HYUNDAI WELDING

Rev. 03

S-9018.B3R

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

HYUNDAI WELDING CO., LTD.

S-9018.B3R

❖ Specification

AWS A5.5	E9018-B3
JIS Z 3223	E6218-2C1M
EN 1599	E CrMo2 B 3 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-9018.B3R meets specific requirements for improved temper embrittlement resistance with prolonged service at 400~550℃ (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.

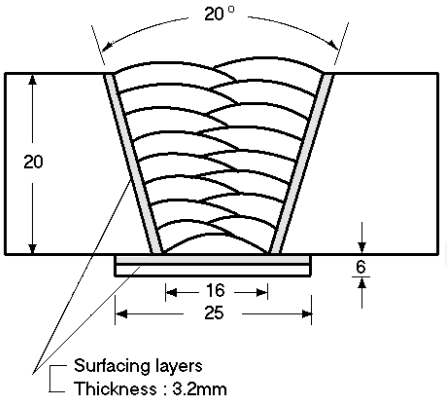
❖ Note on Usage

1. Dry the electrodes at 350℃~400℃(662~752°F) one hours before use.
2. Preheat at 200~350℃(392~662°F) and post-heat at 670~730℃(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



[Joint Preparation & Layer Details]

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

Amp./ Volt. : 170 / 23~25

Interpass Temp. : 160~190℃ (320~374°F)

Polarity : DC+

❖ Mechanical Properties of The Weld Metal

Consumable	Tensile test			CVN Impact Value J (ft·lbs)		PWHT	
	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	0℃ (32°F)	-20℃ (-4°F)	Temp. ℃(°F)	Time
S-9018.B3R	632(91,700)	721(104,600)	23.8	121(89)	81(60)	690(1274)	1hr
	606(87,900)	703(102,000)	25.2	132(97)	105(77)	690(1274)	2hr
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-9018.B3R	0.072	0.62	0.79	0.009	0.010	2.22	0.97	0.0060	0.0070	0.0040	13.1
AWS 5.5	0.05 ~ 0.12	0.80 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

Hardness & Weldability& Diffusible Hydrogen Contents

❖ Hardness

Consumable	Welding current	Hardness of all-Weld Metal (HB)						PWHT
		X_1	X_2	X_3	X_4	X_5	Avg.	
S-9018.B3R (4.0 x 400 mm) (5/32 x 16 in)	DC 170 Amp.	212	215	203	212	219	212	690℃(1274°F) *2hr

❖ Test method : JIS Z 3114

❖ 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 (㎖/gr. Weld metal)					Test method
		X_1	X_2	X_3	X_4	Avg.	
S-9018.B3R (4.0 x 400 mm) (5/32 x 16 in)	DC 170 Amp.	3.49	3.42	3.44	3.22	3.39	Gas Chromatograph

Average Hydrogen Content 3.39 *㎖/100g Weld Metal*

Proper Welding conditions

❖ 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	