

SeAH Changwon
Integrated Special Steel



SeAH CSS



**SEAMLESS STEEL
PIPES & TUBES**



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SeAH CSS’s constant mission:
Creating new value from steel
for the world

Our constant mission is to open a door to the future of the global special steel industry.

From high-tech industries including power generation, petrochemicals and semiconductors to futuristic industries such as nuclear power and aerospace, SeAH CSS is growing into a leader in stainless steel, tool steel, and Ni-alloys.

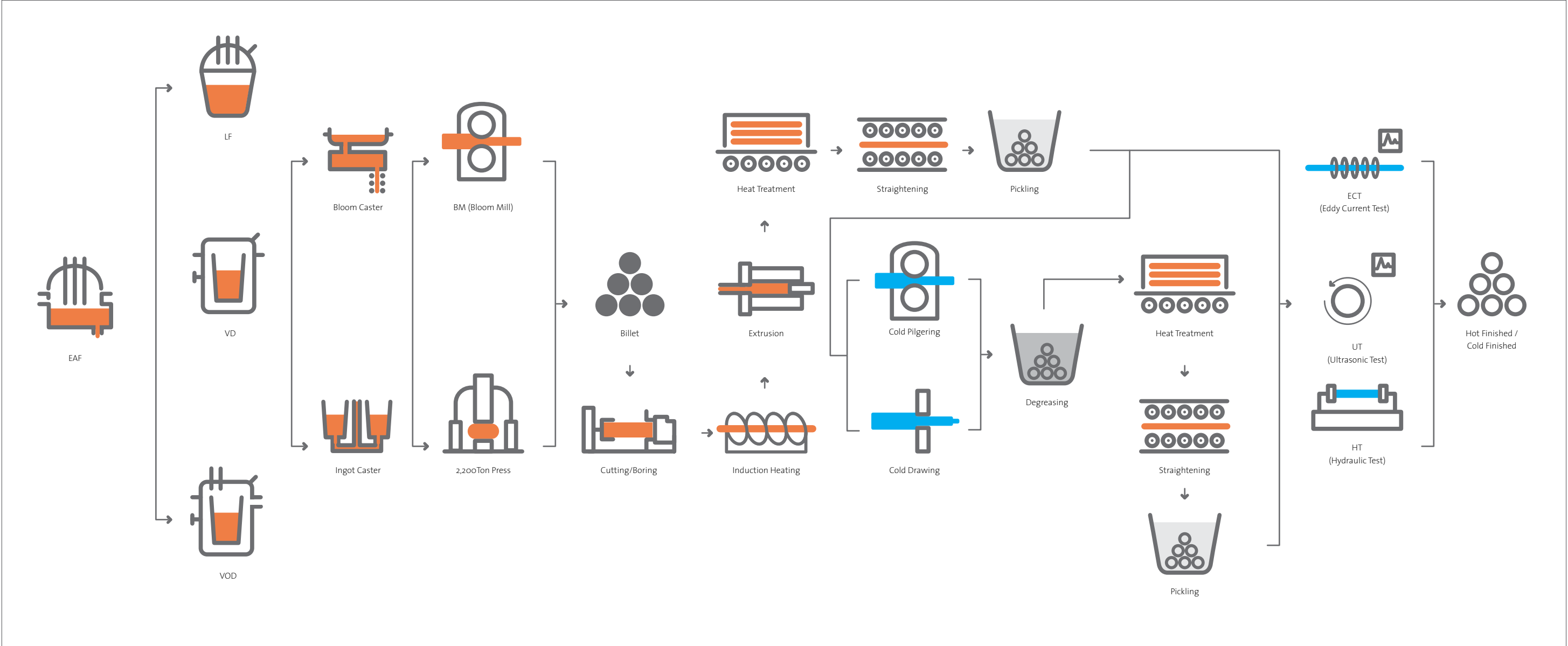
With our products, we aim to raise the level of customer satisfaction and set up the new industry standard by constantly challenging ourselves.



History

- 04/1966 Founded as Samyang Special Steel Co., Ltd.
- 12/1977 Completed a general special steel plant as Korea Specialty Steel Co., Ltd
(for round bars, steel pipes and plates)
- 06/1982 Changed its name to SAMMI General Special Steel Co., Ltd
- 04/1991 Opened its second special steel plant
(for steelmaking, rolling, processing)
- 02/1997 Annexed to POSCO Group
(for round bars and pipe business)
- 10/2006 Completed the 1st phase of its facility rationalization
(AOD, HV Mill, second acid cleaning plant and more)
- 02/2007 Renamed Changed its name to POSCO Specialty Steel Co., Ltd
- 04/2012 Completed the 2nd phase of its facility rationalization
(60 ton EAF, Bloom Caster, SBM and more)
- 03/2015 Acquired by SeAH Group and changed its name to SeAH Changwon Integrated Special Steel Co., Ltd

Manufacturing Process and Major Facilities



EAF



VOD



Bloom Caster



BM (Bloom Mill)



Extrusion



Cold Pilgering



Cold Drawing



NDT



Pipes

General Characteristics

Excellent corrosion resistance	Excellent weldability	High strength in a high pressure environment
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Product Specifications

Grade	ASTM	TP304(L, H, N, LN), TP316(L, H, N, LN), TP317(L), TP321(H), TP310S(H), TP347(H), N08904, TP410, TP430, TP405, S32304, S31803, S32205, S32750, S32760, S31254, N06600, N08810, N06625, N08825, N06690, N04400, N02200, N07718, N09925, N08020, N09901, N05500
	JIS	304(L)TP, 316(L)TP, 317(L)TP, 321(H)TP, 310S(H)TP, 329J3LTP, 347(H)TP, 405TP, 410TP, 430TP
Outer diameter	10.5~273.1ø(1/8 ~ 10inch)	
Thickness	1.0~23T(SCH5S~XXS)	
Related standard	A312, A376, A790, G3459	

Applied Areas

Utilized in petrochemicals, shipbuildings, and power plant pipes

Applications



Boilers & Heat Exchanger Tubes

General Characteristics

High strength under high temperture and high pressure environment	Excellent corrosion resistance	Excellent thermal conductivity
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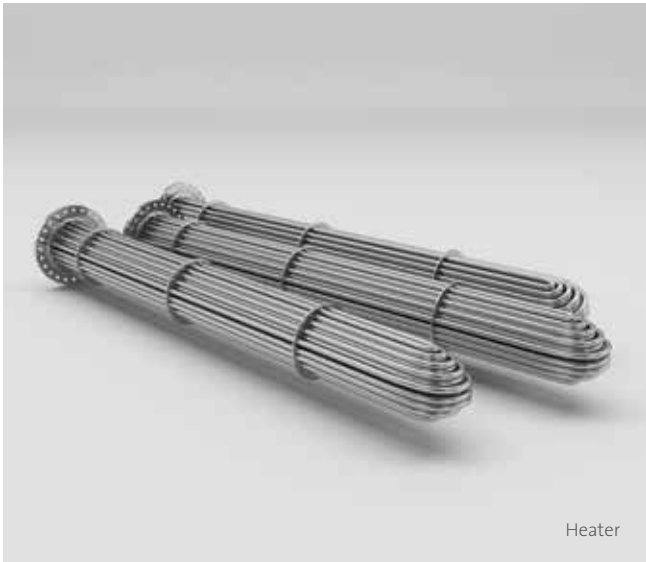
Product Specifications

Grade	ASTM	TP304(L, H, N, LN), TP316(L, H, N, LN), TP317(L), TP321(H), TP310S(H), TP347(H), S30432, S31254, N06600, N08810, N06625, N08825, N06690,N04400, N02200, N07718, N09925, N08020, N09901, N05500
	JIS	304(L)TB, 316(L)TB, 317(L)TB, 321(H)TB, 310S(H)TB, 329J3LTB, 347(H)TB, 405TB, 410TB, 430TB
	Others	SCA10, SCA12
Outer diameter	10 ~ 120ø	
Thickness	1.0~30T	
Related standard	A213, A268, A269, G3463	

Applied Areas

Utilized in power plants and petrochemicals

Applications



Pipes for Machine Structural Use

General Characteristics

Excellent corrosion and heat resistance	Outstanding wear resistance	High strength
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Product Specifications

Grade	ASTM	MT304(L), MT316(L), MT317, MT321, MT347, MT310S, MT410, MT430, MT405, 1040, 1045, 4130, 4140
	JIS	304(L)TKA, 316(L)TKA, 410TKA, 430TKA, SCR, SCM, STKM16A
Outer diameter	10.5 - 273.1ø (1/8 -10 inch)	
Thickness	1.0 ~ 23T	
Related standard	A511, A519, G3441, G3445, G3446	

Applied Areas

Utilized in machinery, aircraft, and automotive parts

Applications

Applied to products for machine structural use



Heat Resistant Stainless Steel Pipes

Grade TP310S

General Characteristics

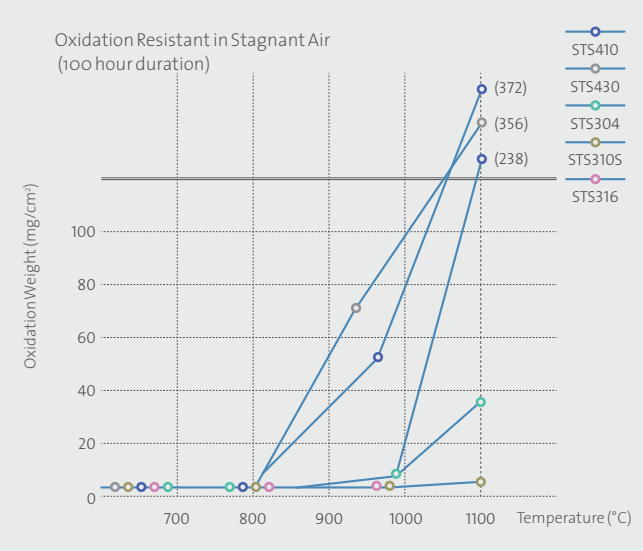
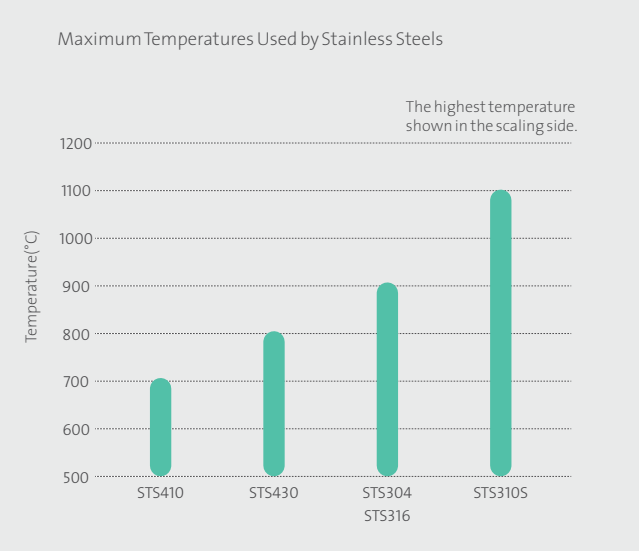
High Ni	High Cr	Low C
Enhances corrosion resistance	Outstanding corrosion resistance Durable at high temperature	Restricts carbide precipitation

Chemical Composition Rate

Grade	Chemical composition rate(wt, %)						
	C	Si	Mn	P	S	Ni	Cr
310S	0.08 ↓	1.0 ↓	2.0 ↓	0.045 ↓	0.03 ↓	19~22	24~26

Applications

Applied to fine line heat treating furnaces, heat exchangers, and high temperature devices



Duplex

Grade S32304, S31803, S32750/60, S31500

General Characteristics

High strength	High corrosion resistance in sea water	Excellent weldability and machinability
High yield strength	Local corrosion resistant (e.g.crevice, pitting, intergranular, and stress corrosion)	

Chemical Composition Rate

Grade	UNS No	Chemical composition rate(wt, %)					PRE	Y.S. (Mpa)	T.S. (Mpa)	EL (%)
		C	N	Cr	Ni	Mo				
304L	S30400	0.035 ↓	-	18~20	8~11	-	18	205	515	40
316L	S31603	0.035 ↓	-	16~18	10~14	2~3	25	170	485	40
Duplex	S32304	0.03 ↓	0.05~0.2	21.5~24.5	3~5.5	0.05~0.6	28	400	600	25
	S31803	0.03 ↓	0.08~0.2	21~23	4.5~6.5	2.5~3.5	34	450	620	25
	S32750	0.03 ↓	0.24~0.32	24~26	6~8	3~5	42	550	800	15
	S31500	0.03 ↓	0.05~0.1	18~19	4.3~5.2	2.5~3.0	30	440	630	30

PRE:Pitting Resistance Equivalent

Applications

- Power plants, petrochemical plants
- Offshore plants, desalination plants
- Wastewater treatment facilities, general pipes in a chloridic environment
- Desulfurizers
- Heat exchangers

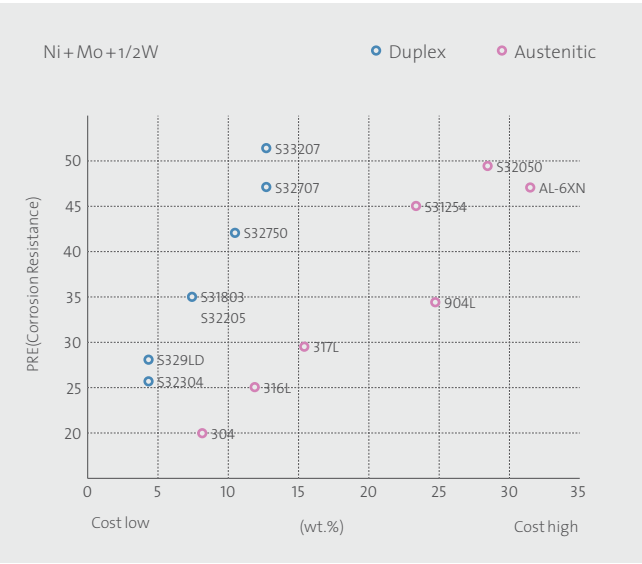
Available Product Size

- Hot finished : Diameter 40-273.1ø, thickness 4.0t or more
- Cold finished : Diameter 19.05-110ø, thickness 1.65t or more

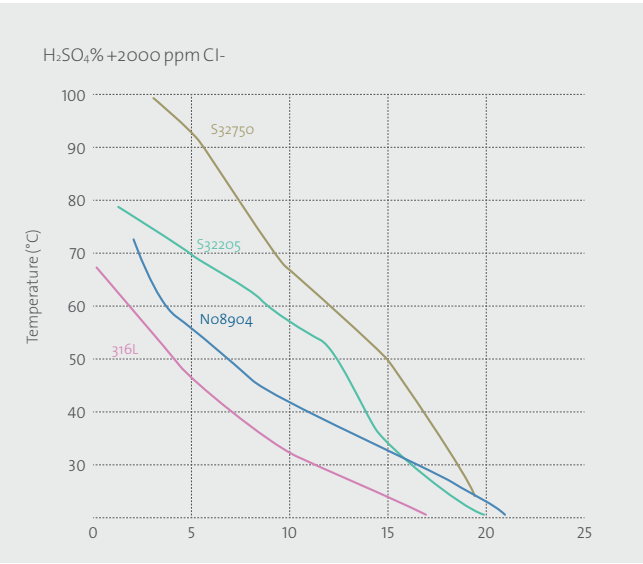


Corrosion Resistance

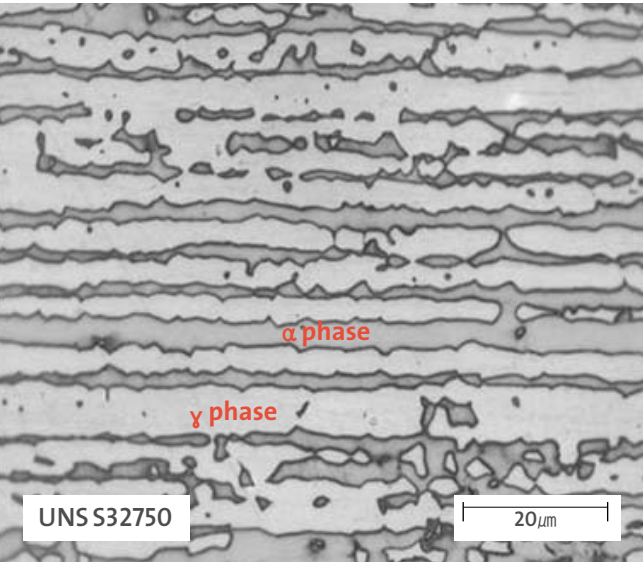
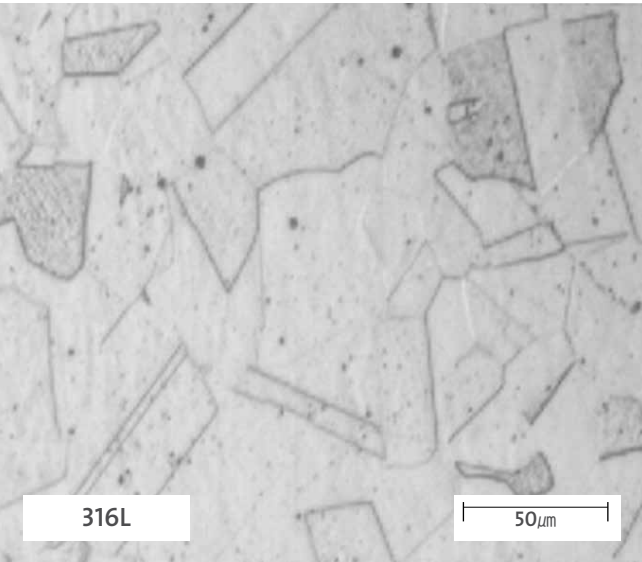
Duplex / Austenitic STS



Corrosion Resistance
- ISO Corrosion, (0.1mm/year)



Microstructures



Boiler Tubes

Grade S30432(Code Case 2328), TP310HCbN

General Characteristics

High temperature corrosion resistance	Outstanding steam oxidation resistance	High temperature strength
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Chemical Composition Rate

Grade	Chemical Composition(wt.%)									
	C	Si	Mn	Ni	Cr	Nb	N	Cu	Al	B
S30432	0.07~0.14	0.3 ↓	1.0 ↓	7.5~10.5	17.0~19.0	0.3~0.6	0.05~0.12	2.5~3.5	0.003~0.03	0.001~0.01
TP310HCbN	0.04~0.1	1.0 ↓	2.0 ↓	19~22	24~26	0.2~0.6	0.15~0.35	-	-	-

Mechanical Properties

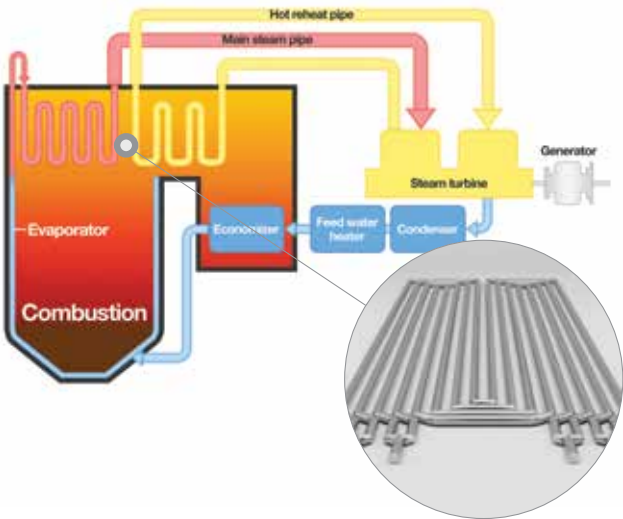
Grade	Y.S(Mpa)	T.S(Mpa)	EL(%)	Hardness(HRB)	Grain Size
S30432	Min 235	Min 590	Min 35	Max 95	ASTM No.8
TP310HCbN	Min 295	Min 655	Min 30	Max 100	ASTM No.7 ↓

Applications

- Applied to coal-firing boilers,super heaters,reheaters

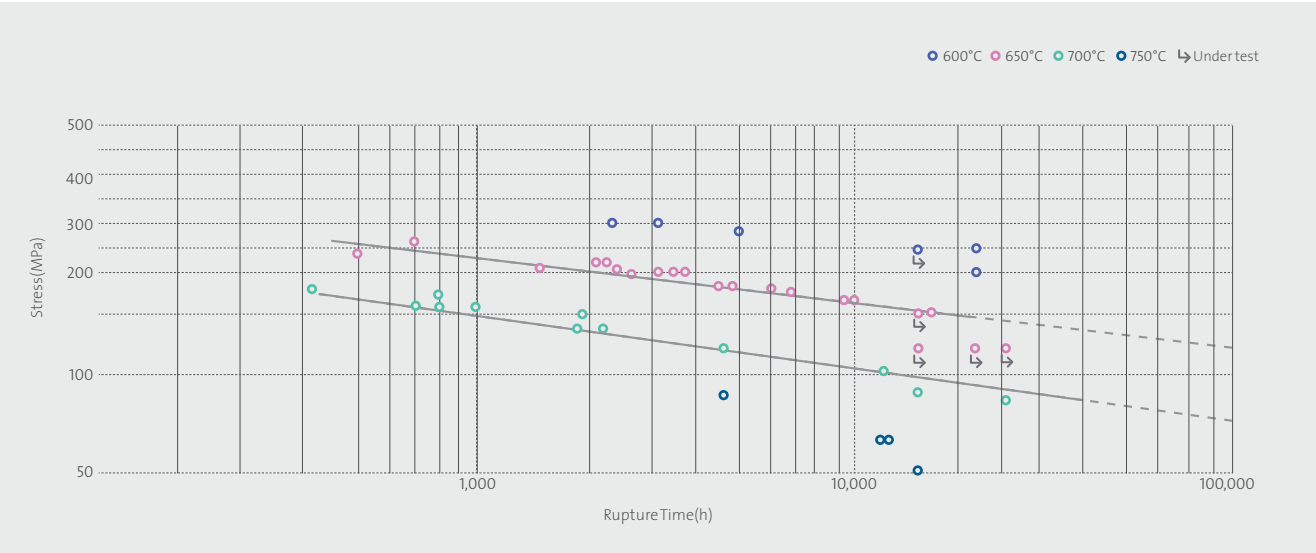
Product Size

- Outer diameter 30-80 mm,inner diameter 20-60 mm,length 8,000-15,000 mm (Retention of 3 Units of Facilities)
- Shot peening can be applied
- * Further discussion required for other sizes
- Boiler Tubes for HRSG available(Max.23,000L)



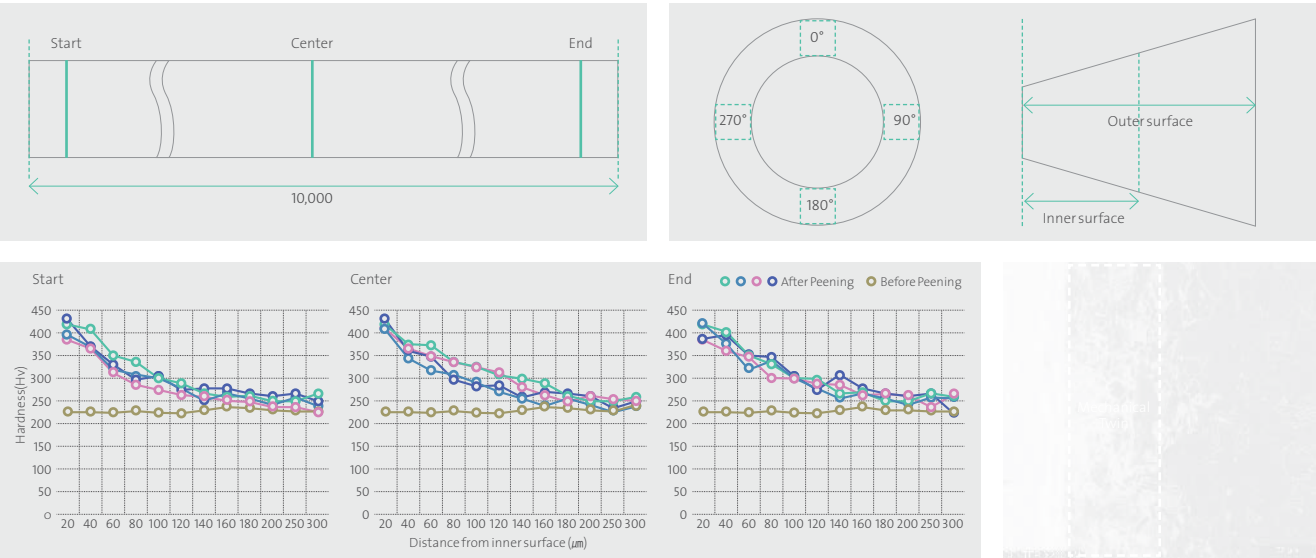
High Temperature Properties

Stress-Rupture curve for S30432 (Up to 40,000 hours)



Shot Peening Properties

Shot balls sprayed inside the tube to enhance compressive residual stress and tensile strength



Heat and Corrosion Resistant Steel Pipes

Grade SCA10, SCA12

General Characteristics

High temperature corrosion resistance (800°~1200°C)	Excellent oxidation resistance	Outstanding thermal conductivity	Low thermal expansion co-efficiency
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Chemical Composition Rate

Grade	Chemical composition rate(wt, %)			
	C	Si	Cr	Al
SCA10	0.03 ↓	0.7~1.2	17~19	0.7~1.2
SCA12	0.12 ↓	1.2~1.7	23~25	1.2~1.7

Mechanical Properties

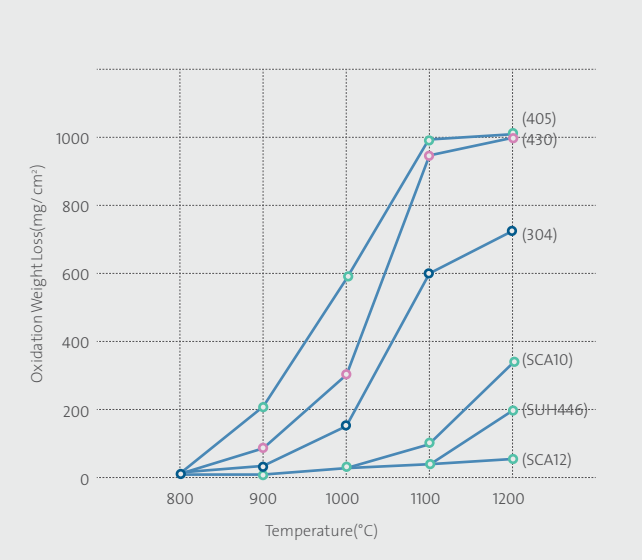
Grade	Y.S.(MPa)	T.S.(MPa)	EL(%)
SCA10	min 190	min 315	min 10
SCA12	min 210	min 315	min 8

Product Order Standards

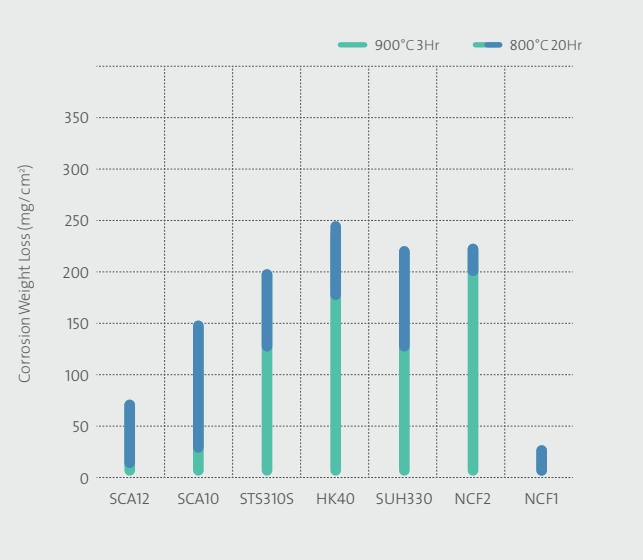
Type	Size(mm)			Tolerance(mm)		
	Outer diameter	Thickness	Length	Outer diameter	Thickness	Length
Hot finished	40φ~50φ	3.ot or higher	Less than 6,000			
	51φ~62φ	4.ot or higher		+0.8		+10
				-0.8	±17.5%	-0
	62 φ or higher (need consultation)					

Properties

Oxidation reduced by continuous heating for 50 hours



Vanadium attack resistance



Applications

Applied to recuperators and heating furnaces



Specifications

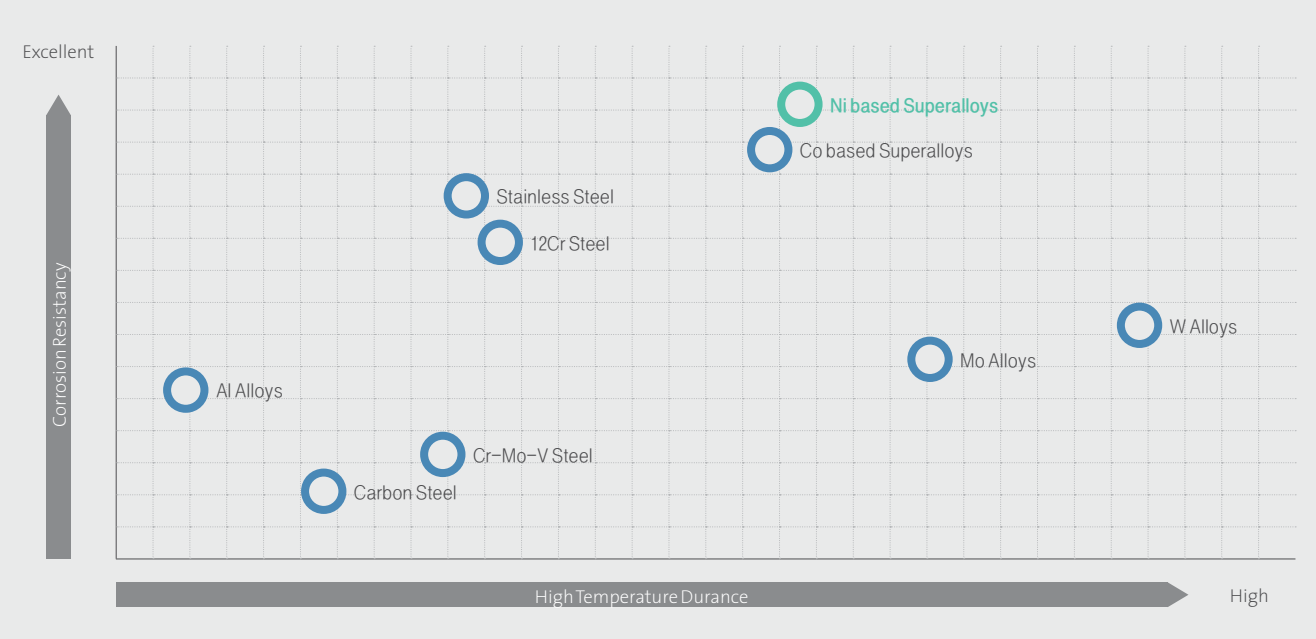
Type	ASTM	JIS	DIN	SeAH CSS Others	Chemical composition rate (%)									Mechanical properties			Applications
					C	SI	Mn	P	S	Ni	Cr	Mo	Others	T.S (Mpa,N/mm²)	Y.S (Mpa,N/mm²)	EL. (%)	
Austenitic	TP304	304TP(TB)			0.080	1.00	2.00	0.040	0.030	8.00 11.00	18.00 20.00			520 ↑	205 ↑	35 ↑	Outstanding corrosion resistance
			1.4301		0.070	1.00	2.00	0.045	0.030	8.50 10.50	17.00 19.00			500~700	195 ↑	35 ↑	
		304LTP(TB)			0.030	1.00	2.00	0.040	0.030	9.00 13.00	18.00 20.00			480 ↑	175 ↑	35 ↑	
	TP304L				0.035	1.00	2.00	0.045	0.030	8.00 13.00	18.00 20.00			485 ↑	170 ↑	35 ↑	
			1.4306		0.030	1.00	2.00	0.045	0.030	10.00 12.50	18.00 20.00			500~700	195 ↑	35 ↑	
		310TP(TB)			0.150	1.50	2.00	0.040	0.030	19.00 22.00	24.00 26.00			520 ↑	205 ↑	35 ↑	
	TP310S				0.080	1.00	2.00	0.045	0.030	19.00 22.00	24.00 26.00	0.75		515 ↑	205 ↑	35 ↑	
		310STP(TB)			0.080	1.50	2.00	0.040	0.030	19.00 22.00	24.00 26.00			520 ↑	205 ↑	35 ↑	
		316TP(TB)			0.080	1.00	2.00	0.040	0.030	10.00 14.00	16.00 18.00	2.00 3.00		520 ↑	205 ↑	35 ↑	
	TP316				0.080	1.00	2.00	0.045	0.030	11.00 14.00	16.00 18.00	2.00 3.00		515 ↑	205 ↑	35 ↑	
			1.4401		0.070	1.00	2.00	0.045	0.030	10.50 13.50	16.50 18.50	2.00 2.50		510~710	205 ↑	35 ↑	Heat exchanger tubes&pipes for chemical plants, power plants, shipbuildings
		316LTP(TB)			0.030	1.00	2.00	0.040	0.030	12.00 16.00	16.00 18.00	2.00 3.00		480 ↑	175 ↑	35 ↑	
	TP316L				0.035	1.00	2.00	0.045	0.030	10.00 14.00	16.00 18.00	2.00 3.00		515 ↑	205 ↑	35 ↑	
			1.4404		0.030	1.00	2.00	0.045	0.030	11.00 14.00	16.50 18.00	2.00 2.50		490~690	190 ↑	30 ↑	
			1.4435		0.030	1.00	2.00	0.045	0.025	12.50 15.00	17.00 18.50	2.50 3.00		490~690	190 ↑	30 ↑	
			1.4436		0.070	1.00	2.00	0.045	0.020	11.00 14.00	16.50 18.50	2.50 3.00		510~710	205 ↑	L : 40 ↑ T : 30 ↑	
		316TiTP(TB)			0.080	1.00	2.00	0.040	0.030	10.00 14.00	16.00 18.00	2.00 2.50	Ti : Min 5xC%	520 ↑	205 ↑	35 ↑	
			1.4571		0.080	1.00	2.00	0.045	0.030	10.50 13.50	16.50 18.50	2.00 2.50	Ti 5xC%~0.80	500~680	1) 190 ↑ 2) 210 ↑	L : 35 ↑ T : 30 ↑	
			1.4580		0.080	1.00	2.00	0.045	0.030	10.50 13.50	16.50 18.50	2.00 2.50	Nb 10xC%~1.00	510~740	215 ↑	L : 35 ↑ T : 30 ↑	
	TP317	317TP(TB)			0.080	1.00	2.00	0.040	0.030	11.00 14.00	18.00 20.00	3.00 4.00		520 ↑	205 ↑	35 ↑	Tubes for coal-firing boiler
	TP317L	317LTP(TB)			0.030	1.00	2.00	0.040	0.030	11.00 15.00	18.00 20.00	3.00 4.00		515 ↑	205 ↑	35 ↑	
	TP321	321TP(TB)	1.4541		0.080	1.00	2.00	0.040	0.030	9.00 12.00	17.00 19.00		Ti 5xC%~0.70	520 ↑	205 ↑	35 ↑	
	TP347	347TP(TB)	1.4550		0.080	1.00	2.00	0.040	0.030	9.00 12.00	17.00 19.00		Nb : Min 10xC%	520 ↑	205 ↑	35 ↑	
	N08904				0.020	1.00	2.00	0.040	0.030	23.00 28.00	19.00 23.00	4.00 5.00	Cu : 1.00~2.00 N : Max 0.10	490 ↑	215 ↑	35 ↑	
	S31254				0.02	0.80	1.00	0.030	0.010	17.50 18.50	19.50 20.50	6.00 6.50	N : 0.18~0.22	675 ↑	310 ↑	35 ↑	
	TP304H	304HTP(TB)			0.040					8.00 11.00	18.00 20.00			520 ↑	205 ↑	35 ↑	
	TP310H				0.040					19.00 22.00	24.00 26.00			515 ↑	205 ↑	35 ↑	
	TP316H	316HTP(TB)			0.040	0.75	2.00	0.030	0.030	11.00 14.00	16.00 18.00	2.00 3.00		520 ↑	205 ↑	35 ↑	
	TP321H	321HTP(TB)			0.04 0.10	0.75	2.00	0.030	0.030	9.00 13.00	17.00 20.00		Ti 4xC%~0.60	520 ↑	205 ↑	35 ↑	
	TP347H	347HTP(TB)			0.04 0.10		2.00	0.030	0.030	9.00 13.00	17.00 20.00		Nb 8xC%~1.00	520 ↑	205 ↑	35 ↑	
	S30432	KA-SUS304J1HTB	VdTUV 550/2		0.07 0.13	0.30	1.00	0.040	0.010	7.50 10.50	17.00 19.00		Al : 0.003~0.03 N : 0.05~0.12 B : 0.001~0.01 Cu : 2.5~3.5	590 ↑	235 ↑	35 ↑	
	TP310HCbN				0.04 0.1		2.00	0.045	0.030	22.00 19.00	26.00 24.00		N : 0.15~0.35 Nb : 0.2~0.6	655 ↑	295 ↑	30 ↑	

Specifications

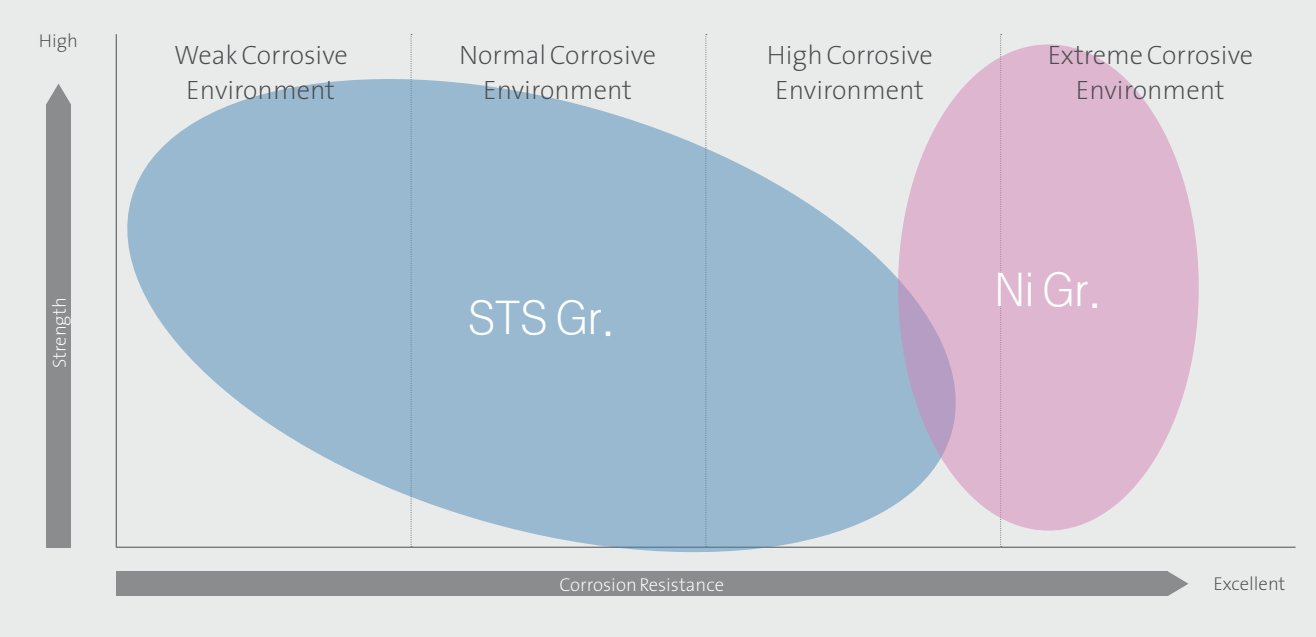
Type	Grade	UNS No.	Chemical composition rate (%)	Applications
N I A L L O Y	ALLOY 718	N07718	Ni-18Cr-5.1Nb-3.1Mo	Rings, Gas Turbine Engines, Extrusion Dies
	ALLOY 600	N06600	Ni-15Cr-8Fe	Steam Generators
	ALLOY 800H	N08810	Ni-45Fe-22Cr	Pressure Vessels, Heat Exchanger, Industrial Furnace
	ALLOY 625	N06625	Ni-22Cr-9.4Mo-4Fe-3.9Nb	Petrochemical Parts
	ALLOY 825	N08825	Ni-30Fe-23Cr-3.3Mo-2.2Cu	Chemical Process Parts, , Fitting, Valves
	ALLOY 925	N09925	Ni-28Fe-20.5Cr-3.2Mo-2.3Ti	Petrochemical Valves, Hangers
	ALLOY 20	N08020	Ni-37Fe-20Cr-3.5Cu-2.3Mo	Chemical Process Pipes, Reactor Vessels
	ALLOY 901	N09901	Ni-36Fe-12.5Cr-6Mo-2.9Ti	-
	ALLOY 690	N06690	Ni-30Cr-9Fe	Petrochemical Heaters
	ALLOY K500	N05500	Ni-30Cu-2.7Al-2Fe-0.6Ti	Fitting, Valves
	ALLOY 400	N04400	Ni-30Cu-2Fe	Fitting, Valves
	ALLOY 200	N02200	99Ni	Marine and Offshore Engineering Parts, Salt Production Parts

Characteristics of Ni Alloys

Properties of Heat and Oxidation Resistance



Properties of Corrosion Resistance



Product Types

	Specification	Specification No.	Grade	Remark
Stainless Steel	ASTM ASME	A/SA312	TP304(L,H,N,LN), TP316(L,H,N,LN), TP317(L), TP321(H), TP309S(H), TP310S(H), TP347(H)	Pipe
		A/SA376	TP304(H), TP304N(LN), TP316(H,N,LN), TP321(H), TP347(H)	
		A/SA790	S31803, S32205, S32304, S32750, S32760, S31500	
		A/SA213	TP304(L,H,N,LN), TP316(L,H,N,LN), TP317(L), TP321(H), TP309S(H), TP310S(H), TP347(H), S30432	Tube
		A/SA269	TP304(L,LN), TP316(L,LN), TP321, TP347	
		A/SA268	TP410, TP430, TP405	
		A/SA789	S31803, S32205, S32304, S32750, S32760, S31500	
		A511	MT304(L), MT316(L), MT317, MT321, MT347 MT310S, MT410, MT405, MT430	Mechanical Tube
	JIS	G3459	SUS304(L,H)TP, SUS316(L,H,TI)TP, SUS317(L)TP, SUS321(H)TP, SUS347(H)TP, SUS310S(H)TP, SUS329J1TP, SUS329J3LTP	Pipe
		G3463	SUS304(L,H)TB, SUS316(L,H,TI)TB, SUS317(L)TB, SUS321(H)TB, SUS347(H)TB, SUS405TB, SUS410TB, SUS430TB, SUS329J1TB, SUS329J3LTB	Boiler & Heat Exchanger Tube
		G3446	SUS304TKA, SUS316TKA, SUS321TKA, SUS347TKA, SUS410TKA, SUS430TKA	Mechanical Tube
		DIN /EN	17456 17458 10216-5	WNR1.4002, WNR1.4006, WNR1.4301, WNR1.4306, WNR1.4401, WNR1.4404, WNR1.4435, WNR1.4436, WNR1.4541, WNR1.4571
			WNR1.4462	Duplex
	Carbon Steel	ASTM	A519	4140, 4130
AISI		-	4140(H), 4130(H), 8650(H)	-
SAE		-	8617(H)	-
JIS		G3441	SCR. SCM	Mechanical Tube
ASTM		A519	1040. 1045	Mechanical Tube
AISI		-	1040. 1045. 1137	-
JIS		-	STKM16A	Mechanical Tube
Alloy Steel	ASTM ASME	B161/SB161	N02200	Pipe/Tube
		B163/SB163	N02200, N04400, N06600, N06690, N08810, N08825	Tube
		B167/SB167	N06600, N06690	Pipe/Tube
		B423/SB423	N08825	Pipe/Tube
		B444/SB444	N06625	Pipe/Tube

Specification	Specification No.	Description
ASTM	A213	(Seamless Ferritic and Austenitic Alloy-Steel Boiler, Superheater, and Heat Exchanger Tubes)
	A268	(Ferritic and Martensitic Stainless Steel Tubes for General Service)
	A269	(Austenitic Stainless Steel Tubes for General Service)
	A312	(Austenitic Stainless Steel Pipes)
	A376	(Seamless Austenitic Steel Pipes for High-Temperature Central-Station Service)
	A511	(Seamless Stainless Steel Mechanical Tubes)
	A519	(Seamless Carbon & Alloy Steel Mechanicak Tubes)
	A789/ A790	(Ferritic / Austenitic Stanless Steel Tubes & Pipes)
	B163	Seamless Nickel and Nickel Alloy Condenser and Heat Exchanger Tubes
	B829	General Requirements for Nickel and Nickel Alloys Seamless Pipes & Tubes
	G 3441	(Alloy Steel Tubes for Machine Purposes)
	G 3445	(Carbon Steel Tubes for Machine Structural Purpose)
JIS	G 3446	(Stainless Steel Tubes for Machine Structural Purpose)
	G 3459	(Stainless Steel Pipes)
	G 3463	(Stainless Steel Boiler and Heat Exchanger Tubes)
	17456	(General Purpose Seamless Circular Stainless Steel Tubes)
DIN	17458	(Seamless Circular Austenitic Stainless Steel Tubes Subject to special Requirements for Pressure Vessels and Chemical Plant)
	17459	(Seamless Circular High-Temperature Austenitic Steel Tubes)
EN	10216-5	Seamless steel tubes for pressure purposes–Technical delivery conditions (Stainless Steel Tubes)

Product Order Standards

Stainless Steel Pipes

t = Nominal wall thickness D = Ordered outside diameter (Unit: mm)

ASTM (Based on A999 for outside diameter tolerance, and A312 for thickness tolerance)				JIS (Based on G3459)							
Nominal diameter	Outer diameter	Outer diam-eter tolerance	Thickness tolerance	Nominal diameter		Outer diameter	Hot finished products		Cold finished products		
				A	B		Outer diameter tolerance	Thickness tolerance	Outer diameter tolerance	Thickness tolerance	
1/8	10.29	+0.4 -0.8	+20.0% -12.5%	6	1/8	10.5	±0.5		±0.3		
1/4	13.72			8	1/4	13.8					
3/8	17.15			10	3/8	17.3					
1/2	21.34			15	1/2	21.7					
3/4	26.67			20	3/4	27.2					
1	33.40			25	1	34					
1¼	42.16	±0.8	τ/D≤5% +22.5% -12.5% τ/D>5% +15.0% -12.5%	32	1¼	42.7	±1.0%	τ<4 : ± 0.5		τ<2 : ± 0.2	
1½	48.26			40	1½	48.6					
2	60.33			50	2	60.5					
2½	73.03			65	2½	76.3					
3	88.90			80	3	89.1				τ≥4 : ± 12.5%	±1.0%
3½	101.60			90	3½	101.6					
4	114.30	100		4	114.3						
5	141.30	125		5	139.8						
6	168.3	150		6	165.2						
8	219.1	200		8	216.3						
10	273.1	250		10	267.4						

Stainless Steel Pipes for Heat Exchangers and Boilers

(Unit: mm)

ASTM (Based on A1016/M)					JIS (Based on G3463)							
Diameters	Diameter tolerance		Thickness tolerance		Diameters	Outer diameter tolerance		Thickness	Hot finished products		Cold finished products	
	Hot finished products	Cold finished products	Hot finished products	Cold finished products		Hot finished products	Cold finished products		100φ↑	100φ↑	40φ↑	40φ↑
25.4 > O.D	+0.4 -0.8	± 0.1	2.4 ≥ ↑ + 40% - 0%	+ 20% - 0%	40 > O.D	±0.25	+0.4 -0.8	2.0 > ↑	-	-	+0.4 -0	
25.4 ≤ O.D ≤ 38.1		± 0.15	2.4 < ↑ ≤ 3.8		2.0 ≤ ↑ < 2.4			+40% -0%	-			
38.1 ≤ O.D ≤ 50.8		± 0.20	+35% -0%		2.4 ≤ ↑ < 3.8			+35% -0%	+35% -0%			
50.8 ≤ O.D < 63.5		± 0.25	3.8 < ↑ ≤ 4.6		3.8 ≤ ↑ < 4.6			+33% -0%	+33% -0%			
63.5 ≤ O.D ≤ 76.2		± 0.30	-0% + 22% - 0%						+20% -0%			
76.2 ≤ O.D ≤ 101.6		± 0.38	4.6 < ↑ +28% -0%									
101.6 < O.D ≤ 141.3	+0.4 -1.2	+0.38 -0.64	-		100 ≤ O.D < 120 120 ≤ O.D < 140	+0.4 -1.2	+0.4, -0.6 +0.4, -0.8	4.6 ≤ ↑	+28% -0%	+28% -0%		

Mechanical Structure Steel Pipes

(Based on A511 for STS Steels, and A519 for Carbon Alloy Steels)

Hot finished products				Cold finished products			
Outer diameter	50 > O.D		±0.50mm	±0.25mm			
	50 ≤ O.D		±1%	±0.5%			
Thickness	4 > t		+0.6 - 0.5mm	-			
	4 ≤ τ		+15% - 12.5%	-			
	3 > τ		-	±0.3mm			
	3 ≤ τ		-	±10%			

ASTM and ASME

(SCH5S, SCH10S, SCH40S, SCH80S : Based on ASME B36.19M / SCH160, XXS : Based on ASME B36.10M)

Nominal diameter	Outer diameter		SCH5S		SCH10S		SCH40S		SCH80S		SCH160		XXS	
			Thickness	Weight	Thickness	Weight	Thickness	Weight	Thickness	Weight	Thickness	Weight	Thickness	Weight
NPS	in.	mm	in.	mm	lb/ft	kg/m	in.	mm	lb/ft	kg/m	in.	mm	lb/ft	kg/m
1/8	0.045	10.29			0.049	1.24	0.186	0.277	0.068	1.73	0.245	0.365	0.095	2.41
1/4	0.540	13.72			0.065	1.65	0.330	0.491	0.088	2.24	0.426	0.634	0.119	3.02
3/8	0.675	17.15					0.423	0.631	0.091	2.31	0.567	0.845	0.126	3.20
1/2	0.840	21.34	0.065	1.65	0.538	0.801	0.083	2.11	0.672	1.00	0.109	2.77	0.851	1.27
3/4	1.050	26.67			0.683	1.02			0.858	1.28	0.113	2.87	1.13	1.68
1	1.315	33.40			0.867	1.29	0.109	2.77	1.40	2.09	0.133	3.38	1.68	2.50
1¼	1.660	42.16			1.11	1.65			1.81	2.69	0.140	3.56	2.27	3.39
1½	1.900	48.26			1.27	1.90			2.09	3.11	0.145	3.68	2.72	4.05
2	2.375	60.33			1.60	2.39			2.64	3.93	0.154	3.91	3.65	5.44
2½	2.875	73.03	0.083	2.11	2.48	3.69	0.120	3.05	3.53	5.26	0.203	5.16	5.80	8.64
3	3.500	88.90			3.03	4.52			4.33	6.46	0.216	5.49	7.58	11.29
3½	4.000	101.60			3.47	5.18			4.97	7.41	0.226	5.74	9.11	13.57
4	4.500	114.30			3.92	5.84			5.62	8.37	0.237	6.02	10.79	16.07
5	5.563	141.30	0.109	2.77	6.35	9.46	0.134	3.40	6.24	9.30	0.258	6.55	14.61	21.77
6	6.625	168.3			7.59	11.31			9.30	13.83	0.280	7.11	18.99	28.26
8	8.625	219.1			9.92	14.78	0.148	3.76	13.41	19.97	0.322	8.18	28.58	42.55
10	10.750	273.1	0.134	3.40	15.21	22.61	0.165	4.19	18.67	27.78	0.365	9.27	40.52	60.29

JIS (Based on JIS G3459)

Nominal Diameter		Outer diameter	SCH5S		SCH10S		SCH20S		SCH40		SCH80		SCH120		SCH160	
A	B		Thickness (mm)	Weight (kg/m)	Thickness (mm)	Weight (kg/m)	Thickness (mm)	Weight (kg/m)	Thickness (mm)	Weight (kg/m)	Thickness (mm)	Weight (kg/m)	Thickness (mm)	Weight (kg/m)	Thickness (mm)	Weight (kg/m)
6	1/8	10.5	1.0	0.234	1.2	0.275	1.5	0.333	1.7	0.369	2.4	0.479				
8	1/4	13.8	1.2	0.373	1.65	0.494	2.0	0.582	2.2	0.629	3.0	0.790				
10	3/8	17.3	1.2	0.476	1.65	0.637	2.0	0.755	2.3	0.851	3.2	1.11				
15	1/2	21.7	1.65	0.816	2.1	1.02	2.5	1.18	2.8	1.31	3.7	1.64			4.7	19.7
20	3/4	27.2	1.65	1.04	2.1	1.30	2.5	1.52	2.9	1.74	3.9	2.24			5.5	2.94
25	1	34.0	1.65	1.32	2.8	2.15	3.0	2.29	3.4	2.57	4.5	3.27			6.4	4.36
32	1¼	42.7	1.65	1.67	2.8	2.76	3.0	2.94	3.6	3.47	4.9	4.57			6.4	5.73
40	1½	48.6	1.65	1.91	2.8	3.16	3.0	3.37	3.7	4.10	5.1	5.47			7.1	7.27
50	2	60.5	1.65	2.39	2.8	3.98	3.5	4.92	3.9	5.44	5.5	7.46			8.7	11.1
65	2½	76.3	2.1	3.84	3.0	5.42	3.5	6.28	5.2	9.12	7.0	12.0			9.5	15.6
80	3	89.1	2.1	4.51	3.0	6.37	4.0	8.39	5.5	11.3	7.9	15.3			11.1	21.4
90	3½	101.6	2.1	5.15	3.0	7.29	4.0	9.63	5.7	13.5	8.1	18.7			12.7	27.8
100	4	114.3	2.1	5.81	3.0	8.23	4.0	10.9	6.0	16.0	8.6	22.4	11.1	28.2	13.5	33.6
125	5	139.8	2.8	9.46	3.4	11.4	5.0	16.6	6.6	21.7	9.5	30.5	12.7	39.8	15.9	48.6
150	6	165.2	2.8	11.3	3.4	13.7	5.0	20.0	7.1	28.0	11.0	42.3	14.3	53.8	18.2	66.6
200	8	216.3	2.8	14.9	4.0	21.2	6.5	34.0	8.2	42.5	12.7	64.4	18.2	89.8	23.0	111
250	10	267.4	3.4	22.4	4.0	26.2	6.5	42.2	9.3	59.8	15.1	94.9	21.4	132	28.6	170

Quality Assurance

Test & analysis			
Chemical analysis		Material testing	
Instrumental analysis	Wet analysis	Testing of mechanical properties	Macro / Micro testing
• Spark emission spectrometry • X-ray fluorescence • Gas (H, O, N) analysis, carbon / sulfur analysis	• ICP emission • Atomic absorption • UV-VIS Spectrophotometry	• Tension test • Hardness test • Impact test • Fatigue test • Creep test • Illumination test • Thermal expansion test	• Heat Treated Structure Cleanliness • Grain Size Corrosion Test Scanning • Electron Microscope/Energy Dispersive Spectrometer (SEM/EDS)

X-Ray Fluorescence Spectrometer (XRF)



Atomic absorption spectrometer



Gas analyzer



Absorption spectrometer



Optical Emission Spectrometer (OES)



Creep tester



Inductively Coupled Plasma Mass Spectrometer



Hardness Tester



By using various testing and analytic instruments, SeAH CSS provides quality seamless pipes and tubes.

Certificates of Approval

 ISO 9001:2008 ISO QUALITY MANAGEMENT SYSTEM	 ISO/TS 16949:2009 ISO QUALITY MANAGEMENT SYSTEM	 ISO 14001:2004 ISO ENVIRON- MENTAL MANAGEMENT SYSTEM	 KOSHA18001 KOSHA SAFE AND HEALTH MANAGEMENT SYSTEM	 JAPANESE INDUSTRIAL STANDARDS	 KOREA ELECTRIC POWER INDUSTRY CODE	 AD 2000- MERKBLATT Wo EUROPEAN DIRECTIVE 97/23/EC (PED)	 KOREAN REGISTER
 LLOYD'S REG- ISTER	 DNV-GL NORWAY & GERMANY REGISTER	 BUREAU VERITAS	 NORSOK M-650 (DUPLEX STS TUBES & PIPES)				

Packing Types



Hessian Packing
- Vinyl+Hessian Packing



Wooden Slate
- Vinyl+Hessian Packing
- Wooden Slate Packing



Neno Fabric



Wooden Skid Packing
- Polyethylene Film Packing
- Wooden Skid packing

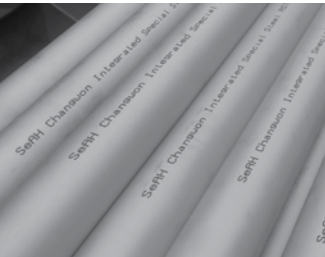


Wooden Box
- Vinyl+Hessian Packing
- Wooden Box Packing

Product Tags & Marking



Tag



Marking

Product Order Requirements

We can only provide the qualified product for you when you fully specify what you need
Be sure to provide detailed information for the line items below (Dial +82 2 6970 2368 for more questions)

- 1)Applicable standards:ASTM,JIS,DIN and more
- 2)Steel grade,surface heat treatment,dimension
- 3)Quantity and delivery
- 4)Applications,method of processing
- 5)Special requirements(if applicable)