

# Excalibur® 309/309L-15, -16, -17

309/309L-15: AWS E309-15/E309L-15; 309/309L-16: AWS E309-16/E309L-16; 309/309L-17: AWS E309-17/E309L-17



## KEY FEATURES

- ▶ Q2 Lot® - Certificate showing actual deposit chemistry and calculated ferrite number (FN) available online
- ▶ Designed with low carbon levels to help eliminate carbide precipitation in high temperature service
- ▶ Designed for joining stainless steel to mild or low alloy steel

### 309/309L-15

- ▶ Flux coating is fast freezing for vertical down welding and slag is self-peeling for easy removal
- ▶ Smooth bead appearance with evenly spaced ripples and flat face

### 309/309L-16

- ▶ Flux coating provides smooth arc transfer and slag is self-peeling for easy removal

### 309/309L-17

- ▶ Flux coating provides smooth arc transfer in the flat and horizontal positions and slag is self-peeling for easy removal

## APPLICATIONS

- ▶ Joining stainless steel to mild or low alloy steel

## WELDING POSITIONS

<b>309/309L-15</b>	All
<b>309/309L-16</b>	All, except vertical down
<b>309/309L-17</b>	Flat & Horizontal

## CONFORMANCES

### AWS A5.4/A5.4M: 2006:

309/309L-15	E309-15, E309L-15
309/309L-16	E309-16, E309L-16
309/309L-17	E309-17, E309L-17

### ASME SFA-A5.4:

Same as Above

### ABS:

309/309L-15	E309-15, E309L-15
309/309L-16	E309-16, E309L-16
309/309L-17	E309-17, E309L-17

### CWB/CSA W48-06:

309/309L-16	E309-16, E309L-16
309/309L-17	E309-17, E309L-17

### MIL-E-22200/2:

309/309L-16	MIL-309-16, MIL-309L-16
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## DIAMETERS / PACKAGING

		8 lb (3.6 kg) Easy Open Can		
Diameter in (mm)	Length in (mm)	309/309L-15	309/309L-16	309/309L-17
3/32 (2.4)	12 (300)	ED033098	ED033097	ED033100
1/8 (3.2)	14 (350)	ED033099		
		10 lb (4.5 kg) Easy Open Can		
Diameter in (mm)	Length in (mm)	309/309L-15	309/309L-16	309/309L-17
1/8 (3.2)	14 (350)		ED033094	ED033101
5/32 (4.0)	14 (350)		ED033095	ED033102
3/16 (4.8)	14 (350)		ED033096	ED033103

# THE LINCOLN ELECTRIC COMPANY

## MECHANICAL PROPERTIES<sup>(1)</sup> – As Required per AWS A5.4/A5.4M: 2006

	Yield Strength <sup>(2)</sup> MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Ferrite Number
<b>Requirements</b> AWS E309-15, -16, -17 AWS E309L-15, -16, -17	Not Specified	550 (80) min. 520 (75) min.	30 min.	Not Specified
<b>Typical Performance<sup>(3)</sup></b> As-Welded				
309/309L-15	490 (71)	640 (93)	38	6 - 8
309/309L-16	455 - 470 (66 - 68)	580 - 585 (84 - 85)	38 - 47	10 - 18
309/309L-17	455 - 490 (66 - 71)	585 - 620 (85 - 90)	37 - 45	7 - 11

## DEPOSIT COMPOSITION<sup>(1)</sup> – As Required per AWS A5.4/A5.4M: 2006

	%C <sup>(4)</sup>	%Cr	%Ni	%Mo	%Mn
<b>Requirements</b> AWS E309L-15, -16, -17	0.04 max.	22.0 - 25.0	12.0 - 14.0	0.75 max.	0.5 - 2.5
<b>Typical Performance<sup>(3)</sup></b>					
309/309L-15	0.03	23.6 - 23.9	13.6 - 13.8	0.03 - 0.05	0.7 - 1.0
309/309L-16	0.02 - 0.04	23.9 - 24.5	12.6 - 13.2	0.05 - 0.09	1.0 - 1.5
309/309L-17	0.02 - 0.04	23.5 - 24.0	13.0 - 13.5	0.05 - 0.09	0.7 - 0.9
	%Si	%P	%S	%Cu	
<b>Requirements</b> AWS E309L-15, -16, -17	1.00 max.	0.04 max.	0.03 max.	0.75 max.	
<b>Typical Performance<sup>(3)</sup></b>					
309/309L-15	0.74 - 0.82	0.02	0.01	0.06	
309/309L-16	0.33 - 0.38	0.03	0.02	0.09	
309/309L-17	0.72 - 0.77	0.03	0.01	0.17	

<sup>(1)</sup> Typical all weld metal. <sup>(2)</sup> Measured with 0.2% offset. <sup>(3)</sup> See test results disclaimer below. <sup>(4)</sup> AWS Requirement for E309-15, -16, -17 is 0.15% max. carbon.

## TYPICAL OPERATING PROCEDURES

Polarity	Current (Amps)			
	3/32 in (2.4 mm)	1/8 in (3.2 mm)	5/32 in (4.0 mm)	3/16 in (4.8 mm)
309/309L-15				
DC+/AC	60 - 70	90 - 100	–	–
309/309L-16				
DC+/AC	40 - 70	60 - 100	90 - 140	120 - 185
309/309L-17				
DC+/AC	40 - 80	75 - 110	95 - 150	130 - 200

NOTE: Preferred polarity is listed first.

Material Safety Data Sheets (MSDS) and Certificates of Conformance are available on our website at [www.lincolnelectric.com](http://www.lincolnelectric.com)

## TEST RESULTS

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods. Users are cautioned to confirm by qualification testing, or other appropriate means, the suitability of any welding consumable and procedure before use in the intended application.

## CUSTOMER ASSISTANCE POLICY

The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

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