

ERW LINE PIPES CONFORMING TO API 5L, IS/ISO:3183

Dimensions, Weights and Test Pressures for Sizes 6 5/8" through 20" (SI Units)

Size	Specified Outside Diameter	Specified Wall Thickness	Plain-end Weight per Unit Length	Calculated Inside Diameter	Minimum Test Pressure (kPa x 100)									
	D (mm)	t (mm)	Wpe (Kg/m)	d (mm)	Grade A25	Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
6 5/8"	168.3	3.2	13.03	161.9	-	48	56	83	91	103	111	118	128	138
	168.3	3.6	14.62	161.1	-	54	63	93	103	116	125	133	144	156
	168.3	4.0	16.21	160.3	-	60	70	103	114	128	139	148	160	173
	168.3	4.4	17.78	159.5	-	66	77	114	125	141	153	163	176	190
	168.3	4.8	19.35	158.7	-	72	84	124	137	154	167	178	193	205
	168.3	5.2	20.91	157.9	-	78	91	134	148	167	181	192	205	205
	168.3	5.6	22.47	157.1	-	84	98	145	160	180	195	205	205	205
	168.3	6.4	25.55	155.5	-	96	112	165	183	205	205	205	205	205
	168.3	7.1	28.22	154.1	-	106	124	184	202	205	205	205	205	205
8 5/8"	219.1	4.0	21.22	211.1	-	46	54	79	88	99	107	114	123	133
	219.1	4.8	25.37	209.5	-	55	64	95	105	118	128	136	148	159
	219.1	5.2	27.43	208.7	-	60	70	103	114	128	139	148	160	173
	219.1	5.6	29.48	207.9	-	64	75	111	123	138	150	159	173	186
	219.1	6.4	33.57	206.3	-	74	86	127	140	158	171	182	197	205
	219.1	7.0	36.61	205.1	-	81	94	139	153	173	187	199	205	205
	219.1	7.9	41.14	203.3	-	91	106	157	173	195	205	205	205	205
	219.1	8.2	42.65	202.7	-	94	110	163	180	202	205	205	205	205
	219.1	8.7	45.14	201.7	-	100	117	173	191	205	205	205	205	205
	219.1	9.5	49.10	200.1	-	109	127	189	205	205	205	205	205	205
	219.1	11.1	56.94	196.9	-	128	149	205	205	205	205	205	205	205
	219.1	12.7	64.64	193.7	-	146	170	205	205	205	205	205	205	205
10 3/4"	273.1	4.0	26.54	265.1	-	37	43	72	80	90	97	103	112	121
	273.1	4.8	31.76	263.5	-	44	52	87	96	108	117	124	134	145
	273.1	5.2	34.35	262.7	-	48	56	94	104	117	126	134	146	157
	273.1	5.6	36.94	261.9	-	52	60	101	112	125	136	145	157	169
	273.1	6.4	42.09	260.3	-	59	69	116	127	143	155	165	179	193
	273.1	7.1	46.57	258.9	-	66	76	128	141	159	172	183	199	205
	273.1	7.8	51.03	257.5	-	72	84	141	155	175	189	202	205	205
	273.1	8.7	56.72	255.7	-	80	94	157	173	195	205	205	205	205
	273.1	9.3	60.50	254.5	-	86	100	168	185	205	205	205	205	205
	273.1	11.1	71.72	250.9	-	102	120	200	205	205	205	205	205	205
	273.1	12.7	81.55	247.7	-	117	137	205	205	205	205	205	205	205
	273.1	12.7	81.55	247.7	-	117	137	205	205	205	205	205	205	205
12 3/4"	323.9	4.4	34.67	315.1	-	34	40	67	74	83	90	96	104	112
	323.9	4.8	37.77	314.3	-	37	44	73	81	91	98	105	113	122
	323.9	5.2	40.87	313.5	-	40	47	79	87	98	106	113	123	132
	323.9	5.6	43.96	312.7	-	44	51	85	94	106	115	122	132	143
	323.9	6.4	50.11	311.1	-	50	58	97	107	121	131	139	151	163
	323.9	7.1	55.47	309.7	-	55	64	108	119	134	145	155	168	181
	323.9	7.9	61.56	308.1	-	61	72	120	133	149	162	172	187	201
	323.9	8.4	65.35	307.1	-	65	76	128	141	159	172	183	198	205
	323.9	8.7	67.62	306.5	-	68	79	132	146	164	178	189	205	205
	323.9	9.5	73.65	304.9	-	74	86	145	160	179	194	205	205	205
	323.9	10.3	79.65	303.3	-	80	94	157	173	195	205	205	205	205
	323.9	11.1	85.62	301.7	-	86	101	169	186	205	205	205	205	205
14"	355.6	4.8	41.52	346.0	-	34	40	67	73	83	89	95	103	111
	355.6	5.2	44.93	345.2	-	37	43	72	80	89	97	103	112	121
	355.6	5.3	45.78	345.0	-	38	44	74	81	91	99	105	114	123
	355.6	5.6	48.33	344.4	-	40	46	78	86	96	104	111	121	130
	355.6	6.4	55.11	342.8	-	45	53	89	98	110	119	127	138	148
	355.6	7.1	61.02	341.4	-	50	59	98	109	122	132	141	153	165
	355.6	7.9	67.74	339.8	-	56	65	110	121	136	147	157	170	183
	355.6	8.7	74.42	338.2	-	62	72	121	133	150	162	173	187	202
	355.6	9.5	81.08	336.6	-	67	79	132	145	163	177	188	204	205
	355.6	10.3	87.71	335.0	-	73	85	143	158	177	192	204	205	205
	355.6	11.1	94.30	333.4	-	79	92	154	170	191	205	205	205	205
	355.6	11.9	100.86	331.8	-	84	98	165	182	204	205	205	205	205
16"	406.4	4.8	47.54	396.8	-	30	35	58	64	72	78	83	90	97
	406.4	5.2	51.45	396.0	-	32	38	63	70	78	85	90	98	106
	406.4	5.6	55.35	395.2	-	35	41	68	75	84	91	97	105	114
	406.4	6.4	63.13	393.6	-	40	46	78	86	96	104	111	120	130
	406.4	7.1	69.91	392.2	-	44	51	86	95	107	116	123	134	144
	406.4	7.9	77.63	390.6	-	49	57	96	106	119	129	137	149	160
	406.4	8.7	85.32	389.0	-	54	63	106	117	131	142	151	164	177
	406.4	9.5	92.98	387.4	-	59	69	115	127	143	155	165	179	193
	406.4	10.3	100.61	385.8	-	64	75	125	138	155	168	179	194	205
	406.4	11.1	108.20	384.2	-	69	80	135	149	167	181	193	205	205
	406.4	11.9	115.77	382.6	-	74	86	144	159	179	194	205	205	205
	406.4	12.7	123.30	381.0	-	79	92	154	170	191	205	205	205	205
18"	457.0	4.8	53.53	447.4	-	27	31	52	57	64	70	74	80	87
	457.0	5.6	62.34	445.8	-	31	36	60	67	75	81	87	94	101

Size	Specified Outside Diameter	Specified Wall Thickness	Plain-end Weight per Unit Length	Calculated Inside Diameter	Minimum Test Pressure (kPa x 100)									
					Grade A25	Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
	457.0	6.4	71.12	444.2	-	35	41	69	76	86	93	99	107	116
	457.0	7.1	78.77	442.8	-	39	46	77	85	95	103	110	119	128
	457.0	7.9	87.49	441.2	-	44	51	85	94	106	115	122	132	143
	457.0	8.7	96.18	439.6	-	48	56	94	104	117	126	134	146	157
	457.0	9.5	104.84	438.0	-	52	61	103	113	127	138	147	159	171
	457.0	10.3	113.46	436.4	-	57	66	111	123	138	149	159	172	186
	457.0	11.1	122.05	434.8	-	61	71	120	132	149	161	171	186	200
	457.0	11.9	130.62	433.2	-	66	77	128	142	159	173	184	199	205
	457.0	12.7	139.15	431.6	-	70	82	137	151	170	184	196	205	205
20"	508.0	5.6	69.38	496.8	-	28	32	58	64	71	77	82	89	96
	508.0	6.4	79.16	495.2	-	32	37	66	73	82	88	94	102	110
	508.0	7.1	87.70	493.8	-	35	41	73	81	91	98	104	113	122
	508.0	7.9	97.43	492.2	-	39	46	81	90	101	109	116	126	136
	508.0	8.7	107.12	490.6	-	43	50	89	99	111	120	128	139	150
	508.0	9.5	116.78	489.0	-	47	55	98	108	121	131	140	152	163
	508.0	10.3	126.41	487.4	-	51	60	106	117	131	142	152	164	177
	508.0	11.1	136.01	485.8	-	55	64	114	126	142	153	163	177	191
	508.0	11.9	145.58	484.2	-	59	69	122	135	152	164	175	190	205
	508.0	12.7	155.12	482.6	-	63	74	131	144	162	176	187	203	205

ERW CASING CONFORMING TO API 5CT

DIMENSIONS, WEIGHTS AND END FINISH

Outside Diameter		Normal Weight T&C		Normal Weight Plain-end		Wall Thickness		TYPE OF FINISH GRADE		COUPLING OD	THREAD TYPES TPI	
In.	mm	lb/ft.	Kg/mtr	lb/ft.	Kg/mtr	Inch	mm	H-40	J-55 K-55	mm	STC LTC	BTC
6 5/8	168.28	20.00	29.76	19.51	29.06	0.288	7.32	PS	PSLB	187.71	8	5
6 5/8	168.28	24.00	35.72	23.60	35.13	0.352	8.94	-	PSLB	187.71	8	5
7	177.80	20.00	29.76	19.56	29.12	0.272	6.91	PS	PS	200.03	8	-
7	177.80	23.00	34.23	22.65	33.70	0.317	8.05	-	PSLB	200.03	8	5
7	177.80	26.00	38.69	25.69	38.21	0.362	9.19	-	PSLB	200.03	8	5
8 5/8	219.08	24.00	35.72	23.60	35.14	0.264	6.71	-	PS	244.48	8	-
8 5/8	219.08	28.00	41.67	27.04	40.24	0.304	7.72	PS	-	244.48	8	-
8 5/8	219.08	32.00	47.62	31.13	46.33	0.352	8.94	PS	PSLB	244.48	8	5
8 5/8	219.08	36.00	53.57	35.17	52.35	0.400	10.16	-	PSLB	244.48	8	5
9 5/8	244.48	32.30	48.07	31.06	46.20	0.312	7.92	PS	-	269.88	8	-
9 5/8	244.48	36.00	53.57	34.89	51.93	0.352	8.94	PS	PSLB	269.88	8	5
9 5/8	244.48	40.00	59.53	38.97	57.99	0.395	10.03	-	PSLB	269.88	8	5
10 3/4	273.05	32.75	48.74	31.23	46.50	0.279	7.09	PS	-	298.45	8	-
10 3/4	273.05	40.50	60.27	38.91	57.91	0.350	8.89	PS	PSB	298.45	8	5
10 3/4	273.05	45.50	67.71	44.26	65.87	0.400	10.16	-	PSB	298.45	8	5
10 3/4	273.05	51.00	75.90	49.55	73.75	0.450	11.43	-	PSB	298.45	8	5
13 3/8	339.72	48.00	71.43	46.02	68.48	0.330	8.38	PS	-	365.12	8	-
13 3/8	339.72	54.50	81.10	52.79	78.55	0.380	9.65	-	PSB	365.12	8	5
13 3/8	339.72	61.00	90.78	59.50	88.55	0.430	10.92	-	PSB	365.12	8	5
13 3/8	339.72	68.00	101.19	66.17	98.46	0.480	12.19	-	PSB	365.12	8	5

STEAM, WATER, GAS AND AIR LINE ERW PIPES CONFORMING TO ASTM A-53

DIMENSION AND WEIGHT

Nominal Pipe Size mm/inch	OD mm	SCHEDULE WALL THICKNESS (mm) / WEIGHT (kg/m)							
		Sch 10	Sch 20	Sch 30	STD	Sch 40	XS	Sch 60	Sch 80
150	168.30	-	-	-	7.11	7.11	10.97	-	10.97
6		-	-	-	28.26	28.26	42.56	-	42.56
200	219.10	-	6.35	7.04	8.18	8.18	12.70	10.31	12.70
8		-	33.32	36.82	42.55	42.55	64.64	53.09	64.64
250	273.00	-	6.35	7.80	9.27	9.27	12.70	12.70	-
10		-	41.76	51.01	60.29	60.29	81.53	81.53	-
300	323.80	-	6.35	8.38	9.53	10.31	12.70	-	-
12		-	49.71	65.19	73.86	79.71	97.44	-	-
350	355.60	6.35	7.92	9.53	9.53	11.13	12.70	-	-
14		54.69	67.91	81.33	81.33	94.55	107.40	-	-
400	406.40	6.35	7.92	9.53	9.53	12.70	12.70	-	-
16		62.65	77.83	93.27	93.27	123.31	123.31	-	-
450	457.00	6.35	7.92	11.13	9.53	14.27	12.70	-	-
18		70.57	87.71	122.38	105.17	155.81	139.16	-	-
500	508.00	6.35	9.53	12.70	9.53	15.09	12.70	-	-
20		78.56	117.15	155.13	117.15	183.43	155.13	-	-



ERW PIPES FOR WATER & SEWAGE CONFORMING TO IS:3589
& WATER WELL CASING CONFORMING TO IS:4270

		CONVENTIONAL MASS PER UNIT LENGTH (Kg/m)																								
NB	OD	WALL THICKNESS (mm)																								
mm	mm	3.20	3.60	4.00	4.30	4.65	4.85	5.00	5.20	5.40	5.60	6.00	6.35	6.40	7.00	7.10	8.00	9.50	10.00	10.30	10.50	11.10	11.50	12.00	12.50	12.70
100	114.30	-	-	-	-	-	-	13.48	-	14.50	-	16.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-
125	141.30	-	-	-	-	-	-	16.81	-	18.10	-	20.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-
150	168.30	13.03	14.62	16.21	17.39	18.77	19.55	20.13	20.91	21.69	-	24.01	25.36	25.55	27.84	28.22	-	-	-	-	-	-	-	-	-	-
175	193.70	-	16.88	18.71	20.08	21.68	22.59	23.27	24.17	25.07	-	27.77	29.34	29.56	32.23	32.67	36.63	-	-	-	-	-	-	-	-	-
200	219.10	-	19.13	21.22	22.78	24.59	25.62	26.40	27.43	28.46	29.48	31.53	33.31	33.57	36.61	37.12	41.65	49.10	51.56	53.03	54.01	56.94	58.87	61.29	63.68	64.64
225	244.50	-	-	23.72	25.47	27.50	28.66	29.53	30.69	31.84	32.99	35.29	37.29	37.58	41.00	41.57	46.66	55.05	57.83	59.49	60.59	63.89	66.08	68.80	71.51	72.60
250	273.10	-	23.93	26.54	28.50	30.78	32.08	33.06	34.35	35.65	36.94	39.52	41.77	42.09	45.93	46.57	52.30	61.75	64.88	66.75	68.00	71.72	74.19	77.26	80.33	81.55
300	323.90	-	-	31.55	33.89	36.61	38.16	39.32	40.87	42.41	43.96	47.04	49.73	50.11	54.70	55.47	62.32	73.65	77.41	79.65	81.15	85.62	88.59	92.30	95.99	97.46
350	355.60	-	-	34.68	37.25	40.24	41.95	43.23	44.93	46.63	48.33	51.73	54.69	55.11	60.18	61.02	68.57	81.08	85.22	87.71	89.36	94.30	97.58	101.68	105.76	107.39
400	406.40	-	-	-	-	46.07	48.03	49.49	51.45	53.40	55.35	59.24	62.64	63.13	68.94	69.91	78.60	92.98	97.75	100.61	102.51	108.20	111.99	116.71	121.42	123.30
450	457.00	-	-	-	-	51.87	54.08	55.73	57.94	60.14	62.34	66.73	70.57	71.12	77.68	78.77	88.58	104.84	102.3	113.46	115.61	122.05	126.34	131.68	137.02	139.15
500	508.00	-	-	-	-	57.72	60.18	62.02	64.48	66.93	69.38	74.28	78.55	79.16	86.48	87.70	98.64	116.78	122.81	126.41	128.82	136.01	140.80	146.78	152.74	155.12

CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES

Speci- fication	Grade	CHEMICAL COMPOSITION % (Max.)										MECHANICAL PROPERTIES										Impact Energy J (Ft/lb) min.
		C	Mn	P	S	Si	V	Nb	Ti	C.E.		YIELD STRENGTH				TENSILE STRENGTH				% Elongation		
										PCM	IIW	Min.		Max.		Min.		Max.		e		
												PSI	MPa	PSI	MPa	PSI	MPa	PSI	MPa			
API 5L	L210 or A	0.22	0.90	0.030	0.030	-	-	-	-	-	-	30500	210	-	-	48600	335	-	-	U.S Customary Unit e = 625,000 A ^{0.2} /U ^{0.9} S.I Unit e = 1940 A ^{0.2} /U ^{0.9} Legend : e = specified min. elongation A= Cross sectional area U= Specified min. UTS	-	
	L245 or B	0.26	1.20	0.030	0.030	-	-	-	-	-	-	35500	245	-	-	60200	415	-	-		-	
	L290 or X-42	0.26	1.30	0.030	0.030	-	-	-	-	-	-	42100	290	-	-	60200	415	-	-		-	
	L320 or X-46	0.26	1.40	0.030	0.030	-	-	-	-	-	-	46400	320	-	-	63100	435	-	-		-	
	L360 or X-52	0.26	1.40	0.030	0.030	-	-	-	-	-	-	52200	360	-	-	66700	460	-	-		-	
	L390 or X-56	0.26	1.40	0.030	0.030	-	-	-	-	-	-	56600	390	-	-	71100	490	-	-		-	
	L415 or X-60	0.26	1.40	0.030	0.030	-	-	-	-	-	-	60200	415	-	-	75400	520	-	-		-	
	L450 or X-65	0.26	1.45	0.030	0.030	-	-	-	-	-	-	65300	450	-	-	77600	535	-	-		-	
	L485 or X-70	0.26	1.65	0.030	0.030	-	-	-	-	-	-	70300	485	-	-	82700	570	-	-		-	
API 5L	L245M or BM	0.22	1.20	0.025	0.015	0.45	0.050	0.050	0.040	0.25	0.43	35500	245	65300	450	60200	415	95000	655		27 (20)	
	L290M or X42M	0.22	1.30	0.025	0.015	0.45	0.050	0.050	0.040	0.25	0.43	42100	290	71800	495	60200	415	95000	655		27 (20)	
	L320M or X46M	0.22	1.30	0.025	0.015	0.45	0.050	0.050	0.040	0.25	0.43	46400	320	76100	525	63100	435	95000	655		27 (20)	
	L360M or X52M	0.22	1.40	0.025	0.015	0.45	-	-	-	0.25	0.43	52200	360	76900	530	66700	460	110200	760		27 (20)	
	L390M or X56M	0.22	1.40	0.025	0.015	0.45	-	-	-	0.25	0.43	56600	390	79000	545	71100	490	110200	760		27 (20)	
	L415M or X60M	0.12	1.60	0.025	0.015	0.45	-	-	-	0.25	0.43	60200	415	81900	565	75400	520	110200	760		27 (20)	
	L450M or X65M	0.12	1.60	0.025	0.015	0.45	-	-	-	0.25	0.43	65300	450	87000	600	77600	535	110200	760		27 (20)	
	L485M or X70M	0.12	1.70	0.025	0.015	0.45	-	-	-	0.25	0.43	70300	485	92100	635	82700	570	110200	760		27 (20)	
API 5CT	H 40	-	-	0.030	0.030	-	-	-	-	-	-	40000	276	80000	552	60000	414	-	-	e = 625,000 A ^{0.2} /U ^{0.9}	20L/16T 27L/20T	
	J-55	-	-	0.030	0.030	-	-	-	-	-	-	55000	379	80000	552	75000	517	-	-		L= long. T= Trans.	
ASTM	A	0.25	0.95	0.050	0.045	-	0.08	-	-	-	-	30000	205	-	-	48000	330	-	-	e = 625,000 A ^{0.2} /U ^{0.9}		
A- 53	B	0.30	1.20	0.050	0.045	-	0.08	-	-	-	-	35000	240	-	-	60000	415	-	-			
IS:1161	YST-210	0.12	0.60	0.040	0.040	-	-	-	-	-	-	30,500	210	-	-	48,000	330	-	-	G.L= 5.65√area 20 17 14 10 G.L= 5.65√area		
	YST-240	0.16	1.20	0.040	0.040	-	-	-	-	-	-	35,000	240	-	-	59,500	410	-	-			
	YST-310	0.25	1.30	0.040	0.040	-	-	-	-	-	0.45	45,000	310	-	-	64,500	450	-	-			
	YST-355	0.25	1.50	0.040	0.040	-	-	-	-	-	0.45	51,500	355	-	-	71,100	490	-	-			
IS:3589	Fe 330	0.16	1.20	0.040	0.040	-	-	-	-	-	-	-	195	-	-	-	330	-	-	20		
	Fe 410	0.20	1.30	0.040	0.040	-	-	-	-	-	0.45	-	235	-	-	-	410	-	-	18		
	Fe 450	0.25	1.20	0.040	0.040	-	-	-	-	-	0.45	-	275	-	-	-	450	-	-	15		
IS:4270	Fe 410	-	-	0.040	0.040	-	-	-	-	-	-	-	235	-	-	-	410	-	-	G.L= 5.65√area 15	Hardness= 230 HV max.	
	Fe 450	-	-	0.040	0.040	-	-	-	-	-	-	-	275	-	-	-	450	-	-	13		

TOLERANCE ON OUTSIDE DIAMETER, WALL THICKNESS, WEIGHT AND LENGTH OF PIPE

SPEC.	OUT SIDE DIAMETER		WALL THICKNESS	WEIGHT	LENGTH							
	PIPE BODY	PIPE END			NOMINAL		Avg. Min.		MINIMUM		MAXIMUM	
					ft	mtr.	ft	mtr.	ft	mtr.	ft	mtr.
API 5L IS/ISO: 3183	< 2 3/8"(60.3 mm) OD : + 0.40mm, - 0.80mm ≥ 2 3/8" (60.3 mm) OD to ≤ 24" (610 mm) : ± 0.0075 D (but max. of ± 3.20 mm)	≤ 6 5/8" (168.3 mm): + 1.60 mm, - 0.40mm > 6 5/8" (168.3 mm) to ≤ 24" (610 mm) : ± 0.005 D (but max. of ± 1.6 mm)	≤ 5.0 mm WT : ± 0.5 mm > 5.0 mm WT to < 15.0 mm WT: ± 0.1t ≥ 15.0 mm WT : ± 1.5 mm	Single length of pipe + 10%, - 3.5% Carloads > 20 Ton : - 1.75%	20 40	6.0 12.0	17.5 35.0	5.33 10.67	9 14	2.74 4.27	22.5 45.0	6.86 13.72
API - SCT	4 - 1/2 and larger = +1.0% _ .5% of OD	5 and larger = + 1.0% – 0.016	-12.50%	Single length of pipe +6.5%, -3.5% Car loads:- for min 40,000 lb or more - 1.75%	Range-1 ft/mtr. 16/4.88 min. ft/mtr 25/7.62 max.		Range-2 ft/mtr. 25/7.62 min. ft/mtr 34/10.36 max.		Range-3 ft/mtr. 34/10.36 min. ft/mtr 48/14.63 max.			
ASTM- A-53	Pipe 2 NPS and over = ±1.0%	-	At any point - 12.5% (Max) Tm = Tn X 0.875 Tn = Nominal w.t Tm = Minimum w.t	± 10%	20 40	6.0 12.0	- 35	- 10.67	16 22	4.88 6.71	22 -	6.71 -
IS: 3589	Upto 508 mm OD = ± 0.75%	-	± 10%	-	- -	6.0 12.0	- -	- -	- -	4.00 7.00	- -	7.0 14.0
IS: 4270	± 1.0%	-	upto 406.4 mm OD = + 15% - 12.5% over 406.4 mm OD = +15% -10%	+ 10% - 8%	- -	6.0 -	- -	- -	- -	4.0 -	- -	7.0 -
IS:1161	Upto 48.3mm O.D.= +0.4mm,-0.80mm Over 48.3mm = ± 1.0%	N.A	±10%	Carload 10 MT : ± 7.5%, Single Tube : ± 10%,	-	6.0	-	-	-	4.0	-	7.0