LINCOLNWELD® 308/308L

Stainless ▪ AWS ER308, ER308L

KEY FEATURES

- Designed to be used primarily with basic fluxes
- Versatile electrode designed to weld several types of austenitic steels
- Q2 Lot® - Certificate showing actual wire composition and calculated ferrite number (FN) available online
- Balanced chromium and nickel levels provide enough ferrite in the weld metal for high resistance to hot cracking
- Give a weld deposit with reduced carbon levels (0.03% max) that offers increased resistance to inter-granular corrosion

RECOMMENDED FLUXES

Lincolnweld® 801, 802, 880, 880M, 882, P2007, ST-100, P2000

CONFORMANCES

AWS A5.9/A5.9M:	ER308, ER308L
ASME SFA-A5.9:	ER308, ER308L
ABS:	ER308, ER308L
CWB/CSA W48-06:	ER308L
EN ISO 14343-B:	SS308L
ISO 14343:2009:	(19 9 L)
MIL-E-19933E (SH)	MIL 308L, MIL 308

TYPICAL APPLICATIONS

- ASTM A743, A744 Types CF-8 and CF-3
- ASTM A240 Types 302, 304, 304L
- For joining the more common austenitic stainless steel grades referred to as "18-8" steels
- Type 308L is ideal for welding Type 304L stainless steels

DIAMETERS / PACKAGING

Diameter in (mm)	55 lb (25 kg) Steel Spool	500 lb (227 kg) Speed Feed® Reel	600 lb (272 kg) Speed Feed® Reel
1/16 (1.6)	ED035160		
5/64 (2.0)	ED033147		
3/32 (2.4)	ED035162	ED035161	ED034478
1/8 (3.2)	ED035163		
5/32 (4.0)	ED035165		

MECHANICAL PROPERTIES[1] – *As Required per AWS A5.9/A5.9M*

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Ferrite Number
Test Results[3, 5] - As-Welded	380 (55)	565 (82)	42	15

WIRE COMPOSITION[1]

	%C[4]	%Cr	%Ni	%Mo	%Mn	%Si
Requirements - AWS ER308, ER308L	0.03 max	19.5-22.0	9.0-11.0	0.75 max	1.0 - 2.5	0.30 - 0.65
Typical Results[3]						
Wire Composition	0.02	20.1	9.8	0.10	1.8	0.50
All Weld Metal Composition[5]	0.02	19.0 - 19.5	9.8	0.10	1.5 - 1.9	0.50 - 0.80

TYPICAL OPERATING PROCEDURES

Diameter in (mm)	Wire Feed Speed m/min (in/min)	Voltage (volts)	Current (amps)
5/64 (2.0)	2.0-6.1 (80-240)	24-30	190-500
3/32 (2.4)	1.5-5.3 (60-210)	26-32	195-575
1/8 (3.2)	0.9-2.8 (35-110)	28-34	200-700
5/32 (4.0)	0.8-1.9 (30-75)	30-36	320-775

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer [4]AWS Requirement for ER308 is 0.08% max. carbon.
[5]Results shown correspond with the recommended Lincolnweld® and Blue Max® fluxes listed above, but not required per AWS A5.9-93.

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m³ maximum exposure guideline for general welding fume.

BEFORE USE, READ AND UNDERSTAND THE SAFETY DATA SHEET (SDS) FOR THIS PRODUCT AND SPECIFIC INFORMATION PRINTED ON THE PRODUCT CONTAINER.

LINCOLNWELD® 308/308H

Stainless ▪ AWS ER308H

KEY FEATURES

- Used to weld unstabilized austenitic stainless steels such as 302, 304H and 305
- Provides a high carbon deposit (minimum of .04% carbon) for high temperature applications
- Q2 Lot® - Certificates showing actual wire chemistry available online
- The high carbon deposit provides creep strength and higher tensile strength at elevated service temperatures

CONFORMANCES

AWS: A5.9/A5.9M: ER308, ER308H

TYPICAL APPLICATIONS

- Chemical
- Petrochemical industries
- Distillery
- Dairy
- Restaurant Equipment
- Catalytic Crackers
- Pulp and Paper

RECOMMENDED FLUXES

P2007, P2000

DIAMETERS / PACKAGING

Diameter in (mm)	55 lb (25 kg) Steel Spool
3/32 (2.4)	ED035158
1/8 (3.2)	ED035159

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Mn
Requirements AWS ER308H	0.04 - 0.08	19.5 - 22.0	9.00 - 11.00	0.50 max	1.0 - 2.5
Typical Results[2]	0.06	19.9	9.7	0.07	1.8
	%Si	**%P**	**%S**	**%Cu**	**FN**
Requirements AWS ER308H	0.30 - 0.65	0.04 max	0.03 max	0.75 max	Not Required
Typical Results[2]	0.44	0.02	0.006	0.10	5 - 12

TYPICAL OPERATING PROCEDURES

Diameter in (mm)	Voltage (volts)	Amperage	Gas
3/32 (2.4)	28-30	275-350	Lincolnweld® P2007
1/8 (3.2)	29-32	350-450	

[1]Typical all weld metal. [2]See test results disclaimer

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

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LINCOLNWELD® 308/308LCF

Stainless ▪ AWS ER308/308L

KEY FEATURES

- Controlled Low Ferrite (Range 3-8)
- Charpy V-Notch test results capable of exceeding 27 J (20 ft▪lbf) @ -196°C (-320°F)
- Exceeds 15 mils (0.38 mm) of lateral expansion @ -196°C (-320°F)
- Q2 Lot® - Certificate showing deposit composition, ferrite number, and charpy impact properties tested at -196C(-320F)
- Batch Managed Inventory

CONFORMANCES

AWS A5.9:	ER308/308L
ASME SFA-A5.9:	ER308/308L

TYPICAL APPLICATIONS

- LNG Storage
- Cryogenic Vessels and Piping

RECOMMENDED FLUX

Lincolnweld® P2007

TYPICAL BASE METALS

- 304L stainless steel
- 18/8 steels with service temperatures down to -196°C (-320°F)

DIAMETERS / PACKAGING

Diameter in	Diameter (mm)	55 lb (25 kg) Steel Coil
5/64	(2.0)	ED034914
3/32	(2.4)	ED034915
1/8	(3.2)	ED034916

MECHANICAL PROPERTIES[1]

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft▪lbf) -196°C (-320°F)	Lateral Expansion mils (mm) -196°C (-320°F)
Typical Results[3] As-Welded with Lincolnweld P2007	410 (59)	570 (82)	32	48 (36)	17 (0.43)

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M:*

	%C	%Cr	%Ni	%Mo	%Mn
Requirements AWS ER308/308L	0.03 max	19.5-22.0	9.0-11.0	0.75 max	1.0-2
Typical Results[3]	0.03	19.9	10.8	0.12	1.8
	%Si	**%P**	**%S**	**%Cu**	**FN**
Requirements AWS ER308/308L	0.30-0.65	0.03 max	0.03 max	0.75 max	Not required
Typical Results[3]	0.35	0.02	0.01	0.14	8-14

[1]Typical all weld metal [2]Measured with 0.2% offset [3]See test results disclaimer

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m³ maximum exposure guideline for general welding fume.

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LINCOLNWELD® 309LMo_MOD

Stainless ▪ AWS Similar to ER309LMo

KEY FEATURES

- Similar to 309 with the exception for the addition of 2.0 - 3.0% molybdenum to increase its pitting corrosion resistance in halide-containing environments
- Surfacing of base metals to improve their resistance to corrosion
- Used to achieve a single-layer overlay with a chemical composition similar to that of a 316L stainless steel
- Q2 Lot® - Certificates showing actual wire chemistry available online

CONFORMANCES

Similar to	
AWS A5.9/A5.9M:	Similar to ER309LMo
ISO 14343:2009:	23 12 2 L

TYPICAL APPLICATIONS

- Used for the first layer of multilayer overlays with filler metals such as 316L or 317L stainless steel

RECOMMENDED FLUXES

P2007, P2000

DIAMETERS / PACKAGING

Diameter in (mm)	55 lb (25 kg) Steel Spool
3/32 (2.4)	ED035171

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Mn
Requirements AWS ER309LMo	0.03 max	23.0 - 25.0	12.0 - 14.0	2.0 - 3.0	1.0 - 2.5
Typical Results[2]	0.01	22.3	15.0	2.6	1.40
	%Si	**%P**	**%S**	**%Cu**	**FN**
Requirements AWS ER309LMo	0.30 - 0.65	0.03 max	0.03 max	0.75 max	Not Required
Typical Results[2]	0.40	0.02	0.01	0.10	6 - 12

TYPICAL OPERATING PROCEDURES

Process	Diameter in (mm)	Voltage (volts)	Amperage	Gas
SAW	3/32 (2.4)	28-33	275-350	Lincolnweld® P2007

[1]Typical all weld metal. [2]See test results disclaimer

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m³ maximum exposure guideline for general welding fume.

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LINCOLNWELD® 310

Stainless ▪ AWS ER310

KEY FEATURES

- Austentic stainless for high temperatures and heat resistant applications
- Used for welding stainless steels of similar composition in cast and wrought forms
- The weld deposit is fully austenitic, low heat inputs required to prevent cracking
- Q2 Lot® - Certificates showing actual wire chemistry available online

CONFORMANCES

AWS A5.9/A5.9M:	ER310
ISO 14343: 2009:	(25 20)
MIL-E-19933E (SH)	MIL 310

TYPICAL APPLICATIONS

- Head shields
- Furnace parts
- Ducting

RECOMMENDED FLUXES

P2007, P2000

DIAMETERS / PACKAGING

Diameter in (mm)	55 lb (25 kg) Steel Spool
1/16 (1.6)	ED035172
3/32 (2.4)	ED035173

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Mn
Requirements AWS ER310	0.08 - 0.15	25.0 - 28.0	20.0 - 22.5	0.75 max	1.0 - 2.5
Typical Results[2]	0.11	27.1	21.0		1.90
	%Si	**%P**	**%S**	**%Cu**	**FN**
Requirements AWS ER310	0.30 - 0.65	0.03 max	0.03 max	0.75 max	Not Required
Typical Results[2]	0.40	0.01	0.003	0.04	

TYPICAL OPERATING PROCEDURES

Process	Diameter in (mm)	Voltage (volts)	Amperage	Gas
SAW	1/16 (1.6) 3/32 (2.4)	28-33	275-350	Lincolnweld® P2007

[1]Typical all weld metal. [2]See test results disclaimer

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m³ maximum exposure guideline for general welding fume.

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LINCOLNWELD® 309/309L

Stainless ▪ AWS ER309, ER309L

KEY FEATURES

- Designed to be used primarily with basic fluxes that recover nearly all of the wire chromium in the deposit
- Q2 Lot® - Certificate showing actual wire composition and calculated ferrite number (FN) available online
- Low carbon content recommended where there is a risk of intergranular corrosion
- Reduced carbon levels (0.03% max) that offers increased resistance to inter-granular corrosion

RECOMMENDED FLUXES

Lincolnweld® 801, 802, 880, 880M, 882, P2000, P2007, ST-100

CONFORMANCES

AWS A5.9/A5.9M:	ER309, ER309L
ASME SFA-A5.9:	ER309, ER309L
ABS:	ER309, ER309L
CWB/CSA W48-06:	ER309L
EN ISO 14343-B:	SS309L
ISO 14343:2009:	(23 12 L)
MIL-E-19933E (SH)	MIL 309

TYPICAL APPLICATIONS

- ASTM A743, A744 Types CF-8 and CF-3 and ASTM A240 Type 309S
- For joining carbon or mild alloy steel to austenitic stainless steels
- Can also be used on "18-8" steels, since it overmatches the corrosion resistance, if the weldment will not be exposed to temperatures of 538° C to 927° C (1000° F to 1700° F)
- Ideal for joining stainless steels to themselves or to carbon or low alloy steels, and can be used at temperatures up to 700°F (371°C)

DIAMETERS / PACKAGING

Diameter in	Diameter (mm)	55 lb (25 kg) Steel Spool	500 lb (227 kg) Speed Feed® Reel
5/64	(2.0)	ED033151	
3/32	(2.4)	ED035168	ED035167
1/8	(3.2)	ED035169	
5/32	(4.0)	ED035170	

MECHANICAL PROPERTIES[1] – *As Required per AWS A5.9/A5.9M*

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Ferrite Number
Test Results [3, 5] - As-Welded	400 (58)	575 (83)	35	8

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer [4]AWS Requirement for ER309 is 0.08% max. carbon.
[5]Results shown correspond with the recommended Lincolnweld® fluxes listed above, but not required per AWS A5.9-12.

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C[4]	%Cr	%Ni	%Mo	%Mn	%Si
Requirements - AWS ER309, ER309L	0.03 max	23.0 - 25.0	12.0 - 14.0	0.75 max	1.0 - 2.5	0.30 - 0.65
Typical Results[3]						
Wire Composition	0.02	23.9	13.0	0.15	1.8	0.50
All Weld Metal Composition[5]	0.03	23.1 - 23.6	13.0	0.15	1.5 - 2.0	0.50 - 0.80

TYPICAL OPERATING PROCEDURES

Diameter - in (mm)	Wire Feed Speed - in/min (m/min)	Voltage (volts)	Current (amps)
5/64 (2.0)	80-240 (2.0-6.1)	24-30	190-500
3/32 (2.4)	60-210 (1.5-5.3)	26-32	195-575
1/8 (3.2)	35-110 (0.9-2.8)	28-34	200-700
5/32 (4.0)	30-75 (0.8-1.9)	30-36	320-775

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer [4]AWS Requirement for ER309 is 0.08% max. carbon.
[5]Results shown correspond with the recommended Lincolnweld® fluxes listed above, but not required per AWS A5.9-12.

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m³ maximum exposure guideline for general welding fume.

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LINCOLNWELD® 316/316L

Stainless ▪ AWS ER316, ER316L

KEY FEATURES

- Designed to be used primarily with basic fluxes that recover nearly all of the wire chromium in the deposit
- Q2 Lot® - Certificate showing actual wire composition and calculated ferrite number (FN) available online
- Low carbon content recommended where there is a risk of intergranular corrosion
- The 2-3% molybdenum improves pitting corrosion resistance of the weld deposit
- Low carbon content reduces the possibility of carbide precipitation and intergranular corrosion

RECOMMENDED FLUXES

Lincolnweld® 801, 802, 880, 880M, 882, P2007, ST-100

CONFORMANCES

AWS A5.9/A5.9M:	ER316, ER316L
ASME SFA-A5.9:	ER316, ER316L
ABS:	ER316L
CWB/CSA W48-06:	SS316L
EN ISO 14343-B:	(19 12 3 L)
ISO 14343:2009:	ER316, ER316L
MIL-E-19933E (SH)	MIL 316L

TYPICAL APPLICATIONS

- ASTM A743, A744 Types CF-8 and CF-3
- Developed for welding type 316 and 316L stainless steels
- For joining the more common austenitic stainless steel grades referred to as "18-8" steels
- For very good corrosion resistance in acid environments
- Power Generation
- Chemical and Petrochemical Processing

DIAMETERS / PACKAGING

Diameter in	Diameter (mm)	55 lb (25 kg) Steel Coil	600 lb (272 kg) Speed Feed® Reel
1/16	(1.6)	ED035180	
5/64	(2.0)	ED035174	
3/32	(2.4)	ED035177	ED034479
1/8	(3.2)	ED035178	
5/32	(4.0)	ED035179	

MECHANICAL PROPERTIES[1] – *As Required per AWS A5.9/A5.9M*

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Ferrite Number
Test Results[3, 5] - As-Welded	380 (55)	550 (80)	42	9

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer [4]AWS Requirement for ER316 is 0.08% max. carbon.
[5]Results shown correspond with the recommended Lincolnweld® and Blue Max® fluxes listed above, but not required per AWS A5.9-93.

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C[4]	%Cr	%Ni	%Mo	%Mn	%Si
Requirements - AWS ER316, ER316L	0.03 max	18.0 - 20.0	11.0 - 14.0	2.0 - 3.0	1.0 - 2.5	0.30 - 0.65
Typical Results[3]						
As-Welded	0.02	19.0	11.9	2.2	1.8	0.50
All Weld Metal Composition[5]	0.02	17.8 - 18.4	11.9	2.2	1.6 - 2.0	0.50 - 0.80

TYPICAL OPERATING PROCEDURES

Diameter - in (mm)	Wire Feed Speed - m/min (in/min)	Voltage (volts)	Current (amps)
5/64 (2.0)	2.0-6.1 (80-240)	24-30	190-500
3/32 (2.4)	1.5-5.3 (60-210)	26-32	195-575
1/8 (3.2)	0.9-2.8 (35-110)	28-34	200-700
5/32 (4.0)	0.8-1.9 (30-75)	30-36	320-775

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer [4]AWS Requirement for ER316 is 0.08% max. carbon.
[5]Results shown correspond with the recommended Lincolnweld® and Blue Max® fluxes listed above, but not required per AWS A5.9-93.

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

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LINCOLNWELD® 316/316LCF

Stainless ▪ AWS ER316/316L

KEY FEATURES

- Controlled Low Ferrite (Range 3-5)
- Charpy V-Notch test results capable of exceeding 27 J (20 ft▪lbf) @ -196°C (-320°F)
- Exceeds 15 mils (0.38 mm) of lateral expansion @ -196°C (-320°F)
- Q2 Lot® - Certificate showing deposit composition, ferrite number, and charpy impact properties tested at -196C(-320F)
- Batch Managed Inventory

CONFORMANCES

AWS A5.9:	ER316/316L
ASME SFA-A5.9:	ER316/316L

TYPICAL APPLICATIONS

- LNG Storage
- Cryogenic Vessels and Piping

RECOMMENDED FLUX

Lincolnweld® P2007

TYPICAL BASE METALS

316L stainless steels

DIAMETERS / PACKAGING

Diameter in	Diameter (mm)	55 lb (25 kg) Steel Coil
5/64	(2.0)	ED034930
3/32	(2.4)	ED034931
1/8	(3.2)	ED034932

MECHANICAL PROPERTIES[1]

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft▪lbf) -196°C (-320°F)	Lateral Expansion mils (mm) -196°C (-320°F)
Typical Results[3] As-Welded with Lincolnweld P2007	420 (61)	610 (89)	43	53 (39)	20 (0.51)

[1]Typical all weld metal [2]Measured with 0.2% offset [3]See test results disclaimer

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m³ maximum exposure guideline for general welding fume.

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LINCOLNWELD® 317/317L

Stainless ▪ AWS ER317L

KEY FEATURES

- Weld deposit similar to 316L with a high molybdenum content for increased corrosion resistance
- Used for welding alloys with similar composition in high corrosive environments
- Q2 Lot® - Certificates showing actual wire chemistry available online

CONFORMANCES

AWS A5.9/A5.9M: ER317L
ISO 14343: 2009: (18 15 3 L)

TYPICAL APPLICATIONS

- Chemical Processing Plants
- Condensers
- Petrochemical
- Food Processing

RECOMMENDED FLUXES

P2007, P2000

DIAMETERS / PACKAGING

Diameter in (mm)	55 lb (25 kg) Steel Spool
3/32 (2.4)	ED035181
1/8 (3.2)	ED035182

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Mn
Requirements AWS ER317L	0.03 max	18.5 - 20.5	13.0 - 15.0	3.0 - 4.0	1.0 - 2.5
Typical Results[2]	0.01	18.9	13.7	3.5	1.4

	%Si	%P	%S	%Cu
Requirements AWS ER317L	0.30 - 0.65	0.03 max	0.03 max	0.75 max
Typical Results[2]	0.45	0.01	0.008	0.08

TYPICAL OPERATING PROCEDURES

Diameter in (mm)	Voltage (volts)	Amperage	Gas
3/32 (2.4)	28-33	275-350	Lincolnweld® P2007
1/8 (3.2)	29-32	350-450	

[1]Typical all weld metal. [2]See test results disclaimer

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m³ maximum exposure guideline for general welding fume.

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LINCOLNWELD® 320LR

Stainless ▪ AWS ER320LR

KEY FEATURES

- Excellent corrosion resistance in highly acidic environments
- Q2 Lot® - Certificates showing actual wire chemistry available online

RECOMMENDED FLUXES

P2007, P2000

CONFORMANCES

AWS A5.9/A5.9M: ER320LR
ASME SFA-5.9: ER320LR

TYPICAL APPLICATIONS

- Tanks
- Process Piping
- Heat Exchangers
- Typically used for welding base metals with similar compositions including alloy 20

DIAMETERS / PACKAGING

Diameter in (mm)	55 lb (25 kg) Steel Spool
3/32 (2.4)	ED035183

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Mn
Requirements AWS ER320LR	0.025 max	19.0 - 21.0	32.0 - 36.0	2.0 - 3.0	1.5 - 2.0
Typical Results[2]	0.003	20.1	33.3	2.4	1.7
	%Si	**%P**	**%S**	**%Cu**	**%Nb**
Requirements AWS ER320LR	0.15 max	0.015 max	0.02 max	3.0 - 4.0	Required 8 x C / 1.0 max
Typical Results[2]	0.01	0.010	0.001	3.3	0.22

TYPICAL OPERATING PROCEDURES

Process	Diameter in (mm)	Voltage (volts)	Amperage	Gas
SAW	3/32 (2.4)	29-32	350-450	Lincolnweld® P2007

[1]Typical all weld metal. [2]See test results disclaimer

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m³ maximum exposure guideline for general welding fume.

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LINCOLNWELD® 347

Stainless ▪ AWS ER347

KEY FEATURES

- The addition of niobium reduces intergranular corrosion in severe operating conditions
- Q2 Lot® - Certificates showing actual wire chemistry available online

CONFORMANCES

AWS A5.9/A5.9M:	ER347
ISO 14343: 2009:	(19 9 Nb)
ASME SFA-5.9:	ER347
MIL-E-19933E (SH)	MIL 347

TYPICAL APPLICATIONS

- Food Processing
- Pharmaceutical Equipment
- Niobium stabilized stainless steel electrodes used for the welding of types 347 and 321 stainless and stainless clad steels

RECOMMENDED FLUXES

P2000

DIAMETERS / PACKAGING

Diameter in (mm)	55 lb (25 kg) Steel Spool	500 lb (227 kg) Speed Feed® Reel
3/32 (2.4)	ED035185	ED035184
1/8 (3.2)	ED035186	

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Nb + Ta
Requirements AWS ER347	0.08 max	19.0 - 21.5	9.0 - 11.0	0.75 max	10 x C - 1.0
Typical Results[2]	0.03	19.5	9.3	0.25	0.60
	%Mn	**%Si**	**%P**	**%S**	**%Cu**
Requirements AWS ER347	1.0 - 2.5	0.30 - 0.65	0.03 max	0.03 max	0.75 max
Typical Results[2]	1.7	0.45	0.01	0.007	0.10

TYPICAL OPERATING PROCEDURES

Process	Diameter in (mm)	Voltage (volts)	Amperage	Flux
SAW	3/32 (2.4) 1/8 (3.2)	28-33 29-32	275-350 350-450	Lincolnweld® P2000

[1]Typical all weld metal. [2]See test results disclaimer

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

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LINCOLNWELD® 385

Stainless ▪ AWS ER385

KEY FEATURES

- Weld metal is fully austenitic and must be done with low heat input using a stringer bead technique
- Q2 Lot® - Certificates showing actual wire chemistry available online

CONFORMANCES

AWS A5.9/A5.9M:	ER385
UNS:	N08904
ISO 14343: 2009:	(20 25 5 Cu L)
ASME SFA-5.9:	ER385

RECOMMENDED FLUXES

P2000, P2007

TYPICAL APPLICATIONS

- Welding 904L Stainless Steel
- Sulfuric and Phosphoric Acid Storage Vessels

DIAMETERS / PACKAGING

Diameter in (mm)	55 lb (25 kg) Steel Spool
3/32 (2.4)	ED035187

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Mn
Requirements AWS ER385	0.025 max	19.5 - 21.5	24.0 - 26.0	4.2 - 5.2	1.0 - 2.5
Typical Results[2] Lincolnweld® 385	0.010	19.9	25.0	4.2	1.8
	%Si	**%P**	**%S**	**%Cu**	
Requirements AWS ER385	0.50 max	0.02 max	0.03 max	1.2 - 2.0	
Typical Results[2] Lincolnweld® 385	0.3	0.01	0.001	1.4	

TYPICAL OPERATING PROCEDURES

Diameter in (mm)	Voltage (volts)	Amperage	Flux
3/32 (2.4)	28-33	275-350	Lincolnweld® P2000

[1]Typical all weld metal. [2]See test results disclaimer

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

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LINCOLNWELD® 410NiMo

Stainless ▪ AWS ER410NiMo

KEY FEATURES

- Used to overlay mild and low alloy steels
- Preheat and inter-pass temperatures of 300°F (150°C) or greater are recommended during welding
- Post-weld heat treatment should not exceed 1150°F (620° C) as higher temperatures may result in hardening
- Q2 Lot® - Certificates showing actual wire chemistry available online

RECOMMENDED FLUXES

P2007, P2000

CONFORMANCES

AWS A5.9/A5.9M:	ER410NiMo
ISO 14343: 2009:	(13 4)
ASME SFA-5.9	ER410NiMo

TYPICAL APPLICATIONS

- Turbines
- Valve Bodies
- High Pressure Piping
- Offshore
- Power Generation
- High Pressure Piping
- Designed to weld materials of similar chemical composition in cast and wrought forms
- CAGNM Material

DIAMETERS / PACKAGING

Diameter in (mm)	55 lb (25 kg) Steel Spool
1/8 (3.2)	ED035188

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Mn
Requirements AWS ER410NiMo	0.06 max	11.0 - 12.5	4.0 - 5.0	0.4 - 0.7	0.6 max
Typical Results[2]	0.02	11.7	4.7	0.5	0.2

	%Si	%P	%S	%Cu
Requirements AWS ER410NiMo	0.5 max	0.03 max	0.03 max	0.75 max
Typical Results[2]	0.2	0.01	0.002	0.06

TYPICAL OPERATING PROCEDURES

Diameter in (mm)	Voltage (volts)	Amperage	Flux
1/8 (3.2)	29-32	350-450	Lincolnweld® P2000

[1]Typical all weld metal. [2]See test results disclaimer

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LINCOLNWELD® 630

Stainless ▪ AWS ER630

KEY FEATURES

- Precipitation hardening martenstic stainless steel covered electrode used for welding materials of similar chemical composition such as 17-4 and 17-7
- Can be used in the as welded condition or may be heat treated to obtain higher strength
- Mechanical properties of the alloy are greatly influenced by the heat treatment
- Q2 Lot® - Certificates showing actual wire chemistry available online

RECOMMENDED FLUXES

P2007, P2000

CONFORMANCES

AWS A5.9/A5.9M:	ER630
UNS:	S17480
ASME SFA-5.9:	ER630

TYPICAL APPLICATIONS

- Hydraulic Equipment Components
- Impellers
- Pump Shafts
- 17-4 PH Stainless Steel

DIAMETERS / PACKAGING

Diameter in (mm)	500 lb (227 kg) Speed-Feed® Reel
3/32 (2.4)	ED035189

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Nb
Requirements AWS ER630	0.05 ma	16.00 - 16.75	4.5 - 5.0	0.75 max	0.15 - 0.30
Typical Results[2] Lincolnweld® 630	0.03	16.5	4.8	0.2	0.22
	%Mn	**%Si**	**%P**	**%S**	**%Cu**
Requirements AWS ER630	0.25 - 0.75	0.75 max	0.03 max	0.03 max	3.25 - 4.0
Typical Results[3] Lincolnweld® 630	0.54	0.43	0.02	0.02	3.6

TYPICAL OPERATING PROCEDURES

Process	Diameter in (mm)	Voltage (volts)	Amperage	Gas Flow	Flux
SAW	3/32 (2.4)	-	-	-	Lincolnweld® P2000

[1]Typical all weld metal. [2]See test results disclaimer

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LINCOLNWELD® 2209

Stainless ▪ AWS ER2209

KEY FEATURES

- The welds offer excellent resistance to stress corrosion, cracking and pitting
- The microstructure of the weld metal consists of austenite and ferrite
- The ferrite content of the weld metal will be lower than the ferrite content of type 2205 base metal
- Q2 Lot® - Certificates showing actual wire chemistry available online

CONFORMANCES

AWS A5.9/A5.9M:	ER2209
ISO 14343:2009:	(22 9 3 N L)
ASME SFA-5.9	ER2209

TYPICAL APPLICATIONS

- Offshore
- Oil and Gas
- Chemical
- Petrochemical
- Used to weld duplex stainless steels such as (Type 2205)

RECOMMENDED FLUXES

P2000

DIAMETERS / PACKAGING

Diameter in (mm)	55 lb (25 kg) Steel Spool
3/32 (2.4)	ED035154
1/8 (3.2)	ED035155

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Mn	%Si
Requirements AWS ER2209	0.03 max	21.5 - 23.5	7.5 - 9.5	2.5 - 3.5	0.5 - 2.0	0.90 max
Typical Results[2]	0.01	22.7	8.5	3.0	1.4	0.4
	%P	**%S**	**%N**	**%Cu**	**FN**	
Requirements AWS ER2209	0.03 max	0.03 max	0.08 - 0.20	0.75 max	Not Required	
Typical Results[2]	0.01	0.001	0.15	0.06	30 - 60	

TYPICAL OPERATING PROCEDURES

Process	Diameter in (mm)	Voltage (volts)	Amperage	Flux
SAW	3/32 (2.4) 1/8 (3.2)	28-33 29-32	275-350 350-450	Lincolnweld® P2000

[1]Typical all weld metal. [2]See test results disclaimer

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LINCOLNWELD® 2594

Stainless ▪ AWS ER2594

KEY FEATURES

- A super-duplex grade electrode that provides matching chemistry and mechanical property characteristics to wrought super-duplex alloys such as 2507 and Zeron 100, as well as to super-duplex casting alloys (ATSM A890)
- The electrode is over-alloyed 2-3% in nickel to provide the optimum ferrite/austenite ratio in the finished weld resulting in high tensile and yield strength and superior resistance to stress corrosion, cracking (SCC) and pitting corrosion
- Q2 Lot® - Certificates showing actual wire chemistry available online

CONFORMANCES

AWS A5.9/A5.9M: ER2594

ISO 14343:2009: 25 9 4 N L

TYPICAL APPLICATIONS

- Process Pipework
- Pumps and Valves
- Pressure Vessels
- 2507
- Zeron 100

RECOMMENDED FLUXES

P2000

DIAMETERS / PACKAGING

Diameter in (mm)	55 lb (25 kg) Steel Spool
3/32 (2.4)	ED035156
1/8 (3.2)	ED035157

WIRE COMPOSITION[1] – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Mn	%Si
Requirements AWS ER2594	0.03 max	24.0 - 27.0	8.0 - 10.5	2.5 - 4.5	2.5 max	1.0 max
Typical Results[2]	0.02	24.6	8.6	3.8	0.8	0.3
	%P	**%S**	**%N**	**%Cu**	**%W**	**FN**
Requirements AWS ER2594	0.03 max	0.02 max	0.20 - 0.30	1.5 max	1.00 max	Not Required
Typical Results[2]	0.02	0.01	0.25	0.01	0.01	30 - 60

TYPICAL OPERATING PROCEDURES

Process	Diameter in (mm)	Voltage (volts)	Amperage	Flux
SAW	3/32 (2.4) 1/8 (3.2)	28-33 29-32	275-350 350-450	Lincolnweld® P2000

[1]Typical all weld metal. [2]See test results disclaimer

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ER16.8.2

Stainless ▪ AWS ER16-8-2

KEY FEATURES

- Solid wire developed to weld 3XXH grades of stainless steel
- Designed with 0.04-0.10% carbon to create a creep, oxidation, and corrosion resistant solid wire
- Engineered with controlled carbon levels and ferrite content for high resistance to thermal embrittlement
- A lean composition and controlled ferrite content provides useful cryogenic toughness down to -196°C (-321°F)

CONFORMANCES

AWS A5.9	ER16-8-2
BS EN ISO 14343-A	16 8 2
BS EN ISO 14343-B	SS16-8-2

TYPICAL APPLICATIONS

- Gas & Steam Turbines
- Petrochemical & Chemical Industries
- Power Generation Industry
- Steam Piping
- Catalytic Crackers

DIAMETERS / PACKAGING

Diameter mm	25 kg (55.1 lb) Coil
2.4	SAER1682-24

MECHANICAL PROPERTIES[1] – *As Required per AWS A5.9*

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf) @-196°C (-321°F)
Requirements AWS ER16-8-2	-	-	-	-
Typical Results[3] As-Welded	360 (52)	630 (91)	29 min	30

DEPOSIT COMPOSITION[1] – *As Required per AWS A5.9*

	%C	%Mn	%Si	%S	%P
Requirements AWS ER16-8-2	0.04-0.10	1.0-2.0	0.3-0.6	0.02 max	0.03 max
Typical Results[3]	0.06	1.4	0.4	0.01	0.01
	%Cr	**%Ni**	**%Mo**	**%Cu**	
Requirements AWS ER16-8-2	14.5-16.5	7.5-9.5	1.0-2.0	0.3 max	
Typical Results[3]	15.5	8.5	1.3	0.1	

TYPICAL OPERATING PROCEDURES

Diameter in (mm)	Polarity	Amperage	Voltage
3/32 (2.4)	DC+	350A	30V

[1] Typical all weld metal [2] Measured with 0.2% offset [3] See test results disclaimer

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