

The Lincoln Electric Company
 22801 St. Clair Avenue
 Cleveland OH 44117-1199



Product: Lincolnweld® 960 /Lincolnweld L-56®
Flux Lot No.: 15183947
Electrode Lot No.: 15097902
Specification: AWS D1.8/D1.8M:2016
Classification: E70 A0
Test Completed: June 5, 2017

This is to certify that the above listed flux was manufactured to meet the class F2 requirements of AWS A5.01 and the above listed electrode was manufactured to meet the class S5 requirements of AWS D1.8/D1.8M:2016.

These products were manufactured and supplied in accordance with a Quality System Program that meets ISO9001 among others as documented on The Lincoln Electric web page (<http://www.lincolnelectric.com/en-us/company/Pages/certifications.aspx>).

Welding Conditions

	Requirements	High heat	Low heat
Electrode Size, in.		5/32	5/32
Current Type & Polarity - Lead/Trail		AC / AC	AC / AC
Average Voltage - Lead/Trail		31 / 33	28 / 30
Average Current, A - Lead/Trail		825 / 750	500 / 450
Wire Feed Speed, cm/min (in/min) - Lead/Trail		107 / 99	51 / 47
Contact Tip to Work Distance, mm (in.)		38 (1.5)	38 (1.5)
Average Travel Speed, cm/min (in/min)		76 (30)	94 (37)
Average Heat Input, kJ/mm (kJ/in)		4 (101)	1.8 (45)
Preheat Temperature, °C (°F)		120 (250)	20 (75)
Interbead Temperature, °C (°F)		230 (450)	120 (250)
Number of Passes / Layers		8 / 4	17 / 8
Welding Position		1G - Flat	1G - Flat

Mechanical Tests

<i>All Weld Metal Properties</i>			
Yield Strength @ 0.2% offset, MPa (ksi) ¹	400 (58) min.	480 (70)	570 (83)
Ultimate Tensile Strength, MPa (ksi) ¹	480 (70) min.	620 (90)	660 (96)
Elongation, %	22 min.	25	27
Charpy V-Notch Impact Strength J (ft-lbf) ² -18°C (0°F)	40 min.	68 (50) average 64, 69, 70 (48, 51, 52)	81 (60) average 73, 79, 91 (54, 58, 68)

NOTES:

- 1) Strength values in SI units are reported to the nearest 10 MPa.
- 2) Applicable for Lowest Anticipated Service Temperature (LAST) greater than or equal to the lowest test temperature reported minus 10°C (20°F)


 Jon Ogborn
 Manager, Consumable Compliance, Date


 Toronto Cunningham
 Certification Supervisor, Date

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 Cleveland OH 44117-1199



Product: Lincolnweld® 960 Lincolnweld® L-56®
Flux Lot No.: 15169076
Electrode Lot No.: 15177448
Specification: AWS D1.8/D1.8M:2016
Classification: E70 A0
Test Completed: June 7, 2017

This is to certify that the above listed flux was manufactured to meet the class F2 requirements of AWS A5.01 and the above listed electrode was manufactured to meet the class S5 requirements of AWS D1.8/D1.8M:2016.

These products were manufactured and supplied in accordance with a Quality System Program that meets ISO9001 among others as documented on The Lincoln Electric web page (<http://www.lincolnelectric.com/en-us/company/Pages/certifications.aspx>).

Welding Conditions

Requirements

High Heat

Low Heat

	Requirements	High Heat	Low Heat
Electrode Size, in.		5/32	5/32
Current Type & Polarity - Lead/Trail		AC / AC	AC / AC
Average Voltage - Lead/Trail		31 / 33	30 / 28
Average Current, A - Lead/Trail		825 / 750	450 / 500
Wire Feed Speed, cm/min (in/min) - Lead/Trail		107 / 99	43 / 52
Contact Tip to Work Distance, mm (in.)		38 (1.5)	38 (1.5)
Average Travel Speed, cm/min (in/min)		76 (30)	94 (37)
Average Heat Input, kJ/mm (kJ/in)		4 (101)	1.8 (45)
Preheat Temperature, °C (°F)		120 (250)	30 (85)
Interbead Temperature, °C (°F)		230 (450)	120 (250)
Number of Passes / Layers		8 / 4	19 / 9
Welding Position		1G - Flat	1G - Flat

Mechanical Tests

<i>All Weld Metal Properties</i>			
Yield Strength @ 0.2% offset, MPa (ksi) ¹	400 (58) min.	480 (69)	550 (80)
Ultimate Tensile Strength, MPa (ksi) ¹	480 (70) min.	600 (88)	640 (93)
Elongation, %	22 min.	27	28
Charpy V-Notch Impact Strength J (ft-lbf) ² -18°C (0°F)	40 min.	78 (58) average 73, 80, 82 (54, 59, 61)	73 (54) average 68, 72, 79 (51, 54, 59)

NOTES:

- 1) Strength values in SI units are reported to the nearest 10 MPa.
- 2) Applicable for Lowest Anticipated Service Temperature (LAST) greater than or equal to the lowest test temperature reported minus 10°C (20°F)



 Jon Ogborn
 Manager, Consumable Compliance, Date



 Toronto Cunningham
 Certification Supervisor, Date

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 Cleveland OH 44117-1199



Product: Lincolnweld® 960 / Lincolnweld® L-56®
Flux Lot No.: 15156913
Electrode Lot No.: 15087350
Specification: AWS D1.8/D1.8M:2016
Classification: E70 A0
Test Completed: June 6,2017

This is to certify that the above listed flux was manufactured to meet the class F2 requirements of AWS A5.01 and the above listed electrode was manufactured to meet the class S5 requirements of AWS D1.8/D1.8M:2016.

These products were manufactured and supplied in accordance with a Quality System Program that meets ISO9001 among others as documented on The Lincoln Electric web page (<http://www.lincolnelectric.com/en-us/company/Pages/certifications.aspx>).

Welding Conditions	AWS D1.8/D1.8M:2016 Requirements		
		High Heat Input	Low Heat Input
Electrode Size, in.		5/32	5/32
Current Type & Polarity - Lead/Trail		AC / AC	AC / AC
Average Voltage - Lead/Trail		31 / 33	30 / 30
Average Current, A - Lead/Trail		825 / 750	500 / 450
Wire Feed Speed, cm/min (in/min) - Lead/Trail		107 / 99	51 / 48
Contact Tip to Work Distance, mm (in.)		38 (1.5)	38 (1.5)
Average Travel Speed, cm/min (in/min)		76 (30)	94 (37)
Average Heat Input, kJ/mm (kJ/in)		4 (101)	1.8 (45)
Preheat Temperature, °C (°F)		120 (250)	30 (85)
Interbead Temperature, °C (°F)		230 (450)	120 (250)
Number of Passes / Layers		8 / 4	17 / 8
Welding Position		1G - Flat	1G - Flat


Mechanical Tests

All Weld Metal Properties			
Yield Strength @ 0.2% offset, MPa (ksi) ¹	400 (58) min.	490 (71)	570 (83)
Ultimate Tensile Strength, MPa (ksi) ¹	480 (70) min.	620 (89)	650 (95)
Elongation, %	22 min.	27	26
Charpy V-Notch Impact Strength J (ft-lbf) ² -18°C (0°F)	40 min.	96 (71) average 91, 98, 98 (68, 73, 73)	76 (56) average 74, 76, 77 (55, 56, 57)

NOTES:

- 1) Strength values in SI units are reported to the nearest 10 MPa.
- 2) Applicable for Lowest Anticipated Service Temperature (LAST) greater than or equal to the lowest test temperature reported minus 10°C (20°F)


 Jon Ogborn
 Manager, Consumable Compliance, Date


 Toronto Cunningham
 Certification Supervisor, Date