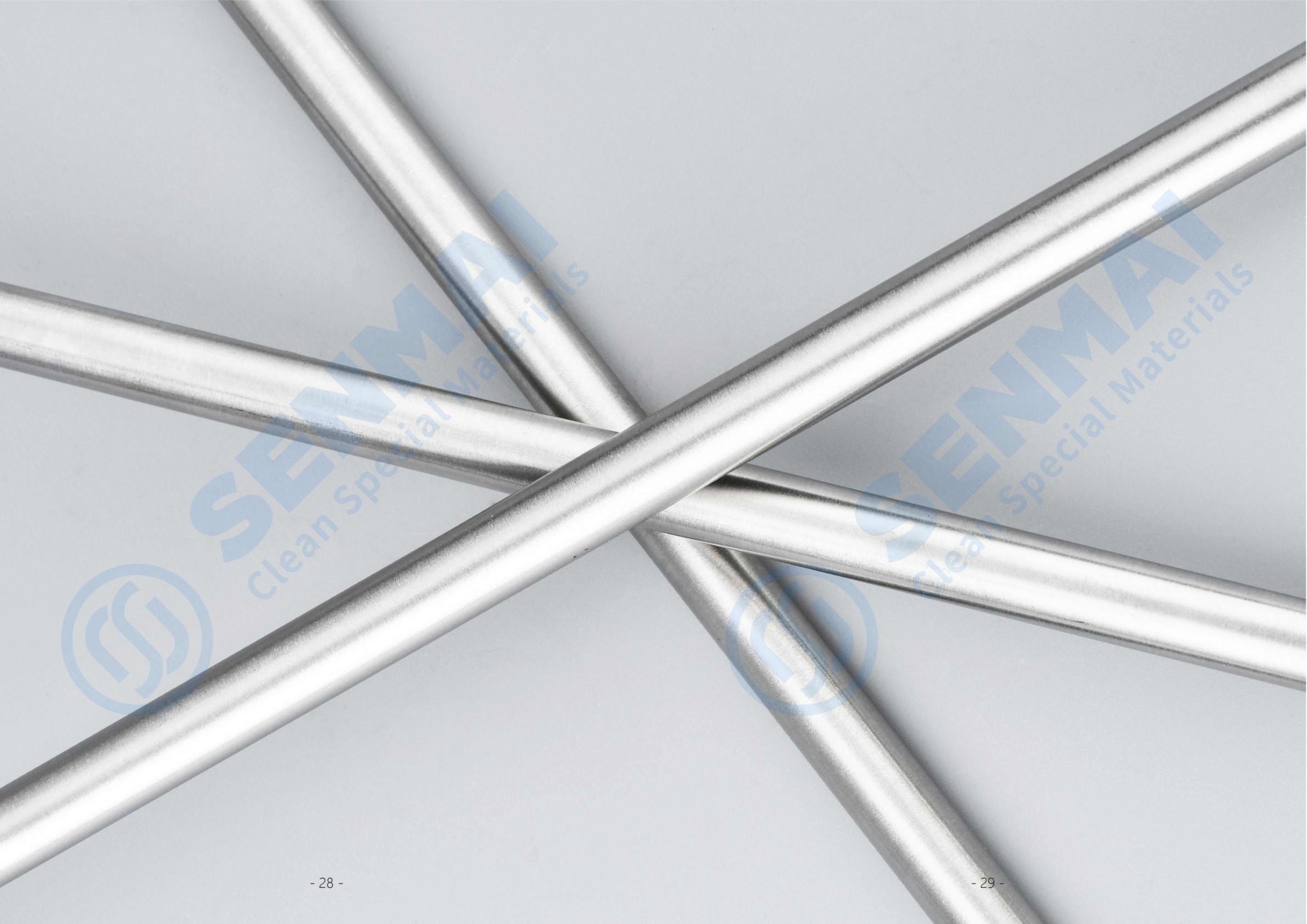
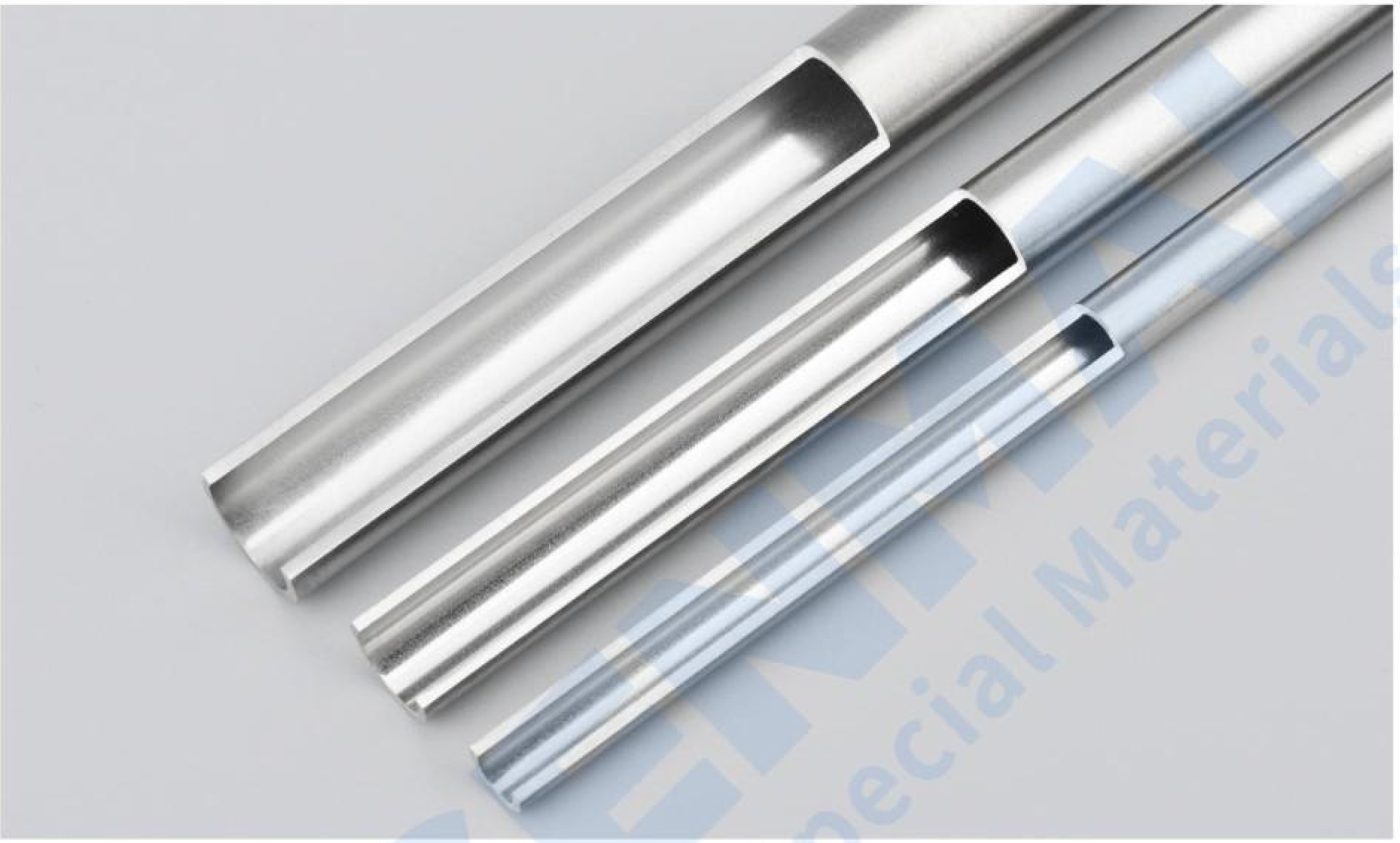


BA等级
BA Level



光亮退火（Bright Annealing），即不锈钢钢管在保护气氛或真空中进行退火，以防止氧化，保持表面光亮的退火工艺。不锈钢光亮退火工艺的目的和要求如下：消除加工硬化获取满意的金相组织，光亮退火炉主要用来进行不锈钢在保护气氛下的成品热处理。当使用性能要求不同时，对光亮退火后金相组织的要求就不同，光亮热处理的工艺也不同。

森脉洁净不锈钢 BA 管采用冷轧 + 精拉工艺引进国外高精度合金模具制成，精度可达到 0.05mm 以下。配合公司自身研发的摇摆式高温清洗循环过滤回收技术代替传统的化学清洗和超声波清洗。这项技术在大大降低对环境影响的同时提高了表面的超洁净度不留油污，并通过国外先进的热处理还原设备在气氛保护下进行光亮固溶（退火）处理，使其表面光亮内管壁粗糙度可达 (≤ 0.2μm)、耐腐蚀性好、尺寸精度高、加工性能好等特点 。是做为 EP 母管的首选材料，也可直接应用于电子、核电、食品、医药、化工、石油、造船等行业。

Bright Annealing is an annealing process in which stainless steel pipes are annealed in a protective atmosphere or vacuum to prevent oxidation and maintain a bright surface. The purpose and requirements of the bright annealing process for stainless steel are as follows: to eliminate work hardening and obtain satisfactory metallographic structure. The bright annealing furnace is mainly used for the heat treatment of stainless steel products in a protective atmosphere. When the performance requirements are different, the requirements for the metallographic structure after bright annealing are also different, and the process of bright heat treatment is also different. Senmai Clean Stainless Steel BA Pipe is made by introducing high-precision alloy molds from abroad through cold rolling and precision drawing processes, with an accuracy of less than 0.05mm. Cooperate with the company's self-developed swing type high-temperature cleaning cycle filtration and recycling technology to replace traditional chemical cleaning and ultrasonic cleaning. This technology greatly reduces the impact on the environment while improving the surface's ultra cleanliness without leaving oil stains. Through advanced heat treatment and reduction equipment from abroad, it undergoes bright solid solution (annealing) treatment under ambient protection, resulting in a bright surface with inner pipe wall roughness of ≤ 0.2 μm, good corrosion resistance, high dimensional accuracy, and good processing performance. It is the preferred material for EP main pipes and can also be directly applied in industries such as electronics, nuclear power, food, medicine, chemical, petroleum, shipbuilding, etc.

EP等级
EP Level

电解抛光（Electro chemical Polishing)，也称作电抛光或电化学抛光，是利用阳极在电解池中所产生的电化学溶解现象，使阳极上的微观凸起部分发生选择性溶解，形成平滑表面的方法。电解抛光时，产品作为阳极，阴极选择不溶性金属，通过电抛，去除金属表面的尖刺与平滑凹处，可以改善表面形态及结构，形成一层封闭的氧化铬膜，提高管道的抗腐蚀性。一般在做电抛前都先做机械抛光 (机械抛光必需是研磨抛光)，这样才能使产品表面更光滑，杜绝死角。

森脉洁净不锈钢 EP 管 , 利用本公司 BA 为母管的基础上再进行电解化学抛光让表面粗糙度、表面缺陷、Cr/Fe 比值、氧化层厚度等达到行业执行标准，具有优异的耐腐蚀性、使其在高温、高压等恶劣环境下也能保持良好的性能。

由于其优异的性能，森脉洁净不锈钢 EP 管被广泛应用于半导体、光电、生物 BPE、特气、新能源等行业的管道输送系统。

Electrochemical polishing, also known as electropolishing or electrochemical polishing, is a method that utilizes the electrochemical dissolution phenomenon generated by the anode in an electrolytic cell to selectively dissolve the micro protrusions on the anode, forming a smooth surface. During electrolytic polishing, the sample is used as the anode, and insoluble metals are selected as the cathode. By electro polishing, the sharp edges and smooth depressions on the metal surface can be removed, which can improve the surface morphology and structure, form a closed chromium oxide film, and enhance the corrosion resistance of the pipeline. Generally, mechanical polishing (which requires grinding and polishing) is performed before electric polishing to make the surface of the product smoother and eliminate dead corners. Senmai Clean Stainless Steel EP Pipe uses our company's BA as the main pipe and then undergoes electrolytic chemical polishing to achieve industry standards for surface roughness, surface defects, Cr/Fe ratio, oxide layer thickness, etc. It has excellent corrosion resistance and can maintain good performance even in harsh environments such as high temperature and high pressure. Due to its excellent performance, Senmai clean stainless steel EP pipes are widely used in pipeline transportation systems in industries such as semiconductors, optoelectronics, bio BPE, specialty gases, and new energy.

奥氏体不锈钢
Austenitic Stainless Steel

编号名称 UNS Designation	化学成分 (%) chemical composition(%)											机械性能 Mechanical properties			注释 Remark
	C max	si max	Mn max	P max	S max	Ni	cr	Mo	Cu	others (1)	others (2)	T.S 抗拉强度 (Mpa)	Y.S 屈服强度 (Mpa)	EL 伸长率 (%)	
S30403	0.035	1.00	2.00	0.045	0.03	8.0-12.0	18.0-20.0					485	170	35	
	0.03	1.00	2.00	0.045	0.03	9.0-13.0	18.0-20.0					480	175	35	
	0.03	1.00	2.00	0.040	0.015	10.0-12.0	18.0-20.0				N ≤ 0.10	460-680	180	40	
S31603	0.035	1.00	2.00	0.045	0.03	10.0-14.0	16.0-18.0	2.0-3.0				485	170	35	
	0.03	1.00	2.00	0.045	0.03	12.0-16.0	16.0-18.0	2.0-3.0				480	175	35	
	0.03	1.00	2.00	0.040	0.015	10.0-13.0	16.5-18.5	2.0-2.5			N ≤ 0.10	490-690	190	40	
	0.03	1.00	2.00	0.040	0.015	12.5-15.0	17.0-19.0	2.5-3.0			N ≤ 0.10	490-690	190	40	
S31703	0.035	1.00	2.00	0.045	0.03	11.0-15.0	18.0-20.0	3.0-4.0				515	205	35	
	0.03	1.00	2.00	0.045	0.03	11.0-15.0	18.0-20.0	3.0-4.0				480	175	35	
S32100	0.08	1.00	2.00	0.045	0.03	9.0-12.0	17.0-19.0				Ti:5(C+N)-0.7	515	205	35	
	0.08	1.00	2.00	0.045	0.03	9.0-13.0	17.0-19.0				Ti:5xc%min	520	205	35	
	0.08	1.00	2.00	0.040	0.015	9.0-12.0	17.0-19.0				Ti:5xc-0.7	460-680	180	35	

参考标准
Referenced Document

标准 Specification	标准 NO. Specification NO.	描述 Description
ASTM	A213	采购产品无缝铁素体和奥氏体合金钢锅炉，过热器和热交换器管 Seamless Ferritic and Austenitic Alloy-stee Boiler, super heater, and Heat-Exchanger Tubes
	A269	适用于无缝和焊接奥氏体不锈钢管 Seamless and welded Austenitic stainless stee Tubing for General service
	A312	无缝和焊接奥氏体不锈钢管 Seamless and welded Austen itic stainless stee pipes
	A790	无缝和焊接铁素体 / 奥氏体不锈钢管 Seamless and welded Ferri tic/Austen itic stainless stee pipe
	B165	适用于镍铜合金 (UNS N04400) 的无缝管标准 Standard specification for Nickel-copperAlloy(UNS N04400)*seamless pipe and Tube
	B423	镍铁 - k2: S7 - 钼铜合金的标准规范 (UNS N08825、N08221 和 N06845) 无缝钢管 Standard specification for Nickel-Iron-k2:s7-Molybdenum-copperAlloy(UNS NO8825, NO8221, and N06845) seamless pipe and Tube
JIS	G3459	不锈钢管 Stainless steel pipes
	G3463	适用于不锈钢锅炉和热交换器管 Stainless steel Boiler and Heat-Exchanger Tubes
DIN	17459	适用于无缝圆形高温奥氏体钢管 Seamless circular High-Temperature Austeniticstee Tubes
EN	10216-5	适用于压力用无缝钢管。 交货技术条件（第 5 部分） Seamless steel tubes for pressure purposed Technical delivery conditions(part5)

直管标准尺寸
Standards Size of Stick Tube

外 径 Outside Diameter			壁 厚 Wall Thickness		直管长度 Stick tube Length		重 量 Weight(kg/M)
	OD(in)	WT(in)	L(ft)	Weight(lbs)	OD(mm)	WT(mm)	
A size	in.	mm	in.	mm	M’ tr	ft	—
	1/4″	6.35	0.035	0.89	6	20	0.122
			0.039	1.00			0.135
			0.049	1.24			0.159
			0.065	1.65			0.195
	3/8″	9.53	0.035	0.89			0.193
			0.039	1.00			0.215
			0.049	1.24			0.259
			0.065	1.65			0.327
	1/2″	12.70	0.035	0.89			0.264
			0.039	1.00			0.294
			0.049	1.24			0.358
			0.065	1.65			0.459
	5/8″	15.88	0.058	1.47			0.533
	3/4″	19.05	0.049	1.24			0.556
			0.065	1.65			0.723
	1″	25.4	0.065	1.65			0.987
	1-1/4″	31.8	0.065	1.65			1.253
	1-1/2″	38.1	0.065	1.65			1.515
	2″	50.8	0.065	1.65			2.042
	2-1/2″	63.5	0.065	1.65			2.570
	3″	76.2	0.065	1.65			3.098
	4″	101.6	0.083	2.11			5.284
	6″	152.4	0.109	2.77			10.432