

SC-81BF

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



❖ Specification

| | |
|-----------------------|-----------------------|
| AWS A5.36 | E81T1-C1A4-Ni1 H4 |
| | E81T1-M21A4-Ni1 H4 |
| 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

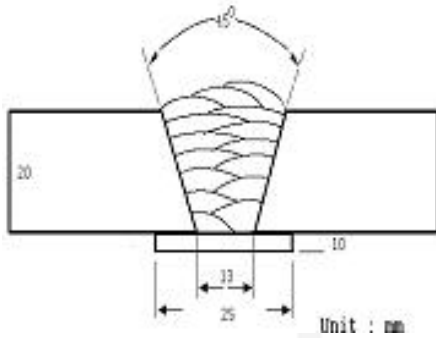
1. Proper preheating(50~150 °C(150~302 °F)) and interpass temperature must be used in order to release hydrogen which may cause cracking in weld metal when electrodes are used for medium and heavy plates.
2. Use 100% CO₂ or Ar+20~25% CO₂ gas.



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%CO ₂ Ar+20%CO ₂ |
| 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 |
|-------------------------------------|-----------------------|---------------------------------|-----------------------------------|-------|------------------------------|
| | | YS MPa(lbs/in ²) | TS MPa((lbs/in ²)) | EL(%) | J(ft·lbs) |
| SC-81BF | 100% CO ₂ | 505 (73,000) | 560 (81,000) | 31.0 | -40°C (-40°F) 95(70) |
| | Ar+20%CO ₂ | 580 (84,000) | 640 (93,000) | 28.5 | 105(77) |
| AWS A5.36 E81T1-C1(M21)A4-Ni1 H4 | | ≥ 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 H4 | | ≤ 0.12 | ≤ 0.80 | ≤ 1.75 | ≤ 0.03 | ≤ 0.03 | 0.8~1.1 | - |
| Consumable | Shield gas | Cr | Mo | V | Nb | Al | Cu | |
| SC-81BF | 100% CO ₂ | 0.03 | 0.002 | 0.025 | 0.018 | 0.003 | 0.02 | |
| | Ar+20%CO ₂ | 0.03 | 0.002 | 0.031 | 0.022 | 0.003 | 0.02 | |

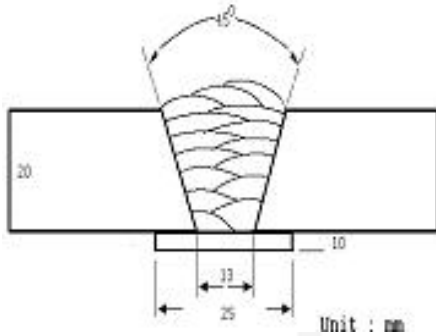
This information is provided solely for the purpose of confirming product conformance with applicable standards. The serviceability of a product or structure utilizing this type of information is and must be the sole responsibility of the builder/user. Many variables beyond the control of HYUNDAI WELDING 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 H4 | | ≥ 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 H4 | | ≤ 0.12 | ≤ 0.80 | ≤ 1.75 | ≤ 0.03 | ≤ 0.03 | 0.8~1.1 | - |
| Consumable | Shield gas | Cr | Mo | V | Nb | Al | Cu | |
| SC-81BF | 100% CO ₂ | 0.03 | 0.002 | 0.025 | 0.018 | 0.003 | 0.02 | |
| | Ar+20%CO ₂ | 0.03 | 0.002 | 0.031 | 0.022 | 0.003 | 0.02 | |

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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% CO₂ | 3.6 | 3.8 | 3.8 | 3.9 | 3.8 |
| 100%CO₂ | 3.1 | 3.2 | 3.3 | 3.3 | 3.2 |



❖ 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 |