Red-D-Arc Welderentals
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WELDING ELECTRODE CLASSIFICATIONS

MILD STEEL COATED ELECTRODES

E7018-X

- **E** Indicates that this is an electrode
- **70** Indicates how strong this electrode is when welded. Measured in thousands of pounds per square inch
- **1** Indicates in what welding positions it can be used
- **8** Indicates the coating, penetration, and current type used (see classification table below)
- **X** Indicates that there are more requirements (see additional requirements below)

WELDING POSITIONS

- **1** Flat, Horizontal, Vertical (up), Overhead
- **2** Flat, Horizontal
- **4** Flat, Horizontal, Overhead, Vertical (down)

Flat Position - usually groove welds, fillet welds only if welded like a “V”
Horizontal - Fillet welds, welds on walls (travel is from side to side)
Vertical - welds on walls (travel is either up or down)
Overhead - weld that needs to be done upside down

CLASSIFICATION TABLE

Class	Electrode Coating	Penetration	Current Type
Exxx0	Cellulose, Sodium	Deep	DC+ (DCEP)
Exxx1	Cellulose, Potassium	Deep	AC, DC+ (DCEP)
Exxx2	Rutile, Sodium	Medium	AC, DC- (DCEN)
Exxx3	Rutile, Potassium	Light	AC, DC+ (DCEP), DC- (DCEN)
Exxx4	Rutile, Iron Powder	Medium	AC, DC+ (DCEP), DC- (DCEN)
Exxx5	Low Hydrogen, Sodium	Medium	DC+ (DCEP)
Exxx6	Low Hydrogen, Potassium	Medium	AC, DC+ (DCEP)
Exxx7	Iron Powder, Iron Oxide	Medium	AC, DC- (DCEN)
Exxx8	Low Hydrogen, Iron Powder	Medium	AC, DC+ (DCEP)
Exxx9	Iron Oxide, Rutile, Potassium	Medium	AC, DC+ (DCEP), DC- (DCEN)

ADDITIONAL REQUIREMENTS

Suffix	Additional Requirement
-1	Increased toughness (impact strength) for E7018 electrodes. Also increased ductility in E7024 electrodes
-M	Meets most military requirements - greater toughness, lower moisture content as received after exposure, diffusible hydrogen limits for weld metal
-H4, -H8,	Indicates the maximum diffusible hydrogen limit measured in millimeters per 100 grams (mL/100g)
-H16	The 4, 8, and 16 indicates what the limit is. Example: -H4 = 4mL per 100 grams

CHEMICAL SYMBOLS FOR THE ELEMENTS

C	Carbon	Most effective hardening element in steel
Mn	Manganese	Hardening element second to carbon
Si	Silicon	Deoxidizer, moderate strengthener
P	Phosphorus	Causes cracking if too high
S	Sulfur	Aids in machining - cracking problems like P
Cr	Chromium	Hardness (low) - corrosion resistance (high)
Ni	Nickel	Hardening element - better cold toughness
Mo	Molybdenum	Hardenability - high temp tensile - creep strength
B	Boron	Very small amounts increase hardness
Cu	Copper	Corrosion resistance (low) - cracking (high)
Al	Aluminum	Deoxidizer - improves mechanical properties
Ti	Titanium	Removes: Oxygen, S, N, and C
N	Nitrogen	Improves strength - lowers toughness
Nb	Niobium	Hardness - improves mechanical properties (formerly Columbium [Cb])
V	Vanadium	Hardness - improves mechanical properties

LOW ALLOY STEEL COATED ELECTRODES

E7018-X

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- **1** Indicates in what welding positions it can be used
- **8** Indicates the coating, penetration, and current type used (see classification table)
- **X** Indicates what alloys are in this electrode (see suffix table)

WELDING POSITIONS

Same as for Mild Steel Coated Electrodes

CLASSIFICATION

Same as for Mild Steel Coated Electrodes

SUFFIX TABLE

Suffix	Steel Alloy Type	Suffix Number Description	
-A1	Carbon-Molybdenum	0.40 - 0.65 Mo	
-B1	Chromium-Molybdenum	0.40 - 0.65 Cr	0.40 - 0.65 Mo
-B2	Chromium-Molybdenum	1.00 - 1.50 Cr	0.40 - 0.65 Mo
-B2L	Chromium-Molybdenum	Lower Carbon B2	
-B3	Chromium-Molybdenum	2.00 - 2.50 Cr	0.90 - 1.20 Mo
-B3L	Chromium-Molybdenum	Lower Carbon B3	
-B4L	Chromium-Molybdenum	1.75 - 2.25 Cr	0.40 - 0.65 Mo
-B5	Chromium-Molybdenum	0.40 - 0.60 Cr	1.00 - 1.25 Mo
-B6	was E502	4.6 - 6.0 Cr	0.45 - 0.65 Mo
-B8	was E505	8.0 - 10.5 Cr	0.8 - 1.2 Mo
-C1	Nickel Steel	2.00 - 2.75 Ni	
-C1L	Nickel Steel	Lower Carbon C1	
-C2	Nickel Steel	3.00 - 3.75 Ni	
-C2L	Nickel Steel	Lower Carbon C2	
-C3	Nickel Steel	0.80 - 1.10 Ni	
-NM	Nickel-Molybdenum	0.80 - 1.10 Ni	0.40 - 0.65 Mo
-D1	Manganese-Molybdenum	1.00 - 1.75 Mn	0.25 - 0.45 Mo
-D2	Manganese-Molybdenum	1.65 - 2.00 Mn	0.25 - 0.45 Mo
-D3	Manganese-Molybdenum	1.00 - 1.80 Mn	0.40 - 0.65 Mo
-W	Weathering Steel	Ni, Cr, Mo, Cu	
-G	No required chemistry		
-M	Military grade	May have more requirements	

Class	Min. Tensile Strength	Min. Yield Strength
E60xx	62,000 psi	50,000 psi
E70xx	70,000 psi	57,000 psi
E80xx	80,000 psi	67,000 psi
E90xx	90,000 psi	77,000 psi
E100xx	100,000 psi	87,000 psi
E110xx	110,000 psi	95,000 psi
E120xx	120,000 psi	107,000 psi

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