HYUNDAI WELDING

Rev. 03

Supercored 420MC

FLUX CORED ARC WELDING CONSUMABLE
FOR WELDING OF MILD & 490MPa CLASS
HIGH TENSILE STEEL

HYUNDAI WELDING CO., LTD.

Supercored 420MC

❖ Specification

AWS A5.20	E71T-1C,-9C E71T-1M,-9M
AWS A5.20M	E491T1-1C,-9C E491T1-1M,-9M
EN ISO 17632-A	T42 2 P C1 1, T46 3 P M21 1

❖ Applications

All position welding of ship hulls, vehicles, bridges, chemical plant machinery and other metal fabrication

❖ Characteristics on Usage

Supercored 420MC is a titania flux cored wire applicable for all-position welding by 100% CO_2 shielding gas or Ar+20~25% CO_2 shielding gas.

Less spattering and good slag detachability shorten the time of bead grinding operation.

❖ Note on Usage

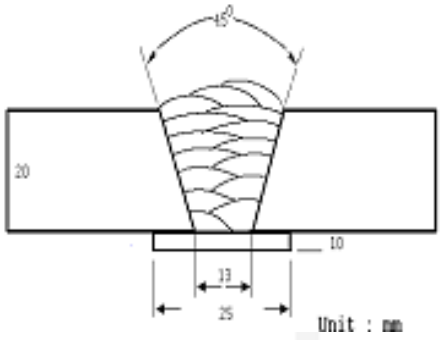
1. Proper preheating(50~150℃) and interpass temperature must be used in order to release hydrogen which may cause cracking in weld metal when electrodes are used for medium and heavy plates

2. Use 100% CO_2 or Ar+20~25% CO_2 shielding 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 Ar+20%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	280A / 32V (100% CO_2) 280A / 30V (Ar-20%CO_2)
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T (℃,°F)
Interpass Temp	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Shielding gas	Tensile Test			CVN Impact Test J(ft · lbs)	
		YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	-18℃ (-0°F)	-29℃ (-20°F)
Supercored 420MC	100% CO_2	520(76,000)	570(83,000)	28.0	60(44)	50(37)
	Ar-20% CO_2	575(83,000)	630(91,000)	26.0	82(61)	68(50)
AWS A5.20 E71T-9C,-9M		≥ 390 (56,000)	490~670 (70,000~ 97,000)	≥ 22.0	≥27J at -29℃ (≥20ft · lbs at -20°F)	

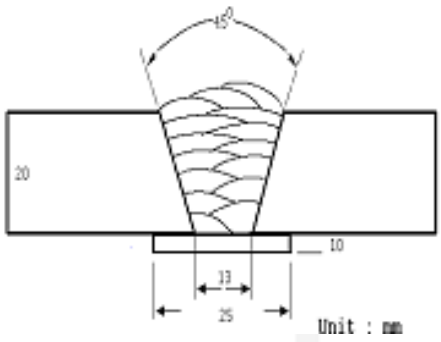
❖ Chemical Analysis of all weld metal(wt%)

Consumable	Shielding gas	C	Si	Mn	P	S
Supercored 420MC	100%CO_2	0.040	0.40	1.20	0.010	0.004
	Ar-20%CO_2	0.043	0.50	1.41	0.010	0.005
AWS A5.20 E71T-9C,-9M		≤ 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	:	1.4mm (0.052in)
Shielding Gas	:	100% CO_2 Ar+20%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	300A / 32V (100% CO_2) 300A / 30V (Ar-20%CO_2)
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T (℃,°F)
Interpass Temp	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Shielding gas	Tensile Test			CVN Impact Test J(ft · lbs)	
		YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	-18℃ (-0°F)	-29℃ (-20°F)
Supercored 420MC	100% CO_2	530(77,000)	580(84,000)	27.6	58(43)	52(38)
	Ar-20% CO_2	570(83,000)	635(92,000)	26.0	85(63)	70(52)
AWS A5.20 E71T-9C,-9M		≥ 390 (56,000)	490~670 (70,000~ 97,000)	≥ 22.0	≥27J at -29℃ (≥20ft · lbs at -20°F)	

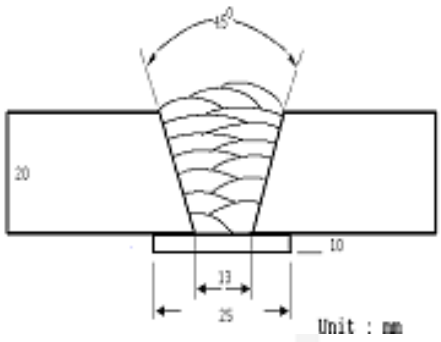
❖ Chemical Analysis of all weld metal(wt%)

Consumable	Shielding gas	C	Si	Mn	P	S
Supercored 420MC	100%CO_2	0.038	0.44	1.19	0.009	0.004
	Ar-20%CO_2	0.044	0.53	1.38	0.010	0.005
AWS A5.20 E71T-9C,-9M		≤ 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	:	1.6mm (1/16in)
Shielding Gas	:	100% CO_2 Ar+20%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	320A / 33V (100% CO_2) 320A / 30V (Ar-20%CO_2)
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T (℃,°F)
Interpass Temp	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Shielding gas	Tensile Test			CVN Impact Test J(ft · lbs)	
		YS MPa (lbs/in²)	TS MPa (lbs/in²)	EL (%)	-18℃ (-0°F)	-29℃ (-20°F)
Supercored 420MC	100% CO_2	520(76,000)	580(84,000)	30.0	76(56)	45(33)
	Ar-20% CO_2	560(81,000)	625(91,000)	28.0	93(69)	72(53)
AWS A5.20 E71T-9C,-9M		≥ 390 (56,000)	490~670 (70,000~ 97,000)	≥ 22.0	≥27J at -29℃ (≥20ft · lbs at -20°F)	

❖ Chemical Analysis of all weld metal(wt%)

Consumable	Shielding gas	C	Si	Mn	P	S
Supercored 420MC	100%CO_2	0.045	0.50	1.35	0.011	0.004
	Ar-20%CO_2	0.048	0.60	1.50	0.012	0.004
AWS A5.20 E71T-9C,-9M		≤ 0.12	≤ 0.9	≤ 1.75	≤ 0.03	≤ 0.03

Welding Efficiency

❖ Deposition Rate & Efficiency

Consumable (size)	Shielding Gas	Welding Conditions		Wire Feed Speed m/min (in/min)	Deposition Efficiency(%)	Deposition Rate kg/hr(lb/hr)
		Amp. (A)	Volt. (V)			
1.2mm (0.045 in)	100%CO_2	280	32	12.7(500)	86~88	4.8(11)
	Ar+20%CO_2	280	30	12.7(500)	87~89	5.0(11)
1.6mm (1/16 in)	100%CO_2	330	32	8.3(325)	86~88	5.3(12)
	Ar+20%CO_2	330	30	8.3(325)	87~89	5.5(12)
Remark					Deposition efficiency =(Deposited metal weight/Wire weight used)×100	Deposition rate =(Deposited metal weight/Welding time,min.)×60

Proper Welding Condition

❖ Proper Current Range

Consumable	Shielding Gas	Welding Position	Wire Dia.		
			1.2mm (0.045 in)	1.4mm (0.053in)	1.6mm (1/16 in)
Supercored 420MC	100%CO_2 or Ar+20~25%CO_2	F	100~280Amp	150~350Amp	150~360Amp
		HF	100~280Amp	140~270Amp	150~360Amp
		V-Up & OH	140~260Amp	160~270Amp	180~300Amp
		V-Down	100~280Amp	220~320Amp	150~360Amp

Diffusible Hydrogen Content

❖ Welding Conditions

Diameter	:	1.6mm (1/16 in)	**Amps / Volts**	:	260A / 28V
Shielding Gas	:	100%CO_2, Ar-20%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
100% CO_2	**4.5**	**4.7**	**4.4**	**4.3**
Ar-20%CO_2	**5.6**	**5.9**	**5.4**	**5.5**

Average Hydrogen Content 4.5 ㎖ / *100g Weld Metal (100% CO_2)*

Average Hydrogen Content 5.6 ㎖ / *100g Weld Metal (Ar-20% CO_2)*

❖ F No & A No

F No	A No
6	1