

SC-81M

FLUX CORED ARC WELDING CONSUMABLE
FOR LOW-TEMPERATURE SERVICE STEEL



❖ Specification

| | |
|-----------------------|-----------------------|
| <i>AWS A5.36</i> | E81T1-M21A8-Ni1 H4 |
| <i>(AWS A5.36M)</i> | E551T1-M21A6-Ni1 H4) |
| <i>(AWS A5.29)</i> | E81T1-Ni 1 M-J H4) |
| <i>EN ISO 17632-A</i> | T 50 6 1Ni P M21 1 H5 |

❖ Applications

All position welding for construction machinery, bridge structures and storage tanks

❖ Characteristics on Usage

SC-81M is an all position flux cored wire designed for Ar+20~25% CO₂ shielding. You can get smooth arc, and low spatter, good weldability. The weld metal impact values at -60°C(-76°F) is excellent and has good bead appearance, slag covering is uniform and easy to remove.

❖ Note on Usage

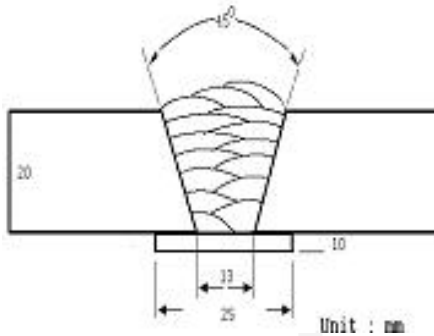
1. Proper preheating(50~150 °C(150~302 °F)) and interpass temperature must be used in order to release hydrogen which may cause cracking in weld metal when electrodes are used for medium and heavy plates.
2. Use Ar+20~25% CO₂ gas.



Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

| | |
|---------------------------|-------------------------|
| Welding Position | : 1G(PA) |
| Diameter(mm) | : 1.2mm(0.045in) |
| Shielding Gas | : Ar+20%CO ₂ |
| Amp./ Volt. | : 270~280 /29~30 |
| Stick-Out(mm) | : 20~25 (0.79~0.98in) |
| Pre-Heat(℃) | : R.T . |
| Interpass Temp.(℃) | : 150±15 (302±59 ℃) |

❖ Mechanical Properties of all weld metal

| Consumable | Tensile Test | | | CVN Impact Test J(ft·lbs) | |
|---------------------------------|----------------|---------------------|-------|------------------------------|-----------------|
| | YS MPa(ksi) | TS MPa(ksi) | EL(%) | -40℃ (-40°F) | -60℃ (-76°F) |
| SC-81M | 540(78) | 580(84) | 25.0 | 105(77) | 73(54) |
| AWS A5.36 E81T1-M21A8-Ni1 H4 | ≥ 470(68) | 550~690 (80~100) | ≥ 19 | ≥ 27(20) at -60℃ (-76°F) | |

❖ Chemical Analysis of all weld metal(wt%)

| Consumable | C | Si | Mn | P | S | Ni |
|---------------------------------|--------|--------|--------|--------|--------|---------|
| SC-81M | 0.04 | 0.32 | 1.15 | 0.008 | 0.008 | 0.90 |
| AWS A5.36 E81T1-M21A8-Ni1 H4 | ≤ 0.12 | ≤ 0.80 | ≤ 1.75 | ≤ 0.03 | ≤ 0.03 | 0.8~1.1 |

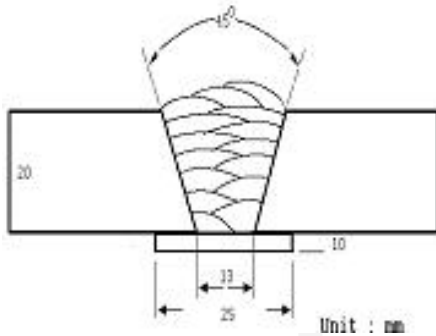
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Mechanical Properties & Chemical Composition of All Weld Metal

❖ **Welding Conditions**

Method by AWS Spec.



[Joint Preparation & Layer Details]

- Welding Position** : 1G(PA)
- Diameter(mm)** : 1.4mm(0.052in)
- Shielding Gas** : Ar+20%CO₂
- Amp./ Volt.** : 300~315 / 29~30
- Stick-Out(mm)** : 20~25 (0.79~0.98in)
- Pre-Heat(°C)** : R.T.
- Interpass Temp.(°C)** : 150±15 (302±59 °F)

❖ **Mechanical Properties of all weld metal**

| Consumable | Tensile Test | | | CVN Impact Test J(ft·lbs) | |
|---------------------------------|----------------|---------------------|-------|------------------------------|------------------|
| | YS MPa(ksi) | TS MPa(ksi) | EL(%) | -40°C (-40°F) | -60°C (-76°F) |
| SC-81M | 545(79) | 585(85) | 26.2 | 102(75) | 70(52) |
| AWS A5.36 E81T1-M21A8-Ni1 H4 | ≥ 470(68) | 550~690 (80~100) | ≥ 19 | ≥ 27(20) at -60°C (-76°F) | |

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

| Consumable | C | Si | Mn | P | S | Ni |
|---------------------------------|--------|--------|--------|--------|--------|---------|
| SC-81M | 0.04 | 0.33 | 1.16 | 0.008 | 0.008 | 0.90 |
| AWS A5.36 E81T1-M21A8-Ni1 H4 | ≤ 0.12 | ≤ 0.80 | ≤ 1.75 | ≤ 0.03 | ≤ 0.03 | 0.8~1.1 |

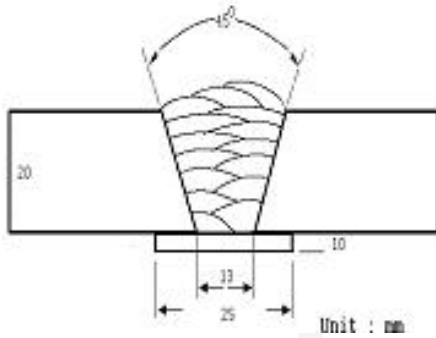
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Mechanical Properties & Chemical Composition of All Weld Metal

❖ **Welding Conditions**

Method by AWS Spec.



[Joint Preparation & Layer Details]

- Welding Position** : 1G(PA)
- Diameter(mm)** : 1.6mm(1/16 in)
- Shielding Gas** : Ar+20%CO₂
- Amp./ Volt.** : 320~330 /29~30
- Stick-Out(mm)** : 20~25 (0.79~0.98in)
- Pre-Heat(°C)** : R.T .
- Interpass Temp.(°C)** : 150±15 (302±59 °F)

❖ **Mechanical Properties of all weld metal**

| Consumable | Tensile Test | | | CVN Impact Test J(ft·lbs) | |
|---------------------------------|----------------|---------------------|-------|------------------------------|------------------|
| | YS MPa(ksi) | TS MPa(ksi) | EL(%) | -40°C (-40°F) | -60°C (-76°F) |
| SC-81M | 550(80) | 590(86) | 26.0 | 96(71) | 67(49) |
| AWS A5.36 E81T1-M21A8-Ni1 H4 | ≥ 470(68) | 550~690 (80~100) | ≥ 19 | ≥ 27(20) at -60°C (-76°F) | |

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

| Consumable | C | Si | Mn | P | S | Ni |
|---------------------------------|--------|--------|--------|--------|--------|---------|
| SC-81M | 0.04 | 0.34 | 1.15 | 0.008 | 0.008 | 0.91 |
| AWS A5.36 E81T1-M21A8-Ni1 H4 | ≤ 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) | 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 | 26 | 10.2(400) | 87~89 | 3.1(6.8) |
| | 250 | 28 | 13.3(525) | 88~89 | 4.3(9.5) |
| | 300 | 32 | 15.3(600) | 88~90 | 5.8(12.8) |
| 1.4mm (0.052in) | 250 | 28 | 7.6 (300) | 85~87 | 3.6(7.9) |
| | 300 | 32 | 10.2 (400) | 86~88 | 4.7(10.4) |
| | 330 | 36 | 12.8 (500) | 87~89 | 6.3(13.9) |
| 1.6mm (1/16 in) | 280 | 31 | 6.4 (250) | 86~88 | 4.0(8.8) |
| | 330 | 33 | 7.6 (300) | 86~89 | 4.6(10.1) |
| | 350 | 34 | 8.1 (320) | 87~89 | 5.6(12.3) |
| | 400 | 38 | 9.2 (360) | 88~90 | 6.5(14.3) |
| Remark | | | | Deposition efficiency =(Deposited metal weight/ Wire weight used)×100 | Deposition rate =(Deposited metal weight/ Welding time, min.)×60 |

* Shielding Gas : Ar+20%CO₂

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Diffusible Hydrogen Content

❖ Welding Conditions

| | | | |
|---------------------------|-------------------------|------------------------------------|------------------------------|
| Diameter(mm) | : 1.6(1/16in) | Amps(A) / Volts(V) | : 310 / 32 |
| Shielding Gas | : 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 Type & Polarity | : DC(+) |

❖ Hydrogen Analysis 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)

| X1 | X2 | X3 | X4 |
|-----|-----|-----|-----|
| 3.4 | 3.5 | 3.3 | 3.4 |

Average Hydrogen Content **3.4 ml / 100g Weld Metal**



❖ Proper Current Range

| Consumable | Shielding Gas | Welding Position | Current |
|--------------------|-----------------------|-------------------|-------------|
| 1.2mm (0.045in) | Ar+20%CO ₂ | Flat | 120~300 Amp |
| | | V-up Over head | 120~260 Amp |
| | | V-down | 140~300 Amp |
| 1.4mm (0.052in) | Ar+20%CO ₂ | Flat | 160~350 Amp |
| | | V-up Over head | 140~270 Amp |
| | | V-down | 160~320 Amp |
| 1.6mm (1/16 in) | Ar+20%CO ₂ | Flat | 180~380 Amp |
| | | V-up Over head | 160~320 Amp |
| | | V-down | 180~360 Amp |

❖ F No. & A No.

| F No | A No |
|------|------|
| 6 | 10 |