HYUNDAI WELDING

Rev. 00

S-6013.LF

COVERED ARC WELDING ELECTRODE
FOR WELDING LIGHT STRUCTURAL STEELS

HYUNDAI WELDING CO., LTD.

S-6013.LF

❖ Specification

AWS A5.1	***E6013***
JIS Z3211	***E4313***
EN ISO 2560-A	***E38 0 R 1 2***

❖ Applications

S-6013.LF can be used for welding of machinery, vehicles and light structural steels surface dressing of heavy steel structures.

❖ Characteristics on Usage

S-6013.LF is a high titania type electrode whose usability is excellent in all position welding. It is suitable for welding of light structural steels because of its stable arc, shallow penetration and smooth weld bead.
S-6013.LF is a low fume type electrode of which fume generation is about 20% less than conventional high titania type electrode.

❖ Note on Usage

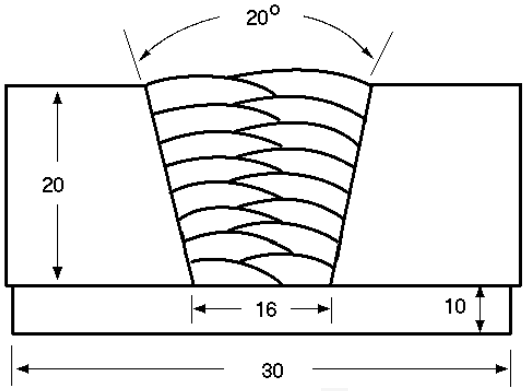
1. When excessive moisture absorption occurs for any reason dry the electrodes at 70～100℃ for 30～60minutes before use.
   Excessive moisture absorption causes increase of fumes, spatters and may result in some porosity, lower usability.

2. Pay attention not to exceed the range of proper currents welding with excessive current not only lowers X-ray performance but also causes increase of spatter, undercut and insufficient slag covering.

Mechanical Properties & Chemical Compositions of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Diameter(mm)	:	***4.0mm x 400***
Amp./ Volt.	:	170 / 23~24
Interpass Temp.(℃)	:	80~130
Polarity	:	AC

❖ Mechanical Property of All Weld Metal

consumable	Tensile test			CVN Impact Test (Joule)
	YS (MPa)	TS (MPa)	EL (%)	0℃
S-6013.LF	439	488	26.8	67
AWS Spec.	≥ 330	≥ 430	≥ 17	-

❖ Chemical Composition of All Weld Metal(wt%)

Consumable	Chemical Composition				
	C	Si	Mn	P	S
S-6013.LF	0.05	0.23	0.35	0.022	0.017
AWS Spec.	≤0.20	≤1.00	≤1.20	N.S	N.S

Weldability & Generated Fumes

❖ Weldability

Item \ Division	Flat position	Vertical position
Arc stability	Excellent	Excellent
Melting rate	Good	Good
Deposition rate	Excellent	Good
Resistance of spatter occurrence	Good	Good
Bead appearance	Excellent	Excellent
Slag fluidity & Removability	Excellent	Excellent
The others	Good	Good

❖ The Amounts of Generated Fumes

Consumable \ Division	Times	X_1	X_2	X_3	X_4	X_5	X_6	Avg.
S-6013.LF	Ft	266	243	276	254	270	269	263
	Fw	8.1	7.8	8.4	7.9	8.2	8.2	8.1
Conventional E/R	Ft	329	332	347	311	325	340	331
	Fw	10.2	10.3	10.6	9.5	10.0	10.4	10.2

❖ Typical Chemical Composition of Fumes

Consumables	Fe_2O_3	SiO_2	MnO	TiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O
S-6013.LF	38	18	7	18	1.5	2	0.5	6	5
Conventional E/R	40	18	8	17	2	1	1	6	6

Welding Efficiency Test

❖ Test Conditions of Deposition Efficiency

Consumable	Base Metal		Welding conditions		
	Specification	Dimension (mm)	Amp. (A)	Welding speed (mm/min)	Position
S-6013.LF (4.0mm x 400)	ASTM A36	300 X 75 X12	170	250	Flat

❖ Results of Deposition Efficiency Test

Consumable	Deposition efficiency(%)	
	For electrode	For core wire
S-6013.LF (4.0mm x 400)	65	92

Size Available and recommended Current & Approval

❖Sizes Available and Reconnended Current

Diameter (mm)		2.6	3.2	4.0	5.0	6.0
Length (mm)		350	350	400 450	400 450	450
Recommended current range (AC or DC+ Amp.)	Flat position	55 ~ 95	80 ~ 130	120 ~ 180	160 ~ 230	220 ~ 300
	Vertical & Overhead position	45 ~ 90	60 ~ 120	100 ~ 160	120 ~ 200	-

❖ Authorized Approval Details

Classification		Dia. (mm)	Welding position	Grade						
JIS	AWS			KR	ABS	LR	BV	DNV	GL	NK
E6013	E6013	2.6 ~ 5.0	All	RMW2	2	2	2	2	2	KMW2
		6.0	F, H- Fil.							