Stainless Steel Solid Welding Wire

AWS A5.9 ER310(3)

Characteristics：

1. High chromium and nickel content: has excellent high temperature resistance and oxidation resistance.
2. Good welding performance: suitable for a variety of welding methods, including TIG and MIG welding.
3. High fluidity: good weld formation and good wettability.
4. Crack resistance: The deposited metal has good crack resistance.

Application：

1. Such as high temperature furnaces (such as SUS310S), coal coking equipment, etc.
2. Suitable for welding of different materials, such as welding of stainless steel and carbon steel.
3. Suitable for chemical equipment that requires high corrosion resistance and high temperature performance.
4. Suitable for equipment manufacturing and maintenance in marine environments.

Power polarity:DC-

Chemical composition.

Item	C	Si	Mn	P	S	Cr
AWS Standard	⩽ 0.08	⩽ 0.65	1.0-2.5	⩽ 0.03	⩽ 0.03	25.0-28.0
Item	**Ni**					
AWS Standard	20.0-22.5					

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	**⩾ 370 MPa**	**⩾ 550 MPa**	**≥35%**

Welding Requirements.

1.TIG (Tungsten Inert Gas Welding) or MIG (Metal Inert Gas Welding).
2.100% Argon (Ar) or a mixture of Argon and a small amount of Helium.
3.The interpass temperature is controlled at 150-200°C to prevent overheating of the weld and grain growth.

AWS A5.9 ER310

Characteristics：

1.ER310 welding wire contains high chromium (Cr) and nickel (Ni) content, usually 25%Cr-20%Ni, which makes it excellent in corrosion resistance and high temperature strength.

2.It has good fluidity and stable arc characteristics, good welding forming and less spatter.

3.Due to its high chromium and nickel content, it has excellent corrosion resistance and is suitable for a variety of industrial environments.

Application：

1. The product is widely used in the same type of stainless steel structures, composite steel and dissimilar steel structures manufactured by petrochemical, synthetic fiber and other equipment. It can also be used for nuclear reactors, pressure vessels, internal transition layer surfacing and tower internal component welding.

2. Commonly used for welding carbon steel and stainless steel, or for welding martensitic and ferritic stainless steel with poor toughness.

3. In multi-layer surface surfacing, in order to achieve a low carbon content when using ER316L or ER317L as the subsequent surfacing layer, the first layer usually needs to use low-carbon ER310.

Power polarity:DC-

Chemical composition.

Item	C	Si	Mn	P	S	Cr
AWS Standard	0.08-0.15	0.30-0.65	1.00-2.50	0.03max	0.03max	25.00-28.00
Item	Ni	Mo	Cu			
AWS Standard	20.00-22.50	0.75max	0.75max			

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥883 MPa	≥554 MPa	≥37%

Welding Requirements.

1. Pay attention to the temperature and humidity. It is recommended that the indoor temperature be above 5°C, the relative humidity not exceed 60%, and a certain distance from the ground and walls (about 30cm).

2. Use 100% argon or Ar+ (1%~3%) O2 as the protective gas, and the protective gas flow rate should be 20-25L/min.

AWS A5.9 ER312

Characteristics：

It is commonly used for welding of carbon steel and stainless steel or transition layer base welding. It can also be used for welding dissimilar joints between ferrite and austenite and welding of difficult-to-weld steels.

Application：

1. The deposited metal has good dilution resistance, the iron content is as high as 30%, and it has excellent heat resistance;
2. The arc is stable, the shape is beautiful, the molten iron has good fluidity, and it has excellent welding process performance.

Power polarity:DC-

Chemical composition.

Item	C	Mn	Si	Cr	Ni	Mo
AWS Standard	0.15	1.00~2.50	0.30-0.65	28.00-32.00	8.00-10.50	0.75
Item	P	S	Cu			
AWS Standard	0.03	0.03	0.75			

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	⩾181 MPa	⩾515 MPa	≥39%

Welding Requirements.

1. The welding area must be thoroughly cleaned of surface impurities such as oil, rust, and moisture.
2. 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.
3. The arc length is generally controlled at about 4-6 mm.

AWS A5.9 ER316(2)

Characteristics：

1. Excellent corrosion resistance and high temperature performance.
2. Suitable for a variety of welding methods, including TIG and MIG welding.
3. Good weld formation and good wettability.
4. The deposited metal has good crack resistance.

Application：

1. Used for welding 316/316L stainless steel, suitable for various structural parts, equipment and containers.
2. Suitable for equipment that requires high corrosion resistance.
3. Suitable for equipment manufacturing and maintenance in marine environments.
4. Suitable for equipment manufacturing in high temperature and high corrosion environments.
5. Suitable for high corrosion resistant parts in automobile manufacturing.
6. Suitable for the manufacture and maintenance of power equipment.

Power polarity:DC-

Chemical composition.

Item	C	Si	Mn	P	S	Cr
AWS Standard	0.04-0.08	0.30-0.65	1.00-2.50	≤ 0.03	≤ 0.03	18.0-20.0
Item	**Ni**	**Mo**	**Cu**			
AWS Standard	11.0-14.0	2.0-3.0	≤ 0.75			

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	**≥ 370 MPa**	**≥ 550 MPa**	**≥35%**

Welding Requirements.

1.TIG (Tungsten Inert Gas Welding) or MIG (Metal Inert Gas Welding).
2.100% Argon (Ar) or a mixture of Argon and a small amount of Helium.
3.The interpass temperature is controlled at 150-200°C to prevent overheating of the weld and grain growth.

AWS A5.9 ER316

Characteristics：

1.ER316 welding wire contains high chromium (Cr), nickel (Ni) and molybdenum (Mo) content, usually 18%Cr-12%Ni-2%Mo, which makes it excellent in corrosion resistance and high temperature strength.

2.It has good fluidity and stable arc characteristics, good welding forming and less spatter.

3.Due to its high chromium and nickel content, it has excellent corrosion resistance and is suitable for a variety of industrial environments.

Application：

1. The product is widely used in the same type of stainless steel structures, composite steel and dissimilar steel structures manufactured by petrochemical, synthetic fiber and other equipment. It can also be used for nuclear reactors, pressure vessels, internal transition layer surfacing and tower internal component welding.

2. Commonly used for welding carbon steel and stainless steel, or for welding martensitic and ferritic stainless steel with poor toughness.

3. In multi-layer surface surfacing, in order to achieve a low carbon content when using ER316L or ER317L as the subsequent surfacing layer, the first layer usually needs to use low-carbon ER316.

Power polarity:DC-

Chemical composition.

Item	C	Si	Mn	P	S	Cr
AWS Standard	0.max	0.30-0.65	1.00-2.50	0.03max	0.03max	18.0-20.0
Item	Ni	Mo	Cu			
AWS Standard	11.0-14.0	2.0-3.0	0.75max			

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥205 MPa	≥515 MPa	≥35%

Welding Requirements.

1. Pay attention to the temperature and humidity. It is recommended that the indoor temperature be above 5°C, the relative humidity not exceed 60%, and a certain distance from the ground and walls (about 30cm).

2. Use 100% argon or Ar+ (1%~3%) O2 as the protective gas, and the protective gas flow rate should be 20-25L/min.

AWS A5.9 ER316H

Characteristics：

1. ER316H has good pitting resistance due to the presence of molybdenum.
2. The weld metal has good crack resistance.
3. It has good creep resistance under high temperature conditions.

Application：

1. Suitable for welding steam pipes, superheater headers, etc.
2. Suitable for welding applications under high temperature service conditions.

Power polarity:DC-

Chemical composition.

Item	C	Si	Mn	P	S	Cr
AWS Standard	0.04-0.08	0.30-0.65	1.00-2.50	0.03max	0.03max	18.0 - 20.0
Item	Ni	Mo	Cu	N		
AWS Standard	11.0-14.0	2.0-3.0	0.75max	0.10max		

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥153 MPa	≥847 MPa	≥11%

Welding Requirements.

1. Use 100% argon or Ar+(1%~3%)O2 as the protective gas, and the protective gas flow rate should be 20-25L/min.
2. Use 100% argon or Ar+ (1%~3%) O2 as the protective gas, and the protective gas flow rate should be 20-25L/min.

AWS A5.9 ER316L（2）

Characteristics：

1. The weld metal is an austenite structure containing 19% Cr-12% Ni-2% Mo, with excellent corrosion resistance, heat resistance and crack resistance. Because it contains Mo, it has good corrosion resistance against acetic acid, sulfurous acid, phosphoric acid and salts, especially against chloride ion pitting corrosion.
2. Excellent welding processability, stable arc, no spatter, beautiful weld shape, can be welded in all positions, good crack resistance

Application：

1. Commonly used in chemical industry and power engineering structures, such as important structures of fertilizer, urea, petrochemical production or storage equipment, and also suitable for food and beverage, pulp and paper industries
2. Mainly used for welding austenitic stainless steel with low carbon molybdenum content, such as 00Cr17Ni14Mo2 (SUS316L), etc. It is also suitable for welding 316 type and similar alloys, and has been successfully used for welding high-pressure pipelines and pipes

Power polarity:DC-

Chemical composition.

Item	C	Cr	Ni	Mo	Mn	Si
AWS Standard	≤0.03	18.0-20.0	11.0-14.0	2.0-3.0	1.0-2.5	≤0.30
Item	P	S	Cu	Other		
AWS Standard	≤0.03	≤0.03	≤0.75	≤0.50		

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≈400 MPa	≈593 MPa	≥36%

Welding Requirements.

1. Generally, 100% argon is used for protection, and a mixed gas of 98% argon + 2% oxygen can also be used
2. Suitable for all-position welding
3. Suitable for metal arc welding (such as MIG welding), tungsten arc welding (TIG welding) and submerged arc welding, etc.

AWS A5.9 ER316L(3)

Characteristics：

1. Excellent corrosion resistance and high temperature performance.
2. Suitable for a variety of welding methods, including TIG and MIG welding.
3. Good weld formation and good wettability.
4. The deposited metal has good crack resistance.

Application：

1. Used for welding 316/316L stainless steel, suitable for various structural parts, equipment and containers.
2. Suitable for equipment that requires high corrosion resistance.
3. Suitable for equipment manufacturing and maintenance in marine environments.
4. Suitable for equipment manufacturing in high temperature and high corrosion environments.
5. Suitable for high corrosion resistant parts in automobile manufacturing.
6. Suitable for the manufacture and maintenance of power equipment.

Power polarity:DC-

Chemical composition.

Item	C	Si	Mn	P	S	Cr
AWS Standard	0.03max	0.65max	1.00-2.50	0.03max	0.03max	18.0-20.0
Item	**Ni**	**Mo**	**Cu**			
AWS Standard	11.0-14.0	2.0-3.0	0.75max			

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	**≥ 370 MPa**	**≥ 550 MPa**	**≥35%**

Welding Requirements.

1.TIG (Tungsten Inert Gas Welding) or MIG (Metal Inert Gas Welding).
2.100% Argon (Ar) or a mixture of Argon and a small amount of Helium.
3.The interpass temperature is controlled at 150-200°C to prevent overheating of the weld and grain growth.

AWS A5.9 ER316L

Characteristics：

ER316L is an ultra-low carbon stainless steel welding wire that meets AWS A5.9 standards. This welding wire is mainly used for welding 316L type austenitic stainless steel and has excellent corrosion resistance, heat resistance and crack resistance.

Application：

1. Used to manufacture and repair chemical equipment, reactors, heat exchangers, etc.
2. Used to manufacture and repair petrochemical equipment, pipelines, etc.
3. Used to manufacture and repair food processing equipment.
4. Used to manufacture and repair marine equipment, ship parts, etc.
5. Used to manufacture and repair medical equipment.

Power polarity:DC-

Chemical composition.

Item	C	Mn	Si	S	P
AWS Standard	0.03max	2.00max	1.00max	0.03max	0.035max
Item	Cr	Ni	Mo	Cu	
AWS Standard	16.00-18.00	12.00-15.00	2.00-3.00	0.50max	

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥205 MPa	≥515 MPa	≥35%

Welding Requirements.

1. The protective gas flow rate is preferably 20-25L/min. Ar and CO2 mixed welding should not be used for this type of steel.
2. A stable jet arc can be obtained, which is particularly suitable for welding stainless steel, thin plates, vertical welding, and butt welding.
3. It directly affects the mechanical properties and crack resistance of the weld metal, and should be given more attention.

AWS A5.9 ER316LSI

Characteristics：

1. The deposited metal has good mechanical properties and corrosion resistance;
2. The addition of Mo element improves the high temperature creep performance and the pitting corrosion resistance in the halide atmosphere;
3. Due to the addition of Si, the molten iron has excellent fluidity, more beautiful molding, less spatter, and excellent welding process performance.

Application：

Applicable to petrochemical, pressure vessels, low-temperature storage tanks, fertilizers, urea, food machinery and other industries, welding 18%Cr-12%Ni-2%Mo stainless steelkey components.

Power polarity:DC+

Chemical composition.

Item	C	Mn	Si	Cr	Ni	Mo
AWS Standard	0.03	1.00~2.50	0.65-1.00	18.00-20.00	11.00-14.00	2.00-3.00
Item	P	S	Cu			
AWS Standard	0.03	0.03	0.75			

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥58,000	≥88,000	≥37%

Welding Requirements.

1. The welding area must be completely cleaned of surface impurities such as oil, rust, and moisture.
2. It is recommended to use Ar + 2% CO_2 or Ar + 5% CO_2 as the shielding gas, and the shielding gas flow rate is preferably 15-25 L/min.
3. The arc length is generally controlled at about 4-6 mm.

AWS A5.9 ER316Si

Characteristics：

1. High silicon content: increases the fluidity of the molten pool and improves the wettability of the weld, especially at the toe of the weld.
2. Molybdenum content: improves corrosion resistance.
3. Low carbon content: suitable for welding stainless steel CrNiMo steel.
4. Electrode identification: inkjet identification is printed on the entire length of the electrode for easy identification.

Application：

1. Austenitic stainless steel containing molybdenum: such as 316 and 316L stainless steel.
2. General manufacturing: suitable for various industrial manufacturing processes.
3. Chemical processing: suitable for the manufacture and maintenance of chemical equipment.
4. Food processing equipment: suitable for equipment that requires high corrosion resistance.
5. Marine engineering: suitable for the manufacture and maintenance of equipment in marine environments.

Power polarity:DC-

Chemical composition.

Item	C	Cr	Ni	Mo	Mn	Si
AWS Standard	0.12max	18.0-20.0	11.0-14.0	2.0-3.0	1.0-2.5	0.65-1.00
Item	P	S	Cu			
AWS Standard	0.03max	0.03max	0.75max			

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	⩾ 370 MPa	⩾ 550 MPa	≥35%

Welding Requirements.

1. Before welding, ensure that the weld area is clean and free of oil, rust and moisture.
2. During welding, ensure that the weld area is fully protected to prevent oxidation and contamination.
3. The weld should be smooth and uniform, without pores, cracks and slag inclusions.

AWS A5.9 ER317

Characteristics：

1. The deposited metal has good mechanical properties and corrosion resistance;
2. The wire feeding is smooth, the arc is stable, the forming is beautiful, the molten iron has good fluidity, and there is less spatter, which has excellent welding process performance.

Application：

1. Commonly used for high corrosion-resistant structures of fertilizer and urea production or storage equipment,
2. Mainly used for welding 317 stainless steel, and other similar austenitic stainless steels, such as 0Cr19Ni13Mo3 (SUS317)
3. Can be used for surface surfacing of steel to improve surface corrosion resistance and wear resistance.

Power polarity:DC+

Chemical composition.

Item	C	Mn	Si	Cr	Ni	Mo
AWS Standard	0.081	1.00~2.50	0.3-0.65	18.5-20.5	13.0-15.0	3.0-4.0
Item	P	S	Cu			
AWS Standard	0.03	0.03	0.75			

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥221 MPa	≥414 MPa	≥31%

Welding Requirements.

1. The welding area must be thoroughly cleaned of surface impurities such as oil, rust, and moisture.
2. It is recommended to use high-purity argon (99.99% or more) as the shielding gas, and the shielding gas flow rate is preferably 15-25 L/min.
3. DC reverse welding is used, and the welding arc length is generally 4-6 mm. If the arc is too long, it is easy to produce defects such as pores. If the arc is too short, its wettability will deteriorate.

AWS A5.9 ER317L

Characteristics：

1. The deposited metal has good mechanical properties and corrosion resistance;
2. The arc is stable, the shape is beautiful, the molten iron has good fluidity, and it has excellent welding process performance.

Application：

1. Commonly used in high corrosion-resistant structures of fertilizer and urea production or storage equipment.
2. Can be used for surface surfacing of steel to improve surface corrosion resistance and wear resistance.
3. Suitable for welding between stainless steel and carbon steel or low alloy steel.

Power polarity:DC+

Chemical composition.

Item	C	Mn	Si	Cr	Ni	Mo
AWS Standard	0.08	1.00~2.50	0.3-0.65	18.5-20.5	13.0-15.0	3.0-4.0
Item	P	S	Cu			
AWS Standard	0.03	0.03	0.75			

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥221 MPa	≥414 MPa	≥31%

Welding Requirements.

1. The welding area must be thoroughly cleaned of surface impurities such as oil, rust, and moisture.
2. It is recommended to use high-purity argon (99.99% or more) as the shielding gas, and the shielding gas flow rate is preferably 15-25 L/min.
3. DC reverse welding is used, and the welding arc length is generally 4-6 mm. If the arc is too long, it is easy to produce defects such as pores. If the arc is too short, its wettability will deteriorate.

AWS A5.9 ER320

Characteristics：

1.ER320 welding wire has good welding process performance, stable arc, less spatter, beautiful shape, easy slag removal, suitable for all-position welding.

2.The deposited metal has excellent resistance to pitting, stress corrosion and cracking, especially suitable for welding Alloy 20.

3.The carbon, silicon, phosphorus and sulfur content are kept at a low level, reducing the thermal cracks and micro cracks of the weld metal.

Application：

ER320 is primarily used for welding metals of similar composition, whether in wrought or cast form. It has excellent corrosion resistance in a wide range of chemical environments.

Power polarity:DC+

Chemical composition.

Item	C	Mn	Si	P	S
AWS Standard	0.07max	2.5max	0.60max	0.03max	0.03max
Item	Cr	Ni	Mo	Cu	Nb+Ta
AWS Standard	19.0-21.0	32.0-36.0	2.0-3.0	3.0-4.0	1.0max

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥440 MPa	≥590 MPa	≥35%

Welding Requirements.

1. Use 100% argon as shielding gas to prevent weld oxidation and contamination.
2. Suitable for all-position welding.
3. Generally between 120-200A, voltage between 20-25V, specific parameters need to be adjusted according to actual conditions

AWS A5.9 ER321

Characteristics：

The main components of the welding wire are 18Cr-8N-Ti. When used with stainless steel aminophenol flux, the deposited metal has good mechanical properties, crack resistance, and intergranular corrosion resistance. The addition of Ti can effectively improve corrosion resistance, especially intergranular corrosion resistance.

Application：

1. Commonly used in food machinery, medical equipment, pressure vessels, petrochemicals and other occasions, such as 07Cr19Ni11Ti (SUS 321) and other materials welding.
2. Can be used for surface surfacing of steel to improve the corrosion resistance and wear resistance of the surface.
3. Suitable for welding between stainless steel and carbon steel or low alloy steel.

Power polarity:DC+

Chemical composition.

Item	C	Mn	Si	Cr	Ni
AWS Standard	≤0.080	1.00~2.50	≤0.60	18.50~20.50	9.00~10.50
Item	Mo	P	S	Ti	
AWS Standard	≤0.75	≤0.030	≤0.030	9xC-1.00	

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥345 MPa	≥515 MPa	≥40%

Welding Requirements.

1. The temperature between welds is recommended to be controlled at about 150℃. When welding small and medium-sized multi-pass and multi-layer welds, pay attention to controlling the welding line energy.
2. The rust layer, moisture, oil stains, dust, etc. on the welding part must be cleaned up.
3. The flux must be baked at 300~350℃ for 2h before use.

AWS A5.9 ER347

Characteristics：

The main components of the welding wire are 19Cr-11Ni-Nb. When used with the pressure equipment stainless steel alkaline sintering flux JQ.SJ601, the deposited metal has good mechanical properties, crack resistance, and intergranular corrosion resistance. The addition of Nb can effectively improve the corrosion resistance, especially the intergranular corrosion resistance.

Application：

1. Commonly used in pressure equipment, food machinery, medical equipment, petrochemical industry and other occasions, such as 07Cr19Ni11Ti (SUS 321), 07Cr18Ni11Nb (SUS 347) and other materials.
2. Can be used for surface surfacing of steel to improve the corrosion resistance and wear resistance of the surface.
3. Suitable for welding between stainless steel and carbon steel or low alloy steel.

Power polarity: DC+

Chemical composition.

Item	C	Mn	Si	Cr	Ni
AWS Standard	≤0.080	1.00~2.50	≤0.60	19.00~21.50	9.00~11.00
Item	P	S	Nb		
AWS Standard	≤0.030	≤0.010	10xC-1.00		

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥181 MPa	≥534 MPa	≥39%

Welding Requirements.

1. The temperature between welds is recommended to be controlled at about 150℃. When welding small and medium-sized multi-pass and multi-layer welds, pay attention to controlling the welding line energy.
2. The rust layer, moisture, oil stains, dust, etc. on the welding part must be cleaned up.
3. The flux must be baked at 300~350℃ for 2h before use.

AWS A5.9 ER347Si

Characteristics：

1.ER347Si welding wire fixes carbon by adding niobium (Nb), preventing the precipitation of chromium carbide between grains, improving the steel's resistance to intergranular corrosion, and having good mechanical properties.

2.Due to the addition of alloying elements such as niobium, the weld has enhanced resistance to intergranular corrosion and has excellent high-temperature strength, making it particularly suitable for welding heat-resistant steel.

Application：

1. Mainly used for welding austenitic stainless steels such as 1Cr18Ni11Nb, 321 and 347.
2. Commonly used in food machinery, medical equipment, pressure vessels, petrochemicals, etc., such as welding of 07Cr19Ni11Ti (SUS321), 07Cr18Ni11Nb (SUS347) or austenitic stainless steels of similar composition.

Power polarity:DC-

Chemical composition.

Item	C	Mn	Si	S	P
AWS Standard	0.08max	2.0max	0.50-1.50	0.03max	0.04max
Item	Cr	Ni	Nb+Ta	Mo	Cu
AWS Standard	17.0-19.0	9.0-12.0	0.15-0.40	0.10max	0.75max

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	205 MPa	585 MPa	≥35%

Welding Requirements.

1. Strictly remove impurities such as oil, rust, and moisture from the weld during welding.
2. Shielding gas: Use 100% argon or Ar+2%O2 as shielding gas, and the shielding gas flow rate should be 15-25L/min.
3. The amount of welding line energy directly affects the mechanical properties and crack resistance of the weld metal, and should be given more attention.

AWS A5.9 ER383

Characteristics：

1.ER383 welding wire contains low maximum values of carbon, silicon and sulfur to reduce the possibility of hot cracking.

2.Suitable for welding its own composition or with other stainless steel grades of substrate

Application：

1. Mainly used for welding its own components or other stainless steel grade substrates
2. Commonly used in the production of various strong acid towers, tanks, pipelines and storage and transportation containers, etc.

Power polarity:DC-

Chemical composition.

Item	C	Mn	Si	S	P
AWS Standard	0.08max	2.0max	0.80max	0.03max	0.04max
Item	Cr	Ni	Mo	Cu	
AWS Standard	16.0-18.0	10.0-13.0	0.60max	0.75max	

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	205 MPa	515 MPa	35%

Welding Requirements.

1. Use 100% argon or Ar+2%O2 as the shielding gas, and the shielding gas flow rate should be 15-25L/min.
2. Generally controlled at about 4-6mm. If the arc is too long, it is easy to produce defects such as pores. If the arc is too short, its wettability will deteriorate.
3. The influence of wind is particularly unfavorable to welding. When the wind speed is greater than 0.5m/s, windproof measures should be taken. Pay attention to ventilation to avoid harm to the operator.

AWS A5.9 ER385

Characteristics：

1. Can resist the comprehensive corrosion of sulfuric acid and phosphoric acid, and can withstand the corrosion of acetic acid at any temperature and any concentration under normal pressure;
2. Can effectively solve the problems of pitting, pitting, crevice corrosion, stress corrosion, etc. of halides;
3. 3. Smooth wire feeding, stable arc, beautiful molding, less spatter, and excellent welding process performance.

Application：

Commonly used in the production of various strong acid towers, pipelines and storage containers, etc.

Power polarity:DC+

Chemical composition.

Item	C	Mn	Si	Cr	Ni	Mo	P	S	Cu
AWS Standard	0.025	1.0-2.5	0.5	19.00-21.5	24-26	4.2-5.2	0.03	0.03	1.2-2.0

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %	Shock value J
Example Value	---	585	30	91/0

Welding Requirements.

1. Refer to P148 General welding requirements for solid welding wire for stainless steel:
2. Shielding gas: 98%Ar+2%O2;
3. Interpass temperature: <150℃.

AWS A5.9 ER409

Characteristics：

ER409 is a 13Cr ferritic stainless steel welding wire, containing an appropriate amount of titanium (Ti), which improves the intergranular corrosion resistance of the weld. It has good welding operability, stable arc, beautiful shape, less spatter, and can be welded in all positions.

Application：

1. Mainly used for welding ferritic stainless steel materials of the same type.
2. Commonly used for manufacturing and repairing ferritic stainless steel structures, such as chemical equipment, pressure vessels, pipelines, etc.

Power polarity:DC-

Chemical composition.

Item	C	Mn	Si	S	P
AWS Standard	0.12max	1.00max	1.00max	0.03max	0.04max
Item	Cr	Ni	Mo	Ti	
AWS Standard	11.50-13.50	0.50max	0.50max	0.15-0.50	

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥310 MPa	≥485 MPa	≥17%

Welding Requirements.

1.ER409 welding wire is suitable for gas shielded metal arc welding (GMAW) and submerged arc welding (SAW).
2.The pulse arc current can obtain a stable spray arc, which is particularly suitable for stainless steel, thin plates, vertical welding, and butt welding.
3.Strictly remove impurities such as oil, rust, and moisture from the welding area during welding.

AWS A5.9 ER409Cb

Characteristics：

ER409Cb is a ferritic stainless steel welding wire that complies with AWS A5.9 standard. This wire is enhanced with the addition of niobium (Nb) to improve its heat resistance and welding performance, and is particularly suitable for welding 409 and 409Ti type substrates.

Application：

ER409Cb welding wire is mainly used for welding 409 type stainless steel and other similar ferritic stainless steel materials.

Power polarity:DC-

Chemical composition.

Item	C	Mn	Si	S	P
AWS Standard	0.08max	1.00max	0.60max	0.03max	0.04max
Item	Cr	Ni	Mo	Nb	
AWS Standard	10.50-13.50	0.50max	0.50max	0.15-0.50	

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥259 MPa	≥596 MPa	≥11%

Welding Requirements.

1. Suitable for gas shielded metal arc welding (GMAW) and submerged arc welding (SAW).
2. Use 100% argon or a mixture of argon and carbon dioxide as the shielding gas, and the shielding gas flow rate should be 15-25L/min.
3. The arc length is generally controlled at about 4-6mm. If the arc is too long, it is easy to produce defects such as pores. If the arc is too short, its wettabilitv will deteriorate.

AWS A5.9 ER410

Characteristics：

ER410 is a 13Cr martensitic stainless steel welding wire that meets AWS A5.9 standards. This welding wire is mainly used for welding stainless steel and alloys of the same type, and has excellent welding process performance and mechanical properties.

Application：

1. Commonly used for welding martensitic stainless steel such as 12Cr13 (SUS 410).
2. Suitable for hydropower stations, valves and other occasions that require wear resistance and corrosion resistance.

Power polarity:DC-

Chemical composition.

Item	C	Mn	Si	Cr	Ni
AWS Standard	0.12max	0.60max	0.50max	11.50-13.50	0.60max
Item	Mo	P	S	Cu	
AWS Standard	0.75max	0.030max	0.030max	0.75max	

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥345 MPa	≥538 MPa	≥24%

Welding Requirements.

1. Suitable for gas metal arc welding (GMAW) and gas tungsten arc welding (GTAW).
2. Use 100% argon as the shielding gas, and the shielding gas flow rate should be 15-25L/min.
3. Generally controlled at around 4-6mm. If the arc is too long, it is easy to produce defects such as pores. If the arc is too short, its wettability will deteriorate.

AWS A5.9 ER410NiMo

Characteristics：

ER410NiMO is a martensitic stainless steel MIG welding wire with excellent welding process, fine and bright forming, small spatter. The weld metal has excellent comprehensive mechanical properties.

Application：

Used for welding of stainless steel such as 0Cr13Ni5Mo, 15Cr13, 08Cr13 and 08Cr13Al. It is mainly suitable for welding and repairing the same material of martensitic stainless steel of turbine runner, and is also suitable for welding and repairing similar pump bodies and valves.

Power polarity:DC-

Chemical composition.

Item	C	Mn	Si	S	P	Cr
AWS Standard	0.013	0.66	0.50	0.008	0.011	12.85
Item	Ni	Mo	Cu			
AWS Standard	4.79	0.63	0.021			

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	735 MPa	≈820 MPa	17.5%

Welding Requirements.

1. Preheat and interpass temperatures should not be less than 300°F (149°C).
2. Post-weld heat treatment temperature should not exceed 1150°F (621°C). Higher temperatures may cause hardening.
3. 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.

AWS A5.9 ER430

DA YANG OCEAN WELDING

Characteristics:

The main component of the welding wire is 17Cr, which is a ferritic stainless steel submerged arc welding wire. With the pressure equipment stainless steel alkaline sintering flux SJ601, the deposited metal has good mechanical properties, crack resistance, and intergranular corrosion resistance. Due to the high content of the alloy, it has good high temperature resistance.

Application:

It is often used in the welding of pressure equipment and wear-resistant and corrosion-resistant components, such as 10Cr17 (SUS430) materials.

WELDING POSITIONS:All

Chemical composition %.

Item	C	Mn	Si	S	P	Cr	Ni
Requirements	≤0.10	≤0.60	≤0.50	≤0.010	≤0.030	15.50~17.00	≤0.60

Chemical composition of deposited

Item	C	Mn	Si	S	P	Cr	Ni
Requirements	≤0.10	≤1.2	≤1.00	≤0.010	≤0.030	15.00-18.00	≤0.60

Mechanical properties of deposited metal

Experimental items	Rm (N/mm”)	A (%)	Matching flux
Guaranteed values	≥450	>17	S.J601
Example values	568	87	SJ601

Welding Requirements.

1. The temperature between welds is recommended to be controlled at about 150℃. When welding small and medium-sized multi-pass and multi-layer welds, pay attention to controlling the welding line energy.
2. The rust layer, moisture, oil stains, dust, etc. on the welding part must be cleaned up.
3. The flux must be baked at 300~350℃ for 2h before use.

AWS A5.9 ER446LMo

Characteristics：

1.ER446LMo exhibits excellent strength and stability at high temperatures, making it suitable for applications where welded joints are exposed to high temperatures, such as in the power generation, aerospace and petrochemical industries.

2. Its excellent weldability and ductility help form strong and durable welds, ensuring the reliability and integrity of critical structures subjected to different loads and stresses.

Application：

1. Used for welding high-temperature and high-pressure equipment, reactors, heat exchangers, etc., such as sulfuric acid plants, refineries, etc.
2. Used for manufacturing high-temperature parts such as aircraft engines, turbine blades, turbochargers, etc.
3. Used for manufacturing seawater treatment equipment, offshore platforms, ship parts, etc., with excellent seawater corrosion resistance.
4. Used for welding nuclear power plant pressure vessels, nuclear reactor components, etc., requiring high temperature resistance and radiation resistance.

Power polarity:DC-

Chemical composition.

Item	C	Si	Mn	P	S
AWS Standard	0.015max	0.40max	0.40max	0.02max	0.02max
Item	**Cr**	**Ni**	**Mo**	**N**	
AWS Standard	25.0-27.0	0.50max	0.75-1.50	0.015max	

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	**≥550 MPa**	**≥620 MPa**	**≥40%**

Welding Requirements.

1.ER446LMo welding wire is suitable for welding methods such as argon arc welding (TIG) and metal arc welding (MIG).

2.Use 100% argon as the shielding gas, and the shielding gas flow rate is preferably 15-25L/min.

3.Use pulse arc current to obtain a stable jet arc, which is particularly suitable for welding stainless steel, thin plates, vertical welding, and butt welding.

AWS A5.9 ER630

Characteristics：

The main component of the welding wire is 17Cr-4Ni-4Cu-Nb, which is a precipitation hardened stainless steel MIG welding wire that can be welded in all positions. The addition of Nb element can effectively improve the corrosion resistance, especially the resistance to intergranular corrosion. The welding workability is excellent - smooth wire feeding, stable arc, beautiful shape, and very little spatter.

Application：

It is often used in the welding of pressure equipment and wear-resistant and corrosion-resistant components, such as 10Cr17 (SUS430) materials.

WELDING POSITIONS:All

Chemical composition %.

Item	C	Mn	Si	S	P	Cr	Ni	Mo	Nb+Ta	Cu
Requirements	0.05	0.25-0.75	0.75	0.03	0.030	16.00-16.75	4.5 - 5.0	≤0.75	0.15- 0.30	3.25 - 4.0

Mechanical properties of deposited metal

Experimental items	Tensile strength	Yield strength	Elongation
Guaranteed values	≥ 1034 MPa	≥931 MPa	10% - 25%

Welding Requirements.

1. Shielding gas: pay attention to the purity of the shielding gas. The recommended mixed gas ratio is Ar+1-3%0. 2. Gas flow rate: 20~25L/min.

3. Dry extension length: 15~25mm.

4. Make sure to remove the rust layer, moisture, oil stains, dust, etc. on the welding part.

5. When welding outdoors, when the wind speed is greater than 1.5m/s, windproof measures should be taken. Appropriate windproof measures must be taken to prevent pores.

AWS A5.9/A5.9M.ER320LR

Characteristics：

1.Excellent corrosion resistance in highly acidic environments

2.Q2 Lot®—Certificates showing actual wire chemistry available online

Application：

1.Tanks

2.Process Piping

3.Heat Exchangers

4.Typically used for welding base metals with similar compositions including alloy 20

Power polarity:DC+

Chemical composition.

Item	C	Cr	Ni	Mo	Mn
AWS Standard	0.025max	19.0-21.0	32.0-36.0	2.0-3.0	1.5-2.0
Item	Si	P	S	Cu	Nb
AWS Standard	0.15max	0.015max	0.02max	3.0-4.0	Required 8xC/1.0max

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥321 MPa	≥599 MPa	≥38.5%

Welding Requirements.

1. The welding area must be thoroughly cleaned of surface impurities such as oil, rust, and moisture.
2. It is recommended to use high-purity argon (99.99% or more) as the shielding gas, and the shielding gas flow rate is preferably 15-25 L/min.
3. DC reverse welding is used, and the welding arc length is generally 4-6 mm. If the arc is too long, it is easy to produce defects such as pores. If the arc is too short. its wettabilitv will deteriorate.

AWS A5.9/A5.9M.ER330

Characteristics：

1.ER330 welding wire has excellent corrosion resistance, especially in environments containing chloride ions, and can effectively resist pitting corrosion and bracket corrosion.

2.ER330 welding wire has excellent welding process, stable arc, beautiful appearance, less spatter, and is suitable for a variety of welding processes.

3.Low carbon content (≤0.10%) reduces the possibility of intergranular precipitation, thereby improving the weld metal's resistance to intergranular corrosion.

Application：

1. Mainly used for welding austenitic stainless steels such as 304, 304L, 316, 316L, and other similar austenitic stainless steels.
2. Can be used for surface surfacing of steel to improve the corrosion resistance and wear resistance of the surface.
3. Suitable for welding between stainless steel and carbon steel or low alloy steel.

Power polarity:DC+

Chemical composition.

Item	C	Cr	Ni	Mo	Mn
AWS Standard	0.18-0.25	15.0-17.0	34.--37.0	0.75max	1.0-2.5
Item	Si	P	S	Cu	
AWS Standard	0.30-0.65	0.03	0.03	0.75max	

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥345 MPa	≥515 MPa	≥35%

Welding Requirements.

1. The welding area must be thoroughly cleaned of surface impurities such as oil, rust, and moisture.
2. It is recommended to use high-purity argon (99.99% or more) as the shielding gas, and the shielding gas flow rate should be 20-25 L/min.
3. The arc length is generally controlled at about 4-6 mm.

AWS A5.9 ER318

Characteristics：

1. Due to the addition of Nb, the deposited metal has good resistance to intergranular corrosion and stable mechanical properties;
2. The wire feeding is smooth, the arc is stable, the forming is beautiful, the molten iron has good fluidity, and there is less spatter, which has excellent welding process performance.

Application：

1. Commonly used in high corrosion-resistant structures such as sulfuric acid and nitric acid production or storage and transportation equipment
2. ER318 welding wire has excellent welding process, stable arc, beautiful shape, less spatter, and is suitable for a variety of welding processes
3. Suitable for welding between stainless steel and carbon steel or low alloy steel.

Power polarity:DC+

Chemical composition.

Item	C	Mn	Si	Cr	Ni	Mo
AWS Standard	0.08	1.00~2.50	0.3-0.65	18.5-20.0	11.00-14.00	2.00-3.00
Item	P	S	Nb			
AWS Standard	0.03	0.03	8C-1.0			

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≥321 MPa	≥599 MPa	≥38.5%

Welding Requirements.

1. The welding area must be thoroughly cleaned of surface impurities such as oil, rust, and moisture.
2. It is recommended to use high-purity argon (99.99% or more) as the shielding gas, and the shielding gas flow rate is preferably 15-25 L/min.
3. DC reverse welding is used, and the welding arc length is generally 4-6 mm. If the arc is too long, it is easy to produce defects such as pores. If the arc is too short, its wettability will deteriorate.

AWS A5.28 ER19-10H

Characteristics：

ER19-10H is a stainless steel welding wire with a slightly higher carbon content. Its main alloying elements are chromium (Cr) and nickel (Ni), with the chromium content generally ranging from 18-20% and the nickel content ranging from 9-11%. The higher carbon content (compared to ordinary ER19-10) enhances its strength, but also affects its corrosion resistance to a certain extent. However, due to the presence of chromium and nickel, it still has good corrosion resistance.

Application：

1. In the field of petrochemicals, it is used for high-pressure pipeline welding to ensure the safety of medium transportation;
2. In mechanical manufacturing, it provides reliable connections for heavy-loaded stainless steel mechanical parts, frames, etc.;
3. In high-temperature environments such as heat treatment equipment and industrial furnaces, it welds furnace bodies and related components to ensure stable operation of the structure.

Power polarity:DC+

Chemical composition.

Item	C	Mn	Si	Cr	Ni
AWS Standard	0.05	1.8	0.3	18.8	9.3

Mechanical Properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %	Impact value J
Example Value	350	550	35	70(At room Tep)

Welding Requirements.

1.: Thoroughly remove oil and rust from the weldment surface to ensure good welding.
2. Accurately adjust the current, voltage, and welding speed according to the thickness of the weldment to ensure arc stability.
3. Adapt to pure argon and other protective gases with appropriate flow to prevent weld oxidation and improve welding quality.

AWS ER410

Characteristics：

I1.ER410 welding wire has a high hardness (about 35 HRC), which can effectively resist deformation and wear, and is suitable for applications that require high wear resistance.

2.ER410 welding wire has excellent welding process, stable arc, beautiful forming, less spatter, and is suitable for a variety of welding processes.

3.ER410 welding wire has moderate corrosion resistance, especially in atmospheric environment, and is suitable for outdoor applications.

Application：

1. Mainly used for welding 410 or 420 series stainless steel, suitable for wear-resistant and corrosion-resistant occasions such as hydropower stations and valves.
2. Can be used for surface surfacing of carbon steel to extend the service life of components.
3. Suitable for welding between stainless steel and carbon steel or low alloy steel

Power polarity:DC-

Chemical composition.

Item	C	Mn	Si	Cr	Ni	Mo
AWS Standard	0.15	1.00~2.50	0.30-0.65	28.00-32.00	8.00-10.50	0.75
Item	P	S	Cu			
AWS Standard	0.03	0.03	0.75			

Mechanical properties.

Mechanical properties	Yield strength MPa	Tensile strength MPa	Elongation %
AWS Standard	≈538 MPa	≈613 MPa	≥24%

Welding Requirements.

1. The welding area must be thoroughly cleaned of surface impurities such as oil, rust, and moisture.
2. 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.
3. The arc length is generally controlled at about 4-6 mm.