



HARBIN WELDING INSTITUTE



ZHONGDA SPECIAL STEEL



HARBIN WELL WELDING

WELDING CONSUMABLES & WELDING MANUAL

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Stainless steels

Welding Method	Item	Specifications	
		AWS A5.4	EN ISO3581-A
SMAW	E410NiMo-16(G232)	E410NiMo-16	E 13 4 R 52
	E308L-16(A002)	E308L-16	E 19 9 L R 3 2
	E308L-17(A002A)	E308L-17	E 19 9 L R 3 2
	E308-16(A102)	E308-16	E 19 9 R 3 2
	E308H-16	E308H-16	-
	E309L-16(A062)	E309L-16	E 23 12 L R 3 2
	E309-16(A302)	E309-16	E 23 12 R 3 2
	E309LMO-16(A042)	E309LMO-16	-
	E316L-16(A022)	E316L-16	E 19 9 3 L R 3 2
	E316-16(A202)	E316-16	-
	E347L(A132)	E347-16	E 19 9 Nb R3 2
	E347H	E347-16	E 19 9 Nb R3 2
	A402	E310-16	E310-16
	E2209-16	E2209-16	E 22 9 3 N L R 3 2
E904L	E385-16	-	
Welding Method	Item	Specifications	
		AWS A5.9	EN ISO14343-A
SAW	HS308L/SJ601A	ER308L	S 19 9 L
	HS316L/SJ601A	ER316L	S 19 12 3 L
	HS347L/SJ660	ER347	S 19 9 Nb
	HS2209/SJ606	ER2209	S 22 9 3 N L
	H309SL/SJ661	ER309L	S 23 12 L
	H308SL/SJ661	ER308L	S 19 9 L
	H347SL/SJ667	ER347	S 19 9 Nb
	H316SL/SJ661	ER316L	S 19 12 3 L
Welding Method	Item	Specifications	
		AWS A5.9	EN ISO14343-A
GSAW	ER308L	ER308L	W 19 9 L
	ER309L	ER309L	W 23 12 L
	ER309LMO	ER309LMO	W 23 12 2 L
	ER316L	ER316L	W 19 12 3 L
	ER317L	ER317L	-
	ER347L	ER347	W 19 9 N
	ER321	ER321	-
	ER2209	ER2209	W 22 9 3 N L
	ER385	ER385	-

E410NiMo-16(G232)

Specifications: AWS A5.4 E410NiMo-16
EN ISO3581-A E 13 4 R 52

Instruction and Application

The 0Cr13NiMo type martensitic stainless steel electrode with titanium-calcium coating is used in the welding of valves and other stainless steel components. The weld metal has more stable corrosion resistance for the additive alloy composition of Ni, Mo, hardness and high temperature wear resistance was improved, the generation of hot and cold cracks was effectively prevented. The 0Cr13NiMo type electrode with titanium-calcium coating can be operated in all welding positions and with AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Mo
0.022	0.68	0.80	0.005	0.025	11.45	4.45	0.58

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)
Room temperature	820	18

All-welded metal radiographic testing

According to JB / T 4730.2, the radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ3.2	Φ4.0	Φ5.0
Amperage	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.The electrode with titanium-calcium coating must be stored at 320 °C for 1hours prior to use.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150 °C .

E308L-16(A002)

Specifications: AWS A5.4 E308L-16
EN ISO3581-A E 19 9 L R 3 2

Instruction and Application

The 304L (022Cr19Ni10)type ultra-low carbon stainless steel electrode with titanium-calcium coating is used in the welding of petrochemical industry, power station boilers, food machinery, medical equipment, fertilizer and other associated equipments in other industries. The electrode with titanium-calcium coating has good welding processing properties, stable arc, little spatter. The electrode with titanium-calcium coating can be operated in all welding positions and with AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni
0.029	0.73	1.37	0.007	0.018	19.87	10.33

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test
Room temperature	585	44	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, the radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-85	85-120	115-160	160-200

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.The electrode with titanium-calcium coating must be stoved at 320°C for 1 hours prior to use.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150 °C.

E308L-17(A002A)

Specifications: AWS A5.4 E308L-17
EN ISO3581-A E 19 9 L R 3 2

Instruction and Application

The 304L (022Cr19Ni10)type ultra-low carbon stainless steel electrode with titanium-calcium coating is used in the welding of petrochemical industry, power station boilers, food machinery, medical equipment, fertilizer and other associated equipments in other industries. The electrode with titanium-calcium coating has good welding processing properties, stable arc, little spatter, the coating is not easy to crack. The electrode with titanium-calcium coating can be operated in all welding positions and with AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni
0.028	0.83	1.46	0.008	0.020	20.10	10.25

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test
Room temperature	600	40	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-90	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
2. The electrode with titanium-calcium coating must be stoved at 210°C for 1 hours prior to use..
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C.

E308-16(A102)

Specifications: AWS A5.4 E308-16
EN ISO3581-A E 19 9 R 3 2

Instruction and Application

The 304 (06Cr19Ni10) type stainless steel electrode with titanium-calcium coating is used in the welding of petrochemical industry, power station boilers, food machinery, medical equipment, fertilizer and other associated equipments in other industries. The electrode has good welding processing properties, beautiful molding, good slag detachability. The electrode with titanium-calcium coating can be operated in all welding positions and with AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni
0.041	0.76	1.42	0.006	0.016	19.64	10.34

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test
Room temperature	590	42	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-90	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Redry the electrode with titanium-calcium coating at 320 °C for 1 hours,.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C .

E308H-16

Specifications: AWS A5.4 E308H-16

Instruction and Application

The stainless steel electrode controlled in carbon and titanium is used in the welding of 304H (07Cr19Ni10) stainless steel structure. It has good welding processing properties, high tensile strength and creep strength with high carbon content at high temperatures. The electrode with titanium-calcium coating can be operated in all welding positions and with AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni
0.058	0.77	1.46	0.008	0.021	19.84	10.45

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test
Room temperature	600	44	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.The electrode with titanium-calcium coating must be stoved at 320°C for 1 hours prior to use.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C .

E309L-16(A062)

Specifications: AWS A5.4 E309L-16
EN ISO3581-A E 23 12 L R 3 2

Instruction and Application

The 309S (06Cr23Ni13) type stainless steel electrode with titanium-calcium coating is used in the welding of carbon steel and stainless steel heterogeneous material or backing weld for corrosion-resisting cladding on the 304L (022Cr19Ni10) type stainless steel. The electrode with a low C content has good welding processing properties, good blowhole and crack resisting performance. The electrode can be operated in all welding positions and with AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni
0.027	0.71	1.61	0.005	0.018	23.80	12.89

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test
Room temperature	565	37	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-90	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.The electrode with titanium-calcium coating must be stored at 320 °C for 1 hours prior to use.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150 °C.

E309-16(A302)

Specifications: AWS A5.4 E309-16
EN ISO3581-A E 23 12 R 3 2

Instruction and Application

The 309S (06Cr23Ni13) type stainless steel electrode with titanium-calcium coating is used in the welding of carbon steel and stainless steel heterogeneous material or backing weld for corrosion-resisting cladding on the 304L (022Cr19Ni10) type stainless steel. The electrode with a low C content has good welding processing properties, beautiful forming, fine slag detachments, good blowhole and crack resisting performance. The electrode can be operated in all welding positions and with AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni
0.045	0.80	1.51	0.004	0.019	23.76	12.80

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test
Room temperature	590	38	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-90	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.The electrode with titanium-calcium coating must be stored at 320 °C for 1 hours prior to use.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150 °C.

E309LMo-16(A042)

Specifications: AWS A5.4 E309LMo-16

Instruction and Application

The austenitic molybdenum-containing electrode with titanium-calcium coating is used in carbon steel, stainless steel heterogeneous consumables, cast steel, ferritic stainless steel welding, or backing weld for corrosion-resisting cladding on the 316L (022Cr17Ni12Mo2) type stainless steel. The electrode with a low C content has good welding processing properties, outstanding crack resisting performance due to joining Mo and low-carbon. The electrode can be operated in all welding positions and with AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni
0.027	0.74	1.51	0.004	0.019	23.48	12.90

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test
Room temperature	645	37	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-90	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.The electrode with titanium-calcium coating must be stored at 320°C for 1hours prior to use.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C.

E316L-16(A022)

Specifications: AWS A5.4 E316L-16
EN ISO3581-A E 19 9 3 LR 3 2

Instruction and Application

316L (022Cr17Ni12Mo2) type stainless steel electrode with titanium-calcium coating is widely used in petrochemical, fertilizer, urea production or storage equipment. The electrode with a low C content has good welding processing properties, fine blowhole resisting performance. The electrode can be operated in all welding positions and with AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Mo
0.022	0.68	1.76	0.005	0.024	18.32	12.13	2.28

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A (%)	Bending Test
Room temperature	575	37	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-90	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.The electrode with titanium-calcium coating must be stored at 320 °C for 1hours prior to use.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C.

E316-16(A202)

Specifications: AWS A5.4 E316-16

Instruction and Application

316(06Cr17Ni12Mo2)type stainless steel electrode with titanium-calcium coating is widely used in petrochemical, fertilizer, urea production or storage equipment. The electrode has good corrosion resistance, heat resistance and crack resistance, particularly good resistance against chloride corrosive pitting . The electrode can be operated in all welding positions and with AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Mo
0.037	0.69	1.50	0.008	0.021	18.52	12.23	2.36

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test
Room temperature	625	44	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-90	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.The electrode with titanium-calcium coating must be stoved at 320 °C for 1hours prior to use.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C .

E347L(A132)

Specifications: AWS A5.4 E347-16
EN ISO3581-A E 19 9 Nb R3 2

Instruction and Application

347(06Cr18Ni11Nb)type stainless steel electrode with titanium-calcium coating is used in welding low carbon corrosion comprising Ti or Nb stainless steel. The electrode has good welding processing properties, good corrosion resistance and crack resistance.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Nb
0.028	0.75	1.35	0.0047	0.017	20.02	10.03	0.75

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test
Room temperature	660	41	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-90	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Redry the electrode with titanium-calcium coating at 260 °C for 1hours.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C .

E347H

Specifications: AWS A5.4 E347-16
EN ISO3581-A E 19 9 Nb R3 2

Instruction and Application

347H(06Cr18Ni11Nb)stainless steel electrode with titanium-calcium coating is used in welding low carbon corrosion comprising Ti or Nb stainless steel. The electrode has good welding processing properties, good corrosion resistance, blowhole resisting performance and crack resistance. The electrode can be operated in all welding positions and with DCEP.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Nb
0.054	0.76	1.45	0.004	0.017	20.12	10.21	0.69

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test
Room temperature	575	38	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-90	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Redry the electrode with titanium-calcium coating at 260 °C for 1 hours.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C .

A402

Specifications: AWS A5.4 E310-16
EN ISO3581-A E310-16

Instruction and Application

310S(06Cr25Ni20)stainless steel electrode with titanium-calcium coating is used in welding heat-resistant stainless steel structure, such as high temperature furnace, urea towers and other equipment.The electrode is good at prevent oxidation between 900 and 1100 ° C with welding processing properties and AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni
0.14	0.65	1.47	0.009	0.025	26.45	21.23

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test
Room temperature	605	31	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-90	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.The electrode with titanium-calcium coating must be stoved at 320 °C for 1 hours prior to use.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150 °C .

E2209-16

Specifications: AWS A5.4 E2209-16
EN ISO3581-A E 22 9 3 N L R 3 2

Instruction and Application

022Cr22Ni5Mo3N duplex stainless steel electrode with titanium-calcium coating is used in petrochemical, nuclear power industry. The electrode has good welding processing properties and both comprehensive performance of austenitic stainless steel and ferritic stainless steel stress corrosion resistance properties. The electrode can be operated in all welding positions and with AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Mo	N
0.021	0.68	1.02	0.007	0.024	22.61	8.76	3.01	0.12

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test	Impact Strength KV2(J,-40°C)
Room temperature	810	25	No Cracks	82,90,80

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-90	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Redry the electrode with titanium-calcium coating at 300 °C for 1 hours.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150 °C .

E904L

Specifications: AWS A5.4 E385-16

Instruction and Application

904L(015Cr21Ni26Mo5Cu2)stainless steel electrode with titanium-calcium coating is used in strong acid tower, groove, pipelines, storage and transportation equipment, etc.good at prevent containing formic acid, acetic acid, medium point corrosion and chloride ion corrosion. The electrode can be operated in all welding positions and with AC-DC dual-use.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Mo	Cu
0.028	0.65	1.65	0.005	0.023	20.45	24.86	4.72	1.52

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)	Bending Test
Room temperature	630	36	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	60-90	90-120	120-160	170-210

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Redry at 320°C for 1 hours.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled below 100°C .

HS308L/SJ601A

Specifications: AWS A5.9 ER308L
EN ISO14343-A S 19 9 L

Instruction and Application

Stainless steel SAW wire and flux is used in welding stainless steel 304L (022Cr19Ni10) type base metal. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance, excellent flux welding usability, easy slag detachability, low burning loss of alloy element.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	δFe
0.015	0.11	1.73	0.008	0.019	20.31	9.85	9

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	δFe
0.022	0.23	1.51	0.009	0.021	19.93	9.73	8

All-weld metal mechanical properties

Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)	Bending Test	Impact Strength KV ₂ (J,-196°C)
570	425	40	No Cracks	56,68,66

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ601A	0.14	0.018	0.020

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Reference range(DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	400-450	28-32	520-580
Φ4.0	450-500	28-32	520-580

Notice

- 1.Redry the flux at 300°C - 350°C for 1 hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150 °C .

HS316L/SJ601A

Specifications: AWS A5.9 ER316L
EN ISO14343-A S 19 12 3 L

Instruction and Application

Stainless steel SAW wire and flux is used in welding stainless steel 316L(022Cr17Ni12Mo2) type base metal. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance, excellent flux welding usability, easy slag detachability, low burning loss of alloy element.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	Mo	δFe
0.017	0.13	1.81	0.008	0.018	19.36	12.78	2.61	6

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Mo	δFe
0.022	0.23	1.55	0.009	0.020	19.07	12.45	2.51	6

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)	Bending Test
Room temperature	585	480	40	No Cracks

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ601A	0.14	0.018	0.020

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Reference range(DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	400-450	28-32	520-580
Φ4.0	450-500	28-32	520-580

Notice

- 1.Redry the flux at 300°C-350°C for 1 hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C .

HS347L/SJ660

Specifications: AWS A5.9 ER347
EN ISO14343-A S 19 9 Nb

Instruction and Application

Stainless steel GTAW wire and flux, is used in welding stainless steel 347(06Cr18Ni11Nb) type base metal. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance, excellent flux welding usability, easy slag detachability, low burning loss of alloy element.

Typical analysis of the wire (%)

C	SI	MN	S	P	CR	NI	δFE
0.016	0.16	1.68	0.007	0.021	19.85	9.88	8.5

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	δFe
0.022	0.28	1.50	0.009	0.023	19.23	9.74	8

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Bending Test
Room temperature	575	430	35	No Cracks

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ606(%)	0.12	0.019	0.020

All-weld metal mechanical properties

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	400-450	28-32	520-580
Φ4.0	450-500	28-32	520-580

Notice

- 1.Redry the flux at 300°C -350°C for 1 hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C.

HS2209/SJ606

Specifications: AWS A5.9 ER2209
EN ISO14343-A S 22 9 3 N L

Instruction and Application

Super duplex stainless steel SAW wire and flux, is used in welding stainless steel 022Cr22Ni5Mo3N type base metal. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance, excellent flux welding usability, easy slag detachability, low burning loss of alloy element. The flux adds alloy elements to the all-weld metal so as to keep suitable ferrite content.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	Mo	N
0.020	0.13	1.59	0.002	0.010	22.54	8.54	3.08	0.17

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Mo	N	δFe
0.022	0.18	1.51	0.005	0.011	22.50	8.43	3.03	0.16	46

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Bending Test
Room temperature	810	600	30	No Cracks

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ606	0.15	0.019	0.020

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	400-450	28-32	520-580
Φ4.0	450-500	28-32	520-580

Notice

- 1.Redry the flux at 300°C -350°C for 1 hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150 °C.

H309SL/SJ661

Specifications: AWS A5.9 ER309L
EN ISO14343-A S 23 12 L

Instruction and Application

309S(06Cr23Ni13)Stainless steel SAW wire and flux is used in the petrochemical, power station boiler industry stainless steel overlaying as corrosion resistance transition layer , to solve the difficulty of welding position of the cylinder tube, flange, instead of the traditional manual arc welding. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance, excellent flux welding usability, easy slag detachability .

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni
0.010	0.08	1.88	0.003	0.012	23.57	13.15

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ661	0.13	0.017	0.021

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ2.5	350-400	28-32	520-580

Notice

- 1.Redry the flux at 300°C -350°C for 1hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C .

H308SL/SJ661

Specifications: AWS A5.9 ER308L
EN ISO14343-A S 19 9 L

Instruction and Application

308L(022Cr19Ni10)Stainless steel SAW wire and flux is used in the petrochemical, power station boiler industry stainless steel overlaying as corrosion resistance transition layer , to solve the difficulty of welding position of the cylinder tube, flange, instead of the traditional manual arc welding. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance, excellent flux welding usability, easy slag detachability.

Typical analysis (%)

	C	Si	Mn	S	P	Cr	Ni
Transition layer wire H309SL	0.010	0.08	1.88	0.003	0.012	23.57	13.15
Transition layer wire H308SL	0.015	0.10	1.92	0.006	0.013	20.52	10.10
Corrosion layer of all welded metal	0.025	0.35	1.41	0.010	0.020	20.15	10.05

Values of the all-weld metal

Temperature	Lateral bending test (D=4a,180°)	Intergranular corrosion
Room temperature	No Cracks	No Tendency

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ661	0.13	0.017	0.021

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	400-450	28-32	520-580

Notice

- 1.Redry the flux at 300°C -350°C for 1hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C .

H347SL/SJ667

Specifications: AWS A5.9 ER347
EN ISO14343-A S 19 9 Nb

Instruction and Application

347 (06Cr18Ni11Nb)Stainless steel SAW wire and flux is used in the petrochemical, power station boiler industry stainless steel overlaying as corrosion resistance transition layer , to solve the difficulty of welding position of the cylinder tube, flange, instead of the traditional manual arc welding. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance, excellent flux welding usability, easy slag detachability.

Typical analysis (%)

	C	Si	Mn	S	P	Cr	Ni	Nb
Transition layer wire H309SL	0.010	0.08	1.88	0.003	0.012	23.57	13.15	-
Transition layer wire H347SL	0.016	0.12	1.86	0.003	0.013	19.78	9.69	0.56
Corrosion layer of all welded metal	0.028	0.27	1.36	0.007	0.018	19.21	9.41	0.51

Values of the all-weld metal

Temperature	Lateral bending test (D=4a,180°)	Intergranular corrosion
Room temperature	No Cracks	No Tendency

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ667	0.14	0.019	0.021

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	400-450	28-32	520-580

Notice

- 1.Redry the flux at 300°C -350°C for 1 hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C .

H316L/SJ661

Specifications: AWS A5.9 ER316L
EN ISO14343-A S 19 12 3 L

Instruction and Application

316L(022Cr17Ni12Mo2)Stainless steel SAW wire and flux is used in the petrochemical, power station boiler industry stainless steel overlaying as corrosion resistance transition layer , to solve the difficulty of welding position of the cylinder tube, flange, instead of the traditional manual arc welding. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance, excellent flux welding usability, easy slag detachability.

Typical analysis (%)

	C	Si	Mn	S	P	Cr	Ni	Mo
Transition layer wire H309SL	0.010	0.08	1.88	0.003	0.012	23.57	13.15	-
Transition layer wire H316SL	0.017	0.13	1.81	0.008	0.018	19.36	12.78	2.61
Corrosion layer of all welded metal	0.023	0.30	1.38	0.010	0.021	19.11	12.51	2.52

Values of the all-weld metal

Temperature	Lateral bending test (D=4a,180°)	Intergranular corrosion
Room temperature	No Cracks	No Tendency

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ667	0.14	0.019	0.021

Reference range (DC+)

WireΦ(mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	400-450	28-32	520-580

Notice

- 1.Redry the flux at 300°C -350°C for 1 hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.The welding slag must be cleaned up in the multi-pass welding. The interpass temperature should be controlled below 150°C .

ER308L

Specifications: AWS A5.9 ER308L
EN ISO14343-A W 19 9 L

Instruction and Application

Super stainless steel gas shielded welding wire with low carbon is used in welding stainless steel 304L(022Cr22Ni5Mo3N) type base metal and also used in the overlaying on the carbon steel or low alloy steel as corrosion resistance layer. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni
0.015	0.38	1.85	0.006	0.020	20.10	9.65

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p_{0.2}} (MPa)	Elongation A(%)	Bending Test
Room temperature	585	440	38	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Reference range (DC-)

WireΦ(mm)	Category	Gas	Amperage(A)	Gas flow (L/min)	Speed(mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil and other impurities to be clean.
- 2.Each layer is controlled below 150 °C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ER309L

Specifications: AWS A5.9 ER309L
EN ISO14343-A W 23 12 L

Instruction and Application

Super stainless steel gas shielded welding wire with low carbon is used in welding stainless steel 309S(06Cr23Ni13) type base metal and also used in the backing weld of the carbon steel or low alloy steel as transition layer. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and usability of welding.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni
0.017	0.40	1.71	0.008	0.019	23.68	12.93

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p_{0.2}} (MPa)	Elongation A(%)	Bending Test
Room temperature	585	473	35	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Reference range (DC-)

WireΦ(mm)	Category	Gas	Amperage(A)	Gas flow (L/min)	Speed(mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 150 °C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ER309LMo

Specifications: AWS A5.9 ER309LMo
EN ISO14343-A W 23 12 2 L

Instruction and Application

Super stainless steel gas shielded welding wire with low carbon is used in welding stainless steel 316L(022Cr17Ni12Mo2) type base metal and also used in the backing weld of the carbon steel or low alloy steel as transition layer. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and usability of welding.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	Mo
0.018	0.37	1.73	0.0075	0.018	23.66	12.95	2.26

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Bending Test
Room temperature	595	480	37	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least .

Reference range (DC-)

WireΦ(mm)	Category	Gas	Amperage(A)	Gas flow(L/min)	Speed(mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 150 °C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ER316L

Specifications: AWS A5.9 ER316L
EN ISO14343-A W 19 12 3 L

Instruction and Application

Super stainless steel gas shielded welding wire with low carbon is used in welding stainless steel 316L(022Cr17Ni12Mo2) type base metal and also used in the overlaying of the carbon steel or low alloy steel as corrosion resistance transition layer. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	Mo
0.015	0.38	1.61	0.009	0.018	19.27	12.47	2.21

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Bending Test
Room temperature	580	470	35	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Reference range (DC-)

WireΦ(mm)	Category	Gas	Amperage(A)	Gas flow(L/min)	Speed(mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 150 °C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ER317L

Specifications: AWS A5.9 ER317L

Instruction and Application

Super stainless steel gas shielded welding wire with low carbon is used in welding stainless steel 022Cr19Ni13Mo3 type base metal and also used in overlaying of the carbon steel or low alloy steel as corrosion resistance transition layer. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	Mo
0.018	0.46	1.86	0.009	0.020	19.31	13.21	3.30

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Bending Test
Room temperature	595	480	36	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Reference range (DC-)

WireΦ(mm)	Category	Gas	Amperage(A)	Gas flow(L/min)	Speed(mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 150 °C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ER347L

Specifications: AWS A5.9 ER347
EN ISO14343-A W 19 9 N

Instruction and Application

Super stainless steel gas shielded welding wire with low carbon is used in welding stainless steel 347(06Cr18Ni11Nb) type base metal and also used in overlaying of the carbon steel or low alloy steel as corrosion resistance transition layer. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	Nb
0.013	0.36	1.79	0.009	0.019	19.68	9.71	0.54

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Bending Test
Room temperature	603	490	35	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Reference range (DC-)

WireΦ(mm)	Category	Gas	Amperage(A)	Gas flow(L/min)	Speed(mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 150 °C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ER321

Specifications: AWS A5.9 ER321

Instruction and Application

Super stainless steel gas shielded welding wire with low carbon is used in welding stainless steel 347(06Cr18Ni11Nb) or 321(06Cr19Ni11Ti) type base metal and also used in overlaying of the carbon steel or low alloy steel as corrosion resistance transition layer. The content of impurity elements C, S, P is low in the all-weld metal, which has good mechanical properties and corrosion resistance.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	Ti
0.023	0.34	1.75	0.008	0.020	19.76	9.53	0.62

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)	Bending Test
Room temperature	615	503	31	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Reference range (DC-)

WireΦ(mm)	Category	Gas	Amperage(A)	Gas flow(L/min)	Speed(mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 150°C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ER2209

Specifications: AWS A5.9 ER2209
EN ISO14343-A W 22 9 3 N L

Instruction and Application

Duplex stainless steel gas shielded welding wire is used in welding stainless steel 022Cr22Ni5Mo3N type base metal and also used in overlaying of the carbon steel or low alloy steel as corrosion resistance transition layer. The content of impurity elements C, S, P is low in the all-weld metal, which has suitable ferrite content, good mechanical properties and corrosion resistance.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	Mo	N
0.022	0.39	1.71	0.002	0.017	22.57	8.95	3.20	0.15

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)	Bending Test
Room temperature	835	620	28	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Reference range (DC-)

WireΦ(mm)	Category	Gas	Amperage(A)	Gas flow(L/min)	Speed(mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 150°C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ER385

Specifications: AWS A5.9 ER385

Instruction and Application

Super austenitic stainless steel TIG welding wire is used in welding stainless steel 904L(015Cr21Ni6Mo5Cu2) type base metal and also used in overlaying of the carbon steel or low alloy steel as corrosion resistance transition layer. The content of impurity elements C, S, P is low in the all-weld metal, which has suitable ferrite content, good mechanical properties and corrosion resistance.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	Mo	Cu
0.018	0.075	1.94	0.008	0.013	20.36	25.76	4.94	1.43

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)	Bending Test
Room temperature	650	480	36	No Cracks

All-welded metal radiographic testing

According to JB / T 4730.2, The radiographic testing should not be less than class AB and the quality grade of all-welded metal should not be less than Class I at least.

Reference range (DC-)

WireΦ(mm)	Category	Gas	Amperage(A)	Gas flow(L/min)	Speed(mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 150°C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

Nickel and Nickel based Alloys

Welding Method	Item	Specifications	
		AWS A5.11	BS EN 14172
SMAW	Ni112	ENi-1	Ni2061
	Ni357	ENiCrFe-2	Ni6133
	Ni307B	ENiCrFe-3	Ni6182
	Ni690	ENiCrFe-7	ENiCrFe~7
	Ni625	ENiCrMo-3	Ni6625
	Ni276	ENiCrMo-4	Ni6276
Welding Method	Item	Specifications	
		AWS A5.14	BS EN ISO 18274
SAW	HS600/SJ608	ERNiCr-3	SNi6082
	HS625/SJ609	ERNiCrMo-3	SNi6625
GSAW	ERNi-1	ERNi-1	SNi2061
	ERNiCrFe-7	ERNiCrFe-7	SNi6052
	ERNiCrFe-7A	ERNiCrFe-7A	SNi6052
	ERNiCr-3	ERNiCr-3	SNi6082
	ERNiCrMo-3	ERNiCrMo-3	SNi6625
	ERNiCrMo-4	ERNiCrMo-4	SNi6276
	ERNiCu-7	ERNiCu-7	SNi4060

Nickel and Nickel based Alloys

Ni112

Specifications: AWS A5.11 ENi-1
BS EN 14172-E Ni2061

Instruction and Application

Ti-containing pure nickel electrode with titanium-calcium coating. It is used for welding pure nickel alloy or be used as transition layer electrode of copper-nickel alloy surfacing. It has excellent performance of fusion ability; prevent cracks and porosity ability, mechanical values, heat resistance and corrosion resistance. It could be used for all-position welding.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni	Fe	Ti
0.020	0.75	0.70	0.007	0.008	94.0	0.50	1.34

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)
Room temperature	568	40

Current adjustment (DC+)

ElectrodesΦ(mm)	Φ2.5	Φ3.2	Φ4.0
Amperage	60-80	90-120	120-150

Notice

- 1.Redry the electrode with titanium-calcium coating at 280°C for 1hours.
- 2.Weld with short arc,control the heat.If move the belt,should not be too wide.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled below 100°C.

Nickel and Nickel based Alloys

Ni357

Specifications: AWS A5.11 ENiCrFe-2
BS EN 14172-E Ni6133

Instruction and Application

Ni-Cr-Fe alloy electrode with low hydrogen coating. It is used for welding Ni-Cr-Fe alloy, which has requirements of the heat and corrosion resistance, could also be used for welding the dissimilar steel or as transition layer and surfacing layer. It could be used for all-position welding.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Fe	Nb+Ta	Mo
0.025	0.45	1.85	0.005	0.006	15.02	73.06	4.96	2.5	1.5

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)
Room temperature	680	40

Current adjustment (DC+)

ElectrodesΦ(mm)	Φ2.5	Φ3.2	Φ4.0
Amperage	60-80	90-120	120-150

Notice

- 1.Redry the electrode with titanium-calcium coating at 300°C for 1hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.Control the heat, if the electrode with titanium-calcium coating move,the magnitude of the swing should be less than 2.5 times the electrode with titanium-calcium coating diameter.
- 4.Multi-pass welding must clean the welding slag. Each layer is controlled below 100°C.

Nickel and Nickel based Alloys

Ni307B

Specifications: AWS A5.11 ENiCrFe-3
BS EN 14172-E Ni6182

Instruction and Application

Ni-Cr-Fe alloy electrode. It is used for welding nickel based alloy, dissimilar steel and surfacing layer where heat and corrosion resistance is required. Excellent performance in resistance of crack, intercrystalline corrosion and stress corrosion. It is used for all position welding.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Fe	Nb+Ta	Ti
0.026	0.42	6.66	0.006	0.007	15.00	68.05	8.25	2.21	0.10

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)
Room temperature	640	42

Current adjustment (DC+)

ElectrodesΦ(mm)	Φ2.5	Φ3.2	Φ4.0
Amperage	60-80	90-120	120-150

Notice

- 1.Redry the electrode with titanium-calcium coating at 300°C for 1hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.Control the heat, if the electrode with titanium-calcium coating move,the magnitude of the swing should be less than 2.5 times the electrode with titanium-calcium coating diameter.
- 4.Multi-pass welding must clean the welding slag. Each layer is controlled below 100 °C .

Nickel and Nickel based Alloys

Ni690

Specifications: AWS A5.11 ENiCrFe-7

Instruction and Application

Ni-Cr-Fe alloy electrode with low hydrogen coating. It is used for welding Inconel690 alloy, Nickel alloy and dissimilar steel. Except for excellent resistance of crack and intercrystalline corrosion, it also has excellent resistance of stress corrosion. It could be used for all position welding.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Fe	Nb+Ta
0.026	0.33	3.72	0.002	0.005	29.98	Bal	10.82	1.77

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)
Room temperature	655	40

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0
Amperage	60-80	90-110	120-140

Notice

- 1.Redry the electrode with titanium-calcium coating at 300°C for 1hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.Weld with short arc,control the heat.If move the belt,should not be too wide.
- 4.Multi-pass welding must clean the welding slag. Each layer is controlled below 100°C .

Ni625

Specifications: AWS A5.11 ENiCrMo-3
BS EN 14172-E Ni6625

Instruction and Application

Ni-Cr-Mo alloy electrode with low hydrogen coating. It could be used for welding alloy of Inconel625, Incoloy825, Incoloy25-6Mo and Monel400, dissimilar metal of nickel alloy and stainless steel, surfacing cladding. With high strength and plasticity, excellent resistance of intercrystalline corrosion, it could be used for all position welding.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Fe	Nb+Ta	Mo
0.021	0.61	0.35	0.003	0.005	20.15	61.02	5.67	3.77	8.09

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)
Room temperature	790	41

Current adjustment (DC+)

ElectrodesΦ(mm)	Φ2.5	Φ3.2	Φ4.0
Amperage	60-80	90-110	120-140

Notice

- 1.Redry the electrode with titanium-calcium coating at 300°C for 1hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.Control the heat, if the electrode with titanium-calcium coating move,the magnitude of the swing should be less than 2.5 times the electrode with titanium-calcium coating diameter.
- 4.Multi-pass welding must clean the welding slag. Each layer is controlled below 100°C.

Ni276

Specifications: AWS A5.11 ENiCrMo-4
BS EN 14172-E Ni6276

Instruction and Application

It is mainly used for manual arc welding INCONEL C276 alloy and Ni-Cr-Mo alloy, or be used for surfacing steel, could also be used for welding nickel based alloy, stainless steel and low alloy steel dissimilar material. Excellent corrosion resistance in a variety of corrosive medium, especially the performance of resist pitting and crevice corrosion.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Fe	Mo	W
0.015	0.10	0.78	0.004	0.005	15.72	Bal	5.65	16.7	3.45

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Elongation A(%)
Room temperature	780	30

Current adjustment (DC+)

ElectrodesΦ(mm)	Φ2.5	Φ3.2	Φ4.0
Amperage	60-80	90-110	120-140

Notice

- 1.Redry the electrode with titanium-calcium coating at 300°C for 1hours.
- 2.Control the heat,if the electrode with titanium-calcium coating move,the magnitude of the swing should be less than 2.5 times the electrode with titanium-calcium coating diameter.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled below 100°C .

Nickel and Nickel based Alloys

HS600/SJ608

Wire Specifications: AWS A5.14 ERNiCr-3
BS EN ISO 18274 Ni6082

Instruction and Application

Nickel based SAW wire and flux, belong to Inconel 82 series. It is used for welding Inconel, Incoloy etc. alloy where heat and corrosion resistance is required. Deposited metal has excellent corrosion and crack resistance and mechanical properties. Welding flux has excellent performance of welding technicality, weld slag is easy to be removed, lesser burning of alloy elements.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	Fe	Nb+Ta
0.016	0.18	3.12	0.003	0.004	20.45	72.91	0.56	2.38

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Fe	Nb+Ta
0.019	0.27	2.96	0.006	0.008	20.34	72.65	1.03	2.32

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	645	455	40

Flux moisture content: ≤0.10%

Current adjustment (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	400-450	28-32	520-580
Φ4.0	450-500	28-32	520-580

Notice

- 1.Redry the flux at 300°C -350°C for 1hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled below 100°C .

Nickel and Nickel based Alloys

HS625/SJ609

Wire Specifications: AWS A5.14 ERNiCrMo-3
BS EN ISO 18274 SNI6625

Instruction and Application

Nickel based SAW wire and flux, belong to Inconel 625 series. It is used for welding Inconel, Incoloy etc. alloy where heat and corrosion resistance is required. Deposited metal has excellent corrosion and crack resistance and mechanical properties. Welding flux with excellent performance of welding technicality, weld slag is easy to be removed, lesser burning of alloy elements.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	Mo	Fe	Nb+Ta
0.017	0.17	0.25	0.004	0.010	21.02	64.05	8.96	<1.0	3.85

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Mo	Fe	Nb+Ta
0.020	0.35	0.35	0.006	0.012	20.80	62.50	8.76	2.73	3.65

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	800	--	--

Flux moisture content: ≤0.10%

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	400-450	28-32	520-580
Φ4.0	450-500	28-32	520-580

Notice

- 1.Redry the flux at 300°C -350°C for 1hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled below 100°C .

Nickel and Nickel based Alloys

ERNi-1

Specifications: AWS A5.14 ERNi-1
BS EN ISO 18274 SNI2061

Instruction and Application

Pure nickel GSAW wire. It is used for welding the chemical equipment with nickel alloy and duplex metal, or be used as transition layer welding of dissimilar metal. As the added of Ti, the production of stomata in welding process is avoided, stable arc, good welding seam forming, deposited metal has a good comprehensive properties.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni	Fe	Ti
0.016	0.15	0.45	0.004	0.008	Bal	0.42	3.62

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A (%)
Room temperature	580	475	28

Reference range (DC-)

WireΦ(mm)	Category	Gas	Amperage (A)	Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 100 °C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

Nickel and Nickel based Alloys

ERNiCrFe-7

Specifications: AWS A5.14 ERNiCrFe-7
BS EN ISO 18274 SNI6052

Instruction and Application

Mainly used for Inconel 690 alloy TIG welding. Could be used for anti-corrosion, anti-oxidizing acid corrosion surfacing layer on low alloy steel, welding dissimilar metals. Deposited metal has a good comprehensive performance, excellent stress corrosion crack resistance in nuclear radiation and pure water environment.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni	Cr	Fe
0.014	0.18	0.60	0.004	0.004	Bal	30.06	10.33

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Impact Strength KV ₂ (J,RT)
Room temperature	670	485	39	170,177,161
350	-	395	-	-

Reference range (DC-)

WireΦ(mm)	Category	Gas	Amperage (A)	Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 100 °C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ERNiCrFe-7A

Specifications: AWS A5.14 ERNiCrFe-7A
BS EN ISO 18274 SNI6052

Instruction and Application

Mainly used for Inconel 690 alloys TIG welding. Could be used for anti-corrosion, anti-oxidizing acid corrosion surfacing layer on low alloy steel, welding dissimilar metals, such as Inconel alloy, Incoloy alloy, carbon steel, low alloy steel and stainless steel. Suitable for welding thick-walled conditions. Deposited metal has a good comprehensive performance, excellent stress corrosion crack resistance in nuclear radiation and pure water environment.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni	Cr	Fe	Nb
0.010	0.07	0.75	0.004	0.005	Bal	29.04	9.92	0.80

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)	Impact Strength KV ₂ (J,RT)
Room temperature	670	460	39	196,197,200
350	-	375	-	-

Reference range (DC-)

WireΦ (mm)	Category	Gas	Amperage (A)	Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 100 °C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ERNiCr-3

Specifications: AWS A5.14 ERNiCr-3
BS EN ISO 18274 SNI6082

Instruction and Application

Mainly used for welding Inconel 600/601 alloy, Incoloy 800/800H alloy, surfacing steel. This wire is widely used for welding dissimilar metals, such as Inconel alloy, Incoloy alloy, Monel alloy, carbon steel, low alloy steel, stainless steel .The deposited metal has a good comprehensive mechanical properties, good resistance to corrosion, oxidation capability, high creep strength.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni	Cr	Fe	Nb+Ta
0.021	0.28	3.22	0.003	0.004	72.22	19.58	1.75	2.35

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)	Impact Strength KV ₂ (J,RT)
Room temperature	670	440	35	180,177,191
350	-	380	-	-

Reference range (DC-)

WireΦ (mm)	Category	Gas	Amperage (A)	Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 100 °C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ERNiCrMo-3

Specifications: AWS A5.14 ERNiCrMo-3
BS EN ISO 18274 SNI6625

Instruction and Application

Mainly used for Inconel 625, Incoloy 825/25Mo, Mo-containing stainless steel, 9% Ni steel TIG welding or MIG welding, also commonly be used for surfacing steel. The deposited metal has high strength, excellent resistance to pitting and crevice corrosion, especially suitable for using in corrosive environments with high H₂S concentration.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni	Cr	Mo	Nb+Ta	Fe
0.021	0.24	0.11	0.002	0.003	63.92	21.03	8.41	3.68	0.81

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)	Impact Strength KV _J (J,R T)
Room temperature	795	555	37	86,92,84

Reference range (DC-)

WireΦ (mm)	Category	Gas	Amperage (A)	Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 100°C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ERNiCrMo-4

Specifications: AWS A5.14 ERNiCrMo-4
BS EN ISO 18274 SNI6276

Instruction and Application

Mainly used for TIG welding Inconel C276 alloy and other Ni-Cr-Mo alloy, surfacing steel. This wire could also be used for welding dissimilar metals, including Inconel C276 alloy with other nickel-based alloy, stainless steel and low alloy steel. The deposited metal has good corrosion resistance, excellent resistance to pitting and crevice corrosion in a variety of corrosive media.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni	Cr	Mo	W	Fe
0.017	0.06	0.12	0.002	0.003	Bal	15.34	15.56	3.51	5.22

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	730	480	32

Reference range (DC-)

WireΦ (mm)	Category	Gas	Amperage (A)	Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 100°C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

ERNiCu-7

Specifications: AWS A5.14 ERNiCu-7
BS EN ISO 18274 SNI4060

Instruction and Application

Mainly used for TIG welding Monel alloy. Also be used for surfacing steel. The deposited metal has good corrosion resistance in a variety of media, such as water, salts, and reducing acid.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni	Ti	Fe	Cu
0.011	0.70	3.83	0.002	0.002	64.02	2.04	1.01	29.02

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	550	345	35

Reference range (DC-)

WireΦ (mm)	Category	Gas	Amperage (A)	Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar	140-160	12.5-13.5	80-120
Φ1.0mm	Auto	Ar	150-170	12.5-13.5	80-120
Φ1.2mm	Auto	Ar	160-180	12.5-13.5	80-120
Φ1.6mm	Hand	Ar	130-150	15-17	80-150
Φ2.0mm	Hand	Ar	140-160	15-17	80-150
Φ2.4mm	Hand	Ar	150-170	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 100°C.
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

Strip Cladding

Category	Item	Specifications		
		AWS A5.9	JIS Z3322	EN ISO 14343-A
Stainless steel strip cladding consumables	H308	EQ308	YB308-D	—
	H308L	EQ308L	YB308L-D	B 19 9 L
	H316L	EQ316L	YB316L-D	B 19 12 3 L
	H347	EQ347	YB347-D	B 19 9 Nb
	H347L	EQ347	YB347L-D	—
	H2209	EQ2209	-	B 22 9 3 N L
	H904L	EQ385	-	B 20 25 5 Cu L
	H309L(2413)	EQ309L	B309L	B 23 12 L
	H309LMo	EQ309LMo	-	B 23 12 2 L
Category	Item	Specifications		
		AWS A5.14	JIS	EN ISO 18274
Nickel Base strip cladding consumables	H600	EQNiCr-3	-	B Ni 6082
	H625	EQNiCrMo-3	-	B Ni 6625
	H690	EQNiCrFe-7	-	B Ni Z

Stainless steel

1.Characteristics

The stainless steel strip cladding consumables, including 304 (06 Cr19Ni10) type, 304 L (022 Cr19Ni10) type, 316 L (022 Cr17Ni12Mo2) type, 347 (06Cr18Ni11Nb) type, 022 Cr22Ni5Mo3 type, 904 L (015 Cr21Ni26Mo5Cu2) type austenitic stainless steel and austenitic-ferritic duplex stainless steel, are used in surface overlaying for corrosion resistance of petrochemical, mining and coal chemical processing industry, boiler, nuclear power of equipment such as surface corrosion resistant overlaying welding. The impurity element C, S, P content of the all-welded metal is low, which has good mechanical strength, corrosion resistance, excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface and integrated fusion.

2.Reference range:(DC+)

Welding Method	Strips (mm)	Amperage (A)	Volt (V)	Speed (mm/min)	Strip Extension (mm)	The Lap Width (mm)
SAW	0.4 X 50	600-800	28-30	150-200	30-40	6-8
	0.5 X 60	800-1000	28-30	150-200	30-40	6-8
ESW	0.4 X 50	600-800	25-27	150-220	30-40	6-8
	0.5 X 60	800-1000	25-27	150-220	30-40	6-8

3.Notice

- (1).Redry the flux at 300°C – 350°C for 1hours.
- (2).The welding consumables surface rust, oil and other impurities must be cleaned up.
- (3).The base metal should be preheated to 150 ° C before welding. The interpass temperature should be below 250 ° C.
- (4).To ensure the quality of welding, the thickness of the transition layer should be guaranteed between 3.0 and 3.5mm, the corrosion layer thickness must be maintained between 3.5-4.0mm.
- (5).Appropriate the surfacing position to the level to about 2 ° uphill welding.

4.FM 316 L –E

F: flux

M: cladding processes, M is SAW, Z is ESW ;

316:the type code of surfaced metal chemical composition

L: signifying low carbon content of deposited metal

E: signifying the surfaced layers position, D is single layer, E is the second or other above layer in the multi-layer surfacing.

5.

Welding Strip	Flux	Application	Deposited Metal Type
H309L	SJ316	transition layer SAW (The first layer) H316L is used in the corrosion resistant layer	F×308-D
	SJ304	transition layer SAW (The first layer)	
	SJ15B	transition layer ESW (The first layer)	
H309	SJ304	transition layer SAW (The first layer)	
	SJ15B	transition layer ESW (The first layer)	
H309(2413)	SJ303	transition layer SAW (The first layer)	
	SJ15B	transition layer ESW (The first layer)	
H309L(2413)	SJ303	transition layer SAW (The first layer)	
	SJ15B	transition layer ESW (The first layer)	
H309LMO	SJ316	corrosion resistant layer SAW (The first layer)	
	SJ15B	transition layer ESW (The first layer)	F×316-D
H316LF	SJ15B	corrosion resistant layer ESW (The second layer or multi-layer)	FZ316-D
H347LF	SJ15B	corrosion resistant layer ESW (The second layer or multi-layer)	FZ347-D
H347	SJ305	corrosion resistant layer SAW (The second layer or multi-layer)	F×347-E
	SJ15B	corrosion resistant layer ESW (The second layer or multi-layer)	
H308	SJ303	corrosion resistant layer SAW (The second layer or multi-layer)	F×308-E
	SJ15B	corrosion resistant layer ESW (The second layer or multi-layer)	
H347L	SJ305	corrosion resistant layer SAW (The second layer or multi-layer)	F×347L-E
	SJ15B	corrosion resistant layer ESW (The second layer or multi-layer)	
H308L	SJ303	corrosion resistant layer SAW (The second layer or multi-layer)	F×308L-E
	SJ15B	corrosion resistant layer ESW (The second layer or multi-layer)	
H316L	SJ316	corrosion resistant layer SAW (The second layer or multi-layer)	F×316L-E
	SJ15B	corrosion resistant layer ESW (The second layer or multi-layer)	
H2209	SJ225	corrosion resistant layer SAW (The second layer or multi-layer)	F×2209L-E
	SJ25B	corrosion resistant layer ESW (The second layer or multi-layer)	
H904L	SJ385	corrosion resistant layer SAW (The second layer or multi-layer)	F×385L-E
	SJ82B	corrosion resistant layer ESW (The second layer or multi-layer)	

H308

Specifications: AWS A5.9 EQ308

Instruction and Application

304 (06Cr19Ni10) type austenitic stainless steel welding strip is used in inner surfacing welding of the pressure equipments involving petrochemical, mining and coal chemical processing industry, boiler etc. SJ303 flux is for SAW and SJ15B flux is for ESW. The impurity element S, P content of all-welded metal is low, which has good mechanical performance and corrosion resistance, excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface, integrated fusion and low dilution rate.

Typical analysis (%)

	C	Si	Mn	S	P	Cr	Ni	δFe
Strip H308	0.037	0.29	2.12	0.006	0.017	20.46	10.32	-
All-Welded Metal(SAW)	0.042	0.78	1.28	0.009	0.021	19.33	9.85	7
All-Welded Metal(ESW)	0.040	0.47	1.43	0.007	0.019	19.52	10.03	6

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ303	0.12	0.022	0.012
SJ15B	0.09	0.018	0.011

Surfacing layer bending performance

After lateral bending test, the sample surface of the surfacing layer shall not be any greater than 1.5mm gap, above the fusion line shall not be any greater than 3mm gap.

Surfacing layer of non-destructive testing

Ultrasonic testing and penetration testing, according to the provisions of JB / T 4730.3, JB/T 4730.5, test results should not be any cracks and lack of fusion.

H308L

Specifications: AWS A5.9 EQ308L
EN ISO 14343-A B 19 9 L

Instruction and Application

304 (06Cr19Ni10) type austenitic stainless steel welding strip is used in inner surfacing welding of the pressure equipments involving petrochemical, mining and coal chemical processing industry, boiler and nuclear plant etc. SJ303 flux is for SAW and SJ15B flux is for ESW. The impurity element S, P content of all-welded metal is low, which has good mechanical performance and corrosion resistance, excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface, integrated fusion and low dilution rate.

Typical analysis (%)

	C	Si	Mn	S	P	Cr	Ni	δFe
Strip H308L	0.021	0.25	2.03	0.003	0.018	20.31	10.25	-
All-Welded Metal(SAW)	0.029	0.80	1.18	0.009	0.019	18.98	9.75	8
All-Welded Metal(ESW)	0.026	0.45	1.53	0.006	0.018	19.55	9.63	9

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ303	0.12	0.022	0.012
SJ15B	0.09	0.018	0.011

Surfacing layer bending performance

After lateral bending test, the sample surface of the surfacing layer shall not be any greater than 1.5mm gap, above the fusion line shall not be any greater than 3mm gap.

Surfacing layer of non-destructive testing

Ultrasonic testing and penetration testing, according to the provisions of JB / T 4730.3, JB/T4730.5, test results should not be any cracks and lack of fusion.

H316L

Specifications: AWS A5.9 EQ316L
EN ISO 14343-A B 19 12 3 L

Instruction and Application

316L(022Cr17Ni12Mo2)type austenitic stainless steel welding strip is used in inner surfacing welding of the pressure equipments involving petrochemical, mining and coal chemical processing industry, boiler and nuclear plant etc. SJ303 flux is for SAW and SJ15B flux is for ESW. The impurity element S, P content of all-welded metal is low, which has good mechanical performance and corrosion resistance, excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface, integrated fusion and low dilution rate.

Typical analysis (%)

	C	Si	Mn	S	P	Cr	Ni	Mo	δFe
Strip H316L	0.020	0.25	1.99	0.005	0.018	19.42	12.01	2.69	-
All-Welded Metal (SAW)	0.028	0.65	1.24	0.007	0.023	18.77	11.51	2.21	7
All-Welded Metal (ESW)	0.026	0.42	1.43	0.006	0.021	18.90	11.83	2.32	6

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ316	0.16	0.027	0.022
SJ15B	0.09	0.018	0.011

Surfacing layer bending performance

After Lateral Bending Test,the Sample Surface Of The Surfacing Layer Shall Not Be Any Greater Than 1.5mm Gap,above The Fusion Line Shall Not Be Any Greater Than 3mm Gap.

Surfacing layer of non-destructive testing

Ultrasonic Testing And Penetration Testing, According To The Provisions Of Jb / T 4730.3,jb/t4730.5, Test Results Should Not Be Any Cracks And Lack Of Fusion.

H347

Specifications: AWS A5.9 EQ347
EN ISO 14343-A B 19 9 Nb

Instruction and Application

347(06Cr18Ni11Nb)type austenitic stainless steel welding strip is used in inner surfacing welding of the pressure equipments involving petrochemical, thermal power, mining and coal chemical processing industry etc. SJ305 flux is for SAW and SJ15B flux is for ESW. The impurity element S, P content of all-welded metal is low, which has good mechanical performance and corrosion resistance, excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface, integrated fusion and low dilution rate.

Typical analysis (%)

	C	Si	Mn	S	P	Cr	Ni	Nb	δFe
Strip H347	0.041	0.35	2.09	0.005	0.022	19.87	10.36	0.53	-
All-Welded Metal (SAW)	0.047	0.75	1.32	0.008	0.026	18.94	9.88	0.50	6
All-Welded Metal (ESW)	0.044	0.44	1.45	0.007	0.025	19.03	9.91	0.52	5

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ305	0.14	0.028	0.024
SJ15B	0.09	0.018	0.011

Surfacing layer bending performance

After lateral bending test,the sample surface of the surfacing layer shall not be any greater than 1.5mm gap,above the fusion line shall not be any greater than 3mm gap.

Surfacing layer of non-destructive testing

Ultrasonic testing and penetration testing, according to the provisions of JB / T 4730.3,JB/T4730.5, test results should not be any cracks and lack of fusion.

H347L

Specifications: AWS A5.9 EQ347L

Instruction and Application

347(06Cr18Ni11Nb)type austenitic stainless steel welding strip is used in inner surfacing welding of the pressure equipments involving petrochemical, thermal power, mining and coal chemical processing industry etc. SJ305 flux is for SAW and SJ15B flux is for ESW. The impurity element S, P content of all-welded metal is low, which has good mechanical performance and corrosion resistance, excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface, integrated fusion and low dilution rate.

Typical analysis (%)

	C	Si	Mn	S	P	Cr	Ni	Nb	δFe
Strip H347L	0.019	0.31	1.98	0.004	0.021	19.95	10.34	0.64	-
All-Welded Metal (SAW)	0.026	0.68	1.22	0.009	0.026	19.03	9.79	0.51	9
All-Welded Metal (ESW)	0.023	0.38	1.41	0.007	0.023	19.22	9.84	0.54	8

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ305	0.14	0.028	0.024
SJ15B	0.09	0.018	0.011

Surfacing layer bending performance

After lateral bending test,the sample surface of the surfacing layer shall not be any greater than 1.5mm gap,above the fusion line shall not be any greater than 3mm gap.

Surfacing layer of non-destructive testing

Ultrasonic testing and penetration testing, according to the provisions of JB / T 4730.3,JB/T4730.5, test results should not be any cracks and lack of fusion.

H2209

EN ISO 14343-A B 22 9 3 N L

Instruction and Application

Austenitic - ferritic duplex stainless steel welding strip is used in inner surfacing welding of the pressure equipments involving petrochemical, mining and coal chemical processing industry and nuclear power etc. SJ225 flux is for SAW and SJ25B flux is for ESW.All-weld metal has a dual phase structure of austenite and ferrite. The impurity element S, P content of all-welded metal is low, which has good mechanical performance and corrosion resistance, excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface, integrated fusion and low dilution rate.

Typical analysis (%)

	C	Si	Mn	S	P
Strip H2209	0.022	0.30	1.42	0.006	0.017
All-Welded Metal (SAW)	0.028	0.69	0.98	0.009	0.022
All-Welded Metal (ESW)	0.025	0.57	0.88	0.008	0.021
	Cr	Ni	Mo	N	δFe
Strip H347	22.84	8.62	3.24	0.17	-
All-Welded Metal(SAW)	21.97	8.21	2.80	0.17	35
All-Welded Metal (ESW)	22.03	8.23	2.84	0.16	35

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ225	0.13	0.025	0.020
SJ25B	0.11	0.020	0.014

Surfacing layer bending performance

After lateral bending test,the sample surface of the surfacing layer shall not be any greater than 1.5mm gap,above the fusion line shall not be any greater than 3mm gap.

Surfacing layer of non-destructive testing

Ultrasonic testing and penetration testing, according to the provisions of JB / T 4730.3,JB/T4730.5, test results should not be any cracks and lack of fusion.

H904L

Specifications: AWS A5.9 EQ385
EN ISO 14343-A B 20 25 5 Cu L

Instruction and Application

Super austenitic stainless steel welding strip is used in inner surfacing overlaying of the petrochemical reactors equipment, heat exchangers and other pressure vessels SJ385 flux is for SAW and SJ82B flux is for ESW. All-weld metal has good resistance to pitting corrosion, crevice corrosion, stress corrosion cracking capacity, resistance to intergranular corrosion. Flux has excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface, integrated fusion and low dilution rate.

Typical analysis (%)

	C	Si	Mn	S	P	Cr	Ni	Mo	Cu
Strip H904L	0.016	0.27	1.61	0.004	0.021	20.85	24.53	4.42	1.41
All-Welded Metal (SAW)	0.026	0.65	1.04	0.006	0.025	19.87	24.21	4.33	1.32
All-Welded Metal (ESW)	0.021	0.51	1.25	0.006	0.023	20.04	24.32	4.34	1.38

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
Sj385	0.15	0.026	0.022
SJ82B	0.12	0.021	0.015

Surfacing layer bending performance

After lateral bending test, the sample surface of the surfacing layer shall not be any greater than 1.5mm gap, above the fusion line shall not be any greater than 3mm gap.

Surfacing layer of non-destructive testing

Ultrasonic testing and penetration testing, according to the provisions of JB / T 4730.3, JB/T4730.5, test results should not be any cracks and lack of fusion.

H309L(2413)

Specifications: AWS A5.9 EQ309L
EN ISO 14343-A B 23 12 L

Instruction and Application

Austenitic stainless steel welding strip with high Cr and Ni content is used in the equipments such as nuclear power equipment, coal chemical equipment and other similar equipments as transition layer strip. SJ303 flux is for SAW and SJ15B flux is for ESW. When used in conjunction with SJ15B, it can also be used as a single-layer surfacing strip.

Typical analysis of the strip (%)

C	Si	Mn	S	P	Cr	Ni
0.018	0.23	2.12	0.005	0.020	23.22	12.62

Typical analysis of the all-weld metal (%) (single-layer surfacing)

C	Si	Mn	S	P	Cr	Ni	δFe
0.037	0.51	1.31	0.009	0.021	20.14	10.13	8

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ303	0.12	0.022	0.012
SJ15B	0.09	0.018	0.011

Surfacing layer bending performance

After lateral bending test, the sample surface of the surfacing layer shall not be any greater than 1.5mm gap, above the fusion line shall not be any greater than 3mm gap.

Surfacing layer of non-destructive testing

Ultrasonic testing and penetration testing, according to the provisions of JB / T 4730.3, JB/T 4730.5, test results should not be any cracks and lack of fusion.

H309LMo

Specifications: AWS A5.9 EQ309LMo
EN ISO 14343-A B 23 12 2 L

Instruction and Application

Austenitic stainless steel welding strip with a high Cr and Ni content is used in high speed ESW of Mo-containing stainless steel, as the corrosion layer (single layer) of the petrochemical pressure vessels. SJ15B flux is for single-layer ESW. All-weld metal has good resistance to pitting corrosion, crevice corrosion, stress corrosion cracking capacity, resistance to intergranular corrosion. Flux has excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface, integrated fusion and low dilution rate.

Typical analysis of the strip (%)

C	Si	Mn	S	P	Cr	Ni	Mo
0.019	0.31	2.02	0.006	0.021	22.37	12.77	2.80

Typical analysis of the all-weld metal (%) (single-layer surfacing)

C	Si	Mn	S	P	Cr	Ni	Mo	δFe
0.030	0.55	1.56	0.008	0.024	20.23	11.05	2.62	10

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ316	0.16	0.027	0.022
SJ15B	0.10	0.017	0.013

Surfacing layer bending performance

After lateral bending test, the sample surface of the surfacing layer shall not be any greater than 1.5mm gap, above the fusion line shall not be any greater than 3mm gap.

Surfacing layer of non-destructive testing

Ultrasonic testing and penetration testing, according to the provisions of JB / T 4730.3, JB/T4730.5, test results should not be any cracks and lack of fusion.

Nickel Base

1.Characteristics

The nickel based alloy welding strips, including Inconel600 type, Inconel625 type, Inconel690 type series is used for carbon steel, stainless steel surface of surfacing nickel-based alloy. All-weld metal has good resistance to pitting corrosion, crevice corrosion, stress corrosion cracking capacity, resistance to intergranular corrosion. Flux has excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface, integrated fusion and low dilution rate.

2.Reference range:(DC+)

Welding Method	Strips (mm)	Amperage (A)	Volt (V)	Speed (mm/min)	Strip Extension (mm)	The Lap Width (mm)
SAW	0.4 X 50	600-800	28-30	150-200	30-40	6-8
	0.5 X 60	800-1000	28-30	150-200	30-40	6-8
ESW	0.4 X 50	600-800	25-27	150-220	30-40	6-8
	0.5 X 60	800-1000	25-27	150-220	30-40	6-8

3.Notice

- (1).Redry the flux at 300°C -350°C for 1hours.
- (2).The welding consumables surface rust, oil and other impurities must be cleaned up.
- (3).Before welding the base metal to be preheated to 150 °C. Each layer is controlled below 200°C.
- (4).To ensure the quality of welding, the thickness of the transition layer need to be maintained in the 3.0-3.5mm, the corrosion layer thickness must be maintained at 3.5-4.0mm.
- (5).Appropriate the surfacing position to the level to about 2° uphill welding.

H600

Specifications: AWS A5.14 EQNiCr-3
EN ISO 18274 B Ni 6082

Instruction and Application

The nickel baseband welding strips is used for carbon steel, stainless steel surface of strip surfacing with Inconel600 alloy or similar. SJ85B flux is for ESW.All-weld metal has good resistance to pitting corrosion, crevice corrosion, stress corrosion cracking capacity, resistance to intergranular corrosion. Flux has excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface, integrated fusion and low dilution rate.

Typical analysis of the strip (%)

C	Si	Mn	S	P	Cr	Ni	Fe	Nb+Ta
0.024	0.16	2.67	0.003	0.012	20.50	72.80	2.60	2.30

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Cr	Ni	Fe	Nb+Ta
0.028	0.55	2.56	0.005	0.015	19.72	70.59	4.50	2.38

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ85B	0.11	0.018	0.010

Surfacing layer bending performance

After lateral bending test,the sample surface of the surfacing layer shall not be any greater than 1.5mm gap,above the fusion line shall not be any greater than 3mm gap.

Surfacing layer of non-destructive testing

Ultrasonic testing and penetration testing, according to the provisions of JB / T 4730.3,JB/T4730.5, test results should not be any cracks and lack of fusion.

H625

Specifications: AWS A5.14 EQNiCrMo-3
EN ISO 18274 B Ni 6625

Instruction and Application

The nickel baseband welding strips used for carbon steel, stainless steel and other similar metal surface,single layer ESW or double layer ESW of Inconel625 alloy or similar. SJ82D/SJ82B flux is for ESW.All-weld metal has good resistance to pitting corrosion, crevice corrosion, stress corrosion cracking capacity, resistance to intergranular corrosion. Flux has excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface, integrated fusion and low dilution rate.

Typical analysis of the strip (%)

C	Si	Mn	S	P	Cr	Ni	Mo	Fe	Nb+Ta
0.018	0.11	0.24	0.003	0.009	21.50	64.00	8.70	1.0	3.5

Typical analysis of the all-weld metal (%)

Item	C	Si	Mn	S	P
H625+SJ82D Single layer welding	0.024	0.48	0.30	0.004	0.010
H625+SJ82B* Double layer welding	0.026	0.52	0.20	0.005	0.011
Item	Cr	Ni	Mo	Fe	Nb+Ta
H625+SJ82D Single layer welding	20.70	59.46	8.25	6.48	3.40
H625+SJ82B* Double layer welding	20.95	62.44	8.20	4.50	3.71

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ82D	0.10	0.016	0.011
SJ82B*	0.11	0.019	0.014

Surfacing layer bending performance

After lateral bending test,the sample surface of the surfacing layer shall not be any greater than 1.5mm gap,above the fusion line shall not be any greater than 3mm gap.

Surfacing layer of non-destructive testing

Ultrasonic testing and penetration testing, according to the provisions of JB / T 4730.3,JB/T4730.5, test results should not be any cracks and lack of fusion.

H690

Specifications: AWS A5.14 EQNiCrFe-7
EN ISO 18274 B Ni Z

Instruction and Application

The nickel baseband welding strips is used for carbon steel, low-alloy steel, stainless steel surface of strip surfacing with Inconel690 alloy or similar. SJ690 flux is for SAW, SJ69B flux is for ESW. All-weld metal has good resistance to pitting corrosion, crevice corrosion, stress corrosion cracking capacity, resistance to intergranular corrosion. Flux has excellent usability of corresponding flux, stable overlaying welding process, good slag detachability, smooth bead surface, integrated fusion and low dilution rate.

Typical analysis of the strip (%)

C	Si	Mn	S	P	Cr	Ni	Fe
0.025	0.25	0.60	0.004	0.005	30.0	57.90	9.70

Typical analysis of the all-weld metal (%)

Item	C	Si	Mn	S	P	Cr	Ni	Fe
H690+SJ690	0.035	0.55	0.50	0.006	0.010	28.20	Bal	11.60
H690+SJ69B	0.028	0.35	0.60	0.005	0.008	28.10	Bal	10.10

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	S	P
SJ690	0.12	0.022	0.020
SJ69B	0.10	0.016	0.012

Surfacing layer bending performance

After lateral bending test, the sample surface of the surfacing layer shall not be any greater than 1.5mm gap, above the fusion line shall not be any greater than 3mm gap.

Surfacing layer of non-destructive testing

Ultrasonic testing and penetration testing, according to the provisions of JB / T 4730.3, JB/T4730.5, test results should not be any cracks and lack of fusion.

Anti Hydrogen Steels

Welding Method	Item	Specifications	
		AWS A5.1	ISO 2560-B-E
SMAW	J507SH	E7016	49 16-1A
	J507SHA	E7016	49 16-1A
Welding Method	Item	Specifications	
		AWS A5.17	--
SAW	H08SHA/SJ204SHA	F6P2-EL8K	--
	H09MnSH/SJ204SH	F7P2-EH14	--
	H09MnSHA/SJ204SHA	F7P2-EH14	--
Welding Method	Item	Specifications	
		AWS A5.18	--
SAW	HS08SHA	ER70S-G	--
	HS09MnSHG-3	ER70S-3	--
	HS09MnSHG-6	ER70S-6	--
	HS09MnSHT	ER70S-G	--

J507SH

Specifications: AWS A5.1 E7016
ISO 2560-B-E 49 16-1A

Instruction and Application

Low hydrogen coating carbon steel electrode. It is used for welding Q345R(HIC)/Q345R(R-HIC) steel and other important structures where high strength is demanded. Deposited metal has low content of S and P, excellent plasticity, impact toughness and resistance to HIC and SSC crack performance. Excellent welding technicality, little spatter, easy be removed slag, stable arc and great welding performance. Adopted the DC power, could be used for all position welding.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P
0.08	0.28	1.24	0.004	0.011

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	550	465	29

Temperature	Impact Strength KV ₂ (J,-30 °C)	Heat treatment
Room temperature	150,148,160	620°C X 8h

*The actual operation of the heat treatment system negotiated by both parties, or be formulated separately according to the the scene working conditions (such as the thickness of the sample).

SSC Test: (NACE TM 0177 , GB/T 4157)

No crack over 0.1mm in the sample through thickness direction

Threshold stress $\sigma_{th} \geq 247\text{MPa}$

HIC Test : (NACE TM 0284)

	Average value of three samples%	Single sample value%
CLR	≤ 10	≤ 13
CTR	≤ 3	≤ 3.8
CSR	≤ 1.5	≤ 1.9

J507SHA

Specifications: AWS A5.1 E7016
ISO 2560-B-E 49 16-1A

Instruction and Application

Carbon steel electrode low hydrogen coating. It is used for welding Q345R (HIC)/Q345R (R-HIC) steel of the pressure vessels and piping where high strength is demanded. Deposited metal has low content of S, P, excellent plasticity, impact toughness and resistance to HIC and SSC crack performance. Excellent welding technicality, little spatter, easy be removed slag, stable arc and great welding. Adopted the DC power, could be used for all position welding.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P
0.07	0.21	1.22	0.002	0.007

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	540	450	28

Temperature	Impact Strength KV ₂ (J,-30 °C)	Heat treatment
Room temperature	170,165,160	620°C X 8h

*The actual operation of the heat treatment system negotiated by both parties, or be formulated separately according to the the scene working conditions (such as the thickness of the sample).

SSC Test: (NACE TM 0177 , GB/T 4157)

No crack over 0.1mm in the sample through thickness direction

Threshold stress $\sigma_{th} \geq 247\text{MPa}$.

HIC Test : (NACE TM 0284)

	Average value of three samples%	Single sample value%
CLR	≤ 10	≤ 13
CTR	≤ 3	≤ 3.8
CSR	≤ 1.5	≤ 1.9

The diffusible hydrogen content of deposited metal Hd (Glycerin method) : $\leq 4.0\text{ml}/100\text{g}$

Percentage of moisture for covering : $\leq 0.25(\%)$

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	70-100	110-150	140-180	180-220

Notice

1. Redry the electrode at 350°C for 1hours.
2. The welding surface rust, oil fouling and other impurities must be cleaned up.
3. Cleaning the welding slag before multi-pass welding. Interpass temperature should be controlled below 250°C .
4. Be short arc welding, narrow weld is appropriate.

H08SHA/SJ204SHA

Specifications: AWS A5.17 F6P2-EL8K

Instruction and Application

F6P2-EL8K SAW wire is used for welding Q245R(HIC) and Q245R(R-HIC) steel of the important structures. It is specially used for welding the copper plated anti-hydrogen steel with SJ204SHA flux, SJ204SHA is the fluoride-basic agglomerated flux, a round particulate, Alkalinity approximately 2.8, the particle size 2.0-0.28mm. Excellent welding technicality, deposited metal has low content of S and P, excellent plasticity, low temperature impact toughness and resistance to HIC and SSC crack. It has low content of diffusible hydrogen.

Typical analysis of the wire (%)

C	Si	Mn	S	P
0.07	0.14	0.50	0.002	0.003

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P
0.04	0.21	0.49	0.004	0.006

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	450	350	33

Temperature	Impact Strength KV ₂ (J,-30 °C)	Heat treatment
Room temperature	110,116,108	620°C x2h

*The actual operation of the heat treatment system negotiated by both parties, or be formulated separately according to the scene working conditions (such as the thickness of the sample).

SSC Test: (NACE TM 0177 , GB/T 4157)

No crack over 0.1mm in the sample through thickness direction

Threshold stress $\sigma_{th} \geq 247\text{MPa}$.

HIC Test: (NACE TM 0284)

	Average value of three samples %	Single sample value %
CLR	≤ 10	≤ 13
CTR	≤ 3	≤ 3.8
CSR	≤ 1.5	≤ 1.9

Deposit metal diffusible hydrogen content H_d (Gas Chromatography): $\leq 2.0\text{ml}/100\text{g}$

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	moisture content	Moisture absorption ratio	S	P
SJ204SHA	0.11	0.05	0.08	0.019	0.021

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	450-500
Φ4.0	500-550	28-32	450-500

Notice

1. Redry the flux at 300-350 °C for 2 hours.
2. The welding surface rust, oil fouling and other impurities must be cleaned up.
3. Cleaning the welding slag before multi-pass welding. Interpass temperature should be controlled below 150 °C.

H09MnSH/SJ204SH

Specifications: AWS A5.17 F7P2-EH14

Instruction and Application

F7P2-EH14 SAW wire is used for welding Q345R(HIC) and Q345R(R-HIC) steel of the important structures and the gas pipeline. It is specially used for welding the copper plated anti-hydrogen steel with SJ204SH flux, SJ204SH is the fluoride-basic agglomerated flux, a round particulate, Alkalinity approximately 2.8, the particle size 2.0-0.28mm. Excellent welding technicality, deposited metal has low content of S and P, excellent plasticity, low temperature impact toughness and resistance to HIC and SSC crack. It has low content of diffusible hydrogen.

Typical analysis of the wire (%)

C	Si	Mn	S	P
0.11	0.014	1.86	0.002	0.009

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P
0.06	0.15	1.36	0.004	0.012

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	520	420	30

Temperature	Impact Strength KV ₂ (J,-30 °C)	Heat treatment
Room temperature	150,143,153	620°C X 8h

*The actual operation of the heat treatment system negotiated by both parties, or be formulated separately according to the scene working conditions (such as the thickness of the sample).

SSC Test: (NACE TM 0177 , GB/T 4157)

No crack over 0.1mm in the sample through thickness direction

Threshold stress $\sigma_{th} \geq 247\text{MPa}$.

HIC Test: (NACE TM 0284)

	Average value of three samples%	Single sample value %
CLR	≤ 10	≤ 13
CTR	≤ 3	≤ 3.8
CSR	≤ 1.5	≤ 1.9

Deposited metal diffusible hydrogen content H_d (Gas Chromatography): $\leq 2.0\text{ml}/100\text{g}$

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ204SH	0.12	0.06	0.08	0.020	0.021

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	450-500
Φ4.0	500-550	28-32	450-500

Notice

1. Redry the flux at 300-350°C for 2 hours.
2. The welding surface rust, oil fouling and other impurities must be cleaned up.
3. Cleaning the welding slag before multi-pass welding. Interpass temperature should be controlled below 150°C.

H09MnSHA/SJ204SHA

Specifications: AWS A5.17 F7P2-EH14

Instruction and Application

F7P2-EH14 SAW wire is used for welding Q345R (HIC) and Q345R(R-HIC) steel of the important structures and the gas pipeline, which has higher requirements. It is specially used for welding the copper plated anti-hydrogen steel with SJ204SHA flux, SJ204SHA is the fluoride-basic agglomerated flux, a round particulate, Alkalinity approximately 2.8, the particle size 2.0-0.28mm. It has purer deposited metal, lower S P content than H09MnSH/SJ204SH, excellent in plasticity, low temperature impact toughness and resistance of HIC and SSC crack.

Typical analysis of the wire (%)

C	Si	Mn	S	P
0.12	0.15	1.89	0.002	0.004

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P
0.06	0.29	1.50	0.003	0.006

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	560	480	29
Temperature	Impact Strength KV ₂ (J,-30°C)	Heat treatment	
Room temperature	200,190,195	620°C X 8h	

*The actual operation of the heat treatment system negotiated by both parties, or be formulated separately according to the scene working conditions (such as the thickness of the sample).

SSC Test: (NACE TM 0177 , GB/T 4157)

No crack over 0.1mm in the sample through thickness direction

Threshold stress $\sigma_{th} \geq 247\text{MPa}$

HIC Test: (NACE TM 0284)

	Average value of three samples%	Single sample value %
CLR	≤ 10	≤ 13
CTR	≤ 3	≤ 3.8
CSR	≤ 1.5	≤ 1.9

Deposit metal diffusible hydrogen content H_d (Gas Chromatography): $\leq 2.0\text{ml}/100\text{g}$

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ204SHA	0.11	0.05	0.08	0.019	0.021

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	450-500
Φ4.0	500-550	28-32	450-500

Notice

1. Redry the flux at 300-350°C for 2 hours.
2. The welding surface rust, oil fouling and other impurities must be cleaned up.
3. Cleaning the welding slag before multi-pass welding. Interpass temperature should be controlled below 150°C.

HS08SHA

Specifications: AWS A5.18 ER70S-G

Instruction and Application

Anti-hydrogen steel gas shielded welding wire. It is used for surfacing or back welding the Q245R (HIC), Q245R (R-HIC) steel of the petrochemical, power generation boilers and other industries. The deposited metal has low S, P content, good plasticity and low temperature toughness, great resistance to HIC and SSC crack.

Typical analysis of the wire (%)

C	Si	Mn	S	P
0.07	0.51	0.48	0.002	0.006

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	520	430	30
Temperature	Impact Strength KV ₂ (J,RT)	Heat treatment	
Room temperature	116,110,108	620°C X 2h	

*The actual operation of the heat treatment system negotiated by both parties, or be formulated separately according to the scene working conditions (such as the thickness of the sample).

SSC Test: (NACE TM 0177 , GB/T 4157)

No crack over 0.1mm in the sample through thickness direction

Threshold stress $\sigma_{th} \geq 247\text{MPa}$

HIC Test: (NACE TM 0284)

	Average value of three samples%	Single sample value %
CLR	≤ 10	≤ 13
CTR	≤ 3	≤ 3.8
CSR	≤ 1.5	≤ 1.9

Deposit metal diffusible hydrogen content H_d (Gas Chromatography): $\leq 2.0\text{ml}/100\text{g}$

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC-)

WireΦ (mm)	Category	Gas	Amperage (A)	Ar Gas flow (L/min)	Speed (mm /min)
Φ0.8mm	Auto	CO ₂ ,Ar	150-170	13-14	80-120
Φ1.0mm	Auto	CO ₂ ,Ar	150-170	13-14	80-120
Φ1.2mm	Auto	CO ₂ ,Ar	190-220	13-14	80-120
Φ1.6mm	Hand	CO ₂ ,Ar	150-170	15-17	80-150
Φ2.0mm	Hand	CO ₂ ,Ar	160-180	15-17	80-150
Φ2.4mm	Hand	CO ₂ ,Ar	180-200	15-17	80-150

Notice

1. The welding surface rust, oil fouling and other impurities must be cleaned up.
2. Interpass temperature should be controlled below 150°C.
3. The operation is appropriate to the short arc, arc length control in 1~3mm.

HS09MnSHG-3

Specifications: AWS A5.18 ER70S-3

Instruction and Application

Anti-hydrogen steel gas shielded welding wire. It is used for welding important low carbon steel and low alloy structure steel, such as boilers, chemical containers, nuclear power station containers, bridges, etc. The deposited metal has low S, P content, good plasticity and low temperature toughness, great resistance to HIC and SSC crack.

Typical analysis of the wire (%)

C	Si	Mn	S	P
0.09	0.65	1.32	0.003	0.004

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	565	470	28
Temperature	Impact Strength KV ₂ (J,-30°C)		--
Room temperature	195,180,188		AW

SSC Test: (NACE TM 0177 , GB/T 4157)

No crack over 0.1mm in the sample through thickness direction

Threshold stress $\sigma_{th} \geq 247\text{MPa}$

HIC Test: (NACE TM 0284)

	Average value of three samples%	Single sample value%
CLR	≤ 10	≤ 13
CTR	≤ 3	≤ 3.8
CSR	≤ 1.5	≤ 1.9

Deposit metal diffusible hydrogen content

H_D (Gas Chromatography): $\leq 2.0\text{ml}/100\text{g}$

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC-)

WireΦ (mm)	Category	Gas	Amperage (A)	Ar Gas flow (L/min)	Speed (mm /min)
Φ0.8mm	Auto	CO ₂ ,Ar	150-170	13-14	80-120
Φ1.0mm	Auto	CO ₂ ,Ar	150-170	13-14	80-120
Φ1.2mm	Auto	CO ₂ ,Ar	190-220	13-14	80-120
Φ1.6mm	Hand	CO ₂ ,Ar	150-170	15-17	80-150
Φ2.0mm	Hand	CO ₂ ,Ar	160-180	15-17	80-150
Φ2.4mm	Hand	CO ₂ ,Ar	180-200	15-17	80-150

Notice

1. The welding surface rust, oil fouling and other impurities must be cleaned up.
2. Interpass temperature should be controlled below 150 °C.
3. The operation is appropriate to the short arc, arc length control in 1-3mm.

HS09MnSHG-6

Specifications: AWS A5.18 ER70S-6

Instruction and Application

Anti-hydrogen steel gas shielded welding wire. It is used for surfacing or back welding the Q345R (HIC), Q345R (R-HIC) steel of the petrochemical, power generation boilers and other industries. The deposited metal has low S, P content, good plasticity and low temperature toughness, great resistance to HIC and SSC crack.

Typical analysis of the wire (%)

C	Si	Mn	S	P
0.10	1.13	1.76	0.002	0.004

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	585	460	29
Temperature	Impact Strength KV ₂ (J,-30°C)		Heat treatment
Room temperature	145,135,140		620°C X 8h

*The actual operation of the heat treatment system negotiated by both parties, or be formulated separately according to the the scene working conditions (such as the thickness of the sample).

SSC Test: (NACE TM 0177 , GB/T 4157)

No crack over 0.1mm in the sample through thickness direction

Threshold stress $\sigma_{th} \geq 247\text{MPa}$

HIC Test: (NACE TM 0284)

	Average value of three samples%	Single sample value%
CLR	≤ 10	≤ 13
CTR	≤ 3	≤ 3.8
CSR	≤ 1.5	≤ 1.9

Deposit metal diffusible hydrogen content

H_D (Gas Chromatography): $\leq 2.0\text{ml}/100\text{g}$

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC-)

Wire diameter (mm)	Category	Gas	Amperage (A)	Ar Gas flow (L/min)	Speed (mm /min)
Φ0.8mm	Auto	CO ₂ ,Ar	150-170	13-14	80-120
Φ1.0mm	Auto	CO ₂ ,Ar	150-170	13-14	80-120
Φ1.2mm	Auto	CO ₂ ,Ar	190-220	13-14	80-120
Φ1.6mm	Hand	CO ₂ ,Ar	150-170	15-17	80-150
Φ2.0mm	Hand	CO ₂ ,Ar	160-180	15-17	80-150
Φ2.4mm	Hand	CO ₂ ,Ar	180-200	15-17	80-150

Notice

1. The welding surface rust, oil fouling and other impurities must be cleaned up.
2. Interpass temperature should be controlled below 150°C.
3. The operation is appropriate to the short arc, arc length control in 1-3mm.

HS09MnSHT

Specifications: AWS A5.18 ER70S-G

Instruction and Application

Anti-hydrogen steel gas shielded welding wire. It is used for surfacing or back welding the Q345R (HIC), Q345R (R-HIC) steel of the petrochemical, power generation boilers and other industries. The deposited metal has low S, P content, good plasticity and low temperature toughness, great resistance to HIC and SSC crack.

Typical analysis of the wire (%)

C	Si	Mn	S	P
0.05	0.80	1.96	0.002	0.004

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	580	490	27
Temperature	Impact Strength KV ₂ (J,-30°C)		--
Room temperature	98,106,93		AW

SSC Test: (NACE TM 0177 , GB/T 4157)

No crack over 0.1mm in the sample through thickness direction

Threshold stress $\sigma_{th} \geq 247\text{MPa}$

HIC Test: (NACE TM 0284)

	Average value of three samples%	Single sample value%
CLR	≤10	≤13
CTR	≤3	≤3.8
CSR	≤1.5	≤1.9

Deposit metal diffusible hydrogen content Hd (Gas Chromatography): ≤2.0ml/100g

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC-)

WireΦ	Category	Gas	Amperage (A)	Ar Gas flow (L/min)	Speed (mm /min)
Φ0.8mm	Auto	CO ₂ ,Ar	150-170	13-14	80-120
Φ1.0mm	Auto	CO ₂ ,Ar	150-170	13-14	80-120
Φ1.2mm	Auto	CO ₂ ,Ar	190-220	13-14	80-120
Φ1.6mm	Hand	CO ₂ ,Ar	150-170	15-17	80-150
Φ2.0mm	Hand	CO ₂ ,Ar	160-180	15-17	80-150
Φ2.4mm	Hand	CO ₂ ,Ar	180-200	15-17	80-150

Notice

1. The welding surface rust, oil fouling and other impurities must be cleaned up.
2. Interpass temperature should be controlled below 150°C.
3. The operation is appropriate to the short arc, arc length control in 1-3mm.

Cryogenic Steels

Welding Method	Item	Specifications	
		AWS A5.5	GB/T 5118
SMAW	J507DR	E7015-G	E5015-G
	W607DR	E7015-G	E5015-G
	W707DR	E8016-C1	E5516-C1
	W707Ni	E7015-C1L	E5015-C1L
	W807Ni	E7015-C1L	E5015-C1L
	W107DR	E7015-C2L	E5015-C2L
Welding Method	Item	Specifications	
		AWS A5.23	GB
SAW	H09MnDR/SJ208DR	F7P5 EG-G	-
	H09MnNiG/SJ18G	F7P6 ENi1-Ni1	-
	H09MnNiDR/SJ208DR	F7P10 ENi3-Ni3	-
	H06Mn35DR/SJ208DR	F7P15 ENi3-Ni3	-
Welding Method	Item	Specifications	
		AWS A5.18	GB/T 8110
GSAW	HS09MnDR	ER70S-G	ER50-G
Welding Method	Item	Specifications	
		AWS A5.28	GB/T 8110
GSAW	HS-Ni1	ER80S-Ni1	ER55-Ni1
	HS09MnNiDR	ER80S-Ni3	ER55-Ni3
	HS06Mn35DR	ER80S-Ni3	ER55-Ni3

J507DR

Specifications: AWS A5.5 E7015-G
ISO 2560-A : E 42 4 0.5Ni B22

Instruction and Application

High toughness electrode with Ti-Ca coating applied to welding important structure, Such as vessel, bridge, high pressure pipe, pressure container, boiler, offshore platform etc, made by ASME SA516Gr.70(16MnDR) steel plate. Welded joint performs excellent in plasticity, low temperature toughness and crack resistance. Suitable for DC+ and all position welding with good welding technology.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni
0.05	0.23	1.25	0.006	0.010	0.55

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	525	425	29.5

Temperature	Impact Strength KV ₂ (J,-46 °C)	Heat treatment
Room temperature	160,153,164	590°C X 5h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H₂ (Glycerin method): ≤4.0ml/100g

Percentage of moisture for covering: ≤0.25(%)

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Current adjustment (DC+)

ElectrodesΦ(mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	70-100	110-140	140-180	180-220

Notice

1. Redry the electrode at 350°C for 1hours.
2. Interpass temperature should be controlled to below 150°C.
3. Operate with short arc and narrow bead welding method.

W607DR

Specifications: AWS A5.5 E7015-G
ISO 2560-A : E 39 6 0.5Ni B22

Instruction and Application

Low temperature steel electrode with Ti-Ca coating applied to welding cryogenic steel working at -60 °C such as 15MnNiDR. Welded joint performs excellent in plasticity, low temperature toughness, and high impact toughness at -60 °C.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni
0.05	0.23	1.30	0.006	0.010	0.65

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	540	450	28

Temperature	Impact Strength KV ₂ (J,-60 °C)	Heat treatment
Room temperature	175,170,168	590°C X 5h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H₂ (Glycerin method): ≤4.0ml/100g

Percentage of moisture for covering: ≤0.25(%)

Deposited metal radiographic testing

According to JB/T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Current adjustment (DC+)

ElectrodesΦ(mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	70-100	110-140	140-180	180-220

Notice

1. Redry the electrode at 350 °C for 1hours.
2. Interpass temperature should be controlled to below 150°C.
3. Operate with short arc and narrow bead welding method.

W707DR

Specifications: AWS A5.5 E8016-C1
ISO 2560-A : E 43 7 2.5Ni B22

Instruction and Application

Ultra-low hydrogen type low temperature steel electrode is suitable for DC+ and all position welding with good welding technology. Applied to welding cryogenic steel working at -70 °C such as 09MnNiDR. Welded joint performs excellent low temperature toughness, and high impact toughness at -70 °C.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni
0.05	0.25	0.55	0.004	0.010	2.44

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	570	480	24
Temperature	Impact Strength KV ₂ (J,-70 °C)		Heat treatment
Room temperature	145,130,150		590°C X 5h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H_D (Glycerin method): ≤3.0ml/100g

Percentage of moisture for covering: ≤0.20(%)

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Current adjustment (DC+)

ElectrodesΦ(mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	70-100	110-140	140-180	180-220

Notice

1. Redry the electrode at 350°C for 1hours.
2. Interpass temperature should be controlled to below 150°C.
3. Operate with short arc and narrow bead welding method.

W707Ni

Specifications: AWS A5.5 E7015-C1L

Instruction and Application

Ultra-low hydrogen sodium type low temperature steel electrode applied to welding cryogenic steel working at -70 °C such as ASME SA 203GR.B, 09MnNiDR. Welded joint performs excellent low temperature toughness, and high impact toughness at -70 °C. It is suitable for DC+ and all position welding with good welding technology.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni
0.04	0.20	0.38	0.004	0.010	2.54

All-weld metal mechanical properties

Temperature (°C)	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	530	425	25
Temperature (°C)	Impact Strength KV ₂ (J,-70°C)		Heat treatment
Room temperature	152,165,170		590°C X 5h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H_D (Glycerin method): ≤4.0ml/100g

Percentage of moisture for covering: ≤0.25(%)

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Current adjustment (DC+)

ElectrodesΦ(mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	70-100	110-140	140-180	180-220

Notice

1. Redry the electrode at 350°C for 1hours.
2. Interpass temperature should be controlled to below 150°C.
3. Operate with short arc and narrow bead welding method.

W807Ni

Specifications: AWS A5.5 E7015-C1L

Instruction and Application

Ultra-low hydrogen type low temperature steel electrode is suitable for DC+ and all position welding with good welding technology. Applied to welding cryogenic steel working at -80°C. Welded joint performs excellent low temperature toughness, and high impact toughness at -80°C.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni
0.04	0.22	0.40	0.006	0.010	2.45

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	575	480	24

Temperature	Impact Strength KV ₂ (J,-80°C)	Heat treatment
Room temperature	110,125,128	590°C X 5h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H_D (Glycerin method): ≤4.0ml/100g

Percentage of moisture for covering: ≤0.25(%)

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Current adjustment (DC+)

ElectrodesΦ(mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	70-100	110-140	140-180	180-220

Notice

- 1.Redry the electrode at 350°C for 1hours.
2. Cleaning the slag and interpass temperature should be controlled to below 150°C.
3. Operate with short arc and narrow bead welding method.

W107DR

Specifications: AWS A5.5 E7015-C2L
ISO 2560-A : E 43 10 3.5Ni B22

Instruction and Application

Ultra-low hydrogen sodium type low temperature steel electrode is suitable for DC+ and all position welding with good welding technology. Applied to welding cryogenic steel working at -101 °C such as ASME SA 203GR.E. Welded joint performs excellent low temperature toughness, and high impact toughness at -101°C.

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni
0.04	0.10	0.35	0.005	0.010	3.50

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	530	440	28

Temperature	Impact Strength KV ₂ (J,-101°C)	Heat treatment
Room temperature	102,112,106	590°C X 5h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H_D (Glycerin method): ≤4.0ml/100g

Percentage of moisture for covering: ≤0.25(%)

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Current adjustment (DC+)

ElectrodesΦ(mm)	Φ2.5	Φ3.2	Φ4.0
Amperage (A)	70-100	110-140	140-180

Notice

1. Redry the electrode at 350°C for 1hours.
2. Cleaning the slag and interpass temperature should be controlled to below 150°C.
3. Operate with short arc and narrow bead welding method. When retreating the arc, crater should be filled to avoid forming crater crack.

H09MnDR/SJ208DR

Specifications: AWS A5.23 F7P5 EG-G

Instruction and Application

The wire applied to petrochemical large-scale equipments' steel plate welding, such as ASME SA516 GR.70 (16MnDR). The combination of wire AWS A5.23 F7P5-EG-G(H09MnDR) and flux SJ208DR which is fluorine base type sintered flux with round particles of size 2.0-0.28mm and basicity more than 2, can get excellent welding and metallurgical performance. And the impurities in the weld metal such as S/P is low.

Typical analysis of the wire (%)

C	Si	Mn	S	P
0.07	0.02	1.68	0.003	0.009

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P
0.05	0.20	1.36	0.004	0.012

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	520	435	32

Temperature	Impact Strength KV ₂ (J,-46°C)	Heat treatment
Room temperature	150,145,153	590°C X 5h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ208DR	0.11	0.04	0.07	0.018	0.021

All-weld metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of all-weld metal should not be less than Class I.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	480-520
Φ4.0	500-550	28-32	480-520

Notice

- 1.Redry the flux at 300-350°C for 2 hours.
- 2.Cleaning the oil stain, rust and moisture of the weldment surface before welding.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled below 150°C.

H09MnNiG/SJ18G

Specifications: AWS A5.23 F7P6 ENi1-Ni1

Instruction and Application

The wire applied to weld ethylene or propane stored vessels, pipeline or LNG stored vessels made of cryogenic steel, such as ASME SA516 GR.70 (16MnDR) or 15MnNiDR. The combination of wire AWS A5.23 F7P5-EG-G(H09MnNiG) and flux SJ18G which is fluorine base type sintered flux with round particles of size 2.0-0.28mm and basicity more than 2, can get excellent welding and metallurgical performance. And the impurities in the weld metal such as S/P is low.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Ni
0.08	0.09	1.16	0.004	0.005	0.94

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni
0.06	0.20	1.03	0.005	0.009	0.89

All-weld metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	535	440	29.5

Temperature	Impact Strength KV ₂ (J,-45°C)	Heat treatment
Room temperature	174,155,162	620°C X 2h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ18G	0.20	0.06	0.06	0.014	0.027

All-weld metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of all-weld metal should not be less than Class I.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	480-520
Φ4.0	500-550	28-32	480-520

Notice

- 1.Redry the flux at 300-350°C for 2 hours.
- 2.Cleaning the oil stain, rust and moisture of the weldment surface before welding.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled below 150°C.

H09MnNiDR/SJ208DR

Specifications: AWS A5.23 F7P10 ENi3-Ni3
ISO 14171-A S 42 7 FB S2Ni3

Instruction and Application

The wire applied to weld press vessels of coal chemical and petrochemical etc. industries made of cryogenic steel, such as ASME SA203 G. E or 09MnNiDR. The combination of wire AWS A5.23 F7P10-ENi3-Ni3(H09MnNiDR)and flux SJ208DR which is fluorine base type sintered flux with round particles of size 2.0-0.28mm and basicity more than 2, can get excellent welding and metallurgical performance ,especially low temperature toughness .And the impurities in the weld metal such as S/P is low.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Ni
0.04	0.12	0.90	0.003	0.006	3.32

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni
0.04	0.18	0.82	0.004	0.009	3.30

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	550	460	26

Temperature	Impact Strength KV _J (J,-70°C)	Heat treatment
Room temperature	140,133,146	590°C X 5h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ208DR	0.11	0.04	0.07	0.018	0.021

All-weld metal radiographic testing

According to JB /T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of all-weld metal should not be less than Class I.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	480-520
Φ4.0	500-550	28-32	480-520

Notice

- 1.Redry the flux at 300-350°C for 2 hours.
- 2..Cleaning the oil stain, rust and moisture of the weldment surface before welding.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled below 110°C .

H06Mn35DR/SJ208DR

Specifications: AWS A5.23 F7P15 ENi3-Ni3
ISO 14171-A S 42 10 FB S2Ni3

Instruction and Application

The wire applied to weld press vessels of coal chemical and petrochemical etc. industries (working at -101°C)made of cryogenic steel , such as ASME SA203 G. E or 09MnNiDR. The combination of wire AWS A5.23 F7P10-ENi3-Ni3(H09MnNiDR)and flux SJ208DR which is fluorine base type sintered flux with round particles of size 2.0-0.28mm and basicity more than 2, can get excellent welding and metallurgical performance ,especially low temperature toughness .And the impurities in the weld metal such as S/P is low.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Ni
0.03	0.14	0.98	0.002	0.005	3.55

Typical analysis of the all-weld metal (%)

C	Si	Mn	S	P	Ni
0.03	0.18	0.91	0.003	0.006	3.57

All-weld metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	520	460	30

Temperature	Impact Strength KV _J (J,-101°C)	Heat treatment
Room temperature	80,95,105	590°C X 5h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ208DR	0.11	0.04	0.07	0.018	0.021

All-weld metal radiographic testing

According to JB /T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of all-weld metal should not be less than Class I.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	480-520
Φ4.0	500-550	28-32	480-520

Notice

- 1.Redry the flux at 300-350°C for 2 hours.
- 2.Cleaning the oil stain, rust and moisture of the weldment surface before welding.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled below 110°C .

HS09MnDR

Specifications: AWS A5.18 ER70S-G

Instruction and Application

The wire applied to cryogenic steels welding or backing welding, such as ASME SA516 Gr.70 (16MnDR), which is working at -46°C. All-weld metal of cryogenic steels GTAW wires is pure with low content of impurity such as S、P. Welded joint performs excellent low temperature toughness and moderate strength.

Typical analysis of the wire (%)

C	Si	Mn	S	P
0.08	0.75	1.96	0.003	0.004

Typical analysis of the all-weld metal (%)

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	565	450	27

Temperature	Impact Strength KV ₂ (J,-46°C)	Heat treatment
Room temperature	122,135,120	620°C X 2h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

All-weld metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of all-weld metal should not be less than Class I.

Reference range (DC-)

WireΦ	Category	Gas	Amperage (A)	Ar Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.0mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.2mm	Auto	Ar or Ar+1-5%O ₂	190-220	13-14	80-120
Φ1.6mm	Hand	Ar or Ar+1-5%O ₂	150-170	15-17	80-150
Φ2.0mm	Hand	Ar or Ar+1-5%O ₂	160-180	15-17	80-150
Φ2.4mm	Hand	Ar or Ar+1-5%O ₂	180-200	15-17	80-150

Notice

- Cleaning the oil stain, rust and moisture of the welding surface before welding.
- The interpass temperature should be controlled to below 150°C.
- Operate with short arc would be better, arc length controlled to among 1-3mm.

HS-Ni1

Specifications: AWS A5.28 ER80S-Ni1
ISO 636 -A W 43 3 Ni1

Instruction and Application

The wire applied to cryogenic steels welding or backing welding, such as ASME SA516 Gr.70 (16MnDR) or 15MnNiDR, which is working at -45°C. All-weld metal of cryogenic steels(-45°C) GTAW wires is pure with low content of impurity such as S、P. Welded joint performs excellent low temperature toughness and moderate strength.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Ni
0.05	0.46	0.92	0.003	0.004	0.81

Typical analysis of the all-weld metal (%)

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	570	485	30

Temperature	Impact Strength KV ₂ (J,-45°C)	Heat treatment
Room temperature	180,172,165	AW

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

All-weld metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of all-weld metal should not be less than Class I.

Reference range (DC-)

WireΦ	Category	Gas	Amperage (A)	Ar Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.0mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.2mm	Auto	Ar or Ar+1-5%O ₂	190-220	13-14	80-120
Φ1.6mm	Hand	Ar or Ar+1-5%O ₂	150-170	15-17	80-150
Φ2.0mm	Hand	Ar or Ar+1-5%O ₂	160-180	15-17	80-150
Φ2.4mm	Hand	Ar or Ar+1-5%O ₂	180-200	15-17	80-150

Notice

- Cleaning the oil stain, rust and moisture of the welding surface before welding.
- The interpass temperature should be controlled to below 150°C.
- Operate with short arc would be better, arc length controlled to among 1-3mm.

HS09MnNiDR

Specifications: AWS A5.28 ER80S-Ni3
ISO 636 –A W 43 7 Ni3.5

Instruction and Application

The wire applied to cryogenic steels welding or backing welding, such as ASME SA203 Gr.E、09MnNiDR and other cryogenic steels working at -70°C . All-weld metal of cryogenic steels GTAW wires is pure with low content of impurity such as S、P. Welded joint performs excellent low temperature toughness and moderate strength.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Ni
0.04	0.48	0.90	0.003	0.004	3.51

Typical analysis of the all-weld metal (%)

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	580	475	31

Temperature	Impact Strength KV ₂ (J,-70°C)	Heat treatment
Room temperature	125,135,118	590°C X 5h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

All-weld metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of all-weld metal should not be less than Class I.

Reference range (DC-)

WireΦ	Category	Gas	Amperage (A)	Ar Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.0mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.2mm	Auto	Ar or Ar+1-5%O ₂	190-220	13-14	80-120
Φ1.6mm	Hand	Ar or Ar+1-5%O ₂	150-170	15-17	80-150
Φ2.0mm	Hand	Ar or Ar+1-5%O ₂	160-180	15-17	80-150
φ2.4mm	Hand	Ar or Ar+1-5%O ₂	180-200	15-17	80-150

Notice

- Cleaning the oil stain, rust and moisture of the welding surface before welding.
- The interpass temperature should be controlled to below 150°C.
- Operate with short arc would be better, arc length controlled to among 1-3mm.

HS06Mn35DR

Specifications: AWS A5.28 ER80S-Ni3
ISO 636 –A W 43 10 W0

Instruction and Application

The wire applied to cryogenic steels welding or backing welding, such as ASME SA203 Gr. E and other cryogenic steels working at -101°C . All-weld metal of cryogenic steels GTAW wires is pure with low content of impurity such as S、P. Welded joint performs excellent and stable low temperature toughness and moderate strength.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Ni
0.04	0.45	0.86	0.003	0.004	3.60

Typical analysis of the all-weld metal (%)

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	570	475	33

Temperature	Impact Strength KV ₂ (J,-101°C)	Heat treatment
Room temperature	85,96,80	590°C X 5h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

All-weld metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of all-weld metal should not be less than Class I.

Reference range (DC-)

WireΦ	Category	Gas	Amperage (A)	Ar Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.0mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.2mm	Auto	Ar or Ar+1-5%O ₂	190-220	13-14	80-120
Φ1.6mm	Hand	Ar or Ar+1-5%O ₂	150-170	15-17	80-150
Φ2.0mm	Hand	Ar or Ar+1-5%O ₂	160-180	15-17	80-150
Φ2.4mm	Hand	Ar or Ar+1-5%O ₂	180-200	15-17	80-150

Notice

- Cleaning the oil stain, rust and moisture of the welding surface before welding.
- The interpass temperature should be controlled to below 150°C.
- Operate with short arc would be better, arc length controlled to among 1-3mm.

Creep Resistant Steels

Welding Method	Item	Specifications		
		AWS A5.5	ISO 3580-A	ISO 3580-B
SMAW	R307C	E8016-B2	E (CrMo1) B42	E5515-1CM
	R307G	E8016-B2	E (CrMo1) B42	E5515-1CM
	R307CL	E8016-B2	E (CrMo1L) B42	E5215-1CML
	R407C	E9015-B3	E (CrMo2) B42	-
Welding Method	Item	Specifications		
		AWS A5.23	ISO 24598-A	-
SAW	H08CrMoC/SJ110	F7P2-EB2-B2	S CrMo1	-
	H08CrMoG/SJ110	F8P2-EB2R-B2R	S CrMo1	-
	H11CrMoG/SJ110G	F8P2-EG-G	S CrMo1	-
	H10Cr2MoC/SJ110	F8P0-EB3-B3	S CrMo2	-
	H10Cr2MoG/SJ150	F8P2-EB3R-B3R	S CrMo2	-
Welding Method	Item	Specifications		
		AWS A5.28	ISO 21952-A	-
GSAW	HS08CrMoC	ER80S-B2	W CrMo1 Si	-
	HS08CrMoG	ER80S-B2	W CrMo1 Si	-
	HS10Cr2MoG	ER90S-B3	W CrMo2 Si	-

R307C

Specifications: AWS A5.5 E8016-B2
 ISO 3580-A: E (CrMo1) B42
 ISO 3580-B : E5515-1CM

Instruction and Application

Low-alloy creep-resistant steel electrode with Ti-Ca coating applied to some complex and large-scale equipments' steel plate welding, such as ASME SA387GR.12Class 2 (15CrMoR(H)), which is used in petrochemical, coal chemical industry, nuclear power, turbine cylinder, thermal power and some other use of harsh conditions and corrosive media. Comprehensive mechanical properties of welded joint are excellent such as anti-failure fracture properties. And it is adequate for field installation and welding. Compared with common creep resistant steel welding material, it has following feature:

1. Purely deposited metal with low content of impurity such as S /P, S≤ 0.010%, P ≤ 0.012%.
2. The deposited metal has good low temperature toughness, KV₂(J,-30 °C) ≥34J.
3. It has good welding technological property, and is suitable for all position welding.

Typical Analysis of the all-welded metal (%)

C	Si	Mn	P	S	Cr	Mo
0.05	0.24	0.69	0.008	0.002	1.05	0.54

All-welded metal mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	550	450	27
475	-	360	-
Temperature	Impact Strength KV ₂ (J,-30 °C)	Heat treatment	
Room temperature	120,116,128	690°C x6h	
475			

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H₀ (Glycerin method): ≤3.0ml/100g

Percentage of moisture for covering: ≤0.20(%)

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC+)

ElectrodesΦ (mm)	Φ3.2	Φ4.0	Φ5.0
Amperage	90-120	120-170	170-220

Notice

1. Redry the electrode at 350~400°C for 1~2hour.
2. Cleaning the oil stain, rust and moisture of the weldment surface before welding.
3. Operate with short arc and narrow bead welding method, preheating temperature about 200°C, the temperature between different welding bead should be controlled to 150~300°C.

R307G

Specifications: AWS A5.5 E8016-B2
 ISO 3580-A: E (CrMo1) B42
 ISO 3580-B : E5515-1CM

Instruction and Application

Low-alloy creep-resistant steel electrode with Ti-Ca coating applied to some complex and large-scale equipments' steel plate welding, such as ASME SA387GR.11 Class 2 (14Cr1MoR), which is used in petrochemical, coal chemical industry, nuclear power, turbine cylinder, thermal power and some other use of harsh conditions and corrosive media. Welded joint with excellent comprehensive mechanical properties such as anti-failure fracture properties, anti-oxidation hot strength(<600°C), anti-hydrogen, sulphur corrosion resistance. It has good operability. And it can be applied for field installation and welding. Compared with common creep resistant steel welding material, it has following feature:

1. Purely deposited metal with low content of impurity such as S、P, $S \leq 0.010\%$, $P \leq 0.010\%$.
2. Deposited metal with excellent low temperature toughness, $KV_2 (J_{-30^\circ C}) \geq 34J$.
3. Deposited metal with excellent temper brittleness resistance and super low X coefficient.
4. It has good welding technological property, and is suitable for all position welding.

Typical Analysis of the all-welded metal (%)

C	Si	Mn	P	S	Cr
0.06	0.26	0.75	0.008	0.003	1.13
Mo	As	Sb	X		
0.58	0.0025	0.0010	8.1ppm		

X coefficient = (10P+5Sb+4Sn+As) × 0.01

In the equation, the ppm content represents elements, such as 100 ppm replaces 0.01%.

All-welded metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	625	510	25
475°C	-	400	-

Temperature	Impact Strength KV ₂ (J _{-30°C})	Heat treatment
Room temperature	120,116,130	690°C X 6h
475°C		

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	580	410	26
475°C	-	385	-

Temperature	Impact Strength KV ₂ (J _{-30°C})	Heat treatment
Room temperature	100,98,110	690°C X 20h
475°C		

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal Hd (Glycerin method): ≤3.0ml/100g

Percentage of moisture for covering: ≤0.20(%)

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ3.2	Φ4.0	Φ5.0
Amperage	90-120	120-170	170-220

Notice

- 1.Redry the electrode at 350~400°C for 1~2hour.
- 2.Cleaning the oil stain, rust and moisture of the weldment surface before welding.
- 3.Operate with short arc and narrow bead welding method, preheating temperature about 200°C, the temperature between different welding bead should be controlled to 150~300°C.

R307CL

Specifications: AWS A5.5 E8016-B2
 ISO 3580-A: E (CrMo1L) B42
 ISO 3580-B : E5215-1CML

Instruction and Application

Low-alloy creep-resistant steel electrode with Ti-Ca coating is special for welding petroleum hydrogenation and coking device, made by ASME SA387Gr.11 class 1 steel plate. Welded joint with excellent comprehensive mechanical properties such as anti-failure fracture properties. It has good operability. And it can be applied for field installation and welding. Compared with common creep resistant steel welding material, it has following feature:

1. The strength region of welding material is appropriately reduced and well suited for base metal. Yield strength of welding material is about 100~110% to base metal.
2. Purely deposited metal with low content of impurity such as S、P, $S \leq 0.008\%$, $P \leq 0.010\%$.
3. Deposited metal with excellent low temperature toughness, $KV_2 (J_{-20^\circ C}) \geq 54J$.
4. Deposited metal with excellent temper brittleness resistance and super low X coefficient.

Typical Analysis of the all-welded metal (%)

C	Si	Mn	P	S	Cr
0.06	0.15	0.62	0.007	0.003	1.13
Mo	As	Sn	Sb	X	
0.57	0.0020	0.0010	0.0010	8.2ppm	

X coefficient = (10P+5Sb+4Sn+As) × 0.01

In the equation, the ppm content represents elements, such as 100 ppm replaces 0.01%.

All-welded metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A%
Room temperature	545	445	26
475°C	-	380	-

Temperature	Impact Strength KV ₂ (J _{-20°C})	Heat treatment
Room temperature	110,105,98	690°C X 4h
475°C		

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A%
Room temperature	530	425	24
475°C	-	360	-

Temperature	Impact Strength KV ₂ (J _{-20°C})	Heat treatment
Room temperature	100,103,108	690°C X 20h
475°C		

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal Hd (Glycerin method): ≤3.0ml/100g

Percentage of moisture for covering: ≤0.20(%)

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ3.2	Φ4.0	Φ5.0
Amperage	90-120	120-170	170-220

Notice

- 1.Redry the electrode at 350~400°C for 1~2hour.
- 2.Cleaning the oil stain, rust and moisture of the weldment surface before welding.
- 3.Operate with short arc and narrow bead welding method, preheating temperature about 200°C, the temperature between different welding bead should be controlled to 150~300°C.

R407C

Specifications: AWS A5.5 E9015-B3
ISO 3580-A:E(CrMo2)B42

Instruction and Application

Low-alloy creep-resistant steel electrode with Ti-Ca coating applied to some complex and large-scale equipments' steel plate welding, such as ASME SA387GR.22Class 2 (12Cr2Mo1R), used in petrochemical, coal chemical industry, nuclear power, turbine cylinder, thermal power and some other use of harsh conditions and corrosive media. Welded joint with excellent comprehensive mechanical properties such as anti-failure fracture properties. It has good operability. And it can be applied for field installation and welding. Compared with common creep resistant steel welding material, it has following feature:

1. Purely deposited metal with low content of impurity such as S, P, $S \leq 0.010\%$, $P \leq 0.010\%$.
2. Deposited metal with excellent low temperature toughness, $KV_2 (J, -30^\circ C) \geq 54J$.
3. Deposited metal with excellent temper brittleness resistance and super low X coefficient.

Typical Analysis of the all-welded metal (%)

C	Si	Mn	P	S	Cr
0.06	0.25	0.70	0.007	0.003	2.25
Mo	As	Sn	Sb	X	
1.05	0.0015	0.0010	0.0010	8.0ppm	

X coefficient = (10P+55b+4Sn+As) × 0.01

In the equation, the ppm content represents elements, such as 100 ppm replaces 0.01%.

All-welded metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	640	550	24
475°C	-	450	-

Temperature	Impact Strength KV ₂ (J,-30°C)	Heat treatment
Room temperature	90,105,93	690°C X 8h
475°C		

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	620	530	25
475°C	-	430	-

Temperature	Impact Strength KV ₂ (J,-30°C)	Heat treatment
Room temperature	80,84,88	690°C X 26h
475°C		

* The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H₀ (Glycerin method): ≤3.0ml/100g

Percentage of moisture for covering: ≤0.20(%)

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ3.2	Φ4.0	Φ5.0
Amperage	90-120	120-170	170-220

Notice

- 1.Redry the electrode at 350~400°C for 1~2hour.
2. Cleaning the oil stain, rust and moisture of the weldment surface before welding.
- 3.Operating with short arc and narrow bead welding method, preheating temperature about 200°C, the temperature between different welding bead should be controlled to 150~300°C.

H08CrMoC/SJ110

Specifications: AWS A5.23 F7P2-EB2-B2
ISO 24598-A S CrMo1

Instruction and Application

The wire applied to some complex and large-scale equipments' steel plate welding, such as ASME SA387GR.12Class 2 (15CrMoR(H)), which is used in petrochemical, nuclear power, thermal power and some other use of harsh conditions and corrosive media. The combination of wire AWS A5.23 F7P2-EB2-B2(H08CrMoC) and flux SJ110 which is fluorine base type sintered flux with round particles of size 2.0-0.28mm, can get excellent welding and metallurgical performance. And the impurities in the weld metal and diffusible hydrogen content is low, with excellent crack resistance, low temperature toughness and low sensitivity of temper embrittlement.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Mo
0.10	0.18	0.97	0.002	0.004	1.30	0.50

Typical Analysis of the all-welded metal (%)

C	Si	Mn	S	P	Cr	Mo
0.07	0.22	0.84	0.003	0.006	1.16	0.46

All-welded metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	560	465	24

Temperature	Impact Strength KV ₂ (J,-30°C)	Heat treatment
Room temperature	100,106,110	690°C X 6h

* The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ110	0.20	0.06	0.06	0.021	0.020

The diffusible hydrogen content of deposited metal H₀ (Gas Chromatography): ≤2.0ml/100g

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	450-500
Φ4.0	500-550	28-32	450-500

Notice

- 1.Redry the flux at 300-350°C for 2 hours.
- 2.Cleaning the oil stain, rust and moisture of the weldment surface before welding.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled to among 200-250°C.

H08CrMoG/SJ110

Specifications: AWS A5.23 F8P2-EB2R-B2R
ISO 24598-A S CrMo1

Instruction and Application

The wire applied to some complex and large-scale equipments' steel plate welding, such as ASME SA387GR.11 Class 2 (14Cr1MoR(H)), which is used in petrochemical, nuclear power, thermal power and some other use of harsh conditions and corrosive media. An agglomerated welding flux (SJ110G) of the fluoride base type, combined with AWS A5.23 F8P2-EB2R-B2R. Good performance of welding technology and metallurgy properties, deposited metal with low content of impurity such as S, P, low temper brittleness sensitiveness.

Typical analysis of the wire (%)

C	Si	Mn	S	P
0.12	0.06	0.85	0.002	0.005
Cr	Mo	As	Sn	Sb
1.31	0.55	0.0020	0.0010	0.0010

Typical Analysis of the all-welded metal (%)

C	Si	Mn	S	P	Cr
0.07	0.14	0.84	0.005	0.008	1.21
Mo	As	Sn	Sb	X	
0.51	0.0020	0.0010	0.0010	9.4ppm	

All-welded metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	585	495	23
475°C	-	400	-

Temperature	Impact Strength KV ₂ (J,-30°C)	Heat treatment
Room temperature	155,162,150	690°C X 6h
475°C		

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	525	425	27.5
475°C	-	330	-

Temperature	Impact Strength KV ₂ (J,-30°C)	Heat treatment
Room temperature	100,115,108	690°C X 20h
475°C		

* The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ110	0.11	0.04	0.08	0.021	0.020

The diffusible hydrogen content of deposited metal H_D (Gas Chromatography): ≤2.0ml/100g

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	450-500
Φ4.0	500-550	28-32	450-500

Notice

- 1.Redry the flux at 300-350°C for 2 hours.
- 2.Cleaning the oil stain, rust and moisture of the weldment surface before welding.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled to among 200-250°C.

H11CrMoG/SJ110G

Specifications: AWS A5.23 F8P2-EG-G
ISO 24598-A S CrMo1

Instruction and Application

The wire is particular suitable for welding boiler and super-heater (≥550°C) fabrication. An agglomerated welding flux (SJ110) of the fluoride base type, combined with AWS A5.23 F8P2-EG-G welding wire, and deposited metal with low content of impurity such as S, P. The content about Strength and Cr/Mo of welded joint is higher than 1.25Cr-0.5Mo. And welded joints perform excellent comprehensive mechanical properties such as low temper brittleness sensitiveness.

Typical analysis of the wire (%)

C	Si	Mn	S	P
0.12	0.16	0.95	0.002	0.003
Cr	Mo	As	Sn	Sb
1.43	0.51	0.0032	0.0016	0.0016

Typical Analysis of the all-welded metal (%)

C	Si	Mn	S	P	Cr
0.08	0.19	0.75	0.004	0.006	1.36
Mo	As	Sn	Sb	X	
0.51	0.0031	0.0014	0.0016	9.4ppm	

All-welded metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	600	515	26
427°C	515	425	-

Temperature	Impact Strength KV ₂ (J,-5°C)	Heat treatment
Room temperature	150,152,160	690°C X 6h
427°C		

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	585	485	27
427°C	485	435	-

Temperature	Impact Strength KV ₂ (J,-5°C)	Heat treatment
Room temperature	150,155,148	690°C X 24h
427°C		

* The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ110G	0.10	0.04	0.08	0.020	0.020

The diffusible hydrogen content of deposited metal H_D (Gas Chromatography): ≤2.0ml/100g

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	450-500
Φ4.0	500-550	28-32	450-500

Notice

- 1.Redry the flux at 300-350°C for 2 hours.
- 2.Cleaning the oil stain, rust and moisture of the weldment surface before welding.
3. Multi-pass welding must clean the welding slag. Each layer is controlled to among 200-250°C.

H10Cr2MoC/SJ110

Specifications: AWS A5.23 F8P0-EB3-B3
ISO 24598-A S CrMo2

Instruction and Application

The wire is particular suitable for boiler and super-heater fabrication (base material ASME SA387GR.12Class 2 (12Cr2Mo1R)). An agglomerated welding flux (SJ110) of the fluoride base type, combined with AWS A5.23 F7P2-EB2-B2. Good performance of welding technology and metallurgy properties, deposited metal with low content of impurity and diffusible hydrogen, well crack resistance properties and low temperature toughness, low temper brittleness sensitiveness.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Mo
0.12	0.15	0.79	0.003	0.005	2.36	1.01

Typical Analysis of the all-welded metal (%)

C	Si	Mn	S	P	Cr	Mo
0.07	0.17	0.80	0.006	0.011	2.15	0.95

All-welded metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	605	500	23

Temperature	Impact Strength KV _J (J-0°C)	Heat treatment
Room temperature	90,95,86	690°C X 6h

* The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ110	0.11	0.04	0.08	0.021	0.020

The diffusible hydrogen content of deposited metal H₀ (Gas Chromatography): ≤2.0ml/100g

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	450-500
Φ4.0	500-550	28-32	450-500

Notice

1. Redry the flux at 300-350 °C for 2 hours.
2. Cleaning the oil stain, rust and moisture of the weldment surface before welding.
3. Multi-pass welding must clean the welding slag. Each layer is controlled to among 200-250°C.

H10Cr2MoG/SJ150

Specifications: AWS A5.23 F8P2-EB3R-B3R
ISO 24598-A S CrMo2

Instruction and Application

The wire applied to some complex and large-scale equipments' steel plate welding, such as ASME SA387GR.22Class 2 (12Cr2Mo1R), which is used in petrochemical, nuclear power, thermal power and some other use of harsh conditions and corrosive media. An agglomerated welding flux (SJ150) of the fluoride base type (round granular structure, particle size 2.0-0.28mm.), combined with AWS A5.23 F8P2-EB3R-B3R. Good performance of welding technology and metallurgy properties, deposited metal with low content of impurity and diffusible hydrogen, well crack resistance properties and low temperature toughness, low temper brittleness sensitiveness, good anti-oxidation hot strength and anti-hydrogen, sulphur corrosion resistance.

Typical analysis of the wire (%)

C	Si	Mn	S	P
0.12	0.10	0.76	0.003	0.005
Cr	Mo	As	Sn	Sb
2.44	1.05	0.0015	0.0018	0.0010

Typical Analysis of the all-welded metal (%)

C	Si	Mn	S	P	Cr
0.11	0.12	0.72	0.004	0.009	2.24
Mo	As	Sn	Sb	X	
1.01	0.0016	0.0026	0.0010	9ppm	

All-welded metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	630	520	22
475°C	-	420	-

Temperature	Impact Strength KV _J (J-30 °C)	Heat treatment
Room temperature	90,94,89	690°C X 8h
475°C		

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	595	490	23
475°C	-	390	-

Temperature	Impact Strength KV _J (J-30 °C)	Heat treatment
Room temperature	75,80,78	690°C X 26h
475°C		

* The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ150	0.10	0.03	0.06	0.018	0.020

The diffusible hydrogen content of deposited metal H₀ (Gas Chromatography): ≤2.0ml/100g

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	450-500
Φ4.0	500-550	28-32	450-500

Notice

1. Redry the flux at 300-350 °C for 2 hours.
2. Cleaning the oil stain, rust and moisture of the weldment surface before welding.
3. Multi-pass welding must clean the welding slag. Each layer is controlled to among 200-250°C.

HS08CrMoC

Specifications: AWS A5.28 ER80S-B2
ISO 21952-A W CrMo1 Si

Instruction and Application

The wire applied to creep resistant steels welding or, backing welding, such as ASME SA387GR.12Class 2 (15CrMoR(H)), which is used in petrochemical, thermal power boiler. Deposited metal of creep resistant steels GTAW wires is pure with low content of impurity such as S、P. Welded joint performs excellent low temperature toughness and moderate strength.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Mo
0.07	0.46	0.63	0.003	0.004	1.15	0.51

All-welded metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Impact Strength KV ₂ (J,-30°C)	Heat treatment
Room temperature	550	445	31	110,120,118	690°C X 6h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H₂ (Gas Chromatography): ≤2.0ml/100g

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC-)

WireΦ	Category	Gas	Amperage (A)	Ar Gas flow (L/min)	Speed (mm /min)
Φ0.8mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.0mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.2mm	Auto	Ar or Ar+1-5%O ₂	190-220	13-14	80-120
Φ1.6mm	Hand	Ar or Ar+1-5%O ₂	150-170	15-17	80-150
Φ2.0mm	Hand	Ar or Ar+1-5%O ₂	160-180	15-17	80-150
Φ2.4mm	Hand	Ar or Ar+1-5%O ₂	180-200	15-17	80-150

Notice

1. Cleaning the oil stain, rust and moisture of the welding surface before welding.
2. Interpass temperature should be controlled to among 180°C ~250°C.
3. Operate with short arc would be better, arc length controlled to among 1-3mm.

HS08CrMoG

Specifications: AWS A5.28 ER80S-B2
ISO 21952-A W CrMo1 Si

Instruction and Application

The wire applied to creep resistant steels welding or backing welding, such as ASME SA387GR.11 Class 2 (14Cr1MoR(H)), which is used in petrochemical, thermal power boiler. Deposited metal of creep resistant steels GTAW wires is pure with low content of impurity such as S、P. Welded joint performs excellent low temperature toughness and higher strength.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Mo
0.08	0.48	0.65	0.002	0.003	1.37	0.55

All-welded metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Impact Strength KV ₂ (J,-30°C)	Heat treatment
Room temperature	595	480	30	108,112,120	690°C X 20h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H₂ (Gas Chromatography): ≤2.0ml/100g

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC-)

WireΦ	Category	Gas	Amperage (A)	Ar Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.0mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.2mm	Auto	Ar or Ar+1-5%O ₂	190-220	13-14	80-120
Φ1.6mm	Hand	Ar or Ar+1-5%O ₂	150-170	15-17	80-150
Φ2.0mm	Hand	Ar or Ar+1-5%O ₂	160-180	15-17	80-150
Φ2.4mm	Hand	Ar or Ar+1-5%O ₂	180-200	15-17	80-150

Notice

1. Cleaning the oil stain, rust and moisture of the welding surface before welding.
2. Interpass temperature should be controlled to among 180°C ~250°C.
3. Operate with short arc would be better, arc length controlled to among 1-3mm.

Creep Resistant Steels

HS10Cr2MoG

Specifications: AWS A5.28 ER90S-B3
ISO 21952-A W CrMo2 Si

Instruction and Application

The wire applied to creep resistant steels welding or backing welding, such as ASME SA387GR. 22 Class 2 (12Cr2Mo1R), which is used in petrochemical press vessel or hydrogenation reaction chamber etc. equipments. Deposited metal of creep resistant steels GTAW wires is pure with low content of impurity such as S、P. Welded joint performs excellent low temperature toughness and higher strength.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Mo
0.10	0.62	0.58	0.003	0.006	2.46	1.09

All-welded metal mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Impact Strength KV ₂ (J,-30°C)	Heat treatment
Room temperature	600	510	21	85,90,82	690°C X 6h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H_D (Gas Chromatography): ≤2.0ml/100g

Deposited metal radiographic testing

According to JB / T 4730.2, the radiographic detecting technique should not be less than class AB and the quality grade of deposited metal should not be less than Class I.

Reference range (DC-)

WireΦ	Category	Gas	Amperage (A)	Ar Gas flow (L/min)	Speed (mm/min)
Φ0.8mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.0mm	Auto	Ar or Ar+1-5%O ₂	150-170	13-14	80-120
Φ1.2mm	Auto	Ar or Ar+1-5%O ₂	190-220	13-14	80-120
Φ1.6mm	Hand	Ar or Ar+1-5%O ₂	150-170	15-17	80-150
Φ2.0mm	Hand	Ar or Ar+1-5%O ₂	160-180	15-17	80-150
Φ2.4mm	Hand	Ar or Ar+1-5%O ₂	180-200	15-17	80-150

Notice

- Cleaning the oil stain, rust and moisture of the welding surface before welding.
- The interpass temperature should be controlled to among 180°C ~250°C.
- Operate with short arc would be better, arc length controlled to among 1-3mm.

High-Strength Steels

High-Strength Steels

Welding Method	Item	Specifications	
		AWS A5.5	GB/T 5118
SMAW	J607R	E8018-G	E6018-G
	J607Ni	E9015-G	E6015-G
	E10018-D2	E10018-D2	E7018-D2
	J807G	E11015-G	E8015-G
	J107G	E12015-G	E10015-G
Welding Method	Item	Specifications	
		AWS A5.23	GB/T
SAW	H08Mn2MoG/SJ101G	F8P0-EA4-A4	-
	H09MnNiMoG/SJ16G	F8P0-EF3-F3	-
Welding Method	Item	Specifications	
		AWS A5.28	GB/T 8110
GSAW	HS-70	ER100S-G	ER69-G
	HS-80	ER110S-G	ER76-G

High-Strength Steels

J607R

Specifications: AWS A5.5 E8018-G
GB/T 5118 E6018-G
JB/T 4747.2

Instruction and Application

Low-temperature alloy steel high-strength electrode with titanium-calcium coating has low hydrogen sodium.DC reverse,all-position welding.The deposited metal has good ductility and toughness.Used in welding the carbon steel and corresponding strength low alloy high strength steel structure, such as: ASME SA508 Gr.3 Class1 (13MnNiMoR), ASME SA302 GR.C,or similar steel for pressure vessel.

Typical analysis of the all-welded metal (%)

C	Si	Mn	S	P	Ni	Mo
0.06	0.25	1.39	0.003	0.009	0.90	0.60

All-weld mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	650	575	26

Temperature	Impact Strength KV ₂ (J,-20°C)	Heat treatment
Room temperature	160,155,148	620°C X 15h

* The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H_D (Glycerin method): ≤2.0ml/100g

Percentage of moisture for covering: ≤0.15(%)

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	70-100	120-160	140-180	180-220

Notice

1.Redry the electrode at 350°C for 1hours.
2.Multi-pass welding must clean the welding slag. Each layer is controlled below 250°C.

High-Strength Steels

J607Ni

Specifications: AWS A5.5 E9015-G
GB/T 5118 E6015-G
JB/T 4747.2

Instruction and Application

Low-temperature alloy steel high-strength electrode with titanium-calcium coating has low hydrogen sodium.DC reverse,all-position welding.Used in welding the corresponding intensity level, and reheat cracking tendency of steel structure,such as similar to ASME SA508 Gr.3 the Class1 (13MnNiMoR) nuclear reactor housing, boiler, chemical containers, storage tanks and other similar equipment.

Typical analysis of the all-welded metal (%)

C	Si	Mn	S	P	Ni
0.08	0.22	1.40	0.004	0.009	1.39

All-weld mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)	Impact Strength KV ₂ (J,-40°C)
Room temperature	650	575	26	118,123,110

* The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H_D (Glycerin method): ≤2.0ml/100g

Percentage of moisture for covering: ≤0.15(%)

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	70-100	120-160	140-180	180-220

Notice

1.Redry the electrode at 350°C for 1hours.
2.Multi-pass welding must clean the welding slag. Each layer is controlled below 250°C.

High-Strength Steels

E10018-D2

Specifications: AWS A5.5 E10018-D2
GB/T 5118 E7018-D2
JB/T 4747.2

Instruction and Application

Low-temperature alloy steel high-strength electrode with titanium-calcium coating has low hydrogen sodium.DC reverse,all-position welding.The deposited metal has good mechanical.Used in welding the corresponding intensity level high strength low alloy steel structure.

Typical analysis of the all-welded metal (%)

C	Si	Mn	S	P	Ni	Mo
0.06	0.10	1.85	0.005	0.017	0.77	0.39

All-weld mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Impact Strength KV ₂ (J,-50°C)
Room temperature	745	675	20	102,106,115

* The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H_D (Glycerin method): ≤2.0ml/100g

Percentage of moisture for covering:≤0.15(%)

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	70-100	120-160	140-180	180-220

Notice

- 1.Redry the electrode at 350°C for 1hours.
- 2.Multi-pass welding must clean the welding slag. Each layer is controlled below 250°C.

High-Strength Steels

J807G

Specifications: AWS A5.5 E11015-G
GB/T 5118 E8015-G
JB/T 4747.2

Instruction and Application

Low-temperature alloy steel high-strength electrode with titanium-calcium coating has low hydrogen sodium.DC reverse,all-position welding,excellent welding performance,the deposited metal has good low temperature impact toughness.Used in welding the corresponding intensity level high strength low alloy steel.

Typical analysis of the all-welded metal (%)

C	Si	Mn	S	P	Ni	Mo	Cr
0.07	0.15	1.28	0.008	0.012	2.16	0.41	0.70

All-weld mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Impact Strength KV ₂ (J,-40°C)
Room temperature	870	790	18	130,132,140

* The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H_D (Glycerin method): ≤2.0ml/100g

Percentage of moisture for covering:≤0.15(%)

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	70-100	120-160	140-180	180-220

Notice

- 1.Redry the electrode at 350°C for 1hours.
- 2.Multi-pass welding must clean the welding slag. Each layer is controlled below 250°C.

High-Strength Steels

J107G

Specifications: AWS A5.5 E12015-G
GB/T 5118 E10015-G
JB/T 4747.2

Instruction and Application

Low-temperature alloy steel high-strength electrode with titanium-calcium coating has low hydrogen sodium.DC reverse,all-position welding.Used in welding T.S. equivalent to 980 MPa high strength low alloy steel structure.

Typical analysis of the all-welded metal (%)

C	Si	Mn	S	P	Ni	Mo	Cr
0.06	0.35	1.80	0.005	0.012	1.85	0.45	0.73

All-weld mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Impact Strength KV ₂ (J,R,T)
Room temperature	995	895	20	150,148,135

* The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

The diffusible hydrogen content of deposited metal H_D (Glycerin method): ≤2.0ml/100g

Percentage of moisture for covering: ≤0.15(%)

Current adjustment (DC+)

ElectrodesΦ (mm)	Φ2.5	Φ3.2	Φ4.0	Φ5.0
Amperage (A)	70-100	120-160	140-180	180-220

Notice

- 1.Redry the electrode at 350°C for 1 hours.
- 2.Multi-pass welding must clean the welding slag. Each layer is controlled below 250°C.

High-Strength Steels

H08Mn2MoG/SJ101G

Specifications: AWS A5.23 F8P0-EA4-A4
JB/T 4747.4

Instruction and Application

F8P0-EA4-A4 wire used with SJ101G flux,SJ101G is the ultra-low hydrogen agglomerated flux,Alkalinity B>2.0,the flux has excellent performance, the deposited metal is pure, low S, P content, good mechanical properties.Used in welding the 60kg grade high strength steel.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Mo
0.07	0.11	1.69	0.007	0.009	0.55

Typical analysis of the all-welded metal (%)

C	Si	Mn	S	P	Mo
0.06	0.20	1.44	0.008	0.014	0.48

All-weld mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)
Room temperature	690	600	22

Temperature	Impact Strength KV ₂ (J,-20°C)	Heat treatment
Room temperature	85,92,80	620°C X 1h

* The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ16G	0.15	0.06	0.09	0.014	0.023

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	450-500
Φ4.0	500-550	28-32	450-500

Notice

- 1.Redry the flux at 300-350°C for 2 hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled below 150°C.

High-Strength Steels

H09MnNiMoG/SJ16G

Specifications: AWS A5.23 F8P0-EF3-F3
JB/T 4747.4

Instruction and Application

F8P0-EF3-F3 wire used with SJ16G flux, SJ16G is the ultra-low hydrogen agglomerated flux, Alkalinity B>2.5, the flux has excellent performance, the deposited metal is pure, low S, P content, good mechanical properties. Used in SAW the ASME SA508 Gr.3 the Class1 (13MnNiMoR) or similar steel for boiler pressure vessel.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Ni	Mo
0.14	0.19	2.06	0.003	0.004	1.03	0.58

Typical analysis of the all-welded metal (%)

C	Si	Mn	S	P	Ni	Mo
0.08	0.27	1.81	0.006	0.008	0.96	0.55

All-weld mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)
Room temperature	650	570	28

Temperature	Impact Strength KV ₂ (J,-20°C)	Heat treatment
Room temperature	150,160,166	620°C X 20h

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Physical and chemical analysis of the flux (%)

	Mechanical inclusion	Moisture content	Moisture absorption ratio	S	P
SJ16G	0.16	0.04	0.07	0.016	0.023

Reference range (DC+)

WireΦ (mm)	Amperage (A)	Volt (V)	Speed (mm/min)
Φ3.2	450-500	28-32	450-500
Φ4.0	500-550	28-32	450-500

Notice

- 1.Redry the flux at 300-350°C for 2 hours.
- 2.The welding consumables surface rust, oil and other impurities to be clean.
- 3.Multi-pass welding must clean the welding slag. Each layer is controlled below 150°C.

High-Strength Steels

HS-70

Specifications: AWS A5.28 ER100S-G
GB/T 8110 ER69-G

Instruction and Application

70kg grade high strength steel gas shielded welding wire, with high strength and low temperature toughness, good arc stability, can welding at high current, high deposition efficiency. Used in welding the pressure vessels, bridges, steel structure, which has high strength requirements.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Ni	Mo
0.08	0.65	1.55	0.008	0.009	0.76	0.32

All-weld mechanical properties

Temperature	Tensile strength R _m (MPa)	Yield strength R _{p0.2} (MPa)	Elongation A(%)	Impact Strength KV ₂ (J,-20°C)
Room temperature	725	650	22	115,106,110

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Reference range (DC+ /DC-)

WireΦ	Category	Gas	Amperage(A)
Φ1.2mm	Auto	CO ₂	200-240
Φ2.0mm	Hand	CO ₂ -Ar	160-180

Volt (V)	Gas flow(L/min)	Speed (mm/min)
27-31	18-22	300-350
-	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 150°C.
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.

High-Strength Steels

HS-80

Specifications: AWS A5.28 ER110S-G
GB/T 8110 ER76-G

Instruction and Application

80kg grade high strength steel gas shielded welding wire, with high strength and low temperature toughness, good arc stability, can welding at high current , high deposition efficiency.Used in welding the pressure vessels, bridges, steel structure,which has high strength requirements.

Typical analysis of the wire (%)

C	Si	Mn	S	P	Cr	Ni	Mo
0.07	0.30	1.43	0.005	0.007	0.23	2.20	0.35

All-weld mechanical properties

Temperature	Tensile strength Rm(MPa)	Yield strength Rp _{0.2} (MPa)	Elongation A(%)	Impact Strength KV ₂ (J,-51°C)
Room temperature	840	730	20	105,110,98

*The actual heat-treating system can be made by working condition and negotiation between supply and requisition parties.

Reference range (DC+ /DC-)

WireΦ	Category	Gas	Amperage(A)
Φ1.2mm	Auto	CO ₂	200-240
Φ2.0mm	Hand	CO ₂ ,Ar	160-180

Volt (V)	Gas flow(L/min)	Speed (mm/min)
27-31	18-22	300-350
-	15-17	80-150

Notice

- 1.The welding consumables surface rust, oil fouling and other impurities must be cleaned up.
- 2.Each layer is controlled below 150°C .
- 3.The operation is appropriate to the short arc, arc length control in 1-3mm.