

## WELDING CONSUMABLE CHART

	Material	Welding Process				Preheat Temp. (°C)	Interpass Temp. (°C)	Post Heating
		GTAW	SMAW	FCAW	SAW			
CARBON STEEL	SA 106 Gr.B	ER70S-2	E7018	E71T-1	EA2 + UV420TTR FLUX  &  EL8 + LINCOLN 780 FLUX (FOR PEMA)	10 °C for T ≤ 25	250°C ,400°C for STBW	250°C for 4 Hrs. (Min.) or 350°C for 2 Hrs. (Min.)  if T ≥ 50 mm.
	SA 210 Gr.A1					100 °C for 25 <T ≤ 150		
	SA 516 Gr. 60					150 °C for T > 150		
	SA 516 Gr. 70							
	SA 105 / IS 2062							
	SA 234 WPB/WPC							
ALLOY STEEL	SA 213 T11/T12	ER80S-B2	E8018-B2	E81T1-B2	EB2 + UV420TTR FLUX	120 °C for T ≤ 13	350°C	350°C for 2 Hrs. (Min.) if T > 35 mm.
	S 335 P11/P12					150 °C for T > 13		
	SA 182 F11/F12							
	SA 234 WP11/12							
	SA 387 Gr.11/12							
	SA 213 T21/T22	ER90S-B3	E9018-B3	E91T1-B3C	EB3 + UV420TTR FLUX	150 °C for T ≤ 13	350°C	350°C for 2 Hrs. (Min.) if T > 25 mm.
	S 335 P21/P22					200 °C for T > 13		
	SA 182 F21/F22							
	SA 234 WP21/22							
	SA 387 Gr.22							
	SA 335 P9	ER80S-B8	E8018-B8	E81T1-B8C	-----	200 °C	350°C	350°C for 2 Hrs. (Min.) for GTAW upto 12 mm thk.  350°C for 4 Hrs. (Min.) for GTAW+SMAW, FCAW
	SA 213 T9							
	SA 234 WP9							
	SA 182 F9							
	SA 335 P91							
	SA 213 T91	ER90S-B9	E9015-B9	E91T1-B9C	-----			
STAINLESS STEEL	SS 304	ER308	E308-16	E308T1-1	-----	10°C	150°C	N.A.
	SS 304L	ER308L	E308L-16	E308LT1-1	-----			
	SS 304H	ER308H	E308H-16	E308HT1-1	-----			
	SS 310 / SS 310H	ER310	E310-16	E310T1-1	-----			
	SS 316	ER316	E316-16	E316T-1	-----			
	SS 316L	ER316L	E316L-16	E316LT-1	-----			
	SS 316H	ER316H	E316H-16	E316T-1	-----			
	SS 321 / SS 321H	ER321	E347-16	E347T0-3	-----			
	SS 347 / SS 347H	ER347	E347-16	E347T0-3	-----			
Gr.11 to C.S.		ER80S-B2	E8018-B2	E81T1-B2	EB2 + UV420TTR FLUX	SAME as GR.11		
Gr.22 to C.S.		ER90S-B3	E9018-B3	E91T1-B3	EB3 + UV420TTR FLUX	SAME as GR.22		
Gr.11 to Gr.22		ER90S-B3	E9018-B3	E91T1-B3		SAME as GR.22		
Gr.22 to Gr.91/Gr.9		ER90S-B3	E9018-B3	E91T1-B3	-----	SAME as GR.91		
CS to SS 304		ER309	E309-16	E309T1-1	-----	PREHEATING IS REQUIRED FOR C.S. SIDE NOT FOR SS SIDE	N.A.	
CS to SS 316 / SS 316H		ER309Mo	E309Mo-16	E309MoT1-1	-----			
CS to SS 304L		ER309L	E309L-16	E309LT1-1	-----			
CS to SS 304H		ER309	E309H-16	E309T1-1	-----			
CS to SS 316L		ER309LMo	E309LMo-16	E309LMoT1-1	-----			
AS to SS 304/310/316/321/347		ER309Mo	E309Mo-16	E309MoT1-1	-----	PREHEATING IS REQUIRED FOR A.S. SIDE NOT FOR SS SIDE	N.A.	
AS to SS 304L/316L		ER309LMo	E309LMo-16	E309LMoT1-1	-----			
Gr.9 & Gr.91 to SS		ERNiCr-3	ENiCrFe-3/ENiCrFe-2	-----	-----	SAME as GR.91		

**NOTES**

(1) FOR SMAW PROCESS, WEAVING SHALL BE 3 TIMES CORE DIA. (MAX.)
(2) FOR GTAW PROCESS, SHIELDING GAS - ARGON (FLOW RATE 5 TO 12 LPM)
(3) FOR GTAW PROCESS, BAKING GAS (IF APPLICABLE) - ARGON (FLOW RATE 8 TO 12 LPM)
(4) FOR FCAW PROCESS, SHIELDING GAS - CO <sub>2</sub> (FLOW RATE 10 TO 20 LPM)
(5) USE DCEP POLARITY FOR SMAW, FCAW, SAW PROCESS
(6) USE DCEN POLARITY FOR GTAW PROCESS
(7) USE UPHILL PROGRESSION FOR VERTICAL WELDING
(8) THESE ARE GENERAL REQUIREMENTS
(9) PLEASE REFER THE APPLICABLE WPS FOR SPECIFIC REQUIREMENTS
CS - CARBON STEEL, AS - ALLOY STEEL OTHER THAN Gr.9 & Gr.91, SS - STAINLESS STEEL, N.A. - NOT APPLICABLE