

S-460Y X H-14

SUBMERGED ARC WELDING CONSUMABLES
FOR WELDING OF Mild & 550MPa CLASS
HIGH TENSILE STEEL



❖ Specification

AWS A5.23 F8A(P)8-EH14-G
EN760 S A FB 1

❖ Applications

The flux is widely used for Multi-layer welding of high strength steels, such as EH47

❖ Characteristics on Usage

It produces the weld metal which has excellent impact value at low temperature service.

Single and multi electrode welding can be performed.

It has excellent X-ray characteristics and slag removal, because of insensitivity to rust, scale, primer on the surface to be welded.

❖ Note on Usage

1. Dry the flux at 300~350°C for 60 minutes before use.
2. When the flux height is excessive, poor bead appearance may occur.
3. Use welding current and speed as low as possible at the first layer of groove to avoid cracking.
4. Preheat the thick plate according to rules if it has heavy restricted stress.



Welding Consumables for Test

❖ Flux

Consumable	Chemical Composition, wt%			
	SiO ₂ +TiO ₂	CaO+MgO	Al ₂ O ₃ +MnO	CaF ₂
S-460Y	20	40	20	15

Consumable	Particle Size (Mesh)	Type of Flux	B.I	H ₂ O _{1000℃} /CO ₂ (%)
S-460Y	12 × 60	Agglomerated/ Fluoride basic	2.4	0.06/1.5

❖ Electrode

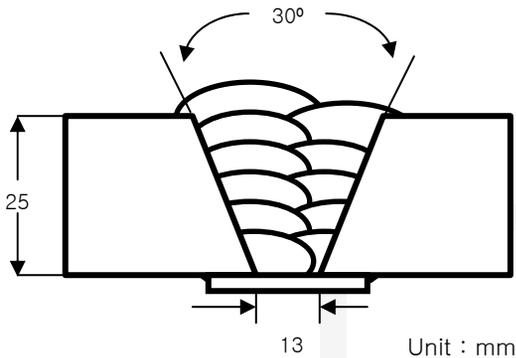
Consumable	Dia. (mm)	Chemical Composition, wt%				
		C	Si	Mn	P	S
H-14	4.0	0.12	0.03	1.93	0.016	0.009
AWS A5.17 EH14		0.10-0.20	≤0.10	1.70-2.20	≤0.030	≤0.030



Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Base metal	: A 36
Particle size	: 12 X 60 (ASME)
Flux type	: Agglomerated
Amp./ Volt./cpm	: 550 / 30 / 40
Stick-Out(mm)	: 30
Pre-Heat(°C)	: R.T .
Interpass Temp.(°C)	: < 150
Polarity	: AC

❖ Mechanical Properties of All weld metal

Consumables	PWHT Condition	Tensile Test			CVN Impact Test (Joule)
		YS(MPa)	TS(MPa)	EI(%)	-62°C
S-460Y/H-14	As welded	595	649	28.0	129
	620°C X 1hr	587	628	30.0	108
AWS A5.23 F8A(P)8-EH14-G	-	≥ 470	550~690	≥ 20	≥ 27J at -62°C

❖ Chemical Analysis of All weld metal(wt%)

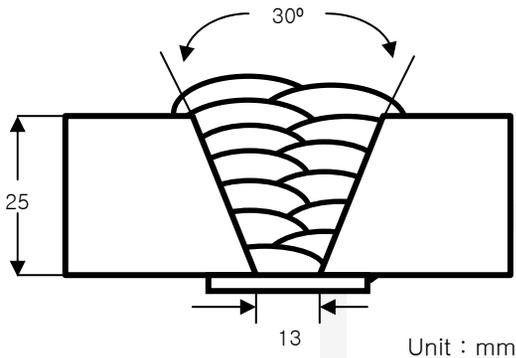
Consumables	C	Si	Mn	P	S
S-460Y/H-14	0.11	0.30	1.51	0.022	0.005



Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Base metal	: AH 36
Particle size	: 12 X 60 (ASME)
Flux type	: Agglomerated
Amp./ Volt./cpm	: 550 / 30 / 40
Stick-Out(mm)	: 30
Pre-Heat(°C)	: R.T.
Interpass Temp.(°C)	: < 150
Polarity	: DC(+)

❖ Mechanical Properties of All weld metal

Consumables	PWHT Condition	Tensile Test			CVN Impact Test (Joule)	
		YS(MPa)	TS(MPa)	EI(%)		
S-460Y/H-14	As welded	640	655	26.6	-40°C	95
					-51°C	81
					-62°C	62
AWS A5.23 F8A(P)8-EH14-G	-	≥ 470	550~690	≥ 20	≥ 27J at -62°C	

❖ Chemical Analysis of All weld metal(wt%)

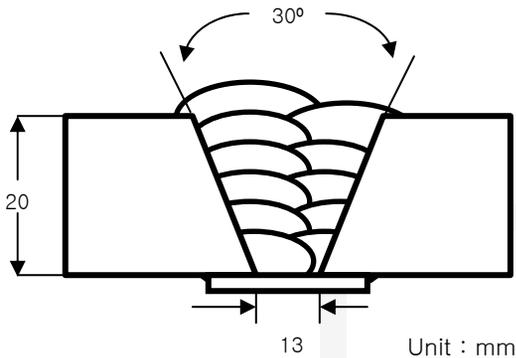
Consumables	C	Si	Mn	P	S
S-460Y/H-14	0.094	0.32	1.51	0.020	0.005



Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by ABS Spec.



[Joint Preparation & Layer Details]

Base metal	: AH 36
Particle size	: 12 X 60 (ASME)
Flux type	: Agglomerated
Amp./ Volt./cpm	: 550 / 33 / 35
Stick-Out(mm)	: 30
Pre-Heat(°C)	: R.T .
Interpass Temp.(°C)	: <150
Polarity	: AC

❖ Mechanical Properties of All weld metal

Consumables	PWHT Condition	Tensile Test			CVN Impact Test (Joule)
		YS(MPa)	TS(MPa)	EI(%)	-60°C
S-460Y/H-14	As welded	540	625	27.5	111
ABS 5Y46M	-	≥460	570~720	≥20	≥47J at -60°C

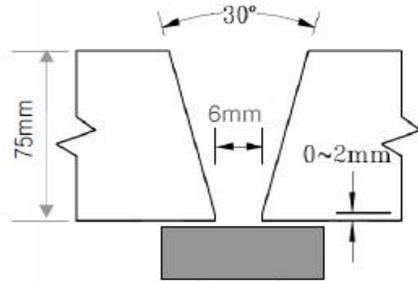
❖ Chemical Analysis of All weld metal(wt%)

Consumables	C	Si	Mn	P	S
S-460Y/H-14	0.11	0.36	1.57	0.022	0.005



Butt Welding Test

❖ Welding Conditions



Unit : mm

[Joint Preparation]

Base metal	: EH47-TM
Particle size	: 12 X 60 (ASME)
process	: Single (1pole)
Wire size (mm)	: 4.0
Stick-Out(mm)	: 30
Pre-Heat(°C)	: R.T .

❖ Welding Conditions

Pass No.	W/D Process	Filler Metal		Current Type/ Polarity	Welding Parameter			Interpass Temp. (°C)
		AWS Class	Size (mm)		Ampere (A)	Voltage (V)	Speed (CPM)	
1	FCAW	E81T1-K2	1.2	DCRP	220	25	21	< 200
2	FCAW	E81T1-K2	1.2	DCRP	270	30	25	
3-4	SAW	EH14	4.8	AC	600	32	35	
5-12	SAW	EH14	4.8	AC	700	35	40	
13-35	SAW	EH14	4.8	AC	750	36	40	



Butt Welding Test

❖ Mechanical Properties of All weld metal

Consumables	Test Location	Tensile Test			CVN Impact Test (Joule)
		YS (MPa)	TS (MPa)	Fracture Location	-20℃
S-460Y/H-14	Face	507	607	B.M	112
	Center	512	600	B.M	160
	Root	541	619	B.M	192

❖ Chemical Analysis of All weld metal(wt%)

Consumables	C	Si	Mn	P	S
S-460Y/H-14	0.11	0.31	1.54	0.022	0.007



Diffusible Hydrogen Content

❖ Welding Conditions

Method by JIS Z3118

wire	: H-14	Amps(A) / Volts(V)	: 625/30
Diameter(mm)	: 4.0	Stick-Out(mm)	: 30
Flow Rate(ℓ /min.)	: -	Welding Speed	: 60 cpm
Welding Position	: 1G	Current Type & Polarity	: AC, DC(+)

❖ Result(ml/100g Weld Metal)

Polarity	X1	X2	X3	X4	Av.
AC	4.54	4.21	3.98	4.11	4.21
DC+	4.12	3.87	4.01	3.99	4.00



Approvals

❖ AUTHORIZED APPROVAL DETAILS

Consumables	KR	ABS	LR	BV	DNV	GL	NK
S-460Y / H-14	5Y46MH5 1.2~6.4	5YQ460M H5 1.2~6.4	5Y46 H5 1.2~6.4	A5Y46M HHH 1.2~6.4	VY46M(H5) 1.2~6.4	6Y46MH5 1.2~6.4	KAW5Y46MH5 KAW63Y47MH5 (-20℃≥53J) 1.2~6.4