HYUNDAI WELDING

Rev. 04

Supershield 11

SELF-SHIELD FLUX CORED ARC WELDING CONSUMABLE
FOR MILD & 490MPa CLASS HIGH TENSILE STEEL

HYUNDAI WELDING CO., LTD.

Supershield 11

❖ Specification

AWS A5.20	E71T-11
(AWS A5.20M	E491T-11)
JIS Z3313	T49 T14-1 N A
EN ISO 17632-B	T 49 Y Z T11-1 NO A

❖ Applications

Supershield 11 is use where light structures, short assembly welds, and other general fabrication and galvanized steel fixtures, gate etc.

❖ Characteristics on Usage

Supershield 11 is an all position self-shielded flux cored wire designed for single & multi-pass welding of thin mild steel plate. Supershield 11 used DC(-) polarity produces smooth arc stability, low spatters ,full covering slag for all position welding

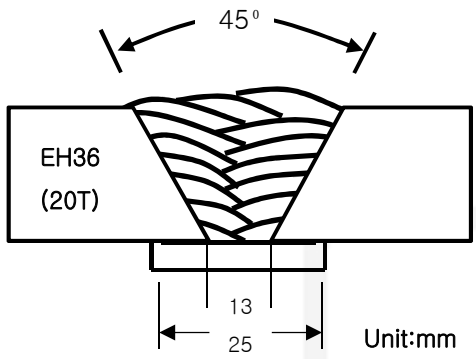
❖ Note on Usage

Do not use 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(mm)	:	1.2mm(0.045in)
Shielding Gas	:	None
Polarity	:	DC-
Amp./ Volt.	:	220 / 20
Stick-Out	:	20mm(0.79in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			Hardness
	Tensile specimen artificially aged at 105℃ for 48hr, as permitted by AWS A5.20-95			
Supershield 11	YS (MPa / ksi)	TS (MPa / ksi)	EL(%)	HRB
	510(74)	580(84)	24.0	82~95
AWS A5.20 E71T-11	≥ 400 (58)	490~660 (70~95)	≥ 22	-

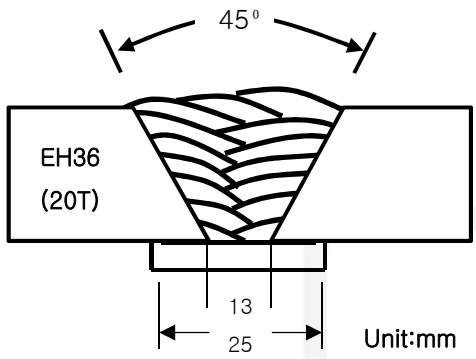
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Al
Supershield 11	0.18	0.34	0.50	0.012	0.006	1.35
AWS A5.20 E71T-11	≤ 0.30	≤ 0.60	≤ 1.75	≤ 0.03	≤ 0.03	≤ 1.8

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	:	None
Polarity	:	DC-
Amp./ Volt.	:	260 / 20
Stick-Out	:	20mm(0.79in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			Hardness
	Tensile specimen artificially aged at 105℃ for 48hr, as permitted by AWS A5.20-95			
Supershield 11	YS (MPa / ksi)	TS (MPa / ksi)	EL(%)	HRB
	520(75)	590(86)	25.2	84~95
AWS A5.20 E71T-11	≥ 400 (58)	490~660 (70~95)	≥ 22	-

❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Al
Supershield 11	0.19	0.35	0.60	0.011	0.006	1.20
AWS A5.20 E71T-11	≤ 0.30	≤ 0.60	≤ 1.75	≤ 0.03	≤ 0.03	≤ 1.8

Welding Efficiency

❖ Deposition Rate & Efficiency

Wire Size	Welding Conditions		Deposition Efficiency(%)	Deposition Rate kg/hr(lb/hr)
	Amp.(A)	Volt.(V)		
1.6mm (1/16in)	150	16	77~79	0.9(2.0)
	200	18	78~80	1.2(2.6)
	250	20	79~81	2.2(4.8)
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.		
			1.0mm (0.040in)	1.2mm (0.045in)	1.6mm (1/16in)
Supershield 11	NONE	F	160~200Amp (180A 23V)	160~220Amp (190A 18V)	200~280Amp (250A 20V)
		HF	160~190Amp (170A 23V)	140~200Amp (180A 17V)	180~260Amp (240A 19V)
		V-Up	150~190Amp (160A 22V)	130~180Amp (150A 16V)	170~230Amp (190A 20V)
		OH	150~180Amp (160A 22V)	130~180Amp (150A 16V)	170~230Amp (190A 20V)

❖ F No & A No

F No	A No
6	1

HYUNDAI WELDING

Rev. 04

Supershield 71GS

SELF-SHIELD FLUX CORED ARC WELDING CONSUMABLE
FOR MILD & 490MPa CLASS HIGH TENSILE STEEL

2020.12

HYUNDAI WELDING CO., LTD.

Supershield 71GS

❖ Specification

AWS A5.20	**E71T-GS**
(AWS A5.20M	**E491T-GS)**
JIS Z3313	**T49 T14-1 N S**
EN ISO 17632-A	**T 42 Z Z V NO 1**

❖ Applications

Supershield 71GS is used where light structures, short assembly welds, and other general fabrication and galvanized steel fixtures, gate etc.

❖ Characteristics on Usage

Supershield 71GS is an all position self-shielded flux cored wire designed for single-pass welding of thin mild and medium tensile steels not exceeding 510MPa.
Supershield 71GS used DC(-) polarity produces smooth arc stability, low spatters ,full covering slag for all position welding

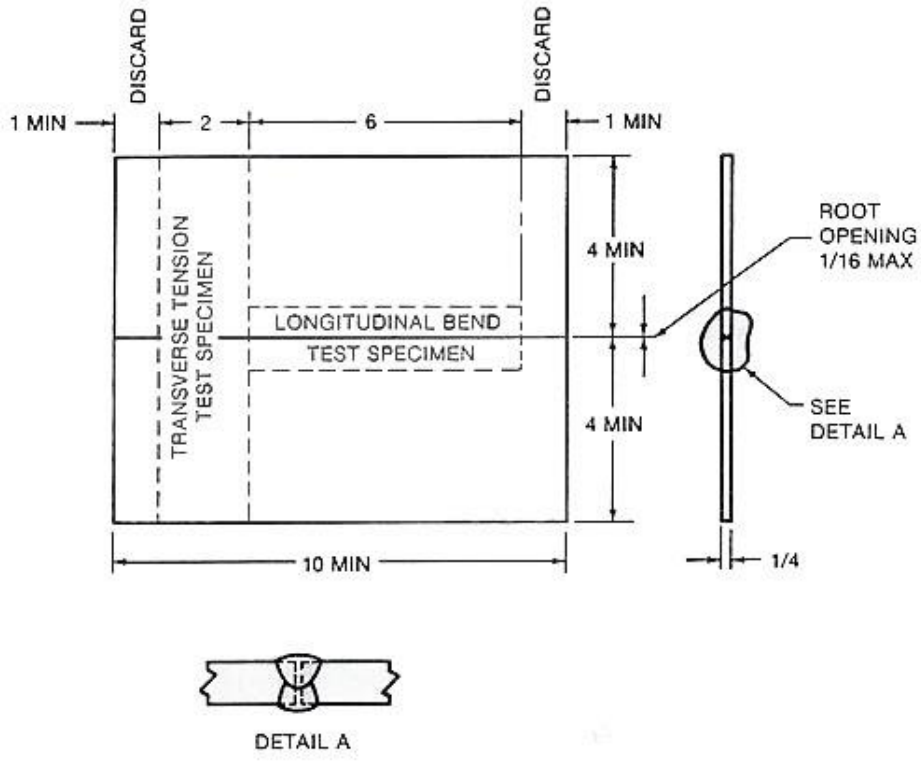
❖ Note on Usage

Do not use shielding gas.

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Test Assembly

Method by AWS Spec.



SI Equivalents	
in.	mm
1/16	1.6
1/4	6.4
1	25
2	50
4	100
6	150
10	250

Note) In accordance with the rule of AWS A5.20

❖ Welding Conditions

Wire Dia.	Polarity	Welding Position	Amp. (A)	Volt. (V)	Carrige Speed	Heat Input (kj/cm)	Interpass Temp.
1.2mm **(0.045in)**	DC(−)	1G	220	20	0.2~0.3**m/min** **(7.8~11.8in/min)**	11~16	150±15℃ (302±59°F)

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Mechanical Properties of all weld metal

Test	As-Welded
Transverse Tensile Strength, MPa(lbs/in^2) (Specimen broken in the base metal)	586(85,000)
Longitudinal Guided Bend Test	Satisfactory

❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S	Al
Supershield 71GS	0.26	0.50	0.91	0.016	0.014	2.05
AWS A5.20 E71T-GS	Not Specified					

Proper Welding Condition

❖ Proper Current Range

Consumable	Shielding Gas	Welding Position	Wire Dia.	
			1.2mm (0.045in)	1.6mm (1/16in)
Supershield 71GS	NONE	F	160~220Amp (190A 18V)	200~280Amp (250A 20V)
		HF	140~200Amp (180A 17V)	180~260Amp (240A 19V)
		V-Up	130~180Amp (150A 16V)	170~230Amp (190A 20V)
		OH	130~180Amp (150A 16V)	170~230Amp (190A 20V)

❖ F No & A No

F No	A No
6	-

HYUNDAI WELDING

Rev. 06

Supershield 71-T8

SELF-SHIELDED FLUX CORED ARC WELDING CONSUMABLE
FOR MILD & 490MPa CLASS HIGH TENSILE STEEL

HYUNDAI WELDING CO., LTD.

Supershield 71-T8

❖ Specification

AWS A5.36	**E71T8-A2-CS3-H8**
(AWS A5.36M	**E491T8-A3-CS3-H8)**
(AWS A5.20	**E71T-8 H8)**
EN ISO 17632-A	**T42 3 Y NO 2 H10**
AWS D1.8	

❖ Applications

All position welding of ship building, machinery, bridges, building, And vehicles using mild and higher strength steels.

❖ Characteristics on Usage

Supershield 71-T8 is self-shielded flux cored wire for high deposition rate all position welding where low temperature impact properties are required.

Supershield 71-T8 meets AWS D1.8 seismic requirements.

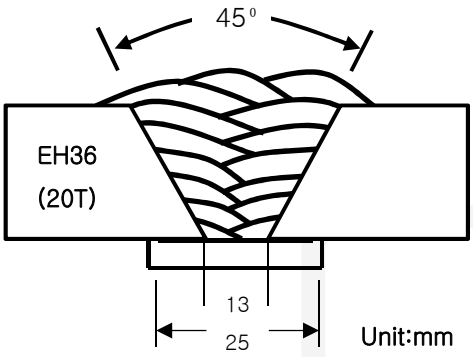
❖ Note on Usage

Do not use 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(mm)	:	1.6mm (1/16in)
Shielding Gas	:	None
Polarity	:	DC-
Amp./ Volt.	:	240A / 21V
Stick-Out	:	25mm (1in)
Pre-Heat(℃)	:	R.T .
Interpass Temp.(℃)	:	150±15 ℃ (302±59°F)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test (Joule)	
	Tensile specimen artificially aged at 93℃ for 48hr, as permitted by AWS A5.20-95				
Supershield 71-T8	YS (MPa / ksi)	TS (MPa / ksi)	EL(%)	-30℃ (-22°F)	-40℃ (-40°F)
	447(64)	565(81)	32.2	65(48)	40(30)
AWS A5.36 E71T8-A2-CS3	≥ 400 (58)	490~660 (70~95)	≥22	≥27J at -30℃ (≥20ft · lbs at -22°F)	

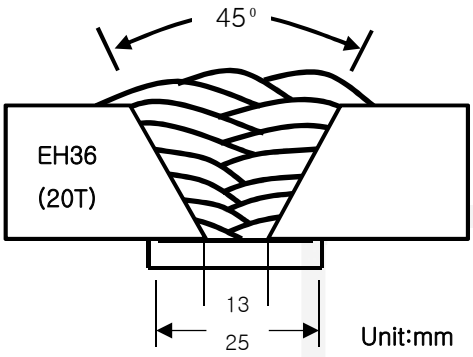
❖ Chemical Analysis of all weld metal(wt.%)

Consumable	C	Si	Mn	P	S	Ni	Cr	Mo	V	Cu	Al
Supershield 71-T8	0.161	0.15	0.63	0.003	0.001	0.016	0.023	0.005	0.004	0.014	0.48
AWS A5.36 E71T8-A2-CS3	≤ 0.30	≤ 0.60	≤ 1.75	≤ 0.03	≤ 0.03	-	-	-	-	-	≤ 1.8

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter(mm)	:	1.8mm (0.072in)
Shielding Gas	:	None
Polarity	:	DC-
Amp./ Volt.	:	240A / 21V
Stick-Out	:	25mm (1in)
Pre-Heat(℃)	:	R.T .
Interpass Temp.(℃)	:	150±15 ℃ (302±59°F)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test (Joule)	
	Tensile specimen artificially aged at 93℃ for 48hr, as permitted by AWS A5.20-95				
Supershield 71-T8	YS (MPa / ksi)	TS (MPa / ksi)	EL(%)	-30℃ (-22°F)	-40℃ (-40°F)
	486(70)	549(79)	26.6	60(44)	39(29)
AWS A5.36 E71T8-A2-CS3	≥ 400 (58)	490~660 (70~95)	≥22	≥27J at -30℃ (≥20ft · lbs at -22°F)	

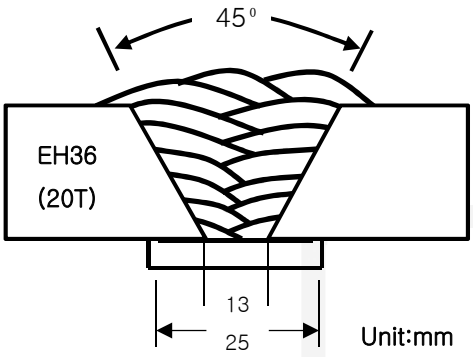
❖ Chemical Analysis of all weld metal(wt.%)

Consumable	C	Si	Mn	P	S	Ni	Cr	Mo	V	Cu	Al
Supershield 71-T8	0.174	0.17	0.59	0.002	0.001	0.014	0.023	0.003	0.0001	0.011	0.49
AWS A5.36 E71T8-A2-CS3	≤ 0.30	≤ 0.60	≤ 1.75	≤ 0.03	≤ 0.03	-	-	-	-	-	≤ 1.8

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter(mm)	:	2.0mm (5/64in)
Shielding Gas	:	None
Polarity	:	DC-
Amp./ Volt.	:	250A / 22V
Stick-Out	:	25mm (1in)
Pre-Heat(℃)	:	R.T .
Interpass Temp.(℃)	:	150±15 ℃ (302±59°F)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test (Joule)	
	Tensile specimen artificially aged at 93℃ for 48hr, as permitted by AWS A5.20-95				
Supershield 71-T8	YS (MPa / ksi)	TS (MPa / ksi)	EL(%)	-30℃ (-22°F)	-40℃ (-40°F)
	491(71)	564(81)	29.4	68(50)	46(34)
AWS A5.36 E71T8-A2-CS3	≥ 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	Ni	Cr	Mo	V	Cu	Al
Supershield 71-T8	0.185	0.15	0.64	0.001	0.001	0.012	0.023	0.007	0.003	0.015	0.59
AWS A5.36 E71T8-A2-CS3	≤ 0.30	≤ 0.60	≤ 1.75	≤ 0.03	≤ 0.03	-	-	-	-	-	≤ 1.8

Diffusible Hydrogen Content

❖ Welding Conditions

Diameter	:	1.8mm (0.072in)	**Amp.(A) / Volt.(V)**	:	240 / 21
Shielding Gas	:	None	**Stick-Out**	:	25mm (1in)
Current Type & Polarity	:	DC(-)	**Welding Speed**	:	30 cm/min (12 in/min)
Welding Position	:	1G (PA)			

❖ 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
6.1	**5.8**	**6.3**	**6.4**

Average Hydrogen Content 6.15 ㎖ / *100g Weld Metal*

Proper Welding Condition

❖ Proper Voltage and Current Range

Wire Diameter	Contact Tip to Work Distance	Current(A)	Voltage(V)
1.6mm (1/16in)	25mm (1 in)	200	18~21
		220	19~21
		240	20~22
		260	21~23
1.8mm (0.072in)	25mm (1 in)	230	20~21
		260	21~23
		290	22~24
2.0mm (5/64in)	25mm (1 in)	240	20~22
		270	21~23
		300	22~24

❖ F No & A No

F No	A No
6	1

HYUNDAI WELDING

Rev. 02

Supershield CrC

CHROMIUM CARBIDE TYPE OPEN ARC WIRE

HYUNDAI WELDING CO., LTD.

Supershield CrC

❖ Specification

DIN8555 MF 10-60GR

❖ Description & Applications

Supershield CrC is an open arc wire used for hardfacing components subject to extreme abrasion/erosion and moderate/heavy impact.

(Gyratory Crusher, Crusher & Coke Hammers Chemical Pipe etc.)

❖ Welding Process

Open Arc Type

❖ Current Type

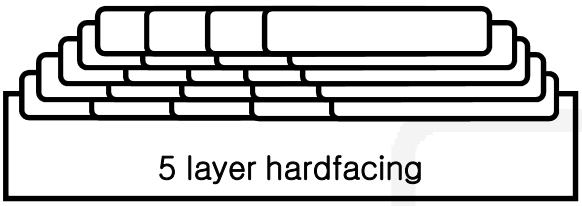
DC+

❖ Packing

Supershield CrC	**Dia.**	1.2mm(0.045in), 1.6mm(1/16in)	2.4mm(3/32in), 2.8mm(7/64in)
	Spool	15kg(33lbs)	-
	Coil	-	25kg(55lbs)
	Pailpack	-	150, 250

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions



Diameter	:	1.2mm(0.045in)
Welding Type	:	Open Arc
Amp./ Volt.	:	300/32
Stick-Out	:	25~30mm(0.98~1.18in)
Pre-Heat	:	150~250℃(302~482°F)
Interpass Temp.	:	200~300℃(392~572°F)
Total layers	:	≥4 layer

❖ Chemical Analysis of All weld metal(wt%)

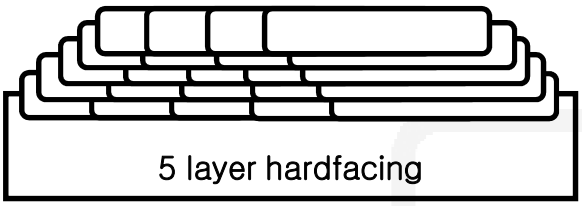
Consumable	C	Si	Mn	Cr	Other
Supershield CrC	4.3	0.4	1.3	24.0	0.1

❖ Hardness test of All weld metal(HRc)

Consumable	Hardness(HRc)					Avg.
Supershield CrC	54	56	57	57	58	57

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions



Diameter	:	2.8mm(7/64in)
Welding Type	:	Open Arc
Amp./ Volt.	:	380/30
Stick-Out	:	25~30mm(0.98~1.18in)
Pre-Heat	:	150~250℃(302~482°F)
Interpass Temp.	:	200~300℃(392~572°F)
Total layers	:	≥4 layer

❖ Chemical Analysis of All weld metal(wt%)

Consumable	C	Si	Mn	Cr	Other
Supershield CrC	5.0	0.5	1.5	28.0	0.1

❖ Hardness test of All weld metal(HRc)

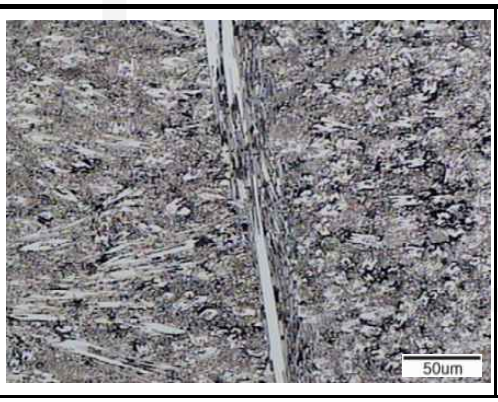
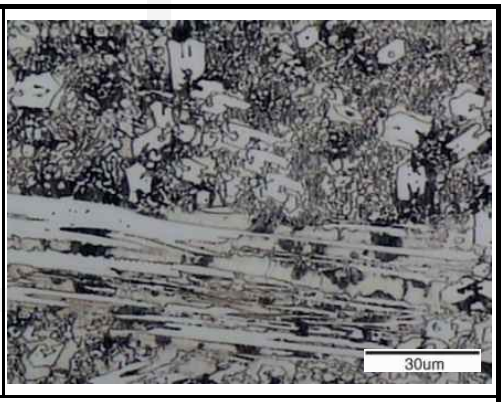
Consumable	Hardness(HRc)					Avg.
Supershield CrC	58	59	60	60	62	60

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Abrasive Wear Test(ASTM G 65-94 Procedure A)

Consumable	Dia.	Welding Layer	Weight loss(g)
Supershield CrC	1.6mm(1/16in)	2Layers	76.90
	2.8mm(7/64in)		41.50

❖ Micro Structures of Weld Metal

Supershield CrC		

1. Hyper-eutectic
2. Volume fraction of Carbides : ≥37%

Test Results

❖ BEAD APPEARANCE

Consumable	Supershield CrC (2.8mm, 7/64in)
Amp.(A)	370~390
Volt.(V)	29~30
Carrige Speed	40~60cm/min(15.7~23.6in/min)
Welding Position	Flat(1G)