

# **SC-80M**

METAL CORED ARC WELDING CONSUMABLE  
FOR 550MPa CLASS HIGH TENSILE STEEL

2022.02

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**HYUNDAI WELDING CO., LTD.**



## ❖ Specification

<i>AWS A5.28</i>	E80C-G
<i>(AWS A5.28M)</i>	E55C-G)
<i>EN ISO 17632-A</i>	T46 4 M ZNiCrCu M21 3

## ❖ Applications

SC-80M is used for welding in bridge construction, structural fabrication automated or robotic welding

## ❖ Characteristics on Usage

SC-80M is a metal cored wire designed for single or multipass welding on high-tensile steel and weathering grade steels. SC-80M was designed specifically to meet the demand for weld deposits that color match the low alloy, high strength weathering grade steels, such as Corten steel.

## ❖ Note on Usage

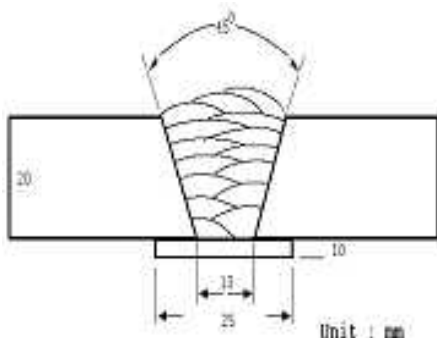
1. For preheating guidelines, please refer to your local standards and codes relative to your best practices
2. Use Ar + 20-25% CO<sub>2</sub> gas.



## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Welding Position</b>	: 1G(PA)
<b>Diameter(mm)</b>	: 1.2mm
<b>Shielding Gas</b>	: 80%Ar + 20%CO <sub>2</sub>
<b>Flow Rate(l /min.)</b>	: 20
<b>Amp./ Volt.</b>	: 280 / 30
<b>Stick-Out(mm)</b>	: 20~25
<b>Pre-Heat(°C)</b>	: R.T .
<b>Interpass Temp.(°C)</b>	: 150±15
<b>Polarity</b>	: DC(+)

### ❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
	YS MPa(lbs/in <sup>2</sup> )	TS MPa(lbs/in <sup>2</sup> )	EL(%)	-18°C (-20°F)	-40°C (-40°F)
<b>SC-80M</b>	610(88,000)	664(96,200)	24.2	115(85)	76(56)
<b>AWS A5.28 E80C-G</b>	-	≥ 550 (80,000)	-	-	-

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

consumable	C	Si	Mn	P	S	Ti	Ni	Cr	Mo	Cu
<b>SC-80M</b>	0.077	0.63	1.65	0.014	0.007	0.007	0.72	0.25	0.012	0.34
<b>AWS A5.28 E80C-G</b>	N/S (Not Specified) <sup>h</sup>									

\* h : The electrode must have a minimum of one or more of the following: ≥0.5%Ni, ≥0.3%Cr, ≥0.2%Mo

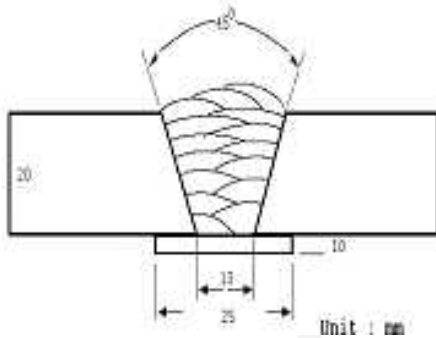
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## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Welding Position</b>	: 1G(PA)
<b>Diameter(mm)</b>	: 1.6mm
<b>Shielding Gas</b>	: 80%Ar + 20%CO <sub>2</sub>
<b>Flow Rate(ℓ /min.)</b>	: 20
<b>Amp./ Volt.</b>	: 350 / 30
<b>Stick-Out(mm)</b>	: 20~25
<b>Pre-Heat(℃)</b>	: R.T .
<b>Interpass Temp.(℃)</b>	: 150±15
<b>Polarity</b>	: DC(+)

### ❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
	YS MPa(lbs/in <sup>2</sup> )	TS MPa(lbs/in <sup>2</sup> )	EL(%)	-18℃ (-20°F)	-40℃ (-40°F)
<b>SC-80M</b>	602(87,000)	658(95,000)	24.6	92(68)	72(53)
<b>AWS A5.28 E80C-G</b>	-	≥ 550 (80,000)	-	-	-

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

Consumable	C	Si	Mn	P	S	Ti	Ni	Cr	Mo	Cu
<b>SC-80M</b>	0.075	0.61	1.62	0.014	0.009	0.006	0.75	0.26	0.015	0.34
<b>AWS A5.28 E80C-G</b>	N/S (Not Specified) <sup>h</sup>									

\* h : The electrode must have a minimum of one or more of the following: ≥0.5%Ni, ≥0.3%Cr, ≥0.2%Mo

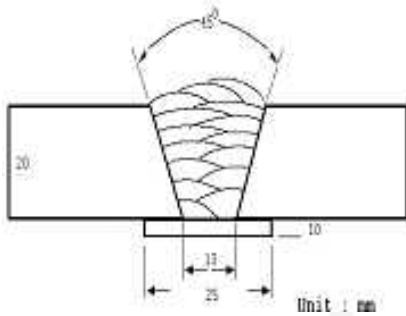
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## Impact Toughness Test on Various Temp.

### ❖ Welding Conditions

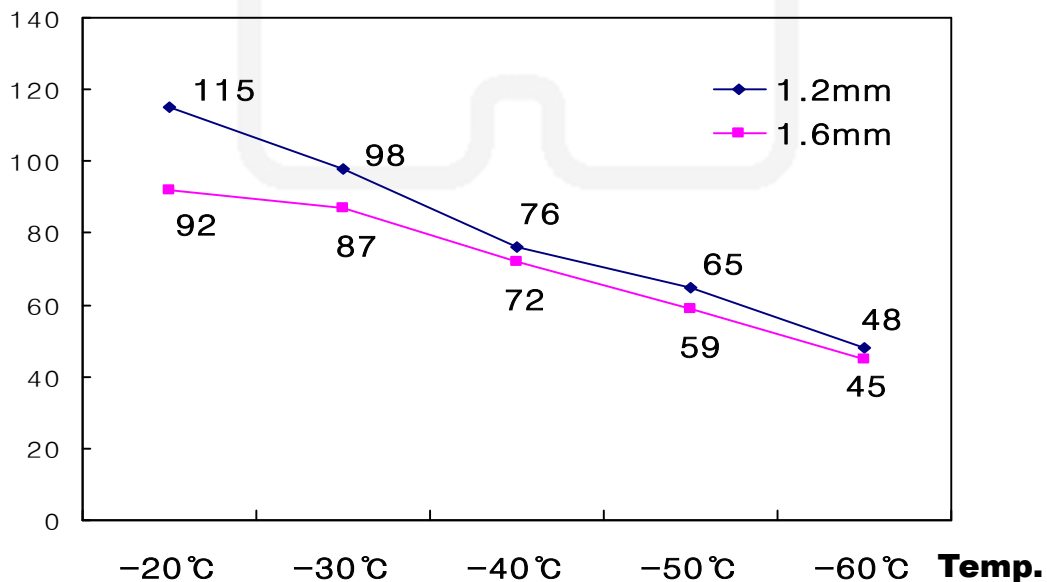
Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Diameter(mm)</b>	: 1.2	1.6
<b>Shielding Gas</b>	: 80%Ar + 20%CO <sub>2</sub>	80%Ar + 20%CO <sub>2</sub>
<b>Flow Rate(ℓ /min.)</b>	: 20	20
<b>Amps(A) / Volts(V)</b>	: 280 / 32	350 / 30
<b>Stick-Out(mm)</b>	: 20~25	20~25
<b>Pre-Heat(°C)</b>	: Room Temp.	Room Temp.
<b>Inter-Pass Temp.(°C)</b>	: 150±15	150±15
<b>Current Type &amp; Polarity</b>	: DC(+)	DC(+)

### Joule



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## Diffusible Hydrogen Content

### ❖ Welding Conditions

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<b>Diameter(mm)</b>	: 1.6	<b>Amps(A) / Volts(V)</b>	: 320 / 30
<b>Shielding Gas</b>	: 80%Ar +20%CO <sub>2</sub>	<b>Stick-Out(mm)</b>	: 20~25
<b>Flow Rate(ℓ /min.)</b>	: 20	<b>Welding Speed</b>	: 30 cpm
<b>Welding Position</b>	: 1G	<b>Current Type &amp; Polarity</b>	: DC(+)

### ❖ Hydrogen Analysis Using Gas Chromatography Method

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<b>Hydrogen Evolution Time</b>	: 72 hrs	<b>Analysis Temp.</b>	: 25 °C
<b>Evolution Temp.</b>	: 45 °C		
<b>Barometric Pressure</b>	: 780 mm-Hg		

### ❖ Result(ml/100g Weld Metal)

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X1	X2	X3	X4
4.3	4.2	4.4	4.3

**Average Hydrogen Content** **4.4 ml / 100g Weld Metal**

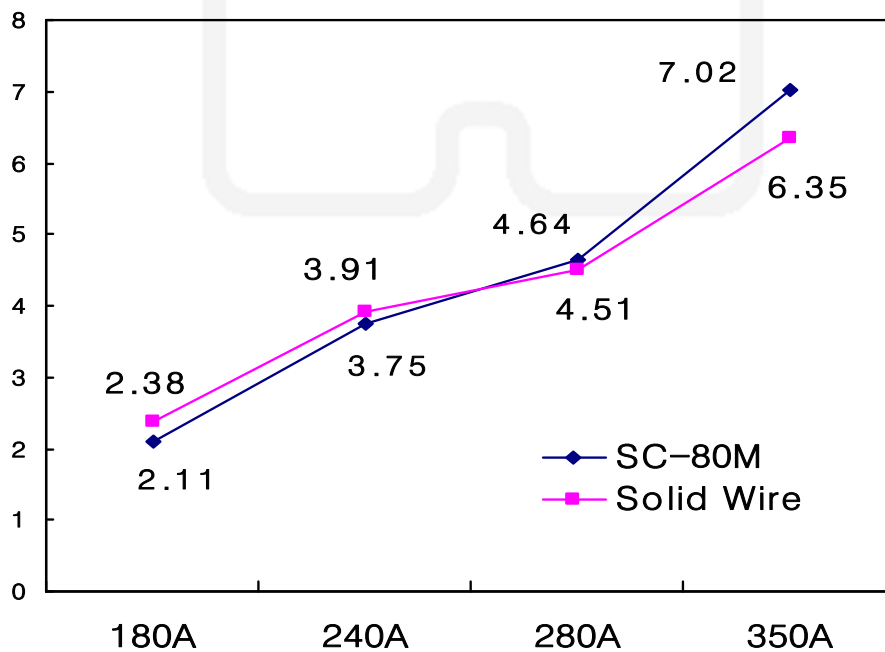


# Welding Efficiency

## ❖ Deposition Rate & Efficiency

Consumable	Welding Conditions		Deposition Efficiency(%)	Deposition Rate(kg/hr)
	Amp.(A)	Volt.(V)		
SC-80M 1.2mm	180	23	92~94	2.11
	240	26	93~95	3.75
	280	30	95~97	4.64
	350	34	97~98	7.02
Remark			Deposition efficiency =(Deposited metal weight/ Wire weight used)×100	Deposition rate =(Deposited metal weight/ Welding time,min.)×60

\* Shielding Gas : 80%Ar+20%CO<sub>2</sub>



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## Fume Test

### ❖ Welding Conditions

<b>Diameter(mm)</b>	: 1.2	<b>Amps(A) / Volts(V)</b>	: 280 / 30
<b>Shielding Gas</b>	: 80%Ar +20%CO <sub>2</sub>	<b>Stick-Out(mm)</b>	: 20~25
<b>Flow Rate(ℓ /min.)</b>	: 20	<b>Welding Speed</b>	: 30 cpm
<b>Welding Position</b>	: 1G	<b>Current Type &amp; Polarity</b>	: DC(+)

### ❖ Result(mg/min.)

X1	X2	X3	X4
692	685	705	695

**Average Fume Emission    695 mg/min.**

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## Proper Welding Condition

### ❖ Welding Conditions

Consumable	Shielding Gas	Welding Position	Amp.(A) / Volt.(V)	
			1.2mm	1.6mm
SC-80M	80%Ar +20%CO <sub>2</sub>	F & H-F	180 ~200A / 23~24V	180 ~200A / 23~24V
			220~240A / 26~27V	220~240A / 23~24V
			280~300A / 29~30V	280~300A /27~28V
			350~370A / 34~35V	350~370A/ 30~31V
			-	400~420A/ 36~37V

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