

# SPECIFICATIONS

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## ASTM

Specification		ASTM A249				
		TP304	TP304L	TP316	TP316L	
Classification						
Application		Boiler, Superheater, Heat Exchanger & Condenser Tubes				
Chemical composition(%)	C(Max.)	0.08	0.035	0.08	0.035	
	Si(Max.)	0.75	0.75	0.75	0.75	
	Mn(Max.)	2.0	2.0	2.0	2.0	
	P(Max.)	0.04	0.04	0.04	0.04	
	S(Max.)	0.03	0.03	0.03	0.03	
	Others	Ni, Cr	Ni, Cr	Ni, Cr, Mo	Ni, Cr, Mo	
	Mechanical properties	Tensile strength (min.)	PSI	75000	70000	75000
MPa			515	485	515	485
kgf/mm <sup>2</sup>			52.8	49.3	52.8	49.3
Yield point (min.)		PSI	30000	25000	30000	25000
		MPa	205	170	205	170
		kgf/mm <sup>2</sup>	21.1	17.6	21.1	17.6
Elongation (min.)		35	35	35	35	
Flattening test	H : Distance between Flattening plates	$H = \frac{(1+e)t}{e+t/D}$ e : 0.07(C : 0.19% over)				
	H' : Inside disance between flattening plates					
	D : Outside diameter of the pipe					
	D' : Inside diameter of the pipe					
Bending test	t : Wall thickness of the pipe					
	Bending angle X Inside radius (D : Outside diameter, t : Wall thickness )					
Hydrostatic test	P : Test pressure					
	S : Fiber stress, PSI(MPa) D : Outside diameter(mm) t : thickness(mm)					
NDT (Non-Destructive Test)		Eddy Current Test (Substitute with Hydrostatic Test)				
Others		Flange Test, Reverse Bend Test, Hardness Test				

## ASTM

Specification		ASTM A671							
		CA55	CB60	CB65	CB70	CC60	CC65	CC70	
Classification									
Application		-							
Chemical composition(%)	C(Max.)	0.28	0.24	0.28	0.31	0.21	0.24	0.27	
	Si(Max.)	-	0.15 ~ 0.40	0.15 ~ 0.40	0.15 ~ 0.40	0.15 ~ 0.40	0.15 ~ 0.40	0.15 ~ 0.40	
	Mn(Max.)	0.90	0.90	0.90	1.20	0.60 ~ 0.90	0.85 ~ 1.20	0.85 ~ 1.20	
	P(Max.)	0.035	0.035	0.035	0.035	0.035	0.035	0.035	
	S(Max.)	0.04	0.035	0.035	0.035	0.035	0.035	0.035	
	Others	-	-	-	-	-	-	-	
	Mechanical properties	Tensile strength (Min.)	PSI	-	-	-	-	-	-
MPa			380 ~ 515	415 ~ 550	450 ~ 585	485 ~ 620	415 ~ 550	450 ~ 585	485 ~ 620
kgf/mm <sup>2</sup>			33.8 ~ 52.6	42.4 ~ 56.1	45.9 ~ 59.7	45.9 ~ 63.3	42.4 ~ 56.1	45.9 ~ 59.7	49.5 ~ 63.3
Yield point (Min.)		PSI	-	-	-	-	-	-	-
		MPa	205	220	240	260	220	240	260
		kgf/mm <sup>2</sup>	21.0	22.5	24.5	26.6	22.5	24.5	26.6
Elongation (min.)		27	25	23	21	25	23	21	
Flattening test		-							
Bending test		-							
Hydrostatic test	Class 10		-						
	Class 11		-						
	Class 12		TEST						
	Class 13		TEST						
	Class 20		-					P = 2St/D	
	Class 21		-						
	Class 22		TEST						
	Class 23		TEST						
	Class 10		-						
	Class 11		TEST(RT)						
NDT (Non-Destructive Test)	Class 12		TEST(RT)						
	Class 13		-						
	Class 20		-						
	Class 21		TEST(RT)						
	Class 22		TEST(RT)						
	Class 23		-						
	Class 20		-						
Class 21		TEST(RT)							
Class 22		TEST(RT)							
Class 23		-							
Others		-							