

S-9016.G

COVERED ARC WELDING ELECTRODE
FOR 600MPa CLASS HIGH TENSILE STEEL



❖ Specification

<i>AWS A5.5</i>	E9016-G
<i>JIS Z3211</i>	E5716
<i>EN ISO 2560-A</i>	E50 2 B 1 2

❖ Applications

Structures using 600MPa class high tensile steel, such as bridges, building, rolling stock and machines.

❖ Characteristics on Usage

S-9016.G is a low hydrogen type electrode for welding 600MPa class High tensile steel.

X-ray performance and mechanical properties of all weld metal are good. Its usability is good with direct current applications as well as alternating current applications and easy to weld in all position.

❖ Note on Usage

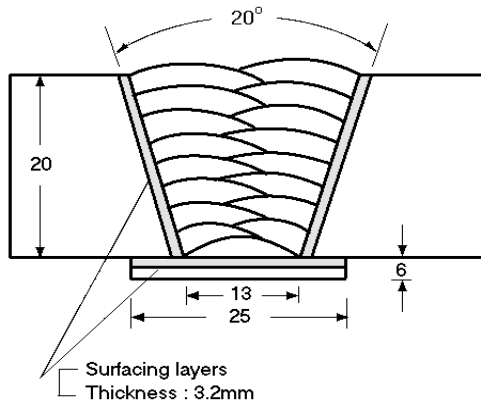
1. Dry the electrodes at 350℃ ~ 400℃ for 60 minutes before use
2. Adopt back step method or strike the arc on a small steel plate prepared for this particular purpose because are striking on the base metal is danger of initiating cracking.
3. Preheat at 60~ 80℃ before use, The temperature to be applied varies in accordance with plate thickness and kind of steel.
4. If each pass welds becomes thicker than acceptable level by high amperage or low speed ratio application, the impact values and yield points will decrease.
5. Keep the arc as short as possible.



Mechanical Properties & Chemical Compositions of all-Weld Metal

❖ Welding Conditions

Method by AWS Rules



[Joint Preparation & Layer Details]

Diameter(mm)	: 4.0 x 400
Amp./ Volt.	: 170 / 23~24
Pre-Heat(°C)	: 95 ~ 110
Interpass Temp.(°C)	: 95 ~ 110
Polarity	: AC

❖ Mechanical Property of All Weld Metal

Consumable	Tensile test			CVN Impact Test (Joule)	
	YS (MPa)	TS (MPa)	EL (%)	- 20 °C	- 40 °C
S-9016.G	573	641	27.6	195	119
AWS Spec.	≥ 530	≥ 620	≥ 17	N.S	

❖ Chemical Composition of All Weld Metal(wt%)

Consumable	Chemical Composition						
	C	Si	Mn	P	S	Ni	Mo
S-9016.G	0.06	0.59	1.04	0.010	0.005	0.66	0.24
AWS Spec.	N.S	≥0.80	≥1.00	≤0.03	≤0.03	≥0.50	≥0.20

In order to meet the alloy requirements of the "G" group, the undiluted weld metal shall have the minimum of at least one of the elements listed in this table.

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.



Weldability & Welding Efficiency Test

❖ Weldability

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

❖ Test Conditions of Deposition Efficiency

Consumable	Base Metal		Welding conditions		
	Specification	Dimension (mm)	Amp. (A)	Welding speed (mm/min)	Position
S-9016.G (4.0mm x 400)	ASTM A36	300 X 100 X12	180	200	Flat

❖ Results of Deposition Efficiency Test

Consumable	Deposition efficiency(%)	
	For electrode	For core wire
S-9016.G (4.0 mm x 400)	63 ~ 66	96 ~ 100

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Diffusible Hydrogen Content

❖ Welding Conditions

consumable	: S-9016.G	Amp.(A) / Volts(V)	: 170 / 23~ 24
Diameter(mm)	: 4.0 x 400	Stick-Out(mm)	: 20~ 25
Flow Rate(ℓ /min.)	: -	Welding Speed	: 60 CPM
Welding Position	: 1G	Current Type & Polarity	: AC

❖ Hydrogen Analysis Using Gas Chromatography 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
4.7	5.2	5.9	6.0

Average Hydrogen Content 5.5 ml/100g Weld Metal



Size Available and recommended Current & Approval

❖ Sizes Available and Recommended Current

Diameter (mm)		2.6	3.2	4.0	5.0	6.0
Length (mm)		350	350	400	400	450
Recommended current range (AC or DC+ Amp.)	Flat position	55 ~ 90	90 ~ 130	130 ~ 190	190 ~ 250	250 ~ 310
	Vertical & Overhead position	50 ~ 80	80 ~ 120	110 ~ 170	150 ~ 200	-

❖ Authorized Approval Details

Classification	Dia. (mm)	Welding position	Grade						
			KR	ABS	LR	BV	DNV	GL	NK
AWS A5.5									
E9016- G	2.6 ~ 5.0	All		○					
	6.0	Flat							

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