

# **SL-81MAG**

FLUX CORED ARC WELDING CONSUMABLE  
FOR WELDING OF LOW-TEMPERATURE  
SERVICE STEEL

2023.02

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**HYUNDAI WELDING CO., LTD.**



## ❖ Specification

**AWS A5.29**

E81T1-Ni1M-J

**(AWS A5.29M)**

E551T1-Ni1M-J)

**EN ISO 17632-B**

T55 5 T1-1 M21 A-N2 H5

## ❖ Applications

All position welding of shipbuilding, steel construction, bridges, offshore, pipes, and pressure vessels.

## ❖ Characteristics on Usage

SL-81MAG is titania type Seamless Flux Cored Wire applicable for all position welding with Ar + 20~25%CO<sub>2</sub> shielding gas.

SL-81MAG offer optimal protection against moisture reabsorption. During use, moisture cannot penetrate into the filling since there is no closed seam running over the wire length. Low level of diffusible hydrogen prevents the weld from hydrogen induced cracking or cold cracking.

## ❖ Note on Usage

1. For preheating guidelines, please refer to your local standards and codes relative to your best practices.

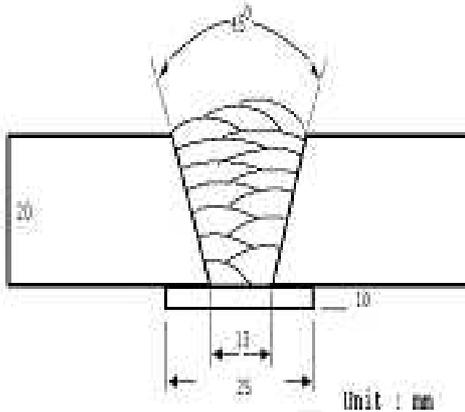
2. Use Ar-20~25%CO<sub>2</sub> gas.



## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Welding Position</b>	: 1G(PA)
<b>Diameter</b>	: 1.2mm (0.045in)
<b>Shielding Gas</b>	: Ar-20%CO <sub>2</sub>
<b>Flow Rate</b>	: 20 ℓ /min
<b>Amp / Volt</b>	: 270~280A / 29~30V
<b>Stick-Out</b>	: 20~25mm (0.79~0.98in)
<b>Pre-Heat</b>	: R.T .
<b>Interpass Temp.</b>	: 150±15℃ (302±59°F)
<b>Polarity</b>	: DC(+)

### ❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
	YS MPa (lbs/in <sup>2</sup> )	TS MPa (lbs/in <sup>2</sup> )	EL (%)	-40℃ (-40°F)	-50℃ (-58°F)
<b>SL-81MAG</b>	594(86,100)	668(96,800)	29.4	79(58)	60(44)
<b>AWS A5.29 E81T1-Ni1M-J</b>	≥ 470 (68,000)	550~690 (80,000~100,000)	≥ 19	≥ 27(20) at -40℃(-40°F)	

### ❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Ni
<b>SL-81MAG</b>	0.036	0.46	1.52	0.016	0.010	0.84
<b>AWS A5.29 E81T1-Ni1M-J</b>	≤ 0.12	≤ 0.80	≤ 1.50	≤ 0.03	≤ 0.03	0.8~1.1

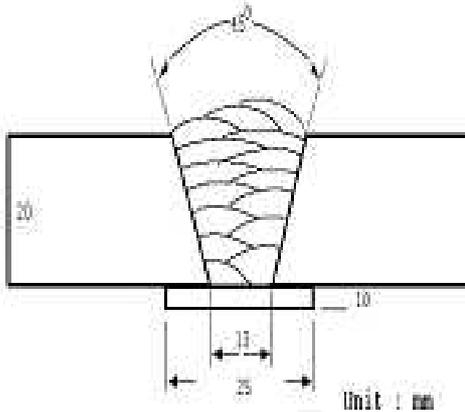
This information is provided solely for the purpose of confirming product conformance with applicable standards. The serviceability of a product or structure utilizing this type of information is and must be the sole responsibility of the builder/user. Many variables beyond the control of HYUNDAI WELDING 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 Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Welding Position</b>	: 1G(PA)
<b>Diameter</b>	: 1.6mm (1/16in)
<b>Shielding Gas</b>	: Ar-20%CO <sub>2</sub>
<b>Flow Rate</b>	: 20 ℓ /min
<b>Amp / Volt</b>	: 320~330A / 29~30V
<b>Stick-Out</b>	: 20~25mm (0.79~0.98in)
<b>Pre-Heat</b>	: R.T .
<b>Interpass Temp.</b>	: 150±15℃ (302±59°F)
<b>Polarity</b>	: DC(+)

### ❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
	YS MPa (lbs/in <sup>2</sup> )	TS MPa (lbs/in <sup>2</sup> )	EL (%)	-40℃ (-40°F)	-50℃ (-58°F)
<b>SL-81MAG</b>	554(80,300)	619(95,300)	25.8	100(74)	54(40)
<b>AWS A5.29 E81T1-Ni1M-J</b>	≥ 470 (68,000)	550~690 (80,000~100,000)	≥ 19	≥ 27(20) at -40℃(-40°F)	

### ❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Ni
<b>SL-81MAG</b>	0.029	0.37	1.35	0.019	0.006	0.81
<b>AWS A5.29 E81T1-Ni1M-J</b>	≤ 0.12	≤ 0.80	≤ 1.50	≤ 0.03	≤ 0.03	0.8~1.1

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## Diffusible Hydrogen Content

### ❖ Welding Conditions

<b>Diameter</b>	: 1.6mm (1/16in)	<b>Amps / Volts</b>	: 320A / 30V
<b>Shielding Gas</b>	: Ar-20%CO <sub>2</sub>	<b>Stick-Out</b>	: 20~25mm (0.79~0.98in)
<b>Flow Rate</b>	: 20 ℓ /min	<b>Welding Speed</b>	: 30 cm/min (12 in/min)
<b>Welding Position</b>	: 1G (PA)	<b>Current Type &amp; Polarity</b>	: DC(+)

### ❖ Hydrogen Analysis Using Gas Chromatography Method

<b>Hydrogen Evolution Time</b>	: 72 hrs
<b>Evolution Temp.</b>	: 45 °C (113°F)
<b>Barometric Pressure</b>	: 780 mm-Hg

### ❖ Result(ml/100g Weld Metal)

x1	x2	x3	X4
3.54	3.84	3.97	3.69

**Average Hydrogen Content 3.76 ml / 100g Weld Metal**



## ❖ Proper welding parameters

Consumable	Shielding Gas	Item	Wire Dia.	
			1.2mm (0.045in)	1.6mm (1/16in)
SL-81MAG	Ar +20%CO <sub>2</sub>	Amp.(A)	180~300	280~380
		Volt.(V)	23~32	25~35

## ❖ F No & A No

F No	A No
6	10