HYUNDAI WELDING

Rev. 07

SC-90M

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

2020.12

HYUNDAI WELDING CO., LTD.

SC-90M

❖ Specification

AWS A5.28	E90C-G
(AWS A5.28	E62C-G)
EN ISO 18276-A	T55 5 ZMn1NiMo M M21 1

❖ 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

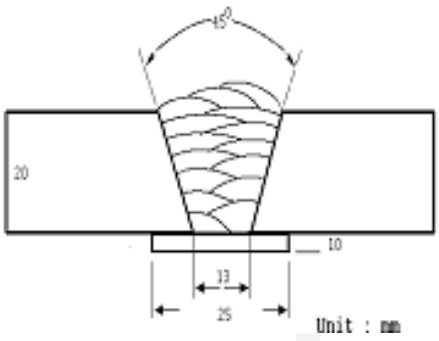
1. Proper preheating(50~150℃) and interpass temperature must be used in order to release hydrogen which may cause cracking in weld metal when electrodes are used for medium and heavy plates

2. Use Ar + 20-25% CO_2 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	:	80%Ar + 20%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	280A/ 30V
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)
SC-90M	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	-50℃ (-58°F)
	633(92,000)	672(98,000)	25.2	88(65)
AWS A5.28 E90C-G	–	≥ 620 (90,000)	–	–

❖ Chemical Analysis of all weld metal(wt%)

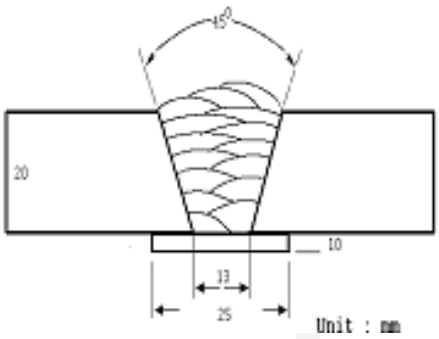
Consumable	C	Si	Mn	P	S	Ni	Mo
SC-90M	0.074	0.54	1.35	0.012	0.007	1.17	0.18
AWS A5.28 E90C-G	N/S (Not Specified) [h]						

* 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]

Welding Position	:	1G(PA)
Diameter	:	1.4mm (0.052in)
Shielding Gas	:	80%Ar + 20%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	300 A/ 30V
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)
SC-90M	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	-50℃ (-58°F)
	627(91,000)	671(97,000)	25.0	93(69)
AWS A5.28 E90C-G	–	≥ 620 (90,000)	–	–

❖ Chemical Analysis of all weld metal(wt%)

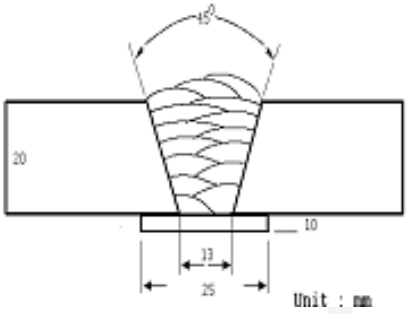
Consumable	C	Si	Mn	P	S	Ni	Mo
SC-90M	0.075	0.53	1.32	0.012	0.007	1.11	0.18
AWS A5.28 E90C-G	N/S (Not Specified) [h]						

* 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.

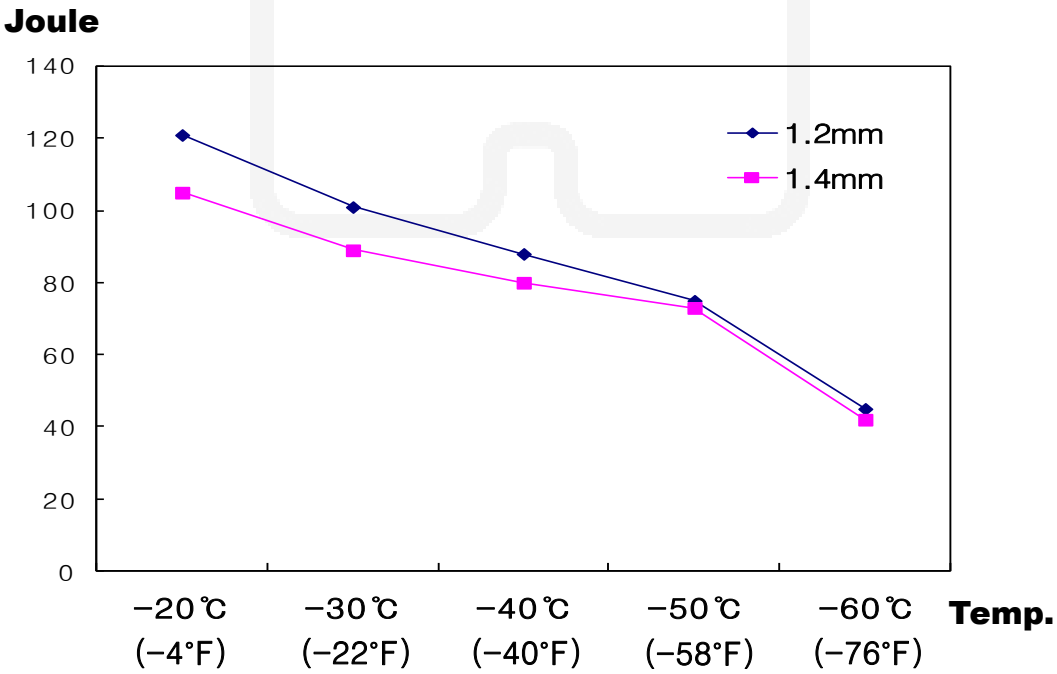
❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Diameter	:	**1.2mm (0.045in)**	**1.4mm (0.052in)**
Shielding Gas	:	80%Ar + 20%CO_2	
Flow Rate	:	20 ℓ /min	
Amps / Volts	:	280A / 30V	300A/ 30V
Stick-Out	:	20~25mm (0.79~0.98in)	
Pre-Heat(℃)	:	Room Temp.	
Inter-Pass Temp.	:	150±15℃ (302±59°F)	
Current Type & Polarity	:	DC(+)	



Diffusible Hydrogen Content

❖ Welding Conditions

Diameter	:	1.4mm (0.052in)	**Amps / Volts**	:	300A / 30V
Shielding Gas	:	80%Ar +20%CO_2	**Stick-Out(mm)**	:	20~25mm (0.79~0.98in)
Flow Rate	:	20 ℓ /min	**Welding Speed**	:	30 cm/min (12 in/min)
Welding Position	:	1G (PA)	**Current Type & Polarity**	:	DC(+)

❖ Hydrogen Analysis Using Gas Chromatograph Method

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

❖ Result(㎖/100g Weld Metal)

X1	X2	X3	X4
3.9	3.8	3.6	3.7

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

Welding Efficiency

❖ Deposition Rate & Efficiency

Wire 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)	180	23	6.1(240)	92~94	2.12(4.7)
	240	26	8.9(350)	93~95	3.76(8.3)
	280	30	11.0(430)	95~97	4.65(10.2)
	350	34	15.7(620)	97~98	7.01(15.4)
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	Amp.(A) / Volt.(V)	
			1.2mm (0.045in)	1.4mm (0.052in)
SC-90M	80%Ar +20%CO_2	F & HF	200~300Amp	220~350Amp
		V-Up & OH	120~220Amp	140~240Amp
		V-Down	200~300Amp	220~300Amp

❖ F No & A No

F No	A No
6	10