

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

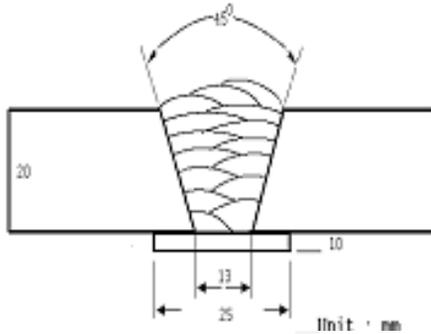
1. Proper preheating(50~150℃) and interpass temperature must be used in order to release hydrogen which may cause cracking in weld metal when electrodes are used for medium and heavy plates
2. Use Ar + 20-25% CO₂ gas.



Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Diameter(mm)	: 1.2mm
Shielding Gas	: 80%Ar + 20%CO ₂
Flow Rate(ℓ /min.)	: 20
Amp./ Volt.	: 280 / 30
Stick-Out(mm)	: 20~25
Pre-Heat(°C)	: R.T .
Interpass Temp.(°C)	: 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	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) ^h						

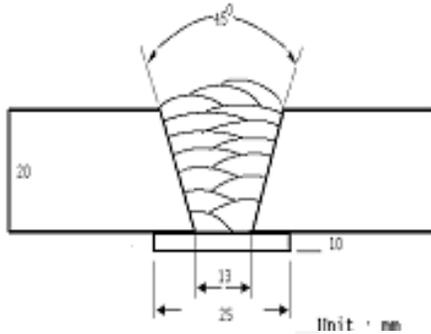
* h : The electrode must have a minimum of one or more of the following: ≥0.5%Ni, ≥0.3%Cr, ≥0.2%Mo



Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Diameter(mm)	: 1.4mm
Shielding Gas	: 80%Ar + 20%CO ₂
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) ^h						

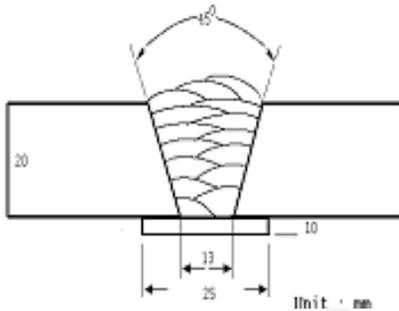
* h : The electrode must have a minimum of one or more of the following: ≥0.5%Ni, ≥0.3%Cr, ≥0.2%Mo



Impact Toughness Test on Various Temp.

❖ Welding Conditions

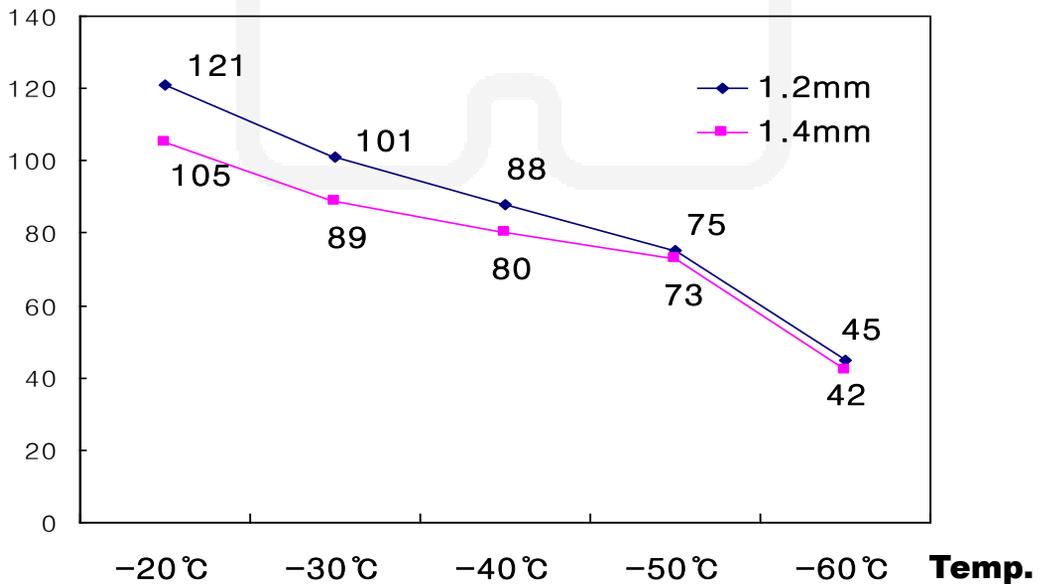
Method by AWS Spec.



[Joint Preparation & Layer Details]

Diameter(mm)	: 1.2	1.4
Shielding Gas	: 80%Ar + 20%CO ₂	80%Ar + 20%CO ₂
Flow Rate(ℓ /min.)	: 20	20
Amps(A) / Volts(V)	: 280 / 32	300 / 30
Stick-Out(mm)	: 20~25	20~25
Pre-Heat(°C)	: Room Temp.	Room Temp.
Inter-Pass Temp.(°C)	: 150±15	150±15
Current Type & Polarity	: DC(+)	DC(+)

Joule





Diffusible Hydrogen Content

❖ Welding Conditions

Diameter(mm)	: 1.4	Amps(A) / Volts(V)	: 300 / 30
Shielding Gas	: 80%Ar +20%CO ₂	Stick-Out(mm)	: 20~25
Flow Rate(ℓ /min.)	: 20	Welding Speed	: 30 cpm
Welding Position	: 1G	Current Type & Polarity	: DC(+)

❖ Hydrogen Analysis Using Gas Chromatograph Method

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

❖ Result(*ml*/100g Weld Metal)

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