0.1 max			0.025	Zr+Hr 99.2	6.50		ANN	55	379	30	207	16	150	Zirconium alloys are corrosion resistant and biocompatible, and therefore can be used for body implants. In one particular application, a Zr-2.5Nb alloy is formed into a knee or hip implant and then oxidized to produce a hard ceramic surface for use in bearing against a polyethylene component.
Z704 R60704		0.05 Max							0.025	Zr+Hf 97.5 Hf 4.5	6.56		ANN	60	415	35	240	14	150	This oxidized zirconium alloy material provides the beneficial surface properties of a ceramic (reduced friction and increased abrasion resistance), while retaining the beneficial bulk properties of the underlying metal (manufacturability, fracture toughness, and ductility), providing a good solution for these medical implant applications.

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		C	Mn	Ni	Cr	Fe	Mo	Ti	Nb	Al	Other	g/cm³	lb/in³		ksi	MPa	ksi	MPa			
Alloy 59 N06059	2.4605	0.010 max	0.5 max	bal	22.0-24.0	1.5 max	15.0-16.5			0.10-0.40	Co 0.3 max	8.60	0.311	ANN	100	690	45	310	45	270 max	Excellent in Sour Service Environments. Highly resistant to Chloride, Sea Waters and Acids.
Alloy 75 N06075	2.4951	0.08-0.15	1.0 max	bal	18.0-21.0	5.0 max		0.20-0.60			Cu 0.5 max	8.37	0.303	ANN	100-120	690-830	46	300	30	230 max	High temperature oxidation resistance.
Alloy 200 N02200	2.4065	0.15 max	0.4 max	99.0 min		0.4 max					Cu 0.25 max	8.9	0.321	ANN	75	515	15	105	33	150 max	Commercially pure Nickel. Good corrosion resistance.
Alloy 263 N07263		0.04-0.08	0.6 Ma	bal	19.0-21.0	0.7 max	5.6-6.1	1.9-2.4			Co 19.0-21.0 N 0.3-0.6	8.36	0.302	HT	140	970	90	620	39	250 min	High creep strength with good weldability.
Alloy 276 N10276	2.4819	0.02 max	1.0 max	bal	14.5-16.5	4.0-7.0	15.0-17.0				W 3.0-4.5	8.9	0.321	ANN	100	690	41	283	40	210 max	Excellent sour service corrosion resistance.
Alloy 400 N04400	2.4360	0.30 max	2.0 max	63.0-70.0		2.5 max					Cu bal	8.83	0.319	ANN	70	480	28	195	35	180 max	General purpose Ni alloy with a good combination of strength, ductility & corrosion resistances.
Alloy 600 N06600	2.4816	0.15 max	1.0 max	72.0 min	14.0-17.0	6.0-10.0					Cu 0.50 max	8.42	0.304	ANN	80	550	35	240	30	200 max	Very good combination of strength & oxidation resistance.
Alloy 625 N06625	2.4856	0.10 max	0.5 max	bal	20.0-23.0	5.0 max	8.0-10.0	0.40 max	3.15-4.15	0.40 max		8.44	0.305	ANN	120	827	60	414	30	260 max	Nickel alloy with very good resistance to pitting, crevice corrosion & sour well environments.
Alloy 690 N06690	2.4642	0.05 max	0.05 max	58 min	27.0-31.0	7.0-11.0					Cu 0.50 Si 0.50	8.19	0.296	ANN	84	586	34	240	30	200 max	Excellent resestance to many corrosive aqueous media and high temperature atmospheres.
Alloy 718 N07718	2.4668	0.08 max	0.4 max	50 .0-55.0	17.0-21.0	bal	2.80-3.30	0.65-1.15	4.75-5.50	0.20-0.80	Co 1.0 max	8.19	0.296	HT	185	1275	150	1034	12	331 min	Age hardenable, high strength nickel alloy with good sour well corrosion resistance.
Alloy X750 N07750	2.4669	0.08 max	1.0 max	70.0 min	14.0-17.0	5.0-9.0		2.25-2.75	0.70-1.20	0.40-1.00		8.25	0.298	HT	160	1103	100	689	20	260-360	High temperature strength performance.
Alloy 800 N08800	1.4876	0.15 max	1.5 max	30.0-35.0	19.0-23.0	39.5 min		0.15-0.60		0.15-0.60	Cu 0.75 max	8	0.289	ANN	75	517	30	207	30	200 max	Resistant to stress corrosion & good in aqueous media.
Alloy 800H N08810	1.4876	0.05-0.10	1.5 max	30.0-35.0	19.0-23.0	39.5 min		0.15-0.60		0.15-0.60	Cu 0.75 max	8.08	0.292	ANN	75	517	30	207	30	200 max	Excellent high temperature creep resistance, combined with oxidation and carburisation resistance.
Alloy 800HT N08811		0.06-0.10	1.5 max	30.0-35.0	19.0-23.0	39.5 min		0.15-0.60		0.15-0.60	AL + Ti 0.85-1.20	7.94	0.287	ANN	75	517	30	207	30	200 max	Similar corrosion properties to A800 & 800H with significantly high creep-rupture strength.
Alloy 825 N08825	2.4858	0.05 max	1.0 max	38.0-46.0	19.5-23.5	bal	2.5-3.5	0.6-1.20		0.20 max	Cu 1.5-3.0	8.1	0.292	ANN	85	586	35	241	30	209 max	Very good sour well and chloride stress corrosion cracking resistance.

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Quality Assurance

Formal system approvals include:

ASME QSC NCA3800 (2011)

RCC-M

CSA N285.0 and Z299.2 category 2 QA program

BS EN ISO 9001 and BS EN ISO 14001 approvals as well as individual client approvals. Fine Tubes also has First Point Approval and can supply to NACE MR-0175 and P.E.D. Reference lists and individual client approvals are available on request.

Fine Tubes also has Nadcap approvals for their most critical operations

ISO 9001:2008 / AS EN 9100 by BSI.

Nadcap (Head Treatment) reaccredited at Merit Status by P.R.I.

Nadcap (NDT) reaccredited at Merit Status by P.R.I.

AD2000 Merkblatt W0/TRD100 - TÜV

97/23/EC (PED) - TÜV

Nuclear product supply is based upon a system which meets the requirements of ASME Section III NCA 3800 for class 1 seamless instrumentation tube. This is independently audited as meeting the requirements of CSA N285.0 and Z299.2 Category 2 QA Program.

ASME Boiler & Pressure Vessel Code

Section I	**Rules for construction of Power Boilers**		
II	**Materials**	Part A	Ferrous Material Specifications
		Part B	Non-Ferrous Material Specifications
		Part C	Specifications for welding rods, electrodes and filler material
III	**Subsection NCA**	General Requirements for Divisions 1 and 2	**-> NCA 3800 = Metalic Material Organisations quality system program**
	Division 1	Metallic Vessels, heat exchangers, piping systems etc.	**Subsequent NB-Class 1 Components -> NB 2552 = Ultrasonic examination**
			Subsection NC Class 2 Components
			Subsection ND Class 3 Components
	Division 2	Code for concrete containments	
	Division 3	Containment system for storage and transport of spent fuel & radioactive waste	

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