HYUNDAI WELDING

Rev. 07

SC-91B3

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

2020.12

HYUNDAI WELDING CO., LTD.

SC-91B3

❖ Specification

AWS A5.29	**E91T1-B3C**
(AWS A5.29M	**E621T1-B3C)**
EN ISO 17634-B	**T69 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.

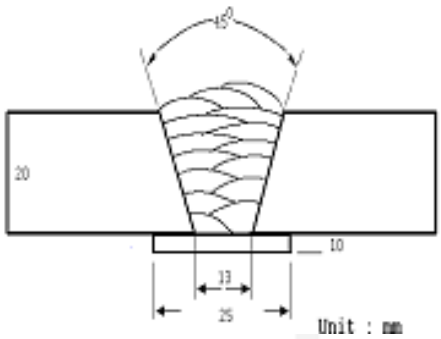
❖ Note on Usage

1. Used 100% CO_2 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℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			PWHT
	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	
SC-91B3	640 (93,000)	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**	**-**

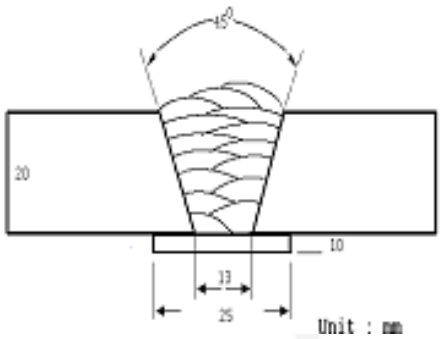
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Cr	Mo
SC-91B3	0.065	0.47	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

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%CO_2
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℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			PWHT
	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	
SC-91B3	642 (93,000)	730 (106,000)	21.0	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**	**-**

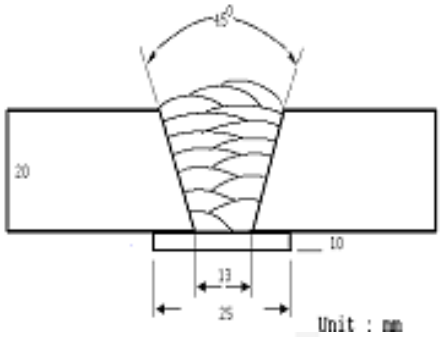
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Cr	Mo
SC-91B3	0.065	0.48	0.65	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

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/in²)	TS MPa (lbs/in²)	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

Welding Efficiency

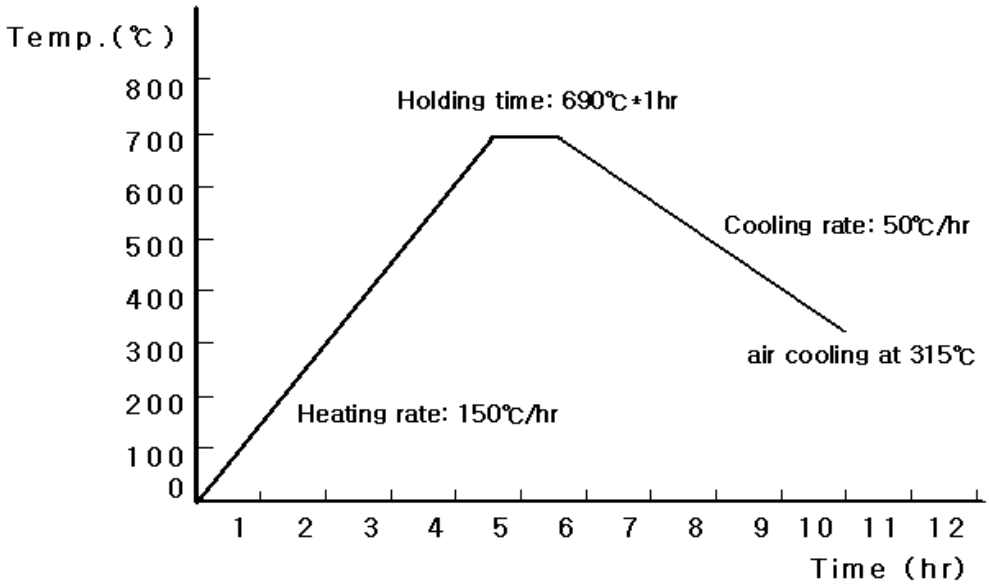
❖ Deposition Rate & Efficiency

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_2

Diffusible Hydrogen Content

❖ Postweld Heat Treatment



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

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 Position	:	1G (PA)	**Welding Speed**	:	30 cm/min (12 in/min)
			Current Type & Polarity	:	DC(+)

❖ Hydrogen Analysis Using Gas Chromatography Method

Hydrogen Evolution Time	:	72 hrs
Evolution Temp.	:	45 ℃ (113°F)
Barometric Pressure	:	780 mm-Hg

❖ Result(㎖/100g Weld Metal)

X1	X2	X3	X4
4.8	**5.2**	**4.5**	**5.4**

Average Hydrogen Content 5.2 ㎖ / *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