Nickel-Chromium-Iron Alloy Welding Wire

AWS ERNiCrFe-7.....2

AWS ERNiCrFe-6.....3

AWS ERNiCrFe-11.....4

AWS ERNiFeCr-1.....5

AWS ERNiCrFe-5.....6

AWS ERNiCrFe-8.....7

AWS ERNiFeCr-2.....8

Characteristics：

ERNiCrFe-7 is mainly composed of nickel, with a chromium content of 14.0-17.0%, which is resistant to oxidation and corrosion. The iron content is about 7.0-10.0%. It also contains elements such as molybdenum and niobium. Molybdenum can enhance corrosion resistance, and niobium can improve high-temperature performance.

Application：

1. ERNiCrFe-7 has good corrosion resistance and can prevent internal corrosion of pipelines.
2. The performance of ERNiCrFe-7 can ensure the service life of equipment, and the mechanical properties can help the equipment withstand stress.
3. The performance of ERNiCrFe-7 can prevent oxidation of components, ensure that components do not deform, extend the life of equipment, and improve power generation efficiency.

Power polarity:DC-

Chemical composition.

Item	Ni[a]	C	Mn	Fe	S	Si	Mo	Cu
AWS Standard	Bal	0.04max	1.0max	7.0-11.0	0.015max	0.50max	0.50max	0.30max
Item	Cr	Ti	Al	P	Nb	Al+Ti	Other	
AWS Standard	28.0-31.5	1.0max	1.10max	0.020max	0.10max	1.5max	0.50max	

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	250 - 300MPa	600 - 700MPa	30 - 35%

Welding Requirements.

1. When using inert gas (such as argon) protection, ensure that the gas flow is stable.
2. RNiCrFe-7 welding wire should be stored in a dry and well-ventilated environment. Avoid places with moisture and corrosive gases
3. The surface of the processed parts may require protective treatment, such as painting and passivation.

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Characteristics：

ERNiCrFe-6 is mainly composed of nickel (Ni), which is at a residual level. As the basic element of nickel-based alloys, it gives the alloy good toughness and corrosion resistance.

Application：

1. ERNiCrFe-6 welded pipelines can withstand pressure and resist seawater corrosion, and their mechanical properties ensure structural integrity.
2. Its welded pipelines can handle corrosive media, and maintain the integrity of chemical pipelines with toughness and fatigue resistance to ensure continuous production.
3. ERNiCrFe-6 ensures that the platform structure is safe and durable, and the connection is reliable and corrosion-resistant when welding

Power polarity:DC-

Chemical composition.

Item	Ni[a]	C	Mn	Fe	S	Si
AWS Standard	67.0min	0.08max	2.0-2.7	8.0max	0.015max	0.35max
Item	Cu	Cr	Ti	P	Other	
AWS Standard	0.50max	14.0-17.0	2.5-3.5	0.030max	0.50max	

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	250 - 300MPa	600 - 700MPa	30 - 35%

Welding Requirements.

1. Maintain a stable gas flow rate during welding. Insufficient flow rate will cause defects such as pores and oxidation in the molten pool.
2. Clean the slag and spatter on the surface of the weld, which will affect the appearance and performance of the weld and become the starting point of corrosion. They can be removed by appropriate methods.

Characteristics：

.ERNiCrFe - 11 is a nickel-based alloy welding wire. It mainly contains nickel (Ni), chromium (Cr) and iron (Fe) elements. The nickel content is relatively high, generally at the residual level, which makes the alloy have good corrosion resistance and toughness

Application：

1.ERNiCrFe-11 is often used to weld various metal structures, such as bridges, building frames, etc.

2. For example, oil pipelines use its weldability and corrosion resistance to ensure pipeline sealing. Each weld can ensure that the pipeline can safely transport fluids under complex chemical media and pressure environments.

3. When cracks and other damage occur in high-temperature furnaces, boilers and other equipment, ERNiCrFe-11 welding can restore their integrity.

Power polarity:DC-

Chemical composition.

Item	Ni	Cr	Fe	Al	C
AWS Standard	58.0-63.0	21.0-25.0	Rem	1.0-1.7	0.10max
Item	Mn	S	Si	Cu	Other
AWS Standard	1.0max	0.015max	0.50max	1.0max	0.50max

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	300 - 350MPa	650 - 750MPa	30 - 40%

Welding Requirements.

1.ERNiCrFe-11 welding wire should be stored in a dry and well-ventilated environment.

2.If heat treatment is performed on the welded parts, it must be carried out strictly in accordance with the process requirements.

3.Ensure the electrical safety of the welding equipment around the welding area to prevent electric shock accidents.

AWS A5.14 ERNiFeCr-1

Characteristics：

ERNiFeCr-1 is a nickel-based alloy, with the main component nickel as the balance, which gives good corrosion resistance and toughness. Iron accounts for 22.0-27.0% to adjust performance and control costs, chromium 19.0-23.0% helps to resist oxidation and corrosion, molybdenum 2.5-3.5% resists pitting, and niobium stabilizes carbides to improve high temperature performance.

Application：

1. In marine engineering, ERNiFeCr-1 is used for ships, seawater pipes and platforms. It is resistant to corrosion and waves, ensuring the safety of deep-sea platforms.
2. In the chemical industry, it is used in the manufacture of reactors, etc. It is resistant to acid and alkali solvents, and its performance stabilizes the chemical process.
3. In the power industry, nuclear power plants and thermal power plants rely on it for the maintenance of multiple components. It is resistant to corrosion and creep, and helps equipment to be efficient.

Power polarity:DC-

Chemical composition.

Item	Ni	C	Mn	Fe	S	Si	Cu
AWS Standard	38.0-46.0	0.05max	1.0max	22.0max	0.03max	0.50max	1.5-3.0
Item	Cr	Al	Ti	Mo	P	Other	
AWS Standard	19.5-23.5	0.20max	0.60-1.20	2.50-3.50	0.03max	0.50max	

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	300 - 350MPa	650 - 750MPa	30 - 35%

Welding Requirements.

1. The base material should be thoroughly cleaned, acetone should be used to remove oil and rust, and sandpaper should be used to grind away rust to ensure that the welding area is bright; check the size, assembly, and control the butt gap.

2. The purity of argon gas should not be less than 99.99%, and the flow should be steady throughout the process to prevent air from entering the molten pool to cause pores and oxidation; pay attention to the coverage range, protect the molten pool and heat-affected zone.

3. Perform post-weld heat treatment as needed, strictly control the temperature (such as 550-750°C) and time, and prevent strength reduction and residual stress.

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Characteristics：

ERNiCrFe-5 is a nickel-chromium-iron alloy gas shielded welding wire. The working temperature of the deposited metal is as high as 980℃, but when the temperature exceeds 820℃, the oxidation resistance and strength of the deposited metal will be reduced.

Application：

Used for welding nickel-iron-chromium alloy, nickel-chromium-iron and dissimilar metal welding for special purposes.

Power polarity:DC-

Chemical composition.

Item	C	Mn	Si	S	P
AWS Standard	≤0.08	≤1.0	≤0.3	≤0.015	≤0.020
Item	Fe	Ni	Cr	Nb	Cu
AWS Standard	6.0~10.0	≥70.0	14.0~17.0	1.5~3.0	≤0.5

Welding Requirements.

1. Use Ar or Ar + He mixed gas as the shielding gas, with a gas flow rate of 25~30L/min
2. Before welding, the oxides and impurities on the welding edge of the workpiece and the surface of the welding wire must be removed
3. When welding outdoors, when the wind speed is greater than 1.5m/s, windproof measures should be taken to prevent the formation of pores

Characteristics：

1.ERNiCrFe-8 welding wire has excellent corrosion resistance, especially in environments containing chloride ions, and can effectively resist pitting and crevice corrosion. Its high chromium and nickel content further improves the corrosion resistance in fluorine-containing acidic environments.

2.ERNiCrFe-8 welding wire has excellent welding process, stable arc, beautiful shape, less spatter, and is suitable for a variety of welding processes.

3.ERNiCrFe-8 welding wire has high yield strength and tensile strength, and can withstand large mechanical loads.

Application：

1. Suitable for the manufacture of pressure vessels with an operating temperature range of -196℃ to +650℃, and anti-oxidation peeling within +1200℃ (sulfur-free conditions).

2. Suitable for welding of nickel-based alloys, high-temperature creep-resistant steels, heat-resistant steels and low-temperature steels, dissimilar steels, etc.

3. Widely used in industries such as petrochemicals, metallurgy, atomic energy, marine development, aviation, and aerospace to solve engineering corrosion problems that cannot be solved by general stainless steel and other metal and non-metal materials.

Power polarity:DC+

Chemical composition.

Item	C	Mn	P	S	Si	Ni	Cr	Cu	Ti
AWS Standard	0.08max	1.00max	0.03max	0.015max	0.50max	70.0min	14.0-17.0	0.50max	2.00-2.75
Item	Al	Fe	Nb+Ta	Pb					
AWS Standard	0.40-1.00	5.00-9.00	0.70-1.20	0.010max					

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥995 MPa	≥731 MPa	≥12%

Welding Requirements.

1. It is recommended to use high-purity argon (99.99% or more) as the shielding gas, and the shielding gas flow rate should be 15-25 L/min.
2. The arc length is generally controlled at around 4-6 mm.
3. When the wind speed is greater than 0.5 m/s, windproof measures should be taken.

Characteristics：

ERNiFeCr-2 is a nickel-based alloy welding consumable mainly used for TIG (Tungsten Inert Gas) welding of Inconel® alloys 718, 706 and X-750.

Application：

ERNiFeCr-2 is mainly used for welding high-strength aircraft components and liquid rocket components, which need to work in low-temperature environments. The alloy has excellent high-temperature strength and good low-temperature properties, and is suitable for aerospace, chemical, power and other industries.

Power polarity:DC-

Chemical composition.

Item	C	Mn	P	S	Si	Ni	Cr
AWS Standard	0.08max	0.35max	0.015max	0.015max	0.35max	50.0-55.0	17.0-21.0
Item	Mo	Cu	Ti	B	Al	Fe	Nb+Ta
AWS Standard	2.8-3.3	0.3max	0.65-1.15	0.006max	0.2-0.8	-	4.75-5.5

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥641 MPa	≥846 MPa	≥41%

Welding Requirements.

When using welding processes with high heat input (such as MIG welding), micro cracks may occur and should be avoided as much as possible.