HYUNDAI WELDING

Rev. 08

Supercored 70SB

BASIC TYPE FLUX CORED ARC WELDING
CONSUMABLES FOR 490MPa CLASS HIGH TENSILE STEEL

2024.12

HYUNDAI WELDING CO., LTD.

Supercored 70SB

❖ Specification

AWS A5.20	E71T-5C
(AWS A5.20M	E491T-5C)
EN ISO 17632-A	T42 3 B C1 2
JIS Z3313	T49 3 T5-1 C A-U

❖ Applications

Supercored 70SB can be used on multipass welding of medium to heavy section carbon-manganese steel and it`s suited for welding of mild and 490MPa high tensile strength steels for ship-building, machinery structures, bridge construction and heavy plant.

❖ Characteristics on Usage

Supercored 70SB is a basic flux cored wire with excellent characteristics and is suitable for steel with a tensile strength up to 600MPa.

It`s flux cored wire which deposits very low hydrogen weld metal, So deposited metal shows superior crack resistance, excellent toughness at low temperature at -20℃~-30℃(-4~-22°F)

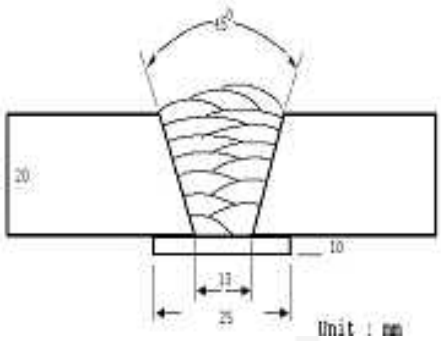
❖ Note on Usage

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(mm)	:	1.2mm (0.045in)
Shielding Gas	:	100% CO_2
Flow Rate	:	20~22 ℓ /min
Amp./ Volt.	:	280A / 31V
Stick-Out(mm)	:	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	Polarlty	Tensile Test			CVN Impact Test J(ft · lbs)	
	-	YS MPa (lbs/in²)	TS Mpa (lbs/in²)	EL (%)	-18℃ (0°F)	-29℃ (-20°F)
Supercored 70SB	DC-	570 (83,000)	620 (90,000)	26.0	112 (83)	70 (52)
	DC+	500 (73,000)	565 (82,000)	31.0	125 (92)	80 (59)
AWS A5.20 E71T-5C	-	**≥ 390 (57,000)**	**490~670 (71,000~ 97,000)**	**≥ 22.0**	**≥27J at -29℃ (≥20ft · lbs at -20°F)**	

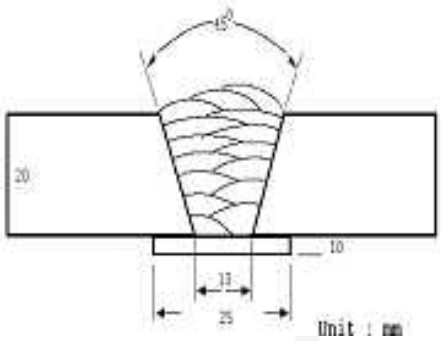
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S
Supercored 70SB	0.06	0.39	1.42	0.013	0.008
AWS A5.20 E71T-5C	≤ 0.12	≤ 0.9	≤ 1.75	≤ 0.03	≤ 0.03

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter(mm)	:	1.4mm (0.052in)
Shielding Gas	:	100% CO_2
Flow Rate	:	20~22 ℓ /min
Amp./ Volt.	:	300A / 32V
Stick-Out(mm)	:	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	Polarlty	Tensile Test			CVN Impact Test J(ft · lbs)	
	-	**YS MPa (lbs/in²)**	**TS Mpa (lbs/in²)**	**EL (%)**	**-18℃ (0°F)**	**-29℃ (-20°F)**
Supercored 70SB	DC-	565 (82,000)	615 (89,000)	27.0	105 (77)	65 (48)
	DC+	515 (75,000)	580 (84,000)	29.0	115 (85)	84 (62)
AWS A5.20 E71T-5C	-	**≥ 390 (57,000)**	**490~670 (71,000~ 97,000)**	**≥ 22.0**	**≥27J at -29℃ (≥20ft · lbs at -20°F)**	

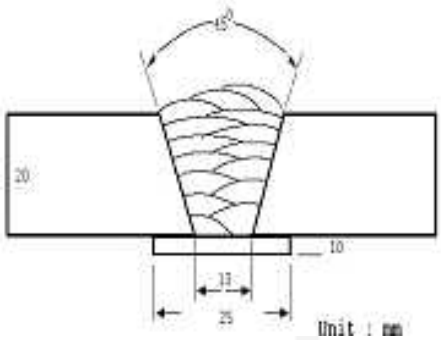
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S
Supercored 70SB	0.06	0.41	1.37	0.013	0.009
AWS A5.20 E71T-5C	≤ 0.12	≤ 0.9	≤ 1.75	≤ 0.03	≤ 0.03

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter(mm)	:	1.6mm (1/16in)
Shielding Gas	:	100% CO_2
Flow Rate	:	20~22 ℓ /min
Amp./ Volt.	:	330A / 33V
Stick-Out(mm)	:	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	Polarlty	Tensile Test			CVN Impact Test J(ft · lbs)	
	-	YS MPa (lbs/in²)	TS Mpa (lbs/in²)	EL (%)	-18℃ (0°F)	-29℃ (-20°F)
Supercored 70SB	DC-	575 (83,000)	630 (91,000)	26.0	102 (75)	65 (48)
	DC+	505 (73,000)	575 (83,000)	30.0	118 (87)	76 (56)
AWS A5.20 E71T-5C	-	**≥ 390 (57,000)**	**490~670 (71,000~ 97,000)**	**≥ 22.0**	**≥27J at -29℃ (≥20ft · lbs at -20°F)**	

❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S
Supercored 70SB	0.06	0.40	1.38	0.014	0.007
AWS A5.20 E71T-5C	≤ 0.12	≤ 0.9	≤ 1.75	≤ 0.03	≤ 0.03

Welding Efficiency

❖ Deposition Rate & Efficiency

Wire Size	Welding Conditions		Deposition Efficiency %	Deposition Rate kg/hr (lb/hr)
	Amp.(A)	Volt.(V)		
1.2mm (0.045in)	150	24	84~86	2.1 (4.6)
	200	26	85~87	3.2 (7.0)
	250	28	85~88	4.2 (9.2)
	300	33	85~88	5.1 (11.2)
1.4mm (0.052in)	250	28	85~87	3.8 (8.4)
	300	32	86~88	4.7 (10.3)
	350	36	87~89	6.1 (13.4)
1.6mm (1/16in)	280	31	86~88	4.1 (9.0)
	330	33	86~89	4.7 (10.3)
	350	34	87~89	5.2 (11.4)
	400	38	88~90	6.0 (13.2)
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	:	**1.2mm (0.045in)**	**Amps / Volts**	:	**230A / 24V**
Shielding Gas	:	**100% CO_2**	**Stick-Out**	:	**20~25mm (0.79~0.98in)**
Flow Rate	:	**20 ℓ/min**	**Welding Speed**	:	**45 cpm (18 in/min)**
Welding Position	:	**1G (PA)**	**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)

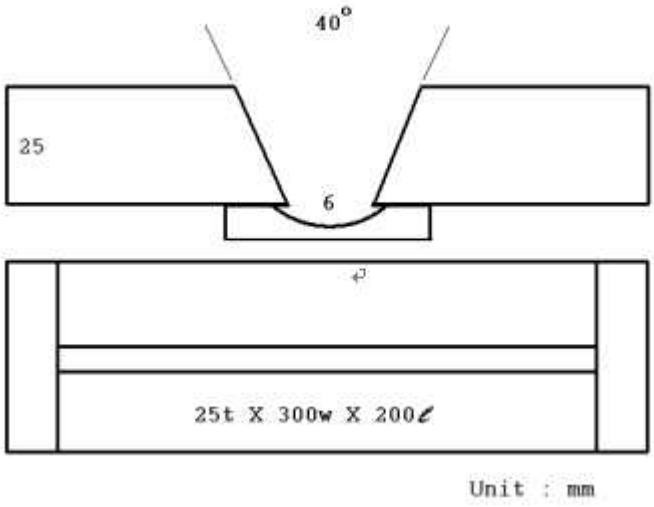
X1	X2	X3	X4
3.9	**4.4**	**3.9**	**4.1**

Average Hydrogen Content 4.1 ㎖ / *100g Weld Metal*

Hot crack resistance of all weld metal

❖ Welding Conditions

Diameter	:	**1.2 (0.045in)**	**Amps / Volts**	:	**250A / 31V**
Shielding Gas	:	**100% CO_2**	**Stick-Out(mm)**	:	**20~25mm (0.79~0.98in)**
Flow Rate	:	**20 ℓ/min**	**Welding Speed**	:	**15-20 cpm (6~8 in/min)**
Welding Position	:	**1G (PA)**	**Current Type & Polarity**	:	**DC(+)**



❖ Result(㎖/100g Weld Metal)

Consumable	Crack Point EA	Crack Length mm (in)
Supercored 70SB	**0**	**0 (0)**

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)
Supercored 70SB	100%CO_2	F & HF	110~280Amp	110~280Amp	120~300Amp
		V-Up	80~150Amp	90~180Amp	90~180mp

Approvals

❖ AUTHORIZED APPROVAL DETAILS

Welding Position	Register of shipping & Size						
	KR	ABS	LR	BV	DNV	GL	NK
All V-Down	3YSG(C)H5 1.2~1.6mm (0.045~1/16in)	3YSAH5 1.2~1.6mm (0.045~1/16in)	3YSH5 1.2~1.6mm (0.045~1/16in)	SA3YM HHH 1.2~1.6mm (0.045~1/16in)	III YMS H5 1.2~1.6mm (0.045~1/16in)	3YH5S 1.2~1.6mm (0.045~1/16in)	KSW53G (C)H5 1.2~1.6mm (0.045~1/16in)

❖ F No & A No

F No	A No
6	1