

**Electrode selection as per Base Metal with Preheat, Postheat and Hardness Details**

Number	BASE MATERIAL		P. Number	ASTM Specification						AWS Specifications			Preheat Temp. C (min)	Postheat Temp. c	Hardness BHN Max.		
				PIPE	TUBE	WROUGHT FITTING	FORGING	CASTING	PLATE	Covered Electrode		Bare Electrode					
										Preferred	Alternate						
1	Carbon Steel	Carbon Steel	1	A 53 A106	A178 A179/192	A234 Gr. WPA/B	A181 A105	A216	A285 A515	E6010 Root E7018 F&F	E6013,E7015 E7028	ER70 S-2,S-3,S-5 RG 60, 65	<25.4mm 10 >25.4mm 80	>19mm 595-650	200		
2		Carbon Steel (LTCS-Impact test)		A333 Gr. 1/6	A334 Gr.1/6	A420 WPL6	A350 LF 1/2	A352 LCB/C	A516	E7018 G	E7018	E 70 S-1B					
3	Low and intermediate alloy steels	C - 1/2Mo	3	A335 P1	A161 T1	A234 WPI	A182 F1	A217 WC1	-	E7010-A1 E7018-A1	E7015-A1	E 70 S-1B	<25.4mm 10 >25.4 mm80	>19mm 595-720	225		
4		1/2Cr-1/2Mo		A335 P2	A213 T2	-	A182 F2	-	A387 Gr.2	E8018-B1	E8016-B1	-					
5		1Cr-1/2Mo	4	A335 P12	A213 T12	A234 WP12	A182 F12	-	A387 Gr.12	E8016-B2	E8018-B2	ER515	150	>12.5mm 705-745	225		
6		1 1/4Cr-1/2Mo		A335 P11	A213 T11	A234 W11	A182 F11	A217 WC6	A387 Gr.11								
7		2 1/4Cr-1Mo	5	A335 P22	A213 T22	A234 WP22	A182 F22	A217 WC9	A387 Gr.22	E9015-B3	E9018-B3	ER521	175	>12.5mm 705-760	241		
8		5Cr-1/2Mo		A335 P5	A213 T5	A234 WP5	A182 F5	A217 C5	A387 Gr.5	E502	E8018-B6	ER502					
9		7Cr-1/2Mo		A335 P7	A213 T7	A234 WP7	A182 F7	-	A387 Gr.7	E7 Cr.	-	ER7 Cr					
10		9Cr-1Mo		A335 P9	A213 T9	A234 WP9	A182 F9	A217 C12	A387 Gr.9	E505	E8018-B8	ER505					
11		Stainless steels	Martensitic & Ferrite	6	-	A268 TP409	-	-	-	-	E309	E312	ER309	150 Inter pass<315	730-790	241	
12					-	A268 TP410	-	A182 F6	A217 CA15	A240 TP410	E410	-	ER410				
13	7			-	A268 TP405	-	A182 F6	A296 CA15	A240 TP405	E309	E Ni Cr Fe-3	ER309	10	-	-		
14				-	A268 TP430	-	-	-	A240 TP430	E430	E Ni Cr Fe-3	ER430					
15	Austenitic			8	-	A312 TP304	A213 TP304	A403 WP304	A182 F304	A351 CF8	A240 TP304	E308	-	ER308	10	-	-
16						A312 TP304L	A213 TP304L	A403 WP304L	A182 F304L	A351 CF3	A240 TP304L	E308L	-	ER308L			
17						A312 TP304H	A213 TP304H	A403 WP305H	A182 F304H	-	-	E16-6-2	E308	ER 16-8-2			
18			A312 TP308			-	A403 WP309	-	A351 CH20	A240 TP3095	E309	E310	ER309				
19			A312 TP310			A213 TP310	A403 WP310	A182 F310	A351 CK20	A240 TP310S	E310	-	ER310				
20			A312 TP316			A213 TP316	A403 WP316	A182 F316	A351 CF 8M	A240 TP316	E316	E16-8-2	ER316				
21			A312 TP316L			A213 TP316L	A403 WP316L	A182 F316L	A351 CF 3M	A240 TP316L	E316L	E308 Mo L	ER316L				
22			A312 TP316H			A213 TP316H	A403 WP316H	A182 F316H	-	-	E16-8-2	E316	ER16-18-2				
23			A312 TP317			A213 TP317	A403 WP317	-	-	A240 TP317	E317	-	ER317				
24			A312 TP321			A213 TP321	A403 WP321	A182 F321	-	A240 TP321	E347	-	ER347				
25			A312 TP321H			A213 TP321H	A403 WP321H	A182 F321H	-	-	E16-6-2	E347	ER16-8-2				
26			A312 TP347			A213 TP347	A403 WP347	A182 F347	A351 CF 8C	A240 TP347	E347	-	ER347				
27			A312 TP347H			A213 TP347H	A403 WP347H	A182 F347H	-	-	E16-8-2	E347	ER16-8-2				
28			A312 TP348			A213 TP348	A403 WP348	A182 F348	-	A240 TP348	E347L To 346	E347	ER348				
29	A312 TP348H		A213 TP348H	-	-	-	-	E16-8-2	E347	ER16-8-2							
30	-		A608 HK40	-	-	A351 HK40	-	E310 H	-	ER310 H							
31	-		B464	B468	B365 WP20CB	B472	A351 CN 7M	B463	E320	E320 LA	ER320						
32	P -	17Cr-4Ni-Ph	-	-	-	A564 TP630	A474 CB7Cu1	-	E630	-	ER630						
33	Ni Steels	3 1/2 Ni	9	A333 Gr.3	A334 Gr.3	A420 WPL6	A350 LF3	A352 LC3	A203 Gr. D/E	E8018-C2	E8016-D2	-	95	>19mm 595-635	-		
34		9 Ni	11	A333 Gr.8	A334 Gr.8	A420WPL8	A522	-	A353	E Ni Cr Fe-3	-	ER Ni Cr-3	10	>19mm 550-5855	-		
35	Non Ferrous	Alluminium	21	B241	B210, B234	B361 WP3003	B247	-	B209	-	-	ER1100	10	10	-		
36		Copper	31	B42	B75	-	-	-	B11	E Cu	-	ER Cu	10	10	-		
37		70 Cu 30 Ni Cupronickel	34	B455 C715	B111 C715	-	-	B359 C964	B171	E Cu Ni	-	ER Cu Ni	10	10	-		
38		Alluminium Bronze	35	-	B111 C614	-	B150	B148	B169	E Cu Aj -A1	8 Cu Aj-A2	ER Cu Aj-A2	10	10	-		
39		Nickel	41	B161	B161, B163	B366 WPN	B160	-	B162	E Ni-1	E Ni-3	ER Ni-3	10	10	-		
40		Monel	42	B185	B165, B163	B366 WPNC	B164	-	B127	E Ni Cu-7	E Ni Cu 3-4	ER Ni Cu-7	10	10	-		
41		Inconel	43	B167,8 B517	B516, B183	B366 WPNCI	B166	-	B168	E Ni Cr Fe-1	E Ni-Cr Fe-3	ER Ni Cr Fe-5	10	10	-		
42		Hastelloy B	44	B619	B522	B366 WPHB	-	A296 N12M	B333	E Ni Mo-1	-	ER Ni Mo-1	10	10	-		
43		Hastelloy C		-	-	B366 WPHC	-	A295 CU12M	B334	E Ni Mo-2	-	ER Ni Mo-2	Inter pass<95	10	-		
44		Incoly	45	B407,B 514	B407, B515	B366 WPNIC	B408	-	B409	E Ni Cr Fe-2	-	ER Ni Cr-3	10	10	-		
45		Titanium	-	B337	B338	B363	B381	B367	B255	-	-	ER Ti-2	10	10	-		
46	Zirconium	-	B658 R02	B523 R02	B853 R 02	B493 R C2	-	B551 R 02	-	-	ER ZR 2	10	10	-			

Note: This selection criteria is for reference only and user must obey the qualified WPS. Proper care has been taken while preparing this chart, but the correctness of this data can not be guaranteed.