

SC-91B3

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

2019.09

HYUNDAI WELDING CO., LTD.



❖ Specification

<i>AWS A5.36</i>	E91T1-C1PZ-B3
<i>(AWS A5.36</i>	E621T1-C1PZ-B3)
<i>(AWS A5.29</i>	E91T1-B3C)
<i>EN ISO 17634</i>	T CrMo2 P C1 2

❖ 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

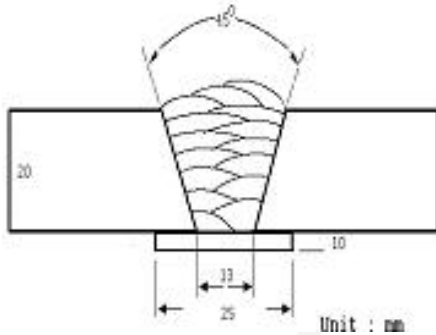
1. Used 100% CO₂ gas.
2. All position gas shielded flux cored wire.



Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	: 1G(PA)
Diameter	: 1.2mm (0.045in)
Shielding Gas	: 100%CO ₂
Flow Rate	: 20 ℓ /min
Amp./ Volt.	: 280A / 32V
Stick-Out	: 20~25mm (0.79~0.98in)
Pre-Heat	: R.T .
Interpass Temp.	: 150±15°C (302±59°F)
Polarity	: DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			PWHT
	YS MPa (lbs/in ²)	TS MPa (lbs/in ²)	EL (%)	
SC-91B3	640 (93,000)	728 (106,000)	20.0	690 ± 15°C x 1hr (1274±59°F x 1hr)
AWS A5.36 E91T1-C1PZ-B3	≥ 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 A5.36 E91T1-C1PZ-B3	0.05~0.12	≤ 0.80	≤ 1.25	≤ 0.03	≤ 0.03	2.00~2.50	0.90~1.20

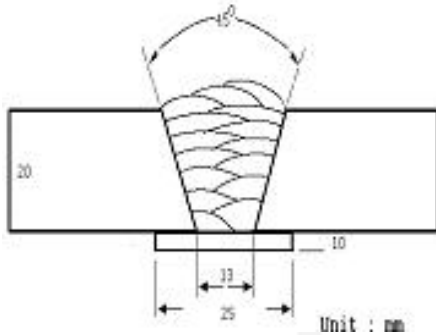
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Mechanical Properties & Chemical Composition of All Weld Metal

❖ **Welding Conditions**

Method by AWS Spec.



[Joint Preparation & Layer Details]

- Welding Position** : 1G(PA)
- Diameter** : 1.4mm (0.052in)
- Shielding Gas** : 100%CO₂
- Flow Rate** : 20 ℓ /min
- Amp./ Volt.** : 300A / 32V
- Stick-Out** : 20~25mm (0.79~0.98in)
- Pre-Heat** : R.T .
- Interpass Temp.** : 150±15°C (302±59°F)
- Polarity** : DC(+)

❖ **Mechanical Properties of all weld metal**

Consumable	Tensile Test			PWHT
	YS MPa (lbs/in ²)	TS MPa (lbs/in ²)	EL (%)	
SC-91B3	642 (93,000)	730 (106,000)	21.0	690 ± 15°C x 1hr (1274±59°F x 1hr)
AWS A5.36 E91T1-C1PZ-B3	≥ 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 A5.36 E91T1-C1PZ-B3	0.05~0.12	≤ 0.80	≤ 1.25	≤ 0.03	≤ 0.03	2.00~2.50	0.90~1.20

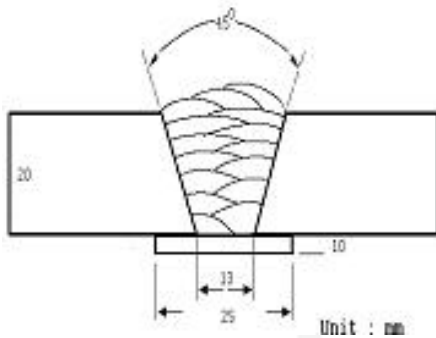
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Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	: 1G(PA)
Diameter	: 1.6mm (1/16in)
Shielding Gas	: 100%CO ₂
Flow Rate	: 20 ℓ /min
Amp./ Volt.	: 320~330A / 29~30V
Stick-Out	: 20~25mm (0.79~0.98in)
Pre-Heat	: R.T .
Interpass Temp.	: 150±15℃ (302±59°F)
Polarity	: DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			PWHT
	YS MPa (lbs/in ²)	TS MPa (lbs/in ²)	EL (%)	
SC-91B3	645 (94,000)	728 (106,000)	20.0	690 ± 15℃ x 1hr (1274±59°F x 1hr)
AWS A5.36 E91T1-C1PZ-B3	≥ 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 A5.36 E91T1-C1PZ-B3	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

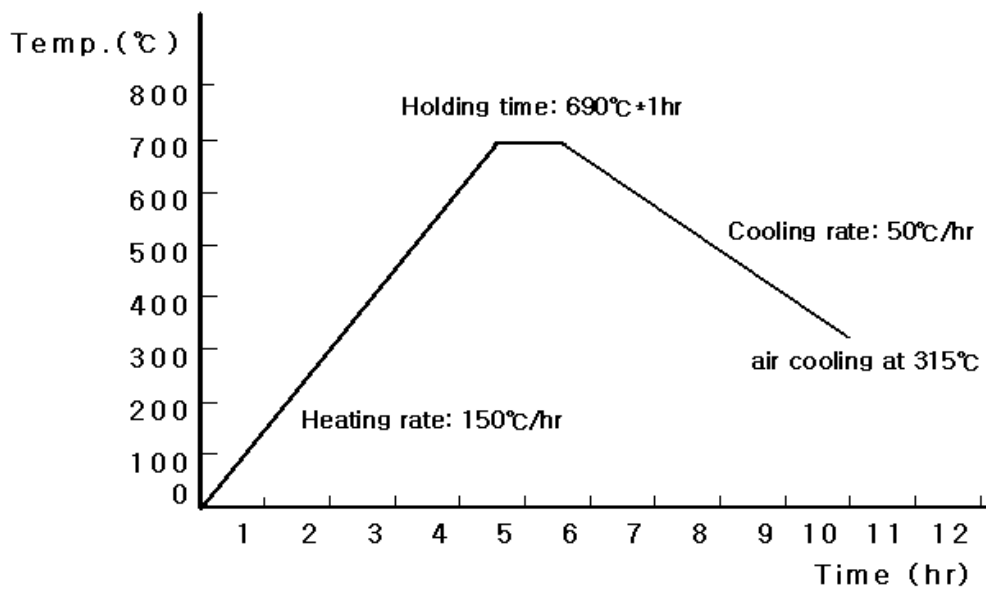
* Shielding Gas : 100%CO₂

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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

Diameter	: 1.4mm (0.052in)	Amps(A) / Volts(V)	: 240A / 27V
Shielding Gas	: 100%CO ₂	Stick-Out	: 20~25mm (0.79~0.98in)
Flow Rate	: 20 l /min	Welding Speed	: 30 cm/min (12 in/min)
Welding Position	: 1G (PA)	Current Type & Polarity	: DC(+)

❖ Hydrogen Analysis Using Gas Chromatography Method

Hydrogen Evolution Time	: 72 hrs
Evolution Temp.	: 45 °C (113°F)
Barometric Pressure	: 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 ₂	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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