HYUNDAI WELDING

Rev. 01

S-76LTH

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

2012. 1

HYUNDAI WELDING CO., LTD.

S-76LTH

❖ Specification

AWS A5.5	E7016-G
EN ISO 2560-A	E 42 6 Z B
ZIS Z3211	E4916-N1 AP L

❖ Applications

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

❖ Characteristics on Usage

S-76LTH is a basic and low hydrogen type electrode for all position welding. It provide excellent notch toughness at low temperature down to -60℃ and good usability in AC/DCEP welding.

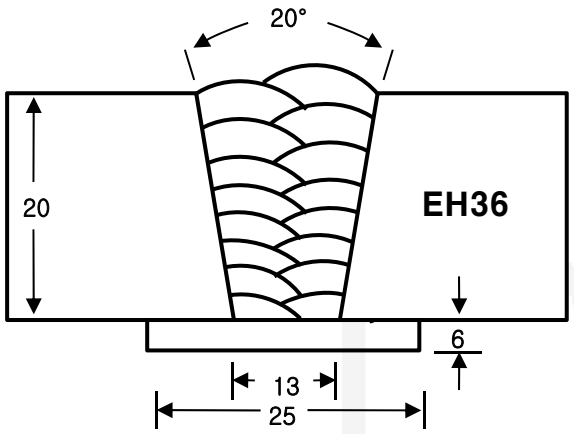
❖ Note on Usage

1. Dry the electrodes at 350~400℃ 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-hole at the arc starting.
4. Use the wind screen against strong wind.

Typical Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Rules



[Joint Preparation & Layer Details]

Diameter(mm)	:	4.0 × 400
Current(A)/Voltage(V)	:	180 / 22~24V
Welding position	:	1G
Welding layer/pass	:	8/16
Interpass Temp.(℃)	:	150±15
Polarity	:	AC

❖ Typical Mechanical Properties of the weld metal

Consumables	Tensile Test Results			Charpy V-Notch Impact Value (J)	
S-76LTH	Y.S.(MPa)	T.S.(MPa)	EL.(%)	-51℃	-60℃
	570	620	31	210	160
AWS A5.5 E7016-G	≥ 390	≥ 490	≥ 22	-	-

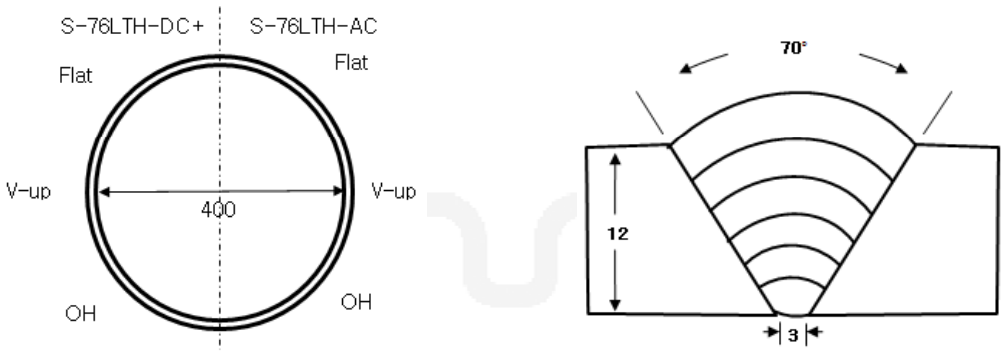
❖ Typical Chemical Analysis of the weld metal(wt%)

Consumables	C	Si	Mn	P	S	Ni	Ti	B
S-76LTH	0.08	0.36	1.39	0.012	0.004	0.46	0.023	0.0015
AWS A5.5 E7016-G	-	0.80 min	1.00 min	≤ 0.03	≤ 0.03	0.50 min	-	-

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

Mechanical properties for one-sided welding of pipes

❖ Welding Conditions



[Joint Preparation & Layer Details]

* **Base metal : ASTM A333 Gr.6**
* **Wire diameter : 3.2/4.0 mm**
* **Polarity : AC /DCEP**
* **Welding parameter :**
  - **1~2 layer : GTAW(ER-70S-3) 2.4mm, 10~15kJ/ cm**
  - **3 layer : S-76LTH 3.2mm, 20~30kJ / cm**
  - **4~6 layer : S-76LTH 4.0mm , 30~50 kJ/cm**
* **Welding Position : all position (unused vertical down position)**

❖ Test result

Polarity	Position	Charpy V-notch impact test (J)			
		-46℃			
		X1	X2	X3	Avg.
AC	Flat	83	81	95	85
	V-up	120	105	115	113
	OH	78	83	76	79
DC+	Flat	88	91	95	91
	V-up	125	118	113	118
	OH	98	96	92	95

* **S-76LTH can maintain fine micro-structure In welded metal with higher heat input(50kJ/cm), due to the specific chemical composition (0.5Ni-Ti-B).**

Weldability & Welding Efficiency

❖ Weldability

Item \ Division	Flat position	Vertical position
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-76LTH (4.0mm x 400)	ASTM A36	300 X 100 X 12	160 (AC/DC+)	155	Flat

❖ Results of Deposition Efficiency Test

Consumable	Polarity	Deposition efficiency(%)	
		For electrode	For core wire
S-76LTH (4.0 mm x 400)	AC	66 ~ 70	98 ~ 105
	DC+	65 ~ 69	95 ~ 102

Diffusible Hydrogen Content

❖ Welding Conditions

Consumable	:	**S-76LTH**	**Current(A) / Voltage(V)**	:	160 / -
Diameter(mm)	:	4.0 × 400	**Stick-Out(mm)**	:	5~10
Flow Rate(ℓ /min.)	:	-	**Welding Speed**	:	-
Welding Position	:	1G	**Current Type & Polarity**	:	AC / DCEP

❖ Hydrogen Analysis Using Gas Chromatograph Method

Hydrogen Evolution Time	:	**72 hrs**	**Analysis Temp.**	:	25 ℃
Evolution Temp.	:	25 ℃	**Exposure Condition**	:	30%RH-25℃
Barometric Pressure	:	780 mm-Hg			

❖ Result(㎖/100g Weld Metal)

Polarity	X1	X2	X3	X4	Average $H_{[D]}$
AC	**3.2**	**3.1**	**3.2**	**3.0**	**3.1**
DC+	**3.5**	**3.3**	**3.2**	**3.3**	**3.3**

Proper Welding Condition

❖Sizes Available and Reconnended Current

Diameter (mm)		2.6	3.2	4.0	5.0
Length (mm)		350	350	400	450
Recommended current range (AC or DC+ Amp.)	Flat position	55 ~85	90 ~130	140 ~180	250 ~310
	Vertical & Overhead position	50 ~80	80 ~115	110 ~160	-

❖ Authorized Approval Details

Classification	Dia. (mm)	Welding position	Grade	
AWS			ABS	DNV
E7016-G	2.6 ~ 5.0	All	5Y ,5Y400 H5	5Y, 5Y40 H5 NV4-4L

Notice

This test report is made for giving general information, and it's not meaning guarantee.
Test results are changeable by several welding
- parameter including base materials