

SC-81BF

FLUX CORED ARC WELDING CONSUMABLE
FOR WELDING OF 550MPa CLASS HIGH TENSILE STEEL



❖ Specification

AWS A5.36

E81T1-C1A4-Ni1

E81T1-M21A4-Ni1

EN ISO 17632-A

T 46 4 1Ni P C1 1 H5

T 46 4 1Ni P M21 1 H5

❖ Applications

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

❖ Characteristics on Usage

SC-81BF is an all position flux cored wire designed for 100% CO₂ shielding gas or Ar-20~25% CO₂ shielding gas. You can get smooth arc, and low spatter, good weldability. The weld metal impact values at -40°C (-40°F) is excellent and has good bead appearance, slag covering is uniform and easy to remove.

❖ Note on Usage

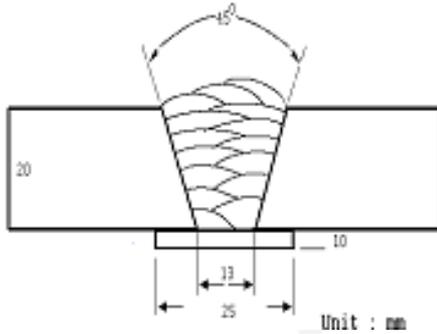
1. Proper preheating(50~150 °C(150~302°F)) and interpass temperature must be used in order to release hydrogen which may cause cracking in weld metal when electrodes are used for medium and heavy plates.
2. Use 100% CO₂ or Ar+20~25% CO₂ gas.



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** : 100%CO₂
Ar+20%CO₂
- Amp./ Volt.** : 270~280 / 29~31
- Stick-Out** : 20~25mm (0.79~0.98in)
- Pre-Heat(°C)** : R.T .
- Interpass Temp.(°C)** : 150±15 (302±59 °F)

❖ **Mechanical Properties of all weld metal**

Consumable	Shield gas	Tensile Test			CVN Impact Test J(ft·lbs)
		YS MPa(lbs/in ²)	TS MPa((lbs/in ²)	EL(%)	-40°C (-40°F)
SC-81BF	100% CO ₂	505 (73,000)	560 (81,000)	31.0	95(70)
	Ar+20%CO ₂	580 (84,000)	640 (93,000)	28.5	105(77)
AWS A5.36 E81T1-C1(M21)A4-Ni1		≥ 470 (68,200)	550~690 (79,800~100,000)	≥ 19	≥ 27(20) at -40°C (-40°F)

❖ **Chemical Analysis of all weld metal(wt%)**

Consumable	Shield gas	C	Si	Mn	P	S	Ni	B
SC-81BF	100% CO ₂	0.040	0.38	0.98	0.007	0.005	0.85	0.004
	Ar+20%CO ₂	0.045	0.50	1.15	0.007	0.005	0.83	0.004
AWS A5.36 E81T1-C1(M21)A4-Ni1		≤ 0.12	≤ 0.80	≤ 1.75	≤ 0.03	≤ 0.03	0.8~1.1	-

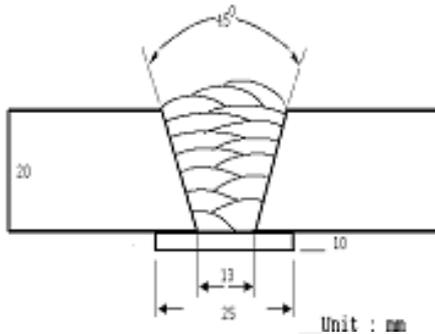
This information is provided solely for the purpose of confirming product conformance with applicable standards. The serviceability of a product or structure utilizing this type of information is and must be the sole responsibility of the builder/user. Many variables beyond the control of HYUNDAI WELDING CO., LTD. affect the results obtained in applying this type of information. These variables include, but are not limited to, welding procedure, shielding gas, plate chemistry and temperature, weldment design, fabrication methods and service requirements.



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(1/16 in)
Shielding Gas	: 100%CO ₂ Ar+20%CO ₂
Amp./ Volt.	: 320~330 /30~32
Stick-Out	: 20~25mm (0.79~0.98in)
Pre-Heat(°C)	: R.T.
Interpass Temp.(°C)	: 150±15 (302±59 °F)

❖ Mechanical Properties of all weld metal

Consumable	Shield gas	Tensile Test			CVN Impact Test J(ft·lbs)
		YS MPa(lbs/in ²)	TS MPa((lbs/in ²))	EL(%)	-40°C (-40°F)
SC-81BF	100% CO ₂	510 (74,000)	570 (83,000)	30.0	90(66)
	Ar+20%CO ₂	590 (86,000)	650 (94,000)	27.5	100(74)
AWS A5.36 E81T1-C1(M21)A4-Ni1		≥ 470 (68,200)	550~690 (79,800~100,000)	≥ 19	≥ 27(20) at -40°C (-40°F)

❖ Chemical Analysis of all weld metal(wt%)

Consumable	Shield gas	C	Si	Mn	P	S	Ni	B
SC-81BF	100% CO ₂	0.040	0.40	1.00	0.007	0.005	0.86	0.004
	Ar+20%CO ₂	0.045	0.51	1.16	0.007	0.005	0.85	0.004
AWS A5.36 E81T1-C1(M21)A4-Ni1		≤ 0.12	≤ 0.80	≤ 1.75	≤ 0.03	≤ 0.03	0.8~1.1	-

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Welding Efficiency

❖ Deposition Rate & Efficiency

Consumable (size)	Shield Gas	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)	100%CO ₂	200	25	10.2(400)	86~88	3.0(6.6)
		250	27	13.3(525)	87~88	4.0(8.8)
		300	31	15.3(600)	88~89	5.5(12.1)
	Ar+ 20%CO ₂	200	26	10.2(400)	87~89	3.0(6.6)
		250	28	13.3(525)	88~89	4.1(9.0)
		300	32	15.3(600)	88~90	5.6(12.3)
1.6mm (1/16 in)	100%CO ₂	280	30	6.4 (250)	85~87	3.8(8.4)
		330	32	7.6 (300)	85~88	4.4(9.7)
		350	33	8.1 (320)	86~88	5.3(11.7)
	Ar+ 20%CO ₂	280	31	6.4 (250)	86~88	3.9(8.6)
		330	33	7.6 (300)	86~89	4.5(9.9)
		350	34	8.1 (320)	87~89	5.4(11.9)
Remark				-	Deposition efficiency =(Deposited metal weight/ Wire weight used)×100	Deposition rate =(Deposited metal weight/ Welding time, min.)×60

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Diffusible Hydrogen Content

❖ Welding Conditions

Diameter(mm)	: 1.6mm(1/16in)	Amps(A) / Volts(V)	: 310A / 29~30V
Shielding Gas	: 100%CO ₂ Ar+20%CO ₂	Stick-Out(mm)	: 20mm(0.79in)
Flow Rate(ℓ /min.)	: 20	Welding Speed	: 35 cm/min (13.8 in/min)
Welding Position	: 1G(PA)	Current Polarity	: DC(+)

❖ Diffusible Hydrogen Test Using Gas Chromatography Method

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

❖ Result(ml/100g Weld Metal)

Shield gas	X1	X2	X3	X4	Avg.
Ar+20% CO ₂	3.6	3.8	3.8	3.9	3.8
100%CO ₂	3.1	3.2	3.3	3.3	3.2

Average Diffusible Hydrogen Content 3.8 ml / 100g Weld Metal(Ar+20%CO₂)

Average Diffusible Hydrogen Content 3.2 ml / 100g Weld Metal(100%CO₂)



❖ Proper Current Range

Consumable	Shielding Gas	Welding Position	Current
1.2mm (0.045in)	100%CO ₂ Ar+20%CO ₂	Flat	140~300 Amp
		V-up Overhead	140~260 Amp
		V-down	140~300 Amp
1.6mm (1/16 in)	100%CO ₂ Ar+20%CO ₂	Flat	180~350 Amp
		V-up Overhead	180~310 Amp
		V-down	180~350 Amp

❖ F No. & A No.

F-No.	A-No.
6	10