



# List of Core values

Professional, Reliable, Efficient

[www.sunnysteel.com](http://www.sunnysteel.com)

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Collect Steel pipe and fitting Resources

## Full range, every size

By choosing Sunny Steel as your supplier, you can focus on what matters most to you instead of getting bogged down in the details.

We are guided and motivated by the following 3 core values.

**Professional**

Our team are highly trained and experienced in servicing and producing all types of steel supplies. Sunny Steel prides itself on the professional relationship we develop with all clients.

**Reliable**

We are reliable because we know the market, we are honest, truthful and we will meet our promise to our clients. We provide our clients with the best value products in an effort to grow their reputation within their industry.

**Efficient**

We are committed to deliver a total solution of steel pipes, fittings, flanges logistics and technical services to fulfill our client's requirements in the most efficient and cost effective manner.



## WHY SUNNY STEEL

Sunny Steel provide a wide range of steel products as Steel pipes, Seamless tube and seamless pipes, Alloy pipes, Pipe fittings, Composite steel pipe used in the industry, construction etc.

Our customers are able to rely on us for deliveries timed to meet the exacting requirements of their projects as well as for regular deliveries of stock.

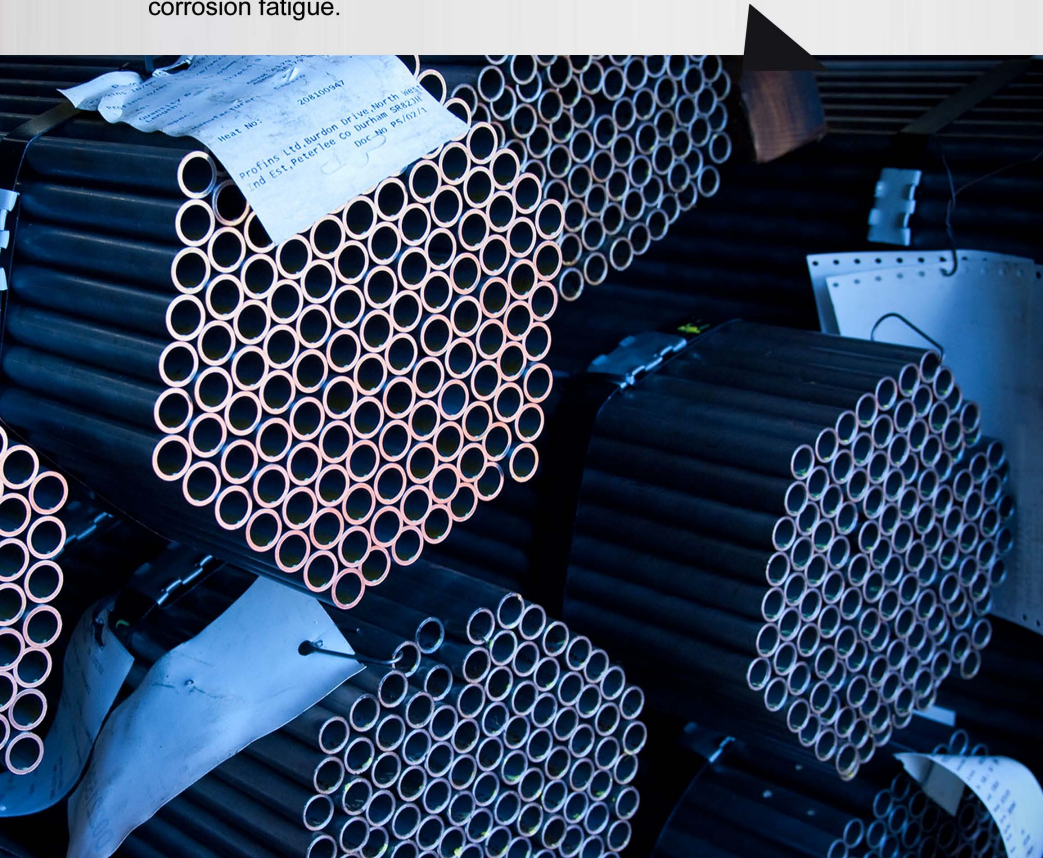
We enjoy close working relationships with our customers working with them from concept through to completion often resulting in economy of design and the cost benefits that go with it. By choosing Sunny Steel as your supplier, you can focus on what matters most to you instead of getting bogged down in the details.



## BOILER TUBES

Boiler Tubes are metal tubes located inside boilers that heat water in order to produce steam.

Boiler tubes are susceptible to certain damage mechanisms, including:  
boiler feed water corrosion,  
graphitization,  
thermal fatigue, and  
corrosion fatigue.



## Standard

ASME: American society of mechanical engineers

ASME SA-106, ASME SA-192M, SAME SA-209M, ASME SA-210M, ASME SA-231M, ASME SA-335M

ASTM: American Society for testing and materials

ASTM A 106M, ASTM A192M, ASTM A210M, ASTM A213M, ASTM A 335M

European standards

EN 10216-2

Deutsche industrie normen

DIN 17175

GB: Chinese National Standards

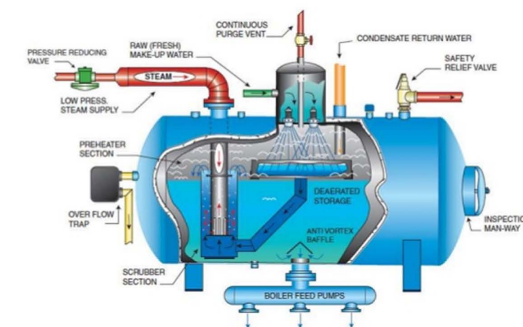
GB 3087, GB 5310, GB 6479, GB 9948, GB/T 13296

JIS: Japanese industrial standards

JIS G 3456, JIS 3461, JIS G 3462

## Usage

For manufacture wall panel, economizer, reheater, superheater and steam pipeline of boilers





## Alloy steel pipes

Alloy steel pipe is a kind of seamless steel pipe, its performance is much higher than the general seamless steel pipe, because this steel pipe inside containing Cr, high temperature resistance, low temperature, corrosion-resistant performance of other non-pipe joints not match, so the more extensive use of alloy tube in the petroleum, aerospace, chemical, electric power, boiler, military, and other industries.

The alloy steel pipe adopts high quality carbon steel, alloy structural steel and stainless & heat resisting steel as raw material through hot rolling or cold drawn to be made.



### ASTM A333

Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service and Other Applications.



### ASTM A213 09

Seamless Ferritic and Austenitic Alloy Steel Boiler, Superheater and Heat-exchanger Tubes



### EN 10216-2

EN 10216-2 is a European standard suitable for seamless steel tubes for pressure purposes.



### ASTM A519

covers for several grades of carbon and alloy steel mechanical tubing, either hot-finished or cold-finished.

## Chrome Moly Pipe

ASTM A335 Pipe (ASME S/A335, Chrome-Moly) is a seamless ferritic Alloy-Steel Pipe for high temperature service.

Main grades: ASTM A335 P5, P9, P11, P-22, and P91

Size range: NPS 1/4" to NPS 24"

## Main products and applications:

Steel Grade	Standard			Application
	GB(China)	ASME (USA)	DIN/EN(Euro)	
Carbon steel	10 20 20G 20MnG 25MnG	SA-106B SA-192 SA-210A1 SA106C SA-210C	PH265GH P195GH P235GH St35.8 St45.8	Economizer tube Water wall tube
Mo steel	15MoG 20MoG	SA-209 T1 SA-209 T1a SA-209 T1b	15Mo3 16Mo3	Water wall tube Superheater tube Reheater tube
Cr-Mo Steel	12CrMoG 12Cr2MoG 12Cr1MoVG 15CrMoG 10Cr9MoVNb	SA-213 T11 SA-213 T22 SA-213 T24 SA-213 T91 A335 P1 A335 P2 A335 P5 A335P9 A335 P11	12Cr1MoV 14MoV63 10CrMo910 X10CrMoVNb91 10CrMo5-5, 13CrMo4-5	Superheater tube Reheater tube
Cr-Mo-W steel	12Cr2MoWVTiB	SA-213 T23 SA-214 T911 SA-213 T92 SA-213 T122 A335 P23 A335 P911 A335 P92 A335 P122	---	Superheater tube Reheater tube
Austentic Stainless steel	---	AP304 TP304H TP321 TP321H TP347 TP347H TP316 TP316H S30432 TP310HCbN	---	Superheater tube Reheater tube

## Seamless steel pipes

We can make and market cold-drawn and hot rolled seamless steel pipes and cold-drawn special-section seamless pipes which are widely applied in the industries of petrochemical, boiler, automobile, mechanical, construction.



ASTM A106

Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service and Other Applications.



ASTM A210

Seamless medium-carbon steel boiler and superheater tubes, including a minimum wall thickness of the security side.



ASTM A179

Seamless Cold-drawn Low-Carbon Steel Heat-Exchanger and Condenser Tubes



15CrMoG

The range of 15CrMoG pipe sizes that may be examined by each method shall be subjected to the limitations in the scope of the respective practice.



12Cr1MoVG

GB 5310 12Cr1MoVG is applicable to seamless tubes for making steam boiler whose pressure is high or higher and seamless tubes used as pipelines.



ASTM A192

Seamless Carbon Steel Boiler Tubes for High Pressure

## Main products and applications:

Steel Grade	Standard			Application
	GB(China)	ASME (USA)	DIN/EN(Euro)	
Carbon steel	10 20 20G 20MnG 25MnG	SA-106B SA-192 SA-210A1 SA106C SA-210C	PH265GH P195GH P235GH St35.8 St45.8	Economizer tube Water wall tube
Mo steel	15MoG 20MoG	SA-209 T1 SA-209 T1a SA-209 T1b	15Mo3 16Mo3	Water wall tube Superheater tube Reheater tube
Cr-Mo Steel	12CrMoG 12Cr2MoG 12Cr1MoVG 15CrMoG 10Cr9MoVNb	SA-213 T11 SA-213 T22 SA-213 T24 SA-213 T91 A335 P1 A335 P2 A335 P5 A335P9 A335 P11	12Cr1MoV 14MoV63 10CrMo910 X10CrMoVNb91 10CrMo5-5, 13CrMo4-5	Superheater tube Reheater tube
Cr-Mo-W steel	12Cr2MoWVTiB	SA-213 T23 SA-214 T911 SA-213 T92 SA-213 T122 A335 P23 A335 P911 A335 P92 A335 P122	---	Superheater tube Reheater tube
Austentic Stainless steel	---	AP304 TP304H TP321 TP321H TP347 TP347H TP316 TP316H S30432 TP310HCbN	---	Superheater tube Reheater tube

**■ Mechanical properties:**

Standard	Grade	Tensile strength (Mpa)	Yield point(Mpa) not less than	Elongation(%) not less than	Impact(J) not less than	Hardness not less than
ASTM A192 ASME SA-192M	A192/SA-192	≥325	180	35	"	77HRB
ASTM A209 ASME SA-209M	A 209T1/SA-209 T1	≥380	205		"	80HRB
	A 209T1b/SA-209T1b	≥365	195		"	77HRB
	A209T1a/SA-209T1a	≥415	220		"	81HRB
ASTM A210 ASME SA-210M	A210 A1/ SA-210A1	≥415	255		"	79HRB
	A210C/ SA-210C	≥485	275		"	89HRB
ASTM A213 ASME SA-213M	A213 T2/SA213 T2	≥415	205		"	85HRB
	A213 T11/SA213 T11	≥415	205		"	85HRB
	A213 T22/SA213 T22	≥415	205		"	85HRB
	A213 T23/SA213 T23	≥510	400	20	"	97HRB
	A213 T24/SA213 T24	≥585	415	20	"	25HRB
	A213 T91/SA213 T91	≥585	415	20	"	25HRB
	A213 T911/SA213 T911	≥620	440	20	"	25HRB
	A213 T22/SA213 T92	≥620	440	20	"	25HRB
	A213 T122/SA213 T122	≥620	400	20		25HRB
	TP304H	≥515	205	35		90HRB
	TP316H	≥515	205	35		90HRB
	TP321H	≥515	205	35		90HRB
	TP347H	≥515	205	35		90HRB
	S30432	≥590	235	35		95HRB
	TP310HCbN	≥655	295	30		100HRB



## ■ Mechanical properties:

Standard	Grade	Tensile strength (Mpa)	Yield point(Mpa) not less than	Elongation(%) not less than	Impact(J) not less than	Hardness not less than
EN 10216-2	P195GH	320-440	195	27		
	P235GH	360-500	235	25		
	P265GH	410-570	265	23		
	16Mo3	450-600	280	22		
	10CrMo5-5	410-560	275	22		
	13CrMo4-5	440-590	290	22		
	10CrMo9-10	480-630	280	22		
	X10CrMoVBb9-1	630-830	450	19	41	
JIS G 3461	STB 340	≥340	175	35		
	STB 410	≥410	255	25		
	STB 510	≥510	295	25		
JIS G 3462	STBA 12	≥382	175	35		
	STBA 13	≥412	255	25		
	STBA 20	≥412	295	25		
	STBA 22	≥412	206			
	STBA 23	≥412	206			
	STBA 24	≥412	206			
	STBA 26	≥412	206			
	STBA 19	≥412	206			
JIS G 3463	SUS 304HTB	≥520	206			
	SUS 316HTB	≥520	206			
	SUS 321HTB	≥520	206			
	SUS 347HIB	≥520	206			

## Chemical composition:

Grade Standard	Steel Grade	C	Si	Mn	S	P	Cr	Mo	V	Ti	B	W	Ni	Al	Nb	N	Others
GB 3087	10	0.07-0.13	0.17-0.37	0.35-0.65	0.020	0.025	≤0.15										
	20	0.17-0.23	0.17-0.37	0.35-0.65	0.020	0.025	≤0.25										
DIN 17175	St 35.8	≤0.17	0.10-0.35	0.40-0.80	0.020	0.025											
	St 45.8	≤0.21	0.10-0.35	0.40-1.20	0.020	0.025											
	15Mo3	0.12-0.20	0.10-0.35	0.40-0.80	0.020	0.025		0.25-0.35									
	13CrMo44	0.10-0.18	0.10-0.35	0.40-0.70	0.020	0.025	0.70-1.10	0.45-0.65									
	10CrMo910	0.08-0.15	≤0.50	0.40-0.70	0.020	0.025	2.00-2.50	0.90-1.20									
	14MoV63	0.10-0.18	0.10-0.35	0.40-0.70	0.020	0.025	0.30-0.60	0.50-0.70	0.22-0.32								
	12Cr1MoV	0.08-0.15	0.17-0.37	0.40-0.70	0.020	0.025	0.90-1.20	0.25-0.35	0.15-0.30								
GB5310	20G	0.17-0.23	0.17-0.37	0.35-0.65	0.015	0.025											
	20 MnG	0.17-0.24	0.17-0.37	0.70-1.00	0.015	0.025											
	25 MnG	0.22-0.27	0.17-0.37	0.70-1.00	0.015	0.025											
	15 MoG	0.12-0.20	0.17-0.37	0.40-0.80	0.015	0.025		0.25-0.35									
	20 MoG	0.15-0.25	0.17-0.37	0.40-0.80	0.015	0.025		0.44-0.65									
	12CrMoG	0.08-0.15	0.17-0.37	0.40-0.70	0.015	0.025	0.40-0.70	0.40-0.55									
	15CrMoG	0.12-0.18	0.17-0.37	0.40-0.70	0.015	0.025	0.80-1.10	0.40-0.55									
	12Cr2MoG	0.08-0.15	≤0.60	0.40-0.60	0.015	0.025	2.00-2.50	0.90-1.13									
	12Cr1MoVG	0.08-0.15	0.17-0.37	0.40-0.70	0.010	0.025	0.90-1.20	0.25-0.35	0.15-0.30								
	12Cr2MoWVTiB	0.08-0.15	0.45-0.75	0.45-0.65	0.015	0.025	1.60-2.10	0.50-0.65	0.28-0.42	0.08-0.18	0.002-0.008	0.30-0.55					
	10Cr9Mo1VNbN	0.08-0.12	0.20-0.50	0.30-0.60	0.010	0.020	8.00-9.50	0.85-1.05	0.18-0.25				≤0.040	≤0.040	0.06-0.10	0.03-0.07	
	07Cr19Ni10	0.04-0.10	≤0.75	≤2.0	0.015	0.035	17.00-20.00		8.00-11.00								
07Cr18Ni11Nb	0.04-0.10	≤0.75	≤2.0	0.015	0.030	17.00-19.00						9.00-13.00	8C-1.10				

## Chemical composition:

Grade Standard	Steel Grade	C	Si	Mn	S	P	Cr	Mo	V	Ti	B	W	Ni	Al	Nb	N	Others	
ASTMA 106M ASME SA-106	A 106B SA-106B	≤0.30	≥0.10	0.29-1.06	0.020	0.025												
	A 106C SA-106C	≤0.35	≥0.10	0.29-1.06	0.020	0.025												
ASTM A192M ASME SA-192M	SA 192 SA-192	0.06-0.18	≤0.25	0.27-0.63	0.020	0.025												
ASTM A209M ASME SA-209M	A209T1 SA-209T1	0.10-0.20	0.10-0.50	0.30-0.80	0.020	0.025		0.44-0.65										
	A209T1b SA-209T1b	≤0.14	0.10-0.50	0.30-0.80	0.020	0.025		0.44-0.65										
	A209T1a SA-209T1a	0.15-0.25	0.10-0.50	0.30-0.80	0.020	0.025		0.44-0.65										
ASTM A210M ASME SA-210M	A 210A1 SA-210A1	≤0.27	≥0.10	≤0.93	0.020	0.025												
	A 210C SA-210C	≤0.35	≥0.10	0.29-1.06	0.020	0.025												
ASTM A213M ASME SA-213M	A 213 T2 SA-213 T2	0.10-0.20	0.10-0.30	0.30-0.61	0.020	0.025	0.50-1.81	0.44-0.65										
	A 213 T11 SA-213 T11	0.05-0.15	0.50-1.00	0.30-0.60	0.020	0.025	1.00-1.50	0.44-0.65										
	A 213 T12 SA-213 T12	≤0.15	≤0.50	0.30-0.61	0.020	0.025	0.80-1.25	0.44-0.65										
	A 213 T22 SA-213 T22	0.05-0.15	≤0.50	0.30-0.60	0.020	0.025	1.90-2.60	0.87-1.13										
	A 213 T23 SA-213 T23	0.04-0.10	≤0.50	0.10-0.60	0.010	0.025	1.90-2.60	0.05-0.30	0.20-0.30	0.005-0.06	0.0005-0.006	1.45-1.75		≤0.03	0.02-0.08	≤0.03	Ti/N≥3.5	
	A 213 T24 SA-213 T24	0.05-0.10	0.15-0.45	0.30-0.70	0.020	0.025	2.20-2.60	0.70-1.10	0.20-0.30	0.06-0.10	0.0015-0.0020			≤0.02		≤0.012		
	A 213 T91 SA-213 T91	0.08-0.12	0.20-0.50	0.30-0.60	0.010	0.020	8.00-9.50	0.85-1.05	0.18-0.25					≤0.40	≤0.40	0.06-0.10	0.03-0.07	
	A 213 T911 SA-213 T911	0.09-0.13	0.10-0.50	0.30-0.60	0.020	0.025	8.50-10.50	0.90-1.10	0.18-0.25		0.0003-0.006	0.90-1.10		≤0.40	≤0.40	0.06-0.10	0.04-0.09	
	A 213 T92 SA-213 T92	0.07-0.13	≤0.5	0.3-0.6	0.010	0.020	8.50-9.50	0.30-0.60	0.15-0.25		0.001-0.006	1.5-2.00		≤0.4	≤0.4	0.04-0.09	0.03-0.07	
	A 213 T122 SA-213 T122	0.07-0.14	≤0.5	≤0.70	0.010	0.020	10.00-12.50	0.25-0.60	0.15-0.30		0.0005-0.005	1.5-2.5		≤0.5	≤0.4	0.040-0.10	0.040-0.100	
	TP304H	0.04-0.10	≤0.75	≤2.0	0.030	0.040	18.00-20.00							8.00-11.000				
	TP321H	0.04-0.10	≤0.75	≤2.0	0.030	0.040	17.00-20.00				4*C%-0.60			9.00-13.00				
	TP347H	0.04-0.10	≤0.75	≤2.0	0.030	0.040	17.00-20.00							9.00-13.00				Nb+Ta≥8*C%-1.00
S30432	0.07-0.13	≤0.30	≤1.0	0.040	0.010	17.00-20.00					0.001-0.010		7.5-10.5	0.003-0.030	0.30-0.60	0.05-0.12	Cu 2.50-3.50	

## Chemical composition:

Grade Standard	Steel Grade	C	Si	Mn	S	P	Cr	Mo	V	Ti	B	W	Ni	Al	Nb	N	Others
	TP310HCbN	0.04-0.10	≤0.75	≤2.0	0.030	0.030	24.00-26.00						17.0-23.0		0.20-0.60	0.15-0.35	
EN10216-2	P195GH	≤0.13	≤0.35	≤0.70	0.020	0.025	≤0.30	≤0.08	≤0.02	≤0.040			≤0.30	≥0.02	≤0.01		Cr+Cu+Mo+Ni ≤ 0.70
	P235GH	≤0.16	≤0.35	≤1.20	0.020	0.025	≤0.30	≤0.08	≤0.02	≤0.040			≤0.30	≥0.02	≤0.01		Cr+Cu+Mo+Ni ≤ 0.70
	P265GH	≤0.20	≤0.40	≤1.40	0.020	0.025	≤0.30	≤0.08	≤0.02	≤0.040			≤0.30	≥0.02	≤0.01		Cr+Cu+Mo+Ni ≤ 0.70
	16Mo3	0.12-0.20	≤0.35	0.40-0.90	0.020	0.025	≤0.30	0.25-0.35					≤0.30	≤0.04			Cu ≤ 0.30
	10CrMo5-5	≤0.15	0.50-1.00	0.30-0.60	0.020	0.025	1.00-1.50	0.45-0.65					≤0.30	≤0.04			Cu ≤ 0.30
	13CrMo4-5	0.10-0.70	≤0.35	0.40-0.70	0.020	0.025	0.70-1.15	0.40-0.60					≤0.30	≤0.04			Cu ≤ 0.30
	10CrMo9-10	0.08-0.14	≤0.50	0.30-0.70	0.020	0.025	2.00-2.50	0.90-1.10					≤0.30	≤0.04			Cu ≤ 0.30
X10CrMoVNb9-1	0.08-0.12	0.20-0.50	0.30-0.60	0.010	0.020	8.00-9.50	0.85-1.05	0.18-0.25				≤0.40	≤0.04	0.06-0.10	0.03-0.07	Cu ≤ 0.30	
JIS G3461	STB 340	≤0.18	≤0.35	0.30-0.60	0.020	0.025											
	STB 410	≤0.32	≤0.35	0.30-0.80	0.020	0.025											
	STB 510	≤0.25	≤0.35	1.00-1.50	0.020	0.025											
JIS G3462	STAB 12	0.10-0.20	0.10-0.50	0.30-0.80	0.020	0.025		0.45-0.65									
	STAB 13	0.15-0.25	0.10-0.50	0.30-0.80	0.020	0.025		0.45-0.65									
	STAB 20	0.10-0.20	0.10-0.50	0.30-0.80	0.020	0.025		0.45-0.65									
	STAB 22	≤0.15	≤0.50	0.30-0.60	0.020	0.025	0.80-1.25	0.45-0.65									
	STAB 23	≤0.15	0.50-1.00	0.30-0.60	0.020	0.025	1.00-1.25	0.45-0.65									
	STAB 24	≤0.15	≤0.50	0.30-0.60	0.020	0.025	1.90-2.60	0.87-1.13									
	STAB 26	≤0.15	0.25-1.00	0.30-0.60	0.020	0.025	8.00-10.0	0.90-1.10									
JIS G3463	SUS304HTB	0.04-0.10	≤2.00	≤0.75	0.020	0.025	18.00-20.00						8.00-11.000				
	SUS321HTB	0.04-0.10	≤2.00	≤0.75	0.020	0.025	17.00-20.00			4*C%-0.60			9.00-13.00				

TABLE COLD FINISHING DIMENSION FOR SEAMLESS TUBES AND PIPES  
(Applicable for thermal power plant in China, other will refer to applicable standards)

		WALL THICKNESS (mm)																												
		1.2	1.5	2	2.5	2.8	3	3.2	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	11	12	13	14	16	18		
OUTSIDE DIAMETER (mm)	8	○	○	○																										
	10	○	○	○	○	○	○	○	○																					
	12	○	○	○	○	○	○	○	○	○																				
	14	○	○	○	○	○	○	○	○	○																				
	16	○	○	○	○	○	○	○	○	○	○	○																		
	19	○	○	○	○	○	○	○	○	○	○	○	○																	
	22	○	○	○	○	○	○	○	○	○	○	○	○	○																
	24	○	○	○	○	○	○	○	○	○	○	○	○	○	○															
	25	○	○	○	○	○	○	○	○	○	○	○	○	○	○															
	28	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○													
	29	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○												
	30	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○											
	32	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○										
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108												○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
114													○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
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159																				○	○	○	○	○	○	○	○	○	○	

Remark: Mark "O" means available value  
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**Tolerances on Out Diameter:**

Standard	Hot Finished Seamless Tube		Cold Finished Seamless Tube	
	Outside Diameter (mm)	Tolerance	Outside Diameter (mm)	Tolerance
EN 10216-1 EN 10216-2 DIN 17175	<100	±0.75% (min. ±0.5mm)	All	±0.5% (min. ±0.30mm)
	>100	±0.90%		
GB 3087	<159	+1.25%, -1.0%	10-30	± 0.40mm
			>30-50	± 0.45mm
			>50	±1.0%
GB 5310	<50	± 0.50mm	<30	± 0.20mm
			>30-50	± 0.30mm
	>50	±1.0%	>50	±0.8%
ASMESA-179M ASMESA-192M ASME SA-209M ASME SA-210M ASME SA-213M JIS G 3461 JIS G 3462	<101.6	+0.4, -0.8mm	<25.4	±0.10mm
			>25.4-38.1	±0.15mm
			>38.1-50.8	± 0.20mm
	101.6-190.5	+0.4, -1.2mm	>50.8-63.5	± 0.25mm
			>63.5-76.2	± 0.30mm
			>76.2	± 0.38mm
ASME SA-106	<48.3	± 0.40mm	<48.3	± 0.40mm
	48.3-114.3	± 0.79mm		
	114.3-219.1	+1.59, -0.79mm		
	219.1-323.9	+2.38, -0.79mm		

## Tolerances on Out Diameter:

Standard	Hot Finished Seamless Tube			Cold Finished Seamless Tube		
	Outside Diameter OD (mm)	Wall Thickness T (mm)	Tolerance	Outside Diameter OD (mm)	Wall Thickness T (mm)	Tolerance
EN 10216-1 EN 10216-2 DIN 17175	<130	S<2Sn	+15%, -10%	—	All	±10%
		2Sn<S<4Sn	+12.5%, -10%			(min. ±0.2mm)
		S>4Sn	±9%			
	>130	S<0.05da	+17.5%, -12.5%			
		0.05da<S<0.11da	±12.5%			
		S>0.11da	±10%			
GB 3087	—	<20	+15%, -12.5% (min.+0.45, -0.35mm)	—	1.0-3.0	+15%, -10%
	—	>20	±12.5%	—	>3	+12.5%, -10%
GB5310	—	<3.5	+15%, -10% (min.+0.48, -0.32mm)	—	2-3	+12%, -10%
		3.5-20	+15%, -10%	—	>3	±10%
		>20	±10%			
ASMESA179M ASMESA-192M ASME SA-209M ASME SA-210M ASME SA-213M JIS G 3461 JIS G 3462	—	2.41-3.8	+35%, -0%	<38.1	—	+20%, -0%
		3.8-4.6	+33%, -0%	>38.1	—	+22%, -0%
		>4.6	+28%, -0%	—	—	—
ASME SA-106	—	All	±12.5%	—	All	±10%