HYUNDAI WELDING

Rev. 03

S-78LTH

COVERED ARC WELDING ELECTRODE
FOR HIGH TENSILE STEEL(490MPa)
AND LOW TEMPERATURE SERVICE STEEL

2020.12

HYUNDAI WELDING CO., LTD.

S-78LTH

❖ Specification

AWS A5.5	E7018-G
EN ISO 2560-A	E 46 6 Z1Ni B 3 2 H5

❖ Applications

Single or multi pass welding for various low temperature service steel such as offshore sector, LPG storage tank, and heat exchanger etc.

❖ Characteristics on Usage

S-78LTH is an iron powder low hydrogen type electrode for all position welding. It provide excellent notch toughness at low temperature down to -60℃(-76°F) and good usability in AC/DCEP welding.

❖ Note on Usage

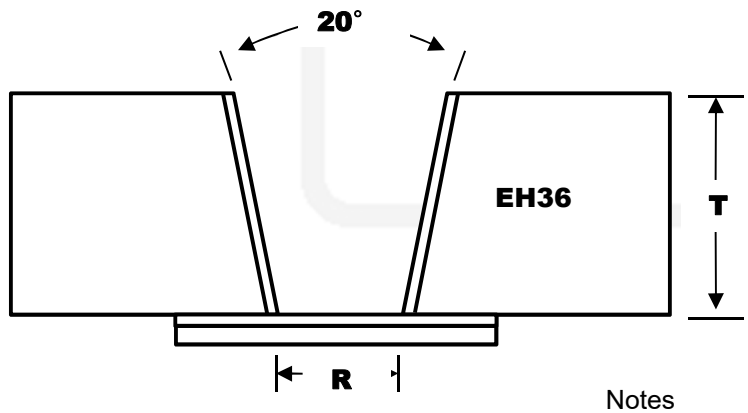
1. Dry the electrodes at 350~400℃ (662~752°F) for 30~60 minutes before use.
2. Keep the arc as short as possible, and avoid large width weaving.
3. Adopt back step method or strike the arc on a small steel plate prepared for this particular purpose to prevent blow-hole at the arc starting.
4. Use the wind screen against strong wind.

Mechanical properties & Chemical compositions of Deposited metal

❖ Welding Conditions

Measurement method	:	AWS A5.5
Diameter	:	3.2mm(1/8in)
Welding position	:	Flat (1G-PA)
Welding Current	:	AC 140Amp / DC+ 135Amp, 12passes - 6 layers
Interpass Temp.	:	105~175℃ (221~347°F)
Test plate	:	EH36 (groove shape as below)

❖ Groove configuration



Notes

: T=13mm, R=13mm

Mechanical properties & Chemical compositions of Deposited metal

❖ Mechanical properties of deposited metal in as-welded condition

Polarity	Tensile Test Results			CVN Impact Test J (ft·lbs)	
	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	-45℃(-49°F)	-60℃(-76°F)
AC	494(71,600)	597(86,600)	30.8	133(98)	111(82)
DC+	525(76,100)	600(87,000)	32.0	165(121)	113(83)
AWS A5.5 E7018-G	≥ 390(57,000)	≥ 490(71,000)	≥ 22	Not specified	
EN 2560-A E46 6 1Ni B 3 2 H5	≥460(67)	530(77) ~680(99)	≥20.0	≥47J(35ft·lbs)@-60℃(-76°F)	

❖ Chemical compositions of deposited metal (wt%)

Polarity	C	Si	Mn	P	S	Ni	Ti (ppm)	B (ppm)
AC	0.07	0.30	1.21	0.014	0.004	0.741	210	40
DC+	0.06	0.23	1.25	0.015	0.004	0.729	230	30
AWS A5.5 E7018-G	-	≥0.80*	≥1.00*	≤ 0.03	≤ 0.03	≥0.50*	-	-
EN 2560-A E46 6 1Ni B 3 2 H5	-	-	≤1.40	-	-	0.60 ~1.20	-	-

* In order to meet the alloy requirement of the AWS "G" group, the undiluted weld metal shall have the minimum of at least one of the elements least on this table.

Diffusible Hydrogen Content

❖ Welding Conditions

consumable	:	S-78.LTH	Welding Position	:	1G
Diameter	:	3.2mm(1/8in)	Amp.(A) / Volts(V)	:	130~140Amp.
Re-drying conditions	:	350℃ X 1hr (662°F X 1hr)	Current Type & Polarity	:	DC+

❖ Hydrogen Analysis Using Gas Chromatography Method (AWS A4.3)

Hydrogen Evolution Time	:	72 hrs	Analysis Temp.	:	25 ℃(77°F)
Evolution Temp.	:	25 ℃(77°F)	Exposure Condition	:	80%RH-30℃(86°F)
Barometric Pressure	:	780 mm-Hg			

❖ Result (㎖/100g Weld Metal)

Polarity	X1	X2	X3	X4	Avg.
AC	3.73	4.52	3.83	4.57	4.16
DC+	4.30	3.97	3.81	3.84	3.98

Weldability & Deposition Efficiency

❖ Weldability

Welding / Position / Item	Flat (1G-PA)	V-Up (3G-PF)
Arc stability	Good	Excellent
Melting rate	Excellent	Excellent
Deposition rate	Excellent	Excellent
Resistance of spatter occurrence	Excellent	Good
Bead appearance	Excellent	Excellent
Slag detachability	Good	Good

❖ Test Conditions of Deposition Efficiency

Consumable	Base Metal		Welding conditions		
	Specification	Dimension (mm)	Amp. (A)	Welding speed (mm/min)	Position
S-78LTH (3.2 x 350mm) 1/8 x 14 in	ASTM A36	300 X 100 X12 (12 X 3.9 X 0.5)	130~140 (AC/DC+)	155	1G-PA

❖ Results of Deposition Efficiency

Consumable	Current & Polarity	Deposition efficiency(%)
S-78LTH (3.2 x 350mm) 1/8 x 14 in	AC	111
	DC+	117
EN ISO E46 5 1Ni B 3 2 H5		105 ~ 125

Optimum Welding Condition

❖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)	400(16)	400(16)
Recommended current range (AC or DC+)	Flat (1G-PA)	60 ~90	90 ~140	130 ~190	180 ~250
	3G (PF) & 4G,5G (PE)	50 ~80	80 ~120	120 ~170	150 ~200