

# **SW-309L Cored**

FLUX CORED ARC WELDING CONSUMABLE  
FOR WELDING OF DISSIMILAR METALS  
STAINLESS STEELS AND CARBON STEELS  
OR STAINLESS STEELS AND LOW ALLOY METALS

2021.02



## ❖ Specification

<b>AWS A5.22</b>	E309LT1-1/-4
<b>JIS Z 3323</b>	TS309L-FB1
<b>EN ISO 17633-A</b>	T 23 12 L P M21/C1 2

## ❖ Applications

SW-309L Cored is designed for welding of dissimilar metals such as Stainless steels and carbon steels or stainless steels and low alloy steels.

## ❖ Characteristics on Usage

1. SW-309L Cored is suitable for all position welding makes easier re-arcng ,beautiful bead appearance and better slag removability. This wire contains a high ferrite level in its austenite thus providing better weldability together superior Heat and corrosion resistance.
2. SW-309L Cored is suitable for dissimilar welding such as stainless steel to carbon steel or low-alloy steels, and for under-layer welding on cladded side groove of cladded stainless steel.

## ❖ Note on Usage

Use 100% CO<sub>2</sub> gas or Ar+20~25% CO<sub>2</sub> gas

## ❖ Packing

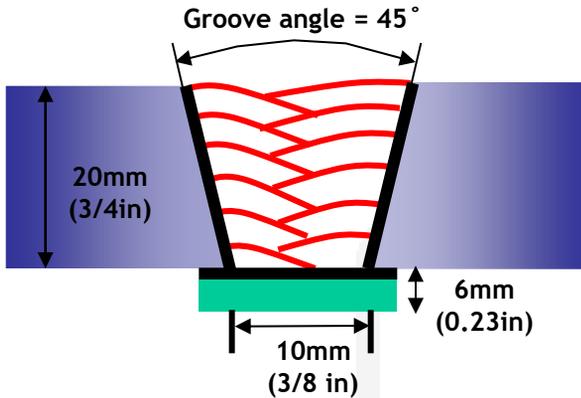
Diameter	0.9mm (0.035in)	1.2mm (0.045in)	1.4 (0.052in)	1.6 (1/16in)
Spool *including ball pac	5kg (11lbs)	12.5kg (28lbs)	15kg (33lbs)	20kg (44lbs)



## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Diameter(mm)</b>	: 1.2mm(0.045in)
<b>Shielding Gas</b>	: 100% CO <sub>2</sub>
<b>Flow Rate(ℓ /min.)</b>	: 20~22
<b>Amp./ Volt.</b>	: 210/30
<b>Stick-Out(mm)</b>	: 20(3/4 in)
<b>Pre-Heat(°C)</b>	: R.T . °C(°F)
<b>Interpass Temp.(°C)</b>	: ≤150°C(302°F)
<b>Polarity</b>	: DC(+)

### ❖ Mechanical Properties of All weld metal

Consumable	Tensile Test		CVN Impact Test J(ft · lbs)	
	TS (Mpa/lbs/in <sup>2</sup> )	EL (%)	-20°C (-4°F)	-60°C (-76°F)
SW-309L Cored	540(78,300)	41.0	49(36.1)	46(33.9)
AWS A5.22 E309LTX-X	≥ 520	≥ 30	Not Specified	

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

Consumable	Shielding Gas	Chemical Composition (%)								
		C	Si	Mn	P	S	Ni	Cr	Mo	Cu
SW-309L Cored	100%CO <sub>2</sub>	0.027	0.74	1.27	0.021	0.006	12.99	23.36	0.130	0.125
AWS A5.22 E309LTX-X		≤0.04	≤1.0	0.5 ~2.5	≤0.04	≤0.03	12.0 ~14.0	22.0 ~25.0	≤ 0.5	≤ 0.5

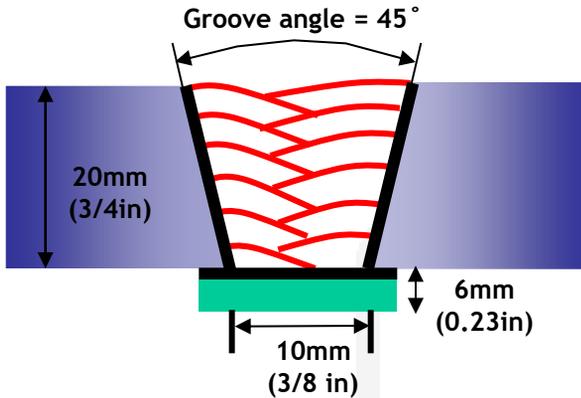
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## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Welding Conditions

Method by AWS Spec.



[ Joint Preparation & Layer Details ]

<b>Diameter(mm)</b>	: 1.2mm(0.045in)
<b>Shielding Gas</b>	: Ar+20% CO <sub>2</sub>
<b>Flow Rate(ℓ /min.)</b>	: 20~22
<b>Amp./ Volt.</b>	: 210/29
<b>Stick-Out(mm)</b>	: 20(3/4 in)
<b>Pre-Heat(°C)</b>	: R.T . °C(°F)
<b>Interpass Temp.(°C)</b>	: ≤150°C(302°F)
<b>Polarity</b>	: DC(+)

### ❖ Mechanical Properties of All weld metal

Consumable	Tensile Test		CVN Impact Test J(ft · lbs)	
	TS (Mpa/lbs/in <sup>2</sup> )	EL (%)	-20°C (-4°F)	-60°C (-76°F)
SW-309L Cored	580(84,100)	39	46(33.9)	40(29.5)
AWS A5.22 E309LTX-X	≥ 520	≥ 30	Not Specified	

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

Consumable	Shielding Gas	Chemical Composition (%)								
		C	Si	Mn	P	S	Ni	Cr	Mo	Cu
SW-309L Cored	Ar+ 20% CO <sub>2</sub>	0.026	0.86	1.43	0.021	0.006	12.8 2	23.5 2	0.130	0.123
AWS A5.22 E309LTX-X		≤0.04	≤1.0	0.5 ~2. 5	≤0.04	≤0.03	12.0 ~14. 0	22.0 ~25. 0	≤ 0.5	≤ 0.5

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## Mechanical Properties & Chemical Composition of All Weld Metal

### ❖ Bead Appearance

Horizontal Fillet(2F, PB) , Base : STS 304L(6mm,0.23in)		Fillet Vertical up(3F, PF) , Base : STS 304L(6mm,0.23in)	
			
100% CO2(220A/30V)		100% CO2(160A/25V)	Ar+20% CO2(160A/24V)
		<b>Dissimilar welding Base : C/S+STS 304L(6T)</b>	
Ar+20% CO2(220A/28V)			
		100% CO2(220A/30V)	Ar+20% CO2(220A/28V)

### ❖ δ – Ferrite No.

Consumable	Shielding Gas	Diagram			FERITSCOPE MP-30 * (FISCHER)
		Schaeffler	Delong	WRC(1992)	
SW-309L Cored	100% CO2	11.2	20.4	14.9	18.5~19.5
	Ar+20% CO2	12.0	21.6	16.8	18.0~19.0

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## Welding Efficiency & Proper Welding Condition

### ❖ Deposition Rate & Efficiency

Consumable (size)	Shielding Gas	Welding Conditions		Wire Feed Speed m/min (in/min)	Deposition Efficiency(%)	Deposition Rate kg/hr(lb/hr)
		Amp. (A)	Volt. (V)			
1.2mm (0.045 in)	100%CO <sub>2</sub>	210	30	12(472)	86~88	4.6(10.1)
	Ar-20%CO <sub>2</sub>	210	29	12(472)	87~89	4.8(10.6)
1.6mm (1/16 in)	100%CO <sub>2</sub>	290	33	8.9(350)	86~88	5.5(12.1)
	Ar-20%CO <sub>2</sub>	290	32	8.9(350)	87~89	5.(12.6)
<b>Remark</b>					Deposition efficiency =(Deposited metal weight/Wire weight used)×100	Deposition rate =(Deposited metal weight/Welding time,min.)×60

### ❖ Proper Current Range

Consumable	Shielding Gas	Welding Position	Wire Dia.	
			1.2mm (0.045 in)	1.6mm (1/16 in)
SW-309L Cored	100%CO <sub>2</sub> or Ar-20~25%CO <sub>2</sub>	F	160~220Amp	250~290Amp
		HF	160~220Amp	250~290Amp
		V-Up & OH	140~180Amp	-



## Approvals

Consumables	Shielding Gas	KR	ABS	LR
SW-309L Cored	C1	RW309LG(C) (-20 °C ≥ 34J) 1.2~1.6	AWS A5.22 E309LT1-1  1.2~1.6	SS/CMn  1.2~1.6
		<b>BV</b>	<b>DNV</b>	<b>NK</b>
		309L with KV at -20 °C (-20 °C ≥ 34J) 1.2~1.6	309L  1.2~1.6	KW309LG(C)  1.2~1.6
		<b>CWB</b>	<b>TUV</b>	<b>CE</b>
		AWS A5.22-95 E309LT1-1  0.9~1.6	EN 12073 T 23 12 L P C2  0.9~1.6	EN 12073 T 23 12 L P C2  0.9~1.6
		<b>DB</b>	<b>CCRS</b>	
T 23 12 L P C 2(1.4322) DIN EN ISO 17633-A 0.9~1.6	AWS A5.22 E309LT1-1  1.2~1.6			
Consumables	Shielding Gas	CWB	TUV	CE
SW-309L Cored	M21	AWS A5.22-95 E309LT1-4  0.9~1.6	EN 12073 T 23 12 L P M2  0.9~1.6	EN 12073 T 23 12 L P M2  0.9~1.6
		<b>DB</b>	-	-
		T23 12 L P M 2(1.4322) DIN EN ISO 17633-A 0.9~1.6	-	-

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