HYUNDAI WELDING

Rev. 03

S-9018.M

COVERED ARC WELDING ELECTRODE
FOR 600MPa CLASS HIGH TENSILE STEEL

2020.12

HYUNDAI WELDING CO., LTD.

S-9018.M

❖ Specification

AWS A5.5	E9018-M
ISO 18275-A	E50 4 Z1.5NiMo B 4 2

❖ Applications

S-9018.M electrodes can be used for welding of high tensile weather proof used in pressure vessels, bridges, rolling stocks and machines.

❖ Characteristics on Usage

S-9018.M is an iron powder low hydrogen type electrode which provides good workability in all positions. The deposited metal has good crack resistibility because of less hydrogen content. The all-weld metal has good x-ray performance, excellent tensile and impact properties.
Extremely good crack resistibility is obtained owing to very low hydrogen content of the all weld metal.

❖ Note on Usage

1. Dry the electrodes at 350～400℃(662~752°F) for about one hour before use and store the electrodes at 100～150℃(212~302°F) after drying them with attention to keep away from moisture.

2. Adopt back step method or strike the arc on a small steel plate prepared for this particular purpose, because arc striking on base metal is in danger of initiation cracking.

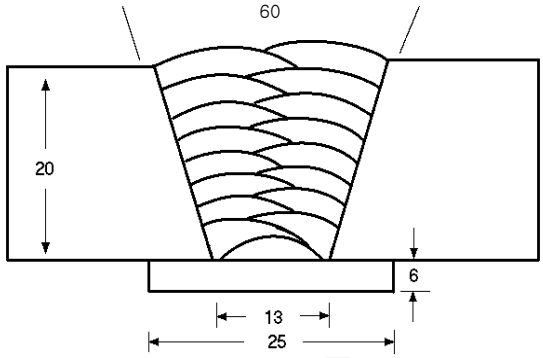
3. Keep the arc as short as possible and avoid large with weaving.

4. Preheat at 80～100℃(176~212°F).
   The temperature to be applied varies in accordance with plate thickness and kind of steel to be welded.

Mechanical Properties & Chemical Compositions of all-Weld Metal

❖ Welding Conditions

Method by AWS Rules



[Joint Preparation & Layer Details]

Diameter : 4.0 X 400mm(5/32 X 16in)
Amp./ Volt. : 170 / 22~24
Interpass Temp. : 90 ~120℃ (194~248°F)
Polarity : DC+

❖ Mechanical Properties of The Weld Metal

Consumable	Tensile test			CVN Impact Value J (ft·lbs)
	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	-50℃(-58°F)
S-11016.G	585(85,000)	646(93,800)	27.6	89(66)
AWS Spec.	550 ~ 630 (80,000 ~ 91,000)	≥630(91,000)	≥24	≥27(20)

❖ Chemical Analysis of The Weld Metal(wt%)

Consumable	Chemical Composition (%)							
	C	Si	Mn	P	S	Ni	Cr	Mo
S-9018.M	0.05	0.46	1.21	0.017	0.011	1.47	0.05	0.22
AWS E9018M	≤0.10	0.80	0.60 ~ 1.25	≤0.030	≤0.030	1.40 ~ 1.80	≤0.15	≤0.35

Weldability & Welding Efficiency

❖ Weldability

Item \ Division	Flat position	Vertical position
Arc stability	Good	Excellent
Melting rate	Excellent	Excellent
Deposition rate	Excellent	Excellent
Resistance of spatter occurrence	Excellent	Good
Bead appearance	Excellent	Excellent
Slag detachability	Good	Good

❖ Test Conditions of Deposition Efficiency

Consumable	Base Metal		Welding conditions		
	Specification	Dimension, mm(in)	Amp. (A)	Welding speed (mm/min)	Position
S-9018.M (4.0 x 400 mm) (5/32 x 16 in)	ASTM A36	300 X 100 X12 (12 X 3.9 X 0.5)	170	200	Flat

❖ Results of Deposition Efficiency Test

Consumable	Deposition efficiency(%)	
	For electrode	For core wire
S-9018.M (4.0 x 400 mm) (5/32 x 16 in)	65 ~ 70	120 ~ 125

Diffusible Hydrogen Content

❖ Diffusible Hydrogen Contents of Weld Metal

Consumable	Welding current	Diffusible hydrogen contents (㎖/gr. Weld metal)					Test method
		X_1	X_2	X_3	X_4	Avg.	
S-9018.M (4.0 x 400 mm) (5/32 x 16 in)	DC+ 170 Amp.	6.72	7.34	7.59	7.70	7.34	Gas Chromatograph

Average Hydrogen Content 7.34 *㎖/100g Weld Metal*

❖Sizes Available and Reconnended Current

Diameter, mm(in)		2.6 (3/32)	3.2 (1/8)	4.0 (5/32)	5.0 (3/16)
Length, mm(in)		350(14)	350(14)	400(16)	400(16)
Recommended current range (DC+ Amp.)	Flat (1G-PA)	70 ~100	90 ~140	130 ~190	180 ~240
	3G (PF) & 4G,5G (PE)	60 ~80	80 ~120	120 ~170	150 ~200

❖ Authorized Approval Details

Classification	Dia. mm(in)	Welding position	Grade						
AWS			KR	ABS	LR	BV	DNV	GL	NK
E9018-M	2.6(3/32) ~5.0(3/16)	All		○					