SUPERARC® L-50®

Mild Steel, Copper Coated ▪ AWS ER70S-3 & EM13K

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KEY FEATURES

- Moderate levels of manganese and silicon for deoxidiztion of clean to light mill scale surfaces
- Copper coating provides superior arc-starting characteristics for long contact tip life
- Supports short-circuiting, globular, axial spray and pulsed spray transfer
- MicroGuard® Ultra provides superior feeding and arc stability

WELDING POSITIONS

All

SHIELDING GAS

100% CO_2
75-95% Argon / Balance CO_2
95-98% Argon / Balance O_2
Flow Rate: 30-50 CFH

CONFORMANCES

AWS A5.18:	ER70S-3
ASME SFA-A5.18:	ER70S-3
AWS A5.17:	EM13K
ABS:	3YSA
Lloyd's Register:	3YS H15
DNV Grade:	III YMS
CWB/CSA W48-06:	ER49S-3
EN ISO 14341-B:	G 49A 2 C S3
MIL-E-23765/1:	MIL-70S-3

TYPICAL APPLICATIONS

- Clean to light mill scale base material
- Sheet metal to 380 - 485 MPa (55 - 70 ksi) yield strength material
- Pipeline and processing pipe
- Pressure vessels
- Structural steel

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Plastic Spool	33 lb (15 kg) Steel Spool	44 lb (20 kg) Steel Spool	44 lb (20 kg) Fiber Spool	60 lb (27.2 kg) Coil
0.030 (0.8)	ED032923	ED031407			
0.035 (0.9)	ED032924	ED031408	ED031914	ED021268, ED036624*	
0.045 (1.1)	ED032925	ED031409, ED036879*	ED031915	ED021270, ED034428*	
0.052 (1.3)			ED031916		
1/16 (1.6)					ED011317

Diameter in (mm)	60 lb (27.2 kg) Fiber Spool	500 lb (227 kg) Accu-Trak® Drum	500 lb (227 kg) Accu-Pak® Box	500 lb (227 kg) Infinity-Pak®	600 lb (272 kg) Speed-Feed® Drum
0.030 (0.8)		ED029223			
0.035 (0.9)	ED021269	ED021052	ED032899		
0.040 (1.0)					
0.045 (1.1)	ED021271	ED020526	ED032901	ED034535	
0.052 (1.3)	ED021273	ED020527	ED032902		
1/16 (1.6)	ED027274		ED032903		ED011316

Diameter in (mm)	900 lb (408 kg) Accu-Pak® Box	1000 lb (454 kg) Accu-Trak® Drum	1000 lb (454 kg) Accu-Pak® Box	1000 lb (454 kg) Precise-Trak® Reel	1000 lb (454 kg) Infinity-Pak®
0.030 (0.8)					
0.035 (0.9)	ED032842	ED028825		ED032379	
0.040 (1.0)			ED033292	ED032380	
0.045 (1.1)		ED028826	ED032844	ED031614	ED031930
0.052 (1.3)		ED029082	ED032845	ED031615	ED034464
1/16 (1.6)		ED029083	ED032846	ED033270	

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WIRE COMPOSITION[1] – *As Required per AWS A5.18*

	%C	%Mn	%Si	%S	%P
Requirements - AWS ER70S-3	0.006-0.15	0.90-1.40	0.45-0.75	0.035 max	0.025 max
Typical Results[3]	0.08-0.11	1.14-1.23	0.53-0.59	0.003-0.009	0.003-0.013
	%Cr	**%Mo**	**%Ni**	**%V**	**%Cu (Total)**[4]
Requirements - AWS ER70S-3	0.15 max	0.15 max	0.15 max	0.03 max	0.50 max
Typical Results[3]	≤ 0.04	≤ 0.02	≤ 0.03	< 0.01	0.15-0.25

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer [4]Copper due to any coating on the electrode plus the copper content of the filler metal itself, shall not exceed the stated 0.50% max.

MECHANICAL PROPERTIES[1] – *As Required per AWS A5.18*

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch - J (ft•lbf) @ -18°C (0°F)	Charpy V-Notch - J (ft•lbf) @ -29°C (-20°F)
Requirements - AWS ER70S-3 As-Welded with 100% CO_2	400 (58) min	485 (70) min	22 min	27 (20) min	Not Specified
MIL-70S-3 per MIL-E-23765/1 As-Welded with CO_2 and 98% Ar/2% O_2	380-485 (55-70)	485 (70) min	22 min	Not Specified	Not Specified
Typical Results[3]					
As-Welded with 100% CO_2	415 (60)	515 (75)	26	95 (70)	88 (65)
Stress Relieved 1 hr. @ 621°C (1150°F)	365 (53)	475 (69)	34	118 (87)	100 (74)
As-Welded with 75% Ar/25% CO_2	420 (61)	525 (76)	28	106 (78)	102 (75)
Stress Relieved 1 hr. @ 621°C (1150°F)	365 (53)	490 (71)	33	165 (122)	163 (120)
As-Welded with 90% Ar/10% CO_2	450 (65)	545 (79)	30	142 (105)	122 (90)
Stress Relieved 1 hr. @ 621°C (1150°F)	365 (53)	485 (70)	35	– –	214 (158)
As-Welded with 98% Ar/2% O_2	425 (62)	540 (78)	27	108 (80)	95 (70)
Stress Relieved 1 hr. @ 621°C (1150°F)	350 (51)	475 (69)	33	– –	339 (250)

TYPICAL OPERATING PROCEDURES

Diameter, Polarity Shielding Gas	CTWD[5] mm (in)	Wire Feed Speed m/min (in/min)	Voltage (volts)	Approx. Current (amps)	Melt-Off Rate kg/hr (lb/hr)
0.030 in (0.8 mm), DC+					
Short Circuit Transfer 100% CO_2	9-12 (3/8-1/2)	1.9 (75) 3.8 (150) 7.6 (300)	17 18 22	35 70 130	0.4 (0.9) 0.8 (1.8) 1.6 (3.6)
0.035 in (0.9 mm), DC+					
Short Circuit Transfer 100% CO_2 [6]	9-12 (3/8-1/2)	2.5 (100) 3.8 (150) 6.4 (250)	18 19 22	80 120 175	0.7 (1.6) 1.1 (2.4) 1.8 (4.0)
Spray Transfer 90% Ar/10% CO_2	12-19 (1/2-3/4)	9.5 (375) 12.7 (500) 15.2 (600)	23 29 30	195 230 275	2.7 (6.0) 3.6 (8.0) 4.4 (9.6)
0.045 in (1.1 mm), DC+					
Short Circuit Transfer 100% CO_2 [6]	12-19 (1/2-3/4)	3.2 (125) 3.8 (150) 5.1 (200)	19 20 21	145 165 200	1.5 (3.4) 1.8 (4.0) 2.5 (5.4)
Spray Transfer 90% Ar/10% CO_2	12-19 (1/2-3/4)	8.9 (350) 12.1 (475) 12.7 (500)	27 30 30	285 335 340	4.2 (9.2) 5.7 (12.5) 6.0 (13.2)
0.052 in (1.3 mm), DC+					
Spray Transfer 90% Ar/10% CO_2	12-19 (1/2-3/4)	7.6 (300) 8.1 (320) 12.3 (485)	30 30 32	300 320 430	4.8 (10.6) 5.2 (11.5) 7.8 (17.1)
1/16 in (1.6 mm), DC+					
Spray Transfer 90% Ar/10% CO_2	12-25 (1/2-1)	5.3 (210) 6.0 (235) 7.4 (290)	25 27 28	325 350 430	4.8 (10.7) 5.4 (12.0) 6.7 (14.8)

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer [4]Copper due to any coating on the electrode plus the copper content of the filler metal itself, shall not exceed the stated 0.50% max. [5]CTWD (Contact Tip to Work Distance). Subtract 1/4 in (6.4 mm) to calculate Electrical Stickout. [6]Procedures in these areas are procedures for short circuiting mode using 100% CO_2. When using 75% Argon, 25% CO_2 for short circuit transfer, reduce voltage by 1 to 2 volts.

Material Safety Data Sheets (MSDS) and Certificates of Conformance are available on our website at 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.

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