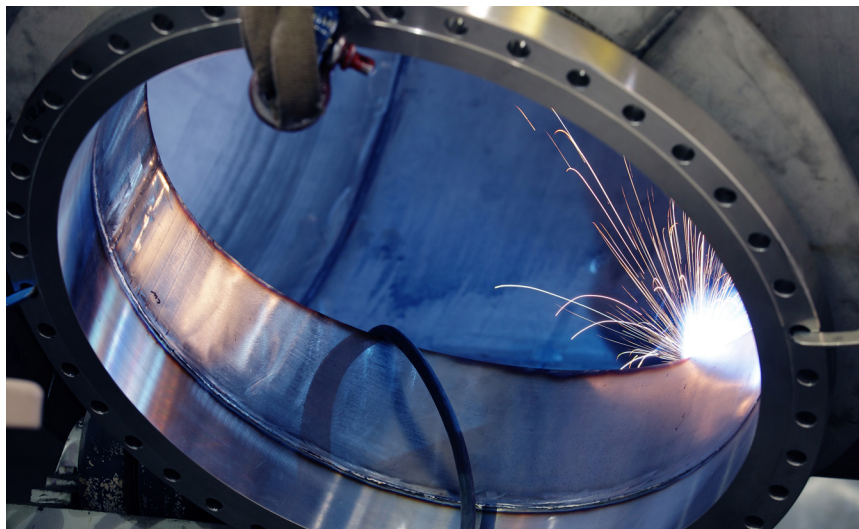


Metalshield® MC®-90

AWS E90C-K3 H4



Metalshield® MC®-90 is a low alloy metal-cored wire designed for high strength welding where tensile requirements of 620 MPa (90ksi) are required. For an electrode designed to produce enhanced strength, high toughness, and H4 diffusible hydrogen weld deposits required in many applications, including pressure vessels – choose Metalshield® MC®-90.

KEY FEATURES

- ▶ H4 diffusible hydrogen levels
- ▶ Low spatter and excellent arc stability
- ▶ Deoxidizing agents minimize pre- and post-weld clean up
- ▶ Enhanced silicon island management
- ▶ Low temperature impact properties – Charpy V-Notch test results capable of exceeding 40 J (30 ft•lbf) @ -51°C (-60°F)
- ▶ Excellent bead shape and profile

APPLICATIONS

- ▶ Robotics/hard automation
- ▶ Structural fabrication
- ▶ HSLA steels (i.e. ASTM A678 & A710)
- ▶ Heavy fabrication
- ▶ Crane fabrication
- ▶ Power generation

CONFORMANCES

AWS A5.28/A5.28M: 2005: E90C-K3 H4
 ASME SFA-A5.28: E90C-K3 H4
 CWB / CSA W48-06: E62C-K3 H4 (E90C-K3 H4)

WELDING POSITIONS

All

SHIELDING GAS

75-90% Argon / Balance CO₂
 Flow Rate: 40-60 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Plastic Spool	500 lb (227 kg) Accu-Trak® Drum
0.045 (1.1)	ED033904	ED033907
0.052 (1.3)	ED033905	ED033908
1/16 (1.6)	ED033906	ED033909

MECHANICAL PROPERTIES⁽¹⁾ – As Required per AWS A5.28/A5.28M: 2005

	Yield Strength ⁽²⁾	Tensile Strength	Elongation	Charpy V-Notch J (ft•lbf)	
	MPa (ksi)	MPa (ksi)	%	@ -40°C (-40°F)	@ -51°C (-60°F)
Requirements AWS E90C-K3 H4	540 (78) min.	620 (90) min.	18 min.	Not Specified	27 (20) min.
Typical Performance⁽³⁾ As-Welded with 75% Argon / 25% CO ₂ As-Welded with 90% Argon / 10% CO ₂	585-685 (85-100) 585-725 (85-105)	655-755 (95-105) 655-825 (95-120)	19-27 18-25	60-93 (44-68) 41-100 (30-74)	36-87 (27-64) 27-91 (20-67)

DEPOSIT COMPOSITION⁽¹⁾ – As Required per AWS A5.28/A5.28M: 2005

	%C	%Cr	%Ni	%Mo	%Mn	%Si
Requirements AWS E90C-K3 H4	0.15 max.	0.15 max.	0.50-2.50	0.25-0.65	0.75-2.25	0.80 max.
Typical Performance⁽³⁾ As-Welded with 75% Argon / 25% CO ₂ As-Welded with 90% Argon / 10% CO ₂	0.04-0.08 0.04-0.08	0.01-0.10 0.01-0.10	1.50-1.90 1.60-1.90	0.30-0.45 0.30-0.45	1.00-1.51 1.10-1.65	0.20-0.35 0.20-0.35
	%P	%S	%Cu	%V	Diffusible Hydrogen (mL/100g weld deposit)	
Requirements AWS E90C-K3 H4	0.025 max.	0.025 max.	0.35 max.	0.03 max.	≤4	
Typical Performance⁽³⁾ As-Welded with 75% Argon / 25% CO ₂ As-Welded with 90% Argon / 10% CO ₂	0.01-0.02 0.01-0.02	0.01-0.02 0.01-0.02	0.02-0.06 0.03-0.07	0.01-0.02 0.01-0.02	2.5-4	

TYPICAL OPERATING PROCEDURES

Diameter, Polarity Shielding Gas ⁽⁴⁾	CTWD ⁽⁵⁾ mm (in)	Wire Feed Speed m/min (in/min)	Voltage (volts)	Approx. Current (amps)	Melt-Off Rate kg/hr (lb/hr)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 90% Argon / 10% CO ₂	19-25 (3/4-1)	5.1 (200)	21-23	170	2.4 (5.3)	2.2 (4.7)	89
		6.4 (250)	23-25	195	3.0 (6.7)	2.7 (6.0)	90
		8.9 (350)	25-27	250	4.3 (9.4)	3.8 (8.4)	89
		11.4 (450)	27-29	285	5.4 (11.9)	5.2 (11.4)	96
		14.0 (550)	29-31	330	6.6 (14.5)	6.4 (14.1)	97
16.6 (650)	31-33	360	7.8 (17.3)	7.7 (16.9)	98		
0.052 in (1.3 mm), DC+ 90% Argon / 10% CO ₂	19 - 25 (3/4-1)	5.1 (200)	22-24	225	3.2 (7.1)	2.9 (6.5)	91
		6.4 (250)	24-26	260	4.0 (8.8)	3.6 (7.9)	90
		8.9 (350)	26-28	295	5.6 (12.4)	5.3 (11.8)	95
		11.4 (450)	28-30	345	7.2 (15.9)	7.1 (15.6)	98
		14.0 (550)	30-32	400	8.7 (19.2)	8.6 (18.9)	98
1/16 in (1.6 mm), DC+ 90% Argon / 10% CO ₂	25-32 (1-1 1/4)	5.1 (200)	23-25	260	4.4 (9.7)	4.0 (8.9)	91
		6.4 (250)	26-28	300	5.5 (12.1)	5.2 (11.4)	94
		8.9 (350)	28-30	360	7.7 (16.9)	7.5 (16.5)	98
		11.4 (450)	30-32	420	9.9 (21.8)	9.7 (21.3)	98

⁽¹⁾ Typical all weld metal. ⁽²⁾ Measured with 0.2% offset. ⁽³⁾ See test results disclaimer below. ⁽⁴⁾ For greater percentage of CO₂ shielding gas, increase voltage by 1-2 volts. ⁽⁵⁾ To estimate ESO, subtract 3/16 in. (4.8 mm) from CTWD.

PREHEAT / INTERPASS

	Up to 19 mm (3/4 in)	19 - 38 mm (3/4 in to 1-1/2 in)	38 - 64 mm (1-1/2 in to 2-1/2 in)	Over 64 mm (2-2/2 in)
Recommended Minimum⁽¹⁾ Preheat Temperature	66°C (150°F)	66°C (150°F)	79°C (175°F)	107°C (225°F)
Recommended Minimum⁽¹⁾ Interpass Temperature	66°C (150°F)	66°C (150°F)	107°C (225°F)	149°C (300°F)

⁽¹⁾ Consult steel manufacturer's recommendations regarding minimum and maximum pre-heat temperature, interpass temperature, and heat input.

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.

CUSTOMER ASSISTANCE POLICY

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