

Cold Drawn Stainless Steel Seamless Tube Cold Drawn Stainless Steel Seamless U Tube Welded Stainless Steel Bright Annealed Tube Welded
Stainless Steel
Bright Annealed U Tube

ISO 9001:2015

ISO 14001:2015

OHSAS 18001:2007

**ADW/AD 2000 WO** 

PED:2014/68/EU

**NORSOK M-650** 

Our Motto believes in Quality towards the perfection along with on time delivery.





SPTT is committed to achieve "Total Customer Satisfaction" by meeting or exceeding customer requirements of seamless and welded Tubes/Pipes and continually improving the IMS (Quality, Environment, Health and Safety) and fulfillment of applicable legal requirements and prevention of pollution.

Prevention of injury and prevention of ill health of employees.

- Promote awareness of Quality, Environment, Health and Safety issues.
- Comply with all applicable Legal and Other requirements.
- Provide resources and technology for prevention of Pollution and Injury and Health improvement.
- Improving QEHS performance by setting measurable Objective and Target.
- To deliver right Quality products first time and every time.
- To maintain co-ordeal relations with Customers, Suppliers, Employees and all interested parties.
- Train, Retrain and Continuously improve employees, contractors for their up-gradation and competencies.

R.D.Patel Chairman



To attain Global excellence by continuously developing and providing the best quality products and services. Exceeding expectations of our Customers with innovative products and applications.



Building value for all our stakeholders.

To be a value driven organization.

To be leading Stainless Steel Pipes and Tubes Manufacturing Company.

### Making difference in our Space through:



- Our PRODUCTS Having wide range of products. Becoming the supplier of choice. Delivering premium products. Creating value for our customers.
- Our PRACTICES Making Best Better all the time. Developing our Processes and System with a future in mind.
- Our PEOPLE Promoting team work. Nurturing talent. Enhancing leadership capability and acting with passion and pace.
- Our INNOVATIVE MINDSET Developing cutting edge solutions in technology, processes and products.
- Our CONDUCT Providing a safe work place. Respecting the environment and caring for our communities we belong to.



**<u>Product:-</u>** Cold Drawn Stainless Steel Seamless and Welded Straight & 'U' Tubes / Pipes

#### **Product Range**

Seamless	Welded
OD: - 6.0 mm to 168.3 mm	OD: - 10.0 mm to 48.3 mm
Thickness: - 0.40 mm to 25.0 mm	Thickness: - 0.30 mm to 3.0 mm
Length: - Up to 30 meters	Length: - Up to 30 meters

#### **Stainless steel Austenitic Specification and Grade**

A/SA-213,269,270,312(Pipe),A/SA-249(Welded)

TP-304/304L/304LN/304H/310S/316/316L/316LN/316H/316Ti/317/317L/317LN/321/321H/347/ 347H/ UNS S31254(Super Austenitic)

#### **Ferritic & Martensitic**

A/SA-268 , **Grade** :- TP-405/409/410/SUS 410L/430/446-1-2/UNS S 44660

#### **Duplex Stainless Steel (DSS)**

A/SA-789(Tube), A/SA-790(Pipe), Grade: UNS S32803/S32205

#### **Super Duplex Stainless Steel (SDSS)**

A/SA-789(Tube), A/SA-790(Pipe) Grade: - UNS S32750

#### **European Standard (welded)**

EN 10217-7 , **Grade** :- 1.4307/1.4306/1.4301/1.4311/1.4511/1.4550/ 1.4404/1.4435/1.4436/1.4401 /1.4429/1.4571/1.4539/1.4547/1.4438/1.463/1.5429/1.4439

#### **European Standard (Seamless)**

EN 10216-5 , **Grade** :- 1.4307/1.4306/1.4301/1.4311/1.4511/1.4550/1.4404/1.4435/1.4436/1.4401/1.4429/1.4571/1.4539/1.4547/1.4438/1.463/1.5429/1.4439/1.4466/1.4580/1.4429/1.4563/1.4558

#### <u>Titanium Alloy (Seamless & Welded )</u>

B/SB 338(Tube), Grade-2

#### **High Nickel Alloy**

B/SB 161(Pipe/Tube), B/SB 163(Tube) Grade:- UNS No2200 / 2201

B/SB 165( Tube/Pipe) **MONEL 400** (UNS NO 4400)

B/SB 163(Tube)/167(pipe) /444(Tube/Pipe), Grade:- INCONEL UNS NO6600/6625

B/SB 407/423, Grade :- **INCOLOY** UNS NO8800/8810/8825



#### STEEL THICKNESS CONVERSION TABLE

#### (GUAGE - INCH - MM)

GUAGE NO.	SW	/G	BWG				
GUAGE NO.	INCH	MM	INCH	MM			
1	0.3	7.62	0.3	7.62			
2	0.276	7.01	0.283	7.21			
3	0.252	6.4	0.259	6.58			
4	0.232	5.89	0.238	6.05			
5	0.212	5.38	0.22	5.59			
6	0.192	4.88	0.203	5.16			
7	0.176	4.47	0.179	4.57			
8	0.16	4.06	0.164	4.19			
9	0.144	3.66	0.147	3.76			
10	0.128	3.25	0.134	3.4			
11	0.116	2.95	0.12	3.05			
12	0.104	2.64	0.109	2.77			
13	0.092	2.34	0.095	2.41			
14	0.081	2.03	0.083	2.11			
15	0.072	1.83	0.072	1.83			
16	0.064	1.63	0.065	1.65			
17	0.056	1.42	0.058	1.47			

GUAGE NO.	SW	'G	BWG				
GUAGE NO.	INCH	MM	INCH	MM			
18	0.048	1.22	0.049	1.24			
19	0.040	1.02	0.042	1.07			
20	0.036	0.92	0.035	0.89			
21	0.032	0.81	0.031	0.81			
22	0.028	0.71	0.028	0.71			
23	0.024	0.61	0.025	0.64			
24	0.023	0.56	0.023	0.56			
25	0.020	0.46	0.02	0.51			
26	0.018	0.41	0.018	0.46			
27	0.016	0.38	0.016	0.41			
28	0.014	0.35	0.0135	0.356			
29	0.013	0.305	0.013	0.33			
30	0.012	0.29	0.012	0.305			
31	0.011	0.27	0.010	0.254			
32	0.0106	0.254	0.009	0.229			
33	0.010	0.229	0.008	0.203			
34	0.009	0.209	0.007	0.178			













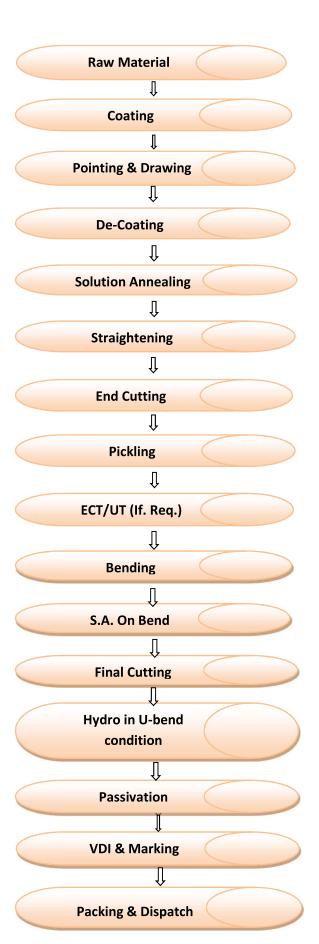














**U-BENDING MACHINE** 



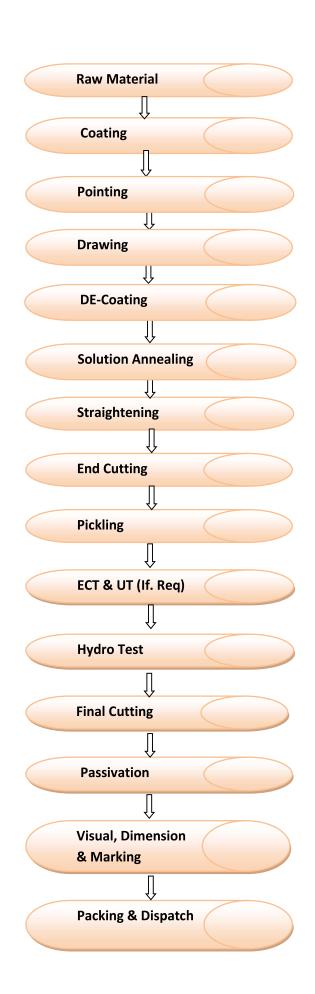
**U-BEND S.A** 



**PMI TESTING** 



**U-BEND HYDRO MECHINE** 





**SURFACE TREATMENT** 



**POINTING** 

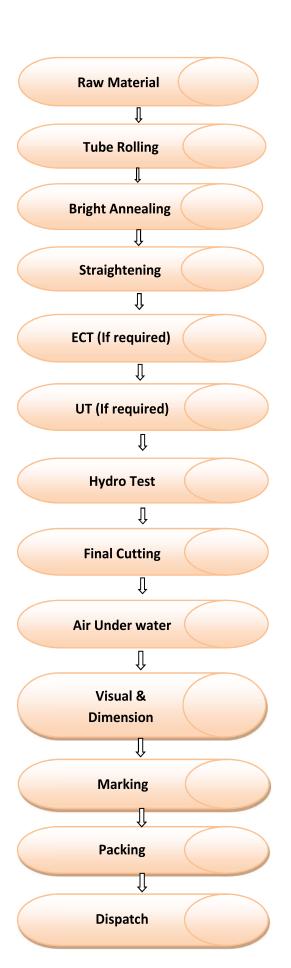


**DRAWING** 



**SOLUTION ANNEALING** 







TUBE MILL WITH ONLINE BRIGHT ANNEALING
AND EDDY CURRENT



STRAIGHTENING MACHINE

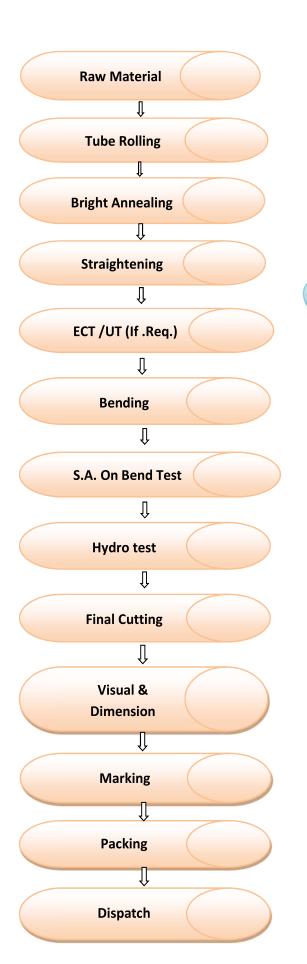


STRAIGHT TUBE HYDRO TEST



**AIR UNDER WATER TEST** 







TUBE MILL WITH ONLINE BRIGHT ANNEALING
AND EDDY CURRENT



**JIG FOR DIMENSION** 

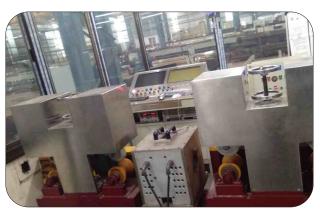


**CUTTING MACHINE** 





Rota Ultrasonic Machine (Immersion Technique)



**Eddy Current Machine** 



**Spectro Meter** 



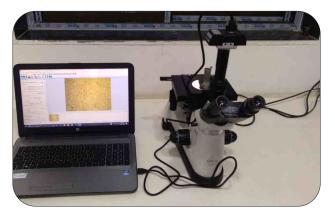
Tensile Machine (40T)



Chemical & IGC Lab



Digital Hardness



Microscope



**Ultrasonic Thickness D-meter** 

Grade TP-304 TP-304L		Max Max	+	Max Si	ò	īZ	ω	z	QN i=	g Z	ð	0	>	3	>	Fo	414 - 61	7
Н	+	_	4	Max													QNI+ PI	₹
		H	H	1 00	18 00-20 00	8 00-11 00				-								Į,
	0.035	2.00 0.0	0.045 0.030	1.00	18.00-20.00	8.00-12.00	1	1	1	1	1							,
	_	Н	Н	1.00	18.00-20.00	8.00-11.00	0.	.10 -0.16										:
	0.040-0.10	-	-	1.00	18.00-20.00	8.00-11.00	1	;		1	1							
	$\forall$	$\dashv$	Н	$\neg$	16.00 -18.00	10.00-14.00	2.0-3.0			1	1							
	+	$\dashv$	$\dashv$	$\dashv$	_	10.00-14.00	-	;	;		:							1
	0.035	-	0.030	00.1	_	10.00-13.00	_	0.10 -0.16	1	1	1							1
тр-316н 0.0	임	$\dashv$	$\dashv$	$\dashv$		11.00-14.00	$\dashv$	$\dashv$		1	;							,
			_	_		10.00-14.00		0.10 Max 5:	5 x (C+N) - 0.70	1	;							1
	0.080	_	0.045 0.030	00.1		11.00-15.00	3.0 -4.0											
				$\vdash$	Н	11.00-15.00		:	:	:	:							:
TP-3171 MN		H	⊢	-		13.50-17.50	Н	0.10-0.20			0 75max							:
H	t	╀	╄	+		00 12 00 0	۰	Г	(C+N) 0 70									
1	4	+	+	+		9.00 -12.00		I	3 X (C+IV) - 0.70	+	+			1				
_	0.040-0.10	$\dashv$	_	$\rightarrow$	17.00 -19.00	9.00 -12.00	1	4		1	1							:
_	080.0	-	_	_		9.00-13.00	1		10	10 × C -1.10	1							1
	0.040-0.10					9.00-13.00	1	;		8 x C -1.10	;							1
UNS31254	H		0.010	0.80		17.50-18.50	6.0-6.5	0.18-0.22	:		0.50-1,00							:
	H	┝	⊢	+		8 00-11 00												
ł	$^{+}$	+	+	+		00012000												
+	$^{+}$	+	+	+		0.00-13.00	t											
IP-304LN	- 1	2.00	0.045 0.030	T.00	18.00-20.00	8.00-12.00	-	0.10-0.16	;	1	;							
	0.040-0.10	_	-			8.00-11.00	1	1	1	1	1							1
		⊢	⊢	-		10 00-14 00	2 0-3 0	,	,	,	,							١
T		+	+	+		10.00 14.00	0.00											
	_	$\dashv$	$\dashv$	$\dashv$		10.00-14.00	$\dashv$				:							:
TP-316LN	0.035		0.045 0.030	1.00		10.00-14.00		0.10 -0.16		1	;							1
	╄	╀	+	H	16.00 -18.00	10.00-14.00	2 0-3 0											:
	4	+	+	+		10.00-14.00	+	+	1 07									
	+	$\dashv$	$\dashv$	-		10.00-14.00	$\dashv$	0.10 Max 5	5 × (C+N) - 0.70		;							
	H	H	Н	Н		11.00-15.00	H	H		,	,							,
170 01	2000	+	2000	200		11.00 12.00												
1	+	+	+	+		11.00-15.00	+											
TP-321	0.080	-	0.045 0.030			9.00 -12.00		0.10 Max 5:	5 x (C+N) - 0.70		:							:
_	0.040-0.10	H	0.045 0.030	1.00		9.00 -12.00	-		C(C+N) - 0.70									:
Ī	1	+	+			200 40 00	,			1								
	- 1	+	-			9.00-13.00	:	:	T(	Η.	:							:
TP-347H 0.0	0.040-0.10		0.045 0.030	00.1	17.00 - 19.00	9.00-13.00		;		8 x C -1.00	;							:
7		⊢	┺			17 50-18 50	60.65	0 18-0 25		Ī	0 50-1 00							
407	- 1	+	-			T/.30-T0.30	+	C7.0-01.7	+	1	00.1-00							
	-	-	_	_		0.50 Max	1	;	;		;						0.10	0.10 -0.30
TP-409		1.00 0.0	0.045 0.030	-		0.50 Max	:		6 x C - 0.75	1	1							1
	H	۰	₽	+-	11 50 11 50													
	$^{+}$	+	+	-	00.11-00.11	:	:	:										:
	+	$\dashv$	_	_	16.00-18.00	:					:							:
TP-446-1	0.200	1.50 0.0	0.040 0.030		23.00-27.00	0.75 Max	1	0.25 Max	:	1	;							:
TP-446-2	H	⊢	⊢	1 00	23 00-27 00	0 50 Max		25 Max										:
+	+	+	+		00 00 00		Т	000										
4	+	+	+	00.1	ZT:00-53:00	4.3 -0.3	1	07.0-00.0	+		+							:
4	+	-	_	1.00	22.00-23.00	4.5 -6.5		0.14-0.20	1	1	;							1
UNS S 32750	0.300		0.035 0.020	0.80	24.00-26.00	6.00-8.00	3.0-5.0	0.24-0.32		1	0.50 Max							1
L	H	H	⊢	1 00	17 50-19 50	80-100	П	0.11Max			,							
t	t	+	+			100120		7111/10										
+	+	+	+	+		TO:0-TZ:0	1	J.TTIMIAX			:							
	_		_			8.0-10.50	1	0.11Max		1	;							
1.4311	H	Н	0.040 0.015	1.00		8.50-11.50	-	0.12-0.22			,							
ł	+	٠	+	+					0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
+	+	+	+	-		9.0-12.0		;	5XC-0.70		;							
	_		0.040 0.015	-		9.0-12.0		:	10XC-1.0	1	;							
1 4404	0.030	000	0 0 0 0 1 5	5		100130	20-250	O 111Max										
	+	+	-	-	10.50-18.50	TO:0-T3:0	-	J. TTINIAX	:	1	;							
			0.040 0.015	_		12.50-15.0	2.50-3.0	0.11Max		,	;							
ł	t	+	+	+	01000	0 0 0 0 0	+											
_		-	_	_	16.50-18.50	10.50-13.0	_	J.T.I.Max										
	_	-	_	-	16.50-18.50	10.0-13.0	_	7.11Max										
+	+	+	+	+	0100	0.00	+	0000										
_		2.00 0.0	0.040 0.015	1.00	16.50-18.50	11.0-14.0		0.12-0.22	1	1	1							
_	H	H	⊢	۰	16 50.18 50	10 50-13 50	-		02.0.20									
+	+	+	+	+	TO:30-TO:30	TO:30-T3:30	-	:	3AC-0.70									
_			0.030 0.010	-	19.00-21.00	24.00-26.00	_	0.15Max	1	1	1.20-2.0							
1 4547	0.000	⊢	⊢	070	19 50-20 50	17 50-18 50	60.70	0 18-0 25			0 50-1 0							
+	0200	+	+	+	20020000	00.00		77.00.77			0.1							
+	+	+	+	+		20.00-22.00	Т	7.11 Max			:							
1.4563	0.020	2.00 0.0	0.030 0.010	0.70		30.00-32.00		).11 Max		1	.70-1.50							
	H	┝	⊢	-	19.00-21.00	24.00-26.00	0.7-0.9	0.15-0.25	1	-	0.50-1.50							
ł	t	+	+	+		02 44 02 01	Т			ľ		1	F	t			-	
+	0.030	2.00	0.040 0.015	1.00		12.5U-14.5U		7.12-0.22	+	+	+	1	-	1	1			
_	_		_	_		21.00-23.00		0.10-0.16			-		_	_	_		_	
	H	⊢	0.040 0.015	1.00		10.50-13.50		:	10XC-1.0		,		L					
ł	000	+	+	+	20 00 22 00	33 00 35 00	i	•	ONICHNI) O GO	l	l	1	-	T	1	1	-	20.0
1.4558	0.030	+	0.015	0.70	20.02-00.02	32.00-22.00		4	A(C+IN)-U.DU		:			:	:	:	- 0.1	U.15-U.45
2	080.0	_	-	-	:	;	-	0.03max		-		.25 max 0.015max	ax	_	0.3(	Omax	_	1
UNS NO 2200	0.15		. 0.01	H		99 n min				-	max				0.40	Jmax		,
+	000	300	0.00	36.0		nim 0 00	l				0.25 may	1	F	t	0	0.40max	_	
TOZZ ON SNO	$^{\dagger}$	0.33	12.5	+	1	33.0 11111	+	+	+	7	VE C7.	<u> </u>	 	†	5	vp	1	
4	+	0.35		$\dashv$		1	1			1	1	1	-	1	1			
UNS NO 4400	0.300	-	- 0.024	1 0.5	1	63.00 min	1	1	-	- 1	28.0-34.0	1		-		2.5max		,
L	7.015	H	0.020 0.020	⊢	20.00-22.50		12.5-14.5	,			;	-	0.35max	2.5max 2.	50-3.50	2.00-6.00		,
11NS NO 6625	-	0.50	+	+		Ī	-	ŀ	İ	İ	İ	_	  -	+			_	
UNS INC DOZO	t	0.30	1	†	İ	Ī	t	1	t	İ	T	1	I	İ	ł	1	1	
INCONEL	+	$\frac{1}{1}$	-	$\dashv$	1	1	1		+	1	1	1	_	1	+		1	
	0.150		- 0.015	0.50	14.00-17.00	72.00 min	1			-	0.50 max	1		1	6.0	6.0-10.0		,
L	t	+	0.015	C C	20 00-23 00	78 OO min	8.0-10.0							1 00	2 00	5 Olmax O 40 max	215.415	0.40mV
	+	1.00	+	0:0	20.00-23.00	39.00 11111	0.01-0.0	+		+	+			T.00	3.00		5.12-4.L3	š
CARPENTER20	1	4	$\dashv$	$\dashv$			$\dashv$											
UNS NO8020	0.03	0.	0.03 0.03	0.50	22.00-26.00	33.00-37.20	5.00-6.70 0	0.10 -0.16	1	- 2	2.00-4.00	1	1	1	,			1
NCO! X		1 00	┝	H			⊢											
INCOLT INCOLT	t	T.00	1200	+	_	00 25 00	t	+	0,0	İ	-	1	Ī	İ	200	1.	-	0
UNS NOSSOO	0.10	1	- 0.015	$\dashv$	19.00-23.00	30.00-35.00	-	:	0.15-0.60		0.75	-	-	:	- 39.5	39.5min	17.0	0.15-0.60
UNS NO8810   0.0	0.05-0.10	Ì	- 0.015	-	_	30.00-35.00			0.15-0.60		0.75	1	-		39.5	min	0.15	0.15-0.60
TORONOSSE	200	1 50	t	+	_	00 91 00 60	25-35	l	00120	l	15.30							000
UNS NUSSZS	0.05	1.50	- 0.U3L	⊣	_	38.00-46.00	2.5-3.5	-	0.6-1.20	-	1.5-3.0	-	-	-	22.0	min	_	0.20

# **Chemical Composition**



						Mechanical					Те	nsile Test		Ligat Tratmant
SPEC	Grade	Flaring	Flattening	Flange	R.Bend	R.Flattening	Micro	Macro	IGC	Hardness HRB	YS Mpa	UTS Mpa	EL %	Heat Tretment Temperature
	TP-304	√	<b>√</b>	Х	Х	Х	√	<b>√</b>	<b>√</b>	90	205	515	35	
	TP-304L	V	√	Х	Х	Х	V	√	V	90	170	485	35	]
	TP-304LN	√	<b>√</b>	X	X	X	√ /	<b>√</b>	<b>√</b>	90	205	515	35	
	TP-304H TP-316	√ √	√ /	X	X	X	√ /	√ /	√ /	90	205 205	515 515	35 35	
	TP-316L		√ √	X	X	X	√ √	√ √		90	170	485	35	1
	TP-316N	√	<b>√</b>	X	X	X	<b>√</b>	<b>V</b> √	V	90	240	550	35	Solution Annealing
	TP-316H	V	√	Х	Х	Х	V	V	V	90	205	515	35	At 1040°C Temperature
SA/A-213,SA/A-249,SA/A-269	TP-316Ti	√	<b>√</b>	Х	X	Х	√	√	√	90	205	515	35	Tomporataro
	TP-317	√	<b>√</b>	X	X	X	√ /	<b>√</b>	<b>√</b>	90	205	515	35	
	TP-317L TP-317LMN	√	<b>√</b>	X	X	X	<b>√</b>	√ /	√ /	90	170 205	485	35	-
	TP-317LMIN	√ √	√ √	X	X	X	√ √	√ √	√ √	90	205	515 515	35 35	1
	TP-347	√	<b>√</b>	X	X	X	<b>√</b>	V	$\overline{}$	90	205	515	35	1
	TP-321H	√	V	X	X	X	√	,	V	90	205	515	35	At 1090°C
	TP-347H	√	√	Х	Х	Х	√	√	√	90	205	515	35	At 1100°C
	UNS31254	√	√	Х	Х	Х	√	√	√	96	310	675	35	At 1150°C
	TP-304	X	√ /	X	X	X	1	<b>√</b>	<b>√</b>	90	205	515	35	
	TP-304L TP-304LN	X	√ √	X	X	X	√ √	√ √	√ √	90	170 205	485 515	35 35	I
	TP-304LN	X	V √	X	X	X		V √	V √	90	205	515	35	1
	TP-316	X	<b>√</b>	X	X	X	√	<b>V</b> √	$\sqrt{}$	90	205	515	35	1
	TP-316L	Х	V	Х	Х	Х	V	√	V	90	170	485	35	Solution Annealing At 1040°C
	TP-316LN	Χ	√	Χ	Х	Х	√,	√	√,	90	205	515	35	Temperature
SA/A-312	TP-316H	X	<b>√</b>	X	X	X	√	√ /	<b>√</b>	90	205	515	35	
	TP-316Ti TP-317	X	<b>√</b>	X	X	X	- √ /	√ /	<b>√</b>	90	205	515	35 35	
	TP-317	X	√ √	X	X	X	√ √	√ √	√ √	90	205 205	515 515	35	1
	TP-321	X	<b>√</b>	X	X	X	<b>√</b>	<b>V</b> √	V	90	205	515	35	1
	TP-321H	X	V	X	X	X	-	,	V	90	205	515	35	At 1100°C
	TP-347	Х	√	Х	Х	Х	√	√	√	90	205	515	35	At 1040°C
	TP-347H	X	√,	Х	Х	Х	√	√	√	90	205	515	35	At 1100°C
	UNS31254	√ /	√	X	X	X	√ /	√ /	√ /	90	310	675	35	At 1150°C
SA/A-268	TP-405 TP-409	√ √	X	X	X	X	√ √	√ √	√ √	95 95	205 170	415 380	20	Reheated 650° C (min) Temperature
	TP-410	√	X	X	X	X	<b>√</b>	V	<del>-                                    </del>	95	205	415	20	
	TP-430	v	X	X	X	X	v v	,	₩	90	240	415	20	
	TP-446-1	√	Х	Х	Х	Х	√	√	√	95	275	485	18	
	TP-446-2	√	X	Х	Х	X	√	√	√	95	275	450	20	
SA/A-789 & &790 ( Duplex)	UNS S 31803	√,	X	X	X	X	√,	√,	√,	30	450	620	25	At 1020°C (min)
SA/A-789 & &790 ( S.Duplex)	UNS S 32205	√ √	X √	X	X	X	√ √	√ √	<b>√</b>	30 32	485 550	655 800	25 15	At 1025°C (min)
SAIA-109 & &190 ( S.Duplex)	UNS S 32750 1.4307		<b>₩</b>	X	X	X	√ √	<b>∀</b>		90	215	460 to 680	40	At 1025 C (IIIIII)
	1.4306	√	1	X	X	X	√	V	- V	90	215	460 to 680	40	At 1000°C to 1100°C
	1.4301	√	Ì	Х	Х	Х	√	Ì	V	90	230	500 to 700	40	At 1000°C to 1100°C
	1.4311	√	√	Х	Х	Х	√	√	√	90	305	550 to 760	35	
	1.4541	√	<b>√</b>	Х	Х	Х	√,	<b>√</b>	<u>√</u>	90	235	500 to 730	35	At 1020°C to 1130°C
	1.4550	√ /	1	X	X	X	√ /	√ /	√ /	90	240	510 to 740	35	At 1020°C to 1130°C
	1.4404 1.4435	√ √	√ √	X	X	X	√ √	√ √	$\sqrt{}$	90	225 225	490 to 690 490 to 690		At 1020°C to 1130°C At 1020°C to 1120°C
	1.4436	√	<b>₩</b>	X	X	X	<b>√</b>	V √		90	240	510 to 710	40	At 1020°C to 1120°C
	1.4401	· √	✓	X	X	X	V	V	Ì	90	240	510 to 710		At 1020°C to 1120°C
EN 10216-5	1.4429	√	√	Х	Х	Х	√	√	√	90	330	580 to 800	35	At 1020°C to 1120°C
	1.4571	V	√	Х	Х	Х	√,	√	√,	90	245	500 to 730	35	At 1020°C to 1120°C
	1.4539	- √	√ /	X	X	X	√ /	<b>√</b>	<b>√</b>	90	250	520 to 720	35	At 1060°C to 1140°C
	1.4547 1.4335	√ √	√ √	X	X	X	√ √	√ √	√   √	90	340 210	650 to 850 470 to 670	35 45	At 1140°C to 1200°C At 1030°C to 1110°C
	1.4335		√ √	X	X	X		√ √		90	245	500 to 750		At 1030°C to 1110°C
	1.4529	√	V	X	X	X	<b>√</b>	<b>√</b>	₩	90	310	600 to 800	35	At 1120°C to 1180°C
	1.4439	√	V	Х	Х	Х	V	V	V	90	315	580 to 800	35	At 1060°C to 1140°C
	1.4466	√	√	Х	Х	Х	√	√	√	90	295	540 to 740	40	At 1070°C to 1150°C
	1.4580	√ /	<b>√</b>	X	X	X	√,	√ /	√,	90	250	510 to 740	35	At 1020°C to 1120°C
D/CD 220 / TITANIU INA C 0 111	1.4558	√ /	√ ./	X	X	X	-√ -/	√ /	√ √	90	210	450 to 700	35	At 950°C to 1150°C
B/SB 338 ( TITANIUM S & W) B/SB 161(Pipe/Tube) , B/SB	2 UNS NO 2200	√ √	√ X	X	X	X	√ √	√ √	X		275 to 450 105	345 380	20 35	Annealed Annealed
163(Tube) High Nickle	UNS NO 2200 UNS NO 2201	√	X	X	X	X	√	√ √	X		80	380 345	35	Annealed Annealed
B/SB 163(Tube) , B/SB 165 ( Pipe/Tube) MONEL	UNS NO 4400		X	X	X	X	√ √	√	X		193	483	35	Annealed
B/SB 163 (tube) , B/SB 167	UNS NO6600	√ √	Х	Х	Х	Х	1	<b>√</b>	Х		241	552	30	Annealed
_, 55 255 (1000), 0/50 10/		√	X	X	X	X	√	√ √	X		276	690	30	At 1093°C
(Pipe) , B/SB 444 (Pipe/Tube)	UNS NO6625	Y												
(Pipe) , B/SB 444 (Pipe/Tube)					Х	Х	J	<b>√</b>	Х		205	520	30	Annealed
(Pipe) , B/SB 444 (Pipe/Tube)  B/SB 407 & B/SB 423	UNS NO8800 UNS NO8810	X	X	X	X	X	√ √	<b>√</b>	X X		205 170	520 450	30 30	Annealed At 1120°C



ASTM (USA)	UNS (USA)	B.S (U.K)	EN/DIN (GERMANY)	AFNOR NF (FRANCE)	UNI (ITALY)
304	S30400	304S15	1.4301	Z6CN18-09	X5CrNi18-10
2041	C20102	204011	1.4306	Z2CN18-10	V20-Mi40 44
304L	S30403	304S11	1.4307	Z3CN18-10	X2CrNi18-11
304N	S30451	304S71	1.6907		
304LN	S30453	304S61	1.4311	Z3CN18-10 Az	
304H	S30409	304S51	1.4948	Z6CN18-09 Az	X8CrNi18-10
246	004600	316S31	1.4401	Z7CND17-11-02	X5CrNiMo17-12
316	S31600	316S33	1.4436	Z7CND18-12-03	X5CrNiMo17-13
		316S11	1.4404	Z3CND17-11-02	X5CrNiMo17-12
316L	S31603	316S13	1.4435	Z3CND18-12-02	X5CrNiMo17-12
		010010	1.7700	Z3CND18-14-03	AGOINIIVIOTI
316N	S31651				
316LN	S31653	316S61	1.4406	Z3CND17-11 Az	
316Ti	S31635	320S31	1.4571	Z6CNDT17-12	X6CrNiMoTi17-13
04011	004000	240050	1.4401	700ND47.40.D	V00-NUM-47.40
316H	S31609	316S52	1.4919	Z6CND17-12 B	X8CrNiMo17-12
321	S32100	321S31	1.4541	Z6CNT18-10	X6CrNiTi18-11
321H	S32109	321S51	1.4878	Z6CNT18-10	X8CrNiTi18-11
317	S31700	317S16	1.4449		X5CrNiMo18-15
317L	S31703	317S12	1.4438	Z3CND19-15-04	X2CrNiMo18-15
347	S34700	347S31	1.455	Z6CNNb18-10	X6CrNiNb18-11
347H	S34709	316Sxx	1.4961		X8CrNiNb18-11
Duplex 2205	S31803		1.4462	Z2CND22-05 Az	
Duplex 2205	S32205	318S13	1.4462	Z3CND22-05 Az	
Super Duplex 2205	S32750		1.441		
405	S40500	405S17	1.4002	Z6CAI13	
410	S41000	410S21	1.4006	Z12C13	X12Cr13



DVI	NDC Designator	Out Side	Dimeter			NOMINAL WALL THICKNESS							
DN	NPS Designator	0	)D	SCH	l 5S	SCH	105	SCH	40S	SCH	80S		
		IN	MM	IN	MM	IN	MM	IN	MM	IN	MM		
	1/8	0.405	10.29		1	0.049	1.24	0.068	1.73	0.095	2.41		
	1/4	0.540	13.72		ŀ	0.065	1.65	0.088	2.24	0.119	3.02		
	3/8	0.675	17.15	-	1	0.065	1.65	0.091	2.31	0.126	3.20		
15	1/2	0.840	21.34	0.065	1.65	0.083	2.11	0.109	2.77	0.147	3.73		
20	3/4	1.050	26.67	0.065	1.65	0.083	2.11	0.113	2.87	0.147	3.91		
25	1	1.315	33.40	0.065	1.65	0.109	2.77	0.133	3.38	0.154	4.55		
32	1.1/4	1.660	42.16	0.065	1.65	0.109	2.77	0.14	3.56	0.179	4.85		
40	1.1/2	1.900	48.26	0.065	1.65	0.109	2.77	0.145	3.68	0.191	5.08		
50	2	2.375	60.33	0.065	1.65	0.109	2.77	0.154	3.91	0.200	5.54		
65	2.1/2	2.875	73.03	0.083	2.11	0.120	3.05	0.203	5.16	0.218	7.01		
80	3	3.500	88.90	0.083	2.11	0.120	3.05	0.216	5.49	0.276	7.62		
90	3.1/2	4.000	101.6	0.083	2.11	0.120	3.05	0.226	5.74	0.300	8.08		
100	4	4.500	114.30	0.083	2.11	0.120	3.05	0.237	6.02	0.318	8.56		
125	5	5.563	141.30	0.109	2.77	0.134	3.40	0.258	6.55	0.337	9.52		
150	6	6.625	168.28	0.109	2.77	0.134	3.40	0.280	7.11	0.375	10.97		
200	8	8.625	219.08	0.109	2.77	0.148	3.76	0.322	8.18	0.432	12.70		
250	10	10.750	273.05	0.134	3.4	0.165	4.19	0.365	9.27	0.500	12.70		
300	12	12.750	323.85	0.156	3.96	0.180	4.57	0.375	9.52	0.500	12.70		
350	14	14.000	355.60	0.165	3.96	0.188	4.78	-	1	ł			
400	16	16.000	406.40	0.165	4.19	0.188	4.78	-	1	ł			
450	18	18.000	457.20	0.165	4.19	0.188	4.78		-	1			
500	20	20.000	508	0.188	4.78	0.218	5.54			-			
550	22	22.000	558.80	0.188	4.78	0.218	5.54			-			
600	24	24.000	609.60	0.218	5.54	0.250	6.35			-			
750	30	30.000	762	0.250	6.35	0.312	7.92						



## S PLUS



**Thermal Power Plant** 



**Heat Exchanger** 



**Nuclear Power Plant** 



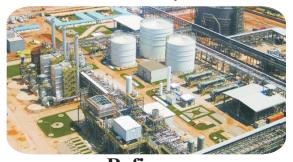
H.P Heater



Railway



L.P.Heater



Refinery



Condenser



Aerospace



Instrumentation







#### A GROUP OF:



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