

A Quick Guide to Suitable Stainless Steel and Nickel Alloy Welding Consumables

Steel alloy type	Key notes for application	FCAW		SMAW		GTAW	
		Product name	AWS class.	Product name	AWS class.	Product name	AWS class.
304	General	[P] DW-308 [P] DW-308P	E308T0-1/4 E308T1-1/4	[P] NC-38	E308-16	[P] TG-S308	ER308
304H	High temperature operation Low carbon (0.04% max.); General	[P] DW-308H [P] DW-308L [P] DW-308LP [P] DW-308LH	E308HT1-1/4 (Bi-free) E308LT0-1/4 E308LT1-1/4 E308LT1-1/4 (Bi-free)	[P] NC-38H [P] NC-38L	E308H-16 E308L-16	---	---
304, 304L	304, 304L Gauge plate Low Cr(VI) in fume	[P] DW-T308L [P] DW-308L-XR [P] DW-308LP-XR	E308LT0-1/4 E308LT0-1/4 E308LT1-1/4	---	---	---	---
	Cryogenic temperature (27J min./-196°C)	[P] DW-308LTP [P] DW-308LT	E308LT1-1/4 E308LT0-1/4	[P] NC-38LT	E308L-16	[P] TG-S308L	ER308L
	TIG rod for root pass welding without back purging gas	---	---	---	---	[P] TG-X308L	R308LT1-5
	General	[P] DW-316L [P] DW-316LP [P] DW-316H [P] DW-T316L [P] DW-316L-XR [P] DW-316LP-XR	E316LT0-1/4 E316LT1-1/4 E316LT1-1/4 (Bi-free) E316LT0-1/4 E316LT0-1/4 E316LT1-1/4	[P] NC-36 [P] NC-36L	E316-16 E316L-16	[P] TG-S316 [P] TG-S316L	ER316 ER316L
316, 316L	Gauge plate Low Cr(VI) in fume	[P] DW-316L [P] DW-316LP [P] DW-316H [P] DW-T316L [P] DW-316L-XR [P] DW-316LP-XR	E316LT0-1/4 E316LT1-1/4 E316LT1-1/4 (Bi-free) E316LT0-1/4 E316LT0-1/4 E316LT1-1/4	---	---	---	---
	High temperature operation Cryogenic temperature (27J min./-196°C)(316L) 316L Mod.; Urea (low ferrite content)	[P] DW-316H [P] DW-316LT	E316T1-1/4 (Bi-free) E316LT1-1/4	[P] NC-36LT	E316L-16	[P] TG-S316L	ER316L
	TIG rod for root pass welding without back purging gas	---	---	[P] NC-316MF	---	[P] NO4051 [P] TG-S310MF [P] TG-X316L	---
	General	[P] DW-309L [P] DW-309LP [P] DW-309LH [P] DW-T309L [P] DW-309L-XR [P] DW-309LP-XR	E309LT0-1/4 E309LT1-1/4 E309LT1-1/4 (Bi-free) E309LT0-1/4 E309LT0-1/4 E309LT1-1/4	[P] NC-39 [P] NC-39L	E309-16 E309L-16	[P] TG-S309 [P] TG-S309L	ER309 ER309L
Dissimilar metal and overlay welding	Gauge plate Low Cr(VI) in fume	[P] DW-309L [P] DW-309LP [P] DW-309LH [P] DW-T309L [P] DW-309L-XR [P] DW-309LP-XR	E309LT0-1/4 E309LT1-1/4 E309LT1-1/4 (Bi-free) E309LT0-1/4 E309LT0-1/4 E309LT1-1/4	---	---	---	---
	TIG rod for root pass welding without back purging gas	---	---	---	---	[P] TG-X309L	R309LT1-5
	General	[P] DW-309MoL [P] DW-309MoLP	E309LMoT0-1/4 E309LMoT1-1/4	[P] NC-39MoL	E309LMo-16	---	---
310, 310S	High ferrite content	[P] DW-312	E312T0-1/4	[P] NC-32	E312-16	---	---
	General	[P] DW-310 [P] DW-347	E310T0-1/4 E347T0-1/4	[P] NC-30 [P] NC-37	E310-16 E347-16	[P] TG-S310 [P] TG-S347	ER310 ER347
321, 347	High temperature operation Low carbon	[P] DW-347H [P] DW-347LH	E347T1-1/4 (Bi-free) E347T1-1/4 (Bi-free)	---	---	---	---
	TIG rod for root pass welding without back purging gas	---	---	[P] NC-37L	E347L-16	[P] TG-S347L	ER347L
317L	General	[P] DW-317L [P] DW-317LP [P] DW-317LH	E317LT0-1/4 E317LT1-1/4 E317LT1-1/4 (Bi-free)	[P] NC-317L	E317L-16	[P] TG-S347L [P] TG-X347 [P] TG-S317L	ER347L R347T1-5 ER317L
	Lean duplex (ASTM S32101, S32304) Standard duplex (ASTM S31803, S32205)	[P] DW-2307 [P] DW-2209 [P] DW-329AP	E2307T1-1/4 E2209T1-1/4 E2209T1-1/4	[P] NC-2209	E2209-16	[P] TG-S2209	ER2209
Duplex stainless steel	TIG rod for root pass welding without back purging gas	[P] TG-X2209	---	---	---	[P] TG-X2209	---
	Super duplex (ASTM S32750, S32760)	[P] DW-2594	E2594T1-1/4	[P] NC-2594	E2594-16	[P] TG-S2594	ER2594
410	General	---	---	[P] CR-40	E410-16	[P] TG-S410	ER410
13Cr-4Ni	Martensitic stainless steel for hydro turbine	[P] DW-410NiMo [P] MX-A410NiMo	E410NiMoT1-1/4 E410NiMo	[P] CR-410NM	E410NiMo-16	---	---
405, 409	Ferritic 13Cr-Nb Buffer layer for 13Cr overlay welding	[P] DW-410Cb [P] DW-430CbS	E409NbT0-1 E430NbT0-1	[P] CR-40Cb [P] CR-43Cb [P] CR-43CbS	E409Nb-16 E430Nb-16 ---	[P] TG-S410Cb	---
	430	17Cr-Nb for car exhaust system	[P] MX-A430M	---	---	---	---
Ni alloy	Alloy 625 and 825; Overlay welding; dissimilar joint Cladding and girth welding of clad pipe (5G, 6G)	[P] DW-N625 [P] DW-N625P	ENiCrMo3T1-1/4 ENiCrMo3T1-1/4	[P] NI-C625 [P] NI-C625	---	[P] TG-S625	ERNiCrMo-3
	Alloy 600 and 800; Dissimilar joint	[P] DW-N82	ENiCr3T0-4	[P] NI-C70A	ENiCrFe-1	[P] TG-S70NCb	ERNiCr-3
	Alloy C276	[P] DW-NC276	ENiCrMo4T1-4	---	---	---	---
9% Ni	LNG storage tank	[P] DW-N70S [P] DW-N709SP [P] DW-N625	ENiMo13T1-4/T0-1 ENiCrMo3T1-1/4	[P] NI-C70S [P] NI-C1S	ENiCrFe-9 ENiMo-8	[P] TG-S709S	ERNiMo-8

Steel alloy type	Key notes for application	GMAW		SAW	
		Product name	AWS class.	Product name	AWS class (wire)
304	General	[P] MG-S308	ER308	[P] PF-S1 / [P] US-308	ER308
304L	General	[P] MG-S308LS	ER308LSi	[P] PF-S1 / [P] US-308L	ER308L
316, 316L	General	[P] MG-S316LS	ER316LS	[P] PF-S1M / [P] US-316 (Single pass) [P] PF-S1 / [P] US-316 (Multi pass)	ER316 ER316L
				[P] PF-S1M / [P] US-316L (Single pass) [P] PF-S1 / [P] US-316L (Multi pass)	ER316L ER316L
	Dissimilar metal and overlay welding	[P] MG-S309	ER309	---	---
	321, 347	General	[P] MG-S347S	ER347Si	[P] PF-S1 / [P] US-347
317L	General	---	---	[P] PF-S1 / [P] US-317L	ER317L
Duplex stainless steel	Standard duplex (ASTM S31803, S32205)	---	---	[P] PF-S1D / [P] US-2209	ER2209
410	General	[P] MG-S410	ER410	---	---
9% Ni	LNG storage tank	---	---	[P] PF-N4 / [P] US-709S (Horizontal position) [P] PF-N3 / [P] US-709S (Flat position)	ERNiMo-8 ERNiMo-8

- The ferrite numbers or percentage indicated by FN, FNW or FS in this brochure are:
FN: ferrite number by DeLong Diagram
FNW: ferrite number by WRC (Welding Research Council) Diagram-1992
FS: ferrite percentage by Schaeffler Diagram
- Inconel is the trademark of Special Metals Corporation, Hastelloy, the trademark of Haynes International, Inc. and SUPER304H, the trademark of Nippon Steel & Sumitomo Metal Corporation, respectively.
- Abbreviations and marks
(1) AWS: American Welding Society
(2) Welding positions
F: flat
HF: horizontal fillet
VU: vertical upward or vertical uphill
(3) Welding procedures
FCAW: Flux Cored Arc Welding
SMAW: Shielded Metal Arc Welding
GTAW: Gas Tungsten Arc Welding
GMAW: Gas Metal Arc Welding
SAW: Submerged Arc Welding
ESW: Electroslag Welding
(4) FCW: Flux Cored Wire

(1) [P] designates PREMIARCTM