KLM

Steel Pipe



KLM STEEL PIPE

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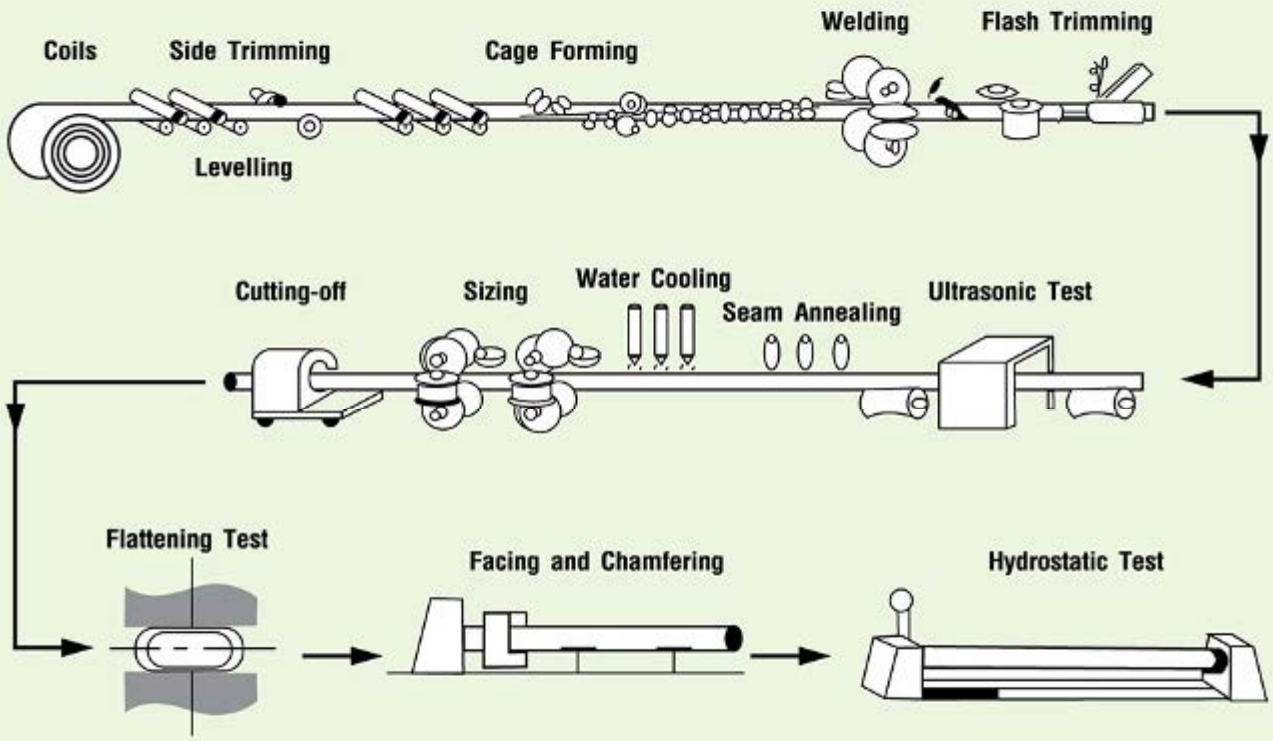
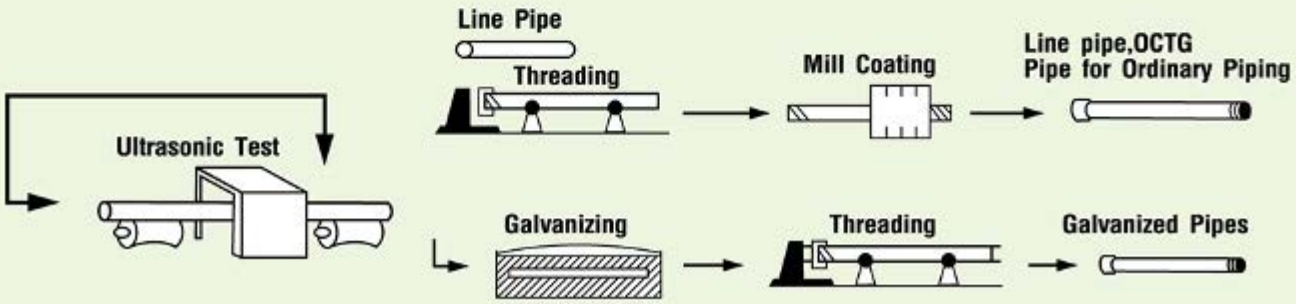
Steel Pipe

MANUFACTURING PROCESS



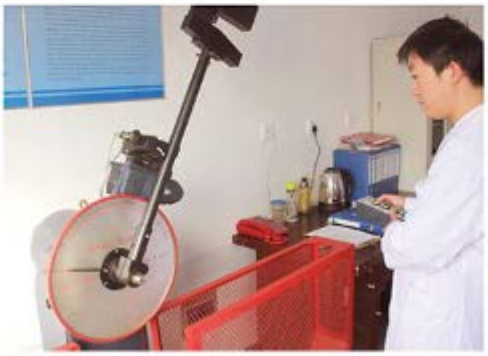
TESTING & GALVANIZING PROCESS



Quality Control

KLM Steel Pipe

Metallogical Test
ทดสอบคุณสมบัติทางกล





Digital Loadcell Test
ทดสอบแรงดึง



Spectrometer Test
ทดสอบคุณสมบัติทางเคมี



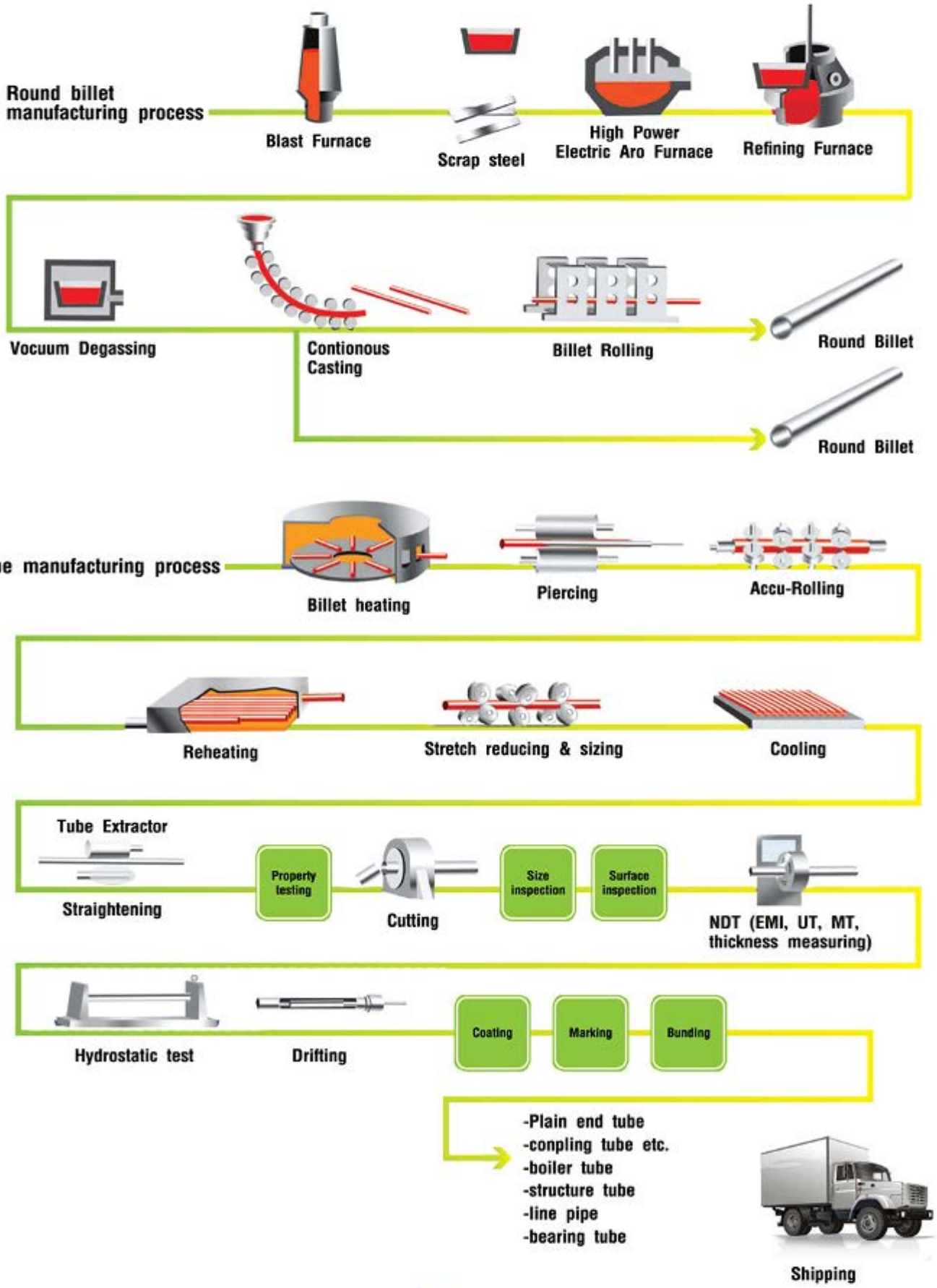
Hydrostatic Test
ทดสอบการรั่วซึมด้วยระบบน้ำแรงดันสูง





KLM
Steel Pipe

Process Flow



KLM Steel Pipe



Shipping

Coating → Marking → Bunding → Drill pipe



Length-measuring, weighing → Hardnoss test



weld NDT(UT)



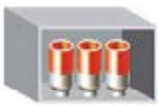
weld finishing



weld heat treatment



Friction welding



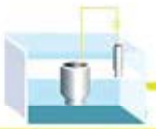
Tool joint heat treatment



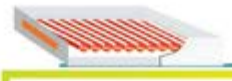
Threading → Thread inspection



NDT(UT, MT)



Cu plating



Heat treatment



Hot straightening

Tube





OCTG : finishing process

Upsetting



NDT(EMI, UT, MT, thickness measuring)



Coupling Threading → Thread inspection → NDT Coupling (MT)



Phosphating



Hydrostatio test



Drilting



make up



Thread jpsuection



Theading



Length-measuring, weighing → Coating → Marking → Bunding → - Tubing & casing - Heat insulated tubing



Shipping

KLM
Steel Pipe

MAJOR PRODUCTION USAGE

Type of pipes		Similar specification				Application
Type	Manufacturing method	Korea	Japan	U.S.A.	U.K	
Steel pipes for ordinary piping	ERW	Carbon steel pipes for ordinary piping (KS D 3507/SPP)	Carbon steel pipes for ordinary piping (JIS G 3452/SGP)	ASTM A53	BS 1387	Steel pipes for steam, air, water, oil and gas etc. with relatively low pressure
	ERW	Galvanized steel pipes for water service (KS D 3537/SPPW)	Galvanized steel pipes for water service (JIS G 3442/SGPW)	ASTM A53	BS 1387	Steel pipes for water supply wity 100m or less at water head
	ERW Spiral Roll bending	Coated steel pipes for water works (KS D 3565/STWW) Fittings of coated steel pipes for water works (KS D 3578)	-	AWWA C200, C203	-	Steel pipes for water works
	Spiral Roll bending	Arc welded carbon steel pipes (KS D 3583/SPW)	Arc welded carbon steel pipes (JIS G 3457/STPY)	ASTM A 134, A139 A671, A672	-	Steel pipes for steam, air, water, oil and gas etc. with relatively low pressure
Steel pipes for pressues service	ERW	Carbon steel pipes for pressure service (KS D 3562/SPPS)	Carbon steel pipes for pressure service (JIS G 3454/STPG)	ASTM A53 API 5L	BS 3601	Steel pipes for application at a temperature of 350 C or less
	Roll bending	Arc welded carbon steel pipes (KS D 3583/SPW)	Arc welded carbon steel pipes (JIS G 3457/STPY)	-	-	Piping for steam, water, gas, air of comparatively low working pressure.
Steel pipes for strucural purposes	ERW	Carbon steel tubes for machine structural purposes (KS D 3517/STKM)	Carbon steel tubes for machine structural purposes (JIS G 3445/STKM)	ASTM A513	BS 980 BS 1717 BS 1775	Steel pipes for application for mechanical Parts such as machinery, automobiles, bicycles, furniture and fixtures etc.
	ERW Spiral Roll bending	Carbon steel tubes for machine structural purposes (KS D 3566/STK)	Carbon steel tubes for genera structural purposes (JIS G 3444/STK)	ASTM A500	BS 980 BS 1139 BS 4848	Steel pipes for application for structures such as civil works, architecture, steel tower, scaffolding, piles, veranda and fence and post etc.
	ERW	Carbon steel square pipes for general structural purposes (KS D 3568/SPSR)	Carbon steel square pipes for general structural purposes (JIS G 3466/STKR)	ASTM A500	BS 4848	Steel pipes for application tocivil works, architecture and other stuctures
	ERW Spiral Roll bending	Steel pipe piles (KS F 4602)	Steel pipe piles (JIS A 5525/SKK)	ASTM A252	-	Steel pipes for foundation civil works, architectures etc.
	Spiral Roll bending	-	-	Fubrication of structural steel pipe (API 2B)	-	Offshore structure. Piping and main structural members
Line pipe	Spiral Roll bending	-	-	API 5L (GR, A, B, X42, X46, X52 X56, X60, X65, X70, X80)	-	Steel pipes for transportation petroleum and natural gas
OCTG	ERW	-	-	API 5CT (H40, J55, K55, N80)	-	Steel pipes for development for petroleum and natural gas
Conduits	ERW	Rigid steel conduits (KS C 8401)	Rigid steel conduits (JIS C 8305)	ANSI C80.1 UL6	BS 31	Steel pipes for protection of electric cable at electric distribution lines
Steel tubes for boiler & heat exchanger	ERW	Carbon sreel boiler and heat exchanger tubes (KS D 3563/STBH)	Carbon sreel boiler and heat exchanger tubes (JIS G 3461/STB)	ASTM A 178, A 214, A 226	BS 3059 BS 3606	Water pipes for boiler, connection pipe, overheat engine, air preheating pipe and heat exchange pipes, condenser
Coated steel pipes	ERW Spiral Roll bending	-	-	-	-	Coated steel pipes for protection of outside surface of steel pipe for underground burial.
Steel tubes for towel structural purposes	ERW Spiral Roll bending	-	-	-	-	High tensile steel pipes applicable to electric transmission tower

KS : Korean standards JIS : Japanese Industrial Standards BS : British Standard API : American Petroleum Institute UL : Underwriters Laboratories
AWWA : American Water Works Association ASTM : American Society for Testing and Materials UK : United Kingdom
* Please consult dimension of main pipes produced with market department.

SPECIFICATIONS

KLM Steel Pipe

Specification / Classification			ASTM A53		ASTM A500				ASTM A513									
			A	B	A		B		MT 1010	MT 1015	MTX 1015	MT 1020	MTX 1020	1025	1026	1030	1035	4130	8630
Application			Ordinary piping		General structural purposes				Machine structural purposes										
Chemical composition(%)	C(Max.)		0.25	0.30	Heat 0.26	Product 0.30	Heat 0.26	Product 0.30	0.05-0.15	0.10-0.20	0.10-0.20	0.15-0.25	0.15-0.25	0.22-0.28	0.22-0.28	0.27-0.34	0.31-0.38	0.28-0.33	0.28-0.33
	Si(Max.)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.15-0.35	0.15-0.35
	Mn(Max.)		0.95	1.20	-	-	-	-	0.30-0.60	0.30-0.60	0.60-0.90	0.30-0.60	0.70-1.00	0.30-0.60	0.60-0.90	0.60-0.90	0.60-0.90	0.40-0.60	0.70-0.90
	P(Max.)		0.05	0.05	0.035	0.045	0.035	0.045	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
	S(Max.)		0.045	0.045	0.035	0.045	0.035	0.045	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.040	0.040
	Other		-	-	Cu 0.20 (Min.)	Cu 0.18 (Min.)	Cu 0.20 (Min.)	Cu 0.18 (Min.)	-	-	-	-	-	-	-	-	-		
Mechanical Properties	Tensile strength (Min.)	PSI	48000	60000	R 45000	S 45000	R 58000	S 58000											
		MPa	330	415	310	310	400	400											
		kgf/mm²	33.8	42.2	31.6	31.6	40.8	40.8											
	Yield point (Min.)	PSI	30000	35000	33000	39000	42000	46000											
		MPa	205	240	228	269	290	317											
		kgf/mm²	21.1	24.6	23.3	27.4	29.6	32.3											
	Elongation (Min.)		e = 625000 [1940]A^0.2/U^0.9		25 (56t + 17.5)		23 (61t + 12)												
Flattening test	H : Distance between Flattening plates (mm) H : Inside disance between flattening plates(mm) D : Outside diameter of the pipe (mm) D : Inside diameter of the pipe (mm) T : Wall thickness of the pipe (mm)		NPS2 over Weld H = 2/3D Base metal H = 1/3D Welded part is located at 90 degree		Weld H = 2/3D Base metal H = 1/3D Soundness Test H = Contact Welded part is located at 90 degree				Welded part H = 2/3D Base metal H = 1/3D Welded part is located at 90 degree										
Bending test	Bending angel X Inside radius (D : Outside diameter of the pipe)		NPS2 below 90° x 12D close coiling 180° x 8D		-				-										
Hydrostatic test	P : Test pressure (PSI, MPa) D : Outside diameter (mm) t : Thickness (mm)		P = 2St / D		-				P = 2St / D S = allowable fiber stress of 14000PSI or 96.5MPA										
NDT (Non-Destructive Test)			Ultrasonic Test or Eddy current test		-				Eddy - Current Test or Ultrasonic Test or Flux leakage Test										
Others			Weight of zinc coating Average : Min. 550 g/m2 Individual : Min. 490 g/m2		-				Flaring Test ID' = 1.15D' (60 tool) D' : Inside diameter ID' : Enlarged inside diameter										

Type	Grade	Tensile strength Min. (PSI)	Yield point Min. (PSI)	Elongation Min(%)
AS-welded	1010	45000	32000	15
	1015	48000	35000	15
	1020	52000	38000	12
	1025	56000	40000	12
	1030	62000	45000	10
	1035	66000	50000	10
Normalized	1010	40000	25000	30
	1015	45000	30000	30
	1020	50000	35000	25
	1025	55000	37000	25
	1030	60000	40000	25
	1035	65000	45000	20
Sink-drawn	1010	50000	40000	8
	1015	55000	45000	8
	1020	60000	50000	8
	1025	65000	55000	7
	1030	70000	62000	7
	1035	80000	70000	7
Mandrel-drawn	1010	60000	50000	5
	1015	65000	55000	5
	1020	70000	60000	5
	1025	75000	65000	5
	1030	85000	75000	5
	1035	90000	80000	5
Mandrel-drawn stress-relieved	1010	55000	45000	12
	1015	60000	50000	12
	1020	65000	55000	10
	1025	70000	60000	10
	1030	80000	70000	10
	1035	85000	75000	10

KLM Steel Pipe

SPECIFICATIONS

Specification / Classification			ASTM A589					BS 1387	BS 3601			BS 3602		BS 1775			
			TYPE 1		TYPE 2	TYPE 3	TYPE 4	(L) Light (M) Medium (H) Heavy	ERW 320	ERW 360	ERW 430	ERW 360	ERW 410	ERW 11	ERW 16	ERW 20	ERW 23
Application			Drive Pipe (Grade A)	Drive Pipe (Grade B)	Water-Well Reamed and Drifted Pipe (Grade A)	Driven Well Pipe (Grade A)	Water-Well Casing Pipe (Grade A)	Ordinary piping	Pressure services			High-pressure services		Machine structural purposes, General structural purposes			
Chemical composition(%)	C(Max.)		-	-	-	-	-	0.20	0.16	0.17	0.21	0.17	0.21	-	-	-	-
	Si(Max.)		-	-	-	-	-	-	-	0.35	0.35	0.35	0.35	-	-	-	-
	Mn(Max.)		-	-	-	-	-	1.20	0.30-0.70	0.40-0.80	0.40-1.20	0.40-0.80	0.40-1.20	-	-	-	-
	P(Max.)		0.050	0.050	0.050	0.050	0.050	0.045	0.040	0.040	0.040	0.045	0.045	0.060	0.060	0.060	0.060
	S(Max.)		0.060	0.060	0.060	0.060	0.060	0.045	0.040	0.040	0.040	0.045	0.045	0.060	0.060	0.060	0.060
	Other		-	-		-	-	-	-	-	-	-	-	-	-	-	-
Mechanical properties	Tensile strength (Min.)	PSI	48000	60000	48000			-	-	-	-	-	-	-	-	-	-
		MPa	331	413	331			320-460	320-460	360-500	430-570	360-500	410-550	309	386	463	494
		kgf/mm^2	33.8	42.1	33.8			32.7-46.9	32.7-46.9	36.7-51.0	43.9-58.2	36.7-51.0	41.8-56.1	31.5	39.4	47.2	50.4
	Yield point (Min.)	PSI	30000	35000	30000			-	-	-	-	-	-	-	-	-	-
		MPa	207	241	207			195	195	235	275	215	245	170	247	309	355
		kgf/mm^2	21.1	24.6	21.1			19.9	19.9	24.0	28.1	21.9	25.0	17.3	25.2	31.5	36.2
	Elongation(Min.)		e = 625,000(A02/U09)					20	25	25	22	24	22	600/TS(700/TS) TS : Ton/In2,Kgf/mm2			
Flattening test	H : Distance between Flattening plates H : Inside disance between flattening plates D : Outside diameter of the pipe D : Inside diameter of the pipe T : Wall thickness of the pipe		-					DN Over 50 Welded part H = 0.75D Base metal H = 0.60D Welded part is located ay 90 degree	$H = \frac{(1+e)t}{e+t/D}$ Class / Constant (Welded part / Base metal): 320: 0.029 / 0.10; 360: 0.026 / 0.09; 460: 0.023 / 0.08			$H = \frac{(1+e)t}{e+t/D}$ e = 0.10	e = 0.08	H' = 3t or H' = 1/2D' whichever is the smaller	H' = 6t or H' = 3/4D' whichever is the smaller	H' = 8t or H' = 7/8D' whichever is the smaller	H' = 8t or H' = 3/4D' whichever is the smaller
Bending test	Bending angle X Inside radius (D : Outside diameter, t : Wall thickness)		-					DN 50below Black pipes 180°x 6D Galvanized pipes 90°x 8D	-			Outside diameter of bar is 4t		-			
Hydrostatic test	P : Test pressure S : Fiber stress, PSI(mPa) D : Outside diameter(mm) t : Thickness (mm)		Prescibed according to dimension and grade					51 (50 bar)	$P = (bar) \frac{20St}{D}$ S : 80% of the specified minimum yield stregth			$P = (bar) \frac{20St}{D}$ S : 80% of the specified minimum yield stregth Max 143Kgf/cm2 (140bar)					
NDT (Non-Destructive Test)			-					Eddy Current Test (substitute with hydrostatic test)	Eddy Current Test (Applied to pipes with Outside diameter of 180 mm or less as substitution for hydrostatic test)			Ultrasonic Test		-			
Others			-					Bore Test (hot-dip zinc coated tubes)	-			The Charpy V-notch Impact test		Drift Expanding Test			
														1D = 1.125D'	1D = 1.10D'	1D = 1.075D'	1D = 1.10D'

SPECIFICATIONS

KLM Steel Pipe

Specification / Classification			KS D 3507 (JIS G 3452)	KS D 3537 (JIS G 3442)	KS D 3565			KS D 3583 (JIS G 3457)	KS D 3562 (JIS G 3454)		KS D 3569 (JIS G 3460)	KS D 3570 (JIS G 3456)	
			SPP (SGP)	SPPW (SGPW)	STWW 290 (300A below)	STWW 370 (300A below)	STWW 400 (350A below)	SPW 400 (STPY 400)	SPPS 38 (STPG 370)	SPPS 42 (STPG 410)	SPLT 39 (STPL 380)	SPHT 38 (STPT 370)	SPHT 42 (STPT 410)
Name of specification			Cabon steel pipes for ordinarypiping	Galvanized steel pipes for water service	Coated steel pipes for water works			Arc welded carbon steel pipes	Carbon steel pipes for pressure services		Steel pipese for low temperature services	Carbon steel pipese for high temperature services	
Chemical composition(%)	C(Max.)		-	-	-	0.25	0.25	0.25	0.25	0.30	0.25	0.25	0.30
	Si(Max.)		-	-	-	-	-	-	0.35	0.35	0.35	0.10-0.35	0.10-0.35
	Mn(Max.)		-	-	-	-	-	-	0.30-0.90	0.30-1.00	1.35	0.30-0.90	0.30-1.00
	P(Max.)		0.050	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.035	0.035	0.035
	S(Max.)		0.050	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.035	0.035	0.035
	Other		-	-	-	-	-	-	-	-	-	-	-
Mechanical properties	Tensile strength (Min.)	kgf/mm²	30	30	30	38	41	41	38	42	39	38	42
		N/mm²	294	294	294	373	402	400	373	472	382	373	412
	Yield point (Min.)	kgf/mm²	-	-	-	22	23	23	22	25	21	22	25
		N/mm²	-	-	-	216	226	225	216	245	206	216	245
	Elongation (Min.) (%)	No.11 specimen No.12 specimen	30	30	30	30	-	-	30	25	35	30	25
		No.5 specimen	25	25	25	25	18	18	25	20	25	25	20
Flattening test	H : Distance between Flattening plates(mm) D : Outside diameter of the pipe T : Wall thickness of the pipe(mm)		H = 2/3D	H = 2/3D	H = 2/3D (Electric resistance welded pipe)			-	Welded part H = 2/3D Base metal H = 1/3D		$H = \frac{(4+e)t}{e+t/D}$ e = 0.08	$H = \frac{(1+e)t}{e+t/D}$ e = 0.07	
Bending test	Bending angle X Inside radius (D : Outside diameter of the pipe)		90° x 6D (pipes of 50A or brlow, substitute with flattening test)	90° x 8D (pipes of 50A or brlow)	-			-	90° x 6D (pipes of 40A or brlow, substitute with flattening test)		90° x 6D (pipes of 50mm or brlow, substitute with flattening test)	90° x 6D (pipes of 50mm or brlow, substitute with flattening test)	
Hydrostatic test	Test pressure (kgf/mm²)		25	25	Letter symbol of grade / Test pressure STWW 290: 25 STWW 370: 35 STWW 400 A: 25 STWW 400 B: 20			25	Schedule No. / Test pressure 10: 20 20: 35 30: 50 40: 60 60: 90 80: 120		Schedule No. / Test pressure 10: 20 20: 35 30: 50 40: 60 60: 90 80: 120	Schedule No. / Test pressure 10: 20 20: 35 30: 50 40: 60 60: 90 80: 120	
Non-destructive test	Ultrasonic test or eddy current test		substitute with hydrostatic test	substitute with hydrostatic test	substitute with hydrostatic test (Selection of one ultrasonic test, eddy current test, radiographic test)			substitute with hydrostatic test	substitute with hydrostatic test		substitute with hydrostatic test	substitute with hydrostatic test	
Others			Galvanized pipes (uniformity test5 times)	Weight of zinc coating (average 600g/m², uniformity test6 times	Tensile strength test for welded part (Arc welded steel pipes)			Tensile strength test for welded part	-		Charpy impact test	-	

KLM Steel Pipe

SPECIFICATIONS

Specification / Classification			API 5L (PSL I/PSL II)										API 5CT			
			A25 Class 1	A25 Class 2	A	B	X42	X46	X52	X56	X60	X65	X70	X80	H40	J55	K55	N80
Application			Line pipe												Casing Tubing			
Chemical composition(%)	C(Max.)		0.21	0.21	0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	-			
	Si(Max.)		-	-	-	-	-	-	-	-	-	-	-	-	-			
	Mn(Max.)		0.60	0.60	0.90	1.20 / 1.20	1.30 / 1.30	1.40 / 1.40	1.40 / 1.40	1.40 / 1.40	1.40 / 1.40	1.45 / 1.45	1.65 / 1.65	- / 1.85	-			
	P(Max.)		0.030	0.080	0.030	0.030 / 0.025	0.030 / 0.025	0.030 / 0.025	0.030 / 0.025	0.030 / 0.025	0.030 / 0.025	0.030 / 0.025	0.030 / 0.025	- / 0.025	0.030			
	S(Max.)		0.030	0.030	0.030	0.030 / 0.015	0.030 / 0.015	0.030 / 0.015	0.030 / 0.015	0.030 / 0.015	0.030 / 0.015	0.030 / 0.015	0.030 / 0.015	- / 0.015	0.030			
	Other		-	-	-	-	-	-	-	-	-	-	-	-	-			
Mechanical properties	Tensile strength (Min.)	PSI	45,000		48,000	60,000 / 60,000-110,000	60,000 / 60,000-110,000	63,000 / 63,000-110,000	66,000 / 66,000-110,000	71,000 / 71,000-110,000	75,000 / 75,000-110,000	77,000 / 77,000-110,000	82,000 / 82,000-110,000	- / 99,000-120,000	60000	75000	95000	10000
		MPa	310		331	414 / 414-758	414 / 414-758	434 / 434-758	455 / 455-758	490 / 490-758	517 / 517-758	531 / 531-758	565 / 565-758	- / 621-827	414	517	655	689
		kgf/mm²	31.6		33.7	42.2 / 42.2-77.3	42.2 / 42.2-77.3	44.3 / 44.3-77.3	46.4 / 46.4-77.3	49.9 / 49.9-77.3	52.7 / 52.7-77.3	54.1.7 / 54.1-77.3	57.7 / 57.7-77.3	- / 63.3-84.4	42.2	52.7	66.8	70.3
	Yield point (Min.)	PSI	25,000		30,000	35,000 / 35,000-65,000	42,000 / 42,000-72,000	46,000 / 46,000-76,000	52,000 / 52,000-77,000	56,000 / 56,000-79,000	60,000 / 60,000-82,000	65,000 / 65,000-87,000	70,000 / 70,000-90,000	- / 80,000-100,000	40000-80000	55000-80000		80000-100000
		MPa	172		207	241 / 241-448	290 / 290-496	317 / 317-524	359 / 359-531	386 / 386-544	414 / 414-565	448 / 448-600	483 / 483-621	- / 552-690	276-552	379-552		552-758
		kgf/mm²	17.6		21.6	24.6 / 24.6-45.7	29.5 / 29.5-50.6	32.3 / 32.3-54.1	36.6 / 36.6-55.4	39.4 / 39.4-55.4	42.2 / 42.2-57.7	45.7 / 45.7-61.2	49.2 / 49.2-63.3	- / 56.2-70.2	28.1-56.2	39.7-56.2		56.2-773
	Elongation (Min.)(%)		U.S. Customary Equation $e = 625.000(A^{0.2}/U^{0.9})$ Metric Equation $e = 1.944(A^{0.2}/U^{0.9})$ e : Minimum elongation in 2 in. (50.80mm) in percent rounded to nearest 1/2 percent A : Cross-sectional area of the tensile test specimen in sp. in. (mm) U : Sprcified minimum ultimate tensile strength. PSI (MPa)												e : Minimum elongation in 50.80mm in percent rounded to nearest 0.5% A : Cross-sectional area of the tensile test specimen in sp.mm U : Sprcified tensile strength in N/mm²			
Flattening test	H : Distance between Flattening plates(mm) D : Outside diameter of the pipe(mm) T : Wall thickness of the pipe(mm)		Welded part H = 3/4D base metal H = 0.6D		Flattening test Welded part H = 2/3D Base metal H = 1/3D Weld ductility test $H = \frac{0.07t}{0.07+3t/D}$ (Grades less than X 52) $H = \frac{3.05t}{0.05+3t/D}$ (Grades X 52 or higher)									D/t ≥16 H=0.5D D/t <16 H=D(0.83-0.0206D/T)	D/t ≥16H=0.65D 3.93 ≤ D/t < 16 H=D(0.98-0.0206D/t) D/t < 3.93 H=D(1.104-0.0518D/t)	9 ≤D/t <28 H=D(1.074-0.0194D/t)	
Bending test	Bending angle X Inside radius (D : Outside diameter of the pipe)		90° X 12D (Nominal size 2 or below)		-										-			
Hydrostatic test	P : Test pressure, PSI (MPa) S : Fiber stress, PSI(mPa) t : Wall thickness, in. (mm) D : Outside diameter, in.(mm)		U.S. Customary Formula $P = \frac{2St}{D}$ Metric Formula $P = \frac{2000St}{D}$												P=2st/D			

Grade	Size Designation	Percent of specified minimum yield strength(%) STD	ALT
A25	5/16	60	-
A	2 3/8 OVER	60	75
B	2 3/8 OVER	60	75
X42-X90	5/16 below	60	75
	5/16-8 5/8	75	75
	8 5/8-20	85	85
	20 OVER	90	90

Grade	F factor STD: smaller than 10 3/4	STD: 10 3/4 and larder	ALT: All sizes
H40	0.8	0.6	0.8
J55	0.8	0.6	0.8
K55	0.8	0.6	0.8
N80	0.8	0.8	-

NDT (Non-Destructive Test)	-	Electric resistsnce welded pipe : Ultrasonic Test or Electromagnetic Test(Eddy Current Test) submerged-arc weld pipe : Radiographic test	Ultrasonic Test or Electromagnetic Test
Others	Residual Magnetism Measurement		

BSI : British Standards Institution

Screwed and socketed steel tubes and tubulars and for plain end steel tubes suitable for welding or for screwing to BS21 pipe threads

KLM Steel Pipe

BS 1387 : 1985

Classification	Nominal Bore		Outside diameter (black pipes)				Wall thickness		Nominal weight (black pipes)					
			Max.		Min.				Plain end			Screwed & socketed		
	in.	mm	in.	mm	in.	mm	in.	mm	lb/ft	kg/ft	kg/m	lb/ft	kg/ft	kg/m
Light weight pipes (L)	3/8	10	0.673	17.1	0.657	16.7	0.071	1.8	0.450	0.204	0.670	0.454	0.206	0.676
	1/2	15	0.843	21.4	0.827	21.0	0.079	2.0	0.636	0.289	0.947	0.642	0.291	0.956
	3/4	20	1.059	26.9	1.039	26.4	0.091	2.3	0.927	0.421	1.38	0.934	0.424	1.39
	1	25	1.331	33.8	1.307	33.2	0.102	2.6	1.331	0.604	1.98	1.344	0.610	2.00
	1-1/4	32	1.673	42.5	1.650	41.9	0.102	2.6	1.707	0.774	2.54	1.727	0.783	2.57
	1-1/2	40	1.906	48.4	1.882	47.8	0.114	2.9	2.170	0.985	3.23	2.197	0.997	3.27
	2	50	2.370	60.2	2.346	59.6	0.114	2.9	2.742	1.244	4.08	2.789	1.265	4.15
	2-1/2	65	2.992	76.0	2.961	75.2	0.126	3.2	3.837	1.740	5.71	3.918	1.777	5.83
	3	80	3.492	88.7	3.461	87.9	0.126	3.2	4.516	2.048	6.72	4.630	2.100	6.89
	4	100	4.484	113.9	4.449	113.0	0.142	3.6	6.552	2.972	9.75	6.720	3.048	10.0
Medium weight pipes (M)	3/8	10	0.685	17.4	0.661	16.8	0.091	2.3	0.564	0.256	0.839	0.568	0.258	0.845
	1/2	15	0.854	21.7	0.831	21.1	0.102	2.6	0.813	0.369	1.21	0.820	0.372	1.22
	3/4	20	1.071	27.2	1.047	26.6	0.102	2.6	1.048	0.475	1.56	1.055	0.479	1.57
	1	25	1.346	34.2	1.315	33.4	0.126	3.2	1.619	0.735	2.41	1.633	0.741	2.43
	1-1/4	32	1.689	42.9	1.657	42.1	0.126	3.2	2.083	0.945	3.10	2.103	0.954	3.13
	1-1/2	40	1.921	48.8	1.890	48.0	0.126	3.2	2.399	1.088	3.57	2.426	1.100	3.61
	2	50	2.394	60.8	2.354	59.8	0.142	3.6	3.380	1.533	5.03	3.427	1.554	5.10
	2-1/2	65	3.016	76.6	2.969	75.4	0.142	3.6	4.321	1.960	6.43	4.401	1.996	6.55
	3	80	3.524	89.5	3.469	88.1	0.157	4.0	5.624	2.551	8.37	5.739	2.603	8.54
	4	100	4.524	114.9	4.461	113.3	0.177	4.5	8.198	3.719	12.2	8.400	3.810	12.5
	5	125	5.535	140.6	5.461	138.7	0.197	5.0	11.155	5.060	16.6	11.491	5.212	17.1
	6	150	6.539	166.1	6.461	164.1	0.197	5.0	13.238	6.005	19.7	13.641	6.187	20.3
Heavy weight pipes (H)	3/8	10	0.685	17.4	0.661	16.8	0.114	2.9	0.685	0.311	1.02	0.692	0.314	1.03
	1/2	15	0.854	21.7	0.831	21.1	0.126	3.2	0.968	0.439	1.44	0.974	0.442	1.45
	3/4	20	1.071	27.2	1.047	26.6	0.126	3.2	1.257	0.570	1.87	1.263	0.573	1.88
	1	25	1.346	34.2	1.315	33.4	0.157	4.0	1.976	0.896	2.94	1.989	0.902	2.96
	1-1/4	32	1.689	42.9	1.657	42.1	0.157	4.0	2.553	1.158	3.80	2.574	1.167	3.83
	1-1/2	40	1.921	48.8	1.890	48.0	0.157	4.0	2.943	1.335	4.38	2.970	1.347	4.42
	2	50	2.394	60.8	2.354	59.8	0.177	4.5	4.160	1.887	6.19	4.207	1.908	6.26
	2-1/2	65	3.016	76.6	2.969	75.4	0.177	4.5	5.329	2.417	7.93	5.409	2.454	8.05
	3	80	3.524	89.5	3.469	88.1	0.197	5.0	6.920	3.139	10.3	7.056	3.200	10.5
	4	100	4.524	114.9	4.461	113.3	0.213	5.4	9.744	4.420	14.5	9.945	4.511	14.8
	5	125	5.535	140.6	5.461	138.7	0.213	5.4	12.028	5.456	17.9	12.364	5.608	18.4
	6	150	6.539	166.1	6.461	164.1	0.213	5.4	14.312	6.492	21.3	14.716	6.675	21.9

KLM Steel Pipe

Scope

Carbon steel pipes used for the piping for conveying steam, water (except public water supply service), oil, gas, air, etc. at comparatively low working pressures.

JIS G 3452							
Nominal diameter		Outside diameter	Tolerances on outside diameter		Wall thickness	Tolerances on wall thickness	Unit mass excluding socket
A	B	mm	Pipes to be cut in taper thread	Other pipes	mm		kg/m
6	1/8	10.5	± 0.5 mm	± 0.5 mm	2.0	+Not specified	0.419
8	1/4	13.8	± 0.5 mm	± 0.5 mm	2.3	-12.5 %	0.652
10	3/8	17.3	± 0.5 mm	± 0.5 mm	2.3		0.851
15	1/2	21.7	± 0.5 mm	± 0.5 mm	2.8		1.31
20	3/4	27.2	± 0.5 mm	± 0.5 mm	2.8		1.68
25	1	34.0	± 0.5 mm	± 0.5 mm	3.2		2.43
32	1-1/4	42.7	± 0.5 mm	± 0.5 mm	3.5		3.38
40	1-1/2	48.6	± 0.5 mm	± 0.5 mm	3.5		3.89
50	2	60.5	± 0.5 mm	± 1 %	3.8		5.31
65	2-1/2	76.3	± 0.7 mm	± 1 %	4.2		7.47
80	3	89.1	± 0.8 mm	± 1 %	4.2		8.79
90	3-1/2	101.6	± 0.8 mm	± 1 %	4.2		10.1
100	4	114.3	± 0.8 mm	± 1 %	4.5		12.2
125	5	139.8	± 0.8 mm	± 1 %	4.5		15.0
150	6	165.2	± 0.8 mm	± 1.6 mm	5.0		19.8
175	7	190.7	± 0.9 mm	± 1.6 mm	5.3		24.2
200	8	216.3	± 1.0 mm	± 0.8 %	5.8		30.1
225	9	241.8	± 1.2 mm	± 0.8 %	6.2		36.0
250	10	267.4	± 1.3 mm	± 0.8 %	6.6		42.4
300	12	318.5	± 1.5 mm	± 0.8 %	6.9		53.0
350	14	355.6	_	± 0.8 %	7.9		67.7
400	16	406.4	_	± 0.8 %	7.9		77.6
450	18	457.2	_	± 0.8 %	7.9		87.5
500	20	508.0	_	± 0.8 %	7.9		97.4

NOTE : The unit mass values have been calculated from the following formula assuming 1 cm^3 of steel to be 7.85 g and rounded off to three significant figures in accordance with rule A of **JIS Z 8401.**

Chemical composition **Unit : %**

Symbol of grade	P	S
SGP	0.040 max.	0.040 max.

Tensile strength

Symbol of grade	Tensile strength N/mm^2
SGP	290 min.

Standard for Steel Pipe & Galvanized steel Pipes
STADARD TIS 276-2532&277-2532

มอก.276-2532 & มอก.277-2532

STANDARD	CHEMICAL COMPOSITION				MECHANICAL PROPERTIES			HYDROSTATIC (MPA)
	C MAX%	Mn MAX%	P MAX%	S MAX%	YIELD STRENGTH (MIN)	TENSILE STRENGTH (MIN) : MPA	ELONGATION (MIN) : %	
TYPE 1	-	-	-	-	-	320.0	20.0	5
TYPE 2	-	-	-	-	-	320.0	20.0	5
TYPE 3	-	-	-	-	-	320.0	20.0	5
TYPE 4	-	-	-	-	-	320.0	20.0	5

Nominal SIZE		Outside Diameter		Wall Thickness	Calculated Weight
mm.	in.	Min mm.	Max mm.	mm.	kg/m
TYPE 1 (ประเภท1)					
15	1/2"	21.0	21.4	2.00	0.95
20	3/4"	26.4	26.9	2.30	1.38
25	1"	33.2	33.8	2.60	1.98
32	1-1/4"	41.9	42.5	2.60	2.54
40	1-1/2"	47.8	48.4	2.90	3.23
50	2"	59.6	60.2	2.90	4.08
65	2-1/2"	75.2	76.0	3.20	5.71
80	3"	87.9	88.7	3.20	6.72
100	4"	113.0	113.9	3.60	9.75
TYPE 2 (ประเภท2)					
15	1/2"	21.0	21.8	2.60	1.21
20	3/4"	26.5	27.3	2.60	1.56
25	1"	33.3	34.2	3.20	2.41
32	1-1/4"	42.0	42.9	3.20	3.10
40	1-1/2"	47.9	48.8	3.20	3.56
50	2"	59.7	60.8	3.60	5.03
65	2-1/2"	75.3	76.6	3.60	6.42
80	3"	88.0	89.5	4.00	8.36
100	4"	113.1	115.0	4.50	12.20
125	5"	138.5	140.8	5.00	16.60
150	6"	163.9	166.5	5.00	19.80
TYPE 3 (ประเภท3)					
15	1/2"	21.0	21.8	3.20	1.44
20	3/4"	26.5	27.3	3.20	1.87
25	1"	33.3	34.2	4.00	2.93
32	1-1/4"	42.0	42.9	4.00	3.79
40	1-1/2"	47.9	48.8	4.00	4.37
50	2"	59.7	60.8	4.50	6.19
65	2-1/2"	75.3	76.6	4.50	7.93
80	3"	88.0	89.5	5.00	10.30
100	4"	113.1	115.0	5.40	14.50
125	5"	138.5	140.8	5.40	17.90
150	6"	163.9	166.5	5.40	21.30
TYPE 4 (ประเภท4)					
65	2-1/2"	72.3	73.7	5.20	8.60
80	3"	88.0	89.8	5.50	11.30
100	4"	113.2	115.4	6.00	16.10
125	5"	139.9	142.7	6.60	21.80
150	6"	166.6	170.0	7.10	28.30
200(ก)	8"	216.9	221.3	7.00	26.80
200(ข)	8"	216.9	221.3	8.20	42.50

KLM Steel Pipe

Standard specification for Pipe,Steel, Black and Hot-Dipped, Zinc-Coated,Welded and Seamless

ASTM A53

NPS Designator	Outside diameter		Wall thickness		Nominal weight						Weight class	Schedule No.	Test pressure							
					Plain end			threads & couplings					Plain end				threads & couplings			
													Grade A		Grade B		Grade A		Grade B	
in.	in.	mm	in.	mm	lb/ft	kg/ft	kg/m	lb/ft	kg/ft	kg/m			psi	kpa	psi	kpa	psi	kpa	psi	kpa
3/8	0.675	17.1	0.091	2.31	0.57	0.26	0.84	0.57	0.26	0.84	STD	40	700	4800	700	4800	700	4800	700	4800
			0.126	3.20	0.74	0.34	1.10	0.74	0.34	1.10	XS	80	850	5900	850	5900	850	5900	850	5900
1/2	0.840	21.3	0.109	2.77	0.85	0.39	1.27	0.85	0.39	1.27	STD	40	700	4800	700	4800	700	4800	700	4800
			0.147	3.73	1.09	0.49	1.62	1.09	0.49	1.62	XS	80	850	5900	850	5900	850	5900	850	5900
			0.188	4.78	1.31	0.59	1.95	-	-	-	-	160	900	6200	900	6200	-	-	-	-
3/4	1.050	26.7	0.113	2.87	1.13	0.52	1.69	1.13	0.52	1.69	STD	40	700	4800	700	4800	700	4800	700	4800
			0.154	3.91	1.48	0.67	2.20	1.48	0.67	2.21	XS	80	850	5900	850	5900	850	5900	850	5900
			0.219	5.56	1.95	0.88	2.90	-	-	-	-	160	950	6500	950	6500	-	-	-	-
1	1.315	33.4	0.133	3.38	1.68	0.76	2.50	1.68	0.76	2.50	STD	40	700	4800	700	4800	700	4800	700	4800
			0.179	4.55	2.17	0.99	3.24	2.18	0.99	3.25	XS	80	850	5900	850	5400	850	5900	850	5900
			0.250	6.35	2.85	1.29	4.24	-	-	-	-	160	950	6500	950	6500	-	-	-	-
1-1/4	1.660	42.2	0.140	3.56	2.27	1.03	3.39	2.28	1.04	3.40	STD	40	1200	8300	1300	9000	1000	6890	1100	7580
			0.191	4.85	3.00	1.36	4.47	3.02	1.37	4.49	XS	80	1800	12400	1900	13100	1500	10340	1600	11030
			0.250	6.35	3.77	1.71	5.61	-	-	-	-	160	1900	13100	2000	13800	-	-	-	-
1-1/2	1.900	48.3	0.145	3.68	2.72	1.23	4.05	2.73	1.24	4.04	STD	40	1200	8300	1300	9000	1000	6890	1100	7580
			0.200	5.08	3.63	1.65	5.41	3.66	1.64	5.39	XS	80	1800	12400	1900	13100	1500	10340	1600	11030
			0.281	7.14	4.86	2.21	7.25	-	-	-	-	160	1950	13400	2050	14100	-	15900	-	-
2	2.375	60.3	0.154	3.91	3.66	1.66	5.44	3.68	1.66	5.46	STD	40	2300	15900	2500	17200	2300	15900	2500	17200
			0.218	5.54	5.03	2.28	7.48	5.07	2.30	7.55	XS	80	2500	17200	2500	17200	2500	17200	2500	17200
			0.344	8.74	7.47	3.39	11.11	-	-	-	-	160	2500	17200	2500	17200	-	-	-	-
2-1/2	2.875	73.0	0.203	8.16	5.80	2.63	8.63	5.82	2.64	8.67	STD	40	2500	17200	2500	17200	2500	17200	2500	17200
			0.276	7.01	7.67	3.48	11.41	7.73	3.51	11.52	XS	80	2500	17200	2500	17200	2500	17200	2500	17200
			0.375	9.52	10.02	4.54	14.90	-	-	-	-	160	2500	17200	2500	17200	-	-	-	-
3	3.500	88.9	0.125	3.18	4.51	2.05	6.72	-	-	-	-	-	1290	8900	1500	10340	-	-	-	-
			0.156	3.96	5.58	2.53	8.29	-	-	-	-	-	1600	11000	1870	12900	-	-	-	-
			0.188	4.78	6.66	3.02	9.92	-	-	-	-	-	1930	13330	2260	15600	-	-	-	-
			0.216	5.49	7.58	3.44	11.29	7.62	3.46	11.35	STD	40	2220	15300	2500	17200	2200	15170	2500	17200
			0.250	6.35	8.69	3.94	12.93	-	-	-	-	-	2500	17200	2500	17200	-	-	-	-
			0.281	7.14	9.67	4.39	14.40	-	-	-	-	-	2500	17200	2500	17200	-	-	-	-
			0.300	7.62	10.26	4.65	15.27	10.33	4.69	15.39	XS	80	2500	17200	2500	17200	2500	17200	2500	17200
			0.438	11.13	14.34	6.51	21.35	-	-	-	-	160	2500	17200	2500	17200	-	-	-	-
3-1/2	4.000	101.6	0.125	3.18	5.18	2.35	7.72	-	-	-	-	-	1120	7720	1310	9030	-	-	-	-
			0.156	3.96	6.41	2.90	9.53	-	-	-	-	-	1400	9650	1640	11310	-	-	-	-
			0.188	4.78	7.66	3.48	11.41	-	-	-	-	-	1690	11650	1970	13580	-	-	-	-
			0.226	5.74	9.12	4.14	13.57	9.20	4.18	13.71	STD	40	2030	14000	2370	16340	2000	13790	2400	16550
			0.250	6.35	10.02	4.55	14.92	-	-	-	-	-	2250	15510	2500	17240	-	-	-	-
			0.281	7.14	11.17	5.07	16.63	-	-	-	-	-	2500	17200	2500	17200	-	-	-	-
			0.318	8.08	12.52	5.68	18.63	12.63	5.74	18.82	XS	80	2800	19310	2800	19310	2800	19310	2800	19310
4	4.500	114.3	0.125	3.18	5.85	2.65	8.71	-	-	-	-	-	1000	6890	1170	8070	-	-	-	-
			0.156	3.96	7.24	3.29	10.78	-	-	-	-	-	1250	8620	1460	10070	-	-	-	-
			0.188	4.78	8.67	3.93	12.91	-	-	-	-	-	1500	10340	1750	12070	-	-	-	-
			0.219	5.56	10.02	4.54	14.91	-	-	-	-	-	1750	12070	2040	14070	-	-	-	-
			0.237	6.02	10.80	4.90	16.07	10.89	4.95	16.23	STD	40	1900	13100	2210	15240	1900	13100	2200	15170
			0.250	6.35	11.36	5.15	16.90	-	-	-	-	-	2000	13790	2330	16060	-	-	-	-
			0.281	7.14	12.67	5.75	18.87	-	-	-	-	-	2250	15110	2620	18060	-	-	-	-
			0.312	7.92	13.97	6.33	20.78	-	-	-	-	-	2500	17200	2800	19310	-	-	-	-
			0.337	8.56	15.00	6.80	22.32	15.17	6.89	22.60	XS	80	2700	18620	2800	19310	2700	18620	2800	19310
			0.438	11.13	19.02	8.63	28.32	-	-	-	-	120	2800	19310	2800	19310	-	-	-	-
			0.531	13.49	22.53	10.22	33.54	-	-	-	-	160	2800	19310	2800	19310	-	-	-	-

ASTM : American Society Of Testing And Materials

Standard specification for Pipe,Steel,
Black and Hot-Dipped, Zinc-Coated,Welded and Seamless

KLM Steel Pipe

ASTM A53

NPS Designator	Outside diameter		Wall thickness		Nominal weight						Weight class	Schedule No.	Test pressure							
					Plain end			threads & couplings					Plain end				threads & couplings			
													Grade A		Grade B		Grade A		Grade B	
in.	in.	mm	in.	mm	lb/ft	kg/ft	kg/m	lb/ft	kg/ft	kg/m			psi	kpa	psi	kpa	psi	kpa	psi	kpa
5	5.563	141.3	0.156	3.96	9.02	4.09	13.41	-	-	-	-	-	1010	6960	1180	8140	-	-	-	-
			0.188	4.78	10.79	4.90	16.09	-	-	-	-	-	1220	8410	1420	9790	-	-	-	-
			0.219	5.56	12.50	5.67	18.61	-	-	-	-	-	1420	9790	1650	11380	-	-	-	-
			0.258	6.55	14.62	6.64	21.77	14.81	6.73	22.07	STD	40	1670	11510	1950	13440	1700	11720	1900	13100
			0.281	7.14	15.87	7.20	23.62	-	-	-	-	-	1820	12550	2120	14620	-	-	-	-
			0.312	7.92	17.50	7.94	26.05	-	-	-	-	-	2020	13930	2360	16270	-	-	-	-
			0.344	8.74	19.19	8.71	28.57	-	-	-	-	-	2230	15380	2600	17930	-	-	-	-
			0.375	9.52	20.80	9.43	30.94	21.09	9.58	31.42	XS	80	2430	16750	2800	19310	2400	16550	2800	19310
			0.500	12.70	27.06	12.28	40.28	-	-	-	-	120	2800	19310	2800	19310	-	-	-	-
			0.625	15.88	32.99	14.97	49.11	-	-	-	-	160	2800	19310	2800	19310	-	-	-	-
6	6.625	168.3	0.188	4.78	12.92	5.87	19.27	-	-	-	-	-	1020	7030	1190	8200	-	-	-	-
			0.219	5.56	14.98	6.80	22.31	-	-	-	-	-	1190	8200	1390	9580	-	-	-	-
			0.250	6.35	17.02	7.73	25.36	-	-	-	-	-	1360	9380	1580	10890	-	-	-	-
			0.280	7.11	18.97	8.61	28.26	19.18	8.71	28.58	STD	40	1520	10480	1780	12270	1500	10340	1800	12410
			0.312	7.92	21.04	9.55	31.32	-	-	-	-	-	1700	11720	1980	13650	-	-	-	-
			0.344	8.74	23.08	10.48	34.39	-	-	-	-	-	1870	12890	2180	15030	-	-	-	-
			0.375	9.52	25.03	11.36	37.28	-	-	-	-	-	2040	14070	2380	16410	-	-	-	-
			0.432	10.97	28.57	12.97	42.56	28.89	13.12	43.05	XS	80	2350	16200	2740	18890	2300	15860	2700	18620
			0.562	14.27	36.43	16.52	54.20	-	-	-	-	120	2800	19310	2800	19310	-	-	-	-
			0.719	18.26	45.39	20.59	67.56	-	-	-	-	160	2800	19310	2800	19310	-	-	-	-
8	8.625	219.1	0.188	4.78	16.94	7.70	25.26	-	-	-	-	-	780	5380	920	6340	-	-	-	-
			0.203	5.16	18.26	8.30	27.22	-	-	-	-	-	850	5860	1000	6890	-	-	-	-
			0.219	5.56	19.66	8.92	29.28	-	-	-	-	-	910	6270	1070	7380	-	-	-	-
			0.250	6.35	22.36	10.15	33.31	-	-	-	-	20	1040	7170	1220	8410	-	-	-	-
			0.277	7.04	24.70	11.07	36.31	25.55	11.60	38.07	-	30	1160	7800	1350	9310	1200	8270	1300	8960
			0.312	7.92	27.70	12.57	41.24	-	-	-	-	-	1300	8960	1520	10480	-	-	-	-
			0.322	8.18	28.55	12.97	42.55	29.35	13.33	43.73	STD	40	1340	9240	1570	10820	1300	8960	1600	11030
			0.344	8.74	30.42	13.82	45.34	-	-	-	-	-	1440	9930	1680	11580	-	-	-	-
			0.375	9.52	33.04	15.00	49.20	-	-	-	-	-	1570	10820	1830	12620	-	-	-	-
			0.406	10.31	35.64	16.18	53.08	-	-	-	-	60	1700	11720	2000	13790	-	-	-	-
			0.438	11.13	38.30	17.40	57.08	-	-	-	-	-	1830	12620	2130	14690	-	-	-	-
			0.500	12.70	43.43	19.70	64.64	43.90	19.94	65.41	XS	80	2090	14410	2430	16750	2100	14480	2400	16550
			0.594	15.09	50.95	23.14	75.92	-	-	-	-	100	2500	17240	2800	19310	-	-	-	-
			0.719	18.26	60.77	27.57	90.44	-	-	-	-	120	2800	19310	2800	19310	-	-	-	-
			0.812	20.62	67.76	30.76	100.92	-	-	-	-	140	2800	19310	2800	19310	-	-	-	-
10	10.750	273.0	0.188	4.78	21.21	9.64	31.62	-	-	-	-	-	630	4340	730	5030	-	-	-	-
			0.203	5.16	22.87	10.39	34.08	-	-	-	-	-	680	4690	800	5520	-	-	-	-
			0.219	5.56	24.63	11.18	36.67	-	-	-	-	-	730	5030	860	5930	-	-	-	-
			0.250	6.35	28.04	12.73	41.75	-	-	-	-	20	840	5790	980	6760	-	-	-	-
			0.279	7.09	31.20	14.17	46.49	32.75	14.87	48.80	-	-	930	6410	1090	7520	950	6550	1100	7580
			0.307	7.80	34.24	15.55	51.01	35.75	16.24	53.27	-	30	1030	7100	1200	8270	1000	6890	1200	8270
			0.344	8.74	38.27	17.36	56.96	-	-	-	-	-	1150	9730	1340	9240	-	-	-	-
			0.365	9.27	40.52	18.38	60.29	41.85	19.31	63.36	STD	40	1220	8410	1430	9860	1200	8270	1400	9650
			0.438	11.13	48.28	21.91	71.87	-	-	-	-	-	1470	10140	1710	11790	-	-	-	-
			0.500	12.70	54.79	24.85	81.52	55.82	25.35	83.17	XS	60	1670	11510	1950	13440	1700	11720	2000	13790
			0.594	15.09	64.49	29.25	95.97	-	-	-	-	80	1990	13720	2320	16000	-	-	-	-
			0.719	18.26	77.10	34.96	114.70	-	-	-	-	100	2410	16620	2800	19310	-	-	-	-
			0.844	21.44	89.38	40.54	133.00	-	-	-	-	120	2800	19310	2800	19310	-	-	-	-

KLM Steel Pipe

Standard specification for Pipe,Steel, Black and Hot-Dipped, Zinc-Coated,Welded and Seamless

ASTM A53

NPS Designator	Outside diameter		Wall thickness		Nominal weight						Weight class	Schedule No.	Test pressure							
					Plain end			threads & couplings					Plain end				threads & couplings			
													Grade A		Grade B		Grade A		Grade B	
in.	in.	mm	in.	mm	lb/ft	kg/ft	kg/m	lb/ft	kg/ft	kg/m			psi	kpa	psi	kpa	psi	kpa	psi	kpa
12	12.750	323.8	0.203	5.16	27.20	12.36	40.55	-	-	-	-	-	570	3930	670	4620	-	-	-	-
			0.219	5.56	29.31	13.30	43.63	-	-	-	-	-	620	4270	720	4960	-	-	-	-
			0.250	6.35	33.38	15.15	49.71	-	-	-	-	20	710	4900	820	5650	-	-	-	-
			0.281	7.14	37.42	16.99	55.75	-	-	-	-	-	790	5450	930	6410	-	-	-	-
			0.312	7.92	41.45	18.80	61.69	-	-	-	-	-	880	6070	1030	7100	-	-	-	-
			0.330	8.38	43.77	19.87	65.18	45.45	20.64	67.72	-	30	930	6410	1090	7520	950	6550	1100	7580
			0.344	8.74	45.62	20.70	67.90	-	-	-	-	-	970	6690	1130	7790	-	-	-	-
			0.375	9.52	49.61	22.49	73.78	51.15	23.23	76.21	STD	-	1060	7310	1240	8550	1100	7580	1200	8270
			0.406	10.31	53.57	24.29	79.70	-	-	-	-	40	1160	7930	1340	9240	-	-	-	-
			0.438	11.13	57.65	26.16	85.82	-	-	-	-	-	1240	8550	1440	9930	-	-	-	-
			0.500	12.70	65.48	29.70	97.43	66.71	30.30	99.40	XS	-	1410	9720	1650	11380	1400	9650	1600	11030
			0.562	14.27	73.22	33.20	108.92	-	-	-	-	60	1590	10960	1850	12760	-	-	-	-
			0.688	17.48	88.71	40.25	132.04	-	-	-	-	80	1940	13380	2270	15650	-	-	-	-
			0.844	21.44	107.42	48.73	159.86	-	-	-	-	100	2390	16480	2780	19170	-	-	-	-
14	14.000	355.6	0.210	5.33	30.93	14.03	46.04				-	-	540	3720	630	4340				
			0.219	5.56	32.23	14.63	47.99				-	-	560	3860	660	4550				
			0.250	6.35	36.71	16.67	54.69				-	10	640	4410	750	5170				
			0.281	7.14	41.17	18.70	61.35				-	-	720	4960	840	5790				
			0.312	7.92	45.61	20.70	67.90				-	20	800	5520	940	6480				
			0.344	8.74	50.17	22.79	74.76				-	-	880	6070	1030	7100				
			0.375	9.52	54.57	24.77	81.25				STD	30	960	6620	1120	7720				
			0.438	11.13	63.44	28.82	94.55				-	40	1130	7790	1110	9030				
			0.469	11.91	67.78	30.77	100.94				-	-	1210	8340	1410	9720				
			0.500	12.07	72.09	32.73	107.39				XS	-	1290	8890	1500	10340				
			0.594	15.09	85.05	38.62	126.71				-	60	1530	10550	1790	12340				
			0.750	19.05	106.13	48.19	158.10				-	80	1930	13310	2250	15510				
			0.938	23.83	130.85	59.42	194.96				-	100	2410	16620	2800	19310				
			1.094	27.79	150.79	68.47	224.65				-	120	2800	19310	2800	19310				
			1.250	31.75	170.22	77.29	253.56				-	140	2800	19310	2800	19310				
			1.406	35.71	189.11	85.86	281.70				-	160	2800	19310	2800	19310				
			2.000	50.80	256.32	116.38	381.83				-	-	2800	19310	2800	19310				
			2.125	53.97	269.51	122.36	401.44				-	-	2800	19310	2800	19310				
			2.200	55.88	277.26	125.89	413.01				-	-	2800	19310	2800	19310				
			2.500	63.50	307.05	139.42	457.40				-	-	2800	19310	2800	19310				
16	16.000	406.4	0.219	5.56	36.91	16.75	54.96				-	-	490	3380	570	3930				
			0.250	6.35	42.05	19.09	62.64				-	10	560	3860	660	4550				
			0.281	7.14	47.22	21.43	70.30				-	-	630	4340	740	5100				
			0.312	7.92	52.32	23.72	77.83				-	20	700	4830	820	5650				
			0.344	8.74	57.57	26.12	85.71				-	-	770	5310	900	6210				
			0.375	9.52	62.64	28.40	93.17				STD	30	840	5790	980	6760				
			0.438	11.13	72.86	33.07	108.49				-	-	990	6830	1150	7930				
			0.469	11.91	77.87	35.31	115.86				-	-	1060	7310	1230	8480				
			0.500	12.70	82.85	37.58	123.30				XS	40	1120	7720	1310	9030				
			0.656	16.66	107.60	48.80	160.12				-	60	1480	10200	1720	11860				
			0.844	21.44	136.74	62.04	203.53				-	80	1900	13100	2220	15310				
			1.031	26.19	164.88	74.85	245.56				-	100	2320	16000	2710	18680				
			1.219	30.96	192.61	87.37	286.64				-	120	2740	18890	2800	19310				
			1.438	36.53	223.85	101.56	333.19				-	140	2800	19310	2800	19310				
			1.594	40.49	245.48	111.36	365.35				-	160	2800	19310	2800	19310				

Standard specification for Pipe,Steel,
Black and Hot-Dipped, Zinc-Coated,Welded and Seamless

KLM Steel Pipe

ASTM A53

NPS Designator	Outside diameter		Wall thickness		Nominal weight Plain end			Weight class	Schedule No.	Test pressure Plain end			
										Grade A		Grade B	
in.	in.	mm	in.	mm	lb/ft	kg/ft	kg/m			psi	kpa	psi	kpa
18	18.000	457	0.250	6.35	47.39	21.52	70.60	-	10	500	3450	580	4000
			0.281	7.14	53.18	24.15	79.24	-	-	560	3860	660	4550
			0.312	7.92	58.94	26.75	87.75	-	20	620	4270	730	5030
			0.344	8.74	64.93	29.46	96.66	-	-	690	4760	800	5520
			0.375	9.52	70.65	32.03	105.10	STD	-	750	5170	88/0	6070
			0.406	10.31	76.36	34.63	113.62	-	-	810	5580	950	6550
			0.438	11.13	82.23	37.32	122.43	-	30	880	6070	1020	7030
			0.469	11.91	87.89	39.86	130.78	-	-	940	6480	1090	7520
			0.500	12.70	93.54	42.43	139.20	XS	-	1000	6890	1170	8070
			0.562	14.27	104.76	47.51	155.87	-	40	1120	7720	1310	9030
			0.750	19.05	138.30	62.74	205.83	-	60	1500	10340	1750	12070
			0.938	23.83	171.08	77.62	254.67	-	80	1880	12960	2190	15100
			1.156	29.36	208.15	94.41	309.76	-	100	2310	15930	2700	18620
			1.375	34.92	244.37	110.84	363.64	-	120	2750	18960	2800	19310
			1.562	39.67	274.48	124.50	408.45	-	140	2800	19310	2800	19310
			1.781	45.24	308.79	140.08	459.59	-	160	2800	19310	2800	19310
20	20.000	508	0.250	6.35	52.73	23.94	78.55	-	10	450	3100	520	3590
			0.281	7.14	59.23	26.88	88.19	-	-	510	3520	590	4070
			0.312	7.92	65.66	29.77	97.67	-	-	560	3860	660	4550
			0.344	8.74	72.28	32.80	107.60	-	-	620	4270	720	4960
			0.375	9.52	78.67	35.67	117.02	STD	20	680	4690	790	5450
			0.406	10.31	84.04	38.57	126.53	-	-	730	5030	850	5860
			0.438	11.13	91.59	41.57	136.37	-	-	790	5450	920	6340
			0.469	11.91	97.92	44.41	145.70	-	-	850	5860	950	6550
			0.500	12.70	104.23	47.28	155.12	XS	30	900	6210	1050	7240
			0.594	15.09	123.23	55.91	183.42	-	40	1170	8070	1250	8620
			0.812	20.62	166.56	75.54	247.83	-	60	1460	10070	1710	11790
			1.031	26.19	209.06	94.84	311.17	-	80	1860	12820	2170	14960
			1.281	32.54	256.34	116.29	381.53	-	100	2310	15930	2690	18550
			1.500	38.10	296.65	134.57	441.49	-	120	2700	18620	2800	19310
			1.750	44.45	341.41	154.87	508.11	-	140	2800	19310	2800	19310
			1.969	50.01	379.53	172.15	564.81	-	160	2800	19310	2800	19310
24	24.000	610	0.250	6.35	63.47	28.79	94.46	-	10	380	2620	440	3030
			0.281	7.14	71.25	32.33	106.08	-	-	420	2900	490	3380
			0.312	7.92	79.01	35.82	117.51	-	-	470	3240	550	3790
			0.344	8.74	86.99	39.47	129.50	-	-	520	3590	600	4140
			0.375	9.52	94.71	42.94	140.88	STD	20	560	3860	660	4550
			0.406	10.31	102.40	46.44	152.37	-	-	610	4210	710	4900
			0.438	11.13	110.32	50.07	164.26	-	-	660	4550	770	5310
			0.469	11.91	117.98	53.50	175.54	-	-	700	4830	820	5650
			0.500	12.70	125.61	56.98	186.94	XS	-	750	5170	880	6070
			0.562	14.27	140.81	63.86	209.50	-	30	840	5790	980	6760
			0.688	17.48	171.45	77.80	255.24	-	40	1030	7100	1200	8270
			0.938	23.83	231.25	104.92	344.23	-	-	1410	9720	1640	11310
			0.969	24.61	238.57	108.21	355.02	-	60	1415	10000	1700	11720
			1.219	30.96	296.86	134.65	441.78	-	80	1830	12620	2130	14690
			1.531	38.69	367.74	166.83	547.33	-	100	2300	15860	2680	18480
			1.812	46.02	429.74	194.94	639.58	-	120	2720	18750	2800	19310
			2.062	52.37	483.57	219.34	719.63	-	140	2800	19310	2800	19310
			2.344	59.54	542.64	246.17	807.63	-	160	2800	19310	2800	19310

KLM
Steel Pipe

PRODUCTS INTRODUCTION

ASTM A106

SEAMLESS CARBON STEEL PIPE FOR HIGH TEMPERATURE SERVICE

Scope

This specification covers seamless carbon steel pipe for high - temperature service in NPS 1/8 to NPS 48 [DN16 - DN1200]

Main Steel Tube Grade :

A106A, A106B, A106C

Other grade can also be provided after consulting with customers.

Chemical Composition & Mechanical Properties

Standard	Grade	Chemical Composition (%)									Mechanical Properties	
		C	Si	Mn	P.S	Cr	Mo	Ni	Cu	V	(MPa) Tersile Strengh	(MPa) Yeld Strengh
ASTM A106	A	≤0.25	≥0.10	0.27~0.93	≤0.035	≤0.40	≤0.15	≤0.40	≤0.40	≤0.08	≥330	≥205
	B	≤0.30	≥0.10	0.29~1.06	≤0.035	≤0.40	≤0.15	≤0.40	≤0.40	≤0.08	≥415	≥240
	C	≤0.35	≥0.10	0.29~1.06	≤0.035	≤0.40	≤0.15	≤0.40	≤0.40	≤0.08	≥485	≥275

General Requirements

1.1 Material furnished to this specification shall conform to the applicable requirements of the current edition of Specification A 530/A 530M unless otherwise provided herein.

Dimensions, Mass, and Permissible Variations

2.1 ***Mass*** - The mass of any length of pipe shall not vary more than 10% over and 3.5% under that specified. Unless otherwise agreed upon between the manufacturer and the purchaser, pipe in NPS 4 [DN 100] and smaller may be weighed in convenienient lots; pipe larger than NPS 4 [DN 100] shall be weighed separately.

2.2 ***Diameter*** - The tolerances for diameter shall be in accordance with the following:

2.2.1 Except for pipe ordered as special outside diameter tolerance pipe or as inside diameter tolerance pipe, variations in outside diameter shall not exceed those given in Table 3.

2.2.2 For pipe over 10 in. [250 mm] OD ordered as special outside diameter tolerance pipe, the outside diameter shall not vary more than 1% over or 1% under the specified outside diameter.

2.2.3 For pipe over 10 in. [250 mm] ID ordered as inside diameter tolerance pipe, the inside diameter shall not vary more than 1% over or 1% under the specified inside diameter.

2.3 ***Thickness*** - The minimum wall thickness at any point shall not be more than 12.5% under the specified wall thickness.

KLM Steel Pipe

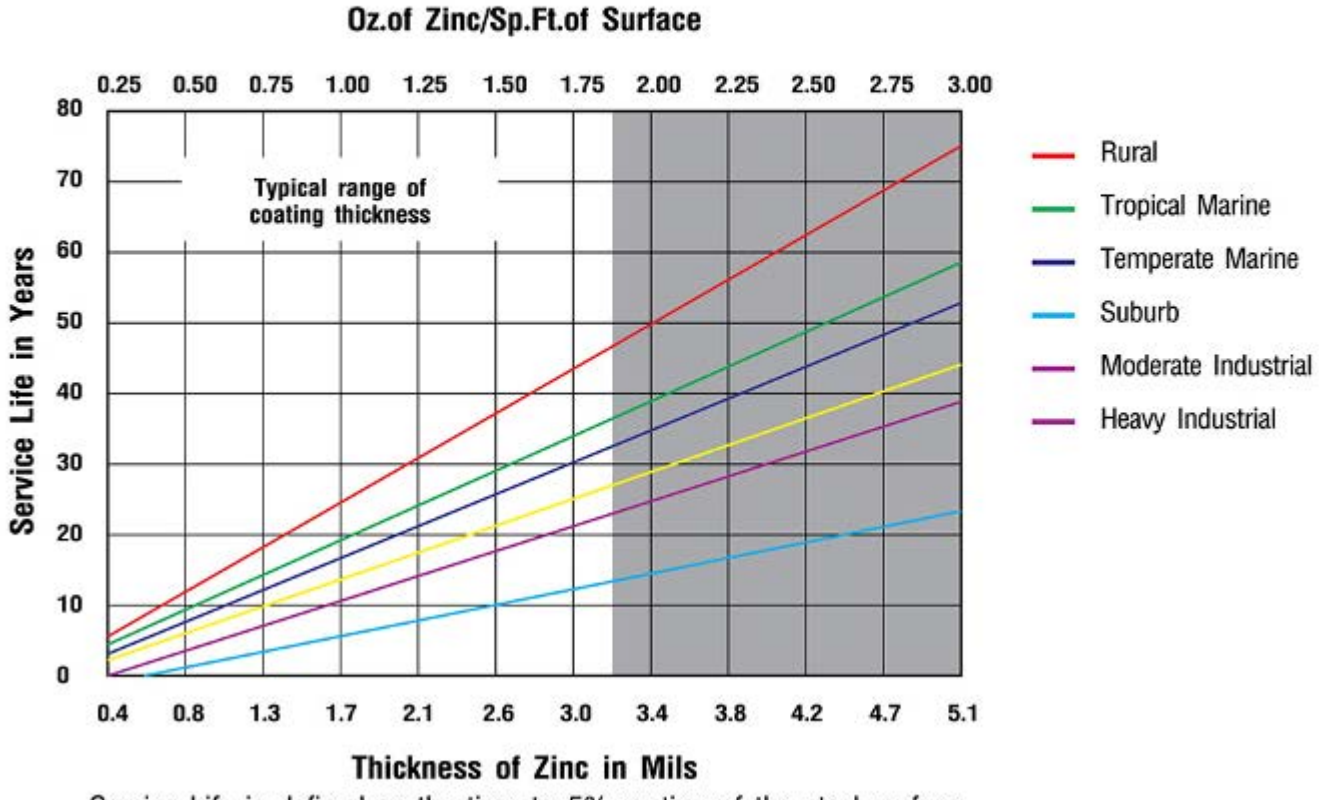
PRODUCTS INTRODUCTION

ASTM A123/123 M

Minimun Average Coating Thickness Grade by Material Category

All Specimens Tested					
Material Category Steel Thickness Range (Measured), in. (mm.)					
	<1/16(<1.6)	1/16to<1/8(1.6to<3.2)	1/8to3/16(3.2to4.8)	>3/16to<1/4(>4.8to6.4)	>1/4(>6.4)
Structural Shapes	45	65	85	85	100
Strip	45	65	75	85	100
Pipe	-	-	75	85	75
Wire	45	45	65	65	85

$1g/m^2 = 0.14$ um ($305 g/m^2 = 1 oz/ft^2 = 43$ um $= 0.0017$ in.)



Service Life is defined as the time to 5% rusting of the steel surface

KLM
Steel Pipe

PRODUCTS INTRODUCION

API 5L STANDARD



Application : It is used for conveying gas, water, and oil in both the oil and natural gas industries.

Tolerance on Dimension

Standard	Outside Diameter		wall thickness Tolerance
	Tolerance		Tolerance
API SPEC 5L	D<60.3	+0.41mm, -0.80mm	+15%S, -12.5%S
API SPEC 5L	D≥60.3	+0.75%D, -0.75%D	

Mechanical Properties :

Specification / Classification			API 5L (PSL I/PSL II)										
			A25 Class 1	A25 Class 2	A	B	X42	X46	X52	X56	X60	X65	X70	X80
Application			Line pipe											
Chemical composition(%)	C(Max.)		0.21 / -	0.21 / -	0.22 / -	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22	0.26 / 0.22
	Si(Max.)		-	-	-	-	-	-	-	-	-	-	-	-
	Mn(Max.)		0.60 / -	0.60 / -	0.90 / -	1.20 / 1.20	1.30 / 1.30	1.40 / 1.40	1.40 / 1.40	1.40 / 1.40	1.40 / 1.40	1.45 / 1.45	1.65 / 1.65	- / 1.85
	P(Max.)		0.030 / -	0.080 / -	0.030 / -	0.030 / 0.025	0.030 / 0.025	0.030 / 0.025	0.030 / 0.025	0.030 / 0.025	0.030 / 0.025	0.030 / 0.025	0.030 / 0.025	- / 0.025
	S(Max.)		0.030 / -	0.030 / -	0.030 / -	0.030 / 0.015	0.030 / 0.015	0.030 / 0.015	0.030 / 0.015	0.030 / 0.015	0.030 / 0.015	0.030 / 0.015	0.030 / 0.015	- / 0.015
	Other		-	-	-	-	-	-	-	-	-	-	-	-
Mechanical properties	Tensile strength (Min.)	PSI	45,000 / -		48,000	60,000 / 60,000 -110,000	60,000 / 60,000 -110,000	63,000 / 63,000 -110,000	66,000 / 66,000 -110,000	71,000 / 71,000 -110,000	75,000 / 75,000 -110,000	77,000 / 77,000 -110,000	82,000 / 82,000 -110,000	- / 99,000 -120,000
		MPa	310 / -		331	414 / 414 -758	414 / 414 -758	434 / 434 -758	455 / 455 -758	490 / 490 -758	517 / 517 -758	531 / 531 -758	565 / 565 -758	- / 621 -827
		kgf/mm²	31.6 / -		33.7	42.2 / 42.2 -77.3	42.2 / 42.2 -77.3	44.3 / 44.3 -77.3	46.4 / 46.4 -77.3	49.9 / 49.9 -77.3	52.7 / 52.7 -77.3	54.1.7 / 54.1 -77.3	57.7 / 57.7 -77.3	- / 63.3 -84.4
	Yield point (Min.)	PSI	25,000 / -		30,000	35,000 / 35,000 -65,000	42,000 / 42,000 -72,000	46,000 / 46,000 -76,000	52,000 / 52,000 -77,000	56,000 / 56,000 -79,000	60,000 / 60,000 -82,000	65,000 / 65,000 -87,000	70,000 / 70,000 -90,000	- / 80,000 -100,000
		MPa	172 / -		207	241 / 241 -448	290 / 290 -496	317 / 317 -524	359 / 359 -531	386 / 386 -544	414 / 414 -565	448 / 448 -600	483 / 483 -621	- / 552 -690
		kgf/mm²	17.6 / -		21.6	24.6 / 24.6 -45.7	29.5 / 29.5 -50.6	32.3 / 32.3 -54.1	36.6 / 36.6 -55.4	39.4 / 39.4 -55.4	42.2 / 42.2 -57.7	45.7 / 45.7 -61.2	49.2 / 49.2 -63.3	- / 56.2 -70.2
	Elongation (Min.)(%)		U.S. Customary Equation $e = 625.000(A^{0.2}/U^{0.9})$ Metric Equation $e = 1.944(A^{0.2}/U^{0.9})$			e : Minimum elongation in 2 in. (50.80mm) in percent rounded to nearest 1/2 percent A : Cross-sectional area of the tensile test specimen in sp. in. (mm) U : Sprcified minimum ultimate tensile strength. PSI (MPa)								

American Petroleum Institute

This specification covers Seamless and Welded steel line pipe.

KLM Steel Pipe

Nominal Size	Outside Diameter		Wall Thickness		Weight			Minimum Test Pressure (psi)									
								API 5L									
	in	mm	in	mm	lb/ft	kg/m	kg/ft		Grade A	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60	Grade X65	Grade X70	Grade X80
0.84	0.840	21.3	0.109	2.77	0.85	1.270	0.390	Std.	700	700	-	-	-	-	-	-	-	-
			0.147	3.73	1.09	1.620	0.490	Std.	850	850	-	-	-	-	-	-	-	-
			0.294	7.47	1.72	2.550	0.780	Std.	1000	1000	-	-	-	-	-	-	-	-
1.05	1.050	26.7	0.113	2.87	1.13	1.690	0.510	Std.	700	700	-	-	-	-	-	-	-	-
			0.154	3.91	1.48	2.200	0.670	Std.	850	850	-	-	-	-	-	-	-	-
			0.308	7.82	2.44	3.640	1.110	Std.	1000	1000	-	-	-	-	-	-	-	-
1.315	1.315	33.4	0.133	3.38	1.68	2.500	0.760	Std.	700	700	-	-	-	-	-	-	-	-
			0.179	4.55	2.17	3.240	0.990	Std.	850	850	-	-	-	-	-	-	-	-
			0.358	9.09	3.66	5.450	1.660	Std.	1000	1000	-	-	-	-	-	-	-	-
1.66	1.660	42.2	0.140	3.56	2.72	3.390	1.030	Std.	1200	1300	-	-	-	-	-	-	-	-
			0.191	4.85	3.00	4.470	1.360	Std.	1800	1900	-	-	-	-	-	-	-	-
			0.382	9.70	5.22	7.770	2.370	Std.	2200	2300	-	-	-	-	-	-	-	-
1.90	1.900	48.3	0.145	3.68	2.72	4.050	1.230	Std.	1200	1300	-	-	-	-	-	-	-	-
			0.200	5.08	3.63	5.410	1.650	Std.	1800	1900	-	-	-	-	-	-	-	-
			0.400	10.16	6.41	9.560	2.910	Std.	2200	2300	-	-	-	-	-	-	-	-
2-3/8	2.375	60.3	0.083	2.11	2.03	3.030	0.920	Std.	1260	1470	1760	1930	2180	2350	2520	2730	2940	-
								Alt.	1570	1830	2200	2410	2730	2940	3150	3410	3670	-
			0.109	2.77	2.64	3.930	1.200	Std.	1650	1930	2310	2530	2860	3000	3000	3000	3000	-
								Alt.	2070	2410	2890	3170	3580	3860	4130	4470	4820	-
			0.125	3.18	3.01	4.480	1.370	Std.	1890	2210	2650	2910	3000	3000	3000	3000	3000	-
								Alt.	2370	2500	3320	3630	4110	4420	4740	5130	5530	-
			0.141	3.58	3.37	5.010	1.530	Std.	2140	2490	2990	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	3740	4100	4630	4990	5340	5790	6230	-
			0.154	3.91	3.66	5.440	1.660	Std.	2330	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4090	4470	5060	5450	5840	6320	6810	-
			0.172	4.37	4.05	6.030	1.840	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4560	5000	5650	6080	6520	7060	7260	-
			0.188	4.78	4.40	6.540	1.990	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4990	5460	6170	6650	7120	7260	7260	-
			0.218	5.54	5.03	7.480	2.280	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	5780	6330	7160	7260	7260	7260	7260	-
			0.250	6.35	5.68	8.450	2.570	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	6630	7260	7260	7260	7260	7260	7260	-
			0.281	7.14	6.29	9.360	2.850	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	7260	7260	7260	7260	7260	7260	7260	-
			0.436	11.07	9.04	13.440	4.100	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	7260	7260	7260	7260	7260	7260	7200	-
2-7/8	2.875		0.083	2.11	2.48	3.690	1.120	Std.	1040	1210	1460	1590	1800	1940	2080	2250	2430	-
								Alt.	1300	1520	1820	1990	2250	2430	2600	2810	3030	-
			0.109	2.77	3.22	4.800	1.460	Std.	1360	1590	1910	2090	2370	2550	2730	2960	3000	-
								Alt.	1710	1990	2390	2620	2960	3180	3410	3700	3980	-
			0.125	3.18	3.67	5.480	1.670	Std.	1570	1830	2190	2400	2710	2920	3000	3000	3000	-
								Alt.	1960	2280	2740	3000	3390	3650	3910	4240	4570	-
			0.141	3.58	4.12	6.130	1.870	Std.	1770	2060	2470	2710	3000	3000	3000	3000	3000	-
								Alt.	2210	2500	3090	3380	3830	4120	4410	4780	5150	-
			0.156	3.96	4.53	6.740	2.050	Std.	1950	2280	2730	3000	3000	3000	3000	3000	3000	-
								Alt.	2440	2500	3420	3740	4230	4560	4880	5290	5700	-
			0.172	4.37	4.97	7.400	2.250	Std.	2150	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	3770	4130	4670	5030	5380	5830	6280	-
			0.188	4.78	5.40	8.04	2.450	Std.	2350	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4120	4510	5100	5490	5890	6380	6870	-
			0.203	5.16	5.80	8.630	2.630	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4450	4870	5510	5930	6350	6880	7260	-
			0.216	5.49	6.14	9.140	2.790	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4730	5180	3860	6310	6760	7260	7260	-
			0.250	6.35	7.02	10.440	3.180	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	5480	6000	6780	7260	7260	7260	7260	-
			0.276	7.01	7.67	11.410	3.480	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	6050	6620	7260	7260	7260	7260	7260	-
			0.552	14.02	13.71	20.390	6.220	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	7260	7260	7260	7260	7260	7260	7260	-
3-1/2	3.00	88.9	0.083	2.11	3.03	4.520	1.380	Std.	850	1000	1200	1310	1480	1590	1710	1850	1990	-
								Alt.	1070	1250	1490	1640	1850	1990	2130	2310	2490	-
			0.109	2.77	3.95	5.880	1.790	Std.	1120	1310	1570	1720	1940	2090	2240	2430	2620	-
								Alt.	1400	1640	1960	2150	2430	2620	2800	3040	3270	-
			0.125	3.18	4.51	6.720	2.050	Std.	1290	1500	1800	1970	2230	2400	2570	2790	3000	-
								Alt.	1610	1880	2250	2460	2790	3000	3210	3480	3750	-
			0.141	3.58	5.06	7.530	2.300	Std.	1450	1690	2030	2220	2510	2710	2900	3000	3000	-
								Alt.	1810	2120	2540	2780	3140	3380	3630	3930	4230	-
			0.156	3.96	5.58	8.290	2.530	Std.	1600	1870	2250	2460	2780	3000	3000	3000	3000	-
								Alt.	2010	2340	2810	3080	3480	3740	4010	4350	4680	-
			0.172	4.37	6.12	9.110	2.780	Std.	1770	2060	2480	2710	3000	3000	3000	3000	3000	-
								Alt.	2210	2500	3100	3390	3830	4130	4420	4790	5160	-
			0.188	4.78	6.66	9.920	3.020	Std.	1930	2260	2710	2970	3000	3000	3000	3000	3000	-
								Alt.	2420	2500	3380	3710	4190	4510	4830	5240	5640	-
			0.216	5.49	7.58	11.290	3.440	Std.	2220	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	3890	4260	4810	5180	5550	6020	6480	-
			0.250	6.35	8.69	12.930	3.940	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4500	4930	5570	6000	6430	6960	7260	-
			0.281	7.14	9.67	14.400	4.390	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	5060	5540	6260	6740	7230	7260	7260	-
			0.300	7.62	10.26	15.270	4.660	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	5400	5910	6690	7200	7260	7260	7260	-
			0.600	15.24	18.60	27.680	8.440	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	7260	7260	7260	7260	7260	7260	7250	-

Please check with the manufacturer the availability of the product

KLM Steel Pipe

American Petroleum Institute

This specification covers Seamless and Welded steel line pipe.

Nominal Size	Outside Diameter		Wall Thickness		Weight			Minimum Test Pressure (psi)									
								API 5L									
	in	mm	in	mm	lb/ft	kg/m	kg/ft		Grade A	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60	Grade X65	Grade X70	Grade X80
4	4.000	101.6	0.083	2.11	3.48	5.180	1.580	Std.	750	870	1050	1150	1290	1390	1490	1620	1740	-
								Alt.	930	1090	1310	1430	1620	1740	1870	2020	2180	-
			0.109	2.77	4.53	6.750	2.060	Std.	980	1140	1370	1500	1700	1830	1960	2130	2290	-
								Alt.	1230	1430	1720	1880	2130	2290	2450	2660	2860	-
			0.125	3.18	5.18	7.720	2.350	Std.	1130	1310	1580	1730	1950	2100	2250	2440	2630	-
								Alt.	1410	1640	1970	2160	2440	2630	2810	3050	3280	-
			0.141	3.58	5.82	8.650	2.640	Std.	1270	1480	1780	1950	2200	2370	2540	2750	2960	-
								Alt.	1590	1850	2220	2430	2750	2960	3170	3440	3700	-
			0.156	3.96	6.41	9.530	2.910	Std.	1400	1640	1970	2150	2430	2620	2810	3000	3000	-
								Alt.	1760	2050	2460	2690	3040	3280	3510	3800	4100	-
			0.172	4.37	7.04	10.480	3.190	Std.	1550	1810	2170	2370	2680	2890	3000	3000	3000	-
								Alt.	1940	2260	2710	2970	3350	3610	3870	4190	4520	-
			0.188	4.78	7.66	11.410	3.480	Std.	1690	1970	2370	2590	2930	3000	3000	3000	3000	-
								Alt.	2120	2470	2960	3240	3670	3950	4230	4580	4940	-
			0.266	5.74	9.12	13.570	4.140	Std.	2030	2370	2850	3000	3000	3000	3000	3000	3000	-
								Alt.	2540	2800	3560	3900	4410	4750	5090	5510	5930	-
			0.250	6.35	10.02	14.920	4.550	Std.	2250	2630	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2800	2800	3940	4310	4880	5250	5630	6090	6560	-
			0.281	7.14	11.17	16.630	5.070	Std.	2530	2800	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2800	2800	4430	4850	5480	5900	6320	6850	7260	-
			0.318	8.05	12.52	18.570	5.660	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2800	2800	5010	5490	6200	6680	7160	7260	7260	-
4-1/2	4.500	114.3	0.083	2.11	3.92	5.840	1.780	Std.	660	770	930	1020	1150	1240	1330	1440	1550	1770
								Alt.	830	970	1160	1270	1440	1550	1660	1800	1940	2210
			0.125	3.18	5.85	8.710	2.660	Std.	1000	1170	1400	1530	1730	1870	2000	2170	2330	2670
								Alt.	1250	1460	1750	1920	2170	2330	2500	2710	2920	3330
			0.141	3.58	6.57	9.770	2.980	Std.	1130	1320	1580	1730	1960	2110	2260	2440	2630	3000
								Alt.	1410	1650	1970	2160	2440	2630	2820	3060	3290	3760
			0.156	3.96	7.24	10.780	3.280	Std.	1250	1460	1750	1910	2160	2330	2500	2700	2910	3000
								Alt.	1560	1820	2180	2390	2700	2910	3120	3380	3640	4160
			0.172	4.37	7.96	11.850	3.610	Std.	1380	1610	1930	2110	2390	2570	2750	2980	3000	3000
								Alt.	1720	2010	2410	2640	2980	3210	3440	3730	4010	4590
			0.188	4.78	8.67	12.910	3.930	Std.	1500	1750	2110	2310	2610	2810	3000	3000	3000	3000
								Alt.	1880	2190	2630	2880	3260	3510	3760	4070	4390	5010
			0.203	5.16	9.32	13.890	4.230	Std.	1620	1890	2270	2490	2810	3000	3000	3000	3000	3000
								Alt.	2030	2370	2840	3110	3520	3790	4060	4400	4740	5410
			0.219	5.56	10.02	14.910	4.540	Std.	1750	2040	2450	2690	3000	3000	3000	3000	3000	3000
								Alt.	2190	2560	3070	3360	3800	4090	4380	4750	5110	5840
			0.237	6.02	10.80	16.070	4.900	Std.	1900	2210	2650	2910	3000	3000	3000	3000	3000	3000
								Alt.	2370	2770	3320	3630	4110	4420	4740	5140	5530	6320
			0.250	6.35	11.36	16.900	5.150	Std.	2000	2330	2800	3000	3000	3000	3000	3000	3000	3000
								Alt.	2500	2800	3500	3830	4330	4670	5000	5420	5830	6670
			0.281	7.14	12.67	18.870	5.750	Std.	2250	2620	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	3930	4310	4870	5250	5620	6090	6560	7260
			0.312	7.92	13.97	20.780	6.330	Std.	2500	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4370	4780	5410	5820	6240	6760	7260	7260
			0.337	8.56	15.00	22.320	6.800	Std.	2700	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4720	5170	5840	6290	6740	7260	7260	7260
			0.438	11.13	19.02	28.320	8.630	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	6130	6720	7260	7260	7260	7260	7260	7260
			0.531	13.49	22.53	33.540	10.220	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	7260	7260	7260	7260	7260	7260	7260	7260
5-9/16	5.563	141.3	0.083	2.11	4.86	7.240	2.210	Std.	540	630	750	820	930	1000	1070	1160	1250	1430
								Alt.	670	780	940	1030	1160	1250	1340	1450	1570	1790
			0.125	3.18	7.27	10.830	3.300	Std.	810	940	1130	1240	1400	1510	1620	1750	1890	2160
								Alt.	1010	1180	1420	1550	1750	1890	2020	2190	2360	2700
			0.156	3.96	9.02	13.410	4.090	Std.	1010	1180	1410	1550	1750	1880	2020	2190	2360	2690
								Alt.	1260	1470	1770	1930	2190	2360	2520	2730	2940	3370
			0.188	4.78	10.80	16.090	4.900	Std.	1220	1420	1700	1870	2110	2270	2430	2640	2840	3000
								Alt.	1520	1770	2130	2330	2640	2840	3040	3290	3550	4060
			0.219	5.56	12.51	18.610	5.670	Std.	1420	1650	1980	2170	2460	2650	2830	3000	3000	3000
								Alt.	1770	2070	2480	2720	3070	3310	3540	3840	4130	4720
			0.258	6.55	14.63	21.770	6.630	Std.	1670	1950	2340	2560	2890	3000	3000	3000	3000	3000
								Alt.	2090	2430	2920	3220	3620	3900	4170	4520	4870	5570
			0.281	7.14	15.87	23.620	7.200	Std.	1820	2120	2550	2790	3000	3000	3000	3000	3000	3000
								Alt.	2270	2650	3180	3490	3940	4240	4550	4920	5300	6060
			0.312	7.92	17.51	26.050	7.940	Std.	2020	2360	2830	3000	3000	3000	3000	3000	3000	3000
								Alt.	2520	2800	3530	3870	4370	4710	5050	5470	5890	6730
			0.344	8.74	19.19	28.570	8.710	Std.	2230	2600	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2780	2800	3900	4270	4820	5190	5570	6030	6490	7260
			0.375	9.52	20.80	30.940	9.430	Std.	2430	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4250	4650	5260	5660	6070	6570	7080	7260
			0.500	12.70	27.06	40.280	12.280	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	5660	6200	7010	7260	7260	7260	7260	7260
			0.625	15.88	32.99	49.110	14.970	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	7080	7260	7260	7260	7260	7260	7260	7260

Please check with the manufacturer the availability of the product

American Petroleum Institute

This specification covers Seamless and Welded steel line pipe.

KLM Steel Pipe

Nominal Size	Outside Diameter		Wall Thickness		Weight			Minimum Test Pressure (psi)										
								API 5L										
	in	mm	in	mm	lb/ft	kg/m	kg/ft		Grade A	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60	Grade X65	Grade X70	Grade X80
6-5/8	6.625	168.3	0.125	3.18	8.69	12.950	3.950	Std.	680	790	1190	1300	1470	1580	1700	1840	1980	2260
								Alt.	850	990	1190	1300	1470	1580	1700	1840	1980	2260
			0.141	3.58	9.77	14.540	4.430	Std.	770	890	1340	1470	1660	1790	1920	2080	2230	2550
								Alt.	960	1120	1340	1470	1660	1790	1920	2080	2230	2550
			0.156	3.96	10.79	16.050	4.890	Std.	850	990	1480	1620	1840	1980	2120	2300	2470	2830
								Alt.	1060	1240	1480	1620	1840	1980	2120	2300	2470	2830
			0.172	4.37	11.87	17.670	5.380	Std.	930	1090	1640	1790	2030	2180	2340	2530	2730	3000
								Alt.	1170	1360	1640	1790	2030	2180	2340	2530	2730	3120
			0.188	4.78	12.94	19.270	5.870	Std.	1020	1190	1790	1960	2210	2380	2550	2770	2980	3000
								Alt.	1280	1490	1790	1960	2210	2380	2550	2770	2980	3410
			0.203	5.16	13.94	20.760	6.330	Std.	1100	1290	1930	2110	2390	2570	2760	2990	3000	3000
								Alt.	1380	1610	1930	2110	2390	2570	2760	2990	3220	3680
			0.219	5.56	15.00	22.310	6.800	Std.	1190	1390	2080	2280	2580	2780	2980	3000	3000	3000
								Alt.	1490	1740	2080	2280	2580	2780	2980	3220	3470	3970
			0.250	6.35	17.04	25.360	7.730	Std.	1360	1580	2380	2600	2940	3000	3000	3000	3000	3000
								Alt.	1700	1980	2380	2600	2940	3170	3400	3680	3960	4530
			0.280	7.11	18.99	28.260	8.610	Std.	1520	1780	2660	2920	3000	3000	3000	3000	3000	3000
								Alt.	1900	2220	2660	2920	3300	3550	3800	4120	4440	5070
			0.312	7.92	21.06	31.320	9.550	Std.	1700	1980	2970	3000	3000	3000	3000	3000	3000	3000
								Alt.	2120	2470	2970	3250	3670	3960	4240	4590	4940	5650
			0.344	8.74	23.10	34.390	10.480	Std.	1870	2180	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2340	2730	3270	3580	4050	4360	4670	5060	5450	6230
			0.375	9.52	25.05	37.280	11.360	Std.	2040	2380	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2550	2800	3570	3910	4420	4750	5090	5520	5940	6790
			0.432	10.97	28.60	42.560	12.970	Std.	2350	2740	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4110	4500	5090	5480	5870	6360	6850	7260
			0.500	12.70	32.74	48.730	14.850	Std.	2720	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4750	5210	5890	6340	6790	7260	7260	7260
			0.562	14.27	36.43	54.200	16.520	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	5340	5850	6620	7130	7260	7260	7260	7260
			0.625	15.88	40.09	59.690	18.190	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	5940	6510	7260	7260	7260	7260	7260	7260
			0.719	18.26	45.39	67.560	20.590	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	6840	7260	7260	7260	7260	7260	7260	7260
8-5/8	8.625	219.1	0.125	3.18	11.36	16.930	5.160	Std.	520	610	910	1000	1130	1220	1300	1410	1520	1740
								Alt.	650	760	910	1000	1130	1220	1300	1410	1520	1740
			0.156	3.96	14.12	21.010	6.400	Std.	650	760	1140	1250	1410	1520	1630	1760	1900	2170
								Alt.	810	950	1140	1250	1410	1520	1630	1760	1900	2170
			0.188	4.78	16.96	25.260	7.700	Std.	780	920	1370	1500	1700	1830	1960	2130	2290	2620
								Alt.	980	1140	1370	1500	1700	1830	1960	2130	2290	2620
			0.203	5.16	18.28	27.220	8.300	Std.	850	990	1480	1620	1840	1980	2120	2290	2470	2820
								Alt.	1060	1240	1480	1620	1840	1980	2120	2290	2470	2820
			0.219	5.56	19.68	29.280	8.920	Std.	910	1070	1600	1750	1980	2130	2290	2480	2670	3000
								Alt.	1140	1330	1600	1750	1980	2130	2290	2480	2670	3050
			0.250	6.35	22.38	33.310	10.150	Std.	1040	1220	1830	2000	2260	2430	2610	2830	3000	3000
								Alt.	1300	1520	1830	2000	2260	2430	2610	2830	3040	3480
			0.277	7.04	24.72	36.810	11.220	Std.	1160	1350	2020	2220	2510	2700	2890	3000	3000	3000
								Alt.	1450	1690	2020	2220	2510	2700	2890	3130	3370	3850
			0.312	7.92	27.73	41.240	12.570	Std.	1300	1520	2280	2500	2820	3000	3000	3000	3000	3000
								Alt.	1630	1900	2280	2500	2820	3040	3260	3530	3800	4340
			0.322	8.18	28.58	42.550	12.970	Std.	1340	1570	2350	2580	2910	3000	3000	3000	3000	3000
								Alt.	1680	1960	2350	2580	2910	3140	3360	3640	3920	4480
			0.344	8.74	30.45	45.340	13.820	Std.	1440	1680	2510	2750	3000	3000	3000	3000	3000	3000
								Alt.	1790	2090	2510	2750	3110	3350	3590	3890	4190	4790
			0.375	9.52	33.07	49.200	12.000	Std.	1570	1830	2740	3000	3000	3000	3000	3000	3000	3000
								Alt.	1960	2280	2740	3000	3390	3650	3910	4240	4570	5220
			0.438	11.13	38.33	57.080	17.400	Std.	1830	2130	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2290	2670	3200	3500	3960	4270	4570	4950	5330	6090
			0.500	12.70	43.43	64.640	19.700	Std.	2090	2430	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2610	2800	3650	4000	4520	4870	5220	5650	6090	6960
			0.562	14.27	48.44	72.080	21.970	Std.	2350	2740	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4110	4500	5080	5470	5860	6350	6840	7260
			0.625	15.88	53.45	79.580	24.260	Std.	2610	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4570	5000	5650	6090	6520	7070	7260	7260
			0.719	18.26	60.77	90.440	27.570	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	5250	5750	7000	7000	7260	7260	7260	7260

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KLM Steel Pipe

American Petroleum Institute

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Nominal Size	Outside Diameter		Wall Thickness		Weight			Minimum Test Pressure (psi) API 5L										
	in	mm	in	mm	lb/ft	kg/m	kg/ft		Grade A	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60	Grade X65	Grade X70	Grade X80
10-3/4	10.750	273	0.156	3.96	17.67	26.270	8.010	Std.	520	610	1040	1130	1280	1380	1480	1600	1730	1970
								Alt.	650	760	1040	1130	1280	1380	1480	1600	1730	1970
			0.188	4.78	21.23	31.620	9.640	Std.	630	730	1250	1370	1550	1660	1780	1930	2080	2380
								Alt.	790	920	1250	1370	1550	1660	1780	1930	2080	2380
			0.203	5.16	22.89	34.080	10.390	Std.	680	790	1350	1480	1670	1800	1930	2090	2250	2570
								Alt.	850	990	1350	1480	1670	1800	1930	2090	2250	2570
			0.219	5.56	24.65	36.670	11.180	Std.	730	860	1450	1590	1800	1940	2080	2250	2420	2770
								Alt.	920	1070	1450	1590	1800	1940	2080	2250	2420	2770
			0.250	6.35	28.06	41.750	12.730	Std.	840	980	1660	1820	2060	2210	2370	2570	2770	3000
								Alt.	1050	1220	1660	1820	2060	2210	2370	2570	2770	3160
			0.279	7.09	31.23	46.490	14.170	Std.	930	1090	1850	2030	2290	2470	2650	2870	3000	3000
								Alt.	1170	1360	1850	2030	2290	2470	2650	2870	3090	3530
			0.307	7.80	34.27	51.010	15.550	Std.	1030	1200	2040	2230	2520	2720	2910	3000	3000	3000
								Alt.	1290	1500	2040	2230	2520	2720	2910	3160	3400	3880
			0.344	8.74	38.27	56.960	17.360	Std.	1150	1340	2280	2500	2830	3000	3000	3000	3000	3000
								Alt.	1440	1680	2280	2500	2830	3050	3260	3540	3810	4350
			0.365	9.27	40.52	60.290	18.380	Std.	1220	1430	2420	2660	3000	3000	3000	3000	3000	3000
								Alt.	1530	1780	2420	2660	3000	3230	3460	3750	4040	4620
			0.438	11.13	48.28	71.870	21.910	Std.	1470	1710	2910	3000	3000	3000	3000	3000	3000	3000
								Alt.	1830	2140	2910	3190	3600	3880	4160	4500	4850	5540
			0.500	12.70	54.79	81.520	24.850	Std.	1670	1950	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2090	2440	3320	3640	4110	4430	4740	5140	5530	6330
			0.562	14.27	61.21	91.050	27.750	Std.	1880	2200	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2350	2740	3730	4090	4620	4980	5330	5780	6220	7110
			0.625	15.88	67.65	100.690	30.690	Std.	2090	2440	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2620	2800	4150	4550	5140	5530	5930	6420	6920	7260
			0.719	18.26	77.10	114.710	34.960	Std.	2410	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4780	5230	5910	6370	6820	7260	7260	7260
12-3/4	12.750	323.8	0.172	4.37	23.13	34.420	10.490	Std.	490	570	960	1050	1190	1280	1380	1490	1610	1830
								Alt.	610	710	960	1050	1190	1280	1380	1490	1610	1830
			0.188	4.78	25.25	37.600	11.460	Std.	530	620	1050	1150	1300	1400	1500	1630	1750	2010
								Alt.	660	770	1050	1150	1300	1400	1500	1630	1750	2010
			0.203	5.16	27.23	40.550	12.360	Std.	570	670	1140	1250	1410	1520	1620	1760	1890	2170
								Alt.	720	840	1140	1250	1410	1520	1620	1760	1890	2170
			0.219	5.56	29.34	43.630	13.300	Std.	620	720	1230	1340	1520	1640	1750	1900	2040	2340
								Alt.	770	900	1230	1340	1520	1640	1750	1900	2040	2340
			0.250	6.35	33.41	49.710	15.150	Std.	710	820	1400	1530	1730	1870	2000	2170	2330	2670
								Alt.	880	1030	1400	1530	1730	1870	2000	2170	2330	2670
			0.281	7.14	37.46	55.760	16.990	Std.	790	930	1570	1720	1950	2100	2250	2440	2620	3000
								Alt.	990	1160	1570	1720	1950	2100	2250	2440	2620	3000
			0.312	7.92	41.48	61.690	18.800	Std.	880	1030	1750	1910	2160	2330	2500	2700	2910	3000
								Alt.	1100	1280	1750	1910	2160	2330	2500	2700	2910	3330
			0.330	8.38	43.81	65.180	19.870	Std.	930	1090	1850	2020	2290	2460	2640	2860	3000	3000
								Alt.	1160	1360	1850	2020	2290	2460	2640	2860	3080	3520
			0.344	8.74	45.62	67.900	20.700	Std.	970	1130	1930	2110	2390	2570	2750	2980	3000	3000
								Alt.	1210	1420	1930	2110	2390	2570	2750	2980	3210	3670
			0.375	9.52	49.61	73.780	22.490	Std.	1060	1240	2100	2300	2600	2800	3000	3000	3000	3000
								Alt.	1320	1540	2100	2300	2600	2800	3000	3250	3500	4000
			0.406	10.13	53.57	78.360	23.880	Std.	1150	1340	2270	2490	2810	3000	3000	3000	3000	3000
								Alt.	1430	1670	2270	2490	2810	3030	3250	3520	3790	4330
			0.438	11.13	57.65	85.820	26.160	Std.	1240	1440	2450	2690	3000	3000	3000	3000	3000	3000
								Alt.	1550	1800	2450	2690	3040	3270	3500	3800	4090	4670
			0.500	12.70	65.48	97.430	29.700	Std.	1410	1650	2800	3000	3000	3000	3000	3000	3000	3000
								Alt.	1760	2060	2800	3070	3470	3730	4000	4330	4670	5330
			0.562	14.27	73.22	108.920	33.200	Std.	1590	1850	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	1980	2310	3150	3450	3900	4200	4500	4870	5250	5990
			0.625	15.88	81.01	120.580	36.750	Std.	1760	2060	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2210	2570	3500	3830	4330	4670	5000	5420	5830	6670
			0.688	17.48	88.71	132.040	40.250	Std.	1940	2270	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2430	2800	3850	4220	4770	5140	5500	5960	6420	7260
14	14.000	355.6	0.188	4.78	27.76	41.350	12.600	Std.	480	560	960	1050	1190	1280	1370	1480	1600	1830
								Alt.	600	710	960	1050	1190	1280	1370	1480	1600	1830
			0.203	5.16	29.94	44.590	13.590	Std.	520	610	1040	1130	1280	1380	1480	1600	1730	1970
								Alt.	650	760	1040	1130	1280	1380	1480	1600	1730	1970
			0.210	5.33	30.96	46.040	14.030	Std.	540	630	1070	1170	1330	1430	1530	1660	1790	2040
								Alt.	680	790	1070	1170	1330	1430	1530	1660	1790	2040
			0.219	5.56	32.26	47.990	14.630	Std.	560	660	1120	1220	1380	1490	1600	1730	1860	2130
								Alt.	700	820	1120	1220	1380	1490	1600	1730	1860	2130
			0.250	6.35	36.75	54.690	16.670	Std.	640	750	1280	1400	1580	1700	1820	1970	2130	2430
								Alt.	800	940	1280	1400	1580	1700	1820	1970	2130	2430
			0.281	7.14	41.21	61.350	18.700	Std.	720	840	1430	1570	1770	1910	2050	2220	2390	2730
								Alt.	900	1050	1430	1570	1770	1910	2050	2220	2390	2730
			0.312	7.92	45.65	67.900	20.700	Std.	800	940	1590	1740	1970	2120	2270	2460	2650	3000
								Alt.	1000	1170	1590	1740	1970	2120	2270	2460	2650	3030
			0.344	8.74	50.22	74.760	22.790	Std.	880	1030	1750	1920	2170	2340	2510	2720	2920	3000
								Alt.	1110	1290	1750	1920	2170	2340	2510	2720	2920	3340

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KLM Steel Pipe

Nominal Size	Outside Diameter		Wall Thickness		Weight			Minimum Test Pressure (psi)										
								API 5L										
	in	mm	in	mm	lb/ft	kg/m	kg/ft		Grade A	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60	Grade X65	Grade X70	Grade X80
14	14.000	355.6	0.375	9.52	54.62	81.250	24.760	Std.	960	1130	1910	2090	2370	2550	2730	2960	3000	3000
								Alt.	1210	1410	1910	2090	2370	2550	2730	2960	3190	3640
			0.406	10.31	59.00	87.790	26.760	Std.	1040	1220	2070	2270	2560	2760	2960	3000	3000	3000
								Alt.	1310	1520	2070	2270	2560	2760	2960	3200	3450	3940
			0.438	11.13	63.50	94.550	28.820	Std.	1130	1310	2230	2450	2770	2980	3000	3000	3000	3000
								Alt.	1410	1640	2230	2450	2770	2980	3190	3460	3720	4250
			0.469	11.91	67.84	100.940	30.770	Std.	1210	1410	2390	2620	2960	3000	3000	3000	3000	3000
								Alt.	1510	1760	2390	2620	2960	3190	3420	3700	3990	4560
			0.500	12.70	72.16	107.390	32.730	Std.	1290	1500	2550	2790	3000	3000	3000	3000	3000	3000
								Alt.	1610	1880	2550	2790	3160	3400	3640	3950	4250	4860
			0.562	14.27	80.73	120.110	36.610	Std.	1450	1690	2870	3000	3000	3000	3000	3000	3000	3000
								Alt.	1810	2110	2870	3140	3550	3820	4090	4440	4780	5460
			0.594	15.09	89.36	126.710	38.620	Std.	1610	1880	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2010	2340	3190	3490	3950	4250	4550	4930	5310	6070
			0.625	15.88	89.36	133.030	40.550	Std.	1610	1880	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2010	2340	3190	3490	3950	4250	4550	4930	5310	6070
			0.688	17.48	97.91	145.750	44.420	Std.	1770	2060	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2210	2580	3510	3840	4340	4680	5010	5430	5850	6680
16	16.000	406.4	0.188	4.78	31.78	47.340	14.430	Std.	420	490	840	920	1040	1120	1200	1300	1400	1600
								Alt.	530	620	840	920	1040	1120	1200	1300	1400	1600
			0.203	5.16	34.28	51.060	15.560	Std.	460	530	910	990	1120	1210	1290	1400	1510	1730
								Alt.	570	670	910	990	1120	1210	1290	1400	1510	1730
			0.219	5.56	36.95	54.960	16.750	Std.	490	570	980	1070	1210	1300	1400	1510	1630	1860
								Alt.	620	720	980	1070	1210	1300	1400	1510	1630	1860
			0.250	6.35	42.09	65.640	19.090	Std.	560	660	1120	1220	1380	1490	1590	1730	1860	2130
								Alt.	700	820	1120	1220	1380	1490	1590	1730	1860	2130
			0.281	7.14	47.22	70.300	21.430	Std.	630	740	1250	1370	1550	1670	1790	1940	2090	2390
								Alt.	790	920	1250	1370	1550	1670	1790	1940	2090	2390
			0.312	7.92	52.32	77.830	23.720	Std.	700	820	1390	1520	1720	1860	1990	2150	2320	2650
								Alt.	880	1020	1390	1520	1720	1860	1990	2150	2320	2650
			0.344	8.74	57.57	85.710	26.120	Std.	770	900	1540	1680	1900	2050	2190	2380	2560	2920
								Alt.	970	1130	1540	1680	1900	2050	2190	2380	2560	2920
			0.375	9.52	62.64	93.170	28.400	Std.	840	980	1670	1830	2070	2230	2390	2590	2790	3000
								Alt.	1050	1230	1670	1830	2070	2230	2390	2590	2790	3190
			0.406	10.31	67.68	100.700	30.690	Std.	910	1070	1810	1980	2240	2420	2590	2800	3000	3000
								Alt.	1140	1330	1810	1980	2240	2420	2590	2800	3020	3450
			0.438	11.13	72.86	108.490	33.070	Std.	900	1150	1950	2140	2420	2610	2790	3000	3000	3000
								Alt.	1230	1440	1950	2140	2420	2610	2790	3020	3260	3630
			0.469	11.91	77.87	115.860	35.310	Std.	1060	1230	2090	2290	2590	2790	2990	3000	3000	3000
								Alt.	1320	1540	2090	2290	2590	2790	2990	3240	3490	3630
			0.500	12.70	82.85	123.300	37.580	Std.	1130	1310	2230	2440	2760	2980	3000	3000	3000	3000
								Alt.	1410	1640	2230	2440	2760	2980	3190	3450	3630	3630
			0.562	14.27	92.75	137.990	42.060	Std.	1260	1480	2510	2750	3000	3000	3000	3000	3000	3000
								Alt.	1580	1840	2510	2750	3110	3340	3580	3630	3630	3630
			0.625	15.88	102.73	152.930	46.610	Std.	1410	1640	2790	3000	3000	3000	3000	3000	3000	3000
								Alt.	1760	2050	2790	3050	3450	3630	3630	3630	3630	3630
			0.688	17.48	112.62	167.650	51.100	Std.	1550	1810	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	1940	2260	3070	3360	3630	3630	3630	3630	3630	3630
18	18.000	457.2	0.188	4.78	35.80	53.330	16.250	Std.	380	440	750	820	920	990	1070	1150	1240	1420
								Alt.	470	550	750	820	920	990	1070	1150	1240	1420
			0.219	5.56	41.63	61.920	18.870	Std.	440	510	870	950	1080	1160	1240	1340	1450	1650
								Alt.	550	640	870	950	1080	1160	1240	1340	1450	1650
			0.250	6.35	47.44	70.600	21.520	Std.	500	580	990	1090	1230	1320	1420	1530	1650	1890
								Alt.	630	730	990	1090	1230	1320	1420	1530	1650	1890
			0.281	7.14	53.23	79.240	24.150	Std.	560	660	1110	1220	1380	1490	1590	1730	1860	2120
								Alt.	700	820	1110	1220	1380	1490	1590	1730	1860	2120
			0.312	7.92	58.99	87.750	26.750	Std.	620	730	1240	1360	1530	1650	1770	1920	2060	2360
								Alt.	780	910	1240	1360	1530	1650	1770	1920	2060	2360
			0.344	8.74	64.93	96.660	29.460	Std.	690	800	1360	1490	1690	1820	1950	2110	2270	2600
								Alt.	860	1000	1360	1490	1690	1820	1950	2110	2270	2600
			0.375	9.52	70.65	105.100	32.030	Std.	750	880	1490	1630	1840	1980	2130	2300	2480	2830
								Alt.	940	1090	1490	1630	1840	1980	2130	2300	2480	2830
			0.406	10.31	76.36	113.620	34.630	Std.	810	950	1610	1760	1990	2150	2300	2490	2680	3000
								Alt.	1020	1180	1610	1760	1990	2150	2300	2490	2680	3070
			0.438	11.13	82.23	122.430	37.320	Std.	880	1020	1740	1900	2150	2320	2480	2690	2900	3000
								Alt.	1100	1280	1740	1900	2150	2320	2480	2690	2900	3310
			0.469	11.91	87.89	130.780	39.860	Std.	940	1090	1860	2040	2300	2480	2660	2880	3000	3000
								Alt.	1170	1370	1860	2040	2300	2480	2660	2880	3100	3540
			0.500	12.70	93.54	139.210	42.430	Std.	1000	1170	1980	2170	2460	2640	2830	3000	3000	3000
								Alt.	1250	1460	1980	2170	2460	2640	2830	3070	3310	3630
			0.562	14.27	104.76	155.870	47.510	Std.	1120	1310	2230	2440	2760	2970	3000	3000	3000	3000
								Alt.	1410	1640	2230	2440	2760	2970	3180	3450	3630	3630
			0.625	15.88	116.09	172.820	52.680	Std.	1250	1460	2480	2720	3000	3000	3000	3000	3000	3000
								Alt.	1560	1820	2480	2720	3070	3310	3540	3630	3630	3630
			0.688	17.48	127.32	189.540	57.770	Std.	1380	1610	2730	2990	3000	3000	3000	3000	3000	3000
								Alt.	1720	2010	2730	2990	3380	3630	3630	3630	3630	3630

Please check with the manufacturer the availability of the product

KLM Steel Pipe

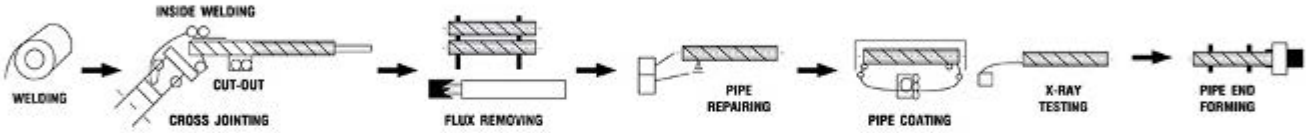
(American Petroleum Institute) Specification for Line Pipes.

Nominal pipe Size		OD.	wall thicknees = mm unit weight = kg/m													Figures based on stainless steel			
mm	Inch	mm	10	20	30	std	40	60	xs	80	100	120	140	160	xxs	5s	10s	40s	80s
6.0	1/8	10.3				1.730 0.370	1.730 0.370		2.410 0.470	2.410 0.470							1.240 0.280	1.730 0.360	2.410 0.480
8.0	1/4	13.7				2.240 0.630	2.240 0.630		3.020 0.800	3.020 0.800							1.650 0.510	2.240 0.640	3.020 0.820
10.0	3/8	17.1				2.310 0.840	2.310 0.840		3.200 1.100	3.200 1.100							1.650 0.640	2.310 0.860	3.200 1.120
15.0	1/2	21.3				2.770 1.270	2.770 1.270		3.730 1.620	3.730 1.620				4.780 1.950	7.470 2.550	1.650 0.820	2.110 1.010	2.770 1.300	3.730 1.650
20.0	3/4	26.7				2.870 1.960	2.870 1.690		3.910 2.200	3.910 2.200				5.560 2.900	7.820 3.640	1.650 1.040	2.110 1.310	2.870 1.710	3.910 2.240
25.0	1	33.4				3.380 2.500	3.380 2.500		4.550 3.240	4.550 3.240				6.350 4.240	9.090 5.450	1.650 1.330	2.770 2.130	3.380 2.550	4.550 3.290
32.0	1-1/4	42.2				3.560 3.390	3.560 3.390		4.850 4.470	4.850 4.470				6.350 5.610	9.700 7.770	1.650 1.680	2.770 2.760	3.560 3.460	4.850 4.560
40.0	1-1/2	48.3				3.680 4.050	3.680 4.050		5.080 5.410	5.080 5.410				7.140 7.250	10.150 9.560	1.650 1.950	2.770 3.170	3.680 4.130	5.080 5.510
50.0	2	60.3				3.910 5.440	3.910 5.440		5.540 7.480	5.540 7.480				8.740 11.110	11.070 13.440	1.650 2.440	2.770 4.010	3.910 5.540	5.540 7.630
65.0	2-1/2	73.0				5.160 8.630	5.160 8.630		7.010 11.410	7.010 11.410				9.530 14.920	14.020 20.390	2.110 3.770	3.050 5.360	5.160 8.810	7.010 11.640
80.0	3	88.9				5.490 11.290	5.490 11.290		7.620 15.270	7.620 15.270				11.130 21.350	15.240 27.680	2.110 4.600	3.050 6.590	5.490 11.520	7.620 15.590
90.0	3-1/2	101.6				5.740 13.570	5.740 13.570		80.080 18.630	8.080 18.630						2.110 5.290	3.050 7.550	5.740 13.840	8.080 19.010
100.0	4	114.3				6.020 16.070	6.020 16.070		8.560 22.320	8.560 22.320		11.130 28.320		13.490 33.540	17.120 41.030	2.110 5.960	3.050 8.520	6.020 16.400	8.560 22.770
125.0	5	141.3				6.550 21.770	6.550 21.770		9.530 30.970	9.530 30.970		12.700 40.280		15.880 49.110	19.050 57.430	2.770 9.670	3.400 11.820	6.550 22.200	9.530 31.590
150.0	6	168.3				7.110 28.260	7.110 28.260		10.970 42.560	10.970 42.560		14.270 54.200		18.260 67.560	21.950 79.220	2.770 11.550	3.400 14.130	7.110 28.830	10.970 43.420
200.0	8	219.1		6.350 33.310	7.040 36.810	8.180 42.550	8.180 42.550	10.310 53.080	12.700 64.640	12.700 64.640	15.090 75.920	18.260 90.440	20.620 100.920	23.010 111.270	22.230 107.920	2.770 15.090	3.760 20.370	8.180 43.390	12.700 65.950
250.0	10	273.1		6.350 41.770	7.800 51.030	9.270 60.310	9.270 60.310	12.700 81.550	12.700 81.550	15.090 96.010	18.260 114.750	21.440 133.080	25.400 155.150	28.580 172.330	25.400 155.150	3.400 23.080	4.190 28.340	9.270 61.520	12.700 83.190
300.0	12	323.9		6.350 49.730	8.380 65.200	9.530 73.880	10.310 79.730	14.270 108.960	12.700 97.460	17.480 132.080	21.440 159.910	25.400 186.970	28.580 208.140	33.320 238.760	25.400 186.970	3.960 31.890	4.570 36.730	9.520 75.520	12.700 99.430
350.0	14	355.6	6.350 54.690	7.930 67.900	9.530 81.330	9.530 81.330	11.130 94.550	15.090 126.710	12.700 107.390	19.050 158.100	23.830 194.960	27.790 224.650	31.750 253.560	35.710 281.700		3.960 35.060	4.780 42.140		
400.0	16	406.4	6.350 62.640	7.920 77.830	9.530 93.270	9.530 93.270	12.700 123.300	16.660 160.120	12.700 123.300	21.440 203.530	26.190 245.560	30.960 286.640	36.530 333.190	40.490 365.350		4.190 42.410	4.780 48.260		
450.0	18	457.0	6.350 70.570	7.920 87.710	11.130 122.380	9.530 105.160	14.270 155.800	19.050 205.740	12.700 139.150	23.880 254.550	29.360 309.620	34.930 363.560	39.670 408.260	45.240 459.370		4.190 47.770	4.780 54.360		
500.0	20	508.0	6.350 78.550	9.530 117.150	12.700 155.120	9.530 117.150	15.090 183.420	20.620 247.830	12.700 155.120	26.190 311.170	32.540 381.530	38.100 441.490	44.450 508.110	50.010 564.810		4.780 60.460	5.540 70.000		
550.0	22	559.0	6.350 86.540	9.530 129.130	12.700 171.090	9.530 129.130		22.230 294.250	12.700 171.090	28.580 373.830	34.930 451.420	41.280 527.020	47.630 600.630	53.980 672.260		4.780 66.570	5.540 77.060		
600.0	24	610.0	6.350 94.530	9.530 141.120	14.270 209.640	9.530 141.130	17.480 255.410	24.610 355.260	12.700 187.060	30.960 442.080	38.890 547.710	46.020 640.030	52.370 720.150	59.540 808.220		5.540 84.160	6.350 96.370		
650.0	26	660.0	7.920 127.360	12.700 202.720		9.530 152.870			12.700 202.720										
700.0	28	711.0	7.920 137.320	12.700 218.690	15.880 271.210	9.530 164.850			12.700 218.690										
750.0	30	762.0	7.920 147.280	12.700 234.670	15.880 292.180	9.530 176.840			12.700 234.670							6.350 120.720	7.920 150.360		
800.0	32	813.0	7.920 157.240	12.700 250.640	15.880 312.150	9.530 188.820	17.480 342.910		12.700 250.640										
850.0	34	864.0	7.920 167.200	12.700 266.610	15.880 332.120	9.530 200.310	17.480 364.900		12.700 266.610			STAINLESS STEEL : ANSI/ASME B 36.19 CARBON STEEL : ANSI/ASME B 36.10							
900.0	36	914.0	7.920 176.960	12.700 282.270	15.880 351.700	9.530 212.560	19.050 420.420		12.700 282.270										
950.0	38	965.0				9.530 224.540			12.700 298.240										
1000.0	40	1016.0				9.530 236.530			12.700 314.220										
1050.0	42	1067.0				9.530 248.520			12.700 330.190										
1100.0	44	1118.0				9.530 260.500			12.700 346.160										
1150.0	46	1168.0				9.530 272.250			12.700 351.820										
1200.0	48	1219.0				9.530 284.240			12.700 377.790										

Please check with the manufacturer the availability of the product

SUBMERGED ARC WELDING

PRODUCTION PROCESS

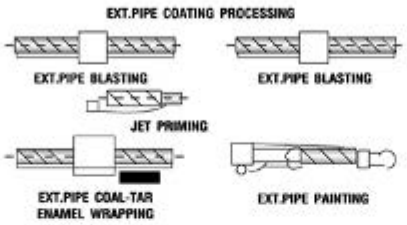


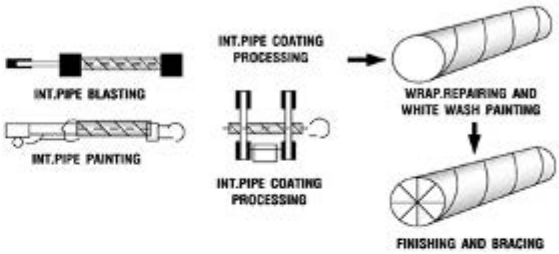


Specification	Products	Production Capacity	
		Outside Diameter	Wall Thickness (mm.)
ASTM A 139	Electrical-Fusion Submerge Are Welding Steel Pipe	300-3000	4.50-19.10
ASTM A 211	Submerged Arc Welding Steel or Iron Pipe	300-3000	4.50-19.10
ASTM A 252	Welded and Seamless Steel Pipe Piles	300-3000	4.50-19.10
AWWA C 200	Steel Water Pipe 6 Inch and Larger	300-3000	4.50-19.10
AWWA C 203	Coaltar Enamel Protective Coating for Steel Water Pipe	300-3000	4.50-19.10
AWWA C 205	Cement Mortar Protective Lining and Coating for Steel Water Pipe	300-3000	4.50-19.10
AWWA C 210	Liquid Epoxy Coating for Steel Water Pipe	300-3000	4.50-19.10
JIS G 3443	Coating Steel Pipe for Steel Water Pipe	300-3000	4.50-19.10
JIS G 3444	Carbon Steel Tubes for General Structural Purpose	300-3000	4.50-19.10
JIS G 3457	Submerged Arc Welded Carbon Steel Pipes	300-3000	4.50-19.10
JIS G 3492	Coaltar Enamel Protective Steel Pipes	300-3000	4.50-19.10
JIS G 3492	Coaltar Enamel Protective Coating for Steel Water Pipes	300-3000	4.50-19.10
JIS A 5525	Steel Pipes Piles	300-3000	4.50-19.10
BS 534 TIS 427	Steel Pipes . Joints and specials for water and sewage	300-3000	4.50-19.10

KLM
Steel Pipe







Hydrostatic Test Pressure for Steel Pipes

Nominal Diameter	Test Pressure kg./cm.^{2}		Minimun Duration
	Underground Pipe	Aboveground Pipe	
100-250	50	50	5
300	40	50	5
400	35	50	5
500	30	35	10
600	25	35	10
700-800	20	35	30
900-1500	20	30	30
1800-2100	20	25	30

There shall be no leak

Before coating and lining, each fitting shall be tested to a hydrostatic pressure of at least 15 kg./cm2 minutes. There shall be no leak

Available Coating

1. AWWA C203 Coal tar protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape Hot - Applied
2. AWWA C205 Cement - Mortar Protective Lining and Coating for Steel Water Pipe 4 Inch and Larger (Shop Applied)
3. AWWA C210 Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
4. AWWA C214 Tape Coating Systems for the Exterior of Steel Water Pipeliness
5. HOT DIPPED GALVANIZED conforming to JIS H8641, ASTM A123
6. Coating as requested

Nominal Diameter	Outside Diameter of Pipe and Fiting (mm.)	Length of Underground Pipe and aboveground Pipe (m.)	Length of Sleeve Pipe (m.)	Wall Thickness		Cement-Motar Lining Thickness (mm.)
				Underground Pipe and Sleeve Pipe (mm.)	Aboveground Pipe (mm.)	
100	114.3+/-1.6	-	-	2.65-0.25	4.5-0.25	6+2,-1
150	168.3+/-1.6	6.00+/-0.05	3.0+/-0.05	3.45-0.25	5.5-0.25	6+2,-1
200	219.1+/-1.6	6.00+/-0.05	3.0+/-0.05	4.50-0.25	6.0-0.25	6+2,-1
250	273.0+/-1.6	6.00+/-0.05	3.0+/-0.05	4.80-0.25	6.0-0.25	6+2,-1
300	323.9+/-1.6	6.00+/-0.05	3.0+/-0.05	6.00-0.25	6.0-0.25	6+2,-1
400	406.4+/-1.6	9.00+/-0.05	3.0+/-0.05	6.00-0.25	7.9-0.25	8+3,-2
500	508.0+/-1.6	9.00+/-0.05	3.0+/-0.05	6.00-0.25	7.9-0.25	8+3,-2
600	609.6+/-1.6	9.00+/-0.05	3.0+/-0.05	6.00-0.25	11.1-0.25	8+3,-2
700	711.2+/-1.6	9.00+/-0.05	3.0+/-0.05	6.00-0.25	11.1-0.25	10+3,-2
800	812.8+/-1.6	9.00+/-0.05	3.0+/-0.05	7.90-0.25	12.7-0.25	10+3,-2
900	914.4+/-1.6	9.00+/-0.05	3.0+/-0.05	7.90-0.25	12.7-0.25	10+3,-2
1000	1016.0+/-1.6	See note 1	3.0+/-0.05	9.50-0.25	12.7-0.25	12+3,-2
1100	1117.6+/-1.6	-	3.0+/-0.05	9.50-0.25	-	-
1200	1219.2+/-1.6	See note 1	3.0+/-0.05	11.10-0.25	15.9-0.25	12+3,-2
1300	1320.8+/-1.6	-	3.0+/-0.05	12.70-0.25	-	-
1400	1422.4+/-1.6	-	3.0+/-0.05	12.70-0.25	-	-
1500	1524.0+/-1.6	See note 1	3.0+/-0.05	12.70-0.25	19.1-0.25	12+3,-2
1600	1625.6+/-1.6	See note 1	3.0+/-0.05	15.90-0.25	19.10-0.25	-
1800	1820.0+/-3.0	6.00+/-0.05	3.0+/-0.05	15.90-0.25	25.4-0.25	14+3,-2
2100	2120.0+/-3.0	-	3.0+/-0.05	19.10-0.25	-	-

Note 1 : 6.0+/-0.05 meter or 9.0+/-0.05 meter as approved by Project Engineer
Source : Metropolitan Waterworks Authority of Thailand

KLM
Steel Pipe

Pressure Equivalents ตารางแปลงหน่วยความดัน

Unit	PSI	kPa	kg/cm^2	cm H_2O	feet H_2O	inches Hg*	mm Hg*	inches H_2O	Atm.	Bar	mPa
PSI	1	6.894757	0.070307	70.306927	2.306723	2.03602	51.71486	27.68068	0.068046	0.0689476	0.00689
kPa	0.1450377	1	0.0101972	10.19745	0.3345618	0.2952997	7.50061	4.01472	0.0096692	0.01	0.001
kg/cm^2	14.223343	98.06694	1	1,000.03	32.809312	28.95901	735.5588	393.71181	0.9678416	0.9806649	0.09806
cm H_2O	0.0142229	0.0980634	0.001	1	0.032808	0.0289581	0.7355372	0.3937	0.0009678	0.0009806	0.00098
feet H_2O	0.433515	2.968961	0.0304791	30.48	1	0.882646	22.4192	12	0.029499	0.0296896	0.00298
inches Hg*	0.4911542	3.386389	0.0345316	34.53253	1.132957	1	25.4	13.595484	0.0334211	0.0338639	0.00386
mm Hg*	0.0193368	0.1333225	0.0013595	1.359554	0.0446046	0.0393701	1	0.535255	0.0013158	0.0013332	0.00013
inches H_2O	0.0361263	0.2490819	0.0025422	2.54	0.08333	0.0735539	1.8682683	1	0.0024583	0.0024908	0.000249
Atm.	14.696	101.32535	1.033231	1,033.26	33.8995	29.9213	760	406.794	1	1.0132535	0.1013
Bar	14.5038	100	1.019716	1019.7466	33.4833	29.53	750.0626	401.8596	0.986923	1	0.1
mPa	145.0377	1,000	10.197	10,197.45	334.56	295.299	7500.61	4014.74	9.669	10	1

* Water (H_2O) at standard temperature 68 °F (20 °C) and mercury (Hg) at standard temperature 32 °F (0 °C)
* น้ำ (H_2O) ที่อุณหภูมิมาตรฐาน 68 °F (20 °C) และปรอท (Hg) ที่อุณหภูมิมาตรฐาน 32 °F (0 °C)
This table can be use to calculate pressure unit and also strength and stress transform
ตารางนี้นอกจากใช้ในการแปลงหน่วยความดัน ยังใช้ได้กับการแปลงหน่วยความแข็งแรงและความเค้นของวัสดุ (Strength & Stress) ได้ด้วย

Volume Equivalents ตารางแปลงหน่วยปริมาตร

Unit	US.gallon	Im.gallon	inch^3	ft^3	liter	m^3	barrel
US.gallon	1	0.83267	231	0.13368	3.7853	0.00378	0.02381
Im.gallon	1.2009	1	277.42	0.16054	4.5459	0.00455	0.02859
Inch^3	0.004329	0.003604	1	0.000579	0.0164	0.000016	0.0001
ft^3	7.4805	6.2288	1728	1	28.316	0.02832	0.17813
liter	0.26418	0.21997	61.024	0.0353	1	0.001	0.00629
m^3	264.17	219.97	61,023.74	35.3147	1,000	1	6.2899
barrel*	42	34.977	9702	5.614	158.983	0.15876	1

*เป็นหน่วยตวงน้ำมัน (Oil barrel) 1 Barrel = 42 US. Gallons

Area Speed Equivalents ตารางแปลงหน่วยความจำ

Unit	mm/s	ft/min	cm/s	ft/s	m/s
mm/s	1	0.19685	0.1	0.003281	0.001
ft/min	5.08	1	0.508	0.016667	0.00508
cm/s	10	1.9685	1	0.032808	0.01
ft/s	304.8	60	30.48	1	0.3048
m/s	1,000	196.85	100	3.2808	1

Volumatic Flow Rate Equivalents ตารางแปลงหน่วยอัตราการไหล

Unit	GPM(US)	GPM(UK)	ft^3/min	ft^3/sec	m^3/hr	m^3/min	liter/sec
GPM(US)	1	0.8327	0.1337	0.00223	0.2271	0.003785	0.06308
GPM(UK)	1.201	1	0.1605	0.002676	0.27275	0.004545	0.0758
ft^3/min	7.481	6.229	1	0.01667	1.699	0.02832	0.4719
ft^3/sec	448.83	373.7	60	1	101.94	1.699	28.32
m^3/hr	4.403	3.666	0.5886	0.00981	1	0.01667	0.2778
m^3/min	0.2642	0.22	35.3147	0.5886	60	1	16.667
liter/sec	15.85	13.2	2.119	0.0353	3.6	0.06	1

Power Equivalents ตารางแปลงหน่วยกำลัง

Unit	pound	ounce	gram	kg	slug
HP	1	550	745.7	0.7457	2,544
Ft-lb/sec	0.00182	1	1.3558	0.00136	4.626
Watt	0.00134	1	1	0.001	3.412
kW	1.34	737.6	1,000	1	3,412
Btu/hr	0.00039	0.2161	0.2931	0.00029	1

Mass Equivalents ตารางแปลงหน่วยน้ำหนัก (มวล)

Unit	pound	ounce	gram	kg	slug	stone	tonne
pound	1	16	453.6	0.453597	0.031	0.0135	0.0004536
ounce	0.0625	1	28.3495	0.028349	0.0019		
gram	0.0022	0.0353	1	0.001			
kg	2.2046	35.274	1,000	1	0.0685	0.157	0.001
slug	32.174	514.785	14,593.90	14.5939	1	2.29825	0.014594
stone	13.988	223.99	6,350.00	6.35	0.4351	1	0.00635
tonne	2,204.60			1,000	68.5213	157.48	1

Metric Tonne (Tonne) = 1000 kg
US ton (Short Ton) = 0.907185 Metric Tonne UK ton (Long Ton) = 1.01605 Metric Tonne

Area Equivalents ตารางแปลงหน่วยพื้นที่

Unit	Inch^2	ft^2	acre	cm^2	m^2
Inch^2	1	0.006944		6.4516	0.0006452
ft^2	144	1		929.0304	0.0929
acre		43,560	1		4,047
cm^2	0.155	6.2288		1	0.0001
m^2	1,550.00	10.76391	0.000247	10,000	1

Length Equivalents ตารางแปลงหน่วยความยาว

Unit	inch	ft	yard	mile	cm	metre	km
inch	1	0.08333	0.027778		2.54	0.0254	
ft	12	1	0.333333		30.48	0.3048	
yard	36	3	1	0.0005682	91.44	0.9144	0.0009144
mile	63,360	5,280	1,760	1		1,609.344	1.609344
cm	0.3937	0.032808	0.010936		1	0.01	
metre	39.3701	3.28084	1.093613	0.0006214	100	1	0.001
km	39,370	3280.8	1,093.61	0.62137	100,000	1,000	1

Density Equivalents ตารางแปลงหน่วยความหนาแน่น

Unit	lb/Inch^3	lb/ft^3	gram/cm^3	kg/m^3	slug/ft^3
lb/Inch^3	1	1,728	27.6799	27,679.90	53.708
lb/ft^3	0.0005787	1	0.01602	16.01846	0.31081
gram/cm^3	0.03613	62.4281	1	1,000	1.9403
kg/m^3	0.0000361	0.06243	0.001	1	0.00194
slug/ft^3	0.019	32.17	0.51538	515.379	1