HYUNDAI WELDING

Rev. 04

Supercored 70NS

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

2018. 02

HYUNDAI WELDING CO., LTD.

Supercored 70NS

❖ Specification

AWS A5.36	**E70T15-M21A2-CS1**
(AWS A5.36M	**E490T15-M21A3-CS1)**
(AWS A5.18	E70C-6M)
EN ISO 17632-A	T 42 3 M M21 3 H5

❖ Applications

Supercored 70NS is used for welding in shipbuilding, machinery, bridge Construction, structural fabrication, automated of robotic welding

❖ Characteristics on Usage

Supercored 70Ns is a metal-cored wire which combines the high deposition rate of FCW with the high efficiencies of solid wire, provides exceptionally smooth and stable arc, low spatter and minimal slag coverage.

❖ 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

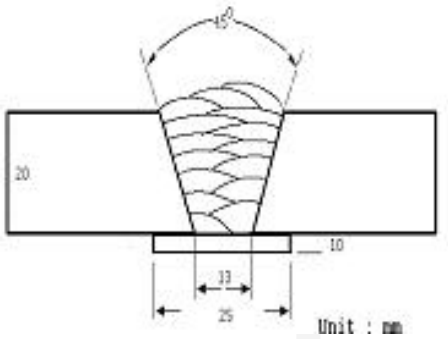
2. One-side welding defects such as hot cracking in may occur with wrong welding parameter such as high welding speed.

3. 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	:	80%Ar + 20%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	280A / 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 (%)	-20℃ (-4°F)	-30℃ (-22°F)
Supercored 70NS	480(70)	550(80)	25.0	75(55)	50(37)
AWS A5.36 E70T15-M21A2-CS1	≥ 400 (58)	490~660 (70~95)	≥ 22	≥27J at -30℃ (≥20ft · lbs at -22°F)	

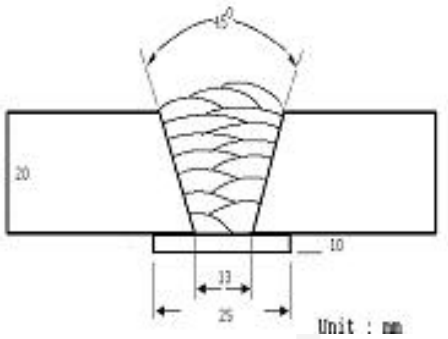
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S
Supercored 70NS	0.05	0.55	1.45	0.011	0.010
AWS A5.36 E70T15-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	:	80%Ar + 20%CO_2
Flow Rate	:	20 ℓ /min₩
Amp./ Volt.	:	280A/ 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)	
Supercored 70NS	YS Mpa(ksi)	TS Mpa(ksi)	EL (%)	-20℃ (-4°F)	-30℃ (-22°F)
	470(68)	535(78)	25.0	70(52)	50(37)
AWS A5.36 E70T15-M21A2-CS1	**≥ 400 (58)**	**490~660 (70~95)**	**≥ 22**	**≥27J at -30℃ (≥20ft · lbs at -22°F)**	

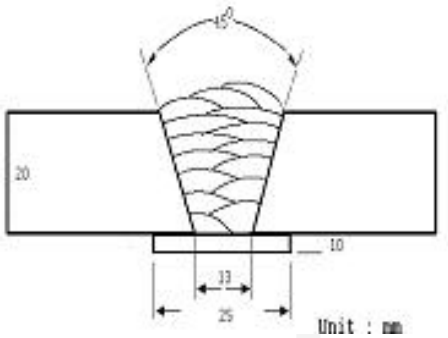
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S
Supercored 70NS	0.05	0.54	1.40	0.011	0.010
AWS A5.36 E70T15-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	:	80%Ar + 20%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	330A / 31V
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)	
Supercored 70NS	YS Mpa(ksi)	TS Mpa(ksi)	EL (%)	-20℃ (-4°F)	-30℃ (-22°F)
	475(69)	540(78)	25.5	72(53)	52(38)
AWS A5.36 E70T15-M21A2-CS1	**≥ 400 (58)**	**490~660 (70~95)**	**≥ 22**	**≥27J at -30℃ (≥20ft · lbs at -22°F)**	

❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S
Supercored 70NS	0.05	0.55	1.50	0.012	0.010
AWS A5.36 E70T15-M21A2-CS1	≤ 0.12	≤ 0.9	≤ 1.75	≤ 0.03	≤ 0.03

Diffusible Hydrogen Content

❖ Welding Conditions

Diameter	:	1.4 mm(0.052in)	**Amps / Volts**	:	300A / 30V
Shielding Gas	:	Ar + 20%CO_2	**Stick-Out**	:	20~25mm (0.79~0.98in)
Flow Rate	:	20 ℓ /min	**Welding Speed**	:	30 cm/min (12 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
4.2	**3.8**	**4.0**	**4.1**

Average Hydrogen Content 4.0 ㎖ / *100g Weld Metal*

Welding Efficiency

❖ Deposition Rate & Efficiency

Wire Size	Welding Conditions		Wire Feed Speed m/min (in/min)	Deposition Efficiency(%)	Deposition Rate(kg/hr)
	Amp.(A)	Volt.(V)			
1.2mm (0.045in)	200	24	6.7(260)	90~92	2.7(5.9)
	250	28	9.8(390)	93~95	4.0(8.8)
	300	30	12.7(500)	95~96	5.4(11.9)
	350	33	15.7(620)	95~96	7.2(15.8)
1.6mm (1/16in)	350	32	8.1(320)	93~95	6.0(13.2)
	400	34	9.8(390)	94~96	7.0(15.4)
	450	36	11.0(430)	95~96	8.1(17.8)
Remark				Deposition efficiency =(Deposited metal weight/ Wire weight used)×100	Deposition rate =(Deposited metal weight/ Welding time,min.)×60

* Shielding Gas : 80%Ar+20%CO_2

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 70NS	Ar+20%CO_2	F & HF	230~300Amp	260~340Amp	290~360Amp

Approvals

❖ Shipping Approvals

Welding Position	Register of shipping & Size(mm)						
	KR	ABS	LR	BV	DNV	GL	NK
F,HF V-up	-	3SAH5, 3YSA 0.9~1.6 (0.035~1/16)	3S, 3YSH5 0.9~1.6 (0.035~1/16)	SA3M, SA3YMHHH 0.9~1.6 (0.035~1/16)	IIIYMSH5 0.9~1.6 (0.035~1/16)	3YH5S 0.9~1.6 (0.035~1/16)	-

❖ F No & A No

F No	A No
6	1