The Lincoln Electric Co.
22801 St. Clair Avenue
Cleveland, Ohio 44117-1199

AWS D1.8/D1.8M:2016 Annex B Intermix CVN Testing
TEST RESULTS
(Applies only to U.S. products)

This is to state that the electrode combinations manufactured by The Lincoln Electric Co. listed below were welded and tested in accordance with AWS D1.8/D1.8M:2016, Annex B, with the following results:

Root / Substrate Electrode			Fill Electrode			CVN Toughness Test Temperature	
Electrode Diameter (inches) *	Trade Name	AWS Classification	Size (in.)	Trade Name	AWS Classification	Joules @ -18°C (ft-lbf @ 0°F)	Joules @ 20°C (ft-lbf @ 70°F)
1/16	Innershield® NR-233	E71T-8-H16	1/8	Excalibur® 7018-1 MR	E7018-1-H4R	AVG. **70** (52) **64,68,79** (47,50,58)	AVG. **160** (118) **157,159,163** (116,117,120)
0.068	Innershield® NR-232	E71T-8-H16	1/8	Excalibur® 7018-1 MR	E7018-1-H4R	AVG. **75** (55) **68,76,81** (50,56,60)	AVG. **140** (103) **136,142,142** (100,105,105)
3/32	Innershield® NR-311Ni	E70T7-K2-H16	1/8	Excalibur® 7018-1 MR	E7018-1-H4R	AVG. **136** (101) **130,137,142** (96,101,105)	AVG. **221** (163) **210,222,230** (155,164,170)
3/32	Innershield® NR-305	E70T-6-H16	1/8	Excalibur® 7018-1 MR	E7018-1-H4R	AVG. **83** (61) **68,88,94** (50,65,69)	AVG. **167** (123) **157,170,174** (116,125,128)
1/16	SuperArc® L-50 w/ 100%CO_2	ER70S-3	0.072	Innershield® NR-233	E71T-8-H16	AVG. **64** (47) **64,64,64** (47,47,47)	AVG. **94** (69) **92,94,95** (68,69,70)
1/16	SuperArc® L-50 w/ 100%CO_2	ER70S-3	1/16	Innershield® NR-233	E71T-8-H16	AVG. **48** (36) **47,49,49** (35,36,36)	AVG. **79** (58) **77,80,80** (57,59,59)
1/16	SuperArc® L-50 w/ 100%CO_2	ER70S-3	0.072	Innershield® NR-232	E71T-8-H16	AVG. **46** (34) **41,46,50** (30,34,37)	AVG. **100** (74) **94,102,104** (69,75,77)
1/16	SuperArc® L-50 w/ 100%CO_2	ER70S-3	0.068	Innershield® NR-232	E71T-8-H16	AVG. **52** (38) **47,54,54** (35,40,40)	AVG. **96** (71) **91,96,102** (67,71,75)
1/8	Excalibur® 7018-1 MR	E7018-1-H4R	1/16	Innershield® NR-233	E71T-8-H16	AVG. **43** (31) **41,41,46** (30,30,34)	AVG. **82** (61) **80,83,84** (59,61,62)
1/8	Excalibur® 7018-1 MR	E7018-1-H4R	0.068	Innershield® NR-232	E71T-8-H16	AVG. **57** (42) **54,58,58** (40,43,43)	AVG. **103** (76) **99,102,108** (73,75,80)
1/8	Excalibur® 7018-1 MR	E7018-1-H4R	3/32	Innershield® NR-305	E70T-6-H16	AVG. **42** (31) **41,41,43** (30,30,32)	AVG. **78** (58) **74,79,81** (55,58,60)
1/8	Excalibur® 7018-1 MR	E7018-1-H4R	3/32	Innershield® NR-311Ni	E70T7-K2-H16	AVG. **58** (43) **42,62,70** (31,46,52)	AVG. **125** (92) **119,122,134** (88,90,99)
1/8	Excalibur® 7018-1 MR	E7018-1-H4R	0.072	Innershield® NR-232	E71T-8-H16	AVG. **64** (47) **60,65,66** (44,48,49)	AVG. **110** (82) **104,108,119** (77,80,88)
1/8	Excalibur® 7018-1 MR	E7018-1-H4R	0.072	Innershield® NR-233	E71T-8-H16	AVG. **79** (58) **76,80,80** (56,59,59)	AVG. **108** (79) **102,110,111** (75,81,82)
1/8	Excalibur® 7018-1 MR	E7018-1-H4R	5/64	Innershield® NR-232	E71T-8-H16	AVG. **90** (66) **83,88,98** (61,65,72)	AVG. **118** (87) **117,118,119** (86,87,88)
1/8	Excalibur® 7018-1 MR	E7018-1-H4R	5/64	Innershield® NR-233	E71T-8-H16	AVG. **64** (47) **56,68,68** (41,50,50)	Not Required**
				Minimum Requirement		**27 Joules** (20 ft-lbf)	**54 Joules** (40 ft-lbf)

*Diameter is not an essential variable for the root / substrate electrode.

** Per Clause C-B5 of AWS D1.8/D1.8M:2016, a single set of specimens shows conformance to both the 0°F and 70°F requirements if it demonstrates greater than 54J (40 ft.lbf) at -18°C (0°F).

Cert No. D1.8 INTERMIX2

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AWS D1.8/D1.8M:2016 Annex B Intermix CVN Testing
TEST RESULTS
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Root / Substrate Electrode			Fill Electrode			CVN Toughness Test Temperature	
Electrode Size (inches) *	Trade Name	AWS Classification	Size (inches)	Trade Name	AWS Classification	Joules @ -18°C (ft-lbf @ 0°F)	Joules @ 20°C (ft-lbf @ 70°F)
1/8	Lincolnweld® L-61/ Lincolnweld® 960	F7A2-EM12K-H8	5/64	Innershield® NR-233	E71T-8-H8	AVG. **71** (52) **68,69,74** (50,51,55)	AVG. **111** (82) **110,111,113** (81,82,83)
1/8	Lincolnweld® L-61/ Lincolnweld® 960	F7A2-EM12K-H8	5/64	Innershield® NR-232	E71T-8-H16	AVG. **74** (55) **70,76,76** (52,56,56)	AVG. **116** (86) **111,114,123** (82,84,91)
1/8	Lincolnweld® L-56/ Lincolnweld® 960	F7A2-EH11K-H8	5/64	Innershield® NR-233	E71T-8-H8	AVG. **65** (48) **64,65,66** (47,48,49)	AVG. **104** (77) **99,106,107** (73,78,79)
1/8	Lincolnweld® L-56/ Lincolnweld® 960	F7A2-EH11K-H8	5/64	Innershield® NR-232	E71T-8-H16	AVG. **77** (57) **72,77,83** (53,57,61)	AVG. **129** (95) **121,129,136** (89,95,100)
1/16	Metalshield® MC-706	E70C-6M-H4	5/64	Innershield® NR-233	E71T-8-H8	AVG. **68** (50) **65,68,72** (48,50,53)	AVG. **103** (76) **100,104,104** (74,77,77)
1/16	Metalshield® MC-706	E70C-6M-H4	5/64	Innershield® NR-232	E71T-8-H16	AVG. **81** (59) **79,80,83** (58,59,61)	AVG. **131** (96) **123,132,137** (91,97,101)
3/32	UltraCore® 70C	E70T-1C-H8 E70T-9C-H8	0.072	Innershield® NR-233	E71T-8-H8	AVG. **57** (42) **54,56,62** (40,41,46)	AVG. **90** (67) **88,91,92** (65,67,68)
3/32	UltraCore® 70C	E70T-1C-H8 E70T-9C-H8	0.072	Innershield® NR-232	E71T-8-H16	AVG. **84** (62) **81,85,85** (60,63,63)	AVG. **126** (93) **125,127,127** (92,94,94)
*Diameter is not an essential variable for the root / substrate electrode.			**Minimum Requirement**			**27 Joules** (20 ft-lbf)	**54 Joules** (40 ft-lbf)

This certificate complies to the requirements of EN 10204, Type 2.2.

Jonathan S Ogborn

Jonathan S Ogborn, Manager, Consumable Compliance, 07-April-2017

Toronto Cunningham 4/7/17

Toronto Cunningham, Certification Supervisor, Date

Cert No. D1.8 INTERMIX2