HYUNDAI WELDING

Rev. 11

SC-70ML

METAL CORED ARC WELDING CONSUMABLES
FOR Mild & 490MPa CLASS HIGH TENSILE STEEL

2024.12

HYUNDAI WELDING CO., LTD.

SC-70ML

❖ Specification

AWS A5.18	E70C-6M
(AWS A5.18M	E48C-6M)
EN ISO 17632-A	T46 4 M M21 2 H5
JIS Z3313	T49 4 T15-1 M A-U

AWS D1.8

Wire Dia. mm(in)		
1.2(0.045)	1.4(0.052)	1.6(1/16)

* AWS D1.8 is available upon request

❖ Applications

SC-70ML can be used on mild and high tensile steel in single and multi-pass applications. It is ideally suited for high production and automatic applications where large amount of filler metal can be deposited with a minimum amount of slag & spatter.Typical industrial applications include shipbuilding, machinery, bridge, structural fabrication and building.

❖ Characteristics on Usage

SC-70ML is a metal-cored gas shielded cored wire which combines the high deposition rates of a flux cored wire with the high efficiencies of a solid wire. SC-70ML is recommended for welding of carbon steel having tensile strengths up to 490MPa Provide an exceptionally smooth and stable arc, low spatter and minimal slag coverage in welding

❖ Note on Usage

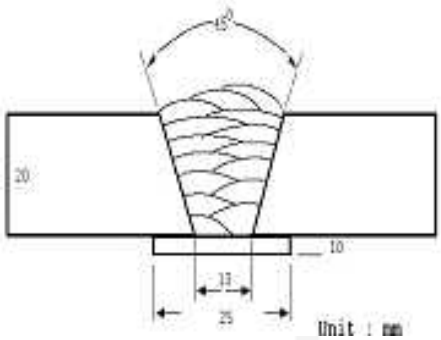
1. For preheating guidelines, please refer to your local standards and codes relative to your best practices

2. Use Ar + 20-25% CO2 gas.

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter	:	1.2mm (0.045in)
Shielding Gas	:	80%Ar + 20%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	280A/ 30V
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
	YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	-29℃ (-20°F)	-40℃ (-40°F)
SC-70ML	476(69,000)	553(80,000)	26.5	86(63)	75(55)
AWS A5.18 E70C-6M	≥ 390 (56,000)	≥ 480 (70,000)	≥ 22	≥27J at -29℃ (≥20ft · lbs at -20°F)	

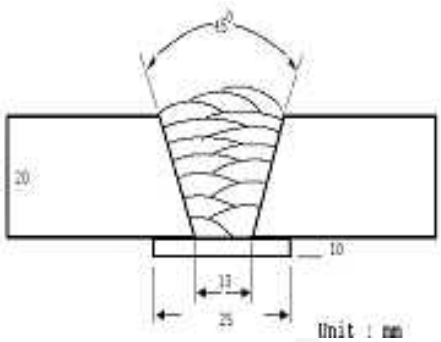
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Ni
SC-70ML	0.040	0.56	1.57	0.011	0.014	0.34
AWS A5.18 E70C-6M	≤ 0.12	≤ 0.90	≤ 1.75	≤ 0.030	≤ 0.030	≤ 0.50

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter	:	1.2mm (0.045in)
Shielding Gas	:	90%Ar + 10%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	280A/ 29V
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
	YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	-29℃ (-20°F)	-40℃ (-40°F)
SC-70ML	487(71,000)	565(82,000)	26.2	82(61)	69(51)
AWS A5.18 E70C-6M	≥ 390 (56,000)	≥ 480 (70,000)	≥ 22	≥27J at -29℃ (≥20ft · lbs at -20°F)	

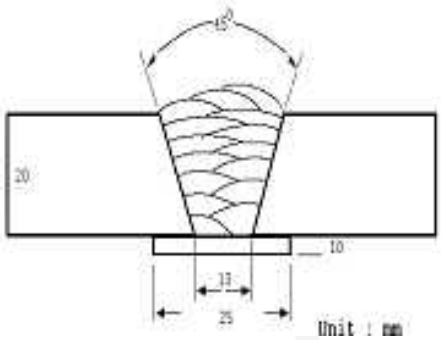
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Ni
SC-70ML	0.043	0.59	1.62	0.010	0.018	0.36
AWS A5.18 E70C-6M	≤ 0.12	≤ 0.90	≤ 1.75	≤ 0.030	≤ 0.030	≤ 0.50

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter	:	1.4mm (0.052in)
Shielding Gas	:	80%Ar + 20%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	300A/ 30V
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
	YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	-29℃ (-20°F)	-40℃ (-40°F)
SC-70ML	490(71,000)	565(82,000)	26.3	83(61)	72(53)
AWS A5.18 E70C-6M	≥ 390 (56,000)	≥ 480 (70,000)	≥ 22	≥27J at -29℃ (≥20ft · lbs at -29°F)	

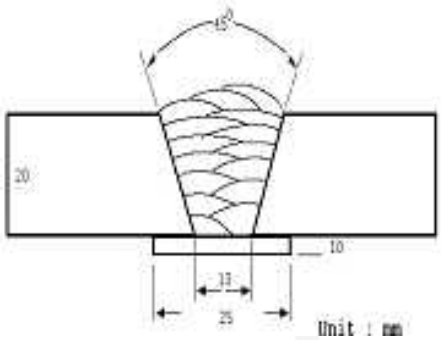
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Ni
SC-70ML	0.046	0.60	1.54	0.010	0.017	0.37
AWS A5.18 E70C-6M	≤ 0.12	≤ 0.90	≤ 1.75	≤ 0.030	≤ 0.030	≤ 0.50

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter	:	1.4mm (0.052in)
Shielding Gas	:	90%Ar + 10%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	300A/ 29V
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
	YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	-29℃ (-20°F)	-40℃ (-40°F)
SC-70ML	505(73,000)	583(84,000)	25.8	77(57)	65(48)
AWS A5.18 E70C-6M	≥ 390 (56,000)	≥ 480 (70,000)	≥ 22	≥27J at -29℃ (≥20ft · lbs at -29°F)	

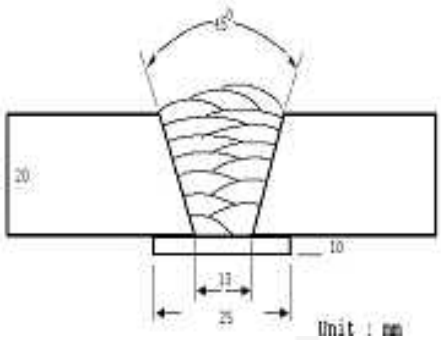
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Ni
SC-70ML	0.048	0.64	1.59	0.011	0.018	0.39
AWS A5.18 E70C-6M	≤ 0.12	≤ 0.90	≤ 1.75	≤ 0.030	≤ 0.030	≤ 0.50

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter	:	1.6mm (1/16in)
Shielding Gas	:	80%Ar + 20%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	320A/ 30V
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
	YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	-29℃ (-20°F)	-40℃ (-40°F)
SC-70ML	488(71,000)	560(81,000)	25.4	79(58)	70(52)
AWS A5.18 E70C-6M	≥ 390 (56,000)	≥ 480 (70,000)	≥ 22	≥27J at -29℃ (≥20ft · lbs at -29°F)	

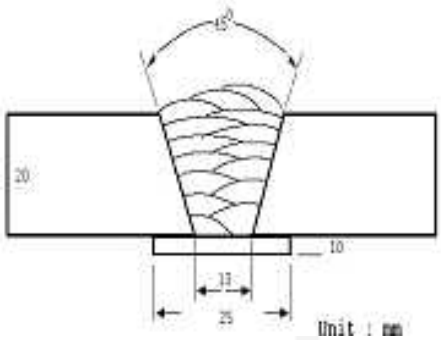
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Ni
SC-70ML	0.045	0.59	1.52	0.011	0.016	0.35
AWS A5.18 E70C-6M	≤ 0.12	≤ 0.90	≤ 1.75	≤ 0.030	≤ 0.030	≤ 0.50

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter	:	1.6mm (1/16in)
Shielding Gas	:	90%Ar + 10%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	320A/ 29V
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
	YS MPa(lbs/in²)	TS MPa(lbs/in²)	EL (%)	-29℃ (-20°F)	-40℃ (-40°F)
SC-70ML	510(74,000)	593(86,000)	25.1	72(53)	61(45)
AWS A5.18 E70C-6M	≥ 390 (56,000)	≥ 480 (70,000)	≥ 22	≥27J at -29℃ (≥20ft · lbs at -29°F)	

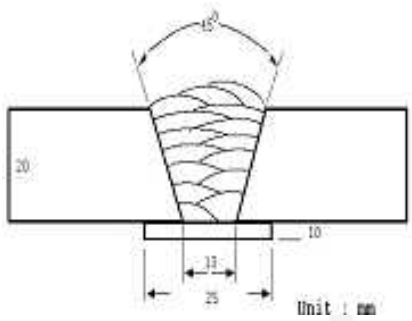
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Ni
SC-70ML	0.050	0.62	1.58	0.011	0.017	0.38
AWS A5.18 E70C-6M	≤ 0.12	≤ 0.90	≤ 1.75	≤ 0.030	≤ 0.030	≤ 0.50

Impact Toughness Test on Various Temp.

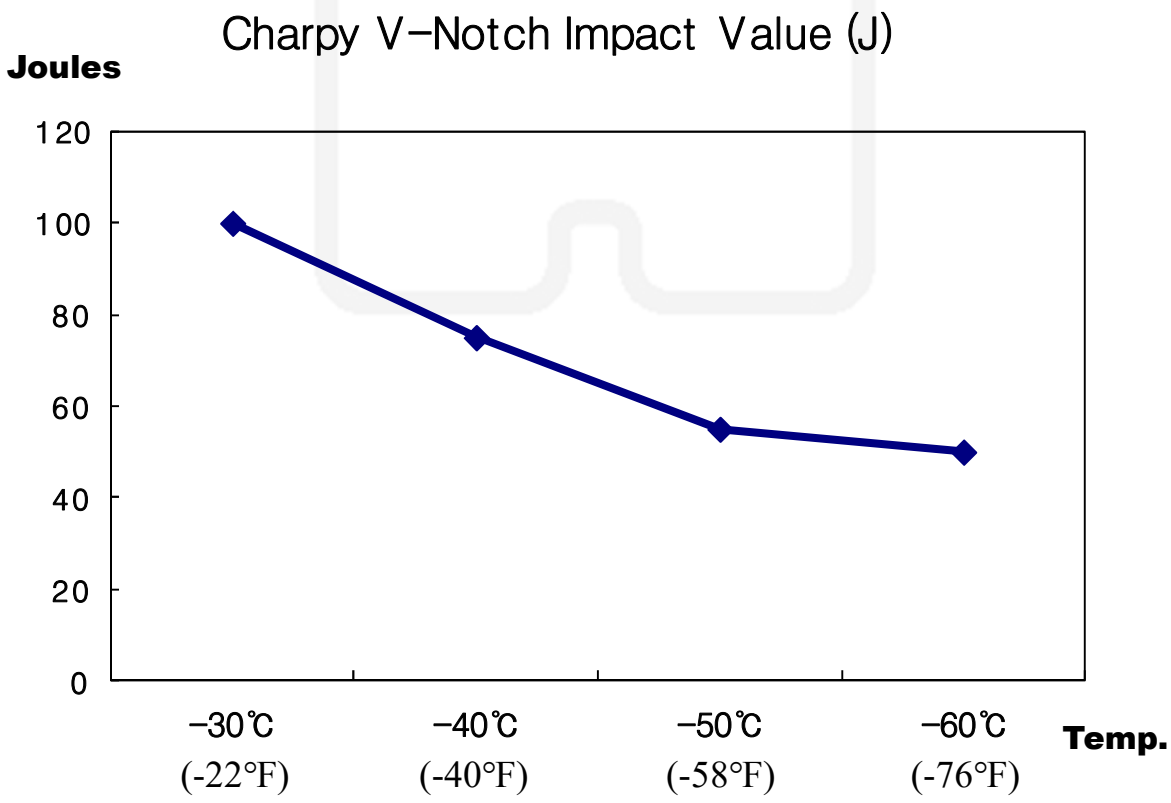
❖ Welding Conditions

Method by AWS Rules



[Joint Preparation & Layer Details]

Diameter	:	1.2mm (0.045in)
Shielding Gas	:	80%Ar + 20%CO2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	280 / 30
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	Room Temp.
Interpass Temp.	:	150±15℃ (302±59°F)
Polarity	:	DC(+)



Diffusible Hydrogen Content

❖ Welding Conditions

Diameter	:	1.2mm (0.045in)	**Amps / Volts**	:	250A / 25V
Shielding Gas	:	80%Ar +20%CO2	**Stick-Out**	:	20~25mm (0.79~0.98in)
Flow Rate	:	20 ℓ /min			
Welding Position	:	1G (PA)	**Welding Speed**	:	30 cm/min (12 in/min)
			Current Type & Polarity	:	DC(+)

❖ Hydrogen Analysis Using Gas Chromatography Method

Hydrogen Evolution Time	:	**72 hrs**
Evolution Temp.	:	45 ℃ (113°F)
Barometric Pressure	:	780 mm-Hg

❖ Result(㎖/100g Weld Metal)

X1	X2	X3	X4
3.8	3.9	3.7	3.5

Average Hydrogen Content 3.7 ㎖ / *100g Weld Metal*

Welding Efficiency

❖ Deposition Rate & Efficiency

Wire Size	Welding Conditions		Wire Feed Speed m/min (in/min)	Deposition Efficiency(%)	Deposition Rate kg/hr(lb/hr)
	Amp.(A)	Volt.(V)			
1.2mm (0.045in)	200	24	6.7(260)	90~92	2.6(5.7)
	250	28	9.8(390)	91~93	3.8(8.4)
	300	30	12.7(500)	94~95	5.3(11.7)
1.4mm (0.052in)	220	25	5.3(209)	90~92	2.7(6.0)
	270	28	6.8(268)	91~93	3.9(8.6)
	320	30	9.0(354)	94~95	5.2(11.5)
1.6mm (1/16in)	230	27	3.8(150)	90~92	2.8(6.2)
	280	29	5.1(200)	92~93	4.2(9.2)
	340	30	6.2(244)	93~96	5.1(11.2)
Remark				Deposition efficiency =(Deposited metal weight/ Wire weight used)×100	Deposition rate =(Deposited metal weight/ Welding time,min.)×60

* Shielding Gas : 80%Ar+20%CO2

Proper Welding Condition

❖ Proper Current Range

Consumable	Shielding Gas	Welding Position	Wire Dia.		
			1.2mm (0.045in)	1.4mm (0.052in)	1.6mm (1/16in)
SC-70ML	80%Ar+ 20%CO_2	F & HF	200~300Amp	260~320Amp	290~340Amp

Approvals

❖ Shipping Approvals

Welding Position	Register of shipping & Size mm(in)			
	ABS	LR	BV	DNV
F,HF V-up	4Y400SA H5 1.2~1.6 (0.045~1/16)	4Y40SH5 1.2~1.6 (0.045~1/16)	SA4Y40M HHH 1.2~1.6 (0.045~1/16)	IVY40MSH5 1.2~1.6 (0.045~1/16)

❖ F No & A No

F No	A No
6	1