

# **SC-90M**

METAL CORED ARC WELDING CONSUMABLE  
FOR WELDING OF 620MPa CLASS  
HIGH TENSILE STEEL



## ❖ Specification

**AWS A5.28** E90C-G

**EN ISO 18276-A** T 55 Z Z M M 1 H5

## ❖ Applications

SC-90M is used for welding in structural and mechanical fabrication automated or robotic welding

## ❖ Characteristics on Usage

SC-90M is a metal cored wire designed for single or multipass welding on 90Grade high-tensile steel.

SC-90M provides an exceptionally smooth and stable arc, low spatter and minimal slag coverage and achieves good impact value at low temperature.

## ❖ Note on Usage

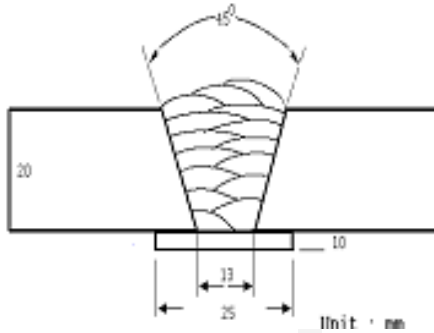
1. Proper preheating(50~150℃) and interpass temperature must be used in order to release hydrogen which may cause cracking in weld metal when electrodes are used for medium and heavy plates
2. Use Ar + 20-25% CO<sub>2</sub> gas.



## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<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 (Joule)	
	YS(MPa)	TS(MPa)	EL(%)	-50℃	-60℃
SC-90M	633	672	25.2	88	75
AWS A5.28 E90C-G	N/S	≥ 620	N/S	N/S	

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

Consumable	C	Si	Mn	P	S	Ni	Mo
SC-90M	0.074	0.54	1.35	0.012	0.007	1.17	0.18
AWS A5.28 E90C-G	N/S (Not Specified) <sup>h</sup>						

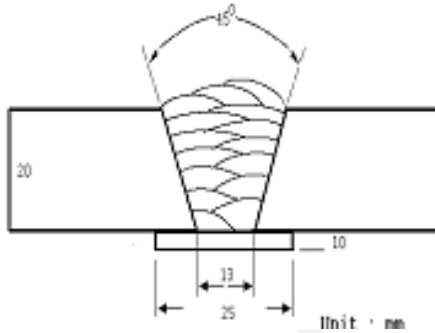
\* h : The electrode must have a minimum of one or more of the following: ≥0.5%Ni, ≥0.3%Cr, ≥0.2%Mo



## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

Diameter(mm)	: 1.4mm
Shielding Gas	: 80%Ar + 20%CO <sub>2</sub>
Flow Rate(ℓ /min.)	: 20
Amp./ Volt.	: 300 / 30
Stick-Out(mm)	: 20~25
Pre-Heat(℃)	: R.T .
Interpass Temp.(℃)	: 150±15
Polarity	: DC(+)

### ❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test (Joule)	
	YS(MPa)	TS(MPa)	EL(%)	-50℃	-60℃
SC-90M	627	671	25.0	93	73
AWS A5.28 E90C-G	N/S	≥ 620	N/S	N/S	

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

	C	Si	Mn	P	S	Ni	Mo
SC-90M	0.075	0.53	1.32	0.012	0.007	1.11	0.18
AWS A5.28	N/S (Not Specified) <sup>h</sup>						

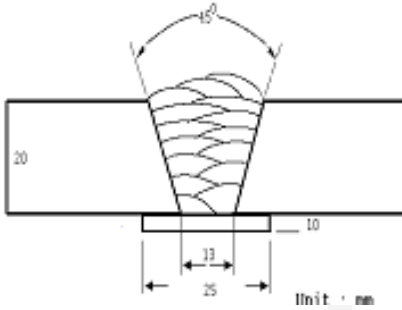
\* h : The electrode must have a minimum of one or more of the following: ≥0.5%Ni, ≥0.3%Cr, ≥0.2%Mo



## Impact Toughness Test on Various Temp.

### ❖ Welding Conditions

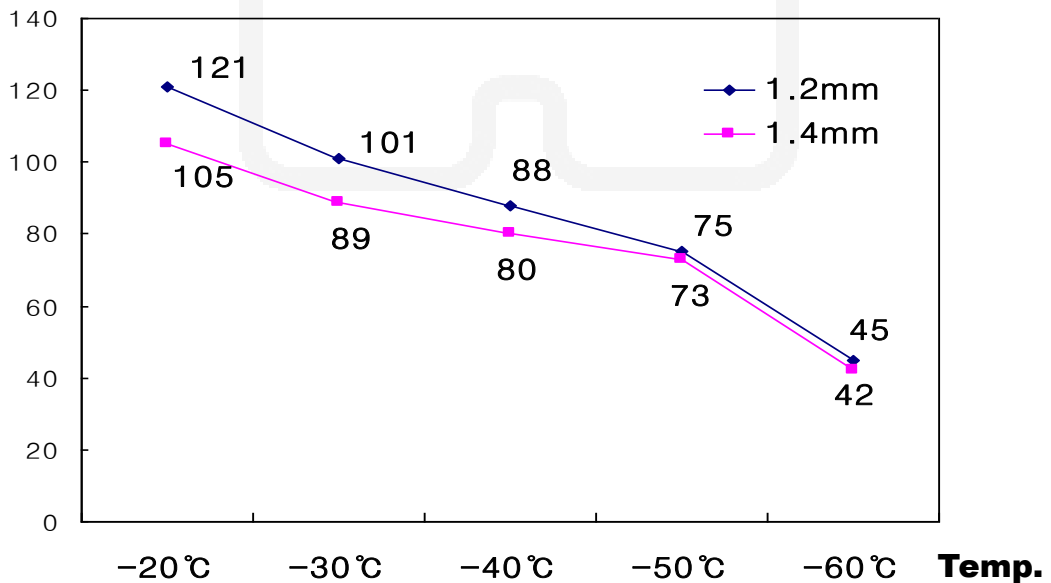
Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Diameter(mm)</b>	: 1.2	1.4
<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	300 / 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





# Diffusible Hydrogen Content

## ❖ Welding Conditions

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<b>Diameter(mm)</b>	: 1.4	<b>Amps(A) / Volts(V)</b>	: 300 / 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 Chromatograph Method

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<b>Hydrogen Evolution Time</b>	: 72 hrs	<b>Analysis Temp.</b>	: 25 °C
<b>Evolution Temp.</b>	: 25 °C	<b>Exposure Condition</b>	: 80%RH-25°C
<b>Barometric Pressure</b>	: 780 mm-Hg		

## ❖ Result(*ml*/100g Weld Metal)

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X1	X2	X3	X4
3.9	3.8	3.6	3.7

**Average Hydrogen Content** **3.8 ml / 100g Weld Metal**



## Welding Efficiency

### ❖ Deposition Rate & Efficiency

Consumable (Size)	Welding Conditions		Deposition Efficiency(%)	Deposition Rate(kg/hr)
	Amp.(A)	Volt.(V)		
SC-90M  1.2mm	180	23	92~94	2.12
	240	26	93~95	3.76
	280	30	95~97	4.65
	350	34	97~98	7.01
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

## ❖ Welding Conditions

Consumable	Shielding Gas	Welding Position	Wire Dia. (mm)	
			1.2mm	1.4mm
SC-90M	80%Ar +20%CO2	F & HF	200~300Amp	220~350Amp
		V-Up & OH	120~220Amp	140~240Amp
		V-Down	200~300Amp	220~300Amp

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.