

# **SC-91B3**

FLUX CORED ARC WELDING CONSUMABLE  
FOR 2.25Cr-1.0%Mo TYPE

2023.03

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**HYUNDAI WELDING CO., LTD.**



## ❖ Specification

<i>AWS A5.29</i>	E91T1-B3C
<i>(AWS A5.29M)</i>	E621T1-B3C)
<i>EN ISO 17634-B</i>	T62 T1-1 C1-2C1M

## ❖ Applications

SC-91B3 can be used welding of 2.25%Cr – 1.0%Mo heat resistant Steels used for steam pipes of boilers for electric power plants and Marine use, equipment for oil refining industries and high temperature synthetic chemical industries.

## ❖ Characteristics on Usage

SC-91B3 is a titania type flux cored wire for all position welding. Arc stability is excellent. Spatter is low and covering is uniform with good removability.

## ❖ Note on Usage

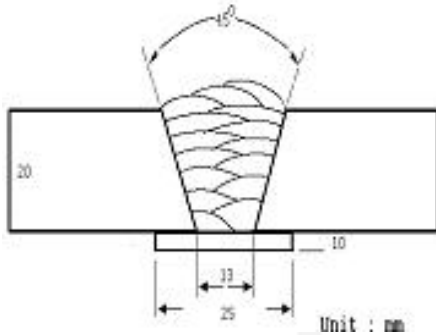
1. Used 100% CO<sub>2</sub> gas.
2. All position gas shielded flux cored wire.



## 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>	: 100%CO <sub>2</sub>
<b>Flow Rate</b>	: 20 ℓ /min
<b>Amp./ Volt.</b>	: 280A / 32V
<b>Stick-Out</b>	: 20~25mm (0.79~0.98in)
<b>Pre-Heat</b>	: R.T .
<b>Interpass Temp.</b>	: 150±15°C (302±59°F)
<b>Polarity</b>	: DC(+)

### ❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			PWHT
	YS MPa (lbs/in <sup>2</sup> )	TS MPa (lbs/in <sup>2</sup> )	EL (%)	
SC-91B3	640 (93,000)	728 (106,000)	20.0	690 ± 15°C x 1hr (1274±59°F x 1hr)
AWS A5.29 E91T1-B3C	≥ 540 (78,000)	620~760 (90,000~ 110,000)	≥ 17.0	

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

Consumable	C	Si	Mn	P	S	Cr	Mo
SC-91B3	0.065	0.47	0.63	0.015	0.009	2.3	0.98
AWS A5.29 E91T1-B3C	0.05~0.12	≤ 0.80	≤ 1.25	≤ 0.03	≤ 0.03	2.00~2.50	0.90~1.20

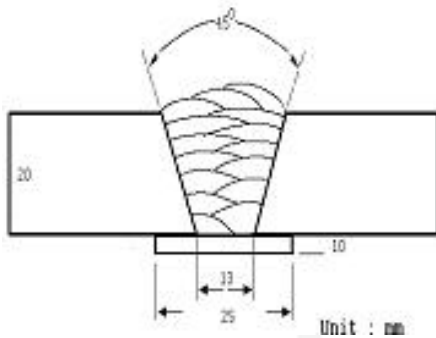
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## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Welding Position</b>	: 1G(PA)
<b>Diameter</b>	: 1.4mm (0.052in)
<b>Shielding Gas</b>	: 100%CO <sub>2</sub>
<b>Flow Rate</b>	: 20 ℓ /min
<b>Amp./ Volt.</b>	: 300A / 32V
<b>Stick-Out</b>	: 20~25mm (0.79~0.98in)
<b>Pre-Heat</b>	: R.T .
<b>Interpass Temp.</b>	: 150±15°C (302±59°F)
<b>Polarity</b>	: DC(+)

### ❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			PWHT
	YS MPa (lbs/in <sup>2</sup> )	TS MPa (lbs/in <sup>2</sup> )	EL (%)	
SC-91B3	642 (93,000)	730 (106,000)	21.0	690 ± 15°C x 1hr (1274±59°F x 1hr)
AWS A5.29 E91T1-B3C	≥ 540 (78,000)	620~760 (90,000~ 110,000)	≥ 17.0	

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

Consumable	C	Si	Mn	P	S	Cr	Mo
SC-91B3	0.065	0.48	0.65	0.015	0.009	2.3	0.10
AWS A5.29 E91T1-B3C	0.05~0.12	≤ 0.80	≤ 1.25	≤ 0.03	≤ 0.03	2.00~2.50	0.90~1.20

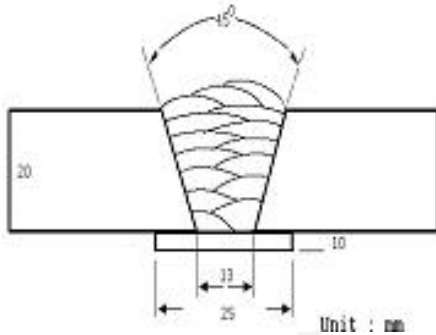
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## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ 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>	: 100%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			PWHT
	YS MPa (lbs/in <sup>2</sup> )	TS MPa (lbs/in <sup>2</sup> )	EL (%)	
SC-91B3	645 (94,000)	728 (106,000)	20.0	690 ± 15℃ x 1hr (1274±59°F x 1hr)
AWS A5.29 E91T1-B3C	≥ 540 (78,000)	620~760 (90,000~ 110,000)	≥ 17.0	

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

Consumable	C	Si	Mn	P	S	Cr	Mo
SC-91B3	0.065	0.48	0.62	0.015	0.009	2.4	0.99
AWS A5.29 E91T1-B3C	0.05~0.12	≤ 0.80	≤ 1.25	≤ 0.03	≤ 0.03	2.00~2.50	0.90~1.20

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## Welding Efficiency

### ❖ Deposition Rate & Efficiency

Consumable (size)	Welding Conditions		Wire Feed Speed m/min (in/min)	Deposition Efficiency %	Deposition Rate kg/hr(lb/hr)
	Amp.(A)	Volt.(V)			
SC-91B3  1.2mm (0.045in)	200	26	10.2 (400)	84~87	3.4 (7.5)
	250	28	11.5 (450)	85~88	4.5 (9.9)
	300	33	15.3 (600)	86~88	5.2 (11.4)
SC-91B3  1.4mm (0.052in)	250	28	7.6 (300)	85~87	3.9 (8.6)
	300	32	10.2 (400)	85~88	4.8 (10.6)
	330	36	12.8 (500)	86~89	5.8 (12.8)
SC-91B3  1.6mm (1/16in)	280	31	6.4 (250)	85~88	4.2 (9.2)
	330	33	7.6 (300)	86~88	4.8 (10.6)
	350	34	8.1 (320)	87~89	5.3 (11.7)
	400	38	9.2 (360)	87~90	5.7 (12.5)
Remark				Deposition efficiency =(Deposited metal weight/ Wire weight used)×100	Deposition rate =(Deposited metal weight/ Welding time,min.)×60

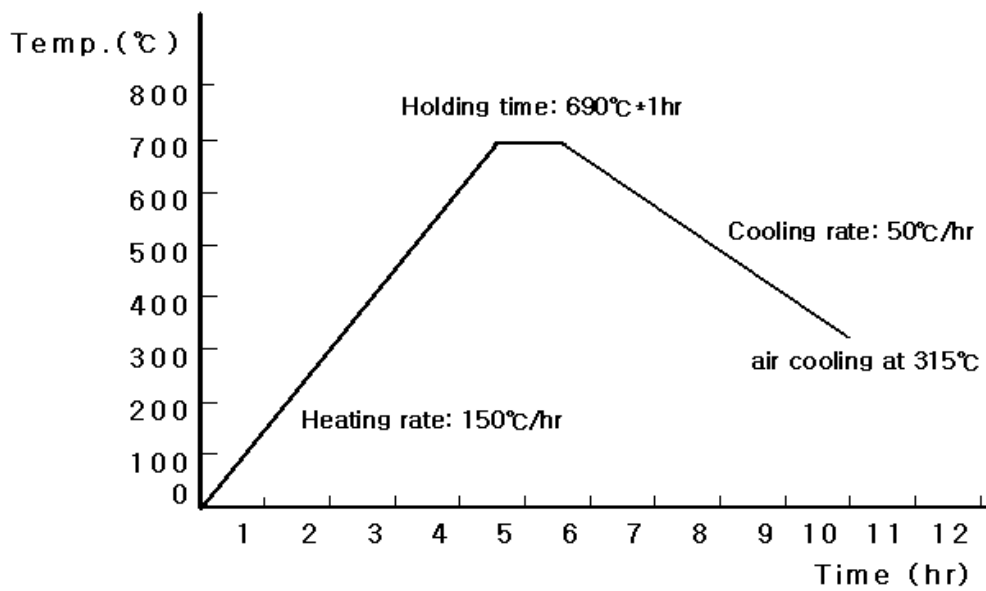
\* Shielding Gas : 100%CO<sub>2</sub>

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# Diffusible Hydrogen Content

## ❖ Postweld Heat Treatment



Division		Remark
Pre-heating Temperature(°C, °F)		150 (302)
PWHT Condition	Heating rate (°C/hr, °F/hr)	150 (302)
	Holding Temperature(°C, °F)	690 (1274)
	Holding time(hr)	1
	Cooling method (°C, °F)	air cooling at 315 (599)

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## Diffusible Hydrogen Content

### ❖ Welding Conditions

<b>Diameter</b>	: 1.4mm (0.052in)	<b>Amps(A) / Volts(V)</b>	: 240A / 27V
<b>Shielding Gas</b>	: 100%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
4.8	5.2	4.5	5.4

**Average Hydrogen Content** **5.2 ml / 100g Weld Metal**





# Proper Welding Condition

## ❖ Proper Current Range

Consumable	Shielding Gas	Welding Position	Wire Dia.		
			1.2mm (0.045in)	1.4mm (0.052in)	1.6mm (1/16in)
SC-91B3	100%CO <sub>2</sub>	F & HF	120~300Amp	200~350Amp	200~400Amp
		V-Up & OH	120~260Amp	180~280Amp	180~280mp
		V-Down	200~300Amp	220~320Amp	250~320Amp

## ❖ F No & A No

F No	A No
6	4

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