HYUNDAI WELDING

Rev. 06

SC-91P

FLUX CORED ARC WELDING CONSUMABLES
FOR WELDING OF HIGH TENSILE STEEL

2022.02

HYUNDAI WELDING CO., LTD.

SC-91P

❖ Specification

AWS A5.29	E91T1-GM
(AWS A5.29M	E91T1-GM)
EN ISO 18276-A	T55 0 Z P M21 1

❖ Applications

Typical industrial applications include shipbuilding, machinery, bridge, structural fabrication and building.

❖ Characteristics on Usage

SC-91P is a rutile-type flux cored wire to be used with Ar+CO_2 gas mixture shielding.

Provide an exceptionally smooth and stable arc with a fast freezing slag system, this wire is ideal for pipe welding.

Bead shape and appearance are excellent in all position welding.

❖ Note on Usage

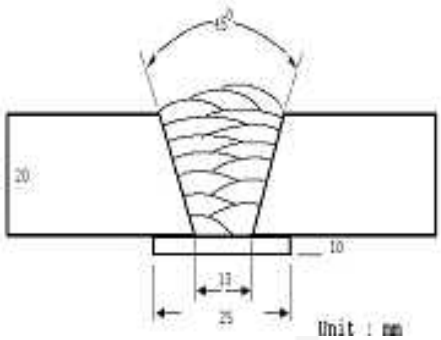
1. For preheating guidelines, please refer to your local standards and codes relative to your best practices.

2. Use Ar+20~25%CO_2 gas.

Typical Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Rules



[Joint Preparation & Layer Details]

Welding Position	: 1G(PA)
Diameter(mm)	: 1.2mm(0.045in)
Shielding Gas	: Ar+20%CO_2
Flow Rate(ℓ /min.)	: 20
Amp./ Volt.	: 280 / 30
Stick-Out(mm)	: 20~25(0.79~0.98in
Welding position	: 1G
Interpass Temp.(℃)	: 150±15 (302±59 °F)
Polarity	: DC(+)

❖ Typical Mechanical Properties of the weld metal

Brand Name	Tensile Test			CVN Impact Test J(ft·lbs)
SC-91P	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	0℃(32℉)
	640(93,000)	680(99,000)	26	80(59)
AWS A5.29 E91T1-GM	≥ 540(78,000)	620~760 (90,000~110,000)	≥ 17.0	Not Specified

❖ Typical Chemical Analysis of the weld metal(wt%)

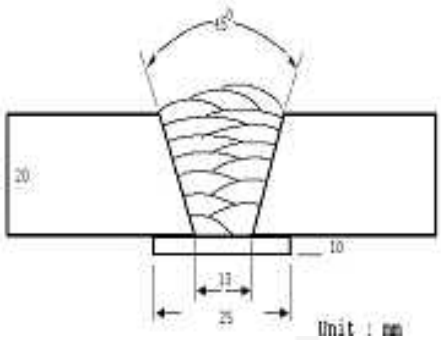
Brand Name	C	Si	Mn	P	S	Ni	Mo
SC-91P	0.05	0.45	1.30	0.013	0.010	0.85	0.22
AWS A5.29 E91T1-GM	Not Specified						

★ : Not less than the minimum specified for one or more alloy

Typical Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Rules



[Joint Preparation & Layer Details]

Welding Position	: 1G(PA)
Diameter(mm)	: 1.4mm(0.052in)
Shielding Gas	: Ar+20%CO_2
Flow Rate(ℓ /min.)	: 20
Amp./ Volt.	: 320/ 30
Stick-Out(mm)	: 20~25(0.79~0.98in
Welding position	: 1G
Interpass Temp.(℃)	: 150±15 (302±59 °F)
Polarity	: DC(+)

❖ Typical Mechanical Properties of the weld metal

Brand Name	Tensile Test			CVN Impact Test J(ft·lbs)
SC-91P	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	0℃(32°F)
	640(93,000)	680(99,000)	26.5	80(59)
AWS A5.29 E91T1-GM	≥ 540(78,000)	620~760 (90,000~110,000)	≥ 17.0	Not Specified

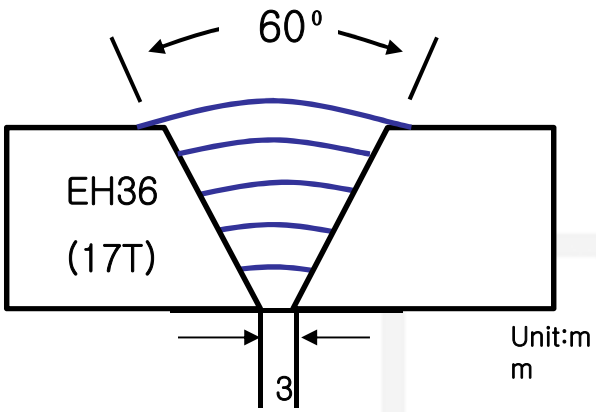
❖ Typical Chemical Analysis of the weld metal(wt%)

Brand Name	C	Si	Mn	P	S	Ni	Mo
SC-91P	0.05	0.43	1.31	0.013	0.010	0.85	0.23
AWS A5.29 E91T1-GM	Not Specified						

★ : Not less than the minimum specified for one or more alloy

Typical Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions



[Joint Preparation & Layer Details]

Layer/ Pass : 5Layer/5Pass

- 1~2pass : TIG Welding (ER70S-G) 2.4mm
- 3~5Pass : SC-91P , 1.2mm

Shielding Gas

- TIG Welding : 100% Ar
- FCW Welding : Ar+20% CO_2

Welding Position

- 3G (Vertical-up)

❖ Welding Detail Data

Welding Method	Pass	Welding parameter		
		Amp /Volt	Welding Speed (cpm)	Heat Input (KJ/cm)
TIG (ER70S-G 2.4mm)	1	150A	8.4	-
	2	200A	5.8	-
FCW (SC-91P 1.2mm)	3	200A /24V	10.9	26.4
	4	200A/ 24V	10.6	27.2
	5	200A /24V	12.0	24.0

Typical Mechanical Properties & Chemical Composition of All Weld Metal

❖ Typical Mechanical Properties of the weld metal

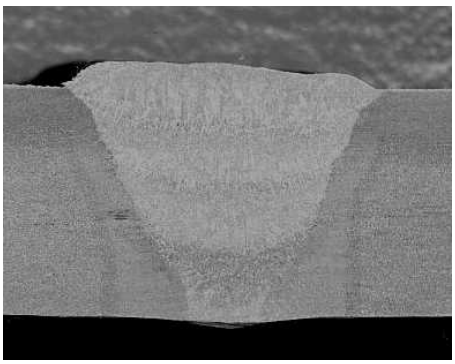
Charpy V-notch Impact Values (Joules) [0℃(32℉)]						
Notch Location	X1	X2	X3	X4	X5	Avg.
Face 2mm(0.08in)	80(59)	86(63)	89(66)	99(73)	72(53)	85(63)
Root 2mm(0.08in)	82(61)	83(61)	101(75)	106(78)	80(59)	90(66)

* Notch location of impact test specimens 1) Face 2mm(0.08in) : Weld center from surface 2mm(0.08in)
2) Root 2mm(0.08in) : Weld center from root 2mm(0.08in)

❖ Typical Chemical Analysis of the weld metal(wt%)

C	Si	Mn	P	S	Ni	Mo
0.05	0.45	1.45	0.013	0.010	0.86	0.25

❖ Macro Section



Welding Efficiency

❖ Deposition Rate & Efficiency

Wire Size	Welding Conditions		Wire Feed Speed m/min (in/min)	Deposition Efficiency(%)	Deposition Rate kg/hr(lb/hr)
	Amp.(A)	Volt.(V)			
1.2mm (0.045in)	200	26	10.2(400)	85~87	4.2(9.2)
	250	28	13.3(525)	85~87	5.1(11.2)
	300	32	15.3(600)	86~88	5.9(13.0)
Remark				Deposition efficiency =(Deposited metal weight/ Wire weight used)×100	Deposition rate =(Deposited metal weight/ Welding time,min.)×60

* Shielding Gas : Ar+20%CO_2

Diffusible Hydrogen Content

❖ Welding Conditions

Diameter(mm)	:	**1.2mm(0.045in)**	**Amps(A) / Volts(V)**	:	**280A / 30V**
Shielding Gas	:	**80%Ar+20%CO_2**	**Stick-Out(mm)**	:	**20mm(0.79in)**
Flow Rate(ℓ /min.)	:	**20**	**Welding Speed**	:	**35 cm/min (13.8 in/min)**
Welding Position	:	**1G (PA)**	**Current Type & Polarity**	:	**DC(+)**

❖ Hydrogen Analysis Using Gas Chromatograph Method

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

❖ Result(㎖/100g Weld Metal)

X1	X2	X3	X4
3.4	**3.2**	**3.2**	**3.0**

Average Hydrogen Content 3.2 ㎖ / *100g Weld Metal*

Proper Welding Condition

❖ Proper Current Range

Consumables	Welding position	Welding condition	
		Proper	Optimum
SC-91P 1.2mm (0.045in)	Flat, H-Fillet	120-300Amp	230A/27V
	Vertical Up	180-250Amp	200A/24V
	Vertical Down	200-300Amp	230A/27V
	Overhead	120-250Amp	200A/24V

* Shielding Gas : Ar+20%CO_2

❖ F No & A No

F No	A No
6	10

Notice

This test report is made for giving general information, and it's not meaning guarantee.
Test results are changeable by several welding - parameter including base materials