



!!!! WARNING !!!!



WELDING FUMES AND GASES CAN BE DANGEROUS TO YOUR HEALTH.

BEFORE USING THIS PRODUCT THE WELDER (END-USER) MUST READ AND UNDERSTAND THE COMPLETE PRODUCT WARNING LABEL AND MATERIAL SAFETY DATA SHEET (MSDS).

THE MATERIAL SAFETY DATA SHEET (MSDS) WHICH OUTLINES THE POTENTIAL HEALTH HAZARDS AND SAFETY INFORMATION RELATED TO THIS PRODUCT CAN BE DOWNLOADED FROM THE MSDS PORTION OF THIS WEBSITE. IT IS ALSO AVAILABLE FROM YOUR EMPLOYER AND WELDING SUPPLY DISTRIBUTOR.

DO NOT PROCEED WITH USE OF THIS PRODUCT UNTIL YOU READ AND UNDERSTAND THE MATERIAL SAFETY DATA SHEET (MSDS) AND PRODUCT WARNING STATEMENT.

BE SURE TO CONSULT THE LATEST VERSION OF THE MSDS.

SEE THE PRODUCT WARNING LABEL AND MSDS FOR COMPLETE WARNING INFORMATION.



CROWN ALLOYS

COMPANY

30105 STEPHENSON HWY.
MADISON HEIGHTS, MI. 48071
(248) 588-3790 • (800) 521-7878

STAINLESS STEEL WELDING WIRE

MIG and TIG Welding Parameters for 300 series Stainless Steel

Procedure:

GMAW (MIG) - Spray Transfer - 99% argon - 1% oxygen is predominantly used. This mixture improves arc stability; produces a more fluid and controllable weld puddle with good bead contour. Undercutting is minimized on heavier sections.

98% argon - 2% oxygen provides better arc stability and welding speed than the 1% oxygen mixture for thinner stainless steel materials.

GMAW (MIG) - Short Circuiting Transfer - 90% helium + 7.5% argon + 2.5% CO₂ has no effect on corrosion resistance; provides small heat-affected zone; no under-cutting; minimum distortion.

GTAW (TIG) - Argon is suggested for thickness up to approximately 1/2". For thicker sections, argon-helium mixtures or pure helium may be used for deeper penetration. Argon-hydrogen mixtures are occasionally used to improve bead shape and wetability.

GMAW (MIG) Welding Parameters

Short Circuit Transfer Welding.

Use DC reverse polarity (DCEP). Settings based on [90% Helium - 7½% Argon - 2½% CO₂] shielding gas.

Wire Diameter (inches)	Welding Current (amperage)	Arc Voltage (volts)	Wire Feed Speed (ipm)	Gas Flow (cfh)
.023	30 - 100	14 - 18	120 - 280	21-25
.030	60 - 125	17 - 22	150 - 430	21-27
.035	75 - 160	17 - 22	120 - 400	21-27
.045	100 - 200	17 - 22	100 - 240	21-27

Spray Transfer Welding.

Use DC reverse polarity (DCEP). Settings based on Argon and 1 to 5 percent Oxygen shielding gas.

Wire Diameter (inches)	Welding Current (amperage)	Arc Voltage (volts)	Wire Feed Speed (ipm)	Gas Flow (cfh)
.030	160 - 225	24 - 28	440 - 650	21-34
.035	180 - 300	24 - 29	430 - 500	24-36
.045	200 - 450	24 - 30	220 - 400	24-36
1/16	220 - 500	24 - 32	110 - 210	24-36

GTAW (TIG) Welding Parameters

Manual Welding – Direct Current – Straight Polarity – Use a 2% thoriated tungsten (Th-2) Red Band – See above for recommended gas

Metal Thickness	Joint Type	Tungsten Diameter	Filler Rod Diameter	Arc Voltage (volts)	Welding Current (amperage)	Gas Flow (cfh)
.045"	All	.040	.045	5 - 10	30 - 50	10-15
1/16"	Butt/Corner	1/16	1/16	9 - 16	50 - 70	15
1/16"	Lap/Fillet	1/16	1/16	10 - 16	60 - 80	15
1/8"	Butt/Corner	1/16 to 3/32	3/32	12 - 18	70 - 90	15
1/8"	Lap/Fillet	1/16 to 3/32	3/32	12 - 18	90 - 115	15
3/16"	Butt/Corner	3/32	1/8	14 - 20	105 - 130	20
3/16"	Lap/Fillet	3/32	1/8	14 - 20	130 - 160	20
1/4"	Butt/Corner	1/8	5/32	15 - 22	140 - 170	20
1/4"	Lap/Fillet	1/8	5/32	15 - 22	165 - 210	20

All suggested settings are approximate. Inverter-based welders generally require less heat input (lower amps). Welds should be tested to comply to your specifications.

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STAINLESS STEEL ALLOYS (continued)

Coated Electrodes (SMAW)	Cut length (TIG) or (GTAW) & Spooled Wire (MIG) or (GMAW)	TYPICAL APPLICATIONS
ANSI/AWS SFA A5.4	ANSI/AWS SFA 5.9	
E 316-15 E 316-16	ER 316	Used for welding 316 wrought alloys and CF-8M cast alloys. Also used on type 304 and 308 alloys when better corrosion resistance than type 308 is needed. Tensile strength 85,000PSI
E 316L-15 E 316L-16 E 316L-17	ER 316L	Similar usage as E316/ER316 but lower carbon content increases resistance to intergranular corrosion and helps to inhibit weld cracking. Tensile strength 82,000 PSI
	ER 316LSi	Similar usage as above but higher silicon content increases wetability. Tensile strength 82,000 PSI
	ER 317L	Used to weld alloys of similar composition. It is utilized in severely corrosive environments where crevice and pitting corrosion are of concern. Tensile strength 75,000 PSI
	ER 320	Resists severe corrosion involving a wide range of chemicals, including sulfuric and sulfurous acids and their salts. Tensile strength 80,000 PSI
	ER 320LR	Similar usage as above but the low residuals "LR" reduce the weld metal hot cracking and fissuring. Tensile strength 75,000 PSI
E 330-16	ER 330	Used to weld 330 wrought alloys and HT cast alloys. Good high temperature characteristics make it first choice for work on heat treat and other type furnaces. Tensile strength 86,000 PSI
E 347-16	ER 347	Used to weld type 347/321 wrought alloy and CF-8C cast alloys. Also used to weld 304-308 type alloys when intergranular corrosion is a problem. Tensile strength 96,000 PSI
	ER 409	Used primarily for welding catalytic converters and exhaust system components.
	ER 409Cb	Columbium (Cb) is added to reduce oxidation losses.
E 410-16	ER 410	Used to weld type 403, 410, 414 and 420 martensitic stainless steels. Tensile strength 89,000 PSI
	ER 420	This classification is similar to ER 410, except for slightly higher chromium and carbon contents which increases wear resistance.
	ER 630 (17-4 PH)	Designed to weld Type 630 and some other precipitation-hardening stainless steels.

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Filler Metal Selector Guide for Stainless Steels *(page 1)*

Stainless Steel or Steel Base Alloy	442	430F	430	501	416	403	321	317	316L	316	314	310	309	304L	303	201	MILD STEEL				
	446	430FSE	431	502	416SE	405	348					310S	309S	304L	303SE	202		301	302	302B	304
201-202	310	310	310	310	309	309	347	308	308	308	308,	308	308	308	308	308	312				
301-302	312	312	312	312	310	310	308	316	316	316	309					310					
302B-304	309	309	309	309	312	312		317			310					309					
305-308																					
303	310	310	310	310	309	309	347	308	308	308	308,	308	308	308	308-15	308	312				
303SE	309	309	309	309	310	310	308	316	316	316	309					310					
	312	312	312	312	312	312	317	317			310					309					
304L	310	310	310	310	309	309	347	308	308L	308	308,	308	309	308L	308	308	312				
	309	309	309	309	310	310	308L	316		316	309		308			310					
	312	312	312	312	312	312	317	317		310	310		309			309					
309	310	310	310	310	309	309	347	317	316	316	309	309	309	309	308	308	309				
309S	309	309	309	309	310	310	308	316	309	309	310	310	310	308		310					
	312	312	312	312	312	312	309	309		310						312					
310	310	310	310	310	310	310	347	317	310	316	310	310	309	308	308	308	310				
310S	309	309	309	309	309	309	308	316	316	310			310			309					
	312	312	312	312	312	312	309	309	309	309						312					
314	310	310	310	310	310	310	309	309	309	309	310-15	310	309	308,	308,	308,	310				
	312	312	312	312	312	309	310	310	310	310			310	309	309	309	309				
	309	309	309	309	309	312	347	317	316	316				310	310	310	312				
316	310	310	310	310	309	309	347	316	316	316	309	316	316	308	308	308	309				
	309	309	309	309	310	310	308	308			310	310	309	316	316	316	310				
	312	312	312	312	312	312					316	309	310	316	316	316	312				
316L	310	310	310	310	309	309	347	316	316L	316	309	310	316	308L	308	308	309				
	309	309	309	309	310	310	308	317			310	316	309	316	316	316	310				
	312	312	312	312	312	312	308	308			316	309				316	312				

Bold numbers indicate first choice, light numbers indicate second and third choice. This choice can vary with specific applications and individual job requirements.

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Filler Metal Selector Guide for Stainless Steels (page 2)

Stainless Steel or Steel Base Alloy	442	430F	430	501	416	403	321									201	MILD STEEL
	446	430FSE	431	502	416SE	405	348	317	316L	316	314	310	309	304L	303	202	
						410	347					310S	309S		303SE	301	
						420										302	
						414										302B	
																304	
																305	
																308	
317	310	310	310	310	309	309	308	317	316	316	309	317	317	308	308	308	309
	309	309	309	309	310	310	347		317	308	310	316	316	316	316	316	310
	312	312	312	312	312	312			308		317	309	309	317	317	317	312
321	310	310	310	310	309	309	347	308	347	347	309	347	347	347	347	347	309
348	309	309	309	309	310	310		347	308	308	310	308	308	308L	308	308	310
347	312	312	312	312	312	312					347					312	312
403-405	310	310	310	310	410-15*	410*	309	309	309	309	310	310	309	309	309	309	309
410-420	309	309	309	309	309**	309**	310	310	310	310	309	309	310	310	310	310	310
414	312	312	312	312	310**	310**	312	312	312	312	312	312	312	312	312	312	312
416	310	310	310	310	410-15*	410-15*	309	309	309	309	310	310	309	309	309	309	309
416SE	309	309	309			309**	310	310	310	310	312	309	310	310	310	310	310
						310**	312	312	312	312	309	312	312	312	312	312	312
501	310	310	310	502*	310	310	310	310	310	310	310	310	310	310	310	310	310
502				310**		309	309	309	309	309	312	309	309	309	309	312	312
						312	312	312	312	312	309	312	312	312	312	309	309
430	310	310	430-15*	310	310	310	310	310	310	310	310	310	310	310	310	310	310
431	309	309	310**		309	309	309	309	309	309	312	309	309	309	309	312	309
			309**		312	312	312	312	312	312	309	312	312	312	312	309	312
430F	310	410-15*	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310
430FSE	309		309	310	309	309	309	309	309	309	312	309	309	309	309	312	309
					312	312	312	312	312	312	309	312	312	312	312	309	312
442	309	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310
446	310	309	309		309	309	309	309	309	309	312	309	309	309	309	312	309
					312	312	312	312	312	312	309	312	312	312	312	309	312

*Preheat **No Preheat Necessary Bold numbers indicate first choice, light numbers indicate second and third choice. This choice can vary with specific applications and individual job requirements.