HYUNDAI WELDING

Rev. 07

SC-91K2 Cored

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

2022.02

HYUNDAI WELDING CO., LTD.

SC-91K2 Cored

❖ Specification

AWS A5.29	E91T1-K2C
(AWS A5.29M	E621T1-K2C)
EN ISO 17632-A	T50 4 1.5Ni P C1 1
JIS Z3313	T57 4 T1-1 C A-N3
KS D 7104	YFW-C602R

❖ Applications

SC-91K2 Cored is designed for the welding of low alloy steel such as 600MPa grade high strength steels HY-80, and ASTM A710, A514, A517.

❖ Characteristics on Usage

SC-91K2 Cored is a rutile type flux cored arc welding wire to be used with CO2 shielding gas. Deposited weld metal toughness is good at low temperature range down -40℃. To achieve good weld metal qualities, heat input must be controlled, not to exceed general welding condition. Welding arc is stable and bead appearance is good in all position welding. Diffusible hydrogen content is low and crack resistance is excellent

❖ Note on Usage

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

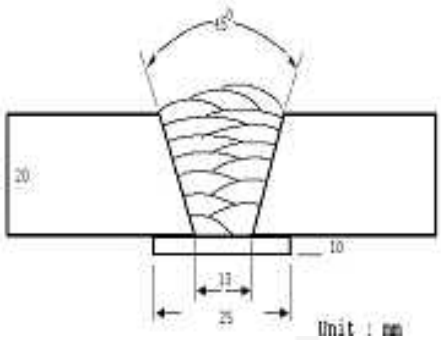
2. One-side welding defects such as hot cracking may occur with wrong welding parameter such as high welding speed.

3. Use 100% CO_2 gas.

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			CVN Impact Test J(ft · lbs)	
	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	-18℃ (0°F)	-40℃ (-40°F)
SC-91K2 Cored	620 (90,000)	650 (94,000)	27.0	110 (81)	60 (44)
AWS A5.29 E91T1-K2C	**≥ 540 (78,000)**	**620~760 (90,000~ 110,000)**	**≥ 17.0**	**≥27J at -40℃ (≥20ft · lbs at -40°F)**	

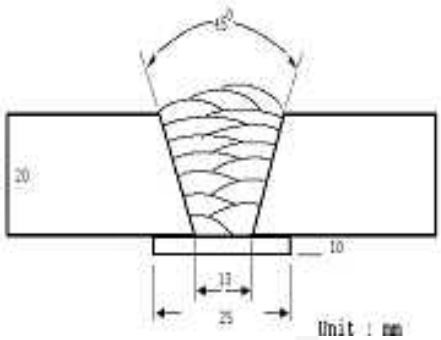
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Ni	Mo
SC-91K2 Cored	0.04	0.35	1.25	0.013	0.012	1.55	0.09
AWS A5.29 E91T1-K2C	**≤ 0.15**	**≤ 0.80**	**0.50~ 1.75**	**≤ 0.03**	**≤ 0.03**	**1.0~2.0**	**≤ 0.35**

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			CVN Impact Test J(ft · lbs)	
	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	-18℃ (0°F)	-40℃ (-40°F)
SC-91K2 Cored	622 (90,000)	651 (94,000)	27.2	113 (83)	61 (45)
AWS A5.29 E91T1-K2C	≥ 540 (78,000)	620~760 (90,000~ 110,000)	≥ 17.0	≥27J at -40℃ (≥20ft · lbs at -40°F)	

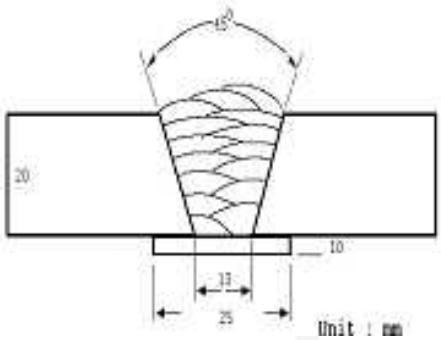
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Ni	Mo
SC-91K2 Cored	0.04	0.35	1.26	0.013	0.012	1.56	0.09
AWS A5.29 E91T1-K2C	≤ 0.15	≤ 0.80	0.50~ 1.75	≤ 0.03	≤ 0.03	1.0~2.0	≤ 0.35

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.	:	320A / 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			CVN Impact Test J(ft · lbs)	
	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	-18℃ (0°F)	-40℃ (-40°F)
SC-91K2 Cored	624 (90,000)	653 (95,000)	27.2	112 (83)	65 (48)
AWS A5.29 E91T1-K2C	≥ 540 (78,000)	620~760 (90,000~ 110,000)	≥ 17.0	≥27J at -40℃ (≥20ft · lbs at -40°F)	

❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Ni	Mo
SC-91K2 Cored	0.04	0.36	1.26	0.013	0.012	1.55	0.09
AWS A5.29 E91T1-K2C	≤ 0.15	≤ 0.80	0.50~ 1.75	≤ 0.03	≤ 0.03	1.0~2.0	≤ 0.35

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-91K2 Cored 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-91K2 Cored 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-91K2 Cored 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

❖ 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
4.5	**4.4**	**4.5**	**4.6**

Average Hydrogen Content 4.5 ㎖ / *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-91K2 Cored	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

Recommended Preheating & Inter pass Temp.

Thickness of plate (mm)	Preheating Temp(℃)
< 10	< 20
> 10~20 incl	> 20
> 20~40 incl	> 85
> 40	> 130

Reference by AWS D1.1 ANNEX I

Approvals

❖ AUTHORIZED APPROVAL DETAILS

Welding Position	Register of shipping & Size(mm)				
	KR	ABS	LR	DNV	NK
All V-Down	-	AWS A5.29 E91T1-K2C (-40℃≥50J) 1.2mm (0.045in)	-	IV Y50MS(H5) 1.2mm (0.045in)	-

❖ F No & A No

F No	A No
6	10