

WELDINGPROS.NET - STICK ELECTRODES CHART

S.M.A.W. ELECTRODES SPECIFICATION - MILD STEEL, STAINLESS, LOW ALLOY, ALUMINUM, COPPER, NICKEL, CAST IRON, AND SURFACING ELECTRODES

THE FOLLOWING HAND CHART WAS DESIGNED TO SUPPLEMENT WELDING CODES TO PROVIDE WELDERS WITH A QUICK AND EASY TO READ PDF DOCUMENT THAT CAN BE USED IN VARIETY OF STICK WELDING TASKS.

THIS DOCUMENT WORKS BEST IF PRINTED AND HELD IN YOUR SHOP BUT IT CAN BE USED ON YOUR SMARTPHONE OR A PDF SUPPORTING COMPUTER.

E6010	Iron powder	E, V, OH, H	AC or DCEP	60000	Designed for light sheet metal work, handle low AC/DCV well, great for radiographic requirements.
E6011	Iron oxide flux potassium	E, V, OH, H	AC, DCEP or DCEN	60000	Smooth quiet arc, medium penetration, high travel speed.
E6012	High iron oxide	H, H-Het, F	AC or DCEN for H-Het / AC, DCEP, DCEN for F	60000	Fluid slag, deep penetration, meets grade 1 radiographic standards.
E6013	High iron oxide	E, H-Het	AC or DCEN	60000	Spray arc, easy slag removal, low viscosity slag, best for sheet metal.
E6027	High iron oxide, iron powder	H, H-Het, F	AC or DCEN for H-Het / AC, DCEP, DCEN for F	60000	
E7014					



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Electrodes For Mild Steel

ELECTRODE	COATING	POSITION	POLARITY	TENSILE STRENGTH - psi	COMMENT
E6010	High cellulose sodium	F, V, OH, H	DCEP	60000	Deeply penetrating, thin slag, frequently used for pipe, difficult to run on IGBT welders.
E6011	High cellulose potassium	F, V, OH, H	AC or DCEP	60000	DCEP use provides weaker joint than AC. Sizes above 3/16" limited to flat or horizontal-fillet position.
E6012	High titania sodium	F, V, OH, H	AC or DCEN	60000	Low penetration, dense slag, great at bridging wide root openings.
E6013	High titania potassium	F, V, OH, H	AC, DCEP, or DCEN	60000	Designed for light sheet metal work, handle low AC OCV well, great for radiographic requirements.
E6018	Low-hydrogen potassium, iron powder	F, V, OH, H	AC or DCEP	60000	Smooth quiet arc, medium penetration, high travel speed.
E6019	Iron oxide titania potassium	F, V, OH, H	Ac, DCEP, or DCEN	60000	Fluid slag, deep penetration, meets grade 1 radiographic standards.
E6020	High iron oxide	H-fillet, F	Ac or DCEN for H-fillet / AC, DCEP, DCEN for Flat	60000	Spray arc, easy slag removal, low viscosity slag, best for thick metal.
E6022	High iron oxide	F, H-fillet	AC or DCEN	60000	For single pass high speed welds
E6027	High iron oxide, iron powder	H-fillet, F	Ac or DCEN for H-fillet / AC, DCEP, DCEN for Flat	60000	For thick metal, spray arc, honeycombed slag on the inside.
E7014	Iron powder, titania	F, V, OH, H	Ac, DCEP, or DCEN	70000	Good for wide root openings and high amperage.
E7015	Low-hydrogen sodium	F, V, OH, H	DCEP	70000	Welds less susceptible to cracking, for thick metal, heavy but easy to remove slag.
E7016	Low-hydrogen potassium	F, V, OH, H	AC or DCEP	70000	Just like E7015 but with ability to run on AC.
E7018	Low-hydrogen potassium, iron powder	F, V, OH, H	AC or DCEP	70000	Smooth quiet arc, medium penetration, high travel speed.
E7018M	Low-hydrogen iron powder	F, V, OH, H	DCEP	70000	E7018 but designed to meet military standards.
E7024	Iron powder, titania	H-fillet, F	Ac, DCEP, or DCEN	70000	Thick electrode coating, high travel speed, low penetration.
E7027	High iron oxide, iron powder	H-fillet, F	Ac or DCEN for H-fillet / AC, DCEP, DCEN for Flat	70000	For thick metal, spray arc, honeycombed slag on the inside.
E7028	Low-hydrogen potassium, iron powder	H-fillet, F	AC or DCEP	70000	Thicker coating, higher deposition in horizontal fillet and flat groove welds than E7018.
E7048	Low-hydrogen potassium, iron powder	F, OH, H, V-down	AC or DCEP	70000	Same as E7018 but specifically designed for downward progression vertical welding.

* All electrodes in this document were classified according to the American Welding Society (AWS) standards: AWS A5.1, A5.5, A5.4, A5.15, A5.11, A5.3, and A5.6.

We reserve the right to make a mistake. This chart should not replace welding codes, standards, and applicable laws in your area. You should always follow your regulations and check the specification provided by the manufacturer of the electrodes you use. While standard electrode classification provided in this chart is helpful, keep in mind that manufacturers can modify the electrodes to an extent.



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Electrodes for Low Alloy Steel

ELECTRODE	COATING	POSITION	POLARITY	TENSILE STRENGTH - psi	COMMENT
E7010-X	High cellulose sodium	F, V, OH, H	DCEP	70000	E70XX-A1 (C-Mo Steel) Electrodes - Main applications are the welding of C-Mo steel metals such as ASTM A 204 plate and A 335-P1 pipe.
E7011-X	High cellulose potassium	F, V, OH, H	AC or DCEP	70000	
E7015-X	Low hydrogen sodium	F, V, OH, H	DCEP	70000	
E7016-X	Low hydrogen potassium	F, V, OH, H	AC or DCEP	70000	EXXXX-BX and EXXXX-BXL (Cr-Mo Steel) Electrodes - Designed to produce weld metal for high temperature service, matching the properties of the typical Cr-Mo metals.
E7018-X	Low hydrogen potassium, iron powder	F, V, OH, H	AC or DCEP	70000	
E7020-X	High iron oxide	H-fillet, F	AC, DCEP or DCEN	70000	
E7027-X	High iron oxide, iron powder	H-fillet, F	AC, DCEP, or DCEN	70000	E70XX-B2L and E80XX-B3L Electrodes - Typically the base metals have lower strength requirements than were reflected by the former electrode classifications.
E8010-X	High cellulose sodium	F, V, OH, H	DCEP	80000	
E8011-X	High cellulose potassium	F, V, OH, H	AC or DCEP	80000	
E8013-X	High titania potassium	F, V, OH, H	AC, DCEP or DCEN	80000	E8018-NM1 (Ni-Mo-Steel) Electrodes -Typically used for welding of high-strength, low-alloy or microalloyed structural steels.
E8015-X	Low hydrogen sodium	F, V, OH, H	DCEP	80000	
E8016-X	Low hydrogen potassium	F, V, OH, H	AC or DCEP	80000	
E8018-X	Low hydrogen potassium, iron powder	F, V, OH, H	AC or DCEP	80000	E90XX-B9 Electrodes - Provide improved creep strength, toughness, fatigue life, oxidation and corrosion resistance at increased temperatures. Due to the higher elevated temperature properties of this alloy, fabricated stainless and ferritic steels parts may be made from a single alloy, eliminating problems associated with dissimilar welds.
E8045-P2	Low hydrogen sodium	F, OH, H, V-down	DCEP	80000	
E9010-G	High cellulose sodium	F, V, OH, H	DCEP	90000	
E9010-X	High cellulose sodium	F, V, OH, H	DCEP	90000	
E9011-G	High cellulose potassium	F, V, OH, H	AC or DCEP	90000	
E9013-G	Hight titania potassium	F, V, OH, H	AC, DCEN or DCEP	90000	
E9015-X	Low hydrogen sodium	F, V, OH, H	DCEP	90000	
E9016-X	Low hydrogen potassium	F, V, OH, H	AC or DCEP	90000	
E9018-X	Low hydrogen potassium, iron powder	F, V, OH, H	AC or DCEP	90000	
E9018M	Iron powder, low hydrogen	F, V, OH, H	DCEP	90000	
E9045-P2	Low hydrogen sodium	F, OH, H, V-down	DCEP	90000	

E10010-G	High cellulose sodium	F, V, OH, H	DCEP	100000	EXXXX-CX and EXXXX-CXL (Ni Steel) Electrodes - Low-hydrogen electrodes made to produce weld metal with increased strength without being air-hardenable.
E10011-G	High cellulose potassium	F, V, OH, H	AC or DCEP	100000	
E10015-G	High titania potassium	F, V, OH, H	AC, DCEP, or DCEN	100000	
E10015-X	Low hydrogen sodium	F, V, OH, H	DCEP	100000	E(X)XX1X-DX (Mn-MoSteel) Electrodes - Made to match the mechanical properties of the high strength, low-alloy pressure vessel steels, such as ASTM A 302 Gr. B.
E10016-X	Low hydrogen potassium	F, V, OH, H	AC or DCEP	100000	
E10018-X	Low hydrogen potassium, iron powder	F, V, OH, H	AC or DCEP	100000	
E10018M	Iron powder, low hydrogen	F, V, OH, H	DCEP	100000	
E10045-P2	Low hydrogen sodium	F, OH, H, V-down	DCEP	100000	E(X)XXXX-G (General Low-Alloy Steel) Electrodes - The description and intended use vary by the supplier.
E11010-X	High cellulose sodium	F, V, OH, H	DCEP	110000	
E11011-G	High cellulose potassium	F, V, OH, H	AC or DCEP	110000	E(X)XXXXM(1) (Military Similar) Electrodes - For welding high-strength, low-alloy or micro alloyed steels to themselves or to lower strength steels, including carbon steels.
E11013-G	High titania potassium	F, V, OH, H	AC, DCEP, or DCEN	110000	
E11015-G	Low hydrogen sodium	F, V, OH, H	DCEP	110000	
E11016-G	Low hydrogen potassium	F, V, OH, H	AC or DCEP	110000	EXX10-P1 (Pipeline) Electrodes -Made for welding typical high-strength pipe butt joints in the vertical welding position using downward or upward progression.
E11018-G	Low hydrogen potassium, iron powder	F, V, OH, H	AC or DCEP	110000	
E11018M	Iron powder, low hydrogen	F, V, OH, H	DCEP	110000	
E12010-G	High cellulose sodium	F, V, OH, H	DCEP	120000	
E12011-G	High cellulose potassium	F, V, OH, H	AC or DCEP	120000	EXX18-P2 Pipe Welding Electrodes - Made for the welding of hot, fill, and cap passes in high strength pipe butt joints using vertical downward progression.
E12013-G	High titania potassium	F, V, OH, H	AC, DCEP, or DCEN	120000	
E12015-G	Low hydrogen sodium	F, V, OH, H	DCEP	120000	
E12016-G	Low hydrogen potassium	F, V, OH, H	AC or DCEP	120000	EXX18-WX (Weathering Steel) Electrodes - Made to produce welds that matche the corrosion resistance and the coloring of the ASTM weathering type structural steels.
E12018-G	Low hydrogen potassium, iron powder	F, V, OH, H	AC or DCEP	120000	
E12018M	Iron powder, low hydrogen	F, V, OH, H	DCEP	120000	
E12018M1	Iron powder, low hydrogen	F, V, OH, H	DCEP	120000	

Electrodes for Stainless Steel

ELECTRODE	POLARITY - POSITION - COATING	TENSILE STRENGTH - psi	COMMENT	
E209-XX	EXXX(X)-15 - DCEP; All positions, Lime based coating	100000	Most often used to weld AISI Type 209 (UNS S20910) base metals.	
E219-XX		90000	Most often used to weld AISI Type 219 (UNS S21900) base metals.	
E240-XX		100000	Most often used to weld AISI Type 240 and 241 base metals.	
E307-XX		85000	Primarily for moderate strength welds with good crack resistance between dissimilar steels such as austenitic manganese steel and carbon steel forgings or castings.	
E308-XX		80000	Most often used to weld base metal of similar composition such as AISI Types 301, 302, 304, and 305.	
E308H-XX		80000	For welding Type 304H base metal. Weld metal ferrite content is normally targeted for 5 FN to minimize the effect of sigma embrittlement in high-temperature service.	
E308L-XX		75000	The 0.04 percent maximum carbon content deposited by these electrodes reduces the possibility of intergranular carbide precipitation and thereby increases the resistance to intergranular corrosion.	
E3308Mo-XX		80000	For welding ASTM CF8M stainless steel castings, as they match the base metal with regard to chromium, nickel, and molybdenum.	
E308LMo-XX		75000	For welding ASTM CF3M stainless steel castings, as they match the base metal with regard to chromium, nickel, and molybdenum.	
E309-XX		80000	For welding similar compositions in wrought or cast form, and welding dissimilar steels, such as 304 to carbon or low-alloy steel.	
E309H-XX		80000	Carbon content has been restricted for higher tensile and creep strengths at elevated temperatures. Suitable for the welding of 24 Cr 12 Ni wrought and cast steels.	
E309L-XX		75000	The 0.04 percent maximum carbon content ensures a higher ferrite content than the E309H, usually greater than 8 FN and reduces the possibility of intergranular carbide precipitation	
E309Nb-XX		80000	Same as Type 309, except for the addition of niobium and a reduction in the carbon limit.	
E309Mo-XX		EXXX(X)-16 - DCEP and AC; All Positions, Titania based coating	80000	For welding Type 316 clad steels or for the overlay of carbon steels.
E309LMo			75000	The lower carbon content of the weld metal reduces the possibility of intergranular corrosion and increases the ferrite content.
E310-XX	80000		Most often used to weld base metals of similar composition.	
E310H-XX	90000		Primarily for welding or repairing highalloy heat and corrosion-resistant castings of the same general composition which are designated as Type HK by the Alloy Castings Institute.	
E310Nb-XX	80000		Welding of heat-resisting castings, Type 347 clad steels, or the overlay of carbon steels.	
E310Mo-XX	80000		Wwelding of heat-resisting castings, Type 316 clad steels, or for the overlay of carbon steels.	
E312-XX	95000		Welding dissimilar metals, especially if one of them is a stainless steel, high in nickel.	
E316-XX	75000		Welding Type 316 and similar alloys.	
E316H-XX	75000		Carbon content 0.04 - 0.08 percent provides higher tensile and creep strengths at elevated temperatures. These electrodes are used for welding 316H base metal.	
E316L-XX	70000		Principally for welding low-carbon, molybdenum-bearing austenitic alloys - 0.04 percent carbon limit in gives protection against intergranular corrosion.	

E316LMn-XX	EXXX(X)-16 - DCEP and AC; All Positions, Titania based coating	80000	Normally a fully austenitic alloy with a maximum ferrite content of 0.5 FN. In critical applications for cryogenic and corrosion resistant service, you should specify the maximum ferrite.
E317-XX		80000	Used for welding alloys of similar composition and are utilized in severely corrosive environments (such as those containing halogens) where crevice and pitting corrosion are of concern.
E317L-XX		75000	The 0.04 percent maximum carbon content reduces the possibility of intergranular carbide precipitation and thereby increases the resistance to intergranular corrosion.
E318-XX	EXXX(X)-17 - DCEP and AC; All Positions, Silica-titania based coating	80000	Added Niobium provides resistance to intergranular carbide precipitation and increased resistance to intergranular corrosion.
E320-XX		80000	Used to weld base metals of similar composition for applications where resistance to severe corrosion is required for a wide range of chemicals.
E320LR-XX		75000	Welding practices typically used to deposit ferrite-containing austenitic stainless steel weld metals can be used.
E330-XX		75000	Repairs of defects in alloy castings, welding of castings and wrought alloys of similar compositions are the most common applications.
E330H-XX		90000	Welding and repairing of high-alloy heat and corrosion-resistant castings of the same composition.
E347-XX		75000	Used for welding chromium nickel alloys of similar compositions stabilized either with niobium or titanium.
E349-XX		100000	For welding steels of similar composition such as AISI Type 651 or 652.
E383-XX		75000	Used to weld base metal of a similar composition to itself and to other grades of stainless steel Type E383.
E385-XX		75000	Mainly for welding of Type 904L materials.
E409Nb-XX		65000	Welding of ferritic stainless steels such as Types 405 and 409.
E410-XX		75000	For Welding alloys of similar compositions and surfacing of carbon steels to resist corrosion.
E410NiMo-XX		110000	Welding ASTM CA6NM (CA-6NM) castings and light-gauge Type 410, 410S, and 405.
E430-XX		65000	Corrosion resistance for the usual applications with sufficient ductility in the heat-treated condition.
E430Nb-XX		65000	Welding of Type 430 stainless steel and for the first layer in the welding of Type 405 and 410.
E630-XX		EXXX(X)-26 - DCEP and AC; F,H-fillet, Same coating as the "16" type but for higher deposition rates and limited to the flat and horizontal welding only.	135000
E16-8-2-XX	80000		For welding Types 16-8-2, 316, and 347 and high-pressure, high-temperature piping systems.
E2209-XX	100000		Mainly used to weld duplex stainless steels containing about 22 percent of chromium.
E2553-XX	110000		Mainly used to weld duplex stainless steels containing about 25 percent of chromium.
E2593-XX	110000		Mainly used to weld duplex stainless steels containing about 25 percent of chromium.
E2594-XX	110000		For welding Type 2507 super-duplex stainless steels UNS S32750 and UNS J93404.
E2595-XX	110000		Welding superduplex stainless steels UNS S32550, S32750, and S32760, and UNS J93370, J93380, J93404, CD4MCuN.

E3155-XX	EXXX(X)-26 - DCEP and AC; F,H-fillet, Same coating as the "16" type but for higher deposition rates and limited to the flat and horizontal welding only.	100000	For welding parts fabricated from material of similar or dissimilar composition.
E33-31-XX		105000	Welding nickel-chromium-iron alloy (UNS R20033) and to weld to carbon steel.

Electrodes for Aluminum

ELECTRODE	POSITION	POLARITY	TENSILE STRENGTH - psi	COMMENT
E1100	PA/PB/PC/PF	DCEP	12000	For welding pure aluminium, good color matching, high electrical conductivity.
E3003	PA/PB/PF	DCEP or AC	14000	For welding forged and cast aluminium-magnesium alloys and aluminium-manganese alloys
E4043	Flat/Horizontal	DCEP or AC	14000	Welding aluminum alloyed with copper, silicon and manganese, for joining dissimilar grades of aluminum and heat-treated aluminum parts.

Electrodes for Copper and Copper Alloys

ELECTRODE	POSITION	POLARITY	TENSILE STRENGTH - psi	COMMENT
ECu	F, V-up, OH, H	DCEP	25000	Pure copper electrode used for joining and build-up on copper parts requiring corrosion resistance.
ECuSi	F, V-up, OH, H, Fillet	DC+	50000	Flux coated electrode for welding or silicon bronze as other copper alloys.
ECuSn-A	F, V-up, OH, H, Fillet	DC+	35000	For joining copper and copper alloys, of similar composition. Preheating and interpass temperature are required.
ECuSn-C	F	DCEN	40000	For joining copper base alloys not only to themselves but to stainless steel, cast iron, steels. May use AC current.
ECuNi	F Fillet, V-up, H, Oh	DCEP	50000	Welding of cupro-nickel clad steel. Build-up welding carbon steel. Welding of similar and dissimilar metals such as various copper alloys.
ECuAl-A2	F, H	DCEP	60000	High strength welding electrode. It resists corrosion, cavitation, erosion, and metal to metal wear.
ECuAl-B	F, V-up, OH, H, Fillet	DC+	65000	For wear and corrosion resistant overlays, and high surface loads. It is acid and erosion-resistant and sea water proof.
ECuNiAl	F, V-up, OH, H	DC+	72000	Welding of cast and wrought nickel aluminum bronze - high resistance to corrosion, erosion, or cavitations in salt and brackish water.
ECuMnNiAl	F	DCEP	75000	Universal high-strength copper based electrode which safely repairs all grades of aluminum bronzes.

Electrodes for Nickel and Nickel Alloys

ELECTRODE	POSITION	POLARITY	TENSILE STRENGTH - psi	COMMENT
ENi-1	Smaller - All/ Larger H, F	Primary DCEP, Occasionally AC	60000	For welding wrought and cast forms of commercially pure nickel to themselves and to steel.
ENiCr-4	Smaller - All/ Larger H, F		110000	Primarily used to weld cast grade ASTM A560.
ENiCu-7	Smaller - All/ Larger H, F		70000	Used for welding nickel-copper alloys to steel, for welding the clad joints side, and for surfacing steel with nickel-copper alloy.
ENiCrFe-1	Smaller - All/ Larger H, F		80000	For welding nickel-chromium-iron alloys, for the clad side of joints, and for surfacing steel with nickel-chromium-iron weld metal.
ENiCrFe-2	Smaller - All/ Larger H, F		80000	Welding nickel-chromium-iron alloys, 9 percent nickel steel, and a variety of dissimilar metal joints.
ENiCrFe-3	Smaller - All/ Larger H, F		80000	Welding nickel-chromium-iron alloys, for welding the clad side of joints, and for surfacing steel with nickel-chromium-iron weld metal, when comparatively high manganese contents are not detrimental.
ENiCrFe-4	Smaller - All/ Larger H, F		95000	For welding 9 percent nickel steel.

ENiCrFe-7	Smaller - All/ Larger H, F	Primary DCEP, Occasionally AC	80000	For welding the nickel-chromium-iron alloy of the UNS Number N06690.
ENiCrFe-9	Smaller - All/ Larger H, F		95000	Used for welding 9 percent nickel steel.
ENiCrFe-10	Smaller - All/ Larger H, F		95000	For welding the nickel steel base metals ASTM A 333, A 334, A 353, A 522, and A 553, all of which have UNS Number K81340
ENiCrFe-12	Smaller - All/ Larger H, F		95000	For UNS Number N06025, welding nickel-chromium-iron to steel and to other nickel base alloys
ENiCrFeSi-1	F		90000	Used for welding nickel chromium-iron to steel and to other nickel base alloys.
ENiMo-1	F		100000	For welding nickel-molybdenum alloys, clad side of joints in steel clad with a nickel-molybdenum alloy, and nickel molybdenum alloys to steel and to other nickel-base alloys
ENiMo-3	F		100000	For welding dissimilar metal combinations of nickel-, cobalt-, and iron-base alloys.
ENiMo-7	F		100000	Welding nickel-molybdenum alloys, for welding the clad side of joints, and for welding nickel-molybdenum alloys to steel and to other nickel-base alloys.
ENiMo-8	F, H		95000	Welding 9 percent nickel steel, but can be used in other applications as well.
ENiMo-9	F, H		95000	Welding 9 percent nickel steel, but can be used in other applications as well.
ENiMo-10	F		100000	Welding nickel-molybdenum alloys (UNS numbers N10665 and N10675).
ENiMo-11	F		100000	Welding nickel-molybdenum alloys (UNS Numbers N10665 and N10629).
ENiCrMo-1	F		90000	Welding nickel-chromium-molybdenum alloys, for welding the clad side of joints, and for welding nickel-chromium-molybdenum alloy to steel and to other nickel-base alloys.
ENiCrMo-2	F		95000	Welding nickel-chromium-molybdenum alloys, for welding the clad side of joints, and for welding nickel-chromium-molybdenum alloys to steel and to other nickel-base alloys.
ENiCrMo-3	F, H		110000	Welding nickel-chromium-molybdenum alloys to steel, and for surfacing steel with nickel-chromium-molybdenum weld metal.
ENiCrMo-4	F		100000	Welding low-carbon nickel-chromium-molybdenum alloy, for welding the clad side of joints, and for welding low-carbon nickel-chromium-molybdenum alloy to steel and to other nickel-base alloys.
ENiCrMo-5	F		100000	For surfacing steel clad with a nickel-chromium-molybdenum alloy.
ENiCrMo-6	F, H		90000	Welding 9 percent nickel steel UNS Number K81340, but can be used in other applications as well.
ENiCrMo-7	F		100000	Welding nickel-chromium-molybdenum alloy, for the welding of the clad side of joints, and for joining nickel-chromium-molybdenum alloys to steel and to other nickel-base alloys UNS Number N06455.
ENiCrMo-9	F		90000	Welding nickel-chromium-molybdenum alloy, for the welding of the clad side of joints, and for joining nickel-chromium-molybdenum alloys to steel and to other nickel-base alloys UNS Number N06985.
ENiCrMo-10	Smaller - All/ Larger H, F		100000	Welding nickel-chromium-molybdenum alloy, for the welding of the clad side of joints, and for joining nickel-chromium-molybdenum alloys to steel and to other nickel-base alloys UNS Number N06022.
ENiCrMo-11	F		85000	Welding nickel-chromium-molybdenum alloy, for the welding of the clad side of joints, and for joining nickel-chromium-molybdenum alloys to steel and to other nickel-base alloys UNS Number N06030.
ENiCrMo-12	F, H		95000	Welding chromium-nickel-molybdenum austenitic stainless steels to themselves, to duplex ferritic-austenitic stainless steels, to nickel-chromium-molybdenum alloys, and to steel UNS S31254.
ENiCrMo-13	F, H	100000	Used to weld low-carbon nickel-chromium-molybdenum alloys, for welding the clad side of joints, and for welding low-carbon nickel-chromium-molybdenum alloy to steel and to other nickel-base alloys UNS Number N06059.	

ENiCrMo-14	F, H	Primary DCEP, Occasionally AC	100000	Weld nickel-chromium-molybdenum alloys (UNS Numbers N06686, N06625, N10276, and N06022) that are used in severe corrosion applications.
ENiCrMo-17	F		100000	Welding nickel-chromium-molybdenum alloys, for the welding of the clad side of joints, to steel and to other nickel base alloys; and for joining nickel-chromium-molybdenum alloys UNS Number N06200.
ENiCrMo-18	F		95000	Welding nickel-chromium-molybdenum alloys like UNS Number N06625, for welding of the clad side of joints, to steel and to other nickel base alloys; and for joining some other nickel-chromium-molybdenum alloys, such as UNS Numbers N06625, N08825, N06985, N08020, N08926 and N08031.
ENiCrMo-19	Smaller - All/ Larger H, F		120000	Welding nickel-chromium-molybdenum alloys, for welding of the clad side of joints, to steel and to other nickel base alloys; and for joining nickel-chromium-molybdenum alloys UNS Number N06058.
ENiCrCoMo-1	F, H		90000	Welding nickel-chromium-cobalt-molybdenum alloys (UNS Number N06617) to themselves and to steel.
ENiCrWMo-1	F		90000	For welding nickel-chromium-tungsten-molybdenumlanthanum alloy ASTM B 366, B 435, B 564, and B 572 having UNS Number N06230.

Electrodes for Cast Iron

ELECTRODE	POSITION	POLARITY	TENSILE STRENGTH - psi	COMMENT
ENi-CI	F, at times H	DCEP or AC	40-65000	Joining ordinary gray irons, or other ferrous and nonferrous materials.
ENi-CI-A			40-65000	The covering of ENi-CI electrodes contains more aluminum to improve operating characteristics such as slag coverage and flowability.
ENiFe-CI			58-84000	For making repair welds, as well as joining work pieces of various types of cast iron.
ENiFe-CI-A			58-84000	Frequently used interchangeably with ENiFe-CI electrodes. The covering of ENiFeCI-A electrodes contains more aluminum to improve operating characteristics.
ENiFeMn-CI			75-95000	Nominal addition of 12% manganese to the nickel iron system, improves the molten metal flow and increases the crack resistance.
ENiCu-A			Not specified and may vary	Used in many applications as the ENi-Fe-CI, ENiFeCI-A, and ENiFeMn-CI. Low depth of fusion, since high dilution by the base metal may cause weld cracking.
ENiCu-B				

Electrodes for Surfacing Alloys

ELECTRODE	POLARITY	TENSILE STRENGTH - psi	COMMENT
EFe1	AC, DCEP or DCEN	25-50 HRC	Used to restore worn machinery parts to their original dimensions.
EFe2	AC, DCEP or DCEN		
EFe3	AC, DCEP or DCEN	55-60 HRC	Used to overlay surfaces and edgest requiring hard hardness and crack-free deposits.
EFe4	AC, DCEP or DCEN	55-60 HRC	Used to rebuild worn cast iron machinery parts subject to metal-to-metal rolling or sliding contact.
EFe5	AC, DCEP or DCEN	55-60 HRC	Applications that require high compressive strength with moderate abrasion.
EFe6	AC, DCEP or DCEN	55-60 HRC	Used for metal-to-metal wear applications at temperatures up to 1100F.
EFe7	AC, DCEP or DCEN	60 HRC or higher	Used for overlying surfaces that require good low-stress abrasion resistance.

EFeMn-A	AC, DCEP or DCEN	20 HRC, but can go up to 55 HRC	Electrodes are used for rebuilding, repair and joining of Hadfield austenitic manganese steel, ideal for rebuilding of worn rock crushing equipment and parts.
EFeMn-B	AC, DCEP or DCEN		
EFeMn-C	AC, DCEP or DCEN		
EFeMn-D	AC, DCEP or DCEN		
EFeMn-E	AC, DCEP or DCEN		
EFeMn-F	AC, DCEP or DCEN		
EFeMnCr	AC, DCEP or DCEN	Check with the manufacturer	Usable for joining austenitic manganese steel both to itself and to carbon steel.
EFeCr-A1A	AC, DCEP or DCEN	51 HRC	Used to surface parts and equipment involved in sliding and crushing of rock, ore etc.
EFeCr-A2	AC, DCEP or DCEN	Check with the manufacturer	Can be applied to both carbon steel and austenitic manganese base metal.
EFeCr-A3	AC, DCEP or DCEN		General purpose hardfacing alloy for earth abrasion applications.
EFeCr-A4	AC, DCEP or DCEN		Same purpose as EFeCr-A1A electrodes.
EFeCr-A5	AC, DCEP or DCEN		Used for applications involving frictional metal-to-metal wear of earth scouring.
EFeCr-A6	AC, DCEP or DCEN	50-60 HRC	Used for applications involving low stress abrasive wear combined with moderate impact.
EFeCr-A7	AC, DCEP or DCEN		
EFeCr-A8	AC, DCEP or DCEN	50-60 HRC	Used for applications involving low stress abrasions combined with minimum impact.
EFeCr-E1	AC, DCEP or DCEN	Check with the manufacturer	Can be used for equipment subjected to severe high-stress abrasion combined with moderate impact.
EFeCr-E2	AC, DCEP or DCEN		
EFeCr-E3	AC, DCEP or DCEN		
EFeCr-E4	AC, DCEP or DCEN		
ECoCr-A	AC, DCEP or DCEN	23-47 HRC	Applications include automotive and fluid flow valves, chain saw guides, hot punches, shear blades, extruder screws etc.
ECoCr-B	AC, DCEP or DCEN	34-47 HRC	Used interchangeably with ECoCr-A.
ECoCr-C	AC, DCEP or DCEN	43-58 HRC	Used to build up mixer rotors and items that encounter severe abrasion and low impact.
ECoCr-E	AC, DCEP or DCEN	20-32 HRC	Applications include guide rolls, hot extrusion and forging dies, hot shear blades, tong bits and valve trim.
ENiCr-C	AC, DCEP or DCEN	49-56 HRC	Applications include cultivator sweeps, plow shares, extrusion screws, pump sleeves, pistons and impellers, capstan rings, glass modl faces etc.
ENiCrMo-5A	AC, DCEP or DCEN	Check with the manufacturer	Used to rebuild and repair hot extrusion dies, hot forging dies sizing punches etc.

ENiCrFeCo	AC, DCEP or DCEN	43-58 HRC	Preffered where high abrasion is major factor.
ECuAl-A2	AC, DCEP or DCEN	130-150 HB	Used for susfacing bearing surfaces requiring hardness in range of 140-220 HB.
ECuAl-B	AC, DCEP or DCEN	140-180 HB	Used for surfacing bearing surfaces requiring hardness in the range of 140-220 HB.
ECuAl-C	AC, DCEP or DCEN	180-220 HB	
ECuAl-D	AC, DCEP or DCEN	230-270 HB	Used to surface bearing and wear-resistant surfaces requiring hardness in the range of 230-320 HB.Used for surfacing corrosion-resistant surfaces.
ECuAl-E	AC, DCEP or DCEN	280-320 HB	
ECuSi	AC, DCEP or DCEN	80-100 HB	Used for surfacing corrosion-resistan surfaces.
ECuSn-A	AC, DCEP or DCEN	70-85 HB	Used to surface bearing surfaces where lower hardness of these alloys is required.
ECuSn-C	AC, DCEP or DCEN	85-100 HB	
ECuNi	AC, DCEP or DCEN	60-80 HB	Used for rebuilding 70/30, 80/20 and 90/10% copper-nickel alloy of the clad side of copper-nickel clad steel.
ECuNiAl	AC, DCEP or DCEN	160-200 HB	Application requiring a high resistance to corrosion, erosion or cavitation in salt.
ECuMnNiAl	AC, DCEP or DCEN	160-200 HB	Used to rebuild or surface cast manganese-nickel-aluminum broze casting or wrought material.

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