

INNERSHIELD® NR®-5

Mild Steel, Flat & Horizontal ▪ AWS E70T-3, E70T3S

KEY FEATURES

- Fast travel speeds
- Increased resistance to porosity
- Consistent bead appearance

WELDING POSITIONS

Flat & Horizontal

MAXIMUM PLATE THICKNESS

Diameter - in (mm)	Maximum Plate Thickness - in (mm)
3/32 (2.4)	3/16 (4.8)
0.120 (3.0)	3/16 (4.8)

DIAMETERS / PACKAGING

Diameter in (mm)	600 lb (272 kg) Speed-Feed® Reel	600 lb (272 kg) Speed-Feed® Drum
3/32 (2.4)	ED012698	ED012699
0.120 (3.0)		

MECHANICAL PROPERTIES⁽¹⁾

	Transverse Tensile Strength MPa (ksi)	Longitudinal Bend Test	Hardness Rockwell B
Requirements - AWS E70T-3	480 (70) min	180° over 3/4 in Radius No openings exceeding 1/8 in	-
Typical Results ⁽²⁾	505-560 (75-80)	Passed	99

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Al	%Ti
Requirements - AWS E70T-3	Not Specified						
Typical Results ⁽²⁾	0.17-0.22	0.95-1.11	0.34-0.40	0.008-0.02	0.01-0.02	0.07-0.12	0.40-0.49

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
3/32 in (2.4 mm), DC+	32 (1-1/4)	2.5 (100)	22-23	340	4.5 (9.9)	3.5 (7.8)	77
		3.8 (150)	23-24	435	6.7 (14.8)	5.6 (12.3)	83
		5.1 (200)	24-25	510	9.0 (19.8)	7.7 (16.9)	85
		6.4 (250)	25-26	575	11.2 (24.7)	9.7 (21.4)	87
0.120 in (3.0 mm), DC+	32 (1-1/4)	3.3 (130)	22-23	500	8.2 (18.0)	7.6 (16.7)	93
		4.2 (165)	23-24	600	10.4 (23.0)	9.5 (20.9)	91
		6.5 (205)	24-25	700	12.9 (28.5)	11.6 (25.6)	90
		6.5 (255)	25-26	800	16.1 (35.5)	14.3 (31.5)	90

⁽¹⁾Typical all weld metal. ⁽²⁾See test results disclaimer

CONFORMANCES

AWS A5.20/A5.20M:	E70T-3
AWS A5.36:	E70T3S
ASME SFA-A5.20:	E70T-3

TYPICAL APPLICATIONS

- Single pass welding on up to 48 mm (3/16 in) thicknesses
- 3 o'clock welding positions
- Welds with copper back-up
- Propane cylinders
- Robotics/hard automation

WARNING

- NR-5 IS NOT RECOMMENDED FOR WELDING MULTIPLE PASSES

INNERSHIELD® NR®-131

Mild Steel, Flat & Horizontal ▪ AWS E70T-10, E70T10S

KEY FEATURES

- Fast travel speeds and high deposition rates
- Maximum penetration
- Flat bead profile on butt welds
- Join dissimilar plate thicknesses with even heat distribution

WELDING POSITIONS

Flat & Horizontal

CONFORMANCES

AWS A5.20/A5.20M:	E70T-10
AWS A5.36:	E70T10S
ASME SFA-A5.20:	E70T-10

TYPICAL APPLICATIONS

- Single pass welding on up to 2.8 mm (0.110 in) thicknesses
- Sheet metal
- Automotive

WARNING

- NR-131 IS NOT RECOMMENDED FOR WELDING MULTIPLE PASSES

DIAMETERS / PACKAGING

Diameter in (mm)	600 lb (272 kg) Speed-Feed® Reel
3/32 (2.4)	ED012163

MECHANICAL PROPERTIES⁽¹⁾

	Transverse Tensile Strength MPa (ksi)	Longitudinal Bend Test	Hardness Rockwell B
Requirements - AWS E70T-10	480 (70) min	180° over 3/4 in Radius No openings exceeding 1/8 in	–
Typical Results⁽²⁾	505-560 (75-80)	Passed	99

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Al
Requirements - AWS E70T-10	Not Specified					
Typical Results⁽²⁾	0.22-0.26	0.42-0.65	0.20-0.27	0.005-0.007	0.007-0.02	1.18-1.49

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
3/32 in (2.4 mm), Single Arc, DC-	38 (1-1/2)	3.8 (150)	25-26	390	6.5 (14.3)	5.3 (11.6)	81
		5.1 (200)	25-27	490	8.6 (19.0)	7.1 (15.6)	82
		6.4 (250)	26-27	570	10.8 (23.7)	8.9 (19.6)	82
		8.9 (350)	26-28	720	15.0 (33.1)	33.6 (27.6)	83
		10.8 (425)	27-28	810	18.2 (40.1)	15.2 (33.6)	83
3/32 in (2.4 mm), Twinarc, DC-	44 (1-3/4)	3.3 (130)	25-26	550	11.1 (24.5)	8.1 (17.9)	72
		4.4 (175)	26-27	740	15.0 (33.0)	12.0 (26.4)	79
		5.7 (225)	26-28	910	19.3 (42.5)	15.8 (34.8)	81
		7.0 (275)	27-29	1030	23.5 (51.9)	19.1 (42.0)	80
		8.3 (325)	28-30	1090	27.9 (61.4)	21.9 (48.2)	78

⁽¹⁾Typical all weld metal. ⁽²⁾See test results disclaimer

INNERSHIELD® NR®-305

Mild Steel, Flat & Horizontal ▪ AWS E70T-6, E70T6-A2-CS3-H16

KEY FEATURES

- High deposition rates in the flat and horizontal positions
- Smooth arc and low spatter levels
- Capable of producing weld deposits with impact properties exceeding 27 J (20 ft•lbf) at -29°C (-20°F)
- Welds on lightly rusted or primed plate
- Meets AWS D1.8 seismic lot waiver requirements

WELDING POSITIONS

Flat & Horizontal

CONFORMANCES

- AWS A5.20/A5.20M:** E70T-6 H16
- AWS A5.36:** E70T6-A2-CS3-H16
- ASME SFA-A5.20:** E70T-6 H16
- FEMA 353**
- AWS D1.8**

TYPICAL APPLICATIONS

- General plate fabrication
- Structural fabrication, including those subject to seismic requirements
- Bridges and offshore rigs
- Shipyards, stiffener welding on barges
- Welding over tack welds made with stick electrode

DIAMETERS / PACKAGING

Diameter in (mm)	25 lb (11.3 kg) Steel Spool	25 lb (11.3 kg) Plastic Spool (Vacuum Sealed Foil Bag)	50 lb (22.7 kg) Coil	50 lb (22.7 kg) Plastic Spool (Vacuum Sealed Foil Bag)
5/64 (2.0)	ED034185	ED030971	ED012593	ED030005
3/32 (2.4)				

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Hardness Rockwell B	Charpy V-Notch J (ft•lbf) @ -29°C (-20°F)
Requirements - AWS E70T-6	400 (58) min	480-655 (70-95)	22 min	–	27 (20) min
Typical Results⁽³⁾ - As-Welded	465-535 (68-77)	565-620 (82-90)	24-28	88-93	27-41 (20-30)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Al
Requirements - AWS E70T-6	0.30 max	1.75 max	0.60 max	0.03 max	0.03 max	1.8 max
Typical Results⁽³⁾	0.06-0.09	1.08-1.57	0.20-0.27	≤0.01	≤0.01	0.9-1.1

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
5/64 in (2.0 mm), DC+	35-51 (1 3/8-2)	4.4 (175)	20-22	300	8.5 (10.5)	4.0 (8.8)	84
		5.6 (220)	21-23	330	6.0 (13.3)	5.0 (11.1)	83
		6.6 (260)	22-24	360	7.1 (15.7)	5.9 (13.1)	83
		7.6 (300)	24-26	375	8.2 (18.1)	6.9 (15.2)	84
		8.3 (325)	25-27	400	8.9 (19.7)	7.4 (16.4)	83
3/32 in (2.4 mm), DC+	41-54 (1 5/8-2 1/4) ⁽⁴⁾	4.1 (160)	21-23	330	6.0 (13.3)	5.0 (11.0)	82
		6.1 (240)	24-26	425	9.1 (20.0)	7.6 (16.7)	83
		7.6 (300)	27-29	475	11.3 (25.0)	9.5 (21.0)	84
		10.2 (400)	33-35	525	15.2 (33.4)	12.7 (28.0)	83

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer. ⁽⁴⁾Use CTWD of 2 1/4 in (54 mm) for wire feed speeds greater than 300 ipm. NOTE: FEMA 353 and AWS D1.8 structural steel seismic supplement test data can be found on this product at www.lincolnelectric.com.

INNERSHIELD® NR®-311

Mild Steel, Flat & Horizontal ▪ AWS E70T-7, E70T7-AZ-CS3

KEY FEATURES

- High deposition rates and fast travel speeds
- Easy slag removal
- Optimal toe wash-in
- Deep penetration
- High resistance to cracking
- Welds on lightly rusted or primed plate

WELDING POSITIONS

Flat & Horizontal

CONFORMANCES

AWS A5.20/A5.20M:	E70T-7
AWS A5.36:	E70T7-AZ-CS3
ASME SFA-A5.20:	E70T-7
ABS:	E70T-7
CWB/CSA W48-06:	E492T-7

TYPICAL APPLICATIONS

- Recommended for fillet, lap and butt welds on 3.2 mm (1/8 in) and thicker steel, including some low alloy steels
- General fabrication
- Assembly welding

DIAMETERS / PACKAGING

Diameter in (mm)	14 lb (6.4 kg) Coil 56 lb (25.4 kg) Master Carton	25 lb (11.3 kg) Steel Spool	50 lb (22.7 kg) Coil	600 lb (272 kg) Speed-Feed® Reel	600 lb (272 kg) Speed-Feed® Drum
5/64 (2.0)	ED014464	ED030649	ED014459 ED012629 ED012632	ED012633	ED012628
3/32 (2.4)					
7/64 (2.8)					

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Hardness Rockwell B
Requirements - AWS E70T-7	400 (58) min	480-655 (70-95)	22 min	-
Typical Results⁽³⁾ - As-Welded	420-475 (61-69)	600-645 (87-93)	23-26	88-92

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Al
Requirements - AWS E70T-7	0.30 max	1.75 max	0.60 max	0.03 max	0.03 max	1.8 max
Typical Results⁽³⁾	0.25-0.29	0.44-0.51	0.09-0.12	≤0.01	≤0.01	1.4-1.7

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
5/64 in (2.0 mm), DC-	38 (1 1/2)	2.5 (100)	20-23	190	2.9 (6.4)	2.3 (5.0)	78
		4.1 (160)	24-28	275	4.7 (10.3)	3.6 (8.0)	78
		6.1 (240)	25-29	355	7.0 (15.4)	5.6 (12.4)	80
		7.6 (300)	27-31	410	8.8 (19.3)	7.2 (15.8)	82
3/32 in (2.4 mm), DC-	45 (1 3/4)	1.9 (75)	20-23	200	3.2 (7.0)	2.5 (5.4)	77
		3.4 (135)	23-26	300	5.9 (13.1)	4.6 (10.2)	78
		3.8 (150)	24-27	325	6.6 (14.6)	5.2 (11.4)	78
		5.3 (210)	26-28	400	9.3 (20.4)	7.5 (16.5)	81
		6.9 (270)	28-30	450	11.9 (26.2)	10.0 (22.0)	84
7/64 in (2.8 mm), DC-	45 (1 3/4)	2.5 (100)	23-26	325	5.4 (12.0)	4.5 (10.0)	83
		3.7 (145)	25-27	400	8.1 (17.8)	6.6 (14.5)	82
		4.4 (175)	26-28	450	9.8 (21.5)	8.2 (18.0)	83
		6.1 (240)	30-32	550	13.4 (29.5)	11.6 (25.5)	86
		7.6 (300)	32-34	625	16.7 (36.9)	15.0 (33.0)	89

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer

INNERSHIELD® NS-3M

Mild Steel, Flat & Horizontal ■ AWS E70T-4, E70T4-AZ-CS3

KEY FEATURES

- Very high deposition rates
- Increased resistance to hydrogen cracking and porosity
- Soft, low penetrating arc for minimal base material admixture

TYPICAL APPLICATIONS

- Open groove welds
- Machinery bases and heavy equipment repair
- Installing wear plates
- 6.4 - 12.7 mm (1/4 - 1/2 in) single pass fillet and lap welds

DIAMETERS / PACKAGING

Diameter in (mm)	14 lb (6.4 kg) Coil 56 lb (25.4 kg) Master Carton	50 lb (22.7 kg) Coil	600 lb (272 kg) Speed-Feed® Drum
5/64 (2.0)	ED012739	ED012740	
3/32 (2.4)		ED012736	ED012735
0.120 (3.0)		ED012732	ED012731

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Hardness Rockwell B
Requirements - AWS E70T-4	400 (58) min	480-655 (70-95)	22 min	-
Typical Results⁽³⁾ - As-Welded	415-450 (60-65)	580-620 (84-90)	25-28	87-91

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Al
Requirements - AWS E70T-4	0.30 max	1.75 max	0.60 max	0.03 max	0.03 max	1.8 max
Typical Results⁽³⁾	0.21-0.25	0.37-0.53	0.25-0.29	≤0.01	≤0.01	1.3-1.6

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
5/64 in (2.0 mm), DC+	54 (2 1/4)	5.1 (200)	29-31	280	5.5 (12.2)	4.6 (10.1)	83
		6.1 (240)	30-32	315	6.7 (14.8)	5.5 (12.1)	82
		6.6 (260)	30-32	330	7.3 (16.0)	6.0 (13.2)	83
		7.6 (300)	31-33	350	8.4 (18.6)	6.9 (15.2)	82
3/32 in (2.4 mm), DC+	76 (3)	2.8 (110)	28-30	250	4.6 (10.1)	3.7 (8.2)	81
		3.8 (150)	29-31	300	6.4 (14.0)	5.3 (11.7)	84
		4.7 (185)	30-32	350	7.9 (17.4)	6.6 (14.6)	84
		5.8 (230)	31-33	400	9.8 (21.6)	8.3 (18.3)	85
0.120 in (3.0 mm), DC+ Electrical Stickout: 2 - 3/4 in (70 mm)	76 (3)	7.0 (275)	32-34	450	11.8 (26.0)	10.0 (22.0)	85
		3.5 (140)	28-30	380	9.0 (19.8)	7.0 (15.5)	78
		4.4 (175)	29-31	450	11.2 (24.6)	9.1 (20.0)	81
		5.1 (200)	30-32	500	12.7 (28.0)	10.5 (23.2)	83
0.120 in (3.0 mm), DC+ Electrical Stickout: 3 - 3/4 in (95 mm)	102 (4)	7.6 (225)	31-33	550	14.2 (31.4)	11.9 (26.2)	83
		5.3 (210)	35-37	450	13.2 (29.0)	11.3 (25.0)	86
		6.4 (250)	36-38	500	15.6 (34.5)	13.2 (29.0)	84
		7.6 (300)	37-39	550	18.8 (41.5)	15.4 (34.0)	82
		9.0 (355)	38-40	600	22.2 (49.0)	18.0 (39.5)	81

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer

CONFORMANCES

AWS A5.20/A5.20M:	E70T-4
AWS A5.36:	E70T4-AZ-CS3
ASME SFA-A5.20:	E70T-4
CWB/CSA W48-06:	E492T-4 H16
DB:	EN 758 T38 Z W N 3
EN ISO 17632-A:	T38 Z V N 3
EN ISO 17632-B:	T 49 Z T4 0 N A-H15

WELDING POSITIONS

Flat & Horizontal

INNERSHIELD® NR®-311 Ni

Low Alloy, Flat & Horizontal ■ AWS E70T7-K2, E80TG-K2, E70T7-A2-K2-H16, E80TG-A2-K2-H16

KEY FEATURES

- Designed to provide a nominal 1.5% nickel weld deposit
- High deposition rates and fast travel speeds
- Capable of producing weld deposits with impact properties exceeding 27 J (20 ft•lbf) at -29°C (-20°F)
- Color match on weathering steel applications
- 3/32 in (2.4 mm) diameter meets AWS D1.8 seismic lot waiver requirements

TYPICAL APPLICATIONS

- Fillet and lap welds
- Horizontal and square edge butt welds, such as column-to-column structural connections
- Deep groove welds
- Structural fabrication
- Weathering steels

DIAMETERS / PACKAGING

Diameter in (mm)	25 lb (11.3 kg) Steel Spool	50 lb (22.7 kg) Coil	50 lb (22.7 kg) Coil (Vacuum Sealed Foil Bag)
5/64 (2.0)	ED030650		
3/32 (2.4)		ED017822	ED032530
7/64 (2.8)		ED017824	

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Hardness Rockwell B	Charpy V-Notch J (ft•lbf) @ -29°C (-20°F)
Requirements					
AWS E70T7-K2	400 (58) min	480-620 (70-90)	20 min	–	27 (20) min
AWS E80TG-K2	470 (68) min	550-690 (80-100)	19 min		Not Specified
Typical Results⁽³⁾ As-Welded	470-515 (68-75)	575-615 (83-89)	27-30	88-93	41-87 (30-65)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni	%Cr	%Mo	%V	%Al
Requirements -										
AWS E70T7-K2 / E80TG-K2	0.15 max	0.50-1.75	0.80 max	0.030 max	0.030 max	1.00-2.00	0.15 max	0.35 max	0.05 max	1.8 max
Typical Results⁽³⁾	0.06-0.08	1.25-1.40	0.18-0.22	≤0.003	0.005-0.008	1.29-1.56	0.03-0.04	≤0.03	–	1.0-1.3

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
5/64 in (2.0 mm), DC-	32 (1 1/4)	2.5 (100)	21-23	170	2.5 (5.5)	1.8 (3.9)	70
		3.3 (130)	24-26	205	3.3 (7.2)	2.4 (5.2)	72
		4.1 (160)	25-27	235	4.0 (8.8)	2.9 (6.5)	73
		5.1 (200)	26-28	270	5.0 (11.0)	3.8 (8.3)	75
		6.1 (240)	27-29	295	6.1 (13.3)	4.5 (10.0)	75
3/32 in (2.4 mm), DC-	38 (1 1/2)	1.9 (75)	20-22	200	2.8 (6.2)	1.9 (4.2)	67
		2.5 (100)	21-23	245	3.8 (8.3)	2.7 (5.9)	71
		3.1 (125)	23-25	285	4.7 (10.4)	3.4 (7.5)	72
		3.8 (150)	25-27	330	5.7 (12.5)	4.1 (9.1)	72
		4.4 (175)	26-28	365	6.6 (14.5)	4.9 (10.8)	74
5.1 (200)	27-29	390	7.6 (16.6)	5.6 (12.3)	74		
7/64 in (2.8 mm), DC-	44.5 (1 3/4)	2.5 (100)	22-24	310	5.2 (11.4)	3.8 (8.4)	73
		3.5 (140)	24-26	370	7.2 (15.8)	5.4 (11.8)	74
		4.3 (170)	26-28	430	8.9 (19.5)	6.6 (14.5)	74
		5.1 (200)	28-30	470	10.4 (22.8)	7.7 (17.0)	74
		6.1 (240)	29-31	520	12.4 (27.2)	9.2 (20.4)	75

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer
NOTE: FEMA and AWS D1.8 structural steel seismic supplement test data can be found on this product at www.lincolnelectric.com.

INNERSHIELD® NR®-152

Mild Steel, All Position ■ AWS E71T-14, E71T14S

KEY FEATURES

- Designed for high speed welding of specially coated steels
- Soft, consistent arc
- Porosity resistant
- Excellent overlapping capabilities
- Ideal for robotic applications

WELDING POSITIONS

All

MAXIMUM PLATE THICKNESS

Diameter - in (mm)	Maximum Plate Thickness - in (mm)
1/16 (1.6)	3/16 (4.8)
0.068 (1.7)	3/16 (4.8)

DIAMETERS / PACKAGING

Diameter in (mm)	25 lb (11.3 kg) Plastic Spool	50 lb (22.7 kg) Coil	500 lb (227 kg) Speed-Feed® Drum	500 lb (227 kg) Accu-Trak® Drum
0.045 (1.1)	EDS01702	ED012185 ED012186	ED024301	ED028123 ED029066
0.062 (1.6)				
0.068 (1.7)				

MECHANICAL PROPERTIES⁽¹⁾

	Transverse Tensile Strength MPa (ksi)	Longitudinal Bend Test	Hardness Rockwell B
Requirements - AWS E71T-14	480 (70) min	180° over 3/4 in Radius / No openings exceeding 1/8 in	-
Typical Results ⁽²⁾	480-550 (70-80)	Passed	93

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Al
Requirements - AWS E71T-14	Not Specified					
Typical Results ⁽²⁾	0.25-0.30	0.83-1.04	0.20-0.23	0.006-0.01	0.005-0.02	1.08-1.38

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
1/16 in (1.6 mm), DC-	16 (5/8)	0.8 (30)	13-14	90	0.5 (1.3)	0.5 (1.2)	92
		1.0 (40)	14-15	115	0.8 (1.8)	0.7 (1.6)	88
		1.3 (50)	15-16	140	0.9 (2.2)	0.9 (2.0)	90
		1.8 (70)	16-17	185	1.4 (3.1)	1.3 (2.8)	90
		2.8 (110)	19-20	265	2.1 (4.8)	2.0 (4.4)	91
0.068 in (1.7 mm), Twinarc, DC-	19 (3/4)	0.8 (30)	13-14	68	0.7 (1.6)	0.6 (1.4)	87
		1.0 (40)	13-14	95	0.9 (2.2)	0.9 (1.9)	86
		1.3 (50)	14-15	120	1.2 (2.7)	1.1 (2.4)	88
		1.5 (60)	15-16	145	1.4 (3.3)	1.3 (2.9)	87
		2.0 (80)	16-17	190	1.9 (4.4)	1.8 (3.9)	88
2.8 (110)	20-21	240	2.7 (6.0)	2.4 (5.4)	90		

⁽¹⁾Typical all weld metal. ⁽²⁾See test results disclaimer

NOTE: The preferred drag angle is 15°, however, NR-152 is capable of welding at zero drag angle, facilitating easy fixturing in automatic applications.

CONFORMANCES

AWS A5.20/A5.20M:	E71T-14
AWS A5.36:	E71T14S
ASME SFA-A5.20:	E71T-14
EN ISO 17632-B:	T 49T14-1 N S G

TYPICAL APPLICATIONS

- Single pass welding on thicknesses from 0.8 mm - 4.8 mm (0.030 in - 3/16 in)
- Spot or short intermittent welds
- Continuous welding on galvanized or zinc coated carbon steel
- Automotive
- Transportation

WARNING

- NR-152 is NOT recommended for welding multiple passes

INNERSHIELD® NR®-203MP

Mild Steel, All Position ■ AWS E71T-8-JH8, E71T8-A4-CS3-H8

KEY FEATURES

- Designed to handle poor fit-up on heavy wall tubes and gaps up to 9.5 mm (3/8 in) with 6.4 mm (1/4 in) offset
- Fast freezing slag with excellent wash-in
- Root bead capability without back-up bars

TYPICAL APPLICATIONS

- General plate fabrication, including bridge fabrication, hull plate and stiffener welding on ships and barges
- Storage tanks
- Structural welding
- Offshore welding in TKY joints

CONFORMANCES

AWS A5.20/A5.20M:	E71T-8-JH8
AWS A5.36:	E71T8-A4-CS3-H8
ASME SFA-A5.20:	E71T-8-JH8
ABS:	3YSA
Lloyd's Register:	3YS H15
DNV Grade:	III YMS H10
GL:	3YH15S
BV Grade:	SA3YMH
CWB/CSA W48-06:	E491T-8 H8

WELDING POSITIONS

All

DIAMETERS / PACKAGING

Diameter in (mm)	14 lb (6.4 kg) Coil 56 lb (25.4 kg) Master Carton	25 lb (11.3 kg) Steel Spool
0.068 (1.7) 5/64 (2.0)	ED021604	ED030640

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Hardness Rockwell B	Charpy V-Notch J (ft-lbf)	
					@ -29°C (-20°F)	@ -40°C (-40°F)
Requirements - AWS E71T-8-J	400 (58) min	480-655 (70-95)	22 min	–	Not Specified	27 (20) min
Typical Results⁽³⁾	415-440 (60-64)	510-545 (74-79)	29-33	82-87	75-203 (55-150)	68-224 (50-165)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Al
Requirements - AWS E71T-8-J	0.30 max	1.75 max	0.60 max	0.03 max	0.03 max	1.8 max
Typical Results⁽³⁾	0.04-0.07	1.35-1.47	0.22-0.32	≤0.01	≤0.01	0.8-1.0

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
0.068 in (1.7 mm), DC-	25 (1)	1.8 (70)	16-17	145	1.5 (3.3)	1.0 (2.3)	69
		2.3 (90)	18-19	180	1.9 (4.2)	1.5 (3.2)	76
		3.0 (120)	20-21	225	2.5 (5.6)	2.0 (4.3)	76
		3.5 (140)	21-22	255	2.9 (6.4)	2.2 (4.8)	75
		3.8 (150)	23-24	265	3.1 (6.8)	2.3 (5.1)	75
5/64 in (2.0 mm), DC-	25 (1)	1.3 (50)	16-17	130	1.4 (3.1)	0.9 (1.9)	61
		1.8 (70)	18-19	180	2.0 (4.3)	1.3 (2.9)	67
		2.3 (90)	19-20	220	2.5 (5.6)	1.9 (4.2)	75
		2.8 (110)	20-21	260	3.1 (6.8)	2.4 (5.3)	77
		3.0 (120)	21-22	280	3.4 (7.4)	2.7 (5.9)	79
3.5 (140)	22-23	310	3.9 (8.7)	3.1 (6.8)	79		

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer

INNERSHIELD® NR®-211-MP

Mild Steel, All Position ■ AWS E71T-11, E71T11-AZ-CS3

KEY FEATURES

- Versatile welding capability on a variety of base materials
- High operator appeal and good bead appearance
- Easy slag removal
- Fast freezing characteristics accommodate poor fit-up

WELDING POSITIONS

All, except 3/32 in (2.4 mm) diameter

MAXIMUM PLATE THICKNESS

Diameter - in (mm)	Maximum Plate Thickness - in (mm)
0.030 (0.8)	5/16 (7.9)
0.035 (0.9)	5/16 (7.9)
0.045 (1.1)	5/16 (7.9)
0.068 (1.7)	1/2 (12.7)
5/64 (2.0)	1/2 (12.7)
3/32 (2.4)	1/2 (12.7)

CONFORMANCES

AWS A5.20/A5.20M:	E71T-11
AWS A5.36:	E71T11-AZ-CS3
ASME SFA-A5.20:	E71T-11
ABS:	E71T-11*
CWB/CSA W48-06:	E491T-11-H16
DB:	EN 758 T42 Z S N 1
TUV:	EN 758 T42 Z S N 1
EN ISO 17632-B	T49ZT11-1NA-H15
JIS Z 3313:	T 49 TG-1 N S

*Except 0.030 in (0.8 mm) and 0.035 in (0.9 mm) diameters

TYPICAL APPLICATIONS

- Sheet or thin gauge metal
- Galvanized sheet metal
- Robotic / hard automation
- General fabrication
- 5/16 in. maximum plate thickness for 0.045 in. and smaller diameters
- 1/2 in. maximum plate thickness for 0.068 - 3/32 in. diameters

DIAMETERS / PACKAGING

Diameter in (mm)	1 lb (0.5 kg) Plastic Spool 5 lb (2.3 kg) Master Carton	10 lb (4.5 kg) Plastic Spool	14 lb (6.4 kg) Coil 56 lb (25.4 kg) Master Carton
0.030 (0.8)	ED031448	ED033130	
0.035 (0.9)	ED030584	ED016354	
0.045 (1.1)		ED016363	
0.068 (1.7)			ED012506
5/64 (2.0)			ED012508
3/32 (2.4)			
Diameter in (mm)	25 lb (11.3 kg) Steel Spool	50 lb (22.7 kg) Coil	500 lb (227 kg) Accu-Trak® Drum
0.030 (0.8)			
0.035 (0.9)	ED030637		
0.045 (1.1)	ED030638		
0.068 (1.7)	ED030641	ED012507	ED029838
5/64 (2.0)	ED030645	ED012509	ED029028
3/32 (2.4)		ED013866	

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Hardness Rockwell B
Requirements - AWS E71T-11	400 (58) min	480-655 (70-95)	20 min	-
Typical Results ⁽³⁾	435-475 (63-69)	605-645 (88-94)	22-25	89-92

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Al
Requirements - AWS E71T-11	0.30 max	1.75 max	0.60 max	0.03 max	0.03 max	1.8 max
Typical Results ⁽³⁾	0.23-0.26	0.57-0.66	0.17-0.26	≤0.01	≤0.01	1.3-1.6

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
0.030 in (0.8 mm), DC-	13 (1/2)	1.3 (50)	13-14	30	0.2 (0.5)	0.2 (0.4)	81
		2.5 (100)	13-14	60	0.5 (1.1)	0.4 (0.8)	75
		3.8 (150)	14-15	80	0.7 (1.6)	0.6 (1.2)	78
		5.1 (200)	14-15	100	1.0 (2.1)	0.8 (1.7)	81
		6.4 (250)	15-16	130	1.2 (2.6)	1.0 (2.1)	80
7.6 (300)	18-19	140	1.4 (3.2)	1.2 (2.6)	81		
0.035 in (0.9 mm), DC-	13-16 (1/2-5/8)	1.3 (50)	14-15	30	0.4 (0.8)	0.3 (0.7)	81
		1.8 (70)	15-16	60	0.5 (1.2)	0.5 (1.0)	83
		2.8 (110)	16-17	115	0.7 (1.6)	0.6 (1.3)	78
		3.8 (150)	17-18	130	1.0 (2.2)	0.8 (1.7)	78
		5.1 (200)	18-19	155	1.4 (3.0)	1.1 (2.5)	84
7.0 (275)	20-21	155	2.0 (4.4)	1.5 (3.4)	78		
0.045 in (1.1 mm), DC-	16 (5/8)	1.8 (70)	15-16	120	0.7 (1.6)	0.5 (1.1)	69
		2.3 (90)	16-17	140	1.0 (2.2)	0.8 (1.7)	77
		2.8 (110)	17-18	160	1.2 (2.7)	1.0 (2.3)	85
		3.3 (130)	18-19	170	1.5 (3.2)	1.2 (2.7)	84
0.068 in (1.7 mm), DC-	19-32 (3/4-1 1/4)	1.0 (40)	15-16	125	1.0 (2.1)	0.8 (1.7)	81
		1.9 (75)	18-19	190	1.8 (4.0)	1.5 (3.4)	85
		3.3 (130)	20-21	270	3.2 (7.0)	2.8 (6.1)	88
		4.4 (175)	23-24	300	4.3 (9.4)	3.8 (8.4)	89
5/64 in (2.0 mm), DC-	19-32 (3/4-1 1/4)	1.3 (50)	16-17	180	1.6 (3.5)	1.3 (2.9)	83
		1.9 (75)	18-19	235	2.4 (5.3)	2.0 (4.5)	85
		3.0 (120)	20-21	290	3.8 (8.4)	3.4 (7.4)	88
		4.1 (160)	22-23	325	5.1 (11.2)	4.5 (10.0)	89
3/32 in (2.4 mm), DC-	19-32 (3/4-1 1/4)	1.3 (50)	16-17	245	2.3 (5.0)	1.9 (4.2)	84
		1.9 (75)	19-20	305	3.4 (7.5)	2.9 (6.4)	85
		2.5 (100)	20-21	365	4.5 (10.0)	3.9 (8.7)	87
		3.3 (130)	22-23	400	5.9 (12.9)	5.1 (11.3)	88

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer

INNERSHIELD® NR®-232

Mild Steel, All Position ■ AWS E71T-8, E71T8-A2-CS3-H16

KEY FEATURES

- High deposition rates for out-of-position welding
- Penetrating arc
- Fast freezing, easy to remove slag system
- Meets AWS D1.8 seismic lot waiver requirements

WELDING POSITIONS

All

TYPICAL APPLICATIONS

- Structural fabrication, including those subject to seismic requirements
- General plate fabrication
- Hull plate and stiffener welding on ships and barges
- Machinery parts, tanks, hoppers, racks and scaffolding

CONFORMANCES

AWS A5.20/A5.20M:	E71T-8-H16
AWS A5.36:	E71T8-A2-CS3-H16
ASME SFA-A5.20:	E71T-8-H16
ABS:	3YSA
Lloyd's Register:	3YS H15
DNV Grade:	III YMS H15
GL:	3YH10S
BV Grade:	SA3YMH
CWB/CSA W48-06:	E491T-8 H16
DB:	EN 758 T42 3 Y N 2
TUV:	EN 758 T42 3 Y N 2
MIL-E-24403/1:*	MIL-71T-8AS
FEMA 353	
AWS D1.8	
EN ISO	T49T38-1NA-H15

**Military Grade Classification of MIL-71T-8AS for 0.068 in (1.7 mm) and 0.072 in (1.8 mm) diameters only.*

DIAMETERS / PACKAGING

Diameter in (mm)	13.5 lb (6.1 kg) Coil 54 lb (24.5 kg) Master Carton	13.5 lb (6.1 kg) Coil 54 lb (24.5 kg) Hermetically Sealed Pail	25 lb (11.3 kg) Steel Spool
0.068 (1.7)	ED012518	ED030232	ED030643
0.072 (1.8)	ED012522		ED030644
5/64 (2.0)	ED012525		ED030647
Diameter in (mm)	25 lb (11.3 kg) Plastic Spool (Vacuum Sealed Foil Bag)		50 lb (22.7 kg) Coil
0.068 (1.7)	ED030949		ED012519
0.072 (1.8)			ED012523
5/64 (2.0)			ED012526

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Hardness Rockwell B	Charpy V-Notch / J ft·lbf @ -29°C (-20°F)
Requirements - AWS E71T-8	400 (58) min	480-655 (70-95)	22 min	–	27 (20) min
Typical Results⁽³⁾ - As-Welded	460-520 (66-75)	575-615 (83-89)	25-31	87-90	47-75 (35-55)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Al
Requirements - AWS E71T-8	0.30 max	1.75 max	0.60 max	0.03 max	0.03 max	1.8 max
Typical Results⁽³⁾	0.16-0.18	0.61-0.72	0.26-0.33	≤0.01	≤0.01	0.5-0.8

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD ⁽⁶⁾ mm (in)	Wire Feed Speed m/min (in/min)	Voltage ⁽⁷⁾ volts	Approx. Current (amps)	Melt-Off Rate kg/hr (lb/hr)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.068 in (1.7 mm), DC-	19-32 (3/4-1 1/4)	2.8 (110)	18-19	195	2.3 (5.0)	1.8 (3.9)	78
		3.3 (130)	19-21	225	2.8 (6.2)	2.0 (4.6)	74
		3.8 (150)	19-21	250	3.2 (7.1)	2.4 (5.3)	75
		4.3 (170)	20-22	270	3.5 (7.8)	2.8 (6.1)	78
		5.0 (195)	23-24	300	4.3 (9.4)	3.2 (7.0)	74
		6.4 (250)	23-24	350	5.4 (11.8)	4.0 (9.0)	76
		7.4 (320)	25-27	400	6.9 (15.2)	5.2 (11.4)	75
0.072 in (1.8 mm), DC-	19-32 (3/4-1 1/4)	2.0 (80)	16-18	130	1.8 (4.0)	1.5 (3.3)	83
		3.5 (140)	18-21	225	3.1 (6.8)	2.5 (5.5)	81
		3.9 (155)	19-22	240	3.3 (7.2)	2.7 (6.0)	83
		4.3 (170)	20-23	255	3.6 (8.0)	2.9 (6.5)	81
		6.4 (250)	22-24	315	5.3 (11.7)	4.3 (9.6)	82
		7.4 (290)	23-25	350	6.2 (13.6)	5.0 (11.0)	81
5/64 in (2.0 mm), DC-	19-32 (3/4-1 1/4)	1.5 (60)	16-17	145	1.7 (3.7)	1.2 (2.7)	73
		2.9 (115)	19-20	260	3.2 (7.0)	2.5 (5.5)	78
		3.0 (120)	19-20	270	3.3 (7.3)	2.6 (5.7)	78
		3.3 (130)	20-21	285	3.5 (7.8)	2.8 (6.2)	79
		4.6 (180)	22-23	365	5.0 (10.9)	3.9 (8.7)	80

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer
NOTE: FEMA 353 and AWS D1.8 structural steel seismic supplement test data can be found on this product at www.lincolnelectric.com.

INNERSHIELD® NR®-233

Mild Steel, All Position ■ AWS E71T-8-H8, E71T8-A2-CS3-H8

KEY FEATURES

- High deposition rates for out-of-position welding
- Welder-friendly, easy to use and great bead appearance
- Minimal gas marking
- Meets AWS D1.8 seismic lot waiver requirements

WELDING POSITIONS

All

NOTES

- Innershield® K126 Gun Assembly requires one of the following gun tube assemblies for better wire feeding - KP2454-1 (62°, 7.5 in), KP2455-1 (45°, 6 in), KP2456-1 (30°, 12 in)

CONFORMANCES

AWS A5.20/A5.20M:	E71T-8-H8
AWS A5.36:	E71T8-A2-CS3-H8
ASME SFA-A5.20:	E71T-8-H8
ABS:	E71T-8-H16
EN ISO 17632-B:	T 49 3 T8-1 N A-UH10
FEMA 353	
AWS D1.8	
JIS Z 3313:	T 49 3 T7-1 N A-H10

TYPICAL APPLICATIONS

- Structural fabrication, including those subject to seismic requirements
- General plate fabrication
- Ship and barge fabrication
- Vertical up and overhead fillets and groove welds

DIAMETERS / PACKAGING

Diameter in (mm)	12.5 lb (5.7 kg) Plastic Spool 50 lb (22.7 kg) Master Carton	25 lb (11.3 kg) Plastic Spool	25 lb (11.3 kg) Plastic Spool (Vacuum Sealed Foil Bag)
1/16 (1.6)	ED030933	ED030934	ED031576
0.072 (1.8)		ED031030	
5/64 (2.0)		ED033039	ED033024

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Hardness Rockwell B	Charpy V-Notch J (ft·lbf) @ -29°C (-20°F)
Requirements - AWS E71T-8-H8	400 (58) min	480-655 (70-95)	22 min	—	27 (20) min
Typical Results⁽³⁾ - As-Welded	435-455 (63-66)	575-595 (83-86)	26-29	87-89	34-54 (25-40)

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer.

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Al
Requirements - AWS E71T-8-H8	0.30 max	1.75 max	0.60 max	0.03 max	0.03 max	1.8 max
Typical Results⁽³⁾	0.15-0.20	0.61-0.65	0.17-0.21	≤0.03	≤0.01	0.5-0.6

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD ⁽⁴⁾ 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 (%)
1/16 in (1.6 mm), DC-	25 (1)	3.8 (150)	17-19	220	2.4 (5.3)	1.9 (4.2)	80
		5.1 (200)	19-21	245	3.2 (7.1)	2.5 (5.4)	76
		6.4 (250)	21-23	270	4.0 (8.9)	3.0 (6.6)	74
		7.6 (300)	23-25	295	4.7 (10.4)	3.5 (7.7)	75
		8.9 (350)	25-27	315	5.6 (12.3)	4.3 (9.4)	77
0.072 in (1.8 mm), DC-	19-25 (3/4-1) ⁽⁴⁾	2.5 (100)	17-18	184	2.0 (4.5)	1.6 (3.6)	80
		3.8 (150)	18-19	250	3.1 (6.7)	2.5 (5.4)	80
		5.1 (200)	20-21	295	4.0 (8.9)	3.2 (7.1)	81
		6.4 (250)	22-23	330	5.1 (11.2)	4.0 (8.9)	79
		7.6 (300)	23-24	355	6.1 (13.4)	4.8 (10.6)	79
5/64 in (2.0 mm), DC-	19-25 (3/4-1) ⁽⁴⁾	2.3 (90)	18-19	210	2.2 (4.9)	1.8 (4.1)	82
		3.2 (125)	19-20	260	3.2 (7.0)	2.6 (5.6)	81
		3.8 (150)	20-21	300	3.8 (8.4)	3.0 (6.7)	80
		5.1 (200)	21-22	340	5.1 (11.2)	4.1 (9.0)	81
		6.1 (240)	22-23	380	6.1 (13.3)	4.9 (10.8)	81

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾CTWD for 0.072 in. (1.8 mm) and 5/64 in. (2.0 mm) for 200 ipm or greater is 1 in (25 mm).
NOTE: For horizontal welding, subtract 1 volt. NOTE: FEMA and AWS D1.8 structural steel seismic supplement test data can be found on this product at www.lincolnelectric.com/d1.8.

INNERSHIELD® NR®-203 NICKEL (1%)

Low Alloy, All Position ▪ AWS E71T8-Ni1, E71T8-A2-Ni1-H16

KEY FEATURES

- Designed to produce a nickel bearing weld deposit
- Capable of producing weld deposits with impact toughness capable of exceeding 27 J (20 ft•lbf) at -29°C (-20°F)
- Color match on weathering steels
- Handles poor fit-up
- Root bead capability

TYPICAL APPLICATIONS

- Roundabout groove welds on heavy wall tubular construction
- Offshore
- Structural fabrication
- Bridges and other structural components made from weathering steels
- NACE applications

CONFORMANCES

AWS A5.29/A5.29M:	E71T8-Ni1-H16
AWS A5.36:	E71T8-A2-Ni1-H16
ASME SFA-5.29:	E71T8-Ni1-H16
ABS:	3YSA
Lloyd's Register:	3YS H15
DNV Grade:	III YMS H10
CWB/CSA W48-06:	E491T8-Ni1 H16 (E71TG-G-H16)
DB:	EN 758 T42 3 1Ni Y N
TUV:	EN 758 T42 3 1Ni Y N
EN ISO	T49T38-1NA-H15

WELDING POSITIONS

All

DIAMETERS / PACKAGING

Diameter in (mm)	14 lb (6.4 kg) Coil 56 lb (25.4 kg) Master Carton	50 lb (22.7 kg) Coil
5/64 (2.0)	ED012385	ED012386

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Hardness Rockwell B	Charpy V-Notch J (ft•lbf) @ -29°C (-20°F)
Requirements - AWS E71T8-Ni1	400 (58) min	480-620 (70-90)	20 min	—	27 (20) min
Typical Results⁽³⁾ - As-Welded	450-480 (65-70)	545-575 (79-83)	27-32	86-90	81-156 (60-115)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements - AWS E71T8-Ni1	0.12 max	1.50 max	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾	0.05-0.07	1.10-1.22	0.30-0.33	≤0.010	0.005-0.008
	%Ni	%Cr	%Mo	%V	%Al
Requirements - AWS E71T8-Ni1	0.80-1.10	0.15 max	0.35 max	0.05 max	1.8 min
Typical Results⁽³⁾	0.89-1.05	0.02-0.03	0.01-0.02	≤0.01	0.8-1.0

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
5/64 in (2.0 mm), DC-	25 (1)	1.3 (50)	16-17	145	1.4 (3.0)	1.0 (2.3)	76
		1.8 (70)	18-19	195	2.0 (4.3)	1.5 (3.3)	76
		2.3 (90)	19-20	240	2.5 (5.5)	2.0 (4.3)	78
		2.8 (110)	20-21	275	3.0 (6.7)	2.4 (5.3)	79
		3.0 (120)	21-22	290	3.3 (7.3)	2.6 (5.8)	79
		3.5 (140)	22-23	310	3.9 (8.5)	3.0 (6.9)	81

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer

INNERSHIELD® NR®-203 Ni C PLUS-H

Low Alloy, All Position ▪ AWS E71T8-K2, E71T8-A2-K2

KEY FEATURES

- A good choice for weathering steels
- Handles poor fit-up in the vertical up position
- Produces a nickel alloyed weld deposit (1.0-2.0%)
- Capable of meeting H8 diffusible hydrogen requirements

WELDING POSITIONS

All

CONFORMANCES

AWS A5.29/A5.29M:	E71T8-K2
AWS A5.36:	E71T8-A2-K2
ASME SFA-5.29:	E71T8-K2

TYPICAL APPLICATIONS

- Offshore welding applications
- Roundabout groove welds on heavy wall tubular construction
- Structural fabrication
- General plate fabrication including bridges
- Hull plate and stiffener welding on ships and barges

DIAMETERS / PACKAGING

Diameter in (mm)	14 lb (6.4 kg) Coil 56 lb (25.4 kg) Hermetically Sealed Pail
5/64 (2.0)	ED033040

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft-lbf) @ -29°C (-20°F)
Requirements⁽⁴⁾ - AWS E71T8-K2	400 (58) min	480-620 (70-90)	20 min	27 (20) min
Typical Results⁽³⁾	435-520 (63-76)	530-600 (77-87)	25-30	98-161

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni
Requirements - AWS E71T8-K2	0.15 max	0.50-1.75	0.80 max	0.03 max	0.03 max	1.00-2.00
Typical Results^(3,4)	0.04-0.07	0.74-0.85	0.06-0.09	≤0.01	≤0.01	1.00-1.21
	%Cr	%Mo	%V	%Al	Diffusible Hydrogen (mL/100g weld deposit)	
Requirements - AWS E71T8-K2	0.15 max	0.35 max	0.05 max	1.8 max	Not Specified	
Typical Results^(3,4)	0.09-0.13	0.01-0.05	<0.01	0.65-1.12	5-8	

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
5/64 in (2.0 mm), DC-	19 - 25 (3/4 - 1)	1.3 (50)	16-17	115	3.2 (1.5)	2.3 (1.0)	72
		1.8 (70)	17-18	170	4.5 (2.0)	3.3 (1.5)	73
		2.3 (90)	19-20	210	5.8 (2.6)	4.4 (2.0)	76
		2.8 (110)	20-21	245	7.0 (3.2)	5.5 (2.5)	79

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾The strength and elongation properties reported were obtained from a 0.505 in (2.8 mm) tensile specimen artificially aged at 104°C (220°F) for 48 hours, as permitted by AWS A5.29-98. A naturally aged tensile specimen may take months to achieve the specified properties. The time required for the natural aging of weld deposits is dependent upon ambient conditions, weldment geometry, the metallurgical structure of the weld deposit and other factors.

INNERSHIELD® NR®-207

Low Alloy, All Position ■ AWS E71T8-K6, E71T8-A2-K6-H16

KEY FEATURES

- Vertical down hot, fill and cap passes on standard cross-country pipelines and arcticgrade pipe
- Recommended for API grades X42 up to undermatching X70
- High deposition rates

TYPICAL APPLICATIONS

- Standard cross-country pipelines
- Arctic grade pipe up to undermatched X70

CONFORMANCES

AWS A5.29/A5.29M:	E71T8-K6-H16
AWS A5.36:	E71T8-A2-K6-H16
ASME SFA-A5.29:	E71T8-K6-H16
ABS:	E71T-8-K6
DNV Grade:	III YMS H15
GL:	3YH15S
BV Grade:	SA3YMH
ISO 17632-B	T49 3 T8 1 NA-N1-H15

WELDING POSITIONS

All

DIAMETERS / PACKAGING

Diameter in (mm)	14 lb (6.4 kg) Coil	56 lb (25.4 kg) Hermetically Sealed Pail
0.068 (1.7)	ED016312	ED012438
5/64 (2.0)		

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Hardness Rockwell B	Charpy V-Notch J (ft·lbf) @ -29°C (-20°F)
Requirements⁽⁴⁾ - AWS E71T8-K6	400 (58) min	480-620 (70-90)	20 min	–	27 (20) min
Typical Results⁽³⁾	415-445 (60-64)	520-545 (75-79)	29-33	84-87	81-237 (60-175)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements - AWS E71T8-K6	0.15 max	0.50-1.50	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾	0.05-0.07	0.87-0.96	0.23-0.27	≤0.003	0.004-0.008
	%Ni	%Cr	%Mo	%V	%Al
Requirements - AWS E71T8-K6	0.40-1.00	0.20 max	0.15 max	0.05 max	1.8 max
Typical Results⁽³⁾	0.73-0.83	0.02-0.03	0.02-0.03	≤0.01	0.9-1.1

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
0.068 in (1.7 mm), DC-	25 (1)	2.0 (80)	17-18	190	1.7 (3.8)	1.3 (3.0)	79
		2.6 (105)	18-19	230	2.2 (5.3)	1.8 (4.0)	80
		3.0 (120)	19-20	245	2.5 (5.7)	2.0 (4.5)	79
		3.5 (140)	21-22	275	3.0 (6.8)	2.4 (5.5)	81
		4.4 (175)	21-22	295	3.6 (8.0)	2.9 (6.4)	80
5/64 in (2.0 mm), DC-	25 (1)	1.7 (70)	17-18	205	2.0 (4.5)	1.5 (3.4)	76
		2.0 (80)	18-19	225	2.3 (5.1)	1.7 (3.9)	76
		2.2 (90)	18-19	240	2.6 (5.8)	2.0 (4.5)	78
		2.7 (110)	20-21	275	3.1 (7.0)	2.4 (5.5)	79
		3.3 (130)	20-21	300	3.7 (8.3)	2.9 (6.5)	78

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer

INNERSHIELD® NR®-208-H

Low Alloy, All Position ▪ AWS E91T8-G-H8, E91T8-AG-G-H8

KEY FEATURES

- Designed to create high strength weld deposits
- Recommended for API grade X80
- High deposition rates

TYPICAL APPLICATIONS

- Standard cross-country pipelines
- Undermatched X80 grade pipe

CONFORMANCES

AWS A5.29/A5.29M:	E91T8-G-H8
AWS A5.36:	E91T8-AG-G-H8
ASME SFA-A5.29:	E91T8-G-H8

WELDING POSITIONS

All, except vertical up

DIAMETERS / PACKAGING

Diameter in (mm)	14 lb (6.4 kg) Coil 56 lb (25.4 kg) Hermetically Sealed Pail
5/64 (2.0)	ED023366

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Hardness Rockwell B	Charpy V-Notch J (ft•lbf) @ -29°C (-20°F)
Requirements - AWS E91T8-G-H8	540 (78) min	620-760 (90-110)	17 min	–	Not Specified
Typical Results⁽³⁾ - As-Welded	555-600 (81-87)	630-670 (91-97)	24-27	91-95	54-129 (40-95)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni ⁽⁴⁾
Requirements - AWS E91T8-G-H8	Not Specified	0.50 min	1.00 max	0.030 max	0.030 max	0.50 min
Typical Results⁽³⁾	0.04-0.07	1.48-2.02	0.11-0.31	≤0.003	0.004-0.010	0.71-0.98
	%Cr ⁽⁴⁾	%Mo ⁽⁴⁾	%V ⁽⁴⁾	%Al ⁽⁴⁾	Diffusible Hydrogen (mL/100g weld metal)	
Requirements - AWS E91T8-G-H8	0.30 min	0.20 max	0.10 min	1.8 min	8.0 max	
Typical Results⁽³⁾	0.02-0.03	≤0.04	≤0.01	0.9-1.2	≤8	

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
5/64 in (2.0 mm), DC-	25 (1)	1.7 (70)	16-17	195	1.8 (4.0)	1.4 (3.2)	81
		2.0 (80)	17-18	220	2.1 (4.6)	1.7 (3.9)	84
		2.2 (90)	18-19	235	2.5 (5.4)	2.0 (4.5)	84
		2.7 (110)	19-20	270	2.9 (6.5)	2.4 (5.5)	85
		3.3 (130)	19-20	295	3.5 (7.6)	2.9 (6.5)	85

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾In order to meet the alloy requirements of the G group, the weld deposit needs to have the minimum, as specified in the table, of only one of the elements marked.

INNERSHIELD® NR®-212

Low Alloy, All Position ▪ AWS E71TG-G, E71TG-AZ-G-H16

KEY FEATURES

- Accommodates a wide range of mild steels
- Fast freeze characteristics accommodate poor fit-up
- Smooth arc performance and ease of use

WELDING POSITIONS

All

MAXIMUM PLATE THICKNESS - IN (MM)

Diameter - in (mm)	Maximum Plate Thickness - in (mm)
0.045 (1.1)	3/4 (19.1)
0.068 (1.7)	3/4 (19.1)
5/64 (2.0)	3/4 (19.1)

CONFORMANCES

AWS A5.29/A5.29M:	E71TG-G
AWS A5.36:	E71TG-AZ-G-H16
ASME SFA-A5.29:	E71TG-G
CWB/CSA W48-06:	E491TG-G-H16 (E71TG-G H16)
ISO 17632-B	T49ZT11-1NAG-H15

TYPICAL APPLICATIONS

- Single or multiple pass welding on up to 19 mm (3/4 in) thicknesses
- General fabrication
- Robotics
- Truck bodies, tanks, hoppers, racks and scaffolding
- Welding on galvanized steel or zinc coated carbon steel

DIAMETERS / PACKAGING

Diameter in (mm)	10 lb (4.5 kg) Plastic Spool	14 lb (6.4 kg) Coil 56 lb (25.4 kg) Master Carton	25 lb (11.3 kg) Steel Spool	50 lb (22.7 kg) Coil
0.045 (1.1)	ED026090	ED027803	ED030639	ED026858
0.068 (1.7)		ED027794	ED030642	
5/64 (2.0)			ED030646	

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Hardness Rockwell B
Requirements - AWS E71TG-G	400 (58) min	480-655 (70-95)	20 min	–
Typical Results ⁽³⁾	440-505 (64-74)	575-605 (84-88)	24-28	89-92

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn ⁽⁴⁾	%Si	%S	%P
Requirements - AWS E71TG-G	Not Specified	0.50 min	1.00 max	0.030 max	0.030 max
Typical Results ⁽³⁾	0.06-0.11	0.84-1.55	0.20-0.33	≤0.003	0.006-0.009
	%Ni ⁽⁴⁾	%Cr ⁽⁴⁾	%Mo ⁽⁴⁾	%V ⁽⁴⁾	%Al
Requirements - AWS E71TG-G	0.50 min	0.30 min	0.20 min	0.10 min	1.8 max
Typical Results ⁽³⁾	1.02-1.15	0.02-0.04	≤0.02	–	1.3-1.6

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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-	16 (5/8)	1.4 (55)	14-15	75	0.5 (1.3)	0.5 (1.1)	84
		1.8 (70)	15-16	90	0.7 (1.6)	0.6 (1.4)	87
		2.3 (90)	16-17	115	1.0 (2.1)	0.8 (1.8)	85
		2.8 (110)	17-18	135	1.2 (2.6)	1.0 (2.2)	84
		3.3 (130)	18-19	155	1.4 (3.1)	1.2 (2.6)	83
		4.1 (160)	19-20	170	1.6 (3.5)	1.4 (3.0)	85
0.068 in (1.7 mm), DC-	25 (1)	1.5 (60)	16-17	145	1.4 (3.1)	1.1 (2.4)	77
		1.9 (75)	17-18	180	1.7 (3.8)	1.4 (3.2)	84
		2.3 (90)	18-19	200	2.0 (4.5)	1.7 (3.8)	84
		3.0 (120)	19-20	230	2.7 (6.0)	2.3 (5.2)	86
		3.8 (150)	20-21	255	3.3 (7.4)	2.9 (6.4)	86
		4.4 (175)	22-23	275	3.9 (8.7)	3.4 (7.5)	86
5/64 in (2.0 mm), DC-	25 (1)	1.5 (60)	16-17	200	1.7 (3.8)	1.5 (3.3)	86
		1.9 (75)	18-19	225	2.1 (4.7)	1.8 (4.1)	87
		2.3 (90)	19-20	245	2.6 (5.7)	2.3 (5.0)	87
		2.8 (110)	20-21	275	3.2 (7.1)	2.8 (6.2)	87
		3.3 (130)	21-23	300	3.7 (8.3)	3.3 (7.3)	87
		3.8 (150)	22-23	325	4.3 (9.6)	3.8 (8.4)	87

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾In order to meet the alloy AWS requirements of the G group, the weld deposit needs to have the minimum, as specified in the table, of only one of these elements.

INNERSHIELD® NR®-440Ni2

Low Alloy, All Position ▪ AWS E71T8-Ni2-JH8, E71T8-A4-Ni2-H8

KEY FEATURES

- Designed to provide optimal weldability in narrow TKY joints and poor fit up conditions
- Expect fast travel speeds and a flat bead face when using vertical-up or vertical-down welding techniques
- Low temperature impact toughness, meets ABS 4YSA and AWS J classification
- Meets H8 diffusible hydrogen requirements over a range of humidity levels
- ProTech® hermetically sealed packaging
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online.

CONFORMANCES

AWS 5.29/A5.29M:	E71T8-Ni2-JH8
AWS A5.36:	E71T8-A4-Ni2-H8
ASME SFA-5.29	E71T8-Ni2-JH8
ABS	4YSAH10
DNV	IV YMS H10
LR	4YS H10

TYPICAL APPLICATIONS

- Offshore

WELDING POSITIONS

All

DIAMETERS / PACKAGING

Diameter in (mm)	8 lb (3.6 kg) Spool 48 lb (21.8 kg) Hermetically Sealed Pail	14 lb (6.4 kg) Coil 56 lb (25.4 kg) Hermetically Sealed Pail
1/16 (1.6)	ED034365	ED034200
5/64 (2.0)	ED034195	ED033827

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft·lbf) @-40°C (-40°F)
Requirements⁽⁴⁾ - AWS E71T8-Ni2-JH8	400 (58) min	480-655 (70-90)	22 min	27 (20) min
Typical Results⁽³⁾	400-485 (58-70)	490-570 (71-83)	22-36	215-460 (160-340)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Ni	%Si	%S	%P	%Al
Requirements AWS E71T8-Ni2-JH8	0.30 max	1.75 max	1.75-2.75	0.60 max	0.030 max	0.030 max	1.8 max
Typical Results^(3,4)	0.01-0.03	0.74-1.12	1.77-2.10	0.13-0.17	0.002-0.004	0.007-0.012	0.84-1.07

TYPICAL OPERATING PROCEDURES

Diameter, Polarity	CTWD 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 (%)
1.6 mm (1/16 in), DC-	22 (7/8)	2.3 (90)	17-18	160	1.6 (3.6)	1.1 (2.5)	69
		2.5 (100)	18-19	170	1.6 (3.6)	1.2 (2.8)	72
		2.8 (110)	18-19	180	2.0 (4.4)	1.4 (3.1)	73
		3.0 (120)	19-20	195	2.2 (4.8)	1.6 (3.5)	73
		3.3 (130)	19-20	210	2.3 (5.1)	1.7 (3.7)	73
2.0 mm (5/64 in), DC-	25 (1)	1.8 (70)	16-17	205	1.9 (4.2)	1.5 (3.2)	76
		2.0 (80)	17-18	225	2.2 (4.7)	1.6 (3.6)	77
		2.3 (90)	18-19	240	2.4 (5.3)	1.9 (4.2)	78
		2.5 (100)	19-20	260	2.7 (5.9)	2.1 (4.7)	79
		2.8 (110)	20-21	260	3.0 (6.5)	2.4 (5.2)	80
3.0 (120)	20-21	295	3.2 (7.1)	2.5 (5.6)	79		

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾The strength and elongation properties reported were obtained from a 2.8 mm (0.505 in) tensile specimen artificially aged at 104 °C (220 °F) for 48 hours, as permitted by AWS A5.20-05. A naturally aged tensile specimen may take months to achieve the specified properties. See AWS A5.20-05, paragraph A8.3. The time required for the natural aging of weld deposits is dependent upon ambient conditions, weldment geometry, the metallurgical structure of the weld deposit and other factors.

INNERSHIELD® NR®-555

Low Alloy, All Position ▪ AWS E81T8-G, E81T8-A5-K8-H8

KEY FEATURES

- Self-shielded electrode designed for welding in structural applications
- Welder friendly operability and flat bead face in out-of-position fillets and groove welds
- Meets AWS D1.8 seismic lot waiver requirements
- ProTech® foil bag packaging shields against moisture, prevents rust and prolongs storage life

WELDING POSITIONS

All

CONFORMANCES

AWS A5.29:	E81T8-G
AWS A5.36:	E81T8-A5-K8-H8
AWS D1.8	
ISO 17632-A:	T465ZYN1H10
JIS Z 3313:	T55 5 T7-1 N A N2M1-H10

TYPICAL INDUSTRY SEGMENTS

- Structural
- General Fabrication

DIAMETERS / PACKAGING

Diameters in (mm)	25 lb (11.3 kg) Plastic Spool
1/16 (1.6)	ED035565
5/64 (2.0)	ED035566

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft-lbf)		
				-46°C (-50°F)	-29°C (-20°F)	21°C (70°F)
Requirements AWS A5.29: E81T8-G	470 (68) min	550-690 (80-100) min	19	-	-	-
AWS A5.36: E81T8-A5-K8-H8				27 (20) min	-	-
AWS D1.8: 80 ksi Classification		550 (80) min		-	54 (40) min	54 (40) min
Typical Results⁽³⁾ AWS A5.36	550 (80)	630 (91)	25	100 (74)	-	-
AWS D1.8 High Heat Input (80 kJ/in)	490 (70)	615 (88)	26	-	64 (47)	143 (105)
AWS D1.8 Low Heat Input (30 kJ/in)	580 (84)	650 (93)	24	-	108 (80)	172 (127)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni
Requirements AWS A5.29: E81T8-G	0.15 max	1.00-2.00	0.40 max	0.030 max	0.030 max	0.50-1.50
AWS A5.36: E81T8-A5-K8-H8						
Typical Results⁽³⁾	0.05	1.84	0.17	0.001	0.011	1.12
	%Cr	%Mo	%V	%Al	Diffusible Hydrogen (mL/100g weld deposit)	
Requirements AWS A5.29: E81T8-G	0.20 max	0.20 max	0.05 max	1.80 max	-	
AWS A5.36: E81T8-A5-K8-H8					8 max	
Typical Results⁽³⁾	0.05	0.01	0.00	0.84	5	

TYPICAL OPERATING PROCEDURES

Diameter, Polarity Shielding Gas	CTWD ⁽⁴⁾ 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 (%)
1/16 in (1.6 mm), DC- Optimal Settings	22 (7/8)	2.8 (110)	19	185	2.0 (4.5)	1.5 (3.4)	77%
Min - Max	22 (7/8)	1.8-3.0 (75-120)	16-20	145-200	1.4-2.2 (3.0-4.9)	1.0-1.6 (2.2-3.6)	72-77%
5/64 in (2.0 mm), DC- Optimal Settings	22 (7/8)	2.8 (110)	19	245	2.9 (6.5)	2.5 (5.5)	85%
Min - Max	22 (7/8)	1.8-3.0 (75-120)	16-21	185-260	1.9-3.2 (4.1-7.1)	1.4-2.6 (3.0-5.8)	74-85%

⁽¹⁾Typical all weld metal. ⁽²⁾Measure with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾To estimate ESO, subtract 1/4 in. (6.0 mm) from CTWD.