

ULTRACORE® 360™ C71

Mild Steel, All Position ▪ AWS E71T-9C-JH4, E81T1-GC-H4, E71T1-C1A6-CS1-H4

KEY FEATURES

- Seamless design protects the flux core from environmental exposure helping to maintain low diffusible hydrogen and extend shelf life
- Copper coating offers superior feedability and extended contact tip life
- Low spatter and fume levels for less post-weld clean up and a better work environment
- Low H4 diffusible hydrogen levels minimize the risk of hydrogen induced cracking
- Premium arc performance and bead appearance

CONFORMANCES

AWS A5.20/A5.20M: E71T-9C-JH4
AWS A5.29/A5.29M: E81T1-GC-H4
AWS A5.36/A5.36M: E71T1-C1A6-CS1-H4

TYPICAL APPLICATIONS

- Offshore
- Shipbuilding
- Structural
- General Fabrication

WELDING POSITIONS

All

SHIELDING GAS

100% CO₂
 Flow rate: 42-53 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	27 lb (12.2kg) Plastic Spool
0.045 (1.1)	ED036167
0.052 (1.3)	ED036168
1/16 (1.6)	ED036169

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -40°C (-40°F)	@ -51°C (-60°F)
Requirements					
AWS A5.20: E71T-9C-JH4	390 (58) min	490-670 (70-95)	22 min	27 (20) min	-
AWS A5.29: E81T1-GC-H4	470 (68) min	550-690 (80-100)	19 min	-	-
AWS A5.36: E71T1-C1A6-CS1-H4	400 (58) min	490-660 (70-95)	22 min	-	27 (20) min
Typical Results⁽³⁾					
As-Welded with 100% CO ₂	510-600 (74-87)	590-650 (85-94)	24-29	60-155 (44-114)	62-137 (46-101)

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni
Requirements						
AWS A5.20: E71T-9C-JH4	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max	0.50 max
AWS A5.29: E81T1-GC-H4	Not Specified	0.50 ⁽⁴⁾	1.00 max	0.030 max	0.030 max	0.50 ⁽⁴⁾
AWS A5.36: E71T1-C1A6-CS1-H4	0.12 max	1.75 max	0.90 max	0.030 max	0.030 max	0.50 max
Typical Results⁽³⁾						
As-Welded with 100% CO ₂	0.04-0.08	1.19-1.41	0.37-0.47	0.003-0.005	0.012-0.013	0.35-0.38
	%Cr	%Mo	%V	%Cu	%B	Diffusible Hydrogen (mL/100g weld deposit)
Requirements						
AWS A5.20: E71T-9C-JH4	0.20 max	0.30 max	0.08 max	0.35 max	Not Specified	4.0 max
AWS A5.29: E81T1-GC-H4	0.30 ⁽⁴⁾	0.20 ⁽⁴⁾	0.10 ⁽⁴⁾	Not Specified		
AWS A5.36: E71T1-C1A6-CS1-H4	0.20 max	0.30 max	0.08 max	0.35 max		4 max
Typical Results⁽³⁾						
As-Welded with 100% CO ₂	0.02-0.03	0.00-0.01	0.01	0.23-0.28	0.003-0.004	1-4

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 100% CO ₂	25 (1)	6.4 (250)	24-29	175	2.7 (5.9)	2.4 (5.3)	88-93
		7.6 (300)	25-30	200	3.2 (7.0)	2.9 (6.4)	
		8.9 (350)	26-32	225	3.7 (8.2)	3.4 (7.5)	
		10.2 (400)	27-33	245	4.3 (9.4)	3.9 (8.6)	
		11.4 (450)	27-35	265	4.8 (10.6)	4.4 (9.7)	
		12.7 (500)	28-36	290	5.3 (11.7)	4.9 (10.9)	
0.052 in (1.3 mm), DC+ 100% CO ₂	25 (1)	5.1 (200)	23-27	200	2.8 (6.2)	2.6 (5.7)	91-93
		6.4 (250)	25-28	235	3.5 (7.7)	3.2 (7.1)	
		8.9 (350)	27-31	300	4.9 (10.8)	4.5 (10.0)	
		10.8 (425)	28-32	335	6.0 (13.1)	5.5 (12.1)	
		12.7 (500)	30-34	375	7.0 (15.4)	6.5 (14.2)	
1/16 in (1.6 mm), DC+ 100% CO ₂	25 (1)	3.8 (150)	23-27	230	3.1 (6.7)	2.8 (6.1)	92-96
		5.1 (200)	24-28	275	4.1 (9.0)	3.8 (8.4)	
		6.4 (250)	25-31	310	5.1 (11.3)	4.8 (10.6)	
		7.6 (300)	27-34	370	6.1 (13.5)	5.8 (12.8)	
		8.9 (350)	29-36	410	7.2 (15.8)	6.8 (15.0)	

⁽¹⁾Typical all weld metal. ⁽³⁾See test results disclaimer ⁽⁴⁾In order to meet the requirements of the G group, the undiluted weld metal shall have not less than the minimum specified for one or more of the elements listed. ⁽⁵⁾To estimate ESQ, subtract 1/4 in (6.0 mm) from CTWD. NOTE: This product contains micro-alloying elements. Additional information available upon request

ULTRACORE® 360™ M71

Mild Steel, All Position ■ AWS E71T-9M-JH4, E81T1-GM-H4, E71T1-M21A6-CS1-H4

KEY FEATURES

- Seamless design protects the flux core from environmental exposure helping to maintain low diffusible hydrogen and extend shelf life
- Copper coating offers superior feedability and extended contact tip life
- Low spatter and fume levels for less post-weld clean up and a better work environment
- Low H4 diffusible hydrogen levels minimize the risk of hydrogen induced cracking
- Premium arc performance and bead appearance

WELDING POSITIONS

All

CONFORMANCES

AWS A5.20/A5.20M: E71T-9M-JH4
AWS A5.29/A5.29M: E81T1-GM-H4
AWS A5.36/A5.36M: E71T1-M21A6-CS1-H4

TYPICAL APPLICATIONS

- Offshore
- Shipbuilding
- Structural
- General Fabrication

SHIELDING GAS

80% Ar, 20% CO₂
 Flow rate: 42-53 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	27 lb (12.2kg) Plastic Spool
0.045 (1.1)	ED036170
0.052 (1.3)	ED036171
1/16 (1.6)	ED036172

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -40°C (-40°F)	@ -51°C (-60°F)
Requirements					
AWS A5.20: E71T-9M-JH4	390 (58) min	490-670 (70-95)	22 min	27 (20) min	-
AWS A5.29: E81T1-GM-H4	470 (68) min	550-690 (80-100)	19 min	-	-
AWS A5.36: E71T1-M21A6-CS1-H4	400 (58) min	490-660 (70-95)	22 min	-	27 (20) min
Typical Results⁽³⁾					
As-Welded with 80% Ar/ 20% CO ₂	525-600 (76-87)	600-640 (87-93)	24-30	60-126 (44-93)	46-81 (34-60)

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni
Requirements						
AWS A5.20: E71T-9M-JH4	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max	0.50 max
AWS A5.29: E81T1-GM-H4	Not Specified	0.50 ⁽⁴⁾	1.00 max	0.030 max	0.030 max	0.50 ⁽⁴⁾
AWS A5.36: E71T1-M21A0-CS1-H8	0.12 max	1.75 max	0.90 max	0.030 max	0.030 max	0.50 max
Typical Results⁽³⁾						
As-Welded with 80% Ar/ 20% CO ₂	0.05-0.07	1.33-1.57	0.41-0.49	0.005-0.007	0.012-0.014	0.27-0.33
	%Cr	%Mo	%V	%Cu	%B	Diffusible Hydrogen (mL/100g weld deposit)
Requirements						
AWS A5.20: E71T-9M-JH4	0.20 max	0.30 max	0.08 max	0.35 max	Not Specified	4.0 max
AWS A5.29: E81T1-GM-H4	0.30 ⁽⁴⁾	0.20 ⁽⁴⁾	0.10 ⁽⁴⁾	Not Specified		
AWS A5.36: E71T1-M21A0-CS1-H8	0.20 max	0.30 max	0.08 max	0.35 max		4 max
Typical Results⁽³⁾						
As-Welded with 80% Ar/ 20% CO ₂	0.02	≤ 0.01	0.01	0.20-0.26	0.003-0.005	1-4

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 80% Ar/ 20% CO ₂	25 (1)	6.4 (250)	22-26	180	2.6 (5.7)	2.4 (5.2)	92-93
		7.6 (300)	23-27	190	3.1 (6.8)	2.9 (6.3)	
		8.9 (350)	24-28	215	3.6 (8.0)	3.3 (7.4)	
		10.2 (400)	25-29	235	4.1 (9.1)	3.8 (8.4)	
		11.4 (450)	26-30	245	4.6 (10.2)	4.3 (9.5)	
		12.7 (500)	27-32	270	5.2 (11.4)	4.8 (10.5)	
0.052 in (1.3 mm), DC+ 80% Ar/ 20% CO ₂	25 (1)	5.1 (200)	21-25	210	2.7 (6.0)	2.5 (5.6)	93-95
		6.4 (250)	24-28	245	3.4 (7.4)	3.2 (7.0)	
		8.9 (350)	26-30	305	4.7 (10.4)	4.4 (9.8)	
		10.8 (425)	27-31	345	5.7 (12.6)	5.4 (11.9)	
		12.7 (500)	28-32	380	6.7 (14.9)	6.4 (14.1)	
1/16 in (1.6 mm), DC+ 80% Ar/ 20% CO ₂	25 (1)	3.8 (150)	21-26	245	3.0 (6.6)	2.7 (6.0)	91-92
		5.1 (200)	22-27	290	4.0 (8.8)	3.6 (8.0)	
		6.4 (250)	24-30	325	5.0 (11.0)	4.6 (10.1)	
		7.6 (300)	25-31	360	6.0 (13.3)	5.5 (12.2)	
		8.9 (350)	26-32	405	7.0 (15.5)	6.4 (14.2)	

⁽¹⁾Typical all weld metal. ⁽³⁾See test results disclaimer ⁽⁴⁾In order to meet the requirements of the G group, the undiluted weld metal shall have not less than the minimum specified for one or more of the elements listed. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD. NOTE: This product contains micro-alloying elements. Additional information available upon request

ULTRACORE® 71A75 DUAL

Mild Steel, All Position ■ AWS E71T-9C-H8, E71T-9M-H8, E71T1-C1A2-CS1-H8, E71T1-M21A2-CS1-H8

KEY FEATURES

- Designed for welding with either 100% CO₂ or 75% Argon/25% CO₂ shielding gases
- Premium arc performance and bead appearance
- ProTech® foil bag packaging

WELDING POSITIONS

All

SHIELDING GAS

100% CO₂
75% Argon / 25% CO₂
Flow Rate: 40 - 50 CFH

CONFORMANCES

AWS A5.20/A5.20M:	E71T-1C-H8, E71T-1M-H8, E71T-9C-H8, E71T-9M-H8
AWS A5.36:	E71T1-C1A2-CS1-H8, E71T1-M21A2-CS1-H8
ASME SFA-A5.20:	E71T-1C-H8, E71T-1M-H8, E71T-9C-H8, E71T-9M-H8
CWB/CSA W48-06:	E491T-9 H8, E491T-9M H8
EN ISO 17632-B:	T493T1-1MA-H10, T493T1-1CA-H10

TYPICAL APPLICATIONS

- General fabrication

DIAMETERS / PACKAGING

Diameter in (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Spool*	50 lb (22.7 kg) Fiber Spool	500 lb (227 kg) Accu-Trak® Drum
0.045 (1.1)	ED031882	ED031669	ED031844	ED032044
0.052 (1.3)	ED031883	ED031670	ED031845	ED032045
1/16 (1.6)	ED031884	ED031671	ED031846	ED032046

*Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -18°C (0°F)	@ -29°C (-20°F)
Requirements⁽⁴⁾ AWS E71T-1C-H8, E71T-1M-H8 AWS E71T-9C-H8, E71T-9M-H8	400 (58) min	480-655 (70-95)	22 min	27 (20) min Not Specified	Not Specified 27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂ As-Welded with 75% Ar/25% CO ₂	510-550 (73-79) 570-610 (82-88)	570-600 (82-87) 620-660 (89-95)	26-28 24-26	38-95 (28-70) 62-111 (46-82)	27-65 (20-48) 39-85 (29-63)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ AWS E71T-1C-H8, E71T-1M-H8 AWS E71T-9C-H8, E71T-9M-H8	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max	8.0 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.03-0.04	1.28-1.41	0.42-0.49	0.01	0.01-0.02	3-8
As-Welded with 75% Ar/25% CO ₂	0.03-0.04	1.45-1.60	0.54-0.62	0.01	0.01-0.02	4-8

TYPICAL OPERATING PROCEDURES

Diameter, Polarity Shielding Gas ⁽⁵⁾	CTWD ⁽⁶⁾ 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+ 75% Ar/25% CO ₂	25 (1)	4.4 (175)	20-25	135	1.8 (4.0)	1.6 (3.5)	86-88
		6.4 (250)	21-26	150	2.6 (5.7)	2.3 (5.0)	
		7.6 (300)	22-27	165	3.1 (6.8)	2.7 (6.0)	
		8.9 (350)	23-28	190	3.6 (8.0)	3.2 (7.0)	
		10.2 (400)	24-29	205	4.1 (9.1)	3.6 (8.0)	
		11.4 (450)	25-30	225	4.7 (10.3)	4.1 (9.0)	
		12.7 (500)	26-31	245	5.2 (11.4)	4.5 (10.0)	
		14.0 (550)	27-32	265	5.7 (12.5)	5.0 (10.9)	
15.2 (600)	27-33	285	6.2 (13.7)	5.4 (11.9)			
0.052 in (1.3 mm), DC+ 75% Ar/25% CO ₂	25 (1)	3.8 (150)	20-25	155	2.0 (4.5)	1.8 (3.9)	86-88
		5.1 (200)	21-26	165	2.7 (6.0)	2.4 (5.2)	
		6.4 (250)	22-27	190	3.4 (7.5)	2.9 (6.5)	
		7.6 (300)	23-28	215	4.1 (9.0)	3.5 (7.8)	
		8.9 (350)	24-29	235	4.7 (10.5)	4.1 (9.1)	
		9.5 (375)	25-30	255	5.1 (11.2)	4.4 (9.8)	
		10.8 (425)	27-31	275	5.8 (12.7)	5.0 (11.1)	
		12.1 (475)	28-33	295	6.4 (14.2)	5.6 (12.4)	
12.7 (500)	29-35	325	6.8 (15.0)	5.9 (13.0)			
1/16 in (1.6 mm), DC+ 75% Ar/25% CO ₂	25 (1)	3.2 (125)	20-25	195	2.4 (5.3)	2.1 (4.6)	86-88
		4.4 (175)	21-26	215	3.3 (7.4)	2.9 (6.4)	
		5.1 (200)	22-27	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	23-28	265	4.3 (9.5)	3.7 (8.2)	
		6.4 (250)	24-29	285	4.8 (10.5)	4.2 (9.2)	
		7.6 (300)	25-31	315	5.7 (12.6)	5.0 (11.0)	
		8.3 (325)	25-32	335	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	26-33	365	6.7 (14.7)	5.8 (12.8)	
		10.2 (400)	28-35	405	7.6 (16.8)	6.6 (14.6)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer. ⁽⁴⁾As-Welded with 100% CO₂ & As-Welded 75% Argon / 25% CO₂. ⁽⁵⁾When welding under CO₂, increase voltage by 1 Volt. ⁽⁶⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD. NOTE: This product contains micro-alloying elements. Additional information available upon request

ULTRACORE® 71A85

Mild Steel, All Position ■ AWS E71T-9M-H8, E71T1-M21A2-CS1-H8



KEY FEATURES

- Designed for welding with 75 - 85% Argon/balance CO₂ shielding gas
- Premium arc performance and bead appearance
- Meets AWS D1.8 seismic lot waiver requirements
- ProTech® foil bag packaging

WELDING POSITIONS

All

SHIELDING GAS

75% - 85% Argon / Balance CO₂
Flow Rate: 40 - 50 CFH

CONFORMANCES

AWS A5.20/A5.20M:	E71T-1M-H8, E71T-9M-H8
AWS A5.36:	E71T1-M21A2-CS1-H8
ASME SFA-A5.20:	E71T-1M-H8, E71T-9M-H8
ABS:	3YSA H10
Lloyd's Register:	3YS H10
DNV Grade:	III YMS H10
CWB/CSA W48-06:	E491T-9M H8
EN ISO 17632-B:	T493T1-1MA-H10
AWS D1.8	

TYPICAL APPLICATIONS

- Shipbuilding
- Seismic structural fabrication
- General fabrication

DIAMETERS / PACKAGING

Diameter in (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Spool**	50 lb (22.7 kg) Fiber Spool	500 lb (227 kg) Accu-Trak® Drum
0.045 (1.1)	ED031885	ED031663, ED035592*	ED031847	ED032047
0.052 (1.3)	ED031886	ED031664, ED035591*	ED031848	ED032048
1/16 (1.6)	ED031887	ED031665, ED035590*	ED031849	ED032049

*Buy America Product **Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft-lbf)	
				@ -18°C (0°F)	@ -29°C (-20°F)
Requirements⁽⁴⁾ AWS E71T-1M AWS E71T-9M	400 (58) min	480-655 (70-95)	22 min	27 (20) min Not Specified	Not Specified 27 (20) min
Typical Results⁽³⁾ As-Welded with 75%-85% Ar/balance CO ₂	550-600 (80-88)	600-650 (87-94)	24 - 26	64-115 (47-85)	43-95 (32-70)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ AWS E71T-1M, E71T-9M	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max	8.0 max
Typical Results⁽³⁾ As-Welded with 75%-85% Ar/balance CO ₂	0.03-0.04	1.43-1.56	0.52-0.59	<0.01	0.01	6-8

TYPICAL OPERATING PROCEDURES

Diameter, Polarity Shielding Gas	CTWD ⁽²⁾ 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+ 75%-85% Ar/ balance CO ₂	25 (1)	4.4 (175)	21-26	125	1.8 (4.0)	1.6 (3.5)	86-88
		6.4 (250)	22-27	150	2.6 (5.7)	2.3 (5.0)	
		7.6 (300)	23-28	165	3.1 (6.8)	2.7 (6.0)	
		8.9 (350)	23-29	190	3.6 (8.0)	3.2 (7.0)	
		10.2 (400)	25-30	205	4.1 (9.1)	3.6 (8.0)	
		11.4 (450)	26-31	225	4.7 (10.3)	4.1 (9.0)	
		12.7 (500)	27-32	245	5.2 (11.4)	4.5 (10.0)	
		14.0 (550)	28-33	265	5.7 (12.5)	5.0 (10.9)	
0.052 in (1.3 mm), DC+ 75%-85% Ar/ balance CO ₂	25 (1)	3.8 (150)	21-26	150	2.0 (4.5)	1.8 (3.9)	86-88
		5.1 (200)	21-27	165	2.7 (6.0)	2.4 (5.2)	
		6.4 (250)	22-27	190	3.4 (7.5)	2.9 (6.5)	
		7.6 (300)	23-28	215	4.1 (9.0)	3.5 (7.8)	
		8.9 (350)	24-29	235	4.7 (10.5)	4.1 (9.1)	
		9.5 (375)	25-30	255	5.1 (11.2)	4.4 (9.8)	
		10.8 (425)	26-31	275	5.8 (12.7)	5.0 (11.1)	
		12.1 (475)	27-32	295	6.4 (14.2)	5.6 (12.4)	
1/16 in (1.6 mm), DC+ 75%-85% Ar/ balance CO ₂	25 (1)	3.2 (125)	20-25	185	2.4 (5.3)	2.1 (4.6)	86-88
		4.4 (175)	21-26	215	3.3 (7.4)	2.9 (6.4)	
		5.1 (200)	22-27	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	23-28	265	4.3 (9.5)	3.7 (8.2)	
		6.4 (250)	24-29	285	4.8 (10.5)	4.2 (9.2)	
		7.6 (300)	25-30	315	5.7 (12.6)	5.0 (11.0)	
		8.3 (325)	26-31	335	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	27-32	365	6.7 (14.7)	5.8 (12.8)	
10.2 (400)	28-33	385	7.6 (16.8)	6.6 (14.6)			

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 75%-85% Argon/Balance CO₂ ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.
NOTE 1: FEMA and AWS D1.8 structural steel seismic supplement test data can be found on this product at www.lincolnelectric.com. NOTE 2: This product contains micro-alloying elements.
Additional information available upon request.

ULTRACORE® 71C

Mild Steel, All Position ■ AWS E71T-9C-H8, E71T1-C1A2-CS1-H8



KEY FEATURES

- Designed for welding with 100% CO₂ shielding gas
- Premium arc performance and bead appearance
- Meets AWS D1.8 seismic lot waiver requirements
- ProTech® foil bag packaging

WELDING POSITIONS

All

SHIELDING GAS

100% CO₂
Flow Rate: 40 - 50 CFH

CONFORMANCES

AWS A5.20/A5.20M:	E71T-1C-H8, E71T-9C-H8
AWS A5.36:	E71T1-C1A2-CS1-H8
ASME SFA-A5.20:	E71T-1C-H8, E71T-9C-H8
ABS:	E71T-1C-H8, E71T-9C-H8
Lloyd's Register:	3YS H10
DNV Grade:	III YMS H10
CWB/CSA W48-06:	E491T-9 H8
EN ISO 17632-B:	T493T1-1CA- H10
AWS D1.8	

TYPICAL APPLICATIONS

- Shipbuilding
- Seismic structural fabrication
- General fabrication
- Barge and railcar fabrication

DIAMETERS / PACKAGING

Diameter in (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Spool**	50 lb (22.7 kg) Fiber Spool	500 lb (227 kg) Accu-Trak® Drum
0.045 (1.1)	ED031818	ED031666, ED033872*	ED031822	ED031876
0.052 (1.3)	ED031819	ED031667, ED033873*	ED031823	ED031877
1/16 (1.6)	ED031820	ED031668, ED033874*	ED031824, ED034410*	ED031878

*Buy America Product **Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft·lbf)	
				@ -18°C (0°F)	@ -29°C (-20°F)
Requirements⁽⁴⁾ AWS E71T-1C-H8 AWS E71T-9C-H8	400 (58) min	480-655 (70-95)	22 min	27 (20) min Not Specified	Not Specified 27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂	515-560 (74-81)	570-605 (82-87)	25-27	56-115 (41-85)	34-72 (25-53)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ AWS E71T-1C-H8 AWS E71T-9C-H8	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max	8.0 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.03-0.04	1.31-1.41	0.43-0.49	0.01	0.01	4-7

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 100% CO ₂	25 (1)	4.4 (175)	21-26	125	1.8 (4.0)	1.6 (3.5)	86-88
		6.4 (250)	22-27	155	2.6 (5.7)	2.3 (5.0)	
		7.6 (300)	23-28	165	3.1 (6.8)	2.7 (6.0)	
		8.9 (350)	24-29	190	3.6 (8.0)	3.2 (7.0)	
		10.2 (400)	25-30	205	4.1 (9.1)	3.6 (8.0)	
		11.4 (450)	26-31	230	4.7 (10.3)	4.1 (9.0)	
		12.7 (500)	27-32	245	5.2 (11.4)	4.5 (10.0)	
		14.0 (550)	28-33	265	5.7 (12.5)	5.0 (10.9)	
0.052 in (1.3 mm), DC+ 100% CO ₂	25 (1)	3.8 (150)	21-26	150	2.0 (4.5)	1.8 (3.9)	86-88
		5.1 (200)	22-27	165	2.7 (6.0)	2.4 (5.2)	
		6.4 (250)	23-28	190	3.4 (7.5)	2.9 (6.5)	
		7.6 (300)	24-29	215	4.1 (9.0)	3.5 (7.8)	
		8.9 (350)	25-30	235	4.7 (10.5)	4.1 (9.1)	
		9.5 (375)	26-31	255	5.1 (11.2)	4.4 (9.8)	
		10.8 (425)	28-33	275	5.8 (12.7)	5.0 (11.1)	
		12.1 (475)	29-34	295	6.4 (14.2)	5.6 (12.4)	
1/16 in (1.6 mm), DC+ 100% CO ₂	25 (1)	3.2 (125)	21-26	185	2.4 (5.3)	2.1 (4.6)	86-88
		4.4 (175)	22-27	215	3.3 (7.4)	2.9 (6.4)	
		5.1 (200)	23-28	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	24-29	265	4.3 (9.5)	3.7 (8.2)	
		6.4 (250)	25-30	285	4.8 (10.5)	4.2 (9.2)	
		7.6 (300)	27-31	315	5.7 (12.6)	5.0 (11.0)	
		8.3 (325)	26-33	335	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	29-34	365	6.7 (14.7)	5.8 (12.8)	
10.2 (400)	30-36	395	7.6 (16.8)	6.6 (14.6)			

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 100% CO₂ ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.
NOTE: FEMA and AWS D1.8 structural steel seismic supplement test data can be found on this product at www.lincolnelectric.com.

ULTRACORE® 712C

Mild Steel, All Position ■ AWS E71T-12C-JH8, E71T1-C1A4-CS2-H8



KEY FEATURES

- Capable of producing weld deposits with impact toughness exceeding 27 J (20 ft•lbf) at -40°C (-40°F)
- Designed for welding with 100% CO₂ shielding gas
- Premium arc performance and bead appearance
- ProTech® foil bag packaging

WELDING POSITIONS

All

SHIELDING GAS

100% CO₂
Flow Rate: 40-50 CFH

CONFORMANCES

AWS A5.20/A5.20M:	E71T-1C-JH8, E71T-9C-JH8, E71T-12C-JH8
AWS A5.36:	E71T1-C1A4-CS2-H8
ASME SFA-A5.20:	E71T-1C-JH8, E71T-9C-JH8, E71T-12C-JH8
ABS:	3YSA H10
Lloyd's Register:	3YS H10
DNV Grade:	III YMS H10
CWB/CSA W48-06:	E491T-12J H8, E491T-9J H8
EN ISO 17632-B:	T494T12-1CA-K-H10

TYPICAL APPLICATIONS

- Bridge fabrication
- Pressure vessels
- Shipbuilding
- Offshore
- ASME related applications

DIAMETERS / PACKAGING

Diameter in (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Spool**	50 lb (22.7 kg) Fiber Spool	500 lb (227 kg) Accu-Trak® Drum
0.045 (1.1)	ED031894	ED031672, ED032754*		ED031681
0.052 (1.3)	ED031895	ED031673, ED034418*	ED031839, ED034420*	ED031879
1/16 (1.6)	ED031896	ED031674, ED034419*	ED031840, ED034421*	ED031799

*Buy America Product **Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)		
				@ -18°C (0°F)	@ -29°C (-20°F)	@ -40°C (-40°F)
Requirements⁽⁴⁾ AWS E71T-1C-JH8 AWS E71T-9C-JH8 AWS E71T-12C-JH8	400 (58) min	480-655 (70-95) 480-620 (70-90)	22 min	27 (20) min Not Specified Not Specified	Not Specified 27 (20) min 27 (20) min	27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂	485-535 (70-77)	540-585 (78-84)	25-28	135-193 (100-143)	91-164 (67-121)	57-133 (42-98)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ AWS E71T-1C-JH8, E71T-9C-JH8 AWS E71T-12C-JH8	0.12 max	1.75 max 1.60 max	0.90 max	0.03 max	0.03 max	0.50 max	8.0 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.03	1.34-1.49	0.26-0.32	0.01	0.01-0.02	0.33-0.41	3-8

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ As-Welded with 100% CO ₂	25 (1)	4.4 (175)	24-29	115	1.8 (3.9)	1.5 (3.4)	85-88
		6.4 (250)	25-30	140	2.5 (5.6)	2.2 (4.8)	
		7.6 (300)	26-31	155	3.1 (6.8)	2.6 (5.8)	
		8.9 (350)	26-31	170	3.6 (7.9)	3.1 (6.8)	
		10.2 (400)	26-31	185	4.1 (9.0)	3.5 (7.8)	
		11.4 (450)	27-32	200	4.6 (10.1)	4.0 (8.8)	
		12.7 (500)	27-32	215	5.1 (11.3)	4.4 (9.8)	
		14.0 (550)	28-33	230	5.6 (12.4)	4.9 (10.8)	
		15.2 (600)	28-33	245	6.1 (13.5)	5.3 (11.7)	
0.052 in (1.3 mm), DC+ As-Welded with 100% CO ₂	25 (1)	3.8 (150)	24-29	140	2.1 (4.7)	1.7 (3.8)	85-88
		5.1 (200)	25-30	160	2.9 (6.3)	2.4 (5.2)	
		6.4 (250)	26-31	180	3.5 (7.8)	3.0 (6.5)	
		7.6 (300)	26-31	205	4.3 (9.4)	3.6 (7.9)	
		8.9 (350)	27-32	225	5.0 (11.0)	4.2 (9.2)	
		9.5 (375)	27-32	235	5.3 (11.7)	4.5 (9.9)	
		10.8 (425)	27-32	255	6.0 (13.3)	5.1 (11.2)	
		12.1 (475)	28-33	275	6.8 (14.9)	5.7 (12.6)	
		12.7 (500)	28-33	290	7.1 (15.6)	6.0 (13.3)	
1/16 in (1.6 mm), DC+ As-Welded with 100% CO ₂	25 (1)	3.8 (150)	23-28	200	2.9 (6.4)	2.4 (5.3)	85-88
		4.4 (175)	24-29	215	3.4 (7.5)	2.9 (6.3)	
		5.1 (200)	24-29	230	3.9 (8.5)	3.3 (7.2)	
		5.7 (225)	24-29	245	4.4 (9.6)	3.7 (8.1)	
		6.4 (250)	25-30	255	4.8 (10.6)	4.1 (9.1)	
		7.6 (300)	25-30	285	5.8 (12.7)	4.9 (10.9)	
		8.3 (325)	26-31	300	6.3 (13.8)	5.4 (11.9)	
		8.9 (350)	26-31	310	6.7 (14.8)	5.8 (12.8)	
		10.2 (400)	27-32	340	7.7 (16.9)	6.7 (14.7)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 100% CO₂ ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.
NOTE: This product contains micro-alloying elements. Additional information available upon request.

ULTRACORE® 712C-H PLUS

Mild Steel, All Positions ▪ AWS E71T-12C-JH4, E71T1-C1A6-CS2-H4, E81T1-GC

KEY FEATURES

- Innovative design capable of superior toughness at -50°F in both the as-welded and stress-relieved conditions
- Designed for welding with 100% CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

CONFORMANCES

AWS A5.20/A5.20M:	E71T-12C-JH4
AWS A5.36/A5.36M:	E71T1-C1A6-CS2-H4, E71T1-C1P5-CS2-H4
AWS A5.29/A5.29M:	E81T1-GC
ABS:	4YSA H5
Lloyds Register:	4YS H5
DNV Grade:	IV YMS H5
CWB/CSA W48-06:	E491T-12J H4

WELDING POSITIONS

All

SHIELDING GAS

100% CO₂
Flow Rate: 40-50 CFH

TYPICAL APPLICATIONS

- Offshore platforms & pipe systems
- Petrochemical pipelines
- Oil & gas pipelines
- Pressure vessels
- Bridge fabrication

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15kg) Plastic Spool
0.045 (1.1)	ED034849
0.052 (1.3)	ED034848
1/16 (1.6)	ED034850

MECHANICAL PROPERTIES⁽¹⁾ - As required per AWS A5.20/A5.20M, AWS A5.29/A5.29M & AWS A5.36/A5.36M

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft·lbf)		
				-40°C (40°F)	-46°C (-50°F)	@ -51°C (-60°F)
Requirements						
AWS A5.20: E71T-12C-JH4 As-Welded with 100% CO ₂	400 (58) min	480-620 (70-90)	22 min	27 (20) min	-	-
AWS A5.36: E71T1-C1A6-CS2-H4 As-Welded with 100% CO ₂	400 (58) min	480-655 (70-95)	22 min	-	-	27 (20) min
AWS A5.36: E71T1-C1P5-CS2-H4 Stress Relieved with 100% CO ₂ for 1 hr @ 621°C (1150°F)	400 (58) min	480-655 (70-95)	22 min	-	27 (20) min	-
AWS A5.29: E81T1-GC As-Welded with 100% CO ₂	470 (68)	550 (80)	19 min	-	-	-
Typical Results⁽³⁾						
As-Welded with 100% CO ₂	490-530 (71-77)	560-585 (81-85)	25-27	89-156 (66-115)	73-148 (54-109)	66-132 (49-97)
Stress Relieved with 100% CO ₂ for 1 hr @ 621°C (1150°F)	420-470 (61-68)	530-565 (77-82)	29-34	115-178 (85-131)	95-148 (70-109)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S
Requirements AWS A5.20: E71T-12C-JH4	0.12 max	1.60 max	0.90 max	0.03 max
AWS A5.36: E71T1-C1A6-CS2-H4, E71T1-C1P5-CS2-H4				0.030 max
AWS A5.29: E81T1-GC	–	–	–	–
Typical Results⁽³⁾ with 100% CO ₂	0.04-0.05	1.48-1.57	0.45-0.50	0.008
	%P	%Ni	Diffusible Hydrogen (mL/100g weld deposit)	
Requirements AWS A5.20: E71T-12C-JH4	0.03 max	0.50 max	4.0 max	
AWS A5.36: E71T1-C1A6-CS2-H4, E71T1-C1P5-CS2-H4	0.030 max		4 max	
AWS A5.29: E81T1-GC	–	–	–	
Typical Results⁽³⁾ with 100% CO ₂	0.013	0.02	2-4	

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 (%)
0.045 in (1.1 mm), DC+ 100% CO ₂							
Optimal Settings	22 (7/8)	11.2 (440)	29	220	1.8-6.1 (3.9-13.5)	1.5-5.1 (3.4-11.3)	83-88
Min - Max	19-25 (3/4-1)	4.4-13.3 (175-525)	23-32	115-245			
0.052 in (1.3 mm), DC+ 100% CO ₂							
Optimal Settings	25 (1)	8.6 (340)	30	235	2.1-7.1 (4.7-15.6)	1.7-6.0 (3.8-13.3)	80-86
Min - Max	19-25 (3/4-1)	3.8-10.2 (150-400)	23-32	140-290			
1/16 in (1.6 mm), DC+ 100% CO ₂							
Optimal Settings	25 (1)	7.6 (300)	28	295	2.9-6.7 (6.4-14.8)	2.4-5.8 (5.3-12.8)	82-87
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	22-31	200-360			

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

ULTRACORE® 712A80

Mild Steel, All Position ■ AWS E71T-12M-JH8, E71T1-M21A4-CS2-H8



KEY FEATURES

- Capable of producing weld deposits with impact toughness exceeding 27 J (20 ft•lbf) at -40°C (-40°F)
- Designed for welding with 75-80% Argon/balance CO₂ shielding gas
- Premium arc performance and bead appearance
- ProTech® foil bag packaging

WELDING POSITIONS

All

SHIELDING GAS

75% - 80% Argon / Balance CO₂
Flow Rate: 40 - 50 CFH

CONFORMANCES

AWS A5.20/A5.20M:	E71T-1M-JH8, E71T-9M-JH8, E71T-12M-JH8
AWS A5.36:	E71T1-M21A4-CS2-H8
ASME SFA-A5.20:	E71T-1M-JH8, E71T-9M-JH8, E71T-12M-JH8
ABS:	4YSA H10
Lloyd's Register:	4YS H10
DNV Grade:	IV YMS H10
CWB/CSA W48-06:	E491T-12MJ-H8, E491T-9MJ-H8
EN ISO 17632-B:	T494T12-1MA-K-H10

TYPICAL APPLICATIONS

- Offshore
- Pressure vessels
- Shipbuilding
- Heavy equipment
- ASME related applications

DIAMETERS / PACKAGING

Diameter in (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Spool**	50 lb (22.7 kg) Fiber Spool	500 lb (227 kg) Accu-Trak® Drum
0.045 (1.1)		ED031675	ED031850	ED032050
0.052 (1.3)	ED035405	ED031676	ED031851	ED032051
1/16 (1.6)	ED031890	ED031677, ED036415*	ED031852	ED032052

*Buy America Product **Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)		
				@ -18°C (0°F)	@ -29°C (-20°F)	@ -40°C (-40°F)
Requirements⁽⁴⁾ AWS E71T-1M-JH8 AWS E71T-9M-JH8 AWS E71T-12M-JH8	400 (58) min	480-655 (70-95) 480-620 (70-90)	22 min	27 (20) min Not Specified Not Specified	Not Specified 27 (20) min 27 (20) min	27 (20) min
Typical Results⁽³⁾ As-Welded with 75%-80% Ar/balance CO ₂	505-555 (73-80)	565-610 (82-88)	25-27	166-186 (123-137)	100-160 (74-118)	72-142 (53-105)

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded 75%-80% Argon/Balance CO₂

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ AWS E71T-1M-JH8, E71T-9M-JH8 AWS E71T-12M-JH8	0.12 max	1.75 max 1.60 max	0.90 max	0.03 max	0.03 max	0.50 max	8.0 max
Typical Results⁽³⁾ As-Welded with 75%-80% Ar/balance CO ₂	0.03-0.04	1.40-1.53	0.31-0.36	0.01	0.01	0.32-0.38	4 - 8

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 75%-80% Ar/ balance CO ₂	25 (1)	4.4 (175)	20-25	140	1.8 (4.0)	1.6 (3.5)	86-88
		5.7 (225)	21-26	150	2.3 (5.1)	2.0 (4.5)	
		7.0 (275)	22-27	165	2.8 (6.3)	2.5 (5.5)	
		8.3 (325)	22-27	190	3.4 (7.4)	2.9 (6.5)	
		8.9 (350)	23-28	205	3.6 (8.0)	3.2 (7.0)	
		10.2 (400)	24-29	230	4.1 (9.1)	3.6 (8.0)	
		11.4 (450)	25-31	245	4.7 (10.3)	4.1 (9.0)	
		12.1 (475)	26-32	265	4.9 (10.8)	4.3 (9.5)	
0.052 in (1.3 mm), DC+ 75%-80% Ar/ balance CO ₂	25 (1)	3.8 (150)	20-25	150	2.0 (4.5)	1.8 (3.9)	86-88
		4.4 (175)	21-26	165	2.4 (5.2)	2.1 (4.6)	
		5.1 (200)	22-27	190	2.7 (6.0)	2.4 (5.2)	
		5.7 (225)	23-28	215	3.1 (6.7)	2.7 (5.9)	
		6.4 (250)	24-29	235	3.4 (7.5)	2.9 (6.5)	
		7.6 (300)	25-30	255	4.1 (9.0)	3.5 (7.8)	
		8.3 (325)	27-31	275	4.4 (9.7)	3.8 (8.5)	
		8.9 (350)	28-32	295	4.7 (10.5)	4.1 (9.1)	
1/16 in (1.6 mm), DC+ 75%-80% Ar/ balance CO ₂	25 (1)	3.8 (150)	21-26	200	2.9 (6.3)	2.5 (5.5)	86-88
		4.4 (175)	22-27	215	3.3 (7.4)	2.9 (6.4)	
		5.1 (200)	22-28	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	24-29	265	4.3 (9.5)	3.7 (8.2)	
		6.4 (250)	25-30	285	4.8 (10.5)	4.2 (9.2)	
		7.6 (300)	26-31	315	5.7 (12.6)	5.0 (11.0)	
		8.3 (325)	27-32	335	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	28-33	365	6.7 (14.7)	5.8 (12.8)	
10.2 (400)	29-34	415	7.6 (16.8)	6.6 (14.6)			

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded 75%-80% Argon/Balance CO₂. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® 712A80-H

Mild Steel, All Position ■ AWS E71T-12M-JH4, E71T1-M21A4-CS2-H4

KEY FEATURES

- Capable of producing low hydrogen weld deposits with impact toughness exceeding 27 J (20 ft•lbf) at -40°C (-40°F)
- Designed for welding with 75-80% Argon/Balance CO₂ gas
- Premium arc performance and bead appearance
- ProTech® foil bag packaging
- Meets H4 diffusible hydrogen levels

WELDING POSITIONS

All

SHIELDING GAS

75% - 80% Argon / Balance CO₂
Flow Rate: 40 - 50 CFH

CONFORMANCES

AWS A5.20/A5.20M:	E71T-1M-JH4, E71T-9M-JH4, E71T-12M-JH4
AWS A5.36:	E71T1-M21A4-CS2-H4
ASME SFA-A5.20:	E71T-1M-JH4, E71T-9M-JH4, E71T-12M-JH4
ABS:	4YSA H5
Lloyd's Register:	4YS H5
DNV Grade:	IV YMS H5
CWB/CSA W48-06:	E491T-12MJ H4, E491T-9MJ H4
EN ISO 17632-B:	T494T12-1MA-K-H5

TYPICAL APPLICATIONS

- Offshore
- Heavy equipment
- Shipbuilding
- Pressure vessels

DIAMETERS / PACKAGING

Diameter in (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Spool*
0.045 (1.1)	ED031891	ED031678
0.052 (1.3)		ED031679
1/16 (1.6)	ED031893	ED031680

*Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)		
				@ -18°C (0°F)	@ -29°C (-20°F)	@ -40°C (-40°F)
Requirements⁽⁴⁾ AWS E71T-1M-JH4 AWS E71T-9M-JH4 AWS E71T-12M-JH4	400 (58) min	480-655 (70-95) 480-620 (70-90)	22 min	27 (20) min Not Specified Not Specified	Not Specified 27 (20) min 27 (20) min	27 (20) min
Typical Results⁽³⁾ As-Welded with 75%-80% Ar/balance CO ₂	490-570 (71-83)	550-615 (80-89)	27-28	149-180 (111-133)	56-164 (41-121)	27-98 (20-72)

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer. ⁽⁴⁾As-Welded 75%-80% Argon/Balance CO₂.

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ AWS E71T-1M-JH4, E71T-9M-JH4 AWS E71T-12M-JH4	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max	0.50 max	4.0 max
		1.60 max					
Typical Results⁽³⁾ As-Welded with 75%-80% Ar/balance CO ₂	0.03-0.04	1.25-1.37	0.28-0.33	0.01	0.01	0.35-0.41	2-4

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 75%-80% Ar/ balance CO ₂	25 (1)	4.4 (175)	21-25	140	1.8 (4.0)	1.6 (3.5)	86-88
		5.1 (200)	22-26	150	2.1 (4.6)	1.8 (4.0)	
		6.4 (250)	23-27	165	2.6 (5.7)	2.3 (5.0)	
		7.6 (300)	23-28	190	3.1 (6.8)	2.7 (6.0)	
		8.9 (350)	24-29	205	3.6 (8.0)	3.2 (7.0)	
		9.5 (375)	25-30	230	3.9 (8.6)	3.4 (7.5)	
		10.8 (425)	26-31	245	4.4 (9.7)	3.8 (8.5)	
		12.1 (475)	27-32	265	4.9 (10.8)	4.3 (9.5)	
12.7 (500)	28-33	275	5.2 (11.4)	4.5 (10.0)			
0.052 in (1.3 mm), DC+ 75%-80% Ar/ balance CO ₂	25 (1)	3.8 (150)	21-25	150	2.0 (4.5)	1.8 (3.9)	86-88
		4.7 (185)	22-26	165	2.5 (5.5)	2.2 (4.8)	
		5.7 (225)	23-27	190	3.1 (6.7)	2.7 (5.9)	
		6.4 (250)	24-28	215	3.4 (7.5)	2.9 (6.5)	
		6.9 (275)	24-29	235	3.7 (8.2)	3.2 (7.2)	
		7.6 (300)	24-30	255	4.1 (9.0)	3.5 (7.8)	
		8.5 (335)	25-31	275	4.5 (10.0)	4.0 (8.7)	
		9.5 (375)	26-32	295	5.1 (11.2)	4.4 (9.8)	
10.2 (400)	26-33	310	5.4 (12.0)	4.7 (10.4)			
1/16 in (1.6 mm), DC+ 75%-80% Ar/ balance CO ₂	25 (1)	3.8 (150)	22-26	200	2.9 (6.3)	2.5 (5.5)	86-88
		4.4 (175)	23-27	210	3.3 (7.4)	2.9 (6.4)	
		5.1 (200)	24-29	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	24-29	265	4.3 (9.5)	3.7 (8.2)	
		6.4 (250)	24-30	285	4.8 (10.5)	4.2 (9.2)	
		6.9 (275)	26-31	315	5.3 (11.6)	4.6 (10.1)	
		8.3 (325)	27-32	335	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	28-33	365	6.7 (14.7)	5.8 (12.8)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer. ⁽⁴⁾As-Welded 75%-80% Argon/Balance CO₂. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.
NOTE: This product contains micro-alloying elements. Additional information available upon request.

ULTRACORE® 712A80-H PLUS

Mild Steel, All Positions ▪ AWS E71T-12M-JH4, E71T1-M21A6-CS2-H4, E81T1-GM

KEY FEATURES

- Innovative design capable of superior toughness at -50°F in both the as-welded and stress-relieved conditions
- Designed for welding with 75-80% Argon/Balance CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

CONFORMANCES

AWS A5.20/A5.20M:	E71T-12M-JH4
AWS A5.36/A5.36M:	E71T1-M21A6-CS2-H4, E71T1-M21P5-CS2-H4
AWS A5.29/A5.29M:	E81T1-GM
ASME SFA-5.20/SFA-5.20M:	E71T-12M-JH4
ABS:	4YSA H5
Lloyds Register:	4YS H5
DNV Grade:	IV YMS H5
CWB/CSA W48-06:	E491T-12MJ H4

WELDING POSITIONS

All

SHIELDING GAS

75-80% Argon / Balance CO₂
Flow Rate: 40-50 CFH

TYPICAL APPLICATIONS

- Offshore Platforms & Pipe Systems
- Oil & Gas Pipelines
- Petrochemical Pipelines
- Pressure Vessels
- Bridge Fabrication

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15kg) Plastic Spool
0.045 (1.1)	ED034845
0.052 (1.3)	ED034846
1/16 (1.6)	ED034847

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft·lbf)		
				-40°C (40°F)	-45°C (-50°F)	@ -51°C (-60°F)
Requirements						
AWS A5.20: E71T-12M-JH4 As-Welded with 75-80% Ar/balance CO ₂	400 (58) min	480-620 (70-90)	22 min	27 (20) min	-	-
AWS A5.36: E71T1-M21A6-CS2-H4 As-Welded with 75-80% Ar/balance CO ₂	400 (58) min	480-655 (70-95)	22 min	-	-	27 (20) min
AWS A5.36: E71T1-M21P5-CS2-H4 Stress Relieved with 75-80% Ar/ balance CO ₂ for 1 hr @ 621°C (1150°F)	400 (58) min	480-655 (70-95)	22 min	-	27 (20) min	-
AWS A5.29: E81T1-GM As-Welded with 75-80% Ar/balance CO ₂	470 (68) min	550-690 (80-100)	19 min	-	-	-
Typical Results⁽³⁾						
As-Welded with 75-80% Ar/balance CO ₂	530-545 (77-79)	590-605 (86-88)	26-28	95-150 (69-112)	65-145 (49-106)	75-140 (55-102)
Stress Relieved with 75-80% Ar/balance CO ₂ for 1 hr @ 621°C (1150°F)	445-470 (65-68)	545-565 (79-82)	31-33	85-150 (62-109)	60-125 (43-91)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S
Requirements AWS A5.20: E71T-12M-JH4	0.12 max	1.60 max	0.90 max	0.03 max
AWS A5.36: E71T1-M21A6-CS2-H4, E71T1-M21P5-CS2-H4				0.030 max
AWS A5.29: E81T1-GM				
Typical Results⁽³⁾ with 75-80% Ar / Balance CO ₂	0.04-0.05	1.40-1.48	0.44-0.46	0.008
	%P	%Ni	Diffusible Hydrogen (mL/100g weld deposit)	
Requirements AWS A5.20: E71T-12M-JH4	0.03 max	0.50 max	4.0 max	
AWS A5.36: E71T1-M21A6-CS2-H4, E71T1-M21P5-CS2-H4	0.030 max		4 max	
AWS A5.29: E81T1-GM				
Typical Results⁽³⁾ with 75-80% Ar / Balance CO ₂	0.015	0.04	2-4	

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 (%)
0.045 in (1.1 mm), DC+ 75-80% Ar/balance CO ₂							
Optimal Settings	22 (7/8)	11.2 (440)	28	220	1.8-5.2 (4.0-11.4)	1.6-4.7 (3.5-10.4)	84-91
Min - Max	19-25 (3/4-1)	4.4-12.7 (175-500)	21-33	140-275			
0.052 in (1.3 mm), DC+ 75-80% Ar/balance CO ₂							
Optimal Settings	25 (1)	8.6 (340)	29	235	2.0-5.4 (4.5-12.0)	1.8-4.7 (3.9-10.4)	84-87
Min - Max	19-25 (3/4-1)	3.8-10.2 (150-400)	21-33	150-310			
1/16 in (1.6 mm), DC+ 75-80% Ar/balance CO ₂							
Optimal Settings	25 (1)	7.6 (300)	27	295	2.9-6.7 (6.3-14.7)	2.5-5.8 (5.5-12.8)	83-87
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	22-33	200-365			

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

ULTRACORE® CLARITY™ C71 LE

Mild Steel, All Positions ▪ AWS E71T-1C-H8, E71T1-C1A0-CS1-H8

KEY FEATURES

- The lowest Manganese Generation Rate (MnGR) of any similarly classified electrode
- Over 80% reduction in MnGR when compared to a standard E71T-1C flux-cored electrode
- Assists efforts to reduce exposure to Mn
- Designed for welding with 100% CO₂ shielding gas
- H8 diffusible hydrogen levels.
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS A5.20/A5.20M: E71T-1C-H8
AWS A5.36/A5.36M: E71T1-C1A0-CS1-H8
CWB/CSA W48-06: E491T-1-H8*
**1/16 diameter only, others pending*

TYPICAL APPLICATIONS

- General Fabrication
- Non-Critical Applications

SHIELDING GAS

100% CO₂
 Flow rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (14.9kg) Fiber Spool
0.045 (1.1)	ED036255
1/16 (1.6)	ED036254

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft-lbf) @-18°C (0°F)
Requirements				
AWS A5.20: E71T-1C-H8	400 (58) min	480-655 (70-95)	22 min	27 (20) min
AWS A5.36: E71T1-C1A0-CS1-H8	400 (58) min	480-655 (70-95)	22 min	27 (20) min
Typical Results⁽³⁾				
As-Welded with 100% CO ₂	405-440 (59-64)	490-530 (71-77)	25-31	34-96 (25-71)

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S
Requirements				
AWS A5.20: E71T-1C-H8	0.12 max	1.75 max	0.90 max	0.03 max
AWS A5.36: E71T1-C1A0-CS1-H8				0.030 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.08	0.11-0.13	0.40-0.50	0.005
	%P	%Ni	Diffusible Hydrogen (ml/100g weld deposit)	
Requirements				
AWS A5.20: E71T-1C-H8	0.03 max	0.50 max	8.0 max	
AWS A5.36: E71T1-C1A0-CS1-H8	0.030 max		8 max	
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.010	0.38-0.50	3-5	

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 (%)
0.045 in (1.1 mm), DC+ 100% CO ₂	19 - 25 (3/4 - 1)	5.1 (200)	21-25	130	2.0 (4.5)	1.7 (3.7)	82-88
		6.4 (250)	22-26	140	2.5 (5.6)	2.1 (4.7)	
		7.6 (300)	23-28	165	3.0 (6.7)	2.6 (5.8)	
		8.9 (350)	25-30	190	3.5 (7.8)	3.1 (6.8)	
		10.2 (400)	26-31	205	4.1 (9.0)	3.5 (7.8)	
		11.4 (450)	27-32	215	4.6 (10.1)	4.0 (8.8)	
		12.7 (500)	28-33	225	5.1 (11.2)	4.4 (9.7)	
1/16 in (1.6 mm), DC+ 100% CO ₂	19 - 25 (3/4 - 1)	3.2 (125)	24-27	180	2.4 (5.3)	2.0 (4.3)	82-88
		3.8 (150)	25-28	205	2.9 (6.4)	2.6 (5.7)	
		5.1 (200)	25-29	235	3.8 (8.4)	3.3 (7.3)	
		6.4 (250)	26-30	260	4.7 (10.4)	4.1 (9.1)	
		7.6 (300)	27-31	310	5.7 (12.5)	5.1 (11.0)	
		10.2 (400)	31-34	390	7.7 (16.9)	6.8 (14.9)	
		12.7 (500)	33-36	450	11.5 (25.4)	8.6 (18.9)	

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

ULTRACORE® CLARITY™ M71 LE

Mild Steel, All Positions ▪ AWS E71T-1M-H8, E71T1-M21A0-CS1-H8

KEY FEATURES

- The lowest Manganese Generation Rate (MnGR) of any similarly classified electrode
- Over 80% reduction in MnGR when compared to a standard E71T1-1M flux-cored electrode
- Assists efforts to reduce exposure to Mn
- Designed for welding with 75% Argon / 25% CO₂ shielding gas
- H8 diffusible hydrogen levels
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS A5.20/A5.20M: E71T-1M-H8
AWS A5.36/A5.36M: E71T1-M21A0-CS1-H8
CWB/CSA W48-06: E491T-9M-H8*

**1/16 diameter only, others pending*

TYPICAL APPLICATIONS

- General Fabrication
- Non-Critical Applications

SHIELDING GAS

75% Argon / 25% CO₂
 Flow rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (14.9kg) Fiber Spool
0.045 (1.1)	ED036253
1/16 (1.6)	ED036252

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft·lbf) @-18°C (0°F)
Requirements				
AWS A5.20: E71T-1M-H8	400 (58) min	480-655 (70-95)	22 min	27 (20) min
AWS A5.36: E71T1-M21A0-CS1-H8	400 (58) min	480-655 (70-95)	22 min	27 (20) min
Typical Results⁽³⁾				
As-Welded with 75% Ar/25% CO ₂	430-440 (62-64)	525-540 (76-78)	25-26	38-85 (28-63)

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S
Requirements				
AWS A5.20: E71T-1M-H8	0.12 max	1.75 max	0.90 max	0.03 max
AWS A5.36: E71T1-M21A0-CS1-H8				0.030 max
Typical Results⁽³⁾				
As-Welded with 75% Ar/25% CO ₂	0.08-0.09	0.12-0.14	0.49-0.54	0.006-0.007
	%P	%Ni	Diffusible Hydrogen (ml/100g weld deposit)	
Requirements				
AWS A5.20: E71T-1M-H8	0.03 max	0.50 max	8.0 max	
AWS A5.36: E71T1-M21A0-CS1-H8	0.030 max		8 max	
Typical Results⁽³⁾				
As-Welded with 75% Ar/25% CO ₂	0.010	0.44-0.46	4-6	

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 (%)
0.045 in (1.1 mm), DC+ 75% Ar/25% CO ₂	19 - 25 (3/4 - 1)	5.1 (200)	20-24	165	2.1 (4.6)	1.8 (4.0)	84-88
		6.4 (250)	21-25	180	2.6 (5.8)	2.3 (5.1)	
		7.6 (300)	22-26	215	3.1 (6.9)	2.8 (6.1)	
		8.9 (350)	23-26	235	3.7 (8.1)	3.3 (7.2)	
		10.2 (400)	24-29	260	4.2 (9.3)	3.7 (8.2)	
		11.4 (450)	25-30	280	4.8 (10.6)	4.3 (9.4)	
1/16 in (1.6 mm), DC+ 75% Ar/25% CO ₂	19 - 25 (3/4 - 1)	12.7 (500)	26-31	300	5.1 (11.2)	4.8 (10.5)	83-90
		3.2 (125)	22-25	170	2.2 (4.9)	2.0 (4.5)	
		3.8 (150)	22-25	185	2.9 (6.3)	2.5 (5.6)	
		5.1 (200)	23-26	230	3.8 (8.4)	3.3 (7.3)	
		6.4 (250)	24-27	260	4.7 (10.4)	4.2 (9.2)	
		7.6 (300)	25-29	295	6.8 (14.9)	5.1 (11.3)	
		10.2 (400)	27-31	325	7.6 (16.7)	6.8 (14.9)	
12.7 (500)	29-33	460	9.5 (21.0)	8.6 (19.0)			

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

ULTRACORE® HD-C

Mild Steel, All Position ■ AWS E71T-9C-H8, E71T1-C1A2-CS1-H8

KEY FEATURES

- High deposition rates, increase weld deposition exceeding 10 lbs/hr out-of-position
- Fast freezing slag for a flat bead shape and increased productivity in all positions, including vertical up
- Operators can set the machine on a single setting and weld in all positions
- Little or no pre-weld clean up required, weld over light rust, mill scale, and primer
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS 5.20/A5.20M:	E71T-1C-H8, E71T-9C-H8
AWS A5.36:	E71T1-C1A2-CS1-H8
ABS:	3YSA H10
Lloyd's Register:	3YS H10
DNV:	III YMS H10
CWB/CSA W48-06:	E491T-9-H8
EN ISO 17632-B	T493T1-1CA-H10

TYPICAL APPLICATIONS

- Shipbuilding
- General fabrication

SHIELDING GAS

100% CO₂
Flow Rate: 40 - 50 CFH

DIAMETERS / PACKAGING

Diameter in. (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Spool*	50 lb (22.7 kg) Fiber Spool	500 lb (227 kg) Accu-Trak® Drum
0.045 (1.1)	ED033756	ED033755	ED033757	
0.052 (1.3)	ED033759	ED033758	ED033760	ED034376
1/16 (1.6)	ED033762	ED033761	ED033763	ED033785

*Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft·lbf)	
				@ -18°C (0°F)	@ -29°C (-20°F)
Requirements AWS E71T-1C-H8 AWS E71T-9C-H8	400 (58) min	480-660 (70-95)	22 min	27 (20) min Not Specified	Not Specified 27 (20) min
Test Results⁽³⁾ - As-Welded with 100% CO ₂	540-560 (78-81)	590-610 (86-89)	27	37-111 (27-82)	31-85 (23-63)

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si
Requirements - AWS E71T-1C-H8, E71T-9C-H8	0.12 max	1.75 max	0.90 max
Test Results⁽³⁾ - As-Welded with 100% CO ₂	0.04-0.05	1.36-1.46	0.38-0.42
	%S	%P	Diffusible Hydrogen (mL/100g weld deposit)
Requirements - AWS E71T-1C-H8, E71T-9C-H8	0.03 max	0.03 max	8 max
Test Results⁽³⁾ - As-Welded with 100% CO ₂	0.01	0.01	4-6

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 (%)
0.045 in (1.1 mm), DC+ 100% CO ₂	19 - 25 (3/4 - 1)	4.4 (175)	22-25	145	1.8 (3.9)	1.5 (3.4)	85 - 87
		6.4 (250)	23-28	185	2.5 (5.6)	2.2 (4.8)	
		7.6 (300)	24-30	215	3.1 (6.8)	2.6 (5.8)	
		8.9 (350)	25-31	235	3.6 (7.9)	3.1 (6.8)	
		10.2 (400)	27-32	255	4.1 (9.0)	3.5 (7.8)	
		11.4 (450)	28-33	280	4.6 (10.1)	4.0 (8.8)	
		12.7 (500)	27-33	300	5.1 (11.3)	4.4 (9.8)	
		14.0 (550)	28-33	315	5.6 (12.4)	4.9 (10.8)	
15.2 (600)	30-35	335	6.1 (13.5)	5.3 (11.7)			
0.052 in (1.3 mm), DC+ 100% CO ₂	19 - 25 (3/4 - 1)	3.8 (150)	22-25	155	2.1 (4.7)	1.7 (3.8)	81 - 85
		5.1 (200)	23-26	190	2.9 (6.3)	2.4 (5.2)	
		6.4 (250)	23-27	225	3.5 (7.8)	2.9 (6.5)	
		7.6 (300)	24-29	265	4.3 (9.4)	3.6 (7.9)	
		8.9 (350)	26-30	285	5.0 (11.0)	4.2 (9.2)	
		9.5 (375)	27-30	310	5.3 (11.7)	4.5 (9.9)	
		10.8 (425)	28-32	325	6.0 (13.3)	5.1 (11.2)	
		12.1 (475)	29-33	345	6.8 (14.9)	5.7 (12.6)	
12.7 (500)	30-34	360	7.1 (15.6)	6.0 (13.3)			
1/16 in (1.6 mm), DC+ 100% CO ₂	19 - 25 (3/4 - 1)	3.8 (150)	21-26	195	2.9 (6.4)	2.4 (5.3)	84 - 87
		4.4 (175)	22-27	245	3.4 (7.5)	2.9 (6.3)	
		5.1 (200)	22-27	260	3.9 (8.5)	3.3 (7.2)	
		5.7 (225)	23-28	290	4.4 (9.6)	3.7 (8.1)	
		6.4 (250)	24-29	310	4.8 (10.6)	4.1 (9.1)	
		7.6 (300)	25-30	330	5.8 (12.7)	4.9 (10.9)	
		8.3 (325)	25-30	365	6.3 (13.8)	5.4 (11.9)	
		8.9 (350)	26-30	390	6.7 (14.8)	5.8 (12.8)	
10.2 (400)	27-31	405	7.7 (16.9)	6.7 (14.7)			

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 100% CO₂ ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® HD-M

Mild Steel, All Position ■ AWS E71T-9M-H8, E71T1-M21A2-CS1-H8

KEY FEATURES

- Increase weld deposition to more than 10 lbs./hr. out-of-position
- Fast freezing slag for a flat bead shape and increased productivity in all positions, including vertical up
- Operators can set the machine on a single setting and weld in all positions
- ProTech® foil bag packaging

WELDING POSITIONS

All

SHIELDING GAS

75% Argon / Balance CO₂
Flow Rate: 40 - 50 CFH

CONFORMANCES

AWS A5.20/A5.20M:	E71T-1M-H8, E71T-9M-H8
AWS A5.36:	E71T1-M21A2-CS1-H8
ASME SFA-5.20:	E71T-1M-H8, E71T-9M-H8
CWB / CSA W48-06:	E491T-1M-H8, E491T-9M-H8
ABS:	3YSA H10
Lloyd's Register	3YS H10
DNV:	III YMS (H10)
EN ISO 17632-B	T493T1-1MA-H10

TYPICAL APPLICATIONS

- Shipbuilding
- General fabrication

DIAMETERS / PACKAGING

Diameter in. (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Fiber Spool (Plastic Bag)	50 lb (23 kg) Fiber Spool (Plastic Bag)
0.045 (1.1)	ED033986	ED033989	ED033992
0.052 (1.3)	ED033987	ED033990	ED033993
1/16 (1.6)	ED033988	ED033991	ED033994

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft·lbf)	
				@ -18°C (0°F)	@ -29°C (-20°F)
Requirements AWS E71T-1M-H8 AWS E71T-9M-H8	400 (58) min	480-655 (70-95)	22 min	27 (20) min Not Specified	Not Specified 27 (20) min
Test Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂	570-588 (83-85)	615-633 (89-92)	26-28	54-74 (40-54)	31-43 (23-32)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS E71T-1M-H8, E71T-9M-H8	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max	8 max
Test Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂	0.04-0.05	1.44-1.50	0.49-0.53	<0.01	0.01	3-7

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 (%)
0.045 in (1.1 mm), DC+ 75% Argon / 25% CO ₂	25 (1)	4.4 (175)	21-26	130	1.8 (4.0)	1.6 (3.5)	87 - 88
		6.4 (250)	22-27	155	2.6 (5.7)	2.3 (5.0)	
		7.6 (300)	23-28	170	3.1 (6.9)	2.7 (6.0)	
		8.9 (350)	23-29	190	3.6 (8.0)	3.2 (7.0)	
		10.2 (400)	25-30	205	4.1 (9.1)	3.6 (8.0)	
		11.4 (450)	26-31	225	4.7 (10.3)	4.1 (9.0)	
		12.7 (500)	27-33	230	5.2 (11.4)	4.5 (9.9)	
		15.2 (600)	28-33	245	5.7 (12.6)	4.9 (10.9)	
0.052 in (1.3 mm), DC+ 75% Argon / 25% CO ₂	25 (1)	3.8 (150)	22-26	145	2.0 (4.5)	1.8 (3.9)	87 - 88
		5.1 (200)	23-27	170	2.7 (6.0)	2.4 (5.2)	
		6.4 (250)	23-28	190	3.4 (7.5)	2.9 (6.5)	
		7.6 (300)	24-29	215	4.1 (9.0)	3.5 (7.8)	
		8.9 (350)	24-30	235	4.8 (10.5)	4.1 (9.1)	
		9.5 (375)	25-30	250	5.1 (11.2)	4.4 (9.8)	
		10.8 (425)	26-31	270	5.8 (12.7)	5.0 (11.1)	
		12.7 (500)	26-32	295	6.4 (14.2)	5.6 (12.4)	
1/16 in (1.6 mm), DC+ 75% Argon / 25% CO ₂	25 (1)	3.8 (150)	22 - 26	195	2.9 (6.3)	2.5 (5.5)	86 - 87
		4.4 (175)	23 - 26	215	3.4 (7.4)	2.9 (6.4)	
		5.1 (200)	23 - 27	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	24 - 28	255	4.3 (9.5)	3.7 (8.2)	
		6.4 (250)	25 - 29	270	4.8 (10.5)	4.1 (9.1)	
		7.6 (300)	25 - 30	310	5.7 (12.6)	5.0 (11.0)	
		8.3 (325)	26 - 31	330	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	28 - 32	350	6.7 (14.7)	5.8 (12.8)	
10.2 (400)	28 - 33	390	7.6 (16.8)	6.6 (14.6)			

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

ULTRACORE® HD-12C

Mild Steel, All Position ■ AWS E71T-12C-JH8, E71T1-C1A4-CS2-H8

KEY FEATURES

- Increase weld deposition to more than 14 lbs/hr out-of-position
- Fast freezing slag for a flat bead shape and increased productivity in all positions
- Operators can set the machine on a single setting and weld in all positions
- Weld over light rust, mill scale, and primer
- Capable of exceeding 27 J (20 ft•lbf) at -40°C (-40°F)
- ProTech® foil bag packaging

WELDING POSITIONS

All

SHIELDING GAS

100% CO₂
Flow Rate: 40 - 50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Fiber Spool
0.045 (1.1)	ED035631	ED034274
0.052 (1.3)	ED035632	ED034275
1/16 (1.6)	ED036295	ED034276

CONFORMANCES

AWS A5.20/5.20M:	E71T-12C-JH8, E71T-1C-JH8, E71T-9C-JH8
AWS A5.36:	E71T1-C1A4-CS2-H8
ASME SFA-5.20:	E71T-12C-JH8, E71T-1C-JH8, E71T-9C-JH8
ABS:	3YSA H10
EN ISO 17632-B	T494T12-1CAK-H10
CWB / CSA W48-06:	E491T-12J-H8 E491T-9J-H8

TYPICAL APPLICATIONS

- Heavy Fabrication
- Mining
- General Fabrication
- Structural
- Applications requiring PWHT of mild steels

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -29°C (-20°F)	@ -40°C (-40°F)
Requirements⁽⁴⁾ AWS A5.20: E71T-12C-JH8 AWS A5.36: E71T1-C1A4-CS2-H8	400 (58) min	480-620 (70-90) 480-660 (70-95)	22 min	-	27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂ Stress-Relieved for 1 hr @ 620°C (1150°F)	538 (78) 496 (72)	593 (86) 579 (84)	28 28	93 (68) 58 (43)	51 (38) -

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%Ni
Requirements⁽⁴⁾ AWS A5.20: E71T-12C-JH8 AWS A5.36: E71T1-C1A4-CS2-H8	0.12 max	1.60 max	0.90 max	0.50 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.04	1.35	0.33	0.40
	%S	%P	Diffusible Hydrogen (mL/100g weld deposit)	
Requirements⁽⁴⁾ AWS A5.20: E71T-12C-JH8 AWS A5.36: E71T1-C1A4-CS2-H8	0.03 max 0.030 max	0.03 max 0.030 max	8.0 max 8 max	
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.01	0.01	4-7	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer. ⁽⁴⁾As-Welded with 100% CO₂.

TYPICAL OPERATING PROCEDURES

Diameter, Polarity Shielding Gas	CTWD ⁽¹⁾ 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+ As-Welded with 100% CO ₂	25 (1)	4.4 (175)	24-29	115	1.8 (3.9)	1.5 (3.4)	85-88
		6.4 (250)	25-30	140	2.5 (5.6)	2.2 (4.8)	
		7.6 (300)	26-31	155	3.1 (6.8)	2.6 (5.8)	
		8.9 (350)	26-31	170	3.6 (7.9)	3.1 (6.8)	
		10.2 (400)	26-31	185	4.1 (9.0)	3.5 (7.8)	
		11.4 (450)	27-32	200	4.6 (10.1)	4.0 (8.8)	
		12.7 (500)	27-32	215	5.1 (11.3)	4.4 (9.8)	
		14.0 (550)	28-33	230	5.6 (12.4)	4.9 (10.8)	
0.052 in (1.3 mm), DC+ As-Welded with 100% CO ₂	25 (1)	3.8 (150)	24-29	140	2.1 (4.7)	1.7 (3.8)	85-88
		5.1 (200)	25-30	160	2.9 (6.3)	2.4 (5.2)	
		6.4 (250)	26-31	180	3.5 (7.8)	3.0 (6.5)	
		7.6 (300)	26-31	205	4.3 (9.4)	3.6 (7.9)	
		8.9 (350)	27-32	225	5.0 (11.0)	4.2 (9.2)	
		9.5 (375)	27-32	235	5.3 (11.7)	4.5 (9.9)	
		10.8 (425)	27-32	255	6.0 (13.3)	5.1 (11.2)	
		12.1 (475)	28-33	275	6.8 (14.9)	5.7 (12.6)	
1/16 in (1.6 mm), DC+ As-Welded with 100% CO ₂	25 (1)	3.8 (150)	23-28	200	2.9 (6.4)	2.4 (5.3)	85-88
		4.4 (175)	24-29	215	3.4 (7.5)	2.9 (6.3)	
		5.1 (200)	24-29	230	3.9 (8.5)	3.3 (7.2)	
		5.7 (225)	24-29	245	4.4 (9.6)	3.7 (8.1)	
		6.4 (250)	25-30	255	4.8 (10.6)	4.1 (9.1)	
		7.6 (300)	25-30	285	5.8 (12.7)	4.9 (10.9)	
		8.3 (325)	26-31	300	6.3 (13.8)	5.4 (11.9)	
		8.9 (350)	26-31	310	6.7 (14.8)	5.8 (12.8)	
10.2 (400)	27-32	340	7.7 (16.9)	6.7 (14.7)			

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 100% CO₂ ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® HD-12M

Mild Steel, All Position ■ AWS E71T-12M-JH8, E71T1-M21A4-CS2-H8

KEY FEATURES

- Increase weld deposition up to 14 lbs/hr out-of-position
- Results in a flat bead shape and enhanced productivity in all positions
- Operators can set the machine on a single setting and weld in all positions
- Capable of exceeding 27 J (20 ft•lbf) at -40°C (-40°F)
- ProTech® foil bag packaging

WELDING POSITIONS

All

SHIELDING GAS

75-80% Argon / Balance CO₂
Flow Rate: 40 - 50 CFH

CONFORMANCES

AWS A5.20/5.20M:	E71T-12M-JH8, E71T-1M-JH8, E71T-9M-JH8
AWS A5.36:	E71T1-M21A4-CS2-H8
ASME SFA-5.20:	E71T-12M-JH8, E71T-1M-JH8, E71T-9M-JH8
ABS:	3YSA H10, 3Y400SA H10
EN ISO 17632-B:	T494T12-1MAK-H10
CWB / CSA W48-06:	E491T-12MJ-H8 E491T-9MJ-H8

TYPICAL APPLICATIONS

- Heavy Fabrication
- Mining
- General Fabrication

DIAMETERS / PACKAGING

Diameter in (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Fiber Spool
0.045 (1.1)	ED036180	ED034277
0.052 (1.3)	ED036181	ED034278
1/16 (1.6)	ED036294	ED034279

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -29°C (-20°F)	@ -40°C (-40°F)
Requirements⁽⁴⁾ AWS A5.20: E71T-12M-JH8 AWS A5.36: E71T1-M21A4-CS2-H8	400 (58) min	480-620 (70-90) 480-660 (70-95)	22 min	-	27 (20) min
Typical Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂ Stress Relieved for 1 hr @ 620°C (1150°F)	538 (78) 503 (73)	600 (87) 593 (86)	26 29	102 (75) 68 (50)	65 (48) -

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer. ⁽⁴⁾As-Welded with 75-80% Ar / Balance CO₂.

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%Ni
Requirements⁽⁴⁾ AWS A5.20: E71T-12M-JH8 AWS A5.36: E71T1-M21A4-CS2-H8	0.12 max	1.60 max	0.90 max	0.50 max
Typical Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂	0.05	1.40	0.39	0.40
	%S	%P	Diffusible Hydrogen (mL/100g weld deposit)	
Requirements⁽⁴⁾ AWS A5.20: E71T-12M-JH8 AWS A5.36: E71T1-M21A4-CS2-H8	0.03 max 0.030 max	0.03 max 0.030 max	8.0 max 8 max	
Typical Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂	0.01	0.01	4-7	

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ As-Welded with 75% Ar/25% CO ₂	25 (1)	4.4 (175)	23-28	115	1.8 (3.9)	1.5 (3.4)	85-88
		6.4 (250)	24-29	140	2.5 (5.6)	2.2 (4.8)	
		7.6 (300)	25-30	155	3.1 (6.8)	2.6 (5.8)	
		8.9 (350)	25-30	170	3.6 (7.9)	3.1 (6.8)	
		10.2 (400)	25-30	185	4.1 (9.0)	3.5 (7.8)	
		11.4 (450)	26-31	200	4.6 (10.1)	4.0 (8.8)	
		12.7 (500)	26-31	215	5.1 (11.3)	4.4 (9.8)	
		14.0 (550)	27-32	230	5.6 (12.4)	4.9 (10.8)	
15.2 (600)	27-32	245	6.1 (13.5)	5.3 (11.7)			
0.052 in (1.3 mm), DC+ As-Welded with 75% Ar/25% CO ₂	25 (1)	3.8 (150)	23-28	140	2.1 (4.7)	1.7 (3.8)	85-88
		5.1 (200)	24-29	160	2.9 (6.3)	2.4 (5.2)	
		6.4 (250)	25-30	180	3.5 (7.8)	3.0 (6.5)	
		7.6 (300)	25-30	205	4.3 (9.4)	3.6 (7.9)	
		8.9 (350)	26-31	225	5.0 (11.0)	4.2 (9.2)	
		9.5 (375)	26-31	235	5.3 (11.7)	4.5 (9.9)	
		10.8 (425)	26-31	255	6.0 (13.3)	5.1 (11.1)	
		12.1 (475)	27-32	275	6.8 (14.9)	5.7 (12.6)	
12.7 (500)	27-32	290	7.1 (15.6)	6.0 (13.3)			
1/16 in (1.6 mm), DC+ As-Welded with 75% Ar/25% CO ₂	25 (1)	3.8 (150)	22-27	200	2.9 (6.4)	2.4 (5.3)	85-88
		4.4 (175)	23-28	215	3.4 (7.5)	2.9 (6.3)	
		5.1 (200)	23-28	230	3.9 (8.5)	3.3 (7.2)	
		5.7 (225)	23-28	245	4.4 (9.6)	3.7 (8.1)	
		6.4 (250)	24-29	255	4.8 (10.6)	4.1 (9.1)	
		7.6 (300)	24-29	285	5.8 (12.7)	4.9 (10.9)	
		8.3 (325)	25-30	300	6.3 (13.8)	5.4 (11.9)	
		8.9 (350)	25-30	310	6.7 (14.8)	5.8 (12.8)	
10.2 (400)	26-31	340	7.7 (16.9)	6.7 (14.7)			

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 75-80% Ar / Balance CO₂. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® HD MARINE

Mild Steel, All Positions ▪ AWS E71T-9C-H8, E71T1-C1A2-CS1-H8

KEY FEATURES

- Excellent operator appeal with minimal spatter and low fume generation rates
- High deposition rates up to 12 lbs/hr out-of-position
- Fast freezing slag for a flat bead shape and increased productivity
- Weld in all positions with one setting
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS A5.20/A5.20M: E71T-1C-H8, E71T-9C-H8
AWS A5.36/A5.36M: E71T1-C1A2-CS1-H8
ABS: 2YSA H10, 2Y400SA H10
DNV: II YMS(H10)
Lloyd's Register: 2YS H10

TYPICAL APPLICATIONS

- Shipbuilding
- General Fabrication

SHIELDING GAS

100% CO₂
 Flow rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Fiber Spool
0.052 (1.3)	ED035743	ED036323
1/16 (1.6)	ED035778	ED036324

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft-lbf)	
				@-18°C (0°F)	@-29°C (-20°F)
Requirements					
AWS A5.20: E71T-1C-H8, E71T-9C-H8	400 (58) min	480-655 (70-95)	22 min	27 (20) min	27 (20) min
AWS A5.36: E71T1-C1A2-CS1-H8				-	
Typical Results⁽³⁾					
As-Welded with 100% CO ₂	580-615 (84-89)	630-655 (92-95)	27	87-96 (64-71)	49-58 (36-43)

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S
Requirements AWS A5.20: E71T-1C-H8,E71T-9C-H8	0.12 max	1.75 max	0.90 max	0.03 max
AWS A5.36: E71T1-C1A2-CS1-H8				0.030 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.04-0.05	1.59-1.70	0.36-0.40	0.01
	%P	%Ni	Diffusible Hydrogen (ml/100g weld deposit)	
Requirements AWS A5.20: E71T-1C-H8,E71T-9C-H8	0.03 max	0.50 max	8.0 max	
AWS A5.36: E71T1-C1A2-CS1-H8	0.030 max		8 max	
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.016	0.02	3.1-4.1	

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 (%)
0.052 in (1.3mm), DC+, 100% CO ₂	19-25 (3/4-1)	3.8 (150)	22-25	140	2.0 (4.5)	1.7 (3.7)	81-85
		5.1 (200)	23-26	175	2.6 (5.8)	2.2 (4.9)	
		6.4 (250)	23-27	210	3.4 (7.4)	2.8 (6.2)	
		7.6 (300)	24-29	230	4.0 (8.8)	3.4 (7.4)	
		8.9 (350)	26-30	255	4.6 (10.2)	3.9 (8.7)	
		9.5 (375)	27-30	275	5.0 (11.1)	4.3 (9.4)	
		10.2 (400)	29-31	280	5.4 (11.9)	4.5 (9.9)	
		12.1 (475)	29-33	295	6.5 (14.3)	5.5 (12.2)	
1/16 in (1.6mm), DC+, 100% CO ₂	19-25 (3/4-1)	3.8 (150)	23-26	185	2.9 (6.3)	2.4 (5.3)	83-87
		4.4 (175)	23-27	220	3.3 (7.3)	2.8 (6.1)	
		5.1 (200)	23-27	240	3.8 (8.3)	3.2 (7.1)	
		5.7 (225)	23-28	260	4.2 (9.2)	3.7 (8.2)	
		6.4 (250)	24-29	275	4.7 (10.4)	4.3 (9.4)	
		7.6 (300)	25-30	315	5.6 (12.4)	4.8 (10.6)	
		8.3 (325)	27-31	325	6.1 (13.5)	5.3 (11.7)	
		8.9 (350)	27-31	335	6.7 (14.7)	5.8 (12.7)	
9.5 (400)	28-32	360	7.7 (16.9)	6.6 (14.5)			

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

ULTRACORE® SR-12

Mild Steel, All Position ▪ AWS E71T-12M-JH8, E71T1-M21A4-CS2-H8

KEY FEATURES

- Meets AWS strength and low temperature impact toughness requirements in the as-welded and stress relieved conditions
- Premium arc performance and bead shape makes SR-12 easy to use for welders of all skill levels
- ProTech® foil bag packaging

WELDING POSITIONS

All

SHIELDING GAS

75-80 % Argon / Balance CO₂
Flow Rate: 40 - 50 CFH

CONFORMANCES

AWS A5.20/5.20M:	E71T-1M-JH8, E71T-9M-JH8, E71T-12M-JH8
AWS A5.36:	E71T1-M21A4-CS2-H8
ASME SFA-5.20:	E71T-1M-JH8, E71T-9M-JH8, E71T-12M-JH8

TYPICAL APPLICATIONS

- Pressure vessel fabrication
- Applications requiring PWHT of mild steel

DIAMETERS / PACKAGING

Diameter in (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Fiber Spool
0.045 (1.1)	ED034109	ED034111

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 E71T-1M-JH8, E71T-9M-JH8, E71T-12M-JH8 As-Welded with 75% Ar / 25% CO ₂	400 (58) min	480-620 (70-90)	22 min	27 (20) min
Typical Results⁽³⁾ As-Welded with 75% Ar / 25% CO ₂ Stress-Relieved for 8 hrs @ 620°C (1150°F)	503-530 (73-77) 450 (65)	565-586 (82-85) 540 (78)	28-29 30	108-162 (80-120) 100-150 (70-110)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si
Requirements⁽⁴⁾ - AWS E71T-12M-JH4 As-Welded with 75% Ar / 25% CO ₂	0.12 max	1.60 max	0.90 max
Typical Results⁽³⁾ As-Welded with 75% Ar / 25% CO ₂	0.03-0.06	1.27-1.60	0.27-0.45
	%Ni	%S	%P
Requirements⁽⁴⁾ - AWS E71T-12M-JH4 As-Welded with 75% Ar / 25% CO ₂	0.50 max	0.03 max	0.03 max
Typical Results⁽³⁾ As-Welded with 75% Ar / 25% CO ₂	0.34-0.41	<0.01	<0.01

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 75% Ar / 25% CO ₂	22 (7/8)	4.4 (175)	22-24	125	1.8 (4.0)	1.5 (3.4)	88
		5.7 (225)	22-24	145	2.3 (5.1)	2.0 (4.4)	
		7.0 (275)	23-25	165	2.9 (6.3)	2.5 (5.5)	
		8.3 (325)	23-25	185	3.4 (7.4)	2.9 (6.4)	
		9.5 (375)	24-26	205	3.9 (8.6)	3.4 (7.5)	
		10.8 (425)	25-27	225	4.4 (9.7)	3.8 (8.4)	
		12.1 (475)	26-28	245	4.9 (10.9)	4.3 (9.5)	
13.3 (525)	29-31	315	5.5 (12.0)	4.8 (10.6)			

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer. ⁽⁴⁾As-Welded 75%-80% Argon/Balance CO₂. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.
NOTE: This product contains micro-alloying elements. Additional information available upon request.

ULTRACORE® SR-12C

Mild Steel, All Position ▪ AWS E71T-12C-JH8, E71T12-C1A5-CS2-H8

KEY FEATURES

- Capable of meeting 20 ft•lbf @ -50°F in both the as-welded and stress relieved conditions
- A premium arc performance and fast freezing slag make UltraCore® SR-12C easy to use for welders of all skill levels
- ProTech® foil bag packaging

WELDING POSITIONS

All

SHIELDING GAS

100% CO₂
Flow Rate: 40 - 50 CFH

CONFORMANCES

AWS A5.20/5.20M:	E71T-12C-JH8
AWS A5.36:	E71T12-C1A5-CS2-H8, E71T12-C1P5-CS2-H8
ASME SFA-5.20:	E71T-12C-JH8
CWB / CSA W48-06:	E491T-12J-H8

TYPICAL APPLICATIONS

- General Fabrication
- Offshore Industry
- Petrochemical

DIAMETERS / PACKAGING

Diameter in. (mm)	33 lb (15 kg) Fiber Spool
0.045 (1.1)	ED034532
0.052 (1.3)	ED034533
1/16 (1.6)	ED034534

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -40 °C (-40 °F)	@ -46 °C (-50 °F)
Requirements AWS A5.20 - E71T-12C-JH8 As-Welded with 100% CO ₂	400 (58) min	480-620 (70-90)	22 min	27 (20) min	-
AWS A5.36 - E71T1-C1A5-CS2-H8 As-Welded with 100% CO ₂		480-655 (70-95)		-	27 (20) min
AWS A5.36 - E71T1-C1P5-CS2-H8 Stress Relieved 1hr @ 620 °C (1150 °F) with 100% CO ₂		480-655 (70-95)		-	27 (20) min
Test Results⁽³⁾ As-Welded with 100% CO ₂ Stress-Relieved 1 hr @ 620 °C (1150 °F) with 100% CO ₂	490 (71) 435 (63)	550 (80) 545 (79)	22 32	47 (34) -	61 (45) 92 (68)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.20 - E71T-12C-JH8 As-Welded with 100% CO ₂ AWS A5.36 - E71T1-C1A5-CS2-H8 As-Welded with 100% CO ₂	0.12 max	1.75 max 1.60 max	0.90 max	0.03 max. 0.030 max	0.03 max 0.030 max	0.50 max	3.0 max
Test Results⁽³⁾ As-Welded with 100% CO ₂	0.05	1.42	0.52	0.007	0.016	0.02	5.9

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 (%)
0.045 in (1.1 mm), DC+ As-Welded with 100% CO ₂	25 (1)	4.4 (175)	23-28	115	1.8 (3.9)	1.5 (3.4)	85-88
		6.4 (250)	24-29	140	2.5 (5.6)	2.1 (4.6)	
		7.6 (300)	25-30	155	3.1 (6.8)	2.6 (5.8)	
		10.2 (400)	25-30	185	4.1 (9.0)	3.4 (7.5)	
		12.7 (500)	26-31	215	5.1 (11.3)	4.4 (9.8)	
		5.2 (600)	27-32	245	6.1 (13.5)	5.1 (11.3)	
		3.8 (150)	23-28	140	2.1 (4.7)	1.7 (3.8)	
0.052 in (1.3 mm), DC+ As-Welded with 100% CO ₂	25 (1)	6.4 (250)	25-30	180	3.5 (7.8)	3.0 (6.5)	85-88
		8.9 (350)	26-31	225	5.0 (11.0)	4.2 (9.2)	
		10.8 (425)	26-31	255	6.0 (13.3)	5.1 (11.2)	
		12.7 (500)	27-32	290	7.1 (15.6)	6.0 (13.3)	
		3.8 (150)	22-27	200	2.9 (6.4)	2.4 (5.3)	
1/16 in (1.6 mm), DC+ As-Welded with 100% CO ₂	25 (1)	5.1 (200)	23-28	230	3.7 (8.1)	3.0 (6.7)	85-88
		6.4 (250)	24-29	255	4.8 (10.6)	4.1 (9.1)	
		7.6 (300)	25-30	300	5.5 (12.1)	4.6 (10.2)	
		10.2 (400)	26-31	360	6.7 (14.8)	5.8 (12.8)	
		3.8 (150)	22-27	200	2.9 (6.4)	2.4 (5.3)	

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

ULTRACORE® SR-12M

Mild Steel, All Position ▪ AWS E71T-12MJ-H8, E71T12-M21A5-CS2-H8

KEY FEATURES

- Capable of meeting 20 ft•lbf @ -50°F in both the as-welded and stress relieved conditions
- A premium arc performance make UltraCore® SR-12M easy to use for welders of all skill levels
- ProTech® foil bag packaging

WELDING POSITIONS

All

SHIELDING GAS

75 - 80% Argon / balance CO₂
Flow Rate: 40 - 50 CFH

CONFORMANCES

AWS A5.20/5.20M:	E71T-12M-JH8
AWS A5.36/5.36M:	E71T12-M21A5-CS2-H8, E71T12-M21P5-CS2-H8
ASME SFA-5.20:	E71T-12M-JH8
CWB / CSA W48-06:	E491T-12MJ-H8

TYPICAL APPLICATIONS

- General Fabrication
- Offshore Industry
- Petrochemical

DIAMETERS / PACKAGING

Diameter in. (mm)	33 lb (15 kg) Fiber Spool
0.045 (1.1)	ED034529
0.052 (1.3)	ED034530
1/16 (1.6)	ED034531

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -40°C (-40°F)	@ -46°C (-50°F)
Requirements AWS A5.20 - E71T-12M-JH8 As-welded with 75-80% Ar / Balance CO ₂	400 (58) min	480-620 (70-90)	22 min	27 (20) min	–
AWS A5.36 - E71T1-M21A5-CS2-H8 As-Welded with 75%-80% Ar/ Balance CO ₂		480-655 (70-95)		–	27 (20) min
AWS A5.36 - E71T1-M21P5-CS2-H8 Stress Relieved 1hr @ 620°C (1150°F) with 75%-80% Ar/ Balance CO ₂		480-655 (70-95)		–	27 (20) min
Test Results⁽³⁾ As-Welded with 75%-80% Ar/ Balance CO ₂ Stress-Relieved 1 hr @ 620°C (1150°F) with 75%-80% Ar/ Balance CO ₂	500 (73) 440 (64)	590 (86) 545 (79)	25 33	134 (99) –	125 (92) 117 (86)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.20 - E71T-12M-JH8 As-Welded with 75-80% Ar / Balance CO ₂ AWS A5.36 - E71T1-M21A5-CS2-H8 E71T1-M21P5-CS2-H8	0.12 max	1.60 max	0.90 max	0.03 max 0.030 max	0.03 max 0.030 max	0.50 max	8 max
Test Results⁽³⁾ As-Welded with 75% Ar / 25% CO ₂	0.06	1.45	0.44	0.008	0.014	0.01	5.6

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 (%)
0.045 in (1.1 mm), DC+ As-Welded with 75% Ar / 25% CO ₂	25 (1)	3.8 (175)	20-25	140	1.8 (4.0)	1.6 (3.5)	85-88
		5.7 (225)	21-26	150	2.3 (5.1)	2.0 (4.5)	
		6.4 (250)	22-27	170	2.6 (5.7)	2.2 (4.8)	
		7.6 (300)	23-28	200	3.5 (7.7)	3.1 (6.8)	
		10.2 (400)	24-29	220	4.2 (9.2)	3.5 (7.8)	
		12.7 (500)	26-32	260	5.1 (11.2)	4.5 (9.9)	
		15.2 (600)	27-33	270	6.2 (13.7)	5.3 (11.7)	
0.052 in (1.3 mm), DC+ As-Welded with 75% Ar / 25% CO ₂	25 (1)	3.8 (150)	20-25	150	2.0 (4.5)	1.8 (3.9)	85-88
		6.4 (250)	24-29	235	3.4 (7.5)	2.9 (6.5)	
		8.9 (350)	28-32	295	4.7 (10.5)	4.1 (9.1)	
		11.4 (450)	29-34	330	6.1 (13.5)	5.3 (11.7)	
1/16 in (1.6 mm), DC+ As-Welded with 75% Ar / 25% CO ₂	25 (1)	3.8 (150)	21-26	200	2.9 (6.3)	2.5 (5.5)	85-88
		5.1 (200)	22-27	245	3.8 (8.4)	2.9 (6.4)	
		6.4 (250)	24-29	285	4.8 (10.6)	4.1 (9.1)	
		7.6 (300)	26-31	325	5.8 (12.7)	4.9 (10.9)	
		8.9 (350)	28-33	340	6.7 (14.7)	5.8 (12.8)	

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

ULTRACORE[®] TC 30

Mild Steel, All Position ▪ AWS E71T-9C-H8, E71T1-C1A2-CS1-H8

KEY FEATURES

- Designed for welding TC-128 base material and achieving impact properties down to -30°F in both the as-welded and stress-relieved conditions
- Fast freezing slag for a flat bead shape and increased productivity in all positions
- Weld in all positions with a single setting
- Wide operating range for excellent operator appeal across all skill levels

WELDING POSITIONS

All

SHIELDING GAS

100% CO₂
Flow rate: 40-50 CFH

CONFORMANCES

- AWS A5.20/A5.20M:** E71T-1C-H8
E71T-9C-H8
- AWS A5.36/A5.36M:** E71T1-C1A2-CS1-H8

TYPICAL APPLICATIONS

- Tank Car & Rail Car Fabrication
- Applications using TC-128 base material
- General fabrication

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Fiber Spool	50 lb (22.7 kg) Fiber Spool
0.045 (1.1)	ED036354	ED036310
0.052 (1.3)	ED036355	ED036311
1/16 (1.6)	ED036356	ED036312

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft-lbf)	
				@ -18°C (0°F)	@ -29°C (-20°F)
Requirements					
AWS A5.20: E71T-1C-H8, E71T-9C-H8	400 (58) min	480 - 655 (70-95)	22 min	27 (20) min	27 (20) min
AWS A5.36: E71T1-C1A2-CS1-H8				Not Specified	27 (20) min
Test Results⁽³⁾					
As-Welded with 100% CO ₂	540-550 (78-81)	585-600 (85-87)	28-29	40-110 (28-80)	30-85 (20-64)

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%B	Diffusible Hydrogen (mL/100g weld deposit)
Requirements							
AWS A5.20: E71T-1C-H8, E71T-9C-H8	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max	Not Specified	8.0 max
AWS A5.36: E71T1-C1A2-CS1-H8				0.03 max	0.03 max		8 max
Test Results⁽²⁾ As-Welded with 100% CO ₂	0.03	1.42	0.39	0.01	0.01	0.001	3-4

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 (%)
0.045 in (1.1 mm), DC+ 100% CO ₂	19 (3/4)	4.4 (175)	24-29	115	1.8 (3.9)	1.5 (3.4)	85-88
		6.4 (250)	25-30	140	2.5 (5.6)	2.2 (4.8)	
		7.6 (300)	26-31	155	3.1 (6.8)	2.6 (5.8)	
		8.9 (350)	26-31	170	3.6 (7.9)	3.1 (6.8)	
		10.2 (400)	26-31	185	4.1 (9.0)	3.5 (7.8)	
	25(1)	11.4 (450)	27-32	200	4.6 (10.1)	4.0 (8.8)	
		12.7 (500)	27-32	215	5.1 (11.3)	4.4 (9.8)	
		14.0 (550)	28-33	230	5.6 (12.4)	4.9 (10.8)	
		15.2 (600)	28-33	245	6.1 (13.5)	5.3 (11.7)	
0.052 in (1.3 mm), DC+ 100% CO ₂	19 (3/4)	3.8 (150)	24-29	140	2.1 (4.7)	1.7 (3.8)	85-88
		5.1 (200)	25-30	160	2.9 (6.3)	2.4 (5.2)	
		6.4 (250)	26-31	180	3.5 (7.8)	3.0 (6.5)	
		7.0 (275)	26-31	195	3.9 (8.5)	3.3 (7.2)	
	25(1)	7.6 (300)	27-32	205	4.3 (9.4)	3.6 (7.9)	
		8.9 (350)	27-32	225	5.0 (11.0)	4.2 (9.2)	
		9.5 (375)	27-32	235	5.3 (11.7)	4.5 (9.9)	
		10.8 (425)	27-32	255	6.0 (13.3)	5.1 (11.2)	
		12.1 (475)	28-33	275	6.8 (14.9)	5.7 (12.6)	
		12.7 (500)	28-33	290	7.1 (15.6)	6.0 (13.3)	
1/16 in (1.6 mm), DC+ 100% CO ₂	19 (3/4)	3.8 (150)	23-28	200	2.9 (6.4)	2.4 (5.3)	85-88
		4.4 (175)	24-29	215	3.4 (7.5)	2.9 (6.3)	
		5.1 (200)	24-29	230	3.9 (8.5)	3.3 (7.2)	
		5.7 (225)	24-29	245	4.4 (9.6)	3.7 (8.1)	
		6.4 (250)	25-30	255	4.8 (10.6)	4.1 (9.1)	
	25(1)	7.6 (300)	25-30	285	5.8 (12.7)	4.9 (10.9)	
		8.3 (325)	26-31	300	6.3 (13.8)	5.4 (11.9)	
		8.9 (350)	26-31	310	6.7 (14.8)	5.8 (12.8)	
		10.2 (400)	27-32	340	7.7 (16.9)	6.7 (14.7)	

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

OUTERSHIELD® 71M

Mild Steel, All Position ■ AWS E71T-9C-J, E71T-9M-J, E71T1-C1A4-CS1-H16, E71T1-M21A4-CS1-H16

KEY FEATURES

- Dual classified for both 100% CO₂ and 75% Argon / 25% CO₂ mixed gas
- Exceeds impact requirements at -40°C (-40°F)
- High travel speeds
- Spray like transfer with minimal spatter
- Rod based manufacturing for industry leading wire stiffness and feedability
- Increased rigidity allows for easy manual break-off

SHIELDING GAS

100% CO₂
75% Argon / 25% CO₂
Flow Rate: 40 - 50 CFH

WELDING POSITIONS

All, except vertical down

DIAMETERS / PACKAGING

Diameter in (mm)	10 lb (4.5 kg) Plastic Spool	25 lb (11.3 kg) Plastic Spool	33 lb (15 kg) Steel Spool	50 lb (22.7 kg) Coil
0.035 (0.9)	ED026804	ED026805		
0.045 (1.1)	ED020836	ED022659	ED030007	ED020844
0.052 (1.3)		ED022660	ED030008	ED020845
1/16 (1.6)		ED022661	ED030009	ED020846
Diameter in (mm)	300 lb (136 kg) Speed-Feed® Reel	500 lb (227 kg) Accu-Trak® Drum	600 lb (272 kg) Speed-Feed® Reel	
0.035 (0.9)				
0.045 (1.1)		ED027364		
0.052 (1.3)		ED029778		
1/16 (1.6)	ED020848	ED029779	ED020851	

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft-lbf)		
				@ -18°C (0°F)	@ -29°C (-20°F)	@ -40°C (-40°F)
Requirements AWS E71T-1C-J / E71T-1M-J AWS E71T-9C-J / E71T-9M-J	400 (58) min	480-655 (70-95)	22 min	27 (20) min -	- 27 (20) min	27 (20) min ^(a) 27 (20) min ^(a)
Test Results⁽³⁾ As-Welded with 100% CO ₂ and 75% Argon/25% CO ₂	500-570 (72-83)	560-630 (81-91)	27-29	176-190 (130-140)	176-190 (130-140)	130-163 (96-120)

^(a)Electrodes with the optional supplemental designator "J" shall meet the minimum Charpy V-Notch impact energy requirement for its classification at a test temperature of 10°C lower than the test temperature for its classification.

CONFORMANCES

AWS A5.20/A5.20M:	E71T-1C-J, E71T-9C-J E71T-1M-J, E71T-9M-J
AWS A5.36:	E71T1-C1A4-CS1-H16 E71T1-M21A4-CS1-H16
ASME SFA-A5.20:	E71T-1C-J, E71T-9C-J E71T-1M-J, E71T-9M-J
ABS*:	3YSA H15
Lloyd's Register:	3YS H15
DNV Grade:	III YMS H10
BV Grade:	SA3YH (CO ₂ only)
CWB/CSA W48-06:	E491T-9, E491T-9M
EN ISO 17632-B:	T494T1-1MA-H15 T494T1-1CA-H15
MIL-E-24403/1:	MIL-71T-1C, MIL-71T-1M

*Only for 0.045, 0.052 and 1/16 in. diameters

TYPICAL APPLICATIONS

- Bridge, ship, & barge
- General fabrication
- Machinery fabrication
- Structural fabrication
- Offshore applications

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS E71T-1C-J / E71T-1M-J AWSE71T-9C-J / E71T-9M-J	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max
Test Results⁽³⁾ As-Welded with 100% CO ₂ and 75% Argon/25% CO ₂	0.05-0.07	1.04-1.60	0.25-0.50	≤ 0.01	< 0.01

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 (%)
0.035 in (0.9 mm), DC+ 100% CO ₂	19-25 (3/4-1)	5.1 (200)	20-23	95	1.3 (2.8)	1.1 (2.8)	85
		6.4 (250)	21-24	115	1.6 (3.5)	1.4 (3.5)	85
		7.6 (300)	22-25	130	1.9 (4.2)	1.6 (4.2)	86
		8.9 (350)	23-26	150	2.2 (4.9)	1.9 (4.9)	86
		10.2 (400)	24-27	160	2.6 (5.6)	2.2 (5.6)	86
		12.7 (500)	26-29	185	3.2 (7.0)	2.7 (7.0)	86
		15.2 (600)	28-31	200	3.8 (8.4)	3.3 (8.4)	86
		17.8 (700)	30-33	215	4.4 (9.8)	3.8 (9.8)	86
0.045 in (1.1 mm), DC+ 100% CO ₂	19-25 (3/4-1)	5.1 (200)	23-26	165	2.1 (4.6)	1.8 (3.9)	83
		6.4 (250)	24-27	190	2.6 (5.8)	2.2 (4.8)	84
		7.6 (300)	25-28	220	3.1 (6.9)	2.6 (5.8)	84
		8.9 (350)	26-29	245	3.7 (8.1)	3.1 (6.8)	84
		10.2 (400)	26-29	265	4.2 (9.2)	3.5 (7.8)	84
		12.7 (500)	28-31	295	5.2 (11.5)	4.4 (9.7)	84
		15.2 (600)	30-33	315	6.3 (13.8)	5.3 (11.7)	85
		17.8 (700)	32-35	325	7.3 (16.1)	6.2 (13.7)	85
0.052 in (1.3 mm), DC+ 100% CO ₂	19-25 (3/4-1)	3.8 (150)	22-25	150	2.1 (4.7)	1.7 (3.8)	81
		5.1 (200)	23-26	180	2.8 (6.2)	2.3 (5.1)	83
		6.4 (250)	24-27	210	3.5 (7.7)	2.9 (6.5)	83
		7.6 (300)	25-28	235	4.2 (9.3)	3.5 (7.8)	84
		8.9 (350)	27-30	265	4.9 (10.8)	4.2 (9.1)	84
		11.4 (450)	29-32	305	6.3 (13.9)	5.4 (11.8)	85
		12.7 (500)	30-33	325	7.0 (15.5)	6.0 (13.2)	85
		15.2 (600)	33-36	360	8.4 (18.6)	7.2 (15.8)	85
1/16 in (1.6 mm), DC+ 100% CO ₂	19-25 (3/4-1)	3.2 (125)	23-26	205	2.5 (5.4)	2.0 (4.5)	82
		3.8 (150)	24-27	225	3.0 (6.5)	2.4 (5.4)	82
		5.1 (200)	25-28	260	4.0 (8.7)	3.3 (7.2)	83
		6.4 (250)	26-29	295	4.9 (10.9)	4.1 (9.1)	83
		7.6 (300)	28-31	330	5.9 (13.0)	5.0 (10.9)	84
		10.2 (400)	30-33	395	7.9 (17.4)	6.6 (14.6)	84
		12.7 (500)	33-36	445	9.9 (21.7)	8.3 (18.3)	84

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾When welding under mixed gas, decrease voltage. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.
NOTE: This product contains micro-alloying elements.

OUTERSHIELD® 71 ELITE

Mild Steel, All Position ■ AWS E71T-9C-H8, E71T-9M-H8, E71T1-C1A2-CS1-H8, E71T1-M21A2-CS1-H8

KEY FEATURES

- Smooth arc transfer and low spatter
- Designed for welding with either 100% CO₂ or 75-82% Argon/balance CO₂ shielding gases
- Good bead appearance
- Fast freezing slag for out-of-position welding
- Meets AWS D1.8 seismic lot waiver requirements

WELDING POSITIONS

All

SHIELDING GAS

100% CO₂
 75 - 82% Argon / Balance CO₂
 Flow Rate: 40 - 50 CFH

CONFORMANCES

AWS A5.20/A5.20M:	E71T-1C-H8, E71T-9C-H8, E71T-1M-H8, E71T-9M-H8
AWS A5.36:	E71T1-C1A2-CS1-H8, E71T1-M21A2-CS1-H8
ASME SFA-A5.20:	E71T-1C-H8, E71T-9C-H8, E71T-1M-H8, E71T-9M-H8
ABS:	3SA, 3YSA H10
DNV Grade:	III YMS H10
GL:	3YH10S
LR:	3YS H10
CWB/CSA W48-06:	E491T-9-H8, E491T-9M-H8

TYPICAL APPLICATIONS

- Shipbuilding, barges and offshore platforms
- Heavy equipment
- Structural fabrication
- General fabrication

DIAMETERS / PACKAGING

Diameter in (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Steel Spool	60 lb (27.2 kg) Coil	600 lb (272 kg) Accu-Trak® Drum
0.045 (1.1)	ED029418	ED029201	ED029202	ED029387
0.052 (1.3)	ED029419	ED029204	ED029205	
1/16 (1.6)		ED029206	ED029207	

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft·lbf)	
				@ -18 °C (0 °F)	@ -29 °C (-20 °F)
Requirements AWS E71T-1C-H8, E71T-9C-H8 AWS E71T-1M-H8, E71T-9M-H8	400 (58) min	485-655 (70-95)	22 min	27 (20) min –	– 27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂ As-Welded with 75% Ar/25% CO ₂	545-565 (79-82) 585-595 (85-87)	585-615 (85-90) 625-630 (91-92)	28 25-28	74-83 (55-61) 92-99 (68-73)	58-64 (43-47) 70-83 (52-61)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS E71T-1C-H8, E71T-9C-H8 AWS E71T-1M-H8, E71T-9M-H8	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂ As-Welded with 75% Ar/25% CO ₂	0.01-0.04 0.02-0.04	1.41-1.50 1.55-1.65	0.44-0.60 0.56-0.75	≤0.01 ≤0.01	≤0.01 ≤0.01

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+ 75% Ar / 25% CO ₂	19 (3/4)	4.5 (175)	21-24	130	1.7 (3.8)	1.5 (3.3)	87
		6.4 (250)	23-26	155	2.4 (5.4)	2.1 (4.7)	87
		7.6 (300)	24-27	180	2.9 (6.4)	2.5 (5.6)	87
		8.9 (350)	25-28	205	3.4 (7.6)	3.0 (6.6)	87
		10.2 (400)	26-29	230	4.0 (8.7)	3.5 (7.6)	87
		12.8 (500)	27-30	260	5.0 (10.9)	4.3 (9.5)	87
		15.3 (600)	28-31	290	6.0 (13.1)	5.2 (11.4)	87
0.052 in (1.3 mm), DC+ 75% Ar / 25% CO ₂	19 (3/4)	3.8 (150)	21-24	150	2.1 (4.6)	1.8 (3.9)	86
		5.1 (200)	22-25	180	2.8 (6.1)	2.4 (5.2)	86
		6.4 (250)	23-26	210	3.4 (7.6)	3.0 (6.5)	86
		7.6 (300)	24-27	240	4.8 (10.6)	4.1 (9.1)	86
		10.2 (400)	26-28	315	6.2 (13.7)	5.4 (11.8)	86
		12.8 (500)	28-31	335	6.9 (15.2)	6.0 (13.1)	86
1/16 (1.6 mm), DC+ 75% Ar / 25% CO ₂	19 (3/4)	3.2 (125)	21-24	190	2.4 (5.2)	2.0 (4.4)	85
		3.8 (150)	22-25	205	2.8 (6.2)	2.4 (5.3)	85
		5.1 (200)	22-26	240	3.8 (8.3)	3.2 (7.0)	85
		6.4 (250)	23-27	290	4.7 (10.3)	4.0 (8.8)	85
		7.6 (300)	24-28	325	5.6 (12.4)	4.8 (10.5)	85
		10.2 (400)	27-31	400	7.5 (16.5)	6.4 (14.0)	85

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾When welding under CO₂ increase voltage by 1 Volt. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® 70C

Mild Steel, Flat & Horizontal ▪ AWS E70T-9C-H8, E70T1-C1A2-CS1-H8

KEY FEATURES

- High deposition in the flat and horizontal positions
- Low fume generation rates
- Designed for welding with 100% CO₂ shielding gas
- Premium arc performance and bead appearance
- ProTech® foil bag packaging

WELDING POSITIONS

Flat & Horizontal

SHIELDING GAS

100% CO₂
Flow Rate: 40-55 CFH

CONFORMANCES

AWS A5.20/A5.20M:	E70T-1C-H8, E70T-9C-H8
AWS A5.36/A5.36M:	E70T1-C1A2-CS1-H8
ASME SFA-A5.20:	E70T-1C-H8, E70T-9C-H8
ABS:	2YSA H10
CWB/CSA W48-06:	E492T-9 H8
EN ISO 17632-B:	T493T1-0CA-H10
FEMA 353	
AWS D1.8	

TYPICAL APPLICATIONS

- Structural fabrication
- Heavy equipment
- Shipbuilding

DIAMETERS / PACKAGING

Diameter in (mm)	50 lb (22.7 kg) Coil	500 lb (227 kg) Accu-Trak® Drum	500 lb (227 kg) Speed-Feed® Drum
1/16 (1.6)	ED032978	ED033064	ED033065
5/64 (2.0)	ED032977		
3/32 (2.4)	ED032941		ED033066

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft·lbf)	
				@ -18°C (0°F)	@ -29°C (-20°F)
Requirements⁽⁴⁾ AWS A5.20 E70T-1C-H8, E70T-9C-H8	400 (58) min	480-655 (70-95)	22 min	27 (20) min	27 (20) min
AWS A5.36 E70T1-C1A2-CS1-H8				-	
Typical Results⁽³⁾ As-Welded with 100% CO ₂	485-520 (70-75)	555-590 (81-86)	28-30	47-72 (35-53)	28-47 (21-35)

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 100% CO₂

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾						
AWS A5.20 E70T-1C-H8, E70T-9C-H8	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max	8.0 max
AWS A5.36 E70T1-C1A2-CS1-H8				0.030 max	0.030 max	8 max
Typical Results⁽³⁾						
As-Welded with 100% CO ₂	0.04-0.05	1.46-1.59	0.54-0.59	≤ 0.01	≤ 0.01	5-8

TYPICAL OPERATING PROCEDURES – Flat & Horizontal

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
1/16 in (1.6 mm), DC+ 100% CO ₂	25 (1)	3.2 (125)	23-27	170	2.4 (5.3)	2.1 (4.7)	84 - 89
		5.1 (200)	24-28	225	3.8 (8.4)	3.2 (7.1)	
		6.4 (250)	25-30	260	4.8 (10.5)	4.1 (9.0)	
		7.6 (300)	27-31	280	5.7 (12.6)	4.9 (10.8)	
		9.5 (375)	28-32	320	7.1 (15.7)	6.1 (13.5)	
5/64 in (2.0 mm), DC+ 100% CO ₂	25 (1)	3.2 (125)	23-27	230	3.8 (8.4)	3.2 (7.1)	84 - 88
		4.4 (175)	24-29	305	5.4 (11.8)	4.6 (10.1)	
		5.7 (225)	25-30	365	6.8 (15.0)	5.9 (13.0)	
		6.4 (250)	26-32	385	7.7 (16.9)	6.5 (14.3)	
		7.6 (300)	27-33	420	9.0 (19.8)	7.8 (17.2)	
3/32 in (2.4 mm), DC+ 100% CO ₂	25 (1)	3.2 (125)	26-33	350	5.4 (11.9)	4.7 (10.3)	87 - 89
		5.1 (200)	27-34	500	8.6 (19.0)	7.6 (16.7)	
	31 (1 1/4)	6.4 (250)	29-35	570	10.6 (23.3)	9.4 (20.8)	
		7.6 (300)	31-37	630	13.1 (28.8)	11.4 (25.1)	
		8.3 (325)	32-38	720	14.3 (31.5)	12.4 (27.2)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 100% CO₂. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® 70M

Mild Steel, Flat & Horizontal ▪ AWS E70T-9M-H8, E70T1-M21A2-CS1-H8

KEY FEATURES

- High deposition in the flat and horizontal positions
- Designed for welding with 75-80% Argon / Balance CO₂ shielding gas
- Low fume generation rates
- Excellent operator appeal and slag detachability
- ProTech® foil bag packaging
- Flat bead profile for excellent bead stacking

WELDING POSITIONS

Flat & Horizontal

CONFORMANCES

AWS A5.20/A5.20M:

E70T-1M-H8, E70T-9M-H8

AWS A5.36/A5.36M:

E70T1-M21A2-CS1-H8

TYPICAL APPLICATIONS

- Structural fabrication
- Heavy equipment
- Shipbuilding

SHIELDING GAS

75-80% Argon / Balance CO₂
Flow Rate: 45-55 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	50 lb (22.7kg) Coil
1/16 (1.6)	ED035847
5/64 (2.0)	ED035848
3/32 (2.4)	ED035849

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 A5.20 E70T-1M-H8, E70T-9M-H8	400 (58) min	480-655 (70-95)	22 min	27 (20) min
AWS A5.36 E70T1-M21A2-CS1-H8				
Typical Results⁽³⁾				
As-Welded with 75% Ar/ 25% CO ₂	575-580 (83-84)	635-660 (92-95)	25-27	39-121 (29-89)

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 75%-80% Ar/ Balance% CO₂

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements⁽⁴⁾ AWS A5.20 E70T-1M-H8, E70T-9M-H8	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max
AWS A5.36 E70T1-M21A2-CS1-H8				0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 75% Ar/ 25% CO ₂	0.06-0.07	1.53-1.56	0.58-0.60	0.009	0.013
	%Ni	%Mo	%Cr	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ AWS A5.20 E70T-1M-H8, E70T-9M-H8	0.50 max	0.30 max	0.20 max	0.08 max	8.0 max
AWS A5.36 E70T1-M21A2-CS1-H8					8 max
Typical Results⁽³⁾ As-Welded with 75% Ar/ 25% CO ₂	0.03	0.01	0.07	0.03	4-7

TYPICAL OPERATING PROCEDURES – Flat & Horizontal

Diameter, Polarity Shielding Gas	CTWD ⁽²⁾ mm (in)	Wire Feed Speed m/min (ipm)	Voltage (volts)	Approx. Current (amps)	Melt-Off Rate kg/hr (lb/hr)	Deposition Rate kg/hr (lb/hr)
1/16 in (1.6 mm), DC+ 75-80% Argon / Balance CO ₂	25 (1)	3.2 (125)	22-26	160	2.2 (4.8)	2.0 (4.4)
		6.4 (250)	24-28	260	4.5 (9.9)	4.0 (8.8)
		9.5 (375)	27-31	345	6.8 (14.9)	6.0 (13.2)
5/64 in (2.0 mm), DC+ 75-80% Argon / Balance CO ₂	25 (1)	3.2 (125)	22-26	255	3.7 (8.1)	3.2 (7.1)
		5.7 (225)	24-28	380	6.6 (14.6)	5.6 (12.4)
3/32 in (2.4 mm), DC+ 75-80% Argon / Balance CO ₂	31 (1 1/4)	8.3 (325)	26-31	415	8.9 (19.5)	7.5 (16.4)
		3.2 (125)	26-30	340	5.1 (11.3)	4.7 (10.3)
		5.1 (200)	27-32	450	8.3 (18.3)	7.4 (16.3)
		6.4 (250)	30-36	615	12.5 (27.5)	10.7 (23.6)

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 75%-80% Ar/ Balance% CO₂. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® 75C

Mild Steel, Flat & Horizontal ▪ AWS E70T-5C-JH4, E70T5-C1A4-CS1-H4

KEY FEATURES

- High deposition in the flat and horizontal positions
- H4 diffusible hydrogen levels
- Designed for welding with 100% CO₂ shielding gas
- Premium arc performance and bead appearance
- ProTech® foil bag packaging

WELDING POSITIONS

Flat & Horizontal

SHIELDING GAS

100% CO₂
Flow Rate: 40-55 CFH

CONFORMANCES

AWS A5.20/A5.20M:	E70T-5C-JH4
AWS A5.36:	E70T5-C1A4-CS1-H4
ASME SFA-A5.20:	E70T-5C-JH4
CWB/CSA W48-06:	E492T-5J H4
EN ISO 17632-B:	T494T5-OCA-H5

TYPICAL APPLICATIONS

- Highly restrained joints
- Heaving equipment
- Mining
- Hard to weld base metals
- Thick steel sections in structural fabrication

DIAMETERS / PACKAGING

Diameter in (mm)	50 lb (22.7 kg) Coil
1/16 (1.6)	ED032974
5/64 (2.0)	ED032975
3/32 (2.4)	ED032940

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft·lbf)	
				@ -29°C (-20°F)	@ -40°C (-40°F)
Requirements⁽⁴⁾ - AWS E70T-5C-JH4	400 (58) min	480-655 (70-95)	22 min	27 (20) min	27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂	465-510 (68-74)	545-580 (79-84)	29-32	91-142 (67-105)	53-113 (39-83)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ - AWS E70T-5C-JH4	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max	4.0 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.06-0.08	1.51-1.66	0.44-0.53	0.01	0.01	2-4

TYPICAL OPERATING PROCEDURES – Flat & Horizontal

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
1/16 in (1.6 mm), DC+ 100% CO ₂	19-25 (3/4-1)	5.1 (200)	29-34	230	4.0 (8.7)	3.1 (6.9)	76-86
		6.4 (250)	31-36	270	5.0 (11.0)	3.8 (8.5)	
		7.6 (300)	32-37	295	5.9 (13.1)	4.5 (10.0)	
		8.9 (350)	33-38	335	6.9 (15.2)	5.5 (12.1)	
		10.2 (400)	33-38	360	7.9 (17.4)	6.3 (13.9)	
		12.7 (500)	35-40	415	9.9 (21.8)	7.9 (17.5)	
5/64 in (2.0 mm), DC+ 100% CO ₂	25-32 (1-1 1/4)	5.1 (200)	29-34	295	5.7 (12.7)	4.8 (10.5)	82-86
		6.4 (250)	30-35	345	7.2 (15.9)	6.0 (13.2)	
		7.6 (300)	32-37	390	8.6 (19.0)	7.1 (15.6)	
		8.9 (350)	33-38	425	10.1 (22.3)	8.5 (18.7)	
		10.2 (400)	34-39	465	11.5 (25.3)	9.9 (21.8)	
3/32 in (2.4 mm), DC+ 100% CO ₂	32 (1-3/8)	3.2 (125)	23-28	335	5.5 (12.2)	4.8 (10.7)	87-90
		5.1 (200)	27-32	445	8.8 (19.3)	7.6 (16.7)	
		6.4 (250)	29-34	500	10.9 (24.1)	9.6 (21.3)	
		7.6 (300)	31-36	590	13.2 (29.2)	11.8 (26.0)	
		8.3 (325)	32-37	605	14.2 (31.4)	12.8 (28.3)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 100% CO₂. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® XP70

Mild Steel, Flat & Horizontal ▪ AWS E70T-9C-H8, E70T1-C1A2-CS1-H8

KEY FEATURES

- High deposition in the flat and horizontal positions
- Low spatter generation
- Good weld bead wetting
- Excellent slag detachability, even in deep or narrow grooves
- Wide operating range for great operator appeal across all skill levels

CONFORMANCES

AWS A5.20/A5.20M: E70T-1C-H8, E70T-9C-H8
ASME SFA-A5.20: E70T-1C-H8, E70T-9C-H8
AWS A5.36/A5.36M E70T1-C1A2-CS1-H8

TYPICAL APPLICATIONS

- Structural fabrication
- Heavy equipment

WELDING POSITIONS

Flat & Horizontal

SHIELDING GAS

100% CO₂
 Flow Rate: 40-55 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	50 lb (22.7 kg) Coil
1/16 (1.6)	ED036431
5/64 (2.0)	ED036430
3/32 (2.4)	ED036427

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -18°C (0°F)	@ -29°C (-20°F)
Requirements⁽⁴⁾ AWS A5.20: E70T-1C-H8, E70T-9C-H8 AWS A5.36: E70T-1-C1A2-CS1-H8	400 (58) min	480-655 (70-95)	22 min	27 (20) min	27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂	495-555 (72-81)	570-625 (82-91)	25-29	35-59 (26-44)	27-59 (20-44)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%B	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ AWS A5.20 E70T-1C-H8, E70T-9C-H8	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max	Not Specified	8.0 max
AWS A5.36 E70T-1-C1A2-CS1-H8				0.030 max	0.030 max		8 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.03 - 0.06	1.44 - 1.64	0.49 - 0.56	≤ 0.008	<0.016	<0.0042	2-4

⁽¹⁾ Typical all weld metal. ⁽²⁾ Measured with 0.2% offset. ⁽³⁾ See test results disclaimer. ⁽⁴⁾ As-Welded with 100% CO₂. ⁽⁵⁾ To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

TYPICAL OPERATING PROCEDURES – Flat & Horizontal

Diameter, Polarity Shielding Gas	CTWD ⁽¹⁾ 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+ 100% CO ₂	19 (3/4)	3.2 (125)	26-30	165	2.4 (5.2)	2.1 (4.6)	87 - 90
		5.1 (200)	27-31	255	3.8 (8.3)	3.4 (7.4)	
6.4 (250)		27-31	300	4.8 (10.4)	4.2 (9.3)		
5/64 in (2.0 mm), DC+ 100% CO ₂	25 (1)	7.6 (300)	28-32	300	5.7 (12.5)	5.1 (11.2)	89 - 92
		9.5 (375)	28-32	315	7.1 (15.6)	6.4 (14.1)	
		3.2 (125)	27-31	260	3.8 (8.3)	3.3 (7.2)	
		4.4 (175)	27-31	330	5.3 (11.7)	4.7 (10.4)	
		5.7 (225)	27-31	390	6.8 (15.0)	6.1 (13.5)	
		6.4 (250)	28-32	420	7.6 (16.7)	6.8 (15.1)	
7.0 (275)	28-32	450	8.3 (18.4)	7.6 (16.7)			
7.6 (300)	28-32	475	9.1 (20.0)	8.3 (18.2)			
8.3 (325)	29-33	500	9.8 (21.7)	9.0 (19.8)			
3/32 in (2.4 mm), DC+ 100% CO ₂	25 (1)	3.2 (125)	28-32	360	5.4 (12.0)	4.9 (10.9)	88 - 91
		5.1 (200)	28-32	490	8.7 (19.2)	7.8 (17.1)	
		6.4 (250)	29-33	575	10.9 (24.0)	9.7 (21.3)	
	32 (1 1/4)	7.0 (275)	29-33	450	12.0 (26.5)	10.6 (23.4)	
		7.6 (300)	30-34	575	13.1 (28.9)	11.5 (25.4)	
		8.3 (325)	31-35	615	14.2 (31.3)	12.5 (27.5)	

⁽¹⁾ Typical all weld metal. ⁽²⁾ Measured with 0.2% offset. ⁽³⁾ See test results disclaimer. ⁽⁴⁾ As-Welded with 100% CO₂. ⁽⁵⁾ To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

OUTERSHIELD® 70

Mild Steel, Flat & Horizontal ▪ AWS E70T-9C, E70T1-C1A2-CS1-H16

KEY FEATURES

- High deposition in the flat and horizontal positions
- Designed for welding with 100% CO₂ shielding gas
- Excellent bead wetting and low spatter
- Tolerates mild levels of surface contaminants
- Stiff wire for easy breaking
- ProTech® foil bag packaging

WELDING POSITIONS

Flat & Horizontal

SHIELDING GAS

100% CO₂
Flow Rate: 40-55 CFH

CONFORMANCES

AWS A5.20/A5.20M:	E70T-1C-H16, E70T-9C-H16
AWS A5.36:	E70T1-C1A2-CS1-H16
ASME SFA-A5.20:	E70T-1C-H16, E70T-9C-H16
ABS:	2YSA
DNV Grade:	II YMS H15
CWB/CSA W48-06:	E492T-9 H16
TUV:	EN 758 T 46 0 R C3 / M3 H10
MIL-E-24403/1:	MIL-70T-1C
ISO 17632-B	T 49 3 T1-0 C A -H10

TYPICAL APPLICATIONS

- Structural fabrication
- Barge fabrication
- Heavy fabrication
- Construction equipment

DIAMETERS / PACKAGING

Diameter in (mm)	50 lb (22.7 kg) Coil	600 lb (272 kg) Speed-Feed® Reel	600 lb (272 kg) Speed-Feed® Drum
1/16 (1.6)	ED012782	ED014588	
5/64 (2.0)	ED012785		
3/32 (2.4)	ED012784	ED014120	ED030262

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -18 °C (0 °F)	@ -29 °C (-20 °F)
Requirements AWS E70T-1C AWS E70T-9C	400 (58) min	485-655 (70-95)	22 min	27 (20) min –	– 27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂	525-575 (76-83)	620-635 (90-92)	27-28	39-42 (29-31)	31-34 (21-25)
Stress Relieved with 100% CO ₂ for 1 hr @ 621 °C (1150 °F)	525 (76)	555 (80)	27-28	27 (20)	24 (18)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements - AWS E70T-1C, E70T-9C	0.12 max	1.75 max	0.90 max	0.03 max	0.03 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.08	1.41-1.43	0.64-0.73	0.01	0.01

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+ 100% CO ₂	25 (1)	3.2 (125)	23-25	170	2.4 (5.3)	2.1 (4.6)	87
		5.1 (200)	25-27	235	3.8 (8.5)	3.4 (7.6)	87
		6.4 (250)	25-28	275	4.8 (10.6)	4.2 (9.2)	87
		7.6 (300)	27-29	310	5.8 (2.7)	5.0 (11.1)	87
		9.5 (375)	29-31	365	7.2 (15.9)	6.4 (14.0)	88
5/64 in (2.0 mm), DC+ 100% CO ₂	28 (1-1/8)	3.2 (125)	23-26	250	3.8 (8.4)	3.2 (7.0)	83
		4.4 (175)	26-28	350	5.4 (11.8)	4.5 (10.0)	85
		5.7 (225)	27-29	375	6.9 (15.2)	5.9 (13.0)	86
		6.4 (250)	29-31	400	7.7 (16.9)	6.5 (14.4)	86
		7.6 (300)	30-32	450	9.2 (20.2)	7.9 (17.4)	86
8.3 (325)	31-33	470	9.9 (21.9)	8.5 (18.8)	86		
3/32 in (2.4 mm), DC+ 100% CO ₂	32 (1-1/4)	3.2 (125)	24-27	335	5.3 (11.7)	4.4 (9.8)	84
		5.1 (200)	28-31	455	8.5 (18.6)	7.3 (16.0)	86
		6.4 (250)	30-32	530	10.6 (23.3)	9.2 (20.2)	87
		7.6 (300)	31-34	590	12.7 (28.0)	11.0 (24.3)	87
		8.3 (325)	33-35	615	13.7 (30.3)	12.0 (26.4)	87

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer. ⁽⁴⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.
NOTE: This product contains micro-alloying elements. Additional information available upon request.

OUTERSHIELD® XLH-70

Mild Steel, Flat & Horizontal ▪ AWS E70T-9C-H8, E70T1-C1A2-CS1-H8

KEY FEATURES

- Meets AWS D1.8 seismic lot waiver requirements for demand critical welds
- H8 diffusible hydrogen levels - controlled for high resistance to hydrogen induced cracking.
- High deposition rates and excellent fast follow characteristics
- Stiff wire enables feeding over long distances
- Tolerates mild levels of surface contaminants
- Designed for welding with CO₂ shielding gas
- ProTech® foil bag packaging

WELDING POSITIONS

Flat & Horizontal

CONFORMANCES

AWS A5.20/A5.20M:	E70T-1C-H8, E70T-9C-H8
AWS A5.36:	E70T1-C1A2-CS1-H8
ASME SFA-5.20:	E70T-1C-H8, E70T-9C-H8
ABS:	3YSA-H5
FEMA 353	
AWS D1.8	

TYPICAL APPLICATIONS

- Structural fabrication
- General fabrication
- Machinery fabrication
- Heavy equipment
- Seismic applications

SHIELDING GAS

100% CO₂
Flow Rate: 40-55 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	50 lb (22.7 kg) Coil	500 lb (227 kg) Speed-Feed® Drum
3/32 (2.4)	ED030236	ED030360

NOTE: Speed-Feed® drums require rotation for proper payoff.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -18°C (0°F)	@ -29°C (-20°F)
Requirements AWS E70T-1C-H8 AWS E70T-9C-H8	400 (58) min	480-660 (70-95)	22 min	27 (20) min –	– 27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂	480-530 (70-77)	570-620 (82-89)	27-30	61-134 (45-99)	42-107 (31-79)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si
Requirements - AWS E70T-1C-H8, E70T-9C-H8	0.12 max	1.75 max	0.90 max
Test Results⁽³⁾ As-Welded with 100% CO ₂	0.06-0.07	1.40-1.60	0.48-0.58
	%S	%P	Diffusible Hydrogen (mL/100g weld deposit)
Requirements - AWS E70T-1C-H8, E70T-9C-H8	0.03 max	0.03 max	8.0 max
Test Results⁽³⁾ As-Welded with 100% CO ₂	≤0.01	≤0.01	3-6

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 (%)
3/32 in. (2.4 mm), DC+ 100% CO ₂	32 (1-1/4)	3.8 (150)	23-26	345	6.5 (14.4)	5.6 (12.4)	86
		5.1 (200)	27-30	445	8.7 (19.2)	7.6 (16.8)	87
		6.4 (250)	28-31	510	10.9 (24.0)	9.5 (21.0)	87
		7.6 (300)	30-32	570	13.1 (28.8)	11.4 (25.2)	87
		8.3 (325)	31-33	600	14.2 (31.2)	12.4 (27.3)	87

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

ULTRACORE® 360™ C81

Low Alloy, All Position ▪ AWS E81T1-Ni1C-JH4, E81T1-C1A8-Ni1-H4

KEY FEATURES

- Seamless design protects the flux core from environmental exposure helping to maintain low diffusible hydrogen and extend shelf life
- Copper coating offers superior feedability and extended contact tip life
- Low spatter and fume levels for less post-weld clean up and a better work environment
- Low H4 diffusible hydrogen levels minimize the risk of hydrogen induced cracking
- Premium arc performance and bead appearance

CONFORMANCES

AWS A5.29/A5.29M: E81T1-Ni1C-JH4
AWS A5.36/A5.36M: E81T1-C1A8-Ni1-H4

TYPICAL APPLICATIONS

- Offshore
- Shipbuilding
- Structural
- General Fabrication

WELDING POSITIONS

All

SHIELDING GAS

100% CO₂
 Flow rate: 42-53 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	27 lb. (12.2kg) Plastic Spool
0.045 (1.1)	ED036173
0.052 (1.3)	ED036174
1/16 (1.6)	ED036175

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft·lbf)	
				@ -40°C (-40°F)	@ -62°C (-80°F)
Requirements					
AWS A5.29: E81T1-Ni1C-JH4	470 (68) min	550-690 (80-100)	19 min	27 (20) min	-
AWS A5.36: E81T1-C1A8-Ni1-H4	470 (68) min	550-690 (80-100)	19 min	-	27 (20) min
Typical Results⁽³⁾					
As-Welded with 100% CO ₂	495-600 (72-87)	570-655 (83-95)	25-30	83-137 (61-101)	31-76 (23-56)

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni
Requirements						
AWS A5.29: E81T1-Ni1C-JH4	0.12 max	1.50 max	0.80 max	0.030 max	0.030 max	0.80-1.10
AWS A5.36: E81T1-C1A8-Ni1-H4		1.75 max				
Typical Results⁽³⁾						
As-Welded with 100% CO ₂	0.05-0.08	1.20-1.39	0.38-0.48	0.003-0.005	0.012-0.015	0.92-1.05
	%Cr	%Mo	%V	%Cu	%B	Diffusible Hydrogen (mL/100g weld deposit)
Requirements						
AWS A5.29: E81T1-Ni1C-JH4	0.15 max	0.35 max	0.05 max	Not Specified	Not Specified	4.0 max
AWS A5.36: E81T1-C1A8-Ni1-H4						4 max
Typical Results⁽³⁾						
As-Welded with 100% CO ₂	0.02-0.03	≤ 0.01	≤ 0.01	0.22-0.25	0.003-0.004	1-3

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 (%)
0.045 in (1.1 mm), DC+ 100% CO ₂	25 (1)	6.4 (250)	24-28	180	2.6 (5.7)	2.4 (5.3)	93-95
		7.6 (300)	25-30	200	3.1 (6.8)	2.9 (6.4)	
		8.9 (350)	26-32	225	3.6 (8.0)	3.4 (7.5)	
		10.2 (400)	27-33	245	4.1 (9.1)	3.9 (8.6)	
		11.4 (450)	27-25	265	4.6 (10.2)	4.4 (9.7)	
		12.7 (500)	28-36	290	5.2 (11.4)	4.9 (10.8)	
0.052 in (1.3 mm), DC+ 100% CO ₂	25 (1)	5.1 (200)	23-28	200	2.8 (6.2)	2.5 (5.5)	88-90
		6.4 (250)	26-32	230	3.5 (7.7)	3.1 (6.9)	
		8.9 (350)	28-33	320	4.9 (10.8)	4.4 (9.8)	
		10.8 (425)	29-36	350	5.7 (12.6)	5.4 (11.9)	
1/16 in (1.6 mm), DC+ 100% CO ₂	25 (1)	3.8 (150)	23-28	230	3.0 (6.6)	2.7 (6.0)	90-94
		5.1 (200)	24-29	280	4.0 (8.8)	3.7 (8.1)	
		6.4 (250)	26-32	325	5.0 (11.0)	4.7 (10.3)	
		7.6 (300)	28-34	365	6.0 (13.3)	5.7 (12.5)	
		8.9 (350)	29-36	405	7.0 (15.5)	6.7 (14.7)	

⁽¹⁾Typical all weld metal. ⁽³⁾See test results disclaimer. ⁽⁴⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.
NOTE: This product contains micro-alloying elements. Additional information available upon request.

ULTRACORE® 360™ M81

Low Alloy, All Position ■ AWS E81T1-Ni1M-JH4, E81T1-M21A8-Ni1-H4

KEY FEATURES

- Seamless design protects the flux core from environmental exposure helping to maintain low diffusible hydrogen and extend shelf life
- Copper coating offers superior feedability and extended contact tip life
- Low spatter and fume levels for less post-weld clean up and a better work environment
- Low H4 diffusible hydrogen levels minimize the risk of hydrogen induced cracking
- Premium arc performance and bead appearance

CONFORMANCES

AWS A5.29/A5.29M: E81T1-Ni1M-JH4
AWS A5.36/A5.36M: E81T1-M21A8-Ni1-H4

TYPICAL APPLICATIONS

- Offshore
- Shipbuilding
- Structural
- General Fabrication

WELDING POSITIONS

All

SHIELDING GAS

80% Ar, 20% CO₂
 Flow rate: 42-53 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	27 lb. (12.2kg) Plastic Spool
0.045 (1.1)	ED036176
0.052 (1.3)	ED036177
1/16 (1.6)	ED036178

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft·lbf)	
				@ -40 °C (-40 °F)	@ -62 °C (-80 °F)
Requirements					
AWS A5.29: E81T1-Ni1M-JH4	470 (68) min	550-690 (80-100)	19 min	27 (20) min	-
AWS A5.36: E81T1-M21A8-Ni1-H4	470 (68) min	550-690 (80-100)	19 min	-	27 (20) min
Typical Results⁽³⁾					
As-Welded with 80% Ar/ 20% CO ₂	545-595 (79-86)	585-650 (85-94)	25-30	104-155 (77-114)	85-121 (63-89)

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni
Requirements						
AWS A5.29: E81T1-Ni1M-JH4	0.12 max	1.50 max	0.80 max	0.030 max	0.030 max	0.80-1.10
AWS A5.36: E81T1-M21A8-Ni1-H4		1.75 max				
Typical Results⁽³⁾						
As-Welded with 80% Ar/ 20% CO ₂	0.05-0.07	1.15-1.38	0.27-0.35	0.003-0.005	0.010-0.013	0.89-0.99
	%Cr	%Mo	%V	%Cu	%B	Diffusible Hydrogen (mL/100g weld deposit)
Requirements						
AWS A5.29: E81T1-Ni1M-JH4	0.15 max	0.35 max	0.05 max	Not Specified	Not Specified	4.0 max
AWS A5.36: E81T1-M21A8-Ni1-H4						4 max
Typical Results⁽³⁾						
As-Welded with 80% Ar/ 20% CO ₂	0.02-0.03	≤ 0.01	≤ 0.01	0.23-0.25	0.003-0.004	1-3

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 (%)
0.045 in (1.1 mm), DC+ 80% Ar/ 20% CO ₂	25 (1)	6.4 (250)	23-27	180	2.6 (5.8)	2.4 (5.3)	90-94
		7.6 (300)	24-28	195	3.1 (6.9)	2.9 (6.4)	
		8.9 (350)	25-29	215	3.7 (8.1)	3.4 (7.5)	
		10.2 (400)	26-30	235	4.2 (9.2)	3.9 (8.6)	
		11.4 (450)	27-31	250	4.7 (10.4)	4.4 (9.7)	
		12.7 (500)	28-33	275	5.1 (11.5)	4.9 (10.8)	
0.052 in (1.3 mm), DC+ 80% Ar/ 20% CO ₂	25 (1)	5.1 (200)	21-27	205	2.7 (6.0)	2.5 (5.6)	92-95
		6.4 (250)	24-28	235	3.4 (7.5)	3.2 (7.0)	
		8.9 (350)	26-30	285	4.8 (10.5)	4.5 (9.8)	
		10.8 (425)	27-32	320	5.8 (12.8)	5.4 (12.0)	
		12.7 (500)	28-33	350	6.8 (15.0)	6.4 (14.2)	
1/16 in (1.6 mm), DC+ 80% Ar/ 20% CO ₂	25 (1)	3.8 (150)	21-26	235	3.0 (6.6)	2.8 (6.2)	92-94
		5.1 (200)	22-27	280	4.0 (8.8)	3.7 (8.3)	
		6.4 (250)	24-29	315	5.0 (11.0)	4.7 (10.4)	
		7.6 (300)	25-30	355	6.0 (13.3)	5.6 (12.5)	
		8.9 (350)	26-31	395	7.0 (15.5)	6.6 (14.6)	

⁽¹⁾Typical all weld metal. ⁽³⁾See test results disclaimer. ⁽⁴⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.
NOTE: This product contains micro-alloying elements. Additional information available upon request.

ULTRACORE® 81Ni1A75-H

Low Alloy, All Position ▪ AWS E81T1-Ni1M-JH4, E81T1-M21A4-Ni1-H4



KEY FEATURES

- Capable of producing weld deposits with impact toughness exceeding 88 - 123 J (65 - 91 ft•lbf) at -40°C (-40°F)
- Designed for welding with 75-85% Argon/ balance CO₂ shielding gas
- Premium arc performance and bead appearance
- Meets AWS D1.8 seismic lot waiver requirements
- ProTech® foil bag packaging
- Color match on weathering steel

CONFORMANCES

AWS A5.29/A5.29M:	E81T1-Ni1M-JH4
AWS A5.36:	E81T1-M21A4-Ni1-H4
ASME SFA-A5.29:	E81T1-Ni1M-JH4
ABS:	4YQ460SA H5
Lloyd's Register:	4Y46S H5
DNV Grade:	IV 46MS H5
CWB/CSA W48-06:	E551T1-Ni1M-JH4 (E81T1-Ni1M-JH4)
EN ISO 17632-B:	T554T1-1MA-N2-H5
FEMA 353	
AWS D1.8	

WELDING POSITIONS

All

SHIELDING GAS

75% - 85% Argon / Balance CO₂
Flow Rate: 40-50 CFH

TYPICAL APPLICATIONS

- Bridge fabrication
- Weathering steels
- Offshore
- Structural fabrication
- NACE applications

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Spool**	500 lb (227 kg) Accu-Trak® Drum
0.045 (1.1)	ED032206, ED034411*	
0.052 (1.3)	ED032279	ED034412*
1/16 (1.6)	ED032207, ED034413*	

*Buy America Product

**Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -29°C (-20°F)	@ -40°C (-40°F)
Requirements⁽⁴⁾ - AWS E81T1-Ni1M-JH4	470 (68) min	550-690 (80-100)	19 min	27 (20) min	27 (20) min
Typical Results⁽³⁾ As-Welded with 75% Ar/25% CO ₂	545-595 (79-86)	595-640 (86-93)	24-28	107-142 (79-105)	88-123 (65-91)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements⁽⁴⁾ - AWS E81T1-Ni1M-JH4	0.12 max	1.50 max	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 75% Ar/25% CO ₂	0.04-0.05	1.26-1.36	0.25-0.29	0.006-0.009	0.005-0.008
	%Ni	%Mo	%Cr	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ - AWS E81T1-Ni1M-JH4	0.80-1.10	0.35 max	0.15 max	0.05 max	4.0 max
Typical Results⁽³⁾ As-Welded with 75% Ar/25% CO ₂	0.86-0.96	0.01	0.04-0.05	0.02-0.03	2-4

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 75%-85% Ar/ balance CO ₂	25 (1)	4.4 (175)	22-27	140	1.8 (4.0)	1.6 (3.5)	86-88
		5.1 (200)	23-28	150	2.1 (4.6)	1.8 (4.0)	
		6.4 (250)	24-29	165	2.6 (5.7)	2.3 (5.0)	
		7.6 (300)	24-29	190	3.1 (6.8)	2.7 (6.0)	
		8.9 (350)	25-30	205	3.6 (8.0)	3.2 (7.0)	
		9.5 (375)	25-30	225	3.9 (8.6)	3.4 (7.5)	
		10.8 (425)	26-31	245	4.4 (9.7)	3.8 (8.5)	
		12.1 (475)	27-32	265	4.9 (10.8)	4.3 (9.5)	
0.052 in (1.3 mm), DC+ 75%-85% Ar/ balance CO ₂	25 (1)	3.8 (150)	22-27	150	2.0 (4.5)	1.8 (3.9)	86-88
		4.7 (185)	23-28	165	2.5 (5.5)	2.2 (4.8)	
		5.7 (225)	23-28	190	3.1 (6.7)	2.7 (5.9)	
		6.4 (250)	24-29	215	3.4 (7.5)	2.9 (6.5)	
		7.0 (275)	24-29	235	3.7 (8.2)	3.2 (7.2)	
		7.6 (300)	25-30	265	4.1 (9.0)	3.5 (7.8)	
		8.5 (335)	25-31	275	4.5 (10.0)	4.0 (8.7)	
		9.5 (375)	26-32	295	5.1 (11.2)	4.4 (9.8)	
1/16 in (1.6 mm), DC+ 75%-85% Ar/ balance CO ₂	25 (1)	3.8 (150)	22-27	200	2.9 (6.3)	2.5 (5.5)	86-88
		4.4 (175)	23-28	210	3.3 (7.4)	2.9 (6.4)	
		5.1 (200)	24-29	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	24-29	265	4.3 (9.5)	3.7 (8.2)	
		6.5 (250)	25-30	285	4.8 (10.5)	4.2 (9.2)	
		7.0 (275)	25-31	315	5.3 (11.6)	4.6 (10.1)	
		8.3 (325)	26-32	335	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	27-33	365	6.7 (14.7)	5.8 (12.8)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 75% Argon / 25% CO₂. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.
NOTE 1: FEMA and AWS D1.8 structural steel seismic supplement test data can be found on this product at www.lincolnelectric.com. NOTE 2: This product contains micro-alloying elements.
Additional information available upon request.

ULTRACORE® 81Ni1C-H

Low Alloy, All Position ▪ AWS E81T1-Ni1C-JH4, E81T1-C1A4-Ni1-H4



KEY FEATURES

- Capable of producing weld deposits with impact toughness exceeding 84 - 130 J (62 - 96 ft•lbf) at -40°C (-40°F)
- Designed for welding with 100% CO₂ shielding gas
- Premium arc performance and bead appearance
- Meets AWS D1.8 seismic lot waiver requirements
- ProTech® foil bag packaging
- Color match on weathering steels

WELDING POSITIONS

All

SHIELDING GAS

100% CO₂
Flow Rate: 40-50 CFH

CONFORMANCES

AWS A5.29/A5.29M:	E81T1-Ni1C-JH4
AWS A5.36:	E81T1-C1A4-Ni1-H4
ASME SFA-A5.29:	E81T1-Ni1C-JH4
ABS:	4YQ460SA H5
Lloyd's Register:	4Y46S H5
DNV Grade:	IV Y46MS H5
CWB/CSA W48-06:	E551T1-Ni1C-JH4 (E81T1-Ni1C-JH4)
EN ISO 17632-B:	T554T1-1CA-N2-H5
FEMA 353	
AWS D1.8	

TYPICAL APPLICATIONS

- Bridge fabrication
- Weathering steels
- Offshore
- Structural fabrication
- NACE applications

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Spool**	50 lb (22.7 kg) Fiber Spool
0.045 (1.1)	ED032204, ED034414*	
0.052 (1.3)	ED032280, ED034415*	
1/16 (1.6)	ED032205	ED032745, ED034416*

*Buy America Product **Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -29°C (-20°F)	@ -40°C (-40°F)
Requirements⁽⁴⁾ - AWS E81T1-Ni1C-JH4	470 (68) min	550-690 (80-100)	19 min	27 (20) min	27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂	540-585 (78-84)	595-635 (86-91)	25-28	111-152 (82-112)	84-130 (62-96)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements⁽⁴⁾ - AWS E81T1-Ni1C-JH4	0.12 max	1.50 max	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.04-0.05	1.24-1.34	0.27-0.31	0.006-0.007	0.007-0.009
	%Ni	%Mo	%Cr	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ - AWS E81T1-Ni1C-JH4	0.80-1.10	0.35 max	0.15 max	0.05 max	4.0max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.88-0.99	0.01	0.04-0.05	0.02-0.03	3-4

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 100% CO ₂	25 (1)	4.4 (175)	23-28	140	1.8 (4.0)	1.6 (3.5)	86-88
		5.1 (200)	24-29	150	2.1 (4.6)	1.8 (4.0)	
		6.4 (250)	25-30	165	2.6 (5.7)	2.3 (5.0)	
		7.6 (300)	25-30	190	3.1 (6.8)	2.7 (6.0)	
		8.9 (350)	26-31	205	3.6 (8.0)	3.2 (7.0)	
		9.5 (375)	26-31	225	3.9 (8.6)	3.4 (7.5)	
		10.8 (425)	27-32	245	4.4 (9.7)	3.8 (8.5)	
		12.1 (475)	28-33	265	4.9 (10.8)	4.3 (9.5)	
0.052 in (1.3 mm), DC+ 100% CO ₂	25 (1)	3.8 (150)	23-28	150	2.0 (4.5)	1.8 (3.9)	86-88
		4.7 (185)	24-29	165	2.5 (5.5)	2.2 (4.8)	
		5.7 (225)	24-29	190	3.1 (6.7)	2.7 (5.9)	
		6.4 (250)	25-30	215	3.4 (7.5)	2.9 (6.5)	
		7.0 (275)	25-30	235	3.7 (8.2)	3.2 (7.2)	
		7.6 (300)	26-31	255	4.1 (9.0)	3.5 (7.8)	
		8.5 (335)	26-31	275	4.5 (10.0)	4.0 (8.7)	
		9.5 (375)	27-32	295	5.1 (11.2)	4.4 (9.8)	
1/16 in (1.6 mm), DC+ 100% CO ₂	25 (1)	3.8 (150)	24-29	200	2.9 (6.3)	2.5 (5.5)	86-88
		4.4 (175)	24-30	210	3.3 (7.4)	2.9 (6.4)	
		5.1 (200)	25-30	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	25-31	265	4.3 (9.5)	3.7 (8.2)	
		6.4 (250)	26-31	285	4.8 (10.5)	4.2 (9.2)	
		7.0 (275)	26-32	305	5.3 (11.6)	4.6 (10.1)	
		8.3 (325)	27-32	335	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	28-34	365	6.7 (14.7)	5.8 (12.8)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 100% CO₂. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.
NOTE 1: FEMA and AWS D1.8 structural steel seismic supplement test data can be found on this product at www.lincolnelectric.com. NOTE 2: This product contains micro-alloying elements.
Additional information available upon request.

ULTRACORE® 81Ni1C-H PLUS

Low Alloy, All Positions ▪ AWS E81T1-Ni1C-JH4, E81T1-C1A6-Ni1-H4

KEY FEATURES

- Innovative design capable of superior toughness at -60°F in both the as-welded and stress-relieved conditions
- Designed for welding with 100% CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging
- Designed to accommodate applications requiring Nickel content of 1% max

WELDING POSITIONS

All

SHIELDING GAS

100% CO₂
Flow Rate: 40-50 CFH

CONFORMANCES

AWS A5.29/A5.29M:	E81T1-Ni1C-JH4
AWS A5.36/A5.36M:	E81T1-C1A6-Ni1-H4, E81T1-C1P4-Ni1-H4
ASME SFA-5.29/SFA-5.29M:	E81T1-Ni1C-JH4
ABS:	4YQ460SA H5
Lloyds Register:	4Y46S H5
DNV Grade:	IV 46MS H5
CWB/CSA W48-06:	E551T1-Ni1C-JH4, E81T1-Ni1C-JH4

TYPICAL APPLICATIONS

- Offshore drilling rigs
- Low temperature storage tanks
- Ship building
- Construction
- Mining Equipment

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15kg) Plastic Spool
0.045 (1.1)	ED034858
0.052 (1.3)	ED034859
1/16 (1.6)	ED034860

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft·lbf)	
				-40°C (40°F)	-51°C (-60°F)
Requirements					
AWS A5.29: E81T1-Ni1C-JH4 As-Welded with 100% CO ₂	470 (68) min	550-690 (80-100)	19 min	27 (20) min	-
AWS A5.36: E81T1-C1A6-Ni1-H4 As-Welded with 100% CO ₂	470 (68) min	550-690 (80-100)	19 min	-	27 (20) min
AWS A5.36: E81T1-C1P4-Ni1-H4 Stress Relieved with 100% CO ₂ for 1 hr @ 621°C (1150°F)	470 (68) min	550-690 (80-100)	19 min	27 (20) min	-
Typical Results⁽³⁾					
As-Welded with 100% CO ₂	505-565 (73-82)	585-640 (85-93)	23-29	87-127 (54-94)	41-123 (30-91)
Stress Relieved with 100% CO ₂ for 1 hr @ 621°C (1150°F)	475-530 (69-77)	560-620 (81-90)	26-30	41-108 (30-80)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS A5.29: E81T1-Ni1C-JH4 AWS A5.36: E81T1-C1A6-Ni1-H4, E81T1-C1P4-Ni1-H4	0.12 max	1.50 max 1.75 max	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ with 100% CO ₂	0.04-0.05	1.29-1.37	0.42-0.45	0.007-0.008	0.011
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.29: E81T1-Ni1C-JH4 AWS A5.36: E81T1-C1A6-Ni1-H4, E81T1-C1P4-Ni1-H4	0.80-1.10	0.15 max	0.35 max	0.05 max	4.0 max 4 max
Typical Results⁽³⁾ with 100% CO ₂	0.89-0.95	0.05	0.10	0.00	2-4

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 (%)
0.045 in (1.1 mm), DC+ 100% CO ₂							
Optimal Settings	25 (1)	10.7 (420)	27	200	1.8-5.1 (3.9-11.3)	1.5-4.4 (3.4-9.8)	85-88
Min - Max	19-25 (3/4-1)	4.4-12.7 (175-500)	26-31	115-214			
0.052 in (1.3 mm), DC+ 100% CO ₂							
Optimal Settings	25 (1)	7.6 (300)	26	210	2.1-5.0 (4.7-11.0)	1.7-4.2 (3.8-9.2)	85-88
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-30	148-231			
1/16 in (1.6 mm), DC+ 100% CO ₂							
Optimal Settings	25 (1)	7.6 (300)	26	280	2.9-6.8 (6.4-15.0)	2.4-5.6 (5.3-12.4)	85-88
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-30	189-299			

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

ULTRACORE® 81Ni1M-H PLUS

Low Alloy, All Positions ▪ AWS E81T1-Ni1M-JH4, E81T1-M21A6-Ni1-H4

KEY FEATURES

- Innovative design capable of superior toughness at -60°F in both the as-welded and stress-relieved conditions
- Designed for welding with 75-80% Argon/ Balance CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging
- Designed to accommodate applications requiring Nickel content of 1% max

WELDING POSITIONS

All

SHIELDING GAS

75-80% Argon / Balance CO₂
Flow Rate: 40-50 CFH

CONFORMANCES

AWS A5.29/A5.29M:	E81T1-Ni1M-JH4
AWS A5.36/A5.36M:	E81T1-M21A6-Ni1-H4, E81T1-M21P4-Ni1-H4
ASME SFA-5.29/SFA-5.29M:	E81T1-Ni1M-JH4
ABS:	4YQ460SA H5
Lloyds Register:	4Y46S H5
DNV Grade:	IV 46MS H5
CWB/CSA W48-06:	E551T1-Ni1M-JH4, E81T1-Ni1M-JH4

TYPICAL APPLICATIONS

- Offshore drilling rigs
- Low temperature storage tanks
- Ship building
- Construction
- Mining Equipment

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15kg) Plastic Spool
0.045 (1.1)	ED034855
0.052 (1.3)	ED034856
1/16 (1.6)	ED034857

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft•lbf)	
				-40°C (40°F)	-51°C (-60°F)
Requirements					
AWS A5.29: E81T1-Ni1M-JH4 As-Welded with 75% Ar / 25% CO ₂	470 (68) min	550-690 (80-100)	19 min	27 (20) min	-
AWS A5.36: E81T1-M21A6-Ni1-H4 As-Welded with 75% Ar / 25% CO ₂	470 (68) min	550-690 (80-100)	19 min	-	27 (20) min
AWS A5.36: E81T1-M21P4-Ni1-H4 Stress Relieved with 75% Ar / 25% CO ₂ for 1 hr @ 621°C (1150°F)	470 (68) min	550-690 (80-100)	19 min	27 (20) min	-
Typical Results⁽³⁾					
As-Welded with 75% Ar / 25% CO ₂	505-530 (73-77)	582-605 (84-88)	26-28	92-104 (68-77)	80-89 (59-66)
Stress Relieved with 75% Ar / 25% CO ₂ for 1 hr @ 621°C (1150°F)	475-493 (69-71)	575-588 (83-85)	27-29	80-96 (59-71)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS A5.29: E81T1-Ni1M-JH4 AWS A5.36: E81T1-M21A6-Ni1-H4, E81T1-M21P4-Ni1-H4	0.12 max	1.50 max	0.80 max	0.030 max	0.030 max
		1.75 max			
Typical Results⁽³⁾ with 75% Argon / 25% CO ₂	0.05-0.06	1.31-1.38	0.41-0.44	0.007	0.012
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.29: E81T1-Ni1M-JH4 AWS A5.36: E81T1-M21A6-Ni1-H4, E81T1-M21P4-Ni1-H4	0.80-1.10	0.15 max	0.35 max	0.05 max	4.0 max
					4 max
Typical Results⁽³⁾ with 75% Argon / 25% CO ₂	0.83-0.87	0.05	0.01	0.00	2-4

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 (%)
0.045 in (1.1 mm), DC+ 75% Argon / 25% CO ₂							
Optimal Settings	25 (1)	10.7 (420)	26	200	1.8-5.1 (3.9-11.3)	1.5-4.4 (3.4-9.8)	85-88
Min - Max	19-25 (3/4-1)	4.4-12.7 (175-500)	24-32	115-214			
0.052 in (1.3 mm), DC+ 75% Argon / 25% CO ₂							
Optimal Settings	25 (1)	7.6 (300)	25	210	2.1-5.0 (4.7-11.0)	1.7-4.2 (3.8-9.2)	85-88
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	24-31	148-231			
1/16 in (1.6 mm), DC+ 75% Argon / 25% CO ₂							
Optimal Settings	25 (1)	7.6 (300)	25	280	2.9-6.8 (6.4-15.0)	2.4-5.6 (5.3-12.4)	85-88
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	25-31	189-299			

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

ULTRACORE® 81Ni2A75-H

Low Alloy, All Position ▪ AWS E81T1-Ni2M-JH4, E81T1-M21A6-Ni2-H4

KEY FEATURES

- Capable of producing weld deposits with impact toughness exceeding 41 - 89 J (30 - 66 ft•lbf) at -51°C (-60°F)
- Designed for welding with 75-85% Argon/ Balance CO₂ shielding gas
- Premium arc performance and bead appearance
- H4 diffusible hydrogen levels
- ProTech® foil bag packaging

WELDING POSITIONS

All

SHIELDING GAS

75% - 85% Argon / Balance CO₂
Flow Rate: 40-55 CFH

CONFORMANCES

AWS A5.29/A5.29M:	E81T1-Ni2M-JH4
AWS A5.36:	E81T1-M21A6-Ni2-H4
ASME SFA-A5.29:	E81T1-Ni2M-JH4
ABS:	3YSA H5
Lloyd's Register:	3YS H5
DNV Grade:	III Y40MS H5
CWB/CSA W48-06:	E551T1-Ni2M-JH4 (E81T1-Ni2M-JH4)
EN ISO 17632-B:	T556T1-1MA-N5-H5

TYPICAL APPLICATIONS

- Mining
- Offshore
- Bridge fabrication
- High strength fabrication

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Spool*
0.045 (1.1)	ED032217
0.052 (1.3)	ED032277
1/16 (1.6)	ED032216

*Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -40°C (-40°F)	@ -51°C (-60°F)
Requirements⁽⁴⁾ - AWS E81T-1Ni2M-JH4	470 (68) min	550-670 (80-100)	19 min	27 (20) min	27 (20) min
Typical Results⁽³⁾ As-Welded with 75% Ar/25% CO ₂	555-580 (80-84)	615-635 (89-92)	25-28	69-115 (51-85)	41-89 (30-66)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S
Requirements⁽⁴⁾ - AWS E81T1-Ni2M-JH4	0.12 max	1.50 max	0.80 max	0.030 max
Typical Results⁽³⁾ As-Welded with 75% Ar/25% CO ₂	0.04-0.05	0.93-1.05	0.25-0.28	0.005-0.006
	%P	%Ni	Diffusible Hydrogen (mL/100g weld deposit)	
Requirements⁽⁴⁾ - AWS E81T1-Ni2M-JH4	0.030 max	1.75-2.75	4.0 max	
Typical Results⁽³⁾ As-Welded with 75% Ar/25% CO ₂	0.006-0.008	2.01-2.13	3-4	

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 75%-85% Ar/ balance CO ₂	25 (1)	4.4 (175)	21-26	140	1.8 (4.0)	1.6 (3.5)	86-88
		5.1 (200)	22-27	150	2.1 (4.6)	1.8 (4.0)	
		6.4 (250)	22-27	165	2.6 (5.7)	2.3 (5.0)	
		7.6 (300)	23-28	190	3.1 (6.8)	2.7 (6.0)	
		8.9 (350)	24-29	205	3.6 (8.0)	3.2 (7.0)	
		9.5 (375)	24-29	225	3.9 (8.6)	3.4 (7.5)	
		10.8 (425)	25-30	245	4.4 (9.7)	3.8 (8.5)	
		12.1 (475)	26-31	265	4.9 (10.8)	4.3 (9.5)	
0.052 in (1.3 mm), DC+ 75%-85% Ar/ balance CO ₂	25 (1)	3.8 (150)	21-26	150	2.0 (4.5)	1.8 (3.9)	86-88
		4.7 (185)	22-27	165	2.5 (5.5)	2.2 (4.8)	
		5.7 (225)	22-27	190	3.1 (6.7)	2.7 (5.9)	
		6.4 (250)	23-28	215	3.4 (7.5)	2.9 (6.5)	
		7.0 (275)	23-28	235	3.7 (8.2)	3.2 (7.2)	
		7.6 (300)	24-29	255	4.1 (9.0)	3.5 (7.8)	
		8.5 (335)	24-30	275	4.5 (10.0)	4.0 (8.7)	
		9.5 (375)	25-31	295	5.1 (11.2)	4.4 (9.8)	
1/16 in (1.6 mm), DC+ 75%-85% Ar/ balance CO ₂	25 (1)	3.8 (150)	21-27	200	2.9 (6.3)	2.5 (5.5)	86-88
		4.4 (175)	21-28	210	3.3 (7.4)	2.9 (6.4)	
		5.1 (200)	22-29	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	23-30	265	4.3 (9.5)	3.7 (8.2)	
		6.4 (250)	24-31	285	4.8 (10.5)	4.2 (9.2)	
		7.0 (275)	24-32	315	5.3 (11.6)	4.6 (10.1)	
		8.3 (325)	24-32	335	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	25-33	365	6.7 (14.7)	5.8 (12.8)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 75% Argon / 25% CO₂ ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® 81Ni2C-H

Low Alloy, All Position ▪ AWS E81T1-Ni2C-JH4, E81T1-C1A6-Ni2-H4

KEY FEATURES

- Capable of producing weld deposits with impact toughness exceeding 54 - 84 J (40 - 62 ft•lbf) at -51°C (-60°F)
- Designed for welding with 100% CO₂ shielding gas
- Premium arc performance and bead appearance
- H4 diffusible hydrogen levels
- ProTech® foil bag packaging

WELDING POSITIONS

All, except vertical down

SHIELDING GAS

100% CO₂
Flow Rate: 40-50 CFH

CONFORMANCES

AWS A5.29/A5.29M:	E81T1-Ni2C-JH4
AWS A5.36:	E81T1-C1A6-Ni2-H4
ASME SFA-A5.29:	E81T1-Ni2C-JH4
ABS:	3YSA H5
Lloyd's Register:	3YS H5
DNV Grade:	III Y40MS H5
CWB/CSA W48-06:	E551T1-Ni2C-JH4 (E81T1-Ni2C-JH4)
EN ISO 17632-B:	T556T1-1CA-N5-H5

TYPICAL APPLICATIONS

- Mining
- Offshore
- Bridge fabrication
- High strength fabrication

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Spool*
0.045 (1.1)	ED032215
0.052 (1.3)	ED032278
1/16 (1.6)	ED032214

*Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -40°C (-40°F)	@ -51°C (-60°F)
Requirements⁽⁴⁾ - AWS E81T1-Ni2C-JH4	470 (68) min	550-670 (80-100)	19 min	27 (20) min	27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂	555-600 (80-86)	615-650 (89-94)	26-28	76-111 (56-82)	54-84 (40-62)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S
Requirements⁽⁴⁾ - AWS E81T1-Ni2C-JH4	0.12 max	1.50 max	0.80 max	0.030 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.04-0.05	1.14-1.24	0.27-0.32	0.006-0.007
	%P	%Ni	Diffusible Hydrogen (mL/100g weld deposit)	
Requirements⁽⁴⁾ - AWS E81T1-Ni2C-JH4	0.030 max	1.75-2.75	4.0 max	
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.006-0.007	1.86-2.19	2-4	

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 100% CO ₂	25 (1)	4.4 (175)	23-28	140	1.8 (4.0)	1.6 (3.5)	86-88
		5.1 (200)	24-29	150	2.1 (4.6)	1.8 (4.0)	
		6.4 (250)	25-30	165	2.6 (5.7)	2.3 (5.0)	
		7.6 (300)	25-30	190	3.1 (6.8)	2.7 (6.0)	
		8.9 (350)	26-31	205	3.6 (8.0)	3.2 (7.0)	
		9.5 (375)	26-31	225	3.9 (8.6)	3.4 (7.5)	
		10.8 (425)	27-32	245	4.4 (9.7)	3.8 (8.5)	
		12.1 (475)	28-33	265	4.9 (10.8)	4.3 (9.5)	
0.052 in (1.3 mm), DC+ 100% CO ₂	25 (1)	3.8 (150)	23-28	150	2.0 (4.5)	1.8 (3.9)	86-88
		4.7 (185)	24-29	165	2.5 (5.5)	2.2 (4.8)	
		5.7 (225)	24-29	190	3.1 (6.7)	2.7 (5.9)	
		6.4 (250)	25-30	215	3.4 (7.5)	2.9 (6.5)	
		7.0 (275)	25-30	235	3.7 (8.2)	3.2 (7.2)	
		7.6 (300)	26-31	255	4.1 (9.0)	3.5 (7.8)	
		8.5 (335)	26-31	275	4.5 (10.0)	4.0 (8.7)	
		9.5 (375)	27-32	295	5.1 (11.2)	4.4 (9.8)	
1/16 in (1.6 mm), DC+ 100% CO ₂	25 (1)	3.8 (150)	24-29	200	2.9 (6.3)	2.5 (5.5)	86-88
		4.4 (175)	24-30	210	3.3 (7.4)	2.9 (6.4)	
		5.1 (200)	25-30	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	25-31	265	4.3 (9.5)	3.7 (8.2)	
		6.4 (250)	26-31	305	4.8 (10.5)	4.2 (9.2)	
		7.0 (275)	26-32	305	5.3 (11.6)	4.6 (10.1)	
		8.3 (325)	27-32	335	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	28-34	365	6.7 (14.7)	5.8 (12.8)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 100% CO₂ ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® 81K2A75-H

Low Alloy, All Position ▪ AWS E81T1-K2M-JH4, E81T1-M21A4-K2-H4

KEY FEATURES

- Capable of producing weld deposits with impact toughness exceeding 89 - 127 J (66 - 94 ft•lbf) at -40°C (-40°F)
- Designed for welding with 75-85% Argon/ Balance CO₂ shielding gas
- Premium arc performance and bead appearance
- H4 diffusible hydrogen levels
- ProTech® foil bag packaging

WELDING POSITIONS

All, except vertical down

SHIELDING GAS

75% - 85% Argon / Balance CO₂
Flow Rate: 40 - 50 CFH

CONFORMANCES

AWS A5.29/A5.29M:	E81T1-K2M-JH4
AWS A5.36:	E81T1-M21A4-K2-H4
ASME SFA-A5.29:	E81T1-K2M-JH4
ABS:	4YQ460SA H5
Lloyd's Register:	4Y46S H5
DNV Grade:	IV 46MS H5
EN ISO 17632-B:	T554T1-1MA-N3-H5

TYPICAL APPLICATIONS

- High strength steels with 550 MPa (80 ksi) tensile strength
- Offshore
- Shipbuilding

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Spool*
0.045 (1.1)	ED032385
0.052 (1.3)	ED032386
1/16 (1.6)	ED032387

*Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -29°C (-20°F)	@ -40°C (-40°F)
Requirements⁽⁴⁾ - AWS E81T1-K2M-JH4	470 (68) min	550-690 (80-100)	19 min	27 (20) min	27 (20) min
Typical Results⁽³⁾ As-Welded with 75% Argon/25% CO ₂	535-550 (78-80)	585-605 (85-88)	26-27	117-155 (86-114)	89-127 (66-94)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements⁽⁴⁾ - AWS E81T1-K2M-JH4	0.15 max	0.50-1.75	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 75% Ar/25% CO ₂	0.04-0.05	0.98-1.09	0.25-0.28	0.006-0.009	0.005-0.008
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ - AWS E81T1-K2M-JH4	1.00-2.00	0.15 max	0.35 max	0.05 max	4 max
Typical Results⁽³⁾ As-Welded with 75% Ar/25% CO ₂	1.40-1.63	0.03-0.04	0.01-0.02	0.02-0.03	2-4

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 75%-85% Ar/ balance CO ₂	25 (1)	4.4 (175)	22-27	140	1.8 (4.0)	1.6 (3.5)	86-88
		5.1 (200)	23-28	150	2.1 (4.6)	1.8 (4.0)	
		6.4 (250)	24-29	165	2.6 (5.7)	2.3 (5.0)	
		7.6 (300)	24-29	190	3.1 (6.8)	2.7 (6.0)	
		8.9 (350)	25-30	205	3.6 (8.0)	3.2 (7.0)	
		9.5 (375)	25-30	225	3.9 (8.6)	3.4 (7.5)	
		10.8 (425)	26-31	245	4.4 (9.7)	3.8 (8.5)	
		12.1 (475)	27-32	265	4.9 (10.8)	4.3 (9.5)	
0.052 in (1.3 mm), DC+ 75%-85% Ar/ balance CO ₂	25 (1)	3.8 (150)	22-27	150	2.0 (4.5)	1.8 (3.9)	86-88
		4.7 (185)	23-28	165	2.5 (5.5)	2.2 (4.8)	
		5.7 (225)	23-28	190	3.1 (6.7)	2.7 (5.9)	
		6.4 (250)	24-29	215	3.4 (7.5)	2.9 (6.5)	
		6.9 (275)	24-29	235	3.7 (8.2)	3.2 (7.2)	
		7.6 (300)	25-30	255	4.1 (9.0)	3.5 (7.8)	
		8.5 (335)	25-31	275	4.5 (10.0)	4.0 (8.7)	
		9.5 (375)	26-32	295	5.1 (11.2)	4.4 (9.8)	
1/16 in (1.6 mm), DC+ 75%-85% Ar/ balance CO ₂	25 (1)	3.8 (150)	22-27	200	2.9 (6.3)	2.5 (5.5)	86-88
		4.4 (175)	23-28	210	3.3 (7.4)	2.9 (6.4)	
		5.1 (200)	24-29	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	24-29	265	4.3 (9.5)	3.7 (8.2)	
		6.4 (250)	25-30	285	4.8 (10.5)	4.2 (9.2)	
		6.9 (275)	25-31	315	5.3 (11.6)	4.6 (10.1)	
		8.3 (325)	26-32	335	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	27-33	365	6.7 (14.7)	5.8 (12.8)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 75% Argon/25% CO₂ ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® 81K2C-H

Low Alloy, All Position ■ AWS E81T1-K2C-JH4, E81T1-C1A5-K2-H4

KEY FEATURES

- Capable of producing weld deposits with impact toughness exceeding 111 - 141 J (82 - 104 ft•lbf) at -40°C (-40°F)
- Designed for welding with 100% CO₂ shielding gas
- Premium arc performance and bead appearance
- H4 diffusible hydrogen levels
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS A5.29/A5.29M:	E81T1-K2C-JH4
AWS A5.36:	E81T1-C1A5-K2-H4
ASME SFA-A5.29:	E81T1-K2C-JH4
ABS:	4YQ460SA H5
Lloyd's Register:	4Y46S H5
DNV Grade:	IV 46MS H5
EN ISO 17632-B:	T554T1-1CA-N3-H5

TYPICAL APPLICATIONS

- High strength steels with 550 MPa (80 ksi) tensile strength
- Offshore
- Shipbuilding

SHIELDING GAS

100% CO₂
Flow Rate: 40 - 50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Spool*
0.045 (1.1)	ED032388
0.052 (1.3)	ED032389
1/16 (1.6)	ED032390

*Spool may be plastic or fiber.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf)	
				@ -29°C (-20°F)	@ -40°C (-40°F)
Requirements - AWS E81T1-K2C-JH4 As-Welded with 100% CO ₂	470 (68) min	550-690 (80-100)	19 min	27 (20) min	27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂	530-555 (77-80)	580-610 (84-88)	27-29	127-157 (94-116)	111-141 (82-104)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements⁽⁴⁾ - AWS E81T1-K2C-JH4	0.15 max	0.50-1.75	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.04	1.08-1.15	0.23-0.31	0.005-0.009	0.005-0.009
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ - AWS E81T1-K2C-JH4	1.00-2.00	0.15 max	0.35 max	0.05 max	4.0 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	1.30-1.62	0.03-0.05	0.01-0.02	0.01-0.02	2-3

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 100% CO ₂	25 (1)	4.4 (175)	23-28	140	1.8 (4.0)	1.6 (3.5)	86-88
		5.1 (200)	24-29	150	2.1 (4.6)	1.8 (4.0)	
		6.4 (250)	25-30	165	2.6 (5.7)	2.3 (5.0)	
		7.6 (300)	25-30	190	3.1 (6.8)	2.7 (6.0)	
		8.9 (350)	26-31	205	3.6 (8.0)	3.2 (7.0)	
		9.5 (375)	26-31	225	3.9 (8.6)	3.4 (7.5)	
		10.8 (425)	27-32	245	4.4 (9.7)	3.8 (8.5)	
		12.1 (475)	28-33	265	4.9 (10.8)	4.3 (9.5)	
12.7 (500)	29-34	275	5.2 (11.4)	4.5 (10.0)			
0.052 in (1.3 mm), DC+ 100% CO ₂	25 (1)	3.8 (150)	23-28	150	2.0 (4.5)	1.8 (3.9)	86-88
		4.7 (185)	24-29	165	2.5 (5.5)	2.2 (4.8)	
		5.7 (225)	24-29	190	3.1 (6.7)	2.7 (5.9)	
		6.4 (250)	25-30	215	3.4 (7.5)	2.9 (6.5)	
		6.9 (275)	25-30	235	3.7 (8.2)	3.2 (7.2)	
		7.6 (300)	26-31	255	4.1 (9.0)	3.5 (7.8)	
		8.5 (335)	26-31	275	4.5 (10.0)	4.0 (8.7)	
		9.5 (375)	27-32	295	5.1 (11.2)	4.4 (9.8)	
10.2 (400)	27-34	310	5.4 (12.0)	4.7 (10.4)			
1/16 in (1.6 mm), DC+ 100% CO ₂	25 (1)	3.8 (150)	24-29	200	2.9 (6.3)	2.5 (5.5)	86-88
		4.4 (175)	24-30	210	3.3 (7.4)	2.9 (6.4)	
		5.1 (200)	25-30	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	25-31	265	4.3 (9.5)	3.7 (8.2)	
		6.4 (250)	26-31	285	4.8 (10.5)	4.2 (9.2)	
		6.9 (275)	26-32	305	5.3 (11.6)	4.6 (10.1)	
		8.3 (325)	27-32	335	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	28-34	365	6.7 (14.7)	5.8 (12.8)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 100% CO₂ ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® 81K2C-H PLUS

Low Alloy, All Positions ▪ AWS E81T1-K2C-JH4, E81T1-C1A6-K2-H4

KEY FEATURES

- Innovative design capable of superior toughness at -60°F in both the as-welded and stress-relieved conditions
- Designed for welding with 100% CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

- | | |
|---------------------------------|---------------------------------------|
| AWS A5.29/A5.29M: | E81T1-K2C-JH4 |
| AWS A5.36/A5.36M: | E81T1-C1A6-K2-H4,
E81T1-C1P4-K2-H4 |
| ASME SFA-5.29/SFA-5.29M: | E81T1-K2C-JH4 |
| ABS: | 4YQ460SA H5 |

TYPICAL APPLICATIONS

- Offshore drilling rigs
- Low temperature storage tanks
- Ship building
- Construction

SHIELDING GAS

100% CO₂
Flow Rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15kg) Plastic Spool
0.045 (1.1)	ED034864
0.052 (1.3)	ED034865
1/16 (1.6)	ED034866

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft-lbf)	
				-40°C (40°F)	-51°C (-60°F)
Requirements AWS A5.29: E81T1-K2C-JH4 As-Welded with 100% CO ₂	470 (68) min	550-690 (80-100)	19 min	27 (20) min	-
AWS A5.36: E81T1-C1A6-K2-H4 As-Welded with 100% CO ₂	470 (68) min	550-690 (80-100)	19 min	-	27 (20) min
AWS A5.36: E81T1-C1P4-K2-H4 Stress Relieved with 100% CO ₂ for 1 hr @ 621°C (1150°F)	470 (68) min	550-690 (80-100)	19 min	27 (20) min	-
Typical Results⁽³⁾ As-Welded with 100% CO ₂	491-531 (71-77)	576-604 (84-88)	24-26	107-117 (79-86)	119-135 (88-100)
Stress Relieved with 100% CO ₂ for 1 hr @ 621°C (1150°F)	477-488 (69-71)	575-580 (83-84)	27	120-147 (89-108)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS A5.29: E81T1-K2C-JH4 AWS A5.36: E81T1-C1A6-K2-H4, E81T1-C1P4-K2-H4	0.15 max	0.50-1.75	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾	0.05	1.39-1.56	0.30-0.36	0.007-0.008	0.013
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.29: E81T1-K2C-JH4 AWS A5.36: E81T1-C1A6-K2-H4, E81T1-C1P4-K2-H4	1.00-2.00	0.15 max	0.35 max	0.05 max	4.0 max
Test Results⁽³⁾	1.54-1.72	0.07	0.02	0.01	4 max
					2-4

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 (%)
0.045 in (1.1 mm), DC+ 100% CO ₂							
Optimal Settings	25 (1)	10.7 (420)	27	200	1.8-5.1 (4.0-11.3)	1.5-4.4 (3.4-9.8)	85-88
Min - Max	19-25 (3/4-1)	4.4-12.7 (175-500)	26-31	118-218			
0.052 in (1.3 mm), DC+ 100% CO ₂							
Optimal Settings	25 (1)	7.6 (300)	26	210	2.1-5.0 (4.7-11.0)	1.7-4.2 (3.8-9.2)	85-88
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-31	148-241			
1/16 in (1.6 mm), DC+ 100% CO ₂							
Optimal Settings	25 (1)	7.6 (300)	26	280	2.9-6.7 (6.4-14.8)	2.4-5.8 (5.3-12.8)	85-88
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-30	190-302			

⁽¹⁾ Typical all weld metal. ⁽³⁾ See test results disclaimer pg. TOC-13. ⁽⁴⁾ To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® 81K2M-H PLUS

Low Alloy, All Positions ▪ AWS E81T1-K2M-JH4, E81T1-M21A6-K2-H4

KEY FEATURES

- Innovative design capable of superior toughness at -60°F in both the as-welded and stress-relieved conditions
- Designed for welding with 75-80% Argon/ Balance CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

- AWS A5.29/A5.29M:** E81T1-K2M-JH4
AWS A5.36/A5.36M: E81T1-M21A6-K2-H4, E81T1-M21P4-K2-H4
ASME SFA-5.29/SFA-5.29M: E81T1-K2M-JH4
ABS: 4YQ460SA H5

TYPICAL APPLICATIONS

- Offshore drilling rigs
- Low temperature storage tanks
- Ship building
- Construction

SHIELDING GAS

75-80% Argon / Balance CO₂
 Flow Rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15kg) Plastic Spool
0.045 (1.1)	ED034861
0.052 (1.3)	ED034862
1/16 (1.6)	ED034863

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft·lbf)	
				-40°C (40°F)	-51°C (-60°F)
Requirements AWS A5.29: E81T1-K2M-JH4 As-Welded with 75% Ar / 25% CO ₂	470 (68) min	550-690 (80-100)	19 min	27 (20) min	-
AWS A5.36: E81T1-M21A6-K2-H4 As-Welded with 75% Ar / 25% CO ₂	470 (68) min	550-690 (80-100)	19 min	-	27 (20) min
AWS A5.36: E81T1-M21P4-K2-H4 Stress Relieved with 75% Ar / 25% CO ₂ for 1 hr @ 621°C (1150°F)	470 (68) min	550-690 (80-100)	19 min	27 (20) min	-
Typical Results⁽³⁾ As-Welded with 75% Ar / 25% CO ₂	503-550 (73-80)	588-628 (85-91)	21-24	107-117 (79-86)	97-111 (72-82)
Stress Relieved with 75% Ar / 25% CO ₂ for 1 hr @ 621°C (1150°F)	480-490 (69-71)	570-590 (83-85)	27-29	81-94 (60-70)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS A5.29: E81T1-K2M-JH4 AWS A5.36: E81T1-M21A6-K2-H4, E81T1-M21P4-K2-H4	0.15 max	0.50-1.75	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ with 75% Argon / 25% CO ₂	0.05	1.28-1.30	0.42-0.44	0.007-0.009	0.011
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.29: E81T1-K2M-JH4 AWS A5.36: E81T1-M21A6-K2-H4, E81T1-M21P4-K2-H4	1.00-2.00	0.15 max	0.35 max	0.05 max	4.0 max
Typical Results⁽³⁾ with 75% Argon / 25% CO ₂	1.45-1.60	0.05	0.01	0.00	4 max
					2-4

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 (%)
0.045 in (1.1 mm), DC+ 75% Argon / 25% CO ₂	Optimal Settings	10.7 (420)	26	200	1.8-5.1 (4.0-11.3)	1.5-4.4 (3.4-9.8)	85-88
	Min - Max	19-25 (3/4-1)	4.4-12.7 (175-500)	24-32			
0.052 in (1.3 mm), DC+ 75% Argon / 25% CO ₂	Optimal Settings	7.6 (300)	25	210	2.1-5.0 (4.7-11.0)	1.7-4.2 (3.8-9.2)	85-88
	Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	24-31			
1/16 in (1.6 mm), DC+ 75% Argon / 25% CO ₂	Optimal Settings	7.6 (300)	25	280	2.9-6.8 (6.4-15.0)	2.4-5.6 (5.3-12.4)	85-88
	Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	25-31			

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

ULTRACORE® 91K2C-H PLUS

Low Alloy, All Positions ▪ AWS E91T1-K2C-JH4, E91T1-C1A6-K2-H4

KEY FEATURES

- Innovative design capable of superior toughness at -60°F in both the as-welded and stress-relieved conditions
- Designed for welding with 100% CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS A5.29:	E91T1-K2C-JH4
AWS A5.36:	E91T1-C1A6-K2-H4
AWS A5.36:	E91T1-C1P4-K2-H4
ABS:	4YQ500SAH5
DNV Grade:	IVY50MSH5

TYPICAL APPLICATIONS

- Offshore drilling rigs
- Low temperature storage tanks
- Ship building
- Construction

SHIELDING GAS

100% CO₂
Flow Rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15kg) Fiber Spool (Plastic Bag)
0.045 (1.1)	ED035381
0.052 (1.3)	ED035382
1/16 (1.6)	ED035383

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft-lbf)	
				-40°C (40°F)	-51°C (-60°F)
Requirements AWS A5.29 E91T1-K2C-JH4 As-Welded with 100% CO ₂	540 (78) min	620-760 (90-110)	17 min	27 (20) min	-
AWS A5.36 E91T1-C1A6-K2-H4 As-Welded with 100% CO ₂	540 (78) min	620-760 (90-110)	17 min	-	27 (20) min
AWS A5.36 E91T1-C1P4-K2-H4 Stress Relieved with 100% CO ₂ for 1 hr @ 620°C (1150°F)	540 (78) min	620-760 (90-110)	17 min	27 (20) min	-
Typical Results⁽³⁾ As-Welded with 100% CO ₂	610-650 (88-94)	665-680 (96-99)	23-25	85-93 (63-69)	75-80 (55-59)
Stress Relieved with 100% CO ₂ for 1 hr @ 620°C (1150°F)	580-610 (84-88)	650-675 (94-98)	23-29	85-93 (63-69)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS A5.29 E91T1-K2C-JH4 AWS A5.36 E91T1-C1A6-K2-H4, E91T1-C1P4-K2-H4	0.15 max	0.50-1.75	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.04-0.07	1.39-1.73	0.25-0.35	0.006-0.008	0.009-0.011
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.29 E91T1-K2C-JH4 AWS A5.36 E91T1-C1A6-K2-H4, E91T1-C1P4-K2-H4	1.00-2.00	0.15 max	0.35 max	0.05 max	4.0 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	1.33-1.66	0.04-0.05	0.22-0.29	0.00	4 max
					1-3

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 (%)
0.045 in (1.1 mm), DC+ 100% CO ₂	Optimal Settings	8.9 (350)	29	220	1.9-5.2 (4.1-11.5)	1.7-4.6 (3.7-10.2)	89-90
	Min - Max	19-25 (3/4-1)	4.4-12.7 (175-500)	25-33			
0.052 in (1.3 mm), DC+ 100% CO ₂	Optimal Settings	7.0 (275)	28	255	2.1-4.9 (4.6-10.9)	1.7-4.1 (3.8-9.1)	82-84
	Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-32			
1/16 in (1.6 mm), DC+ 100% CO ₂	Optimal Settings	7.0 (275)	28	255	2.9-6.7 (6.3-14.8)	2.4-5.7 (5.2-12.6)	83-85
	Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-32			

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

ULTRACORE® 91K2M-H PLUS

Low Alloy, All Positions ▪ AWS E91T1-K2M-JH4, E91T1-M21A6-K2-H4

KEY FEATURES

- Innovative design capable of superior toughness at -60°F in both the as-welded and stress-relieved conditions
- Designed for welding with 75-80% Argon/ Balance CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS A5.29:	E91T1-K2M-JH4
AWS A5.36:	E91T1-M21A6-K2-H4
AWS A5.36:	E91T1-M21P4-K2-H4
ABS:	4YQ500SAH5
DNV Grade:	IVY50MSH5

TYPICAL APPLICATIONS

- Offshore drilling rigs
- Low temperature storage tanks
- Ship building
- Construction

SHIELDING GAS

75-80% Argon / Balance CO₂
Flow Rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Fiber Spool (Plastic Bag)
0.045 (1.1)	ED035378
0.052 (1.3)	ED035379
1/16 (1.6)	ED035380

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft•lbf)	
				-40°C (40°F)	-51°C (-60°F)
Requirements					
AWS A5.29 E91T1-K2M-JH4 As-Welded with 75% Ar / 25% CO ₂	540 (78) min	620-760 (90-110)	17 min	27 (20) min	-
AWS A5.36 E91T1-M21A6-K2-H4 As-Welded with 75% Ar / 25% CO ₂	540 (78) min	620-760 (90-110)	17 min	-	27 (20) min
AWS A5.36 E91T1-M21P4-K2-H4 Stress Relieved with 75% Ar / 25% CO ₂ for 1 hr @ 620°C (1150°F)	540 (78) min	620-760 (90-110)	17 min	27 (20) min	-
Typical Results⁽³⁾					
As-Welded with 75% Argon / 25% CO ₂	615-630 (89-91)	670-685 (97-99)	23-24	84-88 (62-65)	65-69 (48-51)
Stress Relieved with 75% Ar / 25% CO ₂ for 1 hr @ 620°C (1150°F)	570-585 (83-85)	635-655 (92-95)	24-27	84-88 (62-65)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS A5.29 E91T1-K2M-JH4 AWS A5.36 E91T1-M21A6-K2-H4, E91T1-M21P4-K2-H4	0.15 max	0.50-1.75	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂	0.04-0.05	1.50-1.66	0.30-0.35	0.006-0.012	0.008-0.010
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.29 E91T1-K2M-JH4 AWS A5.36 E91T1-M21A6-K2-H4, E91T1-M21P4-K2-H4	1.00-2.00	0.15 max	0.35 max	0.05 max	4.0 max
Typical Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂	1.44-1.58	0.04-0.05	0.24-0.27	0.00	4 max
					1-3

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 (%)
0.045 in (1.1 mm), DC+ 75% Argon / 25% CO ₂							
Optimal Settings	19 (3/4)	7.0 (275)	27	200	1.9-5.2 (4.1-11.5)	1.7-4.6 (3.7-10.2)	89-90
Min - Max	19-25 (3/4-1)	4.4-12.7 (175-500)	25-33	127-280			
0.052 in (1.3 mm), DC+ 75% Argon / 25% CO ₂							
Optimal Settings	19 (3/4)	7.0 (275)	27	210	2.1-4.9 (4.6-10.9)	1.7-4.1 (3.8-9.1)	82-84
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-32	142-300			
1/16 in (1.6 mm), DC+ 75% Argon / 25% CO ₂							
Optimal Settings	19 (3/4)	7.0 (275)	27	280	2.9-6.7 (6.3-14.8)	2.4-5.7 (5.2-12.6)	83-85
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-32	142-300			

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

ULTRACORE® 101K3C-H PLUS

Low Alloy, All Positions ▪ AWS E101T1-K3C-JH4, E101T1-C1A6-K3-H4

KEY FEATURES

- Innovative design capable of superior toughness at -60°F in both the as-welded and stress-relieved conditions
- Designed for welding with 100% CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS A5.29: E101T1-K3C-JH4
AWS A5.36: E101T1-C1A6-K3-H4
AWS A5.36: E91T1-C1P4-K3-H4
ABS: E101T1-K3C-JH4, E101T1-C1A6-K3-H4

TYPICAL APPLICATIONS

- Offshore drilling rigs
- Low temperature storage tanks
- Ship building
- Construction

SHIELDING GAS

100% CO₂
 Flow Rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15kg) Fiber Spool (Plastic Bag)
0.045 (1.1)	ED035415
0.052 (1.3)	ED035416

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft-lbf)	
				-40°C (40°F)	-51°C (-60°F)
Requirements AWS A5.29 E101T1-K3C-JH4 As-Welded with 100% CO ₂	605 (88) min	690-825 (100-120)	16 min	27 (20) min	-
AWS A5.36 E101T1-C1A6-K3-H4 As-Welded with 100% CO ₂	605 (88) min	690-825 (100-120)	16 min	-	27 (20) min
AWS A5.36 E91T1-C1P4-K3-H4 Stress Relieved with 100% CO ₂ for 1 hr @ 620°C (1150°F)	540 (78) min	620-760 (90-110)	17 min	27 (20) min	-
Typical Results⁽³⁾ As-Welded with 100% CO ₂	730-765 (106-111)	775-810 (113-117)	18-21	59-64 (44-47)	49-53 (36-39)
Stress Relieved with 100% CO ₂ for 1 hr @ 620°C (1150°F)	640-695 (93-101)	705-750 (103-109)	22-25	59-64 (44-47)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS A5.29 E101T1-K3C-JH4 AWS A5.36 E101T1-C1A6-K3-H4, E91T1-C1P4-K3-H4	0.15 max	0.75-2.25	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.04-0.06	1.44-1.89	0.26-0.70	0.006-0.008	0.007-0.011
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.29 E101T1-K3C-JH4 AWS A5.36 E101T1-C1A6-K3-H4, E91T1-C1P4-K3-H4	1.25-2.60	0.15 max	0.25-0.65	0.05 max	4.0 max 4 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	1.68-2.09	0.03-0.24	0.42-0.51	0.00-0.01	1-3

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 (%)
0.045 in (1.1 mm), DC+ 100% CO ₂	Optimal Settings	8.9 (350)	29	220	1.8-5.1 (3.9-11.3)	1.5-4.4 (3.4-9.8)	85-88
	Min - Max	19 (3/4) 19-25 (3/4-1)	4.4-12.7 (175-500)	25-33			
0.052 in (1.3 mm), DC+ 100% CO ₂	Optimal Settings	7.0 (275)	28	255	2.1-5.0 (4.7-11.0)	1.7-4.2 (3.8-9.2)	85-88
	Min - Max	19 (3/4) 19-25 (3/4-1)	3.8-8.9 (150-350)	26-32			

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

ULTRACORE® 101K3M-H PLUS

Low Alloy, All Positions ▪ AWS E101T1-K3M-JH4, E101T1-M21A6-K3-H4

KEY FEATURES

- Innovative design capable of superior toughness at -60°F in both the as-welded and stress-relieved conditions
- Designed for welding with 75-80% Argon/ Balance CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS A5.29:	E101T1-K3M-JH4
AWS A5.36:	E101T1-M21A6-K3-H4
AWS A5.36:	E91T1-M21P4-K3-H4
ABS:	E101T1-K3M-JH4, E101T1-M21A6-K3-H4

TYPICAL APPLICATIONS

- Offshore drilling rigs
- Low temperature storage tanks
- Ship building
- Construction

SHIELDING GAS

75-80% Argon / Balance CO₂
Flow Rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Fiber Spool (Plastic Bag)
0.045 (1.1)	ED035413
0.052 (1.3)	ED035414

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft•lbf)	
				-40°C (40°F)	-51°C (-60°F)
Requirements					
AWS A5.29 E101T1-K3M-JH4 As-Welded with 75% Ar / 25% CO ₂	605 (88) min	690-825 (100-120)	16 min	27 (20) min	-
AWS A5.36 E101T1-M21A6-K3-H4 As-Welded with 75% Ar / 25% CO ₂	605 (88) min	690-825 (100-120)	16 min	-	27 (20) min
AWS A5.36 E91T1-M21P4-K3-H4 Stress Relieved with 75% Ar / 25% CO ₂ for 1 hr @ 620°C (1150°F)	540 (78) min	620-760 (90-110)	17 min	27 (20) min	-
Typical Results⁽³⁾					
As-Welded with 75% Argon / 25% CO ₂	695-710 (100-103)	740-765 (108-111)	21-23	55-60 (40-44)	48-53 (35-39)
Stress Relieved with 75% Ar / 25% CO ₂ for 1 hr @ 620°C (1150°F)	655-670 (95-97)	720-730 (104-106)	22-23	55-60 (40-44)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS A5.29 E101T1-K3M-JH4 AWS A5.36 E101T1-M21A6-K3-H4, E91T1-M21P4-K3-H4	0.15 max	0.75-2.25	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂	0.04-0.05	1.60-1.71	0.33-0.34	0.007-0.008	0.010-0.011
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.29 E101T1-K3M-JH4 AWS A5.36 E101T1-M21A6-K3-H4, E91T1-M21P4-K3-H4	1.25-2.60	0.15 max	0.25-0.65	0.05 max	4.0 max 4 max
Typical Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂	1.89-2.17	0.04-0.06	0.39-0.44	0.00	1-3

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 (%)
0.045 in (1.1 mm), DC+ 75% Argon / 25% CO ₂							
Optimal Settings	19 (3/4)	8.9 (350)	27	220	1.8-5.1 (3.9-11.3)	1.5-4.4 (3.4-9.8)	85-88
Min - Max	19-25 (3/4-1)	4.4- 12.7 (175-500)	25-33	127-280			
0.052 in (1.3 mm), DC+ 75% Argon / 25% CO ₂							
Optimal Settings	19 (3/4)	7.0 (275)	27	255	2.1-5.0 (4.7-11.0)	1.7-4.2 (3.8-9.2)	85-88
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-32	142-300			

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

ULTRACORE® 111K3C-H PLUS

Low Alloy, All Positions ▪ AWS E111T1-K3C-JH4, E111T1-C1A6-K3-H4

KEY FEATURES

- Innovative design capable of superior toughness at -60°F in both the as-welded and stress-relieved conditions
- Designed for welding with 100% CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS A5.29: E111T1-K3C-JH4
AWS A5.36: E111T1-C1A6-K3-H4
AWS A5.36: E101T1-C1P4-K3-H4
ABS: E111T1-K3C-JH4, E111T1-C1A6-K3-H4

TYPICAL APPLICATIONS

- Offshore drilling rigs
- Low temperature storage tanks
- Ship building
- Construction

SHIELDING GAS

100% CO₂
 Flow Rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15kg) Fiber Spool (Plastic Bag)
0.045 (1.1)	ED035419
0.052 (1.3)	ED035420

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft·lbf)	
				-40°C (40°F)	-51°C (-60°F)
Requirements					
AWS A5.29 E111T1-K3C-JH4 As-Welded with 100% CO ₂	675 (98) min	760-895 (110-130)	15 min	27 (20) min	-
AWS A5.36 E111T1-C1A6-K3-H4 As-Welded with 100% CO ₂	675 (98) min	760-895 (110-130)	15 min	-	27 (20) min
AWS A5.36 E101T1-C1P4-K3-H4 Stress Relieved with 100% CO ₂ for 1 hr @ 620°C (1150°F)	605 (88) min	690-825 (100-120)	16 min	27 (20) min	-
Typical Results⁽³⁾					
As-Welded with 100% CO ₂	735-745 (107-108)	780-790 (113-115)	19-20	67-70 (49-52)	62-66 (46-48)
Stress Relieved with 100% CO ₂ for 1 hr @ 620°C (1150°F)	680-725 (99-105)	740-780 (107-113)	20-25	67-70 (49-52)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS A5.29 E111T1-K3C-JH4 AWS A5.36 E111T1-C1A6-K3-H4, E101T1-C1P4-K3-H4	0.15 max	0.75-2.25	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.05-0.07	1.59-1.73	0.25-0.28	0.007-0.011	0.008-0.011
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.29 E111T1-K3C-JH4 AWS A5.36 E111T1-C1A6-K3-H4, E101T1-C1P4-K3-H4	1.25-2.60	0.15 max	0.25-0.65	0.05 max	4.0 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	2.41-2.50	0.04-0.12	0.41-0.49	0.00-0.01	4 max
					1-3

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 (%)
0.045 in (1.1 mm), DC+ 100% CO ₂							
Optimal Settings	19 (3/4)	8.9 (350)	29	220	1.8-5.1 (3.9-11.3)	1.5-4.4 (3.4-9.8)	85-88
Min - Max	19-25 (3/4-1)	4.4-12.7 (175-500)	25-33	127-280			
0.052 in (1.3 mm), DC+ 100% CO ₂							
Optimal Settings	19 (3/4)	7.0 (275)	28	255	2.1-5.0 (4.7-11.0)	1.7-4.2 (3.8-9.2)	85-88
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-32	142-300			

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

ULTRACORE® 111K3M-H PLUS

Low Alloy, All Positions ▪ AWS E111T1-K3M-JH4, E111T1-M21A6-K3-H4

KEY FEATURES

- Innovative design capable of superior toughness at -60°F in both the as-welded and stress-relieved conditions
- Designed for welding with 75-80% Argon/ Balance CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS A5.29: E111T1-K3M-JH4
AWS A5.36: E111T1-M21A6-K3-H4
AWS A5.36: E101T1-M21P4-K3-H4
ABS: E111T1-K3M-JH4, E111T1-M21A6-K3-H4

TYPICAL APPLICATIONS

- Offshore drilling rigs
- Low temperature storage tanks
- Ship building
- Construction

SHIELDING GAS

75-80% Argon / Balance CO₂
 Flow Rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Fiber Spool (Plastic Bag)
0.045 (1.1)	ED035417
0.052 (1.3)	ED035418

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft•lbf)	
				-40°C (40°F)	-51°C (-60°F)
Requirements					
AWS A5.29 E111T1-K3M-JH4 As-Welded with 75% Ar / 25% CO ₂	675 (98) min	760-895 (110-130)	15 min	27 (20) min	-
AWS A5.36 E111T1-M21A6-K3-H4 As-Welded with 75% Ar / 25% CO ₂	675 (98) min	760-895 (110-130)	15 min	-	27 (20) min
AWS A5.36 E101T1-M21P4-K3-H4 Stress Relieved with 75% Ar / 25% CO ₂ for 1 hr @ 620°C (1150°F)	605 (88) min	690-825 (100-120)	16 min	27 (20) min	-
Typical Results⁽³⁾					
As-Welded with 75% Argon / 25% CO ₂	725-745 (105-108)	770-785 (112-114)	19-20	50-54 (37-40)	47-52 (34-39)
Stress Relieved with 75% Ar / 25% CO ₂ for 1 hr @ 620°C (1150°F)	705-720 (102-105)	765-775 (110-112)	21-22	50-54 (37-40)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS A5.29 E111T1-K3M-JH4 AWS A5.36 E111T1-M21A6-K3-H4, E101T1-M21P4-K3-H4	0.15 max	0.75-2.25	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂	0.05-0.06	1.59-1.84	0.27-0.34	0.007	0.010-0.011
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.29 E111T1-K3M-JH4 AWS A5.36 E111T1-M21A6-K3-H4, E101T1-M21P4-K3-H4	1.25-2.60	0.15 max	0.25-0.65	0.05 max	4.0 max
Typical Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂	2.31-2.60	0.04-0.07	0.45-0.51	0.00	4 max
					1-3

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 (%)
0.045 in (1.1 mm), DC+ 75% Argon / 25% CO ₂							
Optimal Settings	19 (3/4)	8.9 (350)	27	220	1.8-5.1 (3.9-11.3)	1.5-4.4 (3.4-9.8)	85-88
Min - Max	19-25 (3/4-1)	4.4-12.7 (175-500)	25-33	127-280			
0.052 in (1.3 mm), DC+ 75% Argon / 25% CO ₂							
Optimal Settings	19 (3/4)	7.0 (275)	27	255	2.1-5.0 (4.7-11.0)	1.7-4.2 (3.8-9.2)	85-88
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-32	142-300			

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

ULTRACORE® 121K3C-H PLUS

Low Alloy, All Positions ▪ AWS E121T1-GC-H4, E121T1-C1A6-K3-H4

KEY FEATURES

- Innovative design capable of superior toughness at -60°F in both the as-welded and stress-relieved conditions
- Designed for welding with 100% CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS A5.29: E121T1-GC-H4
AWS A5.36: E121T1-C1A6-K3-H4
AWS A5.36: E111T1-C1P4-K3-H4
ABS: E121T1-GC-H4, E121T1-C1A6-K3-H4

TYPICAL APPLICATIONS

- Offshore drilling rigs
- Low temperature storage tanks
- Ship building
- Construction

SHIELDING GAS

100% CO₂
 Flow Rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15kg) Fiber Spool (Plastic Bag)
0.045 (1.1)	ED035421
0.052 (1.3)	ED035422

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft·lbf)	
				-40°C (40°F)	-51°C (-60°F)
Requirements AWS A5.29 E121T1-GC-H4 As-Welded with 100% CO ₂	745 (108) min	825-965 (120-140)	14 min	-	-
AWS A5.36 E121T1-C1A6-K3-H4 As-Welded with 100% CO ₂	745 (108) min	825-965 (120-140)	14 min	-	27 (20) min
AWS A5.36 E111T1-C1P4-K3-H4 Stress Relieved with 100% CO ₂ for 1 hr @ 620°C (1150°F)	675 (98) min	760-895 (110-130)	15 min	27 (20) min	-
Typical Results⁽³⁾ As-Welded with 100% CO ₂	785-815 (114-118)	825-850 (120-124)	19	66-68 (49-50)	61-63 (45-46)
Stress Relieved with 100% CO ₂ for 1 hr @ 620°C (1150°F)	740-790 (107-115)	790-840 (115-122)	19-22	66-68 (49-50)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS A5.29 E121T1-GC-H4 AWS A5.36 E121T1-C1A6-K3-H4, E111T1-C1P4-K3-H4	Not Specified	0.50 ⁽⁴⁾	1.00 max	0.030 max	0.030 max
	0.15 max	0.75-2.25	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.06-0.07	1.56-1.88	0.24-0.29	0.007-0.012	0.010-0.011
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.29 E121T1-GC-H4 AWS A5.36 E121T1-C1A6-K3-H4, E111T1-C1P4-K3-H4	0.50 ⁽⁴⁾	0.30 ⁽⁴⁾	0.20 ⁽⁴⁾	0.10 ⁽⁴⁾	4.0 max
	1.25-2.60	0.15 max	0.25-0.65	0.05 max	4 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	2.21-2.50	0.04-0.07	0.53-0.67	0.00	1-3

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 (%)
0.045 in (1.1 mm), DC+ 100% CO ₂							
Optimal Settings	19 (3/4)	8.9 (350)	29	220	1.8-5.1 (3.9-11.3)	1.5-4.4 (3.4-9.8)	85-88
Min - Max	19-25 (3/4-1)	4.4-12.7 (175-500)	25-33	127-280			
0.052 in (1.3 mm), DC+ 100% CO ₂							
Optimal Settings	19 (3/4)	7.0 (275)	28	255	2.1-5.0 (4.7-11.0)	1.7-4.2 (3.8-9.2)	85-88
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-32	142-300			

⁽¹⁾Typical all weld metal. ⁽³⁾See test results disclaimer.

⁽⁴⁾In order to meet the requirements of the G group, the undiluted weld metal shall have not less than the minimum specified for one or more of the elements listed.

⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® 121K3M-H PLUS

Low Alloy, All Positions ▪ AWS E121T1-GM-H4, E121T1-M21A6-K3-H4

KEY FEATURES

- Innovative design capable of superior toughness at -60°F in both the as-welded and stress-relieved conditions
- Designed for welding with 75-80% Argon/ Balance CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

WELDING POSITIONS

All

CONFORMANCES

AWS A5.29:	E121T1-GM-H4
AWS A5.36:	E121T1-M21A6-K3-H4
AWS A5.36:	E111T1-M21P4-K3-H4
ABS:	E121T1-GM-H4, E121T1-M21A6-K3-H4

TYPICAL APPLICATIONS

- Offshore drilling rigs
- Low temperature storage tanks
- Ship building
- Construction

SHIELDING GAS

75-80% Argon / Balance CO₂
Flow Rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Fiber Spool (Plastic Bag)
0.045 (1.1)	ED035423
0.052 (1.3)	ED035424

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft•lbf)	
				-40°C (40°F)	-51°C (-60°F)
Requirements					
AWS A5.29 E121T1-GM-H4 As-Welded with 75% Ar / 25% CO ₂	745 (108) min	825-965 (120-140)	14 min	-	-
AWS A5.36 E121T1-M21A6-K3-H4 As-Welded with 75% Ar / 25% CO ₂	745 (108) min	825-965 (120-140)	14 min	-	27 (20) min
AWS A5.36 E111T1-M21P4-K3-H4 Stress Relieved with 75% Ar / 25% CO ₂ for 1 hr @ 620°C (1150°F)	675 (98) min	760-895 (110-130)	15 min	27 (20) min	-
Typical Results⁽³⁾					
As-Welded with 75% Argon / 25% CO ₂	815-840 (118-122)	850-875 (123-127)	17-18	65-67 (48-50)	59-61 (44-45)
Stress Relieved with 75% Ar / 25% CO ₂ for 1 hr @ 620°C (1150°F)	745-765 (108-111)	805-820 (116-119)	18-23	65-67 (48-50)	-

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

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS A5.29 E121T1-GM-H4 AWS A5.36 E121T1-M21A6-K3-H4, E111T1-M21P4-K3-H4	Not Specified	0.50 ⁽⁴⁾	1.00 max	0.030 max	0.030 max
	0.15 max	0.75-2.25	0.80 max	0.030 max	0.030 max
Typical Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂	0.06-0.07	1.61-1.80	0.26-0.35	0.007-0.012	0.010-0.011
	%Ni	%Cr	%Mo	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements AWS A5.29 E121T1-GM-H4 AWS A5.36 E121T1-M21A6-K3-H4, E111T1-M21P4-K3-H4	0.50 ⁽⁴⁾	0.30 ⁽⁴⁾	0.20 ⁽⁴⁾	0.10 ⁽⁴⁾	4.0 max
	1.25-2.60	0.15 max	0.25-0.65	0.05 max	4 max
Typical Results⁽³⁾ As-Welded with 75% Argon / 25% CO ₂	2.21-2.46	0.04-0.07	0.58- 0.65	0.00	1-3

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 (%)
0.045 in (1.1 mm), DC+ 75% Argon / 25% CO ₂							
Optimal Settings	19 (3/4)	8.9 (350)	27	220	1.8-5.1 (3.9-11.3)	1.5-4.4 (3.4-9.8)	85-88
Min - Max	19-25 (3/4-1)	4.4-12.7 (175-500)	25-33	127-280			
0.052 in (1.3 mm), DC+ 75% Argon / 25% CO ₂							
Optimal Settings	19 (3/4)	7.0 (275)	27	255	2.1-5.0 (4.7-11.0)	1.7-4.2 (3.8-9.2)	85-88
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	26-32	142-300			

(1) Typical all weld metal. (3) See test results disclaimer

(4) In order to meet the requirements of the G group, the undiluted weld metal shall have not less than the minimum specified for one or more of the elements listed.

(5) To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

CORMET™ 1

Low Alloy, All Position ■ AWS E81T1-B2C-H4

KEY FEATURES

- Designed for strength and resistance to corrosion
- Cr-Mo Alloyed steel for elevated temperature service to aid creep resistance

WELDING POSITIONS

All

SHIELDING GAS

80% Argon / 20% CO₂
Flow Rate: 40-50 CFH

CONFORMANCES

AWS 5.29 E81T1-B2C-H4

TYPICAL APPLICATIONS

- Piping
- Chemical & Petrochemical Industry
- Steam Generating Power Plant
- Pressure Vessels

DIAMETERS / PACKAGING

Diameter mm (in)	15 kg (33.1 lb) Spool	5 kg (11 lb) MIDI Spool
1.2 (.045)	ED033354, CORM1-12* CM1-16	CM1MD-12
1.6 (1/16)		

*The Metrode part number will be replacing the current EDO numbers after the inventory has been depleted.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft-lbf) @20°C (68°F)	Hardness HV
Requirements AWS E81T1-B2C-H4	470 min	550 min	19 min	-	-
Typical Results⁽³⁾ As-Welded	550	650	24	>40	220

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S
Requirements AWS E81T1-B2C-H4	0.05-0.12	1.25 max	0.80 max	0.030 max
Typical Results⁽³⁾	0.06	0.8	0.3	0.01
	%P	%Cr	%Mo	%Cu
Requirements AWS E81T1-B2C-H4	0.030 max	1.00-1.50	0.40-0.65	0.3 max
Typical Results⁽³⁾	0.01	1.3	0.5	0.05

TYPICAL OPERATING PROCEDURES

Diameter mm (in)	Polarity	Amp-Volt Range	Typical	Stickout mm (in)
1.2 (0.045)	DC+	160-260A / 24-30V	190A / 25V	15-25 (5/8-1)
1.6 (1/16)	DC+	220-350A / 26-32V	260A / 28V	15-25 (5/8-1)

⁽¹⁾ Typical all weld metal ⁽²⁾ Measured with 0.2% offset ⁽³⁾ See test results disclaimer ⁽⁴⁾ Preferred polarity is listed first.

CORMET® 2

Low Alloy, All Position ▪ AWS E91T1-B3C/M-H4

KEY FEATURES

- High metal recovery
- Smooth arc performance in all positions

WELDING POSITIONS

All

SHIELDING GAS

80% Argon / 20% CO₂
 100% CO₂
 Flow Rate: 40-50 CFH

CONFORMANCES

AWS A5.29	E91T1-B3C/M-H4
BS EN ISO 17634-B	T62T1-1C/M-2C1M
ASME IX	QW432 F-No 6, QW442 A-No 4

TYPICAL APPLICATIONS

- Designed for prolonged elevated temperature service up to 600°C (1112°F)
- Refineries where corrosion resistance to sulphur bearing crude oil is at 250-450°C (482-842°F)
- Designed for all-position welding of 2.25% chromium, 1% molybdenum low alloy steels
- Petro-Chemical
- Power Plants
- Piping
- Turbine Casting
- Steam Chests
- Valve Bodies
- Boiler Superheaters

DIAMETERS / PACKAGING

Diameter mm (in)	15 kg (33 lb) Spool
1.2 (0.045)	ED033365, CORM2-12*

*The Metrode part number will be replacing the current EDO numbers after the inventory has been depleted.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft-lbf) @ 20°C (68°F)	Hardness HV10 ⁽⁴⁾ @ PWHT
Requirements AWS E91T1-B3C/M-H4	540 min	620 min	17 min	–	–
Typical Results⁽³⁾ As-Welded Stress-Relieved	625	725	22	>70	235

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S
Requirements AWS E91T1-B3C/M-H4	0.05 - 0.12	1.25 max	0.80 max	0.030 max
Typical Results⁽³⁾	0.06	1.0	0.30	0.01
	%P	%Cr	%Mo	%Cu
Requirements AWS E91T1-B3C/M-H4	0.030 max	2.00 - 2.50	0.90 - 1.20	0.30 max
Typical Results⁽³⁾	0.01	2.3	1.0	0.05

TYPICAL OPERATING PROCEDURES

Diameter in (mm)	Amp-Volt Range	Typical	Stickout in (mm)
1.2 (0.045) DC+	160 - 260A 24 - 30V	190A 25V	15 - 25 (5/8 - 1)

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾Industry specific data, not required by AWS.
 NOTE: Additional test data available upon request.

CORMET™ 5

Low Alloy, All Position ▪ AWS E81T1-B6C/M

KEY FEATURES

- Designed for high strength and improved corrosion resistance with hot hydrogen gas, super-heated steam, and Sulphur crude oils
- Smooth arc performance in all positions

WELDING POSITIONS

All

SHIELDING GAS

80% Argon / 20% CO₂
Flow Rate: 40-50 CFH

CONFORMANCES

AWS 5.29 E81T1-B6C/M

TYPICAL APPLICATIONS

- Piping
- Steam Generating Power Plant
- Pressure Vessels
- Oil Refineries

DIAMETERS / PACKAGING

Diameter mm (in)	15 kg (33.1 lb) Spool
1.2 (0.045)	CM5-12

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %
Requirements AWS E81T1-B6C/M	470 (68)min	550 (80) min	19 min
Typical Results⁽³⁾ As-Welded	600	690	22

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P
Requirements AWS E81T1-B6C/M	0.05-0.10	1.20 max	0.50 max	0.030 max	0.030 max
Typical Results⁽³⁾	0.06	0.8	0.3	0.01	0.01
	%Cr	%Ni	%Mo	%Cu	
Requirements AWS E81T1-B6C/M	4.0-6.0	0.40 max	0.45-0.65	0.3 max	
Typical Results⁽³⁾	5	0.01	0.5	0.05	

TYPICAL OPERATING PROCEDURES

Diameter mm (in)	Polarity	Amp-Volt Range	Typical	Stickout mm (in)
1.2 (0.045)	DC+	160-260A / 24-30V	25V	15-25 (5/8-1)

⁽¹⁾ Typical all weld metal ⁽²⁾ Measured with 0.2% offset ⁽³⁾ See test results disclaimer ⁽⁴⁾ Preferred polarity is listed first

SUPERCORE® F91

Low Alloy, All Position ■ AWS E91T1-B9C/M-H4

KEY FEATURES

- High deposition rates
- Fast freezing slag for out of position welding
- Designed to weld the modified steels T91, P91 or Grade 91. Which are designed to provide improved creep strength, toughness fatigue and oxidation, and corrosion resistance at elevated temperatures.

WELDING POSITIONS

All

CONFORMANCES

AWS A5.28 E91T1-B9C/M-H4
BS EN ISO 17634-B T69T1-1C/M-9C1MV

TYPICAL APPLICATIONS

- Power Plants
- Piping
- Turbine Castings
- Oil Refineries
- Coal Liquefaction Plants
- Gasification Plants

SHIELDING GAS

100% CO₂
 75% Argon / 25% CO₂
 Flow Rate: 40-50 CFH

DIAMETERS / PACKAGING

Diameter mm (in)	15 kg (33 lb) Spool
1.2 (0.045)	ED033387, SCF91-12*

*The Metrode part number will be replacing the current EDO numbers after the inventory has been depleted.

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft·lbf) @ 20°C (68°F)	Hardness HV10 ⁽⁴⁾ AW PWHT
Requirements AWS E91T1-B9C/M-H4	565 (82) min	690 (100) min	16 min	–	–
Typical Results⁽³⁾					
2 hr @760°C (1400°F)	660 (96)	790 (115)	20	25 (18)	260
6 hr @ 760°C (1400°F)	630 (91)	760 (110)	–	–	–
Stress-Relieved					
+566°C (1050°F)	360 (52)	450 (65)	21	–	–
+600°C (1112°F)	288 (42)	420 (61)	27	–	–
+650°C (1202°F)	245 (36)	396 (57)	29	–	–

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Cr	%Ni
Requirements AWS E91T1-B9C/M-H4	0.08 - 0.13	0.60 - 1.20	0.50 max	0.015 max	0.020 max	8.0 - 10.0	0.80 max
Typical Results⁽³⁾	0.10	0.80	0.30	0.01	0.016	9.0	0.50
	%Mo	%Nb	%V	%N	%Cu	%Al	%Ni+Mn
Requirements AWS E91T1-B9C/M-H4	0.85 - 1.2	0.02 - 0.07	0.15 - 0.25	0.02 - 0.07	0.15 max	0.40 max	1.5 max
Typical Results⁽³⁾	1.0	0.04	0.20	0.05	0.05	0.01	1.30

TYPICAL OPERATING PROCEDURES

Diameter in (mm)	Amp-Volt Range	Typical	Stickout in (mm)
1.2 (0.045) DC+	140 - 170A 24 - 26V	160A, 25V	15 - 25 (5/8 - 1)

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾Industry specific data, not required by AWS.
 NOTE: Additional test data available upon request.

ULTRACORE® 80Ni1C

Low Alloy, Flat & Horizontal ▪ AWS E80T1-Ni1C-JH8, E80T1-C1A4-Ni1-H8

KEY FEATURES

- High deposition in the flat and horizontal positions
- Excellent operator appeal and slag detachability
- Designed for welding with 100% CO₂ shielding gas
- ProTech® foil bag packaging

WELDING POSITIONS

Flat & Horizontal

SHIELDING GAS

100% CO₂
Flow Rate: 40-55 CFH

CONFORMANCES

AWS A5.29/A5.29M: E80T1-Ni1C-JH8
AWS A5.36/A5.36M: E80T1-C1A4-Ni1-H8
AWS D1.8

TYPICAL APPLICATIONS

- Structural fabrication
- Heavy equipment
- Shipbuilding

DIAMETERS / PACKAGING

Diameter in (mm)	50 lb (22.7 kg) Coil
1/16 (1.6)	ED035765
5/64 (2.0)	ED035766
3/32 (2.4)	ED035767

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 A5.29 E80T1-Ni1C-JH8	470 (68) min	550-690 (80-100)	19 min	27 (20) min
Requirements⁽⁴⁾ AWS A5.36 E80T1-C1A4-Ni1-H8	470 (68) min	550-690 (80-100)	19 min	27 (20) min
Typical Results⁽³⁾ As-Welded with 100% CO ₂	500-600 (80-87)	630-670 (91-97)	24-28	43-72 (32-53)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni	%Mo	%Cr	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ AWS A5.29 E80T1-Ni1C-JH8	0.12 max	1.50 max	0.80 max	0.03 max	0.03 max	0.80-1.10	0.35 max	0.15 max	0.05 max	8.0 max
Requirements⁽⁴⁾ AWS A5.36 E80T1-C1A4-Ni1-H8	0.12 max	1.75 max	0.80 max	0.030 max	0.030 max	0.80-1.10	0.35 max	0.15 max	0.05 max	8 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.04-0.07	1.32-1.45	0.52-0.59	0.006-0.008	0.013-0.016	0.81-1.03	0.01	0.04-0.09	0.02-0.03	3.4-5.6

TYPICAL OPERATING PROCEDURES – Flat & Horizontal

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
1/16 in (1.6 mm), DC+ 100% CO ₂	25 (1)	3.2 (125)	23-27	155	2.2 (4.8)	2.0 (4.4)	84 - 89
		6.4 (250)	25-29	250	4.5 (9.9)	4.0 (8.8)	
		9.5 (375)	28-32	325	6.8 (14.9)	6.0 (13.2)	
5/64 in (2.0 mm), DC+ 100% CO ₂	25 (1)	3.2 (125)	23-27	240	3.5 (7.8)	3.1 (6.8)	84 - 88
		5.7 (225)	25-29	350	6.4 (14.0)	5.5 (12.2)	
3/32 in (2.4 mm), DC+ 100% CO ₂	31 (1 1/4)	8.3 (325)	27-32	395	8.5 (18.6)	7.5 (16.4)	87 - 89
		3.2 (125)	27-32	320	5.4 (11.9)	4.7 (10.3)	
		5.1 (200)	28-33	450	8.6 (19.0)	7.6 (16.7)	
		6.4 (250)	31-37	580	13.1 (28.8)	11.4 (25.1)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer. ⁽⁴⁾As-Welded with 100% CO₂. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

ULTRACORE® 80Ni1M

Low Alloy, Flat & Horizontal ▪ AWS E80T1-Ni1M-JH8, E80T1-M21A4-Ni1-H8

KEY FEATURES

- High deposition in the flat and horizontal positions
- Excellent operator appeal and slag detachability
- Designed for welding with 75-80% Argon / balance CO₂ shielding gas
- ProTech® foil bag packaging

WELDING POSITIONS

Flat & Horizontal

SHIELDING GAS

75-80% Argon / balance CO₂
Flow Rate: 40-55 CFH

CONFORMANCES

AWS A5.29/A5.29M: E80T1-Ni1M-JH8
AWS A5.36/A5.36M: E80T1-M21A4-Ni1-H8

TYPICAL APPLICATIONS

- Structural fabrication
- Heavy equipment
- Shipbuilding

DIAMETERS / PACKAGING

Diameter in (mm)	50 lb (22.7 kg) Coil
1/16 (1.6)	ED035768
5/64 (2.0)	ED035769
3/32 (2.4)	ED035770

MECHANICAL PROPERTIES^{(1) W}

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft-lbf) -40°C (-40°F)
Requirements⁽⁴⁾ AWS A5.29 E80T1-Ni1M-JH8	470 (68) min	550-690 (80-100)	19 min	27 (20) min
Requirements⁽⁴⁾ AWS A5.36 E80T1-M21A4-Ni1-H8	470 (68) min	550-690 (80-100)	19 min	27 (20) min
Typical Results⁽³⁾ As-Welded with 75% Ar / 25% CO ₂	585-595 (85-86)	630-650 (91-94)	27	50-75 (37-57)

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S	%P	%Ni	%Mo	%Cr	%V	Diffusible Hydrogen (mL/100g weld deposit)
Requirements⁽⁴⁾ AWS A5.29 E80T1-Ni1M-JH8	0.12 max	1.50 max	0.80 max	0.03 max	0.03 max	0.80-1.10	0.35 max	0.15 max	0.05 max	8.0 max
Requirements⁽⁴⁾ AWS A5.36 E80T1-M21A4-Ni1-H8	0.12 max	1.75 max	0.80 max	0.030 max	0.030 max	0.80-1.10	0.35 max	0.15 max	0.05 max	8 max
Typical Results⁽³⁾ As-Welded with 100% CO ₂	0.04-0.06	1.32-1.36	0.54-0.55	0.004-0.006	0.011-0.012	0.91-1.04	0.01	0.04-0.06	0.02	2.9-4.6

TYPICAL OPERATING PROCEDURES – Flat & Horizontal

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)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
1/16 in (1.6 mm), DC+ 75% Ar / 25% CO ₂	25 (1)	3.2 (125)	22-26	155	2.2 (4.8)	2.0 (4.4)	84 - 89
		6.4 (250)	24-28	250	4.5 (9.9)	4.0 (8.8)	
		9.5 (375)	27-31	325	6.8 (14.9)	6.0 (13.2)	
5/64 in (2.0 mm), DC+ 75% Ar / 25% CO ₂	25 (1)	3.2 (125)	22-26	250	3.5 (7.8)	3.1 (6.8)	84 - 88
		5.7 (225)	24-28	360	6.4 (14.0)	5.5 (12.2)	
3/32 in (2.4 mm), DC+ 75% Ar / 25% CO ₂	31 (1 1/4)	8.3 (325)	28-31	410	8.5 (18.6)	7.5 (16.4)	87 - 89
		3.2 (125)	27-32	340	5.4 (11.9)	4.7 (10.3)	
		5.1 (200)	27-32	465	8.6 (19.0)	7.6 (16.7)	
		6.4 (250)	30-36	620	13.1 (28.8)	11.4 (25.1)	

⁽¹⁾Typical all weld metal. ⁽²⁾Measured with 0.2% offset. ⁽³⁾See test results disclaimer ⁽⁴⁾As-Welded with 100% CO₂. ⁽⁵⁾To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.