HYUNDAI WELDING

Rev. 05

SF-80W

FLUX CORED ARC WELDING CONSUMABLES
FOR ATMOSPHERIC CORROSION RESISTING STEEL

2020.12

HYUNDAI WELDING CO., LTD.

SF-80W

❖ Specification

AWS A5.29	**E81T1-W2C**
(AWS A5.29M	**E551T1-W2C)**
EN ISO 17632-B	**T55 3 T1-1 C1 A-NCC1**
JIS Z 3320	**T55 3 T1-1 C A-NCC1 H10**

❖ Applications

All position welding of bridges, building using atmospheric corrosion resisting steels.

❖ Characteristics on Usage

SF-80W is the most widely used titania type flux cored wire for all position welding with CO_2 shielding gas. Arc stability is excellent, so spatter loss is low and slag covering is uniform with good removability. SF-80W is effective for use in insufficient in insufficient ventilation and/or space areas.

❖ Note on Usage

1. Proper preheating(50~150℃, 122~302°F) 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.

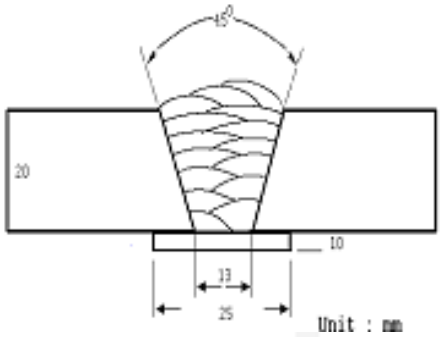
2. One-side welding defects such as hot cracking may occur with wrong welding parameter such as high welding speed.

3. Use 100% CO_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)	-29℃ (-20°F)
SF-80W	540 (75,000)	615 (84,000)	28.0	66 (49)	46 (34)
AWS A5.29 E81T1-W2C	**≥ 470 (68,000)**	**550~690 (80,000~ 100,000)**	**≥ 22.0**	**≥27J at -29℃ (≥20ft · lbs at -20°F)**	

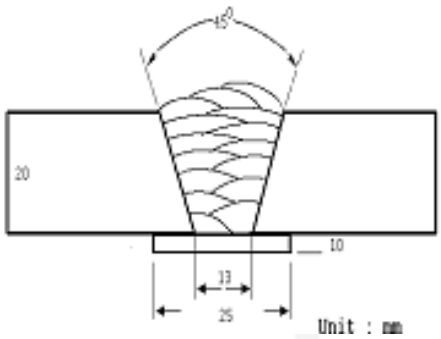
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Cu	Cr	Ni
SF-80W	0.04	0.40	0.92	0.016	0.009	0.40	0.52	0.50
AWS A5.29 E81T1-W2C	≤ 0.12	**0.35~0.80**	0.50~1.30	≤ 0.03	≤ 0.03	0.30~0.75	0.45~0.70	0.40~0.80

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)	-29℃ (-20°F)
SF-80W	550 (80,000)	620 (90,000)	26.5	82 (61)	40 (30)
AWS A5.29 E81T1-W2C	**≥ 470 (68,000)**	**550~690 (80,000~ 100,000)**	**≥ 22.0**	**≥27J at -29℃ (≥20ft · lbs at -20°F)**	

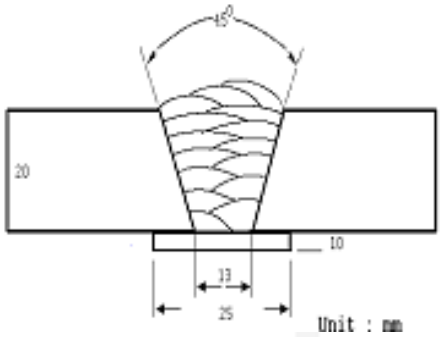
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Cu	Cr	Ni
SF-80W	0.04	0.42	0.95	0.016	0.009	0.41	0.50	0.52
AWS A5.29 E81T1-W2C	≤ 0.12	**0.35~0.80**	0.50~1.30	≤ 0.03	≤ 0.03	0.30~0.75	0.45~0.70	0.40~0.80

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			CVN Impact Test J(ft · lbs)	
	YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	-18℃ (0°F)	-29℃ (-20°F)
SF-80W	545 (79,000)	618 (90,000)	26.0	76 (56)	40 (30)
AWS A5.29 E81T1-W2C	**≥ 470 (68,000)**	**550~690 (80,000~ 100,000)**	**≥ 22.0**	**≥27J at -29℃ (≥20ft · lbs at -20°F)**	

❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Cu	Cr	Ni
SF-80W	0.04	0.39	0.92	0.016	0.009	0.42	0.50	0.48
AWS A5.29 E81T1-W2C	≤ 0.12	**0.35~0.80**	0.50~1.30	≤ 0.03	≤ 0.03	0.30~0.75	0.45~0.70	0.40~0.80

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)			
SF- 80W 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)
SF- 80W 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)
SF- 80W 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
6.5	**6.3**	**6.2**	**6.6**

Average Hydrogen Content 6.4 ㎖ / *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)
SF-80W	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	1