

S-7018.1H

COVERED ARC WELDING ELECTRODE
FOR HIGHLY EFFICIENT WELDING
OF MILD & 490MPa CLASS HIGH TENSILE STEEL

2023.04

HYUNDAI WELDING CO., LTD.



❖ Specification

AWS A5.1 / ASME SFA-5.1 **E7018 H4R, E7018-1 H4R**

JIS Z 3211 **E4918 H5**

EN ISO 2560-A **E42 4 B 3 2 H5**

❖ Applications

Structures using 490MPa class high tensile steel, such as bridges, building, rolling stock and low temperature used for structures.

❖ Characteristics on Usage

S-7018.1H is an iron powder low hydrogen type electrode. Its coating contains much iron powder, which increasing welding efficiency. Its usability is good with direct current applications and extra low-hydrogen electrode. (HDM < 4ml/100g). Good CTOD properties at temperatures down to -10°C(-14°F)

❖ Note on Usage

1. Keep the arc as short as possible, and avoid large width weaving.
2. Adopt back step method or strike the arc on a small steel plate prepared for this particular purpose to prevent blowholes at the arc starting.
3. Use the wind screen against strong wind.

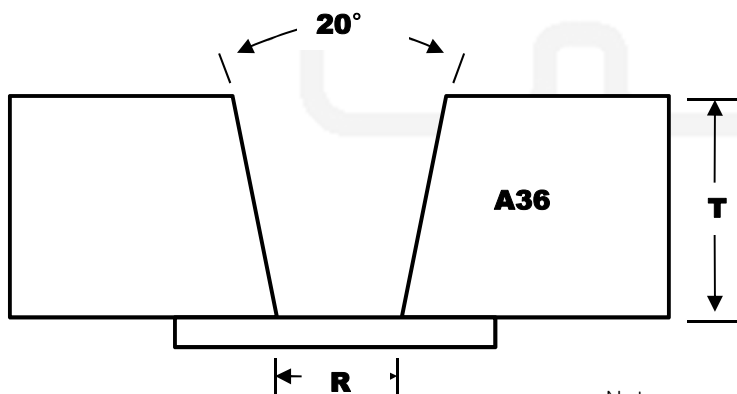


Mechanical properties & Chemical compositions of Deposited metal

❖ Welding Conditions

Measurement method	: AWS A5.1
Diameter	: 3.2mm(1/8in) , 4.0mm(5/32in). 5.0mm(3/16in)
Welding position	: Flat (1G-PA)
Welding Polarity	: AC or DC+
Welding Current	: 3.2mm(1/8in) = 130~140Amp, 12passes - 6 layers 4.0mm(5/32in) = 170~180Amp, 16passes - 8 layers 5.0mm(3/16in) = 200~220Amp, 14passes - 6layers
Interpass Temp.	: 105~175°C (221~347°F)
Test plate	: A36 (groove shape as below)

❖ Groove configuration



Notes

- : 3.2mm ; T=13mm, R=13mm
- : 4.0mm ; T=20mm, R=16mm
- : 5.0mm ; T=20mm, R=19mm



Mechanical Properties & Chemical Compositions of All Weld Metal

❖ Mechanical properties of deposited metal in as-welded condition

Welding Current & Polarity	Size mm(in)	Tensile Test			CVN Impact Test -45°C(-50°F)
		YS MPa (lbs/in ²)	TS MPa (lbs/in ²)	EL (%)	J (ft·lbs)
AC	3.2(1/8)	492(71,200)	554(80,300)	28.6	93(68)
	4.0(5/32)	482(69,900)	545(79,000)	27.0	78(57)
	5.0(3/16)	469(68,000)	542(78,600)	29.8	76(56)
AWS Spec.		≥ 400(58,000)	≥ 490(70,000)	≥ 22	≥ 27(20)

❖ Chemical compositions of deposited metal (wt%)

Welding Current & Polarity	Size mm(in)	C	Si	Mn	P	S
AC	3.2(1/8)	0.08	0.29	1.15	0.012	0.006
	4.0(5/32)	0.07	0.21	1.10	0.013	0.005
	5.0(3/16)	0.07	0.19	1.08	0.013	0.004
AWS Spec.		≤0.15	≤0.75	≤1.60	≤0.035	≤0.035

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.



Mechanical Properties & Chemical Compositions of All Weld Metal

❖ Mechanical properties of deposited metal in as-welded condition

Welding Current & Polarity	Size mm(in)	Tensile Test			CVN Impact Test -45°C(-50°F)
		YS MPa (lbs/in ²)	TS MPa (lbs/in ²)	EL (%)	J (ft·lbs)
DCEP	3.2(1/8)	490(71,000)	547(79,300)	28.7	90(66)
	4.0(5/32)	492(71,300)	542(78,600)	27.4	97(71)
	5.0(3/16)	481(96,700)	531(77,100)	28.4	75(55)
AWS Spec.		≥ 400(58,000)	≥ 490(70,000)	≥ 22	≥ 27(20)

❖ Chemical compositions of deposited metal (wt%)

Welding Current & Polarity	Size mm(in)	C	Si	Mn	P	S
DCEP	3.2(1/8)	0.07	0.28	1.11	0.013	0.005
	4.0(5/32)	0.08	0.22	1.09	0.011	0.004
	5.0(3/16)	0.08	0.26	1.07	0.012	0.004
AWS Spec.		≤0.15	≤0.75	≤1.60	≤0.035	≤0.035

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Absorbed Moisture contents & Diffusible Hydrogen Content

❖ Absorbed Moisture contents

Measurement method : AWS A4.4
 Diameter : 4.0mm(5/32in)
 Exposed environment : 30°C(86°F) and 80% Relative humidity (RH)
 Exposed Time : 3~12 hours (* AWS requirement is period of not less than 9 hours)
 Analysis method : Infrared Detector
 Limit of moisture content "E7018-1 H4R" : As-Received or Reconditioned (≤0.3%) / As-Exposed (≤0.4%)

Absorbed moisture contents (wt%)				
As-received	2hr	4hr	6hr	9hr
0.070	0.09	0.10	0.10	0.10

❖ Diffusible Hydrogen Content

Diameter : 4.0mm(5/32in)
 Electrode conditions : Opening original condition
 Welding current : 170~180Amp, AC or DC+
 Test method : AWS A4.3 (Gas chromatography method)

Welding Current & Polarity	Diffusible hydrogen content (ml/100g)				
	X1	X2	X3	X4	Ave.
AC	2.98	3.16	3.51	3.33	3.25
DCEP	3.56	3.05	2.74	2.89	3.06

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Weldability & Deposition Efficiency

❖ Weldability

Characteristics	Division	Flat (1G-PA)	V-Up (3G-PF)
	Arc stability		Good
Melting rate		Excellent	Excellent
Deposition rate		Excellent	Excellent
Spatter appearance		Excellent	Good
Bead appearance		Excellent	Excellent
Slag detachability		Good	Good

❖ Deposition Efficiency

Consumable	Welding conditions			Deposition efficiency(%)	
	Amp. (A)	Welding speed (mm/min)	Position	For electrode	For core wire
S-7018.1H 4.0 x 400 mm (5/32 x 16 in)	170 (DC+)	200	1G-PA	65 ~ 70	120 ~ 125

* Base Metal : ASTM A36 - 300mm(12in) X 100mm(3.9in) X 12mm(0.5in)



Available Size, Recommended Current & Authorized approval

❖ Available Sizes and Recommended 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) 450(18)	400(16) 450(18)	400(16) 450(18)
Recommended current range (AC/DC+ Amp.)	Flat (1G-PA)	60 ~90	90 ~140	130 ~190	180 ~240
	3G (PF) & 4G,5G (PE)	50 ~90	80 ~120	120 ~170	150 ~200

❖ Authorized Approval Details

Classification	Diameter. mm(in)	Welding position	ABS	LR	BV	DNV	CWB
AWS A5.1 E7018-1 H4R	2.6(3/32) ~ 5.0(3/16)	All	4YH5	4YH5	4YHHH	4YH5	CSA W48-06 E4918-1 H4

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