

**CHEMICAL COMPOSITION & MECHANICAL PROPERTIES OF POPULAR GRADES**

Spec.	Type	Grade	Chemical Composition (%)													Mechanical Properties*				
			C		Mn		P	S	Si		Cr		Mo	Cu	Ni	V	Yield Strength	Tensile Strength		
			Min.	Max.	Min.	Max.	Max.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	Max.	Max.	Min.	Min.	
A-53	E & S	A	-	0.25	-	0.95	0.050	0.045	-	-	-	0.40 <sup>a</sup>	-	0.15 <sup>a</sup>	0.40 <sup>a</sup> -S 0.50 <sup>a</sup> -S	0.40 <sup>a</sup>	0.08 <sup>a</sup>	265	330	
	E & S	B	-	0.30	-	1.20	0.050	0.045	-	-	-	0.40 <sup>a</sup>	-	0.15 <sup>a</sup>	0.40 <sup>a</sup> -S 0.50 <sup>a</sup> -S	0.40 <sup>a</sup>	0.08 <sup>a</sup>	240	415	
A-106	S	A	-	0.25 <sup>a</sup>	0.27	0.93 <sup>a</sup>	0.035	0.035	0.10	-	-	0.40 <sup>a</sup>	-	0.15 <sup>a</sup>	0.40 <sup>a</sup>	0.40 <sup>a</sup>	0.08 <sup>a</sup>	205	330	
		B	-	0.30 <sup>a</sup>	0.29	1.06 <sup>a</sup>	0.035	0.035	0.10	-	-	0.40 <sup>a</sup>	-	0.15 <sup>a</sup>	0.40 <sup>a</sup>	0.40 <sup>a</sup>	0.08 <sup>a</sup>	240	415	
		C	-	0.35 <sup>a</sup>	0.29	1.06 <sup>a</sup>	0.035	0.035	0.10	-	-	0.40 <sup>a</sup>	-	0.15 <sup>a</sup>	0.40 <sup>a</sup>	0.40 <sup>a</sup>	0.08 <sup>a</sup>	275	485	
A179	S	-	0.06	0.18	0.27	0.63	0.035	0.035	-	-	-	-	-	-	-	-	180	325		
A192	S	-	0.06	0.18	0.27	0.63	0.035	0.035	-	0.25	-	-	-	-	-	-	180	325		
A210	S	A-1	-	0.27 <sup>a</sup>	-	0.93 <sup>a</sup>	0.035	0.035	0.10	-	-	-	-	-	-	-	-	255	415	
		C	-	0.35 <sup>a</sup>	0.29	1.06 <sup>a</sup>	0.035	0.035	0.10	-	-	-	-	-	-	-	-	275	485	
A333	E & S	1	-	0.30 <sup>a</sup>	0.40	1.06 <sup>a</sup>	0.025	0.025	-	-	-	-	-	-	-	-	-	205	300	
		6	-	0.30 <sup>a</sup>	0.29	1.06 <sup>a</sup>	0.025	0.025	0.10	-	-	-	-	-	-	-	-	240	415	
A213/ A335	S	P-1	0.10	0.20	0.30	0.80	0.025	0.25	0.10	0.50	-	-	0.44	0.65	-	-	-	205	380	
		T-2/P-2	0.10	0.20	0.30	0.61	0.025	0.025	0.10	0.30	0.50	0.81	0.44	0.65	-	-	-	205	380	
		T-5/P-5	-	0.15	0.30	0.60	0.025	0.025	-	0.50	4.00	6.00	0.45	0.65	-	-	-	205	415	
		T-9/P-9	-	0.15	0.30	0.60	0.025	0.025	0.25	1.00	8.00	10.00	0.90	1.10	-	-	-	205	415	
		T-11/P-11	0.05	0.15	0.30	0.60	0.025	0.025	0.50	1.00	1.00	1.50	0.44	0.65	-	-	-	205	415	
		T-12/P-12	0.05	0.15	0.03	0.61	0.025	0.025	-	0.50	0.80	1.25	0.44	0.65	-	-	-	220	415	
		T-22/P-22	0.05	0.15	0.03	0.60	0.025	0.025	-	0.50	1.90	2.60	0.87	1.13	-	-	-	205	415	
		T-91/P-91	0.07 0.08 0.12	0.14 0.30	0.60 0.60	0.020 0.010	0.20	0.50	8.00	9.50	0.85	1.05	-	-	0.40	0.18- 0.25	-	-	415	585
		N : 0.030 - 0.070, AL : 0.02 Max, NB/C3 : 0.06-0.10, TI : 0.01 max, ZR: 0.01 max																		
		API 5L	E & S PSL-1	L210 or A	-	0.22 <sup>b</sup>	-	0.90	0.030	0.030	-	-	-	-	-	-	-	-	-	210
L245 or B	-			0.26 <sup>b</sup>	-	1.20	0.030	0.030	-	-	-	-	-	-	-	-	-	245	415	
L290 X-42	-			0.26 <sup>b</sup>	-	1.30	0.030	0.030	-	-	-	-	-	-	-	-	-	290	415	
L320 or X-46	-			0.26 <sup>b</sup>	-	1.40	0.030	0.030	-	-	-	-	-	-	-	-	-	320	435	
L360 X-52	-			0.26 <sup>b</sup>	-	1.40	0.030	0.030	-	-	-	-	-	-	-	-	-	360	400	
L390 X-56	-			0.26 <sup>b</sup>	-	1.40	0.030	0.030	-	-	-	-	-	-	-	-	-	390	490	
L415 or X-60	-			0.26 <sup>b</sup>	-	1.40	0.030	0.030	-	-	-	-	-	-	-	-	-	415	520	
L450 or X-65	-			0.26 <sup>b</sup>	-	1.45	0.030	0.030	-	-	-	-	-	-	-	-	-	450	535	
L485 or X-70	-	0.26 <sup>b</sup>	-	0.65 <sup>c</sup>	0.030	0.030	-	-	-	-	-	-	-	-	-	485	575			

**LEGENDS :** E : ERW (Electric Resistance Welded), S - Seamless, PSL - Product Specification Level  
<sup>a</sup> : The Total Composition of these five elements shall not exceed 1%. a : For each reduction of 0.01% below the specified carbon maximum, an increase of 0.06% manganese above the specified maximum will be permitted upto maximum of 1.35%.  
<sup>b</sup> : For Seamless, Carbon will be 0.28% for Gr. B to X-70 and E 'Mn' Gr. X-65 to X-70 will be 1.40%.  
<sup>c</sup> : For Each reduction of 0.01% below the specified carbon content, an increase of 0.05% above the specified maximum manganese content is permissible. maximum of 1.65% for Grades B to X 52, & 1.75% for Grades higher than X56 to X65, 2.00% for Grade X70

OD	MM	INCH	CARBON STEEL / ALLOY STEEL / SEAMLESS TUBES DIMENSIONS & WEIGHT														
			Gauge and Size														
			14	16	18	20	22	24	26	28	30	32	34	36			
6.85	1/4	0.154	0.157	0.190	0.191	0.376	0.366	0.551	0.655	0.678	1.112	1.266	1.306	1.389	1.147	1.417	1.538
9.53	3/8	0.250	0.255	0.317	0.320	0.534	0.551	0.655	0.678	0.895	1.036	1.112	1.266	1.306	1.389	1.417	1.538
12.70	1/2	0.345	0.353	0.445	0.450	0.654	0.655	0.678	0.895	1.036	1.112	1.266	1.306	1.389	1.417	1.538	1.660
15.88	5/8	0.441	0.451	0.573	0.579	0.693	0.717	0.862	0.895	1.036	1.112	1.266	1.306	1.389	1.417	1.538	1.660
19.05	3/4	0.537	0.549	0.700	0.708	0.852	0.882	1.036	1.112	1.266	1.306	1.482	1.545	1.775	1.844	1.962	2.003
25.40	1	0.728	0.745	0.956	0.966	1.170	1.212	1.482	1.545	1.775	1.844	2.284	2.376	2.535	2.595	2.595	2.853
31.75	1 1/4	0.919	0.940	1.011	1.225	1.488	1.542	1.895	1.979	2.284	2.376	2.847	2.909	3.108	3.184	3.184	3.511
38.10	1 1/2	1.110	1.136	1.466	1.483	1.806	1.873	2.309	2.413	2.793	2.909	3.441	3.441	3.682	3.772	3.772	4.168
44.45	1 3/4	1.300	1.332	1.721	1.742	2.124	2.203	2.722	2.847	3.301	3.441	3.682	3.682	3.974	4.254	4.361	4.826
50.80	2	1.492	1.527	1.976	2.000	2.442	2.534	3.135	3.280	3.810	3.974	4.254	4.254	4.506	4.927	4.950	5.483
57.14	2 1/4	1.683	1.723	2.231	2.258	2.759	2.864	3.549	3.714	4.319	4.506	4.829	4.829	5.039	5.401	5.540	5.952
63.50	2 1/2	1.874	1.919	2.487	2.517	3.077	3.195	3.962	4.149	4.829	5.039	5.401	5.401	5.616	6.104	6.142	6.548
76.20	3	2.256	2.310	2.998	3.034	3.713	3.855	4.789	5.016	5.847	6.104	6.548	6.548	6.717	7.223	7.223	7.458

Note : For Stainless Steel weight will be 2% more than above  
 SWG : Standard Wire Gauge, BWG : Birmingham Wire Gauge