HYUNDAI WELDING

Rev. 05

S-9016.B9

COVERED ARC WELDING ELECTRODE
FOR 9%Cr-1%Mo HEAT RESISTANT STEEL

2020.12

HYUNDAI WELDING CO., LTD.

S-9016.B9

❖ Specification

AWS A5.5	E9016-B91
JIS Z 3223	E6216-9C1MV
ISO 3580-A	ECrMo91 B 4 2 H5

❖ Applications

S-9016.B9 is a low hydrogen type covered electrode for 9%Cr-1%Mo Heat resistant steel. The electrode is suitable for all-position welding in plate and pipes and Good performance by AC/DCEP current.

❖ Characteristics on Usage

- Suitable for butt and pipes welding
- Applied for ASTM A387 Gr.91 and equivalents
- Developed for power plants and the petrochemical industry

❖ Note on Usage

1. Dry the electrodes at 350℃～400℃(662～752°F) for 60 minutes before use.

2. Keep the Arc as short as possible, and avoid large width weaving.

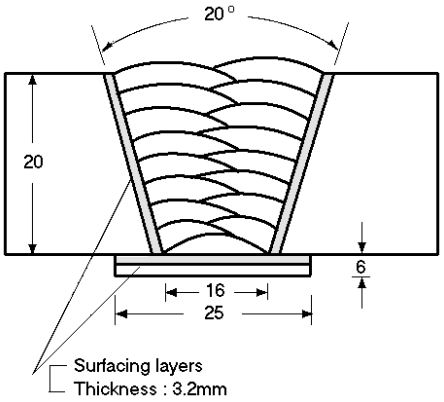
3. Adopt back step method or strike the Arc on a small steel plate prepared for this particular purpose to prevent blow-holes at the Arc starting.

4. Use the wind screen against strong wind.

Mechanical Properties & Chemical Compositions of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Diameter,	:	4.0 X 400mm(5/32 X 16in)
Amp./ Volt.	:	170 / 23~25
Interpass Temp.	:	200 ~ 315℃ (392~599°F)
Polarity	:	AC/DC+

❖ Mechanical Property of All Weld Metal

Consumable	Tensile test			CVN Impact Value J (ft·lbs)	PWHT	
	YS MPa (ksi)	TS MPa (ksi)	EL (%)	RT	Temp. ℃(°F)	Time
S-9016.B9	660(95,700)	762(110,500)	24.8	71(52)	760(1400)	2hr
AWS A5.5	≥530(77,000)	≥620(90,000)	≥17	Not-Specified	760(1400)	2hr

❖ Chemical Composition of All Weld Metal(wt%)

Consumable	Chemical Compositions (wt%)												
	C	Si	Mn	P	S	Ni	Cr	Mo	V	Cu	Al	Nb	N
S-9016.B9	0.10	0.24	0.68	0.008	0.005	0.26	8.90	0.94	0.21	0.026	0.003	0.043	0.037
AWS A5.5	0.08 ~0.13	0.30 max	1.20 max	0.010 max	0.010 max	0.80 max	8.0 ~10.5	0.85 ~1.20	0.15 ~0.30	0.25 max	0.04 max	0.02 ~0.10	0.02 ~0.07

● Mn+Ni shall be 1.40max

Weldability & Welding Efficiency

❖ Weldability

Item \ Division	Flat position	Vertical position
Arc stability	Excellent	Excellent
Melting rate	Excellent	Excellent
Deposition rate	Excellent	Excellent
Resistance of spatter occurrence	Excellent	Excellent
Bead appearance	Good	Good
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-9016.B9 (4.0 x 400 mm) (5/32 x 16 in)	ASTM A36	300 X 100 X12 (12 X 3.9 X 0.5)	170 ~180	200	Flat

❖ Results of Deposition Efficiency Test

Consumable	Deposition efficiency (%)	
	For electrode	For core wire
S-9016.B9 (4.0 x 400 mm) (5/32 x 16 in)	65 ~ 70	110 ~ 120

Diffusible Hydrogen Contents & Proper Welding conditions

❖ 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-9016.B9 (4.0 x 400 mm) (5/32 x 16 in)	DC 170 Amp.	4.86	4.69	3.80	4.33	4.42	Gas Chromatograph

Average Hydrogen Content 4.42 *㎖/100g Weld Metal*

❖ Sizes Available and Recommended Currents

Diameter, mm(in)		2.6 (3/32)	3.2 (1/8)	4.0 (5/32)	5.0 (3/16)
Length, mm(in)		350(14)	400(16)	400(16)	450(18)
Recommended current range (AC/DC+ Amp.)	Flat (1G-PA)	100 ~ 140	120 ~ 160	150 ~ 190	180 ~ 240
	3G (PF) & 4G,5G (PE)	90 ~ 130	110 ~ 150	140 ~ 180	