GTAW TIG ROD

ST-50G

AWS A5.18 / ASME SFA5.18 ER70S-G
JIS Z3316 YGT50
EN 1668 - W3Si1

Applications

Butt and fillet welding of carbon steel for pressure vessels, tubes for nuclear reactors, ships, penstock and aluminum-killed steel for low temperature service.

Characteristics on Usage

ST-50 G is a wire for TIG welding with pure Ar gas.
All position welding and steel sheet welding can be performed quite easily.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Shielding Gas
0.07	0.83	1.43	Ar

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J(ft.lbs) -20℃ (-4℉)
460 (66,700)	530 (76,900)	27	170 (125)

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

Approval

KR, ABS, DNV, LR, NK, BV, GL

ST-50.6

AWS A5.18 / ASME SFA5.18 ER70S-6
JIS Z3316 YGT50
EN 1668 - W3Si1

Applications

Butt and fillet welding of carbon steel for pressure vessels, tubes for nuclear reactors, ships, penstock and aluminum-killed steel for low temperature service.

Characteristics on Usage

ST-50 · 6 is a wire for TIG welding with pure Ar gas.
All position welding and steel sheet welding can be performed quite easily.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Shielding Gas
0.07	0.85	1.50	Ar

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J(ft.lbs) -20℃ (-4℉)
450 (65,300)	520 (75,500)	28	180 (132)

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

Approval

ABS

ST-50.3

AWS A5.18 / ASME SFA5.18 ER70S-3
EN 1668 - W2Si

Applications

Butt and fillet welding of carbon steel for pressure vessels, tubes for nuclear reactors, ships, penstock and aluminum-killed steel for low temperature service.

Characteristics on Usage

ST-50.3 is a wire for TIG welding with pure Ar gas.
All position welding and steel sheet welding can be performed quite easily.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Shielding Gas
0.07	0.65	1.15	Ar

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J(ft.lbs) -20℃ (-4℉)
495 (71,800)	565 (81,950)	26	170 (125)

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

ST-1N

AWS A5.28/ ASME SFA5.28 ER80S-Ni1

Applications

Oil and gas industry, Offshore industry, Power plant Petro chemical industry and oil pipes.

Characteristics on Usage

① As ST-1N contains 1% Ni, its impact value in low temperature is good.
② Both its bead apperarance and weldability are excellent.
③ ST-1N is designed for welding of back bead of pipes.
④ ST-1N meets NACE Standard.

Shielding Gas | Welding Current

Ar

GTAW: DC-

Typical Chemical Composition of Wire (%)

C	Si	Mn	P	S	Ni	Cu
0.082	0.62	1.15	0.011	0.010	0.87	0.08

Typical Mechanical Properties of All-Weld Metal

PWHT	YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J(ft.lbs) -45℃
As Weld	594 (86,000)	671 (97,300)	32.3	59
PWHT	568 (82,400)	645 (93,500)	34.0	108

Approval | Packing

ABS

Size (mm) 2.0 2.4 3.2
Weight 5kg* 900mm

ST-308

AWS A5.9 / ASME SFA5.9 ER308
JIS Z3321 YS308

Applications

TIG welding of 18%-8%Ni stainless steel.

Characteristics on Usage

ST-308 is a filler rod for TIG welding with pure Ar gas.
As the weld metal contains ferrite, its crack resistibility is excellent.
Both its bead appearance and weldability are good.
Furthermore, resistance to corrosion and mechanical properties is good.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Ni	Cr
0.05	0.38	1.75	10.1	19.8

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J(ft.lbs) 0℃ (32℉)
610 (88,500)	40	130 (95)

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

Approval

KR, ABS, DNV

ST-308L

AWS A5.9 / ASME SFA5.9 ER308L
JIS Z3321 YS308L
EN ISO 14343-A - W 19 9 L

Applications

TIG welding of extra-low carbon 18%Cr-18%Ni and 18%Cr-8%Ni stainless steel.

Characteristics on Usage

ST-308L is a filler rod for TIG welding with pure Ar gas.
As the weld metal contains ferrite, its crack resistibility is excellent.
Both its bead appearance and weldability are good.
The corrosion resistibility and intergranular corrosion, resistibility are extremely excellent.
Furthermore, resistance to corrosion and mechanical properties are good.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Ni	Cr
0.02	0.36	1.70	10.3	20.0

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in^2)	EL (%)	CVN-Impact Value J(ft.lbs) 0℃ (32℉)
600 (87,000)	41	110 (81)

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

Approval

KR, ABS, DNV, LR, NK, BV, CCS

ST-309

AWS A5.9 / ASME SFA5.9 ER309
JIS Z3321 YS309

Applications

TIG welding of 22%Cr-12%Ni steel and a variety welding stainless with mild steel.
Clad steel side of 18%Cr-8%Ni clad steel.

Characteristics on Usage

ST-309 is a filler rod for TIG welding with pure Ar gas.
As the weld metal contains ferrite, its crack resistibility is excellent.
Furthermore, resistance to corrosion and heat is extremely good.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Ni	Cr
0.07	0.38	1.88	12.8	24.4

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J(ft.lbs) 0℃ (32℉)
620 (90,000)	38	130 (96)

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

Approval

ABS

ST-309L

AWS A5.9 / ASME SFA5.9 ER309L
JIS Z3321 YS309L
EN ISO 14343-A - W 23 12 L

Applications

TIG welding of low carbon 22%Cr-12%Ni steel and a dissimilar metals.
Clad side of 18%Cr-8%Ni clad steel.

Characteristics on Usage

ST-309L is a filler rod for TIG welding with pure Ar gas.
As the weld metal contains ferrite, its crack resistibility is excellent.
Furthermore, resistance to corrosion and heat is extremely good.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Ni	Cr
0.03	0.40	1.74	12.6	24.2

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in^2)	EL (%)	CVN-Impact Value J(ft.lbs) 0℃ (32℉)
600 (87,000)	38	150 (110)

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

Approval

ABS, DNV, LR, NK, BV , CCS

ST-309MoL

AWS A5.9 / ASME SFA5.9 ER309LMo

Applications

TIG Welding of dissimilar metals such as stainless steels and carbon steels.

Characteristics on Usage

This wire contains a high ferrite level in its austenitic structure thus providing superior heat and corrosion resistance.
ST-309MoL is suitable for the build up on low alloy or mild steel and welding of STS 316, 316L clad steel.
Both bead appearance and weldability are good.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Ni	Cr	Mo
0.02	0.35	1.8	13.7	23.2	2.5

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in^2)	EL (%)
650 (94,200)	32

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100		
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100		
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200	25	Ar
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

ST-310

AWS A5.9 / ASME SFA5.9 ER310
JIS Z3321 YS310

Applications

TIG welding of 25%Cr-20%Ni steel.

Characteristics on Usage

ST-310 is a filler rod for TIG welding with pure Ar gas.
The structure of the weld metal is all austenite.
Resistance to corrosion and heat of weld metal is excellent.
Elongation of weld metal is extremely good.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Ni	Cr
0.09	0.35	1.90	20.9	26.8

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J(ft.lbs) 0℃ (32℉)
610 (88,500)	41	110 (81)

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

ST-312

AWS A5.9 / ASME SFA5.9 ER312
JIS Z3321 YS312

Applications

TIG Welding of 29%Cr-9%Ni stainless steel and dissimilar metals.

Characteristics on Usage

Due to high Cr content, it has excellent resistance to corrosion.
This wire contains a high ferrite level in its austenitic structure thus providing better crack resistance.
ST-312 is suitable for the welding of dissimilar metal such as stainless steels, mild steels and low alloy.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Ni	Cr
0.10	0.38	1.68	8.8	30.0

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in^2)	EL (%)
770 (111,600)	27

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

ST-316

AWS A5.9 / ASME SFA5.9 ER316
JIS Z3321 YS316

Applications

TIG welding of low carbon 18%Cr-12%Ni-2%Mo.

Characteristics on Usage

ST-316 is a filler rod for TIG welding with pure Ar gas.
As the weld metal contains ferrite, its crack resistibility is excellent.
Both bead appearance and weldability are good.
Resistance to corrosion and heat is extremely good.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Ni	Cr	Mo
0.05	0.41	1.82	12.5	18.9	2.5

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J(ft.lbs) 0℃ (32℉)
590 (85,600)	41	130 (95)

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

Approval

ABS

ST-316L

AWS A5.9 / ASME SFA5.9 ER316L
JIS Z3321 YS316L
EN ISO 14343-A - W 19 12 3 L

Applications

TIG welding of low carbon 18%Cr-12%Ni-2%Mo steel.

Characteristics on Usage

ST-316L is a filler rod for TIG welding with pure Ar gas.
As the weld metal contains ferrite, its crack resistibility is excellent.
Both its bead appearance and weldability are good.
Resistance to corrosion and heat is extremely good.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Ni	Cr	Mo
0.02	0.38	1.85	12.4	18.8	2.5

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J(ft.lbs) 0℃ (32℉)
570 (82,700)	44	140 (103)

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

Approval

KR, ABS, DNV, GL, LR, NK, BV, CCS

ST-347

AWS A5.9 / ASME SFA5.9 ER347
JIS Z3321 YS347

Applications

TIG Welding of 18%Cr-8%Ni-Nb(SUS 347) and 18%Cr-8%Ni-Ti(SUS321) stainless steel

Characteristics on Usage

As the weld metal contains ferrite, its resistance to crack is good.
Bead appearance and weldability are good.
ST-347 has stabilizing element (Nb) thus providing good integranular corrosion resistance and better heat resistance.
Due to high creep strength at high temperature, suitable for the welding of boiler and gas turbine.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Ni	Cr	Nb
0.05	0.43	1.66	9.6	20.0	0.7

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)
680 (98,600)	32

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

ST-2209

AWS A5.9 / ASME SFA5.9 ER2209

Applications

① Used for welding of 22%Cr-5%Ni-2%Mo-0.15%N STS steel.
② Used for welding of offshore oil/gas, chemical and petrochemical process industries, e.g. pipework systems, flowlines, risers, manifolds etc.

Characteristics on Usage

① Duplex stainless steel pipes, plates, fittings and forgings have an approximate 50:50 microstructure of austenite with a ferrite matrix.
② Preheat not generally required. Interpass temperature 100 ~ 150℃ max, heat input in the range 0.5 ~ 1.5KJ/min - depending on material thickness.
③ Good general corrosion resistance in a range of environments.
④ High resistance to chloride induced stress corrosion cracking (CSCC).

GTAW

Typical Chemical Composition of Wire (%)

C	Si	Mn	Ni	Cr	Mo
0.01	0.41	1.70	8.9	23.4	3.2

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃ (℉)	CVN-Impact Value J (ft · lbs)	PREN
810 (116,700)	27	-20 (-4)	195	35

Ferrite Contents of All-Weld Metal(Shielding gas : 100%Ar)

	WRC-1992 (FN)	Shaeffler Diagram(%)
As welded	66	55

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

Approval

LR, DNV

SMT-2594

AWS A5.9 ER2594

Applications

① used for welding of 25%Cr-7%Ni-4.5%Mo-0.25%N Super Duplex steel.
② used for welding of Petochemical plants, offshore structures and FPSO.

Characteristics on Usage

① Weld metal has 30~60% ferrite contents
② Due to the high chromium contents, corrosion resistance is excellent in most environments(chloride enviroment)
③ Superior pitting resistance(PREN ≥40)

Typical Chemical Composition of Wire (%)

C	Si	Mn	P	S	Cr	Ni	Mo	Cu	N
0.011	0.41	0.53	0.019	0.001	25.27	9.13	3.86	0.21	0.257

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃ (℉)	CVN-Impact Value J (ft · lbs) 0℃ (32℉)	PREN
890 (129,000)	28.6	-50 (-58)	195	40

Ferrite Contents of All-Weld Metal(Shielding gas : 100%Ar)

	WRC-1992 (FN)	Shaeffler Diagram(%)
As welded	66.9	80.3

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		

Approval I Packing

ABS

SMT-904L

AWS A5.9 ER385
EN ISO 14343-A-G(W) 20 25 5 Cu L

Applications

Used for welding of 20%Cr-25%Ni-4.5%Mo-1.5%Cu STS Steels.

Characteristics on Usage

① SMT-904L has a fully austenitic stucture.
② Good general corrosion resistance, especially for sulphuric acid and phosphoric acid.
③ Preferably keep Heat input below 1.5KJ/mm.

Shielding Gas | Welding Current

Ar, Ar+He

GMAW: DC+(Pulse) GTAW : DC-

Typical Chemical Composition of Wire (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.013	0.31	1.89	0.013	0.001	24.96	20.52	4.32	1.42

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J(ft.lbs) +20℃	-196℃
490 (71,000)	650 (94,300)	35.0	110	70

Approval I Packing

SMT-904L	Size(mm)	1.0	1.2	1.6
	Weight	Spool : 12.5kg		
SMT-904L	Size(mm)	2.0	2.4	3.2
	Weight	5kg* 1,000mm		

ST-410

AWS A5.9 / ASME SFA5.9 ER410
JIS Z3321 Y410

Applications

TIG Welding of 13%Cr stainless steel (STS 403, STS 410)

Characteristics on Usage

Structure of all-weld metal is martensite having magnetic properties thus providing high hardness, good anti-abrasive property. Both bead appearance and weldability are good.
Due to high hardness of all-weld metal and excellent resistance to corrosion and abrasion, it can be used to hardfacing of carbon steels and 13%Cr stainless steels application.

Typical Chemical Composition of Wire (%)

C	Si	Mn	Ni	Cr
0.10	0.38	0.34	0.17	12.0

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J(ft.lbs) 0℃ (32℉)
530 (76,800)	37	-

Typical Welding Conditions (DC-)

Size mm(in)	Currents A	Gas Flow (ℓ /min.)	Shielding gas
1.2 (.045) ~ 2.0 (5/64)	50 ~ 100	25	Ar
1.6 (1/16) ~ 3.2 (1/8)	100 ~ 200		
2.4 (3/32) ~ 3.2 (1/8)	200 ~ 300		
3.2 (1/8)	300 ~ 400		