

S-9016.B3R

COVERED ARC WELDING ELECTRODE
FOR WELDING 2.25% Cr – 1.0% Mo STEEL

2020.12

HYUNDAI WELDING CO., LTD.



❖ Specification

<i>AWS A5.5</i>	E9016-B3
<i>JIS Z 3223</i>	E6216-2C1M
<i>ISO 3580-A</i>	E CrMo2 B 1 2 H5

❖ Applications

Welding of 2.25% Cr-1.0% Mo heat resistant steel used for pipes of boilers for electric power plant, equipment for oil refining industries and high temperature synthetic chemical industries.

❖ Characteristics on Usage

S-9016.B3R meets specific requirements for improved temper embrittlement resistance with prolonged service at 400-550°C (752~1022°F) Relevant trace element P, Sb, As and Sn are controlled to ensure low Bruscato X-Factor. Its usability is good with direct current applications and very low-hydrogen electrode.

❖ Note on Usage

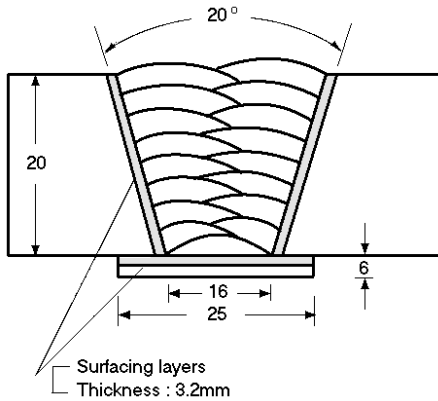
1. Dry the electrodes at 350°C ~ 400°C (662~752°F) one hours before use.
2. Preheat at 200~350°C (392~662°F) and post-heat at 670~730°C (1238~1346°F).
3. Keep the arc as short as possible.



Mechanical Properties & Chemical Compositions of all-Weld Metal

❖ Welding Conditions

Method by AWS Rules



Diameter, : 4.0 X 400mm(5/32 X 16in)

Amp./ Volt. : 170 / 23~25

Interpass Temp. : 160~190℃(320~374°F)

Polarity : AC

[Joint Preparation & Layer Details]

❖ Mechanical Properties of The Weld Metal

Consumable	Tensile test			CVN Impact Value J (ft·lbs)			PWHT	
	YS MPa (lbs/in ²)	TS MPa (lbs/in ²)	EL (%)	0℃ (32°F)	-20℃ (-4°F)	-30℃ (-22°F)	Temp. ℃(°F)	Time
S-9016.B3R	675(97,900)	759(110,000)	23.2	139(103)	116(86)	103(76)	690(1274)	1hr
	623(90,400)	680(98,600)	22.4	145(107)	111(82)	108(80)	690(1274)	8hr
AWS A5.5	≥530(77,000)	≥620(90,000)	≥17	Not-Specified			690(1274)	1hr

❖ Chemical Analysis of The Weld Metal(wt%)

Consumable	Chemical Composition (%)										X-factor (ppm)
	C	Si	Mn	P	S	Cr	Mo	Sb	Sn	As	
S-9016.B3R	0.09	0.46	0.83	0.011	0.004	2.35	0.98	0.0010	0.0030	0.0040	13.0
AWS 5.5	0.05 ~ 0.12	0.60 max	0.90 max	0.03 max	0.03 max	2.00 ~ 2.50	0.90 ~ 1.20	-	-	-	-

❖ Bruscato Factor $X = \frac{10P + 5Sb + 4Sn + As}{100}$ (ppm) = 18 max or 15 max

100

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 & Diffusible Hydrogen Contents****❖ 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

❖ Diffusible Hydrogen Contents of Weld Metal

Consumable	Welding current	Diffusible hydrogen contents (ml/gr. Weld metal)					Test method
		X ₁	X ₂	X ₃	X ₄	Avg.	
S-9016.B3R (4.0 x 400 mm) (5/32 x 16 in)	AC 170 Amp.	3.88	3.31	3.48	3.69	3.59	Gas Chromatograph

Average Hydrogen Content *3.59 ml/100g Weld Metal*



Proper Welding conditions & Approval

❖ 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)	350(14)	400(16)	400(16)
Recommended current range (AC or DC + Amp.)	Flat (1G-PA)	55 ~ 90	90 ~ 130	130 ~ 180	190 ~ 240
	3G (PF) & 4G,5G (PE)	50 ~ 80	80 ~ 120	120 ~ 170	

❖ Authorized Approval Details

Classification	Dia. mm(in)	Welding position	Grade						
			KR	ABS	LR	BV	DNV	GL	NK
AWS									
E9016-B3	2.6(3/32) ~5.0(3/16)	All		○					

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