HYUNDAI WELDING

Rev. 02

Supercored 71MAG

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

HYUNDAI WELDING CO., LTD.

Supercored 71MAG

❖ Specification

AWS A5.36	E71T1-M21A2-CS1
(AWS A5.36M	E491T1-M21A3-CS1)
(AWS A5.20	E71T-1M/-9M)
EN ISO 17632-A	T 46 3 P M21 1 H10

❖ Applications

Supercored 71MAG can be used on mild and high tensile steel in single and multi-pass applications. Shipbuilding, machinery, bridge, structural fabrication and building.

❖ Characteristics on Usage

Supercored71MAG is a rutile-type flux cored wire to be used with Ar+CO_2 gas Provide an exceptionally smooth and stable arc with a fast freezing slag system, this wire is ideal for welding flat, vertical up, vertical down. Bead shape and appearance are excellent in all position welding.

❖ Note on Usage

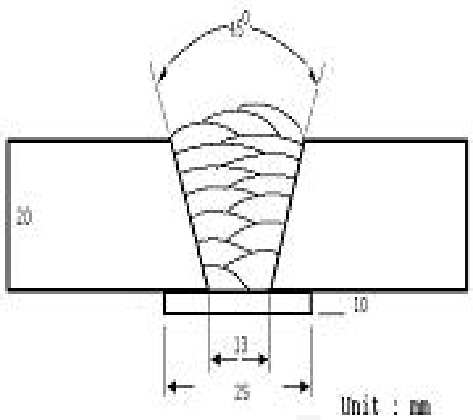
1. Proper preheating(50~150℃, 122~302°F) and interpass temperature must be used in order to release hydrogen which may cause cracking in weld metal when electrodes are used for medium and heavy plates.

2. Use Ar-20~25% 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	:	Ar-20%CO_2
Flow Rate	:	20 ℓ /min
Amp / Volt	:	270~280A / 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 (Ksi)	TS Mpa (Ksi)	EL (%)	-30℃ (-22°F)
Supercored 71MAG	580(84)	600(87)	28.0	60(44)
AWS A5.36 E71T1-M21A2-CS1	≥ 400 (58)	490~660 (70~95)	≥ 22	≥27J at -30℃ (≥20ft · lbs at -20°F)

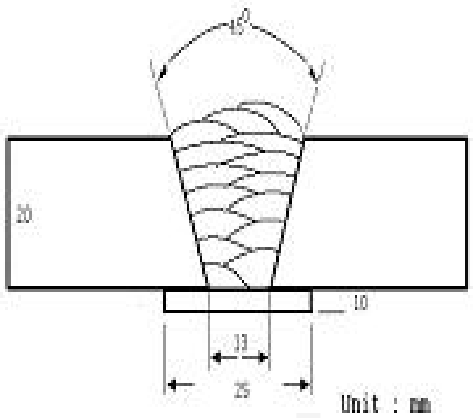
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S
Supercored 71MAG	0.04	0.54	1.25	0.011	0.012
AWS A5.36 E71T1-M21A2-CS1	≤ 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	:	Ar-20%CO_2
Flow Rate	:	20 ℓ /min
Amp / Volt	:	290~300A / 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 (Ksi)	TS Mpa (Ksi)	EL (%)	-30℃ (-22°F)
Supercored 71MAG	585(85)	605(88)	27.0	65(48)
AWS A5.36 E71T1-M21A2-CS1	≥ 400 (58)	490~660 (70~95)	≥ 22	≥27J at -30℃ (≥20ft · lbs at -20°F)

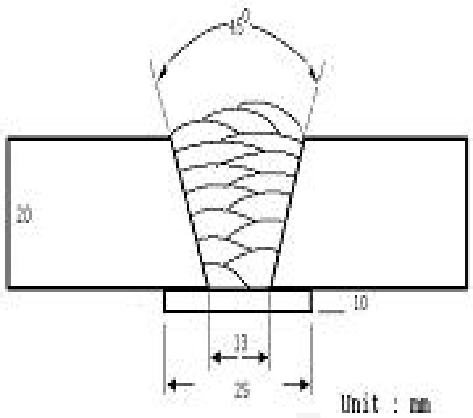
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S
Supercored 71MAG	0.05	0.55	1.20	0.010	0.011
AWS A5.36 E71T1-M21A2-CS1	≤ 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	:	Ar-20%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 (Ksi)	TS Mpa (Ksi)	EL (%)	-30℃ (-22°F)
Supercored 71MAG	575(83)	595(86)	27.5	65(48)
AWS A5.36 E71T1-M21A2-CS1	≥ 400 (58)	490~660 (70~95)	≥ 22	≥27J at -30℃ (≥20ft · lbs at -20°F)

❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S
Supercored 71MAG	0.04	0.50	1.20	0.011	0.012
AWS A5.36 E71T1-M21A2-CS1	≤ 0.12	≤ 0.9	≤ 1.75	≤ 0.03	≤ 0.03

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)			
Supercored 71MAG 1.2 mm (0.045in)	200	26	10.2 (400)	87~89	3.1 (6.8)
	250	28	11.5 (450)	88~89	4.3 (9.5)
	300	32	15.3 (600)	88~90	5.8 (12.8)
Supercored 71MAG 1.4 mm (0.052in)	250	28	7.6 (300)	85~87	3.6 (7.9)
	300	32	10.2 (400)	86~88	4.7 (10.3)
	330	36	12.8 (500)	87~89	6.3 (13.9)
Supercored 71MAG 1.6 mm (1/16in)	280	31	6.4 (250)	86~88	4.0 (8.8)
	330	33	7.6 (300)	86~89	4.6 (10.1)
	350	34	8.1 (320)	87~89	5.6 (12.3)
	400	38	9.2 (360)	88~90	6.5 (14.3)
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	:	1.2mm (0.045in)	**Amps / Volts**	:	230A / 25V
Shielding Gas	:	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
5.8	**6.0**	**5.7**	**5.9**

Average Hydrogen Content 5.9 ㎖ / *100g Weld Metal*

❖ Proper Current Range

Consumable	Shielding Gas	Welding Position	Wire Dia.		
			1.2mm (0.045in)	1.4mm (0.052in)	1.6mm (1/16in)
Supercored 71MAG	Ar – 20%CO_2	Flat	120~300 Amp	160~350 Amp	180~380 Amp
		V-up Over head	120~260 Amp	140~270 Amp	160~320 Amp
		V-down	140~300 Amp	160~320 Amp	180~360 Amp

❖ AUTHORIZED APPROVAL DETAILS

Welding position	Register of shipping & Size(mm)				
	ABS	LR	BV	DNV	GL
All V-down	3SAH10, 3YSA 1.2~1.6 (0.045~1/16in)	3S,3YSH10 1.2~1.6 (0.045~1/16in)	SA3M,SA3YMHH 1.2~1.6 (0.045~1/16in)	IIIYMSH10 1.2~1.6 (0.045~1/16in)	3YH10S 1.2~1.6 (0.045~1/16in)

❖ F No & A No

F No	A No
6	1