Your Best Welding Partner!

HYUNDAI WELDING

Welding Consumables

SPECIALTIES & RECOMMENDATIONS

www.hyundaiwelding.com

Heat-Resistant Steel

Applications

1. Applications

Pipe of boilers for power plant, equipment for oil refining industries and high temperature synthetic chemical industries.

2. Welding Consumables for Heat-Resistant Steel

Types of Steel	Types of Steel (ASTM/ASME)	Tem. (℃)	SMAW	FCAW	GTAW
0.5Mo	A335 Gr.P1	400~475	S-7010.A., S-7016.A1 S-7018.A1, S-8016.B1	SC-81A1	-
1Cr-0.5Mo	A335 Gr.P12	450~550	S-8016(18).B2, S-8018.B2R S-8016.B2R	SC-81B2	ST-80B2 ST-80CM
1.25Cr-0.5Mo	A335 Gr.P11	500~550			
2.25Cr-1Mo	A335 Gr.P22	520~600	S-9016(18).B3, S-9018.B3R S-9016.B3R	SC-91B3	ST-90B3
9Cr-1Mo	A335 Gr.P9	600~650	S-9015.B9 S-9016.B9	SC-91B9	ST-91B9
9Cr-1Mo-Ni-V-Nb	A335 Gr.P91	525~600			
9Cr-0.5Mo-Ni-V-Nb-W	A335 Gr.P92	550~650	S-9015(16).B92	-	ST-92B9

Characteristics

Division		Product Name	Chemical Compositions	Current	X-factor	J-factor	Temp.	Hydrogen	TS at High Temp.	Shielding Gas
SMAW	B2	S-8016(18).B2	1.25Cr-0.5Mo	AC/DC	-	-	-	H10~H15	-	-
		S-8018.B2R			≤15ppm	≤150ppm	-20℃	H5	◎	
	B3	S-9016(18).B3	2.25Cr-1.0Mo		-	-	-	H10~H15	-	
		S-9018.B3R			≤15ppm	≤180ppm	-20℃	H5	◎	
	B9	S-9015.B9	9Cr-1Mo-0.5Ni-0.2V -0.05Nb	DC	N/R	N/R	+20℃		◎	
		S-9016.B9	9Cr-1Mo-0.3Ni-0.2V -0.05Nb	AC/DC						
		S-9015(16).B92	9Cr-0.5Mo-0.5Ni-0.2V -0.05Nb-1.5W						-	
FCAW		SC-91B9	9Cr-1Mo-0.5Ni-0.2V -0.05Nb	DC	N/R	N/R		H4	-	Ar+ 20% CO_2
GTAW		ST-91B9			N/R	N/R		-	-	Ar
		ST-92B9	9Cr-0.5Mo-0.5Ni-0.2V -0.05Nb-1.5W						-	

Heat-Resistant Steel

S-8018.B2R / S-9018.B3R

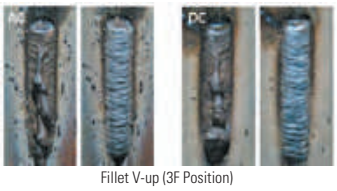
1. Chemical Composition of All-Weld Metal (%)

Division	Chemical Compositions of all-Weld Metal (wt%)												
	C	Si	Mn	P	S	Ni	Cr	Mo	Sb	Sn	As	X-factor	J-Factor
S-8018.B2R	0.061	0.44	0.76	0.009	0.010	0.052	1.26	0.55	0.002	0.002	0.001	10.9	132
AWS E8018-B2	0.05 ~0.12	0.80 max	0.90 max	0.030 max	0.030 max	-	1.00 ~1.50	0.40 ~0.65	-	-	-	-	-
S-9018.B3R	0.072	0.61	0.78	0.008	0.010	0.054	2.22	0.97	0.002	0.004	0.006	11.2	167
AWS E9018-B3	0.05 ~0.12	0.80 max	0.90 max	0.030 max	0.030 max	-	2.00 ~2.50	0.90 ~1.20	-	-	-	-	-

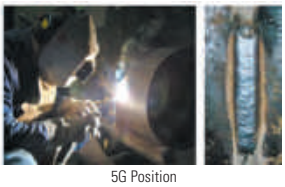
- Bruscato X-factor = $\frac{(10\,P + 5\,Sb + 4\,Sn + As)}{100} \leq 15ppm$
- Watanabe J-factor = (Mn+Si) X (P+Sn) X 104 ≤ 150 or 180ppm

2. Mechanical Properties and Diffusible Hydrogen of All-Weld Metal (%)

Division	Tensile Test			Charpy V-Notch Impact Values (Joule)					Diffusible Hydrogen (ml/100g)
	YS (Mpa)	TS (Mpa)	EL (%)	Temp.	x1	x2	x3	Avg.	
S-8018.B2R	578	664	25.4	0℃	108	119	121	116	3.32
				-20℃	58	63	65	62	
AWS E8018-B2	460min.	550min.	19min.	Not specified					-
S-9018.B3R	601	681	23.8	0℃	118	116	127	120	3.39
				-20℃	79	83	81	81	
AWS E9018-B3	530min.	620min.	17min.	Not specified					-



Fillet V-up (3F Position)



5G Position

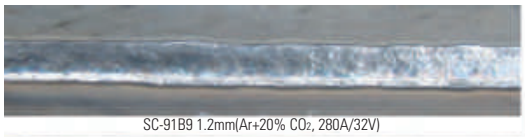
SC-91B9

1. Chemical Composition of All-Weld Metal(%) (Ar+20% CO_2)

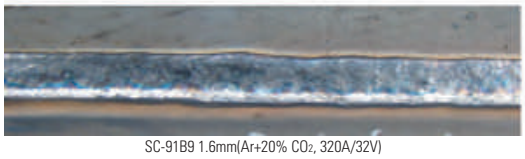
Division	Chemical Compositions of all-Weld Metal (wt%)													
	C	Si	Mn	P	S	Ni	Cr	Mo	V	Cu	Al	Nb	N	Mn+Ni
SC-91B9	0.100	0.11	0.53	0.011	0.004	0.48	8.86	0.98	0.21	0.021	0.001	0.046	0.04	1.01
AWS E91T1-B9M	0.08 ~0.13	≤0.5	≤1.2	≤0.02	≤0.015	≤0.8	8.0 ~10.5	0.85 ~1.20	0.15 ~0.30	0.25 max	0.04 max	0.02 ~0.10	0.02 ~0.07	1.50 max

2. Mechanical Properties and Diffusible Hydrogen of All-Weld Metal(%)

Division	Tensile Test			Charpy V-Notch Impact Values (Joule)					Diffusible Hydrogen (ml/100g)
	YS(Mpa)	TS(Mpa)	EL(%)	Temp.	x1	x2	x3	Avg.	
SC-91B9	632	727.9	20.8	+20℃ (RT)	39	40	40	39.7	2.01
AWS E91T1-B9M	540min.	620~830	16min.	Not specified					H4



SC-91B9 1.2mm(Ar+20% CO_2, 280A/32V)



SC-91B9 1.6mm(Ar+20% CO_2, 320A/32V)

SC-91B9 1.2mm (Ar+20% CO_2, 200A/25V)

S-9015.B9 / S-9016.B9

1. Chemical Composition of All-Weld Metal (%)

Division	Chemical Compositions of all-Weld Metal (wt%)													
	C	Si	Mn	P	S	Ni	Cr	Mo	V	Cu	Al	Nb	N	Mn+Ni
S-9015.B9	0.11	0.20	1.01	0.008	0.005	0.47	9.43	1.02	0.20	0.025	0.015	0.047	0.033	1.48
S-9016.B9	0.12	0.19	0.92	0.005	0.006	0.24	8.90	0.96	0.21	0.026	0.014	0.053	0.035	1.16
AWS E9015-B9 E9016-B9	0.08 ~0.13	0.30 max	1.20 max	0.010 max	0.010 max	0.80 max	8.0 ~10.5	0.85 ~1.20	0.15 ~0.30	0.25 max	0.04 max	0.02 ~0.10	0.02 ~0.07	1.50 max

2. Mechanical Properties and Diffusible Hydrogen of All-Weld Metal (%)

Division	Tensile Test			Charpy V-Notch Impact Values (Joule)					Diffusible Hydrogen (ml/100g)
	YS (Mpa)	TS (Mpa)	EL (%)	Temp.	x1	x2	x3	Avg.	
S-9015.B9	658	755	22.4	+20℃ (RT)	41	45	50	44	3.73
S-9016.B9	609	736	22.2		46	50	52	49	4.42
AWS E9015-B9 E9016-B9	530min.	620min.	17min.	Not specified					-

5G Position

6G Position

ST-91B9

1. Chemical Composition of Wire (%)

Division	Chemical Compositions of Wire (wt%)													
	C	Si	Mn	P	S	Ni	Cr	Mo	V	Cu	Al	Nb	N	Mn+Ni
ST-91B9	0.100	0.30	0.47	0.005	0.003	0.67	8.91	0.96	0.20	0.007	0.001	0.06	0.05	1.14
AWS ER90S-B9	0.07 ~0.13	0.15 ~0.50	≤1.2	≤0.01	≤0.01	≤0.8	8.0 ~10.5	0.85 ~1.20	0.15 ~0.30	0.20 max	0.04 max	0.02 ~0.10	0.03 ~0.07	1.50 max

2. Mechanical Properties of All-Weld Metal (%)

Division	Tensile test			Charpy V-Notch Impact Values (Joule)				
	YS(Mpa)	TS(Mpa)	EL(%)	Temp.	x1	x2	x3	Avg.
ST-91B9	746	833.1	20.6	+20℃ (RT)	215	220	215	220
AWS ER90S-B9	410min.	620min.	16min.	Not specified				

ST-92B9

1. Chemical Composition of Wire (%)

Division	Chemical Compositions of Wire (wt%)												
	C	Si	Mn	P	S	Ni	Cr	Mo	V	Nb	W	B	N
ST-92B9	0.100	0.23	0.55	0.008	0.002	0.49	8.82	0.44	0.18	0.06	1.7	0.003	0.046
AWS ER90S-G	Not specified												

2. Mechanical Properties of All-Weld Metal (%)

Division	Tensile Test			Charpy V-Notch Impact Values (Joule)				
	YS(Mpa)	TS(Mpa)	EL(%)	Temp.	x1	x2	x3	Avg.
ST-92B9	758	845	21.4	+20℃ (RT)	150	151	150	150
AWS ER90S-G	Not Specified							

S-8018.B2R
1.25%Cr - 0.5%Mo Heat-Resistant Steel

Applications and Characteristics on Usage

1. Applications

S-8018.B2R can be used for welding of 1~1.25%Cr - 0.5%Mo steel, such as high-temperature and high-pressure boilers, petroleum refining devices, chemical engineering facilities, thermoelectric power plant and etc.

2. Characteristics on Usage

S-8018.B2R is a low hydrogen type (HDM < 5ml/100g) electrode for all position welding and also pipe welding(5G). X-Factor ≤ 15ppm

Good mechanical properties after the post weld heat treatment(PWHT 690°C*1hr, 2hr) Good toughness against the impact at low temperature.

3. Types of Steel (ASTM/ASME)

A387Gr.12 Cl.1, Cl.2 , A387Gr. 11 Cl.1, Cl.2

A213Gr.T11, T12, A335Gr.P11, T12

Specifications

1. Typical Chemical Composition of All-Weld Metal(%)

	C	Si	Mn	P	S	Cr	Mo
S-8018.B2R	0.069	0.57	0.82	0.007	0.010	1.32	0.58
AWS A5.5 E8018-B2	0.05 ~0.12	≤0.80	≤0.90	≤0.030	≤0.030	1.00 ~1.50	0.40 ~0.65

2. X-Factor

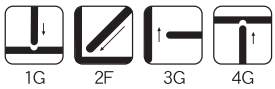
	P	Sb	Sn	As	X-Factor (ppm)
S-8018.B2R	0.0070	0.0050	0.0020	0.0010	10.4

- X-factor : Very small amount of element that causes 400~550°C tempering fragileness
- X-factor Formula= $\frac{(10\,P + 5\,Sb + 4\,Sn + As)}{100} \leq 15ppm$

3. Typical Mechanical Properties and Diffusible Hydrogen Levels of All-Weld Metal(%)

	PWHT (690°C)	YS (MPa)	TS (MPa)	EL (%)	Impact (J)		Diffusible Hydrogen (ml/100g)
					0°C	-20°C	
S-8018.B2R	1hr	608	684	25.4	144	62	3.37
	2hrs	606	661	27.2	143	91	
AWS A5.5 E8018-B2	690±15°C *1hr	≥460	≥550	≥19	-		-

Welding Position



1G (PA) 2F (PB) 3G (PF) 4G (PE)

Packing

- Packet : 5kg
- Carton : 20Kg : 4 X 5kg

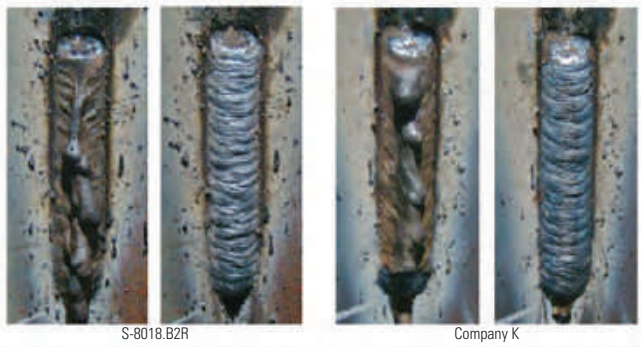
Weldability Test

1. Weldability

Good arc stability, fusibility, deposition and bead appearance

Size : 4.0mm*400 Welding Position : 3F (V-Up)
Base Metal : 12mmt Fillet Current : AC 140Amp / DC+ 140Amp

AC



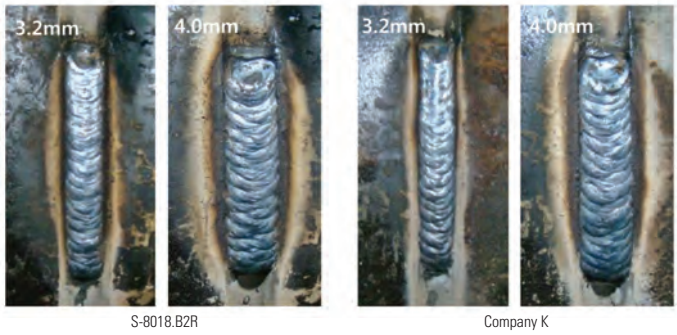
S-8018.B2R Company K

DC+

2. Pipe Welding

Good arc stability(steady melting of the coating material), deposition and bead appearance.

- Size : 3.2mm, 4.0mm
- Base Metal : 10mmt pipe
  V-groove, groove angle 60°
- Pipe 5G : (Direction from
  5 o'clock to 3 o'clock)
  1st 3.2mm, DC+ 120A
  2nd 4.0mm, DC+ 140A



S-8018.B2R Company K

S-9015.B9

9%Cr - 1%Mo Heat-Resistant Steel

Applications

1. Applications

9%Cr-1%Mo heat resistant steel, power plant and oil refining industries.

2. Classifications

- AWS A5.5 E9015-B9
- EN ISO 3580-A ECrMo91 B 4 2
- JIS Z3223 E6215-9C1MV

3. Types of Steel

- ASTM : A213 T91, A335 P91, A387 Gr 91, A182/A336 F91, A217 C12A, A234 WP91, A369 FP91
- DIN / BS EN : 1.4903 (X10CrMoVNb 9 1)
- BS : 1503 Gr91, 3059-2 Gr91

Specifications

1. Typical Chemical Composition of All-Weld Metal (%)

Division	Chemical Compositions of All-Weld Metal (wt%)													
	C	Si	Mn	P	S	Ni	Cr	Mo	V	Cu	Al	Nb	N	Mn+Ni
S-9015.B9	0.9	0.24	0.85	0.005	0.004	0.58	9.37	1.06	0.22	0.026	0.002	0.042	0.025	1.43
Company A	0.09	0.18	0.65	0.007	0.007	0.56	8.76	0.92	0.23	0.037	0.001	0.050	0.050	1.21
AWS A5.5	0.08 ~0.13	0.30 max	1.20 max	0.010 max	0.010 max	0.80 max	8.0 ~10.5	0.85 ~1.20	0.15 ~0.30	0.25 max	0.04 max	0.02 ~0.10	0.02 ~0.07	1.50 max

2. Mechanical Properties and Diffusible Hydrogen levels of All-Weld Metal (%)

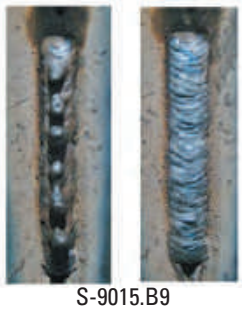
Division	Tensile Test			Charpy V-Notch Impact Values (Joule)					Diffusible Hydrogen (ml/100g)
	YS (Mpa)	TS (Mpa)	EL (%)	Temp.	x1	x2	x3	Avg.	
S-9015.B9	659	766	23.6	+20℃ (RT)	64	80	92	78	2.76
Company A	640	770	22.0		47	65	83	65	2.15
AWS A5.5	530min.	620min.	17min.	Not Specified					-

PWHT 760°C x 2hr

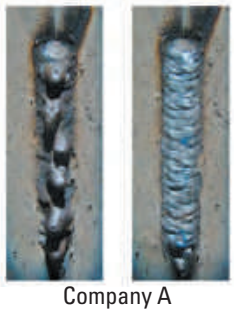
Weldability Test

1. Fillet V-up

- 4.0mm, DC+ 135Amp / 12mmt Fillet



S-9015.B9



Company A

2. Pipe 5G

- 4.0mm, DC+, 130Amp.

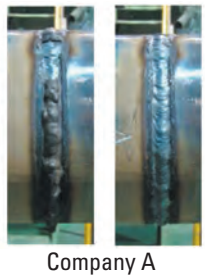
S-9015.B9

20inch pipe

Company A

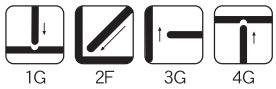
S-9015.B9

4.5inch pipe



Company A

Welding Position



1G (PA) 2F (PB) 3G (PF) 4G (PE)

Packing

- Packet : 5kg
- Carton : 20Kg : 4 X 5kg

Superflux787
Flux

Applications

Multi-layer welding of various kinds of structure such as ship building, offshore structures, machinery and pressure vessels.

Characteristics

1. Flux content

Division	Main content (%)			Gas content (% at 1000℃)	
	MgO+MnO	CaF_2+CaO	Al_2O_3+SiO_2	H_2O	CO_2
Superflux787	35	35	30	0.02	0.51

2. Flux type

Division	Particle Size (Mesh)	EN 760	Basic index
Superflux787	12 x 60	SA FB 1	2.7

3. Wire type

Division	Chemical Composition (wt%)							
	C	Si	Mn	P	S	Ni	Cr	Mo
H-12K	0.09	0.24	1.70	0.012	0.007	-	-	0.49
H-14	0.14	0.02	1.89	0.009	0.005			
A-3	0.096	0.03	1.93	0.014	0.009	0.01	-	0.49
F-3	0.12	0.21	1.77	0.018	0.001	1.05	-	0.51
M-4	0.099	0.17	1.48	0.012	0.001	2.44	0.59	0.50
B-2	0.10	0.23	0.55	0.018	0.005	0.09	1.42	0.52

Types of Steel

Steel type	ASTM/ASME/API	Wire	AWS Spec.
Carbon	A 285 Gr.A A53 Gr.A	H-14	A5.17 F7A8-EH14 A5.17 F7P8-EH14
Killed Carbon	A516 Gr.60 A333 Gr.1 API 5L X55	H-12K	A5.17 F7A8-EH12K A5.17 F7P8-EH12K
0.5Mo	A204 Gr.A A335 Gr.P1	A-2	A5.23 F7A4-EA2-A2 A5.23 F7P4-EA2-A2
		A-3	A5.23 F8A5-EA3-A3
1.25Cr-0.5Mo	A335 Gr.P11	B-2	A5.23 F8P0-EB2-B2
Mn-Ni-Mo	A302 Gr.C A533 Type B	F-3	A5.23 F9A6-EF3-F3 A5.23 F9P6-EF3-F3
Mn-Ni-Mo	-	M-4	A5.23 F10A6-EG-G

Mechanical Properties

1. AWS Depo. (550A/30V/40cpm)

Division	Heat Treatment	Tensile Test			CVN Impact (J)	
		Y.S(MPa)	T.S(MPa)	EL.(%)	Temp.	Ave.
Superflux787 / H-12K	As welded	527	568	31.8	-62℃	169
	620℃x1hr	486	555	32.4	-62℃	143
Superflux787 / H-14	As welded	504	552	30.0	-62℃	114
	620℃x1hr	473	531	32.8	-62℃	102

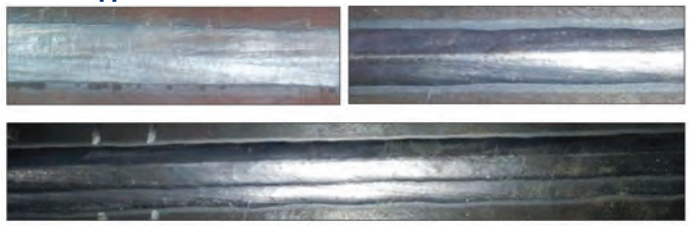
Division	Heat Treatment	Tensile test			CVN Impact Values	
		YS(Mpa)	TS(Mpa)	EL(%)	Temp.(℃)	J (Joule)
Superflux787 / A-3 (F8A5-EA3-A3)	As welded	560	612	27.4	-46	72
	As welded	≥470	550-700	≥ 20	Ave ≥ 27J -46 ℃	
Superflux787 / B-2 (F8P2-EB0-B2)	690℃x1hr	560	623	27.8	-18	48
	690℃x1hr	≥470	550-700	≥ 20	Ave ≥ 27J -18 ℃	
Superflux787 / F-3 (F9A(P)6-EF3-F3)	As welded	632	701	25.8	-51	67
	620℃x1hr	638	699	26.4		58
	As welded, 620℃x1hr	≥540	620-760	≥ 17	Ave ≥ 27J -51 ℃	
Superflux787 / M-4 (F10A6-EG-G)	As welded	691	763	25.0	-51	54
	As welded	≥610	690-830	≥ 16	Ave ≥ 27J -51 ℃	

2. Tandem

Pass	Polarity &Current	Amp. (A)	Volt (V)	Speed (cpm)	H.I. (kJ/cm)
1~3	DC+	550	30	50	19.8
4~11	L: DC+	700	32	60	43.4
	T: AC	600	35		

Division	Heat Treatment	Tensile Test			CVN Impact (J)	
		Y.S(MPa)	T.S(MPa)	EL.(%)	Temp.	Ave.
Superflux787 / H-12K X2	As Welded	-	-	-	-51℃	133
	620℃x1hr	-	-	-	-51℃	110
	620℃x12hr	449	538	31.0	-51℃	102

3. Bead Appearance



Diffusible Hydrogen

Division	Diffusible Hydrogen (ml/100g)					Remark
	X1	X2	X3	X4	Avg.	
Superflux787 / H-12K	4.86	4.77	4.89	4.91	4.86	H5

S-7018.1H, S-76LTH, S-7016.LS

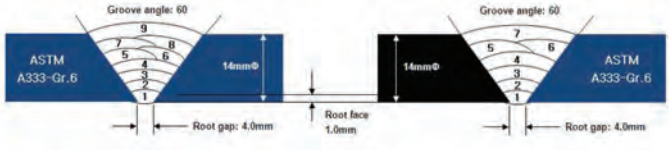
Low Temp. & Low Hydrogen type

Applications

Offshore, LPG structure, Off-shore structure
AC/DC+, Diffusible hydrogen (H5), Low temperatures (-46 ~ -60°C)

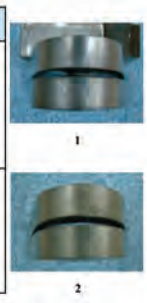
Pipe Welding : ST-50.G + S-7018.1H

Welding Condition 1 | Welding Condition 2



Division	Location	Temp (℃)	Charpy V-Notch Impact Values (Joule)				Spec.
			x1	x2	x3	Avg.	
1	W/M	-46	106	80	86	91	≥27J at −46℃
2	W/M		70	111	113	98	

Division	Fracture	TS(MPa)	Location
1 ST-50G + S-7018.1H		537.9 534.4	BM BM
2 ST-50G + S-7018.1H		534.2 529.5	BM BM

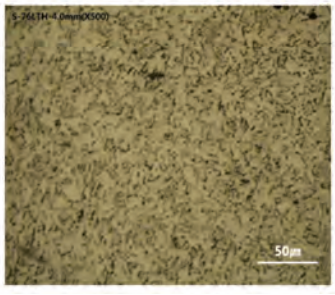


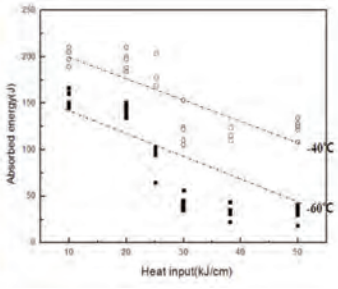
Low Temp. & Low Hydrogen type Electrode

Brand Name	Specifications	Temp. (℃)	Approval
S-76LTH	AWS A5.5 E7016-G JIS Z3211 E4916-N1 AP L EN ISO 2560-A E 42 6 Z B	-60	5Y H5 (Low hydrogen)
S-7016.LS	AWS A5.5 E7016-G JIS E4916-N1 AP L EN ISO 2560-A E 42 6 Z B	-60	5Y H10
S-7018.1H	AWS A5.5 E7016-G JIS Z3211 E4916-N1 AP L EN ISO 2560-A E 42 6 Z B	-46	4Y H5 (Low hydrogen)

Typical Mechanical Properties : S-76LTH

Division	Current	Mechanical Properties				Chemical Composition (wt%)					
		YS (MPa)	TS (MPa)	EL (%)	IV (-60℃, J)	C	Si	Mn	Ni	Ti	B
20T AWS DEPO	AC	516	568	31	110	0.08	0.34	1.30	0.47	0.020	0.0015
	DC+	500	550	31	125	0.08	0.30	1.39	0.48	0.017	0.0015





- EH 36, thickness 20mm, root gap 16mm , angle 20 degree

Application Example

S-7018.1H

1) Hyundai Engineering Co., Ltd, Turkmenistan TONE project.
2) Daewoo Engineering & Construction Co., Ltd, Papua New Guinea PNG project.
3) Hyundai Engineering & Construction Co., Lt., UAE KONE project.
4) Samsung Engineering Co., Ltd., UAE Fertil-2 project.
5) Doosan Heavy Industry & Construction. Saudi Arabia Rabigh power plant
6) Hyundai Engineering Co., Ltd, UAE, LBO project.

S-7016.LS

1) Daewoo Engineering & Construction Co., Ltd., Nigeria project.
2) Hyundai Engineering Co., Ltd, Qatar GTL-5 project.

S-76LTH

1) Hyundai Oil Bank Co., Ltd., LPG Tank
2) Korea Institute of Construction Technology PQT

H4R Grade
Low Hydrogen type

Characteristics

1. Extra Low Hydrogen

AWS Spec. "H4" Grade ($H_{[d]}$ ≤ 4ml / 100g)

2. AWS Moisture Test "R"grade

3. Low Hydrogen type Electrode (AWS Spec.)

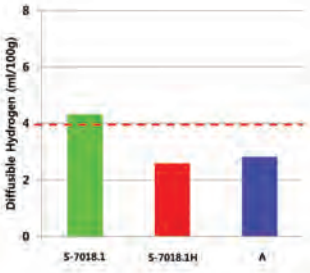
Division	AWS Code.	Hydrogen	Moisture
Low Hydrogen	H16	≤ 16㎖ /100g	≤ 0.6%
	H8	≤ 8㎖ /100g	
Extra Low Hydrogen	H4	≤ 4㎖ /100g	
	H4R	≤ 4㎖ /100g	≤ 0.3%

AWS Moisture Test
- Tem. 30°C / Humidity 80% - Hold Time 9Hr

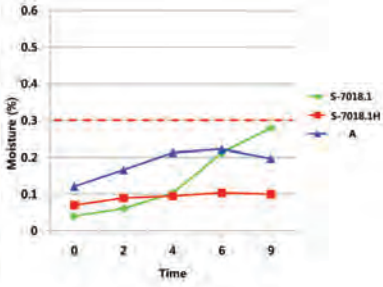
S-7018.1H Type

Brand Name	Spec.		Packing
	AWS	EN	
S-7018.1H	E7018-1 H4R	E46 4 B 3 2 H5	Vacuum Pack (1.5kg, 5kg)

1. Diffusible Hydrogen (ml/100g)



2. Moisture Content (%)



3. Mechanical Properties & Chemical Composition of all Weld Metal

Brand Name	Chemical Composition (wt%)						Mechanical Properties			
	C	Si	Mn	P	S	Ni	YS (MPa)	TS (MPa)	EL (%)	CVN Impact (-45℃)
S-7018.1H	0.059	0.41	1.27	0.013	0.007	0.24	510	571	29.4	114J
E7018-1 H4R	≤ 0.15	≤ 0.75	≤ 1.60	≤ 0.035	≤ 0.035	≤ 0.30	≥400	≥490	≥22	≥27J@-45℃

Packing

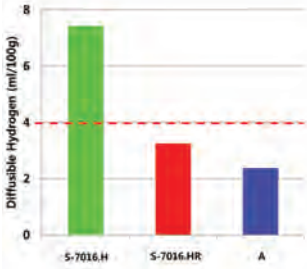
- Vacuum Pack : 1.5kg
- Carton : 15Kg : 10 X 1.5kg

- Vacuum Pack : 5kg
- Carton : 20Kg : 4 X 5kg

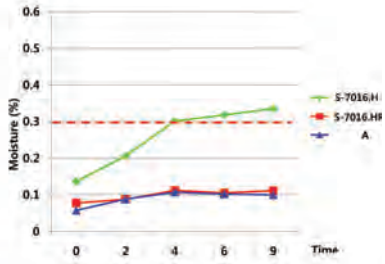
S-7016.H Type

Brand Name	Spec.		Packing
	AWS	EN	
S-7016.HR	E7016 H4R	E42 3 B 1 2 H5	Vacuum Pack (1.5kg, 5kg)

1. Diffusible Hydrogen (ml/100g)



2. Moisture Content (%)



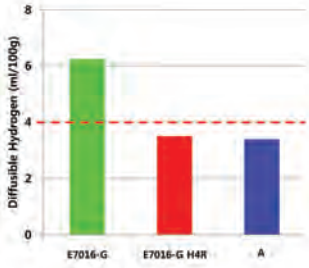
3. Mechanical Properties & Chemical Composition of all Weld Metal

Brand Name	Chemical Composition (wt%)						Mechanical Properties			
	C	Si	Mn	P	S	Ni	YS (MPa)	TS (MPa)	EL (%)	CVN Impact (-30℃)
S-7016.HR	0.072	0.43	0.89	0.012	0.007	0.053	506	586	33.2	84J
E7016 H4R	≤ 0.15	≤ 0.75	≤ 1.60	≤ 0.035	≤ 0.035	≤ 0.30	≥400	≥490	≥22	≥27J@-30℃

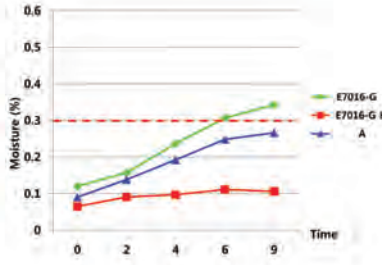
S-7016.LS Type

Brand Name	Spec.		Packing
	AWS	EN	
S-7016.LS	E7016-G H4R	E46 6 1Ni B 1 2 H5	Vacuum Pack (1.5kg, 5kg)

1. Diffusible Hydrogen (ml/100g)



2. Moisture Content (%)



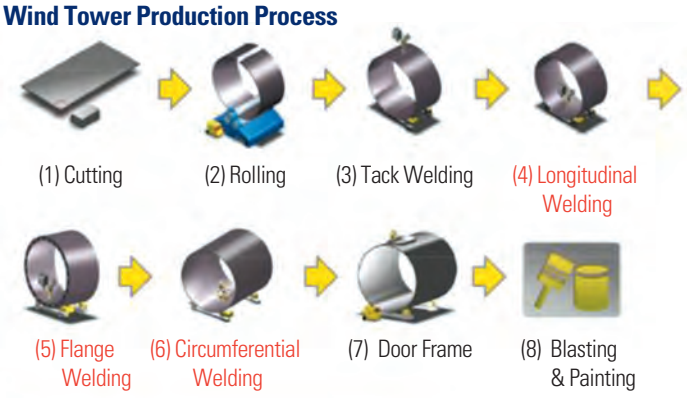
3. Mechanical Properties & Chemical Composition of all Weld Metal

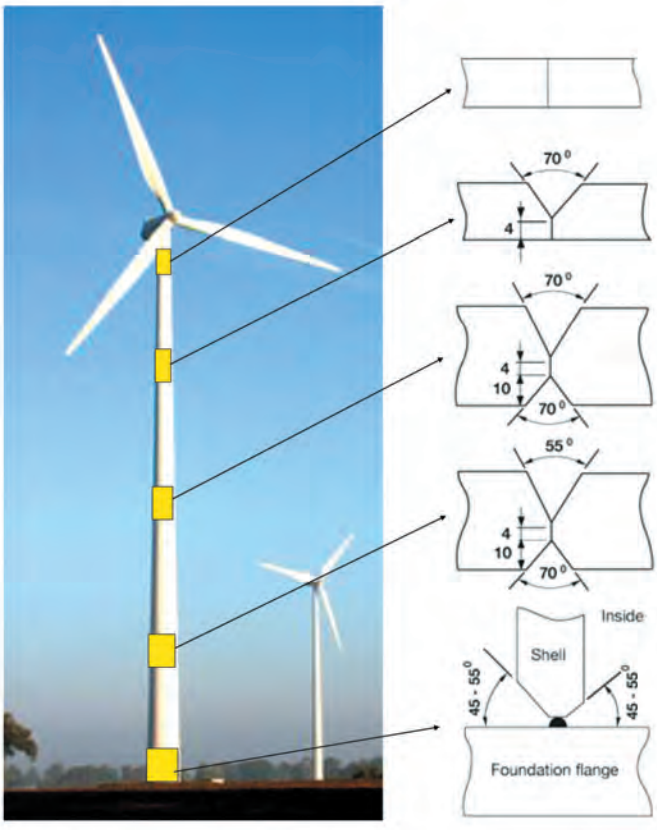
Brand Name	Chemical Composition (wt%)						Mechanical Properties			
	C	Si	Mn	P	S	Ni	YS (MPa)	TS (MPa)	EL (%)	CVN Impact (-60℃)
S-7016.LS	0.058	0.32	0.99	0.011	0.005	0.91	524	573	30.4	79J
E7016-G H4R	-	≤0.80*	≤1.00*	≤ 0.030	≤ 0.030	≤ 0.50*	≥390	≥490	≥22	-

Superflux800T / A-G2
Wind Tower

Wind Tower

Wind Tower Production Process





SAW Welding Consumables for Wind Tower

Applications

Division	Applications
S-717/M-12K	On shore (-20℃)
Superflux800T/M-12K	Off shore (-30℃, -40℃)
Superflux800T/A-G2	Off shore (-40℃, -50℃, -60℃)

Mechanical Properties

1. AWS Depo. (550A/30V/40cpm)

Division.	YS (MPa)	TS (Mpa)	EL (%)	CVN Impact (J) -60℃			
				X1	X2	X3	AV.
Superflux800T / A-G2	601	657	30.0	73	105	106	95

Division.	C	Si	Mn	P	S	Ti	B
Superflux800T	0.091	0.19	1.58	0.019	0.012	0.020	0.0025

2. Tandem

Thickness	Product	No.	Polarity	Current (A)	Volt (V)	Speed (cm/min)
20	SM-1N	1	DC+	320	28	70
	Superflux800T / A-G2	2	Lead : DC+	750	28	60
			Tail : AC	650	34	60

Division.	CVN Impact (J) -50℃			
	X1	X2	X3	AV.
Superflux800T / A-G2	82	78	80	80

Applications

1. Longitudinal Welding

2. Circumferential Welding

3. Flange Welding

Supershield 71-T8

Self shield FCAW for Low Temp. & All Positions

Features

- High deposition rate for out-of-position welding.
- Easy to remove slag.
- No shielding gas required.
- Excellent mechanical properties and good impact value at -30°C (-22°F)
- Excellent resistance to cracking.

Benefits

- Increase productivity
- Minimizes risk of slag entrapment
- Meets AWS D1.8 seismic requirements
- Suitable for outdoor welding

Applications

- Building
- Structural fabrication, including seismic requirements
- Shipbuilding - Bridges construction
- Machinery - Civil construction

- Building

- Bridges construction

- Shipbuilding

- Machinery

- Pipeline construction

Mechanical Properties

1. AWS A5.20

	Chemical Composition of All-Weld Metal (Wt. %)						
	C	Si	Mn	P	S	Al	Ti
Supershield 71-T8	0.09	0.15	0.69	0.003	0.001	0.65	0.037
AWS A5.20 E71T-8	<0.30	<0.60	<1.75	<0.03	<0.03	<1.80	

	Mechanical Properties of All-Weld Metal						Diffusible Hydrogen (ml/100g)	
	Tensile Test			Impact Test (Avg, J)				
	Y.P (MPa)	T.S (MPa)	EL (%)	-20℃	-30℃	-40℃	As received	After exposure one week at 27℃, 80%RH.
Supershield 71-T8	520	583	27.6	106.4	87.7	78.6	7.13	9.35
AWS A5.20 E71T-8	>400	480~655	>22	-	>27	-	H16 (AWS D1.8)	

2. AWS D1.1

Heat Input Limits For Demand Critical Welds Test	Yield Strength MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-notch J (ft·lbs) 20℃(68℉)
Low Heat Input (Avg. 1.2kJ/mm (29kJ/in))	480 (70)	605 (88)	26	100 (74)
High Heat Input (Avg. 2.9kJ/mm (74kJ/in))	410 (59)	550 (80)	29	85 (63)
AWS D1.8	400 (58) min.	480 (70) min.	22 min.	54 (40) min.

Typical Operating Procedures

Diameter	CTWD	Approx. Current (A)	Voltage (V)	Wire Feed Speed m/min (in/min)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
1.6mm (0.063 in)	19~32mm (3/4~1 1/4in)	225	19~21	3.3 (130)	2.0 (4.6)	74
		250	19~21	3.8 (150)	2.4 (5.3)	75
		270	20~22	4.3 (170)	2.8 (6.1)	78
		300	23~24	5.0 (195)	3.2 (7.0)	74
1.8mm (0.072 in)	19~32mm (3/4~1 1/4in)	225	18~21	3.5 (140)	2.5 (5.5)	81
		240	19~22	3.9 (155)	2.7 (6.0)	83
		255	20~23	4.3 (170)	2.9 (6.5)	81
		315	22~24	6.4 (250)	4.3 (9.6)	82
2.0mm (5/64 in)	19~32mm (3/4~1 1/4in)	260	19~20	2.9 (115)	2.5 (5.5)	78
		270	19~20	3.0 (120)	2.6 (5.7)	78
		285	20~21	3.3 (130)	2.8 (6.2)	79

Bead Appearance

Horizontal Fillet

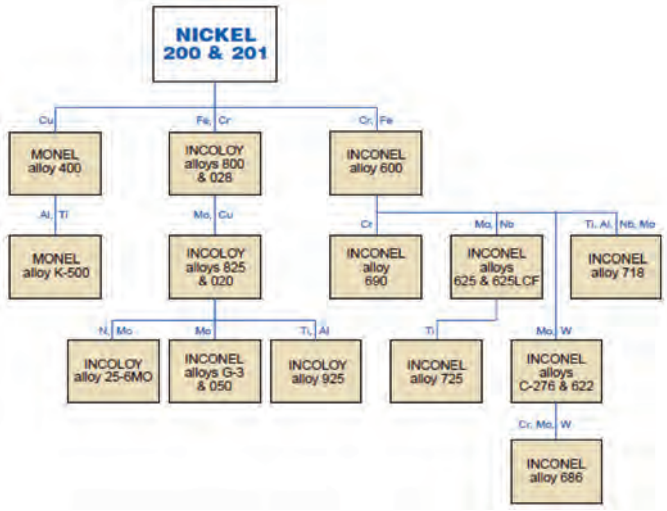
Vertical Up

Welding Conditions

- Wire Diameter 1.8mm(0.072in)
- Current/Voltage : 250A~260A / 21V~22V
- Polarity : DCEN
- Shielding Gas : None
- Power Source : Lincoln Electric DC-600
- Feeder : Lincoln Electric LN-9
- Torch : Lincoln Electric Magnum 400A

SR-182, SR-625
Ni Base Steel

Ni Alloys



Ni Base SMAW Applications

	Nickel 200	MONEL 400	INCONEL 600	INCONEL 625	INCOLOY 825	Carbon, Low alloy & Nickel steel	3 - 30% Cr steel	ASS
INCONEL 600	SR-625 SR-182	SR-625 SR-182						
INCONEL 625	SR-625 SR-182	SR-625	SR-625 SR-182					
INCONEL 800 , 803 800H/HT	SR-625 SR-182	SR-625 SR-182	SR-625	SR-625 SR-182				
INCONEL 625 &Super ASS	-	SR-625 SR-182	SR-625 SR-182	SR-625				
Carbon Low Alloy & Nickel steel	SR-625 SR-182	SR-625 SR-182	SR-625 SR-182	SR-625	SR-625 SR-182			
3 - 30% Cr steel	SR-625 SR-182	SR-625 SR-182	SR-625	SR-625	SR-625 SR-182	SR-625		
ASS	SR-625 SR-182	SR-625 SR-182	SR-625 SR-182	SR-625	SR-625 SR-182	SR-625 SR-182	SR-625 SR-182	
Cast high-temperature alloys	SR-625 SR-182	SR-625 SR-182			SR-625	SR-625 SR-182	SR-625	SR-625
Copper-Nickel alloys			SR-182	SR-625	SR-182	SR-182	SR-182	SR-182

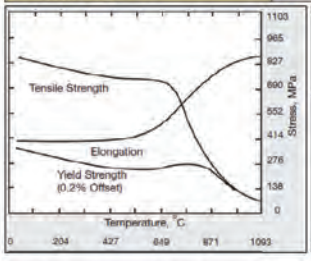
Applications

Characteristics of Ni Alloys

Superior Corrosion Resistance

A Guide to Aqueous Corrosion-Resistance
(All alloys listed are resistant to chloride cracking)
★ = Good to excellent
☆ = Acceptable
– = Not suitable

	Sulfuric Acid	Hydrochloric Acid	Hydrofluoric Acid	Phosphoric Acid	Nitric Acid	Organic Acids	Alkalines & Salts	Seawater
Nickel 200	☆	☆	★	☆	–	★	★	☆
Nickel 201	☆	☆	★	☆	–	★	★	☆
DURANICKEL® alloy 301	☆	☆	★	☆	–	★	★	☆
MONEL® alloy 400	★	☆	★	★	–	★	★	★
MONEL® alloy R-405	★	☆	★	★	–	★	★	★
MONEL® alloy K-500	★	☆	★	★	–	★	★	★
INCONEL® alloy 600	☆	–	☆	☆	–	★	★	☆
INCONEL® alloy 622	★	★	★	★	★	★	★	★
INCONEL® alloy 625	★	★	★	★	★	★	★	★
INCONEL® alloy 625LCF®	★	★	★	★	★	★	★	★
INCONEL® alloy 718	☆	☆	☆	☆	☆	★	★	★
INCONEL® alloy 725™	★	★	★	★	★	★	★	★
INCONEL® alloy C-276	★	★	★	★	☆	★	★	★
INCOLOY® alloy 25-6MO	★	★	☆	★	★	★	★	★



Test Temperature, °F	°C	Orientation	Impact Strength J
85	29	Longitudinal	65,66,68
		Transverse	62,66,70
-110	-79	Longitudinal	53, 57, 60
		Transverse	53, 57, 60
-320	-196	Longitudinal	47, 47, 48
		Transverse	42, 43, 49

Mechanical Properties

1. SR-182 (AWS A 5.11 ENiCrFe-3)

Filler Metal	Temp (°C)	Charpy V-Notch Impact Values (Joule)					
SR-182	-196	X1	x2	x3	x4	x5	Avg.
		74	75	80	78	77	77
		Lateral Expansion(mm)					
		0.87	1.02	0.91	0.98	0.90	0.94
		Tensile Test					
		TS(Mpa)			Elongation(%)		
		640			40		

2. SR-625 (AWS A 5.11 ENiCrMo-3)

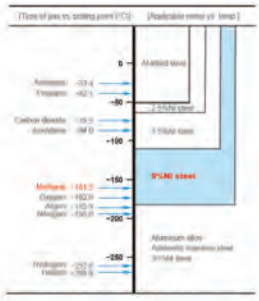
Filler Metal	Temp (°C)	Charpy V-Notch Impact Values (Joule)					
SR-625 3.2mm	-196	X1	x2	x3	x4	x5	Avg.
		50	45	46	52	46	48
		Lateral Expansion(mm)					
		0.45	0.50	0.48	0.46	0.55	0.49
		Tensile Test					
		TS(Mpa)			Elongation(%)		
		772			32		

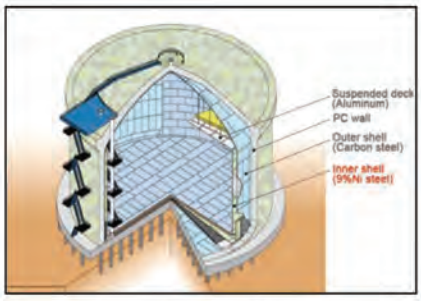
S-Ni2 / SA-08, SR-134

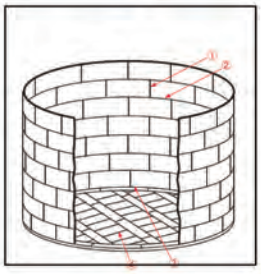
9% Ni Steel

S-Ni2 / SA-08

LNG Storage Tank Production Process







Joint No.	①	②	③	④
Component	Side shell	Side shell	Bottom to Side shell	Bottom
Welding Position	3G	2G	2G	2F
Welding Process	SMAW FCAW	SAW	SMAW	SMAW FCAW

SR-134

1. Classifications

AWS A5.11 / ASME SFA5.11 ENiCrFe-4 JIS Z3225 D9Ni-1

2. Types of Steel

Standard		ASTM	
		A353	A553 Type1
Max. Plate Thickness(mm)		50	50
Heat Treatment		Double-normalized and tempered material(NNT)	Quenched and tempered material(QT)
Chemical Composition(%)	C	≤0.13	
	Si	0.15~0.40	
	Mn	≤0.90	
	P	≤0.035	
	S	≤0.035	
	Ni	8.50~9.50	
0.2% proof strength (Mpa)		≥ 515	≥ 585
TS (Mpa)		690~825	
EL (%)		≥ 20.0	
IV(J) at -196℃		≥ 34	
Lateral expansion (mm) at -196℃		≥ 0.38	

Mechanical Properties

JIS Depo. (2.4mm 400A / 280V / 40cpm)

Consumables	Tensile Test Results			CVN Impact(Joules)					
	YS (MPa) 0.2% off set	TS(MPa)	EL(%)	-196℃					Avg.
S-Ni2/SA-08	450	731	36.0	82	95	90	100	93	92.6
AWS A5.11 ENiMo-8	Not Specified	≥650	≥ 20	Not Specified					

Consumables	Lateral Expansion(mm)						Shear Fracture Area(%)					
	-196℃					Avg.	-196℃					Avg.
S-Ni2/SA-08	0.89	1.06	0.82	0.89	0.99	0.92	100	100	100	100	100	100

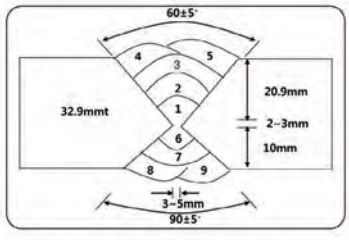
Consumables	Chemical Composition(wt%)										
	C	Si	Mn	P	S	Ni	Cr	Mo	W	Fe	Cu
S-Ni2/SA-08	0.04	0.12	0.46	0.010	0.001	68.1	1.92	18.2	2.54	7.7	0.01
AWS A5.11 ENiMo-08	≤0.10	≤0.75	≤1.5	≤0.02	≤0.015	≥60.0	0.5~3.5	17~20	2.0~4.0	≤10.0	≤0.50

Korea Gas Corporation Approval Test

Welding Conditions

- Base Metal : 9% Ni (32.9mmt)
- Layer/ Pass : 4Layer / 5Pass (Up hill)
  3Layer / 4Pass (Down hill)
- Welding Position : 3G(V-Up)
- Current & Polarity : AC
- Interpass Temp(Max.) : 150 ℃

Built-up Sequence



Results

TS (MPa)			CVN Impacts (J)		CTOD		Bending Test	
RT	-164℃	-196℃	RT	-196℃	RT	-164℃	Face	Root
711.4	895.1	977.6	62.82	48.82	0.22	0.37	No Crack	No Crack

Bead Appearance

Korea Gas Corporation Approval Test

Test Results

Division	Test	Results
S-Ni2/SA-08	Tension test	744MPa
	Bending test	No Crack
	Impact test	CVN Impacts (J) -196℃ : 194J
	Hardness test	240~290Hv
	Macro test	No Crack
	Micro test	Pass
	Chemical composition	Pass
	CTOD	Pass

Tensile Test

Bending Test

S-308(L).16N, S-309(L).16, S-316(L).16N
STS Steels

Weldability

1. V-up & Pipe 5G etc.
2. Good weldability at all positions.

<Pipe 5G : DC+ 130A, Intermittent Welding>

S-308L.16N 3.2mm

308L (Company A)

<H-Fillet, V-up, DC+ 100A, Continuous Welding>

S-308L.16N 3.2mm

308L (Company A)

Use Efficiency

308L (Company A)

S-308L.16N 3.2mm

308L (Company B)

Pit Test

308L (Company A)

308L (Company B)

S-308L.16N

Weld Metal δ–Ferrite

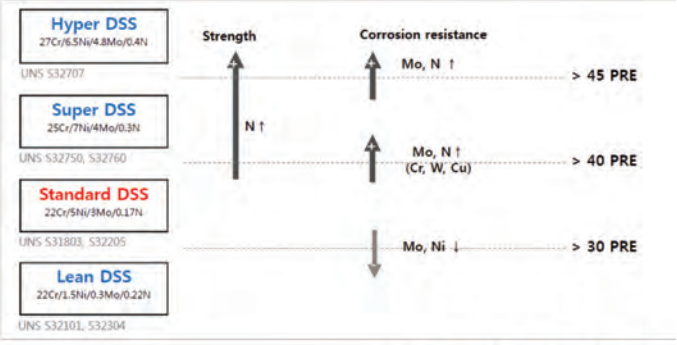
Division	S-308(L).16N S-316(L).16N	S-309(L).16
δ – Ferrite Number	Low δ-Ferrite : 5-7 FN	16~19 FN
	High δ-Ferrite : 10-11 FN	

Super Duplex STS

Characteristics for Super Duplex STS

Applications

Petrochemical plants, offshore structures and FPSO
Superior pitting resistance (PREN ≤ 40)
Super Duplex STS Welding (UNS S32750, S32760)



PRE = %Cr + 3.3 x %Mo + 16 x %N

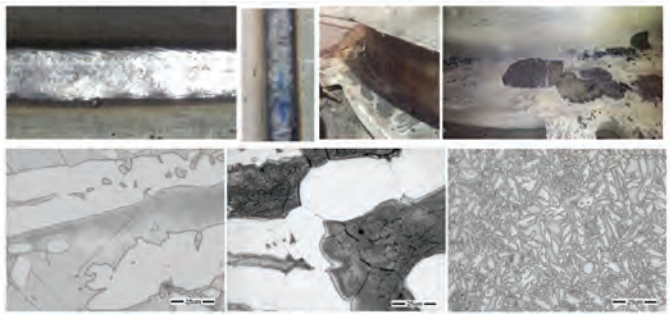
Super Duplex / Duplex STS

Super Duplex STS				
Process	Brand name	Spec.	PREN	δ-Ferrite No. (WRC1992)
FCW	SW-2594 Cored	AWS A5.22 E2594T1-1	42	58.7
GMAW/ GTAW	SMT-2594	AWS A5.9 ER2594	41	66.9
SMAW	S-2594.16	AWS A5.4 E2594-16	41	60
FCW	SW-2209 Cored	AWS A5.22 E2209T1-1/-4	36.0	55.1
GMAW/ GTAW	SM-2209/ ST-2209	AWS A5.9 ER2209	34.3	66.7
SMAW	S-2209.16	AWS A5.4 E2209-16	34.6	58.5
SAW	SuperFlux209/YS2209	EN 760 S A AF 2 DC /AWS A5.9 ER2209	35.2	58.9

SW-2594 Cored

Consumables	Shielding Gas	Chemical Composition (%)											PREN
		C	Si	Mn	P	S	Ni	Cr	Mo	N2	Cu	W	
SW-2594 Cored	100%CO_2	0.023	0.42	0.74	0.018	0.002	9.16	25.5	3.77	0.24	0.018	0.001	41.8
AWS A5.22 E2594TX-X		≤0.04	≤1.0	0.5 ~2.5	≤0.04	≤0.03	8.0~ 10.5	24.0~ 27.0	2.5~ 4.5	0.2~ 0.3	≤1.5	≤1.0	

Consumables	Tensile Test		CVN Impact Test (Joule)	
SW-2594 Cored	TS(MPa)	EL(%)	-20℃	-50℃
	896	24.2	27	20
AWS A5.22 E2594TX-X	≥760	≥ 15	Not Specified	



Base Metal (UNS S32750) | HAZ (UNS S32750+SW-2594) | Weld Metal (SW-2594)

SMT-2594

Consumables	Shielding Gas	Chemical Composition (%)										PREN
		C	Si	Mn	P	S	Ni	Cr	Mo	Cu	N	
SMT-2594	100% Ar	0.011	0.41	0.53	0.019	0.001	9.13	25.27	3.86	0.21	0.257	42
AWS A5.9 ER2594		≤0.03	≤1.0	≤2.5	≤0.03	≤0.02	8.0 ~10.5	24.0 ~27.0	2.5 ~4.5	≤1.5	0.2 ~0.3	

Consumables	Tensile Test		CVN Impact Test (Joule)	
SMT-2594	TS(MPa)	EL(%)	-20℃	-50℃
	889	28.6	298	288
AWS A5.4 E2594TX-X	≥760	≥ 16	Not Specified	

Consumables	Specimen Weight(g)		Weight loss(g)	Remark (Pitting)
	Before	After		
SMT-2594 (1G)	116.0912	116.0910	0.0002	No Pitting

Ferric Chloride Pitting Test (ASTM G48 Method A)

S-2594.16

Consumables	Current	Chemical Composition (%)										PREN
		C	Si	Mn	P	S	Ni	Cr	Mo	Cu	N	
S-2594.16	AC/DC+	0.023	0.54	0.53	0.020	0.016	9.5	25.7	3.8	0.02	0.21	41
AWS A5.4 E2594-16		≤0.04	≤1.0	0.5~ 2.5	≤0.04	≤0.03	8.0~ 10.5	24.0 ~27.0	3.5 ~4.5	≤0.75	0.2 ~0.3	

Consumables	Tensile Test		CVN Impact Test (Joule)	
S-2594.16	TS(MPa)	EL(%)	-20℃	-50℃
	887	28.2	40	34
AWS A5.4 E2594-16	≥760	≥ 16	Not Specified	

S-2594.16 4.0mm(160A, AC)

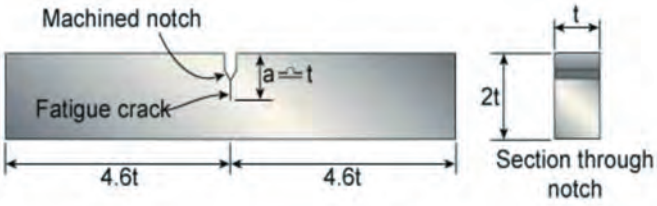
S-2594.16 4.0mm(160A, DC+)

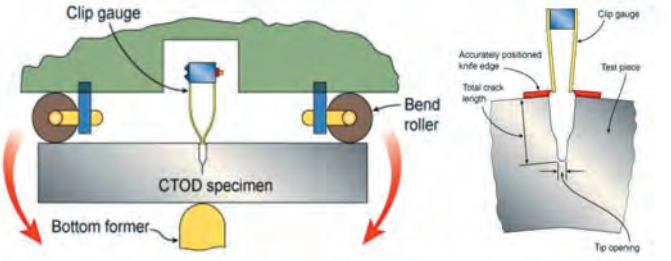
Superflux55ULT, Superflux55LP, S-787TT
CTOD

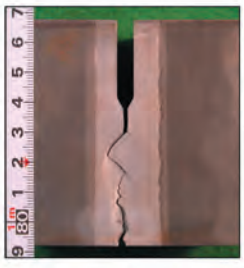
CTOD (Crack Tip Opening Displacement)

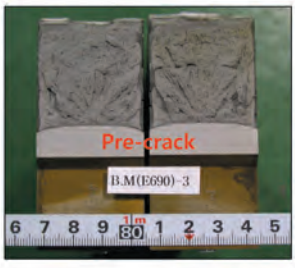
CTOD : Crack Tip Opening Displacement

Specifications : BS 7448, ASTM E1290









$$\delta = \left[\frac{FS}{BW^{1.5}} \times f\left(\frac{a_o}{W}\right)\right]^2 \frac{(1-\nu^2)}{2\sigma_{YS}E} + \frac{0.4\,(W-a_o)\,V_p}{0.4W + 0.6a_o + z}$$

CTOD(δ) : 0.15~0.38mm

SAW Welding Consumables for CTOD

Division	Type of steels	Current	Layer	Test Temperature (℃)			
				-10	-20	-30	-40
Superflux55ULT / H-14	EH40 (80t)	DC+	Multi	◎			◎
	API2W (76t)	DC+/AC	Multi	◎			
	-	AC	Multi	◎			
Superflux55LP / H-14	-	DC+	Multi				◎
S-787TT / A-3 SM-1N	DNV450M (14.3t,17.5t)	DC+/AC	Two-run			◎	
S-787TT / H-14	S355NL(63t)	DC+/AC	Multi		◎		

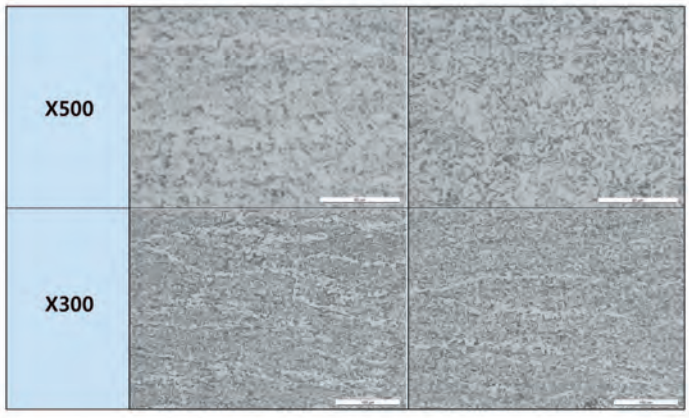
Typical Mechanical Properties

1. Typical Mechanical Properties (AWS Depo. DC+)

Brand name	YS (MPa)	TS (MPa)	EL (%)	CVN Impact (J)
				-60℃
Superflux55ULT / H-14	580	590	30.0	140

Brand name	C	Si	Mn	P	S	Ti	B
Superflux55ULT / H-14	0.094	0.24	1.51	0.023	0.005	0.019	0.0026

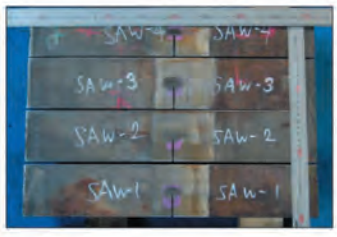
2. Micro Structure



CTOD

CTOD Test

Brand Name	Superflux55ULT/H-14
Welding Process	SAW
Test Specimen Number	SAW-1, 2, 3, 4
Number of Test Specimen	3
Number of Spare Specimen	1
Test Temperature	-40℃
Standard	BS7448
Thickness (B) (mm)	80t



	Test Temperature (℃)	CTOD(mm)
SAW-1	-40	1.10
SAW-2		0.76
SAW-3		0.54

SW-625 Cored
ALLOY 625 FCAW

Specification

AWS A5.34 ENiCrMo3T1-4

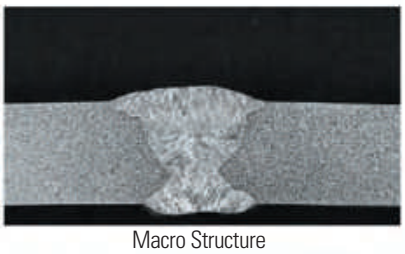
Mechanical / Chemical properties of All-weld metal

Brand Name	Temp (℃)	Charpy V-Notch Impact values (Joule)				
SW-625 Cored	-196	X1	x2	x3	x4	x5
		77	75	73	69	72
	Tensile Test					
	TS(MPa)			El.(%)		
	810			35.0		

Brand Name	Chemical Composition of All-Weld Metal										
	C	Si	Mn	P	S	Ni	Cr	Mo	Ti	Nb	Fe
SW-625 Cored	0.07	0.35	0.29	0.003	0.002	61.8	20.7	9.1	0.2	3.4	3.7
AWS 5.34 ENiCrMo3T1-4	≤0.1	≤0.5	≤0.5	≤0.02	≤0.015	≥58.0	20.0~23.0	8.0~10.0	≤0.4	3.15~4.15	≤5.0

Weldability

Bead appearance
(1G,180A/28V)



Macro Structure
(3G,170A/26V)

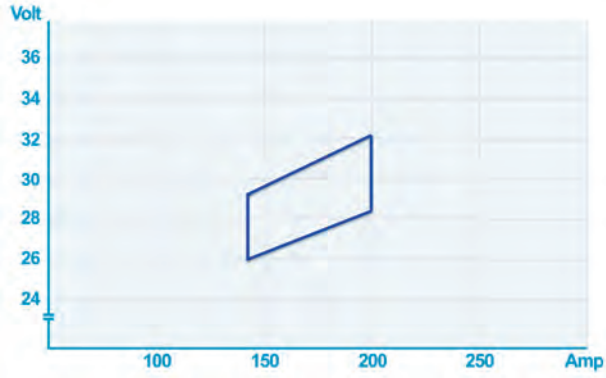
Bead appearance
(3G,170A/26V)

Welding Conditions
Diameter(mm) : 1.2mm
Shielding Gas : Ar+20% CO_2
Flow Rate(l/min.) : 15~20
Amp./ Volt. : 160/26
Stick-Out(mm) : 20
Pre-Heat(℃) : 23
Interpass Temp.(℃) : ≤ 150℃
Thickness(mm) : 10
Polarity : DC(+)
Welding machines : SCR

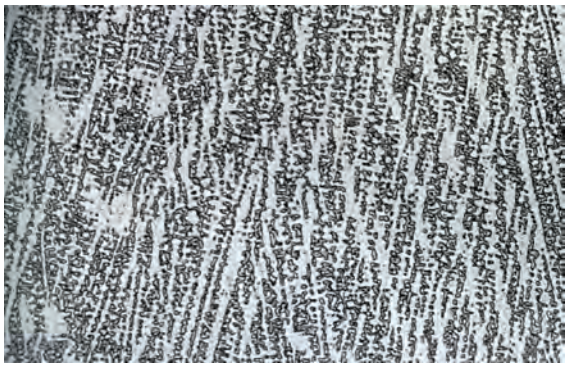
NiCrMo-3 Type welding Consumables

PROCESS	BRAND NAME	Size(mm)
MIG	SMT-625	1.0/1.2/1.4/1.6
TIG		2.0/2.4/3.2
SMAW	SR-625	2.6/3.2/4.0
FCW	SW-625 Cored	1.2

Recommended Parameter Range, For Flat Position



Microstructure of weld metal



Application of Alloy 625

SF-436

Classifications

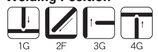
Description & Applications

SF-436 is a metal cored wire for horizontal, fillet and flat position welding of 409, 430 and 436 type stainless steels as found in ferrite stainless steels automotive mufflers.

Shielding Gas
Ar/Ar+2~5%O_2

Current Type
DC+

Welding Position



1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Mo	Ti
0.03	0.60	0.40	0.008	0.010	17.5	1.0	0.40

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Heat Treatment
500 (72,600)	35	770℃×4hr FC to 600℃ AC to RT

Approval

SW-309LNS Cored

Classifications

AWS A5.9 / ASME SFA5.9 EC309L JIS Z3323 TS309L-MA0 EN ISO 17633-A-T 23 12 L M M

Description & Applications

Main uses are for thin plate stainless steels and for the welding of automotive mufflers in 22%Cr-12%Ni stainless steels.

Shielding Gas
Ar/Ar+2~5%O_2

Current Type
DC+

Welding Position

1G (PA) 2F (PB)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni
0.03	0.65	1.80	0.020	0.010	24.0	13.0

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
590 (85,600)	45	-20 (-4)	60 (44)

Approval

Recyclable HYUNDAI WELDING Green Policy

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HYUNDAI WELDING

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HYUNDAI WELDING

Welding Consumables

AUTOMOTIVE

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SM-70(E)

Classifications

AWS A5.18 / ASME SFA5.18 ER70S-6 JIS Z3312 YGW12 EN ISO 14341-A G 42 2 C 3Si1 EN ISO 14341-A G 42 3 M 3Si1

Description & Applications

Butt and fillet welding of steel structures such as vehicles, machinery and bridges.

Shielding Gas
CO_2/Ar+CO_2

Current Type
DC+

Welding Position
1G (PA) 2F (PB) 3G (PF.PG) 4G (PE)

Typical Chemical Composition of Wire (%)

C	Si	Mn	P	S
0.07	0.83	1.48	0.017	0.020

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
430 (62,400)	540 (78,400)	28.0	-29 (-20)	70 (52)

Approval

KR, ABS, LR, BV, DNV, GL, NK, CWB, TÜV, NAKS, MRS, CE, DB

SM-70EN

Classifications

AWS A5.18 / ASME SFA5.18 ER70S-6 JIS Z3312 YGW12 EN ISO 14341-A G 42 2 C 4Si1
EN ISO 14341-A G 46 4 M 4Si1

Description & Applications

Butt and fillet welding of steel structures such as vehicles, machinery and bridges.

Shielding Gas
CO_2/Ar+CO_2

Current Type
DC+

Welding Position
1G (PA) 2F (PB) 3G (PF.PG) 4G (PE)

Typical Chemical Composition of Wire (%)

C	Si	Mn	P	S
0.08	0.95	1.70	0.019	0.015

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
461 (66,900)	560 (81,200)	29	-29 (-20)	80 (59)

Approval

TÜV, DB, CE, DNV, GL

SM-430LNb

Classifications

JIS Z3321 YS430LNb EN ISO 14343-A-G-18LNb

Description & Applications

① SM-430LNb is a Mig wire for horizontal, fillet and flat position welding of 429 and 444 type stainless steels.
② Mainly used for automotive exhaust applications, especially for manifolds and catalytic converter canning.

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	Cr	Ni	Nb
0.01	0.41	0.33	18.4	0.27	0.45

Typical Mechanical Properties of All-Weld Metal

Dia (mm)	Amp (A)	Vol (V)	Cpm (cm/min)	Gas Flow (ℓ/min)	Shielding Gas
1.2 1.6	250 300	26 29	30 35	25	100% Ar or Ar+2%O_2

Approval

SC-70T Cored

Classifications

AWS A5.18 / ASME SFA5.18 E70C-3C / -6M JIS Z3313 T 49 2 T15-1 CA EN ISO 17632-A-T 42 2 M C 1
JIS Z3313 T 49 3 T15-1 MA EN ISO 17632-A-T 46 2 M M 1 H5

Description & Applications

SC-70T Cored is ideally suitable for thin plate welding and root pass welding of structural steel. Designed for high productivity and automatic applications where a large amount of filler metal can be deposited with a minimum amount of slag & spatter. Typical industrial applications include shipbuilding, machinery, bridge construction and structural fabrication.

Shielding Gas
CO_2/Ar+20~25%CO_2

Current Type
DC+

Welding Position
1G (PA) 2F (PB) 3G (PF.PG) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Shielding Gas
0.06 0.07	0.60 0.65	1.20 1.45	0.011 0.010	0.014 0.011	100% CO_2 Ar+20~25% CO_2

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	Shielding Gas
520 (75,500) 550 (79,900)	590 (85,700) 620 (90,000)	27 27	-20 (-4) -30 (-22)	45 (33) 50 (37)	100% CO_2 Ar+20~25% CO_2

Approval

ABS, BV, DNV, GL, LR, TÜV, DB, CE

SC-70Z Cored

Classifications

AWS A5.18 / ASME SFA5.18 E70C-G EN ISO 17632-A-T 46 Z M M/C 3

Description & Applications

Welding of galvanized steel sheets in the field of automobile manufacturing and galvanized steel in the structure of ships or construction as well.

Shielding Gas
Ar+20~25%CO_2

Current Type
DC+

Welding Position
1G (PA) 2F (PB) 3G (PF)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Shielding Gas
0.09 0.10	0.42 0.61	1.35 1.57	0.022 0.025	0.013 0.014	100% CO_2 80% Ar+20% CO_2

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	Shielding Gas
550 (79,900) 580 (84,200)	600 (87,100) 640 (92,900)	30 25	0 (32) 0 (32)	120 (89) 105 (77)	100% CO_2 80% Ar+20% CO_2

Approval

CWB

SF-409Ti

Classifications

AWS A5.9 / ASME SFA5.9 EC409 JIS Z3323 TS409-MA0

Description & Applications

SF-409Ti is a metal type flux cored wire designed for the horizontal fillet welding of AISI 409 ferrite stainless steels.

Shielding Gas
Ar/Ar+2~5%O_2

Current Type
DC+

Welding Position
1G (PA) 2F (PB)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ti
0.03	0.50	0.55	0.012	0.010	12.5	0.7

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)
500 (72,600)	20

Approval

Recyclable HYUNDAI WELDING Green Policy

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S-2209.16

Classifications

AWS A5.4 / ASME SFA5.4 E2209-16 JIS Z3221 ES2209-16 EN 1600 - E 22 9 3 N L

Description & Applications

Welding of 22%Cr-5%Ni-2%Mo-0.15%N stainless steel (SAF2205, UNS31803).

Current Type

AC or DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	N
0.029	0.78	1.03	0.023	0.012	23.1	9.2	3.1	0.12

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
830 (120,400)	28	-20 (-4) -50 (-58)	50 (37) 45 (33)

Approval

S-2594.16

Classifications

AWS A5.4 / ASME SFA5.4 E2594-16

Description & Applications

Welding of UNS S32750, S32760(Independent water power plant)

Current Type

AC or DC+

Welding Position

1G (PA) 2F (PB)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	N
0.019	0.58	0.53	0.020	0.012	25.17	8.9	3.9	0.22

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
830 (120,400)	26	-20 (-4) -50 (-58)	35 (25) 30 (22)

Approval

S-316LT.16

Classifications

AWS A5.4 / ASME SFA5.4 E316L-16 JIS Z3221 ES316L-16 EN 1600 - E 19 12 3 L R

Description & Applications

Welding of extra-low carbon 18%Cr-12%Ni-2%Mo stainless steel for cryogenic applications.

Current Type

AC or DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.035	0.55	1.59	0.021	0.016	18.5	13.5	2.5

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
538 (78,000)	34.4	-196 (-321)	40 (30)

Approval

ABS

S-76LTH

Classifications

AWS A5.5 / ASME SFA5.5 E7016-G JIS Z3211 E4916-N1 AP L EN ISO 2560-A-E42 6 Z B H5

Description & Applications

S-76LTH is extra low hydrogen type covered electrode. It can be used for welding of high tensile steel and low temperatures applications such as off-shore structure, LPG storage tank and carrier.

Current Type

AC or DC +

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Ni	Ti	B
0.08	0.35	1.35	0.013	0.004	0.45	0.018	0.0015

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	CTOD(mm) −40℃(−40℉)
540 (78,400)	590 (85,600)	30.0	-46 (-51) -60 (-76)	190 (137) 100 (72)	0.748

Approval

ABS, DNV

SR-625

Classifications

AWS A5.11 / ASME SFA5.11 ENiCrMo-3 JIS Z3224 DNiCrMo-3 EN ISO 14172 Ni6625

Description & Applications

SR-625 is designed for welding of Inconel 600 + 625 and Nickel alloys, 9% Nickel steels.
(LNG storage tank manufacture, desulfurization, Heat exchanger, Building of chemical carrier)

Current Type

Ar or DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	Nb+Ta	Fe
0.06	0.35	0.001	0.001	0.003	21.21	62.61	9.2	3.58	3.5

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
772 (111,000)	32	-196 (-321)	48 (35)

Approval

ABS

SR-133

Classifications

AWS A5.11 / ASME SFA5.11 ENiCrFe-2 JIS Z3224 DNiCrFe-2 EN ISO 14172 Ni 6092

Description & Applications

SR-133 is designed for welding of Inconel 600 and 601, Incoloy 800 and 800HT dissmillar welding of stainless steels and low-alloyed steel & Nickel-alloyed steel.(Inconel, Incoloy, Monel alloys)
It can be used for welding of overlay cladding where a similar composition.

Current Type

AC or DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	Nb+Ta	Fe	Cu	Others
0.05	0.15	3.10	0.005	0.003	15.0	71.5	1.0	1.25	7.5	0.01	-

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
610 (88,500)	37	-196 (-321)	90 (66)

Approval

SM-2209

Classifications

AWS A5.9 / ASME SFA5.9 ER2209 JIS Z3321 YS2209 EN ISO 14343-A G 22 9 3 N L

Description & 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.

Typical Chemical Composition of Wire (%)

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

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	PREN
784 (113,700)	30	-20 (-4)	83 (61)	35

Approval

SMT-2594

Classifications

AWS A5.9 / ASME SFA5.9 ER2594 EN ISO 14343-A-G 25 9 4 N L

Description & Applications

① Used for welding of 25%Cr-7%Ni-4.5%Mo-0.25%N super duplex stainless steel.
② Used for welding of petochemical plants, offshore structures and FPSO.

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)	PREN
890 (129,000)	28.6	-50 (-58)	195 (144)	40

Approval

ABS

ST-1N

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

Description & Applications
Oil and gas industry, offshore industry, power plant petrochemical industry and oil pipes.

Shielding Gas
Ar

Current Type
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℃ (−49℉)
As Weld	594 (86,000)	671 (97,300)	32.3	59 (43)
PWHT	568 (82,400)	645 (93,500)	34.0	108 (80)

Approval
ABS, CWB

S-460Y X H-14

Classifications
AWS A5.23 / ASME SFA5.23 F8A8-EH14-G JIS Z3183 S584-H EN ISO 14174 S A FB 1 / EN ISO 14171 S4

Description & Applications
Multi-layer welding of high strength steels, such as EH47.

Current Type
AC, DC+

Basicity Index
2.5

Typical Chemical Composition of All-Weld Metal (%)

Wire	C	Si	Mn	P	S	BM
H-14	0.10	0.28	1.50	0.020	0.005	SM570

Typical Mechanical Properties of All-Weld Metal

Wire	YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	BM	Th. (mm)	CTOD (mm) −10℃(14℉)
H-14	610 (88,500)	640 (92,800)	27.0	-60 (-76)	100 (74)	SM570	25	1.267

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

SC-91K2 Cored

Classifications

AWS A5.29 / ASME SFA5.29 E91T1-K2C JIS Z3313 T57 4 T1-1 C A-N3 H10 EN ISO 17632-A-T50 4 1.5Ni P C 1

Description & Applications

SC-91K2 Cored is designed for the welding of low alloy steel such as 600Mpa grade high strength steels HY-80 and ASTM A710, A514, A517.

Shielding Gas

CO_2

Current Type

DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Ni	Mo
0.04	0.35	1.25	0.013	0.012	1.55	0.09

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
620 (90,000)	650 (94,500)	27	-20 (-4) -40 (-40)	110 (82) 60 (44)

Approval

ABS

SC-81Ni2

Classifications

AWS A5.29 / ASME SFA5.29 E81T1-Ni2C JIS Z3313 T 55 6 T1-1 C A-N5 H5 EN ISO 17632-A T 46 6 2Ni P C 1 H5

Description & Applications

SC-81Ni2 is a titania type flux cored wire for welding of low-temperature service steel.

Shielding Gas

100% CO_2

Current Type

DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Ni
0.06	0.27	1.28	0.010	0.010	2.20

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs)	
			−60℃ (−76℉)	−80℃ (−112℉)
610 (88,500)	640 (92,800)	25.0	80 (59)	60 (44)

Approval

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

Supercored 110

Classifications

AWS A5.29 / ASME SFA5.29 E111T1-GC H4

Description & Applications

Supercored 110 is suitable for single or multipass welding for high strength low alloy steel.

Shielding Gas

CO_2

Current Type

DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Ni	Mo
0.06	0.35	1.55	0.016	0.007	2.20	0.50

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
780 (113,000)	830 (121,000)	19.9	-40 (-40)	60 (44)

Approval

ABS

SW-625

Classifications

AWS A5.34 / ASME SFA5.34 ENiCrMo3T1-4

Description & Applications

① High-alloy steel, heat-resistant steel, 5~9%Ni steel and similar steel with high notch toughness at extra-low temperatures.
② Welding heat resisting alloys including Inconel 601, Incoloy 800/800H or combination of these with other alloys for furnace equipment, petrochemical and power generation plants.
③ Suitable for alloy with NiCr22Mo9Nb (2.4856) / NiCr21Mo (2.4858) / NiCr15Fe (2.4640) / X10 NiCrAlTi32 20 (1.4876) / NiCr20Ti (2.4951) etc.
④ Remark of SMAW (SR-112), SAW (Superflux 300*SA-625), GT(M)AW (SMT-625).

Shielding Gas

Ar +20~25% CO_2

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	Fe	Cu	Nb+Ta
0.03	0.40	0.35	0.003	0.005	21.9	62.4	8.6	2.0	0.14	3.5

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
760 (110,200)	35	-196 (-321)	60 (44)

Approval

SW-2209 Cored

Classifications

AWS A5.22 /ASME SFA5.22 E2209T1-1/-4 JIS Z3323 TS2209-FB1 EN ISO 17633-A-T 22 9 3 N L M/C 2

Description & Applications

SW-2209 Cored is an all positional flux cored wire for duplex stainless steels like 2205.

Shielding Gas

CO_2/Ar+20~25%CO_2

Current Type

DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	N
0.03	0.70	1.10	0.02	0.010	23.5	8.7	3.2	0.10

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	PREN
680 (98,600)	820 (119,100)	27	-20 (-4) -50 (-58)	60 (44) 40 (30)	36

PREN(Pitting Resistance Equivalent Number) = Cr+3.3xMo+16xN

Approval

BV, DNV

SW-2594 Cored

Classifications

AWS A5.22 / ASME SFA5.22 E2594T1-1/4

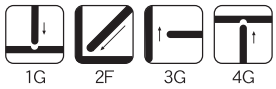
Description & Applications

Welding for super duplex stainless steel.

Shielding Gas

CO_2/Ar+20~25%CO_2

Welding Position



1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	N_2
0.025	0.42	0.70	0.019	0.005	26	9.19	4	0.21

Typical Mechanical Properties of All-Weld Metal (Shielding Gas : 100% CO_2)

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs) −20℃(−4℉)	CVN-Impact Value J (ft · lbs) −50℃(−58℉)
750 (108,750)	900 (130,500)	27	50 (37)	35 (26)

Approval

SR-134

Classifications

AWS A5.11 / ASME SFA5.11 ENiCrFe-4

Description & Applications

SR-134 is designed for welding of of 9%Ni steel for cryogenic storage tanks for LNG, liquified nitrogen, etc.

Current Type

AC or DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	Nb	Fe
0.12	0.40	2.80	0.003	0.001	15.3	70.0	3.1	2.35	5.40

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
715 (103,700)	40	-196 (-321)	60 (44)

Approval

SR-08

Classifications

AWS A5.11 / ASME SFA5.11 ENiMo-8

Description & Applications

SR-08 is designed for welding of 9%Ni steel for tack and repair welding.

Current Type

AC

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	W	Fe
0.04	0.30	0.30	0.003	0.001	2.85	68.6	17.9	3.05	6.45

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
760 (110,000)	40	-196 (-321)	75 (55)

Approval

S-Ni2 X SA-08

Classifications

AWS A5.14 / ASME SFA5.14 ERNiMo-8 JIS Z3333 FS9Ni-H

Description & Applications

Horizontal butt welding of 9%Ni steel for cryogenic storage for LNG, liquefied nitrogen, etc.

Current Type

DC+

Basicity Index

7.6

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	W	Al
0.038	0.17	0.54	0.001	0.001	1.95	65.7	18.5	2.45	0.23

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	Base Metal
680 (98,600)	43	-196 (-321)	100 (74)	9% Ni

Approval

SMT-08

Classifications

AWS A5.14 / ASME SFA5.14 ERNiMo-8 JIS Z3334 SNi1008 (NiMo19WCr) EN ISO 18274 Ni 1008 (NiMo19WCr)

Description & Applications

Used for welding of LNG storage tank. (welding for 9%Ni steel), FPSO

Shielding Gas

Ar, Ar+He

Typical Chemical Composition of Wire (%)

C	Si	Mn	P	S	Cr	Ni	Mo	Cu	W
0.014	0.012	0.010	0.002	0.001	2.0	70.2	19.4	0.01	2.62

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
725 (105,100)	38.0	-196 (-321)	176 (130)

Approval

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S-8018.B2R

Classifications

AWS A5.5 / ASME SFA5.5 E8018-B2 JIS Z3223 E5518-1CM EN 1599 ECrMo1 B 3 2 H5

Description & Applications

S-8018.B2R can be used for welding of 1.25%Cr-0.5%Mo heat resistant steel. Used for steam pipes of boilers for power plant and marine use, equipment for oil refining industries, and high temperature synthetic chemical industries.

Current Type

AC or DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Mo	Sn	As	Sb	X-factor(ppm)
0.069	0.57	0.82	0.007	0.010	1.32	0.58	0.0050	0.0020	0.0010	10.4

X-factor = (10P + 5Sb + 4Sn + As)/100 ≤ 15 (ppm)

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs) 0℃(32℉)	CVN-Impact Value J (ft · lbs) −20℃(−4℉)	Heat Treatment
608 (88,200)	684 (99,200)	25.4	144 (106)	62 (46)	690℃(1274℉) X 1hr. S.R
606 (87,900)	661 (95,900)	27.2	143 (106)	91 (67)	690℃(1274℉) X 2hr. S.R

Approval

S-9018.B3R

Classifications

AWS A5.5 / ASME SFA5.5 E9018-B3 JIS Z3223 E6218-2C1M EN 1599 ECrMo2 B 3 2 H5

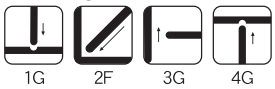
Description & Applications

S-9018.B3R can be used for Welding of 2.25%Cr-1%Mo heat resistant steel. Used for steam pipes of boilers for power plant and marine use, equipment for oil refining industries, and high temperature synthetic chemical industries.

Current Type

AC or DC+

Welding Position



1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Mo	Sn	As	Sb	X-factor(ppm)
0.072	0.62	0.79	0.009	0.010	2.22	0.97	0.0060	0.0020	0.0070	13.1

X-factor = (10P + 5Sb + 4Sn + As)/100 ≤ 15 (ppm)

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs) 0℃(32℉)	CVN-Impact Value J (ft · lbs) −20℃(−4℉)	Heat Treatment
632 (91,700)	721 (104,600)	23.8	121 (89)	81 (60)	690℃(1274℉) X 1hr. S.R
606 (87,900)	703 (102,000)	25.2	132 (97)	105 (77)	690℃(1274℉) X 2hr. S.R

Approval

S-9015.B9

Classifications

AWS A5.5 / ASME SFA5.5 E9015-B9 JIS Z3223 E6215-9C1MV EN 1599 ECrMo91 B 4 2 H5

Description & Applications

S-9015.B9 can be used for Welding of 9%Cr-1%Mo heat resistant steel. Used for pipes of boilers for power plant, equipment for oil refining industries, and high temperature synthetic chemical industries.

Current Type

DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	V	Nb	N
0.10	0.24	0.90	0.008	0.006	9.25	0.50	0.99	0.25	0.023	0.043

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs) 20℃(68℉)	Heat Treatment
604 (87,600)	746 (108,200)	22.2	85 (63)	760℃(1400℉) X 2hr. S.R
684 (99,200)	733 (106,300)	25.2	71 (52)	760℃(1400℉) X 4hr. S.R

Approval

S-308L.16N [17]

Classifications

AWS A5.4 / ASME SFA5.4 E308L-16 JIS Z3221 ES308L-16 EN 1600 - E 19 9 L R
AWS A5.4 / ASME SFA5.4 E308L-17 JIS Z3221 ES308L-17 EN 1600 - E 19 9 L R

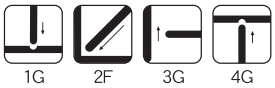
Description & Applications

Welding of extra-low carbon 18%Cr-8%Ni steel.

Current Type

AC or DC+

Welding Position



1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

Product Name	C	Si	Mn	P	S	Cr	Ni
S-308L.16N	0.02	0.67	0.87	0.030	0.018	19.2	10.0
S-308L.17	0.02	0.63	0.98	0.028	0.017	19.0	9.9

Typical Mechanical Properties of All-Weld Metal

Product Name	TS MPa(lbs/in²)	EL (%)
S-308L.16N	561 (81,500)	44.0
S-308L.17	570 (82,800)	49.0

Approval

KR, ABS, LR, DNV, NK, BV, CWB, TÜV, CE, DB, CCS (S-308L.16N), ABS (S-308L.17)

S-309L.16 [17]

Classifications

AWS A5.4 / ASME SFA5.4 E309L-16 JIS Z3221 ES309L-16 EN 1600 - E 23 12 L R
AWS A5.4 / ASME SFA5.4 E309L-17 JIS Z3221 ES309L-17 EN 1600 - E 19 9 L R

Description & Applications

Welding of 22%Cr-12%Ni steel Welding of dissimilar metals and build-up welding of stainless steel on carbon steel or low alloy steel.

Current Type

AC or DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

Product Name	C	Si	Mn	P	S	Cr	Ni
S-309L.16	0.02	0.76	1.30	0.023	0.019	22.9	12.7
S-309L.17	0.02	0.72	1.38	0.020	0.019	23.1	12.8

Typical Mechanical Properties of All-Weld Metal

Product Name	TS MPa(lbs/in²)	EL (%)
S-309L.16	563 (81,800)	43.0
S-309L.17	570 (82,800)	43.0

Approval

KR, ABS, LR, BV, DNV, NK, GL, CWB, TÜV, CE, DB, CCS (S-309L.16), ABS (S-309L.17)

S-316L.16N [17]

Classifications

AWS A5.4 / ASME SFA5.4 E316L-16 JIS Z3221 ES316L-16 EN 1600 - E 19 12 3 L R
AWS A5.4 / ASME SFA5.4 E316L-17 JIS Z3221 ES316L-17 EN 1600 - E 19 12 3 L R

Description & Applications

Welding of extra-low carbon 18%Cr-12%Ni-2%Mo (316L stainless steel).

Current Type

AC or DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

Product Name	C	Si	Mn	P	S	Cr	Ni	Mo
S-316L.16N	0.02	0.75	1.10	0.032	0.015	18.5	11.9	2.5
S-316L.17	0.02	0.73	1.33	0.029	0.016	19.4	11.7	2.5

Typical Mechanical Properties of All-Weld Metal

Product Name	TS MPa(lbs/in²)	EL (%)
S-316L.16N	557 (80,900)	45.2
S-316L.17	560 (81,300)	48.0

Approval

KR, ABS, LR, BV, DNV, NK, CWB, TÜV, CE, DB, CCS (S-316L.16N), ABS (S-316L.17)

SR-182

Classifications

AWS A5.11 / ASME SFA5.11 ENiCrFe-3 JIS Z3224 DNiCrFe-3

Description & Applications

SR-182 is designed for welding of Inconel 600 + 601 and dissimilar welding of stainless steels and low-alloyed steel & Nickel-alloyed steel. It can be used for welding of Ni-Cr-Fe alloyed clad steel as well.

Current Type

AC or DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Nb+Ta	Fe
0.060	0.45	6.20	0.010	0.010	16.5	72.0	1.8	5.2

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
640 (93,300)	40	-196 (-321)	76 (56)

Approval

ST-91B9

Classifications

AWS A5.28 / ASME SFA5.28 ER90S-B9 EN ISO 21952-A W CrMo91

Description & Applications

ST-91B9 is used for components such as headers, main steam piping and turbine casings, in fossil fulled power generating plants. Suitable for steels to A213 T91(Seamless tube), A335 P91(Seamless pipe), A387 Gr91(Plate), A182/A336 F91(forging), A234 WP91, etc

Shielding Gas

Ar

Current Type

GTAW : DC-

Typical Chemical Composition of the wire(%)

C	Si	Mn	P	S	Cr	Ni	Mo	V	Nb
0.10	0.30	0.47	0.005	0.003	8.91	0.67	0.96	0.20	0.06

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs) R.T	0℃(32℉)
746 (108,200)	833 (120,800)	20.6	220 (163)	200 (148)

Approval

S-625ES X YSB-625

Classifications

AWS A5.14 / ASME SFA5.14 EQNiCrMo-3

Description & Applications

YSB-625 is a nickel-based alloy strip electrode designed for cladding applications using the electroslag process with a neutral flux.

Current Type

DC+

Welding Position

1G
(PA)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Nb+Ta	Fe
0.026	0.40	0.13	0.005	0.014	20.1	57.2	7.26	0.018	2.69	8.7

Bead (0.5 * 60)

Approval

S-300EM X YSB-309LNb

Classifications

AWS A5.9 / ASME SFA5.9 EQ309L

Description & Applications

S-300EM is a highly basic electroslag flux for use stainless steel strip

Current Type

DC+

Welding Position

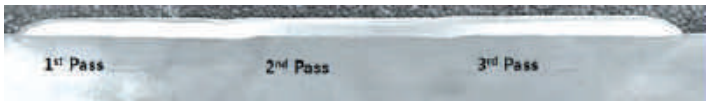
1G
(PA)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	Nb	Cu	N
0.024	0.42	1.41	0.019	0.007	19.6	10.4	0.05	0.47	0.02	0.036

Bead Appearance

Macro



Approval

Superflux800T X A-G2

Classifications

AWS A5.23 / ASME SFA5.23 F8A8-EG-G JIS Z3183 S502-H EN ISO 14174 S A AB 1 / ISO 14171 S Z

Description & Applications

Butt and flat welding of windmill tower, hydro plant penstocks and pressure vessels.

Current Type

AC, DC+

Basicity Index

2.4

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Ni	Ti	B
0.08	0.27	1.87	0.023	0.006	0.26	0.014	0.001

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs) −50℃(−58℉)	CVN-Impact Value J (ft · lbs) −60℃(−76℉)
613 (88,900)	640 (92,800)	27.2	130 (96)	100 (174)

Approval

S-100 X B-2R

Classifications

AWS A5.23 / ASME SFA5.23 F8P2-EB2R-B2R EN 760 S A FB 1

Description & Applications

S-100 X B-2R is Multi-layer welding of various kinds of structure such as 1.25%Cr-0.5% heat resistant steels used for boilers.

Current Type

DC+

Basicity Index

3.0

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Mo	Cu
0.082	0.24	0.94	0.010	0.004	1.04	0.47	0.05

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs) −30℃(−22℉)
555 (80,500)	619 (89,800)	27	120 (89)

Approval

S-100 X F-3

Classifications

AWS A5.23 / ASME SFA5.23 F9P8-EF3-F3 EN 756 S 50 6 FB S3Ni1Mo EN 760 S A FB 1

Description & Applications

S-100 X F-3 is Multi-layer welding of various kinds of structure for high yield strength on steels.

Current Type
AC, DC+

Basicity Index
3.0

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Ni	Mo	Cu	BM	Th. (mm)
0.085	0.27	1.71	0.014	0.004	0.98	0.44	0.056	A516 Gr.70	25

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	YS MPa(lbs/in²)	EL (%)	PWHT condition	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	BM	Th. (mm)
660 (95,700)	709 (102,800)	25	As welded	-62 (-80)	46 (34)	A516 Gr.70	25
641 (93,000)	698 (101,200)	28	620℃ X 1hr	-62 (-80)	38 (28)	A516 Gr.70	25

Approval

S-100 X M-4

Classifications

AWS A5.23 / ASME SFA5.23 F11A(P)8-EG-M4 EN 756 S 50 6 FB S3Ni1Mo EN 760 S A FB 1

Description & Applications

S-100 X M-4 is single and multi-layer welding of various kinds of high strength structure such as ship buildings, offshore structures, machinery.

Current Type
AC, DC+

Basicity Index
3.0

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	Cu	BM	Th. (mm)
0.08	0.28	1.55	0.015	0.008	0.48	2.26	0.47	0.08	A516 Gr.70	25

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	YS MPa(lbs/in²)	EL (%)	PWHT condition	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	BM	Th. (mm)
771 (111,800)	803 (116,500)	24	As welded	-62 (-80)	83 (61)	A516 Gr.70	25
706 (102,400)	796 (115,400)	25	620℃ X 1hr	-62 (-80)	41 (30)	A516 Gr.70	25

Approval

S-380F X B9

Classifications

AWS A5.23 / ASME SFA5.23 F9PZ-EB9-B9

Description & Applications

Joint welding and surfacing of creep- resistant CrMo-steels.

Current Type

AC, DC+

Basicity Index

1.3

Typical Chemical Composition of Wire (%)

C	Si	Mn	P	S	Cr	Ni	Mo	Nb	Cu
0.09	0.30	0.50	0.005	0.003	9.0	0.70	0.90	0.05	0.03

Typical Mechanical Properties of All-Weld Metal

PWHT	YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)
760°C X 2hr	640 (92,800)	720 (104,400)	21
760°C X 6hr	610 (88,500)	680 (98,600)	25
760°C X 20hr	600 (87,000)	660 (95,700)	26

Approval

Supercored 81MAG

Classifications

AWS A5.29 / ASME SFA5.29 E81T1-Ni1M H4 EN ISO 17632-A-T 46 6 1 Ni P M 2 H5

Description & Applications

Supercored 81MAG can be used in oil and gas construction, pipe and offshore structures.

Shielding Gas

Ar+20~25%CO_2

Current Type

DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Ni
0.05	0.28	1.20	0.008	0.012	0.93

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	
550 (79,900)	590 (85,700)	26	-60 (-76)	60 (44)	As welded
510 (74,100)	570 (82,800)	28	-40 (-40)	98 (73)	PWHT(620°C X 2hr)

Approval

ABS, BV, DNV, LR, CWB, RINA, MRS, TÜV, DB, CE

SC-91B3

Classifications

AWS A5.29/ ASME SFA5.29 E91T1-B3C EN ISO 17634-A-T CrMo2 P C 2

Description & Applications

SC-91B3 can be used for welding of 2.25%Cr-1.0%Mo steel used for super heat tubes and steam pipes of boilers for electric power plant and marine use, equipment for oil refining industries and high temperature synthetic chemical industries.

Shielding Gas

CO_2

Current Type

DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Mo
0.063	0.47	0.83	0.022	0.017	2.32	0.99

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	PWHT
643 (93,300)	730 (106,000)	20	690°C±15 X 1hr)

Approval

SC-91B9

Classifications

AWS A5.29 / ASME SFA5.29 E91T1-B9M-H4

Description & Applications

① SC-91B9 is titania type flux cored wire for all position welding.
② It is designed for the welding B9 steel. (P91,T91,F91)

Shielding Gas

Ar+20~25% CO_2

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	Cr	Ni	Mo	V	Nb	N2
0.09	0.11	0.53	9.0	0.50	1.0	0.20	0.05	0.03

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	PWHT
630 (91,400)	730 (105,900)	20.8	760°C X 2hr

Approval

SC-80D2

Classifications

AWS A5.28 / ASME SFA5.28 E80C-G JIS Z3318 YFM-G EN ISO 17632-A-T 46 0 MnMo M M 3

Description & Applications

SC-80D2 can be used on high strength steels and low alloy steels in heavy industries and structural steels.

Shielding Gas

Ar+20~25% CO_2

Current Type

DC+

Welding Position

1G (PA) 2F (PB)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Mo
0.05	0.60	1.65	0.012	0.010	0.51

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
590 (85,600)	660 (95,700)	28	-20 (-4)	70 (52)

Approval

SW-82

Classifications

AWS A5.34 / ASME SFA5.34 ENiCr3T1-4

Description & Applications

① LNG and LPG storage plant, boilers of thermal power station.
② Suitable for Alloy 600 (NiCr15Fe), 601 (NiCr23Fe), 800 or 800H (X10 NiCrAlTi32 20), 9%Ni steel etc.
③ Remark of GM(T)AW (SM-82, ST-82), SMAW (SR-182).

Shielding Gas

CO_2 / Ar +20~25% CO_2

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Fe	Nb+Ta
0.05	0.40	2.90	0.003	0.005	20.0	72.0	1.3	2.4

Typical Mechanical Properties of All-Weld Metal

TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs) −196℃(−321℉)
680 (98,600)	38	50 (37)

Approval

SC-71LHM Cored

Classifications

AWS A5.20 / ASME SFA5.20 E71T-1M/-9M JIS Z3313 T49 3 T1-1 M A-U H5 EN ISO 17632-A-T 46 3 P M 1 H5

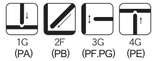
Description & Applications

All position welding of building, shipbuilding, bridge construction machinery and vehicles.

Shielding Gas
Ar+20~25% CO_2

Current Type
DC+

Welding Position



Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S
0.05	0.50	1.20	0.012	0.015

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(˚F)	CVN-Impact Value J (ft · lbs)
580 (84,200)	600 (87,100)	28	-30 (-22)	80 (59)

Approval

ABS, LR, BV, DNV, GL, TÜV, DB, CE, CWB

Supercored 70MXH

Classifications

AWS A5.20 / ASME SFA5.20 E70T-1C/-9C JIS Z3313 T49 2 T15-0 C A-U H5 EN ISO 17632-A-T 42 2 R C 3 H5

Description & Applications

Supercored 70MXH is a metal cored wire for high speed single or twin tandem welding application in the flat and horizontal fillet position. This wire benefits from high deposition rate and is widely used for shipbuilding, construction of bridge, and structural fabrication.

Shielding Gas
CO_2

Current Type
DC+

Welding Position

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S
0.05	0.55	1.65	0.013	0.010

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(˚F)	CVN-Impact Value J (ft · lbs)
540 (78,400)	620 (90,000)	28	-20 (-4)	60 (44)

Approval

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

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SHIPBUILDING

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S-7018.1H

Classifications

AWS A5.1 / ASME SFA5.1 E7018-1 H4R JIS Z3211 E4918 EN ISO 2560-A - E42 4 B 3 2 H5

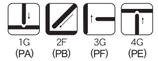
Description & Applications

S-7018.1H can be used for welding of high tensile steel, such as bridges, buildings, rolling stock and low temperature used for steel structure.

Current Type

AC or DC+

Welding Position



Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S
0.06	0.25	1.35	0.014	0.005

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
493 (71,500)	566 (82,100)	30.8	-45 (-49)	152 (112)

Approval

ABS, BV, DNV, LR, GL, CWB

Superflux55ULT X H-14

Classifications

AWS A5.17/ASME SFA5.17 F7A(P)8-EH14 JIS Z3183 S502-H EN ISO 14174 S A FB 1 / EN ISO 14171 S4

Description & Applications

Multi-layer welding of various kinds of structures such as shipbuildings, offshore structures and pressure vessels.

Current Type

AC, DC +

Basicity Index

2.5

Typical Chemical Composition of All-Weld Metal (%)

Wire	C	Si	Mn	P	S	Ti	B	BM	Th.(mm)
H-14	0.09 0.08	0.21 0.26	1.34 1.40	0.019 0.020	0.012 0.009	0.018 0.020	0.0015 0.0018	SS400 EH36-TM	25 83

Typical Mechanical Properties of All-Weld Metal

Wire	YS MPa(lbs/in²)	YS MPa(lbs/in²)	EL (%)	Position of fracture	CVN-Impact Value J (ft · lbs) -40℃(-40℉)	CVN-Impact Value J (ft · lbs) -62℃(-80℉)	BM	Th. (mm)	CTOD (mm) -10℃(14℉)
H-14	530 (76,900) 510 (74,000)	580 (84,200) 570 (82,800)	30 32	- -	- 150 (110)	120 (88) 110 (81)	SS400 EH36-TM	25 83	1.896

Approval

KR, ABS, LR, BV, DNV, GL, NK, TÜV, CE-Mark, DB

SC-71MSR

Classifications

AWS A5.20 / ASME SFA5.20 E71T-12M-J EN ISO 17632-A-T 46 4 P M 1 H5

Description & Applications

Oil and gas construction, pipe and offshore structures.

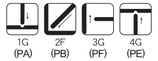
Shielding Gas

Ar+20~25% CO_2

Current Type

DC+

Welding Position



Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Ni
0.06	0.35	1.24	0.012	0.012	0.45

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs) −40℃(−40℉)	CVN-Impact Value J (ft · lbs) −51℃(−60℉)	
542 (78,600) 523 (75,700)	577 (83,600) 552 (80,000)	30 33	115 (85) 90 (66)	85 (63) 70 (52)	As welded PWHT(620°C X 2hr)

Approval

ABS, BV, DNV, LR, GL, TÜV, DB, CE, CWB

SF-71MC

Classifications

AWS A5.20 / ASME SFA5.20 E71T-1C/-1M/-9C/-9M/-12C/-12M EN ISO 17632-A-T 46 3 P M 1
EN ISO 17632-A-T 46 2 P C 1

Description & Applications

All position welding for ship hulls, vehicles, bridges, chemical plant machinery and other metal fabrication.

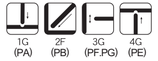
Shielding Gas

CO_2 / Ar+20~25% CO_2

Current Type

DC+

Welding Position



Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Shielding Gas
0.04 0.04	0.40 0.50	1.20 1.41	0.010 0.010	0.012 0.014	100%CO_2 75%Ar + 25%CO_2

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs) −20℃(−4℉)	CVN-Impact Value J (ft · lbs) −30℃(−22℉)	Shielding Gas
510 (74,000) 540 (78,400)	550 (79,900) 605 (87,700)	28 28	95 (70) 110 (81)	75 (55) 90 (66)	100%CO_2 75%Ar + 25%CO_2

Approval

ABS, LR, BV, DNV, TÜV, DB, CE, CWB

SC-81Ni2M

Classifications

AWS A5.29 / ASME SFA5.29 E81T1-Ni2M JIS Z3313 T55 6 T1-1 M A-N5 H5 EN ISO 17632-A T46 6 2Ni1 P M 2 H5

Description & Applications

SC-81Ni2M is a titania type flux cored wire for welding of low-temperature service steel.

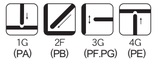
Shielding Gas

Ar+20~25% CO_2

Current Type

DC+

Welding Position



Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Ni
0.06	0.24	1.15	0.010	0.010	2.25

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs) −50℃(−58℉)	CVN-Impact Value J (ft · lbs) −60℃(−76℉)
600 (87,000)	645 (93,500)	24.8	110 (81)	90 (66)

Approval

DNV, LR, BV

SC-81LT

Classifications

AWS A5.29 / ASME SFA5.29 E81T1-K2C JIS Z3313 T55 6 T1-1 C A-N3 H5 EN ISO 17632-A T46 6 1.5Ni P C 1 H5

Description & Applications

All postion welding of building, shipbuilding, bridge construction machinery and vehicles.

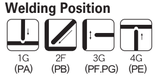
Shielding Gas

CO_2

Current Type

DC+

Welding Position



Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Ni
0.04	0.26	1.10	0.012	0.011	1.50

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs) −40℃(−40℉)	CVN-Impact Value J (ft · lbs) −60℃(−76℉)	CTOD (mm) −20℃(−4℉)
520 (75,400)	610 (88,500)	28.0	120 (89)	85 (63)	0.993

Approval

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Welding Consumables

STEEL FABRICATION

www.hyundaiwelding.com

S-7018.1H

Classifications

AWS A5.1 / ASME SFA5.1 E7018-1 H4R JIS Z3211 E4918 EN ISO 2560-A - E42 4 B 3 2 H5

Description & Applications

S-7018.1H can be used for welding of high tensile steel, such as bridges, buildings, rolling stock and low temperature used for steel structure.

Current Type

AC or DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S
0.06	0.25	1.35	0.014	0.005

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
493 (71,500)	566 (82,100)	30.8	-45 (-49)	152 (112)

Approval

ABS, BV, DNV, LR, GL, CWB

S-7016.LS

Classifications

AWS A5.5 / ASME SFA5.5 E7016-G H4R JIS Z3211 E4916-N1 AP L EN ISO 2560-A - E46 6 1Ni B 1 2 H5

Description & Applications

S-7016.LS can be used for welding of high tensile steel for low temperature. Such as off-shore structures, LPG storage tanks, etc.

Current Type

AC or DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Ni
0.06	0.30	0.98	0.013	0.008	0.80

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	CTOD (mm) −10℃(14℉)
538 (78,100)	589 (85,500)	30.0	-45 (-49) -60 (-76)	95 (70) 73 (54)	1.350

Approval

KR, ABS, LR, BV, DNV

S-7016.HR

Classifications

AWS A5.5 / ASME SFA5.5 E7016 H4R JIS Z3211 E4916 EN ISO 2560-A E 42 2 B 1 2

Description & Applications

S-7016.HR can be used for welding of high tensile steel, such as bridge, buildings, shipbuilding, high pressure vessels and rolling stock.

Current Type

AC or DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo	V
0.064	0.56	0.95	0.012	0.005	0.042	0.063	0.005	0.010

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
493 (71,500)	566 (82,100)	30.4	-30 (-22)	160 (118)

Approval

Superflux787 X H-12K

Classifications

AWS A5.17/ASME SFA5.17 F7A(P)8-EH12K JIS Z3183 S502-H EN ISO 14174 S A FB 1 / EN ISO 14171 S3Si

Description & Applications

Multi-layer welding of various kinds of structures such as ship buildings, offshore structures, machinery, pressure vessels, large diameter and heavy wall steel pipe.

Current Type

AC or DC+

Basicity Index

2.5

Typical Chemical Composition of All-Weld Metal (%)

Wire	C	Si	Mn	P	S	BM	Th.(mm)
H-12K	0.09	0.30	1.50	0.018	0.010	AH36	25

Typical Mechanical Properties of All-Weld Metal

Wire	YS MPa(lbs/in²)	YS MPa(lbs/in²)	EL (%)	PWHT condition	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	BM	Th. (mm)
H-12K	540 (78,400) 450 (65,300)	580 (84,200) 520 (75,500)	32.0 33.0	- 620℃ X 1hr	-62 (-80) -62 (-80)	168 (124) 180 (133)	AH36 AH36	25 25

Approval

S-717 X M-12K

Classifications

AWS A5.17 / ASME SFA5.17 F7A(P)6-EM12K JIS Z3183 S502-H EN ISO 14174 S A AB 1 / EN ISO 14171 S2Si

Description & Applications

Multi-layer welding of structural steels, offshore structures and thick, windmill, pressure vessels.

Current Type

AC, DC +

Basicity Index

1.9

Typical Chemical Composition of All-Weld Metal (%)

Wire	C	Si	Mn	P	S	BM	Th.(mm)
M-12K	0.09	0.26	1.40	0.023	0.004	SS400	25
M-12K	0.08	0.54	1.47	0.025	0.018	BS4360-Gr, 50D	44

Typical Mechanical Properties of All-Weld Metal

Wire	YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)	BM	Th. (mm)
M-12K	555 (80,500)	614 (89,100)	29	-51 (-60)	60 (44)	SS400	25
M-12K	510 (74,000)	580 (84,200)	28	-20 (-4)	70 (52)	BS4360-Gr, 50D	44

Approval

KR, ABS, LR, BV, DNV, GL, NK, MRS, CWB, TÜV, CE-Mark, DB

Supershield 4

Classifications

AWS A5.20/ ASME SFA5.20 E70T-4 EN ISO 17632-A T 42 Z Z W N 3

Description & Applications

Only Flat, H-Fillet welding of general fabrication, structural fabrication, machinery bases and heavy equipment repair.

Current Type

DC+

Welding Position

1G (PA) 2F (PB)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Al
0.19	0.38	0.40	0.012	0.010	1.25

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)
465 (67,400)	610 (88,400)	24.0

Approval

Supershield 11

Classifications

AWS A5.20 / ASME SFA 5.20 E71T-11 JIS Z3313 T49 T14-1 N A EN ISO 17632-A-T 42 Z Z Z N 1

Description & Applications

Supershield 11 is used where light structurals, short assembly welds, other general fabrications and galvanized steel fixtures, gate etc.

Current Type

DC-

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Al
0.19	0.35	0.60	0.011	0.006	1.20

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)
520 (75,400)	590 (85,600)	21

Approval

Supershield 71GS

Classifications

AWS A5.20 /ASME SFA 5.20 E71T-GS JIS Z3313 T49 T14-1 N S EN ISO 17632-A-T 42 Z Z V N 1

Description & Applications

Supershield 71GS is used where light structurals, short assembly welds, other general fabrications and galvanized steel fixtures, gate etc.

Current Type

DC-

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Al
0.26	0.50	0.91	0.016	0.014	2.05

Typical Mechanical Properties of All-Weld Metal

	As Welded
Transverse Tensile Strength, MPa(psi) (Specimen broken in the base metal)	586 (85,000)
Longitudinal Guided Bend Test	Satisfactory

Approval

Supershield EG-72T

Classifications

AWS A5.26 / ASME SFA5.26 EG72T-1

Description & Applications

Supershield EG-72T is an Selfshield Flux cored consumable used for electro gas arc welding process (EGW).
Vertical-up, self-shielded, V-groove & Square Butt joint single pass electro gas arc welding process for Storage tank fabrication.
This process does not use an external shielding gas.

Current Type

DC+

Welding Position

1G (PA) 2F (PB) 3G (PF) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V
0.05	0.35	1.45	0.008	0.009	0.01	0.03	0.25	0.01	0.01

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	CVN-Impact Value J (ft · lbs)
520 (75,400)	590 (85,500)	27	45 (33)

Approval

SC-70H Cored

Classifications

AWS A5.20 / ASME SFA5.20 E70T-1C/-9C JIS Z3313 T49 3 T15-0 C A H10 EN ISO 17632-A-T 42 2 R C 3

Description & Applications

Flat & H-Fillet welding of building, shipbuilding, bridge construction, machinery, vehicle using mild and 490MPa class high tensile steels.

Shielding Gas

CO_2

Current Type

DC+

Welding Position

1G (PA) 2F (PB)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S
0.05	0.56	1.48	0.014	0.010

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
495 (71,900)	580 (84,100)	27	-30 (-22)	51 (37)

Approval

ABS, CCS, LR, GL, CWB

Supercored 71H

Classifications

AWS A5.20 / ASME SFA5.20 E71T-1C/-9C/-9C-J JIS Z3313 T49 4 T1-1 C A H5 EN ISO 17632-A-T 42 4 P C 1 H5

Description & Applications

All position welding of shipbuilding, bridges, building and structural fabrication.

Shielding Gas

CO_2

Current Type

DC+

Welding Position

1G (PA) 2F (PB) 3G (PF.PG) 4G (PE)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S
0.03	0.46	1.36	0.008	0.011

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
550 (79,900)	570 (82,800)	27	-30 (-22) -40 (-40)	90 (66) 60 (44)

Approval

KR, ABS, LR, BV, DNV, GL, NK, TÜV, CWB, CE, DB, CCS, RINA, MRS

Supercored 70NS

Classifications

AWS A5.18 / ASME SFA5.18 E70C-6M JIS Z3313 T49 3 T15-0 M A H5 EN ISO 17632-A-T 42 3 M M 3 H5

Description & Applications

Supercored 70NS is used for welding in shipbuilding, machinery, bridge construcion, structural fabrication, automated or robotic welding.

Shielding Gas

Ar+20~25%CO_2

Current Type

DC+

Welding Position

1G (PA) 2F (PB) 3G (PF)

Typical Chemical Composition of All-Weld Metal (%)

C	Si	Mn	P	S
0.05	0.55	1.45	0.013	0.010

Typical Mechanical Properties of All-Weld Metal

YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	Temp. ℃(℉)	CVN-Impact Value J (ft · lbs)
480 (69,700)	550 (79,900)	27.0	-30 (-22)	50 (37)

Approval

ABS, LR, BV, DNV, GL, TÜV, CWB, CE, DB, RINA