

# **SF-71P**

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

2020.12



## ❖ Specification

<i>AWS A5.20</i>	E71T-1C,-9C-J H4
<i>(AWS A5.20M)</i>	E491T1-1C/-9C-J H4)
<i>EN ISO 17632-A</i>	T42 4 P C1 1 H5

## ❖ Applications

Oil and gas construction, pipe, and offshore stations

## ❖ Characteristics on Usage

SF-71P is a titania-type flux cored wire to be used with 100%CO<sub>2</sub> gas shielding. It provide excellent notch toughness at low temperature, not only as-welded but also stress relieved state

## ❖ Note on Usage

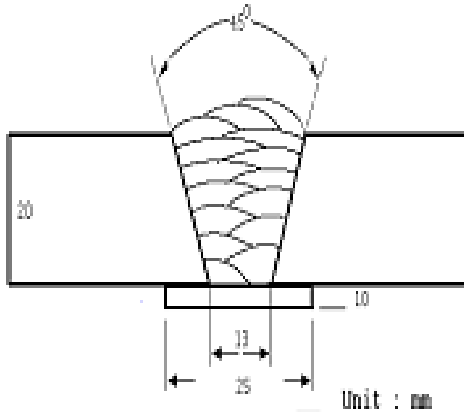
1. Proper preheating(50~150℃, 122~302°F) and interpass temperature must be used in order to release hydrogen which may cause cracking in weld metal when electrodes are used for medium and heavy plates
2. Use 100% CO<sub>2</sub> shielding gas



## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Welding Position</b>	: 1G(PA)
<b>Diameter</b>	: 1.2mm (0.045in)
<b>Shielding Gas</b>	: 100%CO <sub>2</sub>
<b>Flow Rate</b>	: 20 ℓ /min
<b>Amp./ Volt.</b>	: 280A / 32V
<b>Stick-Out</b>	: 20~25mm (0.79~0.98in)
<b>Pre-Heat</b>	: R.T .
<b>Interpass Temp.</b>	: 150±15℃ (302±59°F)
<b>Polarity</b>	: DC(+)

### ❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)		Remark
	YS MPa (lbs/in <sup>2</sup> )	TS MPa (lbs/in <sup>2</sup> )	EL (%)	-29℃ (-20°F)	-40℃ (-40°F)	
SF-71P	550(80,000)	600(87,000)	28.0	86(63)	73(54)	As-welded
	530(77,000)	560(81,000)	30.0	73(64)	57(42)	PWHT (620℃x2hr)
AWS A5.20 E71T-9C-J	≥ 390 (56,000)	490~670 (70,000~ 97,000)	≥ 22	≥ 27J at -40℃ (≥ 20ft · lbs at -40°F)		-

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

Consumable	C	Si	Mn	P	S	Ni
SF-71P	0.04	0.45	1.30	0.009	0.005	0.45
AWS A5.20 E71T-9C-J	≤ 0.12	≤ 0.90	≤ 1.75	≤ 0.03	≤ 0.03	≤ 0.50

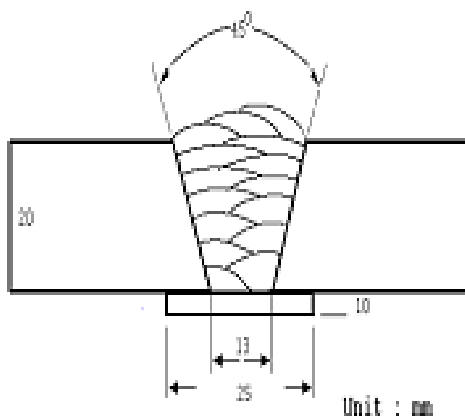
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## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Welding Position</b>	: 1G(PA)
<b>Diameter</b>	: 1.4mm (0.052in)
<b>Shielding Gas</b>	: 100%CO <sub>2</sub>
<b>Flow Rate</b>	: 20 ℓ /min
<b>Amp./ Volt.</b>	: 300A / 32V
<b>Stick-Out</b>	: 20~25mm (0.79~0.98in)
<b>Pre-Heat</b>	: R.T .
<b>Interpass Temp.</b>	: 150±15℃ (302±59°F)
<b>Polarity</b>	: DC(+)

### ❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)		Remark
	YS MPa (lbs/in <sup>2</sup> )	TS MPa (lbs/in <sup>2</sup> )	EL (%)	-29℃ (-20°F)	-40℃ (-40°F)	
SF-71P	545(79,000)	590(86,000)	28.0	88(65)	73(54)	As-welded
	530(77,000)	555(80,000)	30.0	74(55)	57(42)	PWHT (620℃x2hr)
<b>AWS A5.20 E71T-9C-J</b>	<b>≥ 390 (56,000)</b>	<b>490~670 (70,000~ 97,000)</b>	<b>≥ 22</b>	<b>≥ 27J at -40℃ (≥ 20ft · lbs at -40°F)</b>		-

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

Consumable	C	Si	Mn	P	S	Ni
SF-71P	0.04	0.44	1.31	0.009	0.005	0.46
<b>AWS A5.20 E71T-9C-J</b>	<b>≤ 0.12</b>	<b>≤ 0.90</b>	<b>≤ 1.75</b>	<b>≤ 0.03</b>	<b>≤ 0.03</b>	<b>≤ 0.50</b>

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## Welding Efficiency

### ❖ Deposition Rate & Efficiency

Consumable (size)	Welding Conditions		Wire Feed Speed m/min (in/min)	Deposition Efficiency %	Deposition Rate kg/hr(lb/hr)
	Amp.(A)	Volt.(V)			
<b>SF-71P</b>  <b>1.2mm</b> <b>(0.045in)</b>	200	26	10.2 (400)	84~87	3.4 (7.5)
	250	28	11.5 (450)	85~88	4.5 (9.9)
	300	33	15.3 (600)	86~88	5.2 (11.4)
<b>SF-71P</b>  <b>1.4mm</b> <b>(0.052in)</b>	250	28	7.6 (300)	85~87	3.9 (8.6)
	300	32	10.2 (400)	85~88	4.8 (10.6)
	330	36	12.8 (500)	86~89	5.8 (12.8)
<b>Remark</b>				Deposition efficiency =(Deposited metal weight/ Wire weight used)×100	Deposition rate =(Deposited metal weight/ Welding time,min.)×60

\* Shielding Gas : 100%CO<sub>2</sub>

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## Diffusible Hydrogen Content

### ❖ Welding Conditions

<b>Diameter</b>	: 1.4mm (0.052in)	<b>Amps(A) / Volts(V)</b>	: 240A / 27V
<b>Shielding Gas</b>	: 100%CO <sub>2</sub>	<b>Stick-Out</b>	: 20~25mm (0.79~0.98in)
<b>Flow Rate</b>	: 20 l /min	<b>Welding Speed</b>	: 30 cm/min (12 in/min)
<b>Welding Position</b>	: 1G (PA)	<b>Current Type &amp; Polarity</b>	: DC(+)

### ❖ Hydrogen Analysis Using Gas Chromatography Method

<b>Hydrogen Evolution Time</b>	: 72 hrs
<b>Evolution Temp.</b>	: 45 °C (113°F)
<b>Barometric Pressure</b>	: 780 mm-Hg

### ❖ Result(ml/100g Weld Metal)

X1	X2	X3	X4	Avg.
3.5	3.7	3.6	3.8	3.7

**Average Hydrogen Content** ***3.7 ml / 100g Weld Metal***



# Proper Welding Condition

## ❖ Proper Current Range

Consumable	Shielding Gas	Welding Position	Wire Dia.	
			1.2mm (0.045in)	1.4mm (0.052in)
SF-71P	100%CO <sub>2</sub>	F & HF	120~300Amp	150~350Amp
		V-Up & OH	120~260Amp	140~280Amp
		V-Down	200~300Amp	220~320Amp

## ❖ F No & A No

F No	A No
6	1

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