

## ARCALOY® Stainless Steel Metal Core Wires

Arcaloy Metal Cored (MC) wires are small diameter stainless steel metal cored electrodes designed primarily for the welding of thin gauge materials. These wires have the typical metal cored wire welding characteristics, i.e., higher deposition rate and less penetration than a solid wire. As a result, these wires are best used to make small butt, fillet and lap type welds on gauge material at increased travel speeds compared to solid wire.

The low spatter and slag-free welds make these electrodes ideal for automatic or robotic welding applications. A lagging gun angle can also be used to further minimize the penetration and the oxide film formed on the surface of the weld. Typical applications include catalytic converters, manifolds, mufflers, exhaust systems, cladding, etc.

The recommended shielding gas for a spray transfer is an argon rich gas containing 1-2% oxygen or carbon dioxide. For overall best results to limit surface oxides and optimize the bead shape, the recommended shielding gas would be 99% Ar/1% CO<sub>2</sub>. Proprietary argon-based shielding gases with small amounts of hydrogen and CO<sub>2</sub> additions also produce excellent results (e.g. 1% H<sub>2</sub> + 2-3% CO<sub>2</sub>, remainder Ar). Pulse welding can also be used to further minimize the burn-through problems generally associated with thin gauge materials.

Type Specifications	Typical Mechanical Properties As Welded	Typical Undiluted Weld Metal Analysis % wt	Description and Application
<b>Arcaloy MC308L</b>			
AWS A5.9	Tensile Strength	Carbon 0.03 Max.	Arcaloy MC 308L is used for welding types 301, 302, 304, 304L, 308, and 308L. May be used for welding types 321 and 347 if service temperatures do not exceed 500°F (260°C). Can be used with ESAB OK 10.93 flux for SAW.
Class EC308/308L	83,000 psi (572 MPa)	Manganese 1.50	
CWB; A5.9	Yield Strength	Silicon 0.50	
EC308/308L	58,500 psi (404 MPa)	Chromium 20.1	
	% Elongation in 2" (51mm)	Nickel 10.3	
	40	FN 11	
<b>Arcaloy MC309L</b>			
AWS A5.9	Tensile Strength	Carbon 0.03 Max.	Arcaloy MC 309L is designed for welding type 309 wrought or for welding type 304 to mild carbon steel. Also recommended for cladding 304 when welded to carbon steel. Can be used with ESAB OK 10.93 flux for SAW.
Class EC309/309L	85,400 psi (589 MPa)	Manganese 1.53	
CWB; A5.9	Yield Strength	Silicon 0.51	
EC309/309L	62,300 psi (430 MPa)	Chromium 24.1	
	% Elongation in 2" (51mm)	Nickel 12.6	
	34	FN 16	
<b>Arcaloy MC316L</b>			
AWS A5.9	Tensile Strength	Carbon 0.03 Max.	Arcaloy MC316L was developed for welding type 316 stainless. The addition of molybdenum helps reduce pitting. Can be used with ESAB OK10.93 flux for SAW.
Class EC316/316L	84,000 psi (579 MPa)	Manganese 1.43	
CWB; A5.9	Yield Strength	Silicon 0.55	
EC316/316L	62,500 psi (431 MPa)	Chromium 18.8	
	% Elongation in 2" (51 mm)	Nickel 12.5	
	37	Molybdenum 2.5	
		FN 7	

\*\* Any item requiring approval certification must be special ordered - Contact ESAB Customer Service



Type Specifications**	Typical Mechanical Properties As Welded	Typical Undiluted Weld Metal Analysis % wt	Description and Application
<b>Arcaloy MC410 NiMo</b>			
AWS A5.9 Class EC410NiMo	*Tensile Strength 119,500 psi (825 MPa) *Yield Strength 104,500 PSI (721 MPa) % Elongation in 2" (51 mm) 18.5 * CVN Impact Toughness 31 ft/lbs (42 J) @ -40°F (-40°C)	Carbon 0.011 Manganese 0.41 Silicon 0.33 Chromium 11.48 Nickel 4.85 Molybdenum 0.60	Arcaloy 410 NiMo is designed for the welding of CA-6NM castings. This low carbon electrode produces hardness, after stress relieving, of 21Rc. Can be used with ESAB OK10.93 flux for SAW.
* Stress-relieved 1135°F (613°C)			
<b>Arcaloy 409Ti</b>			
AWS A5.9-93 Class EC409	No Mechanical Properties Required	Carbon 0.02 Manganese 0.55 Silicon 0.65 Phosphorus 0.01 Sulfur 0.008 Chromium 11.8 Titanium 0.9	Arcaloy 409Ti is a 12% Cr alloy stabilized with titanium (Ti) for arc stability and to form carbides to improve corrosion resistance, increase strength at high temperatures, and promote the ferritic microstructure. Cr range is 11.0 to 13.50%.
<b>Arcaloy 409Cb</b>			
AWS A5.9 Class EC409Cb	No Mechanical Properties Required	Carbon 0.02 Manganese 0.50 Silicon 0.62 Chromium 11.70 Niobium 0.60	Arcaloy 409Cb is stabilized with niobium (Nb) for arc stability and to form carbides as a means to improve corrosion resistance and increase strength at high temperatures. Cr range is 10.50 to 13.50%.
<b>Arcaloy 439Ti</b>			
No AWS Classification	No Mechanical Properties Required	Carbon 0.020 Manganese 0.50 Silicon 0.45 Chromium 18.0 Titanium 0.60	Arcaloy 439 is an 18% Cr alloy stabilized with titanium (Ti). The high level of chromium provides additional oxidation and corrosion resistance. Cr range is 17.0 to 19.0%.
<b>Arcaloy 18 CrCb</b>			
No AWS Classification	No Mechanical Properties Required	Carbon 0.02 Manganese 0.65 Silicon 0.55 Chromium 18.8 Titanium 0.25 Niobium 0.50	Arcaloy 18 CrCb is an 18% chrome alloy stabilized with titanium (Ti) and niobium (Nb). Designed for welding Armco 18Cr-Cb HP-10™ stainless steels. Cr range is 17.5 to 19.5%.

\*\* Any item requiring approval certification must be special ordered - Contact ESAB Customer Service



# ARCALOY COATED ELECTRODES CURRENT RANGES

## Arcaloy Welding Parameters for Austenitic Metal Cored Wire

(MC308L, 309L, 316L, 410, 410NiMo, etc.) <sup>(a)</sup> <sup>(b)</sup> <sup>(c)</sup>

	Amps	Volts	Wire Feed Speed In/Min	Deposition Rate lbs/hr (kg/hr)	% Efficiency
.045" (1.2mm)	144	16	160	4.2	99.3
	245	25	265	7.1	99.3
	321	26	370	10	99.4
	390	28	475	13.0	98.5
	441	30	580	16.0	99.2
1/16" (1.6mm)	212	23	145	6.9	99.2
	285	23	225	10.8	98.8
	332	26	300	13.7	98.1
	420	28	380	18.3	99.5
	500	31	460	22.5	98.9
	WFS	Pulse Peak	Pulse Width	Pulse Background	Pulse Freq.
.045" (1.2mm)	100	407	1.8	35	71
	150	418	1.86	44	90
	200	429	1.91	53	109
	250	440	1.97	62	128
	300	451	2.02	70	146
	350	462	2.08	79	165
	400	473	2.13	88	184
	450	484	2.19	97	203
	500	495	2.24	105	222

## Arcaloy Welding Parameters for Ferritic Metal Cored Wire

(409Ti, 409Cb, 430LCb, 439Ti, 18 CrCb, etc.) <sup>(a)</sup>

	Amps	Volts	Wire Feed Speed In/Min	Electrical Stick-out (ESO)
.045" (1.2mm)	200	20	210	0.5"
	215	21	230	0.5"
	234	22	250	0.5"
	290	24	300	0.5"
	323	24	350	0.5"

Note: DCEP (Electrode Positive) Only

(a) Larger sizes and additional alloys are available on request.

(b) Austenitic Grades can be used in submerged arc applications with ESAB OK Flux 10.93

(c) Parameters developed using the ESAB 350 MPI Power Source