

Supercored 70SB

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

2022.02

HYUNDAI WELDING CO., LTD.



Supercored 70SB

❖ Specification

<i>AWS A5.20</i>	E71T-5C
<i>(AWS A5.20M)</i>	E491T-5C)
<i>EN ISO 17632-A</i>	T42 3 B C1 2
<i>JIS Z3313</i>	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 $-20^{\circ}\text{C} \sim -30^{\circ}\text{C}$ ($-4 \sim -22^{\circ}\text{F}$)

❖ Note on Usage

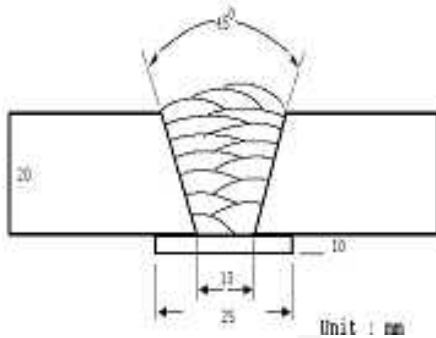
1. For preheating guidelines, please refer to your local standards and codes relative to your best practices.
2. One-side welding defects such as hot cracking may occur with wrong welding parameter such as high welding speed.
3. Use 100% CO₂ gas.



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(°C)	: R.T .
Interpass Temp.(°C)	: 150±15 (302±59°F)
Polarity	: DC(±)

❖ Mechanical Properties of all weld metal

Consumable	Polarity	Tensile Test			CVN Impact Test J(ft · lbs)	
		YS MPa (lbs/in ²)	TS Mpa (lbs/in ²)	EL (%)	-18°C (0°F)	-29°C (-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°C (≥ 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

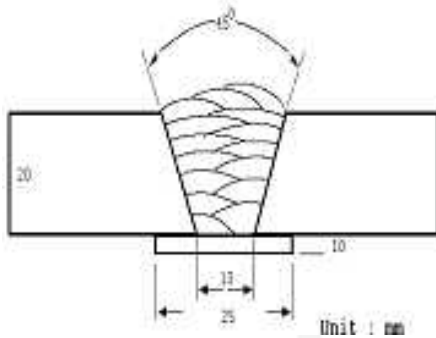
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Mechanical Properties & Chemical Composition of All Weld Metal

❖ 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(°C)	: R.T .
Interpass Temp.(°C)	: 150±15 (302±59°F)
Polarity	: DC(±)

❖ Mechanical Properties of all weld metal

Consumable	Polarity	Tensile Test			CVN Impact Test J(ft · lbs)	
		YS MPa (lbs/in ²)	TS Mpa (lbs/in ²)	EL (%)	-18°C (0°F)	-29°C (-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°C (≥ 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

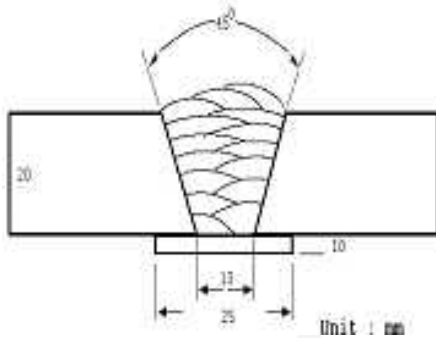
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Mechanical Properties & Chemical Composition of All Weld Metal

❖ 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(°C)	: R.T .
Interpass Temp.(°C)	: 150±15 (302±59°F)
Polarity	: DC(±)

❖ Mechanical Properties of all weld metal

Consumable	Polarity	Tensile Test			CVN Impact Test J(ft · lbs)	
		YS MPa (lbs/in ²)	TS Mpa (lbs/in ²)	EL (%)	-18°C (0°F)	-29°C (-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°C (≥ 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

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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%CO₂



Diffusible Hydrogen Content

❖ Welding Conditions

Diameter	: 1.2mm (0.045in)	Amps / Volts	: 280A / 31V
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 °C (113°F)
Barometric Pressure	: 780 mm-Hg

❖ Result(ml/100g Weld Metal)

X1	X2	X3	X4
1.9	2.4	1.9	2.1

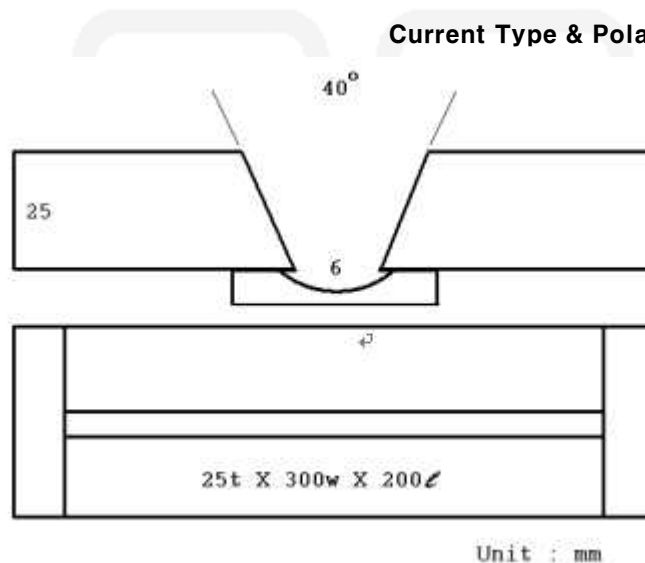
Average Hydrogen Content 2.1 ml / 100g Weld Metal



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(ml/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	170~320Amp	200~350Amp	200~350Amp
		V-Up	80~150Amp	90~180Amp	90~180mp

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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