

S-500Y X F-3

SUBMERGED ARC WELDING CONSUMABLES
FOR WELDING FOR 540MPa CLASS
HIGH YIELD STRENGTH ON STEELS

2019.09



❖ Specification

Flux	JIS Z 3352	EN ISO 14174	KS B ISO 14174
S-500Y	S A FB 1	S A FB 1	S A FB 1
Wire	AWS A5.17/A5.23	EN ISO 14171	
F-3	A5.23 F9A(P)8-EF3-F3	S3Ni1Mo	

❖ Applications

Multi-layer welding of various kinds of high strength structure such as ship buildings, offshore structures, machinery and pressure vessels.

❖ Characteristics on Usage

High-basic bonded type flux having High Tensile strength and good impact value at low temperature. Because of insensitivity to rust, scale, primer on the surface to be welded, it has excellent X-ray characteristics and slag removal.

❖ Note on Usage

1. Dry the flux at 300~350°C(572~662°F) for 60minutes before use.
2. When the flux height is excessive, poor bead appearance may occur.
3. Remove rust, scales, oil, paint, water, dirt and slag of tack welds from the groove to obtain sound weld metal.



Welding Consumables for Test

❖ Flux

Consumable	Chemical Composition, wt%		
	Al ₂ O ₃ +Fe ₂ O ₃	CaF ₂ +MgO	SiO ₂ +CaO
S-500Y	20	55	25

Consumable	Particle Size (Mesh)	Type of Flux	B.I	H ₂ O(1000℃)/CO ₂ (%)
S-500Y	10 × 48	Agglomerated	3.0	0.05/1.0

❖ Electrode

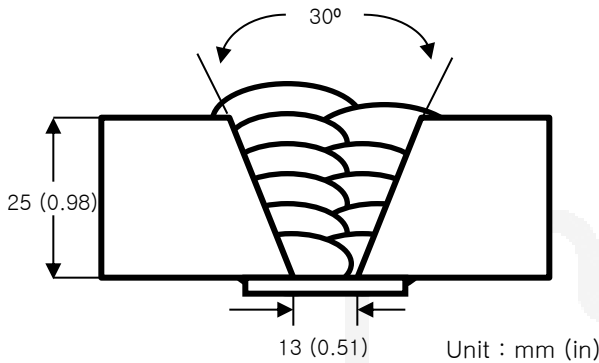
Consumable	Dia.	Chemical Composition, wt%								
	mm (in)	C	Si	Mn	P	S	Ni	Cr	Mo	Cu
F-3	4.0(5/32)	0.12	0.15	1.71	0.015	0.001	0.85	0.16	0.45	0.21
AWS A5.23 EF3		0.10-0.18	≤0.30	1.50-2.40	≤0.025	≤0.025	0.70-1.10	-	0.40-0.65	≤0.35



Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Rules



[Joint Preparation & Layer Details]

- Base metal** : EQ500
- Particle size** : 10 X 48
- Flux type** : Agglomerated
- Amp./ Volt./CPM** : 550 / 30 / 40 (25kJ/cm)
- Stick-Out mm (in)** : 30 (1.18)
- Pre-Heat °C (°F)** : R.T .
- Interpass Temp. °C (°F)** : <150 (302)
- Polarity** : DC+

❖ Mechanical Properties of All weld metal

Consumables	PWHT Condition	Tensile Test			CVN Impact Test J (ft.-lbs)	
		YS MPa(lbs/in ²)	TS MPa(lbs/in ²)	EL (%)		
S-500Y X F-3	As welded	630 (91,000)	712 (103,000)	27	-62°C (-80°F)	85 (63)
	620°C X 1hr	626 (91,000)	698 (101,000)	27	-62°C (-80°F)	75 (55)
AWS A5.23 F9A(P)8-EF3-F3	-	≥ 540	620~760	≥ 17	≥ 27J at -62°C	

❖ Chemical Analysis of All weld metal(wt%)

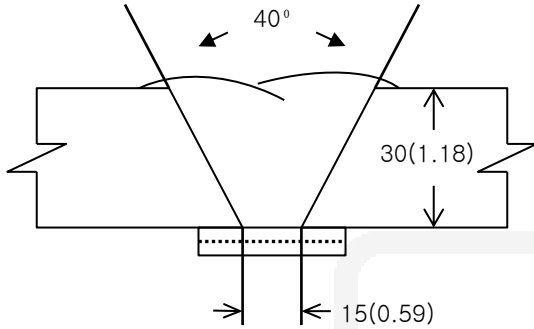
Consumables	C	Si	Mn	P	S	Ni	Cr	Mo	Cu
S-500Y X F-3	0.08	0.25	1.55	0.016	0.001	0.80	0.03	0.46	0.09
AWS A5.23 F3	≤0.17	≤0.80	1.25- 2.25	≤0.03	≤0.03	0.70- 1.10	-	0.40- 0.65	≤0.35

This information is provided solely for the purpose of confirming product conformance with applicable standards. The serviceability of a product or structure utilizing this type of information is and must be the sole responsibility of the builder/user. Many variables beyond the control of HYUNDAI WELDING CO., LTD. affect the results obtained in applying this type of information. These variables include, but are not limited to, welding procedure, shielding gas, plate chemistry and temperature, weldment design, fabrication methods and service requirements.



Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions



Unit : mm(in)

[Joint Preparation & Layer Details]

- Base metal** : API 2W60
- Particle size** : 10 X 48
- Flux type** : Agglomerated
- Amp./ Volt./CPM** : 700 / 32 / 42 (32kJ/cm)
- Stick-Out mm (in)** : 30 (1.18)
- Pre-Heat °C (°F)** : R.T .
- Interpass Temp. °C (°F)** : <150 (302)
- Polarity** : DC+

❖ Mechanical Properties of All weld metal

Criteria	PWHT Condition	Tensile Test			CVN Impact Test J (ft·lbs)	
		YS MPa(lbs/in2)	TS MPa(lbs/in2)	EL (%)	-40°C (-40°F)	-62°C (-80°F)
Face	As welded	646 (94,000)	699 (101,000)	26	122 (90)	78 (58)
Center		652 (95,000)	706 (102,000)	25	134 (99)	88 (65)

❖ Chemical Analysis of All weld metal(wt%)

Consumables	C	Si	Mn	P	S	Ni	Cr	Mo	Cu
S-500Y X F-3	0.07	0.19	1.67	0.014	0.001	0.87	0.03	0.46	0.12
AWS A5.23 F3	≤0.17	≤0.80	1.25- 2.25	≤0.03	≤0.03	0.70- 1.10	-	0.40- 0.65	≤0.35

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Diffusible Hydrogen Content

❖ Welding Conditions

Wire	: F-3	Amp.(A) / Volts(V)	: 525/28
Diameter(mm)	: 4.0(5/32)	Stick-Out mm (in)	: 30 (1.18)
Flow Rate(ℓ /min.)	: -	Welding Speed(cm/min.)	: 42
Welding Position	: 1G	Current Type & Polarity	: DC+

❖ Polarity DC+ Result(ml/100g Weld Metal)

X1	X2	X3	X4
4.65	4.72	4.47	4.91

Average Hydrogen Content 4.69 ml / 100g Weld Metal