

# **SC-91K2 Cored**

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



## ❖ Specification

**AWS A5.29** E91T1-K2C

**EN ISO 17632-A** T 50 4 1.5Ni P C 1

## ❖ 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 CO<sub>2</sub> shielding gas. Deposited weld metal toughness is good at low temperature range down -40°C. 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

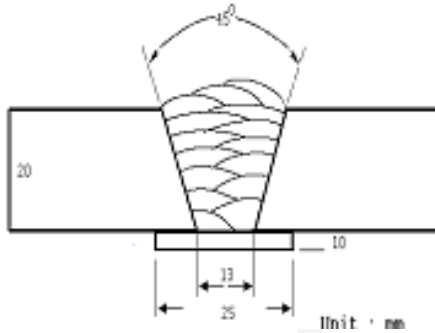
1. Proper preheating(50~150°C) and interpass temperature must be used in order to release hydrogen which may cause cracking in weld metal when electrodes are used for medium and heavy plates.
2. One-side welding defects such as hot cracking may occur with wrong welding parameter such as high welding speed.
3. Use 100% CO<sub>2</sub> gas.



## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

Diameter(mm)	: 1.2mm
Shielding Gas	: 100% CO <sub>2</sub>
Flow Rate(ℓ /min.)	: 20
Amp./ Volt.	: 260~280 / 29~31
Stick-Out(mm)	: 20~25
Pre-Heat(°C)	: R.T .
Interpass Temp.(°C)	: 150±15
Polarity	: DC(+)

### ❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test (Joule)	
	YS(MPa)	TS(MPa)	EL(%)	-20°C	-40°C
SC-91K2 Cored	620	650	27.0	110	60
AWS A5.29 E91T1-K2C	≥ 540	620~760	≥ 17	≥ 27J at -18°C	

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

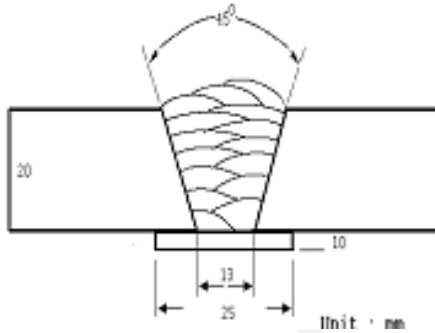
Consumable	C	Si	Mn	P	S	Ni	Mo
SC-91K2 Cored	0.04	0.35	1.25	0.013	0.012	1.55	0.09
AWS A5.29 E91T1-K2C	≤ 0.15	≤ 0.80	0.50~1.75	≤ 0.03	≤ 0.03	1.0~2.0	≤ 0.35



## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Diameter(mm)</b>	: 1.4mm
<b>Shielding Gas</b>	: 100% CO <sub>2</sub>
<b>Flow Rate(ℓ /min.)</b>	: 20
<b>Amp./ Volt.</b>	: 290~310 / 29~32
<b>Stick-Out(mm)</b>	: 20~25
<b>Pre-Heat(°C)</b>	: R.T .
<b>Interpass Temp.(°C)</b>	: 150±15
<b>Polarity</b>	: DC(+)

### ❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test (Joule)	
	YS(MPa)	TS(MPa)	EL(%)	-18°C	-40°C
SC-91K2 Cored	622	651	27.1	113	61
AWS A5.29 E91T1-K2C	≥ 540	620~760	≥ 17	≥ 27J at -18°C	

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

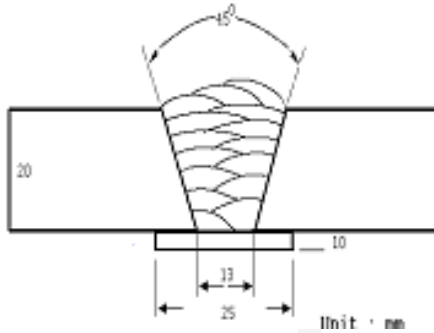
Consumable	C	Si	Mn	P	S	Ni	Mo
SC-91K2 Cored	0.04	0.35	1.26	0.013	0.012	1.56	0.09
AWS A5.29 E91T1-K2C	≤ 0.15	≤ 0.80	0.50~1.75	≤ 0.03	≤ 0.03	1.0~2.0	≤ 0.35



## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Diameter(mm)</b>	: 1.6mm
<b>Shielding Gas</b>	: 100% CO <sub>2</sub>
<b>Flow Rate(ℓ /min.)</b>	: 20
<b>Amp./ Volt.</b>	: 310~330 / 31~33
<b>Stick-Out(mm)</b>	: 20~25
<b>Pre-Heat(°C)</b>	: R.T .
<b>Interpass Temp.(°C)</b>	: 150±15
<b>Polarity</b>	: DC(+)

### ❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test (Joule)	
	YS(MPa)	TS(MPa)	EL(%)	-18°C	-40°C
SC-91K2 Cored	624	653	27.1	112	65
AWS A5.29 E91T1-K2C	≥ 540	620~760	≥ 17	≥ 27J at -18°C	

### ❖ 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		Deposition Efficiency(%)	Deposition Rate(kg/hr)
	Amp.(A)	Volt.(V)		
SC-91K2 Cored 1.2mm	200	24	84~86	2.4
	250	27	84~86	3.3
	300	31	84~86	4.5
	350	35	85~87	5.3
SC-91K2 Cored 1.4mm	250	27	84~86	3.3
	300	31	84~86	4.5
	350	35	85~87	5.4
SC-91K2 Cored 1.6mm	280	31	85~87	3.5
	330	33	85~87	4.6
	350	34	86~88	5.4
	400	38	86~88	5.7
<b>Remark</b>			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>



## Diffusible Hydrogen Content

### ❖ Welding Conditions

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Diameter(mm)	: 1.2	Amps(A) / Volts(V)	: 280 / 31
Shielding Gas	: 100% CO <sub>2</sub>	Stick-Out(mm)	: 20
Flow Rate(ℓ /min.)	: 20	Welding Speed	: 45 cpm
Welding Position	: 1G	Current Type & Polarity	: DC(+)

### ❖ Hydrogen Analysis Using Gas Chromatography Method

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Hydrogen Evolution Time	: 72 hrs	Analysis Temp.	: 25 °C
Evolution Temp.	: 25 °C	Exposure Condition	: 80%RH-25°C
Barometric Pressure	: 780 mm-Hg		

### ❖ Result(ml/100g Weld Metal)

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X1	X2	X3	X4
6.49	7.13	5.49	6.25

**Average Hydrogen Content 6.34 ml / 100g Weld Metal**



## Proper Welding Condition

### ❖ Proper Current Range

Consumable	Shielding Gas	Welding Position	Wire Dia. (mm)		
			1.2mm	1.4mm	1.6mm
SC-91K2 Cored	100%CO <sub>2</sub>	F & HF	200~300Amp	250~350Amp	280~380Amp
		V-Up & OH	140~240Amp	160~260Amp	180~260mp
		V-Down	250~310Amp	260~320Amp	280~340Amp





## Approvals

### ❖ AUTHORIZED APPROVAL DETAILS

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