

# Stainless Steel Stick Electrodes

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**AC-DC/Sterling AP/Smootharc Plus (-16)** Ideal multipurpose stainless electrodes provide smooth, uniform and finely rippled weld beads that require minimal finishing. AC-DC/Sterling AP electrodes perform well on AC or DCEP and possess outstanding out-of-position capabilities and good strike and restrike characteristics.

**Sterling® (-17)** A superb family of spray transfer electrodes that produces attractive, finely rippled concave weld beads. Sterling electrodes operate well in all positions, on AC or DCEP, with self-peeling slag and excellent restrike characteristics. The direct spray arc transfer is extremely stable and exhibits higher deposition rates with little spatter.

Hobart Product	AWS Class	Smootharc Plus/ AC-DC/Sterling AP -16	Sterling -17
308/308H	E308 & E308H	•	•
308L	E308L	•	•
309	E309	•	•
309L	E309L	•	•
310	E310	•	○
312	E312	•	○
316/316H	E316 & E316H	•	•
316L	E316L	•	•
317L	E317L	•	•
347	E347	•	•
410	E410	•	○
410NiMo	E410NiMo	•	○
2209	E2209	•	○

• Offered                      ○ Not Offered

NOTE: Actual certs are included in every master carton of stainless stick electrodes at no charge.

## 308/308H Sterling® AP 308/308H Sterling®

### AWS E308-16, E308H-16

For applications where service conditions are not severe. Intermediate layer prior to deposition of hard-facing material. Use on Types 301, 302, 304, 305, and 308 base metals. Approvals and conformance: AWS Spec A5.4, ASME SFA5.4 (F-5, A-8)

### Typical Deposit Analysis %

Carbon .....0.06  
Manganese .....1.14  
Silicon .....0.44  
Chromium .....19.88  
Nickel .....9.78  
Iron .....Balance

### Typical Properties and Ferrite Number of Weld Deposit as Welded

Tensile Strength (psi)    86,000 (593 MPa)  
Yield Strength (psi)     65,000 (448 MPa)  
Elongation in 2"        45%  
DeLong Ferrite Number    7

## 308/308L Sterling® AP 308/308L Sterling® 308L Smootharc™ Plus

### AWS E308, E308L-16, E308L-17

For welding Type 308L. Properties similar to Type 308 with low C to avert carbide precipitation and inhibit subsequent carbide precipitation. Approvals and conformance: AWS Spec A5.4, ASME SF5.4 (F-5, A-8)

### Typical Deposit Analysis %

Carbon .....0.03  
Manganese .....1.14  
Silicon .....0.43  
Chromium .....19.68  
Nickel .....9.89  
Iron .....Balance

### Typical Properties and Ferrite Number of Weld Deposit as Welded

Tensile Strength (psi)    83,000 (572 MPa)  
Yield Strength (psi)     64,000 (441 MPa)  
Elongation in 2"        37%  
DeLong Ferrite Number    9

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## 309 (H) Sterling® AP

### AWS E309-16, E309H-16

The moisture resistant, all-position 309 (H) Sterling® AP electrode is primarily designed for welding Type 309 metal but can also be used for 18-8 clad steels or dissimilar materials if the alloy content is sufficiently high for a sound, ductile deposit. It yields a uniform weld bead that is flat to slightly convex. AWS Spec A5.4, ASME SF5.4 (F-5, A-8)

#### Typical Deposit Analysis %

Carbon .....	0.08
Chromium .....	23.50
Nickel.....	13.00
Molybdenum.....	0.10
Manganese .....	1.05
Phosphorus .....	0.020
Sulfur.....	0.016
Copper .....	0.10

#### Typical Properties and Ferrite Number of Weld Deposit as Welded

Tensile Strength (psi)	88,000 (607 MPa)
Yield Strength (psi)	67,000 (462 MPa)
Elongation in 2"	37%
DeLong Ferrite Number	6-15

## 309/309L Sterling® AP 309/309L Sterling® 309L Smootharc™ Plus

### AWS E309, E309L-16, E309L-17

Low C modification of standard Type 309 analysis used for weld overlay or welding stainless to mild or low alloy steels. Approvals and conformance: AWS Spec A5.4, ASME SFA5.4 (F-5, A-8)

#### Typical Deposit Analysis %

Carbon .....	0.03
Manganese .....	1.32
Silicon .....	0.41
Chromium .....	23.00
Nickel.....	13.50
Iron.....	Balance

#### Typical Properties and Ferrite Number of Weld Deposit as Welded

Tensile Strength (psi)	79,000 (545 MPa)
Yield Strength (psi)	64,000 (441 MPa)
Elongation in 2"	41%
DeLong Ferrite Number	13

## 309Mo 309MoL AC-DC

### AWS E309Mo-16, E309MoL-16

The addition of molybdenum to the 309 improves tensile strength and resistance. Used for 316 clad steels and joining Mo-containing steels to carbon steels: AWS Spec A5.4, ASME SF5.4 (F-5, A-8)

#### Typical Deposit Analysis %

Carbon .....	0.03
Manganese .....	1.23
Silicon.....	0.44
Chromium .....	22.70
Nickel.....	13.60
Molybdenum.....	2.40
Iron .....	Balance

#### Typical Properties and Ferrite Number of Weld Deposit as Welded

Tensile Strength (psi)	90,000 (621 MPa)
Yield Strength (psi)	70,000 (483 MPa)
Elongation in 2"	35%
DeLong Ferrite Number	13

## 310 AC-DC

### AWS E310-16

For welding base metal of similar composition, when the stainless base metal is of unknown composition, and for dissimilar metals. Used as a transition layer for high restrained joints of high carbon steels. Approvals and conformance: AWS Spec A5.4, ASME SFA5.4 (F-5, A-9)

#### Typical Deposit Analysis %

Carbon .....	0.14
Manganese .....	2.02
Silicon .....	0.46
Chromium .....	26.12
Nickel.....	21.00
Iron .....	Balance

#### Typical Properties and Ferrite Number of Weld Deposit as Welded

Tensile Strength (psi)	86,000 (593 MPa)
Yield Strength (psi)	63,000 (434 MPa)
Elongation in 2"	40%
DeLong Ferrite Number	0

## 312 AC-DC

### AWS E312-16

Welding Type 312 base metals. Excellent for dissimilar metal joining due to high ferrite potentials. Approvals and conformance: AWS Spec A5.4, ASME SFA5.4 (F-5, 4-8)

#### Typical Deposit Analysis %

Carbon .....	0.07
Manganese .....	0.80
Silicon.....	0.40
Chromium .....	28.50
Nickel.....	9.10
Iron .....	Balance

#### Typical Properties and Ferrite Number of Weld Deposit as Welded

Tensile Strength (psi)	115,000 (793 MPa)
Yield Strength (psi)	95,000 (655 MPa)
Elongation in 2"	25%
DeLong Ferrite Number	45

## 316/316H Sterling® AP 316/316H Sterling®

### AWS E316-16, E316H-16, E316-17, E316H-17

For welding Type 316 steel. Applies where increased high temperature corrosion resistance of molybdenum-bearing steels are necessary. Low FN version. Approvals and conformance: AWS Spec A5.4, ASME SFA5.4 (F-5, A-8)

#### Typical Deposit Analysis %

Carbon .....	0.07
Manganese .....	1.63
Silicon.....	0.40
Chromium .....	18.50
Nickel.....	12.40
Molybdenum.....	2.21
Iron .....	Balance

#### Typical Properties and Ferrite Number of Weld Deposit as Welded

Tensile Strength (psi)	85,000 (586 MPa)
Yield Strength (psi)	68,000 (469 MPa)
Elongation in 2"	45%
DeLong Ferrite Number	4

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## 316/316L Sterling® AP 316/316L Sterling® 316L Smootharc™ Plus

### AWS 316, E316L-16, E316L-17

Welding Type 316L material. Properties similar to Type 316. Suited for urea environments. Approvals and conformance: AWS Spec A5.4, ASME SFA5.4 (F-5, A-8)

#### Typical Deposit Analysis %

Carbon .....	0.02
Manganese .....	1.55
Silicon .....	0.48
Chromium .....	18.20
Nickel.....	13.00
Molybdenum.....	2.27
Iron .....	Balance

#### Typical Properties and Ferrite Number of Weld Deposit as Welded

Tensile Strength (psi)	82,000 (565 MPa)
Yield Strength (psi)	61,000 (421 MPa)
Elongation in 2"	42%
DeLong Ferrite Number	2

## 317L AC-DC

### AWS E317L-16, E317L-17

Increased molybdenum content results in higher tensile strength, better corrosion resistance, and improved high temperature creep strength when compared with 316L. Approvals and conformance: AWS Spec A5.4, ASME SFA5.4 (F-5, A-8)

#### Typical Deposit Analysis %

Carbon .....	0.03
Manganese .....	1.21
Silicon .....	0.51
Chromium .....	18.80
Nickel.....	13.70
Molybdenum.....	3.40
Iron .....	Balance

#### Typical Properties and Ferrite Number of Weld Deposit as Welded

Tensile Strength (psi)	92,000 (634 MPa)
Yield Strength (psi)	69,000 (476 MPa)
Elongation in 2"	35%
DeLong Ferrite Number	4

## 347 AC-DC

### AWS E347-16

Metal stabilized with columbium prevents carbide precipitation. Better corrosion resistance than Type 308. For welding Types 347 and 321 steels. Good corrosion resistance in steam or utility applications up to 1400°F. Approvals and conformance: AWS Spec A5.4, ASME SFA5.4 (F-5, A-8)

#### Typical Deposit Analysis %

Carbon .....	0.06
Manganese .....	1.19
Silicon .....	0.46
Chromium .....	20.24
Nickel.....	10.00
Columbium.....	0.60
Iron .....	Balance

#### Typical Properties and Ferrite Number of Weld Deposit as Welded

Tensile Strength (psi)	80,000 (552 MPa)
Yield Strength (psi)	64,000 (441 MPa)
Elongation in 2"	36%
DeLong Ferrite Number	10

## 410 AC-DC

### AWS E410-16

Air-hardening stainless for welding 12 Cr material. Requires pre and post-weld heat treatments. Approvals and conformance: AWS Spec A5.4, ASME SFA5.4 (F-5, A-8)

#### Typical Deposit Analysis %

Carbon .....	0.09
Manganese .....	0.55
Silicon .....	0.29
Chromium .....	12.30
Iron .....	Balance

#### Typical Properties and Ferrite Number of Weld Deposit as Welded (Heat Treated for 1 hr. @ 1375°F)

Tensile Strength (psi)	80,000 (552 MPa)
Yield Strength (psi)	44,000 (303 MPa)
Elongation in 2"	24%

## 410NiMo AC-DC

### AWS E410NiMo-16

Used extensively for welding ASTM CA6NM castings as well as 410, 410S and 405 base metals. Better as-welded toughness than 410. Approvals and conformance: AWS Spec A5.4, ASME SFA5.4 (F-5, A-8)

#### Typical Deposit Analysis %

Carbon .....	0.02
Manganese .....	0.68
Silicon .....	0.35
Chromium .....	12.48
Nickel.....	4.30
Molybdenum.....	0.55
Iron .....	Balance

#### Typical Properties and Ferrite Number of Weld Deposit as Welded (Stress Relieved for 1 hr. @ 1125°F)

Tensile Strength (psi)	134,000 (924 MPa)
Yield Strength (psi)	123,000 (848 MPa)
Elongation in 2"	18%

## 2209 AC-DC

### AWS E2209-16

Specially formulated for welding the 22 Cr-5 Ni-3 Mo (Type 2205) duplex stainless steels. The deposited duplex weld metal offers combined high strength with improved pitting and SSC resistance. Approvals and conformance: AWS Spec A5.4, ASME SFA5.4 (F-5, A-8)

#### Typical Deposit Analysis %

Carbon .....	0.03
Manganese .....	1.01
Silicon .....	0.38
Chromium .....	22.90
Nickel.....	10.10
Molybdenum.....	3.00
Nitrogen .....	0.093
Iron .....	Balance

#### Typical Properties and Ferrite Number of Weld Deposit as Welded

Tensile Strength (psi)	115,000 (793 MPa)
Yield Strength (psi)	90,000 (621 MPa)
Elongation in 2"	27%
DeLong Ferrite Number (Extended)	34
Impact Strength, -50°F (Charpy v Notch)	23 ft.lbf